

DEVELOPMENT OF A BASE MODEL
FOR THE
CANADIAN FORCES

BY

HARRY GORDON BOWN

A thesis submitted to the Faculty of Graduates
Studies in partial fulfilment of the requirements
for the degree of Master of City Planning

University of Manitoba

Winnipeg, Manitoba

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ABSTRACT

Harry Gordon Bown: Development of a Base Model for the Canadian Forces, MCP Thesis, University of Manitoba, Winnipeg, Manitoba, April 26, 1978.

At present there are 32 bases, 35 stations and 9 miscellaneous units with a unique layout of buildings on each one. This causes a number of problems within the individual bases, but more so for, mainly, the overall physical planning of bases. The planning principles for a base are compared with those of a civilian town, and the common components of a base, i.e. those that are present in some form, regardless of size or whether the base is of the Sea, Land or Air element, are identified. Finally, a model, termed the Formal Horizontal model, which groups the common components around a formal space, is proposed to serve as a core for future base developments.

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GLOSSARY OF TERMS

- Base - a unit designated as such, the function of which is to provide such accommodation and support services for assigned units.
- Integral Unit - a unit which is functionally controlled by the same command as exercises command over the Base Commander.
- Integration - something that stops short of unification (see Unification). At the very least it means devising structures that enhance co-ordination between the three services, the Department itself and the Defence Research Board. At the other extreme, it may mean unification of sections of the armed forces, usually the supporting services and parts of the planning staffs.

- Lodger Unit - an autonomous unit of one command or National Defence Headquarters which normally is lodged on a host unit of a different command.
- Mess - the organization whose membership is related to identifiable rank structure or associated standards; or the building or facility in which the activities take place.
- Semi-Urban and Isolated - determined by assessing three factors to determine the degree
a. climatic conditions
b. distance to urban locations
c. population
A number of points are awarded for the degree of remoteness and the services supplied accordingly.
- Station - a unit designated as such. The station provides essentially the same services as a base but on a smaller scale.
- Unification - the merging of the armed forces and their supporting structures into a single organization with a unitary hierarchy.

Urban

- bases which are located either within five miles of the boundaries of or in a suburb of an urban community with a population in excess of 25,000.

PREFACE

Military planning, or at the very least, military considerations in planning have been a dominant consideration in the physical planning of human habitations throughout the history of man. As he emerged from the cave and began to gather in small communities, man acquired possessions in the form of household goods, crops, and cattle that needed protection from the elements and/or greedy neighbours. This protection took physical form early on in the defensive elements of his habitations viz walls, ditches and inaccessible locations.

Part of the evolution involved the formation of special units or armies whose primary purpose was to be prepared to administer force in whatever degree required to achieve the aims of the society. Certain characteristics or behaviour patterns of soldiers were felt to ensure, to the highest degree possible, the success of any operation. Two of the primary requisites of a military force were discipline and a sense of order which became, particularly in ancient Roman times, embodied in the physical layout of their camps and towns.

"later colonial foundations will permit Roman Planners to develop not only regular but symmetrical plans that become concrete embodiments of military order and discipline.

Then the rigid symmetry of the Roman "castrum" plan can find ample justification in its military nature...They always retained their military character and expressed to perfection the disciplined order and uniformity so essential

to military establishments*.

Of course, as technological developments made city walls ineffective, the city started to take a new direction on development and the walls were replaced by other priorities such as parks and boulevards. The planning for cities has continued to flourish on a continuum that reflects the changing social and physical values of the society.

It appears, though, that planning for a military base, once so firmly established as part of a peoples survival, has languished. Very little effort appears to have been made to incorporate the once firmly established physical planning principles in the modern era to ease the planning load when establishing new installations and to provide a sense of order and continuity from place to place.

It is not intended that this thesis provide a detailed plan of development but rather, it proposes a model which would act as a central development strategy for the future. More importantly it is hoped that it would generate discussion of military base planning to recognize the unique nature of the military base when considering the spectrum of human settlements.

* De La Croix, Horst "Military Considerations in City Planning: Fortifications", George Braziller, New York, 1972, pp 21-31

CHAPTER I

INTRODUCTION

1.1 Aim

The aim of this thesis is to propose a model for development of the common elements of a Canadian Forces Base (CFB) which will serve as a guide for the construction of new bases; and, for the development/redevelopment of those already in existence.

1.2 Scope

The scope of this thesis includes:

1. An examination of the problems affecting the bases.
2. An examination of the model civilian town and the planning principles on which it is based.
3. An examination of the principles of the military base planning.
4. A comparison of the plan's formation and implementation for the town and the base.
5. The establishment of the common elements of the base.
6. The proposition and the evaluation of models for development.

The thesis does not include:

1. A detailed development for a base. It will show the chosen model as a central core for development.

2. Provision for protection against an attack either nuclear or non-nuclear. The only consideration given to security is the normal industrial type security of safeguard the premises and its contents.
3. Provision for expansion due to mobilization. The need for flexibility and expansion room will be considered as part of a provision for growth.
4. A solution to the problems of base development which will incorporate the special requirements of each of the elements, i.e. Sea, Land and Air of the Canadian Forces (CF). However, because there are perceived to be certain elements which are common to all bases, the model developed will propose a guide for the establishment of the common components at any location.

1.3 General

At present, there are 32 bases, 35 stations¹ and 9 miscellaneous sites which make up the inventory of the physical installations of the Canadian Forces. Most of the bases are of World War II (WW II) vintage, but some of them date back to the founding of the country.²

The current system of development planning for these bases encompasses a planning period of ten years. The

¹See Glossary for the definition of base and station.

²See Figure 1/Table 1, pp. 3 & 4 for construction dates of the bases and stations.

LEGEND

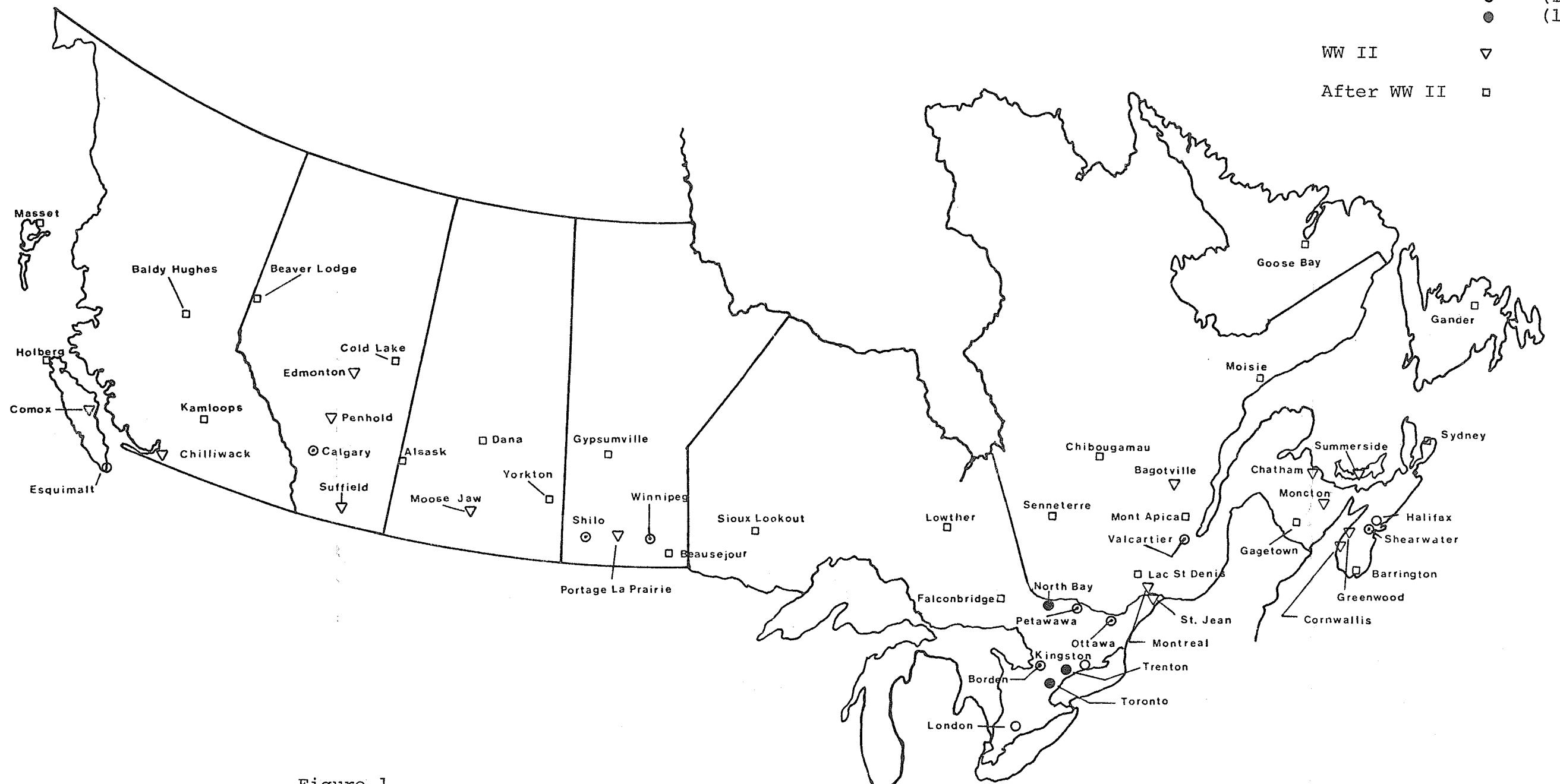
Before WW II

- (before 1900)
- ◎ (1900-1919)
- (1920-1939)

WW II



After WW II

Figure 1

Bases and Stations by year of construction. This figure gives the initial date of construction. Portions may have been added later but these dates are not noted. See Table 1, page 4 for dates of construction.

TABLE 1

Bases and Stations by Year of Construction
 (See Figure 1 page 3 for locations of Bases and Stations)

	<u>Before 1900</u> ○	<u>1900-1919</u> ◎
<u>Before</u>	Esquimalt	Borden
	Halifax	Calgary
	Kingston	Ottawa
	London	Petawawa
	*Quebec	Shearwater Shilo Valcartier Winnipeg
<u>WW II</u>		
		<u>1920-1939</u> ●
		North Bay Toronto Trenton
		<u>1940-1949</u> ▽
<u>WW II</u>	Bagotville	Moncton
	Chatham	Montreal
	Chilliwack	Moose Jaw
	Comox	Penhold
	Cornwallis	Portage la Prairie
	Edmonton	St. Jean
	Greenwood	Summerside
		<u>Post 1950</u> □
<u>After</u>	Cold Lake	Gypsumville
	Gagetown	Holberg
	Alsask	Kamloops
	Baldy Hughes	Lac St. Denis
	Barrington	Lowther
	Beausejour	Masset
	Beaverlodge	Moisie
	Chibougamau	Mont Apica
	Dana	Senneterre
	Falconbridge	Sioux Lookout
	Gander	Sydney
	Goose Bay	Yorkton
<u>WW II</u>		

*Note LaCitadelle is under the control of CFB Valcartier for support purposes. All future references to CFB Valcartier will be understood to include LaCitadelle.

plans, largely completed by civilian consultants, are controlled by the Director of Construction Engineering Requirements (DCER) at National Defence Headquarters (NDHQ), Ottawa, and are intended to provide a framework for the orderly, comprehensive development and/or redevelopment of the physical facilities of the Canadian Forces Base.

This particular system of planning has been in existence since 1972, and is an improvement on the former single service and individual base planning methods. The planning is mainly oriented to physical planning and seeks to govern the orderly, comprehensive development and/or redevelopment of the physical plant of a Canadian Forces Base.

Many facilities are repeated from base to base, but with different configurations and relationships to one another. This situation has developed largely because bases were built in isolation at various times in the history of the country or were built in great haste in the midst of preparations for war, or indeed, during wartime.

Now, in peacetime, and with a history of piecemeal replacement of facilities, it is time to examine how best to build for the future. Clearly, it does not make sense to make plans for the future based on hastily conceived models of almost half a century before. There is a requirement to develop a new approach to planning.

In support of this new approach, it is felt that the common elements of a base could be arranged in an efficient and effective manner to provide a "core" for a base and a nucleus of activity for the other components regardless of the size of the installation or whether it be sea, land or air-oriented.

1.4 Description of the Existing System

As was stated, the bulk of the physical plant of the CF is contained in 32 bases, 35 stations and 9 miscellaneous sites which are spread throughout the country and overseas. Of 32 Bases examined and listed in Table 1, two were constructed after World War II; fourteen were built during World War II; three were built between World War II and I; eight were constructed during World War I; and five are historical in that they predate the First World War. Indeed, La Citadelle was first fortified by De Frontenac in 1693, and is still being used by the Royal 22nd Regiment.

Most of the buildings provided during the construction of these installations, especially those built during World War II, were of wood frame construction and were expected to last about ten years. It was thought that, at the end of the war, many of the facilities would no longer be needed, would be declared surplus, and replaced by a more permanent type of construction.

However, many of these wood frame buildings remain and because of their age, are becoming an increasingly heavy burden on maintenance fund. Also, the buildings

built in the years 1939-1945 were designed to do certain jobs and to meet certain expectations. Thirty years later, because of technological changes and higher expectations of the users, the buildings are functionally unsuited for the job required of them.

A measure of the size of the commitment that the Department of National Defence (DND) has in its physical plant is given by the Plant Replacement Value (PRV) associated with thirty of the major installation across the country. The PRV is the cost, in current dollars, of replacing existing facilities.

For the thirty installation, the PRV in 1975/76 dollars would be approximately \$3.6 billion or an average of \$0.13 billion per installation. Also, the annual operating and maintenance cost of this physical plant is in the order of \$0.15 billion annually or an average cost per installation, for the thirty, of \$5.0 million.

1.5 Existing Problems

On a macro scale, there are several factors which have placed the CF in the situation in which it finds itself today. Among them are;

1. The lack of a clear defence policy statement;
2. Integration and unification³ of the Armed Forces and the subsequent restructuring of the base function and method of operation;

³There is often some confusion of these two terms. See Glossary for definitions.

3. The state of the defence budget over the past ten years; and
4. The retention of certain bases in attempts at alleviating regional disparities.

As it is clearly impossible to do a rigorous study of the influences of history on the present state of the physical infrastructure of CF bases, the points outlined above will only be discussed to give the reader some background as to why planning for infrastructure changes has been difficult in the past and how it has created a critical need for such planning in the future.

For centuries, the Atlantic Ocean has been a moat for the North American Continent. It has afforded the continent a breathing space in troubled times to train and equip a force for defence of its own borders and for participation, if necessary, in other conflicts.

This physical barrier, coupled with a defence by regular French and British troops in the formative years of the country, has fostered a laissez-faire attitude in the Canadian people toward a permanent force.⁴ This attitude, which trusts in the militia system, allows for the gradual decrease in the size of the regular force to one whose duties and capabilities are essentially house-keeping.

After World War II, in a reversal of the normal reduction move, there were many standing armies left throughout

⁴D.J. Goodspeed, The Armed Forces of Canada 1867-1967, Ottawa, 1967, pp 7, 13.

the world. This retention of men in uniform was due largely to the Korean conflict and the Cold War. However, in the late fifties and early sixties, the cost of equipping a modern force skyrocketed. Canada, like other countries, called for a smaller, more efficient Armed Force⁵ and this call resulted in the integration, and later unification, of the Navy, Army and Air Force.

Although there have been a number of attempts to clearly define the roles and responsibilities of the CF, there has been no clear defence policy, which recognized the decreased numbers of the forces, since 1966. In addition, in the late sixties and early seventies, the defence budget was frozen, resulting in a lack of proper equipment to do the jobs required.

These "jobs" are those which arise from the consideration of the areas of activity outlined for the Canadian Forces in the White Paper on Defence for the 1970's

"The policy announced by the Prime Minister on April 3, 1969, initiated the process of adjusting the balance between Canadian defence activities to ensure that priorities for defence were responsive to national interests and international developments. Four major areas of activity for the Canadian Forces were identified in summary form as follows:

- a) the surveillance of our own territory and coast-lines, i.e. the protection of our sovereignty;
- b) the defence of North America in co-operation with U.S. Forces;

⁵Vernon J. Kronenberg, All Together Now, Canadian Institute of International Affairs, Monograph, Toronto, 1973, p. 18.

- c) the fulfilment of such North Atlantic Treaty Organization (NATO) commitments as may be agreed upon; and
- d) the performance of such international peacekeeping roles as⁶ we may from time to time assume.

Recent (1976) announcement by the government to supply a replacement for the Centurion tank (circa WW II) and the Argus (1959) long range patrol aircraft have been the first in these areas since the dates noted, although the equipment has been wanting for some time.

Within the military sphere, in an effort to stretch a tight budget and resources, proposals were made to close down a number of bases which were costly to maintain and inefficient to operate. Many of these bases, however, represented the major industry to the surrounding area, and as such, it was not possible from a political or economic point of view to eliminate that major source of income.

All this has left the CF with an aging infrastructure that is fast reaching a critical replacement point, a generally deaf ear turned to its requests for increases in resources and too many bases for its needs.

Hence, the resources which are allocated to the Department must be husbanded with some care if the CF is to be able to carry out its assigned roles. Facilities provided must be useful during their economic lifetime and make the transition to replacement facilities as

⁶CANADA, White Paper on Defence, "Defence in the 70^s" Information Canada 1971, p. 16.

smooth as possible.

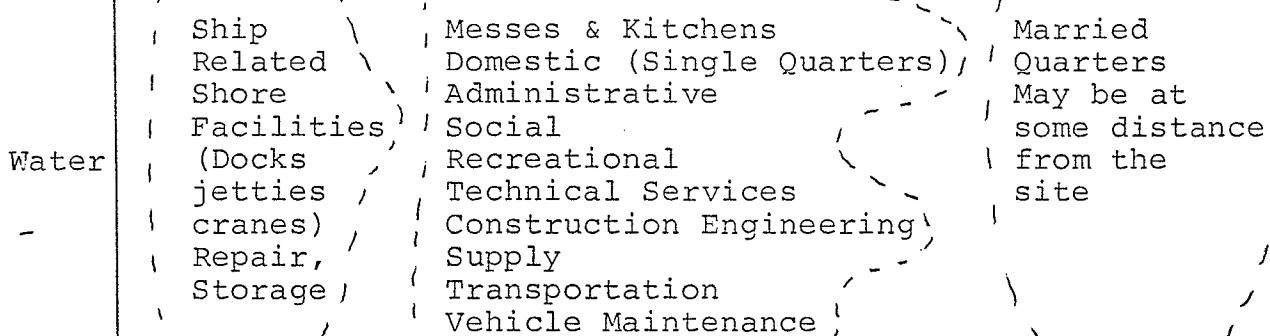
1.6 State of the Art

Prior to integration of the separate services. The layout and planning of the physical facilities was an individual service responsibility. Each of the former three services developed long-range plans based on its perceived needs for facilities. The Army, for example, built its camps with the appropriate buildings in clusters, which conformed to the principle that the units are self-contained entities both in a static and field environment. The Air Force adopted a base concept which meant that there was one central activity, i.e. Supply, Ground Maintenance, Messes, etc., which serviced the whole base. See Figure 2 page 12 for simplified models of the former individual service installations which show the functional inter relationships between elements.

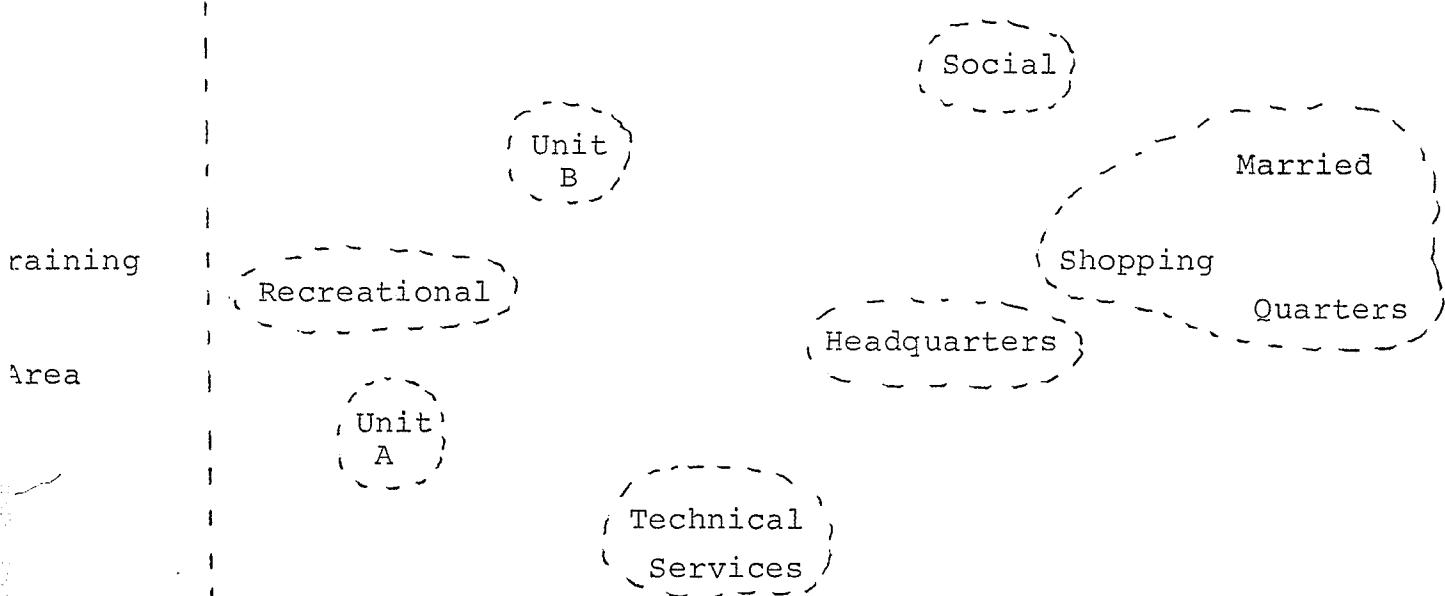
Upon integration in 1967, essentially the base concept of the Air Force was adopted as the form and organization of the physical facilities. It was chosen, primarily, to avoid costly duplication of facilities and to provide a single, unified posture for development in future years.

In 1972, the process for base development planning was re-examined and re-organized to incorporate an input from the three organizational levels of Base, Command and National Defence Headquarters. Prior to this time, the base was the responsible agency for projecting its

NAVY



ARMY



AIR FORCE

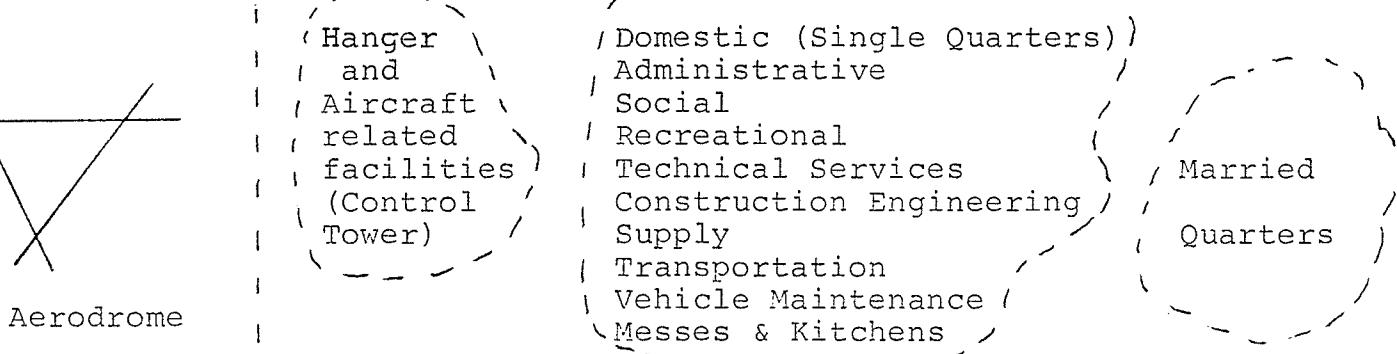


Figure 2
Single Service Installation Models

needs into a ten-year time frame. The functions of the upper echelons were to approve and control the appropriation of funds for implementation of the plan.

This method was filled with difficulties, including:

1. A lack of firm direction for development;
2. A lack of staff both in number and qualification for the preparation of the plan;
3. An element of bias and multiplication that reflected the wishes of the particular base commander and a penchant to ask for facilities in excess of those required.

In 1972, a system was developed whereby the overall control development planning was assumed by NDHQ which established, as far as possible, the roles of the particular base for a ten-year time frame and co-ordinated the resources and inputs for the Command and Base.

Civilian consultants were used to:

1. Prepare development plans to gain an element of objectivity and credibility when submitting the plans to senior levels of government, and
2. Supply the necessary expertise and manpower which could not be committed from DND resources.

Recently, several plan have been developed using only the resources within DND.

1.6.1 Modern Bases

The development of completely new bases is a relatively rare phenomenon. In Canada, the bulk of the bases were

constructed prior to 1950⁷ and development has essentially been redevelopment of existing sites. In only two cases since 1954, has there been a complete redevelopment of bases - at CFB Valcartier and CFB St. Jean, P.Q. At CFB St. Jean, it is intended that the base be razed except for one or two relatively modern buildings and be completely rebuilt in a mega-structure type complex.

Presently, there is a study under way at NDHQ into the feasibility of northern base for the CF.

1.7 Summary

Thirty-two bases, 35 stations and 9 miscellaneous sites make up the bulk of the physical plant of the CF.

Long-range (ten-year) physical development planning for these installations is controlled by NDHQ with participation by Command and Base. The actual development plans have been made by civilian consultants, but recently, plans have been carried out using DND resources.

Several problems beset the bases. They are generally made up of facilities built quickly thirty or more years ago. Originally intended to last ten year, in 1978 these facilities are at, or beyond, the end of their economic life. A laissez-faire attitude of the Canadian people toward defence throughout the history of the country has allowed the situation to deteriorate to the point where it will soon cost an inordinately large amount of money just to keep going.

⁷See Figure 1/Table 1, pp. 3 & 4.

It is proposed that to aid in planning for the future, the common components of a base be arranged into a model which will serve as a core for all bases to:

1. Increase the efficiency and effectiveness of the common elements in their role to support the integral and lodger units;
2. Eliminate the need for individual planning of each base;
3. Provide a single unified goal for at least one phase of development planning for the future.

CHAPTER 2

THE TOWN AND THE BASE

2.1 General

This chapter is one which ties base planning to better-known and more-established civilian town planning principles. It is meant to establish a frame of reference for the development of a model base through a comparison with the model civilian town, and more particularly the civilian resource town. Initially, the base and the resource town are compared with reference to a set of general criteria for a town. Later, a comparison is made of the planning principles which guide the development, and lastly, there is a brief examination of the planning processes for the town and the base.

2.2 Background Information

To begin, a military base might be considered a special case of human settlements, a subset, as it were, of the larger community or society as a whole. This approach is based on the idea that because the population of the base is a subset of the total population (i.e. a group in the society that voluntarily submits to the conditions of military life), then the community may be considered as a special case of the "average" civilian community.

To identify the base in the spectrum of civilian communities, we attempt to establish certain bounds by which its characteristics, in relation to the better-established civilian town, can be demonstrated in order to serve as a theoretical base for the discussion of planning principles and implications.

To set a frame of reference, it is proposed: (1) to examine some of the classic definitions of towns and extract general characteristics for comparison; (2) to examine the base in relation to what is considered to be its close civilian "cousin", the resource town, for as Keeble says:

Planning principles can most easily be identified, examined and evaluated in relation to the development of new towns, since the distorting factors which operate in unplanned existing towns so strongly are greatly weakened in new towns. 8

To guide the discussion of the base in relation to the resource town, it is proposed that the following headings be used, viz:

Historical Background

Geographical Location

Physical Characteristics

Population Sizes

Political Characteristics

Sociological Characteristics

Economic Characteristics

⁸Keeble, Lewis, Principles and Practice of Town and Country Planning, The Estates Gazette Limited, London, 1969, p. 98

2.3 Definition of a Town

It was felt that we might begin by attempting to establish a definition for a town and then to examine the base in relation to this definition.

As with attempts to define planning itself, there appears to be a multitude of definitions for a town which seem to reflect the background of the person writing it. Upon examining the various definitions, however, one finds that each contains a certain ring of truth and appropriateness and it remains to synthesize these various definitions into some sort of pragmatic set of criteria.

The following are some of the definitions which show the range of opinion of what constitutes a town. Although the term "city" is used in some of the definitions, it is intended that the question of size differential be taken for granted and the "other" characteristics be the prime candidates for examination.

The Encyclopedia Britannica⁹ defines the city as:

...a type of community regarded as a relatively permanent concentration of population together with its diverse activities occupying a more or less discrete site and having a cultural importance which differentiates it from other types of human settlement and association. In its elementary function and rudimentary characteristics, however, a city is not clearly distinguishable from a town or even a large village. Mere size of population surface area or density of settlement are not in themselves sufficient criteria of distinction while many of their social

⁹Lampard, Eric, Encyclopedia Britannica, 1963 Ed., Vol. 5, p. 809.

correlates (division of labor, non-agricultural activity, central place function and creativity) characterize in varying degrees, all urban communities from the small town to the giant metropolis.

Hence, this definition would suggest that the characteristics common to all urban communities are those which relate not to strict numbers of people, but those which arise from their interaction, i.e. division of labour, non-agricultural activity, central place or service function, and creativity.

Dickinson¹⁰ says that:

The very essence of urban character is the function of service for a tributary area. The universally distinctive characteristic of the town arises from the mode of life and activities of its inhabitants. The town differs from the village in the occupations of its people who are not concerned directly with farming and who live and work in the settlement sharing its life and organization --- True town character implies some measure of community service and organization; what is sometimes called community balance--- It is this grouping of centralized services in a clustered settlement which is the essence of a town and which at a higher grade is the hall mark of a city. The town of Western Europe and North America may be defined as a compact settlement engaged primarily in non-agricultural occupations.

Keeble¹¹ establishes a definition of a town through the establishment of what he feels are its three component

¹⁰ Robert E. Dickinson, *City, Region and Regionalism*, Kegan Paul, Trench, Trubner and Co. Ltd., 1947, pp. 21, 22 & 25.

¹¹ Lewis Keeble, Op. Cit., p. 98.

parts or characteristics of the town, namely, the Town Centre, Industrial Areas and Residential Areas.

"The Town Centre. This is the area in which the commercial and administrative (and some aspects of social) life of the town take place in their highest and most complicated form and in which the most important central services supplied by the town are made available. The essential constituents of the central area are: shops supplying occasional needs, offices, banks, administrative buildings, the town hall, etc., and important buildings for social and cultural purposes, such as the principle library and museum, the theatre, and the largest churches. A good deal of wholesale and retail storage accommodation is likely to be required.

The Industrial Area. This may be split into a number of parts and is the area in which manufacturing, industry and the largest service industries are located, together with electricity and gas generators, and large scale warehousing of bulky goods.

The Residential Area. This is the area in which people live. Although it is principally made up of dwellings and gardens, it includes many other uses: Local shopping, primary schools, local open spaces and the smaller service industries."

S.D. Lash¹² provides a summation of the various characteristics outlined by these and other authors and states that the town has:

1. A certain minimum size;
2. A corporate feeling in that the people feel they are identified with a particular locality;
3. A "civilized" population in that they are prepared to work together for the common good;

¹²S.D. Lash, An Introduction to Urban and Regional Planning, Queen's University, Kingston, 1973, pp 11-16.

4. A physical separation from other towns;
5. A centre where civic, commercial and cultural uses are concentrated;
6. Inhabitants who may be:
 - a. employed in industries producing goods for export;
 - b. employed in industries meeting local needs;
 - c. employed in commercial activities serving a wide area;
 - d. occupied in providing services both for people within the town and for a region surrounding;
 - e. employed in providing services for tourists and others who do not normally live in the town.

2.3.1 The Resource Town and the Base

2.3.1.1 History

As was mentioned in the introductory chapter¹³, many of the bases in Canada have followed or provided the means of existence and survival of many of the towns and cities across Canada. The building of new resource towns has often created a cause-and effect relationship with the provision of military bases, since the establishment of new settlements on the frontier often required the presence of armed troops to provide for the physical security of

¹³Cf. Table 1, p. 3 , with particular note of the "historic" towns such as Quebec, Montreal, Winnipeg, etc.

the settlers. The building of new resource towns as we know them, however, has been especially notable since World War II when, as Robinson¹⁴ states:

...reflecting the accelerated development of mineral, forest and water power resources which has sparked this country's post war economic "boom". Although the impetus for expansion came after the war, the resource town has been a continuous feature in Canada's development. Initially, there was the push westward and in all surges of expansion throughout the history of the country there has been a flurry of activity on the particular resource frontier normally marked by the establishment of new isolated communities.

Historically most of these resource towns have been established within the past thirty years, but, unfortunately, most bases were built prior to or during World War II. In essence, resource town designers had the opportunity to avail themselves of the experiences of their predecessors and each new one built, potentially, represented the best of what had been developed. There have not been that many completely new bases built since World War II so the base planning might draw from the experiences of the town and adapt the planning principles derived from the town to its particular situation.

2.3.1.2 Geography

In geographical terms, the bases of the CF are like the towns which dot the map of Canada. Both bases and stations are spread throughout the country from the

¹⁴Ira M. Robinson, New Industrial Town on Canada's Resource Frontier, The University of Chicago, Department of Geography, Research Paper #75, Chicago, 1961, p. 3.

Atlantic to the Pacific and from the border with the United States (US) to Canadian Forces Station (CFS) Alert which is 450 miles from the geographic north pole. These installations, as entities controlled by one organization, are situated in as varied a geographical setting as can be found in the country.

The installations also vary in their urban/rural setting but some, notably CFB Halifax, are located in the centres of some of Canada's major cities. Figure 3 and Table 2 gives the overall distribution of bases in the CF inventory and Figure 4 and Table 3 gives the urban/rural breakdown.

As has been stated¹⁵, one of the common identifying marks of the resource town is that it has been at the resource frontier. Since World War II, the resource frontier has been away from the population belt in Canada. This population belt is essentially a 100-mile wide band just north of the border with the U.S. and stretching from coast to coast. In some ways, the military installations, especially those termed isolated or semi-isolated, have taken advantage of a particular "resource" that an area has had to offer, e.g. vast tracts of wilderness which could act as a training area for a large number of troops and bombing and gunnery ranges away from danger to the civilian population.

¹⁵Cf. p. 22.

LEGEND

Base ●

Station ■

Figure 3

Bases and Principal Stations in Canada
See Table 2 for Key

TABLE 2

Bases and Principal Stations in Canada
 (See Figure 3 page 24 for location of Bases and Principal Stations)

<u>Bases</u>	<u>Stations</u>
Bagotville	Alsask
Borden	Baldy Hughes
Calgary	Barrington
Chatham	Beausejour
Chilliwack	Beaverlodge
Cold Lake	Chibougamu
Comox	Dana
Cornwallis	Falconbridge
Edmonton	Gander
Esquimalt	Goose Bay
Gagetown	Gypsumville
Greenwood	Holberg
Halifax	Kamloops
Kingston	Lac St. Denis
London	Lowther
Moncton	Masset
Montreal	Moisie
Moose Jaw	Mont Apica
North Bay	Senneterre
Ottawa	Sioux Lookout
Penhold	Sydney
Petawawa	Yorkton
Portage La Prairie	
St. Jean	
Shearwater	
Shilo	
Suffield	
Summerside	
Toronto	
Trenton	
Valcartier	
Winnipeg	



Figure 4

Bases and stations relative to centers of population
 * See Glossary for definition of Urban, Semi-Urban and Isolated.

TABLE 3

Bases and Stations Relative to Centres of Population
 (See Figure 4 page 26 for location of bases and stations)

<u>Bases, Urban</u> ●	<u>Bases Semi-Urban</u> ◻	<u>Bases, Isolated</u> ○
Calgary	Bagotville	Cold Lake
Edmonton	Borden	Cornwallis
Esquimalt	Chatham	Suffield
Halifax	Chilliwack	
Kingston	Comox	
London	Gagetown	
Moncton	Greenwood	
Montreal	Moose Jaw	
North Bay	Penhold	
Ottawa	Petawawa	
St. Jean	Portage la Prairie	
Shearwater	Shilo	
Toronto	Summerside	
Winnipeg	Trenton	
	Valcartier	
<u>Stations, Urban</u> ■	<u>Stations, Semi-Urban</u> ◻	<u>Stations, Isolated</u> □
Sydney	Falconbridge	Alsask
	Gander	Baldy Hughes
	Kamloops	Barrington
		Beausejour
		Beaverlodge
		Chibougamu
		Dana
		Goose Bay
		Gypsumville
		Holberg
		Lac St. Denis
		Lowther
		Masset
		Moisie
		Mont Apica
		Senneterre
		Sioux Lookout
		Yorkton

2.3.1.3 Physical Characteristics

The criterion set down for physical facilities of a town states that there be a centre where civic, commercial and cultural uses are concentrated. The civic centre for a town is usually the town hall or some other building which indicates that it is the seat of the municipal representatives and contains the offices which govern the day-to-day affairs of the town. The "civic" centre for the base is Base Headquarters; and the power of overall command and control rests in the position of Base Commander.

There is generally a well-defined centre of commercial activity in the town since, in most cases, the raison d'etre for the town is that it provides a concentration of commercial services for its own residents and those of the surrounding area. Up until a few years ago, the base population depended largely upon the neighbouring towns for the normal consumer services. Recently, with the growth of the Canadian Forces Exchange System (Canex), the shopping centre concept has developed on the base and, like its civilian counterpart, it has provided a focus for community life, e.g. as a gathering place not directly related to a formal or organized facility such as the mess or a club.

The cultural centre of a small town is often the local high school, auditorium or church hall, i.e. it does not have dedicated space for "cultural" activities. Similarly, the base does not have any building which is dedicated solely to such activities and must depend on

space available in other buildings. Generally, there are more places on a base for group assembly than in a town, since there is a requirement on a base to gather large groups of people together for drill, parades, physical fitness training, etc.

In toto, especially within the more recently developed new towns, the notion of a "centre" has become quite pronounced.

In essence, the approach is conservation-oriented in the best sense of the word. Rather than building a recreation centre here and a commercial centre there, each with its own attendant servicing costs and parking lots, the service, recreation, education, health and municipal components are consolidated into a single entity and thereby conserve both land and buildings.¹⁶

Although the current (1977-79) plan for CFB St. Jean, P.Q., sees the commencement of construction of a mega structure complex that will provide accommodation, feeding, educational and recreational facilities for language students and recruits undergoing training, it is an anomaly in the CF. Most bases have the administrative centre in the headquarters, sports and recreation centred on the recreation building and certain other community activities centred on the churches and the shopping centre.

2.3.1.4 Population

The Municipal Act, Ontario 1960, Section 11 (4) states that "upon the application of a village having a

¹⁶Clunie, David, "Two New Northern Communities", in Contact. Vol. 8, No. 3, Aug. 76, p. 315.

population of not less than 2,000, the Municipal Board may erect the village into a town."

In discussing the population criterion, most authors agree that there is a certain minimum size that serves as a base line measure for the identification of village, town and city. Lash¹⁷ has cited Doxiadis and his Ekistic Community Scale to show the range of population from "man" as an ekistic unit of population 30 billion. Both Doxiadis and Keeble¹⁸ fix the town in the range from 9,000 to 40,000 inhabitants. The final decision of what minimum population constitutes a town appears to rest with the authority which is empowered to make the decision i.e. the Ontario Municipal Board cites a figure of 2,000 people as a minimum.

Bases of the CF vary in size from CFB Halifax, N.S. with a military and civilian work force in the neighbourhood of 10,000 to some stations which have populations of less than 100¹⁹. Figure 5 /Table 4 , pages 31-32 gives the broad breakdown of bases by population.

Most of the resource towns developed in the country since WW II have been built as new towns. The Institute of Local Government at Queen's University²⁰ identified 145

¹⁷ Lash, S.D., An Introduction to Urban and Regional Planning, Op. Cit., p. 5.

¹⁸ Keeble, Op. Cit., p. 89.

¹⁹ Because the populations of bases rarely exceed 10,000. they will be considered in the category of small towns, i.e. less than 10,000 people.

²⁰ Institute of Local Government, Queen's University, Single Enterprise Communities in Canada (Ottawa; Central Mortgage and Housing Corporation, 1959)

LEGEND

0 - 999	○
1000 - 1999	○
2000 - 2999	●
3000 - 3999	□
4000 - 4999	□
5000 - 5999	■

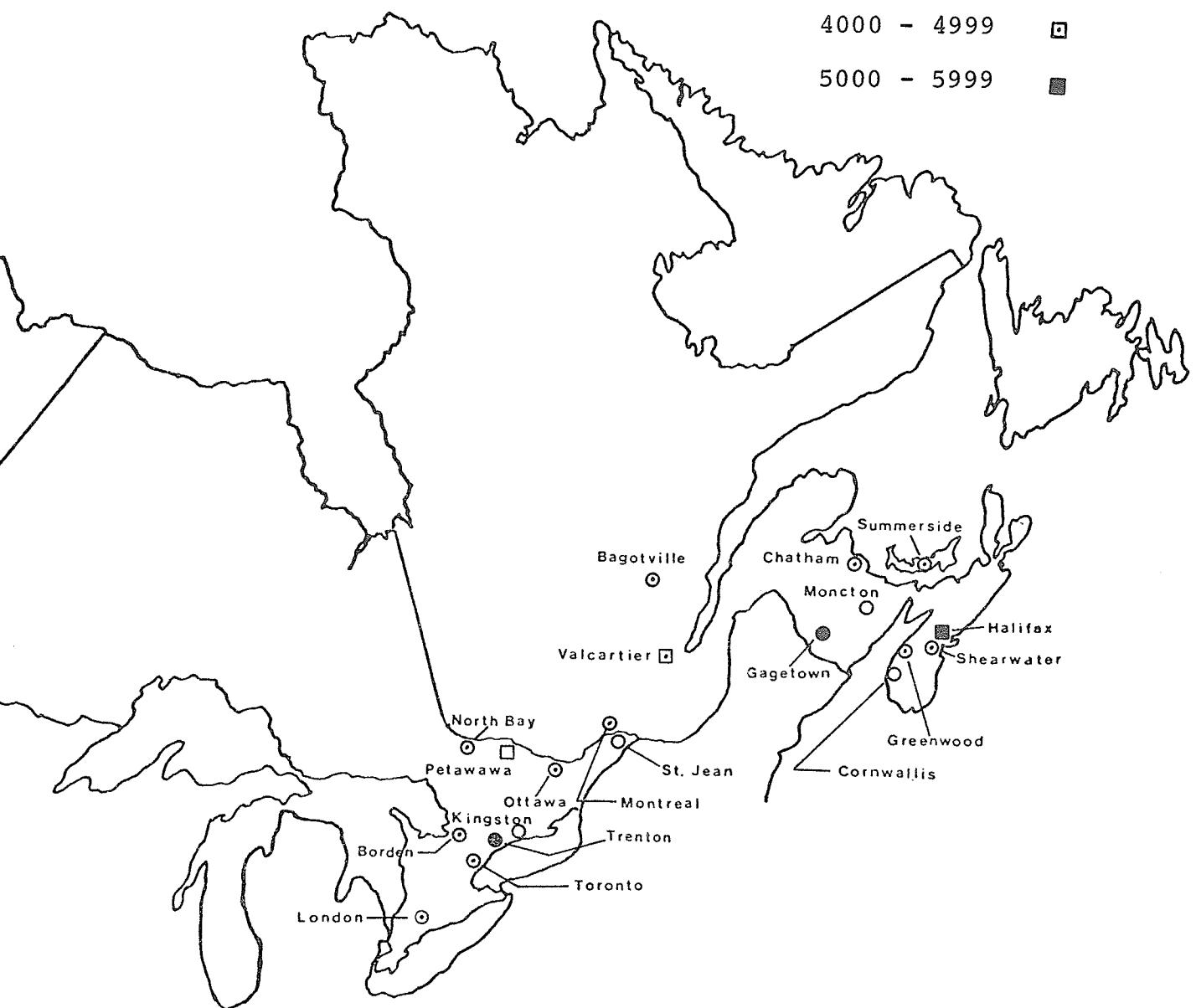




Figure 5

Bases by Population

CFB Ottawa does not include NDHQ
See Table 4 page 32 for a listing of bases.

TABLE 4
Bases by Population

<u>0-999</u> ◎	<u>1000-1999</u> ◎	<u>2000-2999</u> ◉
Cornwallis	Bagotville	Calgary
Kingston	Borden	Cold Lake
Moncton	Chatham	Gagetown
Moose Jaw	Chilliwack	Trenton
Penhold	Comox	Winnipeg
Portage la Prairie	Greenwood	
Shilo	London	
St. Jean	Montreal	
Suffield	North Bay	
	Ottawa	
	Shearwater	
	Summerside	
	Toronto	
<u>3000-3999</u> □	<u>4000-4999</u> □	<u>5000-5999</u> ■
Edmonton	Valcartier	Halifax
Esquimalt		
Petawawa		

such communities with a total population of approximately 165,000 persons or an average of 1,137 per community.

These new communities were often quite small and some quickly became ghost towns, but the towns that have gained the most fame as new towns on Canada's resource frontier and have retained a modicum of permanency are:

Kitimat, Leaf Rapids and Elliot Lake.

2.3.1.5 Political Characteristics

In discussing the political characteristics of the town and the base, one finds a fruitful area for comparison. In this case, the "Political" characteristics are those which involve the control and operation of the town or the base.

The early resource towns had quite a lot in common with bases, in that the towns were often "company towns" with the parent industry acting as landlord, town council, firemen and recreation director as well as sole employer.²¹ The situation, on the military base might be considered the epitome of the autocratic system in that, in many ways, the lives of the inhabitants are directly controlled by one man, the Base Commander. For example, on most bases, a group of councillors from the military community advise the Base Commander on matters dealing with the functioning of the married quarters, but it is he who has the final word. He, unlike the civic officials in a town, is not accountable to the personnel under his command.

²¹ Robinson, Op. cit., p. 4.

Both the resource town and the base are controlled from outside their borders since the parent company rarely has the head office located at the site of the resource extraction and with all, the policy decisions which influence the life and existence of the town are often made in response to economic forces far removed from the production area. Because of the three tiered command structure of Base, Command and NDHQ, the roles earmarked for the base can be developed without (although this is rarely the case) its consultation.

Traditionally, in the company town, there has often been direct control of the facilities and their operation by the paternalistic companies. The company was foreman town council, landlord and recreation director and controlled payroll deductions, store prices and the house allocation policy, resulting in sources of complaint in single-enterprise communities.²² However, Porteous²³ in an examination of these "company" towns in British Columbia found that the residents of the more modern town of Gold

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From studies in the following publications:
Institute of Local Government, Queen's University (1953)
Single Enterprise Communities in Canada, Kingston;
Robinson, I.M. (1962) New Industrial Towns in Canada
Résource Frontier, University of Chicago Department of
Geography Research Paper No. 73; Marsh, L. (1970)
Communities in Canada, Toronto; Lucas, R. (1971)
Minetown, Milltown, Railtown, Toronto.

23

Porteous, J. Douglas, Quality of life in British Columbia Towns: Residents Attitudes in Contact. *Journal of Urban and Environmental Affairs, University of Waterloo* Vol 8, No. 3, Aug 76. P. 332-345.

River (mid 1960^s) perceived a higher degree of social equality, were less aware of overall company influence, demonstrated a lower dependence upon the company and appeared more stable in terms of migration moves than the traditional company town of Tahsis (1940^s). This latter factor reflects positively on the attainment of goals aimed at increasing the role of individuals and citizen groups in defining community goals and achieving those goals. This sense of community involvement was identified by Jackson and Poushinsky²⁴ as having the effect of transforming residents of many new settlements into full-fledged citizens and marks the development of a settlement to a mature community.²⁵

Because, perhaps, members of a military community move as frequently as three years on average, the base does not generally have a chance to develop the politically mature characteristics exhibited by developed settlements who have kept, essentially, the same population for a substantially longer period of time. However, on most bases the organizational structure exists for

²⁴Jackson, J.E., Winston and Nicolas, W., Poushinsky. Migration to Northern Mining Communities: Structural and Social-psychological Dimensions Research Report No. 8, Winnipeg, Manitoba: University of Manitoba, Centre for Settlement Studies, 1971.

²⁵Wichern, P.H., G. Kunka and D. Waddell The Production and Testing of a Model of Political Development in Resource Frontier Communities Research Report No. 4, Winnipeg, Manitoba: University of Manitoba, Centre for Settlement Studies, 1971.

the residents of the married quarters in particular and the base in general to advise the Base Commander on matters dealing with the functioning of their area of concern. The role is, however, advisory and unlike the civic officials in a town, the Base Commander is not accountable to the personnel under his command.

Thus company towns in recent years have shown a move toward more citizen involvement in the formulation and realization of community goals. Military bases, however, because of the transient nature of the population and the military command structure have maintained citizen participation in an advisory role.

2.3.1.6 Sociological Characteristics

2.3.1.6.1 General

Two of the criteria identified in the general characteristics of towns are: (1) a corporate feeling and (2) a civilized population. It is proposed to examine the base and the resource town in the light of these two criteria and in so doing, identify to a certain extent the similarities and differences in the "peopling" of the two types of communities.

The corporate feeling that most people have for their town, i.e. Haligonians or Kingstonians, stems largely from their long association with their birthplace. Indeed, Lynch states that:

Every citizen has had long associations with some part of his city, and his image is soaked in memories and meanings.

He considers the visual quality of the American city by studying the mental image of the city which is held by its citizens, that is the ease with which its parts can be recognized and organized into a coherent pattern.

He further states:

...that, as might be expected, people adjust to their surroundings and extract structure and identity out of the material at hand. 26

In most cases, the resource town has not had the benefit of a long history to which its inhabitants can tie and as a result, the corporate feeling may be weak. As

Robinson says:

Unlike ordinary urban communities, these towns do not grow by a gradual process of natural increase plus some yearly immigration. Instead they "boom" into existence and in a few months large numbers of people find themselves concentrated in an area that can hardly be called "home" but no longer is wilderness either. 27

Also, because of the nature of the work and the sometimes uncertain economic future of a boom town, the variety of people attracted to the town does not always create an air of permanence from which the corporate feeling flows.

The initial migrants fall into three categories, First, those who came to make quick money or temporarily escape. Second, those who came to take production jobs contemplating settling in and bringing their families to the area. Third, those who approached the new town in a highly tentative and uncertain fashion and who might become

²⁶ Lynch, Kevin, *The Image of the City*, MIT Press, 1960
p. 1,2 & 43.

²⁷ Robinson, Op. cit., p. 79.

permanent if good living and working conditions were provided. 28

In like manner, the base has a certain corporate feeling, but it is not one in which people identify themselves, at least not permanently, with a particular locality. Once fact of military life is the moving from place to place with each posting usually lasting from two to three year on average. In such a life style, it is not likely that the individual would consider his current posting as his permanent "home", since he could easily be moved from there in two years. The corporate feeling, then, is one that reflects the esprit de corps actively fostered by most military units. It is aided by the social institutions such as the messes and clubs which help assimilate the newcomers into the social fabric of the base in a relatively short time. The institutions, then the overall structure and even some buildings of the base are very similar from place to place, it is the people who are different. This is to say that the military system is set up to function effectively in as wide a choice of geographical surroundings and as wide a variety of situations as possible. In part this leads to standard procedures and facilities which help the trooper get oriented quickly and effectively. The fact of human individuality remains however and is ultimately dominant so that what really determines the character of

²⁸ Ibid., p. 80.

of the base or station and whether it is a "good" or "not-so-good" place to live is the people that form the community.

The population of the established bases as with the permanent residents of the resource towns can be considered to be "civilized". Indeed, because of their diverse backgrounds and training military personnel are often involved in civilian community activities such as cubs and scouts and sports.²⁹

2.3.1.6.2 Division of Labour

Because both the resource town and the base are one industry communities, there is a relatively narrow range of occupations. For instance, on a base of Mobile Command which provides support for Combat Arms Units, one finds individuals of various levels engaged in the profession of soldiering. In that area, there are certain jobs (Infantryman) which have no civilian equivalent and thus one might consider the base a more precise refinement of the one industry town in that it is a very specialized "industry".

In the resource town, the labour force consists of two main groups: (1) white collar and supervisory personnel and (2) industrial workers. The base exhibits the same division of labour, although because of the

²⁹ Gian and Woodend, The Social Impact of Canadian Forces Bases Upon Their Host Communities, Defence Research Analysis Establishment Report, No. R48, Ottawa, April, 1974.

rank structure, the differences are more clear-cut than in the resource town.

2.3.1.6.3 Age and Sex

Both the town and the base have similar age distribution in that they are both skewed to reflect a particular age group.

The population structure is also skewed with respect to age. There are practically no old people and few teenagers. The average age of the parents is quite low resulting in a high proportion of young children.³⁰

Because of the early retirement plan of the CF, there are no military personnel in the work place over the age of 55 and under 17. The military community as a whole tends to reflect the age distribution of the military members, i.e. there are no old people and children tend to move out on their own when the opportunity arises rather than follow the family on a new posting.

Up until recently, the military work place was almost completely dominated by males. In recent times, with the growing acceptance of females in what have been traditionally male occupation, the ratio of the number of females per 100 males is beginning to increase. Even so, there are still certain trades within the Armed Forces such as Infanteer and Pilot, which are not open to females. Likewise, many of the jobs in mines and mills have traditionally been heavy labour jobs and have tended to be taken on by males rather than females. Thus,

³⁰Robinson, Op. cit., p. 81.

the nature of the work in both the industry based resource town and the military base tends to create a predominantly male population.

2.3.1.6.3.1 Single Personnel

Traditionally the single male population has made up a small proportion of the total population of a base. The only exception occurs on a training establishment when young recruits receive their basic indoctrination training and basic trades training. Apart from that, the base population tends to reflect the marital status of the Canadian population as a whole.³¹ On the base, however, because the single male occupies quarters akin to a university residence he is subject to much the same controls as are his counterparts in the residence. There are few quarters which are entirely self contained, i.e. cooking, washing and sleeping facilities included in the suite or room; and, having guests stay overnight is strictly frowned upon.

With the introduction of a greater proportion of females into the military population, there has been a re-evaluation of the traditional separation of males and females. In previous times, female quarters were provided in a separate building from male quarters or at the very least were a different wing in otherwise male quarters. The messes and clubs provided common meeting ground for both parties. In recent times the notion of apartment living has come to the fore and with the construction of quarters

³¹ See Canadian Magazine, Vol. 28, No.6, Feb.11, 1978, p.3.

which are, in the main self contained entities has come the type of living arrangements found in most apartment buildings.

2.3.1.6.4 Ethnicity

The ethnic character of the forces tends to reflect all the provinces of Canada and includes practically the full range of races and language groups already in the country. Most of the bases tend to reflect this ethnic mix, although there is a perponderance of French-speaking personnel in the bases in the Province of Quebec. The same situation exists in the resource towns as, perhaps owing to the "volunteer" nature of the community, it tends to attract a full range of people from a varied social background.

2.3.1.6.5 Class Distinction

Because of the nature of military operations, the class distinction between the various rank groups is quite clearcut to the point where the various rank groups are housed in separate areas and it is understood that there is very little interaction among the areas. Historically, in the resource town, housing tended to be of uniform quality so, as with the base, the social stratification was reflected in the location of different groups.³² Generally the delineation of social class tends to follow clearly defined physical barriers. The best views on the top of the hill are allocated to the managers and other officials

³² Robinson, Op. cit., p. 85.



from there to the bottom of the hill went the other classes. Today, however, the situation has changed.

Porteous³³, commenting on the social class structure says:

"It is a cliche that in single industry towns the occupational hierarchy of the plant is mirrored in the type and arrangement of housing so that strongly segregated residential patterns emerge. The most obvious dichotomy, made explicit in the plant and often symbolized by distinctive head gear is between salaried staff and hourly paid employees. As in military camps, wives frequently act out the husbands status role in social relationships which consequently remain class-bound. This situation was stereo-typically so in nineteenth century British company towns and is found today in for example, American built towns in Chile. In the latter, however, as in British Columbia attempts have been made to reduce social and residential segregation.

Likewise Siemens³⁴ indicates that the present day tendency is to provide maximum opportunity and circumstance for social interaction, viz:

Marven Lipman (1969, p. 6) writing on social integration of communities in Habitat says that there is ample evidence to support the assumption that most people prefer to live among those who share a similar life style. On the other hand, we are nowadays increasingly concerned about enlarging the range of opportunities for all of Canada's citizens and tend to view segregation whether along racial, ethnic or socioeconomic lines as something to be deplored and if possible avoided through orderly development and planning of our communities and resources.

³³ Porteous, J. D., Op. cit. pg. 337.

³⁴ Siemens, L.B., Single Enterprise Communities on Canada's Resource Frontier in "Contact" Special Edition, Vol. 8, No. 3, p. 283.

2.3.1.6.6 Education

On most bases the Department of National Defence (DND) maintains schools to adequately serve the needs of the personnel posted to the base. Most married quarter areas have a population sufficient to maintain at least one elementary school and depending on the size of the base and its location relative to a center of population there may be a high school provided to cater to the needs of the older children. The decision as to whether or not to provide a high school depends largely on the position of the base relative to a community which itself has such facilities for its own citizens. Normally, if suitable civilian facilities exist, arrangements are then made with the closest community to have eligible children from the base transported to classes at the appropriate high school. If the distance to the closest community is considered too far or if the facilities are not available in a local community DND will provide a high school of a suitable standard.

2.3.1.6.7 Recreation Facilities

Recreation facilities are somewhat better on the base than in any town owing to the requirement of the Armed Forces to have its personnel maintain a certain level of fitness and the social requirement to develop a sense of esprit de corps. Recreation facilities on most bases, regardless of size, include gymnasiums and related sports fields. Depending on the size, the base may have bowling alleys, curling facilities, hobby shops, a swimming pool

and a movie theater. Whether these facilities are provided at public or non-public expense is largely a function of the geographic location of the base. (See glossary for definitions of various degrees of isolation) Normally, basic messing facilities and gymnasiums are provided at public expense in all locations and other facilities may be provided depending on the size and relative degree of isolation from normal facilities experienced by the residents of the base. The provision of these facilities normally aids in the quick assimilation and continued involvement (if desired) of the personnel of the military community.

Hence, within the existing system there is generally adequate provision made for the overall welfare of the serviceman and his dependants in the area of social, recreational and educational needs. What sometimes does vary, from place to place, is the standard of facilities provided. Most educational facilities are post war construction; most married quarters likewise were built after 1950 and therefore reflect an overall high standard of living. Even so, most married quarters do not have basements and the resulting lack of storage space is an anomaly in modern construction standards.

2.3.1.7 Economics

The economic criteria for a town indicate that it has residents who may be:

- a. employed in industries producing goods for export;

- b. employed in industries meeting local needs;
- c. employed in commercial activities serving a wide area;
- d. occupied in providing services both for people within the town and for a region surrounding;
- e. employed in providing services for tourists and others who do not normally live in the town.

The resource town might be considered as primarily serving a, b and d in that it is oriented toward a resource extraction process. To do so, of course, it must have people who do the work and they must be supplied with the necessities of life. Often the towns are located "in the middle of nowhere" and although they may provide services to the surrounding area, there may not be a sufficient number of people in the surrounding area for it to constitute a major reason for its existence.

The base is somewhat different in its impact on the economic well-being of the area. In the sense that the bases bring in "outside" money, they could be considered a primary industry in some of the areas in which they are located. The base itself does not produce goods for export, but in some areas where it is the centre for search and rescue and it provides training support for militia units, it could be considered to be providing services for people within the town and region surrounding.

Because most of the money injected by DND in the area (Digby-Anapolis, N.S.) whose main part is wages for military and civilian employees of the base (CFB Cornwallis) -- stays in the area, there is a direct effect on its retail sales. In addition, this primary effect through a multiplication process gives rise to a second important effect on this industry. One of the main conclusions of this study is that in the Digby-Anapolis region the base initiated from 8.6 to 11 per cent of total regional retail sales in 1971-72. In the area within a circle of ten miles radius around the base this percentage is between 24 and 32 per cent.³⁵

The resource town and the base share the same problem of never being quite sure of what the future holds. Most towns in the "settled" area of the country generally look to the future with an optimistic outlook, i.e. that the town will grow by natural increase in population and perhaps by the addition of some industry that would provide impetus for growth.

The resource towns have had a mixed history; some have survived and thrived and some have not.

Canada's history has been marked by the rise and fall of dozens of new resource towns. They have all followed a similar growth pattern. They grew rapidly, almost by spontaneous generation. This sudden rush of capital investment and rapid exploitation continued until such time as the resource was depleted ... then the towns experienced an equally swift shutdown or actual loss of population.³⁶

³⁵ Lafleur, L.M., The Economic Impact of CFB Cornwallis on its Micro Environment, Defence Research Analysis Establishment Report No. DRAE R38 Ottawa, Jan. 1974.

³⁶ Robinson, Op. cit., p. 91.

Thus, both the base and the resource town have been subjected to rapid changes in population largely due to forces outside their control. The town may lose its economic reason for existence, and changes in defence policy can result in rapid changes in base population with the relocation of military units.

2.3.1.8 Summary

In examining the various definitions for the town different authors have accented different characteristics. Overall, however, the following are generally ascribed to a town. It has:

1. A certain minimum size;
2. A corporate feeling;
3. A civilized population;
4. A centre where civic, commercial and cultural uses are concentrated;
5. Inhabitants who may be:
 - a. employed in industries producing goods for export;
 - b. employed in industries meeting local needs;
 - c. employed in commercial activities serving a wide area;
 - d. occupied in providing services within the area and for a region surrounding;
 - e. employed in providing services for tourists.

Using the criteria as background, the resource town and the base are compared using the headings of History, Geography, Physical Characteristics, Population Size, Political,

Social and Economic Characteristics. With all, the resource town is considered to be the closest civilian equivalent to the military base.

Except in recent years, resource towns and military bases have had some association, since the pioneer town often had some military association to protect the residents. Also, the bases themselves could be considered resource towns since, at various times through the history of Canada, they have taken advantage of a resource, such as vast tracts of wilderness area, which would be suitable for training.

Geographically, the resource towns are generally more isolated than most bases, although the CF maintains the most northerly settlement in North America at CFS Alert. Both the base and the resource town could be considered as fulfilling the criteria of physical separation from other settlements in that they are spread across the country.

The physical characteristics dictate that the town must have a centre where civic, commerical and cultural uses are concentrated. Some of the newer resource towns demonstrate this characteristic very well. For example, Leaf Rapids has a Uni-Building which houses, under one roof, the shopping, educational and cultural facilities of the town. The base does not have one centre such as this where the aforementioned activities take place, but it epitomizes the centralization of "civic" activity in that the responsibility for the orderly and efficient operation is vested in the position of Base Commander.

Both the resource town and the base have a wide range in numbers of inhabitants.

The "political" characteristics show the similarity between the town and the base, since the resource town in its early history was often developed as a one owner "company town." The military base is, of course, the essence of the one owner town since command and control of the installation is vested in one position.

The sociological characteristics exhibited by the town and the base reflect that both have a civilized population in the accepted sense of the word, but the corporate feeling, in that the residents identify with the area, is mixed. The town normally grows by "booms" in that it is established; the population grows to full size very quickly, and the people never really have a chance to adjust. The base has a transient population, the members of which stay in one place, on average, for only three years. The corporate feeling is replaced to a certain extent on the base by the esprit de corps of the units.

The town and the base exhibits the standard divisions of labour between white and blue collar workers, although the base, with its military hierarchy, exhibits the distinction between the levels more markedly. The base, again because of the nature of military service, contains occupations, such as the infanteer, that have no civilian equivalent.

The town and the base exhibit a skewed age/sex pyramid, since in both cases the nature of the work for a number of years has tended to draw young male workers and young families to the work place. In addition, there is a specific age bracket which is preferred in military service and hence there are no "older" (55-65) people in the work place or the townsite and young people often leave the PMQ area when parents are posted to a new location.

The base and the resource town tend to reflect all the provinces of Canada and include practically the full range of races and language.

The "class" distinction on a base is more marked than in the resource town. Because most of the housing is very similar in both cases, the class lines are drawn by clearly defined physical barriers. The best views go to the senior people and the rest are parcelled out, in descending order, to the lower levels.

In general, both the resource town and the base could be considered to be primary industries in that they bring "outside" money to the area. Because of the nature of military operations, the base often has a questionable future since defence policy may require that the base grow or shrink in size on relatively short notice. The resource town, also, must respond to the relative abundance of the resource for which it was built to exploit and the vagaries of world markets.

2.4 Comparison of the Planning Principles

In this section, it is proposed that a comparison be made of the principles which guide the development of new towns and those which govern base planning. The new town of Kitimat was chosen as a focus for the examination to (1) limit the scope of the paper and (2) because it was developed for the Aluminum Company of Canada (ALCAN) in the early 1950's and hopefully represents a synthesis of all positive and negative experiences to that time.

In 1954, Clarence Stein³⁷, the "author" of Kitimat identified the following principles which guided the development of this new town:

1. The purpose of Kitimat is the industrial success of the plant.
2. To provide a town so attractive that it would draw workmen with their families for permanent residence against the wilderness drawbacks of remoteness, strangeness and climate.
3. To realize guiding ideas long seeking an effective outlet:
 - the garden city idea that a town should be planned for calculated expansion after which new growth is in a separate new community;
 - the Radburn idea of separating through-traffic from the pathways of the local citizens;

³⁷Stein, Clarence S., Kitimat A New City, Special Reprint from The Architectural Forum, 1954.

- the greenbelt idea of surrounding a well-defined town with a belt of farm and forest in the place of amorphous string development;
- a balancing park and greenery system within the town;
- the idea of neighbourhood.

The quiding principles, as listed in Canadian Forces Publication (CFP) 120, Chapter 10³⁸, which govern base planning are:

1. To provide facilities to accomplish assigned roles, missions and tasks;
2. To provide an optimum living, working and training environment;
3. To provide maximum efficiency for the use of vehicles and equipment;
4. To minimize operating and maintenance costs;
5. To provide optimum building use efficiency;
6. To provide optimum land use efficiency.

These principles are reflected to a certain degree in other military and civilian planning guides, i.e.:

Important planning consideration are: relationships of the installation to the surrounding region; necessary allocation, proper arrangement and efficient correlation of land area and structures to serve the mission and strength of the installation; suitability of existing streets' structures, utilities transportation facilities and recreation

³⁸Department of National Defence Canadian Forces Publication 120, Ottawa, 1970.

facilities; and future expansion requirements.³⁹

Keeble considers that the objectives which should be sought in the planning of a town, new or existing are:

1. The allocation of sufficient space for all uses of land for efficient operation, for the comfort of those who use the land and for whatever degree of growth it is regarded as desirable to allow for.
2. Compactness of town form and design of road and pedestrian routes to promote ease of communication from one part to another and to minimize the loss of open land generally, and agricultural land particularly.
3. Avoidance of juxtaposition of incongruous uses (e.g. residential and noxious industry) and the bringing together of specially harmonious uses or those whose combination can produce special benefits (e.g. open spaces to act as a buffer between industrial and residential uses).
4. Preservation and enhancement of existing good features.
5. Removal of existing unsatisfactory features;
6. Creation of specific town character where possible in combination with 4 by different uses of

³⁹ U.S. Government Department of Army Installation Master Planning Principles and Procedures, Technical Manual TM 5-803-1, November, 1970.

topography and other natural features and by specific groupings of uses and densities.

7. Economy - This should mean the design of a plan which shall, overall, produce a desired level of spaciousness, accessibility and visual pleasantness for the minimum possible expenditure and/or perhaps easier to measure, the maximum levels of spaciousness accessibility and visual pleasantness obtainable for a given expenditure.⁴⁰

A cursory examination of the principles of planning listed for civilian towns and military bases makes it apparent that the prime concern is, understandably, with the provision of facilities to accomplish the prime role of the installation. For ALCAN, of course, this would be the smelter and its ancillary facilities and for the base, it would be the facilities that provide support for the units. Subsequently, however, there appears to be a difference in the weight that the base and the town put on each of the remaining principles.

If one considers the recurrence of words and phrases such as "efficiency", "cost reduction", "optimum", etc., one would tend to think that, above all, the efficiency of the base plant is the overall concern and the life style of the inhabitants is of secondary consideration. It may not necessarily be true that the plant takes pre-

⁴⁰ Keeble, Op. cit., p. 114.

cedence over all, since the second principle of the military base is the provision of an optimum living, working and training environment. However, it does not match the second principle of Kitimat - to provide a town so attractive that it would draw workmen with their families for permanent residence against the wilderness drawbacks of remoteness, strangeness, and climate.

The prime reason for the difference in focus is primarily because ALCAN must depend on a truly volunteer and contented work force in order to survive. The labour turnover rate in the resource town is legendary and generally, apart from long association pension plans and the like, private companies do not have a "hold" on the workers. Hence, they have to do their best to entice the workers to come to an area and when they get there to find it agreeable enough to stay. Because of the nature of military service and, in particular, the posting, when a member is sent to an area for on average, three year, the CF does not have to "entice" people to stay. By the same token, because it is a military force made up entirely of volunteers, people cannot be treated in a cavalier fashion with impunity, even though the member of the CF has to apply for release from the service.

In discussing the principles for military base planning and the civilian town and using the resource town as a close "cousin" of the base, there is one point that has to be kept in mind. Kitimat, the most resource town, was planned and built without the presence of

of people and so, to a large extent, the subsequent inhabitants had no say as to how things were planned. Also, the town was not planned in response to the needs of those who had experienced the often singular conditions which exist in the resource town and so, the designs often reflected a transposed suburb of Toronto⁴¹ in an inhospitable climate.

In some ways, the base population experiences the same detachment from the planning process. If a base is to be built or redeveloped, in most cases, the foci of concern are the facilities that support the units on the base. Hence, comments are eagerly sought from those who may be affected by the changes, but there is little in the way of direct lobbying that can be brought to bear.

To attempt to draw people into the planning process, several parts of the resource town have been left in an undeveloped state. After a period of community maturation, the residents themselves take an active role in the development of the remaining areas with the master plan serving as a guide document. Unfortunately, because of frequent moves of the residents, the same thing is very difficult to achieve within the military base. However, with a continuation and development of the present trend of the active involvement of all three levels of Base, Command, and NDHQ, but especially the base personnel, the plans that evolve will reflect a deeper commitment by all concerned.

⁴¹Robinson, Op. cit., p. 26.

2.4.1 Industrial Area

Both the resource town and the base have placed a high priority on the efficient functioning of all industrial areas of the site, since the industrial function is, for the resource town, the primary means of existence. The base, likewise, is heavily dependent on the "industrial" type facilities such as Supply, Transport, CE and Maintenance, and their efficient functioning is critical to the efficient functioning of the base.

Planning for an industrial area, however, is extremely difficult for a civilian community for, as stated by Keeble⁴² and generally supported by Barber⁴³:

It is not easy to say very much about the planning requirements for an industrial area. The space requirements of different industries vary enormously in relation to the number of workers they employ, and it is, of course, quite impossible in advance of the development of an industrial area to foretell, except in the most general terms, what kinds of firms will establish themselves in it.

The base is more fortunate in this respect because there are standard sections that go to make up the support elements of a base and the only variable is normally the size of the facility to be provided.

It is intended here, then, to only outline some general principles for the placement of industries.

⁴² Keeble, Op. cit., p. 214.

⁴³ Barber, B.J., Industrial Land Planning in the American Society of Civil Engineers, Urban Planning Guide, New York, 1969, pp. 147-162.

2.4.1.1 Location

The area selected for the industrial park should have ample supplies of power, water and sewage disposal facilities; the location of the industry for the town or the military base in the first place presupposes that there is a reasonable access to labour and communication routes. Also, the park should be so sited as not to interfere with the quiet enjoyment of the residential area.

2.4.1.2 Site Requirements

More than for any other facility on a base or in a town, the land chosen for the industrial area should be as flat as possible. However, for every light industries as might be experienced with Base Supply warehousing or light manufacture, the land requirement are not as stringent.

2.4.1.3 Space Needs

The amount of land to be dedicated to the industrial uses on a base varies considerably with the size of the base. However, because many of the buildings within DND are standardized, there is often a certain minimum size of building that can be placed on a base, regardless of its size. Keeble⁴⁴ indicates that present day tendencies in establishing new industrial areas in civilian towns are to develop densities around 30 workers per acre or about 3.5 acres per 1,000 population.

⁴⁴Keeble, Op. cit., p. 214.

2.4.1.4 Layout

Since there is significant uncertainty as to the size of the individual undertakings that will come into the civilian industrial park, Keeble⁴⁵ recommends a grid iron pattern layout to give the maximum degree of flexibility. Similarly, although the size of the industrial park would be fixed on the initial construction or development of the base, a flexible layout would aid future expansion or redevelopment.

2.4.1.5 Appearance

The present day trend in most industrial parks is to use single storey buildings on large lots to aid in the efficient execution of many assembly-line-type plant processes. The number and type of possible combinations of building and their ancillary services such as water tanks and towers do not permit the establishment of a rigid plan for a unified and harmonious appearance. About the only guiding principle identifiable would be the subversion of ugliness and discord.

2.5 Comparison of the Planning Processes

In the previous two sections, some of the similarities and differences between the town and the base have been identified. To complete the comparison, the planning processes for the two environments must be examined.

⁴⁵Keeble, Op. cit., p. 214.

At the outset, the two adjectives that sum up the planning process for each of the town and the base are that the town is democratic and the base is autocratic. While neither is exclusively correct, this perception will be used as a base-line definition.

With reference to figure 6 , page 62, the planning process in DND starts with a decision by senior departmental officials to carry out a long-range (10-year) development plan for a particular base. This decision is predicated on the fact that the base chosen has a long-term future in the base posture plan⁴⁶ for the CF.

From the office of the Vice-Chief of the Defence Staff (VCDS) are issued preliminary base development guidelines which outline the roles and responsibilities of the base for the foreseeable future.

Once these guidelines have been issued, the actual planning of the site begins. In the past, this work was executed by civilian consultants who had the ready manpower and expertise at hand to carry out the task and, also, they lent credibility to the findings, since they had no biases nor could they be accused of empire building. Recently, a program was launched whereby the three levels of Base, Command and NDHQ would combine their resources under the guidance of NDHQ to develop the plan.

⁴⁶The Base Posture Plan refers to the macro-scale plan for bases in the country as a whole. This differs from Base Development Planning which deals with a particular base.

THE PREPARATION AND ADOPTION OF A DEVELOPMENT PLAN FOR A MILITARY
BASE

Steps by Senior Departmental Officials - Vice-Chief of Defence Staff

Steps by Directorate Construction Engineering Requirements

Steps by Command, Base, Other Units, Consultant

Decision to Prepare or Revise Development Plan

Engage Planner and Briefs Concerned Parties

Conducts Surveys and Analysis

Prepares Draft Development Plan

Review of Draft Plan

Solicitation of Comments from Concerned Parties

Revise Draft Plan

Submit Official Plan to DCER

Circulation of Development Plan for Comments

General Meeting of Concerned Parties for Final Resolution of Conflicts

Submit Official Plan to Senior Departmental Officials

Approval of Developmental Plan by Senior Departmental officials

THE PREPARATION AND ADOPTION OF AN OFFICIAL PLAN FOR A CIVILIAN TOWN

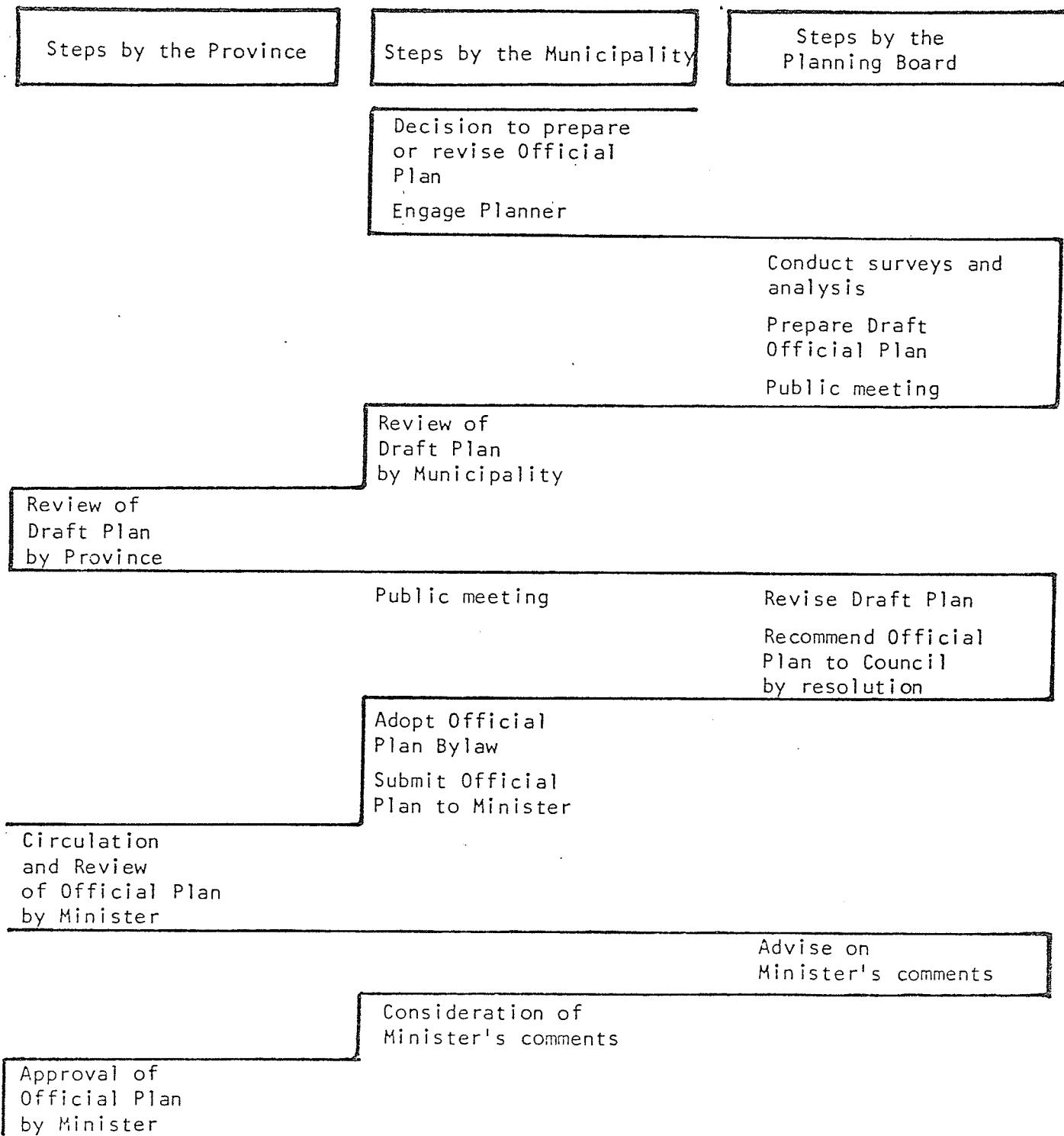


Figure 7

Once the plan is finished, it is staffed through the agencies that have an imput and who are affected by the provisions and proposals contained therein. This is the point of final resolution of conflicts that may have arisen during the preparation of the plan. Once these conflicts have been resolved, the plan is submitted to senior management for approval and adoption as the official plan of development for the base. This completes the planning process, recognizing, of course, that the plan is continuously updated as conditions change.

The implementation phase is executed when and if funds become available..

With the reference to figures 6 and 7 , the planning process for the town is not substantially different in its overall preparation, but it is more subject to political pressure than the one for the base. Hence, guidelines must be more general in scope than those which can be specified for a military base, as there cannot be the same control over the town as by the military commander over a base.

The plan preparation must elicit support on a completely voluntary basis and cannot require the participation of individuals or groups in the town if they are unwilling. Of course, even though personnel on a base could be directed to give the planners their support, if that support is not willingly given, the plan is doomed to failure.

The approval process for the town plan may be subject to more pressure than can be generated in the military sphere. Because the plan must be approved and adopted by elected officials, special interest groups or lobbies can have a considerable influence on the direction of the plan and its success or failure.

2.6 Summary

To tie the military base to better known and more well established town planning principles, the base might be compared to its closest civilian counterpart, the resource town.

In general definition of a town, the town and the base both:

1. Have a certain minimum size, but with the base designated functionally as well as by size of population;
2. Have a civilized population;
3. Are separated from others of the same type;
4. Have inhabitants who may be:
 - a. employed in industries meeting local needs;
 - b. employed in "commercial" activities serving a wide area.

They both do not have:

1. The same corporate feeling where people feel that they are identified with a particular locality;
2. The same type of centre where civic, commercial

and cultural uses are concentrated;

3. Inhabitants who are:

a. employed in industries producing goods for

export;

b. employed in providing services for tourists.

The base provides services of a military nature, i.e. search and rescue, aid to the civil power, and support to militia units within the town and in the region surrounding.

The base and the model town have the same guiding principle relating to the attainment and sustainment of the prime role of each. The town may have a different role from the military base, i.e. industrial development vs. the support of operational military units, but it is recognized in both that without sustaining the prime function, the rest need not exist.

The town and the base differ on the method of providing workers to support the main function. The town has to depend on the continued voluntary support of its population (in the case of Kitimat) whereas the military base need not necessarily have volunteer for its base population.

Bases and towns have similarly:

1. Attempted to separate business traffic from the living areas of the citizens;
2. Attempted to surround a well-defined building area with a belt of green.

Bases have not been able to plan for calculated expansion owing to the uncertainty of defence policy and the speed at which it can change. They do, however, have

total control over development unlike their civilian counterparts.

The base is limited in its development potential by the presence or absence of funds which are controlled by higher management. These funds, as part of the public purse, are tightly controlled and as such call for the efficient management of resources.

The planning processes for the base involve:

1. The issuance of guidelines;
2. The formation of the plan;
3. The submission of the plan for approval;
4. Implementation and updating.

The formation of a plan for a town involves the same step except that:

1. Guidelines are much broader in scope;
2. The formation of the plan depends on the voluntary support of the citizens;
3. The approval process in the town may be subjected to more pressure than can be generated on a military base.

2.7 Conclusion

At the end of this chapter, whose primary purpose was to acquaint the reader with the military base by tying it to its better known "cousin" the single enterprise resource town, it would be beneficial to draw certain desirable characteristics which would serve as guide points for the development of the base. These

desirable characteristics arise out of consideration of both the town and the base since both have positive as well as negative points. It remains to draw the best from both situations and try and incorporate these positive aspects into a viable design.

Briefly these positive characteristics include:

The notion of centre or a focal point for the base and the use of strong identifying symbols throughout the base.

The provision of a total community atmosphere to include:

- the incorporation of green spaces as physical education and recreation areas designed and placed to encourage participation from the married quarter area and the base proper;
- the establishment of strong linkages between the domestic and recreational facilities such as arenas and gymnasiums;
- the establishment of a greater sense of community involvement through an increased participation of the residents of the married quarters in the decisions that affect the military community;
- the segregation of conflicting land uses i.e. residential and "industrial" or heavy traffic generating facilities; and,
- the provision of facilities such as apartment type single quarters which allows the occupant some element of choice of life style.

The notion of centre is of critical importance on a military base as it gives form and a sense of order essential to military life. The centre idea could be achieved through the judicious placement of building to form a central place or by the establishment of a particular building in a prominent place to act as a symbol of the centre of the base. These buildings could vary from the Air Traffic Control Tower on the flight line of most flying bases to the administration building which is an integral part of all bases.

Because the military community is a transient one there has to be an extra ordinary effort made to help new members of the community fit into the existing situation. Once there, it is important that the members of the military community feel as much apart of the achievement of the overall arms of the base as the personnel who are specifically charged with the operation and administration of base policy. The premise is that a contented work force will be more productive and efficient than one which is not pleased with the existing situation and so it behooves the planner to establish a situation where the worker and his dependants are as content as possible.

Some methods of achieving this sense of involvement and interaction within the community would be to make a smooth transition from the married quarters area to the base proper with the use of a park/recreation area used for organized sports and other activities. In addition,

recreational and sports facilities could be placed close to the married quarters and other domestic areas to provide a focal point for community activities.

At present the community councils on most bases are a group of people elected from the military community to advise on the administration of the married quarter area. This community council has absolutely no authority in its own right and it is here that a substantial impact might be made into the quality of life on a base. While the Base Commander must retain overall command and control of the whole base there would probably be an improvement in the effective running of the military community if the councillors had direct access to the Base Commander on matters affecting life in the married quarters area. This, of course, requires agreement that the quality of life in the married quarters area is as important overall as the achievement of the overall aim of the base.

In other areas the principle of proper zoning would create an efficient and effective utilization of land and facilities provided should be built to current standards and provide in so far as possible the element of choice in the life style pursued.

CHAPTER 3

THE ELEMENTS OF A BASE

3.1 Introduction

Because of the nature of the subject, there have not been many formal studies done which might serve a background and supportive material for the discussions in this chapter. Studies done by the Canadian Forces Management Study Units, which are concerned with examining the organization and manpower aspects that make up the base, tend to be micro in nature in that they deal with the internal organization on a specific base. The closest thing to a general analysis of a CF base was the CFB Halifax Base Development Study which provided a ten-year development plan for the largest base of the CF. Even this study, however, dealt with certain specific and unique facilities that would be found on a Maritime Command base and did not address the general case. Moreover, studies done by US military authorities are generally not available because of security implications.

In the following chapter, where possible, references are supported by existing documents such as Canadian Forces Publication 219, Volume 1 - Organization and Operating Concept for the Canadian Forces. In other areas, where there is no single source document or where there has not been a formal study done, relationships have been discussed with senior offices who have had experience on

a number of bases.

3.2 General

This chapter identifies the basic building blocks of the base from which a model can be built. It is the contention of the author that these common components are present in some form, regardless of the base or whether it belongs to the Sea, Land or Air forces, and that these components can be combined together in an optimum form.

Initially, it is proposed that the general organization of the base be outlined to serve as a background for the later identification of the common components.

The last part of the chapter will show the interaction of the components through the flow of people, direction and information, and goods.

3.3 Background Information

The bases of the CF, regardless of size or whether they be Sea, Land or Air bases, have essentially the same organization structure as shown in figure 8.

Base Operations is the raison d'etre of the base in that it is composed of those ships, land units or aircraft squadrons whose job it is to carry out the tasks required to meet the objectives of Canada's Defence Policy.

Base Support is made up of those components whose function is to provide support services to the operational units which are attached to the base.

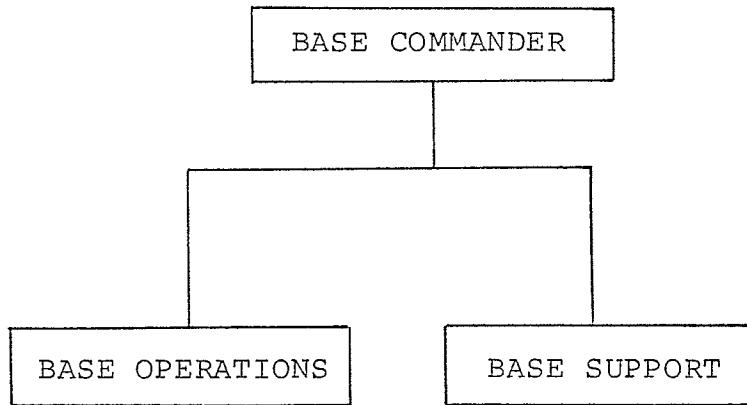


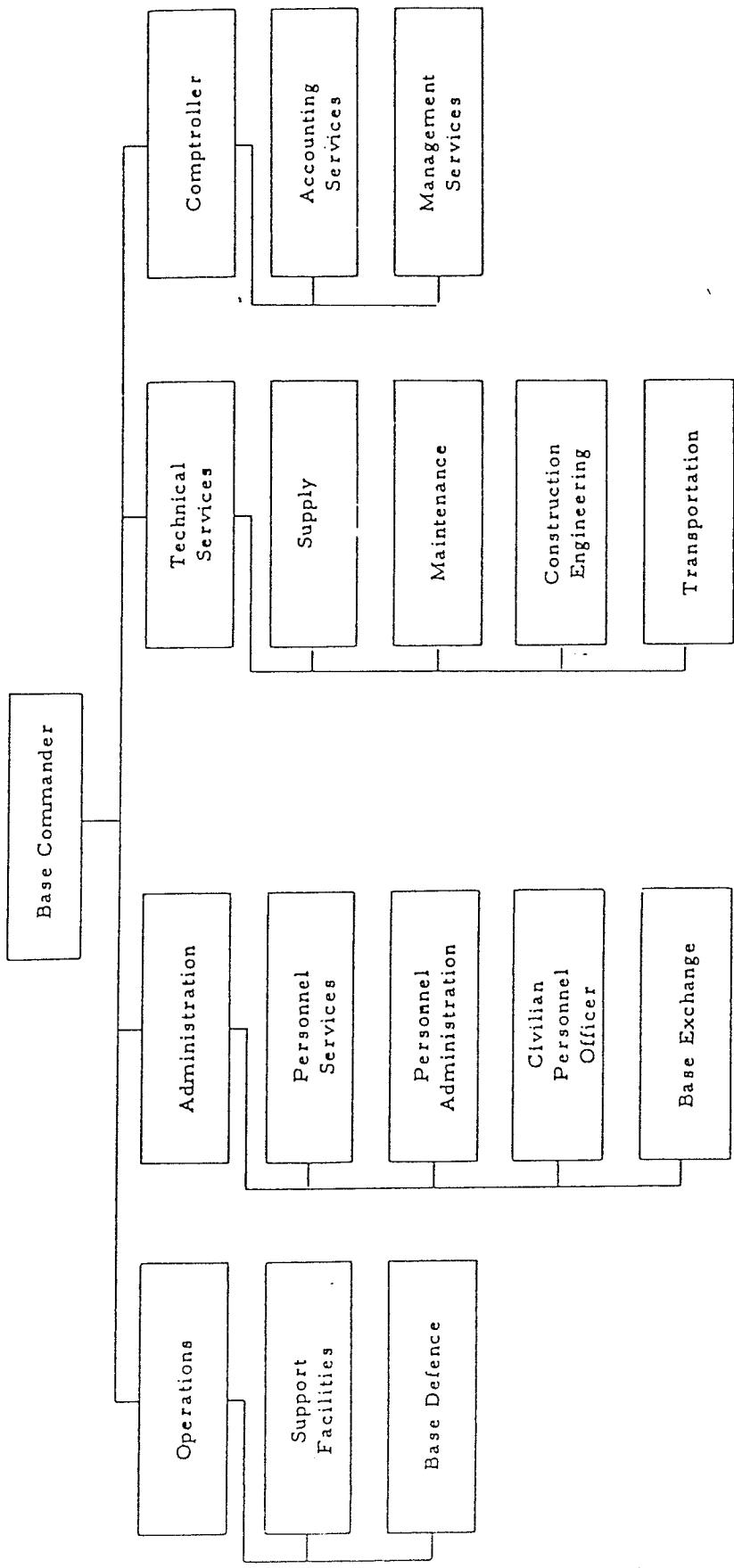
Figure 8

3.4 The Common Components

To show the functioning of the base and how the common components are derived, outlined in figure 9 , is an organizational chart showing typical base organization branch responsibilities.

From the figure, there are three branches within the support function of the base, namely, Base Administration, Base Comptroller, Base Technical Services. All branch heads work in the headquarters building as they are the senior advisers to and responsible to the Base Commander for the efficient operation of the sections under their control.

TYPICAL BASE ORGANIZATION BRANCH RESPONSIBILITIES



- NOTE:
1. The above represents the main subdivisions of a base. Within any given branch, sections may be rearranged or combined to suit the requirements of individual bases. The relative positions of the various subsections is not intended to imply either rank or establishment.
 2. Security usually is a subsection of Personnel Services (within Base Administration), however, if so approval may be placed under Operations.

Figure 9

The Base Commander is responsible for:

1. Exercising command over all personnel and units assigned to the Base except for those responsibilities specifically assigned to Commanding Officers of Integral and Lodger Units;
2. Providing administrative and support services for both on-site and satellite units Integral and Lodger on the base;
3. Administering the Support functions, such as Administrative, Comptroller and Technical services under his control;
4. Maintaining contacts with the civilian community and creating a favorable public image for the CF.

The Base Administration Officer is responsible to the Base Commander for the administration and local policy control of the sections under his control. Typical responsibilities of the Base Administration Officer are posting (in and out), ration control, personnel records, course records for personnel attending educational establishments on some base, etc. (The Civilian Personnel Officer is responsible to the Base Administration Officer for the administration of civilian personnel programs).

The Base Technical Services officer is responsible to the Base Commander for the efficient management of the Branch in providing technical services to the Base and the units which it supports. With reference to figure 9,

the sections under his control are Supply, Maintenance, Construction Engineering (CE) and Transportation. The names of the sections imply the capacities in which they serve and will not be subjected to further elaboration. However, there should be a clear distinction made between CE and Maintenance. CE is responsible for the construction and maintenance of works, i.e. grounds, training areas and buildings, while the Maintenance section is responsible for the repair and maintenance of vehicles and equipment.

The Base Comptroller organization normally comprises three fields of activity:

- a. organization and establishments;
- b. financial management and accounting services; and
- c. management improvement activities.

The sections such as CE, Supply, Comptroller and the various parts of Base Administration are spread throughout most bases with a general tendency, where possible, to put the industrial type activities, i.e. Base Maintenance, Supply, Transportation and CE together and separate from the non-industrial functions such as Comptroller, Medical and Dental facilities and the like. Generally, the administrative functions such as military police and recreation work out of their own buildings.

With the organizational chart as a background, elements common to every base are:

1. Base Construction Engineering
2. Base Maintenance
3. Base Transportation

4. Base Supply
5. Officers' Mess
6. Warrant Officers' (WO) and Sergeants' (SGTS) Messes
7. Corporals (CPLS) and Privates (PTES) (Junior Ranks) Clubs
8. Officers' Quarters
9. WO/Sgts Quarters
10. Cpl/Ptes Quarters
11. Married Quarters
12. Base Headquarters
13. Base Hospital/Medical Inspection Room (MIR)
14. Base Recreation Centre
15. Base Military Police Section

More precisely these sections can be generically grouped into the following functions:

- Base Administration
- Base Technical Services
- Messing and Lodging
- Community and Recreational Facilities

3.5 The Interaction of the Components

The components listed in the previous section are those which normally demand separate buildings for their functions. Because they are in separate facilities, there is a flow of direction information and/or goods between and among the components that is necessary for their mutual existence. To keep the diagrams readable, the interactions will be studied only at the Branch level,

i.e. Administration, Technical Services, Comptroller and their interaction with the Base Commander.

The interactions considered will be those concerning:

- a. people movement
- b. the flow of information and direction
- c. the flow of non-commercial good necessary for the efficient functioning of the base

The purpose of examining the above-noted points is to show how the base function and how there are certain areas which could create problems in the inefficient utilization of resources. With this background, the aims of the model development in the next chapter can be better understood.

3.5.1 Personnel Movement

Ultimately, facilities are built to serve the personnel who carry out the tasks assigned to them. That combination and condition of facilities which produces a contented work force will aid immeasurably in producing high morale and a work force ready to carry out assigned duties.

Unfortunately, even with this acknowledged importance of people, no formal study⁴⁷ exists that quantifies the personnel movement of a base. Generally, however, there are certain operating principles which give an overall picture of the nature of the movement of people.

⁴⁷ The planning consultants for the CFB Halifax Base Development Study did an indepth analysis of personnel movements in selected industrial facilities, but the scope was limited to those specific and unique facilities and did not encompass the whole base.

Formally, the only personnel whose job takes them away from their central work place are those in certain sections of Base Technical Services, notably, Base Transportation and Base CE. In those cases, the workers generally go to the customers as opposed to, say, Pay Accounts, which normally demands that the customer come to the work place.

Informally, people move mainly between the work place and the place of residence or recreation. Morning generally sees a movement of personnel from married quarters, single quarters and off-base accommodation to the work place. The movement at noontime is to sports and recreation facilities, messes and clubs and the residential areas for those who live close at hand. The evening normally brings on an exodus from the work place to the living areas whether they be single quarters, married quarters or residences external to the base.⁴⁸

⁴⁸ As was stated, no formal study exists that quantifies the personnel movement on a base. In an effort to gain some idea how personnel move on a base a small study was carried out at CFB Kingston using the base taxi service as an indicator of the overall personnel movements on base during the work day. The base taxi service uses radio dispatched vehicles to transport personnel from place to place in the execution of their duty. While data is not available for the privately owned motor vehicles (POMV) that might be used by their owners in lieu of the base taxi service it is safe to assume that duty trips would, in all likelihood, conform to the same pattern. Also, the examination did not take into account the vehicle (and hence personnel) movement of base CE which by itself is the heaviest user of base transportation vehicles to the point that it normally has its own detachment of vehicles attached to the section. The Methodology used to get an indication of the people movement on the base was to examine the movements of the base taxi service on four days drawn at random from the

One central point arises from the consideration of personnel movements. As was stated, generally only two sections, Base Transportation and Base CE move to other areas in the execution of their duties. In the other sections, the people must come to the work place. Because the services provided by Base Administration, Base Comptroller, Medical and Dental facilities are "people" intensive in that they exist to deal with the personnel of the base, they would most logically be placed where personnel could gain easy access to those facilities. Since CE and Transportation go out to the customers, they generally do so for some purpose that requires the tools of the trade, and therefore, have a vehicle at their disposal. Often, personnel in pursuit of some

months of January, February and March 1978. The daily dispatch log which records the origin, destination and time travel for each trip was examined to determine if there were any particular areas or functions that created a substantial amount of traffic either as an attractor or a generator. Then the degree to which one building or area determined the flow of daily traffic relative to the total vehicular flow was determined by expressing the number of trips generated by or attracted to the particular locale or facility as a percentage of the total trips. The results indicated that for the period examined there was an average of 135 details (or duties) per day for four days and two trip ends (a start and a finish) per duty for a total of 1082 trip ends. A further examination reveals that four entities were responsible for 52.7% of all trips. These four entities with their individual proportions are as follows:

Base Headquarters	193	17.8%
Medical Inspection Room (Hospital)	165	15.2%
Unit 1	157	14.5%
Unit 2	157	5.2%

Trips which accounted for less than 5% of the total were not included (i.e.) the remaining 47% was split in varying degrees among more than 35 buildings.

administrative service are not as well equipped. On many bases, there are often personnel undergoing training who because of the duration of the course or their particular financial circumstances, do not have access to privately-owned motor vehicle transportation. These personnel have an inordinately difficult time getting around to the various sections which are spread out, in some cases, miles apart and there is no form of mass transit available. Therefore, insofar as it is possible, within certain zoning constraints of not mixing industrial and non-industrial functions, the "people" functions such as administration, messes and quarters and recreation should be placed within easy walking distance of one another.

3.5.2 Information and Direction

The flow of information and direction represents the prime organizational relationships within the base and in large measure takes place through the interchange of letters, memoranda and auxiliary documents. A substantial proportion of the interchanges, especially those involved in the reception of direction from the Base Commander, takes place over the telephone or other voice communication medium and through personal contact at meetings.

Figure 10 is representation of the interaction of the various components in that it shows the rough order of magnitude of the interchange of direction and information requirements. Normally, direction for the efficient operation of the base flows from the Base Commander to the various branches. The links between the branches represent

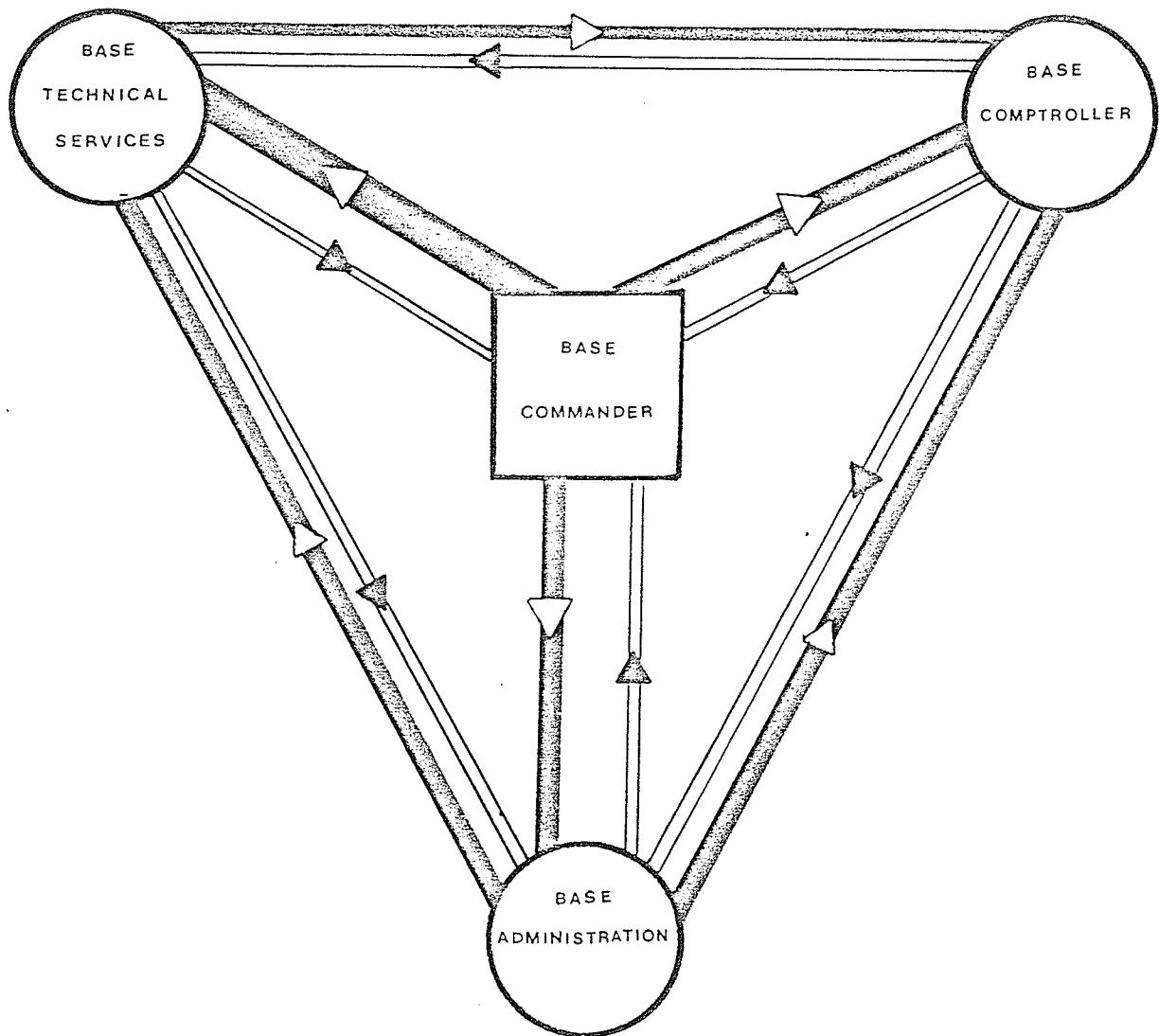


Figure 10

The Interchange of Direction and Information
See Figure 12 page 86 for the interaction within
Technical Services.

the normal interaction of the working elements of the base. For example, the links between Technical Services and the Comptroller represent the exchange of information with, say, Base CE on the preparation of budgets, and the review and appraisal of actual performance against assigned budgets. The links from Administration to Technical Services involve the indenting for rations for personnel living in single quarters and the request for maintenance of specific pieces of equipment normally used or controlled by the Base Adminstration Officer. Similar services and requirements as were extended to Technical Services by the Comptroller are extended to Base Administration and vice-versa.

3.5.3 Goods

The flow of goods is mainly a technical services operation, since it is made up of Base Supply, Maintenance Transportation and Construction Engineering, which are intensive goods users in the execution of their primary functions. The flow of goods is represented by figure 11. The lack of linkage to the Base Commander and an interaction between the Comptroller and Base Administration does not mean that there is absolutely no interchange of goods of any sort. Rather, the bulk of goods flow is as shown in the diagram and the flow to the Base Commander and between Base Administration and the Comptroller is insignificant by comparison.

Within the Technical Services organization, there is a substantial interchange of goods requiring a heavy

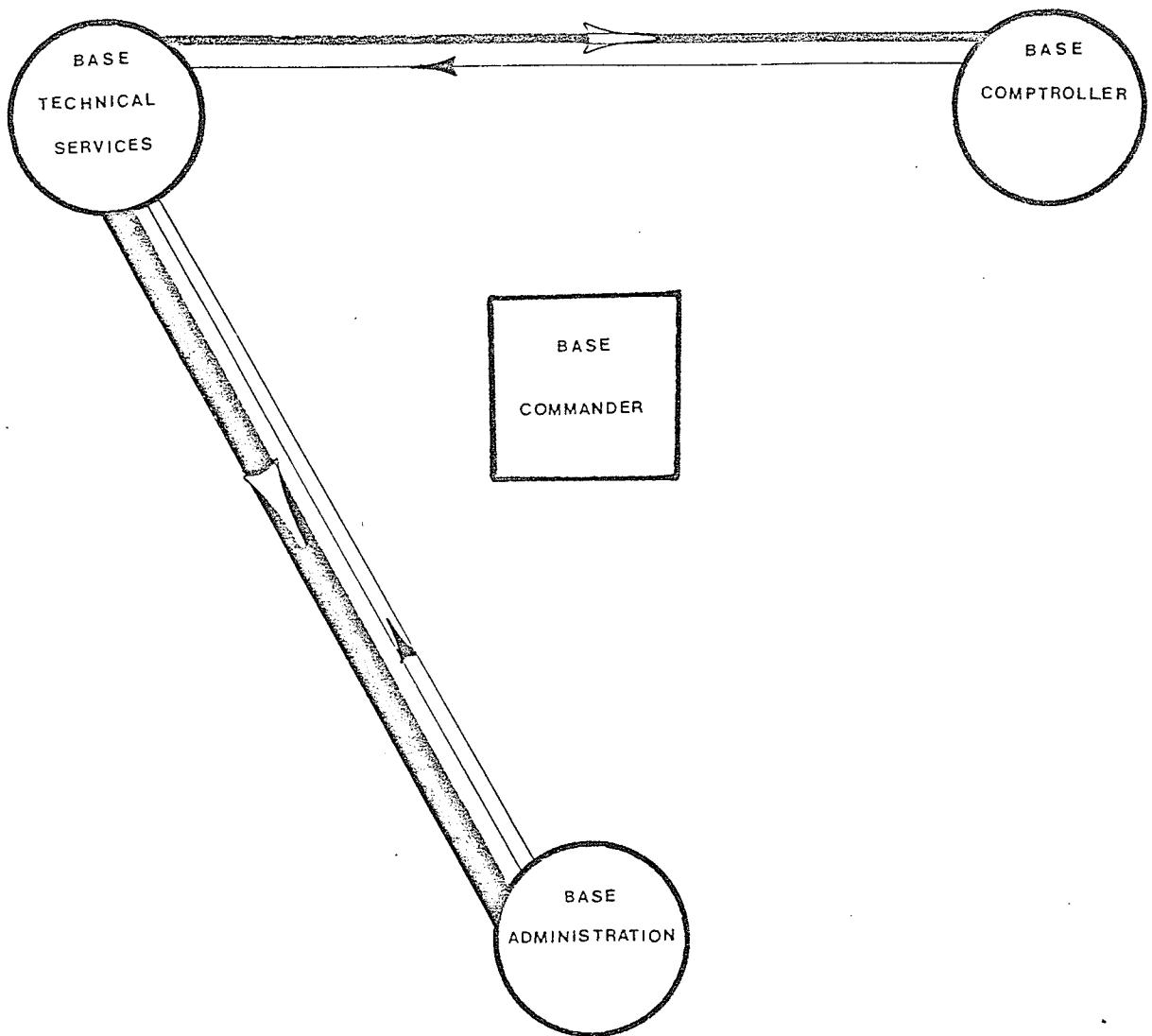


Figure 11

The Flow of Goods

input of resources. Each of the component sections of Technical Services depends on the other for support and provides some service to the other sections. Base Supply is probably the most heavily involved in material as it is its stock-in-trade.

The interactions show in figure 12 represent the qualitative relationship between the sections of Base Technical Services. Of particular note are the Supply sub-stores which hold dedicated⁴⁹ stores for the particular user section. For example, building materials and other such stores are a Base Supply responsibility in that it is the agency on base that procures the materials from outside services. The Base CE section, however, is the prime user of building materials and, thus, supply maintains a stores group at or near the Construction Engineering section. Similarly, a stock of spare parts is retained at Base Maintenance and Base Transportation. Base Transportation, in addition to its normal service, provides two groups of vehicles which are, respectively, earmarked for duties with Base Supply and Base CE.

3.6 Summary

The base is broken down into two main divisions, namely, Base Operations and Base Support.

Base Support has three branches - Base Administration, Technical Services, Comptroller, and is that part which

⁴⁹Dedicated Stores are those of a particular type ordered and held generally for one user.

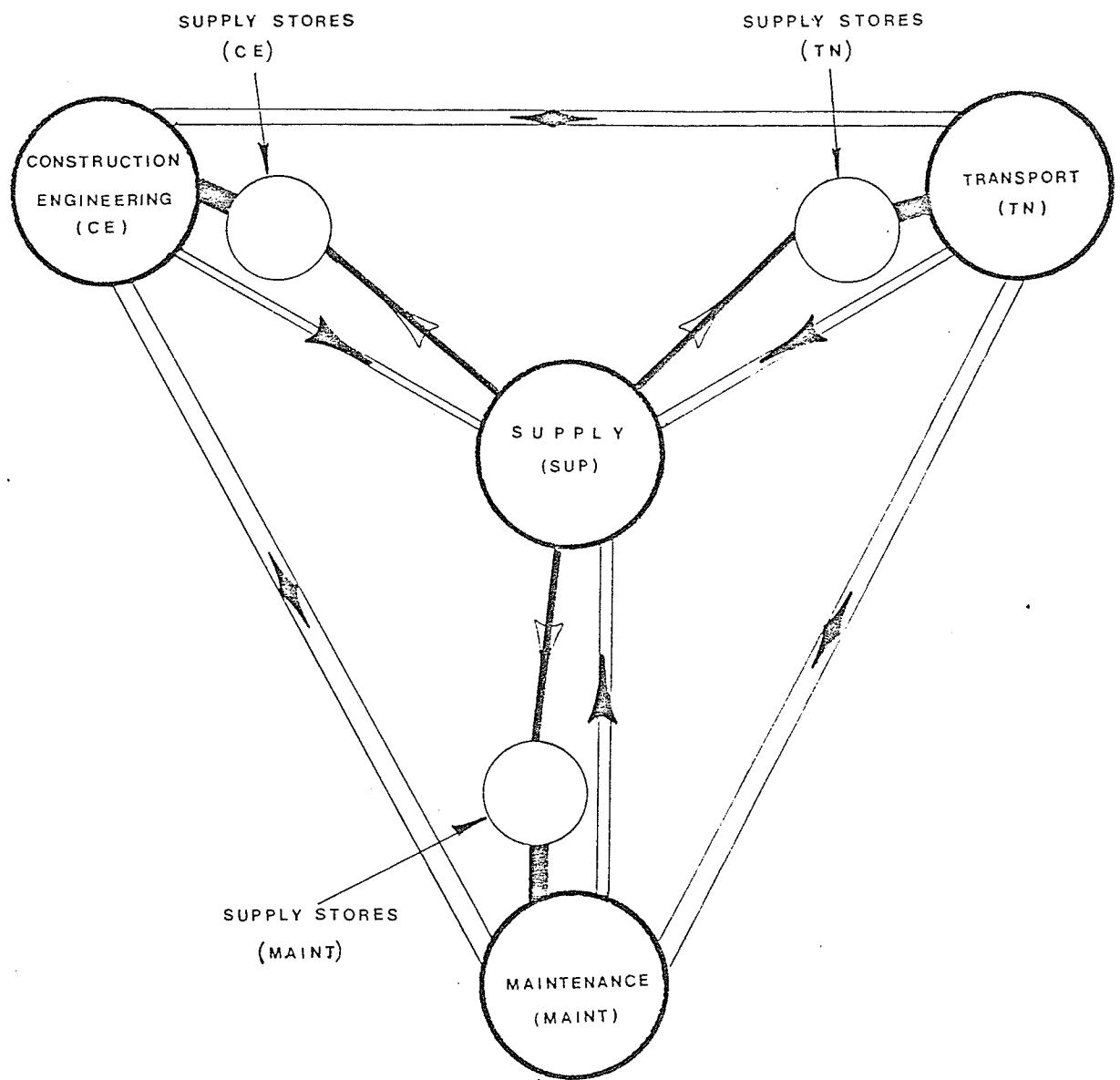


Figure 12

Goods Flow Within Technical Services

fulfills the primary role of the base, i.e. that of providing support services to the units attached to the base.

The components which are found in some form on nearly all bases are listed on page 77 , and generically can be grouped under the following headings:

Base Administration

Base Technical Services

Messing and Lodging

Community and Recreational Facilities

The areas or functions of the base interact in three main ways, namely: People movement, the flow of direction and information/requirements and goods.

The movement of people is predictably heaviest on the home to work trip in the morning and the work to home trip in the evening. The movement during the day is hard to identify and therefore it is difficult to draw conclusions which adequately reflect the move of personnel in a duty and/or non-duty role. However, from observations and investigation of selected DND vehicle moves. Base CE is by far the heaviest used of Base Transportation vehicles indicating that Base CE personnel travel extensively in the performance of their work. Of the other "core" buildings or entities Base Headquarters and the MIR account for a substantial portion of the daily trips.

Direction normally flows downward from the Base Commander and states the guiding principles for the efficient functioning of the base.

Information/requirements represent the normal interchanges of the working branches of the base.

The flow of goods is mainly a technical service function and the storage, handling and transportation of those goods represents the largest commitment of resources on the base..

3.7 Conclusions

Having discussed the resource town and the base in Chapter Two and having examined the key elements of the base and their interaction of Chapter Three, it is necessary now to draw out a set of "check points" for the model base.

These check points are:

1. that the base should have a "centre" and strong identifying symbols;
2. that this centre be somehow linked to a people intensive function and these people intensive functions be located within easy reach of majority of the population;
3. that the PMQ^S should be separate, but joined to the base in a meaningful way (ie) through common use facilities and participation;
4. that the "industrial" functions of Base Technical Services should be co-located because of the heavy interchange of goods and services between and among sections;
5. that the "industrial" functions and "living" functions be properly segregated;

6. that in so far as it is possible, the circulation system be kept to a minimum so as to incur the lowest possible maintenance and transportation costs.

CHAPTER 4

THE MODEL DEVELOPMENT

4.1 General

In this chapter, it is proposed to develop a model for the common components of the base to optimize certain factors which are critical for its efficient operation.

Although integral and lodger units are present on every base, they will not be considered in the modelling, since they could vary from place to place and their inclusion would digress from the main idea of the thesis, i.e. a model for the common components.

This chapter will discuss three model types, namely, Point, Formal Horizontal and Nodal. Each model will be scored against a set of criteria and the highest score will indicate the best model.

4.2 The Criteria

In order to evaluate the models proposed it is necessary to develop a set of criteria against which each of them can be scored. In 1973, DND commissioned a Base Development Study by civilian consultants⁵⁰ of

⁵⁰The study represented the most ambitious attempt by the Department to provide a plan of development for one of its bases. The study examined the various problems of the base which are to some degree being experienced by all the bases of the CF, but it focused on the problems of the industrial facilities related to ship repair and maintenance which are the largest industrial facilities east of Montreal. It took over 4,200 man days to complete.
con't

CFB Halifax, which is Canada's largest base in terms of industrial plant and work force. Because of the complexity of the facilities the consultants found it necessary to do an evaluation matrix applying a method of termed factor analysis⁵¹ to highlight critical areas. Using the study as a start point, it was possible through discussions with other serving members of the CF to synthesize the criteria into a more general format and identify:

1. Basic factors, considerations or fields which should be used in evaluating the base development plan.
2. The areas, functional and physical, which should be evaluated.
3. An evaluation description for each basic factor and function or physical area.
4. A rating structure and points for each evaluation description.

Thus, the criteria for evaluation, which include the "check points" or overall development aims of Chapter 3 are:

^{con't}Because CFB Halifax is one of the largest bases in the CF inventory, the study of base interactions, although somewhat restricted by the particular demands of a base of Maritime Command, represents an analysis that is as close to the general case for base support elements as can be attained without launching a study for that specific purpose. The prime focus of the study was, however, on the industrial facilities and must be given due consideration when considering its merit.

⁵¹CBCL Evaluation Matrix, CFB Halifax Base Development Study, Halifax, N.S., May 1974, pp. 3-10.

1. Customer requirements
2. Operating costs
3. Material flow and handling
4. Ease of implementation
5. Working conditions
6. Layout flexibility
7. Interaction of components
8. Future expansion
9. Capital cost
10. Management
11. Aesthetics

A brief description of each of the factors is as follows:

1. Customer requirements evaluates how well each layout conforms to the basic criteria for each functional area. It also evaluates the overall ability to meet the demands of the prime customer of these support services, the operational, integral and lodger units.
2. Operating costs and the reduction of them is one of the stated aims of development planning within the CF. Although it may be difficult to assess whether one model would be less costly to operate than another, the criteria used here will be the ability of the layout to reduce energy consumption for buildings and vehicles.
3. Material flow and handling evaluates the layouts for effectiveness and simplicity relative to flow

of material and, accessibility for a transportation equipment interface with external handling. It serves to determine the ability of layouts of obviate conflict between internal and external pedestrian and traffic movements.

4. Ease of implementation evaluates the relative ease at which all the component parts of the chosen model could be brought together in time.
5. Working conditions evaluates the location of personnel facilities with particular emphasis on easy access and short walking distances. It also seeks to determine to what extent user comfort and safety are assured.
6. Layout flexibility evaluates the degree of ease by which the layout can be adapted to accommodate changes. Examples of changes are:
 - a. adaptability of space for alternative use, temporary or permanent, and special arrangements;
 - b. switching of space used for related activities;
 - c. ability to accommodate planned changes in uses of structures.
7. Interaction of Components evaluates the relative ease with which the components could relate for efficient mutual support and the execution of their prime function.

8. Future expansion evaluates what potential each layout has for future expansion over and above the present foreseen role. Vertical as well as horizontal expansion is included in the consideration.
9. Capital cost per se for a model is not a relevant tool in the evaluation process of the model. However, the relationship between cost and quality is a valid criterion, since the present condition of the bases reflects a lack of capital imput for buildings that were destined to last for upwards of fifty years.
10. Management evaluates how each layout would affect the management system and management structures. The rearrangement of activities and a consolidation/separation of related processes and operation physically and/or supervisory might require changes in the management of affected areas.
11. Aesthetics places a value on the importance of scale, proportion, type of material and structure, and general compatibility with on-site and off-site structures. Because the recruit enters the service from a civilian environment that has generally, a high standard of living, the CF has to be conscious of the type of facilities in which it expects its members to live. If they are retained on the 1940 level, then the serviceman will not be motivated to give his best.

4.3 The Models

As identified in the introduction, of this chapter, the three models considered are Point, Formal Horizontal, and Nodal Models. They essentially represent the situations that are currently found at various bases.

Each model, with the possible exception of the point model, is tied to one of the "classic" models of the internal structure of the city. These classic models are, of course, the concentric zonation hypothesis of Robert Park and E.W. Burgess, the residential sector model of Homer Hoyt, and the multiple nuclei proposal of Harris and Ullman.⁵²

The Formal Horizontal model represents a synthesis of the sector theory and the concentric zone theory in that the central space is either occupied by a formal spatial focus such as a parade square, football field or formal garden, or a building in which is housed the command authority for the base. To alleviate clashes that might occur between zones of the concentric zonal model, i.e. with industrial traffic passing through an administrative or residential area, the other sections are ranged in radiating sectors around the periphery. Within each of the sections, there is a continuation of the zonal theory in that the Officers, Senior NCO's and Men's quarters are in separate zones and the "people" intensive activity in

⁵²The theories are summarized in Bourne, L.S. (ed), Internal Structure of the City Oxford University Press, N.Y., 1971, pp. 69-74.

Technical Services, i.e. Base Supply occupies a central place "on the square" and others are ranged at the rear.

Because many bases are found in rural areas where land is not a scarce commodity, the Nodal model is intended to represent an expanded version of the multiple nuclei proposal of Harris and Ullman. The nodes are flexible on placement with the only criteria being that the industrial facilities would not create a hazard or interfere with the quiet enjoyment in the residential areas.

4.3.1. The Point Model

The point model is like unto NDHQ, the bulk of which occupies one building in downtown Ottawa. In that one building complex are contained elements of Command, Administration and Comptroller Services, Medical, Messing (cafeteria) and Technical Services. Recreation facilities were designed into the complex, but not constructed. A plan view of the complex is shown in figure 13. The various heights of the towers and connecting central portion are not critical as they are there simply because that was the way DND found the complex. The central idea, however, is that it represents virtually a complete base in a highrise. In the point model, the facilities are arranged from a "hard" or industrial type of activity on the low levels to the "soft" or managerial type of activity on the higher levels of the structure. A graphical representation of the base is shown in figure 14. This represents a vertical section through a building.

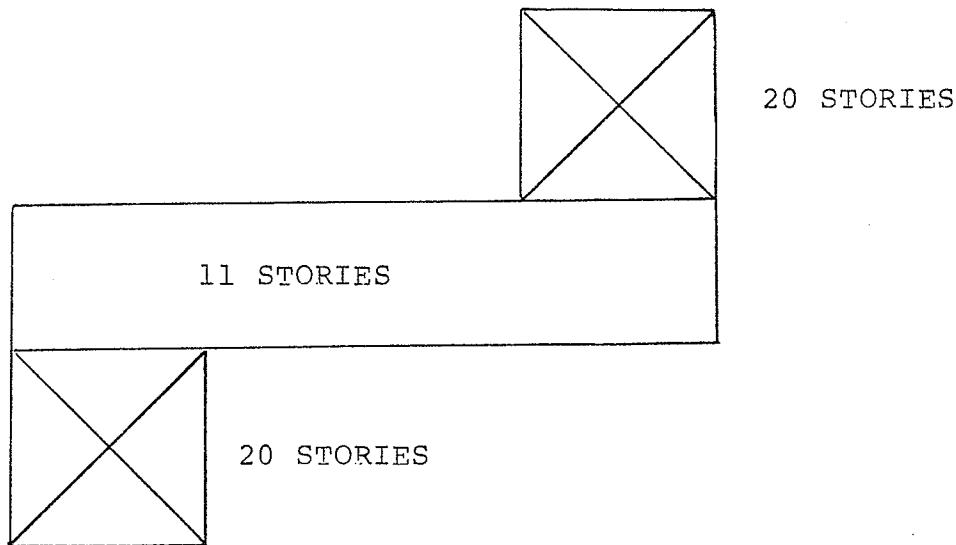


Figure 13

The industrial functions in the lower levels represent the shops and repair facilities of Base Maintenance, the vehicle garages to Base Transportation, the warehouse of Base Supply and the shops of Construction Engineering. These shops et al would contain the personnel and equipment necessary for the efficient running of that central core building as well as those buildings belonging to the integral and lodger units which would be located outside the core building.

Immediately above the shops and stores would be the section heads and staff responsible for the administration and management of the work below. Also at this level would be the administrative functions for the whole base. Contained therein would be pay accounts, personnel administration, records, and medical/dental facilities for all personnel both inside and outside the core building.

Above that level would be the command and control section containing the offices and staff of the branch

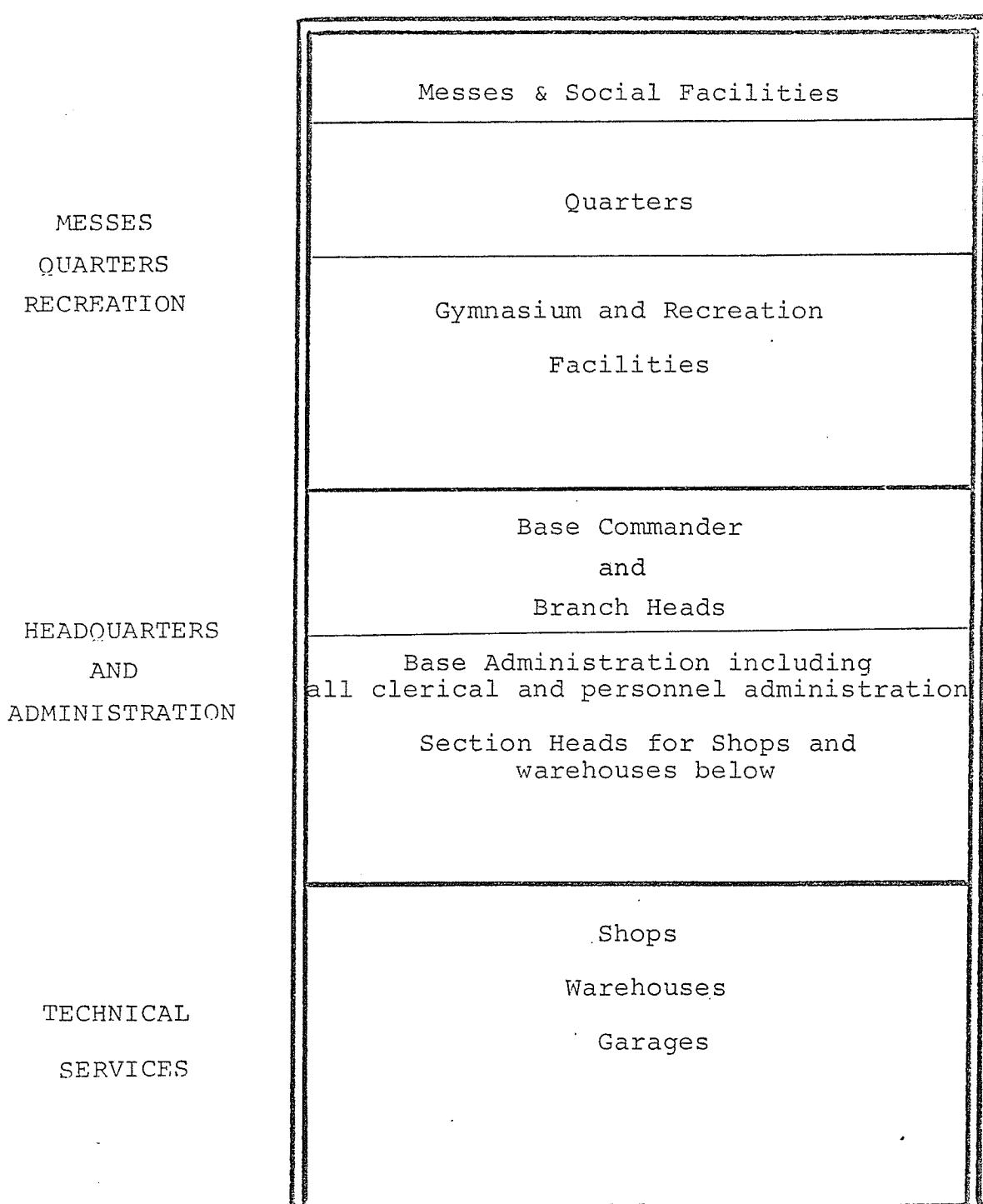


Figure 14

The Point Model
(a vertical section through a building)

heads and the office of the Base Commander.

Above all, at the top level would be the clubs and messes, feeding facilities, recreation facilities and living quarters for single and transient personnel. It is not considered likely that the married personnel would live in the same building, but would live in a condominium type of building that would be built adjacent to the structure and connected to it.

4.3.1.1 Discussion

One of the advantages of such an arrangement is that everything would be contained in one building. For those who live and work in the complex, it would present an ideal solution to problems encountered in harsh climate - that of travelling to and from work.

Transportation links would be at the absolute minimum in that all movement to and from the core building would be that required for the completion of a job in another sector and not for basic communication.

There would be a minimal loss of energy from the building, since it would be built to modern standards presenting essentially only four walls to the elements. Climatic control within the building would be relatively easy, ensuring a comfortable living and working environment.

Security would be fairly simple to ensure, since it would essentially be a matter of controlling access to one building.

The single building complex would make very good use of scarce or extremely expensive land.

The cost of maintenance of utility services would be minimal, since there would be few external services to other buildings and all internal systems would be free from the ravages of the climate.

The disadvantages of the model arise, unfortunately, from the other side of some of those things which might be considered advantageous.

The one building concept could create an atmosphere where people would eat, sleep, work and spend their spare time within the building. This might well be the case if the base were located in an isolated location or in an area where the climate was not conducive to outside activities.

The one structure concept would not lend itself to flexible rearrangement of functions and sections. It is possible that office areas, especially on the open office concept, could be readily rearranged, but workshops and warehouses and other specialized space would be difficult to convert. Also, the addition of a substantial number of people in a short period of time would be difficult to accommodate.

4.3.2 The Formal Horizontal Model

The Formal Horizontal Model is essentially the same as the "unit line" concept which is characteristic of the unit layout found with infantry battalions or armored regiments in former Army camps. The difference here would be that the development would not be restricted to the unit level, but would be applied to the larger organization

of the base and serve as a centre of activity for the units. It is intended that it would assume some formal type of arrangement that would give the base form, allow space between buildings, but yet keep the links to a minimum.

The general format of the Formal Horizontal model is as shown in figure 15.

All the common facilities would be arranged around a central place which would either be a building, a combination of a parade square and a lawn/playing field or be totally covered with grass. In the optimum situation, all the buildings would face out onto an area which was pedestrian oriented. All "local" vehicular traffic would move among the buildings via a common ring road arrangement behind the major buildings which would front on the formal space. All "special" traffic, such as deliveries to Technical Services would be applied to the buildings. Utilities would be supplied via a central utility ring that would run the periphery of the road for ease of servicing.

The area around would be retained as a green or undeveloped area to provide space for athletic facilities or, in the case of emergencies, expansion room.

4.3.2.1 Discussion

The central place would give form to the base. On many DND establishments, the buildings are arranged in a haphazard fashion with roads meandering throughout the base. This pattern is the result of the rapid building program during the war years with later buildings demolition, but the retention of their service roads.

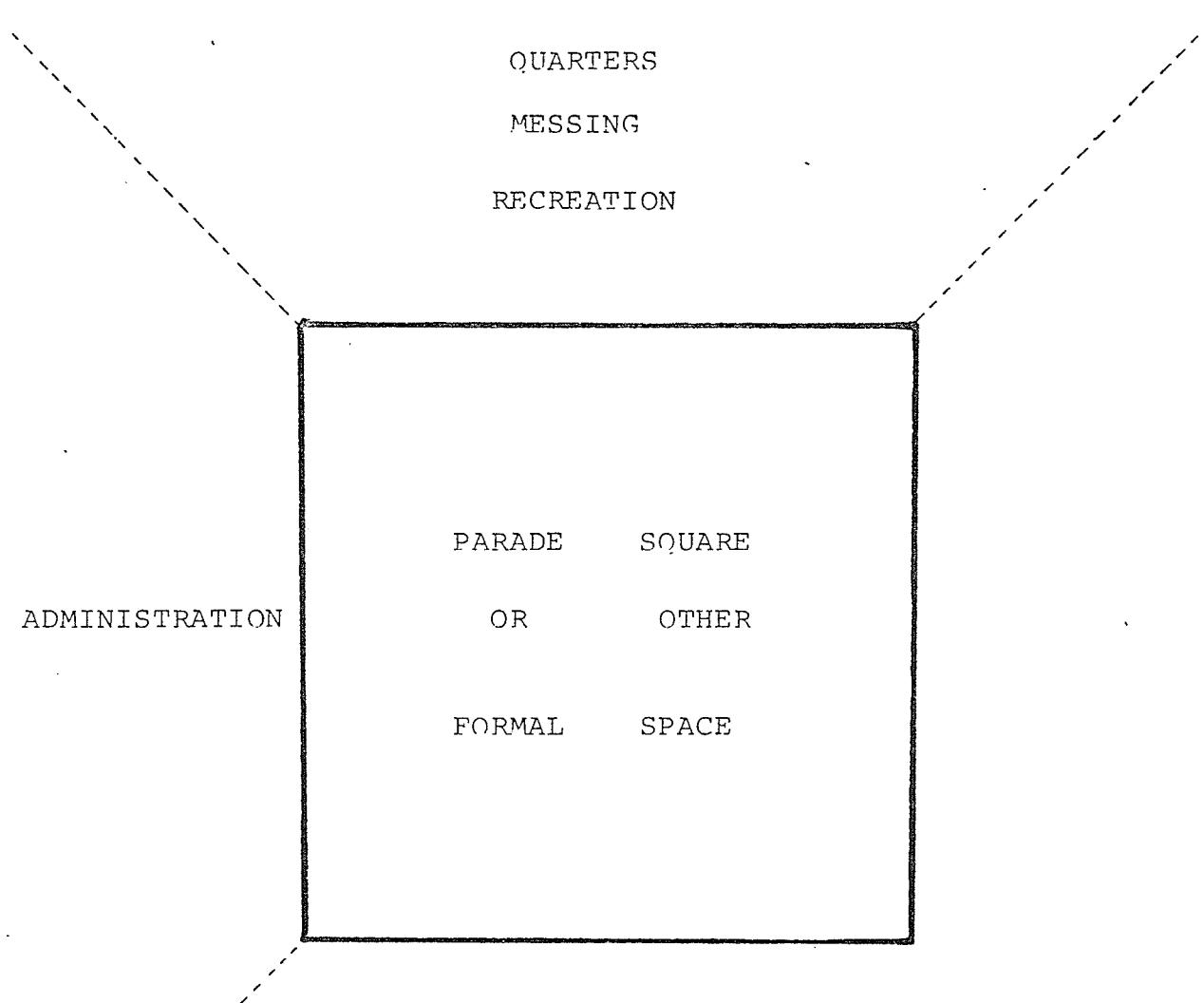


Figure 15

The Formal Horizontal Model

The buildings would be separated giving an identifiable symbol for those who work in the building. The arrangement would allow for flexibility in the expansion capability of the installation since the mirror image could be built in any direction presuming the availability of suitable land.

Travel distance to and from various sections could be kept to a minimum, since the high traffic areas of Base Administration and Technical Services would be grouped to one side of the array.

One of the disadvantages of this model arises out of the separation of buildings. This separation calls for individual utility lines, and communication links which bring the people outdoors in harsh weather. It means that the user who comes to the core of business has to move between several buildings if he wishes to visit more than one section.

4.3.3 The Nodal Model

The Nodal model essentially consists of having the various sections placed in a somewhat random fashion over an area. The general outline of the model is as shown in figure 16.

4.3.3.1 Discussion

In many ways, this model represents what exists today on several bases, except that on the bases, most of the sections noted in figure 16 are further subdivided and spread in more random fashion.

The chief advantage of a layout like the Nodal model is that there would be plenty of room for expansion of each

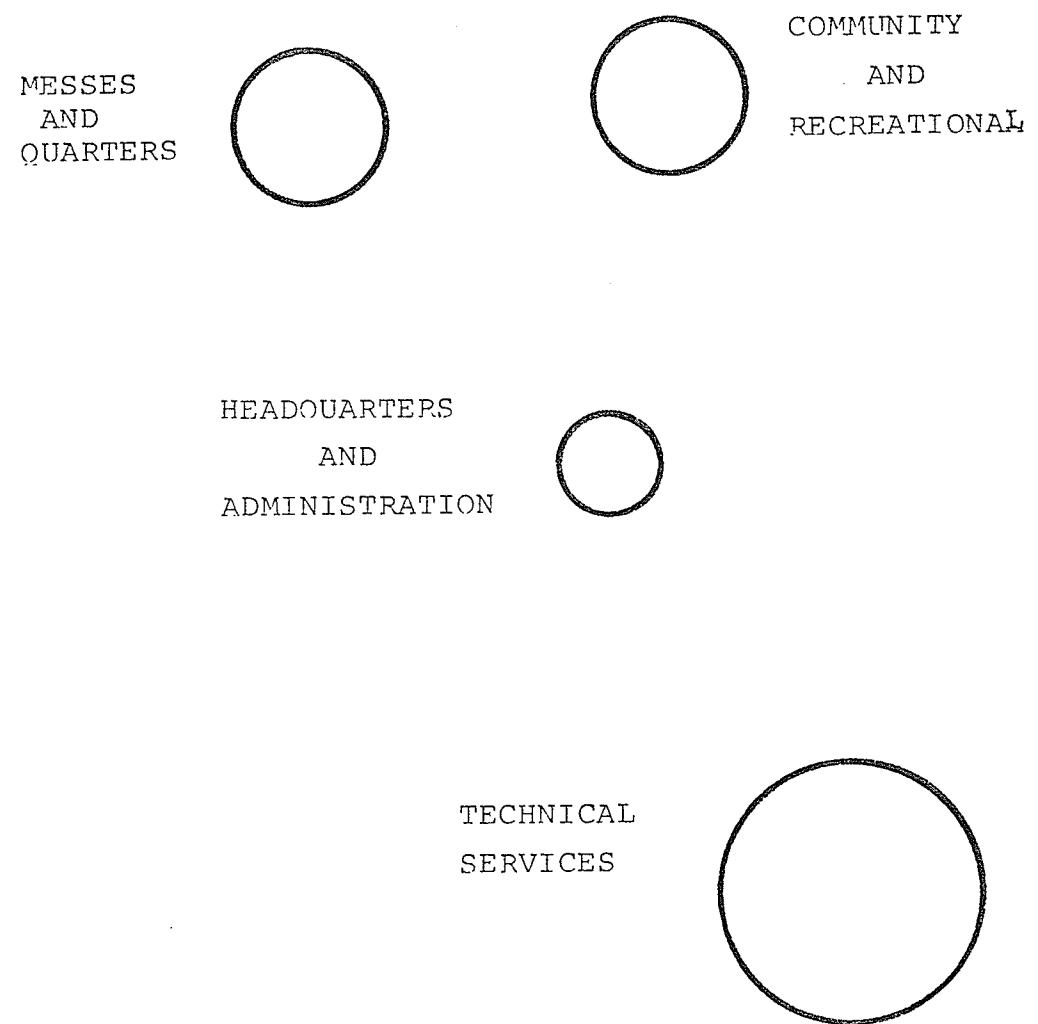


Figure 16

The Nodal Model

individual section and for the base in general. In addition, the dispersal of facilities would allow for individual circulation routes to be planned between sections with plenty of land to adjust the route to the most efficient layout attainable.

However, the random placement of the sections does not lead to the efficient utilization of utilities and creates problems for communication between sections. Traffic patterns if not tightly controlled, can grow haphazardly creating conflicts between pedestrian and vehicular movement. The service that one section gives to the other, and to the units on base is complicated by the distance that customers have to travel to get to the sections; or that the workers have to go to carry out their duties. As with other models with sections in separate facilities, this model proposes a poor utilization of land; and because the facilities are spread out, material destined for various sections must be handled several times.

4.4 The Matrix Methodology

The method for determining a score for each of the models involved:

1. Assigning a weight score to each of the factors;
2. Conducting a survey to:
 - a. assign a weight score to each of the component functions;
 - b. rate each of the models against each of the

factors or criteria.

Initially, each of the factors was assigned a weight⁵³ based on its perceived importance to the overall accomplishment of the principles of base development. The following scale was used in determining the basic weight factor for each of the criteria listed.

- 5 most important to the entire plan
- 4 very important to most areas
- 3 important in several areas
- 2 some importance to the plan or part of the plan
- 1 relevant to the plan in general

From chapter three, the areas or functions considered to be the generic grouping of the support facilities were:

Base Technical Services

Base Administration

Messing and Lodging

Community and Recreational Facilities

Each of these was not considered to have the same impact on development of a layout for a base as all do not have the same demand for space both in quantity and type. For example, Base Administration is not specialized in its space requirements, because being essentially a clerical function, it could be accommodated in any office type building.

⁵³See figure 17. The numbers obtained result from a modification of a concensus weighting procedure carried out during the CFB Halifax Base Development Study when the consultant and representatives of DND from Base and Headquarters rated each of the factors subjectively and individually and the balance was struck within the group.

MODEL EVALUATION SHEET

Model Number

Factor Weights		CRITERIA	I	II	III
5	1	Customer Requirements			
5	2	Operating Costs			
5	3	Material Flow and Handling			
4	4	Ease of Implementation			
4	5	Working Conditions			
4	6	Layout Flexibility			
4	7	Interaction of Components			
3	8	Future Expansion			
2	9	Capital Cost			
2	10	Management			
1	11	Aesthetics			

TOTALS

Figure 17

On the other hand, community and recreational type facilities, such as gymnasiums, swimming pools chapels and shopping facilities are more specialized in their space requirements and, therefore, a little more critical to locate.

Because of the industrial nature of the functions, Base Technical Services is also a specialized branch and, it is for this reason that the interviewees were asked to give their opinion on the relative impact of each component or function on an area.

4.4.1 The Survey

The survey was carried out at the Royal Military College, Kingston, Ontario, and comprised interviews with five officers ranging in rank from Lieutenant to Lieutenant Colonel with an average for the group of 16.6 years of service each. An attempt was made to interview an officer with a background in each of the Sea, Land and Air elements and to get a "young" as well as an "experienced" analysis; but in the main to draw on the opinion of experienced officers.

Because of the length of time that a full survey, i.e. the evaluation of each of the models for each of the components (Messes and Quarters, Administration, Community and Recreation facilities and Technical Services) would have taken, the interviewees were asked to score the models only once.

Each person interviewed was first asked to rank order each of the aforementioned components according to degree

of land consumption. The assumption here was that the component which consumed the largest amount of land in the normal execution of its function would be the most difficult to place and hence should be given due consideration in a detailed design phase. (A first place was assigned four points, a fourth, one point.)

The three models were then shown to each interviewee and each was explained to him. He was then asked to rate each of the models on a scale of one to five (five being excellent and one being poor) as to how well each fulfilled a set of criteria. The scores were determined by multiplying each of the interviewee's ratings by the weight score determined by the Halifax study and summing.

The results of the survey are as follows:

The relative ranking of the components functions according to consumption of land was:

Community and Recreation Facilities

Base Technical Services

Messes and Quarters

Bases Administration

The final score for each of the models are as follows:

Formal Horizontal	736	I
Point	632	II
Nodal	614	III

4.5 Model Application

The two salient points which would guide the application of the models to a particular site would be:

- a. the determination of the size of facility to be provided;
- b. the availability of sufficient land with the correct topographical and bearing characteristics.

From the discussion of the principles of industrial park planning⁵⁴, the most important criteria appears to be that there be an adequate amount of relatively flat land of good bearing capacity. The amount of land consumed will, of course, depend on the size of the installation to be placed.

4.6 Conclusion

From the survey carried out to determine the relative ranking of component functions according to consumption of land it was found that Community and Recreational Facilities was the highest followed by Base Technical Services, Messes and Quarters and Base Administration. From that same survey it was determined that of the three development models proposed (ie) the Point, Formal Horizontal and Nodal, that the Formal Horizontal Model was judged the one which would best fulfill the criteria envisaged as being critical for successful base development.

This criteria, which incorporate the check points or overall development aims of Chapter 3 are:

1. Customer Requirements
2. Operating Costs

⁵⁴Cf., pp. 57-58.

3. Material Flow and Handling
4. Ease of Implementation
5. Working Conditions
6. Layout Flexibility
7. Interaction of Components
8. Future Expansion
9. Capital Cost
10. Management
11. Aesthetics

The Formal Horizontal model provides a formal centre to a military base and depending on the design and arrangement of buildings within each zone, it could provide strong identifying symbols for the inhabitants of the base. This central arrangement of facilities would enhance the service that the base gives to its customers in that all facilities would be located on one place within a reasonable walking distance one from the other that would minimize operating costs such as heating and snow removal and provide for an efficient interaction of components in personnel administration, the flow and handling of material and the overall command and control.

The separation of facilities would ease the capital cost and implementation through a phased construction schedule and allow for layout flexibility within the zones with a good potential for future expansion in a "mirror image" type of situation in any of four directions. This separation would also obviate zoning clashes between Domestic, Administrative and "Industrial" type functions

yet provide for a reasonably easy access of personnel to the "people intensive" functions associated with Headquarters, MIR, Messing, Recreation, etc.

The only drawbacks might be experienced through the separation of building in that each facility or group of facilities would require individual utility and transportation service and no matter how close the buildings are placed to each other it would still necessitate some travel outside in sometimes harsh or inhospitable weather. This factor might not necessarily be a totally negative thing however when it is considered that the alternative might be eating, sleeping, working and playing in one building as might be the case on the point model or if one had to travel outside to travel twice the distance as might be the case with the nodal model.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 General

There are two major problems associated with the current development planning in the CF; the aging infrastructure and the method of planning for the future.

5.2 The Aging Infrastructure

There are 32 bases, 35 stations and 9 miscellaneous sites which make up the bulk of the physical plant of the CF. Many of these facilities were built quickly thirty or more years ago and were originally intended to last ten years. Now, in 1978, many facilities are at the end of their economic life and are becoming an increasingly heavy burden on maintenance funds. Also, the facilities have been allowed to deteriorate to the point where it will soon cost an inordinately large amount of money to replace them. Because of the general laissez-faire attitude of the Canadian people toward defence, the size of the CF has declined steadily since the late 1950's and with the declining numbers has been a reduced or frozen budget. Even so, the number of bases has remained virtually constant, making it difficult to stretch tight defence resources.

5.3 The Method of Planning

Most of the development plans made in the past few years have attempted to deal with the problems outlined in the previous section and discussed in detail in Chapters 1 and 2. These plans, however, appear to be dealing with the base as it is rather than how it should be for the next thirty to fifty years. The plans seem to be largely "make and mend" on a theme that was set more than thirty years ago. While it is acknowledged that many of the planning principles remain the same, it is felt that with restricted resources a fact of life, every effort should be made to develop a new approach to base planning based on the development of a core which could service any size base anywhere, no matter what the role of the units attached to the base.

5.4 Town and Base Planning

In an effort to tie it to more well-known and well-established planning principles, the military base has been compared to a civilian town and more specifically the civilian resource town. They both:

1. Have a certain minimum size, but with the base designated functionally as well as by size of population;
2. Have a civilized population;
3. Are separated from others of the same type;
4. Have inhabitants who may be:
 - a. employed in industries meeting local needs;

- b. employed in "commercial" activities serving a wide area.

They both do not have:

- 1. The same corporate feeling where people feel that they are identified with a particular locality;
- 2. The same type of centre where civic, commercial and cultural uses are concentrated;
- 3. Inhabitants who are:
 - a. employed in industries producing goods for export;
 - b. employed in providing services for tourists.

The one major difference between the resource town and the base, however, is that the former must depend on a completely volunteer work force while, to a certain extent, the latter can be staffed for a certain period of time by people who are ordered to go there.

5.5 The Common Components

All bases are basically divided into the operational and support components. Within the support category are found several components which are present in some form or another on each installation of the CF regardless of size of the operational role of the base. These common components can be generically grouped in terms of space requirements into the following functions or area:

Community and Recreational Facilities

Base Technical Services

Messing and Lodging

Base Administration

5.6 The Models

The three models considered for evaluation are the Point, Formal Horizontal and Nodal Models.

The Point model is essentially the vertical base with the functions arranged from the "hard" or industrial type of activity at the lower levels to the "soft" or managerial type of activity at the top.

The Formal Horizontal model is an arrangement whereby the facilities are grouped along the sides of a formal space which would either be a structure such as a headquarters building or a centre for military activity such as a parade square and/or park/sports field.

The Nodal model is an arrangement of like functions in clusters, but distributed randomly over the landscape. The only criteria is that there be no conflict of uses through locating an industrial and non-industrial activity together.

The Formal Horizontal model received the highest score is a subjective weighing survey discussed in detail in Chapter 4.

It is felt that this Formal Horizontal model could serve as a core for all bases to:

1. Increase the efficiency of the common components in their role to support the integral and lodger units;
2. Eliminate the need for individual planning for each base;

3. Provide a single unified goal for one phase of development planning for the future.

since it most closely fulfills the criteria deemed necessary for the ideal base core.

It would serve as a formal centre providing, functionally as well as symbolically, a reference point for the inhabitants of a base. Its central location would provide improved service to the "customers" of the base (ie) the schools and units which it supports in that all facilities would be located reasonably close to one another to minimize operating costs and provide for an efficient interaction of components in personnel administration, the flow and handling of material and the overall command and control.

From an overall planning point of view, the layout would be beneficial in that it could be repeated from place to place to serve the sea, land or air units of varying sizes. The exact dimensions of the individual facilities would of course depend on the base population. The layout would provide good potential for future expansions in any of four directions and the separation of facilities, although demanding individual utility linkages, would obviate zoning clashes between conflicting land uses.

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ANNEX A

QUESTIONNAIRE

QUESTIONNAIRE

I am doing a study of Canadian Forces Bases and I would like to ask you a few questions on the physical planning of the CF Base.

RANK

ELEMENT BACKGROUND

TOTAL YEARS OF SERVICE

1. Assuming that the following sections or buildings are on every base or station regardless of size, list them in order from the section that takes up the most land for its buildings to the one which takes up the least.

MESSES AND QUARTERS

BASE ADMINISTRATION

COMMUNITY AND RECREATION FACILITIES

BASE TECHNICAL SERVICES

2. Here are three diagrams which show various ways that these sections could be placed relative to one another. I will explain each of the diagrams to you and then I'll ask you a few questions.

3. Each of the following questions represents one of a set of criteria considered to be important for the functioning of a base. Would you rate how you feel each of these models fulfills each of the criteria by giving each a number from 1 to 5 where 4 is excellent and 1 is poor.

QUESTIONS

1. How well would each arrangement serve the customers, i.e. support the schools and units of a base?
2. Which would have the lowest operating and maintenance cost for such things as heat, light, snow clearing, general building maintenance?
3. In each of the diagrams, how would you rate material flow and handling - CE or Supply stores, Stationery, Food, etc.?
4. Rate each of the plans according to ease of implementation - would they be difficult or easy to build?
5. How would you rate working conditions in each of the three situations?
6. How easy would it be to change the buildings or groups of buildings to an alternate usage?
7. Rate each of the diagrams as to how they would facilitate the interaction of the sections?
8. Would future expansion be easy or difficult?
9. Would the capital cost of construction be low or high?
10. Rate each of the diagrams as to how easy or difficult it would be for the Base Commander and the Section Heads to control the organization?
11. From an aesthetics point of view, rate how you think they'd look.

Thank You.