A LAND-USE PLAN

FOR FORT McMURRAY, ALBERTA

by

Robert Kirby Gorman

A thesis
presented to the University of Manitoba
in partial fulfillment of the
requirements for the degree of
Master of City Planning
in
The Department of City Planning

Winnipeg, Manitoba

August 26, 1986 

ISBN 0-315-37207-9

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ABSTRACT

Fort McMurray is a city that is destined to grow in the future, regardless of present economic conditions. The city is surrounded by vast deposits of oilsands. The oil contained within the oilsands will be required by world markets some day and when that day arrives Fort McMurray will benefit and grow tremendously.

This thesis examines how and where the city should expand in the future. The recommendatiron of this thesis is that two new development sites can be utilized. The subdivision of Timberlea has already been started and can accomodate a doubling of the city's present population of 35,000. If required the city can then expand further with the subdivision of Forest Heights. The Plan in this thesis will accomodate up to 155,000 people, thus it is a long range plan as the city will not reach this population for many years.

As the city will grow at different rates of growth according to the supply and demand of oil this plan is both general and flexible and has several stages. Once the demand for oilsands oil begins the city will grow rapidly making it necessary to plan for larger scale developments, which can be built as required. Fort McMurray is a city of the future and this thesis is a land-use plan for that future city.

ACKNOWLEDGEMENTS

There are several people who provided invaluable aid during my years of study and in the preparation of this thesis. First I must thank my parents, Allan and Joan, for putting up with me and allowing me to live at home while I studied. I appreciate the financial aid and moral support more than words can express. As this thesis neared completion the financial costs of type, supplies and xeroxing ran high and I owe my grandfather, Norman Gorman, many thanks for his financial assistance.

My sincere thanks to the people on my thesis committee: Dr. D. Stylarias, Advisor; Prof. B. Rotoff, Reader, and Prof. W.P. Beley, Reader. It was an excellent committee and I appreciate their patient guidance and support during the writing of this thesis.

Finally, I would like to thank all the people in Fort McMurray who provided information and assistance during the research stage of this thesis.

GLOSSARY OF TERMS

This thesis contents include many terms both specific to the City of Fort McMurray and unrelated that require further clarification. As anyone who has not been to Fort McMurray will not be familiar with many of the terms used. Thus this Glossary has been provided.

Abasands	A small subdivision.
Alberta Housing Corporation	The Provincial Government's Department of Housing
Alsands	An oil sands venture that never came about
Arterial Routes	A major roadway that connect one region of the city to another, with limited access
Athabasca Realty	The Housing Department of Suncor
Athabasca River	The cities largest river
Beacon Hill	A small subdivision
Bitumont	The site of the first commercial oil sands pit forty miles north of the city
Buffer	A zone of undeveloped land used to separate two conflicting land-uses
Central Business District	The commercial heart of the city; the downtown
Clearwater River	The cities second largest river
Collector	A roadway that connects residential street to arterial routes
Community Park	A medium size park centered on a community club or a school
Company Housing	A form of housing supplied by the employer usually at reduced cost with

	company buy back to insure the homeowner
Comprehensive Planning	To plan for as many aspects of the subject as possible within reason
Construction Land/Area	Land that cannot be developed due to the physical terrain
Developmental Planning	Planning for the growth and expansion of the city
Dickinsfield	Residential development in the sub-division of Dickins
Duplex	A form of house with two units under one roof (also known as semi-detached)
Forest Heights	A proposed new development east of the lower townsite across the Clearwater River
Franklin Avenue	A major street that travels the length of the lower townsite including the C.B.D.
Freeway	A high speed arterial that is only accessed by other arterials
Frontier	An area that is on the fringe of civilization isolated from other developed areas
Gregoire Park	A subdivision for mobile homes only
Gregoire Provincial Park	A large park on a lake 20 miles south of the city operated by the province
Growth Factor	The amount the cities population increase for each job created. (Also known as multiplier and spin-off growth)
Hanging Stone River	A small river that flows into the Clearwater
Heavy Industry	Although there is little heavy industry in the city at present, two sites have been allocated for use by factories, manufacturing firms, etc.
High Density Housing	Residential areas of apartment blocks

Highway Sixty Three (63)	The cities main thoroughfare and only access route to the south
Horse River	A small river that flows into the Athabasca River
Insitu Plant	An experimental method of mining oil from the tar sands
Keyano College	The cities only community college
Labour Turnover	Employees who work only for a short duration in order to make money and move back to southern Canada
Lay-out	The plan of future Fort McMurray
Leisure Time	The time an individual has to spend on activities aside from work or sleep
Light Industry	Industry that supplies goods and services to the population directly, such as auto services, food and beverage and printing and publishing
Linkages	Transportation routes that link one area with another area
Low Density Housing	Residential areas of single family homes duplexs and semi detached homes
Lower Townsite	The developed area of the Clearwater Hwy that was the original site of the settlement and includes the C.B.D.
Macdonald Island	The cities main park and recreation area
McKenzie Park	The existing Industrial Park
Medium Density Housing	Townhouse-type residential units
Mobile HOmes	A type of residence that can be easily moved from one site to another
Mobile Population	A portion of the population that does not wish to be permanent residents but only stay for a few years to get work experience and to save money usually to move to southern Canada
Multiplier Effect	(Refer to Growth Factor)

Neighborhood Park	A small park usually only for immediate local use
Non-Renewable Resource	Oil is a finite resource thus as other supplies run out, further development or the oil sands becomes more probable
Northward Housing	The housing department of Syncrude
Oil Sands	Land that contains oil in tar and sand deposits
Oil Sands Plant	Industrial plant that mines the oil from the tar sands
Open Space Network	A system of continuous and non-continuous undeveloped land set aside for recreational and aesthetic purposes
Overburden	Land and vegetation which lies on top of oil sands deposits and must be striped away to mine the oil
Patio Housing	A form of townhouse units
Plan	The layout of this thesis's plans for future Fort McMurray
Plateau	An area of land surrounded by deep river valleys, isolating it from other areas of the city
Population Per Unit Average- or person per unit average -	The number of people living in a type of residential unit
Prairie	One of the original three settlements that joined to form the village of Fort McMurray. Located at the south end of the Lower Townsite
Private Industry	Businesses and Industries that are privately owned with no ties to any level of Canadian Government
Regional Park	A major park servicing a large population base with recreational and sports activities
Residential Street	A quiet street which runs through neighborhoods past all homes with

	various layouts. They lead to collector routes
River Park	The large new park proposed to run along the Clearwater River from Macdonald Island to Waterways
Row Housing	A form of townhouse units
Scenario	Hypothetical version of possible future development
Semi-Detached Housing	(Refer to Duplexes)
Set Backs	An area of land close to a slope that must be left as conservation land due to slope instability
Shopping Centres	There are 4 types in this thesis
- Neighbourhood -	Small mall usually containing convenience stores, containing between two to ten stores
- Community -	These malls carry a full range of essential items with eleven to twenty-five stores and are usually indoor malls
- Strip Malls -	These are already in existence in the city with five to twenty-five stores
- Regional -	This thesis will call malls with over twenty-five stores Regional considering the size of the city
Solar Access/Orientation	A development that is oriented to use solar energy benefits when such a form of energy becomes available in the city
Spin Off Growth	(Refer to Growth Factor)
Squatters	People who live on land illegally with no right to the land
Strip Mine	A form of mining that strips overburden away in order to get at the resource
Suncor	The name of the city's first oil sands plant

Syncrude	The name of the city's second oil sands plant
Tar Sands	Another name for the oil sands
Terraced Housing	A form of townhouse units
Thickwood Heights	A subdivision of almost 15,000 people
Timberlea	A new development area, with a total projected population of 70,000 in two stages of 35,00
Townhouses	A medium density form of housing that can take the form of various layouts
Waterways	One of the original 3 settlements and now a separate subdivision from the city
Zero-Lot-Line Housing	In Fort McMurray these homes are single family homes that are built on one of the lot's property line

LIST OF ABBREVIATIONS

APX	Approximate
APT	Apartments
A.H.C.	Alberta Housing Corporation
A.O.S.E.R.P.	Alberta Oil Sands Environmental Research Program
A.R.C.L.	Athabasca Realty Company Limited
C.B.D.	Central Business District
C.L.F.	Construction Labour Force
C.N.R.	Canadian National Railways
G.C.G.	G.C.G. Engineering Group
G.M.P.	General Municipal Plan
Gov't	Government
Hwy 63	Highway Sixty-three
K.P.H.	Kilometers Per Hour
M.H.	Mobile Homes
N.E. A/B	North East Alberta
N.W. Sask.	North West Saskatchewan
N.W.T.	Northwest Territories
Pop.	Population
P.P.U./P.P.U.A.	Person/Population per Unit Average
P.S.O.	Population Spin-Off
P.W.A.	Pacific Western Airlines
S.F.H.	Single Family Home
S.I.P.	Small Insitu Plant
Town	Townhouses

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INTRODUCTION

1.1 Introduction

Canada is a country blessed with many natural resources, located in isolated frontier regions. In most cases when a decision is made to extract a particular resource, a new town is built. Such new towns are also known as single industry frontier resource towns. Fort McMurray, although a city of 35,000 inhabitants is still a single industry centre and was built to extract oil from the tar sands.

The thesis is basically divided into 3 sections; first, introductory material, second, material on existing conditions, third, future landuse proposals, and conclusions. However, some of the design recommendations are inserted at some points in the second section.

1.2 EXISTING CONDITIONS

The intent of this work is to provide a potential general land use plan for the City of Fort McMurray, as expansion occurs beyond the present city limits.

Fort McMurray has grown from a village of just over 1,000 to a city of 35,000 in twenty years (1963-1983). This growth is the result of the development of the oil sands as a commercially marketable resource product. There are presently two oil sands plants. Once the economy strengthens, and the oversupply of oil ends, there will most likely be more oil sands plants.

(Detailed pieces of history will be outlined in paragraph form while brief historical facts will be given in point form.)

Unless oil is replaced by an alternative energy source, Fort McMurray will experience rapid growth once again, and it is necessary to plan for that potential growth now.

The plan will take existing land use areas and potential new development areas, and mold them into a possible land use pattern for Fort McMurray's future. A better land use scheme for the city will be achieved by concentrating all new development in one or two areas limiting the total expanse of the city.

1.3 A BRIEF HISTORY OF FORT MCMURRAY

Planning for the city in its recent past has led to its present pattern. The following is a brief history of the city focusing on its recent planning policies. (Additional information on the city's history is in the Appendix.)

1900 - The population was 300 and the main function of the settlement was transportation and trade, while the fur trade was still important to the local economy.[1] The settlement was actually three villages named Waterways, the Prairie and Fort McMurray. The Prairie was midway between Waterways and the post.

1946 - The three settlements became an official village "McMurray".[2]

1948 - The town of Fort McMurray was created.[2]

1950's - "Sun-Oil" (later named Suncor) commenced explorations and decided to build a commercial plant twenty miles north of Fort McMurray. The provincial and federal governments placed many restrictions on such a plant, beyond only environmental controls. Chuck Knight, Mayor of Fort McMurray and former

Suncor employee, said there was a good chance Suncor might have built a new town. However, the provincial government was lobbied by the town of Fort McMurray to locate the employees of the plant in the town.[3]

The provincial government controlled the development permits for the oil sands plant and told Suncor to locate its employees in Fort McMurray and not to build a new town. At this time, projections were that Suncor would increase the population to 5,000 and the valley of the Clearwater could hold 10,000 to 12,000. However, the valley was in a flood plain and could not accommodate population increases if a second oil sands plant were to be built. These points were not considered important enough to build a new town on a site with fewer development restrictions. Short-range politics and economics won out over long-range planning. Suncor did get the benefit of the existing infrastructure and its problems such as flooding and a potential shortage of developable land in the valley.

1960's - As a result of the tendency of every new plant wanting a new town, the provincial government set out a policy that any plant locating within fifty miles of Fort McMurray would have to locate its employees in the town.[4]

At this time, a group of oil companies collectively known as Syncrude was doing explorations in the region and this policy came into effect as Syncrude selected a site twenty-five miles north of the town. As a result Syncrude could not choose the

option of a new town and had to locate its employees in Fort McMurray.[5]

1963 - Suncor begins construction of its oil sands plant approximately 20 miles north of Fort McMurray.[6]

1964 - Fort McMurray granted new town status.[7]

1963-65 The population doubles from 1,303 in 1963 to 3,378 in 1966.[8]

1966 - The town' first subdivision (Poplar Grove) built.

- The first all-weather (gravel) road to Edmonton was opened.[9]

1967 - The Suncor plant became operational.

- The town's population was 4,984.[10]

1972 - Alberta housing took over the servicing of all housing projects as private firms would not assume the risk in the growing town.

- The town's population was 8,148, a seven-fold growth in 10 years.

- Syncrude started construction of its oil sands plant.[11]

- As Syncrude construction workers moved in, the valley's developable land was running out and a planning decision had to be made where to put new development.

1.4 PLANNING IN FORT MCMURRAY

1.4.1 Planning in the 1960's

Planning was done in Edmonton by provincial government planners who made field trips to Fort McMurray when necessary.[12]

1.4.2 Planning in the 1970's

1970 - A planning office was located in Fort McMurray due to economics and lobbying by the town.[13]

1972 - The Clearwater Valley was running out of developable land and David Russell, Minister of Urban Affairs, decided to hire a private firm, to plan for the town's future development. At this time the town was planning to put the next development across the Athabasca in Thickwood Heights, a large site with a lot of adjacent developable land.[14] The private planning firm "Cohos Evamy and Partners", disagreed.

Cohos advocated scattering development on several nearby small plateaus, with the idea that such a line of development would keep the new "small" subdivisions dependent on the C.B.D., and ensure the C.B.D.'s survival.[15] Cohos had the backing of the Minister to do this and the town's plans for developing Thickwood were scratched for the moment. There were several problems, such as the first subdivision being built on the region's only close gravel deposit. This policy of preserving the C.B.D. was costly as services had to be built up to each small plateau subdivision, as opposed to developing one large site such as Thickwood/-Timberlea. yet, once all the nearby plateaus had been developed, a large site had to be chosen anyway. The choice was between Forest Heights (across the Clearwater) and Timberlea. Economics and location favored Timberlea as it would be cheaper than Forest Heights which would require crossing the Clearwater and putting services up its slopes, whereas services to Timberlea only had to be extended and upgraded. The location of Timberlea allowed good access to the plant sites while there were no

oil plants on the Forest Heights side of the Clearwater. Timberlea was chosen to be developed when needed.

Planning 1976 - A provincial planning team was put in Fort McMurray replacing Cohos.

Planning 1980 - Fort McMurray became a city and hired its own planning staff.

- A new regional hospital was built with 150 beds and room for 150 more as needed.

1983 - The population slowed from its rapid growth during Syncrude's construction, and has continued growing at a moderate rate. By 1983 the population was almost 35,000.

1.5 CONCLUSION

My decision to do a land-use plan of Fort McMurray was based on many factors. I worked as a planning technician in Fort McMurray on two occasions (1982, 1983), both were summer jobs although one was extended in the planning of the city. I am very familiar with the city and have first hand knowledge of this topic. There are no new oil sands plants planned, but one could be announced anytime, especially once the economy of the country improves. At this point the city may experience rapid growth once again.

This thesis will provide a general land-use plan of how the city should grow in future years. It is my hope that it will provide some direction for the future growth of the city.

FOOTNOTES

INTRODUCTION

1. Community West, p. 36.
2. Ibid., p. 40.
3. Ibid., p. 40.
4. Interview with Mr. Chuck Knight.
5. Interview with Mr. Chuck Knight.
6. Interview with Mr. Chuck Knight.
7. Stats Can, 1981 Census, p. 1.
8. Ibid., p. 1.
9. Ibid., p. 1.
10. Community West, p. 40.
11. Op.cit., p. 1.
12. Op.cit., p. 1.
13. Interview with Mr. Gerry Bussires.
14. Interview with Mr. Gerry Bussieres.
15. Interview with Mr. Gerry Bussieres.

CHAPTER TWO

COMPREHENSIVE PLANNING AND FRONTIER RESOURCE COMMUNITIES

2.1 INTRODUCTION

This thesis, while it is a land use plan, will deal with some comprehensive planning theory as well as developmental planning. Developmental planning is used to the extent that this is a development plan focusing on future land use.

Comprehensive planning has some merits in a land use plan. However, it is not the intention of this chapter to discuss the merits of a comprehensive plan. Comprehensive planning is applied, in some parts of the thesis, starting from the assumption, based on practice that comprehensive planning is an accepted tool of planning. Thus, this chapter will describe those aspects of comprehensive planning that may be applied in this thesis.

This chapter is divided into three parts: 2.2) A description of comprehensive planning; 2.3) A description of frontier resource communities; 2.4) Plans for frontier resource towns.

2.2 COMPREHENSIVE PLANNING

The term comprehensive planning is construed as synonymous with master planning and general plans. The very term "comprehensive" means exhaustively dealing with as many aspects of the subject as possible within reason.

> Comprehensive planning encompasses conceptually and analytically as many as possible of those essential elements within the primary control of the organism itself which determines its course of action and influence its development.

> It is planning for the totality rather than for one or several of its parts; system rather than subsystem planning. It incorporates the best estimates that can be derived concerning pertinent events external to the organism.
>
> A comprehensive plan is the product of the formulation into a set of interrelated policies and sequential actions of the results of continuing analysis and decision with respect to the future development of the organism.[1]

Since comprehensive planning is an attempt to encompass as many elements of the plan as possible, few if any single individuals will ever possess all the requisite qualities that comprehensive planning entails. John Friedmann states comprehensive planning may best be accomplished with a group of planners working closely together.[2]

2.2.1 Comprehensive plans

Comprehensive plans deal with functional planning. In functional planning the planner assumes the goals to be given in the situation and is rational with respect to the means only.[3] While the goals are assumed, they are based on Fact and thus can be considered rational in many cases. The means themselves are always construed as rational, for example, the means of achieving goals usually involve various planning policies and programs. The goal of this plan is to lay out a general land-use plan for the future long-range growth of Fort McMurray.

> General long-range planning means that the plan summarizes policies and proposals and does not indicate special locations or detailed locations ... and the plan looks beyond the foreground of pressing warrant issues to the perspective of problems and possibilities 20 to 30 years in the future.[4]

T.J. Kent lists the following as some of the content of most plans.

> Most existing plan documents include overviews of essential background material concerning population, the local and regional economy, the geographic setting and the historical

development of the community. It should also include an assessment of present conditions in the community, pointing out major problems and issues. The opportunities and needs for the future should be discussed assumptions and forecasts should be stated.

The general plan is not a program. It states the desired ends, but does not specify the means for achieving them.

It is not correct to view the general plan as an ideal picture of the community at some date in the future.[5]

This is because of the possibility of changes in the future, changes in the very instruments used to plan for the future. In short, the plan can be amended to allow for changes in the future, but changes in the future cannot be amended to the plan. Thus, this plan will attempt to reveal a desire state of affairs.[6] Long range comprehensive plans rarely specify the detailed courses of action needed to achieve that desired state. By their long range nature they cannot do so.[7]

2.2.2 Planning Legislation

The Alberta Planning Act does not set out a specific definition of comprehensive planning. It does define what every general municipal plan has to include, by law.

A general municipal plan shall

a) Describe

   i) the land use proposals for the municipality, and

   ii) the manner of and the proposals for future development in the municipality.

b) Designate or describe the areas of the municipality that would, in the opinion of the council, be suitable for an area structure plan or an area redevelopment plan or both;

c) Contain any other matters that the council considers necessary.[8]

Area structure plans and area redevelopment plans refer to an area of the municipality that requires detailed planning in addition to the general municipal plan.

2.2.3 Content of the Plan

With regard to the content of the plan itself, the Olmstead Bettman idea is that the scope of the general plan should be limited to questions of physical development.[9] Therefore by this definition a land-use plan can be considered a general plan in nature. The book Principles and Practices of Urban Planning suggests there are six basic requirements a plan should fulfill; most of these have been discussed already, therefore are only briefly mentioned.

1. The plan should be comprehensive (in nature).
2. The plan should be long range.
3. The plan should be general (in scope).
4. The plan should focus on physical development.
5. The plan should relate physical design proposals to community goals and social and economic policies.
6. The plan should be first a policy instrument and only second a technical instrument.[10]

2.2.4 Problems with Comprehensive Planning

There are several problems with comprehensive planning. One is that setting objectives in comprehensive planning is a complex task. Due to the many factors involved in comprehensive planning such as defining available resources and existing commitments, internal operating require-

ments, external trends and events, numerous wants and wishes and their many interconnections are all involved".[11] Andreas Faludi states that even a planning team cannot be truly comprehensive.

> The prescriptions of the rational planning process are that they must evaluate all alternative programmes against all the objectives pursued. The rational planning process is comprehensive. But though planning agencies may draw on the faculties of many individuals and thus pool their memories, even the most successful team still has far too limited capacity for simultaneously holding the mass of information to fulfill this prescription. Therefore, criticisms of "rational comprehensive" planning focus on the sheer impossibility of fulfilling its recommendations.[12]

2.3 FRONTIER RESOURCE COMMUNITIES

Frontier Resource Communities usually exist to exploit mineral resources and fossil fuels. Most of these communities have only one major industry, which is the production of the resource in question. Service industries for the population and support industries for the primary industry are usually the only other major employers. However in most resource towns the resource industry is the only reason for the town's existence and if the industry should close or falter, the resulting repercussions on the community are severe.

Fort McMurray is one of the largest single industry resource towns in Canada (if not the largest). Resource towns in Manitoba such as Flin Flon, Thompson, and Lynn Lake have all seen a reduction in population. Flin Flon was once a city of 12,000, but has shrunk steadily to about 8,000. Thompson was well over 20,000 at its peak, but now has less than 15,000. Lynn Lake once a town of over 3,000, has had its mine closed and now has no reason for existence.

Another thing in common most of these communities share is isolation. Usually when a resource is discovered it is the frontier far beyond heavily settled regions. As a result these communities are isolated, sometimes with no ground transportation links to settled areas.

2.4 PLANNING PROBLEMS IN FRONTIER SINGLE-INDUSTRY RESOURCE TOWNS.

Resource towns are often located on poor terrain and have little suitable land for urban development, and those areas have to be cut out of the wilderness that has heavy vegetation cover. Often developable sites are relatively small and dispersed. This factor and others lead to many problems in these communities, some of which include: high prices for goods and services, high turnover in the labour force, cabin fever (feeling of being restricted to community), poor selection for purchase of goods and services and many others. Some of these problems are due to the location of the community but many are caused by the residents themselves. This is because most residents come from southern Canada and they bring pre-conceived ideas with them. Although the climate and geography are radically different they expect to be provided with the same services and amenities that were available in southern Canada. New towns have to attempt to provide as many of these amenities and services as possible in order to attract people to the community. Another aspect of southern society these immigrants bring with them is the single family home (S.F.H.). The cost of building and maintaining (such as heating costs) are higher in the new towns but the S.F.H. is still the most popular form of housing. A more economical form of housing would be town-house units and apartments as heating costs are lower and many services

can be contained in the development reducing the amount of time the resident has to spend outside when the climate is severe.

Other general problems with single-industry resource towns are as follows:

1. The rate of development.

Most resource companies upon discovering a resource want to get it to the marketplace as soon as possible. This means locating the employees rapidly in order to mine the resources. Thus, a new town is built as soon as possible after it has been decided to mine the resource. As a result, the new community is rushed into existence to house the employees and many new towns often run into urban development problems later due to the rapid planning.

This indicates that a comprehensive plan of a new community should be done before the new town is built. However, this is the ideal situation. Many new towns receive their first comprehensive plan after the town is built, and it is a problem-solving measure. Another factor to consider is that a comprehensive general plan should be adapted to the unique development constraints of resources towns. Each resource town has different factors affecting its development, thus requiring a plan geared towards that end. Yet many towns get slightly altered versions of a standardized plan, the goal of which is mainly to erect sleeping quarters for employees of the industry so they can get to work as quickly as possible.

2. The rush for potential investors in investing in a Community with an uncertain future. (This problem led to Alberta Housing developing new subdivision, and will be discussed in the Housing Chapter).

3. High population turnover as many residents come to work for a couple of years, save money and leave.

FOOTNOTES

1. Urban Planning Theory, Melville Campbell Branch, p. 14.
2. Knowledge and Action: A Guide to Planning Theory. John Friedmann, p. 14.
3. Ibid., p. 10.
4. Principles and Practice of Urban Planning, William Coodman, p. 349.
5. The Urban General Plan, T.J. Kent, Jr., pp. 18-19.
6. A Reader in Planning Theory, Andreas Faludi, p. 135.
7. Ibid., p. 135.
8. Alberta Planning Act, Chapter P-9, p. 30.
9. The Urban General Plan, T.J. Kent, Jr., p. 63.
10. Principles and Practice or Urban Planning, William Goodman, p. 349.
11. Urban Planning Theory, Melville Campbell Branch, p. 150.
12. Planning Theory, Andreas Faludi, pp. 106-107.

CHAPTER THREE

PHYSICAL LANDSCAPE AND CLIMATE

3.1 INTRODUCTION

A prerequisite to all physical planning is the knowledge of the environmental characteristics which exists in any given area. Some areas are undevelopable due to the type of terrain and these areas must be identified at the outset of the plan before the land is designated for a certain use. The land in and around Fort McMurray clearly illustrates this statement. There are some areas that cannot be developed and some that should have varying development restrictions.

3.2 TOPOGRAPHY

The natural landscape in and around Fort McMurray is dominated by a number of deep river valleys,[1] the four main ones being the Athabasca, Clearwater, Hanging Stone and Horse Rivers. These river valleys dissect the countryside creating a series of mostly small separate plateaus. Some of these plateaus are not accessible for urban development, those economically accessible to the lower townsite have already been developed. "This topographic fragmentation of potential urban expansion areas creates significant engineering problems for urban growth, but it also contributes to an unusually attractive physical setting for the community."[2]

The lower townsite is in the valley of the Clearwater River, largely within its flood zone. The valley bluffs are generally steep and

unstable owing to relatively soft surface and sub-surface materials, and the rivers and streams continue to erode their banks.

The river valleys contain alluvial flat lands with little (0 - 5%) slope. They are generally 200 - 300 feet lower than the surrounding uplands.[3] The slopes of the valleys vary in steepness from 10% to over 20%, with numerous divisions by small creeks and streams.

3.3 CLIMATE

The climate is continental with significant daily and seasonal variation in temperature and precipitation.[4] The region receives the least (1900) annual hours of sunshine in Alberta with 65 - 75% of daylight hours cloudy.[5] The frost free season is generally short, usually from early June to early September.[6] Generally winters are long and cold while summers are short and cool.[7]

The prevailing winds are from the east (with northwest winds frequent in January and February). Summer winds are from the east, southeast and southwest.(note another source claims summer winds are from the west and south-west)*.[8] Winter winds are usually light or calm with the average speed ten m.p.h., from the northwest and east most of the precipitation occurs during the growing season (285 mm of an annual 435 mm). Snowfall is light to moderate with a long period of ground cover.[9]

The region receives very long hours of daylight in June and very little daylight in December. The difference in elevation lead to the variation in weather between the lower townsite and other areas of the city. The two major variations are, lower temperatures on occasion in

the winter caused by inversion conditions,[10] and frequent ice fogs in the winter.[11]

"The varying microclimate within the town area is a product of the modification of the general climate context by the orientation of various surface forms and features."[12] For example, the slopes in the city receive different climates, those facing the sun and prevailing winds are warmer and dryer. While north and east facing slopes are cooler and more retentive of moisture.[13]

Hence, the lower townsite has a distinct micro climate, in addition to the lower temperatures (from the uplands) and ice fogs, it has some protection from winds and a shorter frost free season. On occasion storms (summer/winter) move up-down the river valley.[14]

3.4 OIL SANDS

The oil sands deposits cover much of northeastern Alberta with four major deposits. The oil sands deposit in the Fort McMurray region is the largest and is known as the Athabasca deposit.

> Two theories have been developed for the origin of the oil sands. Either paleozoic oil was carried by the rivers and deposited in the sands or the heavy bitumen came from decomposing plants which were deposited in the sands.[15]

In 1972 the estimated reserve of oil in the oil sands was 626 billion barrels with twenty-six billion barrels recoverable using the strip mining method[27] (using 1972 technology).

These estimates have increased since 1972, and the recoverable reserves of oil have barely been touched, however an exact figure was not available for present estimates of oil.

3.5 OTHER RESOURCES

Aside from the oil sands and the environment itself (i.e. vegetation, hydrology, wildlife), other resources in the region include; lumber, coke and sulphur, silica sand, salt, gypsum, limestone and clay, gravel, granite and peat moss with uranium, coal and molybdenum close to Lake Athabasca.

Oil sand by-products include silica sand, and trace amounts of titanium bearing minerals and zircon, vanadium and nickel. Interest has been expressed in utilizing carbon dioxide, another by-product of oil sands processing in Insitu mining.

3.6 DEVELOPMENT CONSTRAINTS

There are many development constraints in the Fort McMurray region, both natural and man-made. The man-made constraints include timber and oil sands leases, transportation corridors, communication networks and traplines.[17]

There are three major natural development constraints; hydrologic, slopes and surface materials. The hydrologic constraints include the river valleys and flooding.

Flooding in the Fort McMurray area is principally caused by formation of ice jams on the Athabasca River, during Spring Break Up, when the flow of water downstream, obstructed by the ice jam, drains into the Clearwater River and backs into low-lying areas (the lower townsite).[18]

The steep river banks/slops separate the flood plains from the upland areas. Most of the slopes are potentially unstable, as many are

in excess of 20%. All slopes require various development setbacks which must be left undeveloped.[19]

There are two surface materials in the region that represent development constraints. First there are lacustrine plains which are a complex of clays and silts that are highly plastic being pliable when wet and hard when dry.[20]

There are three problems with lacustrine soils;

1) building on shallow foundations may become unstable, (however there are no developments in the City encountering this problem.
2) transportation and utility corridors may encounter construction difficulties requiring additional gravel subgrade,
3) surface drainage is usually poor due to the impervious nature of lacustrine deposits, this often leads to the creation of organic areas.[21] (i.e. muskeg or swamp).

The two latter problems concern the region around the city, not common within the city itself, but they ruled out several potential arms of future city expansion.

Second there are Organic Fen deposits that present some development difficulties. Organic areas are pockets of poorly drained surface materials that lead to buildups of organic material usually one to three feet deep. The development problems encountered are the depth of the organic material, poor surface drainage and the possibility of sporadic permafrost.

3.7 CONCLUSION

The topography and soil conditions have to be considered in developing a land-use plan. The city has presently developed most of its available land, and new development areas are required. The terrain of the city and the surrounding regions has been described briefly in this chapter.

The oil sands are the reason Fort McMurray is a city and no longer a village. The oil sands will prove a stable resource for the continued existence of the city for the following reasons:

1) Statistics given in this chapter show there is enough oil to last for a long time so the resource is stable, with large deposits.
2) The oil companies have a guaranteed market for their oil with set prices, thus fluctuations in world supply and demand do not have as great an impact on the oil sands as on other resources (such as precious metals - gold, nickel, etc.).
3) Oil will continue to be in demand until a substitute source of energy comes along to replace it.

FOOTNOTES

1. Northeast Alberta Regional Information Base, p. 65.
2. Ibid., p. 65.
3. Revised General Plan of Fort McMurray, Stanley Engineering, p. 5-3.
4. Ibid., p. 5-3.
5. Ibid., p. 5-1.
6. Northwest Alberta Regional Information Base, p. 14.
7. Revised General Plan, Stanley Engineering, p. 5-1.
8. Northwest Alberta Regional Information Base, p. 15.
9. Revised General Plan, Stanley Engineering p. 5-1.
10. Northwest Alberta Regional Information Base, p. 14.
11. Revised General Plan, Stanley Engineering, p. 5-1.
12. Ibid., p. 18-5.
13. Ibid., p. 18-5.
14. Ibid., p. 18-5.
15. Ibid., p. 5-8.
16. Ibid., p. 5-8.
17. Ibid., p. 5-10.
18. Ibid., p. 5-10.
19. Ibid., p. 5-11.

CHAPTER FOUR

DEMOGRAPHICS

4.1 INTRODUCTION

This chapter examines various demographic statistics pertaining to For McMurray which have varying impacts on the plan, including the following points to be discussed in this chapter.

1) Concentration of the population as opposed to its historical fragmentation (small isolated subdivision).
2) Population forecasts for the new development areas.
3) Historical population growth patterns. (Important as a basis for predictions on future growth).
4) Population distribution (to illustrate the fragmentation of the population).
5) - Age of residents
   - Origin of residents
   - Residency of residents (for recreation planning, and important to problem of population turnover vs. stability).
6) Scenarios - Old scenarios of future growth detailed to show how past plans have been incorrect,
   - Current scenarios to compare to,
   - This plan's scenarios.

4.2 EXISTING CONDITIONS

4.2.1 Factors Concerning the Growth of the City

Fort McMurray has increased from a town of approximately 1,000 people in 1961 to a city of almost 35,000 in 1983 (refer to Table 4.1). Any growth by the city in the future is dependent on the growth of the oil sands industry. There is an abundance of oil in the region and there is a good probability that companies will come to mine it in the future. However, the timing of this industrial expansion will be determined by external factors, (i.e. world price of oil, supply and demand, cost of mining the oil). Therefore, as the future growth of the city is uncertain, demographic predictions will be difficult to forecast. This is especially true in the case of Fort McMurray since it is not a typical northern resource centre.

It is one of the largest Northern single industry resource towns in Canada. (Only Timmins, Ontario, is larger and it now has some secondary industry so its status is no longer "single industry"). The resource in question has a guaranteed market and is available in very large quantities.

In many respects, it has the facilities and services of a city of comparable size in Southern Canada.

> Fort McMurray today is a typical southern Canadian town, both in appearance and in its community features. It differs from other towns of comparable size in western Canada only in terms of its bush location, its obvious 'boom' prosperity, and its clear indications of having experienced very rapid growth.[1]

However, several factors that are common to resource centres are found in Fort McMurray. Some of the most prominent of these include location, rapid growth and strong economy.

4.2.2 Population Forecasting

Population forecasting is required to assess the probability levels of growth and their effects on urban expansion. In the case of Fort McMurray, they will establish parameters within which short, intermediate and long-term development concepts can be accommodated. At each state of future town development, the population size and structure will have implications on the nature and extent of proposals. Many things can happen to upset long-term forecasts especially in resource-based expansion situation, so the probability of accuracy must be understood in that context.[2]

4.2.3 Historical Population Growth

Table 4.1 shows the historical growth on the population of Fort McMurray, and outlines the major factors influencing population growth. The construction of Suncor from 1964 to 1968 increased the population from 1,303 to 5,943, and increase of 456% in five years. The construction of Syncrude from 1972 to 1978 increased the population from 8,148 to 24,586, an increase of 302% in seven years. The oil sands plants started the rapid growth of the city in 1963. During periods with no construction of an oil sands plant growth tapered off severely (i.e. 1969-1971, 1979-1980, see Table 4.1). Thus it is clear the oil sands plants are directly responsible for the growth of the city. Even the exploration phase of Alsands, which was cancelled, increased the population, as a result of pre-construction research activity and people moving to the city in anticipation of finding a job. After Alsands was cancelled the

population did not decrease, in fact a small increase was still registered in 1983.

During years when no oil sands plant was being built, the population still increased due to expansion of the service industry and new employees of the oil sands plants. These people included teachers, merchants, and other service industry employees. These periods were from 1964-1971, and 1979 to the present.

In fact, from 1963 to 1982, the growth rate was never under 3% and only twice under 6%. This shows the stability of the growth rate in that there was never a population decrease and few years with small increases, even when no oil sands plant was under construction. Prior to the first oil sands plant (Suncor) the population had grown at an average rate of under 2%.[3]

Graph 4.1 clearly illustrates just how rapidly the city has grown since the first oil sands plant was built while the town grew fastest in terms of percentage growth during the construction of Suncor. Graph 4.1 shows the greatest real growth occurred during the construction of Syncrude.

4.2.4 Demographic Statistics

Table 4.2 and Graph 4.2 show the breakdown of the population by age. There is one fact shown by this table that stands out, that is the population is very young. Thirty-eight percent of over 1/3 of the population is young adults from twenty to thirty-four years old. A further 40.63% of the population is under twenty years old, mostly children and teenagers living at home. Thus, almost 80% (79.5%) of the

population is under thirty-five. This compares with the national average of 58.9% and the provincial average of 65.1% of people under thirty-five years old.

While most resource towns have young populations, few are the size of Fort McMurray. Most resource towns have less than 20,000 people, many are smaller than 10,000, and consequently do not have enough people in any age category to warrant the development of a full range of recreational centres. Fort McMurray has a young population in large enough numbers to justify (in terms of both economics and usage) recreational activities geared for a younger age group.

The fact that it is a young population also means that there is a large number of young families with children being born in greater than average numbers. Educational and recreational facilities have to be planned for them.

Another factor associated with a young population is that it will likely be more mobile than an older population. This is especially true for the single young adults.

At the other end of the scale, only 7.34% of the population is over forty-five years old. This compares with the national average of 28.9% and the provincial average of 23.3%. In fact, only 0.57% of the population of the city is over sixty-five (national = 9.8%, provincial = 7.3%).

Graph 4.2 is an age/sex population which visually illustrates the age structure of the city. An interesting fact to notice is that the male/female ratio is fairly well balanced. In the case of most northern resource centres there are significantly more males and females. This is

not true for Fort McMurray now, although it was true in the early boom years.

Fort McMurray had only 1,000 residents in the early 1960's. Most of the population is from other parts of Canada. Appendix Table 4 shows where the population of Fort McMurray originally came from. Approximately 60% came from outside Alberta. Ontario provided the highest number of immigrants (after Alberta), however, an interesting fact is that Newfoundland supplied almost 14% of the population (3rd highest). The problem is that many of these immigrants come to Fort McMurray to make money and after a couple of years they return home. Many immigrants from Newfoundland come during the "off season" for fishing and return during the fishing season. This does not occur much now, but it was common during the construction of an oil sands plant. These are some of the reasons Fort McMurray has a high labour (and overall population) turnover. Even in recent years the city has had high population turnover.

Table 4.3 shows that during twelve months from June 1981 to May 1982, 5,416 people moved to Fort McMurray. Some of this was due to Alsands which folded in May 1982. However, during roughly the same period the population only rose 2,804. Thus in twelve months 2,612 people left the city. This fact illustrates the high population turnover the city still has. The rate of turnover has been decreasing in recent years and while the city is still experiencing some population turnover, it is receiving more people than it is losing, as of 1983. Table 4.4 further illustrates this trend. This table shows the length of residency of the present population and compares it to Table 4.1. When gross referenced against actual populations of each year it is shown the city

has a high population turnover. For example, of the 3,378 people living in the city in 1966, only 529 are left. Another example is that in 1975 the population was 13,393, however, only 5,107 people presently in the city were here in 1975. This trend continue for each year.

A stable population would be an asset to the city. To achieve this, the population turnover must be further reduced.

4.3 CONSTRAINTS/OPPORTUNITIES

The city has a historical planning problem of fragmenting the population into several small subdivisions. This plan will concentrate the future population growth of the city in two development areas which will be known as Timberlea and Forest Heights.

4.3.1 Historical Planning Problems

This problem began in the early 1970's when the city had a choice between developing a large new area, to house most of the future population, or developing several small subdivisions. This decision had to be made, as the Lower Townsite was almost fully developed, with no more room for the rapidly growing population. The city wanted to develop one large site (Thickwood). However, the province decided to hire a private planning firm (Cohos, Evamy and Partners). This firm decided to develop several small subdivisions on neighboring small plateaus around the Lower Townsite. Their reason for this, was that they believed this would preserve the C.B.D., as the small subdivisions could not support shopping centres to compete with the C.B.D. However, this design led to several problems; it fragmented the population, the new subdivisions each only

had one usable access road, the city became spread out instead of concentrated. Eventually, when the small subdivisions were completed, the city developed Thickwood anyhow, so the aim to save the C.B.D. was negated. The city was stuck with an elongated, yet fragmented design.

4.3.2 Current Locations for Population Increases

Table 4.5 is a breakdown of population of the city's areas and subdivisions. Abasands, Beacon Hill and Gregoire Park are all at or very close to capacity with no significant development space for new population. The exceptions are as follows: Abasands which has a small area available, but development costs would be high if and when it is developed. Waterways has space available, largely through infill as it is one of the oldest settled areas in the city. The Lower Townsite also has infill potential and several areas could be converted to higher density developments.

Thickwood has some land available for development but unless it is a high density development, the increase would be limited to 1,000-2,000 people.

Timberlea has only recently begun development and presently (1983) contains approximately a hundred single family homes (S.F.H.) and seventy-five mobile homes with a population of between 500-700. This subdivision will probably grow rapidly within the next decade, but for the next few years development may be slow, as the Alberta Housing Corporation (A.H.C.) has decided to put a hold on further development until there is sufficient demand for new housing. Briefly, the reason for this is economic, because if many more new homes are built, a new

water treatment plant will be required on that side of the Athabasca. A.H.C. will have to pay for part of the cost, as a result they advocate as much housing infill as possible in existing areas before continuing to develop Timberlea. However, this plan will put all future foreseeable development into Timberlea and Forest Heights.

4.4 ELEMENTS OF THE PLAN

4.4.1 New Development Areas

The two new development areas are Timberlea, and Forest Heights. The present city design of Timberlea allows for a population of 35,000 and there is potential land to expand Timberlea by another 35,000 to a total of 70,000. Thus the city would become more concentrated in terms of its design and its population distribution. If it is decided to fully develop Timberlea (to a population of 70,000) before starting Forest Heights, the city would have 85,000 people out of a total population of 105,000 living on the west side of the Athabasca River. This would put the C.B.D. off to the side of the city at some distance from the majority of the residents.

It is important to maintain the C.B.D. as a major retail centre and a primary office location in the city. The only way to offset this is to develop Forest Heights creating a balanced design. Thus the main plan examines a future Fort McMurray with both Timberlea and Forest Heights developed. The projected population for these two developments is 70,028 for Timberlea, and 49,990 for Forest Heights. These figures are detailed in the Housing Chapter as the number of units for each housing type have

been given. (Refer to Housing chapter for population per unit averages.) The total population of the city would be approximately 155,000.

A secondary design will have only Timberlea developed with a city population of 105,000 (for details refer to Chapter Twelve).

4.4.2 Scenarios of Future Growth

This plan proposes four scenarios of future growth which outlines potential oil sands development until the year 2000 by which time the technology used to mine the oil sands may be different, they are as follows:

1. No new oil sands plants, but continued exploration.
2. One new oil sands plant, one small insitu plant.
3. Two new oil sands plants, one small insitu plant.
4. Maximum rate of development, one new plant and one small insitu plant completed every four years starting in 1988, thus three plants will be completed by the year 2000, (1992, 1996, 2000).

The population of the city will grow at different rates for each scenario.

As all four scenarios, each depend on a number of factors, any of which could occur, all four of the scenarios theoretically have an equal chance of transpiring.

This is just an arbitrary decision as there are four growth alternatives, any of which could theoretically occur.

The assumptions behind these projections are given in Chapter Eleven and the Scenarios given in greater detail. (Table 12.1).

The city of Fort McMurray has twice set out scenarios of future growth in 1972 and 1980. While many of the assumptions behind these scenarios have failed to occur they will be noted for information purposes and to compare to the projections made in this thesis.

The 1980 General Municipal Plan (G.M.P.) lists four growth alternatives for the city and the region.

1. No more oil sands development.
2. Construction of any number of oil sands plants with all of the new population to live in Fort McMurray.
3. A new town to be built for population increases brought about by any oil sands plants built north of the city. Any plants built south of the city will have population based in the city. Finally, Fort McMurray to be developed as a regional centre, with most service industries.
4. Several new towns for all new oil sands plants. Fort McMurray to house most service industries as a regional centre.[4]

These alternatives included population projections for the city using the following assumptions:

1. Each new plant to employ 2,500, taking six years to build.
2. At the peak of construction 6,500 will be involved at each site, with 1,500 in the city constructing housing.
3. A multiplier ratio of an increase of five people for each new plant employee.
4. Also 0.5 service positions for each new plant employee.
5. These projections are based on Alsands proceeding with construction

peaking in 1984, and the plant operational in 1986. (This proved to be an invalid assumption.)

6. Suncor expanding with 175 new employees in 1982.
7. Syncrude expanding with 1,200 new employees in 1986. (This assumption will probably be invalid as Syncrude has announced that its labour force will remain stable, no increases.)
8. After 1986, a new plant will start every six years for the life of the oil sands deposits. (This assumption is probably invalid as the economy and demand is poor.)[5]

The basic difference in these Scenarios and those proposed by this thesis is the idea of a new town. The possibility of a new town is not being considered and all future population is assumed to be concentrated in Fort McMurray.

Other plans and documents make note of the potential for a new town if new plants are built. In this thesis it will be assumed that Fort McMurray will remain the regional centre of northeastern Alberta, even if a new town were to be built, moreover, it is assumed that none will be built in the foreseeable future.

Assumptions one through four are applied to varying degrees in the Design Chapter. The expansion of Syncrude has been cancelled.

The 1980 G.M.P. set out population horizons (prediction if assumptions proven) of 45,000 in 1986, 60,000 in 1991, and 90,000 in 2000. As Table 11.1 shows these fall within the range of my four Scenarios, but at the two fastest rates of development.

The old General Municipal Plan (G.M.P.) from 1972 offered five scenarios.

1. No new plants after Syncrude.
2. Syncrude construction force remains in the city.
3. One more plant plus construction force after Syncrude.
4. Two more plants plus construction force after Syncrude.
5. Maximum growth.[6]

The population growth rates forecasted for these Scenarios are in Table 4.7, scenario three's population prediction (made in 1972) is close to what occurred, but it forecast one more plant than was built, so it is actually too low, as with another plant the population would be much higher. Numbers one and two predictions are both too low across the board. Scenario four might be correct if two more plants had been built. Scenario five is too high; there is no chance the population could be 120,000 in 1990, or 80,000 in 1995.

4.4.3 Growth Factor (Multiplier/Spin-off Formula)

The growth factor (multiplier/spin-off growth) that occurred from 1968-1972 was always close to four (four new residents for each job created).

1968 - 3.0	1971 - 3.7
1969 - 4.2	1972 - 4.3
1970 - 4.0	

These four additional residents would include family of the employee, teachers, merchants, civic employees, etc.

Since 1972 the growth factor has continued at or close to 4.0. Thus this figure will be used in the Design Chapter.

4.5 CONCLUSION

This plan will use this chapter and the population forecasts in Chapter 11 to determine how large the city's population will grow and at what rate. The two plans have maximum population capacities which will be able to contain all potential growth rates (except for maximum growth rates) for the foreseeable future.

The future number, type and distribution of residents is also strongly linked to housing, to plan for the number of units of each housing type. This will determine the size of the housing subdivisions in the new developments.

Examining the historical growth rate is important in predicting future growth. The city has had several rapid growth periods in the past, due to the construction of oil sands plants. The oil sands industry will be the impetus for future growth of the city.

The Scenarios are examples of the city's possible future growth. This plan's Scenario of future population growth is detailed in Chapter 11. The other scenarios are for comparison and to illustrate how close past predictions have been. Most of the Scenarios have been wrong to date. The projections this plan has made examine possibilities ranging from no significant growth to heavy population increases, so that several future patterns of growth have been accounted for. The primary lay-out can accommodate a population of approximately 155,000. Even at the maximum growth rate the population would be 113,907 (see Table 11.1) in the year 2000, and would not reach 155,000 until the year 2010, so even if the city grew over 400% in twenty-five years this plan would still be within limits, however, this is the maximum rate of growth. At other

rates of growth the maximum population would not be reached until decades later, at least fifty years from the present. In fact, the lay-out population of 155,000 may never be attained.

TABLE 4.1

POPULATION GROWTH

YEAR	POPULATION	% INCREASE	GROWTH FACTOR
1961	1,181		
1962	1,186	0.42	
1963	1,303	9.9	Suncor begins construction
1964	1,804	38.45	Alberta "new town" status
1965	2,515	39.14	
1966	3,37	34.31	
1967	4,984	47.54	Suncor operational
1968	5,943	19.24	
1969	6,132	3.18	
1970	6,684	9.00	
1971	7,146	6.91	
1972	8,148	14.02	Syncrude begins construction
1973	9,442	15.88	Thickwood subdivision established
1974	11,000	16.50	Beacon Hill, Gregoire, subdivisions established
1975	13,393	21.75	
1976	15,425	15.17	Abasands subdivisions established
1977	20,340	31.86	
1978	24,586	20.88	Syncrude operational
1979	25,802	4.95	
1980	27,784	7.68	City status
1981	30,772	10.75	Timberlea subdivision established
1982	33,576	9.11	
1983	34,494	2.70	
1984	34,500	0.1	Approximate

TABLE 4.2

POPULATION AGE COMPOSITION

	FORT McMURRAY			ALBERTA	
AGE GROUP	1982	1981	1982	1977	1981
0-4	12.1%	11.35%	11.16%	8.4%	7.3%
5-9	12.5	11.0 1	0.78	7.8	7.3
10-14	9.7	10.0	10.05	8.0	7.9
15-19	8.3	8.96	8.64	9.6	9.5
20-24	13.5	13.67	12.76	11.8	9.6
25-29	13.7	14.0	14.45	19.5*	8.9
30-34	11.0	11.46	11.66	8.4	
35-39	7.0	7.56	8.10	11.6*	6.7
40-44	4.4	4.81	5.06	5.5	
45-49	3.0	3.0	3.10	9.1	5.2
50-54	2.3	1.82	1.89	5.1	
55-59	1.4	1.14	1.17	4.8	
60-64	0.6	0.63	0.61	4.0	
65-69	0.2	0.30	0.30-	2.6	3.5
70-74	0.1	0.14	0.127	2.6	
75-79	0.1	0.05	0.088	4.7**	1.8
80-84	0.04	0.03	0.052	1.1	
85+	0.02	0.01	0.003	0.8	

TABLE 4.4

LENGTH OF RESIDENCY IN FORT MCMURRAY

YEAR ARRIVED		% OF 1982 POP.
1966 + Before	529	1.94%
1967	527	1.93%
1968	232	0.85%
1969	256	0.94%
1970	353	1.29%
1971	359	1.32%
1972	437	1.60%
1973	438	1.61%
1974	970	3.56%
1975	1,006	3.69%
1976	1,820	6.68%
1977	3,106	11.40%
1978	3,051	11.20%
1979	3,357	12.32%
1980	3,583	13.15%
1981	5,494	20.16%
1982	1,733	6.36%
	27,251	100.00%
No response	6,325	
Total	33,576	

TABLE 4.3

IMMIGRATION JUNE 1981 TO MAY 1982

June	646
July	545
August	680
September	569
October	541
November	366
December	389
January	426
February	257
March	357
April	373
May	267
Total	5,416

TABLE 4.5

CITY POPULATION BY AREA (SUBDIVISION)

	1976	1977	1978	1979	1980	1981	1982	1983
Abasands Heights	0	462	3190	3333	3480	3677	3915	
Beacon Hill	2564	2817	2723	2669	2691	2610	2616	
Lower Townsite	9900	10180	9833	10621	10739	10875	10966	
Waterways	1270	1364	1143	738	724	695	719	
Thickwood Heights	2019	3355	5042	5687	7561	10416	12640	
Gregoire Park	1797	2148	2655	2563	2598	2499	2720	

TABLE 4.6

POPULATION FORECASTS FOR FOUR SCENARIOS

	1984	1988	1982	1996	2000
1.	35,000	39,400	44,300	49,900	56,000
2.	35,000	45,400	57,600	65,100	75,200
3.	35,000	46,400	57,600	71,100	88,500
4.	35,000	45,400	65,600	88,300	113,400

FOOTNOTES

1. Alsands, Regional Socio-Economic Import Assessment, Volume 2, Hobart, Walsh and Associates, p. 104.

2. Revised General Plan, Stanley Engineering, p. 9-1.

3. 1982 Census, p. 2.

4. 1980 General Municipal Plan, Population Background Study, p. 6.

5. An Examination of Urban Growth Alternatives in the Northeast Alberta Region, pp. 5-7.

6. Revised General Plan, Standley Engineering, Figure 9-3, p. 9-3.

* Note all figures and numbers obtained from 1982 Census unless otherwise noted.

CHAPTER FIVE

HOUSING

5.1 INTRODUCTION

This chapter is a brief analysis of housing in Fort McMurray. It contains a short history of housing in the city examining such problems as the severe housing shortages during rapid growth periods. Statistics illustrate past and present housing trends, and are used to forecast future needs including distribution of housing types and population per unit for housing types.

Housing is an important element in any urban plan. "Shelter next to food is probably man's most basic need ... in Fort McMurray especially, it is essential that a high quality housing program exists, to meet the demand for living space. Housing is seen as a key attraction factor in local employee recruitment programs. The city has to draw its labour force from a highly competitive market and in order to combat its locational disadvantage, it must respond to the desire of individuals for a good standard of housing."[1] If Fort McMurray has an attractive selection of housing types that are desirable by southern standards it will be easier to attract people to work and live in the city. A job in itself may often not be enough to attract potential employees to the city. Therefore forms of housing that are practical to the climate and location sometimes have to be replaced by the housing units that are in demand by the immigrants from southern Canada.

5.2 EXISTING CONDITIONS

5.2.1 History of Housing

The history of housing in the city clearly reflects it growth. Shortages during periods of rapid urban expansion created housing crises that had people living in tents in open fields. Following these rapid growth periods the city caught up on the housing shortages and maintained a somewhat stable market. It was during the construction of Suncor that demand first exceeded supply.[2]

Once construction of Suncor was completed the pressure on the housing supply continued as new employees moved into the town. Just as the housing situation stabilized, Syncrude began construction (early 1970's). At this time there was heavy activity in the housing industry and many units were built to accommodate the new population, while shortages were not as severe as in the 1960's, the market was strained. Vacancy rates were low and there was little choice in housing. As units became available, they were occupied fast. Between 1974 and 1978, the price of a S.F.H. lot more than tripled from $9,000 to $30,000. Rental prices also increased rapidly.[3]

By 1976 the percent of S.F.H. out of the total housing stock had fallen to 37.3% from 61.1% in 1967, but the actual number of S.F.H. continued to increase.[4] By 1978, the percent of S.F.H. was only 28.3% of the total housing stock.[5]

In 1979, there was a further increase in the total housing stock. At long last after the limited availability of housing throughout the 1970's, a reasonable balance between the supply and demand was obtained.

However, the 1970's were a critical decade for the city as the population grew by over 400%, and the housing situation was always critical as any greater demand would have created a severe shortage. The tight housing market in the 1970's was reflected by a high proportion of mobile home ownership, low vacancy rates, high rental rates, high housing prices, and for a time illegal squatting.[6]

When the subdivision of Dickinsfield in Thickwood was built in the early 1980's the housing supply finally exceeded demand. Thus for the first time in almost twenty years there was no urgent need to supply new housing. As a result, the housing construction industry slowed down and entered a slump with a few new housing starts.

5.2.2 Housing Agencies

The three most important housing agencies in the city are the Alberta Housing corporation (A.H.C.), Northward (Syncrude), and Athabasca Realty (Suncor).

A.H.C. is a provincial crown corporation. In 1974, the city and the province agreed that A.H.C. "should be the vehicle for developing new urban areas in the community ... A.H.C. had control over the supply of serviced land in the new urban growth areas during the Syncrude period".[7] A.H.C. continues to control most undeveloped urban land in the city and around the city. Reasons for this include: the magnitude of housing subdivisions, financing, and to control private speculation. These factors have discouraged private developers from developing a single industry resource city. The provincial government's commitment to ensure that housing would be available, led to A.H.C. taking over.[8]

Since the cancellation of Alsands, the city has assumed a stable rate of growth (see Table 4.1 and Graph 4.1), and it may be possible to decrease the activity of A.H.C. As it is, A.H.C. provides all serviced lots for sale or lease to private developers. However any new oil sands plants will lead to rapid growth and the same problems will arise, so A.H.C. should not phase out all activity in the market.

Northward Development Limited is the housing branch of Syncrude, and was created in 1974 to provide housing for incoming Syncrude employees. The company became heavily involved in constructing and managing residential units, and it also played a major role in developing parts of Thickwood and all of Abasands as an agent of A.H.C.[9]

Athabasca Realty Company Limited (A.R.C.L.) is the housing arm of Suncor and was created in 1965. It developed parts of the Lower Townsite, Waterways and parts of Thickwood as the Suncor plant was built in the 1960's. It has remained active, but at a slower rate of development once Suncor was established.[10]

A.R.C.L. believed it was essential for incoming employees to be protected against the possible closure of the plant. To allow for this protection, the company would guarantee the cost of their housing against any loss. As a result, the employees would never receive less for their homes than the amount paid against the principal cost of their home purchase.[11]

As of March 1980 employer-owned housing accounted for 46% of the city's total housing stock.[12] The 1982 census showed 55.3% of the population owned or leased their homes, while 44.7% rented.

The 1980 G.M.P. set out an objective of creating a housing market which removes the need for employer-owned and controlled housing. One way to do this would be to promote a local housing construction industry.[13]

5.2.3 Housing Types

As shown in Table 5.1, there are basically five forms of housing existing in Fort McMurray: S.F.H., semi-detached (duplexes), townhouses, mobile homes and apartments. Fort McMurray has single detached homes built on one of the houses lot lines, called zero lot lines. These will be included with S.F.H.

Housing is the dominant land-use in the plan. The five combined forms of housing use more land than any other land use. There are four basic types in the design.

1. Detached single family homes, and duplexes.
2. Medium density, townhouse type units.
3. High density (walk-up and elevator apartments)
4. Mobile homes

The present subdivisions of Thickwood and Beacon Hill are primarily S.F.H. as well as a large part of the Lower Townsite. The development of the city's housing industry has been marked with an abundance of S.F.H. Most residents prefer the S.F.H., and it is assumed that this trend will continue,

The total number of housing units has grown every year, more than doubling from 5,424 in 1976 to 11,029 in 1982, an increase of 203% (see

Table 12.2). This reflects the population growth which also doubled during this period with an increase of 218%.

Single family homes presently make up 35% of the total housing stock. The plan will maintain this proportion.

The single family home is still the housing form in greatest demand. "The Canadian housing tradition is that each person should own a home of his/her own choice on his/her own 1/4 acre plot of ground."[14]

The S.F.H. is still the choice of the average Canadian for shelter. This will probably continue to be true in the future, even in Fort McMurray despite the high cost.

The only way to slow this trend is to make denser housing forms more attractive and cheaper so that they become a viable alternative to the consumer both economically and aesthetically.

Mobile homes now only make up 16.1% (1982) of the total housing stock compared to 29.2% in 1976. The number of units will remain the same as now but the percent will fall to 6.4%. In the recent past townhouses increased the most from 4.3% to 12.0% while apartments, semi-detached and S.F.H. have increased slightly in terms of the total. The number of townhouse type units will be increased in the design.

Apartments presently make up 24.5% of the total housing stock and the final plan will contain 23.6% apartment units.

Zero lot line housing is recent to Fort McMurray and one of its advantages is that it allows for more common space, close to most homes.

The S.F.H. subdivisions in the design should include several zero lot line development. This is because the type of housing in Fort McMurray known as "zero line lot housing" has homes built on one of the

lot's boundaries and the house having a side yard, so that some homes have only 8 - 10 feet separating them (usually in the form of sidewalks and fences). Thus they are actually S.F.H. on small lots, increasing the total number of units per acre.

Duplexes (semi-detached) and townhouse-type units will be defined by this thesis as medium-density housing. They made up 21.6% of the total housing stock in 1982. There is no patio and terraced housing, these housing types might be successful in the city if built as an attractive alternative to S.F.H.

Medium density housing makes effective use of its land and allows for close-knit communities. However, as previously stated, it must be attractive both economically and aesthetically before people will choose it over S.F.H. This is where patio and terrace housing could be utilized. The plan will double the percent of townhouse-type units from 12.0% in 1982 to 24.5%.

The number of mobile homes in the city has remained constant over the last five years, but has declined in its percent of the total housing stock. The mobile home was most important during the housing shortage, as a unit could be brought in, with the biggest problem being getting a serviced lot.

5.3 CONSTRAINTS/OPPORTUNITIES

There are several opportunities for new housing ideas in Fort McMurray. Those already mentioned are patio and terraced housing. Briefly these forms of housing will only be an asset if they are designed to maximize economic savings while being aesthetically pleasing in the

eyes of the consumers who up to now have mainly kept S.F.H. in high demand.

Another new form of housing the city could develop that it does not presently have is acreage lots. A proposal has been submitted to build a small so-called "country residential subdivision" near the airport along the Clearwater River, beyond the city limits. However, as it would be responsible for its own services and utilities, it would be an expensive development.

Even in the city, building and servicing costs are high, up to 25% higher than Edmonton during the construction of Syncrude.[15] As of 1981-82 the average cost of a bungalow home (approximately 1200 sq. feet) was $100,000, including land.[16]

There are two design considerations that would improve housing in the city that can be mentioned now.

1) "to incorporate solar access in the design of subdivisions and considerations or development permits."[17] This would have certain new developments oriented to the sun (southern exposure) such as new subdivisions consisting of medium density housing (i.e. townhouse-type housing) could be oriented and constructed so that part of their energy requirements are met by solar heating, when this technology is perfected.
2) To have neighborhoods developed around a focal point such as a community centre, park or playground.[18] This is an important design consideration as open, green space is essential to every housing development. This plan will incorporate an open green space network

in all new subdivisions. The plan will have major parks in each community, with open space linkages.

5.4 ELEMENTS OF THE PLAN

5.4.1 Housing Layouts

The two new development areas will have large medium and high density housing developments at their core, around the commercial areas giving the retailers a large nearby population base. S.F.H. districts will encircle these higher density housing areas.

The S.F.H. will have a greater impact on the Timberlea development. As close to 45% of the subdivisions population will reside in S.F.H., while in Forest Heights only about 33% will live in S.F.H.

In Timberlea there will be several modest S.F.H. developments and one large development covering the entire west side of the subdivision, except for the mobile home area). Forest Heights will have a higher population density, with only two S.F.H. developments, located on either side (east/west) of a large medium-high density area.

Timberlea and Forest Heights will each have a relatively tightly developed core, with housing types arranged in concentric rings radiating from a commercial core. This commercial area will be surrounded by high density housing developments with medium density housing next to them. Low density developments will be on the perimeter of the developments. These developments will be detailed in Chapter Twelve.

The new mobile home district in Timberlea will eventually accommodate all the mobile homes in the city (except for the Gregoire Park mobile home subdivision).

The present housing developments in the city will basically be left intact, except for the transfer of mobile homes, and some redevelopment in the Lower Townsite.

5.5 CONCLUSION

Housing is an important element of this land-use plan of Fort McMurray. A good supply of quality housing will be an asset in attracting people in the city. Residents from southern Canada will desire housing units similar to what they had in southern Canada, and this has been taken into consideration with a high percentage of S.F.H.

The city has had a turbulent housing history with demand often exceeding supply. But presently the city has attained a stable market. However, it is important to plan now for the next potential housing crisis. The proposed developments will easily accommodate several population surges that may be brought about by the construction and operation of oil sands plants. As the housing market is stable with a good supply of serviced land, company housing no longer needs to play a major role in the city's housing industry. There will probably always be a certain percent of employees that will prefer company housing, but the role will be reduced.

The major change in the city's present distribution of housing types will be an increase in the percent of medium-density housing, including townhouses, patio housing and terraced housing with some developments perhaps being solar oriented. This increase in the percent of townhouses will be offset by a decrease in the percent of mobile homes. Otherwise

the percentages of S.F.H., apartments and duplexes will remain relatively the same.

As to mobile homes, a certain percent of the population will probably always desire to live in them by their own choice so a major mobile home park has been planned for in Timberlea as a result. The mobile home will continue to be present in Fort McMurray until a more economic form of housing is offered as an alternative while still allowing the home owner his own individual (detached) unit as the mobile home does.

Housing can be related to every other land-use in the city. Transportation routes take the resident to his place of work, to recreation centres and to shopping facilities. Transportation networks within the housing developments themselves are also important. Major arterial routes should be buffered from nearby housing units. These points and other aspects of transportation will be discussed in the following chapter.

TABLE 5.1

HOUSING MIX

	Abasands 1978	Abasands 1982	Beacon Hill 1978	Beacon Hill 1982	Lower Townsite 1978	Lower Townsite 1982	Waterways 1978	Waterways 1982	Thickwood 1978	Thickwood 1982	Gregoire 1978	Gregoire 1982
S.F.H.	28	231	498	464	974	965	75	125	914	2374	0	0
Semi-Detached Duplex	57	326	39	38	162	162	4	6	258	524		
Townhouse	685	443	130	130	175	175	0	0	456	574		
Apartment	310	301	0	0	1954	1986	11	0	114	410		
Mobile Home	0	0	39	79	635	611	214	171	7	62		
Other	0	0	0	0	14	13	4	0	6	5	0	0
TOTAL	1080	1301	706	711	3934	3912	308	302	1755	3949	814	854

1978 Total 8,597
1982 total 11,029 (Increase 28.3%)

FOOTNOTE

1. Revised General Plan, Stanley Engineering, p. 11-1.
2. A Study of Fort McMurray 1961-1980, Barbara Kasinska (for A.O.S.E.R.P.), P. 104.
3. Ibid., p. 143.
4. Ibid., p. 143.
5. Ibid., p. 144.
6. Service Delivery in the Athabasca Oil Sands Region Since 1961, by Peter Nichols for A.O.S.E.R.P., P. 37.
7. Ibid., pp. 28, 30.
8. Ibid., pp. 30.
9. Ibid., p. 30.
10. Ibid., p. 30.
11. The Housing Arm of Suncor A.R.C.L., George, Thompson, p. 2.
12. Service Delivery in the Athabasca Oil Sands Region Since 1961, O.A.S.E.R.P., p. 39.
13. 1980 General Municipal Plan, p. 8.
14. Revised General Plan, Stanely Engineering, p. 11-15.
15. 1980 General Municipal Plan, Housing Background Paper, p. 3.
16. Alberta Locations, Fort McMurray, p. 10.
17. 1980 General Municipal Plan, p. 18.
18. 1980 General Municipal Plan, p. 18.

CHAPTER SIX

TRANSPORTATION

6.1 INTRODUCTION

Transportation plays two major roles, in this plan. First, it connects all the various land-uses with a network of roadways (including bicycle and pedestrian paths). Second, it connects the city to the rest of the world.

The main form of transportation to the city and within the city is by road. Other types include air, railway, and river barges. These types of transportation and others will be examined individually by mode of transportation, starting with Section 6.2.1 Road Networks.

Direct linkages between the various land-uses are a primary consideration in this plan. All land-uses and transportation are interdependent on each other, as the various locations of human activity have to be connected. For example, residential areas need strong links to areas of commerce and employment. Routes such as freeways and arterials require buffering from residential neighbourhoods. Such routes can also serve, in conjunction with adequate green space, as a buffer between certain areas such as industrial and residential. This chapter will examine the above topics and others, illustrating transportation's role in the plan.

Fort McMurray is the regional centre in northeastern Alberta, as such it is a transportation hub. Air service to the north stops in the city and until recently the city was a major terminus for river barge traffic to the north. Land links by rail and road to the south come as

far north as Fort McMurray. The physical features outlined earlier often determine the route of transportation links. Roads have to go around hills or cross valleys.

> The physiographic characteristics of the northeastern Alberta region impose major constraints upon the development of transportation networks. The regional landscape is dominated by lakes, river systems, and dissected uplands, while much of the low-lying terrain is organic or muskeg. The Athabasca River flows northbound through the region, and its valley effectively bisects the region, imposing another major constraint on infrastructural development in the region.[1]

6.2 EXISTING CONDITIONS

6.2.1 Road Networks

Fort McMurray has had a road transport link for less than twenty years. The first (and only) all winter (gravel) road to the south was completed in the spring of 1966.[2] This highway was not completely paved until the mid 1970's. At present the city still has only one road link (Highway 63 to the south and travel on Highway 63 is occasionally impeded, due to heavy smoke from nearby forest fires. This highway has been extended forty miles, (twenty paved then twenty gravel) north to where the proposed Alsands oil sands plant was to be, including a new bridge across the Athabasca River that now has no practical purpose.

A link of thirty miles to a highway in Saskatchewan is possible, if another highway to the South is not feasible. On weekends and even during the week, highway 63 to Edmonton is often very busy and a car can be slowed down by being trapped behind a large truck, occasionally waiting long periods until an opportunity to pass comes. If the highway were expanded to four lanes, it would relieve some traffic problems. Also, the shoulders of the highway are only a couple of feet from the

paved surface leaving no room to pull over in an emergency (such as a flat tire) so at a minimum the highway's shoulders should be widened.

To improve the city's role as a regional transportation centre, better road links are needed. An improved road network between the city and the south would reinforce its role. Then when road connections to the north are built in the future, the city will serve the north as well.

At this time, a proposal is being considered by a group of oil companies to build a network of all-weather roads to the west of the city to exploit the natural resources and incidentally giving the city secondary access to the south, as well as to the west.[3]

There are many old and new oil exploration roads in the region. Some of these might be useful as a start for future regional transport links. They certainly have recreational potential, leading to wilderness areas and just for recreational drives in some cases.

6.2.2 Bus

Bus service in the region is of two major types. There is a public transit system within the city and a separate system to take workers to the oil sands plants (as well as school buses). In the early 1970's when Suncor was the only plant, 68% of the workers used the transit system and only 32% used private vehicles.[4] Current figures were not available, but it is probable the present figure could be closer to 50-50.

The transit system to and from the oil plants could be expanded and improved so as to attract as many riders as possible, as this would reduce the number of private vehicles on the highway which is heavily used at peak hours (such as shift changes). One way to encourage workers

to use the system would be to make the transit fare a tax deduction. Or at least discontinue its inclusion with the railcars taxable income. Currently the part of the fare the company pays has to be reported on the workers' tax forms as taxable income, this is a deterrent to using the buses.

The public transit system is adequate, but far from perfect; some problems are unavoidable, such as the physical layout of the city with isolated subdivisions on steep hills. Problems with the service itself include: cost, transfers, and timing. Until recently, the cost of one ride was a dollar for all ages. Recently, school age children received a subsidy. However, the system should have a transfer system to change buses. The frequency of buses on the route has been improved at peak times, but better service especially during the peak hours is a needed improvement.

6.2.3 Truck

Truck transport is by far the primary mover of goods, and cargo into and out of Fort McMurray.[5] As of 1975 the breakdown of goods moved by truck was as follows:[6]

Petroleum products	46%
Construction materials	42%
Iron and steel pipe	5%
General merchandise and bulk freight	4%
Vehicles and machinery	2%
Foodstuffs	1%

The major change in this would be in construction materials as Syncrude was being built then and housing was booming. Thus construction materials would be somewhat lower and the other goods proportionately higher.

As of 1982, there were at least seventeen trucking firms servicing the city, illustrating the importance of the industry.[7]

6.2.4 Air

Commercial air service to and from the city is primarily by Pacific Western Airlines (P.W.A.). A small independent airline has recently started offering daily flights to Edmonton. The airport has only one major runway, 6,000 feet long. Although this runway has been certified by Canada Transport, other major airlines decline to fly to Fort McMurray as they feel the runway is too short (as well as the fact that it is a small market). As a result P.W.A. has had a virtual monopoly on the market, which generally fills flights to capacity on weekdays, and on weekends flights are only at capacity one way, as people leave and return to the city. There is usually little cargo on the jets (just mail and small freight items).

P.W.A. has several drawbacks. The major one is cost. While other regions of the country often have seat sales, seats to Edmonton from Fort McMurray remain near or at regular price. In fact, during some sales, it is cheaper to fly to Winnipeg, or even Toronto, from Edmonton return, than it is to fly from Edmonton to Fort McMurray, return. Part of this is probably due to low load factors on weekends thus increasing overall prices.

6.2.5 Rail

The railway line to Fort McMurray was built in the early 1920's and for over forty years was the sole land link to the city. It also served as a cargo carrier for goods heading further north on barges. However, the McKenzie Highway and the Great Slave Railway to Hay River gave competition to the Fort McMurray rail line reducing its importance by the early 1950's. In 1966 the first all-weather road to Edmonton was completed, and road transport, especially truck, began to compete against the railway, taking an ever-increasing share of the cargo market. This was balanced slightly by increased activity in the petroleum industry but the final result is a constant decrease in the total percent of the cargo market by the railway.[8] Although some references believe the railway will continue to play a role in the region's transport, improvements will have to be made to rail service if it is to survive.[9] There are virtually no passengers to Edmonton as the trip includes an overnight stop (Lac le Biche) making the trip two days as opposed to just over four hours by car.[10]

6.2.6 Water

As with the railway, water transport has lost importance with the establishment of highways, and other railroads directly into the N.W.T. Historically, the barge system has been very important to northern transportation, however, since 1970 no freight has been hauled to points in the N.W.T.[11] Since then barge traffic has carried cargo to points on Lake Athabasca, with Uranium City being the primary receiver.[12] However, the mine at Uranium City recently closed, and severely cut the amount of

cargo using the water system. This led to a decision to discontinue the barge system, mainly due to a lack of business and the high cost of dredging rivers in the city. As a result, commercial water transportation has ceased to be a factor in the city, at least for the present.

6.2.7 Parking

The supply of parking spots in the downtown (C.B.D.) just barely meets the demand at peak periods. As the city grows, so will this problem. During my tenure as a planner in Fort McMurray one of my duties was to report on the parking situation. The following is a brief summary of the findings of that study.

The highest concentration of commercial land uses exists in the Lower Townsite and generates the highest demand for parking facilities. For the purpose of this study, the Central Business District is selected as the study area for three reasons:

1. Parking in other areas of the city is not a serious problem.
2. Parking policies and requirements applicable in this area are also applicable in other less dense commercial areas.
3. The parking conditions in the Central Business District, under the present Land Use By-Law, are subject to great concern and discussion.

The maximum occupancy rate or parking spots in the C.B.D. during the study was 72% (this is the maximum usage observed, the true maximum could be higher). This means the C.B.D. has a maximum of 28% (or less) of parking spaces available at peak times. However, 7% (of 28%) are on-street spots which restrict traffic flow and should be eliminated. This

leaves the number of spots available at 21% (or less). Most of these spots are on the periphery of the C.B.D. and some residents prefer to drive around the downtown until they find a better location, this further congests traffic.

The critical location in the C.B.D. is the retail shopping centre which has approximately 860 parking spots, while current city by-laws requires 1,396 spots. There is no land suitable to pick up the shortfall so the problem has no easy solution. A second level on the existing parking lot is the best possibility but very costly. A further breakdown on this study is in the Appendix.

6.2.8 Pedestrian/Bicycle Paths

Pedestrian and bicycle routes in the city are insufficient. While some streets do have sidewalks there is a significant number that do not. The most prominent location that needs a sidewalk is the bridge over the Athabasca River which has a sidewalk but the lengthy approaches to the bridge have no side walks, and no access for pedestrians or cyclists other than walking on the freeway itself. Linkages to the various subdivisions up steep hills and slopes are equally insufficient. There are no designated (city-constructed) cyclist routes in the city. Such pedestrian-cyclist routes could be built gradually until a network exists to link all major developments in the city.

6.3 CONSTRAINT/OPPORTUNITIES

The main areas of transportation that need improving in the city are the road networks in the city. The opportunity exists to align road improvements with potential new development areas.

6.3.1. City Traffic Problems

Traffic systems within the city were largely built for a smaller city, and the city has outgrown them. Some can be expanded while others cannot due to the topography. The major problems are as follows.

Fort McMurray is located in the valley of the Clearwater River with subdivisions on neighbouring plateaus. Highway 63 cuts through the plateaus and enters the valley as they only road link to the valley from the south. As they highway descends from the plateau to the valley, it does so in a wide curve. Thus, traffic already travelling at 80 k.m.h., plus, (many vehicles exceed the speed limit, as it is downhill) cannot see what is around the bend. As the highway ends its descent and enters the valley there is an intersection with stop signs on the cross street. This intersection is heavily used and is dangerous in that traffic is moving so fast, there is no chance to stop if a vehicle leaves the stop sign too soon. The best solution would be an overpass; but minor rerouting with traffic lights would be sufficient for the present. However, all this brings up one of the major transportation problems, namely, the fact that there is only one road out of the city to the South. This is the city's main arterial and is known as Highway 63. It has access roads connected to it at 4 points (2 controlled by traffic light, 1 by stop signs and 1 overpass, recently built). This route is

heavily used throughout the city as it is the only way in or out to the South and the North.

The other major arterial in the valley is Franklin Avenue which is heavily used throughout the C.B.D. with volumes decreasing gradually as one moves to the South of the C.B.D. Both of these routes are congested at peak times, and will be insufficient as the city grows larger.

As new developments are planned east of the valley in Forest Heights, a new arterial linking the valley with Forest Heights is required. This new arterial could be extended through the valley relieving traffic pressure on Highway 63 and Franklin Avenue. Transportation consultants employed by the city to do a study propose a loop road along the Clearwater River through the Lower Townsite. This thesis does not recommend this. For a more detailed look at the Loop Road proposal refer to Appendix 4. In place of the loop road it is recommended that Highway 63 be expanded as required to six and then eight lanes of traffic. Franklin Avenue could also be expanded if needed.

Connections to Forest Heights would be off McDonald Island in the north end of the valley and off the end of Franklin Avenue in the south end of the valley. This proposal would leave the land in the valley open for recreational use, but available for a loop road if it ever became necessary. Secondary access out of the valley is provided from the Forest Heights development south to the area of the airport.

Another problem with traffic is that the major arteries in the downtown area (particularly Highway 63, Franklin Avenue and Hardin Street) are close to capacity and soon could reach capacity. The loop road would solve most if not all congestion problems. However, I think

the expansion of Highway 63 and Franklin Avenue would do as well, if not, the land would still be available for a loop road. One time in particular, there is a lot of traffic on "sunny Fridays". On several Fridays during the summer the oil sands companies gave their employees a Friday off. This leads to heavy traffic in the downtown, especially pressing the supply of available parking stalls.

6.4 CONCLUSION

Roadway transport is the primary type of transportation in this plan. Without proper roads, connecting the various land-uses the city could not exist. It is the location of each land-use and the physiographic layout of the city that determine the city's future road network.

Other forms of transportation although significant to the economy of the city do not present particular planning or land-use problems. The railway from Edmonton only runs twice a week with limited cargo and virtually no passengers. The barge system is no longer in existence. Air transportation is basically a passenger service.

Most of the traffic in and out of the city is on a narrow 2-lane highway (#63) with no shoulder on a large part of the route. This highway is the only road to the city from the south, and as the city grows it will have to be supplemented by an additional route or at the least it will have to be widened.

Within the city, Highway 63 is the primary route connecting all developments, and will have to be expanded within the city limits to six lanes (and possibly eight) as the city grows to the plan's capacities.

Other vehicular routes in the city will be expanded, supplemented or replaced as required.

The city is, and will most likely remain, the regional centre of N.E. Alberta and this magnifies the role of transportation. The city may also become a supply centre for N.W. Saskatchewan and parts of the N.W.T. if a proper road link is established.

FOOTNOTES

1. Alsands, Regional Socio-Economic Impact Assessment, Volume 2, p. 217.

2. Fort McMurray Overview, Northward Developments, p. 24.

3. Media Sources, from the Planning Department of the City of Fort McMurray.

4. Revised General Plan, Stanley Engineering, p. 13-1.

5. Fort McMurray Overview, Northward Developments, p. 25.

6. Fort McMurray Overview, Northward Developments, p. 25.

7. Alberta Locations, Fort McMurray, p. 5.

8. Fort McMurray Overview, Northward Developments, p. 26.

9. Northeast Alberta Regional Information Base, p. 98.

10. Fort McMurray Overview, Northward Developments, p. 27.

11. Alsands, Regional Socio-Economic Impact Assessment, Volume 2, p. 220.

12. Fort McMurray Overview, Northward Developments p. 29.

CHAPTER SEVEN

COMMERCIAL LANDUSES

7.1 INTRODUCTION

The commercial sector of the city is the location from which most services to the residents and to the region are being provided. They include essential items and luxury goods. The heart of the commercial sector is found in the Central Business District (C.B.D.) of Fort McMurray. There are two major types of commerce in the city; shopping centres and single retail (or services) outlets. The C.B.D. is composed of two shopping centres on either end of it and single business outlets in between. Other commercial areas basically consist of small neighborhood shopping centres. Thus the C.B.D. is in direct competition with these shopping centres for the consumer dollar as they both provide all essential goods.

The C.B.D. is also in competition with commercial outlets in Edmonton. This is because the cost of many items is higher in Fort McMurray and some items are not available. As a result, some residents do a certain percentage of their shopping in Edmonton. Another factor in the commerce of the city is that it has a very small hinterland, in terms of a population base, as there are only a few villages within 100 miles. These are some of the problems concerning commerce in Fort McMurray. There are no easy solutions.

7.1.1 History

Commerce in Fort McMurray has had to grow under difficult conditions. As the town developed it had one commercial district in each of the three villages that formed the town. This fragmentation continued into the 1970's and became a serious problem.

> Fort McMurray lacks a strong central area ... A trend towards commercial decentralization is evident ... If this shifting continues, the shopper will become inconvenienced ... A major problem with local commerce is that many businesses are scattered throughout the town. This has led to decentralized commercial districts lacking any form or identity. Land in the central business core is either vacant, developed with non-commercial uses, or underutilized.[1]

Then a private planning firm, Cohos Evamy and Partners, was brought in. As outlined in Chapter One, they felt strongly that the Central Business District (C.B.D.) should be preserved, as opposed to commercial activity in new districts in the city. As a result, the planning firm advocated building several small subdivisions that could not support any commercial area that might compete with the C.B.D.

By the late 1970's th C.B.D. was easily identifiable and was dominated by a major downtown shopping centre, however the C.B.D. still competes with outlying commercial areas.

As the C.B.D. prospered and suffered so did the commercial base of the town as a whole. During the Syncrude boom, thousands of people moved to the town. The population tripled in five years[2] resulting in a lack of services and shopping facilities were lacking, as the city's population rapidly outgrew the services provided. Since then the range of goods and services has expanded and now all essential items and many luxury items can be found in the city (although at a higher cost than in

the south). Many of these facilities located in the C.B.D. which further strengthened it.[3]

7.2 EXISTING CONDITIONS

7.2.1 Commercial Locations

While the largest commercial concentration in the city is in the C.B.D., with its 2 shopping centres, other commercial locations are dispersed along Franklin Avenue and within the area known as the Prairie. The Park Plaza Shopping Centre, located on Franklin Avenue, is the only other major shopping facility.[4] However, the subdivisions of Gregoire Park and Thickwood Heights each have several strip malls of various sizes. Other subdivisions generally have shopping facilities whether it is just a single convenience store or a small neighborhood shopping centre (see Appendix maps).

Commercial activities in the professional service sector, such as finance, realty, insurance, law and other offices are largely located in the C.B.D. They are often on the second floor of a building, above some sort of retail store. Other service industries such as automotive sales, service and repairs, wholesale trades and warehousing are located in the area known as the Prairie. Hotels and motels are located on or close to major arterials.

The central business district has served as the core of the city. Newer outlying shopping centres, competing with the C.B.D. for the consumer's dollar, threaten to weaken its position.

7.2.2 Consumer Satisfaction

Consumer satisfaction with retail service facilities in the city has always been poor.[5] It was worst in the 1960's when there were few retail outlets. The lack of competition combined with the high cost of transporting goods led to high prices. Just as the situation was clearing up, Syncrude started construction and the problem began all over. Though there are now sufficient retail outlets in most sectors, prices remain appreciably higher than in Edmonton. This has led to a large portion of the consumers' disposable income being spent outside Fort McMurray. "Because residents perceived the merchant class to be opportunistic and the central business district deficient in variety and mix."[6]

In a survey by A.O.S.E.R.P. (Alberta Oil Sands Environmental Research Program) 75% to 80% of informants stated they shopped in Edmonton as much as possible.[7] Some of the reasons given included: poor selection, not enough competition, high prices, lack of variety, some items not available.[8]

Another reason is aesthetic in nature, that being many of the stores are just four walls, operating on a "production line system rather than providing the atmosphere for shopping to be a special outing or a form of entertainment".[9] Recent retail outlets have had a better design to attract customers, but the recently built West Edmonton Mall, a tourist attraction in itself, may have partially negated the better design of Fort McMurray shopping centres.

7.3 CONSTRAINTS AND OPPORTUNITIES

The opportunity to have all new urban growth in two large development areas will be utilized. As a result these new areas will be able to support substantial commercial developments which will take the form of regional shopping centres at the central core of each development. However these new commercial activities will be competing with the C.B.D. for the consumer dollar. To partially offset this constraint, any new commercial outlets will have to locate in the C.B.D. if they do not locate in one of the two new subdivisions. The opportunity exists to maintain the C.B.D. as the primary location of all business offices in the city giving it two bases to grow from. First the existing commercial infrastructure in the C.B.D. Second it will allow the C.B.D. to continue to enjoy the benefits of being a major workplace in the city. As business office employees will spend lunchtime eating and shopping downtown and will sometimes stay downtown to shop and have supper after work.

This consideration of the cities commercial ventures into three primary locations will help overcome the constraint the city has had with small scattered subdivisions each with it's own varying size of commercial development. In time some of these commercial activities will gravitate to one of the three cores where a much larger population once is available with easier access.

7.4 Elements of the Plan

7.4.1. Policy Recommendations

While working for the city of Fort McMurray I wrote a report on the C.B.D. outlining these policies to aid in preserving the C.B.D. as the predominant commercial area in the city. However the C.B.D. should not just be a place of commerce,, (any shopping centre can perform that function), it can have many functions, both daytime and evening, all of which should be utilized.

1. The Central Business District should be maintained as the primary commercial area in the city.

2. Development should be concentrated in the Central Business District with only one outlying new shopping centre, that to serve Thickwood-Timberlea. Shopping centres compete with the central business district, weakening its position of importance, as the commercial core of the city. However when and if Forest Heights is developed, it will have a shopping centre.

3. The Central Business District should be compact, restricted in size, to keep it concentrated.

   The Central Business District should not be allowed to sprawl. If it is too large, it will lose its attractiveness to shoppers and will weaken itself, as some small shops depend on being close to the main department stores to attract business. Definite boundaries could be established to restrict the size of the Central Business District.

4. A small compact Central Business District can be pedestrian oriented, pedestrian links could be established and strengthened throughout the Central Business District.

One of the attractions of a compact Central Business District is that shoppers can park their cars in one spot and walk around the entire Central Business District.

5. The C.B.D. should be landscaped to make it visually more pleasing (perhaps with a park next to it especially where the C.B.D. is close to the river).

The C.B.D. has an advantage over shopping centres, in that it can be landscaped and have small parks, as it is nice to be outside on a nice summer day. This could help the C.B.D. compete with shopping centres, so the C.B.D. can be improved aesthetically to make it more attractive.

6. A high density residential development next to the C.B.D. would benefit both.

The residents of the residential development would always be within walking distance of the C.B.D. which would provide every service they would need. The C.B.D. would have a base population that would not be tempted to go to a suburban shopping centre.

7. Older areas and vacant lots in the C.B.D. should be rehabilitated.

To keep the C.B.D. a vital place, it should be used in the evening as well as daytime. A possibility is to have evening and weekend events in the downtown malls' open areas, such as bingo,

with temporary seats. New theatres and other entertainment facilities should be located in the C.B.D.

One of the just-mentioned policies stated that only one more shopping centre should be built; that to serve the new subdivision of Timberlea. How large this shopping centre should be depends on the growth rate of Timberlea. However, since Timberlea has been planned to have a capacity of 35,000 people, and since the city has very few satisfactory potential locations for a regional shopping centre, a commercial site should be set out in Timberlea that has enough space allocated to it, to allow for a future regional shopping centre. Such a location could start with a small neighbourhood mall on a large landscaped site, that could be expanded in stages as required up to the size of a regional shopping centre, when and if such a facility is required in the future.

7.4.2 Planning Commercial Objectives

In the plan, the commercial areas will focus on the C.B.D. and the Timberlea shopping centre, if Forest Heights is ever built, it also will have a major shopping centre. The commercial sector of the city will retain the Central Business District (C.B.D.). The C.B.D. will be central again, once Forest Heights (across the Clearwater from the C.B.D.) is built. This will reinforce the C.B.D. in at least two ways. First consumers desire to do their basic shopping close to home not at some distance. For luxury items they may travel farther. Second, new offices and businesses will want to be central to al of the city and

should locate in the C.B.D. if it is easily accessible from all parts of the city.

The two new development areas will have large commercial districts possibly in the form of regional shopping centres. Thus, all new commercial activities that come to the city will have three strong potential locations to choose from. The C.B.D., while retaining major commercial activity, will begin to become more important as a workplace.

The city's existing commercial districts and shopping centres will be maintained. New commercial districts will only be built in the new developments. Any new commercial activities that wish to locate in the city's existing areas will do so in already existing commercial districts so as to strengthen them.

The Forest Heights development will have one large central commercial district probably in the form of a regional shopping centre to serve population base of 85,000 (Thickwood, Timberlea, Timberlea expansion). There will also be a community shopping centre in the north part of the Timberlea expansion, to fulfill local shopping needs. A neighbourhood shopping centre will be established to service the mobile home park which could house up to 3,000 units, maximum.

Part of the commercial activities in the city deal with the distribution of fresh food grown in southern markets. These foods particularly fruits and vegetables are usually substantially more expensive than in southern cities. This is basically due to shipping costs. Such greenhouses could utilize waste heat by-products from the oil sands plants as well as solar benefits.

7.5 CONCLUSION

Fort McMurray has a problem similar to that of many Canadian cities, the C.B.D. (downtown) is facing increased competition for consumer income from suburban shopping centres. At the present, the C.B.D. is holding an adequate share of the market, but increased suburban commercial development will jeopardize this position. Thus, it is recommended that any new commercial development in the presently existing city be located in the C.B.D. (no new shopping centres outside the downtown). Only the new development areas will have substantial commercial centres to service their large population bases. These two new subdivisions' developments will put the C.B.D. at the centre of the physical layout of the city once more. At the present the C.B.D. is central from a north-south perspective, but on the eastern edge of the city. Forest Heights will centralize its location. This is important, as a C.B.D. must be easily accessible to all residents, and if all development were to take place in Timberlea, 80% of the population would have to travel a considerable distance to get to the C.B.D. However, this plan will have 50,000 people east of the C.B.D., 85,000 northwest of it, and 20,000 with immediate access.

It is the aim of this plan to maintain the C.B.D. as the commercial core and centre of the city. The policies laid out in this chapter and the design of the future layout of the city will help accomplish this. However, the C.B.D. will only be a choice to consumers as long as they have an alternative (to shop in shopping centres). That way the C.B.D. should be an attractive convenient location, as well as the commercial

core of the city. Consumers will choose whether they wish to shop in the C.B.D. or outlying shopping centres.

FOOTNOTES

1. Servicve Delivery in the Athabasca Oil Sands Region Since 1961, A.O.S.E.R.P., p. 43.

2. 1982 Census, p. 1.

3. 1980 General Municpal Plan, Commercial Background Paper, p. 8.

4. Northeast Alberta Regional Information Base, p. 69.

5. Service Delivery in the Athabasca Oil Sands Region Since 1961, O.A.S.E.R.P., pp. 45-46.

6. Urban Alternatives - Northeast Albertya, G.M. Young, p. 11.

7. Community Studies, Fort McMurray, A.O.S.E.R.P., p. 44.

8. Community Studies, Fort McMurray, A.O.S.E.R.P., pp. 42-43.

9. Community Studies, Fort McMurray, A.O.S.E.R.P., p. 44.

CHAPTER EIGHT

INDUSTRY

8.1 INTRODUCTION

Fort McMurray is a single industry city. Before the oil sands were developed, it only had 1,000 residents, and the oils sands development is directly responsible for its growth. However, the resource involved is oil and the current oil producers (oil sands plants) have guaranteed markets for the oil, so unlike other single-industry resource towns, Fort McMurray has a relatively stable resource.

The total amount of oil in the tar sands is immense, and will not run out for a long time, as less than 1% has been mined to date. This oil will be required by the industrial nations of the world at some time in the future (unless a substitute for oil is found). Thus, more oil sands plants will be built in the future, and Fort McMurray will grow as a result. Just how far into the future, this thesis cannot predict, however. Even though the resource in question is stable, it would still be desirable to diversify the city's economy. This chapter will discuss the oil sands industry and other industries in the city, as well as examine the city's prospects of diversifying its economic base.

8.2 EXISTING CONDITIONS

8.2.1 Oil Sands Technology

The method of mining oil from the tar sands is presently by strip mining, but this may change in the future. However the oil is mined it is and will probably always be the primary industry in Fort McMurray.

This section will examine its importance to the city as well as how it operates. The city is a single industry resource centre and as such the industry should have a detailed examination as to its relationship with the city and its potential for expansion and growth.

The type of mining involved is important to determining the future growth of the city as a strip mine plant employs 1,000 to 5,000 employees depending on its size. The alternative technology in situ mining will only employ a few hundred per plant. The following is a brief description of the resource in this one-industry city, examining the two types of mining and possible benefits (i.e. population growth) to the city.

Strip mining, extracts oil by the hot water wash-flotation process.[1] The Athabasca deposit is the only deposit with sites presently accessible to strip mining. In situ mining is still largely at an experimental stage, but it has a promising future, especially since only 10% of the Athabasca deposit can be strip mined.[2]

Aside from the technological differences, the largest difference between the two forms is cost. If Alsands had been built, it would have cost approximately $15 billion to produce 150,000 barrels of oil a day. A typical In Situ plant once the experimental staging is over will cost approximately $100 million to produce 5,000 to 10,000 barrels a day.[3] Assume the final In Situ design produces 7,500 barrels a day. For the cost of Alsands, 150 In Situ plants could be built on different sites producing approximately 1,125,000 barrels a day, almost 8 times as much as Alsands. Add to this that the In Situ plants could mine 150 sites to Alsands' one, and the distinct possibility that In Situ plants could be transportable from one site to another. The result is that it would seem

In Situ methods will be the future method of mining oil sands if and when a final economical process comes out of the experimental models. Such an occurrence would mean no more strip mines such as Syncrude would be built once the In Situ process is proven. It could take up to ten to twenty years or more to finalize the In Situ process. It took five years each to build Syncrude and Suncor, so it could be assumed that two to four additional oil sands plants could be built if economic conditions are favorable.

The size of any future oil sands plants is debatable but sources agree a plant the size that Alsands would have been is not likely due to economics. It is likely that a new plant would be the size of Suncor (55,000 barrels per day, B.P.D.), certainly no bigger than Syncrude's (120,000 B.P.D.). A new plant would probably be built in stages.[4] Such a plant might start at a production level of 10,000 barrels a day and be expanded in stages of 10,000 barrels every few years up to a maximum of 75,000 to 100,000 barrels.[5] Table 11.1 examines four scenarios of future growth for the city.

One) No more major plants built

Two) One more major plant

Three) Two more major plants

Four) Three or more major plants

With all plants to have production levels around 100,000 barrels a day. However, this depends on whether the In Situ process is perfected or abandoned (not likely). Already a road network to the west of the city has been proposed to explore the oil sands. Such a network could transport mobile In Situ plants from site to site. This thesis will

assume a maximum of two new oil sands plants by the year 2000 (at the 100,000 barrel a day production level). After the year 2000, a series of In Situ plants are possible, however, if the In Situ process is eliminated a modified strip mining method could result.

The direction the oil sands industry takes in the future will have a major impact on the city. Even one Syncrude size plant would lead to tremendous growth. To see how the expansion of the oil sands industry may affect the city refer to Table 11.1.

Until a new energy source replaces oil, oil will remain in demand. As oil is a non-renewable resource, other deposits will run out eventually, and supplies could be lost sooner due to political and military conflicts in the Middle East. The Athabasca oil sands potentially contain 630 billion barrels of oil that will be in demand at some point in the future when other supplies run low (this is not to mention the other deposits containing an additional 270 billion barrels)." Thus, the region has a vast untapped reserve of oil.

The future growth of the city seems promising, and technology is being devised to economically extract the oil. Therefore, it is relatively safe to assume the mining of the oil sands will continue, and will expand.

8.2.2 Evaluation of Industrial Activity in the City

In the chapter on the physical environment, a number of natural resources were identified. These resources have varying development potentials, some of which will be dealt with in this chapter. Several industries have existed in the region for a long time, these include

trappings, transportation, hunting, fishing, and forestry. It is important to identify alternate industries for the city to develop.

> Diversification of the economic base of the region is desirable for several reasons. A diversified economic base provides for overall economic stability during periods when demands for our resource or its products is low ... Secondly, it provides a variety of occupational opportunities to residents ... increased job satisfaction and a resulting stability of population in the region.[6]

The city would clearly benefit from the diversification of the economy. Dynamic new policies could attract new industry to Fort McMurray and could be directed at the manufacturing sector, as manufacturing only makes up a small percent of the city's economic activities.

TABLE 8.1

ECONOMIC STATISTICS

	1971*	1981*
Population	6,907	30,772
Population Income	$21,833,000*	$346,800,000*
Construction	1,811,481*	75,535,548*
Assessment	851,617	600,000,000
Retail Trade	9,650,000*	91,082,000*
Industrial Plants	2	12
Total Industrial	N/A	N/A
Unoccupied Acreage	N/A	N/A
Serviced Acreage	N/A	N/A

1970* *1980

The table shows Fort McMurray's rapid growth in all sectors. However, it also shows 44% (175/400 acres) of serviced industrial land is vacant. This is due to the fact that the city has little secondary industry and manufacturing. The oil sands plants themselves are twenty and twenty-five miles respectively from the city.

The population has grown 5-fold due to Syncrude, however there is still a good supply of serviced industrial land.

8.2.3 Other Industries

Construction. The second largest industry in the city is the construction sector. There are many construction companies in the city employing hundreds of workers. The construction industry runs in cycles, when an oil sands plant is being built, thousands of temporary jobs are created of which about half become permanent.

When a plant was not being built, an average of 18% of the labour force was employed by construction firms, as compared to almost a third (33%) during construction periods.[7] For several years almost all construction was in the housing sector as the city had a housing shortage. Now that the shortage is over, there is a normal range of construction activities in commercial, institutional, recreational, and residential sectors.

Manufacturing. The manufacturing sector has always employed only a small percent of the labour force with the main activities in the food, beverage, and wood industries, printing and publishing, and small establishments in the furniture and fixtures, metal fabricating and non-metallic mineral product sectors.[8]

The manufacturing industry has always been of secondary importance, primarily due to Fort McMurray's location. Fort McMurray has traditionally relied on products manufactured outside of the region because its distances from large centers has been too great to make manufacturing viable. Also the city has the disadvantage of being a region where it makes up 90% of the population. So while it is the regional centre, it has a very small hinterland. Therefore, any new manufacturing industry will either be small enough to service the local region or it will be related to the oil sands industry. This relation to the oil sands can be direct (producing materials for the plants) or indirect (using secondary by-products of the plant). Either way the most viable way to accomplish this is through government (federal, provincial, and municipal) initiation. This is partly due to the poor state of the economy as private capital is unwilling to assume the risk of moving to Fort McMurray.

Retail Trade. The retail/service trade in the city, has traditionally lagged behind provincial averages, due to the city's rapid growth. This has changed recently as the city's growth stabilized at a moderate rate since Syncrude opened. Now "Fort McMurray has attained self-sufficiency as a business community and can supply a full range of commodities and services".[9] This is not to say that all retail/service imbalances have been corrected. However, there are still more hotels/motels less amusement/recreation facilities than the provincial average.[10] While the retail/service facilities in the city are adequate, they are also more expensive than the provincial average due to shipping costs. This has led to the industries most serious imbalance. A large portion of a

typical Fort McMurray's consumer's dollar is spent outside of the city largely on shopping trips to Edmonton. While this is a serious problem it will prove difficult to solve as the best way to reduce prices is through competition. This would involve attracting more retail/service facilities to the city with the ensuing competition, hopefully reducing prices.

Government Services. One of the largest employers in the city is in government services with the provincial government and the city each employing a large number of employees. The federal government also employs a significant number of employees.

Tourism. Tourists who come to the city are generally directly attracted to the region as there is no through traffic to attract incidental tourism. Being on the end of a dead end highway makes tourism difficult, unless there is a major attraction. The main tourist attraction is in the area of recreation, primarily hunting and fishing. Nature tours of the environment and rivers are available.[11] The main draw for tourists to the area is related to the environment, both in its physical attributes and cultural/historical sites.[12] While the potential for tourism is not great there are facilities to accommodate tourists with the large number of hotel/motel rooms, built to accommodate workers during construction booms.

The availability of these hotel rooms would be an asset if the city were to try and become a convention centre. Some facilities exist and a couple of conventions of groups from southern Alberta have already come to the city.

Forestry. Forestry in the region has had little success although it has great potential. "The Athabasca Forest represents about 14% of the presently productive forest land in Alberta, and the amount of timber that could be cut annually is about 6% of the total Alberta coniferous timber and 8% of Alberta deciduous timber. However, current production from the region is less than 1% of total Alberta production, the major products being fuelwood and lumber for local use."[13]

The future of the timber industry in the region is clouded, while the potential is great, demand from southern markets is hard to meet due to shipping costs.[14] The timber itself is often difficult to harvest due to the terrain (rivers and valleys) and soil (muskeg). The timber industry, at least for the immediate future will likely only grow as local demand grows.

Trapping and Fishing. Trapping and fishing in the region largely takes place outside of the Fort McMurray area. Fishing is now primarily done on Lake Athabasca by residents of Fort Chippewan.[15] Trapping by 67 Fort McMurray trappers from 1971-1974 resulted in a net annual average income of $579.23. For the 1976-1977 season the greatest income was $2,052.08, and the smallest $162.24. This illustrates how trapping is no longer significant to the economy of the city.

Transportation. Transportation is an important industry to the city with several trucking firms and two bus lines taking goods and people to and from the city. The city is also serviced by the C.N.R. and one major airline, Pacific Western. The barge system was dealt a death blow by the closure of Uranium City and is no longer a significant industry.

In the land-use plan industry will continue to play a major role. However, most industry will likely be either directly related to the oil sands plants, or to meet local demand. New forms of industry, especially manufacturing will only come about when the city and its hinterland area large enough to support it.

8.3 CONSTRAINTS/OPPORTUNITIES

The major constraint on Fort McMurray is that it is a single industry resource centre. As such it only has one primary industry and is totally dependent upon it for the continue existence of the city as a settlement of 35,000, as opposed to 1,000 residents before the industry was developed. The city must endeavour to diversify its economy at every opportunity.

8.3.1 Diversification of the Economy

There are three major difficulties in trying to diversify the economy. First the city is relatively isolated. As a result the city has no real hinterland to supply goods to, and the city is a great distance from potential southern markets, making transportation costs high. Thus, it would seem the way to start diversifying the economy would be with goods produced for the local market in the city. This could be started on a small scale (i.e. market goods, dairy, and other food stuffs). As this process starts it could hire the unemployed in the city, until the job opportunities attract migrants.

Second, Fort McMurray is a small city and its labour force is largely employed already. Therefore there is no labour pool from which

new industries could draw from locally. Third, there is a risk factor involved for private industry to locate in a single industry resource centre. This could be alleviated, at least partially, with a stabilized economy in the city even if it is based on a single industry. As the situation presently exists, most secondary industry in the city exists to supply the two oil sands plants, or the local market. With just two plants, private industry has little room to deal and bargain to its best advantage, and if one plant should shut down, it would be disastrous. Thus, the local economy may have to wait until one or more new plants are built in the region before diversification can truly begin. With a stronger economy, even a single-industry city, isolated as it is, could probably still attract some secondary industry.

Therefore I believe that if there were four major oil sands plants and several minor plants private industry would be able to complete through the choice of more plants, with cheaper bids, and more plants to supply with goods. This process could begin with small manufacturing plants using by-products of the plants or supplying the plants, possibly with items presently obtained from southern markets.

The method of achieving this is not clear. As stated, it is probable there will be more plants in the region when demand for oil rises. More plants, in themselves, could attract private industry. The federal and provincial governments could play a role. Government laws and taxes partially led to the demise of Alsands. With government aid (not necessarily financial, as laws could be amended, and taxes reduced) and an increased demand for oil, more plants will probably be built.

However, the major industry in the city will always be the oil sands industry.

8.4 ELEMENTS OF THE PLAN

For the purposes of this plan, industry has been broken down into two categories in the layout (light [service] industry and heavy industry). Some typical services in light industrial areas will include auto repair and service, warehouses, food and beverage, printing and publishing, motels/hotels, community colleges, public/government buildings and similar services. Of course, some of these services such as service stations, hotels/motels and public buildings may also be in other parts of the city, but the majority should conform to the plan.

Secondly, there are two new heavy industry districts. Presently, there is little heavy industry in the city, however, as the city grows, secondary industries can be attracted by at least four factors:

1) The city's growth
2) City policies to attract industry
3) Support services for the oil sands industry
4) New industries which come to the city that are both related to the oil sands plants (i.e. to process by-products), and unrelated to the oil sands plants.

The new heavy industry locations are in the new design areas. One is at the northernmost part of the city, at the closest point in the new city limits to the two existing oil sands plants. The other area is in Forest Heights across the Clearwater River. It is bounded by the Clearwater River, the railway, the new arterial, and a light industrial area.

It is relatively isolated from the rest of the city, yet close to all services. It is some distance across the river to adjacent land uses and this is further buffered by recreational open space (parks). The other side, across from the new arterial will be a new light industrial area.

The layout foresees four light industrial areas. They include the existing MacKenzie Park to the south. A small area adjacent to the Central Business District (C.B.D.) consisting of light service industries as previously defined by this design. A new area in the north expansion of Timberlea adjacent to the new heavy industrial area. This area will have both support services for the oil sands plants and services for the population of Thickwood, Timberlea and its expansion. The fourth light industrial area will be in Forest Heights adjacent to the new heavy industrial area. It will also have both support services for new oil sands plants, east of the Athabasca River and services for the population of Forest Heights. These sites can be kept unused until they are required.

8.5 CONCLUSION

Fort McMurray is a single-industry resource town that is dependent on the oil sands industry. Only 1,000 people lived here before the oil sands were developed, and if the oil sands plants were to close the population would fall dramatically to pre-development levels. However, the industry is stable with guaranteed markets for its products. There are vast resources of oil in the tar sands and it will be required some day unless oil is replaced by some other form of fuel. Thus, Fort McMurray is different from most single-industry resource towns.

Aside from the fact that the oil industry is stable, it is still advisable for the city to try and diversify its economy. Several problems must be overcome to accomplish this (isolation of the city, cost of transporting material and finished goods, risk factor for private industry in locating in the city, little unemployment, therefore no labour force available to new industry). One of the best ways to overcome these problems is for the city to grow to a size where local demand will attract secondary industry.

For the city to grow, the oil sands industry must expand and there is a strong possibility that it will, as the oil will be in demand for a long time. There are two types of plants which might be built and strip mine plants employ thousands while In Situ plants only employ a couple of hundred. Therefore, the type of plant that is built will have a bearing on the size of population increases. Other resources in the region have limited potential at this time.

The other major industries in the city are service industries (47% of the labour force), including 7% as government employees.

Construction companies with 10% of the labour force are closely tied to the oil sands plants (43% of the labour force). Other industries including manufacturing (1.0%) are relatively small with less than 2% of the labour force.

The layout will supplement the city's current industrial park with four new industrial areas, two in Timberlea (a light and a heavy industrial park) and the same set-up in Forest Heights. These sites can be developed when required, left vacant until that time.

FOOTNOTES

1. Interview with Mr. Chuck Knight.
2. A Study of Fort McMurray, James Kerri, p. 53.
3. Interview with Mr. Wayne Antler.
4. Interview with Mr. Dave Young.
5. Intervieiw with Mr. Gerry Bussieres.
6. Northeast Alberta Regional Information Base, p. 115.
7. 1982 Census, p. 18.
8. Fort McMurray Overview, Northward Developments, p. 36.
9. Alsands Regional Socio-Economic Impact Assessment, Volume 2, p.63.
10. Northeast Alberta Regional Information Base, p. 123.
11. Northeast Alberta Regional Information Base, p. 125.
12. Northeast Alberta Regional Information Base, p. 125.
13. Northeast Alberta Regional Information Base, p. 121.
14. Alsands Regional Socio-Economic Impact Assessment, Volume 2, p. 63.
15. Northeast Alberta Regional Information Base, p. 123.

CHAPTER NINE

EMPLOYMENT

9.1 INTRODUCTION

The oil sands industry is by far the largest employer in the city, other employers in the city will be examined as well as a breakdown of the labour force by activity and classification.

9.2 EXISTING CONDITION

The labour force in Fort McMurray has always been closely associated with the oil industry. Of the seven major employers in the city only two are not directly related to the oil sands. These two are the city's municipal staff and provincial government employees. The two largest employers are the oil sands plants themselves, Syncrude and Suncor. Two companies do service and maintenance for the oil sands plants as well as the plants own staff. These are Catalytic and Bechtel. There is also a heavy equipment company called R. Angus, which is also a major employer.

As a percent of the population the labour force has remained stable, with only slight fluctuations from 44.3% in 1978 to 44.4% in 1982.[1]

A breakdown by status shows that over 91% of the employed labour force is employed full time (13,628 of 14,919 as of 1982).

This table also shows that 9.2% of the labour force was unemployed. It should be noted that census material was collected just after Alsands was cancelled and may include some people who moved, speculating on a job. (Supporting this is the fact that unemployed members of the labour force was only 4.4% in 1981).[2]

TABLE 9.1

STATUS OF LABOUR FORCE

STATUS	EMPLOYMENT	% OF POPULATION
Full time employee	13,628	40.6 (% labour force = 83.0)
Part time employee	1,291	3.8 (% labour force = 7.8)
Unemployed	1,507	4.5 (% labour force = 9.2)
(Total potential labour force)	(16,426)	100.0
Student/pre-school	11,654	34.7
Housewife	3,368	10.0
Retired	190	0.6
Other	52	0.2
No Response	33,576	100.0

A general breakdown of the labour force in 1982 (13,628 employees) used three categories:

1. Basic includes agriculture, fishing, mining and manufacturing.
2. Construction both general and specific construction trades
3. Service includes all other industries not included in basic and construction trades.

TABLE 9.2

GENERAL BREAKDOWN OF LABOUR FORCE

	1978	1979	1980	1981	1982
Basic	40	37	37	39	43
Construction	18	16	17	17	10
Service	42	47	46	44	47

Now that there are no oil sands plants being proposed or built and that the housing situation is stable the percentage of employees in the construction trade has declined to 10% and the percentage of the basic and service industries has risen slightly.

However, if any new activity in the oil sands occurs the percentage in the construction trade will rise again.

Table 3 breaks down the labour force more specifically by employment classification.

Aside from the dominance of the oil sands plant workers (under mining) it is clear there is little secondary industry as only 140 people are employed in manufacturing (Table 3).

As Fort McMurray is one of the largest single-industry resource towns in Canada and because (as has been mentioned before) the resource has a stable guaranteed market with expansion probable, the city has many services and facilities not available in smaller resource towns. The

TABLE 9.3

BREAKDOWN OF EMPLOYMENT BY CLASSIFICATION

CLASSIFICATION	PART TIME	FULL TIME	TOTAL
Agriculture/Forestry	4	12	16
Mining	73	6,074	6,147
Manufacturing	16	124	140
Construction	77	1,403	1,480
Transportation/Communication/Utilities	57	635	692
Wholesale Trade	5	243	248
Retail Trade	376	1,073	1,449
Finance/Insurance/Real Estate	55	629	684
Education Services	725	881	1,006
Health & Welfare Services	144	505	649
Accommodation/Food Services	147	547	694
Other Community/Business/Personal/	100	575	675
Government	89	838	927
No Response	23	89	112
TOTAL	1,291	13,628	14,919

three levels of government employ large numbers of employees with various provincial and federal offices in the city. Smaller resource towns do not have entire provincial department offices located in them. Thus the size of the city has attracted some secondary employment, and as the city grows and shows that it is stable (not likely to become a ghost town), more sources of employment and industry will locate here.

The two major employers stated that they do not expect to increase the number of staff over the next five years, since new technology will eliminate some positions thus offsetting any new positions which may be created.[3]

Thus any significant increases in employment opportunities in the immediate future will only come from new industry or new oil sands exploration and/or plants. As the situation presently exists employment levels are stable and unemployment is low, with most unemployed being recent arrivals in the city.

9.3 CONCLUSION

As to constraints/opportunities and elements of the plan they are directly tied to the industry or the city and these items have been detailed in chapter eight.

The oil sands industry is and will probably always be the city's largest employer. Construction services and government services are also major employers and will likely remain so. If the city's industrial base is diversified the new industries will be important employers as well.

FOOTNOTES

1. 1982 Census, p. 16.

2. 1982 Census, p. 17.

3. Interview with Dave Young and Wayne Antler.

CHAPTER TEN

OPEN SPACE AND RECREATION

10.1 INTRODUCTION

Fort McMurray has a lot of open space in its natural state within its city limits due to the physical landscape and development restrictions. The city has a number of small neighbourhood parks and one regional park, but needs more community parks centered on community clubs, not schools, which is the case with most of the city's parks. There is a narrow range of entertainment in the city with the Keyano College Theatre, two cinemas and several pubs. The city has grown rapidly and has too many citizens for too few facilities.

In the recent past the average workday for most people in the country is shorter. Many employees now work seven hours a day. This has increased the time available for other activities.

Aside from work and sleep, leisure time takes up most of the rest of man's time. Over the last few years, as work hours have been reduced, leisure time has increased. As man's leisure time increases so does his demand for something to do during this free time. The primary use of leisure time is recreation and entertainment.

10.2 EXISTING CONDITIONS

10.2.1 Consumer Demand

According to a 1969 survey of Fort McMurray, entertainment and recreation were ranked by resident respondents as the first priority among services and conditions as necessary for an enjoyable life.[1] This was ahead of housing, income, education and medical facilities, so it shows that even in 1969, recreation and entertainment were very important to the residents of Fort McMurray.

Recreation and entertainment activities are many and diverse. They include: park activities, sports, churches/ religion, libraries, theatres, museums and many more. Most of these services are in place and adequate.

10.2.2 Facilities

The main theme of this chapter is that facilities be fully utilized and that as many forms of recreation and entertainment as possible are available.

The city has several neighbourhood parks, but only one major regional park. This park (MacDonald Island) has many indoor and outdoor sports facilities including golf, tennis, baseball, soccer, curling, racquetball, squash. This facility is excellent, however, as will be discussed later in the chapter the city needs at least one more park like it, or perhaps two community parks which combined have as many facilities as MacDonald Island.

The city has an excellent new library with the Keyano College Library supplement it. As to other recreational/ entertainment facili-

ties such as theatres, churches, sports, etc., the city has an adequate supply, which will be supplemented by additional facilities in the new development areas.

10.3 CONSTRAINTS/OPPORTUNITIES

The city's developed areas have little land available to be developed as new recreation sites. Therefore the new development areas have large parks planned for recreational use. This will be supplemented by two major developments in the existing city, the Clearwater Riverside Park and the Waterways Park which are explained in section 4.2. The city's conservation areas should be maintained as open space as they are all on undevelopable land due to landscape features.

The city's existing parks and recreation sites will be supplemented by several new developments and will become a network or open space throughout the city with direct connections wherever possible.

10.4 ELEMENTS OF THE PLAY

10.4.1 Policy Recommendations

The 1980 general municipal plan (G.M.P.) of Fort McMurray raises several points that concur with those of this thesis. They are as follows:

First, is to promote the maximum possible use of all community and school facilities.[2] School auditoriums and classrooms can be used by various community sports groups and cultural groups on a year-long basis. This is already done to an extent, but many more activities could be

scheduled. As well, classes for adults and children in other cultural and recreational activities would be taught.

Each new community/neighbourhood (as well as every existing community/neighbourhood) should be developed around a focal point that included adequate open space, such as community clubs, parks, sports fields, playgrounds. This policy should ensure that all housing is relatively close to some sort of open space. As well, there should be at least one large community park (how large depends on the size of the community) for each area (most communities in the city are distinctly separated by the landscape from the rest of the city).

The riverbanks and accompanying shoreline should be preserved as open space.

All of the city's developed areas should be linked with pedestrian/-cyclist routes, which could be used for cross-country skiing in the winter.

A different way to occupy leisure time not yet mentioned is gardening. The city should establish a site for residents to have allotment gardens and also commercial market gardens.[2] Such a location is provided for in the design, a site near Forest Heights, with no current access available.

The existing open space, where necessary can be landscaped using in part vegetation removed from development sites and transplanted.

The vegetation from recent development sites is almost always bulldozed after the marketable lumber has been removed. Some of this vegetation could be left in place, as open space in the development, or transplanted to another site.

The city is surrounded by wilderness in its natural state. Some or all of these areas in and around the city should be declared conservation areas, with no development allowed, to protect the environment and animals from human abuse and for aesthetic purposes. To preserve the natural beauty of the wilderness areas in and around the city for the enjoyment of other generations. The numerous slopes in and around the city are protected, and this is a start, and will ensure these lands will remain in their natural state. These areas for the most part are undevelopable anyway.

There are many reasons to conserve natural areas besides for aesthetic reasons. Firstly, the open spaces which are within the city, once lost, cannot be replaced. Secondly, preserving the ecology will prevent soil erosion of the slopes. The various slopes in and around the city while undevelopable, serve other functions. They serve as wind breaks, maintain even flows of water run-off and the vegetation in large quantities helps purify city air. Thirdly, these sites allow for recreation activities as well as potential pedestrian links. Thus, it is important to conserve all open space in the city, especially those areas that are sensitive to any kind of development.

User trips to city and provincial parks in the area have dramatically increased, straining the parks' capacities to serve them. More parks are needed, both urban parks and also all three types of city parks (regional, community and neighbourhood).

Gregoire Provincial Park campground is often full during the summer, especially on weekends (see attached map). It is heavily used and is the only one within 150 miles, a 3 hour drive of the city. Another park is

needed to take some of the pressure off the existing park. There are many scenic spots in the area and most have lakes to increase their recreational potential. City parks are also needed. The only large city park, MacDonald Island, is occupied by a golf course, community facility, tennis, baseball and soccer fields, so that there is little park land left over. There are few picnic sites and no scenic drives (one is possible but undeveloped). Thus, another major park should be built on a spot available at the opposite end of the valley along the Clearwater River. Indeed, a new major park would be an asset to the city and will soon be required. Also, a new provincial park, fully developed will offer an alternative to the often congested Gregoire Provincial Park.

Existing and new parks and open spaces must have continuous links with each other and have outlets to some of the wilderness areas in and around the city. These links should include paths for pedestrians, cyclists and cross-country skiers.

This is easier to do in Fort McMurray than in most cities because there is a 300 foot development setback from the edge of the slopes in the city. Ever area except in the downtown has this setback and some areas are circled by this green strip.

10.4.2 New Open Space in Existing Areas

There will be two forms of open space in the plan. One) Designated public open spaces and parks (developed and undeveloped) Two) Conservation land that has development constraints and must be left open, with no form of development.

There is little vacant land available in the developed areas to build new parks. There are only two reasonably large potential locations. One is in the Lower Townsite, the other in Waterways. The site in the Lower Townsite is along a bend in the Clearwater River in the southern end of the valley. In the plan this park would be extended along the river right to the C.B.D. This would entail relocating a light industrial area which the design recommends be relocated to one of the industrial parks, and relocating some mobile homes to the new mobile home park in Timberlea. This park will be connected to the MacDonald Island complex and create a strong open space system in the Lower Townsite. The park will then be anchored by two large well-developed sites. and have pedestrian and cyclist links alongside the river. This would also remove all intensive urban development away from the river and off its flood-plain. In this thesis it will be known as River Park.

There is a site in Waterways on which a community park could be developed to serve the residents of Waterways and overflow activities from the rest of the city. Once the railway is relocated out of Waterways, land will be available to link the Lower Townsite parks system with the proposed new park in Waterways, reclaiming for recreational use, all of the land along the Clearwater River.

10.4.3 Recreation Sites/Open Spaces in New Development Sites

As to the new development areas, they will have major regional parks, with various interconnecting open space links so that all residents will be relatively close to the open space/parks system. Aside from its recreational and public health value, the open space system will

also serve to facilitate pedestrian and cyclist movement to and from industrial, commercial and residential areas.

In Forest Heights, there will be one large continuous open space system with major parks at various locations. This open space system will follow the two creeks bisecting the development and the Clearwater River. The entire development will be encircled by a continuous open space system. The two industrial areas will be buffered from the rest of the development by this open space system, as well as the creek and its valley. The open space system will penetrate into the centre of the development both from the north and the south. There will be other smaller routes interconnecting the open space system with the development that are too small to be shown in these drawings. The fact will also be true for the Timberlea expansion.

The Timberlea development will have several major parks all interconnected with the development by a series of pedestrian/ cyclist routes. The industrial area here will also be buffered from the development by parks and a community shopping centre.

The conservation areas (absolutely no development allowed, i.e., due to slope instability) will also play a major role in the open space system. While they will not be used intensively as the parks will be they can serve to link open spaces and parks by having pedestrian/cyclist routes along their perimeters. Trails can be built across and across them for recreational hiking and cross-country skiing. They also serve an aesthetic purpose having natural, undeveloped landscape within the city.

As to the rivers themselves, they are used for pleasure boating, fishing, pontoon planes, and to a limited extent, swimming. Now that the barges no longer use the Clearwater River, a marina could be built along it with a developed swimming area. The Backwater Snye between MacDonald Island Park and the Lower Townsite can continue to be a pontoon plane base.

The development of Forest Heights will allow the city to set up a large area for allotment gardens on the flood plain of the Clearwater River. This site can also have market gardens for commercial use, to supply some local demand for fresh produce.

The city's present cemetery is close to capacity and a new location will soon be required. I did a location study for a new cemetery and tree nursery in 1982, and reached the conclusion that the best potential sites were along Airport Road to the south of the city, if servicing costs could be optimised.

As to sporting activities, MacDonald Island has a full range of sport facilities already listed in this chapter. However, they are heavily used and additional outlets will be required. These will be provided in the new parks in the Lower Townsite and Waterways. As for the residents of the new developments, the regional parks planned for them will meet their needs.

10.5 CONCLUSION

The amount of leisure time available to the average individual has increased, mainly due to shorter hours of work. People choose many types of recreation and entertainment to fill this leisure time, and it is up

to the city to provide as much diversity as possible in these fields. Recreation both indoors and outdoors, whether sports-related or not has become increasingly important, especially in a city as isolated as Fort McMurray which does not have the cultural or entertainment facilities that cities in southern Canada have.

Most forms of recreation take place in developed parks or open green space. While the city has a number of parks, they are geared for vehicular access and have poor, if any, pedestrian/cyclist links except those from surrounding areas in the immediate vicinity. Thus, the city needs a continuous green space network, such as has been planned for Forest Heights and the Lower Townsite and Waterways. Timberlea, too, will be connected where possible. Besides better connections, other components of this network should include more community size parks with developed sports fields centered on community clubs and regional parks, both in the existing city and the new development areas (see Design Chapter).

The undevelopable open space in the city should be conserved and protected with minimal use by the public. These areas can serve as pedestrian/cyclist linkages between various parts of the city.

CHAPTER ELEVEN

PROPOSED LONG RANGE PLAN

11.1 INTRODUCTION

In the later 1970's, Fort McMurray had occupied almost all of the urban land then available for development. At this point of time, there were two choices for future development areas. First was the site known as Timberlea, a large tract of land immediately to the north of the subdivision of Thickwood.

Second was a site across the Clearwater River to the east of the Lower Townsite known as Forest Heights. The capital costs involved for Forest Heights were substantially higher than for Timberlea (for example, at least one or two bridges across the Clearwater River would be needed and servicing trunk lines would have to be built). Thus, the city decided to make Timberlea its new development area. Part of the site had already been cleared and serviced. However, only (approximately) 1,000 people lived there as of 1984. This is only a small percentage of the 35,000-40,000 people who will eventually live in the City of Fort McMurray's planning department projects. This subdivision will be sufficient for the presently foreseeable future potential growth of the city. However, when this site is fully occupied, Timberlea could be expanded by 35,000 to a total of 70,000 residents. After Timberlea is completed, the city will again have two major choices as to the next development area. It may continue to the north of Timberlea or it may be decided to start Forest Heights, which has been planned for in this layout. Forest Heights would be a development with approximately 50,000

residents and an unknown amount of land available for expansion if it was ever necessary. This plan will examine a land-use layout of a Fort McMurray that has both an expanded Timberlea and Forest Heights developed. This plan will allow for a growth of up to 155,000 people.

11.2 GUIDING CRITERIA

Each land use will have certain criteria to be examined including constraints and opportunities that will affect the land-use. Some of these criteria will be common to all elements of the plan while other criteria will only affect one particular land-use.

These criteria include three systems common to all land-uses. One, an open space network, two, transportation and traffic, three, public/private buildings. The plan will include these three systems in the design as part of its infrastructure, especially one and two as they play major roles in all urban land-use plans.

The open space network (close to all major public/private buildings including residential units), and the central transportation links, tie the plan together. The open space system is based on both the developed park network and the undeveloped conservation land, so that pedestrian links can be almost as strong as vehicular links. As a result, all three systems are closely linked in the plan, as the open space network and transportation system parallel each other where necessary linking them with as many developments (public/private buildings) as possible.

The relationship between existing conditions and future land-uses must also be considered. However, in the case of the new development

areas there are no structural land-use developments as yet so existing conditions are limited to that of the physical landscape.

11.3 POLICIES

This section with list nine policies of this thesis. Other policies pertaining to particular land-uses will be outlined in the sections on the various land-uses as part of the text describing them. (Note all policies have varying impacts on the plan and it is difficult to rank them so they are not necessarily in order of importance to the plan.)

One. Future development will be concentrated in one or two locations. Past development has been scattered in small subdivisions fragmenting the city.

Two. The two future development sites are known as Timberlea and Forest Heights. It is possible to develop Timberlea as the sole new development area. However this thesis will advocate developing both sites for reasons already described and some to be given later in this chapter.

Three. There are three stages to the layout: i) A general land-use plan of 1984 Fort McMurray with minor modifications; ii) the same as above with moderate modifications and Timberlea complete; iii) the full Plan. These three stages all have maps detailing the various land uses.

Four. As described in 12.2 criteria there are three systems used in all land-uses in the Plan; an open space network, the transportation network and public/private buildings.

Five. Conservation of the physical landscape is an important policy. The terrain in and around Fort McMurray is delicate with many areas unsuitable for development (see section 12.5).

Six. To diversify the industrial base and economy if and when possible as outlined earlier in the thesis.

Seven. There are several scenarios of possible future population growth outlined in the chapter in an attempt to forecast the potential size of the city at future dates in order to plan for these population increase.

Eight. The single family home (S.F.H.) is the predominant residential housing type. While this thesis maintains the S.F.H. as an important housing type it is recommended to promote high density housing forms especially townhouse-unit types as they are more economical. Other features to attract tenants include reduced exposure to climate, and improved layout both exterior and interior to be aesthetically pleasing rather than of a standard design.

Nine. Future new commercial activity will locate in one of three locations, the C.B.D., Timberlea of Forest Heights, the C.B.D. will be the site of most business offices.

11.4 GENERAL CHARACTERISTICS OF THE PLAN

The flexibility of this plan is that it can be developed in stages as required by the rate of the city's growth. The scenarios of future growth outlined are flexible enough to include several rates of growth from near zero to high growth rates thus the city's future growth rates, will likely fall somewhere in between.

As this is a general land-use plan, the level of detail will include layouts of possible development sites for the various land-uses. Each land-use will be examined to varying extents as to it's impact on the plan. However as it is a general plan only major lay-out details will be examined for each land-use and minor design details will not be included.

The scenarios of population growth examine several population horizons and this plan will be able to accommodate a future city of up to 155,000 people

11.5 ELEMENTS OF THE PLAN

11.5.1. Physical Landscape and Climate

The landscape plays a major role in the land-use plan, since many areas are not suitable for urban development. The development areas themselves have several ravines that are undevelopable, as are the slopes that extend for some distance from the creeks that crest the ravines. There are several areas of marsh that will have to be cleared away. This was also done in Timberlea as the city has cleared part of the site already. As for areas not cleared already, maps of physical constraints, surficial deposits, and landforms have been examined and used to determine the best sites for development as far as the resources of this author can determine.

11.5.2 Growth Scenarios

The construction force for Syncrude and Alsands (projected) was approximately 6,000, with 2,500 becoming permanent employees with 3,500 leaving once construction is finished. Table 12.1 follows this pattern

except in scenario four since the construction workers are needed for the next oil sands plant. These figures have been outlined, in the four scenarios listed in Table 12.1.

Table 12.1 used a growth rate of four new residents in addition to each job created. This figure has been the case for the city's past growth, and this thesis will apply it to future growth. Thus, for each permanent job created, four additional people; such as family (to the employee), merchants and teachers will be attracted to the city. Accordingly, an oil sands plant with 2,500 employees should attract an additional 10,000 people for a total increase of 12,500. (Note: Syncrude led to an increase of almost 20,000, so this figure is conservative.) A small In Situ plant would have approximately 400 employees attracting 1,600 people for a total increase of 2,000. These scenarios all foresee the city continuing to grow, which is the assumption of this thesis. Since it is impossible to predict which will occur all four scenarios are given a rough chance of occurring.

Scenario one examines the possibility that there is no demand for oil and the oil sands have no further development at least until the year 2000. However it is assumed that exploration is continued and that natural increases (mainly in the form of the birthrate to a young population) will result in an average growth of 2% annually in the city's population. While some years may be less then 2% and some more; spread over fifteen years from 1985-2000 it is an assumption of this thesis that the average growth rate will be 2%. Thus scenario one forecasts the city will grow to a population of 48,100 by the year 2000.

TABLE 11.1

PLAN POPULATION GROWTH SCENARIOS

Scenario	1984	1988	1992	1996	2000
1	35,000	37,800	41,000	44,400	48,100
2	35,000	45,400 CLF+6,000	57,600 CLF -3,500 PSO+10,000	65,100 -	75,200 SIP+2,000
3	35,000	45,400 CLF+6,000	57,600 CLF -3,500 PSO+10,000	71,100 CLF+6,000	88,500 CLF -3,500 PSO+10,000 SIP+ 2,000
4	35,000	45,400 CLF+6,000	65,600 CLF+2,500* PSO+10,000 SIP+2,000	88,300 CLF+2,500 PSO+10,000 SIP+2,000	113,900 CLF+2,500 PSO+10,000 SIP+2,000

*With a new plant every four years the C.L.P. never leaves.

CLF = Construction Labour Force
PSO = Population Spin Off
SIP = Small In Situ Plant
- total labour force 400 + 1,600 spin off = 2,000

(This table uses two basic assumptions: first all new population arrivals are put in one year, not spread out. Second, during non-construction years the regular population is 3%).

Scenario One: No new oil sands plants developed, continued exploration. 2% growth rate.

Scenario Two: One new oil sands plant start construction 1988, complete 1992. One small In Situ plant, complete 2000.

Scenario Three: Two new oil sands plants, start construction 1988, 1996, complete 1992, 2000. Once small In Situ plant, complete 2000.

Scenario Four: Maximum rate of development possible. One new oil sands plant complete every 4 years, starting in 1992. One small In Situ plant completed every 4 years, starting in 1992.

Scenario two outlines the city's potential growth should one major oil sands plant and one in situ plant be built. The time frame allows for the oil sands plant to start construction in the year 1988 and be compacted in 1992. The in situ plant would be completed in the year 2000. As stated earlier the size of the oil sands plant forecast, by this thesis would have 2,500 permanent employees and an additional 3,500 temporary workers during its construction. Thus Table 12.1 shows an increase of 6,000 people in the year 1988 with 3,500 departing in 1992 and 10,000 people arriving (although they may not all come in the same year this thesis places them in one year). The in situ plant would result in an increase of 2,000 people in the year 2000. During non-construction years it is assumed the growth rate will be 3% due to natural increases (mainly births) and spin-off effects of a expanding economy attracting people looking for a job. The city's population in the year 2,000 would be 75,200. Scenarios three and four will follow the assumption, laid out in scenario two with the following additions.

Scenario three examines the possibility that two oil sands plants and one in situ plant will be built by the year 2000. The second oil sands plant not outlined in scenario two will start construction in 1996 and be completed in the year 2000. Therefore the city's population in the year 2000 would be 88,500.

Scenario four looks at the maximum growth rate considered possible. One new oil sands plant and an in situ plant to start construction every four years starting in 1988. Therefore there would be three new oil sands plants completed in the years, 1992, 1996, and 2000. There would be three in situ plants opened in the years 1992, 1996, 2000. This rapid

rate of development is not likely unless there is a radical increase in world demand for oil. However it is possible it could occur. Using this scenarios assumptions the city's population would be 113,900 in the year 2000. This is well within the plan's capabilities as the plan allows for growth of up to 155,000.

11.5.3 Industrial Land-Uses

The industry of the city has been and most likely always will be, inextricably tied to the oil sands, since the city has no hinterland and probably never will (unless another resource town is built, which would only compete with Fort McMurray for new industry). Thus, secondary industry will likely only occur once the city is big enough to create local demand for the production of some product currently imported.

Transportation costs will always be a setback to attracting industry that would have to export products to the rest of Canada. However, the size of the city projected by this thesis should create local demand to attract a secondary industry manufacturing base that could grow into an exporter of goods.

The definitions of industry used by this design have been set out in the Industrial Chapter.

Timberlea and Forest Heights will have two industrial subdivisions each (one light industrial, one heavy industrial, each). The plan also includes the existing McKenzie Park industrial park.

The Timberlea Industrial Park, will house all new support services for the existing oil sands plants and any new ones that are west of the Athabasca River. It will also have light industrial services such as

automotive supply shops, warehouses and other services. The subdivision itself will contain a light industrial park and a heavy industrial park. They will be buffered on two sides by undeveloped open space and by developed open space on the other two sides. A commercial area will border on the industrial land. The only residential area close by is some medium density housing for employees who wish to live close to work. The commercial area will supplement the services in the industrial park. This industrial area will be slightly larger than McKenzie Park (existing) and there will be room for expansion if required to the north of the arterial route immediately adjacent to it.

In forest Heights the two industrial areas will be physically separated by a major arterial linking the industrial park with Forest Heights and the rest of the city. It will supply all new oil sands plants east of the Athabasca River. Alsands would have been on that side. It will also have local services for the population of Forest Heights. This industrial area will have a large amount of land allotted to it. Land not required by the industrial subdivision can be left vacant until it is required (this also applies to the Timberlea Industrial Parks).

The heavy industrial section will be buffered by the valley of the Clearwater River and light industrial areas, as well as the major arterial. There is direct access to the railway with two spur lines. The heavy industrial area should not come into conflict with adjacent land uses, as it is fairly well isolated from other developments by the physical landscape. It has direct access to Forest Heights and the Lower

Townsite and a direct route out of the city not close to any residential developments.

The light industrial area will also be surrounded by developed and undeveloped open space. The west side is bordered by a major arterial linking Forest Heights to the Lower Townsite, and the Clearwater River. On the other side of the arterial is the heavy industrial park. The south border of the area is the valley of the Clearwater River. The north side has a creek ravine separating the industrial area from residential areas. The east side is bordered by the railway and undeveloped land. It will be serviced by two arterials. The railway will have two spur lines running into the developments.

Access to the area can be from the new arterial that runs south to the airport so that industry-related traffic can enter and leave without travelling through any other developed area.

11.5.4 Residential

As previously stated, housing is a major component of the design. Of all land uses, housing occupies by far the most land. There are types of housing in this design: single family homes (S.F.H.), semi-detached (duplex), townhouses, apartment, and mobile homes (M.H.).

The new development areas will have a high population density at the core radiating to a light density at the periphery. The number of town-houses in the design is the most significant change. The percent of S.F.H., duplexes and apartments all remained about the same, while the percent of townhouses increased 9.5% and the percent of mobile homes decline 9.0%. I believe that townhouses can be designed to attract

tenants. The two design factors which could accomplish this would be economics and layout. The present townhouses in the city are of a standard layout common to all cities, in addition they are almost all company housing only available to qualifying employees. Thus, demand for townhouses for the rest of the population has not been met.

New townhouse complexes can be designed as townhouses, patio housing, row housing and terraced housing with all four adaptable to solar heating for a portion of their energy requirements. This would be one reason they could be a viable economic alternative to S.F.H. Other reasons include lower heating costs compared to S.F.H., many services can be provided within a townhouse complex reducing the need to go outside during poor weather due to the concentration of activities (leisure, shopping, close to friends, etc.), lower mortgages (S.F.H. cost more, have higher mortgages; in fact many are currently subsidized by company housing). These are the major reasons townhousing can be made economically attractive. They can also be made more attractive aesthetically through design improvements on standard townhouse subdivision layouts. I believe townhouse type units should plan an increased role in the housing market of the city for these reasons.

However, I acknowledge that the S.F.H. still will remain an important factor in the housing market of the city (until economics and practicality reduce its viability), while a demand for S.F.H. will continue, it is anticipated that the advantages medium-high density housing have to offer will increase their percent of the total housing units.

All mobile homes except for Gregoire Park will be relocated to Timberlea. The majority of mobile homes to be moved are on the flood plain of the Clearwater River and the reasons for moving them have already been examined. The percent of mobile homes as a housing unit will decrease from the present figure of 16.1% to 7.1%, but the actual number will increase as the new M.H. park in Timberlea will be large enough to satisfy any future residents.

TABLE 11.2

TOTAL HOUSING UNITS PRESENT AND FUTURE

	1982 Existing Units	1982 %	New Units in Park	%	Combined Total	Total %
S.F.H.	4,159	37.7	14,000	37.7	18,159	38.2
Duplex	1,056	9.6	3,500	9.4	4,556	9.6
Townhouse	1,322	12.0	8,900	23.9	10,222	21.5
Apartment	2,697	24.5	8,500	22.9	11,197	23.6
Mobile Home	1,777	16.1	2,275	6.1	3,352	7.1
Other	18	0.2	0	0	0*	0
TOTAL	11,029	100.0	37,175	100.0	47,486	100.0

*Approximately 700 MH will be relocated to Timberlea to the overall total is reduced by 700.

While most of the new housing units will be in Forest Heights and Timberlea, there will be some infill in the existing city, with approximately 1,000 new apartment units in the Lower Townsite, most close to the C.B.D., and 200 townhouse units in Thickwood. That is all the infill

that is recommended. Other vacant land in the present city should be left undeveloped and used as open space with new developments taking place in Forest Heights and Timberlea.

Table 12.3 shows housing unit counts for the new development areas, and population forecasts based on 1982 persons per unit averages (P.P.U.A., or just P.P.U). The only change is a decrease for duplexes from 3.88 to 3.75. This is only a small change basically made to balance figures in the rest of the thesis. The P.P.U.A. for other housing types has remained the same as current figures. Using the number of housing units by type and multiplying those numbers by the corresponding P.P.U.A. for that type population forecasts for Timberlea and Forest Heights have been set out. These are the exact figures and compare to the estimates made earlier: Timberlea

Stage one,	estimate	35,000,	actual	34,948
Stage two,	estimate	35,000,	actual	35,080
Total Timberlea,	estimate	70,000,	actual	70,028
Forest Heights,	estimate	50,000,	actual	49,990
Total both areas,	estimate	120,000,	actual	120,018
Existing city	estimate	35,000,	actual	35,000
Infill	estimate	none	actual	2,346
Final city plan	estimate	155,000,	actual	157,364

the only significant change is that there was no estimate on the population increase due to infill in the original estimate of the final city plan projected population.

Table 12.4 shows the projected population of the city based on the housing unit totals shown in Table 12.2. This is the maximum population

for the city as this plan allows, but the city is reviewed would have land adjacent to both Timberlea and Forest Heights for expansion if it was to grow past the projected population.

TABLE 11.3

HOUSING UNITS/POPULATION FORECAST FOR NEW DEVELOPMENT AREAS

	Timberlea	PPU*	Population	Timberlea Expansion	PPU	Population	Forest Heights	PPU	Population
S.F.H.	4,500	3.86	17,370	4,500	3.86	17,370	5,000	3.86	19,300
Duplex	1,000	3.75	3,750	1,000	3.75	3,750	1,500	3.75	5,625
Townhouse	1,500	3.32	4,9809	1,000	3.32	8,300	4,500	3.32	14,940
Apartment	2,000	2.25	4,500	2,500	2.25	2,250	4,500	2.25	10,125
M.H.	1,275	3.41	4,348	1,000	3.41	3,410	-		
Total	10,275	-	34,948	10,000	-	35,080	15,500		49,990

*PPU - Persons per unit (based on 1982 Census); Pop = Population.

TABLE 11.4

POPULATION OF THE CITY BASED ON THE NUMBER OF HOUSING UNITS

	Total Units	% of Total	PPU	Population
S.F.H.	18,159	38.2	3.86	70,094
Duplex	4,456	9.4	3.75	16,710
Townhouse	10,222	21.5	3.32	33,937
Apartment	11,197	23.6	2.25	25,193
M.H.	3,352	7.1	3.41	11.430
Total	47,486	100.0	-	157,364

11.5.5 Transportation

Transportation was one of the city's original economic roles as goods to points further north were sent by rail to the city and by barge north from the city. However, the barge system has been discontinued and the railway has greatly declined in importance.

In the final plan the railway has been relocated to a point just south of waterways. This will serve as a secondary terminus for goods coming to the city. The primary terminus will be a new railway along the eastern boundary of Forest Heights. It will have immediate access to Forest Heights with four spur lines into the light industrial area. Goods can be trucked from there along arterial routes to the rest of the city. Where previously the goods had to be trucked through waterways and the Lower Townsite, including residential areas. The Forest Heights rail

line could be expanded to serve any potential oil sands plants east of the Athabasca River.

Air traffic will remain mainly passenger with some small cargo. There will be a new connection from Forest Heights to the airport, allowing secondary access, both out of the city and to the airport, which is five miles directly south of Forest Heights.

The major form of transportation in the city today is by road, both within the city and to points south. Most consumer goods are shipped to the city by truck, while most passenger traffic is by private vehicle or one of the two bus lines serving the city. Therefore, the focus of this thesis will be on vehicular road transport.

There are two major changes made to the city's current road network, basically to connect the Lower Townsite to Forest Heights. The first improves an existing intersection along Highway 63 connecting it with Franklin Avenue, Waterways and Forest Heights. The connection to Waterways is along the old railway bed. This will be done for two basic reasons, firstly, to give Waterways secondary access to the rest of the city, secondly, to upgrade a dangerous (outlined in Transportation Chapter) intersection. This will create a direct arterial link from Highway 63 to Forest Heights and keep through traffic away from developed areas in the Lower Townsite.

The other change is an upgrading of the road along MacDonald Island with arterial links connecting MacDonald Island with Forest Heights and Thickwood. This will create a rapid short link between the Lower Townsite and both subdivisions. The bridges will utilize existing islands to help support their structures, however the main link from the

Lower Townsite to Forest Heights will be the southern route. The arterial over MacDonald Island will be to create secondary access from the Lower Townsite to Forest Heights and also to Thickwood/Timberlea.

Transportation links in the new development areas will follow a standard residential pattern as far as environmental restrictions allow. This means neighborhood streets linked by collectors to arterials, however due to the scale of the map, the arterials are the basic routes illustrated with some collectors shown as well.

Timberlea's access points to Highway 63 are limited by the slope of the valley of the Athabasca River. In addition to the already constructed arterial link to Highway 63, this design suggests two additional links down creek beds. The reasoning is that it is more economic to use a creek bed as it is a stable cut through the slope. Even diverting a small creek is far cheaper than cutting a route through the slope. However, these are the only sites available and due to economic costs the only ones that can be feasibly developed. Thus, they will have to be 6-8 lanes wide to accommodate heavy traffic flows at peak traffic hours, they can be built in several stages as required.

Timberlea's existing internal route will remain, connected to two arterials leading to the north. One will be a major, buffered arterial through the S.F.H. subdivision; the other will be a minor arterial/major collector through the dense population centre, alongside the regional shopping centre and finally through the industrial park, connecting to the major north-south arterial. These three routes will all be interconnected and will be the only through-routes servicing the entire development. The north-south arterial will take the form of an eight

lane (start with four and expanded in stages) buffered freeway. All three routes will have land set aside for expansion if required.

Forest Heights will be served by two major roadways both originating at the two new river crossings. The MacDonald Island arterial will separate the S.F.H. subdivision, from the townhouse and apartment districts. It will then turn and pass through the commercial core linking up with the major north-south arterial, which is directly linked with Franklin Avenue and crosses the Clearwater River using an old creek bed. The route is well-buffered passing through the industrial park and housing subdivisions, linking the city to an oil sands developments to the north. It will have a connection to a route to the south through the light industrial park, then parallel to the railway to the airport highway. This will give two routes out of the city to the south, giving Forest Heights a direct route out of the city and allow secondary access for the rest of the city as currently there is only one route in and out of the city.

There will be a series of major collectors both in the industrial subdivisions and housing developments. The S.F.H. collectors will run through the centre of the subdivisions. The collectors for the medium/-high density housing areas will largely run along the edge of the developments allowing them to retain their internal integrity (pedestrian linkages with small resident roads, largely in the form of lanes). These high to medium density housing developments should not have through routes as they can be serviced just as well by perimeter roads (collectors) with a series of access lanes. Some of these collectors are shown in the layout. Only major collectors will intersect with the arterials

as the arterials will be buffered routes to allow higher speeds with few intersections. The theory behind the layout for the medium-high density transportation routes is to maintain a quiet neighborhood atmosphere in an area that has high population densities. This road network will reduce through traffic, as the collector roads on the perimeter of the developments will get the heavy traffic loads. While the access lands which will not be through routes (either dead end, horseshoe shape or loop roads) will only have local traffic. The housing units themselves can share common front yards where possible with sidewalks, and no roads with the access lane, to the rear of the units.

11.5.6 Commercial

The city's existing commercial areas will remain as is, but not expanded, as they are sufficient to service currently developed areas. The C.B.D. may see some additional development, but the majority of this would be in the form of business offices.

Once Timberlea is fully developed, the C.B.D. will be off to the edge of the city's development with 70% of the city's population in Timberlea/Thickwood across the river from the C.B.D. When Forest Heights is developed the C.B.D. will again become central to the city's total developed area. However both Timberlea and Forest Heights will have retail commercial areas. The C.B.D. will retain its present retail activities which will have to compete with the commercial areas in the two new development areas. This plan will not try to insulate the C.B.D. against competition as previous plans have. However, the role of the C.B.D. as the location for all business offices in the city should

continue, although some medical clinics should be located in the new development areas. Other businesses and professional offices (i.e. lawyers and accountants) should locate in the C.B.D. in order to preserve it as the Central Business District for the city.

New retail activities coming to the city will have to locate in one of the three areas (C.B.D., Timberlea, Forest Heights) as no other substantial commercial areas will be developed. There will be the occasional vacancy in existing developments which can be filled but that will be the extent of new commercial outlets outside of the three areas outlined above.

Timberlea's major commercial development will consist of a regional shopping centre with ancillary services such as gas stations. The northern commercial area will be a community shopping centre largely for the 35,000 people in the expansion of Timberlea. The regional shopping centre can be built in stages in a north-south rectangular layout with the first stage in the southern most part of the site. It will have a full range of retail services as it will be serving the 85,000 people on that side of the river (supplemented by several community and neighborhood malls, including the existing ones in Thickwood).

Forest Heights' commercial area could take one of two forms. It could be another regional shopping centre, or it could concentrate its development in a strip commercial fashion along the north side of the east-west arterial with a major community shopping centre south of the arterial. It could be built all at once or in stages as in Timberlea. It will be central to all of Forest Heights, relatively equidistant by high density housing developments. The commercial area will be sur-

rounded by high density housing developments (as will Timberlea) so the greatest number of people possible can have immediate access. There will be a direct link to the open space network and there should be all-weather links across the arterial, either skywalks, tunnels, or both. The arterial as it passes through the commercial district will become a sort of "main street" to Forest Heights with several access points to the commercial area.

11.5.7 Open Space and Parks

There are two types of public open space in the plan. The first type includes both developed and undeveloped open space and parks. The second is conservation land that has development constraints and/or set-backs. The first thing to examine is the Plan's changes to the city's existing parks system, with the main alterations occurring in the Lower Townsite and Waterways. Land uses along the flood plain of the Clear-water River will be relocated and the land along the river from Waterways to MacDonald Island will become one continuous park. It will be known as River Park in this thesis. There will be four major developments in this park; MacDonald Island complex, the Marina, Keyano College and high school open space and the Waterways Park. River Park will contain pedestrian and cyclists paths from one end to the other. Most of the park will be left in natural "forested" state, such as at the junction of the Clearwater River and the Snye. The developed areas will largely occur at points with little natural vegetation, or where previous land uses have been relocated.

The MacDonald Island complex will be expanded with picnic sites and may play a larger role as a convention centre if the city chooses to bid for conventions (the facility has large meeting rooms). The arterial route along the west side of the island will be buffered. It would be preferable to have it as an elevated route, but this might not be economically feasible. Such a design would allow access from the park to the west side of the island, keeping the disturbance the arterial will do to the integrity of the park to a minimum. A site for the marina exists where the river barges used to dock, and could be redeveloped as a marina. The college and high school would develop their own sports areas. The Waterways Park would be the end of the park with MacDonald Island the other end.

Timberlea will have three major developed parks, with several community parks (includes school playgrounds) and several small neighborhood parks. Linkages between them for pedestrian and cyclist traffic will exist where possible. The southern park will have a large sports complex. While the northeastern park will largely be undeveloped, as it overlooks the valley of the Athabasca River, it will contain a scenic drive. The north central park will also have a sports complex and will have substantial open space for the residents of the townhouse developments surrounding it. The community parks will all have community clubs as their focal point. All will have pedestrian/cyclist access between them. There will be a perimeter of undeveloped open space around Forest Heights. This will include a strip of park around the developed areas and outside of that will be conservation land as on the boundaries of the residential developments there are the valleys of two creeks and the

Athabasca River. On the fourth side will be a strip of park alongside the railway. Thus the park network of Forest Heights will consist of a perimeter of open space around the development and internal parks, with direct links to the perimeter park. Both will have various forms of developed recreation infrastructure. The two main internal parks will in effect be extensions of the perimeter park, from the north and south boundaries of the residential areas into the heart of the development which will have sports complexes. There will be substantial open space around the industrial parks, not only to buffer them from residential land but as open space for employees of the local industries. There will be a large park overlooking MacDonald Island and the Lower Townsite that is on land not suited for development (hilly terrain). There will be land allotted to market gardens to the south of the industrial parks along the flood-plain of the Clearwater River. The open space along the river valleys will have scenic views and should be developed around this focal point.

11.6 STAGE ONE OF THE PLAN

This is a description of sketch/map one which shows land-uses in Fort McMurray as of 1984, with several modifications/improvements which will now be noted. In the Lower Townsite, the light industrial area and mobile home parks along the Clearwater River have been relocated to McKenzie Park and to the new trailer park in Timberlea, respectively. One of the major reasons for this relocation is that these activities are located within the flood plain of the river. Also, these land uses are not usually found in the downtown (the Lower Townsite, includes the down-

town, while the north end is generally the business district, the south end is basically residential) of most cities. The first stage of the Plan, therefore, is to remove these activities to better suited locations. The railway spur to the Lower Townsite has been taken out, with the terminus of the line in Waterways.

This land along the river was developed at a time when the city was growing rapidly and the Lower Townsite was the only development area. As a result, the land was developed despite the fact that it was on a flood plain. The city realized this, and, in fact, some of the mobile homes were only given temporary permission to locate until a more suitable site was established. However, they were never relocated. The city is now developing a large mobile home park in Timberlea that can easily accommodate all of the mobile homes in the Lower Townsite. The light industrial area is established in the Lower Townsite, but out of character in a largely residential area. There is plenty of serviced land available in the city's industrial park to relocate these industries to. Although this would be costly, this site is a major roadblock before the park can be complete, and industry is not a suitable use for this land, for the reasons just given.

The Lower Townsite land is better suited for a less intensive development such as a riverside park and open space. Thus, the city will have all of the river bank property along the Clearwater, within the city as park land, with a large park at either end (MacDonald Island and a new park). The sites could have some permanent sports facilities, possibly with flood protection measures (i.e. built on a rise). River Park will link the regional park on MacDonald Island, the C.B.D. and the new park

proposed at the other end of the valley, and the land will still be available if an arterial route is ever needed along the river.

11.7 STAGE TWO OF THE PLAN

This is a description of sketch/map two it shows Fort McMurray once Timberlea has reached a population of 35,000. However, there are also some changes to the rest of the city. In Thickwood, the open land next to the medium density residential has infilled with more of the same, focusing the development on the two shopping centres. In Waterways, the mobile home park has been relocated to Timberlea. At this point, the city would only have two consolidated mobile home parks, Gregoire and Timberlea. Once this is done the new park system in the Lower Townsite can be extended through to Waterways.

In the Lower Townsite, when the park has been completed, a marina can be established close to where the river barges were docked. The area around the Central Business District will be infilled with high density residential developments. This will intensify the land use in the downtown area and bring more residents close to the C.B.D. This concentration of population will probably do most of their shopping downtown, as it will be within walking distance (1-3 blocks) from the C.B.D.

Keyano College and the Public High School will have land for needed expansions once the mobile home park immediately behind them is relocated. They will also be using the future park, as it will have various sports facilities.

Timberlea's layout is altered from the one the Fort McMurray's planning department laid out. The city's plan was to have approximately

eight neighborhoods each with a core development as well. This would, in effect create eight semi-isolated villages (by arterial routes, etc.). However, my proposal advocates a strong central core that will not be weakened by secondary neighborhood cores. The development will focus on a regional shopping centre with all major commercial activities in it or around it. Of course, there will be some neighborhood stores, but only small single ones. The commercial core will be surrounded by a large high density residential mass which will in turn be encircled by medium density housing. The outlying areas will consist of large S.F.H. subdivisions. This will create a land use pattern that is most intense at the centre and least intense at the perimeter that fairly evenly transcends from one extreme to the other. This kind of layout will locate the greatest number of consumers with easy access to the commercial core, with all of the high density developments with a short walking distance. While the S.F.H. which consumes the greatest amount of land will be on the periphery but still relatively close to the core due to the semi-circular layout.

There will also be a large park located close to the (undevelopable) ravine that will have open space links to all parts of Timberlea (however these links are too small to be shown). This park will be next door to the commercial core and readily accessible to the high density developments.

11.8 THE FINAL LAYOUT

This is a brief description of sketch/map three which is the map of the final layout of the plan. This section will give the size of the new development areas may by necessity be slightly repetitive.

To date, Fort McMurray has a population of 35,000, together with Timberlea when completed, the city will have a population of approximately 70,000. This proposal foresees Timberlea to eventually double its population in the long run. At this stage, the city would have a population of 105,000 with 85,000 (Thickwood = 15,000) on Timberlea's side of the Athabasca River. This would create a severe imbalance, placing the C.B.D. at some distance from most of the population, indeed at the edge of the city. At this point Forest Heights, best suited after Timberlea, would be developed.

Forest Heights will have a maximum potential population of 50,000 (detailed later in chapter). Thus, combining existing and new development areas, this plan will be able to accommodate a population up to a maximum of 157.400. There is an additional large urban reserve to the north of Forest Heights should the city ever require it. As the section 12.2.2 illustrated, even at the maximum rate of growth given in scenario four the city would only have 113,900 people in the year 2000, well within the limits of this plan. At an annual growth rate of 3% from the year 2000 on, based on a maximum population of 113,900 in 2000 this plan's maximum population would not be met until the year 2011 when the population would be 157,700. At a 4% growth rate the plan's maximum population would be achieved between the years 2008-2009 (155,900-162,100). This is at the maximum rate of growth which is very unlikely.

Thus this plan will be sufficient for at least 25 years until the year 2011 and probably more than 25 years as the cities population may never reach 157,400.

11.9 CONCLUSION

The city will grow in two directions, first Timberlea will be developed, then Forest Heights will be developed as required. The main layout will examine a future Fort McMurray with both areas fully developed. This Plan will include some relocation or land-uses in the existing city but the majority of new development will occur in Timberlea and Forest Heights.

The major details of the Plan are as follows. Timberlea and Forest Heights will have commercial cores surrounded by high population density housing areas, radiating to medium density and finally light density (S.F.H.) on the periphery of the developments.

The maximum population for this proposed future Fort McMurray will be approximately 155,000, with growth rates outlined in the chapter. Timberlea will have 70,000 residents, Forest Heights, 50,000 with the existing city's 35,000.

There will be a small industrial park (about the size of McKenzie Park) in Timberlea, mainly to serve the existing oil sands plants and future plants west of the Athabasca River. Forest Heights will have two large industrial areas set aside for the secondary industry it is anticipated a city of 155,000 will attract, and to service oil sands plants east of the Athabasca River.

There will be a greater proportion of townhouse units in the design (as a percent of total housing units) and a smaller proportion of mobile homes than presently exist. The other housing types will retain their current percent of total housing units.

The primary form of transportation in the design will be by road. The plan will improve some existing road problems and plan road networks for the new development areas, as well as linking the proposed areas with the existing city.

Future commercial activity that is beyond the scope of daily necessities will be developed in one of three places, the C.B.D., Timberlea, Forest Heights. The C.B.D. will retain all new business offices that come to the city (except essential services for the new areas), and will have most new entertainment and cultural facilities.

There will be a lot of open space, both developed and undeveloped in the design. Timberlea and Forest Heights will have open space networks with linkages through the developments. There will be a major park from MacDonald Island along the Clearwater River to Waterways for all of the city's residents to use.

Whichever route Fort McMurray develops, it is clear to me the city has a bright future and will continue to grow due to its close proximity to the oil sands. It is my hope this thesis will contribute to the city's success.

CONCLUSION

12.1 INTRODUCTION

Fort McMurray may be a single industry resource city, but as this thesis has shown, the city has great potential for future growth. This conclusion will restate the main points of the thesis, illustrating the growth potential and the direction this growth should take.

The oil available in the tar sands has barely been touched. There are vast reserves of oil ready to be extracted even with present methods of technology. While the supply and demand of oil will play a role in the future growth of the city, this role will be in the form of determining when (not if) the city will grow. As oil is a finite resource, the oil in the tar sands will be required some day (unless an energy substitute for oil is found), when companies set up extraction plants in the vicinity of Fort McMurray the city will grow as a result.

12.2 MAIN POINTS OF THESIS

This plan will attempt to be comprehensive in that comprehensive planning is planning for the totality rather than for several parts. It will incorporate the best estimate that I can make to achieve that goal.

The physical landscape plays a major role in determining the design of the city. The rivers and creeks in the city cut deep valleys that either have to be bridged or if too wide (as in the valley or the Clearwater) they can be developed. These valleys separate the 7 developed areas of the city isolating them and fragmenting the design of the present city. This plan will develop one or two large sites as the sole new development areas to concentrate the city's future development.

therefore, a goal of the plan is to concentrate future population as opposed to the historical fragmentation.

The present city has two main developed areas and four small subdivisions ranging from 700 - 3,000 people. This thesis proposes to build Timberlea to a total population of 70,000, and Forest Heights (when required) to 50,000. These two areas will be able to accommodate all population increases in the foreseeable future. The oil sands industry will most likely be the impetus for this future growth. Although oil extraction is the city's only major industry there is a large supply of oil - (although over 200 million barrels have been extracted to date, over twenty years this represents less than 1% of the total oil in the tar sands). Although the method of extracting oil at the present is strip mining, a new process called In Situ is in the experimental stage. Commercially viable In Situ plants could be widespread, but not for fifteen to twenty years as the technology has to be first perfected then put into place. The main difference between the two types as far as the plan is concerned is that a strip mine employs approximately ten times as many workers. Thus, strip mines will have a much greater impact on the city.

Diversification of the city's industrial base to include other industries is desirable. However, this will be difficult. There are several problems in attracting other industries to Fort McMurray. They are as follows: 1) The city is isolated, and any goods produced for export out of the city will have high shipping costs; 2) private industry is hesitant to locate in single industry frontier resource towns due to the risk factor of the town losing the primary industry and becoming a

ghost town; 3) there is not a large labour pool readily available in the city for new industry as unemployment is relatively low.

Housing is very integral to the plan. the new developments will consist of large housing developments. These will be concentric in nature with the highest densities at the centre and the lowest densities at the periphery. These developments will have a large commercial district as their focal point at the centre of their lay-out. The other main change in the city's housing lay-out is that the proportion of medium-density housing (specifically townhouses) will be increased, and the proportion of mobile homes decreased.

Single family homes (S.F.H.) will remain an important type of housing. One reason for this is that most residents come from southern Canada where society seems to consider it an asset to have a S.F.H. thus,even though the climate is more severe and heating costs higher, the S.F.H. remains the preference of many residents of the city.

Long before the oil sands were commercially developed the village of Fort McMurray had transportation as its main reason for existence. Located on the junction of two major rivers (the Athabasca being north-south, the Clearwater east-west), fur traders and trappers have long used the location, hence the "Fort" in the name Fort McMurray (McMurray, being one of those early explorers). Water transport, however, is no longer in service as the last barge service from the city to the north recently closed. The railway has also decreased greatly in importance, but it could be used to service future oil sands plants if a direct link were built. Air transport is largely a passenger service with not much cargo. By far the most important form of transportation to and from the city, as well as within it, is by road. Most goods to and from the city is

shipped by truck. Many travellers choose to use the more economical bus service instead of air travel to go to the south and back. Buses also take many oil sands employees to work and back each day. However, the automobile remains the choice of most residents when they have to travel, whether within the city or on longer trips. Thus, the transportation details in the layout focus on road links within the developments and to the rest of the city.

Fort McMurray is the regional centre of northeast Alberta, and if roads to northern Canada are built,they should pass through the city.

Future commercial activity in the city should be located in either the C.B.D. or the commercial districts in Timberlea and Forest Heights. Existing areas have sufficient retail facilities. The C.B.D. should be the location of all new business offices in the city. This will help retain the C.B.D. as a unique and important district to the city.

Recreation is an important element of the plan, accordingly, a large amount of open space (both developed parks, and undeveloped conservation land), has been planned for. Major new regional parks are planned for both new development areas with as many pedestrian/cyclist linkages as possible. The Clearwater valley will have a continuous part along the west side of the river the length of the Lower Townsite and Waterways.

12.3 CONCLUSIONS OF THE PLAN

The conclusions of the plan have already been listed, so this will be a brief summary of them. The primary layout will have two new development areas with Timberlea developed before Forest Heights. The other maps showing the design in various stages of completion are in the

Appendix, with the completed design having a potential population of 155,000.

Townhouse units will be important to both designs although they will be only one of three main housing types (high density, medium density and low density). They will be concentric in design, encircling a major commercial development, so both Timberlea and Forest Heights will have commercial cores which, along with the C.B.D., will receive most of the city's future new retail activity.

There will most likely be new oil sands plants developed in the next twenty years. A typical strip mine plant will have 2,000 - 3,000 employees for a total increase in the population of 10,000 - 15,000 (formula = four additional residents for each job created). An In Situ plant will probably have 200 - 300 employees for a total increase of 1,000 to 1,500 (see Table 1 for projected total increases). Land has been set aside in Forest Heights for secondary industry if it should occur in the city.

Major arterial routes (possibly in the form of freeways) will link Timberlea, Forest Heights and the Lower Townsite to each other. The new development areas will have arterials within the developments linking the various housing developments with the commercial core.

The Lower Townsite will have some land-uses relocated in order to crease a riverside park along the Clearwater River which will link MacDonald Island with Waterways, and will be a focal point of recreation in the city. Timberlea and Forest Heights will have a network of open space as previously outlined.

In conclusion, this author hopes that this plan will provide a general framework for the future development of the city. This author

believes the city will grow substantially in the future as the oil sands are further developed. The oil in the tar sands will be extracted some day when the world requires it and as more oil sands plants are built in the vicinity of Fort McMurray the city will grow and prosper.

APPENDIX ONE

A BRIEF HISTORY OF FORT MCMURRAY UP TO 1950

Fort McMurray is one of the oldest settlements in all of Alberta. Indians have lived in the area for many years before the arrival of the white man.

1778 - The first European reached the junction of the Athabasca and Clearwater Rivers. Peter Pond was a fur trapper and explorer.[1] He established McLeod House, a trading post and noted the presence of the oil sands in his journals.[2]

1790 - The first settlement was built by the North West Trading Company (N.W.C.), named the Fort of the Forks.[3]

1790-1840 - Five different trading posts succeeded each other at the site.[4]

1821 - The Hudson's Bay Company (H.B.C.) took over operation of the site.

1840 - A smallpox epidemic broke out[5] and the site was abandoned with the post moved downstream to Fort McKay.[6]

1870 - Due to a fierce competition for furs, the H.B.C. decided to establish a permanent settlement at the confluence of the two rivers giving direct access to the north, south and east to Lower Fort Garry. The new settlement was named after J.D. McMurray, a H.B.C. trader.[7] Settlers came from Saskatchewan and Winnipeg,[8] and the settlement became an important trading post and a supply centre to the north.[9]

1875-1881,1885 Major floods occurred in the valley of the Clearwater River.[10]

1883 - A steamboat line terminus was established increasing the settlement's transportation supply role.[11]

1906 - A Count Von Hammerstein drilled for conventional oil and found salt instead. As a result, a salt mine was later established. By this time many claims were being made on oil sands land.[12]

1912 - Fort McMurray was experiencing a real estate boom caused by excitement over the oil sands. Residential lots were selling for $200.[13]

1913 - An R.C.M.P. post was established.[14]

1914 - Residential lots were selling for $1,500 a piece, but the boom was soon to end, owing to high transportation cots, a lack of technology to convert oil sands to oil and other factors.[15] After the boom ended,the economy of the settlement reverted to the established staples of transportation, trade/supply, fishing and the fur industry. From this point the settlement grew at a moderate rate.[16]

1920 - Oil sands development grew closer to reality when Dr. Karl A. Clarke, an Albertan, discovered the hot water method of extracting oil from oil sands.[17]

- The population was 700.[18]

1922 - The railway to Edmonton reached Draper, three miles south of Waterways.

1925 - The railway reached Waterways.[19] The time for the trip to Edmonton was reduced to 28 hours (as of 1983, the trip by train still took 28 hours) as opposed to 8 days on horse. The railway strengthened the transport role with goods transferred to river barges taken to the North West Territories (N.W.T.).

1929 - The economy was still based on fur, fish, salt, trade/ supply, and transport. Over 25 million pounds of fish primarily from Lake Athabasca was sent south.[20]

1930's - Bush pilots were stationed in the settlement to relay supplies and services to the north.

- The research council of Alberta developed an experimental hot water, oil sands extraction plant at Waterways using Dr. Clarke's method.[21]

1936 - A commercial extraction plant was built by Abasands Oil with a 400 ton a day capacity.

- There was a major flood in the valley of Clearwater.[22]

1941-1945 - During World War II, Fort McMurray became important as a link to the north. Three thousand American soldiers were stationed in the settlement to build a pipeline to the north in case there was a shortage of oil/gas. While in Fort McMurray, they built a railway spur from Waterways to the Prairie. They also built a road to the airport[23] which was built by Canadian Pacific Air, during World War II.[24]

1945 - After the soldiers left, the population was 900.

1949 - Another experimental oil sands plant was built, named Bitumont, forty miles downstream on the Athabasca.[25]

FOOTNOTES

1. Community West, p. 36.
2. Community West, p. 36.
3. Community West, p. 36.
4. Community West, p. 36.
5. Community West, p. 36.
6. Community West, p. 36.
7. Community West, p. 36.
8. Community West, p. 36.
9. Community West, p. 36.
10. Community West, p. 36.
11. Community West, p. 36.
12. Community West, p. 36.
13. Community West, p. 37.
14. Community West, p. 37.
15. Community West, p. 37.
16. Community West, p. 37.
17. Community West, p. 37.
18. Community West, p. 37.
19. Community West, p. 37.
20. Community West, p. 37.
21. Community West, p. 38.
22. Community West, p. 38.
23. Community West, p. 38.
24. Community West, p. 38.
25. Community West, p. 38.

APPENDIX TWO

TIMBERLEA AS SOLE NEW DEVELOPMENT

Timberlea Option

Developing Timberlea is the solution the city has chosen to follow for now. Once Timberlea is completed, the city will have to choose between expanding Timberlea or starting Forest Heights. At some point in the future both may be developed as the plan shows. Even though Forest Heights balances the layout of the city, it would be expensive to shift services there (and build arterial connections and bridges). It could be decided to keep all new development in Timberlea to concentrate the supply of services and economics. Sketch four shows a design of Timberlea should it be the sole new development ruling out Forest Heights. This design is slightly larger than Timberlea is presented in Sketch three, however, the terrain to the west of the development is poor and the terrain to the north has never been examined for development possibilities, thus, this represents the maximum (presently foreseen) development boundaries of Timberlea.

The major differences in the design are as follows. There will be a heavier population density. As this area (in this particular design) will be the city's only new development, it will have to be capable of housing more people. There will be 1,000 more units of S.F.H. (10,000 from 9,000) and more than double the amount of both medium and high density housing. This would put a high majority of the population to the Athabasca River, and create several problems which this thesis will not

examine (i.e. should the C.B.D. be moved to Timberlea with 85% of the population, 115,000 of a total 135,000).

TABLE A-1

TIMBERLEA HOUSING AS SOLE NEW DEVELOPMENT AREA

	Total Units	PPU	Population
S.F.H.	10,000	3.86	38,600
Duplex	3,000	3.75	11,250
Townhouse	8,000	3.32	26,560
Apt.	6,000	2.25	13,500
M.H.	3,000	3.41	10,230
Total	30,000	-	100,140

The townhouse developments along the valley of the Athabasca River will be oriented to the east and south to maximize solar energy benefits, to cut down on high heating costs.

The commercial core will be oriented around an arterial route with direct access to Highway 63. The regional shopping centre which will be built with Timberlea will anchor the commercial area to the surrounded by high density housing which will in turn be encircled by medium density housing developments. The industrial areas will be larger, and will still be along the northern arterial. This information is illustrated on Map four.

There will still be three major arterials connecting Timberlea with Highway 63. As there are only three economically viable locations to

build routes down to the valley. Internal routes will be adjusted to fit the new residential layouts. The major change is an east-west arterial through the centre of the development.

If Timberlea is developed and expanded as the sole new development area, it will unavoidably become, almost, an independent city, whether it is designed that way or not. This is due to its distance from the C.B.D., and that it will contain a vast majority (especially if Thickwood is included) of the city's population. That is why Forest Heights would be a desirable addition to the city as a future development area. It would balance the city's population keeping the C.B.D. central.

APPENDIX THREE

PARKING SURVEY RESULTS

For the purpose of this report, the study area is defined by

- Manning Avenue and Franklin Avenue at the N.E.
- Richard Street and Morrison Street at the N.W.
- McDonald Avenue, Biggs Avenue and Saunderson Avenue at the S.W.
- Haineault Street at the S.E.

Surveys are conducted on a block-by-block basis (see Figure 1).

The survey includes occupancy rates for individual parking locations and for block totals. The block maximum occupancy rates are the total between the seven surveys. Although the timing of the surveys is at high parking demand, the result of the surveys is still a limited indication of the restricted parking situation. More surveys would probably find other maximum occupancy rates for many of the individual locations (Appendix Table breaks down parking stalls by block).

This concludes, however, that the maximum occupancy rate for the area is at least 72% and that there is a maximum of 28% (or 808 stalls) vacant at peak usage times. The minimum number of available spaces is unknown. Theoretically, occupancy ratios for parking areas (commercial areas) are contained at 70 - 80% of the total capacity (75%, GCG study), in order to guarantee proper functioning. From the total 808 "vacant" stalls, theoretically the number of onstreet stalls (210) should be deducted, resulting in 598 stalls effectively available for offsite

parking (required parking Land Use By-Law), at peak usage times (see Appendix Map).

The total number of parking stalls required is based on the total of M^2 of leasable space for each land use (businesses, offices, stores, restaurants, vacant, etc.). With the parking requirements from the land use by-law the number of parking stalls have been identified for each land use, for each block and for the entire study area.

On the basis of the existing number of parking stalls and their location,each land use (building sizes for office buildings) was checked to determine whether they conformed with the land use by-law. On street stalls or any other type of off-site parking are not applicable in this analysis.

Compared to the available number of parking stalls (2,887, onsite, offsite, alley and onstreet parking) the shortfall is + 576 stalls. However, in allocating the available number of stalls per block, most of the blocks do have a sufficient number of stalls (Figure Five), and taking into account that the shortfall of block four (eighty stalls), and block seven (sixty stalls) is offset by the surplus of stalls in that area (163), a second conclusion is that the majority of the shortfall is on the Peter Pond parking area (664). However, the shopping centre parking lot is redesigned, it will have + 860 stalls which is still 536 stalls short. (See Appendix Tables for parking stalls required and usage.)

GCG PARKING STUDY (See Bibliography - Private study on parking)

The transportation systems study of February 1983 included a section on downtown parking with the research done in June 1981. Some of its conclusions are as follows:

1. The angle parking on Franklin Avenue is proposed to be converted to parallel parking in order to resolve saftey and capacity deficiencies. This conversion should be linked with the provision of alternate parking supplies to minimize impacts.
2. The available parking space will be reduced by 150 onstreet stalls due to traffic development and by 300 offstreet stalls due to redevelopment of lands in the foreseeable future. The report recommends that the city should acquire land to replace at least the 150 stalls.
3. Although one hour restrictions exist at some critical locations, even greater utilization is required. In order to effect this objective the installation of parking meters is recommended.
4. The study analysis in general the parking situation of the study area (1981) and makes a number of general recommendations. More specifically the study indicates a shortage of parking facilities, a high occupancy of onstreet parking at peak period times and also concludes that space is rather limited to provide additional parking in the near future.

APPENDIX FOUR

LOOP ROAD PROPOSAL

The most likely solution is complicated and can be broken down into four components. First is a loop road through the Lower Townsite beginning and ending at opposite ends of the valley connecting with both ends of Highway 63. This can be built in 2 stages with a partial loop road to be completed when required. This loop road would take pressure off Highway 63 and the city's second most important artery, Franklin Avenue.

The second component, when the loop road is completed, would be a by-pass from the interchange just described to the loop road. This south-end by-pay would join with Franklin Ave., as would the loop road in the south end of the valley. It is at this point that the best location for a bridge across the Clearwater River to the potential new development area.[17] Whenever this new area is developed, however, this is the best location for a bridge and from this bridge secondary access out of the valley to the south could be built. This route can be built in advance of the new development area (Forest Heights), in stages as outlined above. Waterways could be connected to this route along the railway line bed and give Waterways secondary access to the valley, as it now only has one way in and out.

However, the loop road would use up land in the flood plain that has strong recreational values. The loop road proposal will not be utilized in this thesis.

APPENDIX TABLE A-TWO

MIGRATION

Fort McMurray's residents have come from:

Origin	Number of People	% of Total Population
Alberta	12,740	41.06%
B.C.	1,809	5.83%
Saskatchewan	999	3.22%
Manitoba	1,221	3.94%
Ontario	5,305	17.10%
Quebec	1,126	3.63%
N.B.	677	2.18%
P.E.I.	87	0.28%
N.S.	1,101	3.55%
Newfoundland	4,283	13.80%
N.W.T.	266	0.86%
Yukon	46	0.15%
U.S.A.	146	0.47%
Great Britain	520	1.65%
Elsewhere	703	2.26%
	31,029	100.00%

TABLE A-THREE

POPULATION FORECASTS FOR SCENARIOS

YEAR	1	2	3	4	5
1975	14,600	14,600	14,700	14,700	14,600
1980	19,900	24,600	31,900	33,900	43,000
1983	23,500	29,000	38,900	44,800	61,900
1984	24,600	30,500	41,500	48,400	71,600
1988	29,100	36,400	52,100	64,000	108,100
1991	32,100	40,100	59,500	76,200	129,400

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TO OILSANDS PLANTS

TO POTENTIAL OILSANDS PLANTS

F.U.R.

N.D.

F.U.R.

N.D.

N.D.

N.D.

N.D.

N.D.

N.D.

TO EDMONTON

TO AIRPORT

N

LEGEND

Stage 1

PLATE 1

SCALE 0 1 2 Kilometers

SINGLE FAMILY HOMES	NON-DEVELOPABLE
MOBILE HOME PARK	OPEN SPACE
MEDIUM DENSITY RESIDENTIAL	N.D. N.D. NON-DEVELOPABLE
HIGH DENSITY RESIDENTIAL	F.U.R. F.U.R. FUTURE URBAN RESERVE
COMMERCIAL	RAILWAY
LIGHT INDUSTRIAL	(K) KEYANO COLLEGE
HEAVY INDUSTRIAL	(H) HOSPITAL
PUBLIC OPEN SPACE	RIVER/CREEK
	DIVIDED HIGHWAY

TO OILSANDS PLANTS

F.U.R.

N.D.

TO POTENTIAL OILSANDS PLANTS

F.U.R.

N.D.

N.D.

N.D.

N.D.

N.D.

TO EDMONTON

TO AIRPORT

N

LEGEND

Stage 2

PLATE 2

SCALE 0 1 2 Kilometers

SINGLE FAMILY HOMES	NON-DEVELOPABLE OPEN SPACE
MOBILE HOME PARK	N.D. N.D. NON-DEVELOPABLE
MEDIUM DENSITY RESIDENTIAL	F.U.R. F.U.R. FUTURE URBAN RESERVE
HIGH DENSITY RESIDENTIAL	RAILWAY
COMMERCIAL	(K) KEYANO COLLEGE
LIGHT INDUSTRIAL	(H) HOSPITAL
HEAVY INDUSTRIAL	RIVER/CREEK
PUBLIC OPEN SPACE	DIVIDED HIGHWAY

a b c d e f g h i j k l m n

18 17 16 15 14 13 12 11 10

TIMBERLEA

THICKWOOD HEIGHTS

ABASAND HEIGHTS

LOWER TOWNSITE

MacDonald Island

SNYE

ATHABASCA RIVER

HORSE RIVER

CLEARWATER RIVER

LEGEND

SCHOOLS
- Public Elementary
- Public Junior High
- Public Senior High
- Separate Elementary
- Separate Junior High
- Separate Senior High

STREETS
- Highway
- Arterial
- Collector
- Secondary
- Private or Laneway
- Proposed

- Keyano College
- Recreational Complex
- Swimming Pool
- Fire Hall
- Post Office
- Hospital
- Tourist Information
- Cemetery
- Church
- Park
- Railway

N

100 0 100 200 300 m

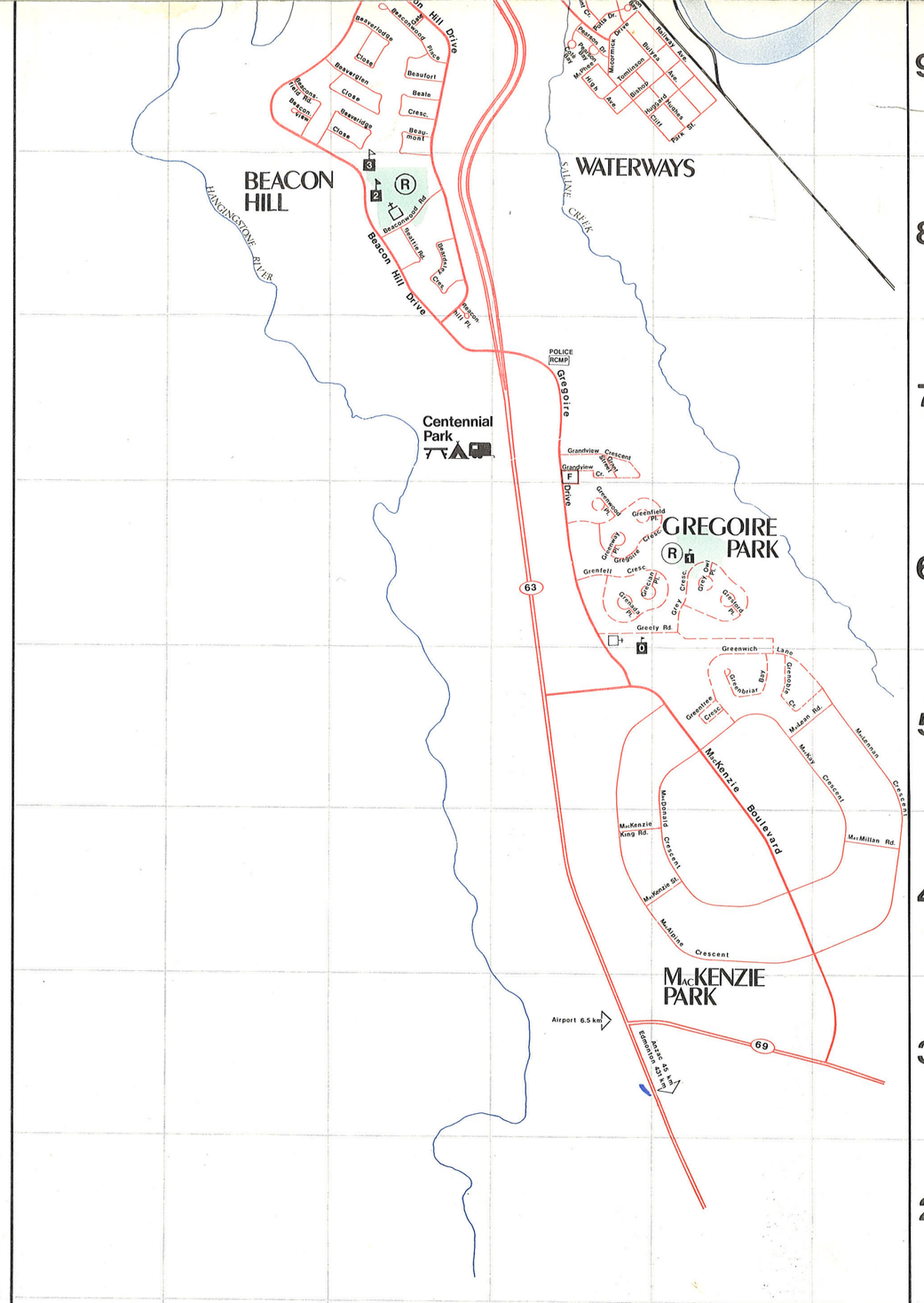
THE CITY OF FORT McMURRAY
1982 STREET MAP

STREET NAMES

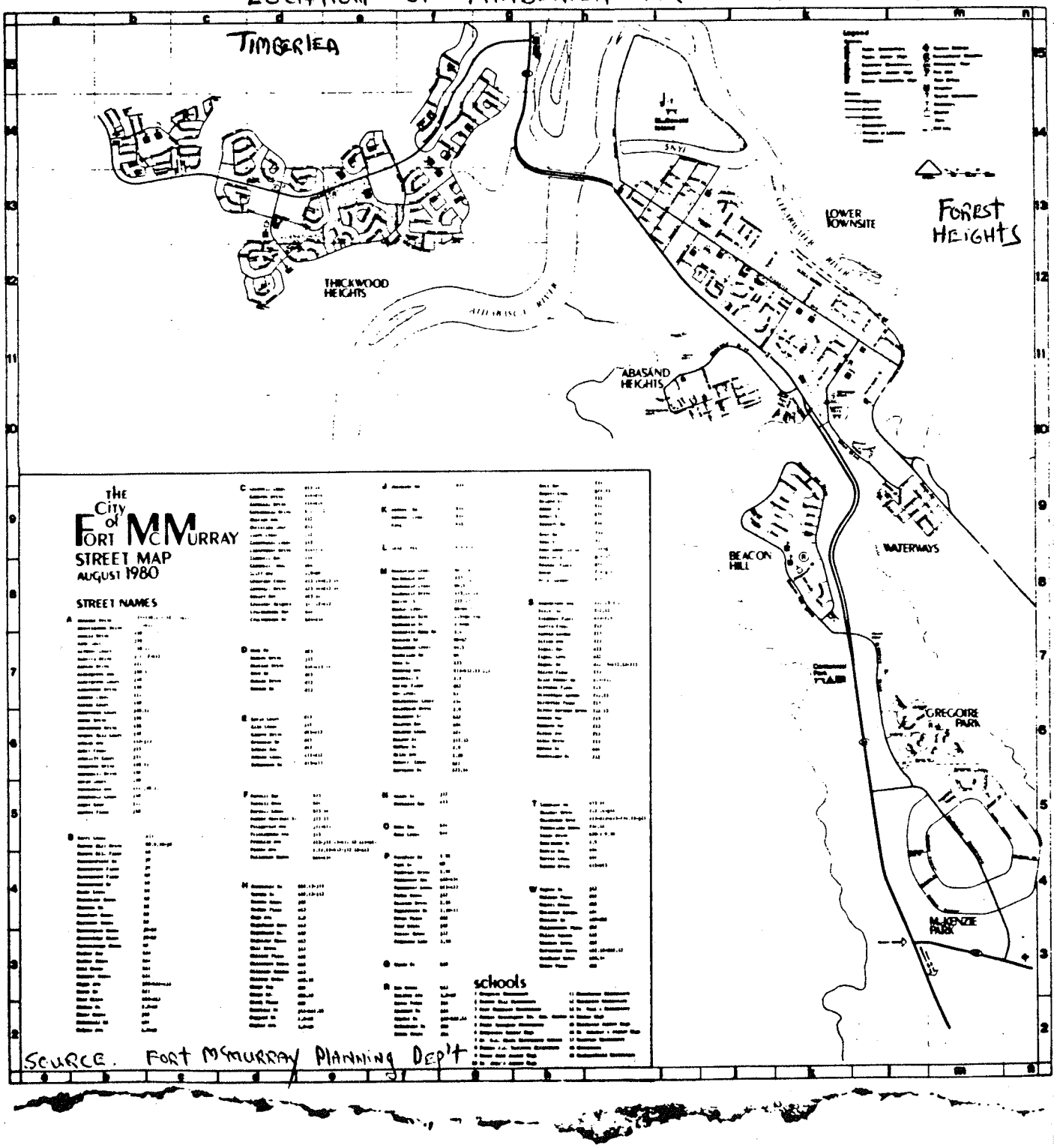
A	Abasand Drive	j11 - i10, 11 - j10, 11 - k11
	Abbottswood Drive	j11 - k11
	Acacia Drive	i10
	Adrian Crescent	j11
	Aime Court	j10
	Airmont Court	j10, 11
	Alberta Drive	j11, 12 - k12
	Albion Drive	i11
	Aldergrove Avenue	j10, 11
	Aldergrove Court	j10
	Alderwood Drive	i10
	Almond Crescent	i11
	Alpine Court	i10
	Amberwood Court	j10, 11
	Amren Drive	j10
	Applewood Drive	i10
	Archer Hill Court	j10
	Armick Avenue	i13 - j13
	Armit Crescent	j13
	Arncliff Court	j11
	Arsenault Cove	j11
	Arsenault Crescent	j11
	Ashgrove Drive	i10, 11
	Aspenhill Drive	j10
	Astum Court	j10
	Athabasca Avenue	i11 - j10, 11
	Athabasca Crescent	j10
	Auger Court	j11
	Aurora Place	j10
B	Bacon Place	b15 - b16
	Ball Place	b16
	Barber Drive	b15 - c15, b16 - c16
	Barry Crescent	k11
	Beacon Hill Drive	k8, 9, 10 - j9
	Beacon Hill Place	k8
	Beaconsfield Road	j9
	Beaconview Place	j9
	Beaconwood Gate	k9
	Beaconwood Place	k9
	Beaconwood Road	k8
	Beale Crescent	k9
	Beardsley Crescent	k8
	Beaton Place	c16
	Beattie Road	k8
	Beaufort Crescent	k9
	Beaumont Crescent	k9
	Beaverglen Close	j9 - k9
	Beaveridge Close	j9 - k9
	Beaverlodge Close	k9
	Becker Bay	b14
	Becker Crescent	b14
	Bell Crescent	k11
	Bennett Crescent	k11
	Berard Crescent	b15
	Berens Place	c16
	Bergeron Road	c16
	Biggs Avenue	j12 - k12 - i13
	Birch Road	k11
	Bird Crescent	c13 - d13
	Bishop Street	1, 9 - m9
	Blair Crescent	j12
	Blanchet Road	c16
	Boisvert Place	b15
	Bourque Bay	b15
	Brachett Crescent	c16
	Brebeuf Crescent	b16 - c16
	Brett Drive	b15 - c15, b16 - c16
	Breukel Crescent	b16 - c16
	Brintnell Road	c14
	Brooks Place	c15
	Brosseau Crescent	c15
	Bulyea Avenue	1, 9 - m9
	Burry Road	b15
	Burton Place	b15
	Bussieres Drive	b15
	Burns Place	c15 - d15
C	Caldwell Crescent	d13, 14
	Cameron Drive	c14 - d14
	Caouette Crescent	b15 - b16
	Card Court	b16
	Card Crescent	b16
	Cardinal Drive	c14 - d14
	Carteret Drive	b16
	Centennial Drive	k11 - 1, 12
	Charles Avenue	i12
	Christina Court	d13
	Clark Crescent	j12
	Clausen Crescent	b16
	Clearwater Crescent	j13
	Clearwater Drive	i14 - j14
	Clenell Bay	c14
	Clenell Crescent	c14
	Cliff Avenue	1, 9 - m9
	Cochrane Crescent	c13, 14 - d13, 14
	Cockerill Crescent	b15
	Confederation Way	a15, b15 - 16, c16
	Cornwall Drive	c13, 14 - d13, 14
	Cote Bay	l9
	Cowley Bay	d13, 14
	Crescent Heights	j11, 12 - k12
	Cruickshank Bay	b14
	Cruickshank Road	b14 - c14
D	Deep Road	d13
	Demers Drive	j13
	Dickins Drive	b14 - c13, 14
	Dowd Road	d13
	Duncan Drive	d14, e13
	Dundas Road	d13
E	Earls Court	d13
	Eglert Drive	b15
	Ells Crescent	j12
	Elmore Drive	d13 - e13
	Erindale Road	d13
	Ermine Bay	d12
	Ermine Crescent	c12 - d12
	Eymundson Road	d13 - e13
F	Farrell Bay	b13
	Farrell Cove	b14
	Farrell Crescent	b13, 14
	Father Mercredi Street	j13, 13
	Fitzgerald Avenue	j11 - k11
	Fitzsimmons Avenue	j13
	Franklin Avenue	i13 - j12, 13 - k11, 12 - i11 - m11
	Fraser Avenue	1, 11, 12 - k12 - j12, 13 - i13
	Fullerton Drive	b14 - c14
G	Gardiner Place	k10
	Garnet Crescent	e14 - f14
	Garson Place	k10
	Gilbert Place	k10
	Gipsy Place	k10
	Gladstone Bay	f14
	Gladstone Street	f14
	Gladue Bay	f14
	Golosky Avenue	i11
	Goodwin Place	k10
	Gordon Avenue	i13 - j13
	Graham Place	k10
	Grandview Crescent	17
	Grant Street	17
	Grayling Crescent	k10
	Grecian Place	l6
	Greely Road	m5, 6 - l6
	Greenbriar Bay	m5
	Greenfield Place	l6
	Greentree Crescent	m5
	Greenway Place	l6
	Greenwich Lane	m5
	Greenwood Place	l6
	Gregoire Crescent	l6
	Gregoire Drive	l5, 6, 7
	Grenada Place	l6
	Grenfell Crescent	l6 - m6
	Grenoble Crescent	m5
	Gresford Place	m6
	Grey Crescent	m6
	Grey Owl Place	m6
H	Haineault Street	j12, 13 - j13
	Hardin Street	i12, 13 - j13
	Harris Crescent	j12
	Hidden Place	e13
	High Avenue	1, 9
	Highfield Cove	e13
	Highfield Street	e13
	Highland Close	e13
	Hill Drive	j13
	Hillary Place	e13
	Hillcrest Drive	e13
	Hillside Garden	e13
	Hilltop Crescent	e12, 13
	Hinge Bay	d12
	Hinge Road	d12, 13
	Hitch Place	d12
	Hospital Street	j11 - k11, 12
	Huggard Street	1, 9 - m9
	Hughes Avenue	1, 9 - m9
J	Jackpine Way	e14
K	Kennedy Bay	b14
	Kennedy Crescent	b14
	King Street	k10, 11, l-11
L	Leigh Crescent	b14 - c14
M	MacAlpine Crescent	m4 - 1, 4, 5
	MacDonald Avenue	i13
	MacDonald Crescent	m4, 5
	MacDonald Drive	i13, 14, 15
	MacIver Street	j12, 13
	MacKay Crescent	m5 - n4, 5
	MacKenzie Boulevard	1, 5 - m4, 5 - n3
	MacKenzie Street	1, 4 - m4
	MacKenzie King Road	1, 4
	MacLean Road	m5 - n5
	MacLennan Crescent	n4, 5
	MacMillan Road	n4
	Main Street	i13
	Manning Avenue	i13 - k12, 13 - 1, 11
	Marshall Street	1, 11, k10
	Marten Place	d12
	May Crescent	k11
	McConachie Crescent	c14
	McCormick Drive	1, 9
	McKinnon Street	k12
	McLaren Bay	c14
	McLaren Crescent	c14
	McLeod Street	j12, 13
	McPhee Street	1, 9
	Mills Avenue	1, 10
	Moberly Crescent	k11
	Morrison Street	i13, 14
N	Nixon Street	j12
	Norbasca Bay	c13
O	Oaks Bay	b14
	Oaks Crescent	b14
P	Paradise Road	1, 10
	Parent Crescent	l9 - 10
	Park Street	m9
	Parkview Drive	1, 10
	Parmenter Bay	c13 - c14
	Parmenter Crescent	b13 - c13
	Pearson Bay	l10
	Pearson Drive	l9
	Peden Crescent	j12
	Pelican Drive	1, 10
	Penhorwood Street	1, 10 - 11
	Piven Place	d12
	Plamondon Bay	l9
	Pond Crescent	j12
	Poplar Crescent	j12
	Potts Drive	l9
	Powder Bay	l10
	Primrose Lane	1, 10
Q	Queen Street	k12
R	Rae Crescent	k11
	Railway Avenue	1, 9 - m9
	Raven Place	f14
	Richard Street	i13
	Riedel Street	j12 - k12, 13
	Robichaud Street	f15
	Robin Crescent	f14
	Rock Bay	f14
	Rogers Crescent	g14, 15
	Roland Street	f15
	Romany Street	f14
	Romer Street	g14
	Rookery Bay	f14
	Rose Bay	f14, g14
	Ross Street	f14
	Ross Haven Drive	f14 - g15
	Rosslyn Street	g14, 15
	Roundel Place	g14
	Rowan Street	f14 - g14
	Royal Garden	f15
S	Saunderson Avenue	i12, 13 - j12
	Sibley Road	f12, 13
	Sicamore Place	e13 - f13
	Sierra Crescent	f13
	Siesta Garden	f13
	Sifton Avenue	f13
	Signal Bay	e13
	Signal Cove	e12
	Signal Road	d12, 13 - e12, 13 - f13
	Silica Place	f13
	Silin Forest Road	e13-f13, g13-14
	Silvanus Place	f13
	Silverdale Garden	f12, 13
	Silvertip Place	f13
	Silver Springs Drive	f12, 13
	Simcoe Way	f13
	Simpson Way	f13
	Sirius Avenue	f13
	Sitka Drive	f13
	Spruce Street	e14
	Stroud Bay	d13
	Sutherland Street	i13
T	Tamarack Way	e13, 14
	Thicket Drive	f13, 14 - g14
	Thickwood Boulevard	a15 - 14, b14 - 13, c13, d13, e13, f14 - 15, g15
	Timberline Drive	f14, 15
	Tolen Drive	k10 - 1, 9, 10
	Tomlinson Street	1, 9
	Torrie Bay	c14
	Torrie Crescent	c14
	Tundra Drive	c13 - d13
W	Wagner Street	j13
	Wallace Place	d12
	Wapiti Crescent	d12
	Whiteoak Garden	e14
	Whitley Road	c12 - d12
	Williscroft Place	d12
	Willow Square	k12
	Windsor Drive	d12
	Wolverine Drive	c12, 13 - d12, 13
	Woodland Drive	e13, 14
	Wylie Place	d12

SCHOOLS

0. Greely Road Elementary
1. Gregoire Elementary
2. Beacon Hill Elementary
3. Good Shepherd Elementary
4. Father Beauregard Edu-Com Centre
5. Frank Spragins Elementary
6. Composite Senior High
7. Dr. K.A. Clark Elementary
8. Father J.A. Turcotte Elementary
9. Peter Pond Junior High
10. St. John's Junior High
11. Clearwater Elementary
12. Thickwood Elementary
13. St. Paul's Elementary
14. Father Mercredi Senior High
15. Birchwood Junior High
16. St. Gabriel's Junior High
17. Westview Elementary
18. Separate Elementary
19. Dickinsfield Elementary
20. Elementary
21. Separate Elementary

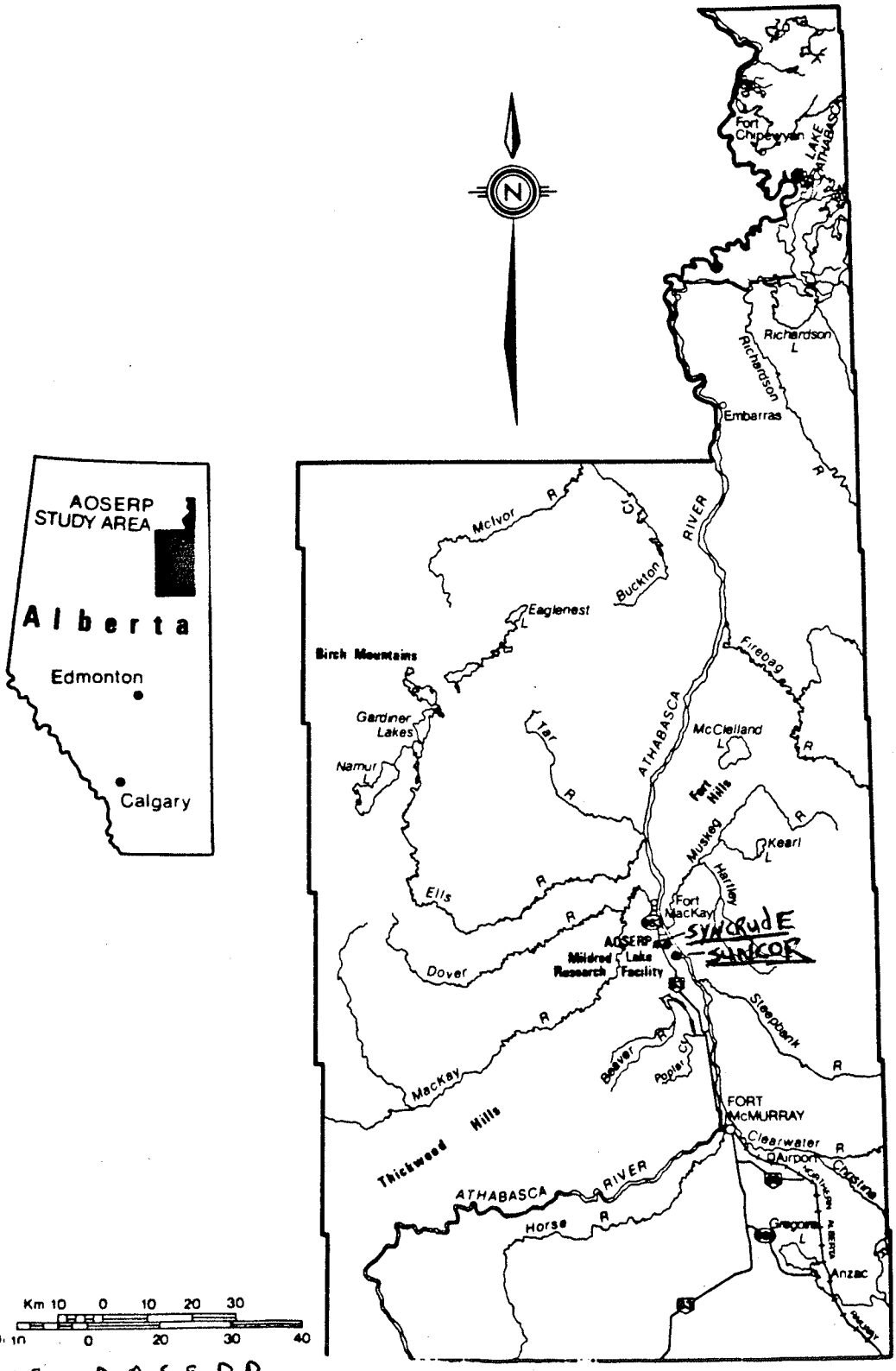


APPENDIX MAP 2
LOCATION OF TIMBERLEA AND FOREST HEIGHTS



SOURCE. FORT McMURRAY PLANNING DEP'T

APPENDIX MAP 3
OIL SANDS REGION



SOURCE A.O.S.E.R.P

THE NEW TOWN OF FORT McMURRAY

REVISED GENERAL PLAN

Appendix Map 4

YSICAL CONSTRAINTS

EGEND

- PRESENT DEVELOPMENT AREAS
- AREA CONSIDERED FOR DEVELOPMENT POTENTIAL
- TIMBER LEASES
- FLOODWAY OF REGIONAL RIVERS
- SLOPE REGION – STEEP, UNSTABLE
- MAIN ROAD – HIGHWAY
- FORESTRY ROAD
- NDARY ROAD – OIL CO. EXPLORATION ROAD
- LOGGING ROAD
- IL & GAS PIPELINE
- Y – N.A.R.
- BOUNDARY

SOURCE

COHOS EVAMY & PARTNERS

JUNE 1974

Fig. 5-4

THE NEW TOWN OF FORT McMURRAY

REVISED GENERAL PLAN

APPENDIX MAP 5

SURFICIAL DEPOSITS OF FORT McMURRAY REGION

LEGEND

- NOT CONSIDERED IN DETAILED INTERPRETATION
- VENEER OF GLACIAL GROUND MORRAINE OVER BEDROCK SHALE
- ORGANIC FEN AND SWAMP DEPOSITS
- GLACIAL GROUND MORRAINE
- GLACIAL FLUTED MORRAINE
- LACUSTRINE PLAIN
- VENEER OF GLACIAL-FLUVIAL TERRACE OVER LACUSTRINE PLAIN
- GLACIAL-FLUVIAL TERRACE
- VENEER OF LACUSTRINE PLAIN OVER GLACIAL GROUND MORRAINE

SOURCE
COLLOS, EVAMY & PARTNERS

JUNE 1974

Fig.5-7

THE NEW TOWN OF FORT McMURRAY

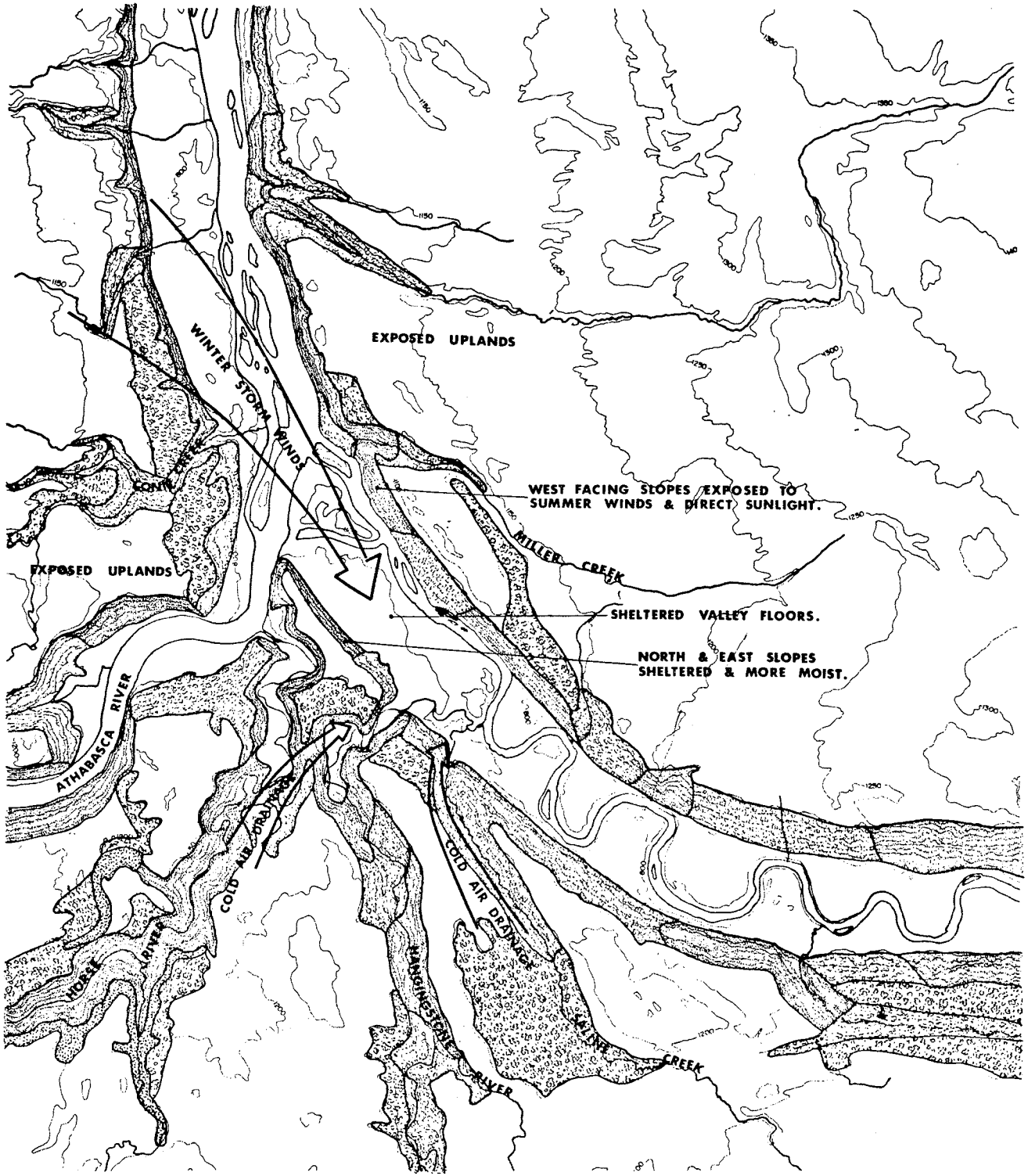
REVISED GENERAL PLAN

APPENDIX MAP 6

LANDFORM & MICROCLIMATE

LEGEND

- 0 - 2% SLOPE
- 2 - 5% SLOPE
- 5 - 10% SLOPE
- 10 - 20% SLOPE
- > 20% SLOPE



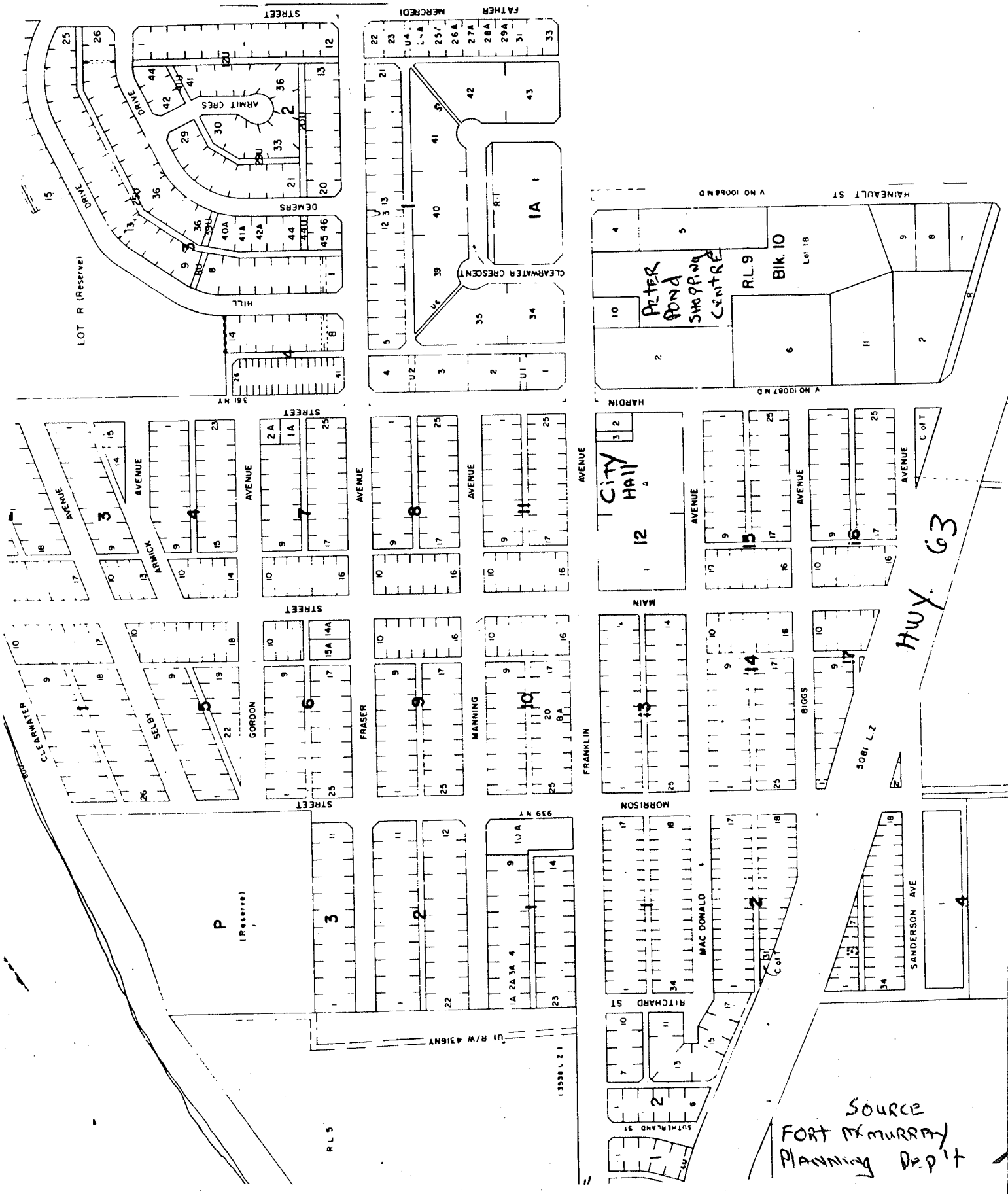
SOURCE.
COLLOS, EVAMY & PARTNERS

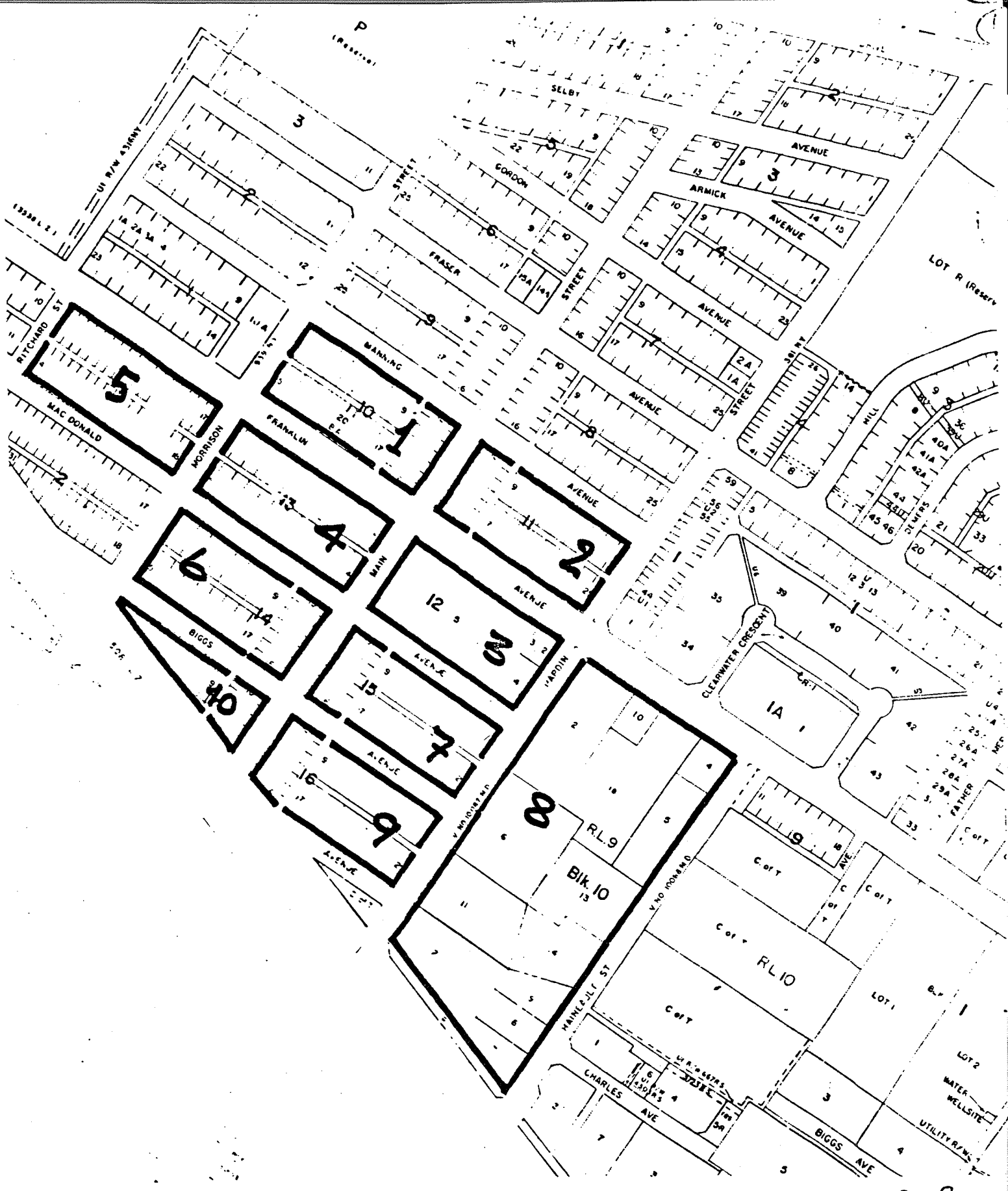
JUNE 1974

Fig.5-6


TOWN BOUNDARY
6
5
3
2
VILLAGE CENTRE
HIGHWAY 63
LIMIT OF RESIDENTIAL
SEWAGE TREATMENT FACILITIES
4
1
7
DICKINSFIELD
THICKWOOD
THICKWOOD HEIGHTS
RIVER
ATHABASCA
timberlea development area
neighbourhoods
SOURCE
fort mcmurray planning team
APPENDIX MAP 7

APPENDIX MAP 8
C.B.D.





APPENDIX MAP 9

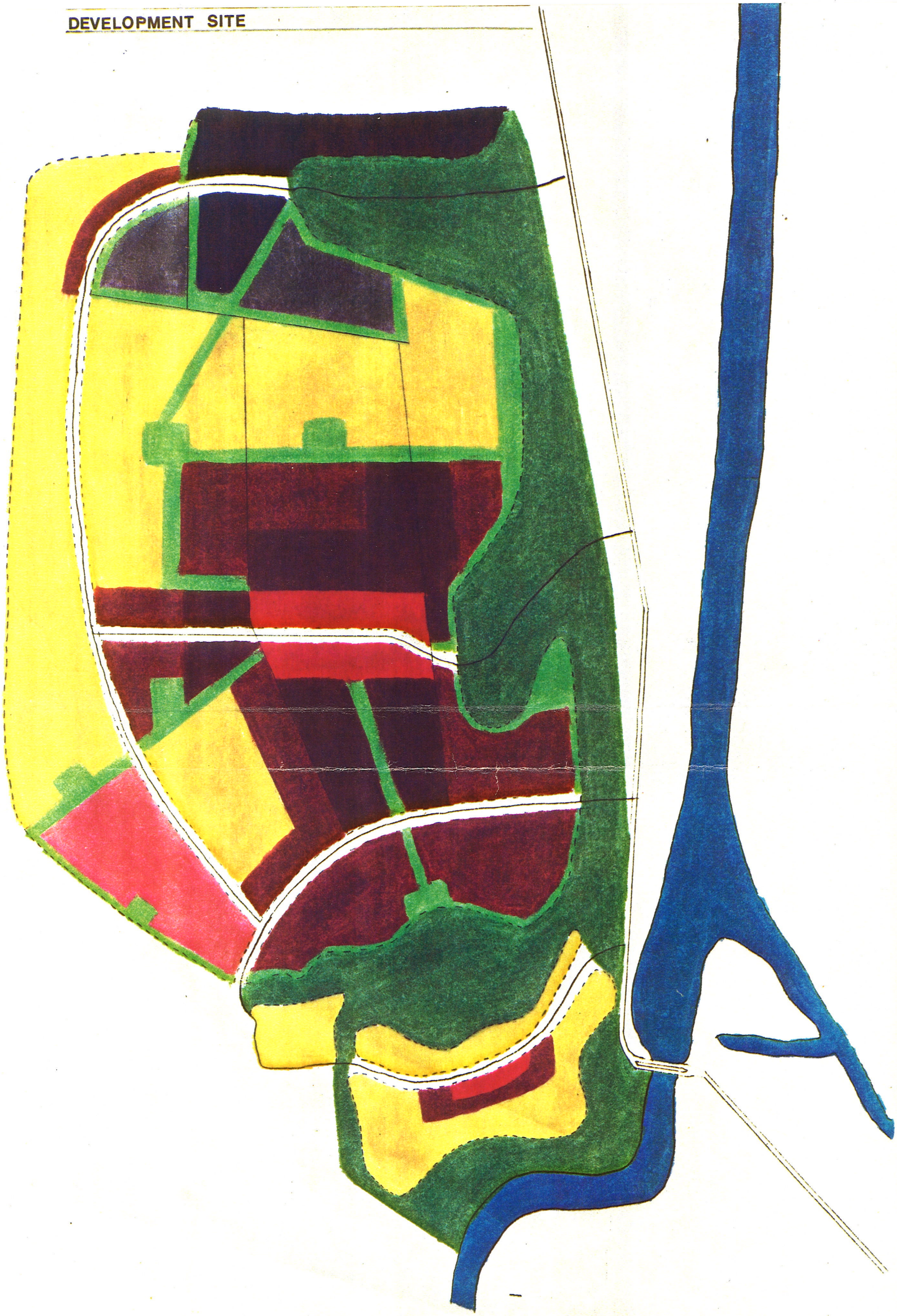
SOURCE FORT MCMURRAY PLANNING DEPT

PARKING STUDY

STUDY AREA / BLOCK

DRAWN		REVI
SCALE	1:5000	

DEVELOPMENT SITE



TO OILSANDS PLANTS

F.U.R.

TO POTENTIAL OILSANDS PLANTS

N.D.

F.U.R.

N.D.

N

N.D.

N.D.

N.D.

N.D.

TO EDMONTON

N.D.

TO AIRPORT

LEGEND

Stage 3

PLATE 3

SCALE 0 1 2 Kilometers

SINGLE FAMILY HOMES	NON-DEVELOPABLE OPEN SPACE
MOBILE HOME PARK	N.D. N.D. NON-DEVELOPABLE
MEDIUM DENSITY RESIDENTIAL	F.U.R. F.U.R. FUTURE URBAN RESERVE
HIGH DENSITY RESIDENTIAL	RAILWAY
COMMERCIAL	(K) KEYANO COLLEGE
LIGHT INDUSTRIAL	(H) HOSPITAL
HEAVY INDUSTRIAL	RIVER/CREEK
PUBLIC OPEN SPACE	DIVIDED HIGHWAY