The historical changes of New Westminster’s Brunette Creek industrial land

by

Chris Hatcher
B.A., Concordia University, 2009

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Approval

Name: Chris Hatcher
Degree: Master of Urban Studies
Title: The historical changes of New Westminster’s Brunette Creek industrial land

Examining Committee: Chair: Karen Ferguson
Professor, Urban Studies and History

Peter V. Hall
Senior Supervisor
Professor, Urban Studies

Patrick J. Smith
Supervisor
Professor, Urban Studies and Political Science

Roger Hayter
External Examiner
Professor Emeritus, Geography

Date Defended/Approved: November 28, 2017
Ethics Statement

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Abstract

This research focuses on how economic and transportation infrastructure changes impact industrial land uses from 1945 to 2014 in the Brunette Creek industrial area of New Westminster, British Columbia. Using a mixed method approach, I conduct a statistical analysis of industrial business listings data and link these results to a content analysis over the study time period. The research shows that industrial land uses were impacted by changes to the economy and transportation infrastructure projects in the region. Economic changes in manufacturing production methods, de-industrialization and rise of the service sector impacted the study area’s land uses and led to industrial diversification. Transportation projects including the development of key road networks, the Port Mann Bridge in 1963 and rapid transit infrastructure had both direct and indirect impacts on industrial land uses in Brunette Creek.

Keywords: Industrial land; economic change; transportation infrastructure; forestry; industrial diversification; history
Dedication

To the memory of my father David Hatcher, a great man whom I miss every day.
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Chapter 1. Introduction

This thesis explores the industrial transformation of the Brunette Creek area of New Westminster, British Columbia from 1945 through to 2014. New Westminster was the first capital of British Columbia and its’ strategic location along the Fraser River has been important in regard to servicing the hinterland but also as a key site along the waterfront for resource-based industrial activity such as the processing of lumber at mills along the shoreline of the river. This thesis will explore how the Brunette Creek industrial area has changed based on numerous economic and transportation infrastructure changes since 1945. The importance of this study is to understand how industrial land use changes over time due to changes in factors such as economic restructuring and transportation infrastructure. Furthermore, within the context of the Vancouver region, industrial land space is decreasing as it conflicts with the growth of residential and commercial developments. As manufacturing and production facilities have moved overseas, these changes have impacted the local manufacturing and production sector as the economy has gone through considerable changes over the past 70 years.

Industrial land usage within cities is important in order to maintain continued economic growth and expansion. During early industrialization periods in the late 19th and early 20th century, cities throughout Western Canada relied heavily on natural resources from their hinterland in order to produce goods for local and non-local consumption. Economic resources within the hinterland included lumber from local and regional forests, and minerals from the surrounding region. With these natural resources being extracted, industrial land expanded in order to facilitate the processing of these resources into goods for local use and export. The industrial base of these cities eventually shifted from the processing of natural resources into other forms of industrial activity such as advanced manufacturing, construction, wholesaling and service type activities which changed the industrial landscape. The industrial activities within cities diversified in order to meet and adapt to local, national and global economic changes. The diversification of the industrial base allowed industrial areas to change focus as the overall North American economy has evolved. This thesis explores the 70-year process
of industrial transformation in a small industrial area in New Westminster, British Columbia.

1.1. Background

The focus of this thesis is to examine how the mix of industrial businesses in the Brunette Creek area of New Westminster changed between 1945 and 2014, (a period of nearly 70 years). After World War II, the North American economy shifted into a boom phase of manufacturing which in turn bolstered the domestic Canadian economy and fostered rapid growth. Prior to World War II, there was a focus on resource-based economic activities such as mills and mineral extraction, but during the conflict years there was a shift to war-related production. Industries such as steel production, shipbuilding and wood framing (for airplanes) were very important. During the early post-war years, there was a considerable increase in the amount of manufacturing in many cities, which helped to meet the need for employment for the returning veterans. The 1950s through to the 1970s was a period of economic growth with the growth of the suburbs and expansion of highway networks in major cities. The economic growth during this time period coincided with the importance of industrial land because these areas manufactured goods, provided services and, assisted with the continued development of cities. Through the 1970s to 1990s, there was a change in the economic landscape with a shift toward service-sector and knowledge-based industrial activity. Increasingly over this time period the impact of globalization and industrial restructuring influenced the relocation of many manufacturing positions as operations increasingly moved overseas for cheaper labour opportunities. North American cities diversified their industrial activity in order to stabilize their economic base, which included smaller more flexible production methods to meet the needs of changing consumer habits.

With the above discussion setting the framework, my thesis will examine two factors that relate to changes in the use of industrial land; economy and transportation infrastructure. In regard to the economy, I will examine both the local changes to the economy and the over-riding macroeconomic changes to the region, nation and global markets. Transportation infrastructure is approached as a locally based analysis of infrastructure developments that have had influence on the industrial land in the Lower Mainland and
in particular, New Westminster’s Brunette Creek study area. These factors have been broken down into 20-year time periods, as these changes occur over longer periods of time. They will then be correlated to the change in the mix of businesses in Brunette Creek, which are analyzed and presented in 10-year time periods. These businesses have been categorized into specific industrial classifications in order to facilitate detailed analysis of the different industries in the study area.

The historical connection between industrial land use changes with the economy and transportation infrastructure is important for policy makers to understand in order to make future decisions on land use and infrastructure developments. The change in the mix of industrial businesses relates to local, regional and global economic shifts. These industrial areas are also impacted by local changes in transportation infrastructure in terms of the businesses that support the building of these types of projects. Furthermore, as new transportation infrastructure projects are developed, the mix of industrial businesses may change due to new accessibility and connections to suppliers and customers.

1.2. Study Area: The City of New Westminster and the Brunette Creek Industrial Area

New Westminster is located on the north bank of the Fraser River in the Metro Vancouver region of British Columbia. The city is in a central location along the Fraser River and served as the first capital of British Colombia from 1858 to 1866. From New Westminster’s initial inception, the city had a rich heritage of being a key transportation and industrial hub serving as a key social and industrial location that historically rivalled Vancouver as a shopping and entertainment district as well as key industrial area. In regard to being a transportation hub, numerous rail lines connected through the city to outlying areas and also further west to Vancouver. The numerous railways that connected through New Westminster and being located on the Fraser River led to the area being an ideal location for industrial businesses to set up for ease of shipping product and being in close proximity to other local businesses. In regard to industrial activity, there was a heavy reliance on resource-based industries, with particular focus on the forestry industry, with multiple mills in the area located along the Fraser River.
The proximity to the Fraser River provided easy access to ship lumber by utilizing water-based transportation methods along the river. Today, resource-based industrial activity isn’t the dominant economic activity along the Fraser River in New Westminster, but the industrial waterfront remains an important part of the economy of the city.

Today, the industrial waterfront of New Westminster contains a diverse mix of businesses that are important to the local and regional economy, but differ from the originating businesses located here. Industrial activity continues along the shores of the Fraser River, with a large paper mill on the western side of the city, as well as diverse industry activity on the north eastern side in the Brunette Creek industrial area that borders the City of Coquitlam. The waterfront of New Westminster is still considered a working waterfront. These industrial businesses contribute to the local and regional economy by providing jobs and a substantial non-residential tax base for the city.

Along the northeast area of New Westminster, there are a number of low-density industrial areas that utilize a considerable amount of space near the waterfront. The northeast area is known as the Brunette Creek industrial area and represents the focused study area of my thesis research. Metro Vancouver (the regional planning authority) along with the City of New Westminster view these low-density areas as an opportunity for future industrial intensification as the large space-consuming businesses move to other locations. Industrial intensification “optimizes the industrial land potential, by allowing sites to achieve higher density forms of industrial development, and by facilitating new growth through the redevelopment of existing underutilized sites” (Metro Vancouver, 2012, p. i). In regard to the large space-consuming businesses, these were typically large-scale mill and wood product manufacturing sites that were located along the shores of the Fraser River. The industrial businesses in the Brunette Creek area have been historically reliant on transportation networks such as roads, railway and the Fraser River in order to transport product to their local, regional and global suppliers and customers. Furthermore, from a macro perspective, changes in the economy have also influenced and shaped how the mix of businesses in the Brunette Creek industrial area have developed and changed over time due to new market opportunities as the economy has evolved.
Historically, the Brunette Creek industrial area of New Westminster was the site of numerous lumber mills that required river transportation access in order to ship wood products from the shores of the Fraser River. These lumber mills also needed a substantial amount of space in order to conduct day-to-day operations. River access was the key transportation mode of shipping lumber products at the time both up and down the Fraser River. The Brunette Creek industrial area also relied on the railways with numerous rail freight depots utilizing the ease of shipping to and from New Westminster. Between the 1950s through to the 1970s, changes occurred in the industrial business area within Brunette Creek, with an emphasis on automotive, wholesale trade and manufacturing firms in place of the traditional resource-based companies. These changes continued into the 1980s and through to the present day as the North American economy shifted from a production-based industrial economy to a service-based one. The shift to a service sector economy meant that the industrial land uses had shifted toward small and medium sized businesses that were more flexible in nature. These types of changes led to an increase in businesses that provided producer services to the fewer large businesses in the area, which in turn influenced the development of industrial clusters. These concepts related to economic changes and transportation infrastructure will be explored further in the literature review and analysis.
of the historical changes to the Brunette Creek study area. This thesis will explore how these economic and transportation changes impacted the mix and diversification of businesses within the Brunette Creek industrial area of New Westminster.

1.3. Thesis Statement / Research Question

In order to understand how the Brunette Creek industrial area of New Westminster has developed over the past 70 years, I will be guided by the following research question:

_How have economic changes and transportation infrastructure impacted the mix of businesses in the Brunette Creek area of New Westminster since 1945?_

Since the end of World War II, there have been considerable economic and transportation infrastructure changes that have affected the industrial land in New Westminster. These changes have been local, regional and global shifts that have had an impact on the mix of businesses in the study area. Since 1945, industrial areas within urban regions have been affected due to shifts in production cycles during the 1950s, globalization changes with substantial amounts of the production sector moving overseas, the rise of the service sector during the 1980s, and the increased growth of the knowledge economy into the 1990s through to 2014. The post-war period also saw changes in transportation infrastructure and technologies that had important impacts on how industrial firms functioned within urban areas. These economic and transportation changes affected industrial land within cities and my research intends to cohesively depict how these factors impacted the mix of businesses within the study area. The overall goal of my research is to understand how industrial land has been impacted by changes in the economy and transportation infrastructure developments. This study is important in order to understand and focus on how we can retain these industrial sites, what influences their development and growth, and what variables affect these areas and lead to industrial retraction. Within the Brunette Creek area, one of the key types of industrial sectors in the study area is related to the forestry industry. Through my research, I will examine how these supporting businesses were affected by key anchor businesses related to the forestry industry.
1.4. Relevance of the Research to the field of Urban Studies

In section 1.4, I will explain why this study is important to the field of Urban Studies. Industrial land within urban areas is in a constant battle with other land uses that may provide better return on investment such as residential and commercial development. It is important to research and attain an understanding of the influencing factors that lead to changes in the mix of industrial uses within the urban environment. Understanding influential factors will help ensure that industrial land continues to provide economic benefit to the local and regional economy through employment opportunities for local residents and supporting the functioning and servicing of the city. From a regional planning perspective, a strong understanding of the past will assist with securing a strategic and well-planned regional future. City planners, regional planners and policymakers can use historical information in order to make important land use decisions for industrial land. These decisions may include making changes to the type of industrial activities in parts of urban areas or analyzing how these areas can increase density in order to grow the industrial base within cities. One of the goals of the Metro Vancouver Regional Growth Strategy is to “protect the supply of industrial land” (Metro Vancouver, 2011, p. 27). As the Metro Vancouver region continues to grow, there is a need to protect industrial land in order to serve the future demands of the local and regional economy.

By examining how industrial land is impacted by economic and transportation infrastructure changes from a historical viewpoint, it provides a long-term analysis of how these areas within cities change and adapt over time. Long-term examination of these industrial areas will allow researchers to see trends that shorter timeframe studies may miss. Examining how the mix of industrial businesses grow and retract within urban areas is important to the field of urban studies because it allows us to examine what factors influence the decisions of industries to locate and/or leave in certain areas within cities. The main focus of this research is to understand economic changes and transportation infrastructure changes that have an impact on the study area of Brunette Creek. In regard to economic changes, these may include local changes such as policies by the regional or local government or also macroeconomic changes that occur on a global scale. For transportation infrastructure changes, these are geared more toward the local and regional changes that occur within the Lower Mainland of British
Industrial land is important for both the local and regional economy as it provides space for jobs to residents and contributes to the overall tax base of cities. Over the past few decades in Metro Vancouver, industrial land has been on the decline, since this land is typically located within urban areas and is considered a prime opportunity to convert the land to residential and commercial uses. As the Metro Vancouver region loses its industrial land to competing land uses, these changes will affect the economic vitality of the region. It is vitally important from a planning perspective to understand how industrial land is affected by changes to transportation infrastructure and the economy.

This research examines a considerable length of time of approximately 70 years of industrial businesses within a specific urban area. By identifying what impacts the mix of industrial businesses within New Westminster, it can provide necessary tools for policymakers, planners and cities in general to make more informed decisions on industrial land within urban areas.

1.5. Thesis Overview

The remainder of this thesis will be broken down into four chapters. The next chapter will discuss the literature review in which I will examine the ideas of numerous economic location theories in relation to how and why industrial businesses locate in specific areas. The literature review will also include how and why economic clustering occurs for certain businesses that locate within close proximity to each other. Within the literature review, I will also examine de-industrialization and how it has influenced changes on the industrial landscape. The de-industrialization section will include a discussion of the shift from the production sector through to the service sector. There will also be an examination into certain industrial sectors that have risen and declined during the time period, which includes the forestry industry and the rise of wholesale and construction industries. Chapter 3 will explain the methodology in which I’ve utilized a mixed method approach, which includes a statistical analysis of 70 years of business establishments in the area as well as a content analysis of planning documents,
newspaper archives and other government related materials. Within the methodology chapter, there will be an explanation of the statistical analysis and methods of data analysis conducted in the thesis. Chapter 4 features the findings and general discussion of each specified time period. Chapter 4 includes an examination of the economic and transportation infrastructure changes within the study area along with industrial business changes that occurred during each time period. Statistical analysis is utilized for key industrial sectors at specified points throughout the study time frame along with an analysis of the overall changes. Chapter 5 will conclude the thesis with an examination of major findings, limitations, policy implications and future research options.
Chapter 2. Literature Review

In this section, I will examine literature that is relevant to clarifying how the industrial landscape within cities has changed during the post-war era of 1945 through to the present day. This chapter has been divided into four main sections with relevant subsections in order to understand some of the reasoning on how and why changes to the industrial landscape have occurred. The first theme I will examine is the relevance of economic location theories and how and why industrial activity and businesses locate in specific areas of cities. The second literature theme will look at how industrial land within North American cities has been impacted by economic restructuring (deindustrialization, globalization, industrial diversification). As the economy has changed and much manufacturing has moved overseas, changes in production have led to a rise in the service sector but also to industrial diversification as cities attempt to redefine their industrial areas and continue to remain important urban areas. The third section of the literature review will examine the forestry industry’s impact in regard to its rise, decline and overall effect on the economy. I focus on the forestry sector because the study area contains numerous wood product-manufacturing businesses that have influenced and shaped the industrial progression of the area. This topic is important due to historic changes in relations with the United States as relates to the softwood lumber dispute through the 1980s to the present day. In the final section I explore further the impact of transportation infrastructure on how industrial areas develop and change. Overall, I believe that these themes provide a full context for examining the changes to the mix of industrial businesses in the Brunette Creek industrial area of New Westminster.

2.1. Economic Location

Economic location theories are important for this thesis because they identify and explain the factors of why industrial activities locate in certain areas of cities instead of
others. The initial part of this section will examine multiple general economic location theories that apply to the changes that have occurred within the study area. These economic location theories pertain to the reasons why industrial businesses locate in certain urban areas, in addition to the impact of transportation, connectivity, accessibility, and how this impacts the change in the mix of businesses in a given area. I will also examine why certain resource-based industrial businesses prefer to locate close to transportation accessible areas in order to benefit their businesses. Furthermore, this section will examine the concept of anchor businesses and how they relate to the surrounding environment and affect industrial economic activity.

2.1.1. General Location Theories

The factors of firms’ decisions to locate in certain parts of cities can be explained by a number of key economic theorists. This thesis concentrates specifically on industrial land use and how it changes over time with some of the originating businesses being related to the natural resource sector, specifically the forestry industry. Economic location theorist Alfred Weber had a simple method of examining how and why industrial activity occurs in one place over another. Weber’s concept was focused on transport costs for firms in order to locate in the most economical places. Weber’s location theory suggests that in order to reduce transport costs, firms should be located close to transportation nodes and the market where their product is sold (Weber & Friedrich, 1929). The reduction of transportation costs is very important especially for natural resource firms such as the forestry industry. Locating in an area where you have ease of access for the supply of products is important, such as the use of rivers in order to ship supplies to your location. This correlates closely with the geography of the New Westminster region. Weber expands his theory to take into account other factors such as labour costs in relation to transportation costs. For example, “if movement to a location with relatively inexpensive labour more than offset increased transportation costs on raw materials and movement to the market, then this deviation was argued to be appropriate” (Beyers & Fowler, 2013, p. 29). On a global scale, this would coincide with the process of globalization, where companies may move their operations overseas in order to benefit from cheaper labour but higher transportation costs. This could also relate to moving from a central urban area where transportation costs are offset by
cheaper labour opportunities in the hinterland of the urban area. Another part of Weber’s ideas relate to a situation where there are multiple markets in which he coined the term “agglomeration economies”. For example, “where multiple markets might be served from a single production facility, cost savings from the construction of a single larger manufacturing facility were conceptualized as “agglomeration economies”, and if these costs savings more than offset increased transportation costs from multiple sites of transport cost minima for plants serving individual markets, then it was argued that agglomerated production should occur” (Beyers & Fowler, 2013, p. 29). By building a larger manufacturing facility that serves multiple markets, this leads to greater economies of scale. In terms of economies of scale, firms benefit from sharing similar services, facilities and other amenities related to the industrial activity. Weber provides some specific terms in regard to locational activities framed around use of the term “locational factor”. By “locational factor” he means “an advantage which is gained when an economic activity takes place at a particular point or at several such points rather than elsewhere” (Weber & Friedrich, 1929, p. 18). Weber believed that the location should serve a place where an industrial activity can produce a product cheaper than other places. He posited that this should also be a location where the supply, production and distribution activity should be cheaper than locating in any other area. As an industrial activity, this may be easier during the initial development of these types of businesses, although as cities become more industrially diverse it can pose problems of industrial location. These problems include being able to locate close to final consumers in order to distribute product to clients. In the case of natural resources such as lumber mills, accessibility to rivers and railway lines was important for shipping product in and out of a central location.

One of the criticisms of Weber’s theory is that it doesn’t take into account all the factors involved with locating in a certain place over another. For example in paraphrasing William Alonso, David Smith stated, “there is no conceptual difficulty in introducing land costs into the analysis of the location of the firm in the same way as transport costs in the original Weber model, and this is also true of other inputs, though their costs topography is likely to be much more complicated than transportation with its’ fairly regular cost/distance functions“ (Smith, 1970, p. 15). Smith states that although land costs and other types of inputs can be introduced into the locational analysis, these
would be more difficult to calculate than the simple method of Weber’s transportation cost input. Alonso further suggests “optimal location will vary with factor mix, with economies of scale, with the structure of demand, with pricing policy, and with the objective of the firm. In other words, there is no one optimal location, and most optimal locations do not minimize transport costs” (Alonso, 1967, p. 28). Alonso suggests that there are many other factors involved in assessing where and why industrial activities locate in specific areas in order to be both efficient and effective. Another criticism of Weber is that over time, transportation costs have become less important for industries. Transportation costs are important when an industrial business is initially considering a location, although less important as the industrial activity becomes saturated with other factors that are involved.

A concept that relates to why firms locate in certain areas relates to the land costs and value associated with maximizing profits. Von Thülen’s theory from 1826 discusses the concept of land rents in relation to agricultural land at the time in Germany. The concept was that “agricultural systems are found to be centered around a single, “isolated” market place in the form of land-use intensity rings” (Lambin, Rounsevell & Geist, 2000, p.324). The closer a firm, farm or business is to the central market, the higher cost of land rents. “This rent is determined by market demands in the consumer centre, transportation costs, production costs and degrees of perishability of goods produced for the central market” (Lambin, Rounsevell & Geist, 2000, p.325). The idea with this theory is that firms who are willing to pay the highest rent value will be located closest to the market. This theory works in relation to a simple isolated market, although similar to the criticism of Alfred Weber, there are many other factors involved including transportation networks and changes in demand for products. For industrial land uses, these should be located close to suppliers and customers but wouldn’t be typically located in a central part of an urban area. This theory provides insight into why some industrial activities may be squeezed out of central urban areas do to the value other industrial sectors are willing to pay to locate closer to the market.

Another economic location theorist Alfred Marshall (1890) examined the economic location of industrial activity by focusing on the localization of industrial activity that was related to the same or similar industries. The advantage of localization was that it allowed for similar firms to cluster in order to produce goods at the district scale. The
theory suggests numerous (small) firms’ work together as part of the production process in order to export product. It allows shared but skilled labour where the workers are dedicated not specifically to a firm but to the industrial district as a whole. The benefit of skilled labour is the distribution of costs and the localization of higher skilled workers. By having skilled labour working in these districts, knowledge sharing and technological innovations can lead to considerable growth as the district progresses as a single unit. As mentioned by Ann Markusen, “linkages and/or cooperation with firms outside the district are assumed to be minimal” (Markusen, 1999, p. 299). This type of industrial district can work in some areas, especially when production is initially starting, although in reality, there are other factors such as land costs, and location of suppliers and customers that need to be assessed when querying why industry locates in certain areas. Another drawback in regard to a lack of cooperation and knowledge sharing with firms outside of the district is that it may hinder innovation if knowledge from outside the district isn’t shared. Furthermore, Markusen states “agglomerative specialization and success in one industry, especially when associated with some degree of market power and/or dominance over regional factor markets, can actually impede the development of other sectors, whose presence might diversify the economy and counteract maturation or instability in the original sector” (Markusen, 1999, p. 301). This can lead to decentralization of specific industrial activities and can influence other types of industrial sectors to move to other parts of cities that may be better locations to conduct business. Diversification of industrial activities is not a disadvantage, especially in times of economic downturns where production and economic activity can be balanced out with other types of production. Industrial diversification will be discussed in Chapter 2.2 of the literature review. The following section will explore literature related to anchor businesses and economic clustering and how they impact industrial areas.

2.1.2. Anchor Businesses / Economic Clustering

Section 2.1.1 described general economic location theories on factors related to industrial location, while this section will examine anchor businesses and economic clustering and the effect on industrial location. Anchor businesses and economic clustering theories are critical to this analysis as the study area of this thesis initially comprised of a few large-scale businesses related to the forestry industry. As stated by
Benjamin Chinitz, “dominant industry’s impact on the location of other industries which are oriented to the supply of the product of the dominant industry. But agglomeration is nourished more by the availability of a wide range of goods and services created in the first instance by the growth of the dominant industry” (Chinitz, 1961, p. 288). Although the dominant industry influences other firms that locate in a given area in regard to support, the core concept here is that new businesses and industries benefit from other services to the area brought on by the dominant industry. For example, transportation options such as expanded road networks, railway lines or accessibility to water transport are important factors that will positively influence other businesses to locate in an area. New industries will therefore clearly experience these benefits due to the impact of the dominant business or industry in the geographic area.

Industrial businesses that anchor within a relatively small geographic area will additionally have influence on the development of subsidiary businesses that support the main anchor business. For example, within the forestry industry, if there were a large mill that focused on the production and export of lumber, supporting businesses would be smaller scale wood product manufacturers. Some of these businesses may include cabinetmakers, shingle mills and other related firms. Supporting businesses may also include machinery manufacturers that provide inputs that can be used by the main anchor business, such as saws and other related machinery. The supporting businesses reduce costs in terms of distribution to end customers by locating close to their clients. Subsidiary and supporting businesses are both strong examples of two types of firms that benefit from locating close to anchor businesses. This research seeks to understand whether dominant anchor industries such as the wood product sector did have an impact on subsidiary and supporting businesses in Brunette Creek.

Anchor businesses can be considered part of a hub-and-spoke network as described by Ann Markusen (1999). Markusen states, “Hub-and-spoke districts are thus dominated by one or several large, vertically integrated firms, in one or more sectors, surrounded by smaller and less powerful suppliers. Hub-and-spoke districts may exhibit either a strongly linked form, where smaller firms are quite dependent upon the large anchor firm or institution for either markets or supplies, or a weaker, more nucleated form, in which small firms enjoy the agglomerative externalities of the larger organization’s presence without necessarily buying or selling to them” (Markusen, 1999, p. 302). Smaller firms
related to one of the anchor industries in an area can either continue the production process during the creation of a final end product or provide supplies that support the anchor industry. Regardless of the circumstances, they are working together and clustering as an industrial economic unit within close proximity to each other in order to save costs and remain efficient and effective as a firm and/or industry. Typically these types of industrial districts, which are related to anchor businesses, can be numerous types of sizes; large (cities), medium (a borough within a large city) or small (an area of only a few block radius). Markusen also states that, “hub-and-spoke districts do evolve unique local cultures related to hub activities” (Markusen, 1999, p. 303). She uses the example of Detroit, which is known for its automotive manufacturing as a geographical example possessing major large anchor firms but many smaller businesses that support the hub at different parts of the production process. Detroit would be considered a large-scale hub-and-spoke district. The study area being examined for the purposes of this thesis is a small industrial area along the Fraser River in New Westminster. Regardless, the general concept of influence from anchor businesses remains the same for a small geographic area.

2.2. De-Industrialization and Industrial Diversification

The second part of the literature review relates to the impacts of de-industrialization on the North American economy and more specifically industrial land within urban areas. Additionally, the concept of industrial diversification, which relates to de-industrialization will be discussed later in this section. Looking at de-industrialization historically, after World War II, there was considerable growth in the industrial manufacturing base with an expanding need for diversified consumer products both locally and globally. This was a time when industrial businesses were thriving and domestic manufacturing was a strong North American presence. Many manufacturers relied upon production-line type setups and were typically capital intensive. In regard to the increase in manufacturing within the Vancouver region, author P.D. McGovern writes of a pronounced expansion “of the Canadian and international markets for wood and paper products, and the growth of a local market in western Canada for a multitude of other manufactured items” (McGovern, 1961, p. 198). The wood product manufacturing industry in British Columbia, being a resource-based dominant industry played an important role in this market growth both
locally and internationally, although it’s worthy to note that other manufacturing grew the industrial base during the post-war era. These increases in the manufacturing base lasted until the early 1970s. This is when the impact of de-industrialization began to occur in North America, Europe, and other Western economies.

2.2.1. De-industrialization

In the 1970s, there was a global shift that began in terms of manufacturing and production within North America and Europe. Prior to the 1970s, the production focus for manufacturing was on a production system known as Fordism. Henry Ford created this system in order to mass-produce his vehicle line in the 1920s and this soon became the global standard for production. The general concept was to be able to produce as much product as possible in the most efficient manner. Ford also provided high wages for the company’s employees and as stated by Piore and Sabel, “the Ford high wage policy had the effect of demonstrating the possibility inherent in combining mass production with mass consumption” (Piore & Sabel, 1984, p. 61). This was the main idea of Ford’s production process, to produce as much as possible in the timeliest manner and then allow workers to consume as much as possible. Mass production was a highly successful production method, although the fact that it was highly dependent on large capital investment, semi to unskilled labour, and reliance on long-term schedules made it inflexible in regard to meeting constantly changing consumer demands in a timely manner. Furthermore, Piore and Sabel suggest that “no longer certain about the future costs of the resource inputs necessary to sustain long production runs, capitalists could no longer undertake continued investment in fixed-cost special purpose machinery dedicated to the production of a single product or component type” (Piore & Sabel, 1984, p. 183). These issues related to the Fordism production style, led to a new way of thinking and approach for manufacturing where production was approached in a more flexible manner in order to meet the ever-shifting demands of the consumer. This was paired with prevalent industry adoption of Taylorism-style organizational techniques to break down tasking and maximize operational efficiencies wherever possible.

Fordist production methods paired with Taylorist labour relations were also well represented in the British Columbia forestry industry, which is an important part of the
study area for this thesis. As mentioned previously, there is a high investment in capital in order to run and operate a Fordist production system, although this led to a certain type of industrial organization. As stated by Hayter, the forestry industry was “dominated by oligopolistic competition in which large firms were vertically integrated and often in arm’s-length contractual relationships with suppliers” (Barnes & Hayter, 1997, p. 9). This means that there were a number of large firms that maintained contractual relationships with suppliers but only related to fulfilling contractual obligations. In terms of Taylorist labour relations, this manifested as a specific breakdown between management or (white collar) workers and labourers (blue collar) workers. Labourers were offered high wages and benefits within the British Columbia forestry industry during the progressive log-boom years. This benefited workers who may have been less skilled in the British Columbia forestry industry in small logging towns. As stated by Hayter, “the mill offered secure well-paid jobs, and even those who left the community found part-time and seasonal employment in the mill when they returned” (Barnes & Hayter, 1997, p. 11). This led to a stable life for many forestry workers both in smaller logging towns and other areas closer to cities. The forestry industry will be discussed in further detail in section 2.3.

De-industrialization occurred during the fall of the Fordist production system and led to important changes in the North American economy in the early 1970s. Tödtling describes the characteristics of Fordist production as “large corporations that have a dominant role in organizing production and innovation, a highly developed division of labour, and a clear-cut separation of conception and execution” (Tödtling, 1994). Instead of mass production, there was a new focus on “flexible specialization” a term coined by Piore and Sabel (1984). Flexible specialization means manufacturing focused on higher skilled labour, and smaller operations that could adapt and change to consumer demands while simultaneously minimizing labour expenses and cost of production. Due to global economic changes, the rise of Asian markets, and a need to continue operations, many firms turned-to relocation of operations to other parts of the world. By exploiting economic disparity between these alternate, often Third World business locations and the West, operational profits could be maximized. Regardless of the cost of transporting goods, overall these new emerging markets were untapped both from a production and consumption standpoint. Rowthorn and Ramaswamy had another view
on why de-industrialization occurred, as stated in their 1997 working paper for the International Monetary Fund, “de-industrialization is not necessarily a symptom of the failure of a country’s manufacturing sector, or for that matter of the economy as a whole. On the contrary, de-industrialization is simply the natural outcome of the process of successful economic development, and is in general, associated with rising living standards” (Rowthorn & Ramaswamy, 1997, p. 14). This viewpoint, infers that advanced industrial countries had reached a point of market saturation from a production and consumption standpoint and evolution of the Fordist business model eventually led to reaching out to new opportunities in other parts of the world that may not have been advanced in terms of industrial production and offered exploitative benefits for profit maximization.

Through a long-term analysis, this research will seek to understand how the effects of de-industrialization impacted the Brunette Creek study area’s industrial sectors. With the de-industrialization of advanced industrial economies (such as Canada and the United States), this led to a decline in manufacturing production and employment but a considerable rise in the service sector as well as an opportunity to diversify the industrial base in urban areas.

2.2.2. Industrial Diversification and Rise of Service Sector

The economic global shift due to de-industrialization led to a reduction of manufacturing in North America, closure or relocation of firms in order to reduce production costs and reach new emerging markets overseas. These changes that were occurring at the global level had an effect on the shape and formation of industrial land within urban areas. Market conditions were such that the opportunity for industrial uses to move toward smaller and medium sized operations was now present. This was important in order to diversify the economic base of cities. In terms of diversification, this can occur in a number of ways, for example, a former large site within an industrial area that may have to downsize or shut down can be replaced with industrial complexes that contain a multitude of different type of firms in the same space. Industrial diversification can take many forms, whether on a small scale or throughout an entire district within cities. As stated by Chinitz, “diversified areas exhibit more stability in their growth because their
fortunes are not tied to the fortunes of a few industries” (Chinitz, 1961, p. 281). Cities that don’t rely specifically on one or two industries will be better off in the long term if there is a diversified industrial base in order to combat the impact of an economic downturn. For example, in a city that relies specifically on the forestry industry, a downshift in the industry can devastate the local economy. As stated by Jacobs, “city diversity itself permits and stimulates more diversity” (Jacobs, 1961, p. 145). This statement holds true for any kind of diversity, whether it relates to the commercial, residential or for the purposes of this thesis, industrial land uses. The Brunette Creek study area consisted of multiple large sites and businesses

2.2.3. Service Sector

With the decline of the manufacturing industry during the 1970s in North America there was a shift in how economic growth was to continue beyond manufacturing alone. Manufacturing in North America didn’t completely shut down, but there were new opportunities to diversify the economy by focusing on the service sector. Firms still required business services in order to operate which led to considerable growth in the 1970s and 1980s. The service sector can be described as a tertiary sector, which supports other businesses. Some examples of the service sector include financial services (banking, insurance), professional services (law firms, management consulting), media services (advertising, marketing) and transportation services (distribution, logistics). Saskia Sassen stated, "The increasingly complex and sophisticated multinational U.S. corporations, operating at both a global and national level, generated a demand for advanced intermediate service inputs” (Sassen, 1994, p. 98). There was an increasing demand for these types of services that Sassen called producer services. As firms continued to pursue further growth in their core competencies, the need for service firms to support these businesses increased in North America. Innovation and continuous change to meet the needs of businesses led to “increasing specialization and increasing demand combined to induce rapid growth in the freestanding market of business service firms” (Sassen, 1994, p. 98). These were major changes in terms of the type of labour in the North American market as many blue-collar jobs moved overseas, the need for more specialization and producer services increased considerably. To further this point, Davis and Hutton state, “service activities are seen to
play critical roles in creating local economic linkages that increase the magnitude of the local income and employment multipliers, while simultaneously adding to the diversity and stability of the local economy” (Davis & Hutton, 1993, p. 59). When there is a major economic change such as de-industrialization, an opportunity arises to diversify the economy in multiple ways. In terms of diversification, small and medium sized businesses can focus on more flexible production methods in order to meet the needs of changing consumer demands. Furthermore, the focus on professions that service larger scale businesses have been shown to fill the void left by de-industrialization in North American cities. Davis and Hutton (1989) compared Vancouver’s industrial labour versus the rest of the province for 1986 and found that Metro Vancouver was more oriented toward producer services such as (finance, insurance, real estate, business services, transportation, communication, utilities and wholesale trade) at 25.2% than 17.9% for the rest of the province (Davis & Hutton, 1989, p. 5). The economic base of the Metro Vancouver region continued toward expanding the service sector and becoming less reliant on manufacturing and natural resource activities as the sole base of the economy through the late 1980s to the present day.

By studying the Brunette Creek industrial area of New Westminster, this research seeks to understand whether the study area followed through with a process of diversification and if service sector industries became prevalent after the effects of de-industrialization.

2.3. British Columbia Forestry Industry

The wood product manufacturing (forestry) industry is the third part of my thesis’ literature review due to the historical importance of the industrial sector within the Brunette Creek area of New Westminster from 1945 through to 2014. Many of the businesses within the study area were related to the wood product manufacturing industry and influenced other type of businesses in the area. This section will describe the transition from a Fordist production structure to flexible specialization, evolving labour issues, privatization, and an examination of the effects of the softwood lumber dispute that occurred from the 1980s through to the early 2000s.
During the post-war era between 1945 and 1970, the forestry industry was a thriving key staples resource for British Columbia. With the expansion of suburban development and construction throughout the Lower Mainland, the demand for wood products was on the rise locally, although there was also an increasing demand for British Columbia lumber on a global scale. In order to meet these demands, the forestry industry utilized a Fordist structure, as this maximized production in an efficient manner. Fordism was described in the previous section 2.2.1 that related to de-industrialization. To reiterate the key aspects, it involved mass production of standardized goods in an assembly line formation with a key division of labour for workers, but struggled with limited flexibility in terms of adaptation to ever-changing consumer trends. In terms of the division of labour as stated by Marshall and Tucker, “Each worker would be assigned one task to be repeated with machine-like efficiency countless times during the day” (Marshall & Tucker, 1992, p. 5). This type of production method availed relatively high wages but lacked flexibility in regard to different employment opportunities. If there was a downturn in the economy or a change in the company’s profits due to shifting consumer demands, it was difficult to make quick changes. Therefore the ability to adapt was difficult due to the large investment in capital required for each specific production method.

In the 1970s, as previously mentioned, there was a change in the method of production of not only the forestry industry but also all types of manufacturing in advanced industrial countries. This also impacted the forestry industry in order for it to remain competitive on a global scale, as stated by Barnes and Hayter, “during the 1970s and 1980s rapidly escalating rates of technological change, market differentiation, and global competition led to more flexible production methods, labour markets, and community development” (Barnes & Hayter, 1997, p. 12). The British Columbia forestry industry still retained its use of capital investment machinery, although the influences of new technologies in order to reduce costs and remain competitive were key changes. This was a major change to Fordist labour production methods in terms of division of labour for workers because it meant increased investment in new technologies in order to reduce costs. “The use of new computerized technology allows the manufacture of a wider range of more specialized high-value products. Literally by pressing a button at a computer terminal production is reconfigured, and a variety of different markets is served” (Barnes & Hayter, 1997, p. 12). This type of change was known as flexible mass production due
to the introduction of new technologies in order to meet the demands of consumers while still maintaining larger scale production methods.

During the 1970s, there were further changes occurring that would affect the British Columbia forestry industry. As stated by Barnes and Hayter, “the structure of BC’s forestry industry was vulnerable to changing global technical, market, and wood supply conditions and that its fibre base was deteriorating. That evidence became starkly clear with the recession in the early 1980s and, later, with trade and environmental conflicts. In response to these difficult conditions the BC forest industry increasingly promoted flexibility” (Barnes & Hayter, 1997, p. 16). The environmental conflicts were with the First Nations and environmentalists due to the old growth logging occurring in British Columbia. For trade issues, which will be discussed later, these include the softwood lumber dispute and the North American Free Trade Agreement (NAFTA). As stated by Hayter, “Since 1970, BC’s forestry economy has become a highly volatile space. Two sharp recessions in the 1970s preceded record high levels of production and profit in 1979 that, in turn, were followed by a devastating recession in the early 1980s” (Hayter, 2003, p. 714). The global recession in the early 1980s was a major blow to the forestry industry in British Columbia. In regard to the job losses and loss of profits, Hayter states “the BC forestry economy lost 20,000 jobs among both professionals and hourly workers; profits of $500 million in 1979 became losses of $500 million in 1982” (Hayter, 2003, p. 714). These were huge losses and devastated the BC forestry industry during this time period. With the wood product industry being one of the key industrial sectors within Brunette Creek, this research is important in order to understand how the forestry industry decline may have affected the sector during this time period.

The need for flexible specialization was further evident for BC forestry firms to be successful and adaptable to economic change. The structure of firms needed to change and as stated by Scott, “when changes in economic conditions bring about intensified uncertainty and instability in production and increased competitiveness in final markets, then internal economies of scale and scope within the firm begin to break down so that the entire production system is liable to display strong symptoms of horizontal and vertical disintegration” (Scott, 1988, p. 176). Flexible specialization led to the development of smaller and medium sized firms within the wood product industry in British Columbia. This sector was known as the value-added or wood product-
remanufacturing sector and can be defined as the “production of specialty products from commodity lumber and panel products and includes manufacturers of lumber specialty products, fencing, specialty panel board, and custom processing activities such as lumber drying” (Rees & Hayter, 1996, p. 208). These types of businesses could also be related to the producer services sector as a secondary industrial activity that complements the key lumber industry.

The British Columbia forestry industry has continued to go through periods of economic instability throughout the 1980s to the present day. The main causal issue is an ongoing softwood lumber dispute between Canada and the United States. In 1982, the United States and Canada were in dispute because the Canadian lumber industry was seen, from the perspective of the United States government, as being unfairly subsidized. As most timber in Canada is government owned, and stumpage fees were established as an administrative charge rather than based upon current market value, the US regarded this as a subsidization effort by the provincial and federal governments in Canada. The United States viewed this as an unfair market advantage and felt that the prices charged should be conducted through market value pricing. In 1986, the US government imposed a tax of 15% on all lumber that was being exported to the United States. The dispute has gone through four different iterations, and in 1996 both countries came to a five-year agreement that ended in 2002. As stated by Hayter, “in May 2002, following unusually acrimonious political debate on both sides of the border, the United States confirmed countervailing and antidumping duties that averaged to a 27-percent duty on Canadian lumber imports” (Hayter, 2003, p. 717). The dispute continues to the present day with the United States wanting a competitive bidding / market value system to be in place by the Canadian government. As the North American Trade Agreement is under joint country review and renegotiation, this subject is increasingly topical. The key date for this dispute in regard to this thesis is the expired agreement of 2002. The softwood lumber dispute’s impact on the study area will be examined in terms of potential changes to the mix of industrial businesses in Brunette Creek. Between 2004 and 2009, the number of direct and indirect jobs related to the forestry industry that were lost in British Columbia was 9,494 jobs, (Stats Canada, 2012) as per Stats Canada’s report on the Lumber Industry during that time period. These jobs were related to direct employment
related to the lumber industry but also indirect employment that may have been affected by the Softwood Lumber Dispute or other economic changes to the industry.

Historically, the British Columbia forestry industry has endured turbulent times for a lengthy period of time, specifically since the 1970s through to the present day. This has affected industrial land use within urban areas in regard to changes to major anchor businesses and secondary supporting businesses. It is important to highlight these changes to the forestry industry for this thesis in order to understand how the industrial landscape changed in the study area of Brunette Creek.

2.4. Transportation Infrastructure’s influence on industrial land use

Transportation infrastructure is key to industrial land use within urban areas because industrial activity typically relies heavily upon the shipping of finished products or the transport of materials as part of the production process. Early economic theorist, Alfred Weber had models on where the best location would be for firms to locate in order to obtain the most benefits. “At the heart of Weber’s model was transportation costs for the product compared to the transportation cost for the input factors. The optimum location was where these costs were minimized” (Beyers & Fowler, 2013, p. 29). This was mentioned in section 2.1.1 in the discussion of general location theories. Weber’s theory works at the local level, although the theory is based during a time when there was more emphasis on local shipping than global shipping. In the past, industrial land was heavily reliant on transportation infrastructure such as rivers and railways with larger scale resource-based industries such as wood mills and the shipping of wood products. This is especially evident along the Fraser River, which is adjacent to the study area of Brunette Creek in New Westminster. These types of transportation methods have changed considerably with more emphasis on the trucking industry to transport products locally. Another factor in regard to transportation is the introduction of shipping containers (containerization), which has had a substantial impact on regional industrial land uses in Metro Vancouver.
The introduction of specific sized shipping containers changed shipping methods to utilize large-scale containers on freight ships which were easier to ship and transfer from ports to trucks for ease of local shipments instead of the former random sized cargo method of shipping. As stated by Wallace, “the essence of containerization is the application of mass production techniques to freight shipment. It requires the mechanized handling of a “box” of standard dimensions in a controlled system which embraces as much of the ultimate objective (door-to-door transfer) as is economically feasible” (Wallace, 1975, p. 434). Basically containerization was a much more efficient method of transporting goods both overseas and over land and this reduced operating costs for firms. By instituting this door-to-door transfer, containers could be offloaded from a freight ship and placed directly onto land-based transportation such as trucks or railways for efficient shipping. In terms of transportation infrastructure, market adoption of containerization created a need for further road transportation networks in order to meet the need of the trucking industry within urban areas. This change affected not only the shipping techniques, but also the land uses that surrounded ports and waterways that formerly relied on cargo methods with a specific type of storage in these areas. With the size of containers, there was a much larger amount of space required within industrial areas instead of the smaller cargo-related warehouses. As mentioned by Norcliffe, “cargo-related industries led to a decline in the use of ports for warehousing and related activities following containerization. General cargo ports were formerly important warehousing and storage locations but the container operations’ key objectives were to move cargo through a port with minimal delay” (Norcliffe, 1981, p. 243). Industrial land that bordered on waterways and ports was affected by these changes, as there was a need for expanded large-scale sites, as well as multi-modal transportation nodes (freighter ships, railways, and trucking routes) in order to maintain the efficiency of transferring containers from ships to trucks and rail.

The trucking industry and introduction of containerization evolved together and the methods of shipping became more effective than in the past. Transportation infrastructure improved, such as the growth of highways and accessibility to ports and industrial areas within urban areas. Manufacturers relied on the trucking industry in order to ship their product locally throughout urban areas. Logistics firms in the past were heavily reliant on major transportation nodes in order to ship products but with the
increased development of transportation networks this has changed. As stated by Rast, “as transportation improvements and the growth of the trucking industry released industries from their dependence on centrally located rail freight terminals, many firms were lured away by cheaper land and labour costs on the urban periphery and beyond” (Rast, 2001, p. 179). There wasn’t a need for industrial activity to solely focus on major transportation nodes with the ease of shipping along major highways and freeways due to the dynamic ability of the trucking industry. In regard to industrial land and transportation, as stated by Hall (2012) in his study of logistics and the Fraser River, “in the past, industrial and transportation-related activities lined the built-up portions of the Fraser River. Today, the key elements of urban morphology are a discontinuous pattern of industrial, commercial, recreational and residential uses strung out along the river, with land-based transportation corridors paralleling the river course” (Hall, 2012, p. 233). Hall is describing the changes that have occurred along the Fraser River and the problems with the disjointed type of uses that line the river today. In the present day, many businesses don’t utilize the river for their business purposes or transportation methods, and there is a mix of different uses that are barricaded by major land-based transportation corridors. This puts further pressure on industrial land uses along the shores of the Fraser River.

Industrial land has been affected by changes in transportation infrastructure, new technologies and increases in trucking traffic. Industrial businesses have had to adapt to these changes in order to maintain efficient operations. Connectivity and accessibility are highly important for industrial land, therefore having access for the shipping of products both as inputs or outputs is vital to operations. The expansion of the trucking industry and highway infrastructure improvements has substantially benefited businesses located on industrial land by allowing them to reach their suppliers or clients in a quick and timely manner. While the increase in highway infrastructure has also produced further congestion in tandem with economic growth for industrial businesses, the benefits potentially outweigh the costs. The Brunette Creek industrial area is located on the north shore of the Fraser River in New Westminster. The area is segregated by multiple methods of transportation such as the Fraser River on the south boundary, railway lines on the north boundary and close to major transportation infrastructure such as the Trans-Canada highway and the Port Mann Bridge. These types of transportation
methods within the study area provide the setting for a deeper understanding of the transportation infrastructure’s influence on industrial land uses.

This chapter has examined previous research related to economic location theories, anchor businesses, de-industrialization, diversification, changes to the British Columbia forestry sector and transportation infrastructure and the influence on industrial land use. In the next section, I will describe the methods, data and type of analysis that were used in order to conduct the research and understand the questions that were raised in this chapter.
Chapter 3. Methodology

In the previous chapter, the relevant literature was reviewed in order to obtain a deeper understanding of the concepts related to this study. This study is examining how both economic changes and transportation infrastructure impacted the mix of industrial businesses in Brunette Creek. The Brunette Creek study area is an ideal place to answer some of following questions that were raised in the literature review:

- How did anchor industrial sectors such as the wood product industry impact subsidiary and supporting businesses in Brunette Creek?
- How was the study area impacted by de-industrialization?
- Did the study area go through a process of industrial diversification and was there growth in the service sector?
- How did the decline of the British Columbia forestry industry in the 1970s affect the industrial businesses in the study area?
- Was there an impact to the mix of industrial businesses due to the softwood lumber dispute?
- How was the study area impacted by the multiple transportation infrastructure changes that occurred over the 70-year time period?

In order to answer the overall thesis statement along with the questions above, this study will use a mixed-method approach. I felt a mixed-method approach would be the best way to approach researching this topic. As part of my research, I conduct a statistical analysis of historical business listings data and support these findings with a content analysis approach to planning documents, newspaper archives and government related documents.

In regard to the mixed-method approach, both the quantitative statistical analysis and content analysis methods will be expanded in further detail in regard to parameters and study boundaries in the sections below. Beyond the specified methods provided here,
this section will also outline some of the key lessons in regard to the relationship between transportation and industrial land and how research of the study area will provide further insight into this topic.

3.1. Statistical Analysis of Establishment Listing Data

The key research portion of this thesis is to examine and statistically analyze establishment-listing data in order to understand how the mix of businesses has changed in the study area since 1945. The establishment listing data is part of my senior thesis advisor Peter Hall’s “Working Waterfronts” project and was obtained through the City of New Westminster’s Museum and Archives. This data was tabulated into a Microsoft Excel spreadsheet and originally listed the business name, street number, and archived year that a business occupied a specific parcel along the waterfront of New Westminster. The term parcel refers to a specific piece of land within the study area. As shown in Figure 2 below, within the study area, each parcel may contain one or multiple businesses depending on the type of establishment(s) occupying a parcel. For example, a large-scale mill may occupy one site, while an industrial business complex may be located on one parcel but contain many businesses of different types of industrial business classifications. The establishment listing data was collected through the archives and reviewed and verified to the best of their abilities by a retired city planner from New Westminster. The parcel data represents the study area’s mix of industrial businesses for the time period of 1945 to 2014.

Other than the business name, address and year the business occupied a specific parcel; one of the most important attributes was the categorization of the type of industry. When the data was initially created, the categorization of the type of industry was generalized to 13 categories because the initial use of the data was to understand types of work and other activities related to the waterfront of New Westminster, not industrial changes.
The initial parcel industrial categories were the following:

<table>
<thead>
<tr>
<th>Initial Parcel Industrial Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation/Restaurants</td>
</tr>
<tr>
<td>Agricultural</td>
</tr>
<tr>
<td>Institutional</td>
</tr>
<tr>
<td>Mill</td>
</tr>
<tr>
<td>Offices &amp; Professional</td>
</tr>
<tr>
<td>Other Manufacturing</td>
</tr>
<tr>
<td>Personal Services</td>
</tr>
</tbody>
</table>

Table 1 – Initial Parcel Industrial Categories

From the initial analysis of the data in Microsoft Excel, there were 77 unique parcels within the Brunette Creek study area. Between 1945 and 2014, there were 870 rows of businesses that occupied a parcel in the study area. It should be noted that a single business might occupy multiple parcels at any time; which would account for the high amount of rows for multiple parcels belonging to one business. That data was structured so that each row in the Excel spreadsheet corresponded to a single industrial activity on
a single parcel. Each row contained a specific parcel number, industrial activity, business name and address. On the column headers of the spreadsheet were the years of 1945 to 2014, and if the corresponding row was located on the site of that year, it would be represented with a number 1, if not there would be a 0 in the cell. Analysis of the data was based on the industrial business and the parcel that it had occupied in a specific year. If there were multiple industrial businesses located on a specific parcel, the original data would list the dominant category of business on the parcel.

I felt it was important to reclassify the industrial categories into more accurate types that represented the North American Industry Classification System (NAICS). This classification system represents the standard coding for all industries throughout North America and provided a more accurate depiction of how the mix of specific industries in the area changed over time. The NAICS categories are related to the specific type of industrial business, therefore, for example, grocery wholesalers, garment wholesalers and electronic part wholesalers were generalized to the category of wholesale trade. Although if there was a garment manufacturer or electronic part manufacturer they’d be listed as a category specifically related to the type of manufacturing that was being conducted in the business. The categories were reclassified from 13 initial general categories mentioned above into 30 specific types of industrial categories. The revised parcel industrial categories are as follows:
The method of reclassifying the parcels was to research and analyze each business name and conduct research through archives and Internet searches to understand the core industrial category of each business listed in the study area. Within the Excel spreadsheet, for each business that occupied a parcel, it would be counted for one year and for classifying the business, there was only one industrial classification per year, per business. This reduced duplication of industrial activities in the study area and kept the data as accurate as possible.

In terms of reliability and validity of historical business directories, as mentioned by Schlichtman & Patch, “business directories are conducive for supplying temporal and geographical information about changes in residential and commercial activity. The

<table>
<thead>
<tr>
<th>Revised Parcel Industrial Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation / Food</td>
</tr>
<tr>
<td>Fabricated Metal Products</td>
</tr>
<tr>
<td>Quarrying</td>
</tr>
<tr>
<td>Automotive Repair / Services</td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td>Rail</td>
</tr>
<tr>
<td>Beverage &amp; Tobacco</td>
</tr>
<tr>
<td>Freight / Shipping</td>
</tr>
<tr>
<td>Retail Shops</td>
</tr>
<tr>
<td>Chemical Manufacturing</td>
</tr>
<tr>
<td>Institutional</td>
</tr>
<tr>
<td>Storage</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Leasing</td>
</tr>
<tr>
<td>Textile Product Manufacturing</td>
</tr>
<tr>
<td>Engineering Services</td>
</tr>
<tr>
<td>Machinery Manufacturing</td>
</tr>
<tr>
<td>Transportation Equipment Manufacturing</td>
</tr>
<tr>
<td>Environmental Technology</td>
</tr>
<tr>
<td>Metal Product Manufacturing</td>
</tr>
<tr>
<td>Wholesale Trade</td>
</tr>
<tr>
<td>Wood Product Manufacturing</td>
</tr>
</tbody>
</table>

Table 2 – Revised Parcel Industrial Categories
directories are published every year and this makes it simple to track year-by-year changes over time” (Schlichtman & Patch, 2008, p. 277). Although not mentioned, these business directories also include industrial businesses, not just residential and commercial land parcels. In regard to the data collection process, I became satisfied that I had gathered enough data once I had an understanding of the dominant industrial category of each parcel in the study area through the time period of 1945 to 2014.

For the analysis and representation of the data, there are multiple parts to this method. My initial thoughts for analyzing the data were to examine the data in full, and identify time periods when there were major development/retraction changes to the industrial businesses. Next I examined the reasons why these changes occurred, and whether it was related to economic or transportation changes that impacted the businesses in the area. I considered this a very limited approach to understanding the study area, as it wouldn’t provide a full in-depth story on the all the historical industrial changes that occurred there. Therefore, I decided to examine the overall percentage of industrial category types by the NAICS identification system, per parcel in ten-year increments (1945, 1955, 1965 etc.). Using 10-year time periods provided enough of a timeframe to observe and analyze the changes that occurred between each decade. Industrial land can remain the same for longer periods of time than other types of land uses such as commercial land, which may have more turnovers of businesses. The date range of the data ends in 2014.

In regard to further analysis, I’ve also examined some of the key industry category types over the entire time period of 1945 to 2014 and identified key sectors. In Chapter 4.1, figures 3 to 7 identified these key sectors because they were some of the highest % of total number of industries within the study area over the total time period. The key industrial sectors that were identified were construction, wholesale trade, automotive repair/services and the wood product manufacturing businesses. These sectors were analyzed in longer-term graphs over the entire 70-year time period in relation to the total % of businesses in the area for each year. The analysis is shown in a long-term graph and displays the key increases and decreases of % share over time. The reason I analyzed these sectors over the longer period of time was because it was easier to identify the long-term trends and key changes that were affected by economic and transportation infrastructure changes.
One of the limitations of the business listings data was that there was no information on how firms or industrial sectors interacted. These details may have been provided through interviews although because the study examines a 70-year time period, there was no method of interviewing former businesses that were no longer in Brunette Creek. Interviews would have been conducted of current or recent businesses instead of businesses from the past. The following section will provide the methods on the use of the Herfindahl Index within this study.

3.1.1. **Herfindahl-Hirschman Index Statistical Analysis**

The Herfindahl-Hirschman Index was also used in the analysis of the data in order to understand changes of the share of industrial firms in the study area. As mentioned by Stephen A. Rhoades, “the Herfindahl-Hirschman index, better known as the Herfindahl index, is a statistical measure of concentration” (Rhoades, 1993, p. 188). For the purposes of this research, this index provides insight into the share of the number of firms related to industrial land use categories, although it can be used in a number of different ways. This type of analysis was important within this study because it displays changes to industrial activity and where concentrations for the share of number of industrial sectors either increased or decreased over the 70 year time period. In order to calculate the index, it “accounts for the number of firms in a market, as well as concentration, by incorporating the relative size (that is, market share) of all firms in a market. It is calculated by squaring the market shares of all firms in a market and then summing the squares” (Rhoades, 1993, p. 188). The squaring of the share of the number of firms in terms of industrial sectors provides more weight on sectors that have larger share of the total number of firms. This study is only examining the share of the number of firms within industrial sectors and not concentrating on industrial revenues or employment statistics within certain industrial sectors. To provide more in-depth examples of how the Herfindahl Index works there are two explanations below. If there was an area with 3 industrial sectors (Sector A – 40% share, Sector B – 30% share, Sector C – 30% share), then this is how the index would be calculated.
<table>
<thead>
<tr>
<th>Sector</th>
<th>Share</th>
<th>Share Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>40%</td>
<td>.40 * .40 = .16</td>
</tr>
<tr>
<td>B</td>
<td>30%</td>
<td>.30 * .30 = .09</td>
</tr>
<tr>
<td>C</td>
<td>30%</td>
<td>.30 * .30 = .09</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>.34</td>
</tr>
</tbody>
</table>

Table 3 – Herfindahl Index Example #1

Therefore, in the case above, the Herfindahl Index is .34, which makes the area somewhat concentrated. If the Herfindahl index equalled 1.00, this would be considered a monopoly with no competition, although if the index equalled 0.00, this would be a perfectly competitive market. To show how areas may differ, another example is shown below with four firms and their shares.
<table>
<thead>
<tr>
<th>Sector</th>
<th>Share</th>
<th>Share Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20%</td>
<td>.20 * .20 = .04</td>
</tr>
<tr>
<td>B</td>
<td>20%</td>
<td>.20 * .20 = .04</td>
</tr>
<tr>
<td>C</td>
<td>30%</td>
<td>.30 * .30 = .09</td>
</tr>
<tr>
<td>D</td>
<td>30%</td>
<td>.30 * .30 = .09</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>.26</strong></td>
</tr>
</tbody>
</table>

Table 4 - Herfindahl Index Example #2

The second example in table 4 shows a change in the overall Herfindahl index from the first example at .26. Therefore, because there are now 4 sectors each with reduced share, there is less concentration in the area with the overall index changing from .34 to .26. This is considered closer to a perfect competitive market than the first example in terms of total share.

In regard to the industrial category data, there are a number of analyses that were conducted utilizing the Herfindahl index. It should be noted that since there are 30 different categories of industrial sectors, a perfectly even competitive market for all potential industrial businesses in the area would be calculated by the following equation:

- (Total % of Industries) / (Total potential industries) / 100 = Lowest possible Herfindahl Index for perfect competition
- 100% / 30 = 3.33% – 3.33% represents the percentage share that each sector would equal for there to be no dominant sector in the study area
- 3.33 / 100 = 0.03333 – This represents a perfectly competitive Herfindahl Index for the study area

Therefore, the Herfindahl Index for this thesis ranges from 0.03333 to 1.00. A perfectly competitive market of all potential industrial businesses in the study area would equal
Although a Herfindahl Index of 1.00 would mean there is just one industrial business sector that is dominant in the area.

Within Chapter 4 (Findings section), the data was analyzed to show the long-term changes over the 70-year timespan for the entire area as well as an examination of specific key industrial sectors. Furthermore, the Herfindahl index was used to analyze industrial changes between 2001 and 2002, which was when there was a substantial decrease in the total businesses in the area due to a number of factors that will be explained in Chapter 4.

The content analysis (Section 3.2) part of the methodology will provide further input into the analysis of content for the economic and transportation infrastructure changes.

### 3.2. Content Analysis

The goal of this part of the methodology was to obtain an understanding of the economic and transportation infrastructure changes that may have been influential to the study area’s industrial land uses. There were a number of documents that were examined throughout the process including municipal government planning reports, regional development plans from Metro Vancouver (formerly the Greater Vancouver Regional District), and newspaper archives. For the municipal government planning reports and Metro Vancouver, my intention was to search for information related to economic development plans for the area and region. Furthermore, I was seeking information related to future economic forecasting for the study area and region. In these documents, I also searched for information related to current and future transportation infrastructure development plans and where the city and region believed new infrastructure should be developed. Within both types of documents, I also examined the current and future state of industrial land that may have affected the region and study area. This included industrial forecasts on where Metro Vancouver, (formerly the Greater Vancouver Regional District) believed the focus should be in the current state and in the future. The government documents were a vital aspect of analysis and a key part of understanding the changes that occurred in the study area.
The second part of the content analysis was the examination of newspaper articles, which would provide additional local information in regard to the study area. I examined newspaper articles that were related to transportation infrastructure changes, economic issues and key factors that impacted industrial land. The articles I examined related to potential transportation developments, business closures or openings and economic changes that may have affected the study area. For example, if a large industrial business, which occupied a large tract of land closed down, newspaper articles would provide details on a new industrial business or businesses to locate on the parcel. If multiple businesses occupied a former single use parcel, this would be an example of diversifying the industrial land base within the study area.

For the analysis of the documents listed above, my intention was to build a narrative on which key transportation infrastructure and economic changes occurred over the study’s time period of 1945 to 2014. The discussion section of the thesis (Chapter 4) is organized with the economy and transportation infrastructure as the introduction of each of the 20-year time periods. Chapter 4 is broken down into the following format:

- **Economy** – Economic changes that influenced the study area’s industrial businesses (20 year time periods)

- **Transportation** – Infrastructure changes that influenced the study area’s industrial businesses (20 year time periods)

- **Industrial Businesses** – Examining specific industrial land changes over a 10 year time period (10 year time periods, with two industrial business decades per 20-year time periods)

By providing an understanding of the key factors related to the economy and transportation infrastructure during the time periods, it provides a foundation on reasons why the industrial business categories may have changed. For my research purposes I examined these changes over 20-year time periods instead of 10 years because the documentation and analysis of content provided both current and also longer-term forecasts of future changes. For example, if there was anticipation and plans for new transportation infrastructure investment in 10 or 15 years, it was easier to break down the time periods for a longer duration. Furthermore, key economic changes don’t typically occur over a few years timespan as they typically transpire over a longer time.
period. There were other approaches that could have been attempted in terms of periodization for how the data and analysis time periods were conducted. I could have examined the data based on periods of economic growth and decline. For example, examining the data from 1945 through to the 1970s would be a period of economic growth during the mass production years through to deindustrialization and the rise of flexible specialization production methods. From this point, I could discuss the time period from the 1970s through to the 1990s, where there was a rise in the service sector and then move forward to 2014. I felt this approach would be too generalized and not pinpoint key industrial trends that were more specific to the 20 year time periods. Economic and transportation infrastructure changes were represented and clearer by examining the 20-year time periods. This allowed a richer and more detailed analysis of how these changes affected the industrial land uses in the study area. This sets the foundation for the methods used in the analysis of both the data and content for this thesis as will be shown in the discussion section of Chapter 4.

In regard to other methods that could have been used in this analysis, I considered conducting interviews of specific businesses as part of the research. I felt however that since the research was focused on examining the overall changes to the study area over a 70-year time period, interviewing a business in the present day would not provide a strong contribution to the research. If the research were on a specific industrial sector then interviews would provide a deeper understanding and in-depth analysis. Therefore, the combination of the business listing data and content mentioned above was enough to contribute to the overall analysis of the study area.

A further explanation of other options to include within the analysis of the changes to the mix of industrial businesses within Brunette Creek was to examine government policies related to land uses. For this study, I did analyze decisions made by the Greater Vancouver Regional District (Metro Vancouver) in terms of economic forecasting and transportation infrastructure projects. However, this study didn’t focus on municipal, provincial and federal government decisions on land use policies for industrial land uses. For example, researching how the industrial land was zoned by the City of New Westminster wasn’t the focus of this research. Furthermore, there is no discussion on Port Metro Vancouver’s influence on changes that occurred on the industrial waterfront, specifically to the Canadian Forest Products site. There is an understanding that these
decisions may have had influence on the changes to the industrial mix within Brunette Creek but weren’t a part of this research project. This would have increased the scope of the research project considerably and could be examined as part of a future research project.

3.3. Brunette Creek - Relationship between Transportation Infrastructure and Industrial Land

The study area, Brunette Creek’s industrial land in New Westminster is a valuable location for examining the relationship between transportation infrastructure and industrial land. Brunette Creek is situated in an area where a multitude of transportation infrastructure barriers have been influential in the growth and/or retraction of industrial land development since the end of World War II. In the past, industrial businesses in the area were reliant on transportation that related to the utilization of the Fraser River. These businesses were related to the wood product manufacturing industry and will be examined in further detail in Chapter 4. Accessibility to the river in order to ship wood product to and from the mills (Fraser Mills / Canadian Forest Products) along the river was an important factor in a given business operations’ location choice. Another type of transportation infrastructure that was important to the area was the railway line connections that ran through the study area along the northern boundary. The Canadian Pacific Railway line was built in 1887, which connected to the main line at Westminster Station (Port Coquitlam) and ran beyond New Westminster to Vancouver. Another railway line that ran through the area was the Vancouver, Westminster & Yukon railway line built in 1903, which ran from the study area site in New Westminster to Vancouver. As New Westminster was historically the key service location for the Fraser Valley, these railway lines were important for shipping product to and from the Lower Mainland. Furthermore, these railway connections were linked via the New Westminster railway bridge (built in 1904) to the Burlington Northern and Great Northern Railways that ran from the United States. The multiple railway lines that ran through the study area provided the industrial land uses with accessibility and longer distance connections to clients and suppliers from afar and potentially led to further economic development opportunities. The third type of transportation infrastructure that relates to the study area is road, highways and bridges that influenced the industrial land uses. Industrial land in
the present day requires accessibility to multiple types of transportation infrastructure but most importantly is the connection to roads and highways for shipping purposes. The study area is located in a distinct area that has gone through multiple road infrastructure changes over the past 70 years. The location is only blocks from the Trans-Canada Highway, and close to the Port Mann Bridge that was initially built in 1963, which had considerable influence on the type of industrial businesses in the area. There has also been conflict over the congestion and upgrading of the Bailey bridge (formerly a one-way bridge) in the area that connects the City of Coquitlam to New Westminster on the southeast access point of the study area. The transportation infrastructure barriers have segregated industrial land but also protected it from major redevelopment plans. Overall, the study area is a unique area with multiple transportation infrastructure factors that have influenced the evolution of the industrial land in the area. These factors mentioned above provide a dynamic opportunity to understand the general lessons about the relationship between transportation infrastructure and changes to industrial land uses. The above mentioned, combined with an analysis of economic changes allows for a clear understanding of how and why industrial land uses in the study area have changed over the time period of 1945 to 2014.
Chapter 4. Findings

This section describes the economic and transportation infrastructure changes and how these changes impacted the mix of industrial businesses in the study area. The chapter is organized by initially examining the overall industrial changes within the study area over the 70-year time period. This will be conducted by examining total changes to numerous dominant industrial sectors and then a specific focus on these key industrial sectors. This section will utilize the Herfindahl Index in order to indicate diversification and change to the total share of dominant industrial sectors and total businesses throughout the 70-year time period.

After the overall statistical analysis, there will be a more detailed examination into specific time period segments in order to understand the changes that occurred during shorter time periods. As mentioned in the methodology (Chapter 3.2), I will analyze the economic and transportation infrastructure changes in 20-year time periods and will analyze the change in the mix of industrial businesses in 10-year time periods.


The following section of the thesis will describe in further detail the overall changes to the industrial land use categories over the 70-year time period of 1945 to 2014. By studying an area over a 70 year time period, the following graphical representations of the data will provide an important overview of how industrial land changes within the Brunette Creek area of New Westminster. In Figure 3, this graph compares all the businesses as shown in red against some of the key sectors that were or are dominant in the study area. I will describe the overall business changes in regard to Figure 3 and other graphs will provide more in-depth details on the key industrial sectors.
Comparison of all businesses to Key Sector businesses in study area
(1945 to 2014)

Figure 3 - Comparison of all businesses to key business sectors, 1945-2014
The red line in Figure 3 above displays the number of establishments in all industrial categories that occupied a parcel within the study area for each year. In 1945, after World War II there were less than 20 establishments occupying parcels in the study area. From 1945 to the mid-1970s, the number of industrial businesses continuously increased with the wood product industry being the most dominant sector. In the mid-1970s, the wood product industry began going through difficult economic times and led to a number of business closures, which affected the overall number of businesses in the study area. These changes allowed Brunette Creek to diversify economically and led to new industrial businesses moving into the area. From the mid-1970s through to the early 1990s, there was considerable growth in the study area as regional industrial land policies for the Lower Mainland were to diversify the industrial base in order to remain stable from economic downturns. The time period of 2001 to 2002 displays the major changes to the area with a large decrease in the number of industrial businesses due to Canfor and Fraser Mills closures as well as completion of the Millennium Skytrain line which will be explained in the more detailed section below. In terms of diversification and overall changes, the mid 1970s was a key point in the development of the study area as it led to new business opportunities in the area and a stronger economic base.

In Figure 4, this displays all businesses in comparison with the Wood Product sector within the study area. As mentioned above, the industry was dominant through to the mid-1970s, but began declining due to economic changes and business closures. Some of the businesses that closed in the mid-1970s were Lamford Cedar and Capilano Timber which reduced its’ parcels from 5 to 1 and was replaced by two large industrial buildings which diversified the industrial base of the area. The number of businesses related to wood products remained relatively stable until 2002 due to the closure of Canfor and Fraser Mills (which wasn’t part of the study area, although had supporting businesses in the area). These factors combined with the softwood lumber dispute with the United States explain the decrease during this time period. The wood product industry still maintains businesses in the area as of the present day but industrial diversification has led to the rise of other sectors in the study area.
Figure 4 – Comparison of all businesses to Wood Product Sector, 1945-2014
Figure 5 - Comparison of all businesses to Automotive Repair / Service Sector, 1945-2014
As shown in Figure 5, the Automotive Repair / Service sector within Brunette Creek was one of the more consistent and stable industries in the study area. This industrial sector began locating in the area in the late 1940s with businesses locating near the corner of Brunette Avenue and East Columbia Street. This location was strategic because the intersection was a junction to numerous outlying areas in the region at this time. The influence of new transportation infrastructure such as the Port Mann Bridge and access to Highway 1 was important to this sector and led to an increase from 2% to 13% of all businesses in the study area between 1965 and 1975. This was due to more freight and shipping companies requiring services because of the rise of the trucking industry for shipping products locally and regionally. The Automotive Repair / Service sector continued to grow and remain stable through the 1980s to 2014 retaining important locations throughout the study area.

In Figure 6, the graph shows that the Wholesale Trade sector has gradually increased over the 70 year time period with multiple fluctuations in the later years. This industrial sector initially entered the study area in the 1950s due to increased trucking traffic and the need to store product close to the urban area. The proximity to transportation infrastructure such as Highway 1 allowed for ease of access to existing and potentially new markets. Furthermore, the change in shipping technologies from cargo to containerization was important for storage purposes in the area. Between 1965 and 1975, this sector was stable in the study area. From 1975 to 1985 there was an increase from 9% to 18% of Wholesale Trade businesses. This was due to an influx of secondary industries and a rise of the service sector, which was forecast by the Greater Vancouver Regional District. Although there was fluctuation from the early 1990s to 2000, this sector is still important to the area as of 2014 due to its’ proximity and ease of connection to many areas throughout the Lower Mainland.
Figure 6 - Comparison of all businesses to Wholesale Trade Sector, 1945-2014
Figure 7 - Comparison of all businesses to Construction Sector, 1945-2014
The Construction Sector is displayed above in Figure 7 and has gradually increased over the 70 year time period with multiple changes at certain points. Construction-related businesses began locating in the study area during the late 1950s, as this was a time that the Lower Mainland was building transportation infrastructure such as highways as well as housing in the outlying areas of the region. Suburbanization allowed construction firms to flourish with a multitude of different projects occurring through the region to meet the needs of development. As previously mentioned, the Port Mann Bridge, which was completed in 1963, relied on construction firms in the years leading up to its completion. The Construction sector was also important for major transportation infrastructure projects such as the completion of the Expo Skytrain line in 1986 and the Millennium Skytrain line in 2002. From 2002 through to 2014, the Construction Sector still remains a key industrial category related to the study area. The following two graphs (Figure 8 and 9) will describe the overall industrial changes by utilizing the Herfindahl Index.

![Herfindahl Index - All Industrial Parcels, 1945 to 2014](image)

**Figure 8 – Herfindahl Index – All Industrial Parcels, 1945 to 2014**
Figure 8 above displays the changes throughout the 70-year time period in terms of the change in total number of business share for the entire area. The Herfindahl index takes all the percentages shares for each industrial category type and squares them. This provides further emphasis on industrial shares that are dominant throughout the study area. The next step is to add up all the squared shares in order to obtain the index for each decade. An index of 1.00 would equate to a complete monopoly of one industrial type for the entire area, while an index of 0.03333 (as explained in Section 3.1.1) would equate to a perfectly competitive area. 1945 was the most dominant time period for industrial category sectors due to such few industries taking most of the share for the area. The trend gradually declined but especially between 1965 and 1975 which coincides with the decline of the wood product industry and rise in other type of industrial uses in the study area. From 1975 through to 2014, the percentage share of the area gradually become more diverse at a much slower rate. Declining numbers in the graph above are not a reflection of industrial decline but it shows that Brunette Creek went through a diversification process with fewer industries being the dominant sector. This shows that the area become more economically stable overall with a multitude of industrial land uses in the study area. In Figure 9 below, this goes into further detail of the Herfindahl index changes for the key industrial sectors of the study area. As explained in the previous graph, in 1945 there were only a few industrial sectors in the area, which meant there were dominant industrial categories with higher percentage shares. Of these industries, the wood product manufacturing industry held the highest share in terms of total number of businesses within the study area in 1945. The blue line displays the rise and sudden fall of the wood product industry. The two sectors that trended to become more dominant were the Wholesale Trade and Automotive Repair / Services industries. This graph also shows the trend of industrial diversification from 1975 to 2014 with the other key industrial sectors in the area.
Figure 9 – Herfindahl Index and share of key Industrial Sectors, 1945 to 2014

This section provided an overview of how the study area changed over the 70-year time period with an examination of some of the key sector changes that occurred. The following sections will provide a further in-depth analysis of the economic changes, transportation infrastructure developments and specific changes to the mix of industrial businesses for each decade.
4.2. Economy, Transportation and Industrial Businesses
Prior to 1945

4.2.1. Economic Changes before 1945

The British Columbia economy and in particular, the Lower Mainland region was characterized by the "staples economy" prior to 1945. As described by Hayter and Barnes, the staples economy is one that is "comprising primary (resource) activities and those primary manufacturing activities, such as lumber, pulp, and paper mills and fish processing plants, in which resources are major inputs to the production process" (Hayter & Barnes, 1990, p. 158). The main assumption of the staples theory is that its exports are the leading sector of the economy and set the pace for economic growth, influence institutional arrangements, and most importantly for this study, shape patterns of land use and infrastructure investment. Economic development will be a process of diversification around an export base, as stated by Watkins (Watkins, 1963, p. 152). This type of activity was evident in the Lower Mainland region due to an influx of lumber mills located along waterfront areas including the Burrard Inlet and along the Fraser River. The economic situation prior to 1945 focused on not only shipping raw materials out of province but also involved the processing of goods related to these raw resources. The staples economy was vital to the economic functioning of the Lower Mainland and its effects were felt throughout the region.

As mentioned by Barnes & Hutton, “Vancouver’s role was primarily a control and distribution centre for staples goods and only secondarily a processing site” (Barnes & Hutton, 2009, p. 1254). The economic situation in the Vancouver region focused on the exportation of natural resource sector products, for example, lumber which was processed and distributed through large-scale mills. These mills were located both on Burrard Inlet but also on the Fraser River along the waterfront of cities such as New Westminster. New Westminster had numerous mills located along the waterfront, especially in the western and north-eastern parts of the city away from the core marine terminals. There was also the large scale Fraser Mills plant situated along the Fraser River in what is today the City of Coquitlam. The location focus of this thesis is situated on the north-eastern sector of New Westminster in an area known as the Brunette Creek industrial waterfront.
4.2.2. Transportation Infrastructure before 1945

The importance of the railways in New Westminster was not only for exporting goods directly, but also to import large-scale raw products to the Brunette Creek industrial area for processing and then export. The Brunette Creek industrial area is segregated by the Fraser River to the south, which was very important to the forestry industry in terms of shipping lumber to and from the area. The industrial area is located near what is today Columbia Street East, and then North Road. The Royal City Engineers as instructed by Colonel Moody, initially built North Road in the 1860s as a strategic military connection. “Colonel Moody worried that an invading American army could blockade the Fraser River and cut-off supplies to New Westminster” (Drew, 2010, p. 1). This allowed for an easy escape route, in case of an American military invasion from the south. This provided an important connection for importing and exporting products by ships via the Burrard Inlet along North Road. Running east to west was Brunette Street (formerly Pitt River Road) and today, Brunette Avenue, which provided a key link to the eastern parts of the Lower Mainland along the north side of the river. In terms of transportation and access, the area was strategically linked in terms of resource access, existing markets and central to servicing the hinterland of Vancouver.
In regard to major transportation infrastructure prior to 1945, there were some key features to the landscape that would have a profound impact on industrial businesses that served New Westminster as well as the Lower Mainland as a whole. In 1886, the Canadian Pacific Railway built a line from Westminster Junction (located at present day Port Coquitlam) to Sapperton in New Westminster. In the early 1900s, New Westminster was considered a key link between the hinterland of the Fraser Valley which extended from Chilliwack and Hope westward to New Westminster and beyond to the city of Vancouver. In order to properly service the hinterland, a railway bridge (which today is parallel to the Pattullo Bridge) was built in 1904 that crossed the Fraser River between New Westminster and Surrey. At the time, the Canadian Pacific Railway opposed the building of the railway bridge because they had a monopoly in the region. The McBride provincial government at the time didn’t want to have such close dealings with just one railway company, and therefore this link allowed easier access to the Fraser Valley and further outreaching regions (Veazey, 1983, p. 47-48). New Westminster was considered a key intermediary point between the Fraser Valley and the City of Vancouver. In 1905, the only other bridge to cross the Fraser River was the
Fraser Street Bridge, which linked Richmond to Vancouver. This allowed produce to be shipped from farms and dairy plants to the markets of the Burrard Inlet (Vancouver Street Stories). In 1910, the BC Electric Railway also began passenger service over the Fraser River in New Westminster, which allowed for the flow of residents and workers to connect to the hinterland of the Lower Mainland. This made it much easier to connect to markets south of the Fraser, from Surrey through to Chilliwack and the eastern Fraser Valley. Although Vancouver had become the final stop of the Canadian Pacific Railway, New Westminster was the key link to service the Lower Fraser Valley, as it was located in such a central location. In 1916, the Water Avenue Bridge was constructed in the eastern Fraser Valley in Hope, B.C, which connected the Trans-Canada Highway and the railway line. By the 1930s, motor vehicles were becoming increasingly prevalent in the Lower Mainland and transportation infrastructure that supported these needs was increasingly in demand. With few locations to cross the Fraser River using motor vehicles, in 1937 the Pattullo Bridge was opened which allowed two lanes of vehicle traffic in both directions to cross from Surrey to New Westminster and vice versa which further developed the areas both south and north of the Fraser River. Prior to the building of the Pattullo Bridge between New Westminster and Surrey, there were only two non-railway crossings between the Straight of Georgia and Hope along the Fraser River. Therefore, the construction of the Pattullo Bridge in 1937 was a very important transportation infrastructure link and centrally located in the Lower Mainland of British Columbia.

4.2.3. Industrial Businesses before 1945

Transportation access to the area was very important for the industries that located in the Brunette Creek area of New Westminster prior to 1945. The business listing data for the area prior to 1945 is out of scope for this thesis, but based on research of the history of the area and industries, numerous businesses were related to the wood product manufacturing industry. The main anchor business located in the Brunette Creek industrial area prior to 1945 was the Pacific Veneer Company, which evolved through different phases and name changes into a single entity known as Canadian Forest Products (CANFOR) in 1947 (Bentley, 2012, p. 29). This company can be identified as an anchor business because of its influence on other subsidiary and/or supporting
businesses that related to the wood product manufacturing industry. Further in the
discussion of change to the Brunette Creek industrial area, I will revisit the impact that
CANFOR had on supporting businesses. There were two other forestry-related
companies in the study area prior to 1945. The first was the Mohawk Handle Company,
which produced wooden handles, and the second was the Capilano Timber Company
that produced wooden shingles in the Brunette Creek area of New Westminster.

Although there were numerous businesses related to the wood product industry, there
were also other types of industries in the Brunette Creek area prior to 1945. Leading up
to World War II, one of the long-standing companies in the area was the America-
Marietta Corporation. The company was a manufacturer of chemical products, paints,
inks, household products and construction materials (Lockheed Martin Company History,
nd). In the 1960s, it merged with the Martin Corporation, which built warplanes,
bombers and other military defense machinery. In later years, through mergers, the
company became Lockheed Martin, which today is one of the world’s largest defense
contractors. Some of the other type of industries in the area related to the food and
beverage sector, Swift Canadian which was located on the north eastern part of the
study area was a slaughterhouse and meat packing company. Its unclear when they
opened at this location but they were in the area until the early 1970s when “most of the
smaller multi-species market oriented plants had been taken out of production and beef
processing shifted to the new-generation plants, principally in southern Alberta”
(MacLachlan, 2001, p. 285). Another long-standing business was New Westminster
Brewing, which changed to Lucky Lager Brewing and was later purchased by Labatt’s
Brewing in 1967. The brewery was located at the corner of Columbia Street and
Brunette Avenue. The industries in the study area prior to 1945 were a combination of
staples manufacturing and local service light manufacturing companies that would lay
the foundation for further changes during the post-war era.
4.3. Economic, Transportation and Industrial Changes – 1945 to 1965

4.3.1. Economic Changes 1945 to 1965

After World War II, the economy of the Lower Mainland was changing due to an influx of people returning from the war seeking employment. In order to plan for the future, in 1952, the Lower Mainland Regional Planning Board released the first Lower Mainland Planning Report in order to examine the state of the economy, transportation networks and industrial land use. The planning board included representatives from cities and municipalities from Vancouver to Hope and funded by the provincial Department of Municipal Affairs. The direction local governments wanted to take in regard to the economy was to rely less on primary industries such as forestry and fishing, transitioning toward manufacturing and what were considered “foreign trade” activities despite the associated unpredictability and volatility of world markets (Metro Vancouver, 1952). The government at the time believed that this would provide a more stable economic/industrial base for the region moving forward.

In regard to the forestry industry, increased emphasis was to be placed on processing and the creation of wood products rather than simply shipping raw lumber overseas. The expectation was that secondary timber industries can also be expected to have greater employment capacity that pulp or primary lumber industries,” (Metro Vancouver, 1952) as per the 1952 Planning Report. This was evident in the Brunette Creek industrial area of New Westminster, with a noted increase in companies that focused on the creation of secondary wood-related products. There was an outward fear at the time of employment within the forestry industry levelling off due to new technologies and the increased mechanization of operations.

One key trend was the rapid suburbanization of the Lower Mainland, which led to an increase in the construction industry and the building of new suburbs and housing throughout the region. With an increase in construction, this allowed new firms to flourish in order to meet the local needs of the region’s development. This included roofing firms, concrete and paving and engineering and construction companies such as Otto Roofing, Graybar Precast Concrete, Esser Engineering and Holiday Homes
Prefabricated Buildings. The building of the highway network and bridges discussed below in the transportation section also led different industries being required to fulfill the regional infrastructure requirements.

4.3.2. Transportation Infrastructure – 1945 to 1965

During this time period there was a rapid increase in the development of the road network within the Lower Mainland region. As the region’s population increased, there was a desire to move further out from the city centre, which also led to more traffic in the outlying areas of the region. As stated in the 1952 Planning Report, “since traffic on roads depends on the number and distribution of the people using them the planning of highways must be preceded by the planning of future residential and industrial areas” (Metro Vancouver, 1952). Prior to planning the highway network, there was a requirement to examine where residents and industries would ideally locate in order to develop the most efficient highway and road network to satisfy those needs. Once this was properly planned out, there were numerous ideas on the future of the road network.
In Figure 11 above, the blue arrow points to the location of the Brunette Creek Industrial area in New Westminster and the potential transportation and land use changes surrounding the area. As shown in the legend, the black solid areas in the map are existing industrial zones while the orange solid areas are potential future industrial zones. The solid black lines in the map represent existing road networks in 1952, while the dashed black lines are planned future road networks. In 1952, there was a plan for the highway to cross over the Fraser River between Coquitlam and Surrey and then extend further out toward the eastern Fraser Valley. The Greater Vancouver Regional District followed through with the road network plan and built the Port Mann Bridge in 1963. The building of the bridge was vital to opening up accessibility for not only vehicle traffic but also shipment of freight throughout the region. In terms of the impact of the Port Mann Bridge on Brunette Creek businesses, this will be discussed examining specific industries in the area at the time.
4.3.3. **Industrial Businesses – 1945**

The end of World War II in 1945 was the beginning of the business listing data that I have analyzed for this thesis. In regard to the industrial businesses located in the Brunette Creek area of New Westminster, the dominant activity at the time was related to the forestry industry and wood product manufacturing. As mentioned, prior to 1945, Canadian Forest Products (CANFOR) was an anchor business that likely influenced other supporting companies related to forestry and the wood product industry in the study area. The primary metal manufacturing industry was another important and influential industry leading up to and during World War II. Two companies in the study area at the time were the New Westminster Foundry and BC Metals. These companies provided the necessary mineral resources that assisted with building ships and other military products. In discussing the impact of the military on industrial businesses, Koistinen writes, “the armed services became the friendly and immensely useful allies of
the industrial community” (Koistinen, 1973, p. 445). Koistinen’s discussion focused upon analysis of the American economy, although Canadian businesses that supported the allied nations during the war had a similar impact. Reliance on military contracts were important leading up to World War II. Due to changes in technology and overseas competition, many foundries were closed in the Vancouver area; this included the New Westminster foundry in 1957. Another longstanding business in the study area, “the Canada Western Cordage Factory opened in 1921, adding jobs to the local economy and millions of feet of rope to both local and export markets” (Wolf, 2005, p. 133). The company was located in the area until the late 1970s, providing rope and textile related products for a wide range of clients and industrial uses.

4.3.4. Industrial Business Changes – 1945 to 1955

By 1955, the study area began to take a different form as a few different industries located in the Brunette Creek area of New Westminster.

Figure 13 - % of Industrial Businesses in Brunette Creek – 1955. Source: Author’s analysis of the Reclaiming the New Westminster Waterfront business listings data, 2015
As shown in Figure 13, the dominant industry was wood product related in the area with CANFOR as the key local business. Between 1945 and 1955, there were two new wood manufacturing companies in the region, namely the Capilano Timber Company and Lamford Cedar Products. In terms of other new industries locating in the area, Automotive Repair and Service businesses located at the intersection of Brunette Avenue and East Columbia Street. Although there wasn’t an abundance of room for many businesses to locate here, this was a strategic corner with considerable visibility for vehicle traffic due to the accessibility to both major thoroughfares that connected the cities. On the northeast end of New Westminster, historically this intersection was the only road link between the city and the eastern regions on the north side of the Fraser River.

As of 2016, the intersection maintains similar automotive-oriented businesses serving the needs of passing traffic. Between 1955 and 1965, there was not much change in the number of total businesses, although a notable long-term industrial business that located in the study area was a transportation equipment manufacturer called BC Propeller Sales. This was an important business for the area due to marine-related transportation along the Fraser River. This business was a mainstay in the area for 40 years through the late 1980s. The demand for retaining a location in the area was likely due to the relatively cheap value of land and accessibility to clients and suppliers in the region.

4.3.5. Industrial Business Changes – 1955 to 1965

Between 1955 and 1965, the Brunette Creek area of New Westminster began diversifying as new businesses and industries were moving into this part of the city. As shown in Figure 14 below, the wood product industry remained as one of the main economic drivers in the area due to Canadian Forest Products status as an anchor business along with other forestry companies such as Capilano Timber and Lamford Cedar Products. There were numerous smaller companies located here, specifically related to smaller wood products such as dry kilns, wooden door manufacturers and other woodworking specialists. The benefits of locating close to suppliers for easy access to raw materials, reduced transportation costs and support service business are each likely factors for why these companies chose this location.
Another long-standing business that located in the area in 1963 was an engineering firm called Esser Engineering Works Ltd. As of 2016, the business is listed as a mechanical engineering firm that conducts a multitude of engineering services. Initially in the 1960s, the business serviced many of the local wood product related companies by assisting with their custom machinery and equipment development.

During this time period, there was an increased focus on the building of new homes in the suburbs of Metro Vancouver. In terms of construction during this time period, as per Stats Canada, “In the 1950s, single-family homes dominated the housing landscape. From 1957 to 1959, they accounted for 60% of new construction. The introduction of the Canada Mortgage and Housing Corporation's mortgage loan insurance model in 1954 made single-family homes more attainable, which increased demand for new suburban neighbourhoods (Stats Canada, 2017). The suburbanization of the region was due in
part to the baby boomer population wanting to live further out from the city centres in order to raise their families. In the Brunette Creek area, numerous construction firms located here including roofing companies, a prefabricated home manufacturer and a variety of firms related to the concrete and paving sectors of the economy. In 1963, the Port Mann Bridge was built, but leading up to the building of the bridge, numerous concrete and paving firms located in the area. This was not only for building the new bridge but also to supply the continued development of the regional highway network.

With the focus on the highway network and the building of the Port Mann Bridge, the ease of mobility around the Lower Mainland increased considerably. Within the Brunette Creek area, numerous freight and shipping companies moved to the area due to its proximity to Highway 1 and the Port Mann Bridge. This, in turn provided easy access to the area south of the Fraser. During this period, there was a shift on local and regional freight deliveries due to the changes in shipping technologies; specifically containerization. Along with freight and shipping companies, numerous wholesale trade businesses also located in the area in order to be close to suppliers in addition to ease of access to new and existing markets and proximity to the transportation network within the Lower Mainland.


4.4.1. Economic Changes – 1965 to 1985

Between 1965 and 1985, the economic base of North American cities changed considerably as there was a move away from the manufacturing sector due to globalization and a shift within cities to an increasingly prevalent service sector. In terms of manufacturing changes, corporations found that it was cheaper to outsource parts of their businesses overseas in order to reduce costs. This led to a change in the industrial and economic landscape of North American cities as many industrial locations were dedicated to the manufacturing industry. The shift from the production sector to service sector was a gradual multi-decade transition that stretched from the 1960s to 1990s. In 1966, the Regional Town Centre Plan was in the initial phase of implementation and
would have an important impact on the Lower Mainland in terms of the economy, transportation and overall population growth.

In 1966, the latest Lower Mainland Forecast Report examined the idea of Regional Town Centres at key locations throughout the region. The idea was to identify areas throughout the Lower Mainland that would be specified as key development areas in which to concentrate population densification and growth, transportation nodes and retail sectors. Furthermore, beyond retail jobs in these town centres, there would be a focus on establishing a diversity of jobs, which for the purpose of this paper critically included industrial jobs. As mentioned in the 1966 Official Regional Plan for the Lower Mainland, “The Regional Towns are to be related to industrial areas to encourage a broad range of employment opportunities throughout the region” (Metro Vancouver, 1966, p. 3). In regard to the Brunette Creek industrial area, the closest future town centres were the Lougheed and New Westminster Town Centres. By concentrating population in these two areas, it would allow residents the option for employment opportunity situated close to transportation hubs in addition to industrial areas.

In regard to the state of the economy for specific industries, there were a number of changes to industrial activity within British Columbia and the Lower Mainland in general. One key change was that the forestry industry was slowly changing from a Fordist production economic format to a production flexibility structure. Production flexibility involves changes technologically, but also leads to an inevitable reduction of manpower in order to reduce costs and increase profits. This shift helped address the needs of a rapidly changing global market and enabled companies to better respond to this change in market conditions. The transition from Fordism to production flexibility really began to take form during the late 1970s into the early 1980s. With increased demand from Asian and European markets, as mentioned by Hayter and Barnes, “BC coastal mills since the early 1980s have been dramatically restructured along flexible lines in order both to reduce costs, but also to serve Asian, primarily Japanese, and European markets, rather than the traditional one south of the border” (Hayter & Barnes, 2001, p. 39). This led to a considerable change in forestry, which impacted all aspects of the wood product manufacturing industry, whether it was the large-scale mills, forestry resource dependent towns and other wood related product businesses.
4.4.2. Transportation Infrastructure - 1965 to 1985

Between 1965 and 1985, there were numerous major transportation changes for the Lower Mainland region of Vancouver. Just prior to this time period in 1963, Highway 1 was extended over the Fraser River with the completion of the Port Mann Bridge. This was a major change to the transportation infrastructure in the region. The crossing was between Surrey on the south side of the river, to New Westminster and Coquitlam. This allowed for an influx of traffic to be opened up to both sides of the Fraser. This bridge also eased the amount of traffic along the Pattullo Bridge, which also linked Surrey and New Westminster. The opening of the Port Mann Bridge was also very important for manufacturers because it allowed much easier access to their customers in addition to potential suppliers on either side of the river. With the Brunette Creek Industrial area located in close proximity to the Brunette Avenue exit on the north side of the Fraser River, this was of vital importance for the businesses located here.

As mentioned previously, in 1966, the Lower Mainland Planning authority was looking into the development of Regional Town Centres throughout the region. In terms of transportation, by concentrating development in these areas, the services and amenities in these areas would be concentrated to meet the needs of the local population. This would also allow for pressure to be taken off downtown Vancouver in terms of office development and traffic in the downtown core. As mentioned in the Livable Region Plan from 1976, “decentralization to these centres of some of the office growth that otherwise will locate in downtown Vancouver will greatly reduce transportation problems” (Metro Vancouver, 1976, p. 10). The general idea was to slowly examine this type of development in order to ensure that compact development would be able to support a transportation system. Today, the regional town centres are linked to rapid transportation options in order for ease of access to other parts of the Lower Mainland without the use of a vehicle. This will be discussed further in the report with the introduction of Skytrain rapid transit lines.

Between 1965 and 1985, there were two underlying themes shaping transportation in the region. By building a new bridge that connected to the Trans-Canada Highway, it led to an inevitable increase in traffic within the region. This allowed ease of access for people to reach their places of employment, regardless of which side of the river they
lived on. For example, someone in Surrey could now easily drive to his or her job in Coquitlam without having to drive over the Pattullo Bridge. The opening of the freeway also satisfied economic viability requirements for businesses to transport goods and provide services with ease throughout the region. As mentioned in the Livable Region Plan of 1976, in planning for the future there should be “emphasis on goods movement, which includes utilizing truck routes and modernizing rail facilities” (Metro Vancouver, 1976, p. 24). This plays an important role for the Brunette Creek industrial area in order to have better access to suppliers and customers in the region. The other theme was the development of transit-oriented Regional Town Centres in order to concentrate residential and commercial development. The idea was that “people should be able to travel quickly and comfortably to major centres in the region without having to own a car” (Metro Vancouver, 1976, p. 10). Travelling to major centres via transit was reasonable for residential and commercial areas, but industrial jobs were not well serviced by public transit. Employees who worked in these locations still needed to rely on their own vehicles in order to get to work.

4.4.3. Industrial Business Changes – 1965 to 1975

During the time period of 1965 to 1975, the Brunette Creek Industrial area again went through a period of diversification in terms of the types of industries located in the area. Examining the data and charts depicts a considerable decrease in the wood product industry and a notable rise in the automotive repair/service industry within the study area.

As one of the key industrial sectors in the area, I will first examine the wood product industry in further detail. As shown in Figure 15, the total percentage of wood product industrial businesses was 20% in 1975, and decreased from 39% in 1965 in comparison to all the businesses in the study area at this time. Representative of this shift, the ongoing decline of the wood product industry in the region led to increased growth and diversification of other sectors that were not previously represented such as the automotive service sector.
The reason for this change can be attributed to numerous influences, although one key factor is that half the wood product industry businesses had moved out of the area. Five wood product businesses (Acme Prehung Doors, Doorwood Woodworking, Irly Bird Lumber Yard, Surrey Shingle Mill and Wills Remanufactured Lumber) either closed or left the area during this time period. Another wood product business was Capilano Timber, which occupied five parcels of land in 1965, and reduced their operations down to one parcel of land in 1975. The data is based on the number of parcels upon which specific businesses are located which is partially misleading because it depicts that four wood product businesses left the area instead of just downsizing. The forestry industry at this time was beginning to be affected by economic changes that began in the 1970s and continued through to the 1980s.

In 1974 and 1975, the site of the Capilano Timber Company which had been at 230 Brunette Ave had been converted into two large-scale industrial buildings. Over the following 10 years, the businesses located at 230 Brunette Ave gradually decreased and
in 1985, the entire site had been taken over by the Labatt Brewery wholesale division as part of an expansion of operations from the main brewery site at Columbia Street and Brunette Avenue.

Between 1965 and 1975, the number of businesses related to the automotive repair/service sector increased substantially in the Brunette Creek industrial area of New Westminster. In 1965, only 2% of all businesses in the area were from this sector but by 1975 this had increased to 13%. New businesses in the area included the following: Brunette Truck Service, Four Wheel Brakes, Speedy Muffler, Westminster Mufflers and Web Autobody. These automotive-oriented businesses were also important contributors to the servicing of vehicles related to freight, shipping and wholesale activity in the area. These businesses remained relatively stable in the 1965 and 1975 time frame within the study area. The increase in the number of automotive repair and service industry businesses can additionally be attributed to the opening of the Port Mann Bridge in 1963 as it allowed further vehicle traffic into the area. With more vehicles travelling along the freeway, there was opportunity for these types of businesses to locate in the area with ease of accessibility for customers and suppliers.

Other notable businesses that began locating in the area during this time period were companies related to the fabricated metal product industry. In 1965, there were no fabricated metal product businesses in Brunette Creek, however it’s notable that four new companies located in the area by 1975. The companies were Vancouver Hydraulics, Polygon Metal Fabricators, P&F Steel Fabricators and Brunette Machine Works. Without specific information on company operations during this time period it is difficult to determine what type of fabricated metal products they manufactured. Typically steel and metal fabrication is related to the construction industry and the development of large buildings and infrastructure such as highway overpasses and other sizeable projects. A complimentary industry to fabrication type businesses is metal product and machinery manufacturing businesses. Sterling Hulburd Crane Service, Continental Building Materials and Capital Grinding also located in the area within this time frame. This indicates a strong likelihood that within the immediate area there were infrastructure projects serviced by these types of companies and causing them to locate in close proximity to each other.
4.4.4. Industrial Business Changes - 1975 to 1985

Between 1975 and 1985, the industrial businesses in the Brunette Creek area of New Westminster were adapting to economic changes that were occurring both locally and nationally. For example, the wood product industry was vital to the British Columbia economy up until this point of the 20th century. This was however a time period in which things began to permanently change. As described by Hayter and Barnes, “From the mid-1970s onwards, evidence began to mount that the structure of BC’s forest industry was vulnerable to changing global technical, market, and wood supply conditions and that its fibre base was deteriorating” (Hayter & Barnes, 1997, p. 16). Specifics of the wood product industry are described below in more detail below.

![% of Business Categories - 1985](image)

Figure 16 - % of Industrial Businesses in Brunette Creek – 1985. Source: Author’s analysis of the Reclaiming the New Westminster Waterfront business listings data, 2015

upon further analysis of the businesses that changed in the area. Other relevant increases in the type of businesses that were locating in the area were the Wholesale Trade industry as well as the Construction industry. The Automotive Repair/Service, Freight/Shipping and Fabricated Metal Product industries remained relatively stable during this time period.
Throughout the timeline under data analysis, the wood product industry remained one of the most important industries in the area until the 1970s when considerable changes occurred. Between 1975 and 1985, the percentage of wood product-related businesses within the study area decreased from 20% to 4%. As per the previous time period the main causal factor was likely the further diversification of the region paired with an increase in the total number of businesses. Numerous long-standing forestry businesses in the area either closed or moved to other parts of British Columbia during this time frame. Capilano Timber Company, which had been in the study area for 27 years since the late 1940’s had closed down. The company during this time took up four parcels of land, which depicts a substantial impact on wood product industry-related businesses in the area. Lamford Cedar Ltd was another long-standing company located in the study area. In 1984 “the bank petitioned it into bankruptcy when its debts had reached more than $60 million and was about to close the doors at its mills and logging operations” (McLintock, 1990). In 1985, former employees of Lamford Cedar decided to work together and reopen the company by assuming the debt and seeking to revitalize the company (Antonides, 1988). The spin-off effect of the wood product industry downturn led to another related business to close in the early 1980s known as The Mohawk Handle Company. This company had been located in the Brunette Creek industrial area since prior to 1945, and specialized in the manufacture of wooden handles and other related products. Numerous additional wood product-related businesses also left the area but the above-mentioned companies were the key regional anchor businesses at the time.
With key forestry businesses departing from the Brunette Creek industrial area of New Westminster, this opened up new opportunities for other types of industries to locate here. As shown in Figure 17, as part of the 1976 Livable Region Plan for the Greater Vancouver Regional District, the forecast for the following ten years in the region anticipated a decrease in primary industries but an increase in secondary and tertiary industries. Primary industries include wood-products, fishing and mining of which there had been a marked decrease over the past few decades but notably evident between 1975 and 1985. In terms of secondary industries, this includes construction, wholesale trade and manufacturing. Between 1975 and 1985, construction-related industrial businesses increased from 6% to 11%. This is likely due to an increase in the amount of new buildings under construction in the Vancouver region at the time, in addition to associated infrastructure projects. The Expo Skytrain, a rapid transit line connecting Surrey to Vancouver was under construction at the time and required the partnership of numerous regional industries. New construction businesses in the area included Reynolds Concrete, WinVan Paving, Marvalite Industries (Drywall) as well as Edge Construction and a number of other firms. In terms of other notable industrial changes, the wholesale trade sector increased considerably from 9% of all businesses to 18% within the study area at this time. With an emphasis on accessibility, the land in the Brunette Creek industrial area was relatively cheap, and located in close proximity to the

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<th>1971</th>
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<tr>
<td>MANUFACTURING</td>
<td>11,373</td>
<td>12,000</td>
<td>6</td>
</tr>
<tr>
<td>– Food &amp; Beverage</td>
<td>10,798</td>
<td>21,000</td>
<td>6</td>
</tr>
<tr>
<td>– Wood Products</td>
<td>8,747</td>
<td>13,000</td>
<td>49</td>
</tr>
<tr>
<td>– Metal Fabricating</td>
<td>38,136</td>
<td>51,000</td>
<td>36</td>
</tr>
<tr>
<td>– Miscellaneous Manufacturing</td>
<td>22,388</td>
<td>38,000</td>
<td>19</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>49,696</td>
<td>74,000</td>
<td>49</td>
</tr>
<tr>
<td>TRANSPORTATION, COMMUNICATION, UTILITIES</td>
<td>28,760</td>
<td>42,000</td>
<td>46</td>
</tr>
<tr>
<td>WHOLESALE TRADE</td>
<td>233,101</td>
<td>389,500</td>
<td>67</td>
</tr>
<tr>
<td><strong>3. TERTIARY INDUSTRIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RETAIL</td>
<td>54,649</td>
<td>96,000</td>
<td>74</td>
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<tr>
<td>BUSINESS SERVICES</td>
<td>47,388</td>
<td>87,000</td>
<td>84</td>
</tr>
<tr>
<td>PERSONAL SERVICES</td>
<td>46,204</td>
<td>75,000</td>
<td>62</td>
</tr>
<tr>
<td>HEALTH</td>
<td>32,826</td>
<td>48,500</td>
<td>48</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>25,970</td>
<td>44,000</td>
<td>69</td>
</tr>
<tr>
<td>GOVERNMENT</td>
<td>26,064</td>
<td>40,000</td>
<td>53</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>426,166</td>
<td>645,800</td>
<td>52</td>
</tr>
</tbody>
</table>

Figure 17 – GVRD Employment Forecast 1971 & 1986. Source: Employment Forecast for GVRD (Greater Vancouver Regional District) – 1976, pg. 16.
freeway. This provided ease of access to many parts of the Lower Mainland in order to reach major stores, customers and potential suppliers. Some of the new wholesale trade businesses were Ray-Flo building products, Stride Industries, Pacific Warehouse Equipment, Material Handling Equipment, Cantec Welding Supplies, and Cap’s Bicycle Warehouse. These were all key changes to secondary industrial businesses in the Brunette Creek area. Regarding tertiary industries, these can be defined as retail, business services, health, and education and governance organizations. These tertiary industrial businesses did not play a major role within the study area during this time period.

4.5. Economic, Transportation and Industrial Changes - 1985 to 2014

4.5.1. Economic Changes – 1985 to 2014

Between 1985 and 2005, the economy of the Lower Mainland continued to shift to service sector types of industries and continued to move away from large-scale manufacturing and primary industries. The decrease in reliance on manufacturing is due to numerous factors, but the key causal factor for the economy is the rise of globalization and outsourcing of production. Many businesses were continuing to shift their operations to cost-effective locations in other parts of the world such as China, India and Mexico. In the later part of this time period, through the mid-1990s and beyond, the knowledge economy and service sector also led to an increased prevalence of IT related firms. Internet and technology firms were becoming increasingly important contributors to the economy in addition to traditional manufacturing and primary industries. As forecast in Figure 17, there was a continued push toward tertiary industries as government and business services expanded their presence. The Brunette Creek industrial area was zoned as heavy industrial, where the growth of secondary industries continued to take form. The secondary industries that continued to thrive in the study area were related to Construction, Wholesale Trade and industries supporting major infrastructure projects such as Fabricated Metal Product Manufacturing, Machinery Manufacturing and Engineering industries.
A goal of the Greater Vancouver Regional District in 1980 was to continue diversification of employment and industrial development in the region. As stated in the 1980 Plan for the Lower Mainland, “diversification in industrial development and in employment is needed to help the region to supplement its traditional sources of economic strength” (Metro Vancouver, 1980, p. 14). This evolution was evident in the Brunette Creek study area data with a clear depiction of gradual changes in the type of businesses locating here. In the past there was a considerable focus on the wood product industry, which was bolstered by the numerous mills in the Lower Mainland. While they remained relevant, an increased market opportunity developed to support new businesses and industries in the region as the economy expanded. Diversification of industrial land also helped retain this land from competing development interests throughout the region. With older primary industries becoming less important, this land had to continue to contribute to the economy through other means instead of being rezoned for residential or commercial development. As per the 1980 Plan for the Lower Mainland, “the use of waterfront areas that are appropriate to industrial development must be carefully planned to limit occupancy of these areas to water-oriented activities” (Metro Vancouver, 1980, p. 47). The Brunette Creek area is directly situated between Brunette Avenue and the Fraser River. As per the 1980 Plan for the Lower Mainland, the importance of maintaining this land for industrial activities took priority over other uses. As shown in Figure 18, between 1987 and 1999, the forecast for an increase in service sector tertiary industries was clearly evident. There was a slight increase in the employment growth in the goods producing sectors in terms of the total number of employed people, which grew from 155,000 to 170,000 throughout Greater Vancouver at this time. Within the service sector however, the total employment statistics over the same time period climbed from 600,000 to 815,000. Service sector jobs not only include business-to-business industries but also relate to construction, wholesale trade and government services. Vancouver was no longer economically focusing on the production of goods and was clearly moving in numerous new directions following the path of planned regional economic diversification.
4.5.2. Transportation Infrastructure – 1985 to 2005

Between 1985 and 2005, a number of major transportation projects were developed which would shape the way residents in the Lower Mainland would travel in perpetuity. With a substantial reliance on motor vehicles in 1985, the new rapid transit Skytrain line would permanently change the travel behaviour of local residents. The building of the Expo Skytrain line was completed in time for Expo 86 as Vancouver hosted the World’s Fair. It was important to not only showcase the fact that Vancouver was a world-class city, but also this major change to the transportation landscape. In regard to the transportation landscape of the region, the development of the Expo Line also led to a key link between the previously mentioned Regional Town Centre plan for Metro Vancouver. With major stops now in Surrey, New Westminster, Burnaby and Broadway, this allowed development in these areas to flourish for new residential and commercial

Figure 18 - Greater Vancouver Employment Growth, 1987 – 1999 -
Source: Stats Canada via the Livable Region Plan – 1996,
pg. 7.
opportunities outside of downtown Vancouver. As mentioned in the 1990 regional planning report, “Vancouver’s downtown core continues to play the predominant role in the distribution and catchment of commercial floor space in the Lower Mainland. Regional Town Centres have provided focal points for firms and functions seeking suburban locations, with excellent connections to all parts of the region” (Metro Vancouver, 1990, p. 20). Regional Town Centres linked via rapid transit, provided residents with new commuting options. It also created new options for living and working close to home. Despite these changes however, within the Brunette Creek industrial area, there wasn’t a direct impact to the employees and businesses in the area. As will be discussed later, the development and building of these rapid transit lines had a more pronounced impact as a positive economic opportunity for the businesses that supported the construction.

By the late 1990s, there was demand for another rapid transit Skytrain line in the region. This manifested as the “Millennium Line”, which runs along the north side of New Westminster, Burnaby and Vancouver connecting to Broadway/Commercial Drive station. This marks continued progress of the development Town Centre concept with new residential and commercial locations developed at the Lougheed and Brentwood Town Centre sites, both located in Burnaby. The Millennium Skytrain line was officially opened in 2002 and included two stops (Braid Station and Sapperton Station) each of which are located within close proximity to the Brunette Creek Industrial area. Braid Skytrain Station is located on the northeast side of the study area and Sapperton Skytrain Station is on the northwest side. In terms of accessibility for commuting employees, the study area remained segregated from the Skytrain stations by a major thoroughfare (Brunette Avenue), as well as the railway lines. There was no safe method of crossing these two major barriers unless commuters and/or employees were to take risks crossing to their place of employment. In terms of potential ridership, Sapperton Station was built with the purpose of “providing easy access to New West’s Labatt Brewery and Royal Columbian Hospital, it is expected to serve 270,000 passengers annually by 2006” (Luba, 2001). Braid station was built in order to become a major interchange for Coquitlam and New Westminster bus routes, with an expected ridership of one million passengers annually by 2006 (Luba, 2001). It can therefore be stated that the Sapperton Skytrain was developed to serve residential and commercial areas north
of the station, rather than providing public transportation access for the Brunette industrial area. Braid Skytrain however, was intended from the outset as a key connection point for bus services to Coquitlam and other areas outside of New Westminster. With the construction of the Millennium line, it allowed businesses in the study area to contribute to the construction and development of the project. Major infrastructure projects including both Skytrain lines helped contribute to the regional economy and likely also heavily benefited many businesses that were within close proximity to the project.

4.5.3. Transportation Infrastructure – 2005 to 2014

Between 2005 and 2014, there were four major infrastructure projects throughout the Lower Mainland that would increase transportation options for both residents and goods. As mentioned in the 1980 plan for the Lower Mainland, “the effective movement of goods and people to and from the region’s industries is also an important part of ensuring a healthy and vital economy and therefore particular attention is drawn to regional transportation plans in the extension or creation of industrial lands” (Metro Vancouver, 1980, p. 47). Movement of goods and people during this time period were extensively upgraded throughout the region in multiple ways in order to keep businesses satisfied and traffic flow working efficiently. There are three infrastructure projects that have or will change the landscape of the Lower Mainland; a new South Fraser Perimeter Road, a rebuilt Port Mann Bridge and the replacement of the Braid Street Bridge (Bailey Bridge) between New Westminster and Coquitlam.

The new South Fraser Perimeter Road extends Highway 17, which runs from the Tsawwassen Ferry Terminal along the southern portion of the Fraser River through to connect to Highway 1 on the east end of Surrey near the Langley Border. This new project allows freight and trucking traffic from Vancouver Island to bypass major areas of the Lower Mainland in order to ship freight through to other parts of the region, or further north to the interior. The replacement of the Port Mann Bridge began in 2009 and was completed in 2015. This was another major project located in close proximity to New Westminster and the Brunette Creek study area. The new bridge had increased lanes both eastbound and westbound, which allowed for much easier movement of residents
and goods throughout the Lower Mainland. Although there were numerous major companies involved with the building of the new bridge, there was likely considerable positive economic spin offs for many other local businesses within Brunette Creek that contributed to the new bridge. This will be examined in further detail in the next sections with the discussion of the industrial businesses during this time period.

Accessibility to the Brunette Creek area for vehicle and freight traffic had always been obstructed due to physical barriers including the railway line and major thoroughfares. Additionally, the access point between New Westminster and Coquitlam has long been the use of a one-lane Braid Street Bridge (Bailey Bridge), which connected Braid Street to United Boulevard and built in 1993. This allowed vehicles to bypass the major intersection of Brunette Avenue and Lougheed Highway, which suffered from considerable congestion. East of the Braid Street Bridge in Coquitlam was Fraser Mills, which closed down on October 1, 2001. In 2004, the Beedie Development Group purchased the Fraser Mills site. Their plans are to build a mixed-use development along the Fraser River on the former site of the mill, which would increase traffic along United Boulevard. As part of the Gateway Project, the federal and provincial government want to ensure the efficient movement of goods by constructing the North Fraser Perimeter Road that connects Coquitlam to New Westminster and further west along the Fraser River. In terms of the movement of freight with major truck traffic through the area, the City of New Westminster rejects this plan since truck traffic volume is already an issue for the city. In regard to the Braid Street Bridge, in March 2014, the bridge was deemed structurally unsafe and was closed to traffic. After a dispute between Coquitlam and New Westminster regarding who would pay for the twinning of the bridge, an arbitrator settled the dispute and a new crossing was built in March 2015. As mentioned by Richard Stewart, the mayor of Coquitlam, “We have long maintained that the Braid Street Bridge is an important piece of the region’s transportation network, and we know that many businesses on both sides of the Brunette River count on this corridor for goods movement” (Hope, 2014). Future plans for the North Fraser Perimeter Road have been halted for the time being until a better solution can be found. Therefore, although the Braid Street Bridge has been rebuilt, truck and vehicle traffic must still flow through the intersection of Brunette and Braid Street.
With the development of the South Fraser Perimeter Road and the new Port Mann Bridge, the transportation of goods, services and residents has been somewhat eased. The new Braid Street Bridge has eased traffic, although the future is unknown on how the region will link the North Fraser Perimeter Road further west along the Fraser River. Easing congestion and allowing the flow of traffic will help facilitate growth in the region and allow the local and regional economy to remain strong and stable into the future. This benefits the regional economy but also the local businesses that support infrastructure projects throughout the region. The next section will discuss the industrial business changes between 1985 through to 2014.

4.5.4. Industrial Business Changes – 1985 to 1995

Between 1985 and 1995, the Brunette Creek industrial area was relatively stable although there were some changes that may have been related to infrastructure projects in the region. As per the 1980 Plan for the Lower Mainland, “the enhancement and

![Figure 19 - % of Industrial Businesses in Brunette Creek – 1995. Source: Author’s analysis of the Reclaiming the New Westminster Waterfront business listings data, 2015](image-url)
diversification of the Lower Mainland’s industrial base is an objective of the plan that is pursued through the industrial area policies" (Metro Vancouver, 1980, p.47). This push toward continued diversification of industrial land uses would lead to a more stable economic base for the Lower Mainland. From examining the data, although the area was zoned as medium to heavy industrial uses, the increase of tertiary industries was evident during this time period. There was a significant increase in the percentage of Fabricated Metal Product businesses and also Metal and Primary Metal Product businesses. The Automotive Repair/Services and Construction industrial businesses remained relatively stable between 1985 and 1995, although there was a considerable decrease in the Wholesale Trade sector.

In regard to the Fabricated Metal Product businesses, the percentage change of these businesses was from 5% in 1985 to 13% in 1995. Furthermore the Metal Product and Primary Metal Product businesses also increased from 0% in 1985 to 2% of all businesses in 1995. Some of the new businesses from this industry included; Bend-Tech Industries (a manufacturer of steel products), Elco Engineering, K&H Custom Fabricators and West Coast Cylinders. With the development of multiple infrastructure projects another industry that supported these types of developments was the Construction Industry. Between 1985 and 1995, the Construction industry remained relatively stable with a slight increase from 11% to 13% over the decade. The construction industry would support the development of these projects but also relate to new residential developments and other road network upgrades.

Other industries in the study area that had noticeable changes were the Wholesale Trade industry, which had decreased from 18% of all businesses in 1985 to 10% in 1995. There could be a number of reasons for the decrease during this time period, although as per a report by the Bank of Canada, one of the reasons was the restructuring of the retail industry between the mid-1980s and mid-1990s. In the 1990s, there was increased expansion by American and Canadian retailers to introduce “big box” type stores (Kwan, 2002, p. 8). Which may have been a contributing factor in the decrease of Wholesale Trade businesses during this time period. As per the focus on the economic changes to the region, this contradicts the push towards tertiary type of industries such as Wholesale Trade. One of the long-standing businesses that had departed from the study area was the Canfor Wholesale/Building Material Division,
which had been in the area since 1952. This may have been a reflection on the future changes to not only Canadian Forest Products as a company but also the forestry industry as a whole. Although other tertiary industries that continued growth in the area were the Office/Professional Service industry from 1% to 4% which included numerous consulting firms and other business type services. The Freight/Shipping businesses also increased from 5% to 8%, which don’t require much space unless they are storing goods. With the relatively cheaper cost of land in the study area and ease of accessibility, this may have been a good opportunity for these types of low capital cost businesses to locate here.

In regard to stable industries in the study area during this time period, the Automotive Repair/Services businesses continued to remain consistent at 15% for the area. The locations of these businesses typically were along East Columbia Street near the intersection of Brunette Avenue as well as Braid Street. Although there were year-by-year fluctuations as is the case with any industry, from the mid-1980s the automotive sector remained relatively stable. The Wood Product Manufacturing industry also increased from 4% to 8% in 1995, although this wasn’t necessarily a resurgence of the industry from examining the new businesses in the study area. Most of the new wood product businesses were smaller scale and included kitchen cabinet manufacturers, spindle railings and restoration companies.

### 4.5.5. Industrial Business Changes – 1995 to 2005

The time period of 1995 to 2005 was an overall period of decline within the Brunette Creek study area. There were some key changes that occurred both within and outside the study area, which impacted the mix of industrial businesses. The Automotive Repair/Services sector’s percentage share of total businesses decreased from 15% to 13%, although there were only 3 businesses from 1995 that were still located in the study area in 2005. This shows that there was considerable turnover within this sector over the 10 year time period.
The Construction sector also reduced from 13% in 1995 to 10% in 2005, although there were also only 3 construction firms that remained in the study area in 2005. This shows that although the percentage change in the number of businesses remained relatively stable, there was a considerable amount of turnover in certain industries. The retail sector increased from 0% in 1995 to 5% of all businesses in the study area. Most of the new retail businesses were related to Automotive Sales and Brokers but also included a nutrition store and an arts studio. One of the most important changes to the study area occurred between 2001 and 2002 over just a one-year time period. The changes in the following paragraph relate to economic clustering and anchor businesses as discussed in the literature review.

Figure 20 - % of Industrial Businesses in Brunette Creek – 2005. Source: Author’s analysis of the Reclaiming the New Westminster Waterfront business listings data, 2015
Between 2001 and 2002, there was a considerable decrease in the total number of businesses in the study area. As shown in Figure 21, in one year’s time, 81 different businesses left the study area. Upon further examination, there were a number of factors that contributed to the loss of so many businesses in the area. The largest factor was that Canadian Forest Products (CanFor), which had been located at its same location for at least the past 57 years, had ceased operations. The company was an anchor business that was supported by other local businesses in the area, which also left the area during this time period. Some of the companies that left were Pro-Tool Sales & Service, Haggerty Equipment, multiple recycling companies and 12 different freight/shipping companies. Although, overall between 1995 and 2005, the number of wood product manufacturing companies in the area only slightly decreased, the economic impacts of an anchor business such as CanFor leaving the area was clearly evident. It is difficult to assume the total number of businesses that were directly or indirectly linked to CanFor. As shown in Figure 21, the decrease in the number of

![Figure 21 - Aggregate change - Total # of Industrial Businesses in Brunette Creek - 2001 to 2002. Source: Author's analysis of the business listings data, 2015.](image-url)
businesses in one year's time may not have only been due to Canfor’s influence. Another anchor business that left the area in 2001 was the Labatt’s Brewery, which was located at the corner of Brunette Avenue and Columbia Street for 35 years. Prior to Labatt’s Brewery at the site it had been the location of numerous beer industry businesses since prior to the end of World War II. With another long-standing business leaving the area, this may have also contributed to supporting companies also departing the area. The final reason why there was such a decrease in the number of businesses leaving the area was because the Millennium Skytrain Line had been completed in 2002. With the completion of this major transportation infrastructure project, there were other industries that left the area including Construction businesses reduced from 10 to 5, as well as the Fabricated Metal Product businesses, which decreased from 9 to 3 businesses in just one year. As mentioned during the 1985 to 1995 decade, the increase of Fabricated Metal Product industrial businesses was likely due to major infrastructure projects, although once complete, these businesses located elsewhere, as was the case in 2002. Other potentially related businesses that left the area included the Automotive Repair / Service industry, Office / Professional Services and Wholesale Trade companies.

In regard to the wood product manufacturing industry, another key anchor business that may have contributed to the major changes of the study area was the closure of Fraser Mills, which was located just east along the Fraser River in Coquitlam. As mentioned on Canada Newswire in April 2001, “International Forest Products Ltd. (Interfor) will downsize its coastal woodlands operations and permanently close its Fraser Mills manufacturing facilities, in Coquitlam” (Canada Newswire, 2001). The official date that Fraser Mills would close was announced as October 31, 2001, which coincides with the major decrease in the number of related firms in the Brunette Creek industrial area. Similar to Canfor previously mentioned above, Fraser Mills was an anchor business and therefore was relied upon in regard to supporting businesses in the area.
The changes to the industrial categories that occurred between 2001 and 2002 in the study area were considerable. In Figure 22 above, the Herfindahl Index provides a further explanation of the industrial share and change in the number of firms in the study area. In 2001 the index was 0.094 and changed to 0.107 in 2002. Although these amounts are minimal, due to the decrease in the number of overall businesses, the study area became slightly more concentrated in terms of industrial business types. To re-iterate the explanation in the methodology, an index of 1.00 would equate to a perfect monopoly of one industrial category in the study area. Meanwhile, an index of 0.0333 would equate to a perfectly competitive market of all industries being equal for the study area. Some of the factors that affected the area were mentioned above with fewer businesses leading to higher overall shares for certain types of industries. Upon further examination and analysis, Figure 23 provides a more in-depth analysis of some key industrial sectors that were affected between 2001 and 2002.
Figure 23 – Change of % Share, Multiple Sectors – 2001 to 2002

Figure 23 above, provides a further breakdown of the industrial changes in the study area between 2001 and 2002. This graph shows that sectors such as the Automotive Repair / Services (14.9% to 15.9%) and Construction (7.1% to 7.9%) increased their share over other sectors between 2001 and 2002. The Wholesale Trade sector also increased from 14.2% to 20.6%, which means that although there was a decline in the number of businesses, it increased overall industrial percentage share due to more decreases in other industries. In regard to decreased % share of total industrial businesses, the Freight/Shipping, Office & Professional and Wood Product Manufacturing sectors all declined between 2001 and 2002. The percentage share increases and decreases are difficult to analyze with such a sudden drop in overall businesses to the study area but Figure 23 provides further insight into which industries were affected more than others. The industrial land was affected by the factors mentioned above during this time period and became more concentrated when examining the overall total Herfindahl index change.
4.5.6. Industrial Business Changes – 2005 to 2014

The industrial changes that occurred in Brunette Creek between 2005 and 2014 were relatively minor, as this was a period of further stability leading toward the present day.

With continued infrastructure projects occurring throughout the Lower Mainland such as the South Fraser Perimeter Road, the new Port Mann Bridge and the extension of the Skytrain Line from Lougheed Town Centre to Coquitlam, there was continued economic opportunity for numerous industrial businesses. For example, during this time period, the Construction industry remained consistent at 10% of all businesses in the study area. Some of these construction-related businesses were WinVan Paving, Newway Concrete Forming, Modu-Loc Fence Rentals and Eagle Crane Inc., which could be directly related to supporting major infrastructure projects locally and throughout the region. The Fabricated Metal Product industry also was consistent during this time period remaining at 10% from 2005. These types of industrial businesses would also...
support further infrastructure projects and included Gortec Machining, Pacific Bolt Manufacturing, Standard Aluminum Products and British Hydraulics within Brunette Creek. With the completion of the Evergreen Skytrain line, it will be interesting to examine how the end of this project affects these supporting types of businesses in the area. Within the Automotive Repair / Service businesses, these increased from 13% in 2005 to 17% in 2014. Although within this sector there has historically been constant turnover in terms of changes to specific companies with 9 automotive businesses leaving the area during this time period. In regard to the wood product industry, there were still companies located in Brunette Creek, although they were of a much smaller scale than in the past and overall increased from 7% to 10% in 2014. Most of these companies were smaller scale operations related to the building of wood cabinets and other products. Some of these companies included AJ Fineline Cabinets, Attractive Kitchen Cabinets, Riley’s Custom Cabinets and Westcraft Cabinet and Millwork in the area. Overall, this time period was stable with few major changes to the industrial landscape.

Throughout the 70-year time period of the study, there have been many changes to the economy and transportation infrastructure developments that have impacted the Brunette Creek area of New Westminster. The following chapter will conclude this study by summarizing the major findings, discussing the limitations and future research options, along with policy and planning implications related to this thesis.
Chapter 5. Discussion and Conclusion

The purpose of this thesis was to understand how economic changes and transportation infrastructure affected the mix of industrial businesses within the Brunette Creek area of New Westminster through a 70-year analysis of business listings data. Due to the long study time period, there were a number of themes to examine in the literature review that included economic location theories, industrial de-industrialization and diversification, the British Columbia forestry industry and transportation infrastructure’s influence on industrial land uses. This was followed up with a case study of the Brunette Creek industrial area of New Westminster and uncovered numerous key findings. In the following paragraphs I will provide details on my expectations of conducting this research, followed by my key findings, limitations and future research directions and concluding with policy and planning implications.

In regard to my overall expectations, I initially believed there wouldn’t be enough information within the small study area to understand how economic changes and transportation infrastructure affected the industrial land. My original intention for this thesis was to examine the entire New Westminster waterfront but in hindsight, this would have been a major undertaking and the scope would have been too large. My expectations were that there would be a substantial change in the mix of industrial businesses in the study area that were related to economic changes. Over a 70-year time period, the economy changed considerably due to the rise of manufacturing, de-industrialization and a shift to the service sector. For transportation infrastructure, since the study area was surrounded by multiple modes of transportation (railways, road networks and river access), I expected that there would be some influence on the industrial land within the study area. The introduction of major road networks, bridges and rapid transit infrastructure had an important effect on the industrial land. In the following paragraphs, I will go into further detail on the major findings of my research for this thesis.
5.1. Major Findings

The research found that there were numerous key links between economic change and transportation infrastructure on the mix of industrial businesses within the Brunette Creek study area of New Westminster. The major findings are separated into economic changes and transportation infrastructure changes and how they affected the study area.

Over a 70-year timespan, it was expected that there would be extensive changes to the economy, although its effect on industrial land was unknown. The study area was heavily reliant on the primary resource sector such as the wood-product industry leading up to 1945. In order to reduce transportation costs, the location of the forestry industrial activity along the Fraser River in the study area confirms the importance of Weber’s theory to locate where transportation costs are lowest by utilizing the Fraser River to transport product. In the 1952 Lower Mainland planning report, the projection was to shift from being less reliant on primary resource industries and to transition the region to manufacturing and secondary industrial businesses related to the primary sector. This would lead to a more stable industrial base throughout the region and through my research; I found that the study area began a transition to other manufacturing industries. While the wood-product sector was still the dominant sector between the time-period of 1945 to 1965, there was an increase in secondary businesses related to the processing and creation of wood products. This relates to Benjamin Chinitz’s economic theory of the impact of initial dominant industry and how it can influence other subsidiary businesses to locate in an area and support the main anchor industry. Other manufacturing companies, chemical production, food and beverage companies became more prevalent in the study area during this time. The 1952 forecast to shift to new types of industrial sectors in order to grow the industrial base were occurring in the study area.

As the Lower Mainland expanded through post-war population growth, the development of the suburbs and highway and bridge infrastructure also influenced the study area. In 1963, the building of the Port Mann Bridge impacted the mix of industrial businesses due to the proximity of the study area to the highway and new bridge. The research showed that after the bridge opened, the automotive repair/service sector grew from 2% in 1965 to 13% in 1975 presumably due to the higher volume of vehicle traffic within the
proximity to the Brunette Creek study area. The wholesale trade sector and freight/shipping sector also benefited within the study area due to new connections and accessibility throughout the region as the ease of transportation allowed these companies to reach their suppliers and clients. This coincides with the change in transportation technology with the introduction of containerization for ease of the movement of goods both overseas and land with the increase in the trucking industry. With the continued growth of the population, development of the suburbs and infrastructure development, the construction industry also became prevalent in the study area in order to meet the growth needs of the region. The rise in the construction sector also coincided with the development of the Regional Town Centre plan for the Lower Mainland in order to concentrate development in key areas throughout the region.

The economic global shift from mass production methods (Fordism) to flexible production combined with de-industrialization had a major effect on the wood-product industrial sector. This was the primary industry within the study area prior to 1945 through to the early 1970s, although there was a considerable decrease from 1965 to 1975 from 39% to 20% of total businesses in the study area. Global competition and changes to the market led to flexible production methods and small to medium sized businesses becoming more prevalent. The businesses that supported the large wood product companies began closing in the 1970s, but this also was combined with the downsizing of larger anchor firms in the study area. In the 1970s and 1980s, anchor wood product manufacturing firms such as Capilano Timber and Lamford Cedar closed which eventually led to the sector only having 2% of total businesses in the study area by 1985. In a 20-year timespan, the wood-product sector businesses decreased from 39% to 2% of total businesses in Brunette Creek. These changes, combined with the global economic recession in the early 1980s had a devastating effect on the forestry industry in the province of British Columbia and more specifically the Brunette Creek study area.

With the decline of the wood-product sector in the 1970s, the industrial base in the study area began to diversify which led to a rise of the service sector and non-primary industrial services through to the 1990s. The economic forecast from the 1976 Livable Region Plan predicted an increase in secondary and tertiary industries throughout the region. The research showed an increase in industries such as wholesale trade from
9% in 1975 to 18% in 1985 within the study area. The connectivity and accessibility of the study area to the freeway and relatively cheap land provided an ideal location for the wholesale trade sector to flourish by being in close proximity to suppliers and clients. With the development of the regional town centres, the introduction of rapid transit infrastructure (the Expo Skytrain) between downtown Vancouver and Surrey provided continued growth of the construction industry in order to support these projects. Between 1975 and 1985, the construction sector increased from 6% to 11% within the study area. These are examples of both economic and transportation infrastructure changes that affected the mix of industrial businesses within the study area and throughout the region.

One of the most drastic findings of this research occurred between 2001 and 2002 and related to both economic changes and the completion of a major transportation infrastructure project. During this one-year time period, 81 businesses had left the area, which had a huge impact for the small study area. Although the wood-product industry had changed and began declining in the 1970s, a major factor was that the anchor businesses of Canadian Forest Products and Fraser Mills had ceased operations in 2001. I wouldn’t define the study area as a unique hub-and-spoke district (Markusen, 1999), although the research confirms the fact that many of the smaller firms were dependant on the main anchor firms during the 2001 to 2002 time period. Anchor businesses within small geographic areas have considerable influence on subsidiary businesses that support them, and when these companies leave an area, supporting businesses typically follow suit. In this case, the smaller supporting businesses such as machinery manufacturers, freight/shipping companies and secondary wood product manufacturers also had departed from the study area during this time period. Another anchor business that closed in 2001 was the Labatt’s Brewery located at the corner of Columbia Street and Brunette Avenue. Supporting businesses in the study area would have also included freight/shipping companies and wholesale trade businesses. In terms of transportation infrastructure, the new Millennium Skytrain Line was completed in 2002 and the research showed the construction sector businesses decreased by 50%, while the fabricated metal product businesses decreased by 66% between 2001 and 2002.
In conclusion, this research has shown that the mix of industrial businesses within the Brunette Creek area of New Westminster have been influenced by changes to the economy and transportation infrastructure since 1945. Numerous economic changes related to the turbulent British Columbia forestry sector, de-industrialization and the rise of the service sector affected the industrial businesses. A key time period was during the 1970s with the decline of the forestry sector, which created an opportunity for the study area to diversify the industrial base and gave rise to other sectors such as the construction industry and wholesale trade. This research also shows how dynamic and adaptable industrial land is to economic change. For transportation infrastructure, development of key road networks, building of the Port Mann Bridge and rapid transit infrastructure also had both direct and indirect impacts on the mix of businesses in Brunette Creek. Although the businesses in Brunette Creek were initially dominated by a few key industrial sectors in 1945, over the 70-year time period the industrial base has diversified with a range of different industries that are located in the area as of 2014.

5.2. Limitations and Future Research

In terms of the limitations of this study, the research was conducted on a small geographic area of New Westminster. Due to the small size of the industrial area, there may have been other local factors that were not taken into account from other industrial areas along the waterfront of New Westminster and the neighbouring suburb of Coquitlam. As previously mentioned, my initial research idea was to examine the entire waterfront of New Westminster’s industrial land, although this would have been much too large a scope. It would have been interesting to examine all the industrial changes and factors on the central and western part of the New Westminster waterfront for comparison. In terms of future research, this could be an initial examination of one part of the waterfront and be followed up with an examination of the rest of the waterfront industries along the Fraser River in the future.

Another limitation of the research was the difficulty in analyzing historical industrial land use change based solely on the business listings data alone. For an analysis of a 70-year time period, there was a lack of other information such as company sales, employment data or other related information that may have provided another
perspective on the changes to the industrial landscape. Conducting a historical analysis of business listings is one aspect of analysis, although obtaining qualitative data through the use of interviews would have also benefited this study. It would have been interesting to understand the reasons why specific businesses located in the area or why they decided to leave or close their businesses. This would give a much richer analysis of industrial change on the New Westminster waterfront. The issue with this approach is that by researching a 70-year time period, the only interviews that could be done would be with recent or current businesses.

As mentioned in the methodology (section 3.2), another limitation was examining government policy related to industrial land uses from the perspective of the municipal, provincial and federal government. This study could have been conducted from a different perspective by researching land use policies over the study time period. There is potential to conduct a study from this angle in the future, although this was out of the scope for this research project.

The above limitations could be included as future research opportunities for graduate or doctorate students in the coming years. Furthermore, through my research I didn’t find very many academic articles or past theses that examined industrial land use from a long-term historical perspective. I believe there is an opportunity to examine other parts of New Westminster or cities throughout the Lower Mainland by conducting a long-term analysis of the changes to industrial land uses.

5.3. Policy and planning implications

This study contributes to the relevant research related to understanding what impacts industrial land use changes over a long period of time. Some of the factors that have been brought up in this thesis relate to economic changes at multiple levels; local, regional and global. The effects of transportation infrastructure developments have also been outlined in this thesis. It is important to understand what factors affect industrial land over a long time period in order to plan for the future. Within the Metro Vancouver region, industrial land is competing with other land uses such as residential and commercial developments. Industrial land contributes to the economy through
employment opportunities for local residents and supporting the functioning and servicing of the city and region. By understanding what impacts industrial land, it will allow policy makers, planners and cities in general to better anticipate change in order to make informed decisions about industrial land uses.

In Metro Vancouver, the exponential growth of the region both in terms of residential and commercial development has put a strain on industrial land uses. As the region grows, the importance of industrial land being available to provide space for jobs for residents and support this growth has become increasingly vital to the economy. Due to these reasons, one of the goals of the Metro Vancouver Regional Growth Strategy is to “Protect the Supply of Industrial Land” (Metro Vancouver, 2011, p. 27). The regional authority’s role is to “monitor the supply of, and demand for, industrial land in the region with the objective of assessing whether there is sufficient capacity to meet the needs of the regional economy” (Metro Vancouver, 2011, p. 27). This research related to economic changes and how it impacts industrial land can assist regional authorities to predict and adapt their policies when there are regional and global economic shifts.

The City of New Westminster has recently developed their latest Official Community Plan, which provides details into the local industrial land uses. Policy 3.2 states to “protect the industrial land base and encourage employment-intensive and sustainable industrial uses” (New Westminster, 2017, p. 59). This follows the lead of Metro Vancouver’s Regional Growth strategy to continue protecting existing industrial land uses throughout the region. In New Westminster, most of the industrial land is located on the Fraser River and the overall demand in the region is expected to absorb the available supply of industrial land by 2030. The map below is from the New Westminster Industrial Strategy study conducted by a consulting firm for the city in 2008. The map
shows the industrial development potential within Brunette Creek, in which there isn’t much potential for increasing industrial land uses in the area. There may be opportunity to intensify the industrial land by increasing the density, but many industrial businesses typically require more space in order to conduct their daily operations. The map also shows the segregation of the area due to transportation infrastructure on numerous boundaries of the area. Transportation infrastructure segregates the study area, but this is also a positive effect because the segregation also protects the industrial land from other impeding land uses. One of the key issues is related to extending United Boulevard and developing the North Fraser Perimeter Road along the north shore of the Fraser River through the Brunette Creek study area. The importance of the movement of goods throughout the region and the connectivity to the Trans-Canada highway make this a highly debated transportation infrastructure issue for New Westminster. This type of major infrastructure project will require further detailed analysis and coordination prior to making future decisions.
References


Google Maps, (multiple)


