GEOGRAPHY AND PLANNING IN PALMERSTON NORTH

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By

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PREFACE

The statement that "planning has an inescapable geographical basis" [1] is in some respects a truism since town and country planning by its nature must operate within a territorial context. It follows that geography and planning should stand in some direct relationship to each other but the question of degree of relationship is open to debate. This present work is an attempt to explore and test the contribution which geographical studies of an area can make to one stage of the planning process - the compilation and analysis of planning data.

Town planning in New Zealand has reached an interesting and critical stage of development. Although comprehensive planning legislation has been in effect since 1926 it is only since the passing of the 1953 Town and Country Planning Act that widespread efforts have been made to prepare planning schemes. During this period as problems have been encountered and experience in the preparation and administration of schemes have been accumulated, critical attention has been focused on the efficacy of both the legislation and the resultant schemes. As a result of this scrutiny substantial amendments were made to the legislation in early 1967.

But almost all the emphasis has been placed on procedural matters and points of law; little attention

1. Freeman 1958 (a) 13.

has been centred on the content or quality of the planning schemes themselves. Already development in the main urban centres is controlled by planning schemes and the stage has been reached where a number of planning authorities are placing a considerable degree of reliance on their schemes. It seems therefore, to be appropriate and important that some assessment of their content and quality should be made.

The nature of planning is such that an assessment of quality and content could be made from a variety of disciplinary standpoints including economics, sociology and architecture. This study is approached from the geographical point of view and to provide a definitive framework for the study the hypothesis is advanced that:-

(a) the planning process in New Zealand should contain a strong geographical component and hence that,

(b) geographically conceived studies of planning districts would provide a sounder basis for planning than the present planning surveys as required and detailed by the legislation.

It was initially proposed to test the hypothesis by means of a broadly based geographical study of Palmerston North, the results of which were to be critically compared with the Palmerston North District Scheme and, in particular, the planning data used in its preparation.

It soon became apparent, however, that a more satisfactory result would be derived from detailed studies of selected aspects of Palmerston North than from a more general survey of the whole city system. Not only would the work have greater depth but it would also enable a more penetrating analysis of part of the planning process. In addition an analysis of the theoretical relationship between geography and planning together with a brief discussion of planning in New Zealand would be needed to give relevance and perspective to the detailed studies of Palmerston North.

The work has, therefore, been organised in two main sections - the theoretical background to the hypothesis and the detailed test studies.

In the first section a discussion of the theoretical relationship between planning and geography is followed by a brief examination of planning in New Zealand with specific reference to legislative requirements and some apparent weaknesses in the planning process.

Finally in this section after reviewing some aspects of planning in Palmerston North a conceptual basis for an integrated planning survey is advanced. The requirements of the legislation and the local authority setting for planning have been adopted as decisive factors in the formulation of the survey framework and the subsequent organisation of the test studies.

If the initial hypothesis is held to be true and if the work is to have any practical significance then the planning survey proposals should be within the scope of the territorial local authorities who are required to prepare planning schemes.

In the second section two major aspects of the proposed survey - population and manufacturing industry - are analysed in detail together with the detailed study of a problem area. No attempt has been made to exhaust the research possibilities in any of the three test studies. They have been organised within the overall survey framework and are designed to provide and analyse geographical data which is likely to be significant in the preparation of planning proposals.

The choice of population as one of the test studies rests on the fact that population analysis is fundamental to the remainder of the survey. Population characteristics and trends are dynamic factors which underlie the growth and internal structuring of urban areas. Not only are planning proposals prepared to meet the needs of a predicted future population but the development of every aspect of a city is related in some way to population trends. Moreover, initial population analysis frequently indicates aspects of city development that will require special investigation and control measures.

Manufacturing poses unique problems for the planner. Industrial space requirements tend to alter over time and are sensitive to a series of variables ranging from changes in industrial structure to technological innovations. Land allocated for industrial development, usually in association with major transport facilities, tends to be surrounded by other development. It is important, therefore, that adequate land be set aside for industrial development in industrially suitable locations and in advance of other development.

The problem area selected for study is an area adjacent to old railway yards near the centre of Palmerston North. Now vested in the City these yards are scheduled to be redeveloped for "civic purposes". Parts of the area display signs of deterioration and obsolescence. Although suggestions have been advanced for the redevelopment of the old yards little account has yet been taken of the surrounding area. The test study examines the characteristics and development trends of the area to determine whether these have any relevance to, or implications for the redevelopment of the railway yards.

Palmerston North is in many ways an ideal city for research of this nature. Located on the right bank of the Manawatu River at the inland fringe of the Manawatu Plain, the city is compact, has a relatively simple morphology and is administered by one territorial local authority.

Established in 1867 the city has experienced almost all the fluctuations in growth to which New Zealand towns have been subject and is thus representative of urban growth in this country. Of particular importance the City has a good record in planning administration. The municipality employed planning staff prior to the 1953 Town and Country Planning Act and has had an operative planning scheme since 1959. A satisfactory basis exists, therefore, in Palmerston North for the testing of the hypothesis.

Finally, it should be pointed out that the value judgements which preceded the formulation of the hypothesis to be tested here were based on many years of experience in the planning profession particularly in Palmerston North as well as geographic training received at Massey University.

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CHAPTER ONE

GEOGRAPHY AND PLANNING - THE THEORETICAL RELATIONSHIP

With the increasing acceptance and application of town and country planning throughout the world in recent decades, the importance of planning in geographical studies as a prime factor in evironmental change has intensified. During the same period the contribution by geographers and by geography to planning particularly in the field of environmental analysis has also been important. Despite a mutual interest in human environments, however, and an increasing overlap of literature, little has been published concerning the relationship between geography and planning. Those statements which have been made have tended towards oversimplification if not mutual exclusion.

Lord Justice Scott is credited with the remark that "town planning is the art of which geography is the science" [1] - a statement which is only true in the narrow sense that planning is a professional 'art' directed at the purposeful control and development of human environments while geography focuses on the scientific study of human environments, including its development whether planned or otherwise. In this narrow sense planning may well be defined as applied geography but in the wider sense it has also developed its own distinctive scientific base as well as being closely related in practice to economics, engineering, architecture, law and politics.

1. Reported in Stamp 1960, 120.

At the other end of the scale Allen has advanced the view that "geography, at least in Britain, is sadly lacking in the analytical tools to provide and test the descriptive and prescriptive theories which must, for all the imperfections of theory, provide the basis of purposeful human action," [2] and again that "Geography and Planning [3] has many useful things to say, but amply illustrates the limitations for town and country planning which appear to be inherent in the basic discipline of geography." [4]

Examined more closely the theoretical interdisciplinary relationship can be seen to exist at four major levels. [5]

(a) Geography and planning are related in the identification of their disciplinary cores and have similar relationships with other disciplines.

(b) The two share much of the same factual material.

(c) The two use many of the same techniques in collecting and analysing this information.

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2. Allen, 1958, 165.
3. Freeman 1958 (a).
4. Allen, 1958, 167.
5. Zetter, 1966 distinguished four similar categories of relationship but his exposition of them differs substantially from that which is presented here.

(d) The two need some of the same concepts as a means to interpret and understand the environment.

At the first level both disciplines have encountered difficulty in defining simply their respective areas of study: both in taking a synoptic view of environment have pursued detailed studies of small and large areas as well as of individual phenomena, factors of change and the dynamic inter-relationship between "folk, place and work". [6] Not infrequently it has been suggested that each is no more than a composite of other disciplines such as economics and sociology, a view which has been reinforced by an emergent interest in areal studies within those fields. For a time after World War II the role of the planner was seen as that of a co-orinatior bringing together a team of specialists, while the concept of geography as a "bridge" subject is well known.

Definitions of town and country planning such as "the art and science of ordering the use of lands and the character and siting of buildings and communication routes so as to secure the maximum practicable degree of economy, convenience and beauty" [7] which were common until

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6. The Geddesian triad of "folk place and work" has become priminent in planning circles as a fundamental approach at both the investigation level and at the level of establishing planning objectives. Abercrombie restated the triad in terms more suitable to present thought when in Town and Country Planning (1945) he referred to "environment, function and organism" (104).

7. Keeble, 1959, 9.

recently, tend to offer up the profession for division amongst a team of specialists. A rapid development of planning thought has taken place however, in the last decade in which the identity of planning has been closely examined and restated. Planning in practice is a process to which many specialists profitably contribute but the process itself is now seen as being generated and supported by a distinctive body of theory and methodology centred on the application of decision theory in the field of spatial interaction, and change. McLoughlin sees the core knowledge of planning as "location theory, of systems analysis applied to locational and communications models, of simulation and projection, and of evaluation and decision theory"[8] all of which is to be supported by "studies of the history of society's relationships with environment, the legal, administrative, social and economic frameworks within which planning must operate, the actual processes of development of all kinds and the constraints under which they are carried out."[9].

Geography's identity lies in part alongside tha t of planning, but has a fundamental difference in motivating purpose. Hartshorne has stated that "geography is concerned to provide accurate, orderly, and rational description and interpretation of the variable character from place to place of the earth as the world of man."[10]

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8. McLoughlin 1965 - 261.
9. McLoughlin 1965 - 261.
10. Hartshorne 1957 - 21, 47.

In fulfilling its purpose geography has developed a complex of related fields of study which have been generalised into three approaches - the earth science approach, the human ecology approach and the locational approach.[11] As with planning, the complex identity of geography has been subjected to reassessment and restatement. Particular attention has been given in recent years to its association with the emergent school of regional science which connects geography, locational studies with human ecology and the systematic social studies such as economics and it is at this point that geography has its most substantial relationship with the new concept of planning.

It is at the second level in the sharing of factual material that the relationship between geography and planning is most commonly understood. In Geography and Planning, Freeman's primary achievment is to emphasise the value to planners of a wide range of information about place, the physical and human elements of environment and the complex inter-relationships between them which is available in the numerous geographical studies which have been carried out in Britain. The value of such studies to planners stems from a mutual interest in the same information, ranging in Freeman's work from the physical landscape climate and weather and patterns of land use to industrial location and national parks.

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11. Chorley and Haggett 1965 - 372.

More important than the simple sharing of factual material is the need to organise and analyse information in much the same way. Any proposal to develop, control or restrict development, or to remedy environmental problems whether dynamic or physical in nature requires penetrating analysis of the existing situation, trends of development and the probable effect on other elements of the system which would follow its implementation. Geography is well equipped to tackle both general environmental analysis and the specific examination of environmental problems particularly in relation to existing areal patterns and the dynamics of change in them. Nevertheless there is a difference in viewpoint between geographers and planners in the orientation and organisation of the survey of any particular area. The geographer is concerned with completeness in his study of an area, or in the systematic study of any aspect, omitting nothing which is significant in establishing and explaining present patterns and inter-relationships. He believes it necessary to go back in time to obtain a sense of perspective and more certainly to interpret the present. Emphasis is placed on both interpreting the areal inter-relationships present in a study area and on the elements and degree of change. For the geographer predictions of the future are a natural extension of his work and give point to his findings but

are not regarded as an end in themselves. In planning, however, forcasting the future is of prime importance and studies of the present are orientated mainly towards this purpose. Moreover, planning survey s have as an essential component the evaluation of the significance and worth of the present environment in relation to the future demands of the community.

Nevertheless geographical techniques make a powerful contribution to planning surveys. An inherent requirement in any survey is the need to establish priorities for the collection of information and to attach a measure of significance to data if it is not to become an endless and useless compendium of facts. Geography, has at the primary level long singled out for study those aspects of the environment which are significant to man as well as attaching orders of significance to the groups of data which give character, individuality and identity to an area. At the secondary level geography relates its collection of information to the end goals of examining spatial relationships, the connections between dynamic elements and physical form setting the whole in the perspective of time and change.

Having assembled the survey data, techniques are required to analyse and present the information in a comprehensible form. Cartographic techniques of analysis

and representation of spatially associated phenomena are outstanding in their value to both geography and planning. Zetter distinguished three aspects of the use of maps which are especially significant in the two fields.[12]

(a) As iconic models maps enable the spatial patterns of phenomena to be recorded in a form which enables either large areas to be comprehended at once or the detailed composition of small areas to be studied closely.

(b) As areal diagrams, maps enable the systematic comparison of a particular factor such as the representation of town populations by circles scaled to the size of populations or the rate of flow of goods or vehicles shown by flow lines giving a spatial emphasis lacking in tabular analysis.

(c) The presentation of correlations between discrete data in map form is particularly useful in the analysis of spatial inter-relationships. The relationships, for example, between soils and land use or between property values and plot ratios can profitably be shown in map form.

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12. Zetter 1966 - 271.

The two disciplines are further united in the development and use of techniques for the statistical analysis and synthesis of a wide range of variable data. Rapid developments in urban analysis both internal and external have produced techniques for the construction of models relating to many aspects of urban development but especially to the statistical measurement of spatial relationships and the meaningful correlation of dynamic and physical aspects of urban growth. Most of these latter developments however remain at a theoretical stage ofusefulness without as yet a widespread use in the planning process.

In addition to a sharing of facts and techniques, planning and geography employ some of the same concepts in organising their work and in establishing a framework for the effective interpretation of survey information. A brief examination of one concept which is important to both subjects will suffice to illustrate the point.

The regional concept which has long been prominent as a basis of geographical research is of great value in the organisation of planning and in the co-ordination of localised planning proposals. Despite the importance and increasing emphasis on systematic studies, planning by its very nature must have as the basis of analysis and

proposal a carefully defined areal division of the total area (be it nation or continent) to be planned. The identification of planning areas, however, goes beyond a simple need to break down a large area into manageable administrative units. Just as the significance of various environmental features, the pattern of their distribution, and the relationship between them varies from place to place, so too will the approach to planning and the nature of the proposals which are devised. Taken at a simple level of planning theory, a three-tiered hierachy of planning areas can be regarded as desirable. At the first tier a country may be regarded as a single region within which certain major features, physical and dynamic form a coarse skeletal system to which are attached a complex of sub-systems. From an analysis of this nation-region national planning objectives can be prepared laying the framework within which more detailed local schemes will be fitted. At the second tier the total area can be divided into several intermediate regions based on broad associations of environmental and/or social elements. Survey and analysis within intermediate regions provide the basis for development priorities within the region and provide perspective for and co-ordination between detailed district schemes. At the third tier small districts are identified

for the preparation of detailed proposals and control of development.

Hartshorne has defined the region as "an area of specific location which is in some way distinctive from other areas and which extends as far as that distinction extends." [13] The regional concept itself, however, in recognising regions in the general terms of Hartshorne also embraces the inter-relatedness of regions observing connections as well as distinctions. Moreover the concept, necessarily, is flexible, embracing as many types of regions and as many methods of identification as are appropriate to the requirements of the particular piece of research which has need of the concept.

Although a strong body of theory and technique is emerging, the importance of planning lies in its practical application. Re-expressed in practical terms the following products of the theoretical relationship between geography and planning may be observed:-

(a) Geographers are, by training, well equipped to participate in the planning process at the stages of preliminary analysis and subsequent evaluation of planning action.

(b) A fruitful area has opened up for geographical research - the theoretical testing of specific planning proposals through environmental studies before

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13. Hartshorne 1957 - 130.

implementation.

(c) A balanced planning programme will contain a strong geographical component, firstly in the areal organisation of planning regions and districts and secondly during the survey and analysis of the area to be planned.

It is (c) above which provides the central focus for the present study. It is contended that the geographical component of planning is in a large measure absent from much of the planning which has been carried out in New Zealand. After a brief examination of the overall picture of planning in New Zealand and some of its deficiencies it is proposed to examine in some detail the contribution which could be made to planning in Palmerston North by the introduction of a more complete geographical component to its District Scheme.

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CHAPTER TWO
PLANNING IN NEW ZEALAND

The Administrative Setting

Although theory and idealised systems are important to the development of planning one of the principal determinants of its organisation and effectiveness is the administrative setting within which it is carried out. In New Zealand the existing framework of local government has been utilised for planning purposes.

Perhaps the outstanding feature of local government in this country is its fragmentation both territorially and functionally. Territorial local bodies, (the town, borough and county councils) are divided between town and country and the larger urban units themselves are further divided between a series of city and borough councils. Commenting on the New Zealand local government system, particularly the territorial bodies Polaschek states that "it has failed in many cases to provide even the basic necessities of organised and orderly social existence." [1] He attributes this failure to the reluctance of property owners for financial reasons to accept responsibility for wider functions. Arising from this failure central government has retained such functions as education, national power distribution, police and public health which are carried out at the local government level in many other countries. Further, there has been a

1. Polaschek, 1956, 1.

proliferation of local ad hoc bodies to deal with drainage, catchment conservation, local education administration, local power distribution and hospital administration functions for which neither central nor local territorial government have accepted responsibility.

Within the complex local government structure it is the territorial bodies which have been given the authority and responsibility for town and country planning. Theoretically the ultimate control of planning should remain with the central government. But apart from a small organisation, the Town and Country Planning Branch of the Ministry of Works, which has few powers, government has no direct control of planning. Government control of planning is exercised indirectly through the legislation supported by a judicial appeal authority. Each government department (acting through the Minister of Works) and the multiplicity of local bodies may require the appropriate territorial authority to make planning provision for public works for which they are responsible. All other detailed planning is initiated and implemented by the local authority.

The Legislative Setting.

Although many of the planning powers used by local authorities originate in the Public Works Act, 1928 and the Municipal Corporations Act, 1954 the principal statutory authority is the Town and Country Planning Act, 1953, the Town and Country Planning Regulations, 1960 and their

various amendments.

A two tier system of planning is established by the Act. It provides for the constitution of regional planning authorities to prepare and administer regional planning schemes while each territorial council is required to "provide and maintain.....an operative district scheme in respect of all land within its district" [2]. The procedure to be followed in preparing and administrating planning schemes and the constitution and powers of the Town and Country Planning Appeal Board are also laid down in some detail.

Secondly the Act and Regulations are the instruments whereby central government exercises control over the content and form of district and regional schemes. The scope and general content of regional planning schemes is set down as follows:-

" Every regional planning scheme shall have for its general purpose the conservation and economic development of the region to which it relates by means of the classification of the lands comprised therein for the purposes for which they are best suited by nature or for which they can be best adapted, and the co-ordination of all such public improvements, utilities, services and amenities as are not limited by the boundaries of the district of any one local

2. Section 19 Town and Country Planning Act, 1953 (hereinafter referred to as "The Act").

authority, or do not relate exclusively to the development of any one such district.

Every regional planning scheme shall be designed as a guide to Councils engaged in the preparation of district schemes, and also as a guideto public authorities and local authorities and all persons in relation to the conservation or development within the region of public utilities, services, industries, amenities and other matters dealt with or adverted to in the regional planning scheme." 3

The content and format of regional planning schemes are not set down in much greater detail than this. "Matters to be dealt with "are listed in the first schedule to the Act and the only other references to the detail of regional planning is in Section 5 of the Act which reads: "Every regional planning scheme shall be preceded by a comprehensive survey of the natural resources of the area to which it relates and of the present and potential uses and values of all lands within the region in relation to national, regional, and local development, public utilities services and amenities."

In direct contrast with the requirements for regional planning schemes however, the content and format of district schemes are set down in close detail. As well as a list of "matters to be dealt with", contained in the second schedule to the Act, the regulations detail the

3. Section 3 of The Act.

planning data to be collected and the manner of its presentation.

The Act also defines the scope and principal objectives of district schemes. "Every district scheme shall have for its general purpose the development of the area to which it relates (including, where necessary, the replanning and reconstruction of any area therein that has already been subdivided and built on), in such a way as will most effectively tend to promote and safeguard the health, safety and convenience, and the economic and general welfare of its inhabitants, and the amenities of every part of the area." [4]

District schemes consist of three principal documents - Scheme Statement, Code of Ordinances, and Planning Map - the format and wording of which are also laid down in the Regulations.

(a) The scheme statement gives "a description of the particular purposes of the district scheme and other particulars necessary for its proper explanation." [5] It contains the basic statistical data, predictions, and principles on which the scheme is based including an analysis of population structure and growth, a comparative tabulation by area of existing and proposed land uses, and an analysis of traffic, including parking, problems and proposals.

4. Section 18 of The Act.
5. Regulation 15 (i) (a).

(b) The code of ordinances contains the main body of regulations "for the administration and implementation of the scheme." [6] These regulations are comprehensive and complex, specifying procedures to be used in applications for development permission; they define the predominant and conditional uses permitted in each use zone, placing restrictions on the siting, height and coverage of buildings in each instance; they set out the standard requirements for the subdivision of land; they require specific provision to be made for parking and off-street loading; they regulate the preservation of amenities including the control of advertising and the maintenance of land and buildings.

(c) On the district planning map, which must enable the identification of properties, every part of the district is scheduled as a particular land use zone. Zoning is to provide for the expansion of various uses over a 20 year period, and to delineate areas required for public works including schools and recreation areas.

Finally in the legislative control of the content of planning an attempt has been made to embody the planning principles, which are to be followed, in the Act and Regulations themselves. The basic notion is that planning shall be effected by a stringent contrd of land use and these principles contained in the legislation relate mainly to the functions and objectives of land use zoning.

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6. Regulation 15 (1) (b).

In addition a considerable number of local planning authority decisions are taken to appeal. Most of the cases heard before the Town and Country Planning Appeal Board turn on planning principles. Where these have not been clearly established in the legislation they have been defined by the Board itself thus adding the intricacies of case law to the already complex legislation.

Some Planning Deficiencies in New Zealand.

It is not proposed to examine the Act and Regulations to detail their deficiencies as law or to criticise the complex and lengthy procedures which must be followed in bringing a planning scheme to the operative state or which are incurred during the administration of a scheme. The deficiencies examined here are basic to planning itself and for the most part have geographic implications.

Regional Planning.

The legislative provisions for regional planning are remarkable for their flexibility and for the weakness with which they are presented. Having listed the matters to be dealt with and requiring that the preparation of a regional scheme be preceded by a comprehensive survey of the area the statute leaves it entirely to the regional planning authority to design the survey and to formulate both the planning proposals themselves and the format in which they are to be presented. In this way the greatest possible flexibility exists to enable regional schemes both

in survey and in plan to express the particular character and needs of individual regions.

The weakness lies in the fact that the formation of regional planning authorities depends on the voluntary association of local authorities although once initiated the Minister of Works may extend or reduce the area to be included in the region. Although a primary function of regional schemes is that they are to be designed as a guide on matters of regional significance for the preparation of district schemes their preparation is entirely voluntary. On the other hand, whether or not regional schemes exist or are in the course of preparation, every territorial council must proceed with the preparation of district schemes. Moreover, district schemes are required to be completed by the 1st January, 1971. It is logical that planning should proceed from the formulation of national objectives and priorities to regional and finally district planning each providing the framework for the other. In the absence of a regional plan the problem of co-ordinating adjoining district schemes is increased and is a reversal of the theoretical order.

A second factor operating against the institution of regional planning authorities is that in providing for regional planning no definition of regions has been made. Reference to regions is vague adding the problem of regional

definition to that of voluntary association. It is stated that in defining regional boundaries "regard shall be had to natural geographic boundaries and to common social and economic interests, and in cases of conflict, such considerations shall prevail over considerations based on the existing boundaries of the districts of the uniting councils." [7] The Town and Country Planning Branch of the Ministry of Works prepared a regional division of New Zealand for its national resources survey but this has not been advanced by the Government as a statutory basis for a network of planning regions. Despite these problems however six regional planning authorities have been formed for the most part centred on the main metropolitan areas. It could be argued that the authorities which have been established demonstrate that where the need for regional planning is strong and the benefits commensurate with expenditure the voluntary association of local bodies will take place. Nevertheless, without the positive establishment of a network of regions and regional planning authorities, planning in New Zealand lacks an integrated geographical basis.

District Schemes.

In comparison with the requirements for regional planning the legislated control of district planning is markedly inflexible and detailed. The content and format

7. Section 7 (5) of The Act.

of district schemes is carefully prescribed even to suggested wording for the principal documents. Planning authorities may make some additions and alterations but it is necessary to follow generally the form laid down.[8]

One result of this apparent inflexibility has been the tendency to make compliance with the detailed requirements a substitute for planning itself. In some districts the authorities are too small to employ qualified planning staff thus accentuating the tendency to mechanically fulfil the requirements of the legislation.[9] Other local authorities have approached planners to give advice at a minimal fee, the intention and the result being simply to fulfil their obligations under the Planning Act and Regulations. Part of the problem lies in the small population of some of the districts required to prepare district schemes. Of the 140 cities and boroughs and the 111 counties in New Zealand 28 boroughs and 18 counties had fewer than 2,000 population at the 1966 census - 18.3% of the districts requiring planning schemes. In effect the strength of the legislation is proving to be the weakness of planning.

The second major deficiency of district planning is that exactly the same approach and form of planning scheme is laid down for all districts whether urban or rural.

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8. Regulation 15 (2)
9. This opinion is supported by experience in planning, discussions with planning consultants and staff of the Town and Country Planning Branch of the Ministry of Works.

Many of the county schemes that have been produced are little more than single zone plans with almost all the area on the planning map reserved as "rural zone". In city areas the suggested zone classifications have proved to be too coarse for the proper control of development. Two examples are outstanding. In the Regulations only one residential zone is suggested. All urban areas of any size have found it necessary to introduce three or more residential zones to differentiate between and effectively control different classes of residential development. Two commercial zones are suggested to cover the full range of commercial activity from local shopping to central area retail, wholesale, financial and office uses. On the whole, the form of scheme suggested is biased towards the needs of the small town. While the recommended zone classifications can be amended to suit the large urban units and the rural areas, the orientation of the Regulations towards the small town tends to stultify the sensitive planning of the other types of district.

Another important contrast in the legislation and a source of a planning weakness is the lack of emphasis given to the analysis and solution of planning problems such as the redevelopment of blighted areas. Section 18 of the Act in prescribing the general purposes of the district schemes refers in brackets to the "replanning and reconstruction of any area therein that has already

been subdivided and built on". Regulation 12 calls for information regarding the "general condition and estimated future life of buildings in decadent areas, or in areas where development or redevelopment seems likely or desirable." Reference is made to the need to provide off-street parking areas and transportation planning. Section 47 of the Act grants power to the planning authority for the taking of land where it is "necessary or expedient to do so for the proper development or use of the land or for the improvement of areas that are too closely subdivided or are occupied by or appurtenant to any decadent building or for the purpose of terminating any use of land or building that does not conform to the scheme or for the provision or preservation of amenities." Provision is also made in Section 46 for the raising of loans for the purpose of giving effect to the requirements of an operative scheme.

Apart from these references, however, the legislation is silent on the action to be taken to investigate particular problems. Should a local authority prepare plans for positive planning action such as the reconstruction of decadent areas it is doubtful whether either the finance available or the political stimulus would be sufficient to achieve results. Auckland and Wellington City Councils have proposed redevelopment schemes. Auckland's redevelopment of the Freeman's Bay area at the rate achieved so far

could take some centuries to complete, whilst Wellington just beginning its project has already encountered severe financial difficulties.

In the main, the existing operative district schemes in New Zealand do not display any attempt to detect, investigate or solve environmental problems.[10] The one exception is the increasing attention focused on transportation studies and plans. Such plans have been produced for Northland, Auckland, Palmerston North, Wellington, Christchurch and Timaru but in no case have been fully integrated with comprehensive environmental evaluation and planning. Recorded criticism of Wellington's transportation proposals for example, includes: "Whatever its justification the Foothills Motorway was not conceived with any concept of the future design of the city in mind".[11]

The last of the broad deficiencies of district planning to be considered here is the low level of survey and analysis which, in practice, precedes the formulation of planning proposals. Although there is nothing in the legislation to prevent comprehensive surveys at the district level, common practice it to collect data in the briefest form required by the Regulations. Most of the factors already discussed apply here as well. Thus, survey weaknesses can be traced to the financial and technical inability of small authorities to undertake a

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10. This opinion was reached after examination of operative schemes lodged with the Town and Country Branch of the Ministry of Works and discussions with officers of that Department.

11. "Lucifer" writing in the Town Planning Quarterly June, 1965 - 13.

comprehensive planning programme, the unwillingness of local government generally to recognise and accept wider functions such as planning, and the misleading detail with which planning surveys are prescribed in the legislation.

As with planning proposals one basic planning survey is prescribed for use in the planning of the full range of environments from rural to metropolitan. Unfortunately the data which is required is far from comprehensive and the survey provisions of the Regulations are detailed at a low level of analysis.

Most of the data is to be compiled in map form and provision is made for the remainder to be recorded in the scheme statement. The full requirements for planning data have been reproduced in Appendix D but in summary form are as follows:-

Maps
- base map showing cadastral and topographical information.
- land use map.
- soil map.
- transportation routes map.
- traffic flow diagram map.
- map showing areas served by public utilities.
- condition and estimated life of buildings in decadent areas.
- land values map.
- land tenure map.

Statistical (recorded in scheme statement)
- population at 1926, 1936 and each census since 1945 showing percentage change in each intercensal period.
- the proportion of males to females at recent census dates.

- numbers and percentages of population in various age groupings with national figures for comparison.
- estimated future population with a statement of assumptions on which the estimated are bases "such as continuation of rate of growth over last period".
- present occupational structure of the district population.
- motor-vehicle registrations past and predicted.
- estimated available parking space kerbside and off-street with a record of the number of spaces occupied when surveyed.
- forecast of parking spaces that will be required during planning period.

Report form.

- description of present social and economic functions of the district.
- description of any proposed major developments and their likely effect on population size or the functions of the district.
- an outline of factors relevant to zoning proposals - such as "sufficiency of housing" or "resources of particular significance".
- general description of the road rail air and sea communications facilities.

Summary.

Summing up it is evident that a simple adherence to the requirements of the legislation will produce planning schemes which lack the geographical bias and sensitivity which is desirable. Survey data which is produced in this way is inadequate as a basis for the preparation of planning proposals which will provide in depth for the stimulation and control of development. In the minimum form in which it is required to be presented planning data bears little relevance to the preparation of the scheme itself.

Without detailed analysis of the data which is collected, the preparation of planning schemes becomes intuitive while the resultant schemes tend to be static expressions of existing land use patterns. Schemes prepared in this way require constant "patching" and, lacking a scientific foundation could become susceptible to uninformed political pressures. Inevitably, intuition should play an important part in the planning process, for just as a geographer by his training acquires a "feeling for country" so a planner develops an aesthetic sense which enables him to introduce a creative element into the planning scheme. Nevertheless it is difficult to see how, in the absence of a comprehensive, penetrating survey and analysis, a planning scheme can be prepared for a twenty year planning period which will reflect the particular development characteristics and dynamic quality of the district being planned.

Secondly, a major objective of planning is the detection and solution of planning problems before such problems become acute. The solution of planning problems does not always involve expensive redevelopment projects and may be adequately dealt with in many cases by special zoning and development controls. Moreover it is conceivable that in an area which is growing rapidly or undergoing functional transition the introduction of land use zoning and development controls which are not based on adequate planning analysis may themselves intensify emergent problems.

Perhaps the simplest way of putting the argument is that without a geographically conceived investigation the planning scheme will tend to be insensitive to the characteristics and dynamics of the geographical area with which it deals.

CHAPTER THREE

A GEOGRAPHICAL APPROACH TO A PLANNING SURVEY FOR PALMERSTON NORTH

Planning Objectives and the Planning Survey

In the previous chapter, many of the weaknesses in New Zealand planning have been traced to the construction and provisions of the planning legislation and the influence of local government organisation. It is, nevertheless, possible to achieve planning in depth within the framework of the present legislation. The pre-eminent requirement is to conceptualise the planning process in terms of planning objectives as laid down in the legislation rather than in terms of compulsory procedure and prescriptive regulations. In a sense it is a case of "what can be achieved" rather than "what has to be done". Once the concept of planning is centred on planning objectives the statutory obligations to zone land and formulate development controls become instruments tobe used in achieving these objectives.

Planning objectives as promulgated in the Act relate physical development to social goals. In providing for the development of any district, including replanning or reconstruction it is the "health, safety, and convenience, and the economic and general welfare of its inhabitants," together with "the amenities of every part of the area" [1] that are the prime concern.

These are the goals which it is hoped the planning scheme will achieve. Hence the principal

1. Section 18 of the Act.

task of the planning process is to translate the objectives into planning proposals which will encompass, control and stimulate the complex system of physical and dynamic elements which comprise the environment to be planned. The process itself can be seen as passing through four stages from the statement of objectives, to planning survey analysis, to formulation of proposals and preparation of a co-ordinated scheme to the final implementation of the plan. Each stage flows from and is based on the previous stages.

It has been suggested that the realisation of a geographically balanced scheme will depend in a large measure on the depth and geographical balance of the survey which precedes it. This is seen also in the relationship between the statement of objectives and the survey. When related to an actual planning district (urban in this case) the statement of objectives described above becomes more specific and goals are outlined for the planning of the various components of the environment. Although the following statement of objectives was advanced by the San Francisco Planning Commission, [2] it could have been derived from the objectives laid down in the New Zealand Town and Country Planning Act:

" 1. Improvement of the city as a place for commerce and industry by making it more efficient, orderly, and satisfactory for the production,

2. San Fransisco Planning Commission 1952, 6.

exchange and distribution of goods and services, with adequate space for each type of economic activity and improved facilities for the loading and movement of goods.

2. Improvement of the city as a place for living, by aiding in making it more healthful, safe, pleasant, and satisfying, with housing representing good standards for all families and by providing adequate open spaces and appropriate community facilities.

3. Organisation of the two principal functional parts of the city - the working areas and the community areas - so that each may be clearly distinguished from but complementary to the other, and so that the economic, social and cultural development of the city may be furthered.

4. Protection, preservation, and enhancement of the economic, social, cultural and aesthetic values that establish the desirable quality and unique character of the city.

5. Co-ordination of the varied pattern of land use with public and semi-public service facilities required for efficient functioning of the city, and for the convenience and well-being of its residents, workers and visitors.

6. Co-ordination of the varied pattern of land use with circulation routes and facilities required for the efficient movement of people and goods within the city and to and from the city.

7. Co-ordination of the growth and development of the city with the growth and development of adjoining cities and counties."

One implication of a comprehensive, although fundamental, statement such as this is that before detailed and co-ordinated planning proposals can be formulated, a comprehensive survey of the planning area will be required. The complexity of urban systems in the inter-relationship of physical and dynamic factors is such that without a balanced and detailed survey many of the inter-relationships, the direction and extent of change, and the emergence of new patterns and problems cannot be detected and measured. Thus, although, planning schemes can be prepared from the minimum of data and analysis proposed by the Regulations they will not reflect planning objectives with the sensitivity that is desirable. Moreover, it is probable that planning proposals will not take account of some nascent changes and problems until they are physically evident.

Three reasons can be advanced for the implementation of geographically balanced planning surveys:-

(a) Detailed and balanced surveys which are orientated towards planning objectives and which are devised

for the specific planning area will be productive of balanced planning criteria which are specifically related to the planning district.

(b) Detailed analysis will also provide a perspective against which planning proposals will be more meaningful.

(c) Survey results will contribute to a body of information which can be related to other areas.

2. Planning in Palmerston North.

Palmerston North's District Planning Scheme has been operative since 1959 and has recently undergone its first quinquennial review. Statutory planning surveys were carried out for the initial preparation of the scheme and for the review.

The collection and analysis of planning data in Palmerston North can be placed in three groups.

(a) Data collected and recorded in map form in accordance with the Regulations.

(b) Data collected and analysed to meet the requirements laid down for scheme statements.

(c) A comprehensive transportation survey conducted in 1963 which forms the basis for a transportation plan produced in the same year.

Data recorded in map form included soil types, fertility and drainage; areas served by public utilities -

gas, water, electricity, stormwater and sewer drains; ownership of land distinguishing between crown, Maori, private and other ownership; widths of existing streets; bus routes; land subject to flooding; location and type of local suburban shops; land use. No comprehensive reports were based on the collection of data and it appears that only the last three named maps were used in the preparation of the scheme. Land use data was analysed to the extent that total areas developed were computed for the different land use categories.

The requisite data was presented in the scheme statement in the minimum form required. In the review edition of the statement in the space of approximately eight quarto pages the following information was detailed both in the form of tables and written analysis:- population changes; age/sex structure of population; future population; present functions of the district; occupational structure; potential development; information of particular relevance to zoning proposals; communications and transport. The relevance of the data to the planning scheme itself can, in part, be gauged from the fact that many of the required statistical tables and the written material were not prepared until after the review planning proposals were formulated.

The transportation survey on the other hand was detailed, comprehensive and fully presented in the published

plan.

Nevertheless, by comparison with other centres and within the planning pattern which is prevalent in this country the Palmerston North District Scheme is successful with its land uze zoning and controls well grounded in planning principles. However, the zoning proposals, (which as defined by map and code of ordinances are the essence of the Scheme), are rather broadly based. For example, only two commercial zones were used to cover the full range of central area functions in the initial Scheme. A third commercial zone, added during the review, provides a transition between commercial and industrial activities. With the exception of proposed public car parks, (the provisions of which are based on the results of the transportation survey) no specific planning problems have been isolated or provided for in the scheme. Some problems such as the development of the old railway yards in the central area (now vacated and vested in the City Coporation) are known, but have not been included as yet in the planning programme.

Basically the preparation of the planning scheme has been an intuitive process of allocating land for development on the basis of the land use survey and broad estimates of future requirements. A particular obstacle to comprehensive planning has, however, been the piecemeal extensions of City boundaries between 1949 and 1961.

In 1967 for the first time, since planning has been established in Palmerston North, sufficient land was ceded to the City to enable all development to be planned for a twenty year period.

Summed up, planning in Palmerston North while following the New Zealand pattern of adherence to the legislative requirements has been based on a minimum of survey and analysis. The resulting plan is sound in terms of disposition of zones and the presentation of development ordinances but a number of planning problems have not been considered. Further, because of the minimal nature of the planning data available it cannot be known whether the plan adequately provides for those development trends which have yet to be investigated.

3. Basis for a Balanced Planning Survey in Palmerston North.

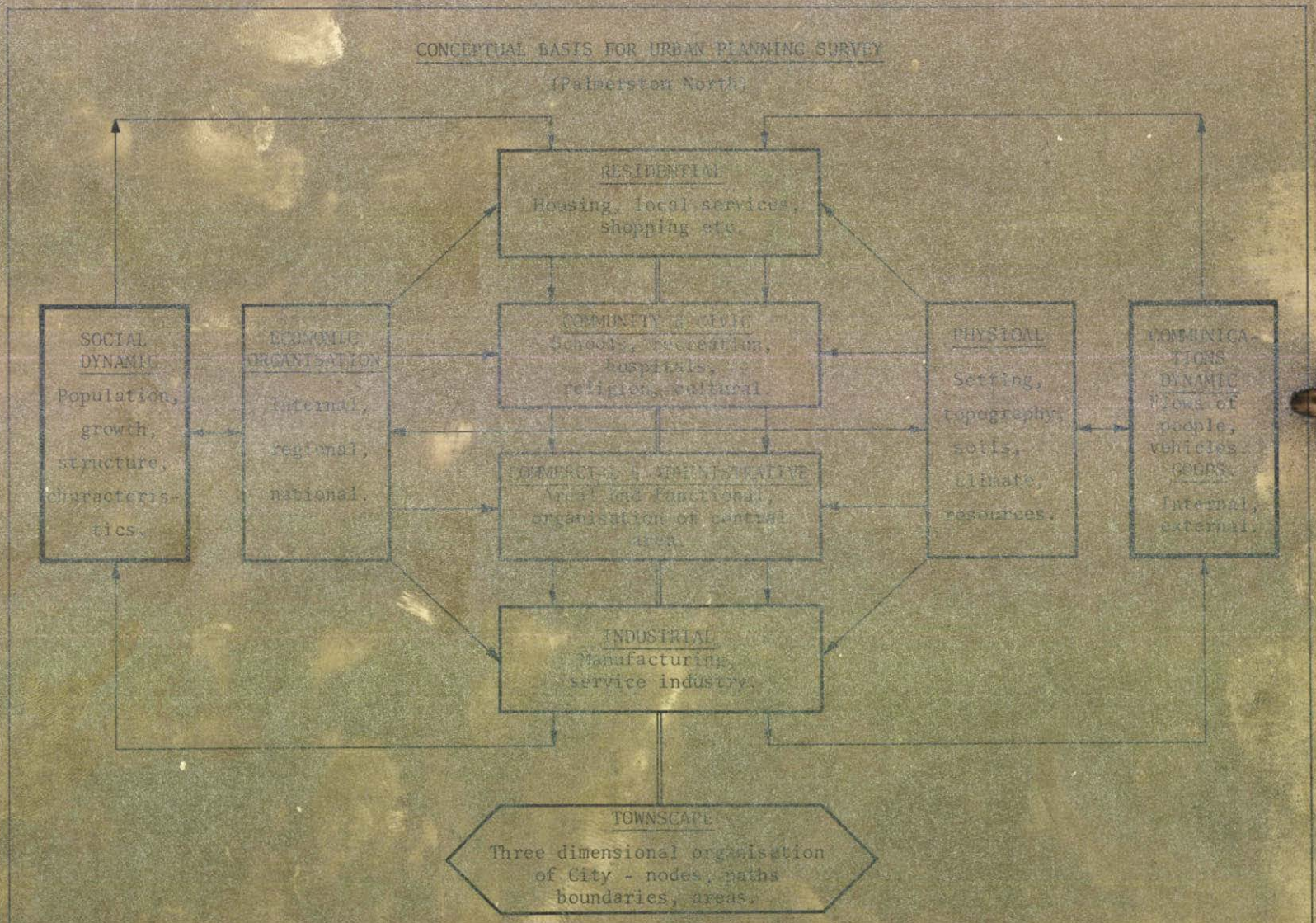
It has been proposed that comprehensive planning should be based on a comprehensive survey and that in this way a stronger geographical element would be introduced to the planning process. In preparing a basis for such a survey in Palmerston North the following conditions and criteria have been imposed.

(a) The survey should be preceded by a statement of objectives similar to that advanced by the San Franscisco Planning Commission so that the detailed investigation can be productive of information which is relevant to the planning objectives.

(b) The plan of survey should take a balanced account of the physical and dynamic elements of the urban environment in their organisation, inter-relatedness and growth trends.
(c) Although comprehensive, the survey should be of manageable proportions and limited to aspects which are of likely significance to the planning programme. Three levels of significance are important; data which will provide direct planning criteria or reveal situations and trends which require special planning action; the assembly of information which will provide a perspective both local and regional for the planning scheme; the analysis of information that may have a wider application at the regional and national level.

With these conditions in mind a conceptual basis for a planning survey of Palmerston North was prepared (Figure 1) as a preliminary to the testing of the main hypothesis. Urban structure both functional and physical has been simplified into compartments capable of individual study and expressed in diagrammatic form to indicate the broad relationships between them. Two dynamic elements - population and communications - are distinguished and are shown with strong inter-relationships with all other elements, but particularly with the four areal elements - residential, community and civic, commerical and administrative and industrial. Two other factors, economic organisation and physical setting are strongly related to

Figure 1


CONCEPTUAL BASIS FOR URBAN PLANNING SURVEY
(Palmerston North)
RESIDENTIAL
Housing, local services, shopping etc.
SOCIAL DYNAMIC
Population, growth, structure, characteristics.
ECONOMIC ORGANISATION
Internal, regional, national.
COMMUNITY FACILITIES
Schools, recreation, hospitals, religion, cultural.
OPEN SPACE AND RECREATIVE
Areal and functional organisation of central area
PHYSICAL
Setting, topography, soils, climate, resources.
COMMUNICATIONS DYNAMIC
Flows of people, vehicles, GOODS
Internal, external.
INDUSTRIAL
Manufacturing, service industry.
TOWNSCAPE
Three dimensional organisation of City - nodes, paths boundaries, areas.

the areal elements. Finally the areal elements of the urban area stand in an organic and aesthetic relationship to each other which can be synthetised as townscape. The study of townscape is at the present time limited in its application to New Zealand planning as specific and detailed legislative authority does not exist which would permit the control of design character. Nevertheless, the study would indicate the three dimensional character of the City, identifying focal points, areas of especially strong aesthetic character, and would provide an insight into problem areas.

Dynamic elements provide the key to the survey and the analysis of these elements will in a large measure indicate trends, and problems which require detailed study in other sections of the survey. Thus, although the survey can be planned in some detail, flexibility must be retained to permit detailed investigation of emergent problems and trends of development which become apparent during the survey.

From the conceptual basis outlined above two studies population and manufacturing industry have been carried out in detail and to these has been added a third study of a known problem - the redevelopment of ex-railway yards near the centre of Palmerston North. It is proposed that these three studies should demonstrate the application of geographically based surveys to planning and should indicate the implications of such studies for planning in Palmerston North.

The studies are limited to the assembly and analysis of data in relation to planning needs and no attempt is made to prescribe planning solutions or proposals.

PART II - TEST STUDIES

CHAPTER FOUR

TEST STUDY ONE - POPULATION

Population Growth in Palmerston North since 1945.

Viewed in its national perspective Palmerston North's population growth has been steady, high, but below the average for urban areas. The average annual percentage increase rose from 2.6 in 1945-51 to a peak of 2.9 in 1951-56 with a subsequent slight decline to 2.7 in 1956-1961 and 1961-1966. Average annual percentage increases in the national population during the same intercensal periods were lower at 1.86, 2.23, 2.11 and 2.11 respectively. A more important comparison may be made between the Palmerston North Urban Area and other urban areas. Palmerston North is located within Kairanga County with the result that city statistics do not always reflect accurately the growth of the urbanised area, particularly where population predictions have been expressed in terms of existing administrative boundaries.[1]

Population growth figures (Table I) for the urban area indicate the same steady rate of growth but contrast sharply with most other urban areas which as a group have experienced a rapidly rising rate of growth reaching an average annual percentage increase during 1961-1966 of 3.5 for North Island urban areas and 3.4

1. Some population statistics are only available for the City itself. However, wherever possible and appropriate urban area figures were used in this study. The Urban Area population is approximately 2,500 persons greater than the City population.

TABLE I.

NORTH ISLAND URBAN AREAS
AVERAGE ANNUAL PERCENTAGE OF POPULATION GROWTH

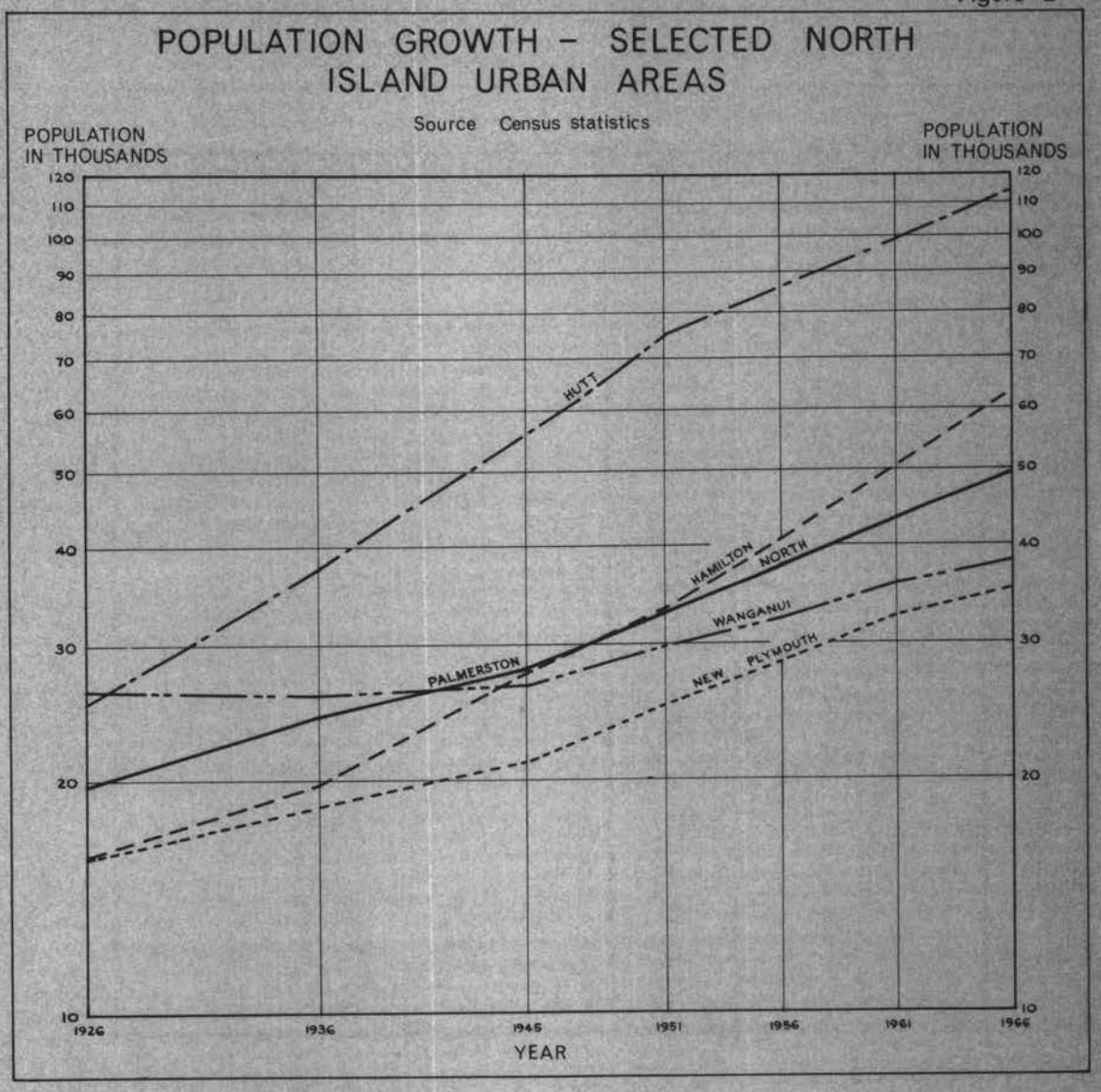
URBAN AREA	1926-1936	1936-1945	1945-1951	1951-1956	1956-1961	1961-1966
WHANGAREI			4.0	3.5	3.5	6.3
AUCKLAND	1.0	2.8	2.05	3.0	3.3	4.1
HAMILTON	1.6	3.6	3.1	4.2	4.6	4.7
TAURANGA			7.6	7.6	5.6	5.1
ROTORUA			5.9	5.3	5.7	5.8
GISBORNE	0.5	1.0	2.3	2.8	2.1	2.1
NAPIER	0.3	1.1	2.6	2.3	3.5	3.2
HASTINGS	2.1	1.6	2.4	3.2	3.5	2.9
NEW PLYMOUTH	1.3	1.6	2.63	2.6	2.8	1.7
WANGANUI	-0.3	0.5	1.8	1.6	2.1	1.4
PALMERSTON NORTH	2.0	1.6	2.6	2.8	2.7	2.6
HUTT	3.9	4.6	5.0	2.8	2.8	3.0
WELLINGTON	1.6	1.1	-0.3	0.7	1.7	2.2
N.I. URBAN AREAS	1.4	2.1	2.4	2.7	3.0	3.5
NEW ZEALAND TOTAL POPL'N.			1.86	2.23	2.11	2.11

SOURCE - Computed from census of population figures.

NOTE 1. Whangarei, Tauranga and Rotorua were first designated as urban areas for the 1961 census but their rates of increase have been computed since 1945.

2. The 1936-1945 and 1945-51 figures have been adjusted to compensate for servicemen overseas.

Figure 2


POPULATION GROWTH – SELECTED NORTH ISLAND URBAN AREAS
Source Census statistics
POPULATION IN THOUSANDS
POPULATION IN THOUSANDS
120
110
100
90
80
70
60
50
40
30
20
10
HUTT
HAMILTON
NORTH
WANGANUI
PALMERSTON
NEW PLYMOUTH
1926
1936
1945
1951
1956
1961
1966
YEAR

for all New Zealand urban areas. Auckland has exerted the largest single influence on this statistic but altogether nine of the thirteen North Island urban areas have experienced a higher rate of growth than Palmerston North. Should the trend continue, Palmerston North's percentage of the national population will gradually diminish. Nevertheless it is expected that the City's past consistently strong rate of growth will be sustained and that the relative loss in national percentages will be of little importance.

General Characteristics of Population Growth.

1. Natural Increase.

Natural increases have been the strongest component in Palmerston North's population growth since 1951 although migration has also been of considerable importance. Since 1951 the intercensal natural increases have been 7.9 per cent, 8.3 per cent and 7.8 per cent indicating a comparatively stable natural increase factor. (Table II). However, the difference in natural increase of 0.5 per cent between the 1956-1961 and 1961-1966 periods may be indicative of the national trend between 1961-1966 towards lower birth rates. Birth rates tend to fluctuate with the level of economic prosperity and it is likely that the present recession could depress the rate of natural increase of population. Palmerston North's economy has however, not been affected as markedly as those of the

main ports. Building activity, for example, the most affected on a national scale, recessed slightly in Palmerston North but remained relatively stable. It is probable therefore that the natural increase of the City's population will continue at a reasonably high level.

TABLE II

PALMERSTON NORTH URBAN AREA
POPULATION GROWTH - NATURAL AND MIGRATION

Intercensal Period	Total Increase		Natural Increase		Migration Increase	
	Number	Percent	Number	Percent	Number	Percent
1951-1956	4867	14.8	2581	7.9	2286	6.9
1956-1961	5410	14.3	3144	8.3	2266	6.0
1961-1966	5955	13.8	3389	7.8	2566	6.0

Source: Census of Population

2. Migration Increase

Most of New Zealand's urban areas have experienced a sustained high rate of in-migration. In-migration to the Palmerston North urban area has accounted for a population increase of between 6 and 7 percent during each of the last quinquennial periods. In absolute numbers the increase due to in-migration during the years 1951-1956 and 1956-1961 were almost the same, (2,286 and 2,266 respectively), but showed a distinct increase to 2,566 persons during the years 1961-1966. (Table II). Examination of the net in-migration for various age groups reveals a strong pattern of change in the character of migration to the City. Net in-migration for the five

yearly age groups from 5 to 9 years through to 60 to 64 years of age were computed by intercensal comparison of age cohorts with an adjustment for deaths (see note below Table III) and are shown in Table III.

In the period 1951-1956 migration gains were scattered comparatively evenly through the age groups with the exception of ages 15 to 29 years. The male increase was small for the 15-19 years age group, strongly negative for the 20-24 years age group but strongly positive in the 25-29 years age group.

Bearing in mind that the arrival and departure of students from Massey Agricultural College [2] would positively influence migration figures in the 15-19 years age group and negatively influence figures in the 20-24 years age group it appears that an out-migration of teenage males occurred. At this time Massey Agricultural College was the only institution for higher education in the City, and a number of teenagers moved out each year to attend teachers' training colleges and Universities in other centres. On the other hand female in-migration was particularly strong for the 15-19 years age group, a net gain of 376 being recorded. No information is available concerning the locations from which these migrants came, but most would probably come from the Manawatu region in search of work. Net out-migration for women occurred in

2. Actual figures for incoming Massey students are not available for this period.

TABLE III

NET IN-MIGRATION - PALMERSTON NORTH CITY

Age Group	1951-1956			1956-1961			1961-1966		
	M	F	T	M	F	T	M	F	T
0 - 4									
5 - 9	132	85	217	118	122	240	159	81	240
10 - 14	132	113	245	165	187	352	153	86	239
15 - 19	23	376	399	91	503	594	267	621	888
20-24	-43	151	108	91	- 4	87	106	-51	55
25-29	205	- 6	199	121	-47	74	139	-55	84
30-34	87	26	113	108	24	132	62	16	78
35-39	106	41	147	88	125	213	39	76	115
40-44	70	83	153	52	70	122	38	94	132
45-49	127	89	216	59	30	89	85	28	113
50-54	72	86	158	28	24	52	124	75	199
55-59	58	66	124	39	62	101	72	55	127
60-64	53	20	73	46	8	54	37	66	103

NOTE This table was computed by analysis of age structure at successive censuses. Each age group or cohort population from the 1951 census was adjusted to allow for intercensal deaths and compared with the next oldest cohort population at the 1956 census, i.e., the 0-4 years cohort of the 1951 census was, after adjustment, compared with the 5-9 years cohort of the 1956 census. The difference in population represents net in-migration for the intercensal period in that age group. The process was repeated for successive censuses to 1966. Death statistics were only available for 5 yearly age groups in the urban area and these figures were interpolated to obtain a near approximation of cohort survival for the city area. The size of migration in each age group is such that the approximation does not significantly affect the results.

the 25-29 years age group.

The establishment in 1956 of the Palmerston North Teachers' Training College to train students from the Wanganui and Taranaki Education Boards' areas had an immediate effect on the migration pattern. Although for the period 1956-1961 the absolute migration gain was commensurate with the earlier period, considerable increases in the numerical gains were recorded for the 15-19 years age group for both males and females. The Teachers' College population was predominantly female in a ratio of approximately four to one, an imbalance which is reflected in the migration table. Male teenage gains in this period are attributable almost entirely to University and Teachers' College expansion, but in-migration of non-student female teenagers remained strong. The transitory nature of these gains is indicated by net losses for females in the 20-29 years age range. Migration gains in other age groups tended to be lower than previously, particularly in the 35-50 years age range.

Trends noted for 1956-1961 period were accentuated during the years 1961-1966 by the additional influence of rapid University expansion. In 1960 a branch of the Victoria University of Wellington was founded in the City and after amalgamation with Massey Agricultural College became an autonomous University in 1964. Rapid expansion

of student rolls and courses at the University have accelerated the rate of in-migration gains for the 15-19 years age group. Net male gains in this age group were 267 compared with 91 during the previous five years - an increase of 193.4 per cent - while the female gain was 888 compared with 594 - an increase of 49.4%. Characteristically, many of the students recorded as in-migrants for the 15-19 years age group, of one quinquennial period, became out-migrants for the 20-25 years age group during the next five years. This effect is particularly marked in the female section where teen-age gains were high. During the last intercensal period considerably higher female migration losses were evident in the 20-24 years age group than previously, a pattern which may be expected to emerge even more strongly in the future. Male in-migration, however, for the 20-29 years age groups showed a further increase over the previous period. By way of contrast the net in-migration for the male 30-44 years age groups and female 30-39 years age groups showed a further decline from the previous period.

To sum up, over the three intercensal periods examined, the following pattern of migration has become increasingly pronounced:- (a) A strong flow and ebb migration movement is present in the 15-24 age groups, principally caused by the expansion of the higher education functions of Palmerston North. The pattern is strongest

in the female section but results in a high overall net gain to the City population.

(b) A continued decline of numerical in-migration for the 30 to 44 years age groups is difficult to explain, but may reflect changes in the employment/functional structure of the city.

(c) The total numerical gains from migration are increasing. Continued expansion of the Teachers' College and the University as at present planned will strengthen the already dominant teenage migration as a factor of population increase and structure.

3. Age/Sex Structure.

In general terms the age/sex structure of a population reflects the combined results, over time, of natural increases and migration. Strong patterns of change in either component of population growth will alter the age/sex balance of the community.

TABLE IV

PERCENTAGES FOR AGE GROUPS - NEW ZEALAND POPULATION

Age	1956	1961
0 - 14	31.5	33.1
15 - 64	59.4	58.3
65 - over	9.1	8.6

Source: Official N.Z. Year Book

The broad national trend since World War II has been towards an increase in the percentage of the 0 -15 and over 65 years groups. (Table IV). It has been shown that this pattern of change correlates closely with other changes in the structure of urban economy in New Zealand.

TABLE V

PERCENTAGES FOR AGE GROUPS - PALMERSTON NORTH CITY

Age	1951	1956	1961	1966
0 - 14	27.5	29.7	31.0	30.3
15 - 64	62.1	60.1	59.5	60.3
64 and over	10.4	10.2	9.5	9.4

Source: Census of Population

In Palmerston North a similar, although not as marked, trend can be observed from 1951-1961. In the 1961-66 period, however, the percentage of the population in the 0-14 years age group declined while the 15-64 years age group increased. (Tables V and VI). National percentages for the last intercensal period are not yet released but the percentage of the population in the 0-14 years age group should remain higher than in Palmerston North. As with the migration figures the most significant change has occurred in the 15-19 years age group which has experienced a notable increase in percentage of the total population. As might be expected the largest increase occurred during 1961-1966 rising from 8.5 percent to 10.5 percent of the total, again attributable to the rising student population. Balancing decreases in percentage composition were not evenly spread over the other age groups but tended to be concentrated in the 30-49 age range.

Forecasts of student rolls for the Teachers' College and the University suggest a total student population in 1975 of approximately 5,000 persons. Beyond this date student numbers are expected to increase steadily

TABLE VI

AGE/SEX STRUCTURE - PALMERSTON NORTH CITY (PERCENTAGES)

Age Group	1951		1956		1961		1966	
	M	F	M	F	M	F	M	F
0 - 4	5.7	5.9	5.5	5.5	5.6	5.5	5.5	5.3
5 - 9	4.5	4.2	5.2	5.3	5.0	5.0	5.2	5.0
10 - 14	3.6	3.6	4.3	3.9	4.9	5.0	4.7	4.6
15 - 19	3.2	3.5	3.1	4.1	3.9	4.6	4.8	5.7
20 - 24	3.4	4.2	2.9	3.6	2.9	3.6	3.6	3.9
25 - 29	3.9	4.0	3.5	3.6	2.8	3.0	2.8	3.0
30 - 34	3.5	3.8	3.6	3.5	3.2	3.2	2.5	2.6
35 - 39	3.3	3.8	3.2	3.4	3.3	3.3	2.9	2.9
40 - 44	3.2	3.5	3.0	3.5	2.9	3.1	2.9	3.1
45 - 49	2.8	3.0	3.1	3.2	2.7	3.0	2.7	2.7
50 - 54	2.2	2.7	2.6	2.7	2.7	2.8	2.3	2.8
55 - 59	1.9	2.5	2.0	2.4	2.2	2.5	2.4	2.5
60 - 64	1.7	2.2	1.6	2.1	1.7	2.1	1.8	2.6
65 - 69	1.7	2.2	1.5	1.9	1.3	1.9	1.4	1.8
70 - 74	1.5	1.8	1.2	1.7	1.1	1.5	1.0	1.6
75 - 79	0.8	0.9	0.9	1.3	0.8	1.2	0.7	1.1
80 - 84	0.4	0.5	0.4	0.5	0.4	0.8	0.4	0.7
85 +	0.2	0.3	0.2	0.6	0.2	0.3	0.2	0.5

Source: Census Bureau

but at a slower rate than previously. Thus the proportion of students to the rest of the Palmerston North urban population will, on present trends, increase significantly. It is probable that by 1975 the tertiary level students will comprise 8.2 percent of the urban area population. [3] The presence of such an over-riding factor renders the prediction of future overall age structure for Palmerston North an uncertain exercise, but it is likely that the age structure of the population excluding tertiary students will follow generally the national pattern.

4. Occupation Structure.

Employment analysis has its primary use in establishing the economic and functional structure of an urban area, but at a basic level also provides useful information concerning the characteristics of a population and factors affecting its growth. Expanding employment factors are significant indications of future migration movements and constitute a basis for population growth. Employment structure and changes for twelve industrial groups are given in Table VII. Unfortunately in the present case Labour Department employment records are only kept for labour districts and City or Borough areas. The largest and fastest growing employer is Massey University, which is located outside the City boundaries and hence is

3. Approximately 40 percent of Massey University students currently reside on the campus which is located outside the City Boundary but within the statistical "urban area".

TABLE VII

PERCENTAGE EMPLOYMENT IN INDUSTRIAL DIVISIONS PALMERSTON NORTH CITY

	1953			1956			1961			1966		
	M	F	T	M	F	T	M	F	T	M	F	T
Forestry Logging, Mining Quarrying	3.4	0.0	0.2	0.5	0.2	0.4	0.4	0.3	0.3	0.5	0.3	0.4
Food and Drink	2.6	1.8	2.4	2.4	2.1	2.4	2.6	1.9	2.4	2.5	1.8	2.3
Textiles, Clothing Leather	1.7	10.9	4.5	1.7	10.9	4.3	1.9	10.0	4.3	2.2	10.2	4.8
Building Materials & Furnishings	6.5	0.8	4.7	6.1	0.8	4.6	4.9	6.0	3.6	4.5	0.6	3.2
Engineering & Metalworking	13.7	2.4	10.2	12.7	2.6	9.8	11.5	2.1	8.7	13.4	2.8	9.9
Miscellaneous Manufacturing	4.5	4.1	4.3	4.7	4.2	4.6	4.9	4.1	4.6	5.0	4.1	4.7
Manufacturing * SUB-TOTAL	28.9	19.9	26.2	34.8	20.6	30.8	32.9	19.4	28.8	34.7	20.4	30.0
Power, Water & Sanitary Services	4.7	0.8	3.5	3.9	0.7	3.0	3.7	0.5	2.7	3.4	0.4	2.4
Building & Construction	14.3	0.7	10.1	15.4	0.9	11.2	15.0	0.9	10.7	12.9	1.0	9.0
Transport and Communications	14.6	5.7	11.9	11.7	6.0	10.1	11.9	5.7	10.0	10.5	5.5	8.9
Distribution & Finance	21.8	28.1	23.7	18.9	26.2	21.2	19.5	26.3	21.6	20.4	24.5	21.8
Domestic & Personal Services Administration and Professional	15.4	46.7	24.3	14.6	45.0	23.3	16.6	47.0	25.8	17.6	48.0	27.5
Seasonal Manufacturing	-	-	-	7.1	-	5.2	7.1	0.7	5.2	7.1	0.9	5.1
TOTALS:	69.6	30.4	100.0	71.2	28.8	100.0	69.6	30.4	100.0	67.3	32.7	100.0

* includes seasonal manufacturing

Source: Official N.Z. Year Book

excluded from Table VII. Despite the exclusion of the University, the largest and fastest growing employment group in the city is "Domestic and personal services, administration and professional" - the group in which Massey University employment would have been included. Employment in this group increased by 32.5 percent and 23.3 percent in the periods 1956-1961 and 1961-1966 respectively. During the same time this group expressed as a percentage of the total increased from 25.8 percent to 27.5 percent. By far the largest proportion of female employment is found in this group (48.0 percent).

All manufacturing constituted the second largest employment group, but comparative employment in this group has fluctuated from 30.8 percent of total employment in 1956 to 28.8 percent in 1961 and 30.0 percent in 1966. During the last intercensal period the rate of growth of manufacturing employment increased significantly totalling 22.3 percent for the five years. Detailed employment in the manufacturing sector will be analysed in a later chapter, but two sub-groups are of especial interest. The "engineering and metalworking" group increased its employment by 32.5 percent between 1961 and 1966 while the "textiles clothing and leather" group which recorded a substantial increase of 20.3 percent between 1956 and 1961 rose again by 28.0 percent during the ensuing five years.

The third large employment sector, "distribution and finance" has maintained a steady percentage of total

employment over the last decade and in 1966 contained 21.8 percent of employment in Palmerston North. Between 1953, when the Labour Department city records commence, and 1956 however, the figure decreased from 23.7 percent to 21.2 percent. To a degree, employment in this group reflects the immediate regional functions of the city while the next group with emphasis on administration, (government), professional (medical, legal and educational) reflects the wider regional functions of the City. Viewed synoptically it can be adduced that Palmerston North's functions in respect of its immediate region are stable, but that its functions over a wider regional area are increasing in importance. The Teachers' College at present serves the Wanganui and Taranaki Education Boards' districts while Massey University attracts students from the southern half of the North Island, Wellington excepted; government departments are tending to increase the importance of Palmerston North branch offices. Secondly the manufacturing sector is, after a slight decline, now increasing in importance.

Changes in the major employment groups have resulted in a corresponding decline of importance in minor groups. "Power, water, and sanitary services" and "transport and communications" although rising in absolute employment numbers have declined as percentages of total employment. "Building and Construction" showed a small absolute decrease.

When compared with employment statistics for New Zealand and Hamilton [4] (Table VIII) several characteristics emerge in the Palmerston North situation. The manufacturing sector is smaller in Palmerston North than for New Zealand, a relationship which is influenced by the concentration of manufacturing at the four main ports but is larger than in Hamilton, the most comparable New Zealand inland city. Distribution and finance are larger than the New Zealand average but smaller than Hamilton while in both cities the domestic and personal, administrative and professional employment is well above the national average.

5. Race.

Non-Europeans do not comprise a significant proportion of the Palmerston North population being only 3.9 percent of the total in 1966. Of the non-Europeans, the Maoris were the largest group representing 2.9 percent of the total city population in 1966. Although not at present important numerically the pattern of increase of the Maori population is interesting and could be of significance in future years. (Tables IX and X). After a 37.9 percent increase between 1945 and 1951 in the City, the Maori population rose by 100 percent in the following five years. Since that time the intercensal increase has

4. Hamilton is frequently compared with Palmerston North on the grounds that they are both inland cities of comparable size, are regional centres for important agricultural regions, and are located approximately the same respective distances from Auckland and Wellington.

TABLE VIII

PERCENTAGE EMPLOYMENT BY INDUSTRIAL DIVISIONS FOR PALMERSTON NORTH HAMILTON AND NEW ZEALAND.

Industrial Group	Palmerston North			New Zealand			Hamilton		
	1956	1961	1966	1956	1961	1966	1956	1961	1966
Forestry, Logging, Mining Quarrying	0.4	0.3	0.4	1.9	1.7	1.5			
Food and Drink	2.4	2.4	2.3	2.7	2.5	2.3	2.0	2.0	1.6
Textiles, Clothing, Leather	4.3	4.3	4.8	6.4	6.3	5.8	1.7	2.3	2.0
Building Materials & Furnishings	4.6	3.6	3.2	5.0	4.9	4.5	4.4	4.4	4.6
Engineering & Metalworking	9.8	8.7	9.9	10.6	10.9	12.2	9.8	9.4	10.9
Miscellaneous Manufacturing	4.6	4.7	4.7	4.7	5.1	5.5	2.4	2.7	3.7
Manufacturing SUB-TOTAL	30.9	28.9	30.0	33.5	34.1	34.5	22.1	21.9	24.7
Power, Water & Sanitary Services	3.0	2.7	2.4	2.1	2.0	1.9	2.6	2.6	2.1
Building and Construction	11.2	10.7	9.0	10.0	9.8	9.5	14.5	11.1	10.4
Transport & Communications	10.1	10.0	8.9	11.0	10.4	9.9	11.6	11.9	9.9
Distribution & Finance	21.2	21.6	21.8	20.7	20.7	20.6	23.1	24.4	25.5
Domestic & Personal Services Administration & Professional	23.2	25.8	27.5	20.8	21.3	22.0	25.8	27.3	27.4
Seasonal Manufacturing	5.2	5.2	5.1	4.1	4.4	4.2	2.1	1.9	1.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Official N.Z. Year Book

TABLE IX

POPULATION - MAORIS

	1926	1936	1945	1951	1956	1961	1966
Palmerston North City	42	92	153	211	422	723	1362
Palmerston North Urban Area	57	114	210	353	494	765	1438

TABLE X

POPULATION GROWTH (PERCENTAGES) - MAORIS

	1926-36	1936-45	1945-51	1951-56	1956-61	1961-66
Palmerston North City	119.0	66.3	37.9	100.0	73.5	88.4
Palmerston North Urban Area	100.0	84.2	68.1	39.8	54.9	88.0

Source: Census of Population

remained high at 73.5 percent between 1956 and 1961 and 88.4 percent between 1961 and 1966 indicating a high proportion of in-migration gains. Although the Maori section of the City's population has maintained a very high growth rate over the last fifteen years, it would be hazardous to forecast that the same high rates will continue for a further period of fifteen or twenty years. If, however, such high rates of growth continue Maori numbers would be of significance before the end of the 20 year planning period. Sustained at a 75 percent intercensal increase the Maori population would be 6.6 percent of the Palmerston North total by 1976 and 15.9 percent by 1986. At an intercensal increase of 50 percent the resultant percentages of the total population would be 4.9 and 8.6.

Forecast of Population.

Although rigorous mathematical techniques are available for the computation of population projections, such projections remain subject to a number of variable trends the continuance of which can never be guaranteed. There are, however a number of factors in the Palmerston North situation which indicate a stable rate of future population growth.

Natural increases during the immediate future may decline in accordance with the national pattern and will probably reflect changes in the economic situation. It is anticipated, however, as demonstrated in an earlier

section, that migration gains in Palmerston North will increase tending to offset any lower increment of natural increase. Continued strong growth in the employment pattern can be expected. In the immediate future the University staff expansion should parallel the rise in student numbers while at a later date the presence of the University may itself become a factor of growth in other employment sectors. With the very low past rate of growth in the Manawatu region, (Table XI) outside of the main towns, expected to continue it is probable that the strongest growth will occur in the manufacturing administration and professional sectors. Apart from the evidence of past growth in the manufacturing and administrative sectors there are a number of factors which could stimulate further growth in the future. Previously government policy has tended to augment the historical concentration of manufacturing and administrative functions at the four main ports. Increasing costs of congestion at the main centres and political pressures from other regions have in recent years influenced both government and private investment policies in this regard. In 1967 Palmerston North was declared an inland port for the purpose of freight equalisation of wire prices, and following political representations from the City Council and others, the extension of freight equalisation to other industrial commodities is being considered by the government.

TABLE XI

POPULATION GROWTH - MANAWATU REGION *

CENSUS 4 YEAR	POPULATION	INTERCENSAL INCREASE	INTERCENSAL % INCREASE	AVERAGE ANNUAL % INCREASE
1926	26,497			
1936	27,666	1,169	4.41	0.4
1945	28,902	1,236	4.47	0.5
1951	31,475	2,573	8.90	1.0
1956	35,325	3,850	12.23	2.3
1961	35,904	579	1.64	0.3
1966	36,967	1,063	2.96	0.6

* The Manawatu Region represented in this table is basically the same as that defined by the Town and Country Planning Branch of the Ministry of Works and includes the Horowhenua, Manawatu, Kairanga, Oroua, Kiwitea and Pohangina Counties. The main urban centres of Palmerston North, Feilding and Levin have, however, been excluded to give a clearer account of rural population growth.

Source: Census of Population

On the wider issue of decentralisation the Minister of Industries and Commerce has stated that, "we in Government have been giving a good deal of thought to, as well as some positive action on, the problems of and policies for decentralisation". [5] Any government action in favour of decentralisation whether in regard to manufacturing or administrative functions can be expected to strengthen growth in Palmerston North.

Finally the city is well located for any transition from a regional to a national orientation of function, (a change which is now evident in the manufacturing sector), which would follow a continued disparity in the growth rates of city and region. At the 1966 census 56 per cent of the national population was located to the north of Palmerston North with 44 percent to the south; the City is located at the centre of a major road rail and air transportation network serving the southern half of the North Island.

In view of these factors the population growth of Palmerston North can be reasonably expected to follow past pattern of steady increase. It is difficult to predict the overall effect of economic restraints introduced recently by the Government and it is assumed that population increase in the long term will not be seriously affected.

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5. Marshall, 13.

The following population estimates produced by the Town and Country Planning Branch of the Ministry of Works indicate continued steady growth. They are, therefore, adopted here despite the narrow range of factors considered in their preparation.

TABLE XII

POPULATION ESTIMATES - PALMERSTON NORTH URBAN AREA

YEAR	ESTIMATED POPULATION	AVERAGE ANNUAL PERCENTAGE GROWTH
1966*	49,140	2.66
1971	55,000	2.4
1976	63,000	2.5
1986	80,000	2.5

* Census figure.

These estimates were produced for every urban area and territorial local authority district in New Zealand being based on the Government Statisticians' population projections for the country as a whole. The projected increases were apportioned to various regions of New Zealand and finally re-apportioned to individual districts within the regions. Detailed analysis of each district was not carried out but cognizance was taken of past average annual increases of population (Tables XIII, XIV) and changes in the percentage share for each district of the total population. Auckland's future growth rate was critical and once estimated dominated projections for other area. It is possible, in view of this, that the

TABLE XIII

POPULATION GROWTH - PALMERSTON NORTH - URBAN AREA

Census Year	Population	Intercensal Increase	Percentage Increase	Average % Annual Increase
1926	20,107			
1936	24,372	4,265	21.2	2.0
1945	27,820	3,448	14.2	1.6
1951	32,908	5,088	18.3	2.6
1956	37,775	4,867	14.8	2.8
1961	43,185	5,410	14.3	2.7
1966	49,140	5,955	13.8	2.6

Source: Census of Population

TABLE XIV

POPULATION GROWTH - PALMERSTON NORTH CITY

Census Year	Population	Intercensal Increase	Percentage Increase	Average % Annual Increase
1926	18,143			
1936	22,202	4,059	22.4	2.0
1945	25,873	3,075	13.6	1.7
1951	30,894	4,654	18.0	2.6
1956	35,632	4,738	15.3	2.9
1961	41,014	5,382	15.1	2.7
1966	46,832	5,818	14.2	2.7

Source: Census of Population

Ministry of Works estimates for the Palmerston North urban area are slightly conservative.

On the present estimates the urban area population is likely to reach 90,000 in 1991 and 100,000 in 1995. However, population estimates are subject to many unpredictable changes which renders such longrange forecasting unreliable.

Distributional Characteristics of Population in Palmerston North.

1. Density Distributions

Gross density figures for urban area or sub-areas do not provide an accurate measurement of actual residential density or the compactness of development. Gross densities are distorted by the inclusion of undeveloped land, reserves, schools and other uses of land which bear little relationship to residential density. Net density, the measurement used here, is arrived at by dividing the actual area (including residential streets) used for housing into the population resident there. Net densities have been computed for each of the zones used in the transportation survey [6] and are presented in Table XV.

The City is remarkably even in its residential densities. Although the range is from 9.4 to 25.7 persons

6. Palmerston North was divided into 26 zones (Figure 4) of approximately the same size and where possible without cutting across major land use groupings for the transportation survey carried out in 1963. The central zone was further divided into ten sub-zones for the 1963 survey but is here divided into four. The 1963 numbering has been retained.

TABLE XV

NET RESIDENTIAL DENSITIES - PALMERSTON NORTH 1966

ZONE	POPULATION	RESIDENTIAL AREA (ACRES).	PERSONS/ACRE
1	1163	58.6	20.05
2	444	22.0	20.18
3	248	610.0	24.80
4	338	22.0	15.36
12	2072	151.0	13.71
13	3167	241.0	13.13
14	1829	157.0	11.64
15	2056	167.5	12.30
16	2172	178.0	12.19
17	1149	87.0	13.20
18	1722	115.0	14.96
19	2382	174.0	1368
22	1298	84.0	15.44
23	586	44.0	13.44
24	1325 *	93.0	14.24
25	1494	111.0	13.45
26	2798	208.0	13.44
27	2621	226.0	11.59
28	2336	230	10.15
29	3152	226.0	13.94
30	1683	179.0	9.39
31	2262	173.0	13.06
32	1849	141.0	13.11
33	1843	136.0	13.54
34	1995	105.0	19.00
35	1952	107.0	24
36	227	11.0	10.63
20	30	3.0	10.0
TOTAL	46832	3459	13.53

* includes Palmerston North Hospital population approximately 650.

per acre, 19 of the 26 zones examined had a density within 2.0 persons of the City average - 13.4 persons per acre. The two zones which recorded low densities (Zones 28 and 30) are also noted for high property values and scored high on the socio-economic scale (Page 86). Three of the high density zones (Zones 1, 2 and 3) are in the central city area while the remaining two are young state and group housing areas with low property values and a low socio-economic rating.

But the outstanding feature is that although a District Planning Scheme has been in operation since 1959 the three areas (Zones 14, 15 and 16) which are planned as high density zones all have densities which are slightly lower than the city average. Two opposing trends have contributed to this position. A large proportion of the flats and tenanted properties in the City are concentrated in a "U" shaped belt around the central area with its open side towards Rangitikei Street. Zones 14, 15 and 16 are the most affected by this concentration of short term accommodation (Fig. 3, 3a) and would normally be expected to result in higher residential densities. Many of the flats are, however, no more than converted houses and almost all are single storey buildings. On the other hand each of the zones contains a somewhat higher proportion than the City average of old people.

If present trends continue only a small increase in residential density can be expected.

Figure 3

PALMERSTON NORTH

DISTRIBUTION OF FLATS

(State Housing Excluded)

REFERENCE

Each dot indicates a property occupied by flats.

SCALE OF CHAINS
25 0 25

Source: PNCC records, 1967

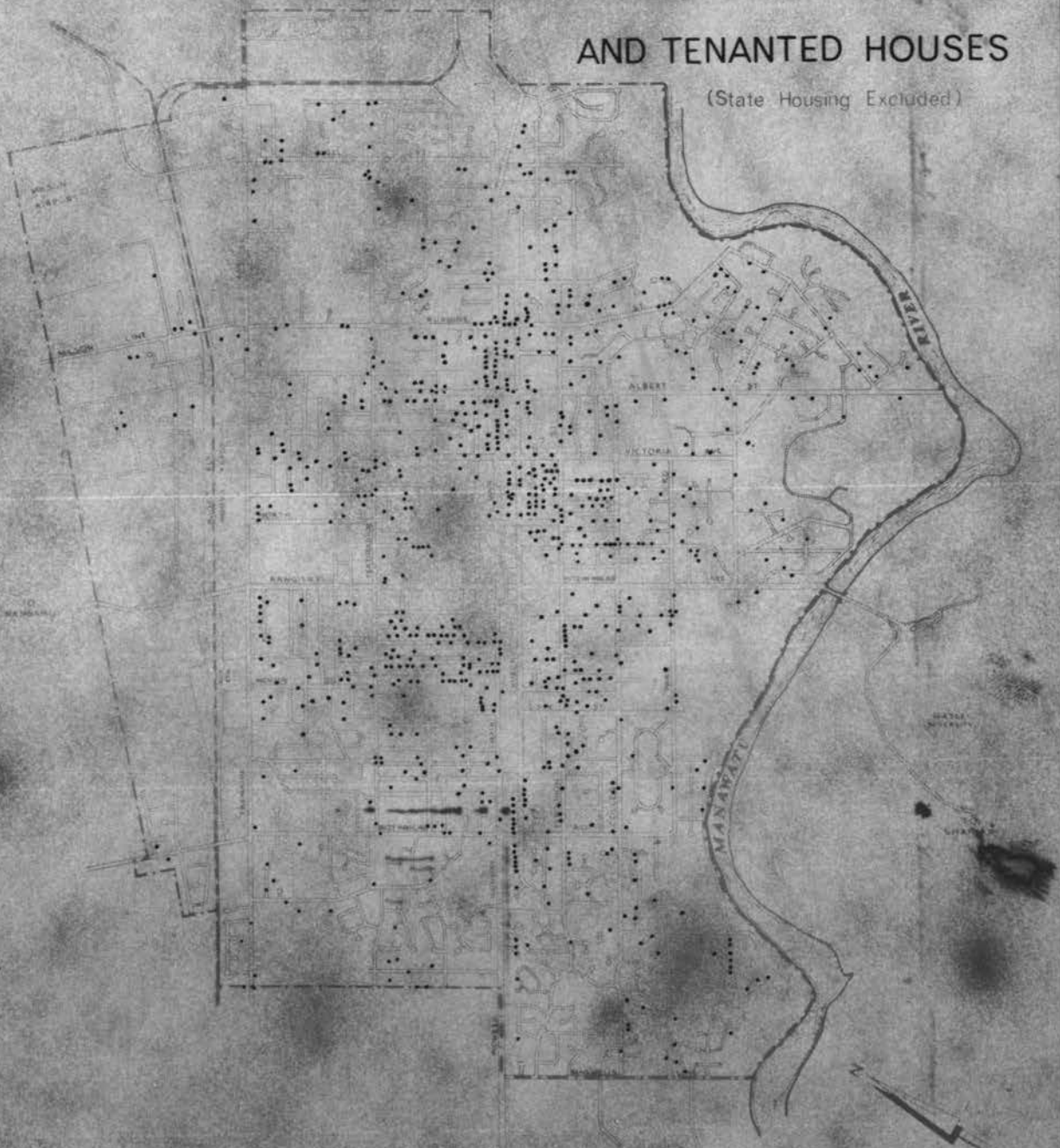
Drawn V.R.C.W. 1968

Figure 3a

PALMERSTON NORTH

AND TENANTED HOUSES

(State Housing Excluded)



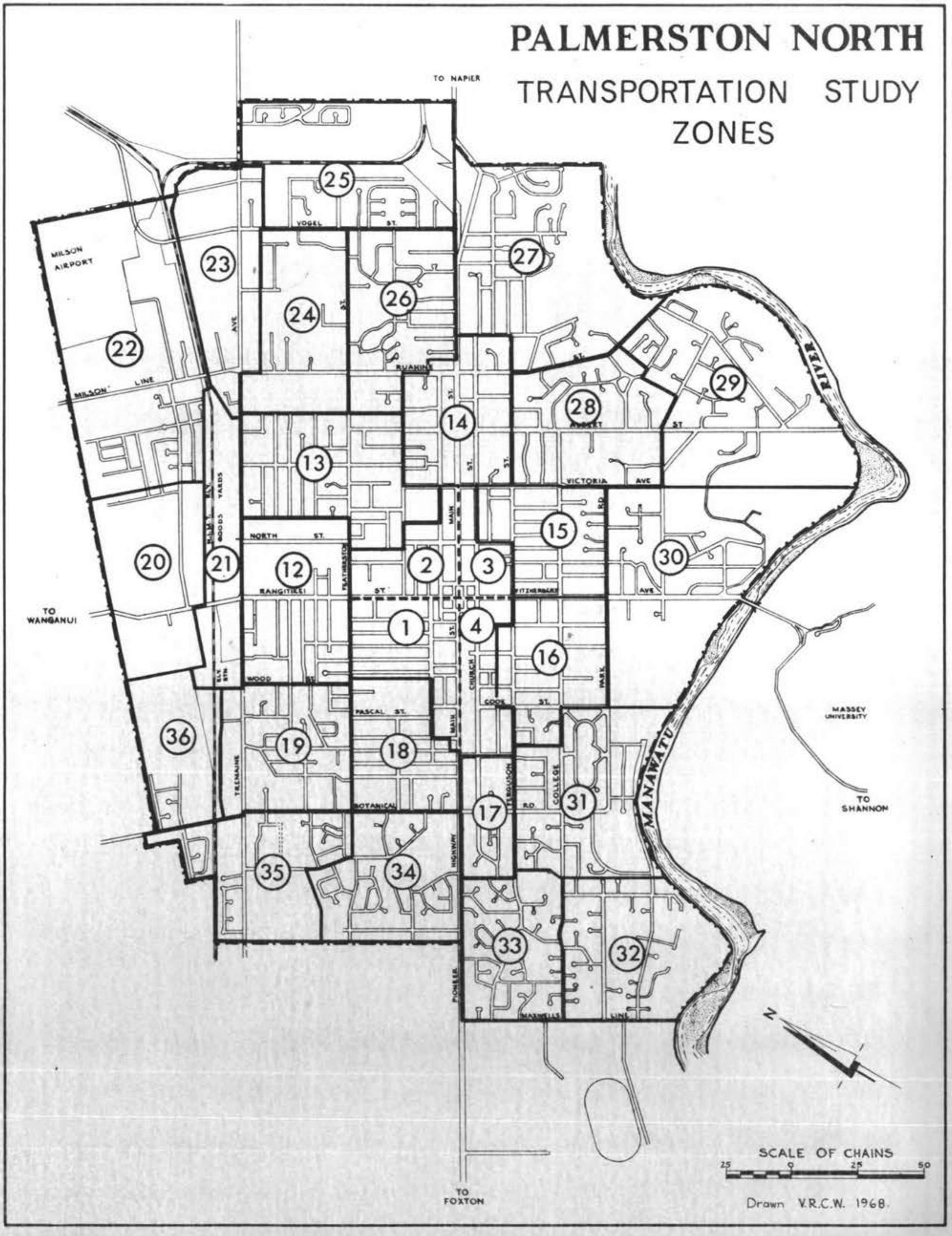
Each dot indicates a tenanted house

Source: PNCC records, 1967

SCALE OF CHAINS
25 0 25

Drawn V.R.C.W. 1968

Figure 4


PALMERSTON NORTH
TRANSPORTATION STUDY
ZONES
TO NAPIER
MILSON AIRPORT
MILSON LINE
VOGEL ST.
AVE
ST.
RUAHINE
ST.
VICTORIA AVE
NORTH ST.
RANGITIKEI ST.
FEATHERSTON
FITZHERBERT AVE
WOODS YARDS
WOOD ST.
PASCAL ST.
BOTANICAL
TREMAINE
MAIN ST.
CHURCH ST.
COOK ST.
PARK RD
FERGUSON
COLLEGE
RD
HIGHWAY
PIONEER
MAXWELLS
LINE
MANAWATU RIVER
MASSEY UNIVERSITY
TO SHANNON
TO WANGANUI
TO FOXTON
N
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968.
1
2
3
4
12
13
14
15
16
17
18
19
20
21
22
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24
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35
36

Without changes in the social patterns of living evident at the present time, or powerful planning incentives the average net density for the City, (excluding the 1967 boundary extensions), will only increase slightly to approximately 14.2 persons per acre. The principal areas of change will be the inner area where a continued demand for flats should lead to an increase in densities but high densities are unlikely without a positive planning programme towards that end.

Rates of Population Growth within the City.

Rates of population growth for different parts of the City have been computed for each of the intercensal periods since 1945 and the results are recorded in Table XVI and Figures 5 to 8.

As is normal in urban areas two distinct patterns of change are present - rapid growth is taking place on the urban fringe while static or declining populations characterise the central area. Palmerston North's compact rectangular form emphasises these two movements.

Rapid growth has not occurred in a continuous band around the fringe, but has been localised to particular peripheral areas. Figures 5 to 8 show that the areas of rapid change have rotated from census to census in a clockwise direction from the north eastern sector of the urban periphery to the south western sector. Development in the northern sector increased between 1961-1966 and during the next five years should complete the peripheral

TABLE XVI - POPULATION DISTRIBUTION - PALMERSTON NORTH - RATES OF GROWTH

Zone	Pop. 1945	Incr.	% Incr.	Pop. 1951	Incr.	% Incr.	Pop. 1956	Incr.	% Incr.	Pop. 1961	Incr.	% Incr.	Pop. 1966
1	2230	-128	-5.74	2102	-439	-20.88	1663	-138	-8.29	1525	-363	-23.80	1162
2	1067	-139	-13.02	928	-217	-23.38	711	-141	-19.83	570	-127	-22.28	443
3	522	- 50	- 9.57	472	- 38	- 8.05	434	- 94	-21.65	340	- 93	-27.35	247
4	553	25	4.52	578	- 2	- 0.34	580	-199	-37.31	381	- 44	-11.54	337
12	1887	175	9.27	2062	22	1.07	2084	34	1.63	2118	- 47	- 2.22	2071
13	2672	290	10.85	2962	- 53	+ 1.79	2909	164	5.64	3073	93	3.02	3166
14	2118	-100	-4.72	2018	- 53	- 2.63	1965	-132	-6.72	1833	- 5	- 0.27	1828
15	2048	125	6.10	2173	- 12	- 0.55	2161	- 46	-2.13	2115	- 60	- 2.83	2055
16	1898	40	2.11	1938	96	4.95	2034	113	5.55	2147	24	1.12	2171
17	478	129	26.99	607	126	20.76	733	324	44.20	1057	92	8.70	1149
18	1578	54	3.42	1632	- 54	- 3.31	1578	59	3.74	1637	84	5.13	1721
19	440	137	31.13	577	1272	228.37	1849	684	36.99	2533	-152	- 6.00	2381
20	25	10	40.00	35	-	-	35	1	-	36	- 6	-	30
22	442	90	20.36	532	118	22.18	650	237	36.46	887	410	46.22	1297
23	173	132	76.30	305	336	110.16	641	27	4.21	668	-83	-12.42	585
24	841	642	76.36	1483	447	30.14	1930	42	2.18	1972	-8	- 0.40	1964
25	253	271	107.11	524	612	116.79	1136	62	5.45	1198	295	24.62	1493
26	1149	1603	139.51	2752	241	8.76	2993	-35	-1.17	2958	-161	- 5.44	2797
27	1350	174	12.88	1524	301	19.75	1825	350	19.18	2175	445	20.45	2620
28	1077	249	23.11	1326	244	18.40	1570	409	26.05	1979	356	27.98	2335
29	318	444	139.6	762	332	43.57	1094	1411	128.98	2455	696	28.35	3151
30	775	626	80.77	1401	379	27.05	1780	-25	-1.40	1755	-73	-4.15	1682
31	1418	118	8.32	1536	312	20.31	1848	451	24.4	2299	-38	-1.65	2261
32	NA	-	-	NA	-	-	372	424	113.98	796	1053	132.28	1849
33	NA	-	-	NA	-	-	606	546	90.10	1152	690	59.89	1842
34	NA	-	-	NA	-	-	NA	-	-	247	2182	883.40	2429
35	NA	-	-	NA	-	-	NA	-	-	806	1118	138.70	1924

Source: Census Collectors' Districts Returns

Figure 5

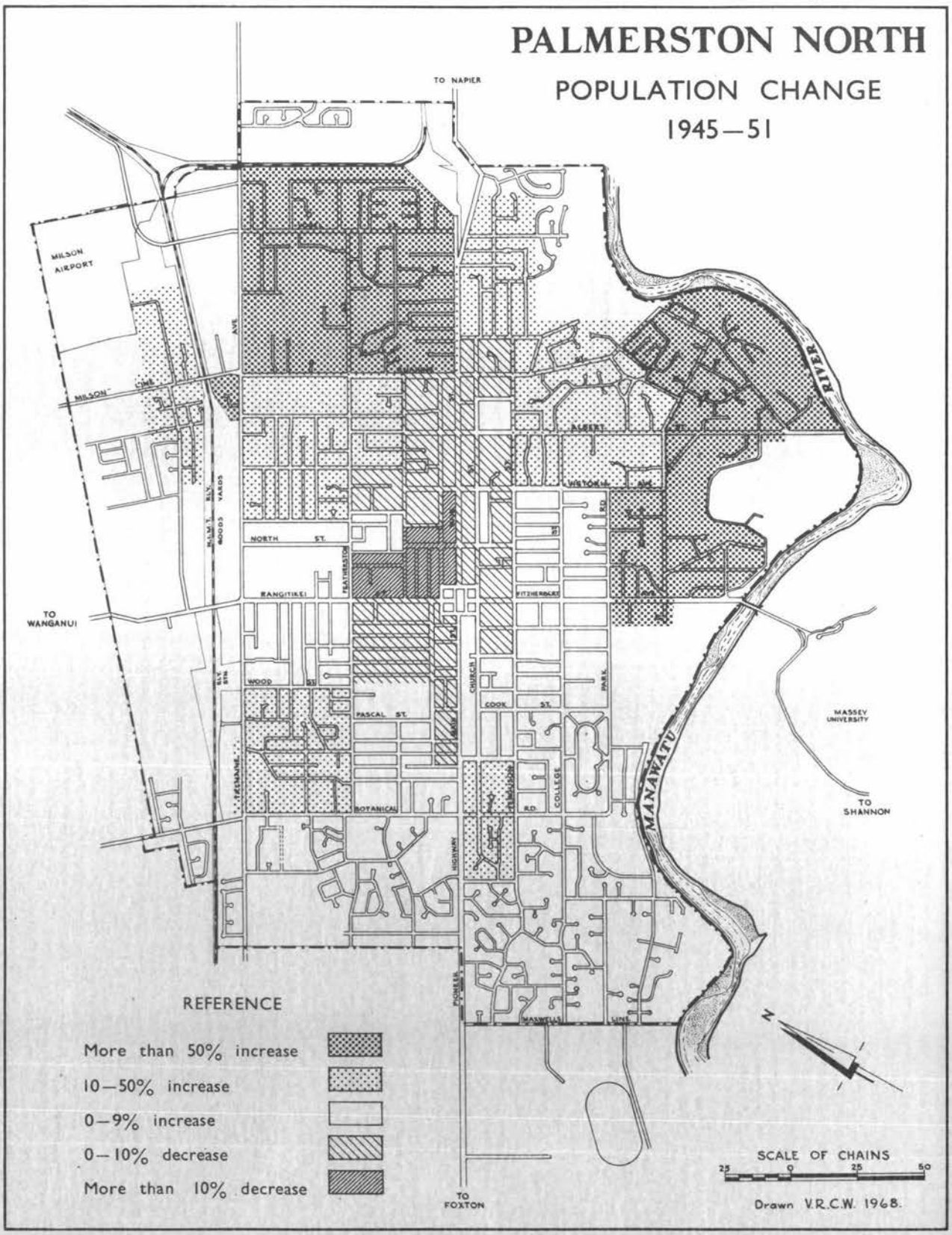

PALMERSTON NORTH
POPULATION CHANGE
1945—51
TO NAPIER
MILSON AIRPORT
MILSON LINE
RIVER
ALBERT
VICTORIA RD
NORTH ST.
RANGITIKEI
FEATHERSTON
FITZHERBERT
TO WANGANUI
WOOD
PASCAL ST.
CHURCH
COOK ST.
PARK
MASSEY UNIVERSITY
MANAWATU
TO SHANNON
TREMAINE
BOTANICAL
HIGHWAY
COLLEGE RD
PIONEER
MAXWELLS LINE
TO FOXTON
REFERENCE
More than 50% increase
10—50% increase
0—9% increase
0—10% decrease
More than 10% decrease
N
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968.

Figure 6

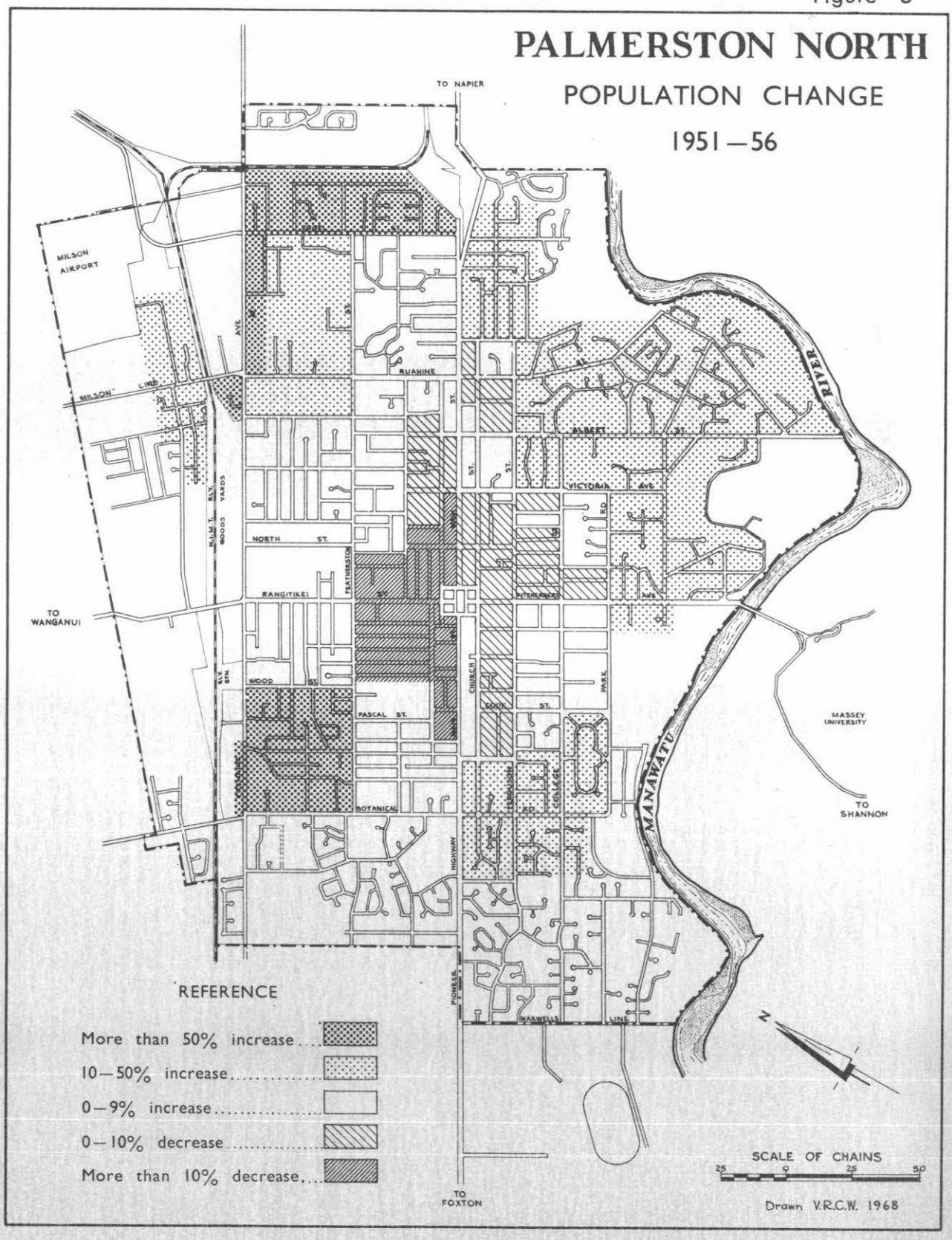

PALMERSTON NORTH
POPULATION CHANGE
1951—56
TO NAPIER
MILSON AIRPORT
MILSON
RUAHINE
ALBERT
VICTORIA
NORTH ST.
RANGITIKEI
FEATHERSTON
TO WANGANUI
WOOD
PASCAL ST.
CHURCH
BOTANICAL
MANAWATU RIVER
MASSEY UNIVERSITY
TO SHANNON
HIGHWAY
PIONEER
MAXWELLS LINE
TO FOXTON
REFERENCE
More than 50% increase
10—50% increase
0—9% increase
0—10% decrease
More than 10% decrease
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968

Figure 7

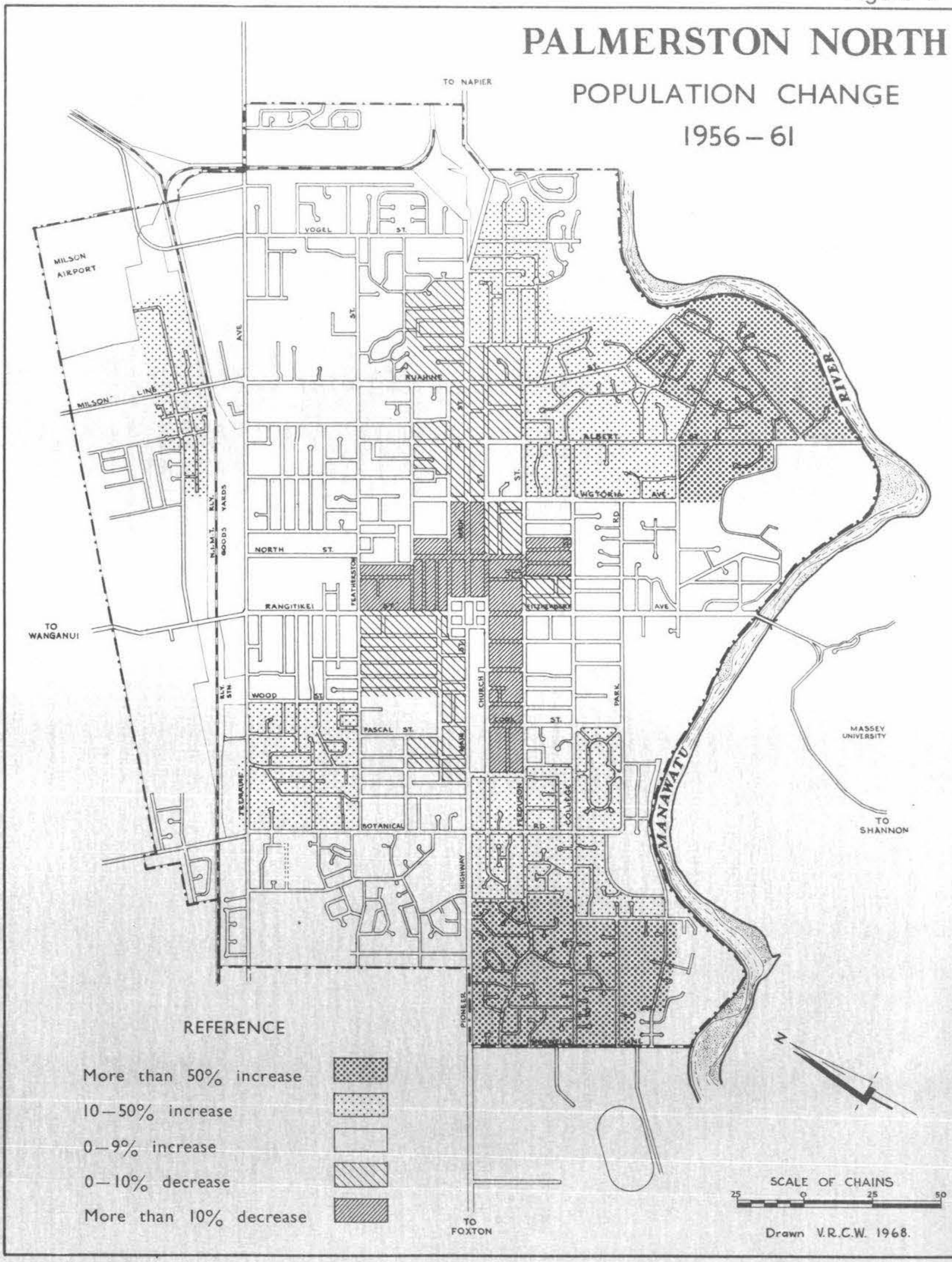
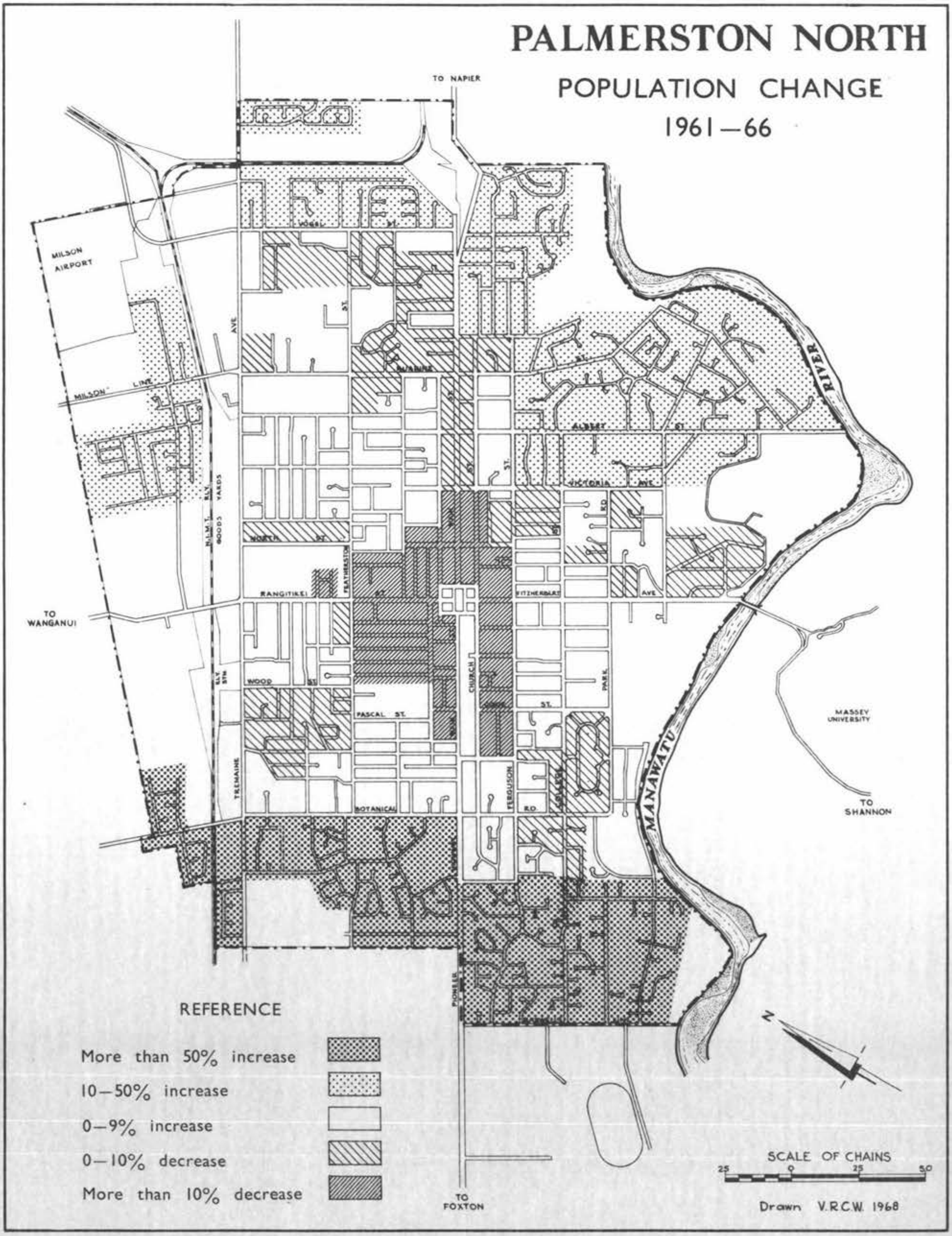

PALMERSTON NORTH
POPULATION CHANGE
1956–61
TO NAPIER
MILSON AIRPORT
MILSON LINE
VOGEL ST.
RUAHINE
ALBERT
VICTORIA AVE
NORTH ST.
FEATHERSTON
RANGITIKEI
FITZHERBERT AVE
TO WANGANUI
N.I.M.T. RLY. GOODS YARDS
RLY. STN.
WOOD ST.
PASCAL ST.
MAIN
CHURCH
COBA
PARK
COLLEGE
FERGUSON
BOTANICAL RD
TREMAINE
HIGHWAY
PIONEER
MASSEY UNIVERSITY
TO SHANNON
MANAWATU RIVER
TO FOXTON
REFERENCE
More than 50% increase
10–50% increase
0–9% increase
0–10% decrease
More than 10% decrease
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968.

Figure 8


PALMERSTON NORTH
POPULATION CHANGE
1961—66
TO NAPIER
MILSON AIRPORT
MILSON LINE
VOGEL ST.
ALBERT ST.
VICTORIA AVE.
NORTH ST.
RANGITIKEI ST.
FEATHERSTON
FITZHERBERT AVE
WOOD ST.
PASCAL ST.
CHURCH
BOTANICAL
FERGUSON ST.
PARK
COLLEGE
TREMAINE
GOODS YARDS
RIVER
MANAWATU
TO WANGANUI
MASSEY UNIVERSITY
TO SHANNON
PIONEER
TO FOXTON
N
REFERENCE
More than 50% increase
10—50% increase
0—9% increase
0—10% decrease
More than 10% decrease
SCALE OF CHAINS
25
0
25
50
Drawn V.R.C.W. 1968

cycle of rapid development. Also a further characteristic of development since 1945 has been the closer subdivision of large allotments within the old borough area tending to spread the effect. As the area of these "backlands" available for development has dwindled and the numerical increments in population have become larger the effect has been to intensify the rate of development in the rapidly growing areas.

Decreases in population near the centre of an urban area are usually the result of outward expansion of central commercial and industrial uses together with the cyclical ageing of the population in the inner housing area. A second trend in these areas is for older houses (either purchased in the anticipation of increasing values due to commercial expansion or as part of an estate), to be rented as short-term accommodation. In Palmerston North a rapid increase in both the area and the intensity of declining population has taken place. Between 1945 and 1949 the area of greatest decline (the northern quadrant of the central area) was also the area of greatest commercial expansion. No record of the decrease in house numbers is available but post World War II commercial expansion was concentrated in this area and away from the depressive effects of the railway yards.

By 1956 the whole of the northern half of the central area (zones 1 and 2) was subject to intercensal

population decreases of more than 20 percent, while decreases in zone 3 had reached 8.05 percent. During the next five years zones 2, 3 and 4 all experienced heavy population losses and by the end of the last intercensal period (1961-1966) the whole of the central area was subject to a high rate of population decline. But the pattern of population decrease has not been consistent throughout the central area. Each of the four zones has a different functional character although there is a degree of overlap. Zone 1 is characterised by an active transition from old and in many cases decadent housing to small light industry and warehousing. Transitional activity is strongest near Rangitikei Street and The Square, but is evident throughout the whole area. Table XVII indicates a continuing high rate of decrease in both the number of houses and in the size of households in this area.

Zone 2 showed a rapid decline in size of households between 1951 and 1956 but since 1956 the principal cause of population decline has been the loss of houses as commercial activity has increased. Zone 3 which contains a high proportion of rented houses and flats has maintained a high size of households, but has shown a steady decline in the number of houses and hence of population. Zone 4, the last central zone to experience heavy population losses has, since 1956, shown a decline

TABLE XVII - HOUSES AND HOUSEHOLDS BY ZONES

Zone	1951 Houses	1951 persons/ house	1956 Houses	1956 persons/ house	1961 Houses	1961 persons/ house	1966 Houses	1966 persons/ house	1966 houses/ acre.
1	569	3.69	468	3.55	426	3.58	391	2.97	
2	247	3.76	238	2.99	202	2.82	172	2.58	
3	109	4.33	101	4.29	87	3.91	59	4.19	
4	161	3.59	162	3.58	127	3.00	120	2.81	
12	578	3.57	624	3.33	556	3.80	655	3.16	4.33
13	852	3.48	875	3.32	919	3.34	954	3.31	3.95
14	587	3.43	611	3.21	593	3.09	617	2.96	3.92
15	633	3.43	676	3.19	691	3.06	743	2.76	4.44
16	564	3.43	617	3.29	642	3.34	735	2.95	4.12
17	185	3.28	239	3.06	301	3.51	363	3.16	4.17
18	474	3.44	522	3.02	536	3.05	587	2.93	5.10
19	160	3.60	491	3.76	639	3.96	658	3.61	3.78
20									
22	151	3.52	188	3.45	224	3.95	274	3.56	
23	80	3.81	145	4.42	142	4.70	157	3.72	3.60
24	243	6.10	313	6.16	388	5.08	392	5.01	4.21
25	132	3.97	197	3.82	310	3.86	377	3.96	3.39
26	729	3.77	792	3.77	808	3.66	823	3.39	3.95
27	434	3.51	529	3.45	602	3.61	742	3.53	3.28
28	396	3.34	475	3.30	567	3.49	680	3.43	2.95
29	220	3.46	374	3.46	551	4.07	865	3.64	3.82
30	441	3.17	441	3.56	530	3.31	539	3.12	6.82
31	430	3.57	524	3.52	686	3.35	684	3.30	3.95
32					188	4.23	440	4.20	3.12
33					279	4.12	445	4.13	3.27
34					54	4.57	536	4.53	5.10
35					220	3.66	389	4.94	3.66

Source: Census Collectors' Districts Returns

in both number of houses and size of households.

Population decline elsewhere in the City has been light, is consistent with the cyclical ageing of the community, and is unlikely to intensify in rate before the end of the planning period. On the other hand numbers of houses and population will continue to decline rapidly in the central area.

Age of Population,

It is, at the present time, difficult to obtain data concerning the age distribution of a City's population. It will be possible to extract this information at the sub-enumeration block level in future censuses but for the present study the information used has been extracted from the 1963 Palmerston North transportation survey. Unfortunately the original interview forms have not been retained and as age data for the central area was not extracted in the original computer programme it cannot now be obtained. Low and diminishing average size of households in zones 1, 2 and 4 does, however, indicate that inner area population is older than the average. [7]

Numbers in each age group as recorded in the sample survey were reduced to percentages for each zone (Appendix A) and the percentages in turn reduced to standard scores which revealed the direction of age bias in each zonal population. (Table XVIII).

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7. A further probable cause of diminishing average household size is the increase of rented properties in the area.

TABLE XVIII

POPULATION DISTRIBUTION - AGE BIAS OF ZONE POPULATIONS (S.T.D.SCORES)

ZONE	AGE GROUPS IN YEARS									
	0 - 4	5-10	11-15	16-20	21-30	31-40	41-50	51-60	61-70	70+
12	-1.5		0.5					0.9	2.3	
13		0.5		0.8		-0.7	-0.8	1.4	1.0	
14	-0.5	-0.7	-0.7		0.5		1.6	1.7	1.4	1.0
15		-1.9	-1.7	1.3	2.1	-1.8	1.1		0.7	0.8
16	-0.5	-1.4		0.9				0.5	0.9	1.3
17							0.8	-0.9	-0.6	1.1
18		-0.9	-0.6	1.4		-1.3	-1.1	2.3	1.2	2.1
19	-1.7	0.7	0.8	0.5	-0.9		0.7	0.6		
22	1.7		-1.1	-0.8		1.0	-1.2		-0.8	-0.9
23	1.0	-0.6	3.0	-1.0	-1.6	1.0	0.6	-1.5		-0.6
24		-0.9	0.5	1.9	0.6	-0.7	0.9			-0.5
25	1.2	-0.5		1.0	-0.5		1.0	-1.2	-0.9	-1.2
26			1.0	1.1		-0.7	1.2		-0.6	
27							1.1		-0.9	
28			-1.3	-0.5					1.7	
29	1.3				1.0		-0.9	-1.3	-0.7	-0.6
30				-0.9			1.4	0.7	-1.1	1.5
31			0.7	0.5	-0.8	-0.8	0.9		-0.6	
32	1.3	1.6	-0.9	-1.2	2.2	-0.5		-1.4	-1.0	-0.8
33	1.8	1.9	1.0	-2.1		1.3	-2.2	-1.1	-1.0	-1.2
34	1.2	1.1	-0.8	-0.9	-1.6	1.5	-0.8			-1.2
35	-1.1	2.2	-0.8	-1.0		2.8	-0.8		-0.9	-1.5

The resulting pattern corresponds closely, as expected, with zonal growth rates. Zones 32 to 35 display youthful characteristics consistent with their recent heavy rates of growth. The inner zones (12-18) tended towards an excess proportion in the older than 50 years age groups with a marked concentration in zone 18. Zone 15 which is characterised by a concentration of tenanted houses and flats contained a high proportion in the 16 to 30 years age groups. Most of the remaining zones displayed small variations from the average age composition.

Within the limitations of the zonal area and the deficiencies of the original sample survey three age zones, old, average and youthful may be distinguished in an areal pattern which is commensurate with the usual pattern of urban development.

A fourth distinctive age bias which is likely to be of increasing importance in the City is found in zone 15 where a marked preponderance is noted in the 16-30 years age group. Three further characteristics of the area - a concentration of tenanted properties, higher than average number of people in the 40-50 years age group and deficiencies of numbers in the 5-15 and 31-40 years age groups indicates a superimposition of a student transitory population on an otherwise middle aged population.

Race Distribution.

There are no special ethnic districts in Palmerston North but there are indications that the Maori

population is tending to concentrate in one class of area. Of the 1,362 Maoris in the City area at the 1966 census 445 or 32.7 percent resided in the Takaro state and group housing area (zones 34 and 35). A further 113 or 8.3 percent resided in the four central zones but mainly in the area of rapid change from residential to commercial and industrial character. Another small concentration of 93 or 6.8 percent is located in the Milson railway and group housing settlements (zone 22). The remainder are scattered without marked concentrations throughout the rest of the city.

Socio-Economic Patterns.

Distribution of persons by occupation data was also available from the 1963 transportation survey, but again excluding the central areas. As with the age distributions occupation group numbers in each zone were reduced to percentages (Appendix A) and standard scores. (Table XIX). The results were further processed on a basis of ranked occupation groups to produce a socio-economic score for each zone. While the resultant pattern (Figure 9) corresponds approximately to the anticipated pattern, field observation of housing quality and analysis of land values suggests that the zones used are too coarse in size to portray socio-economic patterns in Palmerston North accurately.

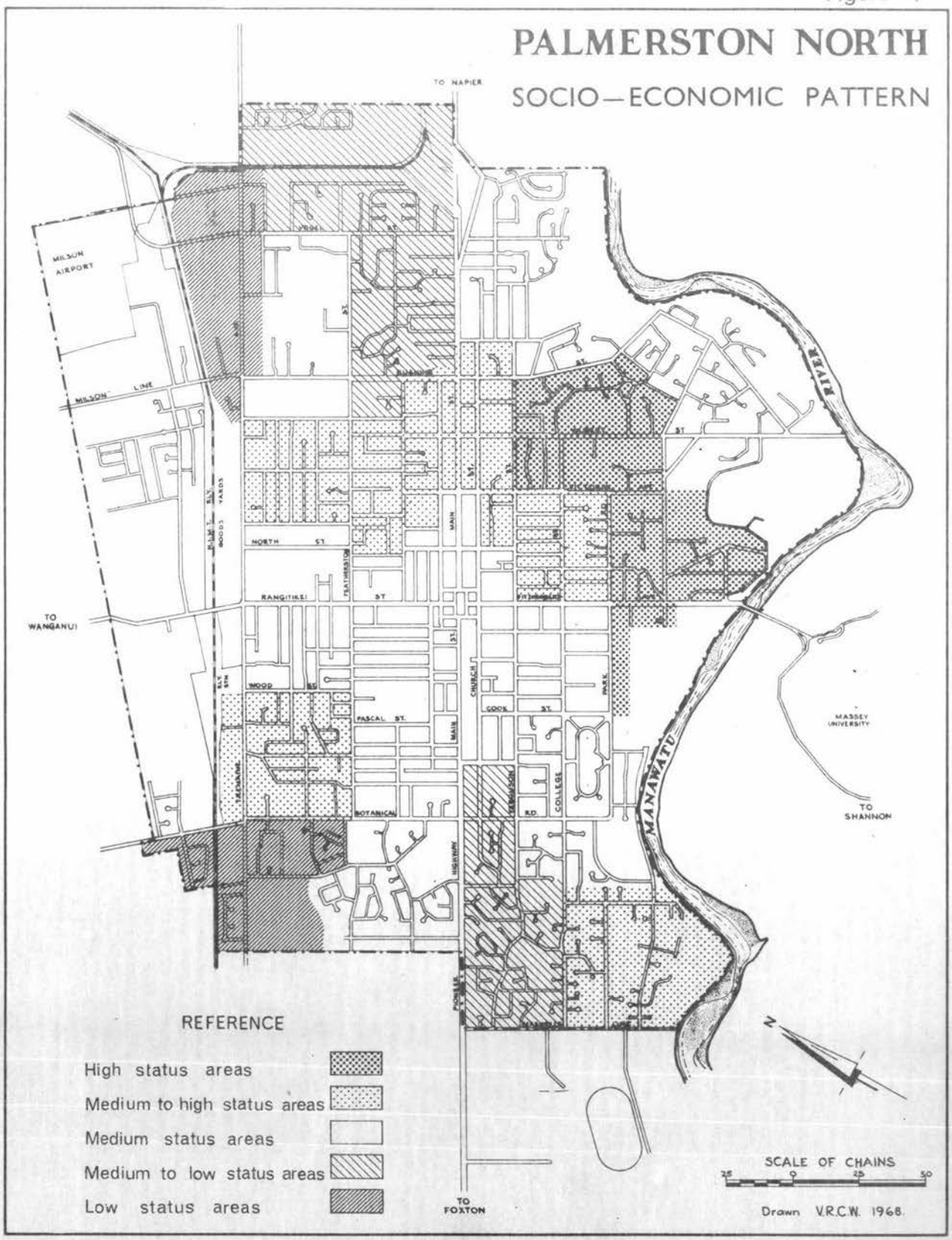
TABLE XIX

POPULATION DISTRIBUTION - OCCUPATIONAL BIAS OF ZONE POPULATIONS (STANDARD SCORES)

ZONE	PROFESSIONAL	MANAGER/ OFFICIAL	CLERK/ SALES-MAN	CRAFTS-MAN	OPERATIVE	UNSKILLED	RESIDENTIAL	SOCIO-ECONOMIC SCORE
12	0.6	- 0,9	0.2	- 0.5	- 0.5	0.9	0.6	- 1.4
13	2.2	- 0.5	0.2	-1.6	- 0.5	-0.4	0.9	8.2
14	-0.2	1.3	0.8	-0.9	- 1.0	-0.7	1.2	7.2
15	1.4	0.4	2.3	-0.3	- 0.2	0.7	1.2	6.5
16	0.8	- 0.4	1.6	0.4	0.2	0.4	-	2.0
17	-0.8	0.4	-0.3	-0.3	1.9	0.8	-0.5	-8.9
18	-0.9	- 0.5	0.8	0.4	0.3	-0.6	1.6	-0.3
19	-0.8	0.8	1.1	0.1	- 0.7	-1.2	0.1	5.5
22	0.3	- 1.4	-0.9	2.9	0.6	-	-0.2	-1.3
23	-1.0	- 1.7	-0.5	0.4	- 0.5	2.5	0.1	-12.9
24	0.2	1.7	-1.1	0.1	1.6	-	-0.9	- 1.1
25	-0.9	- 0.5	-	1.0	0.4	0.4	-0.3	- 5.0
26	-0.9	- 0.4	0.6	-1.0	0.7	-0.4	-0.4	- 6.7
27	-0.5	-	-0.5	0.2	- 0.4	0.3	-0.1	- 2.0
28	0.8	1.2	-1.6	-1.0	- 1.4	-1.0	2.2	10.2
29	0.7	0.5	-0.6	-1.1	0.4	-0.3	-1.1	-0.5
30	2.1	1.3	-	-2.0	- 1.3	-1.3	0.7	11.1
31	-0.5	0.9	1.3	-0.7	- 0.3	-0.2	-0.9	1.2
32	0.2	1.2	-	1.3	-1.1	-0.1	-1.0	5.8
33	-1.0	-1.4	-0.5	0.4	- 0.2	0.1	-1.7	4.1
34	-0.4	-0.8	-1.1	0.3	-1.0	0.3	-	-2.5
35	-1.6	-1.6	-1.6	0.9	2.4	2.8	-1.5	-23.4
rank coeficient NEG.	- 3	-2	-1	-1	2	3	-1	
rank coeficient POS.	3	2	1	1	-2	-3	1	

NOTE:- each standard score was multiplied by the appropriate rank coeficient and the results for each zone summed to give the socio-economic score at right.

Figure 9


PALMERSTON NORTH
SOCIO—ECONOMIC PATTERN
TO NAPIER
MILSON AIRPORT
MILSON LINE
NORTH ST
RANGITIKEI ST
TO WANGANUI
WOOD ST
PASCAL ST
BOTANICAL
MAIN
CHURCH
COOK ST
COLLEGE
PARK
MANAWATU RIVER
MASSEY UNIVERSITY
TO SHANNON
HIGHWAY
TO FOXTON
REFERENCE
High status areas
Medium to high status areas
Medium status areas
Medium to low status areas
Low status areas
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968.

By comparing the zonal socio-economic scores with the pattern of growth (Figures 5 to 8) it can be shown that most of the high and low status areas have emerged since the war and more particularly since 1956. Areas developed prior to this time show a remarkable degree of homogeneity. Two main reasons can be advanced in support of this trend. When the population was comparatively small, status areas existed primarily as small enclaves (with the exception of zone 13) the identity of which is lost in the coarse mesh selected for the present study. Secondly a change in the pattern of house building and design occurred with the emergence of large group housing companies, (backed by timber wholesalers) who entered the land subdivision market. Large blocks of land were taken up and reserved for low cost group house development catering mainly for low-income groups. The remaining undeveloped residential land within the City rose in value to a point where only medium to high income groups could afford to purchase and build homes. As a result distinctive status areas have developed.

Implications for Planning.

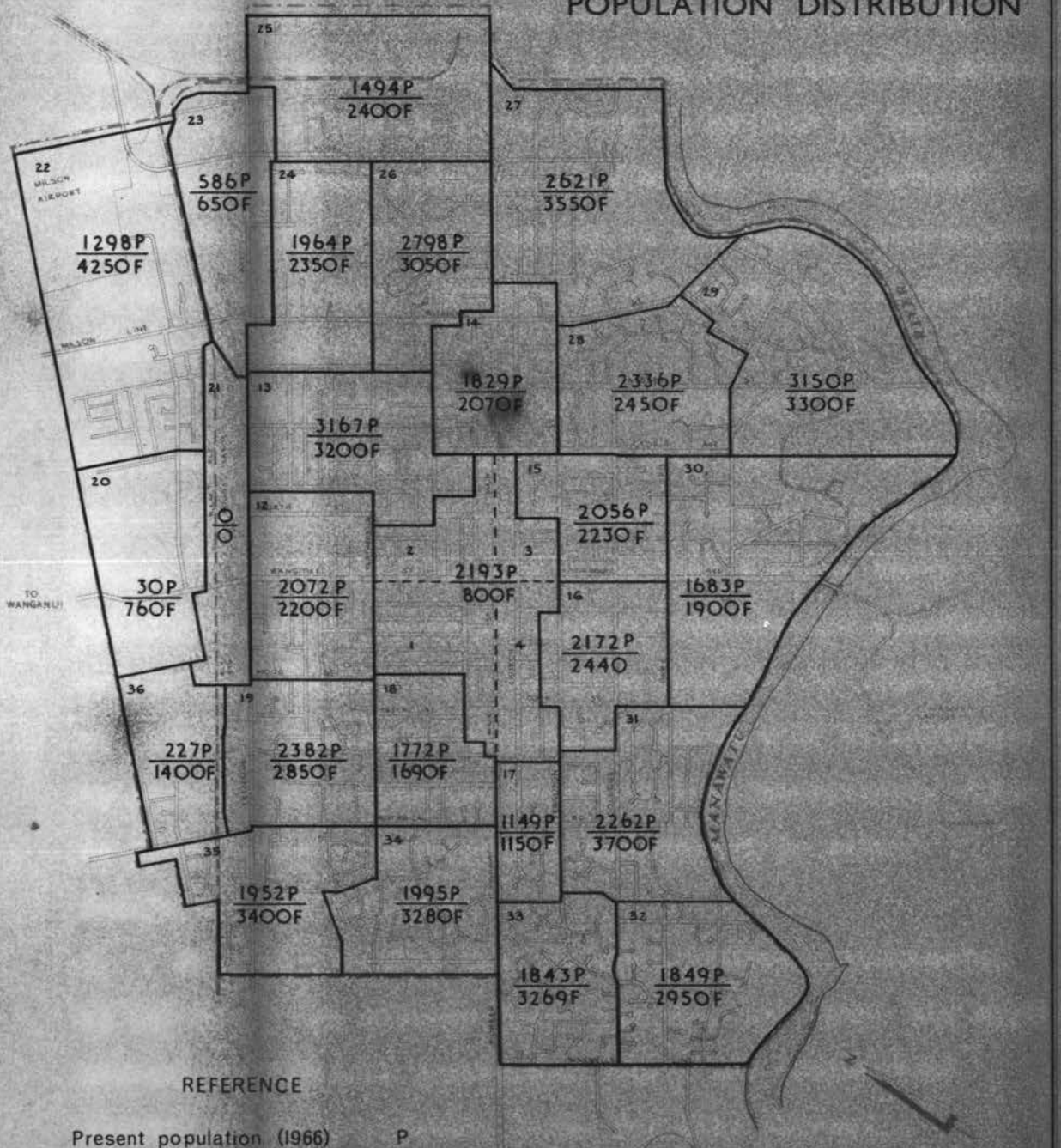
From the foregoing collection and analysis of population data it is now possible to draw together trends and patterns which have particular implications for planning in Palmerston North.

1. Planning for the ensuing twenty year period will need to be based on a projected population of 80,000 by 1986 an increase of 30,860 over the number recorded for the urban area at the 1966 census. On the basis of past rates of growth, net residential densities and the availability of land for development a projected population distribution within the 1966 city boundaries has been produced (Figure 10). There is little evidence to suggest any large scale changes in the social traditions of residential accommodation over the next twenty years and it has been assumed that residential densities in the developing fringe areas will remain at approximately the same level, although allowances have been made for cyclical declines in density in some fringe areas, which are at present high by Palmerston North standards. Continued decline of population is expected in the central areas. On current trends it is unlikely that the inner housing area already designated in the Planning Scheme for high density development will show more than a small increase in net residential density. Based on these assumptions the future projected population within the 1966 boundaries is 61,290 persons at a net residential density of 14.25 persons per acre compared with the 1966 figures of 46,832 at 13.53 persons per acre. As any area nears full development the rate of growth slows

Figure 10

PALMERSTON NORTH

POPULATION DISTRIBUTION



REFERENCE

Present population (1966)	P
Future population (c1991)	F

Note: Future population based on current trends, undeveloped land and a future urban population of 90,000.

SCALE OF CHAINS

Drawn V.R.C.W. 1968

rapidly, but it is probable that the population within the 1966 boundaries will approach the projected figures by the end of the planning period. Allowing for population growth within the old boundaries to reach 90 percent of the projected increase sufficient residential land, outside the old boundaries, will be required to accommodate approximately 20,000 persons plus a surplus of developed land to maintain stable land values.

New boundaries have been defined (1st September 1967) incorporating an additional 3440 acres of which 1,790 acres are terrace lands on the south bank of the Manawatu River.[8] The remaining area is divided between three localities at the northern, eastern and western boundaries of the City (Figure 11). Detailed analysis is required to estimate the timing of development which will be necessary to provide for population growth without unnecessary rises in land values or unnecessary expenditure on public facilities and services.

2. Density planning has, to date, proved unsuccessful in the City. As already shown the area set aside for higher density residential development has a net residential density which is slightly below the city average. Nevertheless, Figure 3 shows that this is the area which

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8. The previous City area of 7190 acres is thus increased to 10,630 acres.

Figure 11

PALMERSTON NORTH

BOUNDARY EXTENSIONS 1967

New areas

contains the highest concentration of flats and tenanted properties. Although the low density is in part explained by an ageing of the permanent population (as compared with tenants) it is apparent from both the density figures and field observation that the general standard and room density of flats [9] in the area is at a low level. Of the flats in the whole City area a large proportion are old houses which have been converted to two or more units while of the flats designed and built as such very few have more than one storey. Consideration should be given to planning controls and development projects which will stimulate a higher density of development in these areas. Present planning ordinances permit a density of 100 persons per acre (excluding streets) in the high density zone. This approximates 80 persons per acre for the density measurement used here (including streets). If a density of 30 persons per acre (or $\frac{3}{8}$ of that permitted) could be achieved in the high density zone an additional 6,800 persons could be accommodated within the old boundaries with a consequent saving of both land and expenditure on public services.

3. Age/sex, and migration analyses have demonstrated the impact of the expanding University and Teachers' College on the composition of the city population. In Palmerston North the normal demand for short term accommodation has been increased by three groups in the 15 to 19 years age

9. Since flats vary considerably in size it is common to use a density figure of either the number of bedrooms or the number of habitable rooms per acre.

group -

(a) nurses from the Palmerston North Hospital (Principal hospital for the region).

(b) students from the Palmerston North Teachers' College.

(c) students from Massey University.

Student numbers in particular are rising rapidly. At present forty percent of the University students reside in hostels on or near the campus while 26 percent of Training College Students have hostel accommodation. The numbers obtaining board in private homes is increasing at a very slow rate and is probably near to saturation point for the City. Even if the present ratio of hostel accommodation can be maintained it appears that the demand for flats and rented houses will increase rapidly during the first decade of the planning period. A preliminary analysis of the location of properties tenanted by students during 1967 has revealed a clear pattern.[10] Nurses' accommodation was clustered in the vicinity of the hospital, Teachers' College students were scattered in a ring around the central area while the University students by far the largest group were distributed throughout the U shaped zone of tenanted properties but mainly concentrated on the south side or bottom of the U.

A detailed study of short term accommodation with an emphasis on the standard of accommodation and a comparison

10. This analysis was carried out by the planning office of the Palmerston North City Council under the direction of the writer.

between past rate of growth of such accommodation and the future demand accruing from the rise of student numbers is necessary before a full analysis of this problem can be made.

4. Much of the information contained in this population study provides a perspective, national and localwithin which to frame planning proposals. Some of the information will provide the basis for sector studies to produce planning criteria for industrial, commercial, residential and recreational planning. Summed up, the population analysis presented here has indicated a continuing strong growth but that a considerable change in the composition and functional character of the population is taking place.

CHAPTER FIVE

TEST STUDY NO. 2 - MANUFACTURING INDUSTRY

Introduction

Manufacturing industry, in the urban context, tends to operate at three levels each reflecting the functional structure of the city and each dynamically related to the nature and rate of urban growth. At the first level industry provides for the local domestic consumer needs of the urban and immediate rural population and will include such ubiquitous manufacturing as bread baking and newspaper printing. In a regional centre the manufacturing sector will also be closely linked with the main economic activities of the region. Thus, in Palmerston North, industries specialising in agricultural equipment ranging from tractors to stock food and barbed wire are important. This level of manufacturing is sensitive to the scale, mode and accessibility of regional development; and in this sense its growth will be determined by regional dynamics.

But manufacturing industry can also operate within a system of national and international markets, raw materials, and transportation and it is at this level that the manufacturing function becomes a major factor in the rate of growth and ultimate size of a city. The degree to which local manufacturing industry

can be structured into a national or international system of production and distribution will influence the extent to which any city can surpass its development potential in the regional context. To express the principle in more parochial terms, if a city which is located in a well established agricultural region is going to sustain a high rate of growth, then the relative importance of the manufacturing function and its orientation to a national network should steadily increase.

A steady continuing high rate of population increase has been forecast for Palmerston North and it seems probable, therefore, that manufacturing will be of increasing importance there. If adequate planning provision is to be made for industry then the nature and structure of industrial development and its space needs are essential pieces of information. Analysis of structure will indicate present and likely future connectivity with regional and national systems while an assessment of space needs is an obvious requirement where land use zoning is the principal instrument of planning. The problem of industrial space in Palmerston North is also accentuated by the following;-

(a) Manufacturing industry has tended to decentralise from central areas to the periphery of urban development where land is cheaper and available

in larger allotments (Figure 11). The major planned industrial zones are located near the railway to the north and northwest of the city. Land on either side of these zones is either already developed or in the process of development for residential purposes.

(b) Future extensions to the city boundaries at these points is extremely unlikely. Several hundred acres were recently added to the city at the northern boundary and it is probable that additional industrial land will be made available there. However the last boundary extension decision [1] laid down a policy directing that major future extensions should take place across the Manawatu River on the south-eastern side of the city.

Manufacturing in New Zealand.

Agriculture and agricultural exports have long been the basis of New Zealand's economy. Even in the manufacturing sector a considerable emphasis has been placed on the processing of agricultural products. [2] Even prior to the Second World War measures were taken to stimulate the growth and diversification of secondary industry. [3] These policies were continued after the War

1. See Page 91.
2. In terms of value added as defined in the New Zealand Official Year Book, the meat freezing industry has been the leading industry throughout this country.
3. Industrial Efficiency Act, 1936 Import Control Regulations 1938, and Export Licenses Regulations 1938.

and following balance of trade crises in 1957-58, government policy has been to encourage manufacturing in depth to increase the New Zealand content of the final product. During the 1960's a further stage of development has begun with the establishment of basic industries such as the iron and steel industry in Auckland and the oil refinery at Whangarei.

Concommitant with these developments manufacturing industry has increased its share of national employment.

TABLE XX

PER CENT NEW ZEALAND LABOUR FORCE IN MANUFACTURING INDUSTRY

Year	Male	Female	Total
1951	25.4	25.6	25.4
1956	25.2	23.8	24.9
1961	26.5	24.7	26.1
1966	28.6	24.7	27.5

Raw Data Source: New Zealand Official Year Book.

Between 1951 and 1966 manufacturing industry's share of the national labour force has risen from 25.4 per cent to 27.5 per cent, (Table XX), and the government statistician has predicted a continued rise to 29.2 per cent by 1972. [4]

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4. Reported by Woods, 172.

A truer picture of the division of labour from the urban point of view is given by Table XXI from which farming employment has been excluded. After a temporary regression in 1956 the percentage employment in manufacturing has risen steadily to reach 35.2 per cent by 1966. If current trends continue, as seems probable, manufacturing industry will attract a disproportionate amount of total labour force increases in future years. [5]

TABLE XXI

PER CENT NEW ZEALAND LABOUR FORCE (EXCLUDING FARMING) IN MANUFACTURING INDUSTRY

Year	Male	Female	Total
1951	36.0	31.0	34.6
1956	35.4	28.1	33.3
1961	36.1	28.7	34.1
1966	37.3	30.2	35.2

Source: New Zealand Official Year Book.

Although a large proportion of the total manufacturing activity is concentrated in the four largest urban areas, the secondary centres such as Hamilton, Palmerston North, and Invercargill are of growing importance. [6] Individual industries show little tendency to concentrate in particular cities but tend to be evenly distributed throughout the country.

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5. Golledge, 40, points out that New Zealand has achieved its high level of development without the emphasis on manufacturing evident in other affluent countries. It seems likely therefore that manufacturing will continue to increase in importance in New Zealand.

6. Golledge, 47.

Linge has shown that only biscuit making, rubber goods, sugar and confectionery tend to be localised in New Zealand.[7] This, briefly, is the general context in which manufacturing in Palmerston North has been and will be developed.

The Structure of Manufacturing Industry in Palmerston North.

Several sources of data were used in the ensuing analysis and it is important to observe some of the difficulties encountered. The Labour Department has recorded employment figures by major industrial divisions for cities and boroughs since 1953. However it is important to note where these figures have been used that many service industry statistics, (such as vehicle repair and servicing) are included. A complete list of registered factories and employment for Palmerston North in 1965 was made available and these figures were processed to separate out service industries from true manufacturing industries. The remaining data was obtained by applying a questionnaire to individual factories (Appendix B).

(i). Market Orientation

Manufacturing in Palmerston North is strongly orientated towards the national market. Value of product and destination by value information could not be obtained. However, using questionnaire survey information individual

7. Linge 1961, 195.

factory employment figures were divided between markets according to the proportion of product marketed there. (Table XXII). All manufacturing in 1967 had only a 42.3 per cent orientation to local and regional markets but a 54.1 per cent orientation to the rest of New Zealand and a futther 3.6 per cent to export markets.

As may be expected from the nature of their products, food and drink together with building materials and furnishings exhibited the closest association with local markets. Clothing textiles and leather manufacturing on the other hand, showed only an 11.2 per cent relationship with local and regional markets, but 65.4 per cent with the remaining North Island markets and 23.4 per cent with South Island markets - clearly the most nationally orientated industrial division in the city. All the industrial divisions showed very much stronger connections with North Island markets than with those in the South Island, reflecting in part the smaller South Island domestic market and in part difficulty of access. Only the clothing industry was strongly connected with southern markets indicating a probable specialism and concentration of the industry in the city. Many of the companies surveyed indicated that they had, over time, expanded their markets from a regional to a North Island or national coverage. At this stage also the dominant

TABLE XXII

MARKET ORIENTATION 1967

The percentage of products sent to each market area has been converted to labour units* for each factory and totals in each industrial division re-processed as percentages.

Industrial Division	Local and Regional	Rest of North Island	South Island	Export
Food and Drink				
Labour units	418	151	49	3
per cent	67.3	24.3	7.9	0.5
Clothing, Textiles and Leather				
Labour Units	107	623	222	
per cent	11.2	65.4	23.4	
Building Materials and Furnishings				
Labour units	283	132	2	
per cent	67.9	31.6	0.5	
Engineering				
Labour units	299	405	106	
per cent	36.9	50.0	13.1	
Miscellaneous				
Labour units	765	581	119	159
per cent	47.1	35.8	7.3	9.8
All Manufacturing				
Labour units	1872	1892	498	162
per cent	42.3	42.8	11.3	3.6

* Employment figures for the surveyed factories were adjusted according to sample percentages in each industrial category (Appendix B) and apportioned as labour units to each market area.

trade area is the southern half of the North Island but there are indications that manufacturing is increasingly looking to national markets.[8] A continuance of the trend is basic to the expected growth of manufacturing industry in the city.

Deeper analysis within each industrial division (Tables XXIII to XXVII) reveals a marked relationship between factory size by employment and market orientation. The smaller the factory unit the more trade is focused on local markets. National trends towards larger factory units are true also of Palmerston North indicating the probability of a strong connection between factory size, enlarging trade areas, and growth points within industrial divisions.[9]

About a third of the companies surveyed had substantial affiliations with other companies throughout the country. Affiliations varied from joint shareholding to supply agreements and direct ownership by a nationally or internationally based company or group, confirming the view that Palmerston North manufacturing industry is strongly structured into a national system.

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8. Two of the largest companies recently established in the city - Ralta and English Electric - base all their operations on the national market.

9. Factory size is dealt with in greater detail in a later section.

TABLE XXVII

MARKET ORIENTATION - FOOD AND DRINK (PERCENT)

Factory Size by Employment	Local & Regional	Rest of North Island	South Island	Export
0 - 5	100.0			
6 - 10	100.0			
11 - 20	64.5	32.3	3.2	
21 - 50	63.4	26.8	7.1	2.7
51 - 100	42.1	42.5	15.4	
100 -				

TABLE XXVIII

MARKET ORIENTATION - CLOTHING TEXTILES & LEATHER (PER CENT)

Factory Size by Employment	Local & Regional	Rest of North Island	South Island	Export
0 - 5	100.0			
6 - 10	-			
11 - 20	24.5	52.9	22.5	
21 - 50	20.8	59.2	20.0	
51 - 100	7.4	75.5	17.1	
100 -	3.9	69.0	27.1	

TABLE XXIX

MARKET ORIENTATION - BUILDING MATERIALS & FURNISHINGS(PER CENT)

Factory Size by Employment	Local & Regional	Rest of North Island	South Island	Export
0 - 5	73.7	26.3		
6 - 10	90.3	9.7		
11 - 20	75.0	25.0		
21 - 50	59.6	39.6	0.8	
51 - 100				
100 -				

TABLE XXVI

MARKET ORIENTATION - ENGINEERING (PER CENT)

Factory Size by Employment)	Local & Regional	Rest of North Island	South Island	Export
0 - 5	76.9	23.1		
6 - 10	37.8	50.0	12.2	
11 - 20	46.3	42.6	11.1	
21 -- 50	37.9	46.3	15.8	
51 - 100	30.3	58.1	11.6	
> 100				

TABLE XXVII

MARKET ORIENTATION - MISCELLANEOUS MANUFACTURING (PER CENT)

Factory Size by Employment	Local & Regional	Rest of North Island	South Island	Export
0 - 5	63.6	27.3	9.1	
6 - 10	85.5	14.5		
11 - 20	46.9	42.1	10.3	0.7
21 - 50	44.4	45.2	10.2	0.2
51 - 100				
> 100	33.6	32.7	4.5	29.2

(ii) Factory Size

Several significant points emerge from the factory size analysis of the 1965 employment data. (Tables XXVIII, XXIX).

(a) Manufacturing within the city as a whole and within each industrial division is diversified and well balanced. Not only is employment well spread between the several divisions but a wide range of factory size is evident within each division. No one factory, or group of factories can be said to dominate any division. A possible exception is the textiles, clothing and leather industry where 42.0 per cent of employment is derived from factories employing more than a hundred persons each. There are, however, three of these factories each producing quite different products. Thus a recession in any section of the manufacturing industry or the failure of any particular factory is not likely to have a significantly depressive effect on industry or employment as a whole.

(b) There is an inverse relationship between the number of factories in each size category and the total employment in that category. In the food and drink division 83.3 per cent of the factories employ ten persons or less but together only account for 36.5

TABLE XXVIII

PALMERSTON NORTH CITY

FACTORY SIZE BY EMPLOYMENT 1965 - NUMBERS

No. employed per unit.	0-5	6-10	11-20	21-50	51-100	>100	Total	Avge. Size
FOOD & DRINK								
No. Factories	32	13	2	4	3		54	9.6
No. Employed	87	103	31	121	179		521	
BUILDING MATERIALS & FURNISHINGS								
No. Factories	21	9	6	5			41	8.4
No. Employed	48	71	86	140			345	
CLOTHING TEXTILES & LEATHER								
No. Factories	18	7	7	3	2	3	40	20.4
No. Employed	46	54	114	108	150	342	814	
ENGINEERING & METAL WORKING								
No. Factories	27	11	4	9	3		54	13.6
No. Employed	80	78	64	314	196		732	
MISCELLANEOUS								
No. Factories	51	15	10	8	2	1	87	10.8
No. Employed	156	112	159	238	180	138	983	
TOTAL MANUFACTURING								
No. Factories	149	55	29	28	10	4	275	12.2
No. Employed	417	418	443	879	705	480	3342	
SERVICE INDUSTRY								
No. Factories	85	25	20	9	1		140	8.0
No. Employed	263	197	288	276	61		1085	

TABLE XXIX

PALMERSTON NORTH CITY

FACTORY SIZE BY EMPLOYMENT - PERCENTAGES

No. employed per unit.	0-5	6-10	11-20	21-50	51-100	>100	Total
FOOD AND DRINK							
No. Factories	59.2	24.1	3.7	7.4	5.6		100.0
No. Employed	16.7	19.8	6.0	23.2	34.4		100.0
BUILDING MATERIALS & FURNISHINGS							
No. Factories	51.2	22.0	14.6	12.2			100.0
No. Employed	13.9	20.6	24.9	40.6			100.0
CLOTHING TEXTILES & LEATHER							
No. Factories	45.0	17.5	17.5	7.5	5.0	7.5	100.0
No. Employed	5.7	6.6	14.0	13.3	18.4	42.0	100.0
ENGINEERING & METAL WORKING							
No. Factories	50.0	20.3	7.4	16.7	5.6		100.0
No. Employed	10.9	10.7	8.7	42.9	26.8		100.0
MISCELLANEOUS							
No. Factories	58.6	17.2	11.5	9.2	2.3	1.2	100.0
No. Employed	16.0	11.5	15.2	24.5	18.6	14.2	100.0
TOTAL MANUFACTURING							
No. Factories	54.2	20.0	10.5	10.2	3.6	1.5	100.0
No. Employed	12.5	12.5	13.3	26.3	21.1	14.3	100.0
SERVICE INDUSTRY							
No. Factories	60.7	17.9	14.3	6.4	0.7		100.0
No. Employed	24.2	18.2	26.5	25.5	5.6		100.0

per cent of all employment in the division. On the other hand 5.6 per cent of the food and drink factories fall in the 51 to 100 employment class and account for 34.4 per cent of employment. Similarly 16.7 per cent of these factories employ more than ten persons and account for 63.6 per cent of employment. Each of the other industrial divisions displays a similar pattern. Most pronounced of all is the clothing, textiles and leather industry where 37.5 per cent of the factories employ more than ten persons but between them total some 87.7 per cent of all employment in the division.

(c) Overall, in 1965, the 275 manufacturing factories in the city had an average size of 12.2 employees. Only textiles clothing and leather with an average size of 20.4 persons showed a significant deviation from the mean.

Employment Trends

Significant changes have taken place in the employment structure of manufacturing industry both at the national and local level during the last ten years. At the national level three main areas of change are apparent. (Table XXX).

(a) Engineering industry increased its share of industrial employment by 3.6 per cent to 35.4 per cent

of the total and remains by far the largest sector of manufacturing.

(b) Miscellaneous manufacturing also grew strongly increasing its share by 2.0 per cent to 16.0 per cent to be the third largest industrial division close behind textiles, clothing and leather.

(c) In almost all the other divisions, although absolute employment gains were recorded, the relative share of total employment diminished.

In Palmerston North, however, a different and generally more moderate change in employment structure took place. (Table XXXI). The largest increase in relative employment occurred in the textiles, clothing and leather division where the proportional share of employment rose by 1.8 per cent to 15.8 per cent. Engineering showed only a small relative increase but remains the most important industrial division in the city. Both textiles, clothing and leather, and engineering are less dominant in the city than for New Zealand as a whole. This can be attributed to the local importance of seasonal manufacturing, (16.7 per cent of industrial employment in Palmerston North compared with 12.3 per cent nationally), a predictable situation in the centre of a major agricultural region. The most notable change was the continuing relative loss of employment by the building materials and furnishings division. Male and female employment structure

TABLE XXX

NEW ZEALAND - COMPOSITION OF MANUFACTURING BY EMPLOYMENT - PER CENT

	1956			1961			1966		
INDUSTRIAL DIVISION	Male	Female	Total	Male	Female	Total	Male	Female	Total
Food and Drink	6.6	12.0	7.9	6.3	11.0	7.4	5.6	9.5	6.5
Textiles Clothing & Leather	8.8	53.5	19.1	8.6	50.4	18.4	7.7	45.8	16.7
Building Materials & Furnishings	18.4	3.5	14.9	17.4	3.8	14.2	16.0	4.0	13.1
Engineering & Metal Working	37.7	11.8	31.8	37.6	13.7	32.0	40.9	17.6	35.4
Miscellaneous Manufacture	13.8	15.2	14.0	14.6	16.8	15.1	15.4	17.9	16.0
Seasonal Manufacturing	14.7	4.0	12.3	15.5	4.3	12.9	14.4	5.2	12.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Official N.Z. Year Books

TABLE XXXI

PALMERSTON NORTH COMPOSITION OF MANUFACTURING BY EMPLOYMENT - PER CENT

INDUSTRIAL DIVISION	1956			1961			1966		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Food and Drink	7.0	10.1	7.6	7.8	9.7	8.2	7.2	9.1	7.5
Textiles Clothing and Leather	4.8	51.5	14.0	5.8	51.4	15.1	6.2	50.1	15.8
Building Materials and Furnishings	17.6	3.9	14.9	14.9	3.1	12.5	13.1	2.7	10.6
Engineering & Metal Working	36.6	12.2	31.8	35.1	11.1	30.2	38.7	13.6	32.7
Miscellaneous Manufacture	13.6	20.0	14.9	14.8	21.2	16.1	14.3	20.1	15.4
Seasonal Manufacturing	20.4	2.3	16.8	21.6	3.5	18.0	20.5	4.4	16.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Official N.Z. Year Books

followed the same general pattern of increase and decrease indicated above. Overall, male employment is dominated by engineering, (38.7 per cent in 1966), whilst female employment was dominated by textiles, clothing and leather, (50.1 per cent in 1966).

With the exception of building materials and furnishin gs, each of the industrial divisions experienced strong growth in actual employment numbers from 1956 to 1966, (Table XXXIII). Even so there were considerable differences between the rates of growth of different industries as well as differences in the rates of growth between the first and last five years in the decade. In addition there were further differences between rates of growth in Palmerston North and New Zealand as a whole. (Tables XXXII, XXXIII).

At both the national and local level the average percentage growth of industrial employment was significantly lower from 1956 to 1961 than from 1961 to 1966. But in Palmerston North the growth rate during the first five years was well below the national average, (11.8 per cent compared with 16.1 per cent) and almost doubled to 20.8 per cent over the last five years to slightly exceed the national increase of 20.1 per cent.

Three of the industrial divisions recorded notably high rates of growth over the ten year period. Two of these, engineering and metalworking, and

TABLE XXXII

NEW ZEALAND PER CENT INCREASE IN EMPLOYMENT IN MANUFACTURING

Industrial Division	1956-61			1961-1966		
	Male	Female	Total	Male	Female	Total
Food and drink	7.8	9.3	8.3	6.6	4.8	6.0
Textiles, Clothing & Leather	12.8	11.8	12.2	6.6	10.0	8.8
Building Materials & Furnishings	9.5	28.8	10.6	9.8	26.6	10.8
Engineering & Metal-working	15.0	37.7	16.9	30.3	55.4	32.9
Miscellaneous Manufg.	22.8	31.0	24.8	26.6	29.9	27.5
Seasonal Manufacturing	21.1	27.4	21.6	11.8	44.7	14.4
TOTAL Manufacturing	15.4	18.7	16.1	19.8	21.2	20.1

Source: Official N.Z. Year Book

TABLE XXXIII

PALMERSTON NORTH PER CENT INCREASE IN EMPLOYMENT IN MANUFACTURING.

Industrial Division	1956-61			1961-1966		
	Male	Female	Total	Male	Female	Total
Food and Drink	23.4	12.0	20.4	8.7	22.6	12.1
Textiles, Clothing & Leather	32.0	15.9	20.3	27.8	28.1	28.0
Building Materials & Furnishings	-6.2	-6.8	-6.2	3.6	14.8	4.2
Engineering and Metal Working	6.1	5.5	6.1	30.1	61.5	32.5
Miscellaneous Manufg.	20.0	22.8	20.8	14.3	25.1	17.2
Seasonal Manufacturing	17.9	76.4	19.5	11.8	63.3	13.8
TOTAL Manufacturing	10.7	16.1	11.8	18.1	31.4	20.8

Source: Official N.Z. Year Book

miscellaneous manufacturing paralleled national trends. The third, textiles clothing and leather, not only led the field in Palmerston North but also grew at a markedly faster rate than the national average for that industry. A further significant point is that these three industries also showed a greater orientation towards national markets, (Table XXXII) reinforcing the view that future growth will be dominated by nationally orientated companies.

An attempt was made to investigate rates of growth according to factory size by comparing the 1965 Labour Department data with the results of the 1967 questionnaire survey. Unfortunately accurate comparisons between the two sets of data were not possible [10] but sufficiently strong trends were identified to indicate that the strongest growth took place in these companies employing ten or more persons. This again reflects the sensitivity of industry in Palmerston North to national trends. National statistics show a steady rise in the size of factories (Table XXXIV) accompanied in many cases by a decrease in the actual number of factories.

Industrial Location in Palmerston North

Industrial location factors can be exceedingly complex and the particular decisive combination of factors

10. Some of the increases revealed over the two year period were improbably great. It is thought that some office and professional staff included under the questionnaire survey may have been excluded by the Labour Department survey.

TABLE XXXIV

NUMBER AND SIZE OF FACTORIES - NEW ZEALAND

INDUSTRIAL DIVISION	1956		1961		1966	
	No.	Size	No.	Size	No.	Size
Food and Drink	1315	11.5	1228	13.3	1095	15.8
Textiles Clothing & Leather	1975	18.3	1810	22.4	1667	26.5
Building Materials & Furnishings	2661	10.7	2530	12.4	2506	13.9
Engineering and Metal Working	4735	12.8	5263	13.4	6385	14.7
Miscellaneous Manufg.	1386	19.2	1432	23.2	1616	26.3
Seasonal Manufacturing	527	44.3	479	59.3	450	72.2
TOTAL Manufacturing	12599	15.1	12742	17.3	13719	19.3

Source: Official N.Z. Year Book

frequently varies from industry to industry or even from company to company. Nevertheless when the location of industries in Palmerston North was analysed two factors proved to be of the greatest importance.

Of the surveyed companies the largest number (31.9 per cent by employment) were established by local residents, many at first in a very small way. More than half of these companies were established prior to the Second World War and as a general rule the earlier the date of establishment, the larger the company today.

On the other hand, 30.7 per cent, (by employment), of the surveyed units were located in the city to take advantage of its position central to the whole of New Zealand market with a further 7.2 per cent established to exploit the regional market. Of these companies fewer than one third were established in the city prior to the Second World War and almost a third have been established since 1956. Palmerston North is fortunately sited from a transport point of view. The city lies at the focal point of a major road and rail transportation network serving the southern half of the North Island with links to all the major market areas of New Zealand. With the large Wellington and Hutt Valley market only ninety miles to the south and the major Auckland and Christchurch markets approximately

equidistant to the north and south respectively the city is well situated for companies seeking a national distribution of their products.

Several companies have relocated themselves from Wellington to Palmerston North. In a number of these cases a major consideration has been the availability of labour and industrial relations. Wellington has for some years experienced labour difficulties reflected in high staff turnover rates; Palmerston North with a turnover rate of 27.0 percent per annum in 1967 [11] presents fewer labour problems for small and medium size employers than Wellington, Auckland or Christchurch. Nevertheless the surveyed companies indicated some difficulty in obtaining skilled or managerial staff. For the most part however, these companies attributed recruiting difficulties to the overall national labour situation or conditions applying within a particular industry rather than to local problems.

Many of the manufacturing operations are, as might be expected, closely related to agricultural markets, especially the assembly and manufacture of farm machinery. Specialist industries of this kind include the construction of tankers for milk collection and other bulk fluid transport. In many instances industries

11. This figure obtained from the questionnaire survey is much lower than rates quoted for either the major cities or comparable regional centres by Woods, 59.

originally established to serve regional agricultural markets have expanded their activities to wider markets.

A few industries have located in the city to be near raw material sources, notably companies processing agricultural products, but growth in this sector is not expected to be significant in the overall industrial scene.

Industrial Location within Palmerston North.

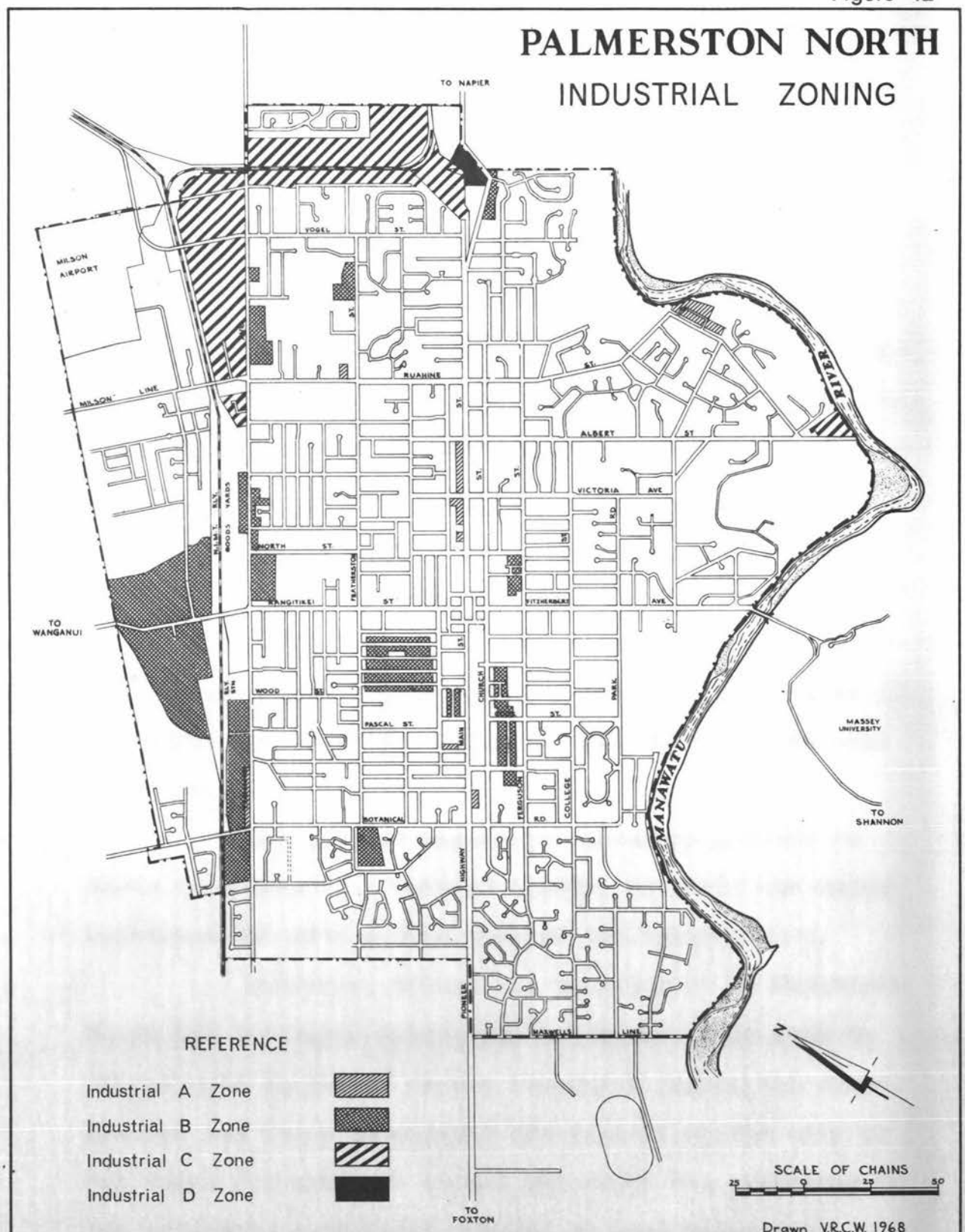
SInce 1959 the location of industry within Palmerston North has been controlled by land use zoning regulations under the Operative District Scheme (Figure 12) Prior tothis and since 1953 industrial location controls were exercised under an Undisclosed District Scheme, (as schemes in the course of preparation were then called). Some light industrial zones have been established near the centre of the city but the major zones are located to the north and north-east of the city in a long narrow strip flanking the railway. Since 1953 a considerable amount of factory relocation has taken place within the city. Relocation movements have been of three major types but almost without exception have been motivated by congestion on the existing site with no opportunity to expand onto adjoining land.

(a) Movements within the central area. [12.]

Fourteen per cent of the companies surveyed (9.7 per cent by employment) had made relocation movements within the central area.

12. The central area is defined here as that area from the Square outwards which is continuously zoned for either commercial or industrial use.

Figure 12


PALMERSTON NORTH
INDUSTRIAL ZONING
TO NAPIER
MILSON AIRPORT
MILSON LINE
VOGEL ST.
RUAHINE ST.
ALBERT ST
VICTORIA AVE
RIVER
MANAWATU
NORTH ST
WOODS YARDS
RANGITIKEI ST
FEATHERSTON ST
FITZHERBERT AVE
TO WANGANUI
WOOD ST
PASCAL ST
CHURCH
MAIN
PARK
MASSEY UNIVERSITY
TO SHANNON
BOTANICAL
HIGHWAY
FERGUSON RD
COLLEGE
PIONEER
MAXWELLS LINE
TO FOXTON
REFERENCE
Industrial A Zone
Industrial B Zone
Industrial C Zone
Industrial D Zone
N
SCALE OF CHAINS
25 0 25 50
Drawn V.R.C.W. 1968

(b) Movements from the central area to outer industrial zones. Eleven per cent of the companies surveyed (12 per cent by employment) had been relocated, for the most part, to the new zones flanking the railway.

(c) Other movements. A further six per cent of companies had relocated themselves mainly from residential to industrial zones.

By 1965 only seven per cent of manufacturing industry (by employment) was located in an inappropriate zone.[13] Since the introduction of planning controls the new manufacturing establishments, (about one third of the total) have been established in industrial zones, mainly near the railway. However, relocation movements are by no means complete. Several companies totalling 9.5 per cent of industrial employment have indicated firm plans to relocate, mostly within category (b) above, in the next five years.

The present industrial location pattern is shown in Figure 13. Earlier factory location was somewhat scattered but with a bias towards the central area.

Latterly, industrial development in Palmerston North has undergone relocation movements which tend to concentrate factories in the scheduled industrial zones. However the total industrial development in the city is too small (in absolute terms) and still too scattered for any extensive industrial suburbs to have developed.

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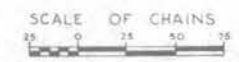
13. In terms of the District Scheme - "Non-conforming".

PALMERSTON NORTH

FACTORY LOCATIONS 1965

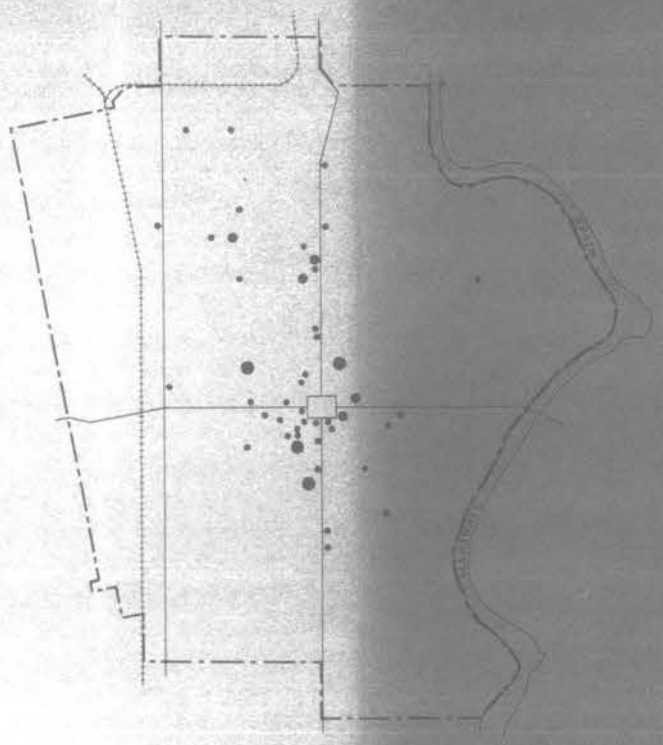


REFERENCE

Factories employing 1–10 persons

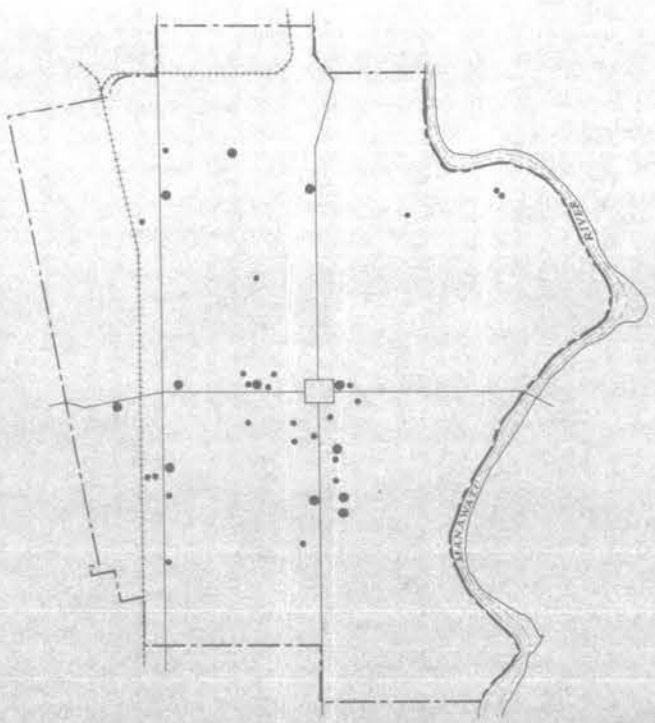
Factories employing 11–50 persons

Factories employing > 50 persons

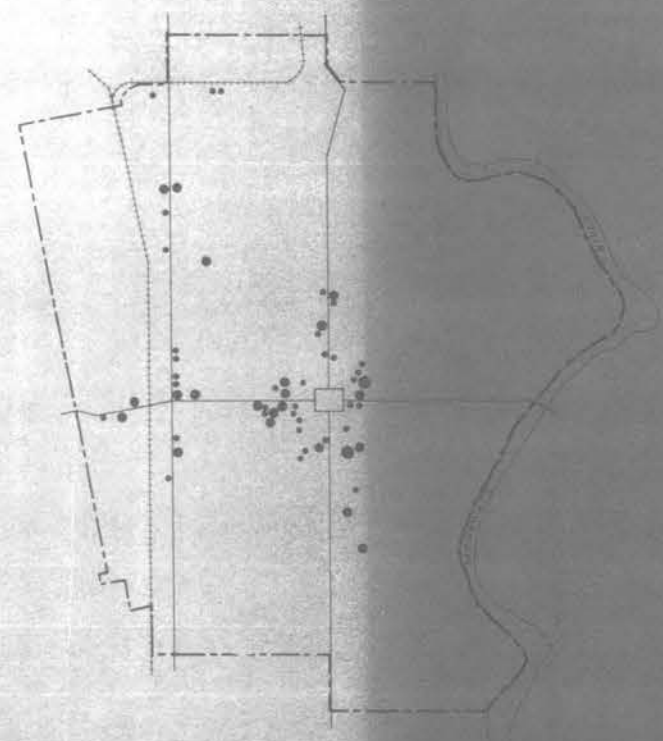


FOOD AND DRINK

CLOTHING, TEXTILES AND LEATHER



BUILDING MATERIALS AND FURNISHINGS



ENGINEERING

MISCELLANEOUS

Nevertheless continued planning control over industrial development should give a distinctive industrial character to the north and north eastern parts of the city. Some general patterns can also be observed for individual divisions. Food and drink, and textiles, clothing and leather are both relatively scattered with a distinct central tendency. Those factories in these classifications which are not truly central show a preference for built up areas. Building materials and furnishings are the most widely scattered of all while engineering and miscellaneous manufacturing having both central and peripheral locations are now tending to concentrate in the vicinity of the railway.

Future Industrial Employment.

Although the proportion of the total Palmerston North labour force engaged in manufacturing industry was in 1966 slightly less than in 1956, (Table XXXV) the trend since 1961 has been one of strong growth.

TABLE XXXV

PER CENT PALMERSTON NORTH LABOUR FORCE IN MANUFACTURING

Year	Male	Female	Total
1956	34.8	20.6	30.8
1961	32.9	19.4	27.8
1966	34.7	20.4	30.0

Source: Labour Department Records.

It has been demonstrated that Palmerston North has strong connections with the national system of

manufacture and marketing, and that a number of factors, (particularly transport accessibility to national markets), favour industrial location in the city. Consequently it seems probable that manufacturing in Palmerston North will follow the national trend and that an increasing proportion of the work force will be captured by manufacturing industry. Bearing in mind national trends and the Palmerston North record between 1961 and 1966 a forecast that employment in manufacturing will reach 35 per cent of the labour force by 1986 would seem conservative. However, the regional functions of the city will not diminish and the educational sector should advance strongly. [14] The Government Statistician has predicted that the national labour force in 1986 will be 37.0 per cent of the total population. [15] On this basis and with regard to the projected population of 80,000 persons living in the city by 1986 it seems likely that manufacturing employment will exceed 10,300 at that time - an increase of almost 100 per cent on the 1966 figure of 5181 persons.

Space Requirements.

Despite the critical need in planning for estimates of the amount of industrial land that will be required within a given planning period comparatively little research has been carried out in this field.

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14. Palmerston North Teachers' College and Massey University are expected to expand rapidly over the next twenty years.
15. New Zealand Official Year Book 1967.
16. Labour Department figures for 1966 employment are used here despite the inclusion of service industry to obtain a valid correlation with the Government Statistician's labour force predictions.

Certainly no results of such work have been published recently in New Zealand. Chapin has outlined four basic steps for the estimation of industrial land needs and these form the basis of work carried out here;- [17]

"1. Determine the salient characteristics of existing manufacturing uses in the urban area, existing industrial densities, and the prospects for future manufacturing activity as determined in previous studies of the urban economy.

2. On the basis of these studies and considering modern day industrial plant requirements, develop local standards for future industrial densities.

3. Apply industrial densities to future manufacturing employment estimates to obtain estimated land requirements.

4. Determine from summary of vacant land and renewal land how supply matches up with estimated needs, and referring to location requirements, make a trial distribution into area considered prime for industrial use, carrying over the surplus for reallocation in the vacant land tally."

Even with this simple analysis technique several difficulties arise. Just as population estimates are subject to changes in social characteristics and economic criteria so industrial development is sensitive to government policies, technological advance and economic

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17, Chapin, 386.

factors. For example, if the government was to adopt a positive policy of balanced industrial decentralisation Palmerston North could expect a strengthened rate of growth in manufacturing.

Estimates made here assume that government encouragement of an increased New Zealand content in end products will continue and that industrial growth will be supported by devaluation. A further problem is that the amount of space occupied by any company will be influenced by the size of land parcels available, the cost of land, the capital structure of the company and its projected growth plans. Again it has been assumed that current trends will continue and that the pattern of land usage adopted by companies established over the last two decades will be the normal pattern during the next twenty years.

Two measures of employment intensity are in common usage - the floor space index per worker and the density of workers per acre. Analysis of the former in Palmerston North has not proved to be of great value but some trends may be indicated (Table XXXVI). The average floor space per worker in all manufacturing industry increased substantially after the second Worl War and appears to have reached a plateau of 398 square feet per person. Nevertheless United States research suggests that much higher figures could well be reached in the future.[18] Despite the overall increase only two of the industrial

18. Chapin 394.

divisions, Food and Drink, and Miscellaneous Manufacturing underwent large increases in the floor space index in the period examined.

Analysis of employment density trends, on the other hand, proved to be of considerable value in estimating future industrial land needs. The analysis of density trends was approached from two directions.

(a) Employment density in persons per acre was computed for each industrial division by date of establishment of individual factories (Table XXXVII). It was thought that early established factories, (say prior to the second World War) with possible site restrictions might have different densities to factories established more recently. Food and drink employment densities are comparatively high and tend to be slightly higher for more recent establishments possibly reflecting the preference for central locations. Textiles, clothing and leather densities are also high and are highest for more recent establishments. Some of the largest plants in this division are also located in built-up areas of the city - a choice motivated by the need for high accessibility to a relatively non-motorised female labour market. In the engineering and miscellaneous manufacturing categories however, the more recently established factories have a markedly lower worker density than the older establishments. The same trend is reflected in the average figures for manufacturing as well as .....

for service industry.[19]

(b) Employment density by industrial divisions was computed for those factories located in the outer areas. The outer area is defined as those industrial zones which at the time the planning scheme was prepared had not been developed to any great extent. In essence this meant those zones to the north and north-east of the city. These are the areas which will absorb the greatest part of future industrial development. Consequently it is suggested that density analysis for this area will be useful in predicting future patterns. Almost all of the factories located here have been established since the second World War and miscellaneous manufacturing proved to be the most important in terms of employment. The results (Table XXXVIII) show an even more marked lowering of employment densities than in section (a) above. Overall densities at only 14.3 persons per acre clearly indicate a tendency to occupy larger sites. Countering this trend is the fact of recent establishment and the likelihood that the factories surveyed here will achieve greater employment densities with future expansion. If the national trend towards fewer and larger units of production becomes significant in Palmerston North employment intensities could increase further.

Land tenure patterns and land values are also likely to influence employment densities. Much of the land in the industrial zones flanking the railway is already

19. Service industry figures are included here since the Labour Department figures on which growth rates are based include service industry.

TABLE XXXVI - FLOOR SPACE PER WORKER

INDUSTRIAL DIVISION	DATE OF ESTABLISHMENT Pre-1945	1945-1956	1957-	Total
Food and Drink	239	133	355	254
Textiles, Clothing & Leather	273	303	283	286
Building Materials & Furnishings	691	609	-	634
Engineering and Metal-working	465	376	421	421
Miscellaneous Manufacturing	187	436	493	279
Total Manufacturing	320	396	398	368
Service Industry	340	686	1417	581

TABLE XXXVII - EMPLOYMENT DENSITY BY DATE OF ESTABLISHMENT - PERSONS PER ACRE

INDUSTRIAL DIVISION	DATE OF ESTABLISHMENT Pre-1945	1945-1956	1957-	Total
Food and Drink	72	18	88	36
Textiles, Clothing & Leather	77	30	147	57
Building Materials & Furnishings	9	31	-	16
Engineering and Metal-working	55	58	19	39
Miscellaneous Manufacturing	172	16	7	17
TOTAL Manufacturing	52	24	17	26
Service Industry	39	18	18	26

TABLE XXXVIII - EMPLOYMENT DENSITY IN OUTER AREAS - PERSONS PER ACRE

INDUSTRIAL DIVISION	PERSONS PER ACRE
Food and Drink	- *
Textiles, Clothing and Leather	47.5
Building Materials and Furnishings	17.8
Engineering and Metalworking	27.5
Miscellaneous Manufacturing	7.8
Total Manufacturing	14.3

* No establishments in area considered.

subdivided into allotments of four to ten acres each. Land values (which in 1967 ranged from $5000 to $10,000 per acre for most parts of these outer industrial zones) are low in comparison with the four main urban centres. Industrialists seeking to establish themselved in Palmerston North, influenced in part by manufacturing trends and in part by low land values, have tended to purchase sites of several acres in recent years.

After taking all these factors into account it appears that employment densities are likely to average out in the vicinity of twenty persons per acre in future years. Twenty persons per acre is lower than the present city average of 26 to the acre but is more than the 14.3 per acre noted in the outer zone. This latter increase takes into account three factors not yet mentioned.

(a) Engineering, which is one of the important growth points in manufacturing, has an average employment density of 27.5 persons to the acre in the outer zone.

(b) A relatively small area of the inner housing area (about 24 acres) which has been zoned for light industrial uses has yet to be developed. This area is closely subdivided and is likely, therefore, to be productive of higher densities.

(c) Some of the undeveloped outer industrial zones is held in large allotments (twenty to forty acres)

and plans have been advanced to develop some of these as designed industrial estates offering sites of varying size. Such developments could again be productive of higher densities.

An increase in industrial employment of nearly 100 per cent or 5,119 persons over the next twenty years will, at a density of twenty persons per acre, require the development of some 256 acres of industrial land. [20] However two other factors need to be considered.

(a) Present planning controls permit the establishment of wholesale distributors and warehouses in the industrial zones. Since the city is well placed as a distribution centre several companies have established warehouses there. Many are located in industrial zones and are included in the City Council estimates of 263 acres used industrially in 1967.[21] Clearly a portion of industrial land will be used for this purpose in the future.

(b) The amount of land zoned for industrial use needs to be well in excess of the actual area to be used. Not all of the land zoned for industrial use can be expected to be offered for sale and development while a further portion will be taken up by investors. Further, a considerable margin of land above demand needs to be

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20. Some of the future employment increase will be taken up by existing factories. But new development will probably occur at an actual density less than the 20 persons per acre used. Thus the density factor used has an inbuilt allowance for existing factory expansion.

21. This excludes Industrial "A" zones which covers trade workshops as well as some service industries.

available to stabilise land values. At the present time although less than fifty per cent of the industrially zoned land is in use, land values are climbing sharply. In some exceptional recent cases, increases of more than 100 per cent in actual sale price for industrial sites were recorded in the space of one year. These increases are in part a reflection of existing low values in comparison with the main manufacturing centres (Wellington, Auckland, etc.) and in part the result of the planning process whereby a limit is placed on the amount of land that canbe used for any category of land use. Little research has been done on this aspect of planning in New Zealand but it appears that provision should be made for a margin of at least forty to fifty per cent above calculated needs for the twenty year planning period. Thus, sufficient land should be reserved in the long term to allow for such a margin at the end of the planning period. Long term reservation of land may require the use of deferred zoning to prevent the uneconomic use of land and services which could result if the whole industrial reservation was to be serviced and released at the beginning of the planning period.

With an estimated new development of 256 acres by 1986 and an existing development of 263 acres the provision of industrial land by the close of the planning period needs to be between 730 and 780 acres plus such land as may be required by distribution and warehousing activities.

The Location and Planning of Industrial Land

During the survey industrial managements were asked to indicate factors which they considered to be important in the planning of industrial areas. The following list of factors were considered to be important by almost all respondents. However, it should be pointed out that letters (a) to (e) appeared on a check-list in the questionnaire and it is difficult to assess either how much emphasis should be given to each item or to what extent respondents were considering their own or all industrial operations.

(a) Rail Sidings. Despite the large number of responses to this factor it is logical that only those industries with a sufficiently large throughput of raw materials and finished products can justify the construction of a rail siding. It follows that sidings are only of limited significance for most manufacturing industries in Palmerston North at the present time. Hence, although desirable, not all industrial zoning needs to be tied to a railway location.

(b) Recreation Areas. As industrial zones become more fully developed and a more definite industrial character is given to parts of the city, the provision of small recreation areas could be desirable.

(c) Landscaping of Streets. It is just as important for industrial areas to be designed to provide aesthetic amenity as it is for any other part of the city.

Increasing attention is being given to the appearance of industrial estates throughout the world today. However by no means all of those interviewed felt that landscaping of streets was either important or desirable.

(d) Landscaping of individual sites. As with (c) above, manufacturing companies are showing increasing awareness of the visual impact of manufacturing plants and resultant public image of the company. Even so, several companies did not regard landscaping as important.

(e) Nearness of shopping was considered to be of especial importance by a number of industries employing a large proportion of female staff.

(f) Nearness of labour was a factor also associated particularly, but not exclusively, with the employment of female labour. At present the major industrial zones are located primarily to one side of the city while future territorial extensions to the city are most likely to take place on the other side of the city. Consequently journeys to work will be increasingly concerned with cross-city movements of increasing length.

(g) Public Transport. Several respondents stressed the need for a public transport service catering to the newer industrial areas. While a growing proportion of journeys to work to factories are across the city from east to west, the present public bus system is, as is usual, focused on the central area. Moreover, the 1963

transportation survey showed that the majority of all present and predicted future trips either originated or ended in the central area.[22] Nevertheless it seems likely that some form of industry-orientated public transport will be needed in future years.

Implications for Planning.

A number of points emerge from the foregoing study which are likely to be important for planning in Palmerston North.

1. Although the city has long been regarded as primarily a regional centre, there is evidence that a functional change is taking place in the direction of increased industrialisation. It is forecast that over the next twenty years while the population increases by approximately 62.8 per cent, (from 49,140 persons in 1966 to 80,000 persons in 1986) employment in manufacturing industry will rise by almost 100 per cent. Previously dominated by its regional functions the city will be increasingly reliant on industrial expansion. Studies of individual manufacturing industries have shown that growth will be associated with exploitation of national markets. Indeed manufacturing in Palmerston North is already based on national markets to a larger extent than on local markets. Within industry, expansion is likely to centre on engineering, textiles clothing and leather, and miscellaneous manufacturing. Industrial planning will, therefore, need

22. Transportation Survey, 1963.

to be prominent in the District Scheme Plan for the current planning period.

2. The most obvious planning requirement is to set aside sufficient land not only for the actual net forecast increase in manufacturing over the planning period but also to permit a development margin. Allowing a margin of forty to fifty percent an area of 730 to 780 acres of Industrial B, C, and D zones [23] will be required. However this figure takes no account of other uses permitted in these zones ranging from warehousing to builders' yards. Thus a study of those elements of city development would probably indicate that an additional area of land will be required in the industrial zones. The location of the industrial zones is of some importance. In the past, two major industrial groups have shown a preference for central locations. Both foodand drink, and textiles and clothing also rely heavily on female labour. The latter is the largest employer of female labour as well as being one of the most rapidly expanding of the industrial divisions.

Under the present transport regulations a large proportion of manufacturing raw materials and end products must be transported by rail while rail sidings are and will be of importance to the larger companies.

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23. Industrial B, C, and D zones are simply planning classifications of land use corresponding to light, heavy and noxious industry.

At the same time is has been shown that close links need to be provided between the location of industrial zones and both centres of population and other facilities such as shopping. A further consideration is that future growth to the north-west of the Manawatu River will be limited. By the end of the planning period at least 12,000 persons are expected to be resident on the south east or Aokautere side of the River. Distances in Palmerston North are not, at present, great, and do not exceed three or four miles for the longest journeys. Nevertheless, some positive advantages could be gained if provision was to be made for industry in the new town that will develop in the Aokautere area. Apart from reducing the peak traffic using river crossing facilities, substantial savings would be made on the cost of the journey to work.

3. Further research is needed into some of the issues raised. Particular topics would include:

(a) National trends in the growth and structure of manufacturing industry. A continued study in this field will appraise planning authorities of likely local trends.

(b) Research is needed to isolate the particular planning needs of those industries which it has been shown are growth points for Palmerston North manufacturing activities.

(c) Little work has been done in the area of land values or the specific effect that availability of

land has on values. It may well be that the planning authority will be faced with the need to develop large scale industrial estates to ensure the continuing availability of land at reasonable prices.

(d) No attempt has been made to analyse or assess the environmental quality of industrial development in the city. Environmental quality is however likely to increase in importance as the larger industrial zones become more fully developed.

4. Summing up, this study has provided detailed information on which some planning proposals can be based, provides a perspective view of manufacturing within which planning policies can be worked out, and indicates areas where further study is necessary before detailed planning can take place.

CHAPTER SIX

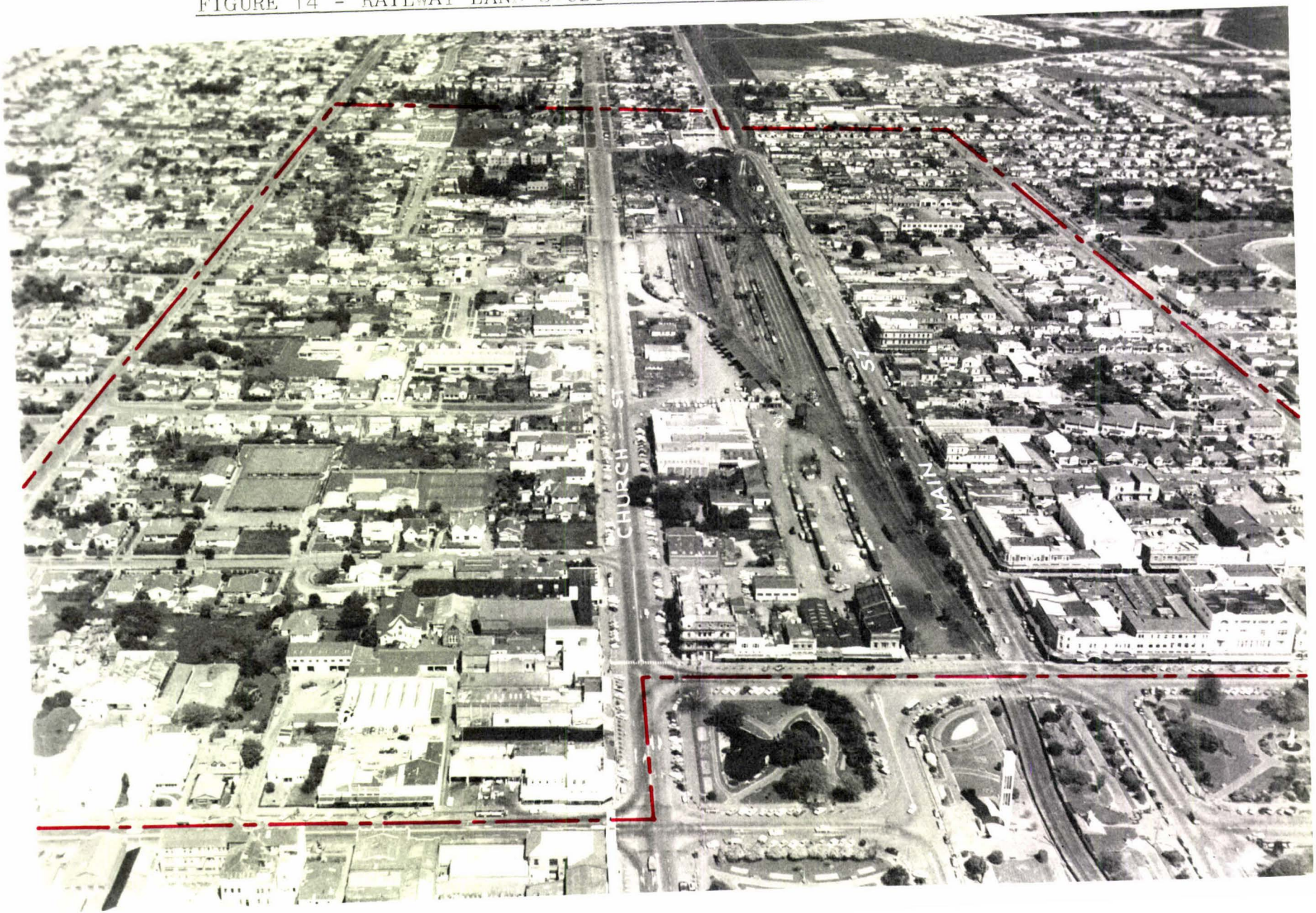
TEST STUDY NO. 3 - RAILWAY LAND REDEVELOPMENT AND THE SURROUNDING AREA

The establishment of Palmerston North as a major rail junction for lines from Wellington, Wanganui, Taranaki, Hawkes Bay, Wairarapa and eventually Auckland during the last quarter of the nineteenth century stimulated the early rapid growth of the City. Constructed to traverse the length of Main Street and passing through The Square the railway also involved the establishment of a 26 acre goods yard and passenger terminal adjacent to The Square.[1] In accordance with government policy at that time little or no compensation was paid for public land, (including streets and a reserve), which were taken for railway purposes. Early protests at the location of the railway and yards were reflected in the recommendations of Royal Commissions in 1921 and 1925 supporting proposals for the deviation of the railway to the outskirts of the City. Work on a deviation was commenced during 1926 by the Government of the day, but it was only in 1963 after a protracted history of objection, delay and petition that the deviation of the railway and relocation of the yards as shown in Figure 15 was completed.

Thus one of the dominant elements of the central city was removed and, of equal significance, a centrally

1. The passenger terminal was located in Main Street opposite David and Domain Streets and the goods terminal in Church Street opposite Pitt Street.

FIGURE 14 - RAILWAY LAND STUDY AREA EARLY 1963 (Photo by Argosy Studios)



located 26 acre block of land became available for development, presenting an unusual opportunity and responsibility for planning. Following a petition to the Government in September, 1963, it was arranged that the freehold of the old railway yards should be vested in the City Corporation for civic purposes. Since that time numerous suggestions have been advanced for the development and use of the land ranging from the full utilization of the area for public and community buildings to its integration with The Square to form a large central park. Except for a decision to reconstruct Main Street to its former width of two chains and to re-establish cross links at Pitt Street and Cook Street no proposals for future development have been brought forward by the Council. As yet consideration has only been given to the development of the old yards themselves; apart from an elementary land use survey, which has not been analysed, little attempt has been made to investigate the relationship between the railway land and the surrounding area, or the possibilities that a development scheme might hold for the area as a whole. This study is designed to establish the functions and characteristics of the area surrounding the railway land and to exlore the implications of possible future development.

Although selected to include all development which might be expected to show a significant relationship

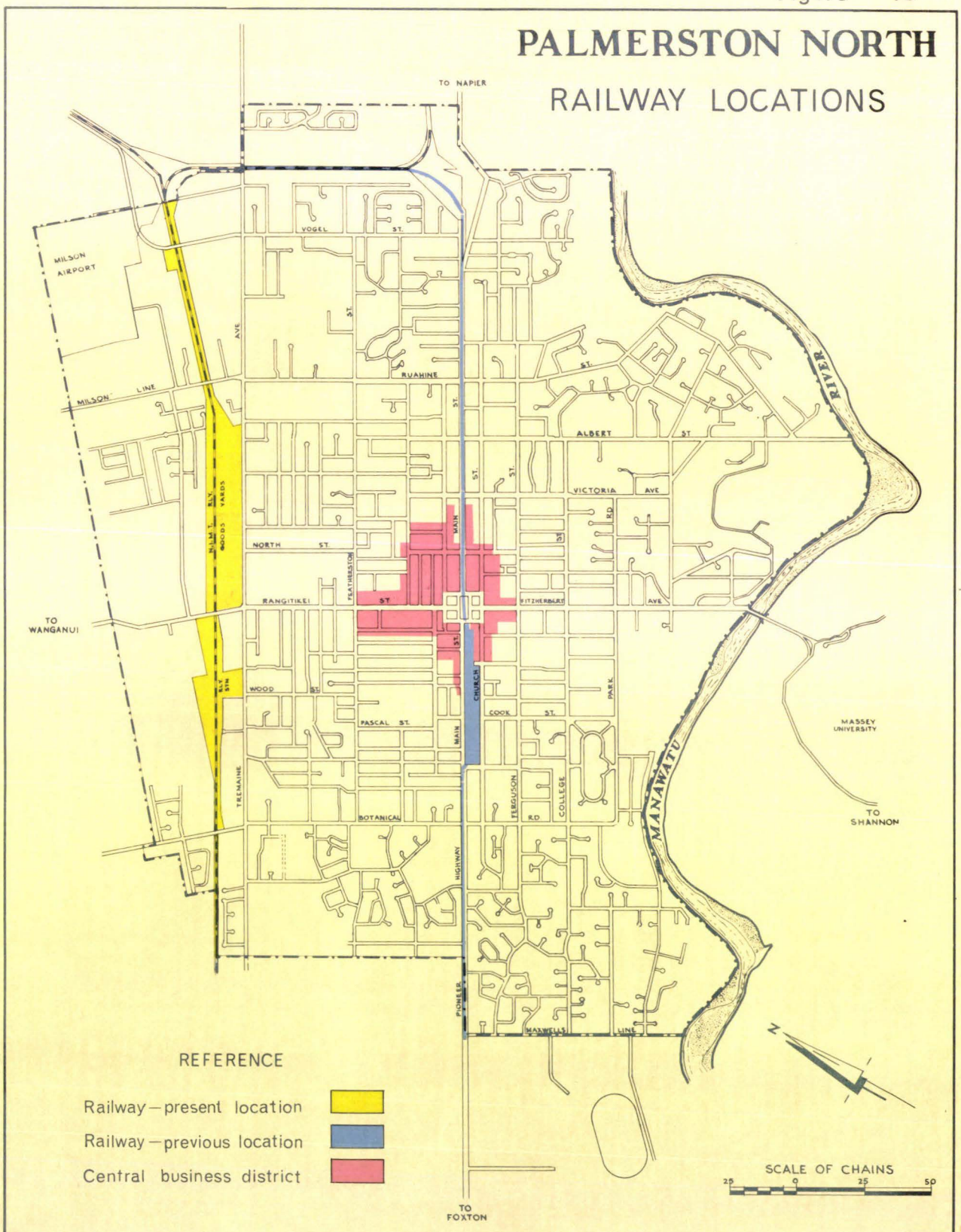
to the railway land, both in its past development and in the impact of planning proposals for future development, the study area proved to be by no means uniform. It became clear that the railway yards divided the study area into two relatively dissimilar blocks. These two areas, defined in Figure 44 will be referred to as Main Street Block and Church Street Block.

General Relationship of Railway Land to the Central Area.

Although the full relationship between the railway and the City's growth will not be analysed here, two important factors relating to the central area may be deduced from Figure 15. Firstly, the elongated nature of the old yards has interrupted the natural traffic circulation pattern of the central core, while, secondly, the central business district has tended to extend towards the north-east and north-west away from the yards, but in conflict with the pattern established both by the four main arterial routes into the centre of the City, and by the initial layout plan which was focused on The Square.

As will be shown in later analysis the study area particularly in its commercial aspects was dominated by the railway and bears little functional relationship with the remainder of the central business district. Even that portion of the area which includes frontage to

Figure 15


PALMERSTON NORTH
RAILWAY LOCATIONS
TO NAPIER
MILSON AIRPORT
MILSON LINE
VOGEL ST.
RUAHINE ST.
ALBERT ST.
VICTORIA AVE
MAIN ST.
NORTH ST.
RANGITIKEI ST.
FITZHERBERT AVE
FEATHERSTON ST.
WOOD ST.
PASCAL ST.
COOK ST.
CHURCH
PARK
TREMAINE
BOTANICAL
FERGUSON RD
COLLEGE
HIGHWAY
PIONEER
MAXWELLS LINE
MANAWATU RIVER
MASSEY UNIVERSITY
TO SHANNON
TO WANGANUI
TO FOXTON
N
REFERENCE
Railway—present location
Railway—previous location
Central business district
SCALE OF CHAINS
25 0 25 50

The Square, while functionally integrated with retail core of the C.B.D., possesses low land values in comparison with other parts of the retail area.

Land Use.

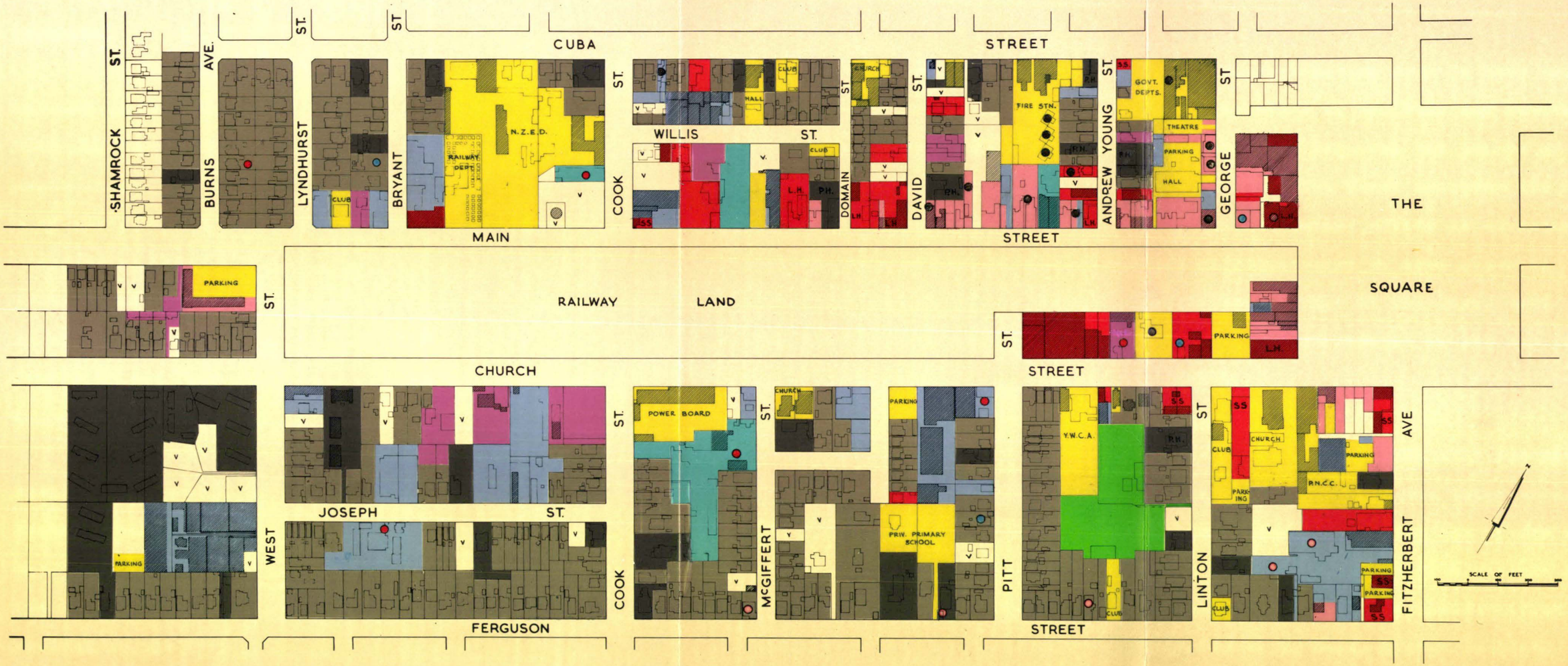
The land use classification used in this section is based on the system prescribed by the Town and Country Planning Regulations, 1960, and requires two points of explanation. 'Civic and Community Uses' includes all local body and government premises whether office or workshops. 'Industrial Uses' are differentiated by town planning rather than economic criteria. All of the basic data relating to the broad use classifications is set out in Figure 16 and Table XXXIX.

1. Residential Pattern.

Residential uses are by far the most important areally, accounting for 46.9 percent of the total area. However, there are differences between the two blocks which should be noted. Main Street Block with 39.6 percent of its area in residential use has a marked concentration of housing in the Bryant Street to Burns Avenue locality. Between Cook Street and Andrew Young Street the pattern of housing is biased towards Cuba Street (away from the old railway) and is interpenetrated by commercial, industrial and civic uses. In contrast with Church Street Block only the concentration of housing which is furthest from The

Figure 16

LAND USE 1966



REFERENCE

Private Houses	Wholesale, Offices, Professional	Service Industry	Civic and Community
Flats, Private Hotels (P.H.)	Service Station (S.S.)	Light Industry	Private Recreation Reserve
Retail	Licensed Hotel (L.H.)	Heavy Industry	Vacant (V.)
Buildings in permanent materials	Major use of site shown by basic colour	Minor use of site shown by circle colour	

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TABLE XXXIX - COMPARISON OF LAND USE BY AREA.

CLASSIFICATION	MAIN ST. BLOCK		CHURCH ST. BLOCK		TOTAL AREA	
	Area in Acres	% of Block	Area in Acres	% of Block	Area in Acres	% of Total area
Houses	16.5		29.3		45.8	
Flats & Priv.Hotels	2.5		11.2		13.7	
Total Residential	19.0	39.6	40.5	51.2	59.5	46.9
Retail Shops	4.3		1.5		5.8	
Offices & Wholesale	3.7		3.7		7.4	
Total commercial	8.0	16.6	5.2	6.6	13.2	10.4
Service Industry	1.2		2.0		3.2	
Light Industry	3.5		11.0		14.5	
Heavy Industry	0.9		2.6		3.5	
Total Industry	5.6	11.7	15.6	19.8	21.2	16.7
Civic & Community	11.8	24.6	10.1	12.8	21.9	17.2
Recreation			2.7	3.4	2.7	2.1
Vacant	3.6	7.5	4.9	6.2	8.5	6.7
TOTAL	48.0	100.0	79.0	100.0	127.0	100.0

Square has avoided serious interpenetration by other uses. Comparatively little area is taken up with high density residential use,[2] (13.0 percent of the housing), and this includes five old private hotels which in the past catered to the railway trade. These hotels today have a depressed appearance and provide single workers' accommodation.

Of the Church Street Block, however, 51.2 per cent is occupied by residential uses of which 27.3 percent is in high density development. This significantly higher proportion of flats is due to a State Housing Division development of pensioners and single persons flats at the corner of West Street and Church Street. Distribution of housing is more even than in the other block but again is biased away from the railway land.

A considerable portion of this block is designated under the present planning scheme for commercial and industrial development. As might be expected residential properties are gradually being taken over for commercial development but surprisingly little interpenetration of use has occurred.

2. Commercial Pattern.

In general, commercial uses are concentrated near the Square and in a finger of development along Main Street. The past influence of the railway passenger terminal facing

2. High density is used loosely here to include flats, private hotels and boarding houses.

Main Street is reflected by the presence of five licensed hotels, four fish and chip shops, four cafes and a continuous line of other old shops in Main Street. Now that the railway has been removed a commercial residue remains which, despite the proximity of The Square, does not show any signs of functional renaissance. A number of shops are vacant while the occupied shops are of a type which require low rent and which, while profiting from a central location, do not contribute essential functions to the central area. Characteristic examples of the enterprises found in this portion of Main Street are secondhand shops, fruiterers, a book exchange (magazines and paperbacks) milkbars, a discount grocery, and a photographer.

Commercial uses in Church Street Block account for only 6.6 percent of the area. Shops are of little importance except in The Square itself and the main concentration of commercial development is in Church Street.

Although small in areal extent commercial uses are by virtue of their grouping and central location one of the principal determinants of the functional character of the study area. That Main Street Block is dominated by shops and hotels while the other block is dominated by offices and service stations illustrates an essential difference between the two halves of the study area. Severed by the railway from the main and dynamically

expanding sections of the C.B.D. the Church Street Block has been slow of development and orientated towards The Square. Main Street Block on the other hand owes both its functional based and depressed commercial character to the historic presence of the railway and especially the passenger terminal.

3. Industrial Pattern.

Dispersed distribution, and variety of age, type and size are characteristic of industrial uses throughout the whole area. Industrial development is of less areal importance in Main Street Block (11.7 percent of area), than in Church Street Block, (19.8 percent of area), but in both cases light industry predominates. Two main factors encourage the location of industry in the vicinity of railways. The railway itself provides a transportation facility which is essential to the operation of some industries while secondly the presence of a railway tends to lower the desirability of adjoining land for other uses. Both factors operated in the study area before the railway was removed. Since 1963, however, a combination of industrial zoning and the continuing depressed character of the area has encouraged continuing industrial development. Apart from an intensive development of wool carding and milling plants on a two acre site in West Street little grouping of industry by either type or age has taken place.

Industries range from repair shops, and specialised engineering (classified as 'light') to timber yards, concrete works and panel beaters which by virtue of offensive elements such as noise, dust and visual unpleasantness are classified as 'heavy'.

Increasing industrialisation of the area can in the main be explained in terms of availability and value of land rather than central location and C.B.D. functions.

4. Civic and Community Uses.

Analysis by area places civic and community uses second to residential uses in the whole area and may be divided into a further three classifications.

(a) Directly related to the central location, local body and government premises and stores account for just over half the area utilized for civic and community functions. Government offices, the Municipal Fire Station, the New Zealand Electricity Department regional offices and workshops, the Manawatu-Oroua Power Board workshops and the Palmerston North City Council offices are all located here.

(b) Public and private community buildings including churches, halls and clubs are dispersed throughout the study area and vary considerably in quality and effect on the area. The Churches, the Maori Battalion Memorial

Hall and the St. John's Ambulance Society Hall provide facilities which are orientated towards a central area hierachy of functions. On a different scale six old houses converted to club halls exist principally because low value properties were available in an appropriately zoned locality.

(c) Prior to the removal of the railway only a small portion of the area (3.2 acres) had been developed for off-street parking acting in itself as an index of the intensity of commercial functions. However, since the deviation a portion of the railway land, immediately adjacent to The Square, has been utilized to provide parking for up to 600 vehicles.

The overall pattern of community uses is dispersed but increases in intensity towards The Square.

5. Synthesis.

The foregoing land use analysis provides a two dimensional index of functional structure in which three principal elements can be dist inguished.

In part the area is functionally integrated with the C.B.D. but only those portions of the area which lie adjacent to the Square are consistently C.B.D. in character. Of the remaining area the hotels, to a limited extent and the civic uses to a greater extent are essential elements of a C.B.D. hierachy of functions. On the other hand financial institutions, high quality personal

service stores, departmental stores and professional offices are all absent from the greater part of the area.

The second functional element may be classified as "railway residues". These uses include hotels, (licensed and unlicensed), cafes, fish and chip shops, old established industries in Willis Street and Joseph Street and old housing which in quality and location were an integral part of the area which was characterised by the railway, goods yards, and passenger terminal. Many of these uses have persisted after the relocation of the railway, partly because of the weight of capital investment represented by buildings and partly because nothing would be gained by their relocation.

Thirdly, changes of business types and new developments have tended to endorse the existing character of the study area. Deprived of railway trade a number of shop premises have changed hands several times, but change has tended to reflect the old and poor quality of the buildings. Houses taken over for commercial use have frequently been converted to storerooms and workshops with a minimum of renovation. New buildings are mainly industrial or civic in use and include the Maori Battalion Memorial Hall and the St. Johns Ambulance Headquarters. The conversion of old houses to private club rooms again reflects development inertia in the area.

The zoning pattern under the operative district

scheme for the study area reflects the existing pattern and character of development, but provides for an extension of commercial and industrial uses in that part of the area where residential uses are already interspersed with commercial and industrial development. (Figure 45 Appendix F). But as already outlined commercial development which has increased since the operation of the scheme, has been sympathetic rather than dynamic in its effect on the functional character of the area. In addition, the functional inertia of Main Street Block is reinforced by an adjoining zone of transition from aged housing to light industry and warehousing [3] which tends to create a psychological barrier between the block and the central commercial core of the City.

A further factor which bears on the climate for change in the study area is the ready availability of commercially zoned land in the north-eastern sector of the C.B.D. which has traditionally experienced a more dynamic growth rate.

Despite the proximity of the area to the centre of the City residential functions, particularly in the Church Street block,remain strong and will be reviewed in greater detail in a later section. Strong civic elements have also emerged in the area but apart from these

3. In the Taonui Street to Waldegrave Street area.

there is little indication that the railway influenced character will, in the natural course of development, be changed to any great degree for some time.

Amenity.

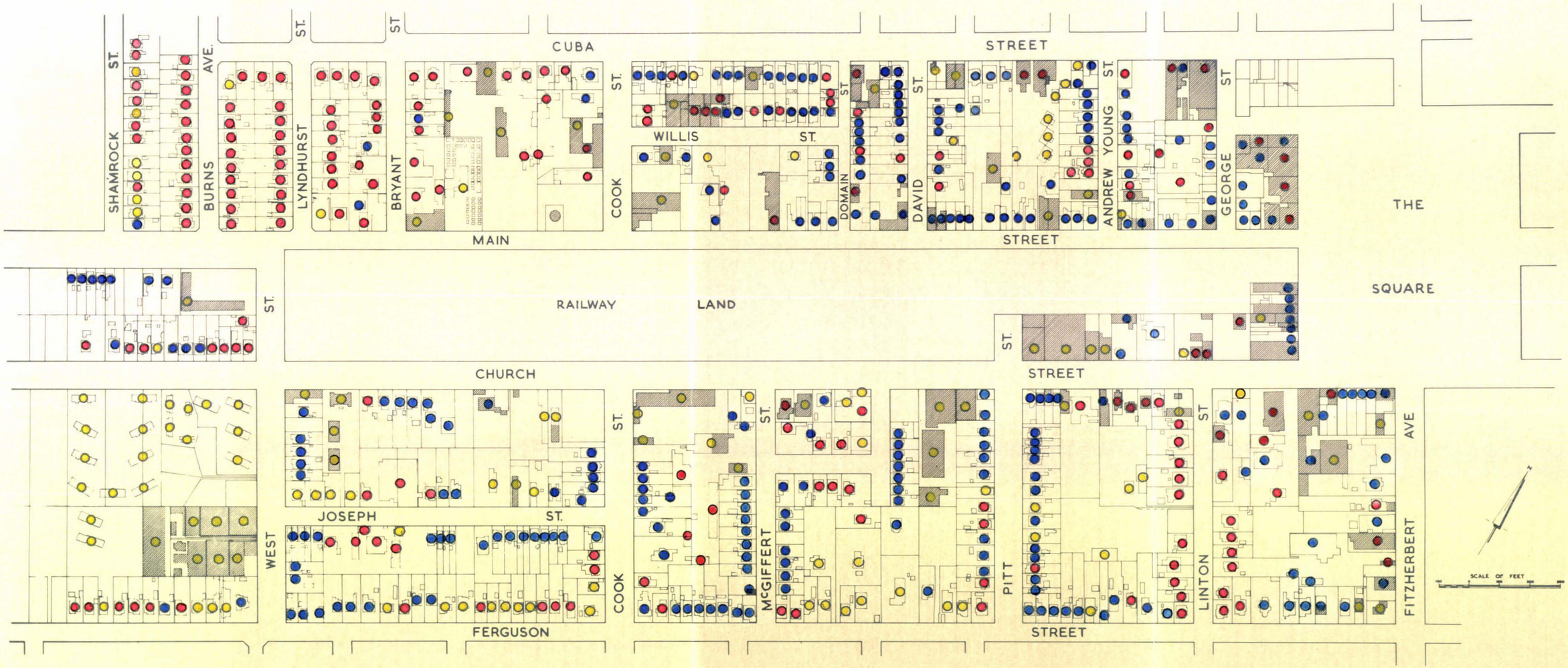
Land use analysis establishes the functions of an area and, in part, its character. But a discussion of amenity is essential to fully determine character as well as to evaluate the present quality and future problems of development. The principal aspects of amenity which will be examined here are age of buildings, values and visual amenity. It is usual also to investigate condition of buildings but the value of such analysis is in doubt. To be valid, an assessment of condition of buildings must be based on a series of consistent and objective tests, a requirement which is difficult to achieve. Moreover an economic assessment of development appears to be more relevant to a study of redevelopment problems and in this case a value analysis will be used.

1. Age of Buildings.

The age of buildings in the study area was established where possible from City Corporation records, the remainder being determined by field comparisons with buildings of known age. Three age groupings were made - built prior to World War I, built during the inter-war period; built after World War II. Age of buildings is shown by Figure 17.

Figure 17

AGE OF BUILDINGS



REFERENCE

Built before 1914..... ● Built between 1914 & 1945..... ● Built after 1945..... ● Built in permanent materials.....

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(a) Residential Buildings.

More than half of the houses (56.4 per cent) were erected prior to World War I (a number of these have subsequently been converted to flats). In Main Street block old housing is solidly concentrated in the area between Cook Street and The Square. In Church Street block old houses are also in a majority but are evenly distributed throughout the area.

The interwar period marked the development of housing between Bryant Street and Burns Avenue in Main Street block but housing construction in the other block was generally scattered with one consistent pocket of development in Linton Street. In all 38.5 percent of the housing was built at this time.

Few houses (7.9 percent of the total) have been erected since World War II. Only two houses were erected in Main Street Block while building activity in Church Street Block was confined to Ferguson Street - as distant from the railway land as possible. During this latest period also a large development of pensioner and single persons flats was undertaken by the State Housing Division in the vicinity of West Street at the south-western extremity of the railway land.

(b) Commercial Buildings.

Almost all shops and office buildings were erected prior to World War II and were orientated

towards The Square, Main Street and Fitzherbert Avenue. Early flourishing development stimulated by the railway followed by a long period of decline is indicated by full commercial development achieved at an early stage followed by a comparative absence of building activity since then. A few of the shops near and in The Square have been renovated during the last decade but even today very few of the buildings are in permanent materials. Some inter-war construction occurred in The Square but in the post-war period new commercial buildings have been, for the most part, limited to Church Street Block .

(c) Industrial Buildings.

Industrial development has been well spread over the three periods. There was, however, a slight lull during the inter-war period followed by a significant increase after World War II and more particularly since the operation of the district scheme. Uncertainty concerning the eventual completion of the railway deviation and hence of the future development of the area combined with the effect of the great depression are the most likely reasons for the inter-war lull in development. Uncertainty was removed by the industrial zoning which was given to a large percentage of the area. Even so industrial development which has taken place since the district scheme became operative has been of mixed quality and character. Industrial developments which have departed from the

established character of the area are all located in the Church Street block and include the intensive wool milling and carding works in West Street and two engineering works in Church Street. In each case the new buildings are of permanent materials. The remaining post-World War II industrial development strengthens the character established during the railway period and includes a concrete works and a wool and hides treatment works.

Viewed as a whole the preponderance of buildings in the area are of impermanent materials and were erected prior to World War I. Main Street Block contains a heavy concentration of old buildings between Cook Street and The Square interspersed with a small number of newer buildings. Old buildings in Church Street Block although in the majority are more evenly distributed. New buildings are more numerous than in the other block and more evenly interspersed with the old development. A significantly greater proportion of the industrial and commercial buildings in this block are of recent construction than in Main Street Block.

2. Value Analysis.

Three principal objectives guided the analysis in this section of the study:

(a) to measure the intensity of site development.

(b) to relate intensity of development to location and land use.

(c) To evaluate the property development in terms of other C.B.D. localities.

Government valuations were used as the basis of analysis and two indices of development were calculated. The value of improvements for each property was expressed as a percentage of land value. This index does not measure quality but indicates intensity of development by comparing the value of buildings with the value of the land, and was separately considered for residential, commercial and industrial uses. Since land values are partly based on zoning, this index also relates present use to potential use. Three intensity groups were established; scores of 100 percent or less (i.e. improvements worth less than land); scores between 100 and 200 percent (improvements value up to twice land value); scores of more than 200. Since the higher the value of land, the higher the value of development that is required to achieve a high intensity index, development intensity is automatically scaled to the location and zoning of each property considered.

Secondly capital values per acre were calculated for the two blocks (Figure 19) and plotted in graph form against distance in chains from The Square. Results were then compared with value per acre along a control line to evaluate potential economic development in the area. A control line was selected in the north-eastern sector of the C.B.D. where historically the greatest amount of

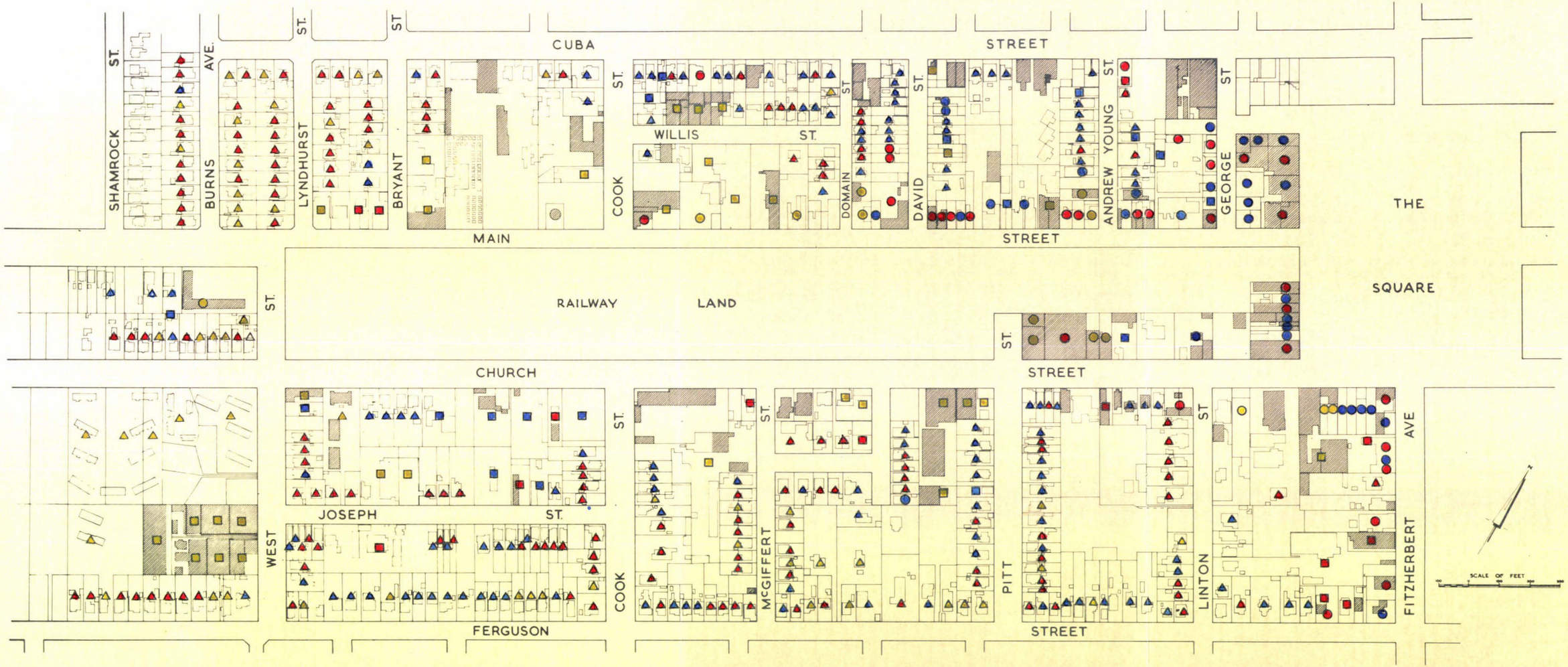
commercial development has taken place. Commencing in Broadway Avenue where peak land values in the City occur, the control line runs parallel to Rangitikei Street to Featherston Street.

Intensity index results are shown in Figure 18. Residential properties reveal a distinct pattern which is related to age of buildings and zoning. In the commercial zone of Main Street Block previously noted for concentration of pre-World War I housing, most of the properties are in the low intensity group. Commercial zone values tended to be offset by narrow frontages in this area indicating that the low intensity indices also reflect a low quality of building. On the other hand the grouping of middleaged houses in the Bryant Street, Burns Avenue area of residential zoning was characterised by medium and high intensity results. Church Street Block with generally lower land values did not reveal as strong a correlation between intensity, zoning and age of buildings. High medium and low intensity results were well spread throughout the zone with a tendency for low scores to predominate in the Pitt Street/Ferguson Street vicinity. A number of pre-World War I houses were placed in the medium intensity group which accounted for 48 percent of the housing.

Despite the low per foot of frontage land values (compared with other commercial areas in the CBD) the commercial properties tended towards the low intensity

Figure 18

VALUE ANALYSIS



REFERENCE

Residential Properties	Commercial Properties	Industrial Properties
Less than 100 percent..... ▲	Less than 100 percent..... ●	Less than 100 percent..... ■
101 to 200 percent..... ▲	101 to 200 percent..... ●	101 to 200 percent..... ■
More than 200 percent..... ▲	More than 200 percent..... ●	More than 200 percent..... ■

Method of Analysis.

Using Government Valuations the value of improvements for each property was expressed as a percentage of the unimproved value, then classified as shown.

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classification with an intermixture of high, medium and low intensity development throughout the area.

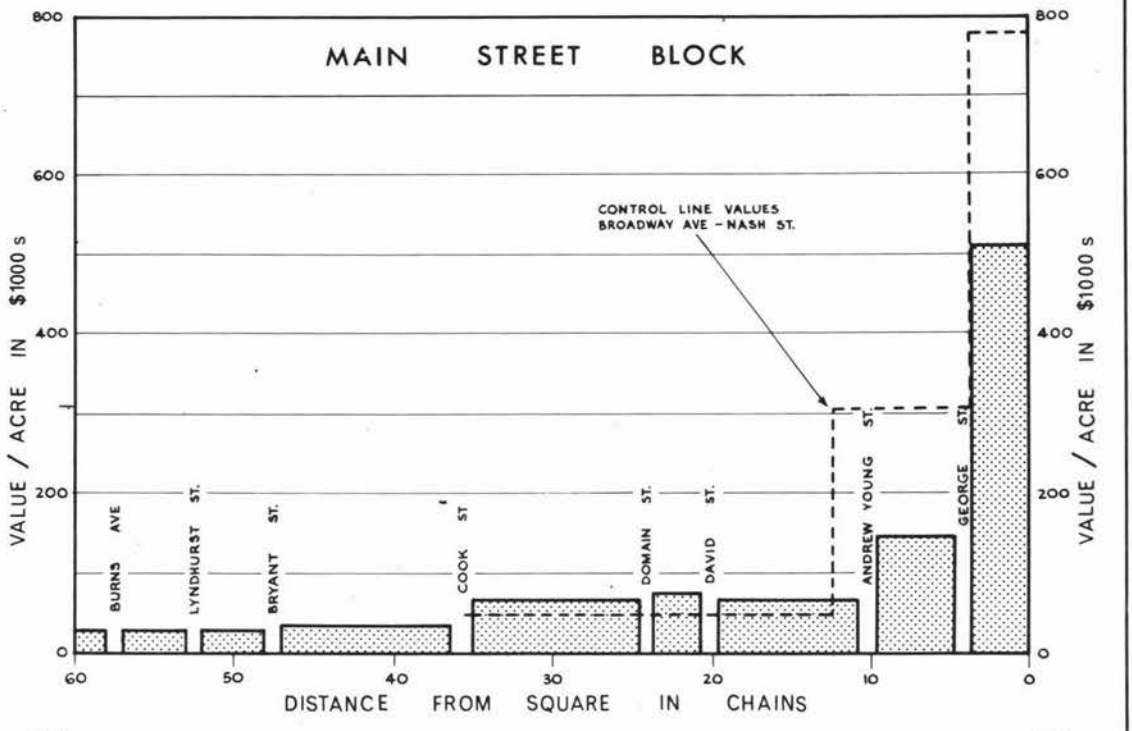
Most of the larger and newer industrial properties on the other hand recorded high intensity scores. However, a concentration of low intensity industrial development is located between Church Street and Joseph Street.

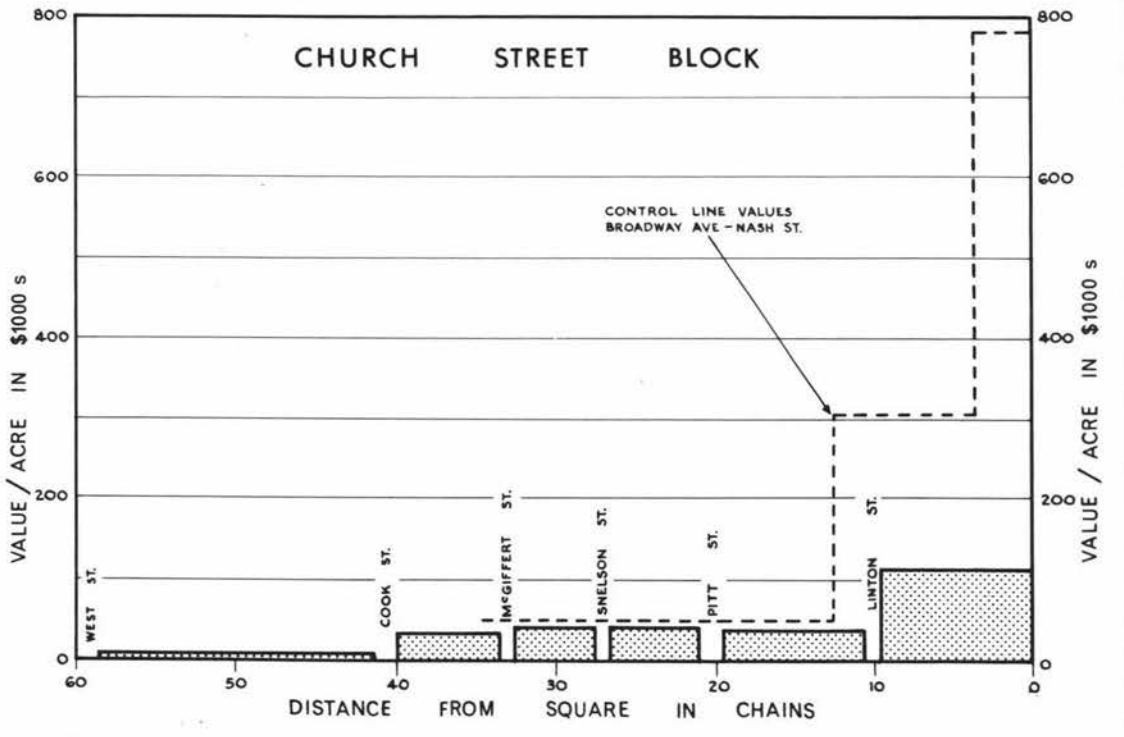
Capital values per acre have been plotted against a distance scale (Figure 19) for each block and compared with a similar plot of values for the control line. In each case, values per acre diminish rapidly with increasing distance over the first 15 chains and diminish less quickly from that point on. Both Main Street Block and Church Street Block show considerably lower values per acre over the first 15 chains than the control line. The disparity is greatest in Church Street block indicating a lower level of development in this area. Both blocks at this point are, by comparison with the control line, substantially under-developed.

Overall, value analysis is consistent with the pattern already established. Considerable areas of low intensity of development, aged buildings and an apparent development value/acre deficiency combine to support the view that the railway engendered character of much of the area is likely to endure. Those portions of the study area where development value per acre approximates values on

Figure 19

CAPITAL VALUES PER ACRE





the control line also display the attributes of depression and blight raising a further problem for future development. Where capital investment levels are already near to the average for localities of the same zoning and relative position in the C.B.D. redevelopment will only be accomplished by the introduction of activities which are capable of absorbing the existing investment load. Such an investment inertia is evident in parts of the study area which at these points is likely to resist change. Rejuvenation of the area will thus be unlikely in the short or medium term without the introduction of some new factor of development.

3. Visual Amenity.

Because of the danger of subjectivity, analysis of visual amenity is difficult and frequently avoided. However visual amenity is an expression of character and creativeness which as an index of aesthetic harmony reflects the condition of urban development. In view of the pattern which the foregoing analysis has established and the possibility of planned redevelopment for part of the area some importance is now attached to the evaluation of townscape in the area.

Analysis has been directed at the establishment of three dimensional image of the area with emphasis on the quality of each category of development and the definition of focal points.

Orientated in a south-south-westerly direction away from The Square the study area is traversed end to end by four streets, (Cuba Street, Main Street, Church Street and Ferguson Street) which have acted as linear focii for the area. Of these the two most important, Church Street and Main Street flank the railway land and most particularly reflect the influence of the railway. These two streets create a sense of locality for the area and are the two most important elements in its image.

Architecturally Main Street contains many residual features of the small market town. Crowded with old wooden commercial buildings - shops with false fronts or accommodation above - in a quasi-colonial style with verandas of varying heights and design supported from below by posts and characterised by a low standard of maintenance the street affords a depressing street picture. (Figures 30-34).

Church Stree t has a less unified character with considerable diversity of use and style. Focused at The Square on All Saints Church (Figure 28) in the middle on St. Lukes Lutheran Church (Figure 29) and at the southern end on a new state pensioners and single persons flats (Figure 26) the street contains a potential for interesting development. Nevertheless the street is marred by some blighted housing and an area of unsightly industrial use

between Cook Street and West Street.

Residantial development displays a wide range of character and standards. (Figures 20-27). At the apex of a wedge of residential uses reaching almost to The Square, a small group of middle-aged houses in Linton Street and Church Street possess considerable charm which could be worth preserving. Apart from these and a solid group of well preserved but undistinguished middle aged houses in the Bryant Street - Burns Avenue locality the majority of houses are of low visual amenity. Visual blight is particularly evident in transitional areas where the houses are interpenetrated by commercial development. Housesin these localities appear to be degenerating at a faster rate than their removal by commercial and industrial interests.

Very few commercial buildings of any merit were found in the study area. (Figures 30-35). An exception was the well designed supermarket with courtyard parking at the corner of West Street and Pioneer Highway. The features attributed to Main Street commercial properties are common to most of the study area; many of the shops in the Square portion of the study area for example, despite renovations, retain some graceless characteristics of pioneer days.

The wide range of industrial uses found in the area is not paralleled by a similar diversity of building standards (Figures 36-43). Only two levels of industrial

RESIDENTIAL PROPERTIES

Figure 20 Linton St.

Figure 21 Church St.

Interesting houses of some charm in Linton Street and Church Street. Both areas are zoned Commercial B, but preservation could add interest to the central area.

Figure 22 Lyndhurst St.
Middle aged, middle class housing, typical of the Lyndhurst St. area.

Figure 23 Snelson St.
Middle aged housing, common throughout the study area.

Figure 24 David St.
Old housing whose economic life is ending faster than an expanding commercial core can replace them. Many are rented.

Figure 25 Church St., opps. State flats
Old now, zoned for low density residential.....what is their future in ten years time?

Figure 26 Cnr. Church St, West St. State pensioner flats. Good development which could be enhanced by thoughtful development of the railway land.

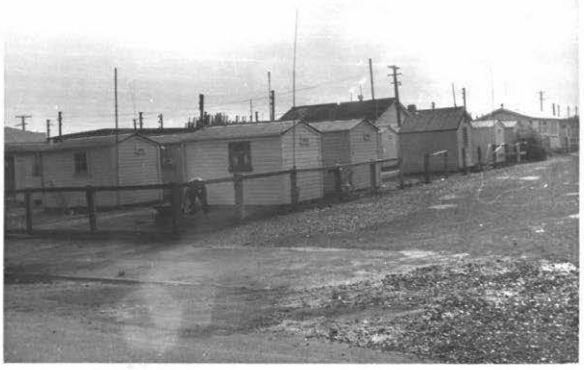


Figure 27 Main St.
A disgrace to the Government and an embarrassment to the City, this railway workers' compound is shortly to be removed.

COMMUNITY USES.

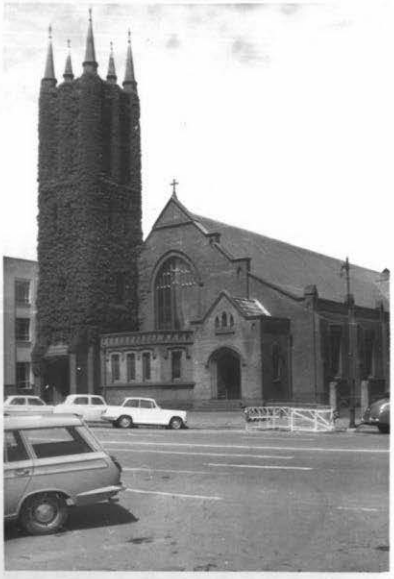


Figure 28 Figure 29
Two of the three excellent church properties in the study area. These and other good community buildings could be used as focal points in future development.

COMMERCIAL PROPERTIES

By far the majority of the commercial properties are devoid of visual merit. Figures 30 to 34 are all of properties in Main St., are typical of commercial development in the area, and are presented without further comment. Figure 35 gives an obvious contrast.

Figure 30

Figure 31

Figure 33

Figure 32

Figure 34

Figure 35

INDUSTRIAL USES

The wide range evident in surveys of both type and value of development of industrial uses, is not reflected in visual amenity. First class design and appearance of industrial buildings is not to be found in the study area. The first three figures show factories which reach a standard suited to a central location, but are by no means outstanding. The remainder are examples of poor appearance.

Figure 36 A renovated factory Church Street.

Figure 37 Church Street

Figure 38 Church Street

Figure 39 Plaster works and timber yards, Church Street.

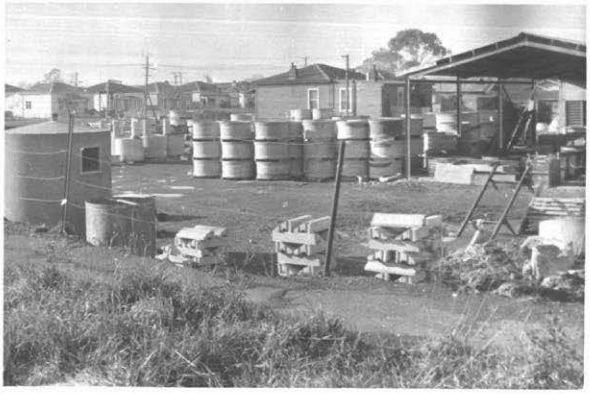


Figure 40 Concrete works, Church Street.

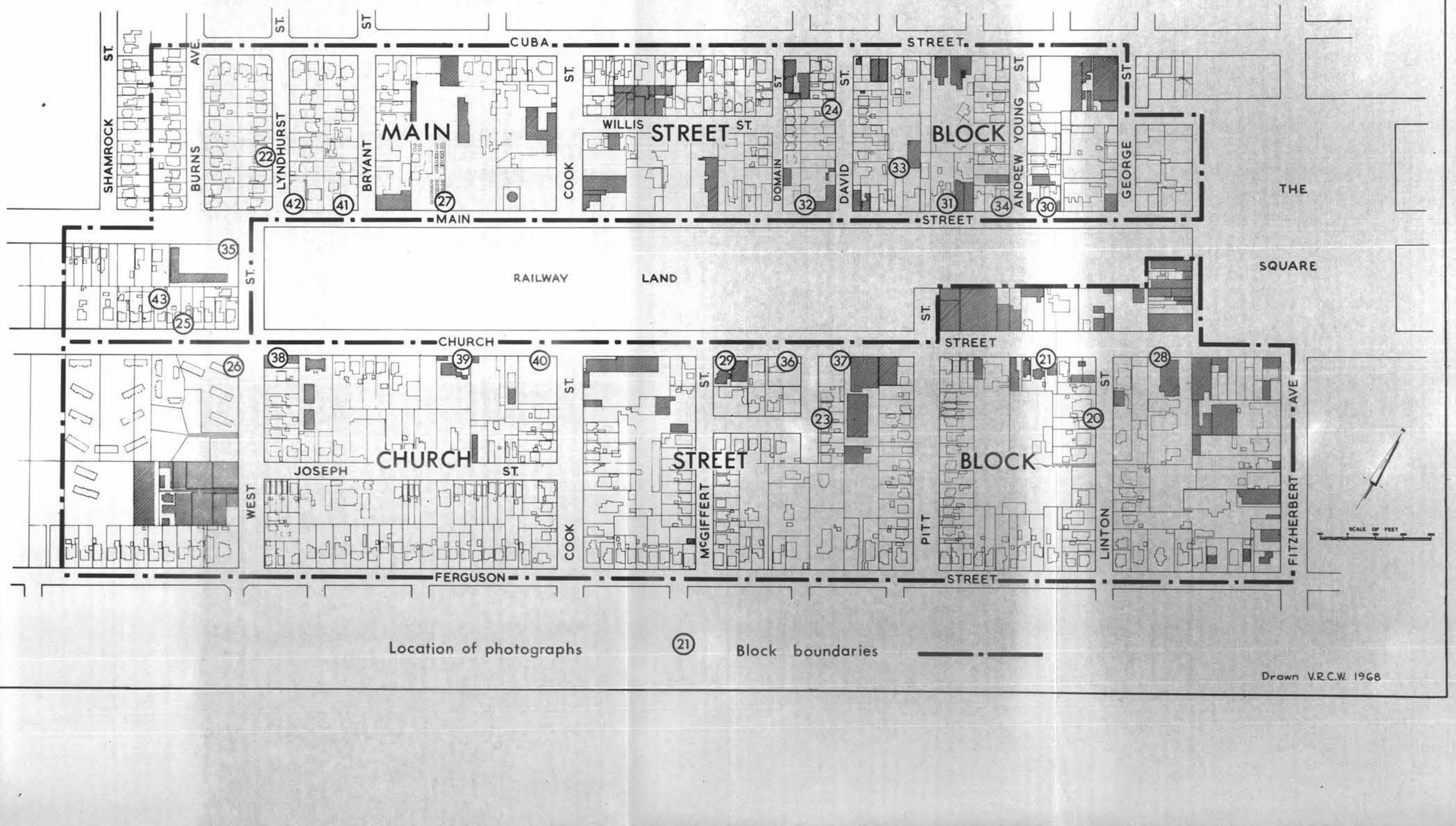
Figure 41 Panel beater and car painter, Main Street.

Figure 42 Upholsterer, Main Street.

Figure 43 Concrete works at rear of housing, Church Street.

Figure 44

LOCATION OF PHOTOGRAPHS



Location of photographs (21)

Block boundaries

Drawn V.R.C.W. 1968

building can be distinguished. A number of factories are, while not outstanding, of an average quality commensurate with a central location. The remainder, however, are of a generally low visual standard by virtue of unsightly yards and poor buildings.

In its total visual image the study area is dominated and blighted by residual elements from the railway period. There are, however, a number of interesting features of considerable merit. The three churches and the Maori Battalion Hall are of a high standard while the supermarket and State flats at the southern end of the area indicate a potential standard for redevelopment.

Population Patterns and Trends.

The strength of the residential category of land uses together with apparent problems of blight in housing areas raises important questions for future development. Future zoning controls and any redevelopment schemes brought forward will need to be cognisant of the character of residential development in this area.

1. Numbers and Change.

Analysis of census data since 1951 indicates that for the area as a whole, population, numbers of houses and size of housholds all decreased rapidly. (Table XL). However, the decrease was not consistent between the two halves of the area which displayed quite different characteristics of change.

TABLE XL

POPULATION CHANGE

AREA	DATE	POPULATION	NO. OF HOUSES	PERSONS/ HOUSE *
Main St. Block	1951	982	254	3.9
	Change	-54	5	
	1956	928	259	3.6
	Change	-124	-67	
	1961	804	192	4.1
	Change	-167	-25	
	1966	637	167	3.8
Church St. Block	1951	1087	296	3.7
	Change	-76	24	
	1956	1011	320	3.2
	Change	-92	-2	
	1961	919	318	2.9
	Change	-36	-3	
	1966	883	315	2.8
Total Area	1951	2069	550	3.8
	Change	-130	29	
	1956	1939	579	3.3
	Change	-216	-69	
	1961	1723	510	3.3
	Change	-203	-28	
	1966	1520	482	3.1

* These figures are arrived at by dividing the population figure by the number of houses in each instance. However, the population figure includes persons living in Hotels, and no allowance has been made for this.

(a) 1951 to 1956.

During this period there was little difference in the pattern of change between the two halves of the study area. Population decreases of 5.4 percent and 6.9 percent in Main and Church Street Blocks respectively were considerably higher than the percentage loss in housing. Church Street block showed an actual increase in house numbers due to the construction of state flats in West Street. It can be deduced that the decline in this period is mainly attributable to an ageing of the population with little expansion of commercial or industrial development.

(b) 1956 to 1961.

The pattern of change altered in this period. Most affected was Main Street block where population decline at 13.4 percent was more than double the rate of the previous five years. Further the percentage decline in house numbers now exceeded the rate of population loss with a corresponding increase in the size of household. A substantial decline in house numbers can be associated with commercial and industrial activity while the increase in size of households could indicate an increase in rented properties. Church Street block on the other hand experienced a continuation of the pattern of decrease in both populationand size of households suggesting limited commercial activity and a continued ageing of the population.

(c) 1961 to 1966.

A similar pattern of change to that recorded in the last period was evident in both blocks. Increased rates of decline in population numbers for Main Street block (20.0 per cent) with a 13.0 percent decline in house numbers indicates continued commercial expansion although not as heavy as for the past period. In Church Street block the decline in population numbers and in size of households continued but at a slower rate.

Since 1951 the total population has decreased markedly - a trend which is likely to continue. There is a limit to cyclical ageing of population, however, and it is probable that a considerable increase in tenanted properties will occur in the future. Concurrently an increasing commercial and industrial development will gradually reduce the extent of the residential function of the area.

2. Socio-Economic Groupings.

Despite its transitional character and acres of blighted buildings the principal function of the study area remains residential. The findings of a sample survey taken of 14.8 percent of the houses (flats excluded) reveals that residential uses are not merely extensive but are important from the point of view of location and social structure. It will be suggested, as a result that the residential function of the area should be protected as far as possible.

The sample survey was designed to relate, at a

simple level, socio-economic groupings with tenancy and other characteristics. The sample was too small in relation to the area population to allow more than tentative findings for some questions but gives a good insight into the social structure of the area.

Three age groupings based on the age of the head of the house have been distinguished and are shown in Table XLI. The population is substantially weighted in both the old and young age groups in Church Street block while the old group in Main Street block is particularly large.

TABLE XLI
AGE GROUPINGS.

AGE	% OF SAMPLE CHURCH STREET BLOCK	% OF SAMPLE MAIN STREET BLOCK
20-40 years	40.0	23.5
41-60 years	28.0	29.5
Over 61 years	32.0	47.0

The small sample precluded a valid comparison of age groups with occupations. However of the active working population the greatest number, (45 percent) were craftsmen, while unskilled and operative occupations (32 percent) outweighed the remainder (23 percent included professional and while collar occupations.)

Car ownership at one car for every 3.5 persons was below the 1963 average of one car for every 3.1 persons

in the City. Comparative figures for the remainder of the Central area are not available but it is probable that lower than average car ownership is related to the low status occupation numbers and the excess of old people in the area.

3. Tenancy.

Tenancy was analysed by ownership, length of occupancy, reasons for selection of house and correlated with standard of house and age of head of household.

(a) Ownership.

It was found that 70 percent of those in the 20 to 40 age group were tenants; all of the 41 to 60 years group were owner-occupiers. A strong relationship between tenancy and the results of the earlier value analysis was noted. 70 percent of all rented houses were placed in the lowest value index classification (value of improvements less than value of land.) Of the owner-occupied houses 52 percent came within the middle value index range, 27 percent were in the low range with the remaining 20 percent in the high range.

(b) Length of Occupancy.

As expected the survey of length of occupancy revealed a stable middle-aged and old population (most of whom were owner-occupiers), who indicated previous and anticipated permanency of residence. The youngest group however which included a large proportion of renters

were in the main short term residents (two years or less). It can be expected that the proportion of retired persons in the area will gradually diminish with a corresponding rise in the numbers of short term tenants as rented properties increase.

(c) Reasons for Residence in the Area.

The questionnaire gave a choice of reasons for selection of the area as a place to live. The replies showed an overall preference for the central locality. In the old age group convenience of location and a liking for the area (possibly linked with long association) were the main reasons for residence. In the younger group, central location, low rents and availability of accommodation were the preferences. With only three exceptions, owner-occupiers had no preference to move from the area, but the reverse was true of tenants. Of the tenants who indicated a desire to move, most were saving for a home of their own and the remainder would move if they could find better accommodation for a similar rent.

Future Development.

Since the commencement of this study the railway land has been divided into three blocks by the extension of Pitt Street and Cook Street and the widening of Main Street to the full two chains has begun. The extension of these roads has effectively altered the

traffic pattern linking the two halves of the study area. In view of the different character and trends evident in the two blocks however it is unlikely that the future development of the two areas will be closely linked. Broadly speaking the following factors impinge on the future development of the railway land.

(a) Ring Road Proposal.

For some time it has been proposed to develop a ring road around the C.B.D. as the major determinant of both central traffic circulation and C.B.D. development. As shown in Figure 45 the proposed route, (part of which has been constructed) crosses the study area only 15 chains from the Square. Implementation of this plan will emphasise the existing tendency for commercial development to concentrate in the north and north-east of the central area and will divide development of the railway land.

(b) Civic Centre.

A co-ordinated civic centre will be needed within the current planning period. City Corporation Offices will be due for replacement and existing central area civic amenities (opera house, library, art gallery) are widely scattered. At the present time the railway land and study area affords the only available land for civic centre development.

(c) Surrounding area.

The study area as has been shown is, in present

character, linked with the past utilisation of the railway land. In the same way future development of the railway land will have a considerable impact on the surrounding area. It is important, therefore, that the future development of the whole area be considered when railway land development is planned. The following features are seen as important:

(a) Much of the area is depressed containing a number of activities which are functionally independent of the C.B.D. Depression is reflected in value of development, type of economic activity and visual amenity.

(b) A portion of the area is economically under-developed in the vicinity of The Square, but at the present time shows few signs of increased intensity of development.

(c) As well as an area of under-development there is a zone where investment levels are commensurate with distance from the area of peak land values in the C.B.D. But this zone exhibits the same depressed features that are characteristic of the area as a whole. Hence the existing investment level is likely to inhibit natural redevelopment.

(d) Although commercial and industrial development has taken place in the area it has tended to be in sympathy with existing development.

(e) The strong residential element falls into two classes - localities of average to good development and blighted areas which have generally been zoned for commercial and industrial development.

(f) Civic and community functions are already strong in the area and for the most part are of higher quality than other development.

(g) The present zoning pattern would permit a much higher grade of development but emphasises the existing pattern of development. Intensification of development is further obstructed by the pattern of small landholdings making it difficult for large scale private development to take place.

With these features in mind the implications of possible railway land development can be examnined. Retention of the land as open space, well landscaped and integrated with The Square would have an immediate effect on land values in Main Street and Church Street. Redevelopment of the surrounding area would probably take place over a long period. However, the increment in value resulting from the expenditure of public funds would accrue to the private investment sector without solving the need for a civic centre in the planning period.

Utilization of the land for civic amenities poses problems both of design and integration with the surrounding area. The ring road will on present planning either contain the civic development near the Square tending to isolate the remainder of the railway land or will separate it from the heart of the C.B.D. with which it should be functionally integrated. Secondly the development of the railway land in isolation from the surrounding area would, due to the

character of the area, detract from new development.

The final alternative is one of comprehensive planned development for the whole area in which the redevelopment of the railway yards and rejuvenation of the surrounding area would be treated as one problem. Although the railway land has been vested in the City Corporation for "civic purposes" it is possible that a comprehensive design for the whole area would show that the whole of the old railway yards are not necessarily the best portion of the area to develop for civic uses. The problems of a comprehensive approach are many and are more difficult for the planner and local government administration than a simple plan for the utilisation of the railway land alone. However, the characteristics and problems of the surrounding area together with the functional organisation of the C.B.D. are closely inter-related and sooner or later will require a comprehensive planning approach.

PART THREE - CONCLUSION.

CONCLUSION

Since the end of the Second World War a number of important structural and functional changes have occurred in Palmerston North. Some aspects of these changes have been examined in detail in relation to population and manufacturing industry, emphasis being placed on the major implications for town planning. A third study, the geographical analysis of an area adjacent to the old railway yards near the centre of the city emphasised the wider implications of proposed railway yards redevelopment. Each research problem was selected to test the hypothesis that "geographically conceived studies of planning districts would provide a sounder basis for planning than the present planning surveys as required and detailed by the legislation." It remains now to compare the results with both the planning data officially collected in Palmerston North, and, to a lesser extent, with the actual planning proposals incorporated in the Palmerston North District Scheme.

Population.

Population data as collected and incorporated in the Palmerston North District Scheme took the minimum form required by the town planning legislation. Census totals for the city and annual average percentage

increases for both the city and New Zealand were tabulated for each census from 1926 to 1966. Figures were given for the male and female components of the population at the 1961 census and the age structure of the city population was compared with the New Zealand statistics for 1956 and 1961 in tabular form. Population estimates for 1971 and 1976 as supplied by the Town and Country Planning Branch of the Ministry of Works were adopted. These figures, however, related only to the then gazetted planning district (coinciding with city boundaries)[1] not to the future urban area of Palmerston North. No analysis of the statistics was presented, or conclusions drawn therefrom. Presumably the most useful information would be the population forecast which would have been used in the preparation of land use zoning proposals.

It would , however, be difficult to over-emphasise the fundamental importance of population trends and structural change as a dynamic factor in urban growth and morphology. As shown in the conceptual model for a planning survey (Figure 1) population is dynamically related to all the physical and functional elements of the city. The inter-relationships are complex. For example it is difficult to assess whether population growth beyond

1. City boundaries were extended in 1967.

certain levels or thresholds is dependent upon the right economic climate for functional change and growth or whether functional change and growth are consequent upon population trends. Nevertheless inter-relationships exist and it would be difficult to properly examine any of the other city elements without first investigating population structure and trends. The following main points which emerged from the population study are therefore not only important for planning itself but also as basic information to be used in the remainder of the planning survey.

(a) Population growth, although less than the average for the eighteen urban areas recognised by the government statistician has been steady and high, ranging between 2.6 and 2.8 per cent per annum since the second World War. Similar rates of growth are expected in the future and the Palmerston North urban population should reach 80,000 persons by 1986, an increase of 62.8 per cent on the 1966 figure of 49,140 persons.

(b) One of the most important characteristics of population growth has been gains from inwards migration. Migration gains were made in almost all age groups but were particularly marked in the 15 to 19 years age group. Rapid rises in the student rolls at the Teachers' College and Massey University account for the gains in this group. Forecasts of student rolls indicate that by 1975

tertiary students could constitute 8.2 percent of the city's population.

(c) Although the present Maori population is small the rate of increase is very large. A continuance of these trends with intercensal increases of say 75 per cent could increase the Maori population to 6.6 percent of the total population by 1976 or 15.9 percent by 1986.

(d) Net residential densities are remarkably even throughout the city with an overall average of 13.4 persons to the acre. Densities tend to be lower in high status areas and also, in the areas which since 1959 have been zoned for high density development. This latter characteristic reflects cyclical ageing of inner area populations and the almost complete absence of high density housing. Although a high proportion of the city's flats have been built in this area, almost all have been single storey developments.

(e) Since the Second World War the status of residential areas has tended to become polarised in comparison with previous conditions. An outstanding feature of this trend is the association between low status areas and state and group housing projects in peripheral locations.

(f) The spatial distribution of age groups is strongly correlated with the pattern of growth of the city. The inner areas are associated both with an absolute decrease in population numbers and a disproportionately

large percentage of older age groups. Fringe areas on the other hand where the highest rate of population growth is found are characterised by a youthful population structure.

(g) Based on a slight overall increase of net residential densities to 14.25 persons per acre a total future population of 61,290 persons could be accommodated within the 1966 city boundaries leaving almost 20,000 persons to be housed elsewhere by 1986.

(h) A brief analysis of the occupational structure showed that two broad groups manufacturing industry and administration, professional domestic and personal services were the fastest growing in the city. The information which has emerged from this study clearly demonstrates the inadequacy of the population analysis required by the legislation. Not only has this study provided basic facts about the structure and growth of the city but has indicated several aspects which require special planning attention. Not the least among these is the loss of population from some areas zoned for high density residential use and the increasing demand for student accommodation.

Manufacturing Industry.

Apart from a table setting out the occupational structure of Palmerston North and New Zealand for 1966 only two sets of industrial data were incorporated in the District Scheme. Four categories of land use were shown on the land use map of the city -

- service industry which included trade workshops and garages.
- light industries which included major distribution warehouses in industrial zones and any industry not included in the other categories.
- heavy industries defined as "those industries requiring segregation because of noise, smoke, smell, effluent, vibration, dust, glare, or other like objectionable aspects." [2]
- noxious industries defined as "industries requiring segregation because of noxious or dangerous aspects." [3]

The area of land used by each category was calculated and published in the Scheme Statement. As with population there was no further analysis of either the whole or specific aspects of manufacturing industry.

In the present study attention was particularly directed to the structure, growth trends and space needs of manufacturing industry in Palmerston North. Some of the principal points to emerge were -

(a) Manufacturing industries in Palmerston North are strongly structured into the New Zealand system of production and markets. Using a system of labour units

2. Appendix II, Fourth Schedule to the Town and Country Planning Regulations 1960. The appendix also lists those industries so defined.
3. Appendix I, Fourth Schedule to the Town and Country Planning Regulations, 1960.

it was found that manufacturing industry has a 54.1 per cent orientation to national markets, a further 3.6 per cent orientation to export markets, and 42.3 percent orientation to local and regional markets.

(b) Those industries which are already important (engineering and metalworking, 32.7 per cent of industrial employment; textiles clothing and leather, 15.8 percent; miscellaneous manufacturing 15.4 percent), are the fastest and most consistently growing. Moreover these industries display the greatest orientation to national markets indicating an overall shift away from regional limitations to wider markets.

(c) Factory size analysis revealed a well balanced industrial structure with no very large dominating companies. Further, the larger companies were the most closely associated with national markets and by implication will be the fastest growing in the future. National trends towards larger and fewer factories support this finding.

(d) Of the factors influencing the location of industry in Palmerston North the two most important are local intrepreneurship and the favourable location of the city for the national distribution of products. The latter depends on Palmerston North's character as a transport focus for road, rail and air. Favourable labour conditions have attracted some industries from the larger centres.

(e) Within the city, under the influence of the District Scheme and central area problems, (congestion, high land values, etc.) new factories have been established and old ones relocated increasingly in the outer and previously undeveloped industrial zones flanking the railway. However, two important industrial groups, food and drink and clothing, textiles and leather have retained a preference for locations near the centre of the city, or in built up areas.

(f) Industrial employment densities are considerably lower for factories established since 1945, (26 persons to the acre), than for factories established before 1945, (52 persons to the acre). Densities in the new, outer industrial zones are even lower at 14.3 persons per acre.

(g) Industrial employment should almost double by 1986 while the total population is only expected to rise by 62.8 per cent. Thus the functional importance of manufacturing industry in Palmerston North as in New Zealand as a whole will increase.

(h) A future employment density of 20 persons to the acre is forecast, (making allowances for expansion of existing industries). Allowing for a land development margin of between forty and fifty per cent, 730 to 780 acres of industrial land needs to be provided under the

district scheme for the current planning period of twenty years.

The main implications for planning are discussed, briefly, at the end of Chapter five.
In effect the culmination of the study is the estimation of future space needs for manufacturing industry and within the existing context and scale of planning in Palmerston North this is certainly the most essential information. At present the District Planning Scheme only provides 650 acres for manufacturing industry including land that will be taken up by non-manufacturing activities such as large scale warehousing, an activity which is already significant in industrial zones. This amounts to a deficit of up to 100 acres. If however, employment densities continue to diminish in the future, even more land will be required. A density average of 17.5 persons to the acre instead of 20 persons to the acre would increase the are of industrial land required to between 780 and 830 acres. Clearly any study of industrial development needs to be continued over time to account for changing trends.
The remaining analysis provides information that will permit a careful location of industrial zones. A further point is that such a study will also be useful should the planning authority or private developers elect to more positively plan and design industrial estates than is required by legislation.

More information is required about the relationship between land values, demand and availability of land in the context of industrial development. It may well be that more than a 40 to 50 per cent margin of undeveloped land is desirable in calculating zoning requirements.

Railway Land Study.

Atlhough the legislation authorises the designation and creative design of redevelopment areas no redevelopment schemes have been promulgated under the District Planning Scheme. Many reasons could be advanced for this but two outstanding factors are important - (a) the financial difficulties involved in such action, and, (b) the complete absence of any survey or analysis that might give rise to such schemes. When the main trunk railway, passenger terminal and goods yards were removed from the centre of the city to their present location, it was arranged that the freehold of the 26 acre old railway yards would be vested in the municipality to be developed for civic purposes. Thus the planning authority is now not only given the opportunity but is faced with the necessity to redevelop part of the inner area of the city. This study analyses the characteristics and current trends of the area adjacent to both sides of the old railway yards. The results show quite clearly that just as the past existence of the railway yards exerted a direct influence on the development and character of the study

area, so any redevelopment scheme for the 26 acres will also have considerable impact on the study area. A considerable portion of the area studied exhibits the characteristic features of physical and functional deterioration indicative of the need for positive planning The study, restricted to geographical aspects of the area, indicates the need for a comprehensive planning approach to both the railway yards and the surrounding area.

Implications and Applications.

There are two main implications which arise from this research project:

(a) geographical studies of planning districts are likely to provide comprehensive and useful information on which the preparation of planning proposals can be based.

(b) The legislation, as it stands, in attempting to detail the extent and nature of planning surveys fails to recognise the geographical nature, (or the importance of that nature), of planning and planning districts. Consequently whenever an authority seeks to discharge its planning responsibilities in the minimum form prescribed, planning proposals are likely to be based on inaccurate and inadequate data. Even in Palmerston North, where the planning authority has shown a responsible attitude towards planning, adherence to the legislative requirements has resulted in an inadequate survey of the district.

The techniques used throughout this study have been deliberately limited to levels that should be

available to medium sized planning authorities in New Zealand and to levels consistent with both legislative requirements and current planning practice. Even so, not all planners would recognise the need for surveys of the kind outlined here. Kennedy, for example, as recently as 1967 wrote,

"The accumulation of data - often for its own sake - has, I think, unnecessarily delayed the production of plans, not only in New Zealand, but also in Britain and the U.S.A. We like to think that the making of decisions in planning is a scientific process based on facts. I have no such illusions. Most of us are incapable of comprehending the full range of facts in the extra-ordinarily wide field of town and country planning. We have to be selective, to simplify and to generalise in order to come to conclusions and to make recommendations as to what should be done." [4]

It is certainly conceded that collection of planning data in the form required by legislation may well amount to the collection of data for its own sake, and that, in some planning districts the required data would be irrelevant. Moreoever the preparation of planning proposals requires professional skill and trained judgment - there is a creative and visionary element in planning. However, the very nature of town planning, centred on spatial and functional inter-relationships and change in the urban

4. Kennedy 1967, 14.

environment demands a clear understanding and analysis of the area to be planned. At best, intuitive planning will be surface planning incapable of penetrating and positive direction of urban growth patterns and at worst will be, itself, productive of planning problems. Following the Palmerston North test studies it is apparent that comprehensive geographical studies do provide the basic analysis and information on which purposeful planning proposals need to be based.

Caution needs to be exercised however in applying the results of this work. The research presented here represents a comparatively narrow sample from a theoretical model survey prepared for Palmerston North. More research would be necessary before any generalisations about either the model or geography and planning could be soundly advanced.

Kennedy further commented that "all facts are not equally relevant or important to the solution of planning problems and it is unlikely that we will ever have sufficient facts on all aspects of planning to completely justify a plan." [5] Geography is not able to provide all the information necessary to formulate or justify planning schemes - economic studies for example are just as necessary to the planning process. Nevertheless it is evident that geographical studies, of

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5. Kennedy 1967, 14.

the type envisaged here would be more relevant to the planning process and provide a higher level of data than the surveys currently required by the legislation.

APPENDICES

APPENDIX A

TABLE XLII

EMPLOYMENT PALMERSTON NORTH CITY BY INDUSTRIAL DIVISIONS

INDUSTRY	1953			1956			1961			1966		
	M	F	T	M	F	T	M	F	T	M	F	T
Forestry Logging	26	0	26	46	6	52	40	12	52	54	14	68
Mining Quarrying												
Food and Drink	197	58	255	214	75	289	264	84	348	287	103	390
Textiles, Clothing Leather	126	357	483	147	384	531	194	445	639	248	570	818
Building Materials & Furnishings	483	25	508	534	29	563	501	27	528	519	31	550
Engineering & Metalworking	1022	78	1100	1114	91	1205	1182	96	1278	1538	155	1693
Miscellaneous Manufacturing	334	133	467	414	149	563	497	183	680	568	229	797
Manufacturing SUB-TOTAL	2162	651	2813	2423	728	3151	2638	835	3473	3160	1088	4248
Power, Water & Sanitary Services	353	27	380	344	23	367	378	22	400	394	23	417
Building & Construction	1066	24	1090	1347	32	1379	1532	39	1571	1483	53	1536
Transport & Communications	1089	185	1274	1025	212	1237	1220	255	1475	1204	305	1509
Distribution & Finance	1631	918	2549	1674	927	2601	1998	1176	3174	2345	1363	3708
Domestic & Personal Services, administration & Professional	1151	1457	2608	1280	1590	2870	1703	2101	3804	2014	2677	4691
Seasonal Manufacturing	-	-	-	619	17	636	730	30	760	816	49	865
TOTALS:	7478	3262	10740	8758	3535	12293	10239	4470	14709	11470	5572	17042

Source: Dept. of Labour

TABLE XLIII

POPULATION DISTRIBUTION BY AGE GROUPS - PERCENTAGES

ZONE	0 - 4	5 - 10	11-15	16-20	21-30	31-40	41-50	51-60	61-70	70+
12	1.50	11.08	11.38	8.38	8.98	12.87	14.07	12.28	14.37	5.09
13.	7.47	9.00	9.58	11.30	10.54	10.15	11.30	14.18	9.96	6.52
14	7.25	8.29	8.29	8.29	11.14	13.73	7.77	15.29	11.40	8.55
15	8.79	3.02	5.77	12.91	19.50	3.30	20.33	9.62	8.79	7.97
16	7.00	5.12	9.16	11.59	10.79	12.94	13.75	10.51	9.43	9.70
17	9.45	10.45	10.45	7.96	9.45	14.93	18.90	5.47	3.98	8.95
18	3.09	7.34	8.50	13.13	10.04	6.56	10.42	17.37	10.81	12.74
19	0.29	14.33	11.99	10.23	5.26	17.84	18.72	11.11	6.14	4.09
22	19.46	12.08	7.38	6.04	10.74	20.81	9.40	8.72	3.36	2.01
23	15.50	8.53	17.83	5.43	2.32	20.93	17.83	3.10	5.43	3.10
24	7.96	7.46	11.44	14.23	11.44	10.45	19.40	7.96	5.48	3.48
25	16.95	9.32	11.01	11.86	7.20	15.68	19.92	4.24	2.97	0.85
26	9.06	9.65	12.60	12.20	7.48	10.04	21.06	8.46	3.94	5.51
27	11.31	13.12	9.73	9.05	7.42	12.22	20.36	8.15	2.71	5.43
28	11.73	9.68	6.74	7.04	9.68	14.08	14.37	8.50	12.32	5.86
29	17.49	12.96	11.11	7.82	12.96	12.96	13.99	3.91	3.71	3.09
30	10.62	9.93	9.93	5.82	5.14	12.67	21.92	11.30	2.05	10.62
31	11.51	12.39	11.95	10.40	5.75	9.73	19.25	9.51	3.98	5.53
32	17.56	18.05	7.80	4.88	18.05	11.71	13.66	3.41	2.44	2.44
33	20.07	19.37	12.68	1.76	10.21	22.89	4.93	4.58	2.46	1.05
34	17.07	16.26	8.13	5.69	2.44	24.39	11.38	7.32	6.51	0.81
35	3.36	20.81	8.05	5.36	8.05	32.22	11.41	8.05	2.68	-
TOTAL	10.12	10.80	10.08	9.24	9.62	13.24	15.51	9.28	6.46	5.64
MEAN	9.90	11.28	10.07	8.73	9.01	14.69	15.19	8.77	6.13	5.15
S.D.	5.77	4.34	2.55	3.25	4.07	6.28	4.72	3.76	3.66	3.54

TABLE XLIV

POPULATION DISTRIBUTION
OCCUPATION STRUCTURE OF ZONE POPULATIONS (PERCENTAGES)

ZONE	RESIDENTIAL	PROFESSIONAL	MANAGER/ OFFICIAL	CLERKS/ SALESMEN	AGENTS	CRAFTS -MEN	OPERA -TIVES	UNSKILLED	PROTECT -IVE	STU- DENT
12	34.4	4.8	2.7	10.2	0.3	8.4	6.3	3.9	0.3	28.7
13	36.3	7.8	3.5	10.0	1.0	7.0	6.4	1.8	0.2	26.0
14	37.7	3.4	7.3	11.5	1.4	7.5	5.0	1.4	0.6	24.3
15	37.8	6.3	5.4	15.3	0.6	8.7	7.2	3.6	0.3	14.7
16	31.6	5.2	3.8	13.6	1.4	10.1	8.1	3.2	0.6	22.3
17	29.1	2.2	5.5	8.8	1.1	8.8	12.6	3.8	-	28.0
18	39.8	2.0	3.6	11.6	2.0	10.0	8.4	1.6	0.4	20.7
19	32.0	2.1	6.2	12.3	0.9	9.4	5.9	0.6	0.6	30.2
22	30.8	4.2	2.5	7.5	2.5	15.0	9.2	2.5	-	25.8
23	32.1	1.8	0.9	8.3	-	10.1	6.4	6.4	0.9	33.0
24	26.9	4.0	8.0	7.0	-	9.5	11.9	2.5	1.0	29.4
25	30.1	2.0	3.6	9.7	1.0	11.2	8.7	3.1	0.5	30.1
26	29.7	1.9	3.7	11.0	1.3	7.4	9.5	1.9	0.6	32.9
27	31.2	2.8	4.6	8.4	1.5	9.6	6.6	3.0	0.8	31.5
28	42.5	5.3	7.0	5.6	2.3	7.3	4.0	1.0	0.3	24.6
29	25.9	5.0	5.7	8.0	2.2	7.2	8.7	2.0	0.5	34.8
30	35.2	7.7	7.3	9.6	1.9	5.4	4.2	0.4	-	28.4
31	27.2	2.7	6.5	12.7	1.2	8.0	6.7	2.2	-	32.7
32	26.6	4.1	7.1	9.5	0.6	11.8	4.7	2.4	0.6	32.5
33	22.9	1.8	1.8	8.4	2.6	10.1	7.0	2.6	1.8	41.0
34	31.4	2.9	2.9	6.9	3.9	9.8	4.9	2.9	1.0	33.3
35	24.3	0.7	1.4	5.6	2.8	11.1	13.9	6.9	0.7	32.6
TOTAL	32.1	3.9	4.9	10.1	1.6	8.8	7.3	2.5	0.5	28.4
MEAN	31.61	3.67	4.59	9.61	1.48	9.25	7.56	2.45	0.47	27.83
S.D.	4.98	1.91	2.05	2.47	0.85	1.99	2.61	1.66	0.35	5.58

TABLE XLV
AGE/SEX STRUCTURE - PALMERSTON NORTH CITY

	1951		1956		1961		1966	
	M	F	M	F	M	F	M	F
0 - 4	1,726	1,807	1,951	1,952	2,317	2,269	2,575	2,462
5 - 9	1,389	1,272	1,838	1,878	2,043	2,062	2,454	2,462
10 - 14	1,098	1,094	1,518	1,380	1,997	2,052	2,192	2,147
15 - 19	986	1,071	1,118	1,469	1,605	1,880	2,260	2,671
20 - 24	1,029	1,294	1,025	1,266	1,202	1,464	1,701	1,826
25 - 29	1,185	1,217	1,230	1,285	1,139	1,216	1,334	1,404
30 - 34	1,060	1,166	1,269	1,239	1,330	1,305	1,194	1,228
35 - 39	1,005	1,157	1,151	1,201	1,346	1,356	1,365	1,376
40 - 44	983	1,058	1,063	1,230	1,188	1,262	1,368	1,438
45 - 49	863	908	1,094	1,131	1,102	1,248	1,254	1,274
50 - 54	686	834	911	972	1,094	1,132	1,086	1,301
55 - 59	576	756	703	872	909	1,010	1,109	1,152
60 - 64	530	678	579	735	683	844	860	1,024
65 - 69	517	671	533	694	547	784	636	849
70 - 74	445	543	437	595	455	625	477	741
75 - 79	255	290	326	446	332	499	318	534
80 - 84	115	165	135	194	176	320	208	346
85 +	46	86	86	218	89	132	112	219
Sub-Totals	14,444	16,037	16,967	18,665	19554	21460	22503	24329
TOTALS	30,531		35,632		41,014		46,832	

Source: Census Bureau

APPENDIX A

TABLE XLVI

BIRTHS AND DEATHS

PALMERSTON NORTH URBAN AREA

YEAR	BIRTHS	DEATHS	NATURAL INCREASE (NUMERICAL)
1951	801	343	458
1952	831	302	529
1953	791	300	491
1954	878	313	565
1955	849	311	538
1956	946	373	573
1957	952	375	577
1958	1,055	372	683
1959	989	377	612
1960	1,078	379	699
1961	989	377	612
1962	1,108	416	692
1963	1,097	411	686
1964	1,075	440	635
1965	1,081	404	677

Source: Census of Population

APPENDIX A - TABLE XLVII

DEATHS BY AGE GROUPS - PALMERSTON NORTH URBAN AREA

Age in Years	M	F	M	F	M	F	M	F	M	F	M	F
	1951		1952		1953		1954		1955		1956	
Under 1	17	11	12	8	11	6	11	7	11	3	17	10
1 & Under 5	2	-	1	1	-	3	2	1	2	-	1	-
5 & Under 10	-	2	1	2	1	1	-	1	-	-	2	1
10 " " 15	-	-	2	1	-	-	-	1	1	-	-	1
15 " " 20	1	-	1	1	-	1	-	-	1	-	1	-
20 " " 25	1	1	2	2	-	2	1	1	1	1	1	1
25 " " 30	1	2	1	1	-	-	2	-	-	-	2	-
30 " " 35	6	2	2	1	2	-	3	1	1	-	5	1
35 " " 40	1	-	1	2	5	3	1	3	5	1	4	2
40 " " 45	6	2	7	2	3	2	2	5	2	4	4	3
45 " " 50	4	6	5	3	7	3	1	7	6	5	8	3
50 " " 55	8	7	7	8	4	6	9	11	5	-	4	4
55 " " 60	11	11	14	4	8	5	13	10	10	2	13	8
60 " " 65	15	25	12	17	15	10	18	15	12	9	12	11

	1957		1958		1959		1960		1961		1962	
Under 1	15	9	22	13	10	12	25	15	15	5	15	17
1 & Under 5	5	-	-	2	3	1	3	-	-	-	3	1
5 " " 10	3	-	-	-	1	1	1	2	1	-	2	-
10 " " 15	1	1	-	1	1	-	-	1	1	-	1	-
15 " " 20	2	-	2	-	1	3	-	-	3	-	3	1
20 " " 25	3	-	2	-	3	1	-	1	1	2	1	1
25 " " 30	1	1	4	-	1	-	1	2	3	-	4	2
30 " " 35	2	1	1	2	2	-	1	1	1	-	1	1
35 " " 40	3	-	1	5	2	2	4	2	4	2	2	3
40 " " 45	4	-	2	2	5	1	5	3	-	3	6	2
45 " " 50	3	8	4	11	5	2	5	1	12	5	11	5
50 " " 55	19	2	6	7	6	3	5	7	8	6	8	7
55 " " 60	16	1	8	7	13	5	13	9	20	14	15	5
60 " " 65	16	9	21	9	13	12	17	11	17	5	24	16

	1963		1964		1965	
Under 1	11	7	12	8	13	10
1 & Under 5	4	1	4	3	1	2
5 " " 10	-	-	-	1	1	1
10 " " 15	1	-	-	-	1	-
15 " " 20	1	1	1	-	1	2
20 " " 25	3	-	3	1	1	1
25 " " 30	-	1	2	1	1	1
30 " " 35	1	2	-	-	-	-
35 " " 40	2	4	2	1	1	-
40 " " 45	6	7	1	2	6	3
45 " " 50	6	3	3	5	6	4
50 " " 55	16	6	11	3	15	7
55 " " 60	16	15	19	11	15	8
60 " " 65	18	9	18	14	23	9

Source: Registrar of Births and Deaths

APPENDIX B - THE INDUSTRIAL SURVEY

The attached questionnaire was used to obtain data for the study of manufacturing industry in Palmerston North. A 1965 list of registered factories (the only list available) was updated and corrected, to eliminate trade workshops (such as plumbers and contractors) and non-manufacturing industry (such as laundries and garages). For the purpose of the survey manufacturing was defined as any process of conversion of raw materials to goods for sale requiring a fixed location. No limit was placed on the number of employees. Thus some marginal industries were included. The alteration of new clothing, (associated with large stores) was accepted as part of the process of manufacture for initial sale; the construction of houses by Keith Hay Homes in the company yard for transportation as a completed unit was included; the assembly of farm machinery and the pasteurisation and bottling of town milk supply were also included.

After pilot testing the questionnaire was applied individually to all companies employing ten or more persons and was applied by mail to all the other companies listed. A very high response was achieved where the questionnaire was applied by an interviewer (100.0 per cent in several categories) but the response to mailed questionnaires was low averaging only 13.4 percent for companies employing

fewer than six persons. Nevertheless the total sample of 76.2 percent gives a high reliability to the results. The responses for each industrial category and factory size are set out in Table XLVIII.
Where applicable results were adjusted in accordance with these figures.

The choice of a thirty mile radius from Palmerston North to define the regional market was based on the following:-

(a) A similar definition has been used in past student assignments in the Geography Department, Massey University.

(b) Thirty miles is the usual statutory limit on road freighting of goods. Industrialists would be more likely, therefore, to be able to provide data for such an area than for a more geographically defined region.

(c) All of the main centres of population normally accepted as having regional links with Palmerston North are located within the thirty mile radius line.

TABLE XLVIII

INDUSTRIAL QUESTIONNAIRE RESPONSE

Factory Size by Employment	1 - 5	6 - 10	11-20	21-50	50-100	>100	Total
			FOOD AND DRINK				
Factories Surveyed	2	4	2	4	2	-	14
Employment 1965	6	30	31	121	117	-	305
% 1965 Employment	6.9	29.1	100.0	100.0	100.0*	-	66.4*
			CLOTHING, TEXTILES AND LEATHER				
Factories Surveyed	1	3	4	3	2	3	16
Employment 1965	6	25	67	130	150	354	732
% 1965 Employment	8.5	46.3	81.7	100.0	100.0	100.0	89.9
			BUILDING MATERIALS AND FURNISHINGS:				
Factories Surveyed	5	6	5	3	-	-	19
Employment 1965	16	49	73	85	-	-	223
% 1965 Employment	33.3	69.0	84.9	60.7	-	-	64.6
			ENGINEERING				
Factories Surveyed	3	3	4	8	3	-	21
Employment 1965	12	23	63	290	196	-	584
% 1965 Employment	15.0	29.5	100.0	92.3	100.0	-	79.8
			MISCELLANEOUS MANUFACTURING				
Factories Surveyed	7	3	9	7	2	1	29
Employment 1965	16	24	159	184	180	138	701
% 1965 Employment	14.3	21.4	100.0	77.3	100.0	100.0	71.3
			ALL MANUFACTURING				
Factories Surveyed	18	19	24	25	9	4	99
Employment 1965	56	151	393	810	643	492	2545
% 1965 Employment	13.4	36.1	88.7	92.2	100.0*	100.0	76.2

Notes

(a) Employment 1965. This row gives the 1965 employment of the surveyed factories.

(b) % 1965 Employment. This row expresses the surveyed employment as a percentage of the total employment in the particular industrial category and factory size group concerned.

(c) * These figures were adjusted here to allow forthe removal of one large employer from the City between 1965 and 1967.

P.O. Box 1267,
PALMERSTON NORTH.

15th November, 1967

Dear Sir,

The Geography Department of Massey University is at present conducting a survey of industry in Palmerston North. Our main aims are to study the nature, growth patterns and space needs of industry here and to assess whether adequate provision has been made in the town planning scheme for our industries.

Basic information is being collected by questionnaire and it will be greatly appreciated if you will assist us by completing the enclosed questionnaire and returning it in the stamped addressed envelope provided. The success of this survey depends to a large degree on the information gained from industrialists and your assistance in this regard will be of considerable value. A second copy of the questionnaire has been enclosed for use by the company if required.

All information will be treated as strictly confidential and will on no account be used in an identifiable form without the prior consent of the company concerned. Individual information will be used to compile totals and averages and it is these which will be presented as the results of the survey. The results of the survey will, in the main, be used by the undersigned in preparing an honours thesis.

The following points are important in answering the questionnaire:-

1. Questions which are not applicable to your Company should be struck out.

Cont/..... - 2 -

2. If information is not available or cannot be released please mark the question "N.A."

3. Where details of changes are given please indicate the approximate time when the change took place.

4. In Section E Markets question 1, an estimate to the nearest 5% is all that is sought.

5. In Section F Employment, it will be appreciated if the information could be given as at April this year with some comment as to whether the present economic situation has had any effect on employment figures.

6. If you have any questions concerning the survey or the questionnaire please ring V. Warren *phone 82 039 business and 75 394 home.

Finally I wish to thank you in anticipation of your contribution to the survey and I look forward to hearing from you soon.

Yours faithfully,

V.R.C. WARREN.

VRCW:JAI

Encls.

The Wellington Manufacturers Association

Established under the Industrial Societies Act 1883

MANAWATU BRANCH

Secretary: S. I. McKENZIE - - P,O. Box 636 - - Telephone 84-163 - - Palmerston North

LLINGTON
CTURERS' ASSN.

R. Moore
844
on

17th November, 1967.

To: Palmerston North City Manufacturers.

It is my pleasure to formally commend to you the survey being undertaken by Mr. Warren.

Mr. Warren points out that he is undertaking this survey in his personal capacity as a post graduate student at Massey University. We have his assurance that individual replies will be kept strictly confidential and only totals, averages, and trends will be made available to interested parties.

We believe that the investigations being carried out by Mr. Warren could prove to be valuable to local industry and trust that all Manufacturers will co-operate to the fullest extent.

David Jones

PRESIDENT

e quote

Telephone 80-006

Massey University

PALMERSTON NORTH
NEW ZEALAND

June 20, 1967.

TO WHOM IT MAY CONCERN

This is to certify that Mr V.R.C. Warren is a postgraduate student in the Department of Geography of this University. Having completed his examinations for the Masterate, he is engaged in preparing a thesis on certain aspects of the urban geography of Palmerston North. The University would appreciate any assistance that may be given to Mr Warren in his research.

Keith W. Thomson,
Professor of Geography
and Dean, Faculty of Social Sciences.

PALMERSTON NORTH INDUSTRIAL SURVEY QUESTIONNAIRE - 1967.

A. GENERAL

1. What is the nature of this Company's product or service? (i.e., manufacture of electrical appliances, dry cleaning, etc.)

. . . . . .

2. If the Palmerston North factory is not the only factory operated by this company, please outline the extent of the Company's operations in other areas.

. . . . . .

. . . . . .

. . . . . .

. . . . . .

3. What affiliations, (if any), has this Company with other concerns?

. . . . . .

. . . . . .

. . . . . .

B. SITE & BUILDINGS

1. Please give the following details of present site and buildings:-

4. To what extent would you estimate the present building area is utilised - 50% 60% 70% 80% 90% 100%

5. Outline any significant changes in floor area or utilization of floor area since World War II.

. . . . . .

. . . . . .

. . . . . .

6. What major changes (if any) have there been in recent years in the mode of operation (e.g., automation or bulk storage), and to what extent has this affected the space requirements of this Company?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

7. What major changes (if any) are likely in the next 5 to 10 years in the mode of operation, and to what extent would these affect the space requirements of this Company?

. . . . . .

. . . . . .

3. What problems (if any) are associated with your present site and buildings?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

4. Does the Company envisage moving from its present site within the next 5 to 10 years? . . . . . .

If yes, what are the major requirements as to location, size, facilities, etc., that will influence the selection of the new site.

. . . . . .

. . . . . .

. . . . . .

. . . . . .

5. If it were possible to start afresh, where would you locate the factory and why?

. . . . . .

. . . . . .

. . . . . .

E. MARKETS

1. Please complete the following table:-

Market	% of Output	Mode of Transport.
Local		
Within 30 mile radius		
Rest of North Island		
South Island		
Overseas		

Note:- Local and 30 mile market areas are defined on appended map.

2. Outline any significant changes in markets or marketing methods since World War II.

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

5. (a) In your opinion is the shortage of labour in any of the above categories related to:-

Factory Location .....

Labour conditions in Palmerston North .....

Labour conditions in New Zealand .....

Any other factor.....

(b) In your opinion is the adequacy of labour supply in any of the above categories related to:-

Factory location .....

Labour conditions in Palmerston North .....

Labour conditions in New Zealand .....

Any other factor.....

6. Outline any changes in employment numbers since World War II.

. . . . . .

. . . . . .

. . . . . .

. . . . . .

7. Do many of your staff commute to work from outside Palmerston North? If known, please state how many and from where.

. . . . . .

3. Will the future availability of natural gas be of significance to this Company? If yes, in what way?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

4. Are any significant quantities of waste material (solid, liquid or gaseous) generated from the factory's operation? How is this waste disposed of?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

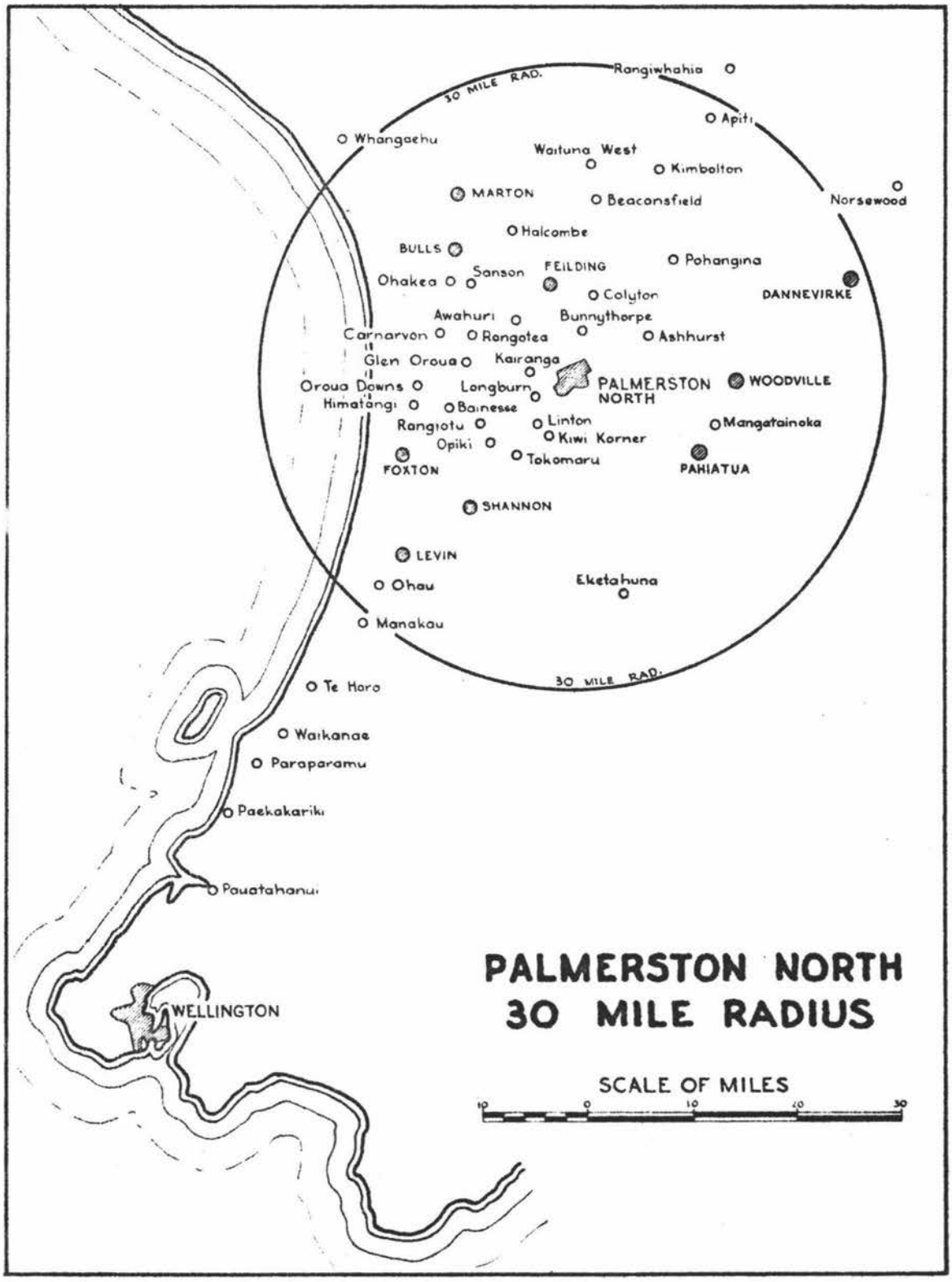
5. Most industrial sites in Palmerston North are fully serviced for electricity, gas, water, sewage disposal. Do you consider that any of the following facilities are important for the planning of new industrial areas?

Rail sidings .....

Recreation areas .....

Lanscaping - streets .....

individual sites


30 MILE RAD.
Rangiwhahia
Apiti
Whangaehu
Waituna West
Kimbolton
MARTON
Beaconsfield
Norsewood
Halcombe
BULLS
Pohangina
Sanson
FEILDING
Ohakea
Colyton
DANNEVIRKE
Awahuri
Bunnythorpe
Carnarvon
Rongotea
Ashhurst
Glen Oroua
Kairanga
Oroua Downs
Longburn
PALMERSTON NORTH
WOODVILLE
Himatangi
Bainesse
Rangiotu
Linton
Mangatainoka
Opiki
Kiwi Korner
FOXTON
Tokomaru
PAHIATUA
SHANNON
LEVIN
Ohau
Eketahuna
Manakau
30 MILE RAD.
Te Horo
Waikanae
Paraparamu
Paekakariki
Pauatahanui
WELLINGTON
PALMERSTON NORTH
30 MILE RADIUS
SCALE OF MILES
10 0 10 20 30

APPENDIX C - RAILWAY LAND STUDY - SAMPLE SURVEY

In order to investigate population characteristics a random sample of 1 in every 6 was selected from a total of 305 households. From the sample of 51, 41 were interviewed, 4 houses proved to be vacant with the remaining 6 not available. Thus the actual sample was 1 in 6.77 or 14.8%.

Since the sample population was small, results involving variables are subject to considerable error, particularly where the proportion of the population which displayed any given attribute was small. Nevertheless some useful generalisations were derived from answers to the interview questionnaire below.

INTERVIEW QUESTIONNAIRE

A. TYPE OF DWELLING - (insert value analysis results).

B. TENANCY

1. Are you the owner? or tenant?
2. How long have you lived here?
3. How much longer do you expect to live here?

C. OCCUPANTS

1. How many adults live here?
2. What are their occupations?
3. To which age group do they belong? -
   younger than 40 years;
   40-60 years;
   older than 60 years;
4. How many children live here?
5. How many cars are owned by all the occupants?

D. REASONS FOR OCCUPANCY

1. For which of the following reasons do you live here?

   a. I like it here.

   b. Its the best I could get at the time.

   c. Its handy to town.

   d. I could afford to buy/rent it.

   e. No particular reasons.

   f. Any other reason.

E. OCCUPANCY PREFERENCE

1. Would you prefer to live elsewhere?

2. If yes to 1. do any of the following reasons apply?

   a. If I could afford a better house.

   b. If I could find a buyer for this house.

   c. If I could find a better renting proposition.

   d. When I have saved enoggh for a home of my own.

   e. I will not be in Palmerston North for very long.

F. FUTURE OF LOCALITY

1. What do you think is the best future development for this locality?

   a. Same as now.

   b. More flats.

   c. Replace some of the older houses by new houses.

   d. Anything else?

APPENDIX D - PLANNING DATA REQUIREMENTS

(The map notations referred to in Regulation 11 (2) below are prescribed in the second Schedule to the Regulations but are not included here.

Town and Country Planning Regulations 1960 1960/109

REGULATION 11—PLANNING DATA—GENERAL REQUIREMENTS

(1) Preparation—As the basis for the preparation of the district scheme the Council shall prepare the planning data in respect of the district.

(2) Composition—The planning data shall comprise a map or set of maps and written information in tabulated or other compact form under the appropriate headings, including in every case, unless clearly not applicable, all of the details for which map notations are specified by these regulations.

(3) Date to be shown—Every part of the planning data shall show the date of its compilation, and the details of matter recorded shall be shown as they exist at the date of completion of the planning data or as near to that date as is reasonably practicable.

REGULATION 12—NATURE OF PLANNING DATA

The data referred to in the following paragraphs are required to be shown in the planning data if, and to the extent that, they might affect the substance or the consideration of any part of the district scheme or justify any important omission therefrom:

(a) Sufficient information on a reasonably up-to-date map of the area to identify every existing motorway, State highway, street, road, access way, and service lane within the district (distinguishing those which are unformed), and sufficient information to enable any property owner to find the approximate location of his land in relation to the highway that gives access to it, including, so far as they are available, the boundaries of each legal subdivision of land within the district:

(b) Topographical information, so far as it is available, such as the mapped position, and (where significant) the recorded bed and tidal or flood limits of every natural or artificial harbour, lake, river, stream, creek, canal, irrigation race, and other waterway or area permanently covered or subject to covering by water, and (where significant) the approximate position in relation thereto of all wharves, graving docks, quays, piers, jetties, landing stages, bridges, culverts, and fords:

(c) Land forms, contours, spot heights, and grades so far as the information is available:

(d) Present land uses in the categories set out in the notations for planning data maps in Part II of the Second Schedule hereto: Provided that uses that are ancillary to the principal use need not be distinguished from the principal use:

(e) The purpose of each existing reserve and open space of the type referred to in clauses 3 and 4 of the Second Schedule to the Act:

(f) An indication so far as it is available of soil types, fertility, and subsoil strata in respect of all urban land where the information may have significance, and in respect of all other land that is in rural use or vacant:

(g) The approximate routes of existing tramways, railways, bus, and other public transport systems, the approximate locations of aerodrome runway approaches, and the approximate layout of any existing aerodromes, railway stations, and other transport terminals:

(h) Traffic volumes, densities, and accident records:

(i) Approximate boundaries of areas served by existing public utilities such as water, sewerage, gas, and electricity, and the locations of all reservoirs, and of all sewage treatment and disposal works and outfalls, but not details of reticulation unless significant:

(j) The location and density, the age and sex groupings, and the occupational structure of the population:

(k) Such information in broad categories as is recorded on land tenure maps in the office of the Chief Surveyor of the district:

(l) The general condition and estimated future life of buildings in decadent areas, or in areas where development or redevelopment seems likely or desirable:

(m) Relative land values in built-up areas in general categories, and an indication of building bulk and density:

(n) Such additional information as is available and, in the opinion of the Council, helpful in the preparation or consideration of the district scheme.

REGULATION 13—REQUIREMENTS AS TO MAPS, ETC.

(1) Maps to have titles—Every map forming part of the planning data, and every district planning map, shall bear a title showing the name of the district and section and what map it is.

(2) Display of information—The total information to be shown on any map may be shared between any number of maps or sheets of the same map, so long as the information and the maps and sheets are so correlated as to enable the information to be understood readily.

(3) Scale of maps—Every planning data map and every district planning map shall be drawn to a scale which makes clear every detail required to be shown thereon. Maps or diagrams of different scales may be used for the better display of information, but all sheets of the same map shall be to the same scale.

(4) Permanency of line and colour—Every planning data map and every district planning map for inclusion in a district scheme as approved by the Council to become operative, and every copy of a district planning map to be distributed or deposited in compliance with section 28 of the Act, shall have permanency of line and colour.

(5) Aerial photographs—Subject to the prior consent of the Minister and to such conditions as he may impose, aerial photographs may be used as the basis of any planning data map or district planning map.

(6) Notations for planning data maps—The details required by these regulations to be shown on a planning data map shall be shown by means of notations authorised in Part II of the Second Schedule hereto or elsewhere in these regulations. Where those notations do not provide as many distinctions as are desired in any use-category, additional distinctions should be used, but should adopt the appropriate basic distinction and not tend to be confused with other notations or distinctions used in the scheme.

(7) Notations for district planning maps—The notations described in Part III of the Second Schedule hereto are for the benefit of those who choose to use them. Other notations may be devised and used provided they do not tend to cause confusion and provided the key is prominently shown; but where colour notations other than those set out in Part III of the Second Schedule are used they shall adopt grey for residential, red for commercial, and blue or red-purple for industrial

zoning. Any Council may use on the district planning map either black and white alone, or black and white with colour superimposed, or colour alone, but the colour notations provided in Part III of the Second Schedule hereto have been devised for superimposition on the black and white notations described in that Schedule. These black and white notations alone should usually be sufficient, but when added clarity is desired the colour notations suggested should improve the display of information.

(8) Key to notations and orientation to be shown—Every map shall have endorsed on the face thereof, or so affixed as to provide convenient simultaneous reference to every sheet thereof and to the key, a key explaining and illustrating the notations used therein, and also the lineal scale of the map; and every sheet shall show the orientation of the sheet.

(9) Use of maps already completed or partly completed—Any map which is completed or partly completed at the commencement of these regulations and which employs notations authorised by regulations repealed by these or any former regulations may be completed and used for the district scheme, and may thereafter be used for every review and change thereof until such time as substantial changes of scheme or map make redrawing of the map desirable.

THIRD SCHEDULE—SCHEME STATEMENT—*continued*

PART II—POPULATION AND OCCUPATIONAL STRUCTURES AND FUNCTIONS OF DISTRICT

CLAUSE 1—PAST POPULATION CHANGES

The following table shows how the population of the district has changed since the 1926 census. New Zealand average annual changes (expressed as percentages) are given for comparative purposes.

POPULATION CHANGES 1926–19.....

Census	Total Population	Intercensal Change (Numbers)	Average Annual Change (Per Cent)	
			District	New Zealand
1926				
			%	+1·13%
1936				
			%	+1·11%*
1945				
			%	+1·91%*
1951				
			%	+2·31%
1956				
Estimate, April 19..				

* In the calculation of the New Zealand average annual change figures between 1936 and 1945, and between 1945 and 1951, allowance has been made for servicemen overseas at the date of the censuses.

CLAUSE 2—SEX AND AGE STRUCTURES OF POPULATION

At the two most recent censuses the sex and age structures of the population were as follows:

(a) Sex Groupings	Males	Females	Totals
19..... census			
19..... census			

(b) Age Groupings

New Zealand averages (expressed as percentages) are given for comparative purposes.

Age Groups	District				New Zealand	
	Numbers		Percentage of Total Population in Each Age Group		Percentage of Total Population in Each Age Group	
	19..	19..	19.. %	19.. %	19.. %	19.. %
Pre-school age (under 5 years)						
School age (5 years and under 16 years)			%	%	%	%
Working age (16 years and under 65 years) ..			%	%	%	%
Over working age (65 years and over)			%	%	%	%
Total			100·0%	100·0%	100·0%	100·0%

CLAUSE 3—ESTIMATES OF FUTURE POPULATION

The following table gives an estimate of population growth for the next 20 years:

[*Explain here the assumptions upon which these estimates are based, such as continuation of rate of growth over past period; or expansion of existing industries; or attraction of new industries; or development of mineral deposits; or whatever the case may be.*]

POPULATION ESTIMATES FOR THE NEXT 20 YEARS

Period	Year	Population
Present	19..	
In 5 years	19..	
In 10 years	19..	
At end of planning period	19..	

CLAUSE 4—PRESENT FUNCTIONS OF DISTRICT

In relation to the surrounding region the social and economic functions of the district are:

[*Explain here fully, in the case of a county, the types of farming that are most prevalent, and state what forestry, mining, industrial, or other activities are also carried on; and, in the case of a town, whether it is primarily a farming centre, transport centre, port, industrial centre, health resort, holiday town, dormitory, commercial centre, administrative centre, or anything else, or any combination of these functions, and whether it is a self-contained urban unit or forms part of a larger metropolitan area.*]

CLAUSE 5—PRESENT OCCUPATIONAL STRUCTURE

The following table shows the occupational structure of the district at April 19..... New Zealand averages (expressed as percentages) are given for comparative purposes.

[*The Department of Labour compiles employment statistics for towns of over 1,000 population. For counties and smaller towns it is suggested that any locally obtainable details of employment be included in this paragraph. Primary industry figures do not include farming, fishing, and hunting.*]

Occupational Groups	District		New Zealand	
	Numbers Employed	Percentage of Total Employed Population Recorded in Survey		Percentage of Total Employed Population Recorded in Survey
(i) PRIMARY INDUSTRY—				
Forestry, logging, mining, and quarrying ..		%		%
(ii) MANUFACTURING INDUSTRY—				
Food, drink, and tobacco (other than seasonal) ..		%		%
Textiles, clothing, and leather		%		%
Building materials and furnishings		%		%
Engineering and metal-working		%		%
Miscellaneous manufacturing		%		%
Totals—All manufacturing		%		%
(iii) POWER, WATER, AND SANITARY SERVICES ..		%		%
(iv) BUILDING AND CONSTRUCTION		%		%
(v) SERVICE INDUSTRY—				
Transport and communication		%		%
Commerce and finance ..		%		%
Administration and professional		%		%
Domestic and personal services		%		%
Totals—All service industry		%		%
(vi) SEASONAL INDUSTRY—				
Meat processing, freezing, etc.		%		%
Fruit and vegetable preserving		%		%
Dairy factories ..		%		%
Totals—All seasonal industry ..		%		%
Totals—All industry surveyed ..		100·0%		100·0%

CLAUSE 6—POTENTIAL DEVELOPMENT OF DISTRICT

[Describe here the major developments proposed for any existing or possible future industrial, commercial, educational, cultural, rural or other activities, and the effect such developments are likely to have on the size and distribution of the population, on the functions of the district generally, and on its relation to the surrounding region.]

PART III—USE ZONING

CLAUSE 1—INFORMATION OF PARTICULAR RELEVANCE TO ZONING PROPOSALS

Note: Outline here such relevant factors as:

(1) Natural characteristics of district:

(2) Resources of particular significance:

(3) Sufficiency of housing:

(4) Sufficiency of other buildings.

PART VIII—COMMUNICATIONS AND TRANSPORTATION

CLAUSE 1—EXISTING

The following are the principal items of existing communications and transportation: [*Describe generally.*]

(1) Road.

(2) Rail.

(3) Sea.

(4) Air.

PART IX—PARKING AND LOADING OF VEHICLES

CLAUSE 2—SURVEY OF PROBLEMS

(1) Motor-vehicle registrations—The number of motor-vehicle registered for the district, including any additional postal area associated with it for registration purposes, in recent years are:

Year:	1945	1950	1955	19..
Number:				

During the planning period the corresponding numbers are likely to be:

End of First Five Years	End of Second Five Years	End of Planning Period
Number:		

(2) Motor-vehicle counts—Surveys of parked vehicles at a given time were made on ..... and ..... with the following results:

Date of Survey: ..... Time of Survey: ..... Locality: .....

Number of vehicles (a) On street: ..... (b) In public parking spaces: ..... (c) Other off street: .....

The greatest observed concentrations of parked vehicles have been at the following places and times:

Places	Dates	Times

(3) Kerbside parking—The existing kerbside parking spaces in commercial and industrial areas, allowing ..... ft per vehicle, total respectively: commercial: ..... industrial: ..... Of these ..... are reserved for passenger transport vehicles and taxis in commercial areas and ..... in industrial areas. At the time of survey there was an average of ..... vacant parking spaces; ..... goods vehicles and ..... public passenger vehicles, and ..... motorcars were double-parked or parked in unauthorised places.

(4) Off-street parking space—Additional parking spaces in public off-street parking lots and buildings total ....., of which ..... were vacant at the time of survey.

CLAUSE 3—FORECAST OF REQUIREMENTS

On the basis of past trends and projected motor vehicle densities the following are the total parking requirements estimated for—

End of First Five Years	End of Second Five Years	End of Planning Period

APPENDIX E - NOTES ON CARTOGRAPHY

Most of the cartographic techniques used in the map-work are standard and self-evident. The following notes indicate only those techniques which are not immediately evident from the maps themselves.

Basemaps

(a) Where possible maps have been designed in series to use a common base. Thus one basemap was drawn for Figures 3-12 and 15 and another for Figures 16-18, photo-reduced and copies made using polyester base auto-positive film. Final details were then added for each map as required and reproduced at same scale.

(b) Figures 3, 3a, 10. A negative was made of the reduced basemap at 1:1 and contact printed with a 50 percent screen to prevent the street patterns from dominating information on the transparent overlays. The black overlays were reproduced on reflex photocopy film and the blue over-lay on diazo material.

(c) Figures 15-18 It is virtually impossible to apply even water colour washes to photographic papers. Hence in Figures 17 and 18 symbols were used which presented only small surfaces to be coloured. In Figures 15 and 16 letrafilm colour was applied and burnished down to obtain a firm bond with the surface. However, although the results are clear, the material lacks sensitivity of colour tones and strengths.

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----------		Records especially government valuations and planning data records.
----------		Computer print-outs from 1963 Transportation Survey.
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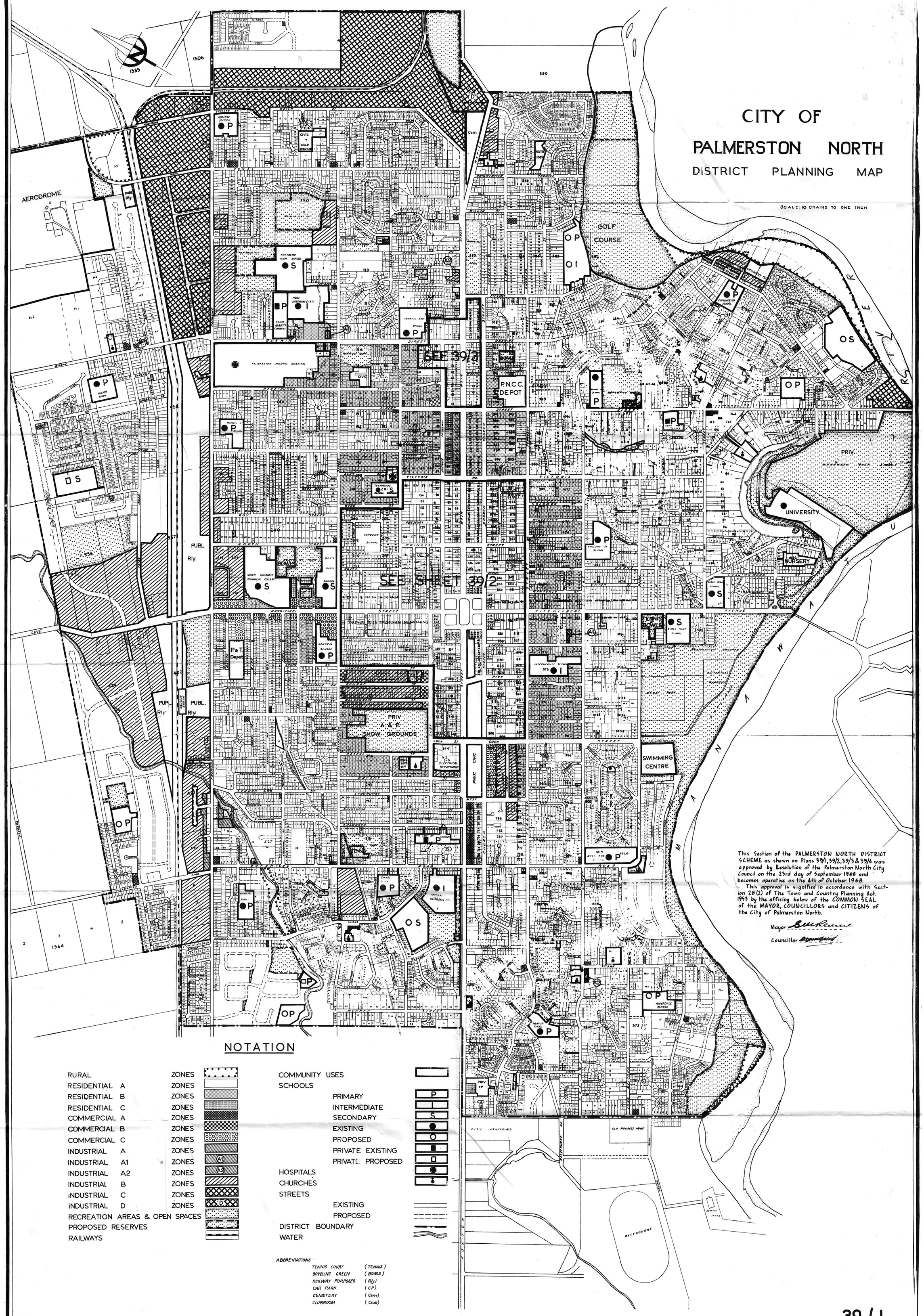
CITY OF PALMERSTON NORTH

DISTRICT PLANNING MAP

SCALE: 10 CHAINS TO ONE INCH



This Section of the PALMERSTON NORTH DISTRICT SCHEME as shown on Plans 39/1, 39/2, 39/3 & 39/4 was approved by Resolution of the Palmerston North City Council on the 23rd day of September 1968 and becomes operative on the 4th of October 1968.

This approval is signified in accordance with Section 28(2) of The Town and Country Planning Act. 1953 by the affixing below of the COMMON SEAL of the MAYOR, COUNCILLORS and CITIZENS of the City of Palmerston North.

Mayor _____

Councillor _____

NOTATION

RURAL ZONES	COMMUNITY USES
RESIDENTIAL A ZONES	SCHOOLS
RESIDENTIAL B ZONES	PRIMARY
RESIDENTIAL C ZONES	INTERMEDIATE
COMMERCIAL A ZONES	SECONDARY
COMMERCIAL B ZONES	EXISTING
COMMERCIAL C ZONES	PROPOSED
INDUSTRIAL A ZONES	PRIVATE EXISTING
INDUSTRIAL A1 ZONES	PRIVATE PROPOSED
INDUSTRIAL A2 ZONES	HOSPITALS
INDUSTRIAL B ZONES	CHURCHES
INDUSTRIAL C ZONES	STREETS
INDUSTRIAL D ZONES	EXISTING
RECREATION AREAS & OPEN SPACES	PROPOSED
PROPOSED RESERVES	DISTRICT BOUNDARY
RAILWAYS	WATER

ABBREVIATIONS

TENNIS COURT	(TENNIS)
BOWLING GREEN	(BOWLS)
RAILWAY PURPOSES	(Rly)
CAR PARK	(CP)
CEMETERY	(Cem)
CLUBROOM	(Club)

39/1

Amended OMR. 13 · 3 · 1968

Drawn DLR 27 · 7 · 1968

SCALE OF CHAINS

2 1 0 2 4 6 8

NOTATION

RESIDENTIAL A ZONES

RESIDENTIAL B ZONES

RESIDENTIAL C ZONES

COMMERCIAL A ZONES

COMMERCIAL B ZONES

COMMERCIAL C ZONES

INDUSTRIAL A ZONES

INDUSTRIAL B ZONES

RECREATION AREAS AND OPEN SPACES

COMMUNITY USES

SCHOOLS

PRIMARY P.

SECONDARY S.

PUBLIC

PRIVATE

CAR PARK C.P.

HOSPITAL

CHURCH

STREETS

EXISTING

PROPOSED

PEDESTRIAN ACCESS

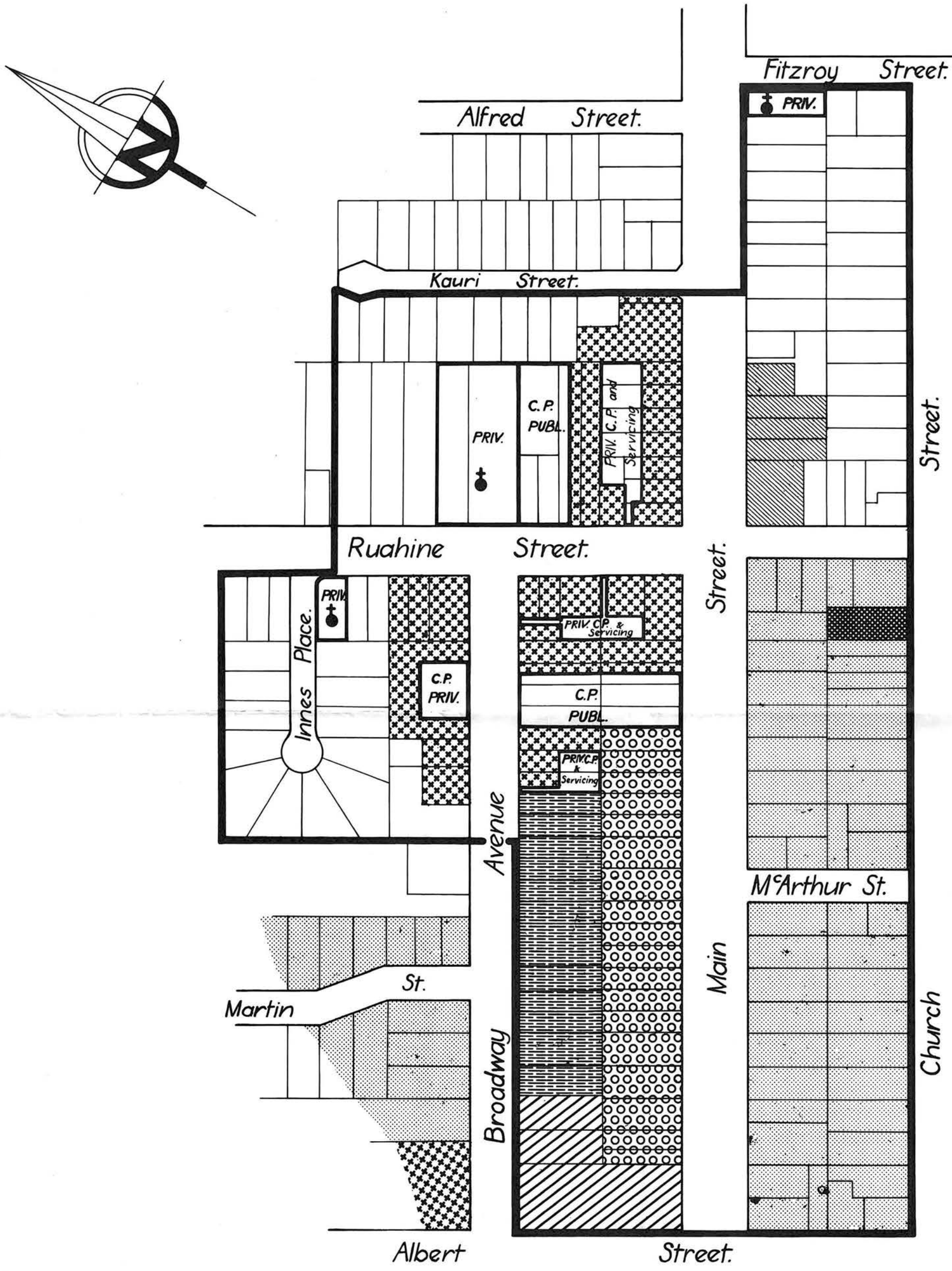
Scale:-3 Chains to an Inch

DISTRICT PLANNING MAP

CITY OF PALMERSTON NORTH - CENTRAL AREA

39/2

Amended O.M.R. 13·3·68 Drawn O.M.R. 28-7-66



DISTRICT PLANNING MAP

CITY OF PALMERSTON NORTH - TERRACE END

Scale :- 3 chains to an inch.

Drawn M.C.M. 21·7·66. Redrawn D.L.R. 7·12·67.

39/3.