Liminal Communities:
An Infrastructure for Identity and Belonging in Planned Resource Towns

by

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CONTENTS

ABSTRACT

Following the economic crisis of 2008, residents of Mackenzie, a remote forestry town in British Columbia, watched as all six local mills closed – putting their economy on pause and forcing nearly a quarter of residents to leave. The 'instant town' was established in 1966 to house forestry workers, and was strategically planned to prevent it becoming a private 'company town'. Despite its planning, Mackenzie remains completely dependent on its initial industry and lacks local control – characteristics shared by many Canadian resource towns. This thesis imagines how architecture and urbanism can facilitate their economic renewal through 'place-based' community development and an investment in their capacity to plan, lead, and leverage existing assets. While exploring how planned resource settlements can better express local identities and become places of permanence, the design strategy attempts to integrate industry, community, and the environment through a transformative biomass district heating system, greenway network, and town centre.

GLOSSARY

Resource Town:

A community which is economically dependent on a single employer or industry for employment and purpose. Also referred to as a *single-industry town* and includes specific typologies such as the *company town* and *instant town*.

Liminality:

An in-between or transitional phase, such as adolescence, associated with a lack or mix of identities.

Community:

A social collective with shared outcomes and identities.

Settlement:

A place of inhabitation where people establish a community.

Place:

A distinct fragment of the world, informed by the physical form, social activity, and mental image of a space.

Placelessness:

Lacking a sense of place; an inauthentic place which lacks integration with local communities, history, or ecology.

Belonging:

The sense of attachment to a specific place or community, encouraged by the authenticity of a place and engagement with a community.

Sustainable Forestry:

Holistic forest management based on closed-loop, renewable practices, simultaneously supporting biodiversity, recreation, and industry.

ACKNOWLEDGEMENTS

CHAPTER 1: INTRODUCTION

Liminal Communities

In the field of cultural anthropology, *liminality* describes an in-between or transitional period, such as adolescence, when someone no longer identifies as a child but is not yet an adult. During liminal phases, an individual is experiencing a transition, but cannot yet understand who they will be or what position they will hold in society when they transcend it. This can be a challenging time, as the individual has a mix, or lack, of identity. These rites of passage are familiar to most individuals, regarded as a fundamental human phenomenon, but what does liminality have to do with communities, urbanism, or architecture?

We have become accustomed to the idea of personal identity, and recognizing that an understanding of it is important for our emotional well-being. We are less conscious of our collective identities and how the built environment can embody or reinforce them. Just like our personal identities, they also change, can be difficult to understand, but are crucial for our emotional well-being and ability to form authentic connections with a place (Relph 1976, 59-61, 67).

The topic of this thesis, the *planned resource town,* is a distinct form of settlement. They are small, often rural places, which have been intentionally built to house the workforce of a resource operation; the mine-towns, mill-towns, and places of work which make up much of the Canadian frontier. A long history of Canadian resource development has resulted in over two hundred resource-dependent communities spread across the country, including private 'company towns' as well as government supported settlements (Figure 1).

200+

RESOURCE-DEPENDENT
COMMUNITIES IN CANADA

Resource Dependence

10%   40%

Mining / Oil / Gas

Metals

Pulp / Paper

Forestry

Fishing / Food
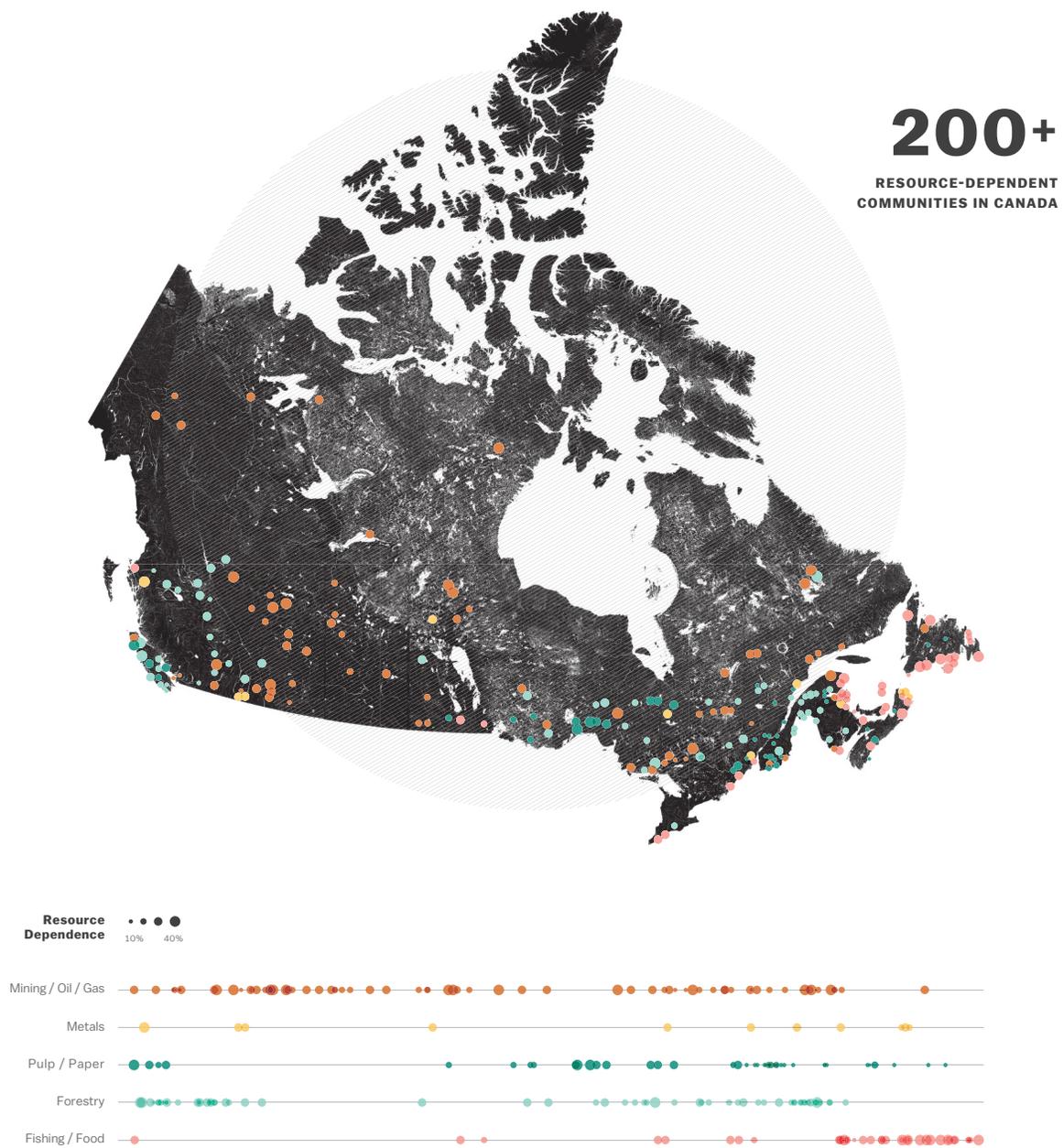
Figure 1

Canadian resource dependent communities. Adapted from Randall and Ironside (1996, 25). Background map by Joy Charbonneau (2018).

The notion of *settlement* — where people establish a community and build a place of inhabitation — is why planned resource towns first became of interest. The act of creating modern settlements raises many questions about how we inhabit the landscape and create 'place', a topic which has fascinated architects for centuries. How do settlements develop a sense of permanence and emotional significance? Of course, no city is ever permanent, as they continue to evolve and reflect their communities. However, the word "settlement" carries with it the connotation of intention and longevity, built for a geographic, economic, or social purpose. The distinctions of a place are what characterize its identity over time, and through the act of dwelling, a place can become 'home', a part of one's identity (Relph 1976, 39).

Planned resource towns are an interesting form of settlement because they present the challenge of establishing community in a place which was built for a single purpose and often lacks the economic stability needed to nurture communities of permanence. Built to house the workers of a company or industry, resource towns share a structural economic dependence on their parent industry. The identity of the community is often tied to their industry as well. The prospect of work draws people to resource towns, but cyclical economic crises regularly drive them back out. What is it that makes some determined to stay and how can they be encouraged to diversify their economies?

Like adolescents, many resource towns can be thought of as being in a liminal phase of development, needing to move from a state of dependence to autonomy. The transition from settlement to place of belonging can be challenging and unpredictable, requiring that their efforts be supported

through infrastructure which builds community capacity (Markey et al. 2012, 67). Reflecting on the characteristics protracting their struggle for security and identity can help us to understand the universal importance of place and belonging in all forms of human settlement.

Many of our young towns and cities also struggle with the process of building cultural heritage and the layers of identity which can be taken for granted in older cities. In the modern age, incremental settlement has given way to 'development' — perhaps a similar act of inhabitation, but in the form of less flexible planned communities and driven by market speculation. The master-planned townsites of resource communities are a good example of the common disconnect between the modern built environment, community identity, and the natural environment, or as Charles Moore puts it, "the disappointing sense of nowhere in some of our newer cities" (Moore et al. 2001, 93).

Figure 2

Place branding is a common strategy for communities seeking to express identity. Photo from *Everything Churchill*.

For over a century, planned resource-towns have enabled architects and planners to design settlements in their entirety, testing various urban theories in response to social problems of the day. Many post-war town designs also sought to solve inherently structural problems, such as single-resource dependence, company control over town life, and their ability to retain workers and build communities of permanence. The typology and evolution of resource towns is explored further in Chapter Two in order to select a site for further study in Chapter Three.

It can be difficult to evaluate whether design decisions have significantly influenced a particular towns ability to attract and retain residents, especially in a turbulent economic

environment where the loss of a major employer likely trumps the most charming streetscapes in a family's decision to stay (Halseth and Sullivan 2003, 154). What master plans and utopian visions have demonstrated, is that solutions cannot rely on top-down design or policy decisions. How to empower local communities and allow them to shape more representative places is a broadly applicable question.

Resource towns throughout the country have demonstrated a need to diversify their economies, and economic renewal has proven to be more effective through strategic planning and foresight than in response to a crisis or the loss of industry (Halseth and Sullivan 2003, 154). To develop an effective framework for their economic renewal, we need to understand why some communities have been successful, while others have collapsed into ghost towns or poverty. In Chapter Four, a methodology for place-based economic renewal is introduced alongside specific case studies before developing the design proposal in Chapter Five.

Architecture and Place

Architects have long theorized how the built environment and the ordering of space are influenced by, and in turn, influence our society. To understand the role of architecture in expressing local identities and encouraging community belonging we must first explore the concept of *place*.

> There are two major reasons for attempting to understand the phenomenon of place. First, it is interesting in its own right as a fundamental expression of man's involvement in the world; and second, improved knowledge of the nature of place can contribute to the maintenance and manipulation of existing places and the creation of new places. (Relph 1976, 44)

Edward Relph defines 'place' as a distinct fragment of the world, which serves as a "profound centre of human existence" (Relph 1976, 42-3). Places do not stand in isolation, they hold different identities depending on the scale of observation (Figure 3). The identity of a place is not reducible to a physical location, but is informed by three components: physical form and appearance, social activities and functions, and mental images or cultural symbolism (Relph 1976, 61). Presumably, any piece of the world we experience has a physical form, harbours activities, and elicits mental connotations, so how are we to distinguish somewhere as a *profound centre of human existence*? Relph argues that to differentiate places of significance — authentic places — they must represent a focused concentration of our intentions and order our experiences (Relph 1976, 43).
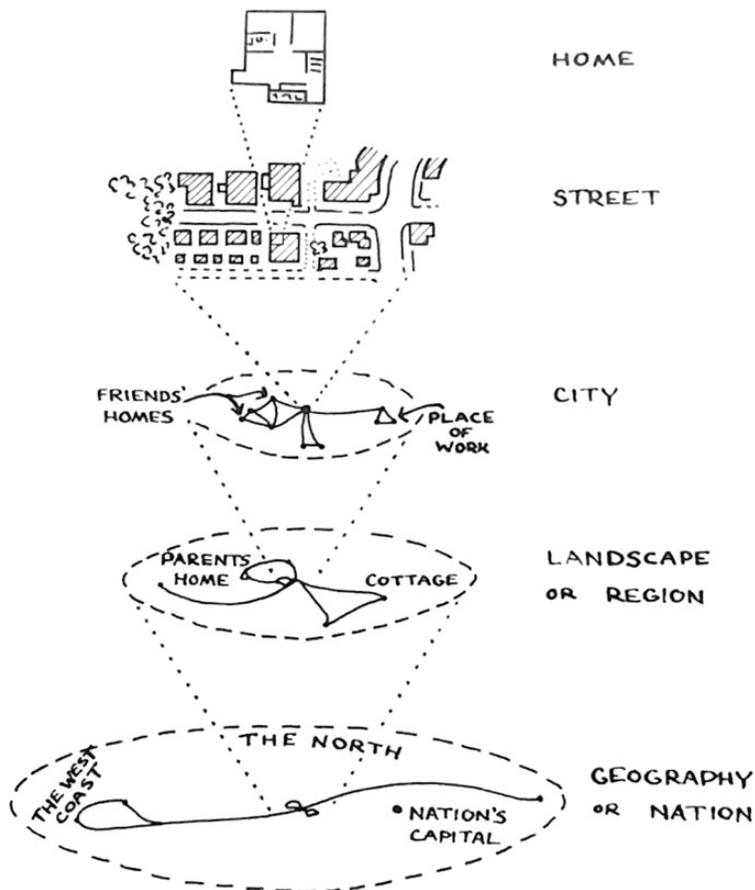
Figure 3

Various scales of existential space explored in their "vertical structure", based on an analysis by Norberg-Schulz (Relph 1976, 21).

> Our magazines are filled with handsome photographs of buildings. But, with all this, our environment grows messier, more chaotic, more out of touch with the natural world and inimical to human life. (Moore et al. 2001, 88)

Recently created environments often lack this focused intention or are built in service of abstract ideologies unrelated to local cultures. Norberg-Schulz described this meaningless, monotonous construction as a *flatscape*, whereas Relph describes the quality of *placelessness*, or lacking a sense of place (Norberg-Schulz 1969) (Relph 1976, 79). Sprawling suburbia and faceless condominium towers are both examples of placelessness, both an inauthentic backdrop ignorant of the rich and diverse communities inhabiting them. Utilitarian construction is more efficient to build under modern economic forces and therefore defines our often placeless modern settlements.

The problem with purely functional and placeless environments, other than their lack of character and delight, is that they are not conducive for human belonging, a prerequisite for building stronger communities. In *The American Landscape*, Ian Nairn states that "everyone is born with the need for identification with [their] surroundings and a relationship to them — with the need to be in a recognisable place. So sense of place is not a fine art extra, it is something we cannot afford to do without" (1965, 6). This concept should be familiar, as we consistently travel in search of recognizable places like Tuscany or New York, not because there aren't similar landscapes and buildings elsewhere, but because their landscape, culture, and symbolism contribute to a distinct sense of place. All environments of inhabitation deserve the same thoughtfulness and intention.

Figure 4

1940's residential neighbourhood in Ocean Falls, BC centred around human activity and conscious of the local landscape. (Canadian Centre for Architecture, 2011)

Figure 5

1960's residential development in the planned resource town of Mackenzie, BC. An imposed model ignorant of context or landscape. (The Exploration Place, 2003)

Recognisable and significant places also tend to encourage an attachment to place, a familiarity which is more than just an understanding or depth of knowledge, but which solicits a "sense of deep care and concern for that place" (Relph 1976, 37). This is a strong tool for any community trying to build a good quality of life, but especially useful for resource towns which need residents to be engaged and committed if they are to take responsibility for their future.

Places often accrue significance over time, in an unselfconscious manner, slowly becoming a product of the many small actions which reflect the needs of a culture (Relph 1976, 67). In our younger towns and cities, without centuries of history, it is understandable why an authentic sense of place is often lacking, especially when building is done by a speculative, specialized construction industry within master-planned urban environments. Resource towns do not have the luxury of waiting for culture and architecture to accrue over centuries. If their physical environments are to become recognizable places of significance which encourage residents to develop an attachment to place, they must do so in an intentional, self-conscious, and inspired manner.

> *Place*, the ordering of the whole environment that members of a civilization stand in the middle of, the making of sense, the projection of the image of the civilization onto the environment. This projection can be manipulated by the architect in ways spatial and formal, but it has as its purpose not simply the making of shapes or of spaces but the making of a sensible image of a culture, to give people a sense of where they are in it, and to make the framework for whatever happens in the civilization. (Moore 2001, 292)

Charles Moore defined place from the perspective of an architect and therefore through its self-conscious construction — as *place-making*. Authentic place-making

successfully interprets a culture and its activities before creating something new, which ultimately becomes a part of that culture. In the words of Norberg-Schulz, "architecture comes into being when buildings gather the properties of the place and bring them close to man" (1980, 426). Several qualities of successful place-making are explored in Chapter Five to inform the design strategy at an urban and building scale.

Thesis Question

How can resource towns use architecture and urbanism to facilitate place-based economic renewal, build resilient communities, and express local identities?

Motivation

This thesis attempts to illustrate that resource-dependent communities can use architecture to facilitate their economic transition while reshaping their physical environment to better reflect their culture. Investments need to focus on building community capacity and enabling residents to take ownership of their future and their environment. Rather than impose ideologies — economics, architecture, and urbanism must become tools for the public good with the goal of building intentional places which reflect the significance of human inhabitation and belonging.

CHAPTER 2: RESOURCE TOWNS

Defining a Typology

This chapter explores the typology of *resource towns* in order to understand their common characteristics, differences, evolution, and ultimately identifies a specific form of settlement and site for the focus of this thesis. It is important to have a broad understanding of the topic in order to develop a strategic methodology that could be applicable to other forms of resource-dependent settlements.

Over a century of Canadian resource development has produced nearly two hundred small communities which rely on a single resource industry for employment (Lucas 1971, 16). Although some single-industry communities developed from existing towns or villages, most were purpose-built to house the workforce required by a company or resource sector (Halseth and Sullivan, 2003, 133). As the product of dynamic twentieth-century values and technology, there have been a variety of attitudes toward their form and permanence, but also common structural challenges.

Having been conceived with a single major employer, resource towns are hindered by their overwhelming economic dependence, which is the root cause for many of their socio-economic characteristics. These include economic instability, high population turnover, social and geographical isolation, a lack of local control, and the exploitation of nature as a resource (Bradbury 1977, 1)(Krannich and Luloff 1991,7-9). Reflecting on the history of the typology can help us understand why various attempts to build more permanent settlements have been less successful than designers had expected.

VULNERABLE DEPENDENCE

LACK OF CONTROL

NATURE AS RESOURCE

" **THIS TOWN,
IT COMES AND GOES.
ONE YEAR IT SHRINKS,
THE NEXT IT GROWS.**

Houston, BC resident describing the realities
of living with a boom - bust economy.

The Tyee, 2014

" **THERE'S NOTHING MORE,
THE TOWN IS DIEING.**

Mackenzie, BC resident after all six of the
local mills closed, forcing a quarter of
residents to leave.

The Globe and Mail, 2008

" **THERE ARE STILL TREES
AND THEY'RE STILL WORTH
MONEY.**

Mackenzie, BC resident expressing hope for a
future upswing because of the remaining
resource.

The Tyee, 2009

Figure 6

Newspaper narratives from northern BC, highlighting common
characteristics of resource towns.

A pervasive economic dependence on resource exports,
which fluctuate between boom and bust, is arguably
the greatest liability for the vitality and viability of these
settlements. Industrial fluctuations such as cyclical growth,
stagnation, and decline have direct consequences for
community stability, often the root cause of population
turnover and anxieties about the future (Krannich and Luloff
1991, 7).

Twentieth-century planning efforts often focused on the
internal dynamics of a community, such as the physical
environment, demographics, and the psychological well being
of workers (Bradbury 1977, 3). Although these are important
factors to the success of a settlement, they did little to
address the concentration of power held by corporations,
governments, and the market (Bradbury 1977, 19) (Gill 2002,
127). A critical challenge for resource towns remains a lack of
local control.

The economic subjection experienced by a local population
is one of several reasons why communities rarely diversify

beyond their initial resource. Krannich and Luloff state that:

> [...] the cumulative effects of sustained instability can limit the capability of the local community to even *react* to problems associated with either growth or decline, much less to *act* in an organized, proactive manner to stimulate desirable change. (1991, 9-10)
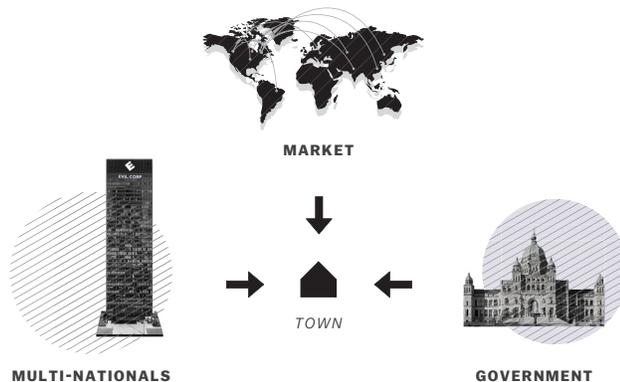
Figure 7

Diagram of resource town subjection by external interests.

Another reason for their incapacity is that residents may become accustomed to the cyclical nature of their instability, losing motivation to act if previous experiences suggest their crisis is only temporary (Krannich and Luloff 1991, 10). Sustained periods of population instability also hinder their capacity because it can foster a *rootless* population which lacks a strong attachment to community or place (Krannich and Luloff 1991, 10). This can be caused by a large number of recent in-migrants who have family and friends elsewhere or by the in-situ isolation of existing residents who have lost friends and family to out-migration (Krannich and Luloff 1991, 10).
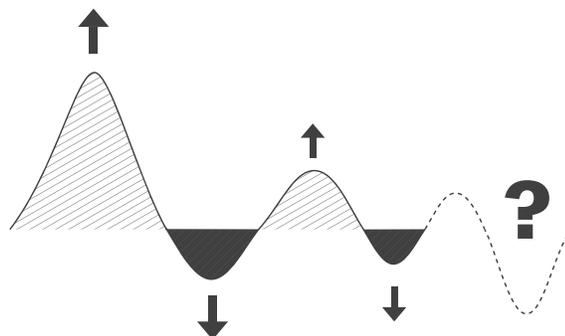
Figure 8

Diagram of economic and population instability in resource-dependent communities.

On top of this, the remote nature of resource towns often leads to social isolation and a sense of confinement similar to that of a small town, but with higher rates of suicide, alcoholism, and drug abuse (Pressman 1978, 87-88). Woman have had an especially hard time in male-dominated resource towns, exacerbated by few employment opportunities and a severe personal isolation referred to as "housewife psychosis" in the past (Pressman 1978, 87). The harsh conditions for women were broadcast across the country by the National Film Board's (1979) controversial *No Life for a Woman*, in which a film-maker interviewed women about their lives in the remote mill-town of Mackenzie, BC (Halseth and Sullivan 2003, 141).

Types of Resources

While resource towns are defined by their dependence on the extraction of resources for export, some argue that the quality and form of a settlement is directly influenced by their perceived lifespan, which depends largely on the lifespan of a resource (Halseth and Sullivan, 2003, 134). The nature of different resources has lead to two main kinds of towns: finite and renewable.

Finite towns rely on inevitably exhaustible industries such as mining or fossil fuels. These are "towns of uncertainty" which can easily follow a boom-bust development pattern (Bone 1998, 253). Boom-bust towns are characterized by their short lifespan and similar model of development, which begins with a sharp increase in population as the town is constructed and recruits workers, a period of relative stability and maturity, followed by a winding down and town closure as the company stops operations and residents abandon the town (Halseth and Sullivan 2002, 15). Many Canadian ghost

towns such as Pine Point, NWT follow this model (Figure 9).

Some finite resource towns avoid such a fate by diversifying their economic base. One example is Yellowknife, NWT, which began as an unplanned gold mining town but eventually repositioned itself as an administrative centre thirty years after its birth. Alternatively, some communities strongly resist the closure of their town following company closures, such as the coal mining town of Tumbler Ridge, British Columbia, which is attempting to restructure their economy following the closure of coal mines in 2000 (Figure 10).
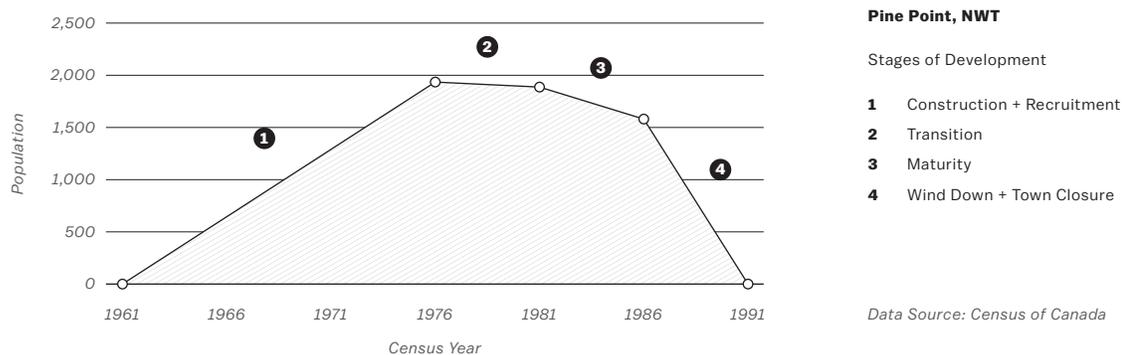
Figure 9

Population of Pine Point, NWT, a boom-bust resource town dependent on mining. Chart adapted from Bone (1998, 253).
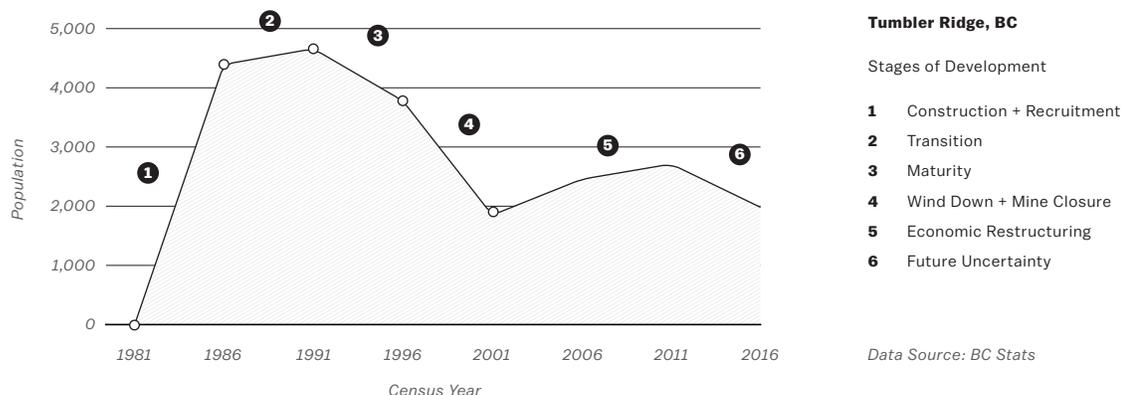
Figure 10

Population of Tumbler Ridge, BC, a coal mining town attempting to restructure their economy after the closure of mines in the region. Population data from BC Stats.

Renewable towns rely on a potentially renewable resource such as forestry or fishing, and could even characterize tourism based resort-towns. With proper management, a renewable resource base can continue to support a community's population. However, economic dependence on renewable resources leads to the same socio-economic instability because of corporate control and fluctuating commodity prices. Without the inevitable exhaustion of their resource as a reminder, these towns can actually become less conscious and responsive to their vulnerable situation.

Evolution of Resource Town Planning

> The problems of new-town building are complex, for they are the problems of the conception, birth, youth, and adolescence of a community.
>
> The idea behind a new town is important because it determines its conception, the way in which the scheme is worked out decides its birth, and the handling of its initial development conditions its growth and completion. (P.B. Purdom, quoted in Robinson 1962, 15)

Like Sweden and Australia, Canada has a rich history of building resource town settlements, required because of low population density and the remote nature of untapped resources (Figure 11). The building of new towns for resource development has provided architects, planners, and other professionals with the unique opportunity to design entire communities from scratch. During the twentieth century, a wave of planned resource town development coincided with new town planning movements throughout the West. "Model" communities were an opportunity for designers to test theories of urbanity and inhabitation, often "altruistic attempts to translate Utopian ideals into reality, to bring culture to the working class, or the luxuries of London to the wilds of Canada" (Lucas 1971, 23).

HISTORICAL PHASES	SETTLEMENT FORM	RESPONSIBILITY

< 1920 ◆ **UNPLANNED BOOM TOWNS**

"sleep camps" ; "boom towns" ; settlements fed off of resource operation ; little separation of industry + living ; poor family conditions ; few amenities ; high worker turnover ; frequent flooding and fire

SLEEP CAMPS
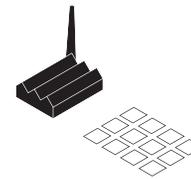
company
gov't
settlement

INFORMAL

1920 - 1950 ◆ **PLANNED COMPANY TOWNS**

"holistic planning" ; "company towns" ; townsite built and operated by company ; planning and amenities focused on attracting and retaining a more stable workforce ; basic land zoning ; often a 'closed' housing market ; strong identity tied to industry

MODEL TOWNS

company
gov't
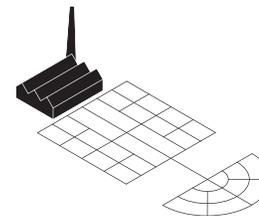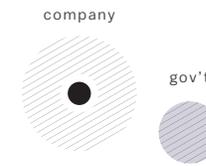
CONCENTRATED

Figure 11

Phases of resource town planning , including responsibility structures and settlement form. Continued on following page. Photo sources: first (Mitchell 2013), second (BC Archives 2018), third (CCA 1996), fourth (CCA 1996), fifth (Arvida History Centre 2018).

1950-1980

POST-WAR MODEL TOWNS

"instant towns" ; "new towns" ; cooperative venture between corporations and governments ; greater social and economic goals ; focus on 'permanence' and complete communities ; response to early company towns ; garden city movement ; population transience persisted due to little economic diversity
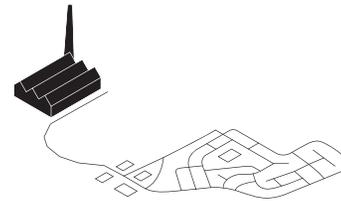
SUBURB IN THE BUSH

company
gov't
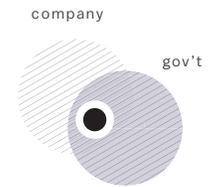
COOPERATIVE

PRESENT

FLY-IN / FLY-OUT CAMPS

temporary worker camps ; operated by industry or private contractor ; long commutes for workers ; planned obsolescence ; have unique social implications for workers, families, and their home community

COMMUTER CAMPS

company
gov't
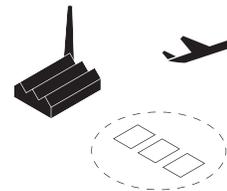
CONCENTRATED

Figure 11 (continued)

Phases of resource town planning , including responsibility structures and settlement form. Photo sources: first (Royal BC Museum 2017), second (Irving K. Barber Learning Centre 2012), third (Ryan 2018), fourth (Modular Building Institute 2018), fifth (Jobs in the Oil Patch 2017).

17

Rise of the Company Town

Architects and planners have designed communities in response to various societal problems of the day, but also in response to the chaos of early resource towns, which weren't planned at all. As a complement to smog filled cities of the nineteenth century, early "boomtowns" are characterized by their unorganized accommodation, lack of services, and mostly male population (Halseth and Sullivan 2003, 134). Accounts from mining towns in the United States describe settlements of chaos, where:

> workers flock in to seek their fortunes, and a sea of tents or shacks or trailers springs up almost overnight. The local people, if indeed there are any, are outnumbered and overwhelmed by the rough and ready newcomers, mostly husky, boisterous, single young men with few inhibitions. There are few jobs for women. (Hart 1998, 42)

The chaotic nature of boomtowns was not sustainable as industrial ventures increased in size and competitiveness, forcing industry to seek ways of attracting a more stable workforce (Pressman 1978, 89). However, past reputations continued to inform the design of resource towns for more

INFORMAL RESPONSIBILITY
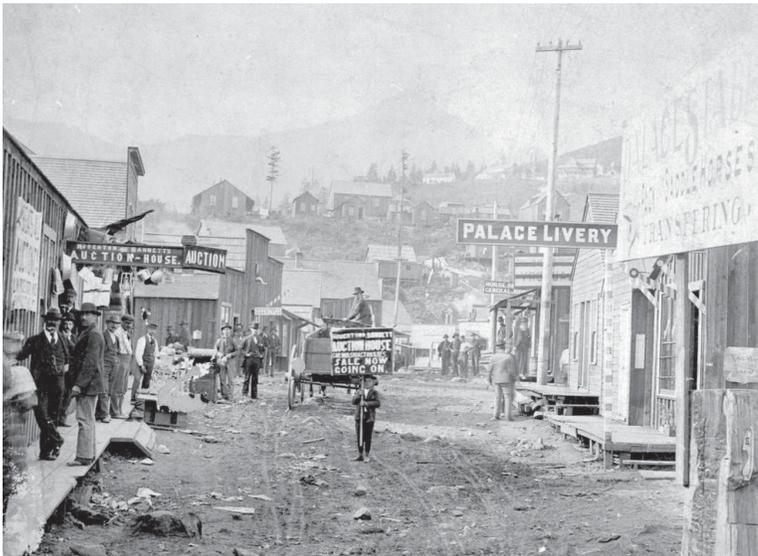
Figure 12

The responsibility dynamic in early unplanned boomtowns.

Figure 13 (above)

Boomtown of Rossland, BC circa 1895 (Thompson 1895).

Figure 14 (left)

Rossland, BC circa 1880's (BC Archives 2018).

than a century. During the first half of the twentieth-century, Canadian resource town development was defined by the *company town*.

> What is a company town: a community inhabited chiefly by the employees of a single company or group of companies which also owns a substantial part of the real estate and houses. (Davis 1930, 119)

In an effort to impose order and stabilize their workforce, companies began to assume complete responsibility for the design, construction, and management of a town. This practice is also referred to as "additive planning" because companies added the task of running a town to the manager's duties (Halseth and Sullivan 2003, 134-5). The now-ghost town of Anyox, BC is a clear example of additive planning, where the company owned all property, operated infrastructure, and paid for public services such as schools and the grocery store (Halseth and Sullivan 2002, 18).

CONCENTRATED RESPONSIBILITY

company

gov't
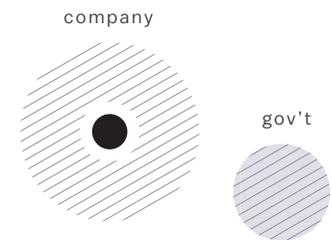
Figure 15

The responsibility dynamic in company towns.
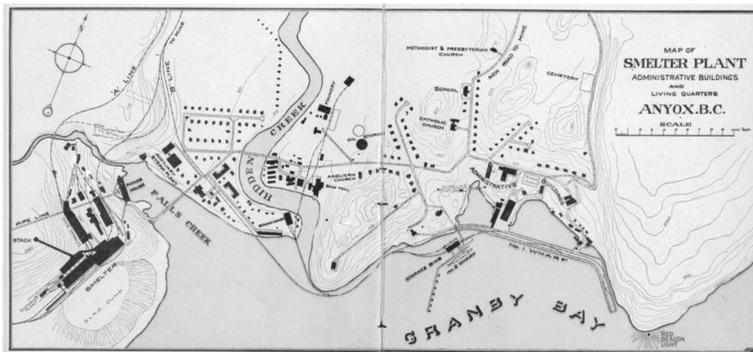
Figure 16

Plan of the company town Anyox, BC (BC Archives 2018).

Figure 17

Anyox, BC. Trees in the area were denuded by acid rain, caused by the copper smelting plant (BC Archives 2018).

Halseth and Sullivan note that company managers were "often ill-equipped to manage the townsites" and that residents began to criticize the quality of town life (2002, 18). Company towns developed in the 1920's began to consider land-use and topography in townsite planning, with polluting industries generally separated from residential areas designed to attract families (Halseth and Sullivan 2002, 19). It was the beginning of a recognition that quality, liveable townsites played an important role in the retention of workers, benefiting both the industry and residents.

Such complete control over the townsite in combination with emerging ambitions for quality and place-making lead to a unique opportunity for architects to build previously theoretical city plans in their entirety. The height of Canadian company town planning was perhaps Ariva, Quebec, the largest company-owned settlement built in Canada during the twentieth century, and designed by American architect Harry Brainerd in 1925 for the aluminum giant Alcoa.

Figure 18

Conceptual drawing of Arvida, QC credited to American architect Harry Brainerd. Image from Arvida History Centre (2018).

Arvida was built as a 'model town', meant to express the potential and identity of aluminum. Inspired by the City Beautiful movement, the plan focused on creating hygienic residential streets lined with trees, a compact town centre,

Figure 19

Company town of Arvida, QC, with residential areas in the foreground and the massive aluminum smelter behind (Canadian Centre for Architecture 1996).

Figure 20

Company town of Arvida, QC (Canadian Centre for Architecture 1996).

Figure 21

Aluminum bridge under construction in Arvida, QC circa 1949-1950. A symbol of identity in the aluminum producing town (Portail Constructo 2013).

and the largest aluminum smelter in the western world showcased at the heart of town. Construction was treated as meticulously as if it were an industrial assembly line and included the country's first aluminum bridge.

Comprehensive Planning

Most company towns lacked the ambition and means of towns like Arvida, especially the most remote company towns which had little government oversight and developed notorious reputations. Such total control over town life eventually fuelled a pushback from residents and led to the increased involvement of provincial governments in resource town development. The prevalence of company-owned resource towns began to decline after the second world war through a phase known as "comprehensive planning" (Halseth and Sullivan 2002, 19).

Governments increased their participation and developed settlements with greater social and economic considerations, including "community health, quality of life, and social well-being" (Halseth and Sullivan 2002, 19). Pressman argues that this phase was driven by the development of Canada's remote and unexploited resource frontier, and industrial innovations requiring a highly skilled workforce (1978, 82). Challenged by isolated northern environments and a need to foster quality community life, companies began to consider "better housing, recreation facilities, attractive town layouts, effective social services and other urban amenities as an integral part of the exploitation of natural resources on the Canadian frontier" (Pressman 1978, 82).

Comprehensively planned towns are of particular relevance to this thesis because they represent an intentional effort

**COOPERATIVE
RESPONSIBILITY**

company

gov't
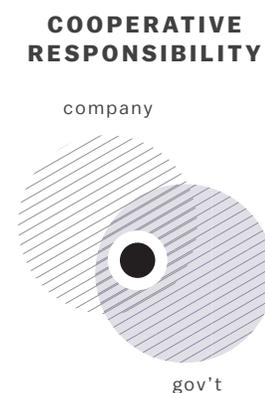
Figure 22

The responsibility dynamic in comprehensively planned towns.

to prevent the corporate paternalism, population turnover, sense of impermanence, instability, and isolation in resource towns. A significant number of comprehensively planned towns were built after the 1950's, and although there were a variety of approaches and formal designs, several recurring strategies are apparent.

In 1977, a study of nine comprehensively planned towns in British Columbia questioned the effectiveness of their planning strategies, as economic dependence, social isolation, mental health problems, and corporate control persisted (Bradbury 1977, 2). Bradbury argues that most planning efforts focused too narrowly on internal dynamics, such as the "individual psychological makeup of workers, or the impact of the physical or planned environment", but failed to address the root problems of isolation and centralized corporate control (1977, 2-3). A critical investigation of post-war resource town planning can help us understand what additional infrastructure and investments are needed to encourage their transition from settlements of dependence and isolation to places of autonomy and permanence.
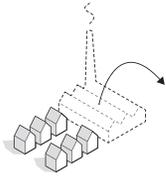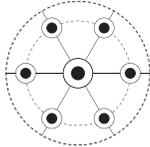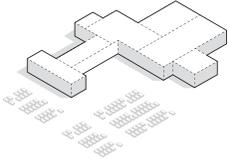
STRATEGY	SEPARATED INDUSTRY	GARDEN CITY PLANNING	AMENITIES	CONSOLIDATED PROGRAM
GOAL	Reduce Company Control	Attract and Retain Stable Workforce	Reduce Social Isolation	Adapt to Winter Climates
CRITICISM	Act as "Bedroom" Communities	Car-oriented Development	Leisure Focused Lack of Public Space	Utilitarian Architecture + Concealed Program

Figure 23 Common characteristics of post-war comprehensively planned resource towns.

The first common characteristic is a separation of industry from the townsite, driven by a desire to limit company control and develop designs which could serve as a 'model' for many types of future settlement. It is logical to keep polluting industrial activities away from residential areas, but this also served to sterilize the townsite, removing a large component of the community's identity and effectively turning the town into a 'bedroom community' for nearby industrial activity. A more nuanced approach might be to locate clean, modern industries within the townsite and encourage a diverse urban environment. Industries were also frequently given the most advantageous geographic location, such as the port or waterfront, while the townsite was carved out of the nearby bush. Most provincial governments also developed a procedure for new towns to be incorporated before their construction and quickly established a local government in an effort to decrease corporate control.

To combat the social isolation in remote resource towns and reduce the "sense of confinement", planners began to incorporate better amenities, with a focus on leisure activities (Pressman 1978, 87). These included robust recreational facilities and an array of traditional services found in urban centres but rarely extended to the urban environment or the creation of public space. Because of harsh winters and economic constraints, designers typically attempted to consolidate as many different programs into one facility, which can isolate public programs from the public realm and conceal their identities within one utilitarian construction. A good example of this is Leaf Rapids, Manitoba, which housed all of its amenities within a mall building, including the school, library, health centre, retail stores, hotel, and government offices (Pressman 1978, 94).

Figure 24

The consolidated "town centre" facility in Leaf Rapids, Manitoba (University of Manitoba Archives 1974).

Comprehensively planned resource towns also share a strikingly similar urban form based on 'garden city' ideologies (Halseth and Sullivan 2003, 133). Companies were typically responsible for hiring planning consultants and more often than not, American architects and planners imported southern planning models into harsh northern climates (Pressman 1978, 89). One well-known example of this is Kitimat, BC, which was designed by the American architect Clarence Stein for Alcan, the Aluminum Company of Canada. The townsite of Kitimat was intended to build off of the influential Radburn, NJ suburban neighbourhood. Stein was clearly aware of economic challenges inherent with resource towns, as he stated in the 1952 Kitimat Master Plan:

> The purpose of Kitimat is the industrial success of the plant. That success will depend on the degree that workers are content, that they like living in Kitimat. Unless the town can attract and hold industrial workers, there will be continuous turnover and difficulty … . The workers must find Kitimat more than temporarily acceptable … . It must become the place they want as homeland, the town they are going to make their own. (Stein 1952 quoted in Halseth and Sullivan 2002, 21)

Kitimat's townsite was built around a series of greenways and pedestrian networks which link schools, parks, and the shopping centre. Residential areas feature curvilinear streets with a strong segregation of vehicles and pedestrian traffic, intended to make for a safer and more leisurely environment (Halseth and Sullivan 2002, 22). Although well intentioned, Stein's removal of pedestrian infrastructure from the main street network also serves to restrict social interactions and encourages automobile use and car-oriented development. The townsite design of Kitimat served as the model for many future resource towns in British Columbia. This model of suburban town planning was also a departure from ambitious

Figure 25

Radburn, New jersey plan (Halseth and Sullivan 2002, 22).

Figure 26

Section of Kitimat, BC town plan (Halseth and Sullivan 2002, 23).

place-making company towns like Arvida, QC. During the construction of Kitimat, the vice president of Alcan clearly summarized the intentions of the town's design:

> We are interested in building neither palaces nor monuments, but we are extremely anxious to avoid a shack town ... we must not be extravagant or encourage the community to be extravagant. Through proper planning we will try to avoid many needless mistakes and expenses of haphazard growth. (Royal BC Museum n.d.)

Criticism of Garden City and Radburn planning used for northern settlements was swift but largely unheeded (Pressman 1978, 92). In 1962, planning critic Ira Robinson condemned the lack of local considerations when he stated:

> With few exceptions the plans do not reflect the special social, geographic, economic or governmental circumstances under which they are built; for example, their unbalanced social structure; their dependence upon a single industrial enterprise; their harsh local climate and the rugged terrain of the areas in which they are located. The plans have differed little from those being carried out in more developed areas in southern Canada. In short, there have been no original, or specially adapted solutions equal to the individual problems of site and situation that these northern towns face. (1962, 2)

Figure 27

Subdivision in Kitimat, BC. Photo by Fred Ryan courtesy of the Royal BC Museum.

Figure 28

The construction of Kitimat, BC circa 1966. Photo courtesy of the Kitimat Museum & Archives.

Later comprehensively planned communities began to consider the unique geographic and climactic conditions of northern environments. One notable example is the sub-arctic mining town of Fermont, Quebec. The design consortium of the new town engaged the Swedish architect Ralph Eriksine for his expertise designing mining communities in Lapland, which has a similar climate to the site of Fermont (Sheppard 2011, 3). The goal of the design was to create a settlement conducive to community life, alleviate harsh climactic conditions, and provide optimum community facilities (Sheppard 2011, 7). The main feature of the town is a large 'windscreen' building meant to deflect northern winds, similar to Eriksine's previous work.

Like the town centre in Leaf Rapids, MB, the windscreen consolidates public services under one roof and provides a climate controlled environment for residents. However, the approach in Fermont uses such a strategy in a rather unique way, which arguably contributes considerably to the town's identity. The town also has a compact town plan which helps to conserve energy and encourage social interaction, although residents have voiced criticisms about a lack of space and adaptability (Halseth and Sullivan 2002, 20).

Figure 29 (above)

Model of 'windscreen' building in Fermont, QC (McGill 2005).

Figure 30 (left)

Aerial of 'windscreen' building in Fermont, QC (Simard 2012).

Overall, the history of planned resource towns in Canada is rich with examples of both good and bad practice. Designers and governments have been justly criticized for their insensitivity to local climates, culture, and socio-economic challenges, but there is also evidence that many believed they were truly enhancing the lives of residents. Considering how beholden residents of earlier company towns were to their employer, I would argue that there have been significant improvements in their quality of life, although the structural problems of their dependence have not been successfully addressed and their physical environments rarely reflect their unique identities and culture.

Today, resource exploitation is more likely to use fly-in-fly-out commuter camps made feasible by transportation advancements. It is unlikely that we will see a large number of new towns being constructed across the Canadian frontier in the near future. With so many communities remaining dependent on industries and facing uncertain futures, today's question is not how to build a Utopian settlement, but how to help existing settlements transition from settlements into places of quality and permanence capable of fostering communities of belonging. In the following chapter, a particular town is chosen to explore just that question.

CHAPTER 3: SITE

Site Selection

Based on research into the topic of resource towns, the test community for this thesis should:

- be a young comprehensively planned resource town.
- currently be dependent on its initial industry.
- demonstrate a need for economic renewal.
- demonstrate challenges shared by other resource towns.

I chose to focus on British Columbia, the province in which I grew up and with which I am most acquainted. BC has a long history of resource development, many resource-dependent communities, and a variety of planned resource towns. The province is made up of several regions which have their own distinct geography, economy, resources, and culture.

Like other resource-based economies, the province is organized into core and periphery regions, with core regions holding most of the population and political power while the rural periphery produces resources for export. Core regions provide access to markets and handle most economic transactions, which is why they are regarded as "economic drivers" (Markey et al. 2012, 43-44). However, it is often overlooked that over half of the provincial wealth is generated by resource exports, meaning the original dollar was sourced from peripheral regions (Markey et al. 2012, 44). With political and economic power concentrated in core regions, the periphery often lacks the means to diversify, remaining as a collection of specialized communities focused on extracting a particular resource. An analysis of the province's different regions clearly illustrates this urban-rural divide (Figure 31).

ECONOMIC DIVERSITY

Most

Least

MAJOR INCOME SOURCE

Forestry

Undergrour

Tourism

Public Sect

FORESTRY DEPENDENCE

70 - 27 %

26 - 21 %

20 - 12 %

12 - 0 %

POPULATION FLOW

Loss

Gain

○ Urban Cent
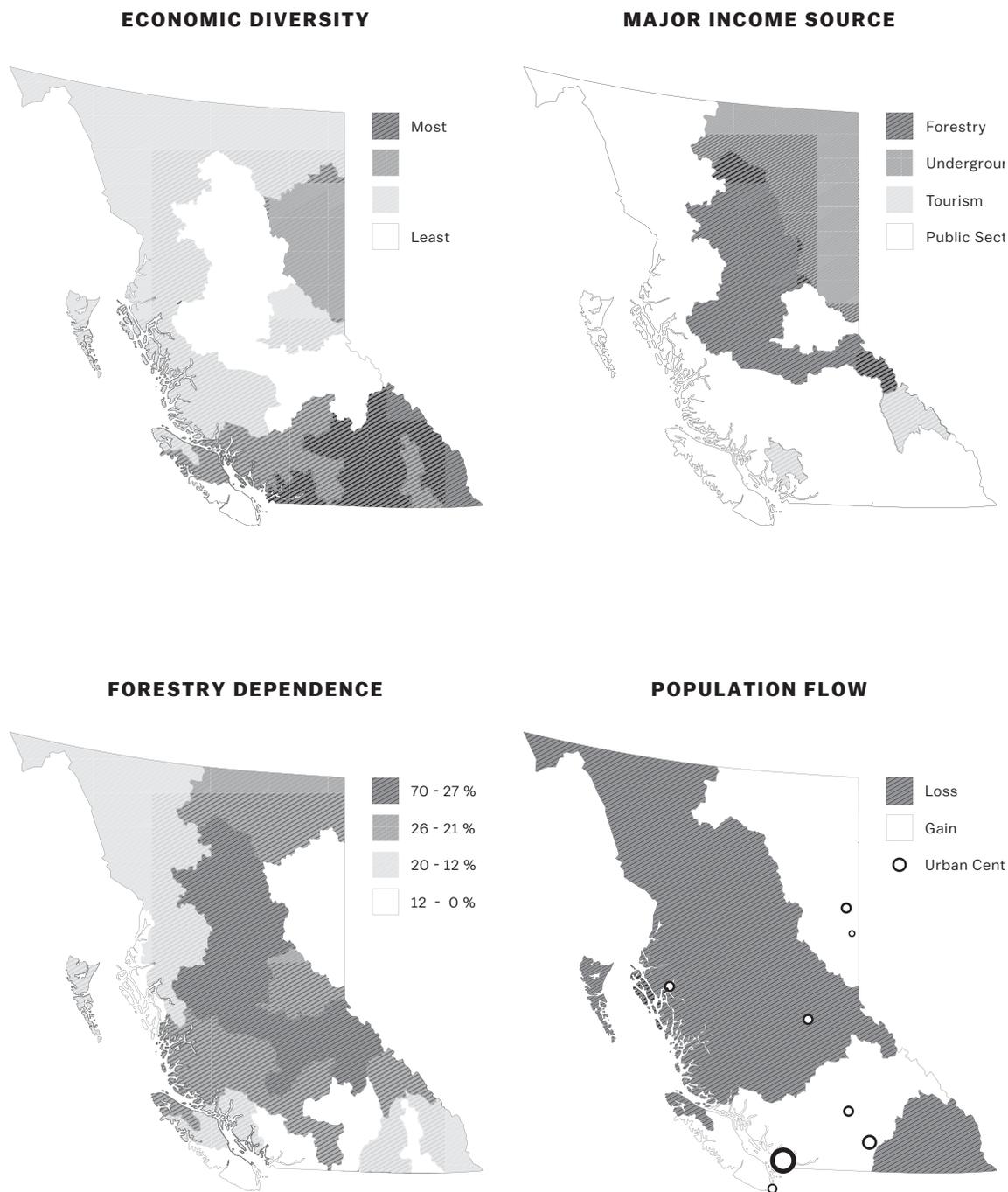
Figure 31

Regional socio-economic analysis of British Columbia, illustrating a clear divide between core and periphery regions, a strong dependence on forestry, and the least diversified regions of the province. Adapted from BC Stats, 2006 Local Area Dependency Report.

The diagrams in Figure 31 also reveal that the least diversified part of the province is also the most dependent on forestry, a sector which includes logging, wood products, and pulp and paper. Many regions in the province have a high dependence on forestry, even if it is a secondary income source. The low diversity among forestry dependent towns could be due to the fact that their resource isn't inevitably exhaustible, and therefore presents a less urgent need to find alternative revenue sources. Decades of restructuring in the forest industry have left many small towns in British Columbia looking to diversify their employment base (Markey et al 2012, 39-40).

Narrowing the focus of site selection to forestry towns provides a relevant example for many resource-dependent communities in Canada and also presents the opportunity to evaluate how resource towns can transition their economies through strategic planning rather than in response to a loss of industry and a large part of their identity. Another thesis might look at how towns which have lost their resource can successfully transition their economies and adapt to a changing identity, such as a mining town facing the end of coal production. By focusing on *renewable* resource towns we can develop strategies which are less restricted and could even be applied to finite resource towns.

Mackenzie, an Instant Town

When evaluating comprehensively planned resource towns in British Columbia (Figure 32) the town of Mackenzie became of interest. Mackenzie is one of twelve planned resource towns in the province with the exclusive distinction of being an 'instant town'. This is a term used to describe towns created under a specific piece of legislation. The provincial

70%

Resources as % of BC Exports*

A STAPLES ECONOMY

British Columbia's economy is dominated by a resource-based model which divides the province into core and periphery regions. Core regions are centres of power and population with access to markets and capital, able to exert control over the less populous regions at the periphery. Peripheral regions are remote, dependent, and often less privileged. This dichotomy conflates the economic role of core regions despite the 'original dollar' often coming from the periphery. This model is prone to inequity because it requires core regions to continually reinvest and manage peripheral regions.

* Chart from BC Finance, "2014 British Columbia Economic and Financial Review".

LEGEND

Planned Resource Town	○
Resource Town	●
Closed Resource Town	+
Regional Centre	○
Transportation Corridor	---
Least diversified regions	▨
Hinterland (periphery)	☐
Heartland (core)	■

REGIONS WITH LEAST ECONOMIC DIVERSITY

MACKENZIE

○ Fort St John

1965 Hudson's Hope (hydro)

○ Dawson Creek

1966 Mackenzie (forestry)
1981 Tumbler Ridge (coal)
1971 Granisle (copper)

Grande Prairie

Prince Rupert

1952 Kitimat* (aluminum)
1969 Houston (forestry)
1966 Fraser Lake (molybdenum)

Prince George

Edmonton ●

ALBERTA

1966 Port McNeil (forestry)
1965 Port Alice (pulp)
1970 Logan Lake (copper)
1970 Tahsis (forestry)
1965 Gold River (pulp / paper)
1971 Elkford (coal)

Kamloops

Calgary ●

Kelowna

Vancouver

CORE REGIONS HOLD ECONOMIC AND POLITICAL CONTROL

Victoria

INSTANT TOWNS

Between 1965 and 1971 the government of British Columbia, partnered with multinational corporations to built 11 'instant towns'. This was part of a larger 'province building' campaign, which brought infrastructure and communities to remote and unsettled regions.

* Kitimat was the precedent for instant towns

Figure 32

Map of British Columbia highlighting the location of twelve comprehensively planned "instant towns", major economic infrastructure, and the least diversified region in the province.

government of the 1950's and 1960's entered a period of 'province building', during which it ambitiously expanded the province's transportation, energy, and resource development infrastructure in an effort to attract large multinational firms. To exploit resources in previously uninhabited regions of the province, they needed settlements to house the workers and wanted a way to prevent private company towns from developing. The tool they created was known as the 'instant town act', and allowed the province to incorporate municipalities in unpopulated areas without many of the previous hurdles to creating a town (Halseth and Sullivan 2002, 26).

It was through this legislation that Mackenzie was incorporated on May 19, 1966, before there was a town or a single resident. The province set up an interim town council, delineated municipal boundaries, allocated land for industry, and granted permission to start clearing the site. As a result, Mackenzie and other instant towns "exploded onto the scene as ready-made, fully functional, towns." without being owned by their parent company (Halseth and Sullivan, 29).

British Columbia Forest Products (BCFP) worked with the province to develop Mackenzie alongside their new forest industry complex. The construction of hydroelectric dams in the region offered a bounty of inexpensive electricity and the massive reservoirs were expected to flood large portions of the mountainous region and provide water access deep into the previously inaccessible forests. Since its initial development by BCFP, Mackenzie has been closely tied to the global marketplace where its forest products are sold, and the multiple sawmills and pulp mill remain the primary source of employment for residents.

Figure 33

The "world's largest tree crusher", responsible for clearing the townsite of Mackenzie, now stands as a monument along the main boulevard.
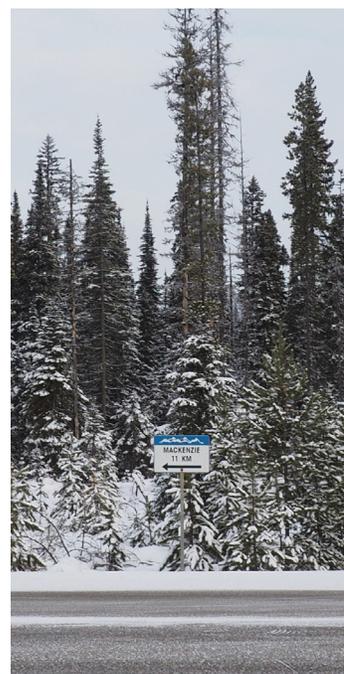
Figure 34

Highway into Mackenzie.

LEGEND

Planned Resource Town
Resource Town
Closed Resource Town
Regional Centre
Transportation Corridor
Mackenzie Forest District
Lowest Diversity Regions

MACKENZIE FOREST DISTRICT

WILLISTON LAKE RESERVOIR

MACKENZIE

HIGHWAY TO ALASKA

FORT ST JOHN

HUDSON'S HOPE (WAC BENNETT DAM)

DAWSON CREEK

TUMBLER RIDGE (COAL)

2 HR TO PRINCE GEORGE

GRANISLE (COPPER)

ANYOX

PRINCE RUPERT (PORT)

KITIMAT (ALUMINUM)

HOUSTON (FORESTRY)

FRASER LAKE (MOLYBDENUM)

NECHAKO RESERVOIR

PRINCE GEORGE (NORTHERN CAPITAL)

12 HR TO VANCOUVER

Figure 35 Mackenzie regional context, illustrating the isolated town's strategic position at the head of Williston Reservoir.

EU
4%

69%
USA

14%
CHINA

5%
JAPAN
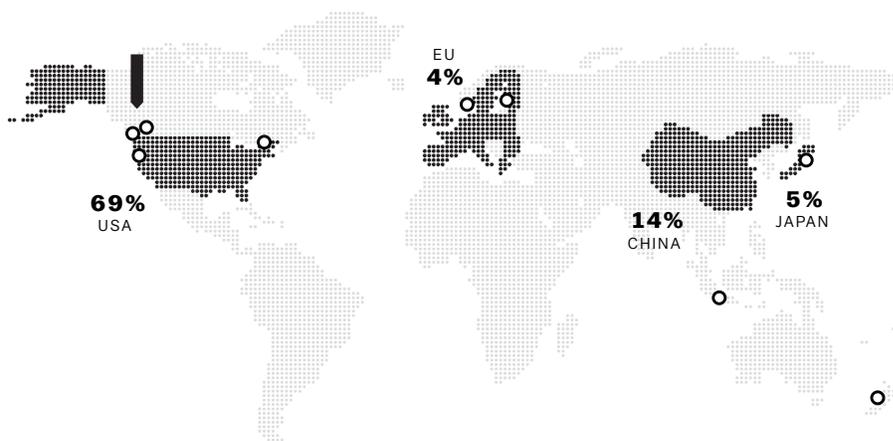
Figure 36 Mackenzie global context, illustrating major export markets and the headquarter locations of multinational corporations who have owned mills in the town.

CLEAR / CUT HARVESTING

FOREST SERVICE ROAD NETWORK

RESERVOIR USED FOR TRANSPORT

TOWNSITE

INDUSTRIAL PENINSULA

WILLISTON LAKE RESERVOIR

MORFEE LAKES

HART MOUNTAIN RANGE

MUNICIPAL BOUNDARY

ROAD AND RAIL OUT OF TOWN

0   0.5   1   2.5km
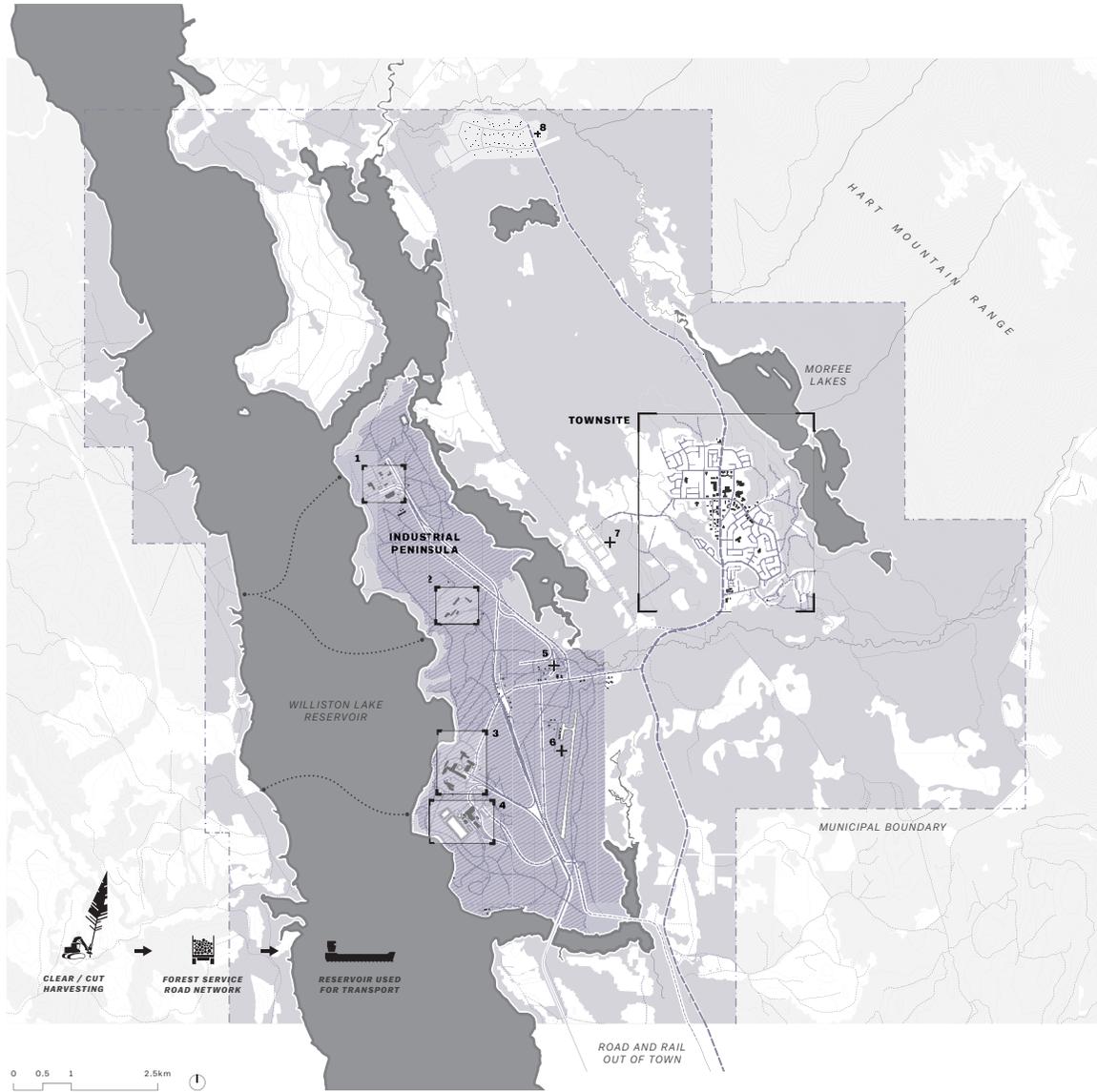
LEGEND

1	Sawmill	**5**	Industrial Park
2	Sawmill	**6**	Airport
3	Sawmill	**7**	Water Treatment
4	Pulp Mill	**8**	Rural Subdivision

Figure 37

Municipal map of Mackenzie, including industrial area, townsite, and major economic infrastructure.

LEGEND

- - - SIDEWALK / TRAIL
········· RECREATION TRAIL
■ PUBLIC FACILITY
▨ PUBLIC
▨ COMMERCIAL
▨ UNLOGGED FOREST

FACILITIES

1 TOWN HALL
2 FOREST MANAGEMENT
3 POST OFFICE
4 POLICE STATION
5 FIRE HALL
6 CLINIC
7 SPORT CENTRE / ARENA
8 SKATE PARK
9 OUTDOOR RINK
10 REGIONAL PARK
11 MUSEUM
12 ELEMENTARY SCHOOL
13 HIGH SCHOOL
14 CHURCH / TEMPLE
15 MALL
16 SKI HILL
17 BEACH
18 DAYCARE
19 LEGION HALL
20 GOLF CLUB
21 TREE CRUSHER

5 MIN WALK

MORFEE LAKE

recently logged

recently logged

recently logged

WETLAND

recently logged

Figure 38 Existing town plan, locating public facilities.

The population instability and turbulent town life illustrated by the diagrams in Figure 39 are typical of many resource-dependent communities. The success of Mackenzie has been directly influenced by the success of industrial operations in the area. Following the global economic crisis of 2008 and the ensuing collapse of the American housing market, all of the mills in Mackenzie unexpectedly closed, with one of the largest employers going bankrupt and leaving many without a final paycheck and millions of dollars in unpaid property taxes. Nearly a quarter of residents were forced to sell their homes and find work elsewhere. The provincial government

27%

New to Town

25%

New to Town

1996 - BOOM PERIOD
During 3.5% population increase

2011 - BUST PERIOD
During 23% population decline

CONSISTENT TURNOVER

63%

14%

18%

5%

0 - 1   1 - 5   5 +   LIFE
1975 survey of new town

**YEARS FOUNDING RESIDENTS
PLANNED TO STAY**

SHORT TERM PERCEPTION

+129 %

105 %

70 %

35 %

0%

-35 %

MACKENZIE, BC

BC AVERAGE

-28 %

66   71   76   81   86   91   96   01   06   11   16
census year
POPULATION CHANGE (%) COMPARED TO BC AVERAGE

POPULATION INSTABILITY

6000

5000

4000

3000

2000

1000

1996

-42%

2011

EST. 1966

66   71   76   81   86   91   96   01   06   11   16
census year
TOWN POPULATION

REBUILDING AFTER BUST

Figure 39

Diagrams of the population instability and short term perception of residents in Mackenzie which are closely tied to employment opportunities. Census data from BC Stats.

stepped in to provide financial support to the municipality in order to maintain civic services, secure the bankrupt pulp mill, and provide educational opportunities to laid-off workers.

As most mills have since restarted their operations and the pulp mill was sold to a new multinational by the provincial government, Mackenzie is now in the position of attracting new workers and residents amidst the stigma and uncertainty left by the recent collapse. The dramatic crisis of 2008 may be the most jarring, but because of gradual automation in local mills and restructuring in the forest industry, the economy and population had actually been declining since the mid-1990's.

Strategies for the renewal of Mackenzie's economy and an analysis of the existing urban environment are developed

Figure 40   Morfee Lake, adjacent to the townsite of Mackenzie.

CHAPTER 4: PLACE-BASED RENEWAL

> The economic development I've seen depends too much on outside investors and [...] the global economy, and for the most part, has failed or has been very short-lived. Development has to be something that's based on the fact there is a solid core of people in this region that aren't going away. If you build economic development around their needs then that economic development tends to hold. (Resident of northern BC, quoted in Markey et al. 2012, 51)

A Global Shift

The overview and evolution of resource towns in Chapter Two demonstrate how instrumental they are in supplying our current zero-sum "space-based" economic system, which is based on the exploitation of natural resources and the competition of markets (Markey et al. 2012, 11). A common instability in resource-towns highlights many of the problems with our current capitalist economy and presents the formidable challenge of transforming a system despite it being responsible for the creation and wealth of a town.

The last industrial revolution removed geographic barriers with new communication technologies, cheap oil, and flexible transportation networks, resulting in a race toward the bottom as communities were judged on their comparative advantages rather than their character (Markey et al. 2012, 11-13)(Rifkin 2011, chap. 2). We have terraformed the planet, extracted unprecedented wealth, and settled the Canadian hinterland, but our pursuit for growth has been largely without conscience, exploiting both communities and our biosphere. As climate change moves from future to present, there is an urgent need to confront our reality and move forward with "a new economic narrative that can take us into a more equitable and sustainable future" (Rifkin 2011, introduction).

Jeremy Rifkin argues that one such narrative has emerged in the form of a "Third Industrial Revolution" and that we are on the verge of a radical shift in the global economy; from a top-down power structure based on fossil fuels and the concentration of responsibility, toward an unprecedentedly collaborative structure based on green industries, digital networks, and the lateral distribution of responsibility (2011, chap. 2). Resource towns, with their proximity to natural resources and skilled workforce, need to prepare for transition if they are to contribute to a new economic system, whatever form it may take. Figure 41 illustrates the major constructs of each industrial revolution described by Rifkin and how they have informed different forms of settlement and social organization.

Industrial Revolution	First	Second	Third
Century	19 th	20 th	21 st
Energy	Coal Steam	Oil Electricity	Renewable Battery storage
Communication	Printing press	Radio Telephone TV	Digital - networking
Transportation	Locomotive	Automotive	Automated
Form of settlements	Factory - based	Suburban	Integrated urban ecologies
Social organization	Dispersion	Hierarchies	Networks

Figure 41

Major constructs of the three revolutions described in *Third Industrial Revolution* (Rifkin 2011).

A Whole Community Approach

Decades of witnessing unsustainable practices in economic and community development lead Markey, Halseth, and Manson to introduce an economic renewal strategy specifically aimed at small and resource-dependent towns with their book *Investing in Place: Economic Renewal in Northern British Columbia* (2012). The authors outline many of the same global problems as Rifkin but focus on very practical solutions for their local region.

Rooted in a collective mentality, their strategy requires moving beyond the existing space-based economy through *place-based* policy and actions. Their goals include equipping small and rural communities to be "flexible, responsive, and more diversified" (Markey et al. 2012, 51). In other words: empower existing residents to build economies of permanence by diversifying existing industries in a way that complements local assets and identities. This thesis uses their model as a framework for the design response.

> Rather than passively suffer the consequences of external pressures, community development approaches provide useful strategies and frameworks for communities to take proactive measures to prepare for and build a better future. (Reimer 2006, 155)

What Markey, Halseth, and Manson refer to as the "Whole Community Approach" (Figure 42) is radical because it firstly seeks to build capacity and flexibility within existing communities through their ability to plan, act, and react (Markey et al. 2012, 52). In their view, economic development should be enabled *through* community development, not vice versa. They assert that rather than government spending in small and rural communities being seen as an "expense", it should be viewed as an "investment" able to pay returns for

generations (Markey et al. 2012, 51-2). This assertion is based on the fact that heavy government investment into resource-based communities in the 1960's and 1970's allowed the entire province to benefit from economic booms in the 1990's and 2000's. The inability of resource towns to take advantage of recent shorter-lived economic opportunities suggests that previous investments have run their course (CBC News 2016).

Traditional top-down or private-sector-led development can be short-sighted or disconnected from communities. For example, a failed dependence may be replaced with another while existing identities are sacrificed, common in mining-towns turned resort-towns. Or it could rely on the promise of a saviour industry currently trending on the global market,
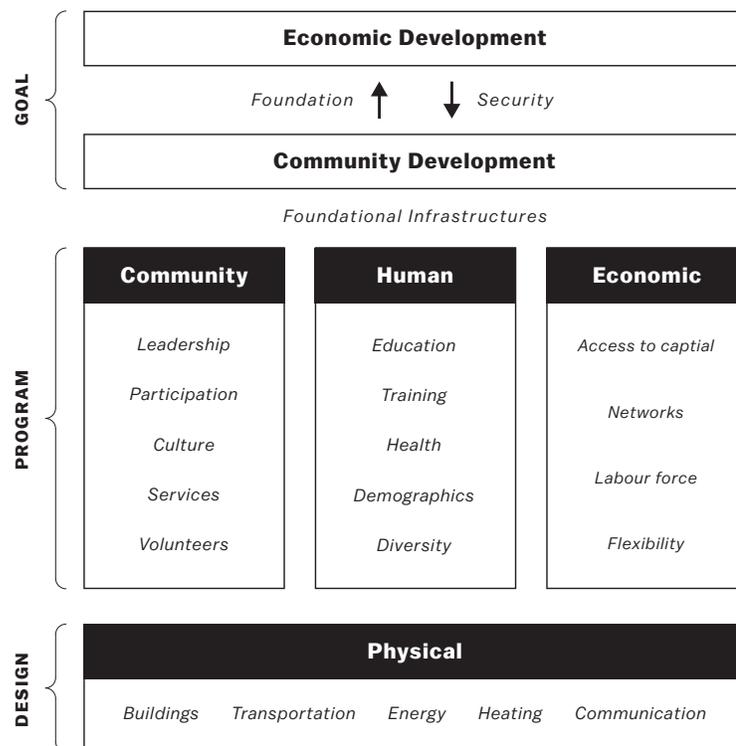
Figure 42

Community development foundations for economic development. Adapted from (Markey et al. 2012, 53).

such as the underwhelming promise of natural gas recently disappointing BC residents. Although an in-demand industry or tourism might make sense for some resource-towns, they aren't always appropriate and often have little to do with the existing assets of a place.

Building robust communities requires strategic community development in four key *infrastructures*, which together provide a stable foundation for economic development (Figure 42). Successful community development is usually constructed from a combination of "bottom-up capacity and top-down public policy" (Halseth and Ryser 2016, 106). These infrastructures are expanded upon later in this chapter through an analysis of Mackenzie.

Varying community capacity can often explain why some towns are successful with economic goals, but seemingly similar towns are not (Markey et al. 2012, 53). Resource towns typically have two routes of action when it comes to economic renewal: through planning or crisis. Ideally, communities are able to strategically plan for place-based renewal, as was the case for Smithers, a small town in northwestern BC. As their forest and mining sectors slowed, the community identified their primary objective was to transition from 'Boomtown to Sustainable Town'. They have since worked to capitalize on their geographic assets and high quality of life, becoming a regional service hub through investments in local amenities and infrastructure, such as a new airport (Markey et al. 2012, 186).

Tumbler Ridge is an example of how some towns are forced into action following a crisis. It is a planned instant town developed in the 1980's to support a coal mining operation

in northeastern BC. In 2000, the community woke up to mine owners announcing the end of coal mining in the area. Following the announcement, Minister of Energy and Mines, Dan Miller, was quoted as saying "the town was built for one purpose, as a place to house the workers for the two mines, and without the mines, I don't know that you could convert the town to some other use" (Hunter and McInnes 2000 from Markey et al. 2012, 190).

Residents opposed such messages from the media and politicians, which described Tumbler Ridge as a 'disposable town'. Instead, they acted quickly to create an emergency action plan and Revitalization Task Force, which began to secure education and health services, buy back housing stock, pay off town debt, and diversify the economy, among other goals (Markey et al. 2012, 191). The town has since been successful in retaining residents and young people, largely thanks to the sense of community belonging which had developed over the town's brief twenty-year lifespan. It was strong enough to solicit a strategic and broadly supported diversification plan which continues to develop a diverse range of economic opportunities, including: resource development, eco-tourism, palaeontology, small businesses, and attracting retirees and students (Markey et al. 2012, 193).

A Case for Renewal in Mackenzie

Mackenzie finds itself somewhere between crisis and planning. Although they experienced a similar loss of industry as in Tumbler Ridge, the mill closures of 2008 were largely temporary, and most have since reopened. The community finds itself in need of attracting workers, who may remember the town's vulnerable situation all too well. A strategic strategy is needed for the town to prevent such a crisis and

give security to families wishing to live in Mackenzie. A seed for their strategic plan was planted shortly after the 2008 crisis, when they held a civic "Save Our Community Rally" and drafted a set of resolutions which greatly inform this thesis, they include (Markey et al. 2012, 205):

- Establish forest policies which require logs to be processed in the community where they are harvested.

- Ban raw log exports. Increase value-added exports.

- Solicit governments to guarantee services are maintained during times of crisis in return for the community's contribution to government coffers.

- Increase funding for training and retraining workers who have been displaced by automation or market downturns.

- Incentivize forest companies to reinvest in their operations to be more sustainable and diverse.

- Make comprehensive reforestation and silviculture a top-priority.

- Ensure sustainable harvesting practices which maintain the resource, a healthy environment, and minimize waste.

- Ensure timber access for value-added production, small companies, non-profits, and cooperatives.

- Advocate for greater local control of forest resources.

Figure 43   Sunset along a hiking trail near Mackenzie.

An Infrastructure for Mackenzie

The four foundational infrastructures described in the whole community approach (physical, community, human, and economic) are expanded upon in this section, used as a methodology to develop the design response. Reflecting on Mackenzie's existing physical infrastructure can help us find a strategic scope and site for the design proposal, while the three other infrastructures can clarify what program investments are best suited to strengthen the community.

Physical Infrastructure

Markey, Halseth, and Manson describe physical infrastructure as the "bridge" from community development to economic development (2012, 54). In this thesis it serves as the vehicle for the design response, facilitating the other infrastructures in the form of programs. Their definition of physical infrastructure includes traditional infrastructure such as roads, rail, energy, and communication, and extends to include the facilities which house community amenities as well as the general quality of the built environment.

If used as an opportunistic tool, physical infrastructure can support functional needs of the community (heat, circulation, parking) while also making the townsite more attractive for residents, businesses, and industry (walkability, density, social interactions, access to nature). For young settlements like Mackenzie, an investment in physical infrastructure also presents the opportunity for place-making, allowing the community to reshape their surroundings to better reflect their culture, identity, and environment. The following series of diagrams analyse existing urban systems and architectural language in Mackenzie.

Zoning

The urban plan of Mackenzie is similar to Stein's Kitimat plan, structured by clear land-use separation with the intention of creating a hygienic and efficient environment. This method of suburban development inspired by the garden city model has encouraged car-oriented development and reduced the liveliness of the public realm. Moving forward, new infrastructure should seek to break down this segregation, combining various uses and bringing modern industry back to the townsite.

INSTITUTIONAL

PARK

RELIGIOUS

COMMERCIAL

MOBILE HOME PARK

SINGLE-FAMILY HOUSING

MULTI-FAMILY HOUSING
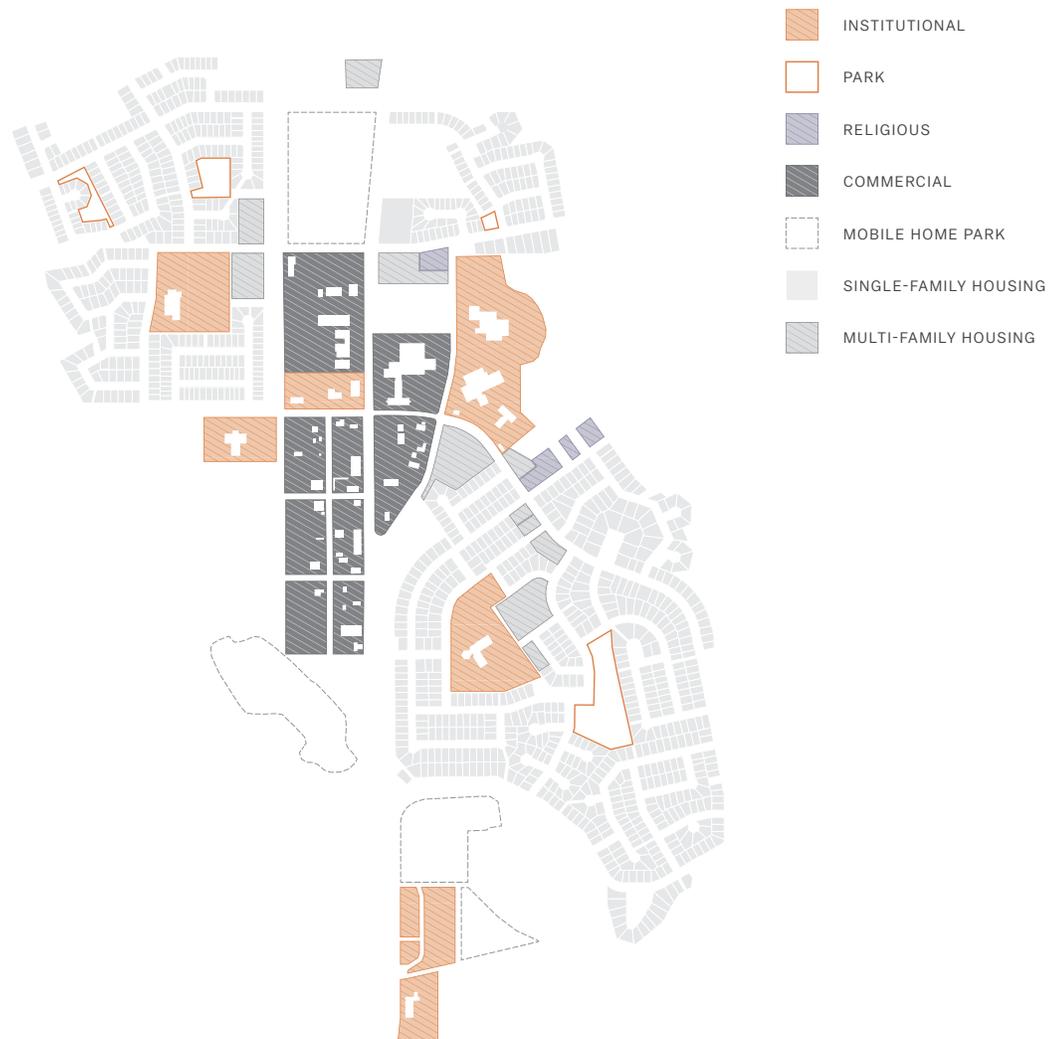
Figure 44

Urban analysis diagram, illustrating land use zoning.

Car-Oriented Development

Segregated land-use strategies have resulted in a car-dominated urban environment, with large blocks concentrating traffic along designated corridors and an urban core made up of independent buildings and isolating parking lots. An axial north-south boulevard acts as the main street, being the only route into and out of the town (south). New infrastructure should encourage future buildings to reinforce the street edge and interact with the public realm. This will require increased walkability and a civic parking strategy.

1 THE TOWN CENTRE IS DOMINATED BY INDEPENDENT PARKING LOTS AND CAR-ORIENTED DEVELOPMENT

2 LARGE SUPERBLOCKS CONCENTRATE TRAFFIC BUT REDUCE WALKABILITY
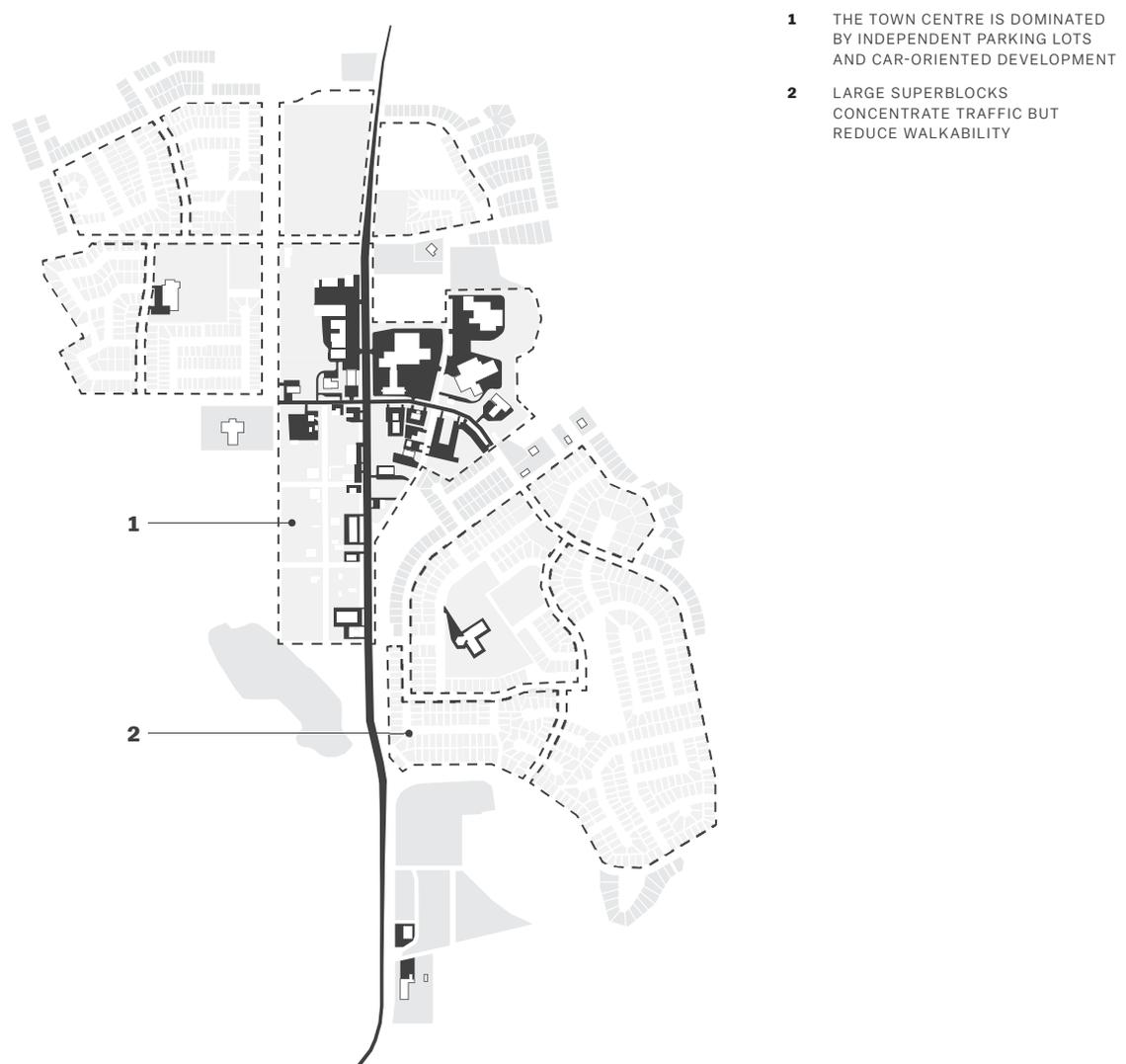
Figure 45

Urban analysis diagram of parking and superblock structure.

Pedestrian Networks

In residential neighbourhoods, there is an existing network of pedestrian pathways which break down the large block structure. The town centre does not have the same fine grain pedestrian infrastructure and lacks both circulation and exterior public space. The community would benefit from greater pedestrian infrastructure in the town centre which integrates with residential networks and further breaks down the large urban blocks.

1   RESIDENTIAL AREAS HAVE A NETWORK OF PEDESTRIAN TRAILS AND STREETS TO INCREASE WALKABILITY

2   PEDESTRIAN ACCESS IS REDUCED IN THE TOWN CENTRE

——   SIDEWALK / PATH

······   TRAIL / INFORMAL PATH

Figure 46

Urban analysis diagram of pedestrian networks.

Public Facilities

Like other instant towns, Mackenzie has a wide array of public services and amenities, with the most notable being a robust recreational centre. These facilities are clustered within the town centre alongside the shopping mall and commercial boulevard. Schools and parks are located in residential areas. The only exterior public spaces are sports fields, playgrounds, and recreational trails, with no central gathering space or town square. The town hall is located on the periphery, near the forest administration building.

1 A CLUSTER OF INDEPENDENT PUBLIC FACILITIES IN THE TOWN CENTRE

2 PARKS AND ELEMENTARY SCHOOLS ARE IN RESIDENTIAL DISTRICTS

**3** TOWN HALL AND FOREST ADMINISTRATION ARE LOCATED AT THE PERIPHERY
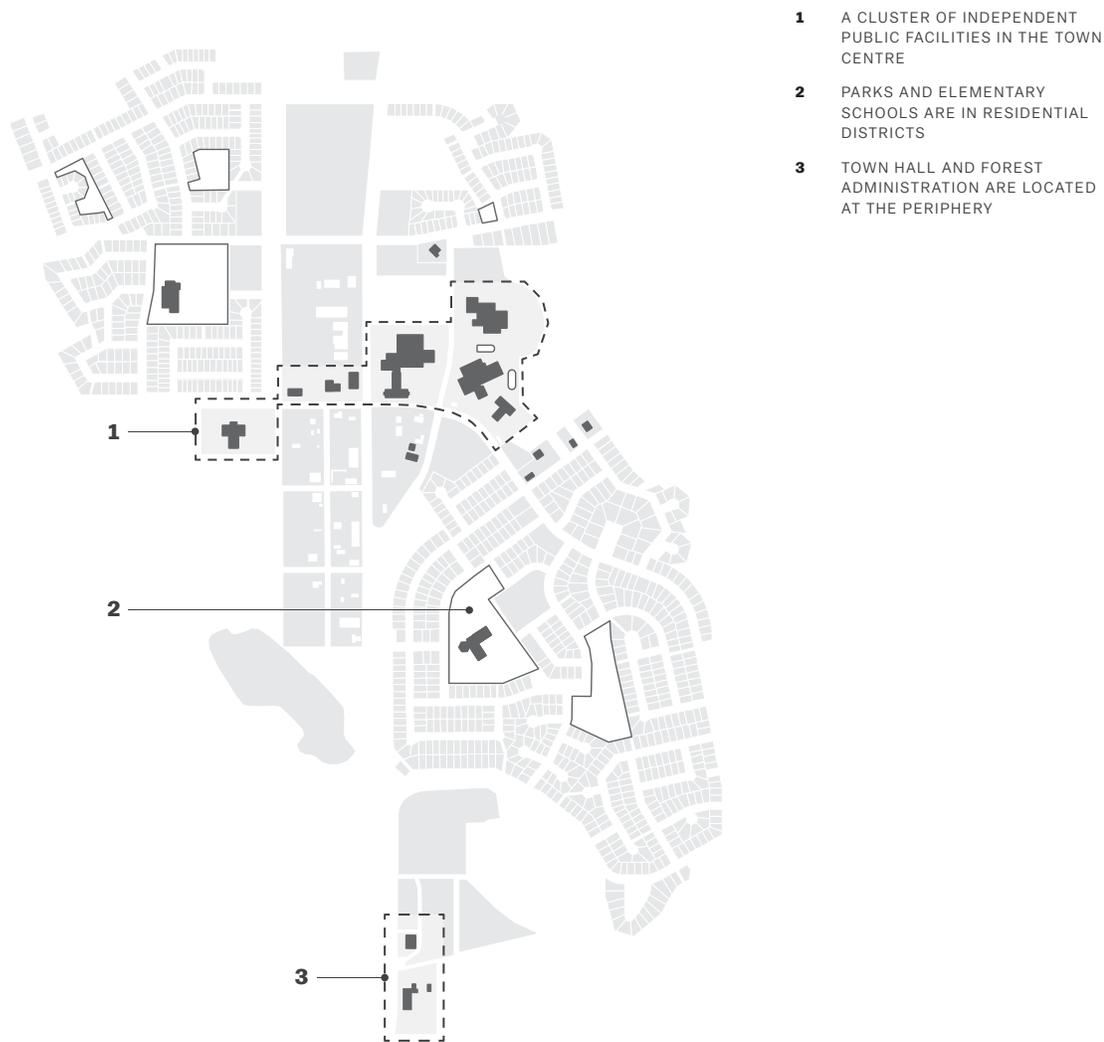
Figure 47

Urban analysis diagram of locating parks and public facilities

Public Building Culture

A desire to 'winterize' the community and cater to the car has resulted in a common public building culture, which consolidates a multitude of programs under one roof and surrounds them with parking. Although there are robust social amenities available, the isolated, functional nature of each development has diluted their civic presence and does not reinforce the street edge. They have been developed as individual buildings, not as an urban fabric. Despite the town being dependent on forestry, there is a lack of wood construction and an abundance of standardized materials such as masonry, steel, vinyl, and metal panels.

IDENTITY   *PROGRAM*   *ORIENTATION*   *ACCESS*

**Inexpressive
+ Utilitarian**   **Consolidated
+ Concealed**   **Isolated
+ Individual**   **Separated
by Parking**

MALL / GROCERY / HOTEL   *REC CENTRE / LIBRARY*
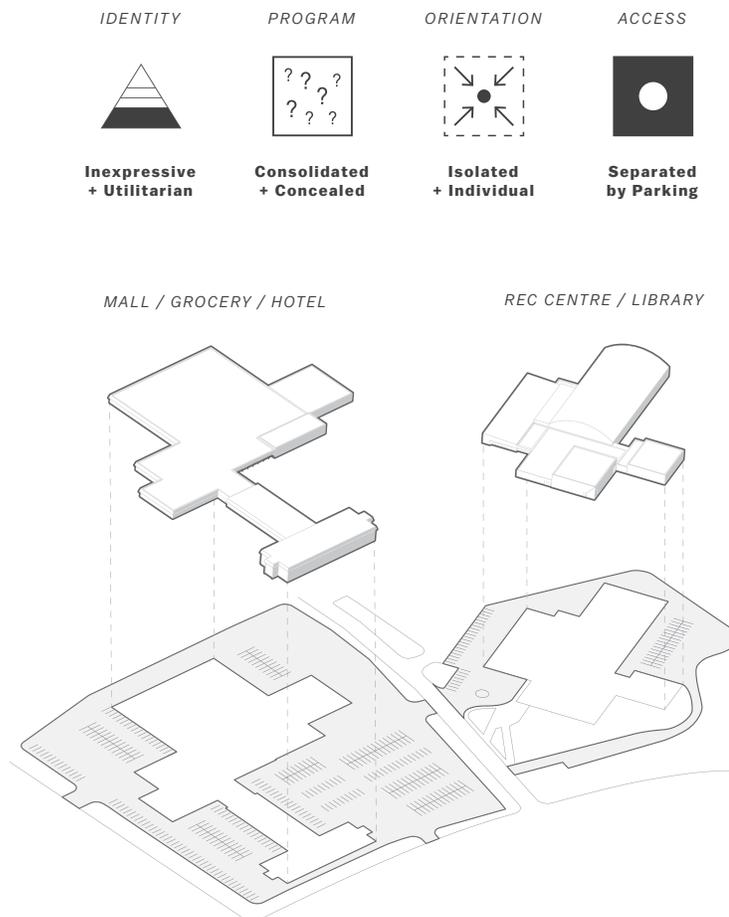
Figure 48

Criticism of current building culture in Mackenzie, which is not conducive to place-making.

Figure 49

A portion of the existing recreational centre which is currently being retrofitted.

Figure 50

An example of commercial buildings in Mackenzie, built of materials not relevant to place and separated from the street with parking.

Figure 51

Existing "municipal offices" in Mackenzie, built in 2001.

Community Infrastructure

Community infrastructure builds capacity within small towns, and includes the delivery of services such as health care, education and social services. These are critical for small communities to attract and retain residents, businesses, and industry. Strengthening community capacity requires increasing their ability to plan as a collective, and encourages the participation and engagement of a complete cross-section of people within the community. It also relates to the strength of local volunteer, service, and nonprofit sectors (Markey et al. 2012, 54).

Van Boxel and Koreman of the design firm ZUS (Zones Urbaines Sensibles) have explored the complex relationship of responsibility and decision making within modern cities, where "the diffuse influences exerted by government, market and citizens, often leads to an impasse in both planning and social terms. This results in a loss of responsibility, direction and involvement" (2002, 18). In the face of retreating corporate responsibility and unpredictable government priorities, the local community should be given as much responsibility as is appropriate for their resources, and investments should focus on building their capacity.

In Mackenzie there is a close knit existing community, but the urban layout and building culture do not encourage engagement. There is no central gathering space (interior or exterior) and civic buildings such as the town hall and forest services building are located at the periphery of town with no associated public space (Figure 51). The automobile-focused urban structure also serves to separate residents, rather than encourage their engagement within the public realm.

Bringing the town hall to a more central location would better represent the role of such a civic institution. A new town hall should be complemented by a community hall, a space for gathering and participation which is large enough for community events, meetings, or festivities. Greater exterior public space is also needed to allow inhabitation of the public realm beyond mere circulation.

Human Infrastructure

Human infrastructure refers to the community's human resource capacity, and can be strengthened through education, training, and health. A flexible and place-specific education system must be available for all ages, including young children, youth, and adults. Good kindergartens and schools are essential to attract and retain young families, while allowing both parents to work if they so choose. Continued adult education is crucial for training an adaptable and responsive workforce, able to take advantage of a diverse range of economic opportunities. There is a trace of this in Mackenzie, where a regional college offers classes based on demand (Figure 52). Mackenzie is in need of adaptable spaces for adult education which can facilitate a broad range of learning environments, especially retraining displaced workers and teaching new technologies.


Figure 52

Existing adult education facility in repurposed commercial space.

Economic Infrastructure

Economic Infrastructure is concerned with the creation of sustainable long-term employment opportunities. Statistics Canada has reported that small and rural places have slightly more business enterprises per capita compared to large urban centres, and although they tend to be smaller, rural BC companies account for over half of all manufacturing exports in the province (Markey et al. 2012, 56-7). This suggests that there is already strong entrepreneurial ability present in smaller communities. Infrastructure should focus on supporting the development of new opportunities which fit local assets and aspirations, enabling private and nonprofit entrepreneurs to create a diverse base of employment and revenue. Markey, Halseth, and Manson suggest investing in research facilities and research capacity as one method to support new industries and technologies.

Residents of Mackenzie have a well established understanding of the forest industry and have advocated for more renewable, locally managed forestry practices. The sustainable forestry model illustrated in Figure 53 offers several opportunities for new industries when compared with existing practices. By reducing waste, increasing reforestation, and exploring value-added exports, an existing industry becomes more diversified, renewable, and creates valuable jobs and revenue. These industries include local tree nurseries, engineered wood products, and waste-to-biomass energy. Locating new industries in the townsite rather than the industrial area is important because it presents an opportunity to integrate work, a fundamental parts of life in Mackenzie and why many residents came to the town.
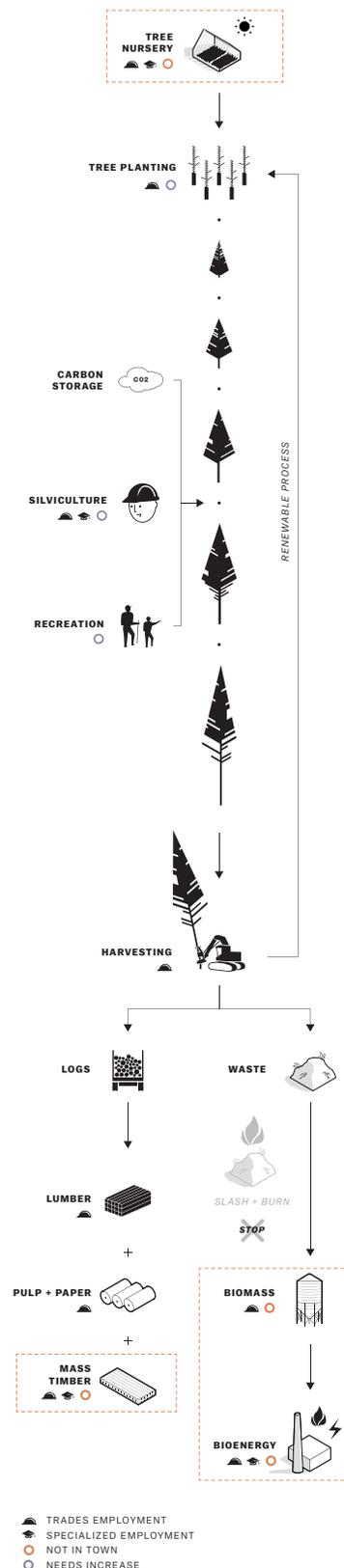
Figure 53 Sustainable forestry system, finding opportunities.

LOCAL OPPORTUNITIES
- SUPPLEMENT AND DIVERSIFY EXISTING ASSETS
- BRING INDUSTRY + IDENTITY TO TOWNSITE

WASTE

GHG

SEEDLINGS

GHG   GHG

EXISTING INDUSTRY
- FOCUSED ON EXTRACTION + EXPORT OF STAPLES

Municipal Boundary

WORKERS

GHG

SAWMILL

PULP MILL

GHG

④

③

②

①

LAND USE
- CLEAR SEPARATION OF INDUSTRY FROM TOWNSITE

Forest service roads
provide access for
backcountry recreation

Municipal Boundary

TOWN SITE

Crown lands used
for clearcut logging

INDUSTRY

Airport

Road out of town

Reservoir used
for transport

LANDSCAPE

Hart Mountain Range

TOWN SITE

Morfee Lakes

Williston Lake Reservoir

Interior Plateau

Figure 54

Economic Infrastructure
in Mackenzie, including
transportation, energy,
existing industries and new
opportunities.

Local Economic Opportunities

Tree nurseries are a relevant opportunity because replanting is a crucial part of a managed forest and the long term future of places which depend on the forest. By shifting responsibility for tree production and planting to the community, it increases their control and creates a benefit from what was previously an expense. The government has also recognized the carbon storage potential of BC's forests. Through the Forest Carbon Initiative, they plan to drastically increase the rate of replanting and seek to rehabilitate up to *300,000 hectares*, reducing annual emissions by *11.7 million tonnes* (Province of BC 2016, 24).

Value added forestry products such as solid wood building materials or biochemicals can diversify exports while creating high paying employment. Engineered timber building materials are poised to become a major industry in the province and Mackenzie can take advantage of their growth. If the province shifts a small amount of the current wood harvest from pulp and paper toward solid wood products it could offset *1.8 million tonnes* of CO2 equivalent per year and create hundreds of new jobs (Pacific Institute for Climate Solutions 2017, 20-22).

Biomass energy is an underutilized opportunity, as companies currently allow most harvest waste to decay on site or burn it to reduce the fuel for forest fires. By collecting residue and using it to produce bioenergy, fossil fuels are offset and the community gains a valuable resource they can use locally, or export in the form of bio pellets. It is estimated that the BC biomass sector could produce over two thousand jobs and offset *4 million tonnes* of CO2 equivalent annually without increasing clear cutting (PICS 2017, 20-22).
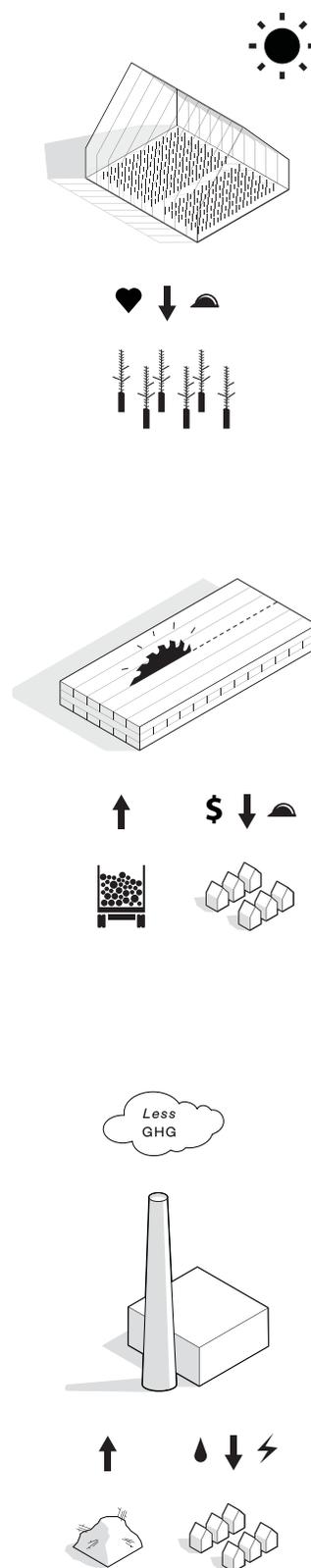
Figure 55

Local economic opportunities.

Selecting Program

Based on the analysis of existing infrastructure in Mackenzie, the urban design strategy should focus on enhancing the public realm within the town centre by increasing walkability, integrating various uses, and creating a public town centre.

Taking advantage of the existing forest industry, a waste to biomass district heating system presents the opportunity to create better connections between existing public facilities and can be used to reshape the urban experience through a multi-use greenway which traces the distribution network. The district heating system would also include an accessible central heating plant, demonstrating how modern industry can contribute to the urban environment in a positive way.

To better facilitate the planning and leadership needed for their economic renewal, community infrastructure should include a new town hall at the centre of town. Along with municipal offices, the town hall should include a variety of community gathering spaces, with at least one large enough for collective events, encouraging community participation and engagement. Exterior gathering spaces at a variety of scales should also be created to encourage social interactions among residents.

A new training and education centre is a strategic example of how human infrastructure could be provided within the new town centre, enabling the community to investigate and take advantage of future opportunities, such as engineered wood production. Childcare spaces should also be included within the centre to give flexibility to families, helping to move away from the culture of a male-dominated workforce.

CHAPTER 5: DESIGN

Mackenzie's new community infrastructure includes several strategic elements, chosen for their potential to strengthen community capacity, improve the urban experience, and contribute to a distinct sense of place. Developed in the previous chapter, the program is drawn from the analysis of existing infrastructure and includes a biomass waste-to-energy district heating system, greenway network, and new Town Centre. The Town Centre contains community infrastructure in the form of a central community hall, municipal offices, and town square; and human infrastructure in the form of a skills incubator and preschool.

Making Place

To inform the scope and intention of the design strategy, a set of place-making qualities are developed in response to the earlier analysis of Mackenzie's existing building culture and urban environment. These qualities inform the design at both urban and building scales, and are organized here with the intention that lessons learned from Mackenzie can benefit other planned resource towns.

expressive   integrated uses   public centres

active connections   clear boundaries   positive space
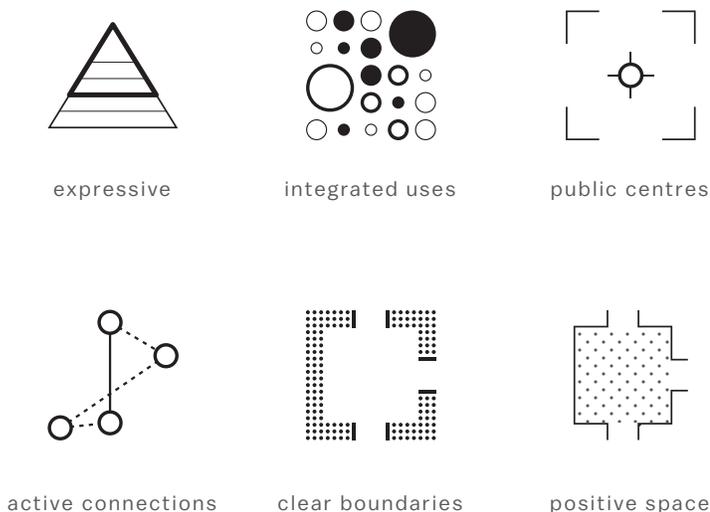
Figure 56

Place-making qualities.
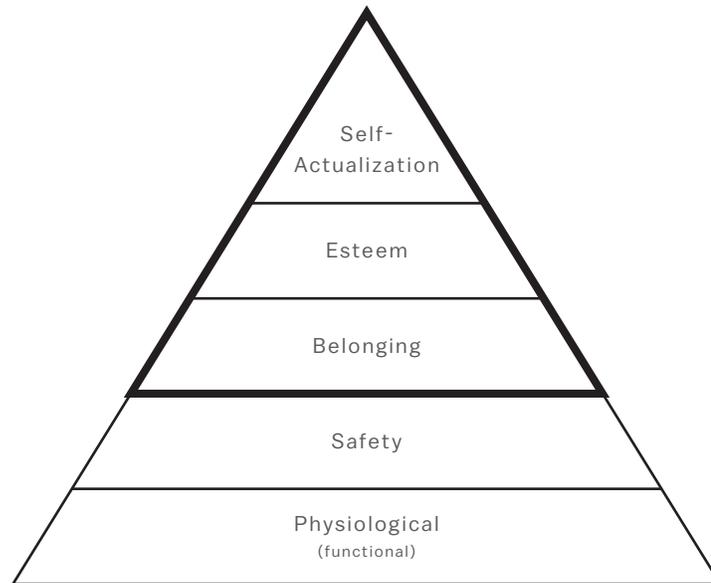
Figure 57

Adaptation of Abraham Maslow's "hierarchy of needs".

New infrastructure should be *expressive* of local identities and place through material, organization, and activity, rather than serving only the functional needs of residents. In *Integral Urbanism*, the author uses Abraham Maslow's "hierarchy of needs" to illustrate how our environments should satisfy not only our physiological and security needs, but also our "higher needs for belonging, self-esteem, and self-actualization" (Ellin 2006, 3). This concept is in line with Moore's notion that true places are not created by simply manipulating shapes and spaces, but by "making a sensible image of a culture" which can give people a sense of where they are within it (Moore 1980, 292).

By designing for *integrated uses*, a diverse range of activities can begin to break down the strict segregation currently experienced in Mackenzie's urban environment and create a dynamic and vibrant town atmosphere. Vibrant cities combine primary and secondary uses to ensure residents share a series of common streets and facilities, which are used for a variety of reasons and do not concentrate

activities around a particular time of day (Jacobs 1961, 161-64, 241)(Montgomery 1998, 104-5). Integral Urbanism expands this concept of integrated uses to include nature and the landscape, which are treated as symbiotic to people and buildings, rather than in opposition (Ellin 2006, 9).

Within a diverse fabric of integrated spaces, structure and hierarchy can be reinforced through *public centres*, concentrations of activity and significance which attract residents and serve to break up the monotonous modern "flatscape" described by Norberg-Schulz (1969). Relph (1976, 49) and Norberg-Schulz (1971, 25) both describe the quality of "insideness" as a primary element behind the place concept, distinguishing centres from an "outside" and allowing us to inhabit a place, build belonging, and begin to identify with it.
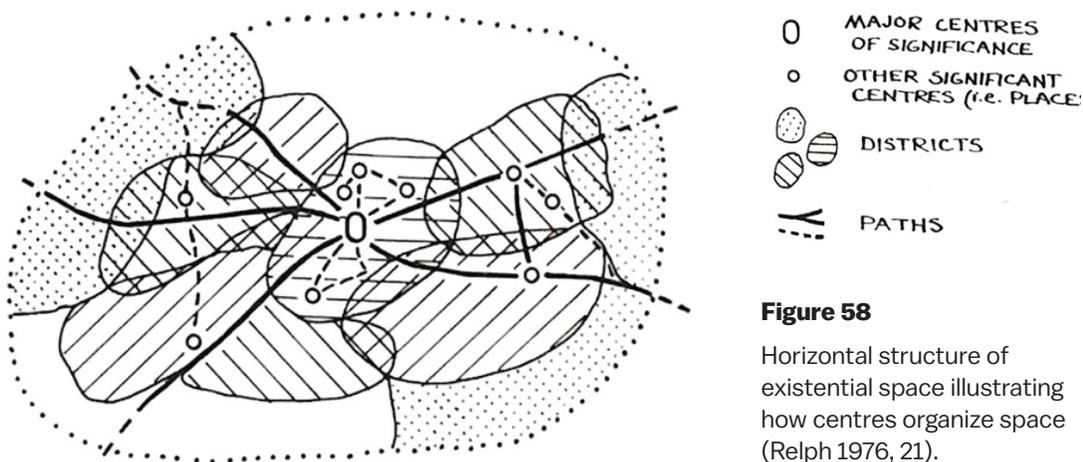

Figure 58
Horizontal structure of existential space illustrating how centres organize space (Relph 1976, 21).

By providing *active connections* between public centres and areas of different primary use, the urban experience can become more integrated and existing centres enriched. Active connections contribute toward a civic quality within the public realm and tie previously independent developments together. Moore has written that connections can "gather up"

importance as someone moves from one place to another, in a processional way (2001, 92-3). A framework of active connections can also give structure to future developments, supporting an adaptable urban environment which is able to respond to growth or decline within the town.

Clear boundaries and edges should demarcate active connections and framed spaces. Moore saw the demarcation of edges as crucial to the "gathering up and enclosing of importance", while the "absence of edges may well be responsible for the disappointing sense of nowhere in some of our newer cities" (2001, 93). Boundaries, thresholds, and other divisional devices have the ability to separate, frame, and unite spaces; crucial tools for the creation of an inside, and ultimately, a distinct place.

Designs should strive to create tangible *positive space* between buildings; that is to say, in-between spaces with a distinct and definite shape. In *A Pattern Language*, Alexander and his colleagues note that left-over "negative spaces" tend to remain unoccupied or become parking; he references Sitte's extensive analysis of European city squares, which determined that the most lively spaces were partially enclosed and of a human scale (1977, 518-22). The current pattern of independently oriented developments in Mackenzie has resulted in a town centre dominated by large swaths of negative space used for parking, separating buildings from each other and from the street. The creation of positive space will, therefore, need to address parking in a more civic manner. From his observations, Alexander suggests that small parking lots of less than five to seven cars are the least disruptive or perceptible (1977, 102-3).

positive space

a.

b.

negative space

c.

d.
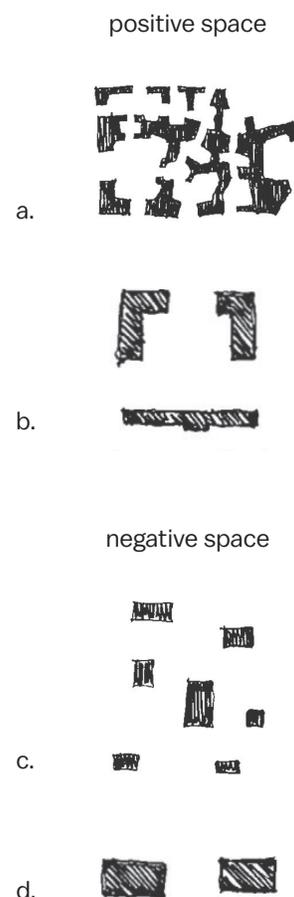
Figure 59

Sketches of positive space (a,b) versus negative space (c,d) (Alexander et al. 1977, 518-9).

Urban Strategy

The urban strategy (Figure 62) takes advantage of the proposed district heating network, which connects all existing public buildings, to frame a new multi-use greenway system, creating active connections throughout the central district of Mackenzie and reinforcing a new Town Centre. By stitching residential areas back to the central district, the greenway system breaks down urban blockages and reintegrates the townsite with the surrounding forest and trail system.

With only one road in, all residents and visitors enter town along the main boulevard from the south, whether that is after a shift at the mill or driving in from the main highway. Currently, the procession into town has a marked shift from forest to townsite; the dense forest is left behind as the road widens, parking lots get bigger, and buildings drift further from the street edge. The new greenway uses native trees to create boundaries and thresholds within the public realm, giving greater definition to the main boulevard and arterial streets which guide the district heating network. Along the central axis of town, the wide boulevard is narrowed to

Figure 60 Looking south along central boulevard, which is well defined by a dense forest edge.

Figure 61 Looking north along central boulevard, which progressively loses street edges and definition as you get closer to the town centre.

accommodate planted areas for water and snow retention, as well as small clusters of street parking. With parking and snow storage being addressed in a civic manner, large swaths of existing parking have the potential for future densification or reforestation.

The design strategy serves to integrate existing public facilities and neighbourhoods, create a new primary Town Centre, and re-orient the fragmented central district of Mackenzie. Rather than provide an overly totalizing masterplan, it intends to act as a framework for any number of unforeseen futures, opening up urban blockages and providing well defined active connections between quality civic spaces. A clear urban framework allows for the town to grow and adapt within a collective civic fabric, rather than as a collection of piecemeal developments.

Future stages of the urban strategy include the densification of existing commercial areas with mixed-use development, including clean industry. As the central boulevard is densified, there is potential for the mixed-use district to expand within a flexible structure, indicated by the street grid west of the Town Centre. Buildings for clean industry, such as wood manufacturing, can contribute to a distinct sense of place which acknowledges the ongoing importance of industry within the community. Just as the textile mills and industrial factories of older cities are part of their fabric, a new heritage of timber structures in Mackenzie can become part of its built environment, continually adapted and modified over generations to serve the changing needs of a community.

MORFEE LAKES

5 MIN WALK

DISTRICT HEATING SYSTEM
CONNECTS PUBLIC BUILDNGS AND
PROVIDES A FRAMEWORK FOR A
NEW GREENWAY NETWORK

recently logged

recently logged

21

14

12

10

13

8

15

7

9

3

5

4

6

11

TOWN CENTRE

14

BIOMASS PLANT

EXISITNG TRAIL-N

16

MIXED-USE DISTRICT
existing commercial areas to become flexible mixed-use neighbourhoods.

21

recently logged

12

WETLAND

NEW TREES

REHABILITATION OF CLEARCUT
AREAS FOR FUTURE HARVESTS

recently logged

1

2

20

LEGEND

— DISTRICT HEATING NETWORK
— NEW PATH
  DISTRICT HEATING AREA
  EXISTING PUBLIC FACILITY
  NEW BUILDING
  CLEARCUT REHABILITATION

EXISTING PUBLIC FACILITIES

1	TOWN HALL	8	SKATE PARK	15	MALL
2	FOREST MANAGEMENT	9	OUTDOOR RINK	16	SKI HILL
3	POST OFFICE	10	REGIONAL PARK	17	BEACH
4	POLICE STATION	11	MUSEUM	18	DAYCARE
5	FIRE HALL	12	ELEMENTARY SCHOOL	19	LEGION HALL
6	CLINIC	13	HIGH SCHOOL	20	GOLF CLUB
7	SPORT CENTRE / ARENA	14	CHURCH / TEMPLE	21	TREE

0m   100   400

Figure 62   Town plan of urban strategy.
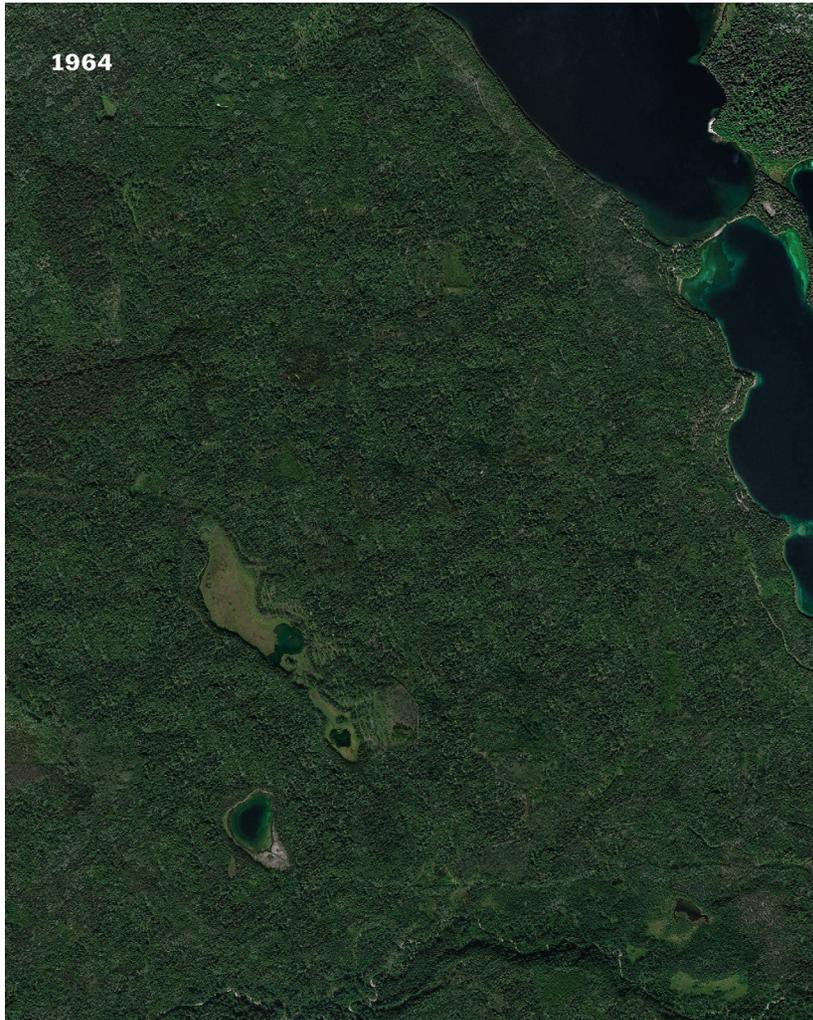
Figure 63 An estimation of the forest canopy in 1964, prior to any clearing of the townsite.

Figure 64 Present tree canopy and clear cut areas, illustrating the disconnection between the townsite and the surrounding forest.

Figure 65 Proposed tree canopy and forest integration. The axial boulevard and arterial roads guiding the district heating system are better defined and existing parks and forested areas better connected.
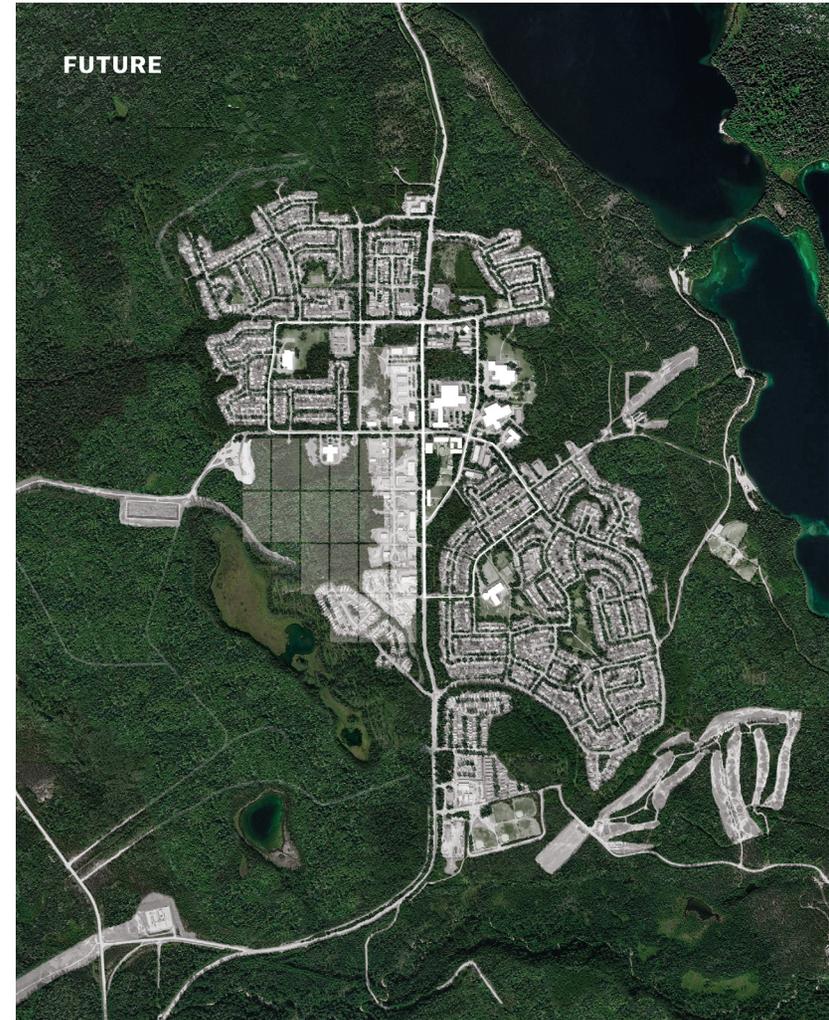

Figure 66 Future tree canopy and forest integration. The greenway network extends into residential areas and becomes more fine grained. Potential expansion of the central district west of the Town Centre.

EXISTING STREET SECTION
Lacks definition and public realm

a. Property line
b. Parking lot
c. Wide 4-lane road
d. Isolated walkways
e. portions of intact forest

Enlarged section below
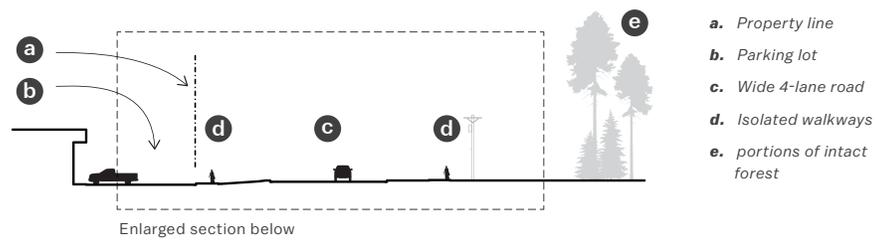
PROPOSED GREENWAY SECTION
Trees and buildings give public realm definition; integrated with water cycle

Future mixed-use and industrial buildings frame sidewalk | Activated sidewalk | Small parking areas | Narrowed road | Water / snow reservoir | Widened multi-use path | Expanded forested areas

| 2 | 1.5 | 3 | 1.5 | 6 | 3.5 | 3.5 | 6 | 1.5 | 4 |
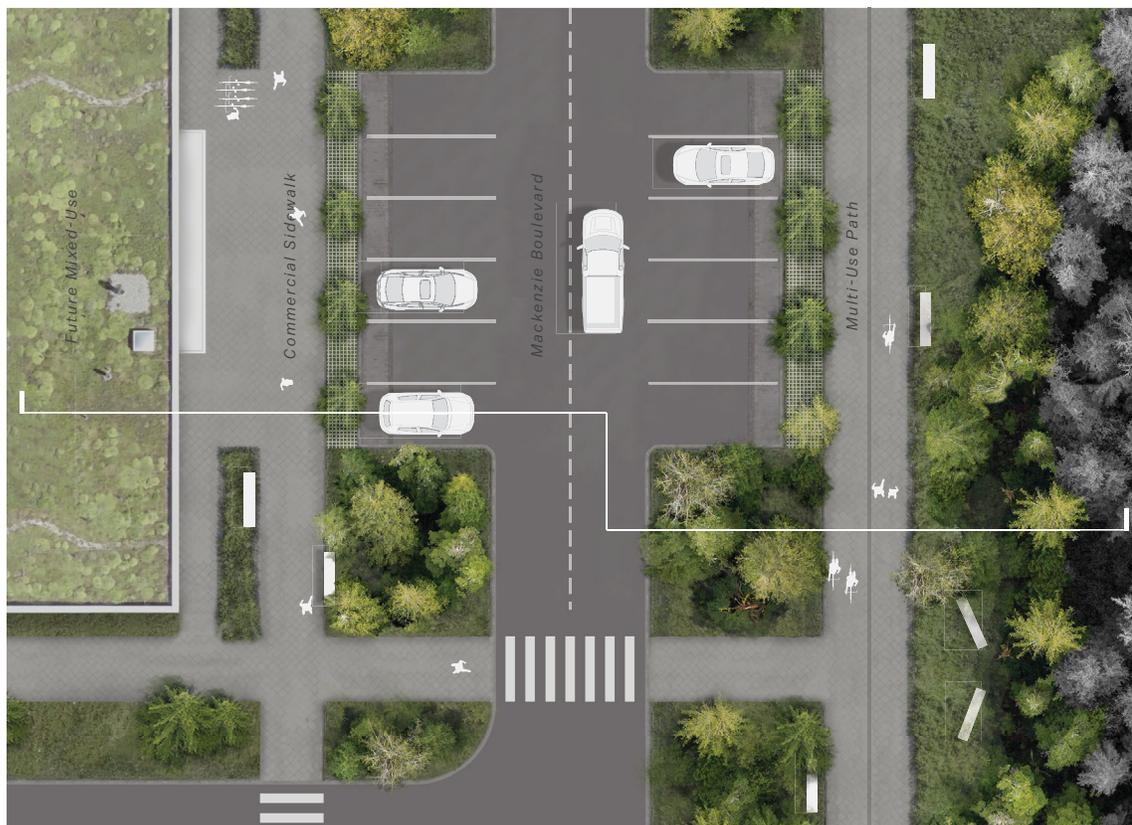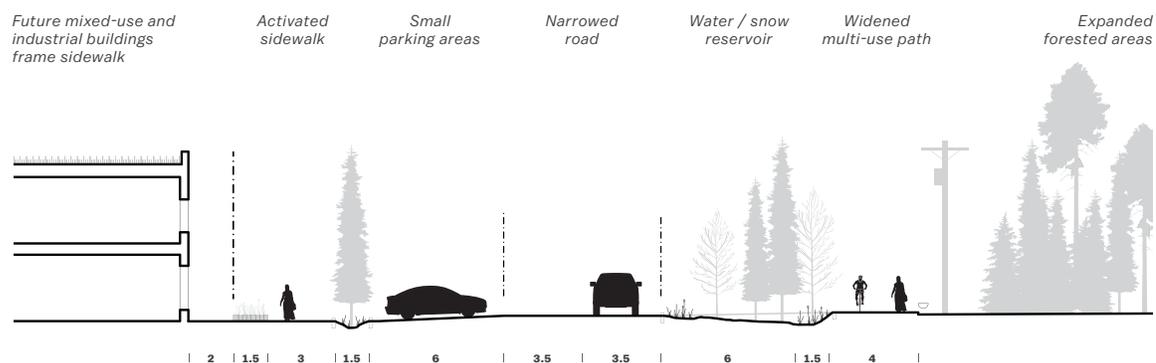
Figure 67 Greenway strategy for central Mackenzie Boulevard.

0   2   5   10m

Town Centre

A large, irregular block along the main boulevard is reimagined as a new Town Centre and park. At the south end of the block is the biomass heating plant, marking the entrance of the Town Centre and acting as a highly visible symbol and identifier within the community. The middle of the block is an urban clearing in the forest, with an existing forest to the west reinforced by arboretums to the east and south. A new Town Square to the north is framed by the Community Hall, Municipal Building, and Skills Incubator. The square acts as
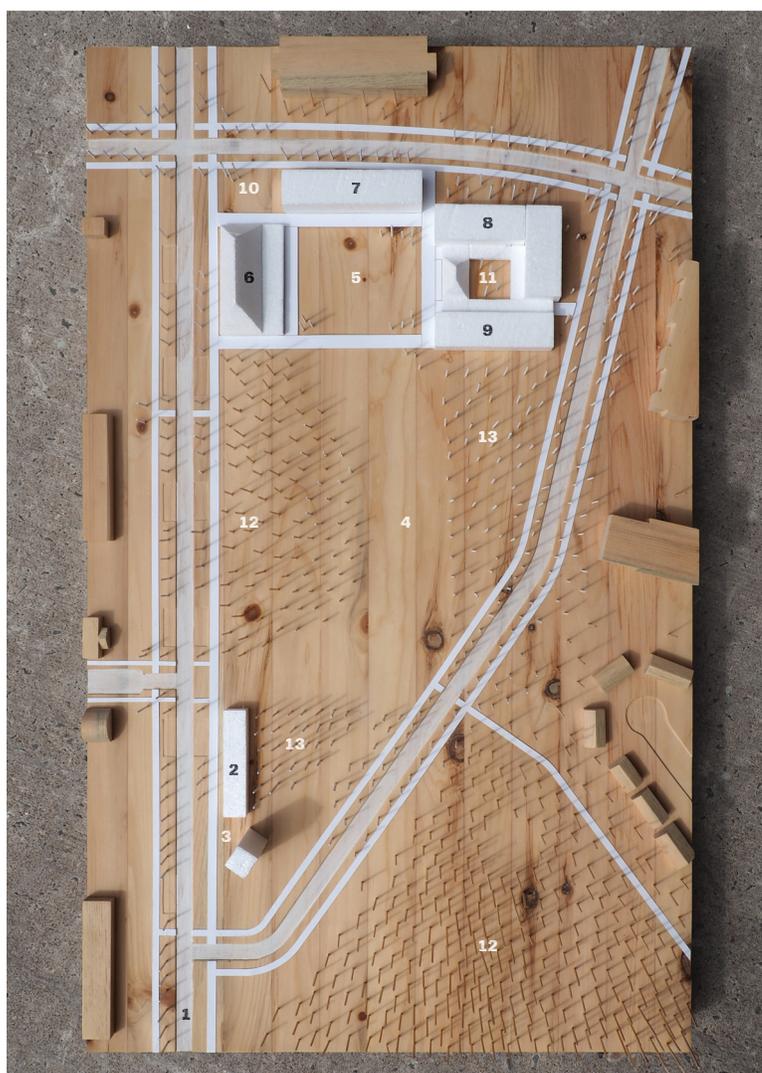
1:500

1 MACKENZIE BOULEVARD GREENWAY
2 BIOMASS HEATING PLANT AND TOWER
3 GATEWAY SQUARE
4 MEADOW
5 TOWN SQUARE (WINTER ICE RINK)
6 COMMUNITY HALL
7 MUNICIPAL ADMINISTRATIVE BUILDING
8 SKILLS INCUBATOR
9 PRESCHOOL
10 ENTRY SQUARE
11 COURTYARD WITH COMMUNITY FIREPIT
12 EXISTING FOREST (EXPANDED)
13 ARBORETUM / MANAGED FOREST

Figure 67 Model of the Town Centre, with new greenway, buildings, and trees.

a singular gesture to connect each of the distinct buildings which reinforce it.

With the majority of existing park spaces designated for children or youth, and located within semi-private residential neighbourhoods or at the periphery of town, there is a lack of truly democratic and flexible park space. The Town Square and central meadow seek to provide a collective gathering space within the public realm which can be used for a range of events, including festivals, markets, rallies, or recreation. The main square can be flooded in the winter to become an ice rink or the summer to become a splash pool. More intimate squares and public rooms are created through the relationships and spaces between new buildings, taking on a distinct character which reflects their context.

Figure 68   Model of the Town Centre, looking south toward biomass tower.

BIOMASS HEATING PLANT

Economic Infrastructure

COMMUNITY HALL   **MUNICIPAL OFFICES**

Community Infrastructure

SKILLS INCUBATOR

Human Infrastructure
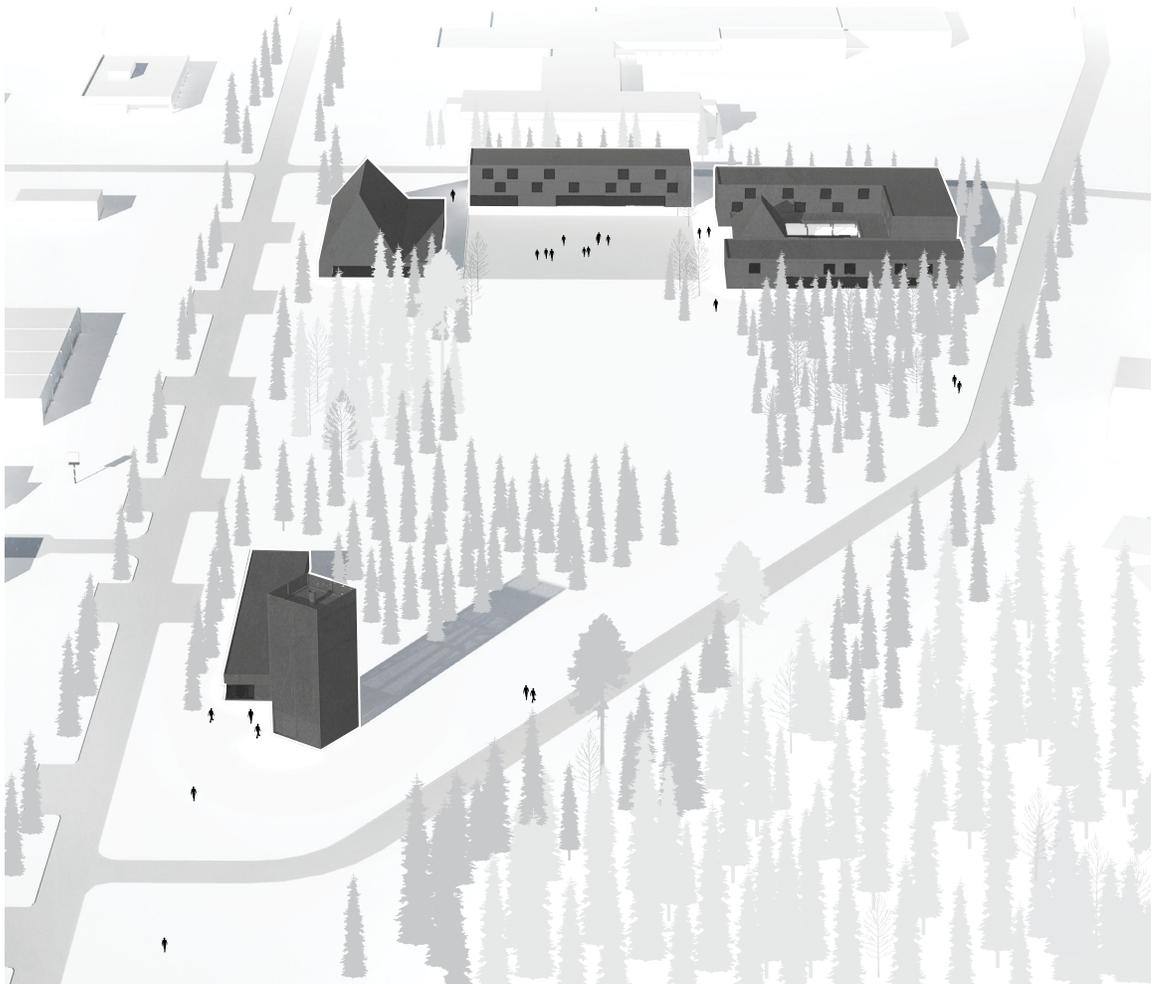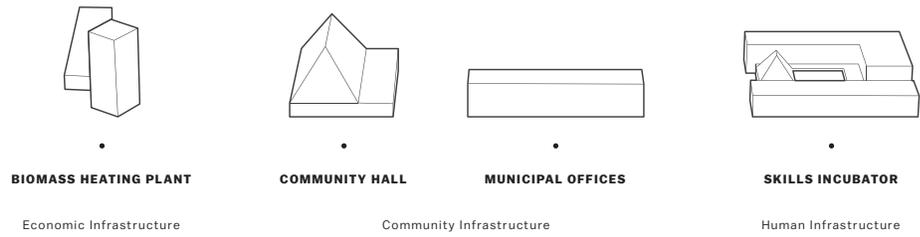
**Figure 69**   Programmatic elements of the new Town Centre.

Biomass Heating Plant

The biomass heating plant is comprised of two elements: a low volume sitting parallel to the main boulevard, and a tower volume which is rotated to align with an adjacent street. Both volumes are clad with slatted timber screens, allowing the illuminated tower to be visible from across the townsite, and the biomass process to be revealed to passersby. The low volume contains a visitor centre and the bulk of biomass facilities. Industrial waste, in the form of chips, sawdust, or pellets, is delivered to the large storage room at the north end of the building, dropped onto a conveyor, and brought down to the southern combustion hall. There, visitors can watch as the highly efficient process transfers energy from the waste to the district heating system. Exhaust is then purified before being released as steam. The tower frames an exaggerated exhaust stack, using a series of inverted mono-pitch wood trusses to brace the structure and frame a vaulted space within, which is open to the surrounding park. The biomass plant is an example of how clean industry can contribute to the public realm.

Figure 70 Approach to the Biomass Heating Plant, looking north.

SCREEN

Slatted Timber Screen

TOWER BRACING

Timber Monopitch Truss

6

BIOENERGY PLANT

1. Biomass Storage
2. Support Spaces
3. Visitor Centre / Viewing Area
4. Combustion Room
5. Views into Process
6. Chimney Stack Pavilion
7. Green Roof

BIOENERGY PROCESS

1. Biomass Waste from Forestry
2. Biomass Storage
3. Biomass Conveyor
4. Combustion and Heat Collection
5. District Heating Distribution
6. Chimney Stack / Icon

1:200

Figure 71   Axonometric of Biomass Heating Plant, illustrating the biomass heating process, program, and architectural elements.

EXISTING FOREST

SERVICE LANE

MULIT-USE PATH

NEW ON-STREET PARKING

MULIT-USE PATH

MACKENZIE BLVD

SWAIL / SNOWPILE TYP

URBAN ARBORETUM

2

7

5

6

1

3

4

PLAZA

SKEENA DRIVE

MEADOW
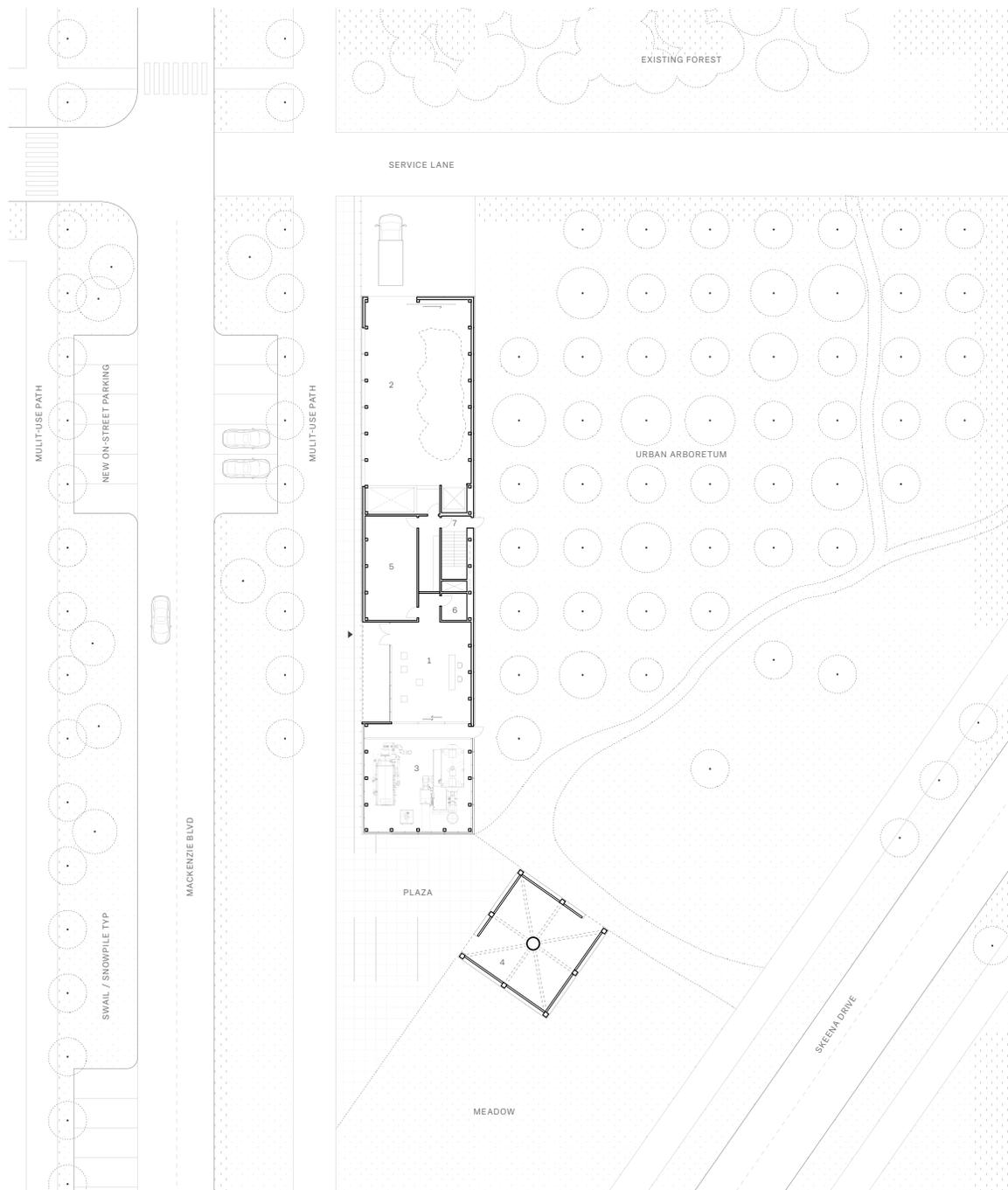
1:200

1 Visitor Centre
2 Biomass Storage
3 Combustion Hall
4 Exhaust Pavilion
5 Staff Room
6 Washroom
7 Stair to Below

Figure 72 Plan of the Biomass Heating Plant, greenway, and park entrance. Original scale noted.

BIOMASS HEATING PLANT
INTERIOR VOLUME OF TOWER LOOKING NORTH

Figure 73 Section perspective of biomass exhaust tower. During the day, the slatted wood facade gives transparency to the tower, letting those outside to catch a glimpse of the internal structure while those within can continue to feel the presence of surrounding trees.

Figure 74   View of the space between the two volumes. A woman stops to examine the biomass equipment within the combustion hall while a man is surprised by the internal space of the exhaust tower. The industrial process becomes a part of town life.

Community Hall

The community hall is the central gathering space for residents of Mackenzie, situated between the main boulevard, Town Square, and municipal offices. Residents enter at the north end of building, greeted by a low first story which breaks down the scale of the hip roof above. The low ceiling of the entry mudroom is of a domestic scale, and introduces the hall as an extended home rather than an institutional facility. Moving into the main space, residents enter a community living room located above a generous bleacher stair. They can either descend into the gathering hall below, or continue down the hallway to a variety of flexible spaces which open onto the town square. In a call for permanence, the main gathering space is carved from the site, putting down literal roots within the community. The sculptural roof which frames the space is instantly recognisable as a place of communion and occasion. To encourage everyday use, the hall has a variety of adaptable meeting and gathering spaces on the ground floor.

Figure 75   View of the Community Hall and Entry Square from across the boulevard. Existing rec centre beyond.

ROOF

1. Hip Roof - Shingles
2. Recessed Gutter
3. Lower Green Roof
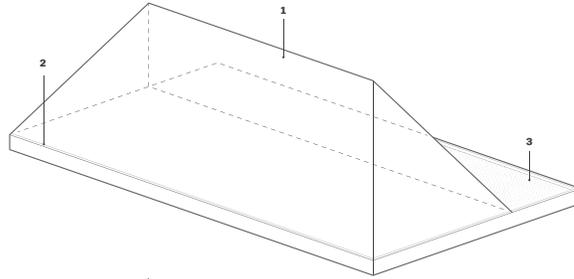
CEILING ELEMENTS

1. Enclosed Hip Roof Volumes - Gypsum Finish
2. Internal Screen - Wood Slats
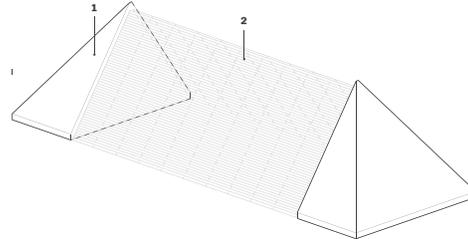
FACADE

1. Glazing - Wood Mullion Curtain Wall
2. Bracing Walls - CLT Panel
3. Main Entrance
4. Service Entrance
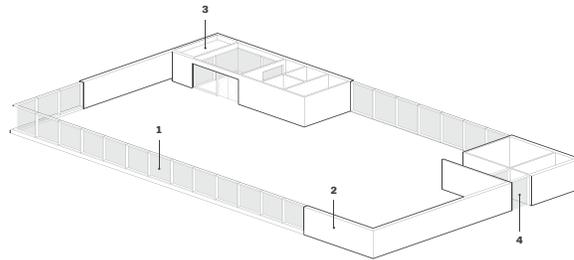
PROGRAM

1. Entry Mudroom / Coat Room
2. Foyer
3. Assembly Hall
4. Stage Area
5. Break-out Space (connected to plaza)
6. Elevator / Service Core
7. Fire Stair
8. Washrooms
9. Mechanical / Storage
10. Kitchen

MAIN ENTRY

PUBLIC PROGRAM

PRIVATE PROGRAM BELOW
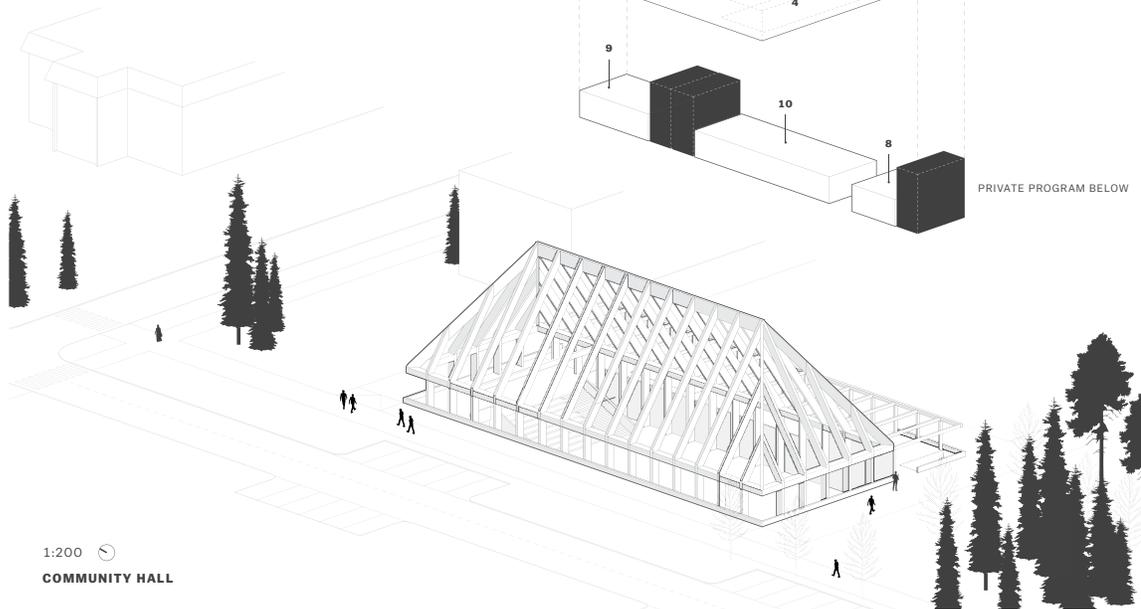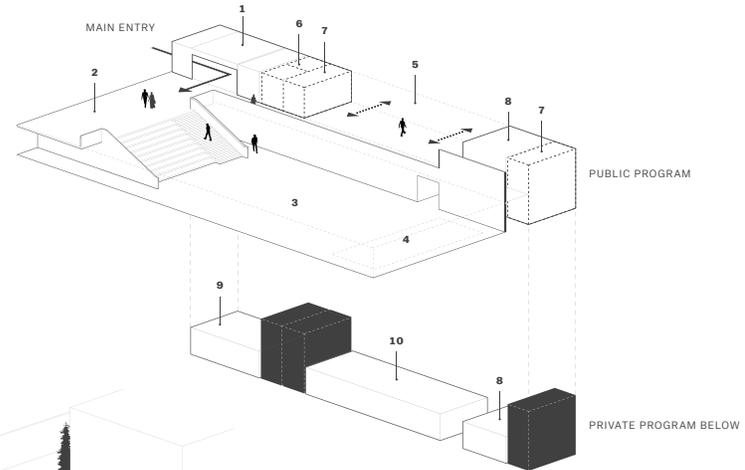
1:200

COMMUNITY HALL

Figure 76 Axonometric of Community Hall with original scale noted.
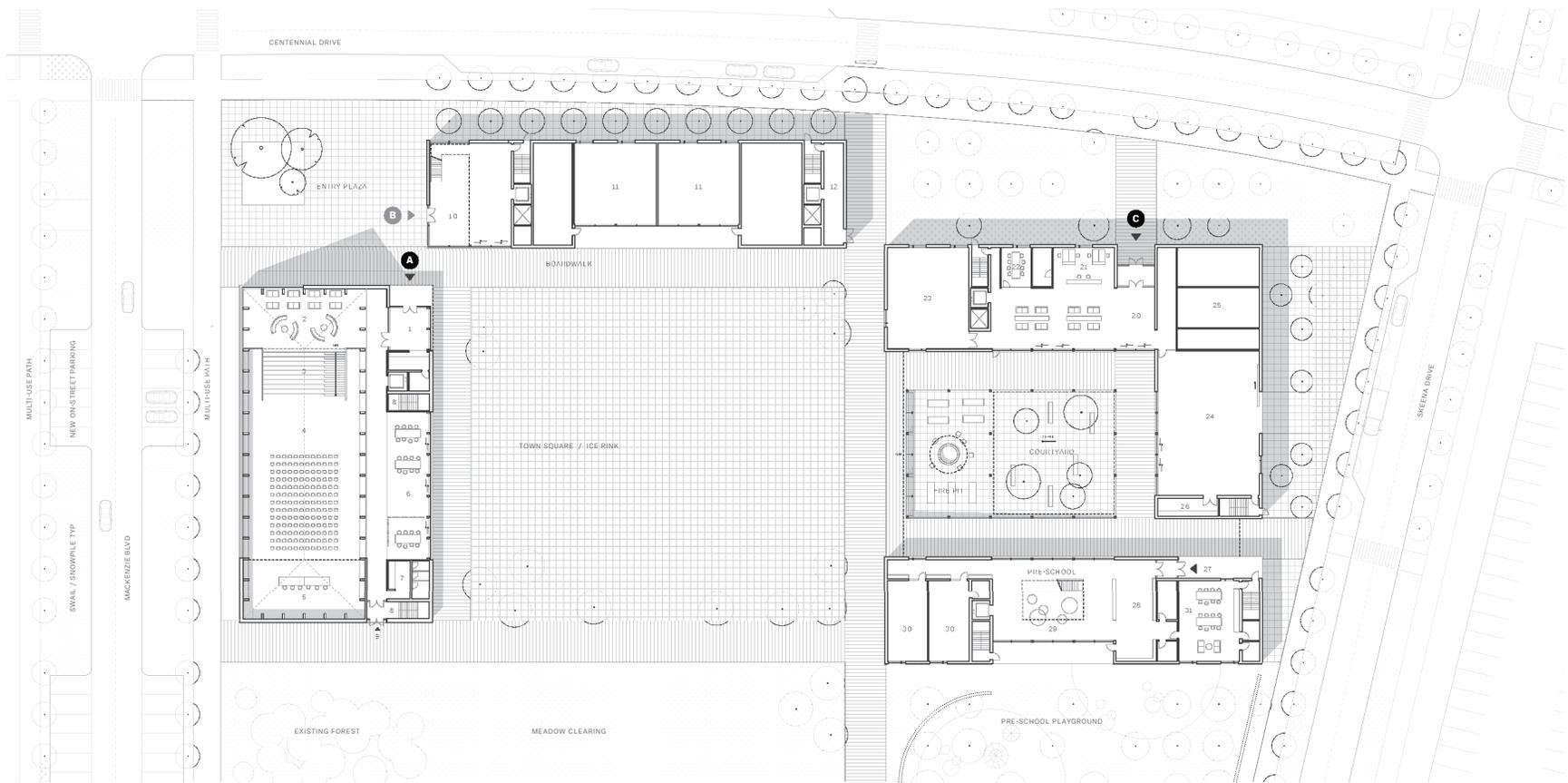
MACKENZIE
TOWN CENTRE

1:200

Figure 77 Overall plan of Town Centre, original scale noted. A: Community Hall, B: Municipal Building, C: Skill Incubator.

CENTENNIAL DRIVE

ENTRY PLAZA

B ▶

10

A

BOARDWALK

MULTI-USE PATH

MACKENZIE BLVD

DN

2

1

3

8

4

6

TOWN SQUARE / ICE

7

5

8

9

1 Entry / Mudroom
2 Community Living Room
3 Bleacher Stair
4 Assembly Hall
5 Stage Area
6 Flex Space
7 Universal Washroom
8 Fire Stair
9 Service Entrance

EXISTING FOREST

MEADOW CLEARI

1:200
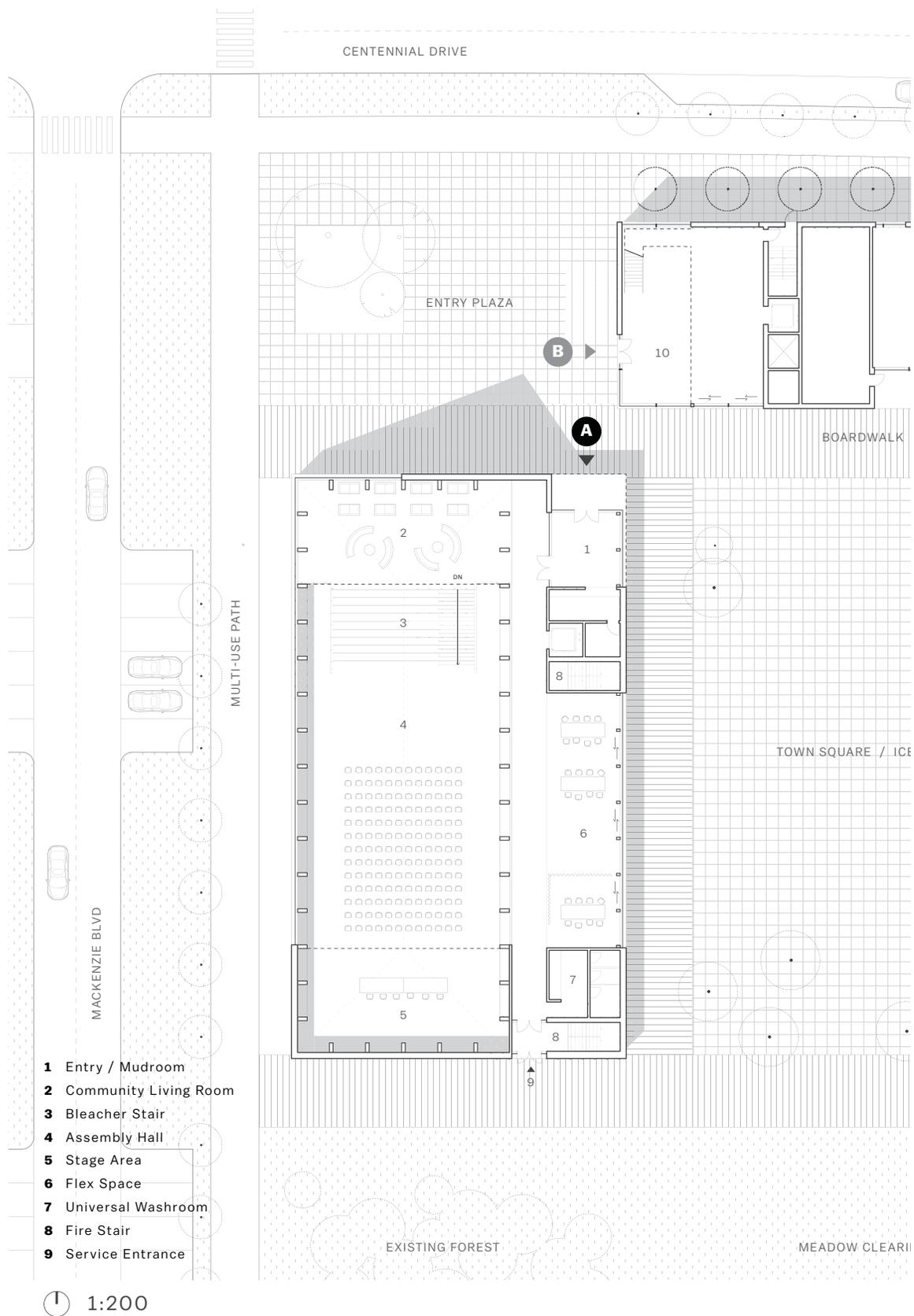
Figure 78 Plan of the Community Hall and adjacent public spaces, greenway, and municipal offices.

The hip roof is made from a structure of glue laminated timber members. The hip portions are perceived as solid, breaking up the large internal volume and concealing structural bracing and mechanical ducts. An internal screen diffuses morning light, which warms the space through an eastern skylight. The bar of program situated between the main hall and the town square is comprised of flexible spaces on the ground floor and kitchen, mechanical, and washrooms below.

A CALL FOR PERMANENCE

The new Mackenzie Hall is a place of gathering, cooperation, and community. The assembly space is rooted into the site to represent a more permanent phase in the life of Mackenzie. The sculptural roof is immediately recognizable as a place of communion and place-making. Entry level spaces are adaptable and reconfigurable for whatever event the community can envision.

**Figure 79**   Section perspective of Community Hall, looking north.

Figure 80   Interior rendering of main stair from within the lower assembly hall.
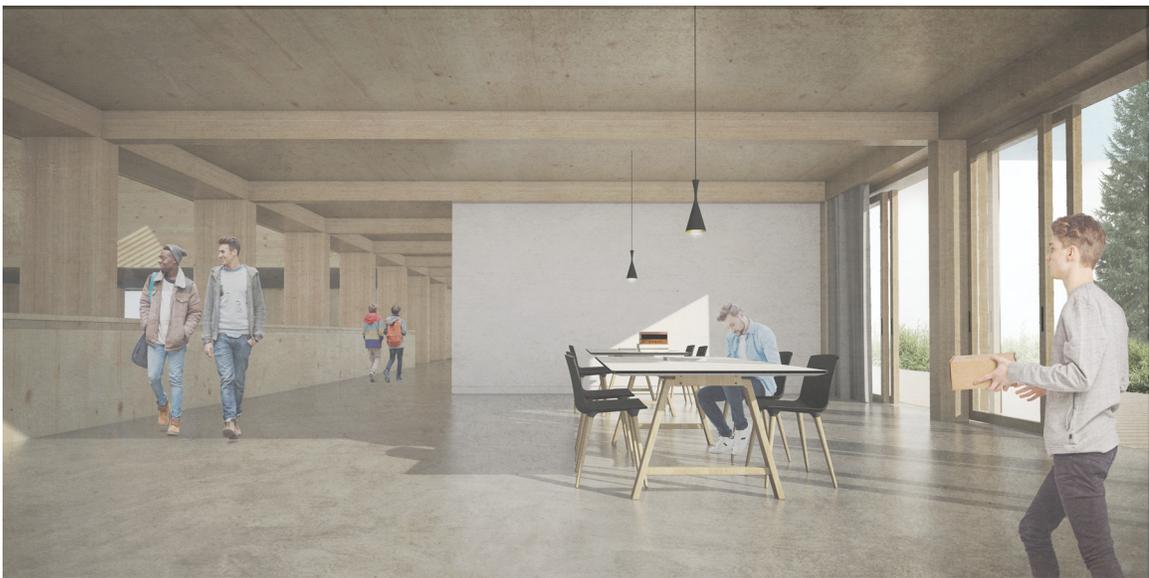
Figure 81   Interior rendering of upper flex space, with sliding doors adjacent to the main square / rink.
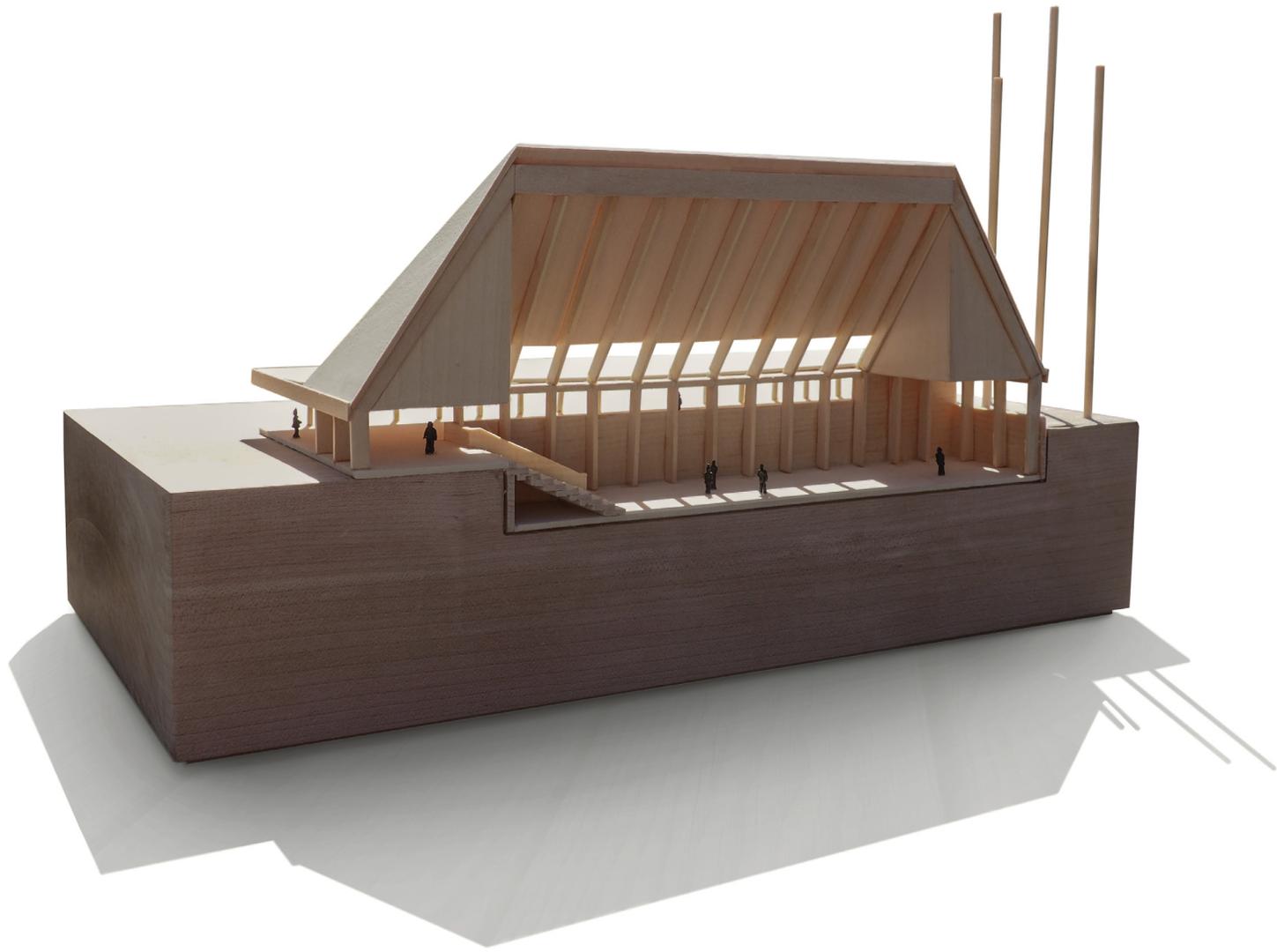
**Figure 82**   1:200 longitudinal section model of Community Hall.

Skills Incubator

The skills incubator contains a variety of adaptable spaces for education, including continued adult education, skills training, and a preschool. The various programs are organized around a central courtyard which slopes toward a community fire pit. The structure of the fire pit roof is similar to the community hall and holds a conical smoke collector. The fire pit serves to mediate between the more intimate courtyard space and the primary Town Square.

To complement the totemic quality of the fire pit and community hall, the incubator buildings are intended to hold the urban fabric through orthogonal volumes made of a panelized timber structural system. Whereas the cultural buildings act as centres of permanence, the incubator buildings (and municipal offices) have a flexible and adaptable nature. A variety of spaces, including a double-height workshop, seminar rooms, classrooms, and daycare spaces, demonstrate how standard manufacturing dimensions can be used for efficiency without reducing the building's adaptability.

Figure 83   Interior rendering of the main shop space.

20 Foyer
21 Reception
22 Meeting Room
23 Seminar Room
24 Shop
25 Support Space
26 Tool Room
27 Pre-School Entry
28 Mudroom
29 Interior Playroom
30 Classroom
31 Staff Room

1:200
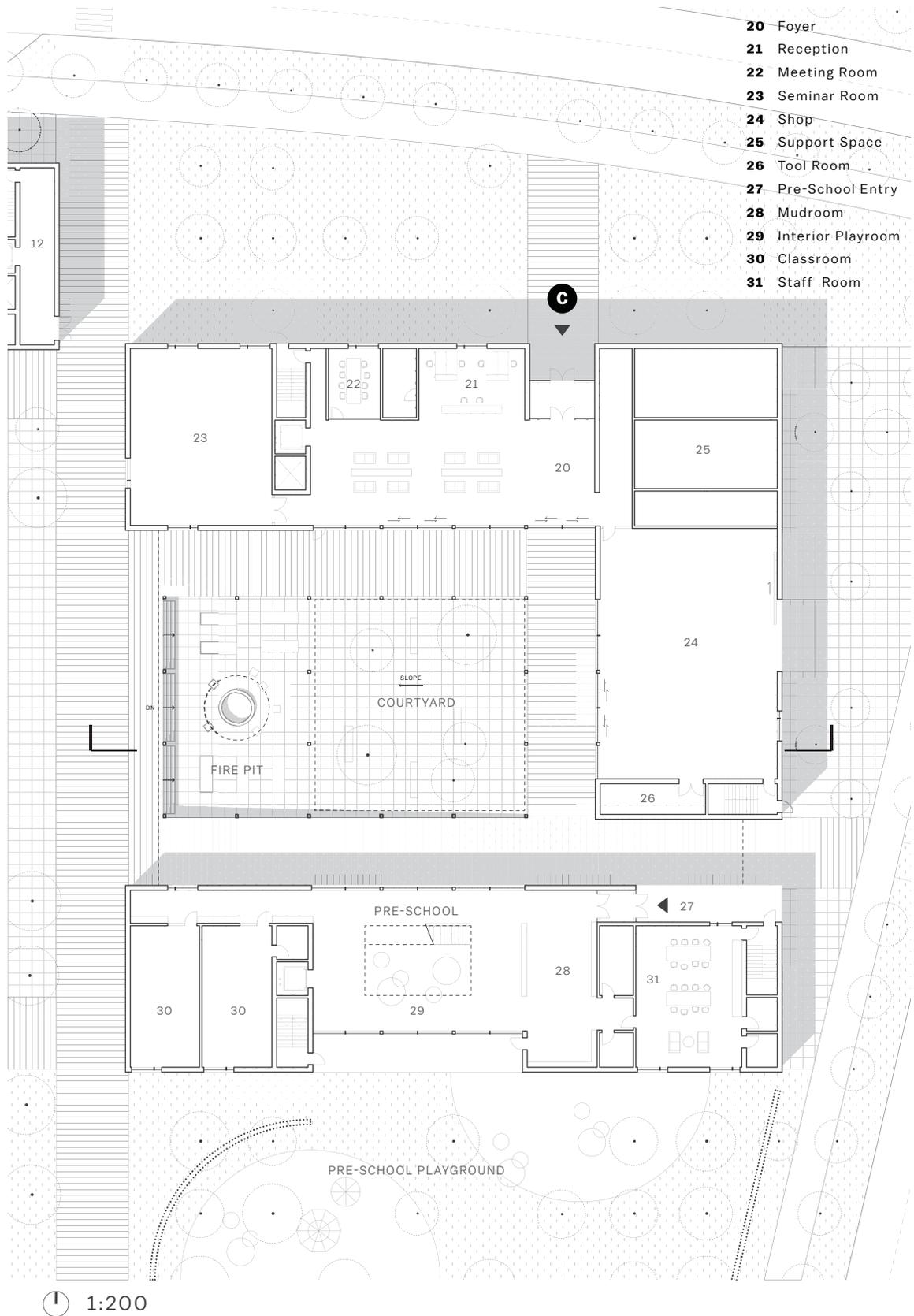
Figure 84 Plan of Skills Incubator, original scale noted.
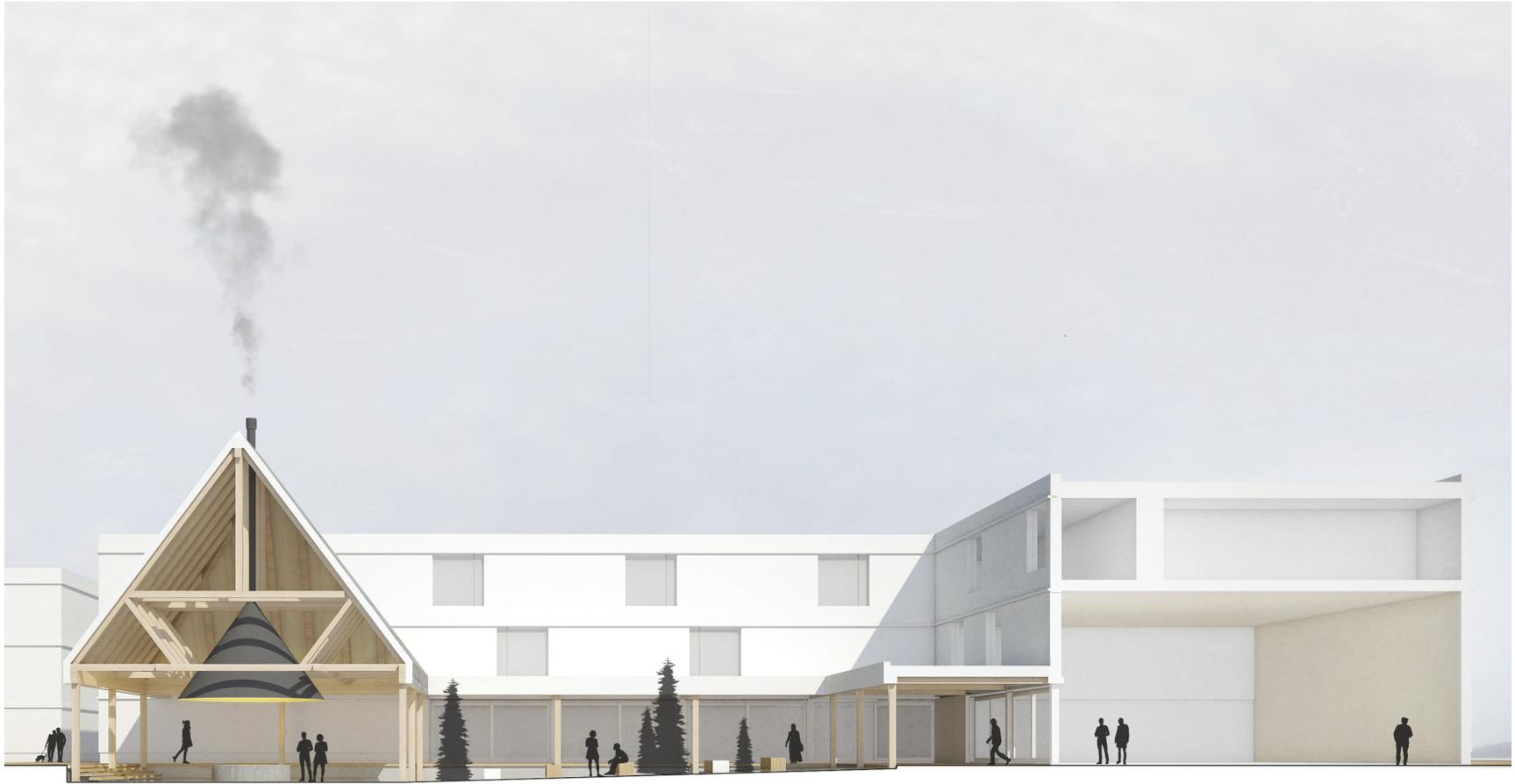
Figure 85   Sectional perspective through the courtyard of the skills incubator, looking north.

Figure 86 View of fire pit pavilion from within the courtyard.

CHAPTER 6: CONCLUSION

Planned resource towns demonstrate how, in our modern society, the act of settlement is often at odds with the creation of distinct places. Competing political, corporate, and social forces continue to construct places of inhabitation with predominantly economic motives and without adequate consideration for how the built environment reflects and contributes to a community's culture. The topic of *preserving* place (local) in an increasingly globalized world has garnered a lot of recent attention within the architectural discipline, but it appears that there is less conversation regarding how we *make* place within a global society.

For over a century, experiments in resource town planning displayed both ambition and experimentation but lacked sufficient sensitivity toward local environments and communities. Most also failed to address the root causes of instability in resource-dependent communities and relied too heavily on government and corporate paternalism. The few resource towns which have successfully diversified their economies and claimed greater autonomy did so through bottom-up decision making and leadership, motivated by a strong sense of community belonging and desire to bring security to town life. Top-down investments and expertise are needed to facilitate their ambitions but need to avoid imposing economic and urban ideologies.

This thesis asks how architecture and urbanism can help resource towns facilitate place-based economic development and their transition from planned settlements to places of permanence and identity. By not shying away from their identity as youthful settlements with a close

relationship to industry, and allowing their unique challenges and aspirations guide the process, exciting and innovative solutions can be found. There is no model solution or urban form which can guarantee a sense of permanence to take hold in remote settlements. Only the community itself can develop it. Analysing the physical, community, human, and economic infrastructure in Mackenzie was an effective method to begin understanding the spirit of place and identifying opportunities to strengthen community capacity.

The architectural strategy attempts to demonstrate that a variety of approaches are needed to address the unique challenges in resource settlements, mainly a search for permanence and a need for flexibility. Cultural elements of the strategy, such as the community hall and fire pit, put down roots within the townsite and act as foundations. Gathering spaces are carved into the earth and held by vaulted wood framed structures above. Flexible elements, such as the municipal offices and education spaces, are made to be adaptable and efficient while also expressing local materials and activities.

The proposed Town Centre suggests a collective urban experience with all buildings being in dialogue with one another through their siting, form, materiality, and openings. The intentional use of wood for structure, floor, envelope, and most finishes is an attempt to reflect an aspect of the community's culture and identity within their built-environment. There is also an intention that local residents be able to adapt, maintain, and replace parts of the buildings over time. The architecture of the town becomes an integral part of the forestry system as components age, are replaced, and return to the earth.

An interesting future exploration could attempt to use the same methodology of analysis and community development within a non-forestry resource town or town which has lost its resource altogether. The strategy of investing in strategic infrastructure to build community capacity and explore identity could also benefit other types of communities, such as gentrifying neighbourhoods, suburban 'bedroom' communities, and economically marginalized groups.

REFERENCES

Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. 1977. *A Pattern Language: Towns, Buildings, Construction*. New York: Oxford University Press.

Arvida History Centre. 2018. "Arvida, a Planned Industrial City." Accessed 12 June. https://www.citedelaluminium.ca/en/planned-industrial-city/.

BC Archives. 2018. "Anyox, BC." Accessed 12 June. http://search-bcarchives.royalbcmuseum.bc.ca/anyox-bc-2.

—. 2018. "Map of Smelter Plant, Administrative Buildings and Living Quarters, Anyox, BC." http://search-bcarchives.royalbcmuseum.bc.ca/map-of-smelter-plant-administrative-buildings-and-living-quarters-anyox-bc.

—. 2018. "Sourdough Alley, Rossland." Accessed 12 June. http://search-bcarchives.royalbcmuseum.bc.ca/sourdough-alley-rossland.

Bone, Robert M. 1998. "Resource Towns in the Mackenzie Basin." *Cahiers de Géographie du Québec* 42, no. 16: 249-259.

Boxel, Elma van, and Kristian Koreman. 2002. *Re-public: Towards a New Spatial Politics*. Rotterdam: Nai Publishers.

Bradbury, John H. 1977. "Instant Towns in British Columbia: 1964-1972." PhD diss., Simon Fraser University. summit.sfu.ca/system/files/iritems1/2873/b10673180.pdf.

Canadian Broadcast Corporation (CBC) News. 2008. "Mackenzie Residents Rally Because of Dying Forest Industry." 23 May. https://tinyurl.com/ybp8xsnk.

—. 2016. "Skilled Labour Shortage Could Cost B.C. Billions, Report Says." 14 Dec. https://tinyurl.com/y7ymx7qk.

Canadian Centre for Architecture. 1996. "Power and Planning: Industrial Towns in Quebec, 1890-1950." https://www.cca.qc.ca/en/issues/11/nature-reorganized/441/power-and-planning.

—. 2011. "Primers of Forestry." https://www.cca.qc.ca/en/issues/11/nature-reorganized/1530/primers-of-forestry.

Charbonneau, Joy. 2018. "Hydrological Map of Canada*."* Accessed 28 May. http://www.joycharbonneau.com/hydrological_map_of_canada.html.

Davis, Horace P. 1930. "Company Towns." In the *Encyclopedia of the Social Sciences*, no. 4, 119. New York: The Macmillan Co.

Ellin, Nan. 2006. *Integral Urbanism*. New York: Routledge.

Everything Churchill. 2018. Accessed 10 June. http://everythingchurchill.com/about-churchill/photo-gallery/.

The Exploration Place at the Fraser Fort-George Regional Museum. 2003. "The Instant Town." http://www.settlerseffects.ca/pls/cats_web/WEB_EXHIBITIONS.show_exhibit?EXHIBIT_ID=153&LANG=EN.

Fried, Joe. 2009. "Joining the Jobless in Mackenzie." *The Tyee*, 6 May. https://thetyee.ca/News/2009/05/06/JoblessInMack/.

Gill, Allison M. 2002. "Respecting Context in Northern Resource Town Planning: The Case of Tumbler Ridge." *Western Geography* 12: 113-129.

Halseth, Greg, and Lana Sullivan. 2002. *Building Community in an Instant Town: A Social Geography of Mackenzie and Tumbler Ridge, British Columbia*. Prince George, BC: UNBC Press.

—. 2003. "From Kitimat to Tumbler Ridge: A Crucial Lesson Not Learned in Resource-Town Planning." *Western Geography* 13/14: 132-160.

Halseth, Greg, and Laura Ryser. 2016. "Rapid Change in Small Towns: When Social Capital Collides with Political/Bureaucratic Inertia." *Community Development* 47, no. 1: 106-121.

Hunter, J., and C. McInnes. 2000. "Miller Powerless to Stop Death of Tumbler Ridge: Minister Said He Was Blindsided by Teck's Decision to Close Mine." *Vancouver Sun*, March 2.

Irving K. Barber Learning Centre. 2012. "Overall Perspective of City Center, Kitimat B.C." University of British Columbia. https://ikblc.ubc.ca/featured-place-at-ikblc-kitimat/.

Jacobs, Jane. 1961. *The Death and Life of Great American Cities*. New York: Vantage.

Jobs in the Oil Patch. 2017. "Torch Industries Camps." http://jobsintheoilpatch.com/wp-content/uploads/2017/11/1550AE-oil-and-gas-article-wide.jpg.

Kitimat Museum & Archives Collections. 1966. "Kitimat." http://collections.kitimatmuseum.ca/items/show/2721.

Krannich, Richard, and A.E. Luloff. 1991. "Problems of Resource Dependency in U.S. Rural Communities." *Progress in Rural Policy and Planning* 1: 5-18.

Lucas, Rex A. 1971. *Minetown, Milltown, Railtown: Life in Canadian Communities of Single Industry*. Toronto: University of Toronto Press.

Markey, Sean, Don Manson, and Greg Halseth. 2012. *Investing in Place: Economic Renewal in Northern British Columbia*. Vancouver: UBC Press.

McGill University Digital Collections. 2005. "Model of Fermont." http://cac.mcgill.ca/schoenauer/cases/large_image.php?slideid=258.

Mitchell, Diane. 2013. "How the Britannia Mine Started - Part 1." *Britannia Mine Museum Blog*, 23 June. https://www.britanniaminemuseum.ca/blog/how-the-britannia-mine-started-part-1.

Modular Building Institute. 2018. "Poplar Creek / Birch Mountain Open Camps." Accessed 18 July. http://www.modular.org/Awards/AwardEntryDetail.aspx?awardentryid=1040.

Montgomery, John. 1998. "Making a City: Urbanity, Vitality and Urban Design." *Journal of Urban Design* 3, no. 1: 93-116.

Moore, Charles W. 2001. "Creating of Place." In *You Have to Pay for the Public Life: Selected Essays of Charles W. Moore*, edited by Kevin P. Keim, 292-301. Cambridge, Mass.: MIT Press.

Moore, Charles W., Donlyn Lyndon, Patrick Quinn, and Sim Van der Ryn. 2001. "Toward Making Places." In *You Have to Pay for the Public Life: Selected Essays of Charles W. Moore*, edited by Kevin P. Keim, 88-107. Cambridge, Mass.: MIT Press.

Nairn, Ian. 1965. *The American Landscape: A Critical View*. New York: Random House.

Norberg-Schulz, Christian. 1969. "Meaning in Architecture." In *Meaning in Architecture*, edited by Charles Jencks and George Baird, 215-229. London: The Cresset Press.

—. 1971. *Existence, Space and Architecture*. New York: Praeger.

—. 1980. *Genius loci: towards a phenomenology of architecture*. New York: Rizzoli.

—. 1985. *The Concept of Dwelling: On the way to figurative architecture*. New York: Rizzoli International Publications.

Pacific Institute for Climate Solutions. 2017. "Evaluating option for managing British Columbia's forest sector to mitigate climate change." http://www.pics.uvic.ca/events/managing-bc's-forest-sector-mitigate-climate-change-future-options-emissions-reductions.

Portail Constructo. 2013. "Le Pont d'Aluminium d'Arvida, Avant-Gardiste et Témoin de l'Évolution des Savoirs." Last modified 25 Feb. http://www.portailconstructo.com/infoconstructo/pont_aluminium_arvida_avant_gardiste_temoin_levolution_savoirs.

Porteous, J.D. 1987. "Single enterprise communities." In *British Columbia: Its Resources and People*, edited by C.N. Forward, 383-399. Western Geographical Series vol. 22. Victoria, BC: University of Victoria.

Pressman, Norman. 1978. "Resource Towns as New Towns." *Urban History Review* 78, no. 1: 78-95.

Province of British Columbia. 2016. "Climate Leadership Plan." http://climate.gov.bc.ca/app/uploads/sites/13/2016/10/4030_CLP_Booklet_web.pdf.

Randall, James E., and R. Geoff Ironside. 1996. "Communities on the Edge: An Economic Geography of Resource-Dependent Communities in Canada." *The Canadian Geographer* 40, no. 1: 17-35.

Reimer, B. 2006. "The Rural Context of Community Development in Canada." *Journal of Rural and Community Development* 1, no. 2: 155-75.

Relph, Edward. 1976. *Place and Placelessness*. London: Pion Limited.

Rifkin, Jeremy. 2011. *The Third Industrial Revolution*. New York: Palgrave Macmillan.

Robinson, Ira M. 1962. *New Industrial Towns on Canada's Resource Frontier*. Chicago: Dept. of Geography, University of Chicago.

Royal British Columbia Museum. 2017. "The Town of Kitimat." Accessed 21 Nov. https://royalbcmuseum.bc.ca/exhibits/living-landscapes/northwest/kitimat/the_town_kitimat.html.

Ryan, Fred. 2018. "Neighbourhood 'A', Nechako - Also Known as 'The Shield'." *Royal BC Museum*. Accessed 22 Feb. https://royalbcmuseum.bc.ca/exhibits/living-landscapes/northwest/kitimat/pic47.htm.

Sheppard, Adrian. 2011. "Fermont: The Making of a New Town in the Canadian Sub-Arctic." McGill University. https://www.mcgill.ca/architecture/files/architecture/fermont-nov_2011-rev.pdf.

Simard, Martin. 2012. "Photo 1 : Fermont Vue de Mont Daviault." https://journals.openedition.org/cybergeo/docannexe/image/25817/img-3.jpg.

Thompson, S.J. 1895. "Sour-Dough Alley, Rossland, B.C." *City of Vancouver Archives*. https://searcharchives.vancouver.ca/sour-dough-alley-rossland-b-c.

University of Manitoba Archives. 1974. "Leaf Rapids, Man. 1971-1980." http://umanitoba.ca/libraries/units/archives/tribune/photographs/display_photo.php?id=5919.