

1946
NEW ZEALAND

MINISTRY OF WORKS

REPORT OF THE COMMISSIONER OF WORKS FOR THE PERIOD ENDED
31ST MARCH, 1946

Presented to both Houses of Parliament by Leave

Wellington, 24th July, 1946.

The Hon. the MINISTER OF WORKS.

SIR,—

I have the honour to submit the following report on the activities of the Ministry of Works. This report covers the whole period from the establishment of this Ministry in March, 1943, up to the 31st March, 1946. Reference is made also to the earlier work of the Commissioner of Defence Construction and his staff.

I have, &c.,

E. R. McKILLOP,

Commissioner of Works.

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INTRODUCTION

FIRST established in order to deal with an emergency situation of great consequence to the efficient prosecution of the Dominion's war effort, the Office of the Commissioner of Defence Construction was later re-established under the more comprehensive title of the "Ministry of Works."

Though information of the work carried out under the supervision of the Commissioner of Defence Construction was for security reasons not available for publication, enough of it was seen by the public for there to be some general understanding of the nature of the supreme effort that was made at that time by the Dominion to provide defence works, camps, hospitals, air-raid shelters, and a hundred other types of constructional works needed by a nation at war. That the rapid and efficient provision of all these requirements should call for some form of higher control and organization was fairly obvious, though no detailed account of what was actually done has hitherto been made public.

While removing the atmosphere of crisis and lessening the urgency and tempo of wartime, the advent of peace can hardly be said to have removed the major problems facing the building and constructional industries of the Dominion. Six years' arrears of house-building, factory-building, school-building, hydro-electric construction, bridge renewals, land development, highway maintenance, and many other forms of peacetime building and construction must now be made up before the physical capital of the Dominion can be properly related to her expanded and redistributed population. The organization of resources and general oversight of the Dominion's effort to meet these urgent peacetime needs in their proper order is the immediate and pressing task of the Ministry of Works.

Constructional work is creative work. Once carried out it fixes for many years, perhaps for generations, the pattern, the surroundings and environment, and the direction and flow of activity. If well planned, its power of conferring benefit on society is almost unique; if poorly planned and unco-ordinated, it can quickly lead to a vast amount of unnecessary waste, ugliness, inefficiency, duplication, and lost opportunities for those who must live and work throughout their lives amongst the results of what is done.

Planning, co-ordination, administration, and research of a high order are therefore necessary if the building and constructional industries as a whole are to carry out their task in the manner best designed to serve the interests of the Dominion. The task of co-ordinating the activities of the many authorities, interests, and agencies involved in this work of planning, so that an harmonious whole shall emerge from the total of their separate efforts, has also been entrusted to the Ministry of Works.

In the following paragraphs it is proposed to deal at greater length with each of the above aspects in turn. This report is divided into three parts. The first part covers the events of the war period; the second describes the immediate post-war problems and the steps being taken to deal with them, and also the placing of works programming and long-term physical planning on a practical working basis; Part III deals with the administrative changes which have followed on the establishment of the Ministry of Works and its relations with other Departments and authorities.

PART I—THE WAR PERIOD

1. THE FIRST IMPACT OF THE WAR ON NEW ZEALAND'S BUILDING AND CONSTRUCTIONAL INDUSTRIES

As international relations continued to deteriorate in the early part of the year 1939, preparations were being made in many countries to meet the contingency of an outbreak of war. New Zealand at that time established her Organization for National Security, charged with the responsibility of seeing that plans were made for action to be taken immediately war broke out. Part of these plans consisted of a programme of constructional works required by the Armed Forces.

With the declaration of war this programme of defence work was swept into operation with extraordinary speed. Conditions favoured speed. At that stage the mobilization of men into the Forces had only commenced, and manpower was consequently available to the constructional and associated industries in numbers which have not since been even approached. Materials were plentiful; stocks of timber were high, and, indeed, all the building and constructional materials were flowing into the market at their maximum volume. Under these conditions it was possible to carry out defence work to a total value of some £3,600,000 in the first seven months of the war without causing any major suspension of normal peacetime work.

Apart from the construction of airfields and emergency-landing grounds, the most important work done at that stage was to provide mobilization camps in which Army and Air Force personnel could be trained prior to their embarkation overseas. Sites were selected, levelled, roaded, drained, and provided with sewerage, water-supply, and electric power. Barracks, kitchens, mess-rooms, garages, hangars, bomb-stores, magazines, bulk-fuel stores, workshops, administration buildings, general stores, machine-gun ranges, wireless and telephone installations, water-towers, recreation-rooms, hospitals, and sick-quarters had to be provided as appropriate in each case, and, apart from these main mobilization camps, considerable work was done on the provision of harbour-defence works, gun emplacements, guard stations, and naval bases. Air Force stations alone accounted for some £1,619,000 in this period. Army camps cost £1,274,000, while naval installations absorbed £74,000. The total cost of all work done up to March, 1940, was £3,568,000.

Most of the work was done by contract on the tendering system which had been normal in peacetime. Men, materials, and plant were assembled on the site. Very little prefabrication was being practised at that stage. Following this initial burst of activity in the opening months of the war, the tempo fell to some extent. Men became more scarce as mobilization proceeded and material supplies became more difficult to obtain. Most of the work required for the training of men to take part in the war in Europe had been done. In the whole twelve months from March, 1940, to March, 1941, less money and less man-hours went into defence works than in the first seven months of the war.

2. DEVELOPMENTS AFTER DECEMBER, 1941

The whole of this background was shattered in December, 1941, by the dramatic entry of Japan into the war, which necessitated a reorientation of the whole effort of the Dominion to meet the new aggressor. Reinforcements to the Division in the Middle East were suspended, and Forces and supplies began instead to flow northwards into the Pacific. With the rapid fall of Singapore and the spectacular ten weeks' southward drive of the Japanese Forces, an intense urgency came to be attached to the speeding-up of defence works already in hand in New Zealand itself and sponsored by New Zealand in the Pacific area.

Perhaps the best measure of the extraordinary change in tempo which occurred at that time is provided by the jump in war expenditure as shown in the accounts of the Public Works Department, which continued to play by far the most important part in the whole constructional field. As compared with £3,600,000 in the first seven months of the war, £3,400,000 in the following twelve months, and £5,300,000 in the next twelve months (which included the beginning of the new phase), the expenditure of this Department jumped to £16,500,000 in the one year from April, 1942, to March, 1943.

Reasons of security did not permit any disclosure at that time of the nature of the work which was done. In the 1943 Public Works Statement the whole £16,500,000 was dismissed with the following cryptic paragraph:—

The past year has been one of very great activity in order to meet the requirements of the Armed Services, and practically the whole of the available resources of the Department have been engaged on these works. The growing scarcity of man-power has made it difficult to meet all demands, but in spite of this a very large volume of engineering and building work has been put through.

As might be expected at a time when the major task was to provide against invasion, the swing was largely towards Army work, which alone accounted for an expenditure of some £5,300,000. The list of Army works done is very long, but the following items taken from it will give some idea of the field covered: gun-emplacements for all calibres, anti-aircraft defences, local defensive works, tactical roads and bridges, brigade and divisional camps, mobilization camps, instruction-rooms, portable huts by the thousand, concrete pillboxes, preparations for demolition of bridges, road-blocks, tank-traps, detours, vehicle-stores, petrol-stores, rifle-ranges, hospitals, internment and prisoner-of-war camps, underground operational centres, emergency electric-power systems, camouflage works, &c.

Scarcely less was the total expenditure on Air Force works in the same year, amounting as it did to £5,100,000. Some of the more outstanding items were: radio-direction stations, meteorological stations, wireless-telegraph stations, dispersal pits, bulk-fuel stores, launches and launch bases, emergency moorings, underground operation rooms, together with large numbers of camps, hospitals, workshops, hostels, camouflage works, hangars, and aerodromes with concrete runways long enough to accommodate Flying Fortresses.

Naval works to a total cost of £900,000 were included in the same year. These consisted of signal stations, controlled-mine stations, anti-boat and anti-submarine booms and nets, training bases, mine and armament depots, oil-stores, hydrographic survey work, &c.

For the United States Forces who were encamped here during the period, New Zealand provided in the way of construction work complete camps, large storage areas, hospitals and convalescent depots, ammunition stores and magazines, wireless stations, and thousands of huts and buildings for shipment into the Pacific. In all, some £2,500,000 worth of work was done for the American Forces.

Civil defence and miscellaneous items ran to another long list, including air-raid shelters, splinter-proofing works, camouflage works, E.P.S. stores, steel stores, emergency accommodation for munition workers, &c.

Apart from all this, New Zealand sent vigorous constructional units into the Pacific, which built aerodromes, gun-emplacements, camps, hospitals, meteorological and wireless stations, and defensive works of all characters over a wide area in the South Pacific.

The peak of constructional activity in New Zealand had passed before the middle of 1943, though an extremely large volume of work continued to be carried out until the end of that year. Though much of the work started in the earlier period was still being finished, the general nature of the work was changing somewhat by the end of the year. From a defensive emergency the war in the Pacific was now assuming an offensive character, and more and more work was being done on the successively advancing sites of a series of bases now moving northward in pursuit of a retreating enemy. At the same time, stores, depots, and hospitals in New Zealand, both for our own and Allied Forces, were being expanded, while naval, shipbuilding, and shipping-repair work was figuring prominently.

As compared with the total of £16,500,000 spent on construction works in the year 1942-43, the following year's work ran to £11,500,000, the total volume of activity and expenditure falling away rapidly towards the end of that period.

Associated with the enormous constructional effort during this whole spectacular period, the supply industries were working at feverish speed, but in many cases were not nearly able to keep pace with the rate of consumption of building materials. Timber stocks, still almost at normal peacetime levels when Japan entered the war, had been completely wiped out by the end of the crisis period. Cement stocks had long since vanished, while steel was extremely scarce and rigidly controlled.

In the construction of camps and buildings themselves, a revolution in constructional methods and organization had taken place as compared with the earlier part of the war. This will be described more fully in the next section.

3. THE APPOINTMENT AND WORK OF THE COMMISSIONER OF DEFENCE CONSTRUCTION

Guiding the whole of New Zealand's great constructional effort was the energetic personality of Mr. (now Sir James) Fletcher. As head of a large contracting firm, Mr. Fletcher already had a long experience in the problems associated with major constructional undertakings. As Commissioner of

Defence Construction he was equally at home in negotiating with contractors, breaking supply bottlenecks, or discussing policy with the heads of the Armed Services.

In this section it is proposed to set down briefly the circumstances which led to his appointment, and to indicate something of the nature of the administrative problems with which he was faced.

By the end of 1941 the system of carrying out defence work by peacetime methods had become badly strained. Some contractors were attempting to take on more work than they were capable of executing, whilst others who had man-power and plant capacity were not sharing in the work because their tenders were not low enough. It was disconcerting also to find that private building was still drawing off an unduly large share of man-power and material resources, and even taking priority at times over the defence work which required to be executed.

With the entry into the war and the southward drive of Japan it became clear to the Government that drastic action would have to be taken at once to co-ordinate the whole resources of the building and constructional industries and to direct them with absolute priority into defence work. It was accordingly decided to place the whole constructional task under the single centralized control of the Defence Construction Council and to appoint Mr. Fletcher as the Chief Executive Officer with the title of Commissioner of Defence Construction. The members of the Council were the Right Hon. the Prime Minister as Chairman, the Commissioner as Vice-Chairman, and the Minister of Defence, the Minister of Public Works, the Engineer-in-Chief of the Public Works Department, the Director of Housing Construction, and a representative of Treasury. Mr. Fletcher was subject to the control of the Prime Minister and given wide powers to ensure that every interest was subordinated to the immediate task in hand. The warrant for Mr. Fletcher's appointment was signed in War Cabinet on 11th March, 1942. Colonel E. R. McKillop, 2nd N.Z.E.F., then returned from the Pacific and was appointed Deputy Commissioner on the 23rd March. Mr. Fletcher retained a very small staff, administrative action being obtained by direct contact with the Departments or authorities concerned.

Outstanding amongst the measures taken or initiated by the Commissioner at that time were—

- (a) Review and fixing of relative priorities as between the highly competitive construction projects of the Armed Forces and the American authorities:
- (b) The stepping-up of working-hours in the constructional industries to fifty-four per week:
- (c) Suspension of virtually all private building activity:
- (d) Establishment of rigid control over scarce building materials:
- (e) Extension of systems of standardization and prefabrication into many phases of defence work, particularly buildings of all kinds:
- (f) Suspension of private tendering for defence contracts, and replacement of this by a system of allocation of work and pooling of resources by master builders:

- (g) Introduction of the system of payment for all defence work on the basis of a standard "master schedule," fixing rates for every component operation which entered into any variety of constructional work. This system enabled work to be put in hand without any of the delays involved in tendering, payment being assessed when the work was finished.

Points of criticism arose here and there as a result of these sweeping changes, but there was no doubt that the prompt and powerful measures taken were largely responsible for the dramatic speed with which New Zealand was provided with camps, air-raid shelters, gun-positions, and all the other buildings and constructional works required by a nation preparing to defend itself against invasion.

The problem, which was difficult enough in so far as it related to the provision of works for our own Armed Services, was rendered much more difficult by the decision to base American Forces in the Dominion. The Commissioner of Defence Construction received very little notice of this, and during the winter of 1942, when the weather was consistently bad, had to solve the problem of transforming bare paddocks into drained, watered, and roaded camps, complete with huts, cookhouses, canteens, and stores, in a little over six weeks. An example of the speed with which work was carried through at that time was provided by the erection of the Cornwall Park Hospital, near Auckland, which stands on a site of 34 acres. This hospital comprises 122 buildings, having a floor area of no less than 8 acres. Its capacity of 1,500 patients is more than that of the Auckland Public Hospital. The preparation of the site was commenced in October, 1942, and sixteen weeks later the buildings were up and patients were being admitted.

4. THE ESTABLISHMENT AND FUNCTIONS OF THE MINISTRY OF WORKS

Sweeping executive powers such as those which were vested in the Commissioner and Deputy Commissioner of Defence Construction are not usually given to private persons in a democratic society, and it would have conflicted with a well-established system of government had these powers remained in existence longer than was necessary to meet the actual crisis.

By the end of 1942 the Chiefs of Staff were able to report that an invasion of New Zealand could no longer be regarded as even a "remote probability," but, although the defence construction crisis had passed, the Dominion was by no means free from difficulty in the constructional field. On the contrary, it was plainly only just entering a long period of great stress. A large programme of defence works had still to be constructed or completed; stocks of materials had been exhausted and would take some years even after the end of the war to bring back to normal; peacetime work had gone far into arrears, and careful organization would be necessary until the arrears had been overtaken. With the advent of peace there would still be many special problems to be overcome in the rehabilitation of our returning servicemen, and it became abundantly clear to the Government that to remove the central control would precipitate a fresh crisis, and that some form of overall guidance and co-ordination at a high administrative level would be

necessary to see the Dominion through the difficult years which lay ahead. These circumstances, together with the successful practical results which had been achieved by the office of the Commissioner of Defence Construction, provided the background for the Government's decision to establish on a more permanent basis an office which would be responsible for the co-ordination and general oversight of the many types of building and constructional work in which the Government had an interest. This office was designated the Ministry of Works, and on the 16th March, 1943, statutory authority for its establishment was provided in the Ministry of Works Act.

With the passing of this Act the Commissioner of Defence Construction relinquished his powers, which were to a large degree vested in the newly created Minister of Works, who replaced the Minister of Public Works. Mr. Fletcher now became Commissioner of Works, and Mr. McKillop became Deputy Commissioner, later succeeding Mr. Fletcher as Commissioner of Works at the end of 1944. (The position of Deputy Commissioner has since been filled by the appointment of Mr. T. G. Beck, Acting Engineer-in-Chief of the Public Works Department.)

At the time when the Act was introduced the Minister outlined the functions of the new organization in the following words:—

(1) To ensure that during the period of the war and the post-war reconstruction era all proposals for construction (whether or not these involve the direct expenditure of Government moneys or carry Government subsidies) are ranked in order of essentiality from the point of view of man-power and materials available. In other words, to ensure that, whilst the building and constructional potential of the country is limited by war and immediate post-war conditions, it is assembled and utilized in the most efficient manner from the point of view of the national interest:

(2) To ensure that all schemes for construction involving expenditure of Government funds are thoroughly examined independently of the source from which they originate both from an economic and technical point of view. In this connection not only to examine proposals coming from Government Departments, but also the proposals of local bodies or of private interests where such carry with them Government subsidies:

(3) To ensure that projects approved for construction involving the direct expenditure of Government moneys or Government subsidy are executed efficiently and economically, whether such works be carried out by the Government itself or by the subsidized authority:

(4) To ensure that no work is undertaken in conflict with the national interest, or, in other words, to relate proposals for construction to an established national plan.

With the establishment of the Organization for National Development in terms of a Cabinet minute dated 6th May, 1944, the Commissioner of Works became a member of the Executive Committee of that Organization, and the Ministry of Works functioned as its Works Planning Committee until, in November, 1945, the physical planning functions of the Organization for National Development were completely absorbed by the Ministry of Works.

5. REVIEW OF THE WHOLE WAR EFFORT OF THE CONSTRUCTIONAL INDUSTRIES

Before concluding this part of the report and passing to the problems of peacetime it is proposed to present some of the more illuminating statistics showing the magnitude of New Zealand's war effort so far as the constructional industries are concerned.

More than £50,000,000 worth of defence work was carried out during the course of the war. The following two tables show how this cost was spread through time and how it was distributed amongst the various Services, &c. :—

Period.					Public Works Department.	Housing Construction Department.	Total.
					£	£	£
September, 1939, to March, 1940	..	..	..	..	3,568,215	..	3,568,215
April, 1940,	..	..	..	..	3,384,158	..	3,384,158
1941,	..	..	..	..	5,340,505	..	5,340,505
1942,	..	..	..	..	16,507,422	700,444	17,207,866
1943,	..	..	..	..	11,485,447	1,737,972	13,223,419
1944,	..	..	..	..	4,760,761	290,847	5,051,608
1945,	..	..	..	..	2,577,969	123,118	2,701,087
Total	..	..	..	..	47,624,477	2,852,381	50,476,858

Armed Service, &c.					Public Works Department.	Housing Construction Department.	Total.
					£	£	£
Army	..	..	..	..	15,569,932	742,462	16,312,394
Navy	..	..	..	..	3,570,464	..	3,570,464
Air Force	..	..	..	..	15,218,907	479,720	15,698,627
U.S. Forces	..	..	..	..	6,163,230	1,101,019	7,264,249
* Civil Defence, &c.	..	..	..	..	7,101,944	529,180	7,631,124
Total	..	..	..	..	47,624,477	2,852,381	50,476,858

* Includes air-raid protection works, munition-factories, &c.

Apart altogether from aerodrome construction—

17,104 acres of land were used for military camp construction.

292 miles of roading were metalled and sealed.

1,023 acres of ground were levelled.

604 acres of ground in the precincts of camps were metalled and sealed.

145 miles of sub-surface and storm-water drains were laid.

302 miles of water-piping were laid.

167 miles of sewerage-pipes were laid.

160 miles of fencing were erected.

Military hospitals, with an aggregate capacity of 9,400 beds, were erected, their total floor area being 1,863,285 square feet. In addition, convalescent depots and camp hospitals for 1,100 patients were constructed, apart from alterations and extensions to existing public hospitals. The greater part of this work was done for the United States Forces.

More than 20,000,000 square feet of defence buildings were erected, as follows:—

On aerodromes	..	4,764 buildings, covering	5,393,008 square feet.
Others	..	28,296 buildings, covering	15,376,282 square feet.

I.e., in all .. 33,060 buildings, covering 20,769,290 square feet.

These buildings included over 5,700,000 square feet of storage space with rail access adaptable for post-war use.

In addition, 28,885 prefabricated huts and warehouses, totalling 3,506,240 square feet, were manufactured in New Zealand for use both here and overseas.

The timber utilized on the construction of all these buildings amounted to 382,147,000 superficial feet, which would have been more than sufficient for the building of 37,000 houses.

Included in the naval work carried out was the driving of 500,000 lineal feet of piles, while the construction of one wharf alone absorbed 600,000 superficial feet of heavy timbers.

Aerodrome work, which had commenced before the war, was accelerated both as the war approached and during the war itself, when many civil aerodromes passed temporarily into Air Force hands.

By the 31st March, 1945, the following stations had been constructed and were in use in New Zealand:—

- 5 permanent Air Force Stations.
- 5 temporary Air Force Stations.
- 8 R.N.Z.A.F. training fields.
- 14 civil aerodromes temporarily used by the Air Force.
- 47 civil aerodromes used for Air Force communications.
- 15 emergency aerodromes.

I.e., 94 in New Zealand, in addition to which—

6 aerodromes or air strips had been constructed in the Pacific.

I.e., 100 in all.

Of these, three civil aerodromes, ten extensions to civil aerodromes, and thirteen temporary aerodromes and training fields were constructed during the war.

Sixty-five hangars, covering 1,643,632 square feet, were erected.

Other work done included:—

- 9,345 acres of ground levelled, drained, top-soiled, and grassed.
- 10,775,000 cubic yards of material excavated.
- 23 acres concrete "aprons" laid down.
- 254 miles of field tile drains laid.
- 106 miles of open drains constructed.
- 75 miles of water pipes laid.
- 40 miles of sewerage drains laid.

It has been estimated that the provision of the whole of the accommodation which was constructed for New Zealand and Allied Forces during the war has involved in all a programme equivalent to the building of seventeen new towns, complete with all services, each with a population of some 10,000. This impressive fact, combined with a realization that, apart altogether from the provision of this accommodation, there was a great volume of work done on tank-traps, gun-emplacements, and other defensive works will serve to give some indication of the great magnitude of the task which was carried out during the war by New Zealand's building and constructional industries.

The nation is indebted in this respect to the unstinted efforts of many loyal interests. It would perhaps be invidious to mention any of these individually, but it would not be out of place to state that the greatest burden fell upon the officers of the Public Works Department, who had the responsibility of organizing and supervising the carrying-out, often under difficult

conditions, of the huge programme of works involved, and upon the contractors and other building interests who played such a conspicuous part in the total effort. Mention should also be made of the officers of the Housing Construction Division, who controlled largely the manufacture and distribution of prefabricated units, and the Timber Controller, who, at a time of great demands for timber, was faced with unprecedented problems.

PART II—THE POST-WAR PERIOD

Practically every nation which was engaged in the war is faced with a six years' accumulation of maintenance and deferred development, and in Great Britain, the United States, and Australia, amongst others, authorities similar to New Zealand's Ministry of Works have been set up to deal with the problems which have arisen. The methods which have been adopted by the Ministry of Works have been decided upon only after a careful examination of the detailed procedures which have been used in these countries. Advantage is being taken also of the position generally to check as far as possible a certain disorder in urban and rural development, and to replace the old system of haphazard growth by a more logical system of planning.

6. NEW ZEALAND'S IMMEDIATE POST-WAR NEED FOR BUILDINGS

When New Zealand entered the war she was still embarrassed by a post-depression housing shortage, running into many thousands of houses. Had the additional work of slum-clearing and routine replacements been able to be carried out, rural housing standards radically improved, and miners' and sawmill workers' accommodation brought up to a satisfactory state, there would have been enough work to keep the building industry busy for many years, even without any increase in population. The population has increased, however, during the war period by more than 100,000, and there has been some redistribution as between town and country and between one part of the Dominion and another. These factors were for a time partly offset by the absence of men abroad with the Armed Forces, but with the return and demobilization of these men and the realization of marriages deferred by the war, the demand for houses has inevitably become greater than at any time during the last twenty-five years.

Information received by the Ministry of Works indicates that some 25,000 more houses are required than are available at the present time, and it is considered that over the next fifteen years a further 40,000 houses in the cities and boroughs alone will require replacement—this figure being based on the results of a survey taken in 1937. Adding 95,000 houses to accommodate the population increase which has been estimated to occur by 1960 (including a suitable allowance for immigration), we have a total of 160,000 houses required over the next fifteen years, which might be increased to 180,000 if a policy of improved housing for rural, mining, and sawmilling industries is to be put into effect. This would necessitate building at least 12,000 houses per annum over the whole of this period. If it were possible for this number to be exceeded for a few years and later the annual number built to be tapered off slightly as circumstances permitted, this would conform to the needs of the Dominion as far as they can be seen at present. The figures received by the Ministry of Works in regard to housing have been accepted with some reservations and are now being subjected to an independent check.

Housing is, however, only one of the many forms of building which are competing at the present time for available man-power and materials. The high wartime birth-rate has greatly increased the number of children in the school ages, while the establishment of entirely new suburbs, the changed distribution of the population, and the raising of the school leaving age have further aggravated the difficult problem of school accommodation and rendered substantial measures of relief absolutely imperative. University student populations are now double their pre-war strength, while the increasing numbers at the oldest ages, where sickness rates are highest, combined with the effect of the war and the social security scheme, have taxed the Dominion's hospitals beyond capacity.

At the same time many industrial undertakings are being launched and others extended, these making high priority calls on building-capacity, whilst tourist accommodation, banks, insurance offices, warehouses, bulk stores, shops, community halls, churches, administrative office buildings, post-offices, courthouses, police-stations, and railway-stations compete with each other and with housing, schools, and hospitals for labour and materials.

7. THE URGENT DEMAND FOR WORKS

Partly competing with buildings for man-power, timber, and cement, and partly in a field of its own, hampered rather by a lack of imported machinery and equipment, the Dominion's need for certain classes of civil engineering works is scarcely less urgent than her need for houses and buildings.

Hydro-electric-power generating resources are already strained to the limit and unable to cope even with the present demand. A long-range plan for the construction of new stations at a speed sufficient to keep pace with the estimated rapid growth in demand had been drawn up and adopted by the Government some years ago, but its implementation was so badly interfered with by the war that an unprecedented construction effort will now be necessary to bring the position back to normal in this field. With large sections of industry, as well as transport, housing, and civic construction, all depending on an increased supply of electric-power it is clear that this form of construction must take an overriding priority.

Attention must be given to railway tracks, which have had to carry an enormous volume of traffic during petrol and rubber shortages, and to which replacements have been difficult because of the world shortage of steel. Railway electrification schemes, deferred by the war, are now rendered urgent by coal shortages. Rolling-stock, station-yards, signals, and track duplication work are all making urgent claims, while various railway extensions suspended during the war and new railway links opening up rural and industrial areas, timber resources, &c., are scheduled for early construction.

Highways, maintained at only half standard during the war, will now require a much greater volume of expenditure and work done on them as motor traffic again comes into its own. Bridges which would have been replaced but for the war have in many cases been repaired from year to year, but cannot be expected to last much longer. Replacement by modern reinforced-concrete structures is urgent, though difficult at the present time on account of cement shortages and on account of the high cement consumption involved. The position, however, in regard to some of the bridges is becoming urgent. Similar remarks apply to wharves and harbour structures at various points.

Telephone-exchanges and extensions have not been able to go ahead at their normal pace during the war, and the overtaking of arrears in this direction must be regarded as urgent.

Civil engineering works associated with land development have featured prominently in the history of the Dominion, and may be expected to feature still more prominently as the policy of soil conservation, flood-protection, irrigation, drainage, and afforestation is put into effect. Such works have the merit of increasing the productive capacity of the primary industries, on which the most substantial proportion of the Dominion's population depends, directly or indirectly, for its livelihood. In view of the need to provide land for thousands of ex-servicemen wishing to take up farming to contribute to the maximum in meeting world food requirements, and to increase the productive-capacity of the whole country in what, after all, is the most logical way, this whole class of works must be regarded as of high priority. It is, fortunately, not competitive with works in the building field.

The growth of cities and towns cannot take place without considerable engineering work being undertaken. Water-supply extensions, sewerage, storm-water drainage, street and amenity works, gas and electric supply works must alike proceed in step with or ahead of the growth of population if living standards are to be maintained or improved. Most of this work has been suspended during the war, but urban populations have expanded notwithstanding. In order to meet the demand in this connection a very heavy expenditure will be required on works, some of which must be classed as urgent.

When the war broke out New Zealand was engaged on the construction of many scenic highways and tourist attractions, and the tourist traffic was responsible for building up substantially our overseas exchange. These works were all closed down during the war, and it does not seem possible to accord them a priority until more urgent works have had consideration.

8. ASSESSMENT AND ANALYSIS OF POTENTIAL DEMAND

With so great a volume of work urgently requiring to be done it was, of course, obvious that the whole problem would have to be handled in a systematic manner if the best interests of the Dominion were to be served. With a demand far in excess of the country's capacity to build, some determination of relative urgency was necessary.

ASSESSMENT OF BUILDING NEEDS

By using the machinery of the Organization for National Development and the National Employment Service, together with separate action originating from the Ministry of Works, information was gathered from Government Departments and local authorities in regard to buildings and works which they contemplated carrying out in the post-war period. Inquiries were at the same time extended to private architects and to manufacturers, and, although the response from these private sources was necessarily less definite than from Departments and local authorities, a considerable amount of information was assembled. As a first step an attack was made on the building problem with a view to determining a policy for building control during the year 1946-47.

An assessment based largely on 1939 conditions was made of the capacity of the building industry to undertake work, and on this assessment a programme for the current year was recommended, Cabinet fixing the allocations for each principal class of work and to each Department of State. These allocations have been published.

ASSESSMENT OF DEMAND FOR WORKS

In order to secure a complete coverage of proposed works it became necessary to take the matter up again with all Government Departments. While some Departments had reasonably complete plans for some years ahead, others had not, and in order to put the whole matter on a uniform basis Departments were asked to submit proposals covering a period of ten years ahead. A period of ten years was fixed for the reason that in any longer period works would tend to become visionary and that for planning purposes any lesser period was not very effective. All Departments were suffering from lack of technical staff, and considerable assistance in the preparation of these ten-year schedules had to be furnished from the Ministry of Works itself. Personal contacts were also made by officers of the Ministry of Works and by District Engineers of the Public Works Department to local authorities, and, where appropriate, the machinery of Regional Councils was used to obtain local-authority development proposals over a similar period of ten years. Information from Government and local authority sources was filed on a uniform basis for the purpose of analysis.

ANALYSIS OF INFORMATION RECEIVED

The analysis of information received in the Ministry of Works covering both buildings and works proposals from all sources for the ten-year period ahead has enabled, probably for the first time in the history of New Zealand, the whole problem of physical development to be seen in perspective. The first fact which emerges from a review of the information gathered is that the proposals of State Departments, local authorities, and of private people are very closely related to each other, and it is contrary to the national interest for them to be regarded separately. It is felt that the importance of securing a practical co-ordination between these three groups of interests cannot be overemphasized.

Whilst it would hardly be justifiable to state that Government Departments have not planned ahead or to infer that there has in the past been a lack of co-operation between Departments, the planning and co-ordination possible has been on a voluntary and incomplete basis, whereas to secure the best results it should be positive and mandatory.

The method of preparing departmental estimates and of carrying out departmental works which has applied in the past has largely resulted in the Departments being in competition for building resources, and in their proposals being unco-ordinated.

Again, the proposals of Government Departments have seldom been made known to local authorities in time for the local authority to take these into consideration in its own internal planning. It is felt that the results of town-planning so far could have been greatly improved had Government Departments given a lead in regard to their own works. One thing stands out—namely, that without knowledge of the Government's

intentions it is scarcely possible for any urban or extra-urban authority to plan its own works with any degree of security at all. Evidence of this can be obtained by a consideration of the position throughout the country, particularly in Auckland and Wellington.

As regards privately-financed works, the information gathered by the Ministry of Works has revealed the private owner of a business or industry to be at a great disadvantage. If a business man or industrialist contemplates extensions to his works, or the establishment of new works, he requires advance information as to the proposals of the Government and of local bodies in so far as they affect such things as the future location of roads, railways, harbours, aerodromes, transport services, water-supply, and other public utilities, &c. Up to the present time he has had largely to fend for himself and has proceeded somewhat in the dark.

Coming now to rural interests, it is reasonable to take the view that landholders, who are concerned with the most efficient utilization of their holdings, should know what proposals the Government contemplates in the way of river control and protection and soil conservation generally over the area in which their holdings are situated, even if these proposals are long-term and capable only of gradual implementation. Similarly, there is no reason why rural authorities should not know the Government's intentions in regard to land-development works, such as swamp drainage, irrigation, clearing, and afforestation, which are of the greatest regional significance and when carried out will affect the economy of the rural areas which local authorities are called upon to administer.

So far as housing is concerned, matters which cause some concern are—

- (a) The validity of the applications on which the demand for State houses is based:
- (b) The extensive building of houses contiguous to the two largest metropolitan areas of Auckland and Wellington:
- (c) The number being built in the North Island in relation to the number in the South Island.

A separate report will be made to the Government when the independent survey referred to earlier has been completed, but on the information which is available, it does appear that a stage in the development of the Dominion has been reached when very positive steps should be taken to arrest the drift from the South Island to the North Island and to prevent the larger cities from becoming larger still at the expense of the secondary towns and at the sacrifice also of better living and working conditions which can be obtained more easily in the provincial centres.

The almost uncontrolled drift of population from the South Island to the North Island, and the equally uncontrolled drift towards the two larger centres in the North Island, are having a profound effect on the geographical distribution of the demand for works and buildings.

To conclude this particular section, it might be said that the analysis reveals a very grave need for forward and co-ordinated planning, both nationally and regionally, throughout New Zealand. It might be argued that, despite this, the development of New Zealand has in the past gone forward without any very disastrous results. This is, of course, true, but only in some respects; on the contrary, evidence is not lacking in many parts of New Zealand in the form of urban overcrowding, ribbon development, misplaced industry, and abandoned works, that much waste from a

national point of view has taken place, and will still take place, until the future development of the country is put on a more rational basis. Particular emphasis may also be given to the hitherto uncontrolled use of land without any regard to the serious consequences now becoming apparent in the form of accelerated erosion.

9. WORKS PLANNING

In view of the fact that in a country like New Zealand the Government is called upon to take a major part in development, the responsibility falls upon the Government now to take the lead in resolving the position as it stands. With this end in view and as a first step, major proposals coming to the Ministry of Works have, after a preliminary scrutiny, been assembled in regional schedules and illustrated on large-scale regional maps. As completed, these are being given to Regional Councils and local authorities who have been asked to consider them, and, in collaboration with the Government, to prepare in each region a plan for physical development to which the Government will adhere and to which local authorities will also subscribe. Project maps and schedules, as referred to above, have been made public in Auckland, Wellington, Christchurch, North Canterbury, Central Otago, and in the Waikato area, by the Hon. the Minister of Works; copies of the project maps are contained in Appendix B to this report. Maps and schedules relating to other areas are being prepared and will be made public in the near future.

The projects shown are, of course, national and regional in their significance, and whilst the decisions in regard to national works such as hydro-electric supply must lie in the hands of the central Government, there is no reason why the views of regional authorities should not be sought in regard to all works which may affect the development of the region. This is in accord with the recommendations made by the Parliamentary Committee which recently reported on local government. This Committee reported, *inter alia*:—

We are convinced that for the effective development of the economic and social resources of the Dominion it is important to utilize the local knowledge and local loyalties in various parts of New Zealand. This can best be done by the Regional Planning Councils which have been set up in recent months, and we recommend that this movement be given every encouragement.

In announcing works plans in the regional areas the Minister has given information of works national in character, realizing that the construction of large national undertakings must affect many people, particularly business people and local authorities, during the time of construction. Works of regional significance have largely originated from the local authorities themselves, and the Minister's intention in announcing these is to ascertain from regional authorities the order in which they consider works should be carried out and whether or not they wish to make alterations to the proposed schedule of works. Further, the publication of works of regional significance does enable the local authorities and private interests to know what the Government has in view so that they can plan their own developments with some assurance.

There can be no doubt of the great value of making public the schedules and maps which have been prepared to show concisely Government and local-body proposals for each region. Those which have been completed and

published so far have been received with intense interest and enthusiasm by the community as a whole. They are, of course, far from complete, but their publication enables Government Departments, local authorities, business interests, and private individuals alike to see for the first time the probable lines of development of the areas in the life of which they play their respective parts. Not only can they criticize and discuss these proposals in the open, and suggest alterations and improvements, but they can set about their respective plans for the future in conformity with and in the light of the information opened up to them.

To prevent exploitation of the benefit from works Parliament has enacted legislation holding down the value of lands to be taken for or in connection with proposed works, either Government or local body, to values based on prices ruling at the date of declaration.

When the whole Dominion has been covered in this fashion the Government hopes that regional works plans will be developed which will enable all works projects in the regions to be arranged in logical order of priority, and that this arranging shall be done not arbitrarily in Wellington, but with the full knowledge and assistance of the local authorities for the benefit of whose administrative areas the works are largely being constructed. There are other benefits to be obtained by co-ordinated planning in the arrangement of material supplies, solution of man-power difficulties, &c., which it is not intended to enlarge upon here.

10. PHYSICAL AND ECONOMIC PLANNING

The proclamation of works projects and works plans is an interim measure only. It is the first step taken to reconcile a confused position, but it is realized equally that a much more logical basis for the determination of works projects must in future be elaborated. Both the economic structure and the physical environment of this Dominion are likely to undergo a fairly vigorous process of evolution during the coming years. There will be many new industries established, new methods of using the land, further development of power resources, much new housing, and considerable changes in transport. The overall growth of population and the growth of cities will almost certainly continue.

In so far as all these forms of evolution will involve changes in the physical environment—for example, through the growth and redevelopment of towns and cities, the location and erection of new factories, the reclamation and development of land, the planting of forests, and the building of dams—they will involve some form of building and constructional activity and will therefore come directly within the purview of the Ministry of Works.

Just as the prosecution of works must be based on physical planning in one form or another, so physical planning itself must be based to some extent on economic and social planning, particularly on economic planning.

The prosecution of works and buildings provides the environment for the flow of life and development in the Dominion, and the great task of physical planning is to see that this environment is well designed. But it comes rather within the purview of economic planning to determine what purpose should be served by development works, what industries should exist,

what use can best be made of resources, how large the population might advantageously become, and what steps of general policy might be taken to secure the ends which are shown by investigation to be desirable.

Economic planning begins most naturally on a national scale. It is concerned with those problems relating to New Zealand's best role in the world as a whole, how far she should develop manufacturing in relation to primary industries, how fast her labour force is growing, what proportion of her national income and physical resources should be concentrated on the task of improving her physical environment and capital equipment, and what proportion should flow into the production of consumer goods. When translated into terms of particular areas and industries, it provides a basis for physical planning without which the physical planner must work somewhat in the dark.

Economic research of a comprehensive nature is not at present the primary function of any Government Department, though it is at present being carried out to some extent in a sectionalized form divided between many Departments, such as the Rural Development Division of the Agriculture Department, the Stabilization Commission, the National Employment Service, the Industries and Commerce Department, and various others.

Because of the intimate connection between physical and economic planning, the many far-reaching economic consequences of decisions taken in the physical planning field and the many economic aspects of major works proposals which must be thoroughly examined before sound recommendations can be made to the Government, it has been found necessary to provide in the Ministry of Works the nucleus of an economic research staff to deal with these aspects.

Perhaps the best example of scientific planning related to the productive use of land which is available in New Zealand at the present stage is the intensive survey of the Whangarei County, which is at present being undertaken by the Department of Scientific and Industrial Research. After a most exhaustive examination of the land itself, the climatic features, the growth, and the uses being made of the land, it has been possible to show what changes in land use might be brought about to the best advantage, which areas should revert to forest, and which might well be developed for farming purposes. It has been estimated that if all the land were to be used in the manner which this exhaustive research has indicated is the most advantageous, then the income arising from the whole area would probably be doubled.

Another notable example of comprehensive planning has been provided in the Huntly-Pukemiro Extra-urban Scheme. Maps have been prepared by the Lands and Survey Department to show, *inter alia*, details of coal and other resources, present and potential uses of productive land, areas proposed for residential construction, for amenities, and for other forms of development in the future.

The connection between work of this type and the drawing-up of works plans is very real and direct. The whole subject will be covered comprehensively in the future by the general adoption of regional planning principles. Legislation relating to regional planning has been on the

statute-book for a number of years (*vide* the Town-planning Amendment Act of 1929). This Act states that the general purpose of a regional planning scheme is—

the conservation and economic development of the natural resources 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 best be adapted, and by the co-ordination of all such public improvements, utilities, services, and amenities as are not limited by the boundaries of the district to any one local authority or do not relate exclusively to the development of any one such district.

It is to this end that regional studies are now being commenced in the Ministry of Works, and steps are being taken to extend these out through Regional Councils which have been established by local authorities in the various regions throughout the Dominion.

Regional studies, to be done scientifically, will take a period of years before they are completed, but until they are prepared, the estimating of traffic loads, direction and capacity of communication systems, location of industries, and practically all development works must be largely the expression of opinion, perhaps well qualified but not founded upon basic data derived from a full study of natural resources. As regional surveys proceed, works plans, therefore, will be adjusted in accordance with any fresh evidence which becomes available as a result of these studies.

11. TOWN AND METROPOLITAN PLANNING

It is hoped now that with the general supervision of all planning activities by the Ministry of Works, and the attachment of the secretariat of the Town-planning Board to this office, much better progress will be made in the field of town and metropolitan planning. It is of the greatest importance that sporadic and unplanned growth should no longer be allowed to take place. The Dominion has reached a stage in its development when proper planning, instead of being regarded as a luxury, has become an absolute necessity.

As urban populations expand, an increasing importance must inevitably become attached to the problems of zoning industrial and residential areas; locating of community facilities, schools, and play areas; steering great traffic arteries away from residential and shopping areas; providing suitable transport services, traffic outlets, water-supply, and similar services and amenities. Contiguous both to Wellington and Auckland there are opportunities for planning in areas now being opened up which, if not taken advantage of, will result in unbalanced development and consequently huge economic loss.

It is an extraordinary fact that expenditure on planning work has in the past often been prevented or even viewed with disfavour. When it is recognized that for many years ahead the Dominion may expect an expansion of urban housing at a rate of some ten thousand houses per annum, involving an investment of considerably more than £20,000,000 per annum in total urban capital, and the work of more than thirty thousand men on the site and in the various supply industries, it will be realized how very important it is to secure the provision at the earliest possible date of town and metropolitan plans to guide the pattern of development, and, on the other hand, what considerable sums can be wasted if this large expenditure is allowed to take place in the absence of co-ordinated plans.

The greatest problem to be faced in the evolution of these co-ordinated plans, a problem which arises from the multiplicity of local authorities, is the tendency of each local authority to disregard the relation which must exist between its own developments and those of neighbouring local authorities. For instance, it is not possible to consider the planning of the new Porirua-Tawa Flat area contiguous to Wellington without considering the whole development of Wellington City itself and the Hutt Valley. These areas are all inseparably linked and dependent upon the same port and transport terminals, and each can only be viewed as a part of the whole complex metropolitan structure.

The general position in regard to both town and regional planning on scientific lines can perhaps be summarized by stating that the object is, from a full study of data available in Government Departments and elsewhere, to determine the best use to which each part of the country can be put, and from these results to devise and implement, through Government and other agencies, policies designed to create trends toward an improved use of land and resources. The problem is complex, and it is recognized that only a gradual improvement will be possible, but, in so far as New Zealand is developed in conformity with this principle, so far will future possibilities of improved living standards be realized.

12. THE PREPARATION OF WORKS PROGRAMMES

Up to the present we have dealt almost entirely with the question of planning, and we have now to consider how works when planned and arranged in order of priority should be carried out. This brings up considerations of an entirely different character.

It had become apparent when the Ministry of Works was instituted that some radical changes in the policy then existing were necessary. Prior to the alterations being made, the procedure which had been in operation for a long term of years was as follows.

Shortly before the completion of the financial year Government Departments were invited by Treasury to submit their estimates for the current financial year. Each Government Department acted independently, and in some cases estimates for development and construction works were included in the totals for each Department along with all other items of expenditure. Each Department, acting in what it conceived to be the best departmental interests, submitted requests to Treasury which had to be adjusted in the aggregate to the money which could be made available. Treasury, in reviewing the very substantial requests annually received, in default of any better system, was forced to make more or less rule-of-thumb decisions. Estimates as thus approved were submitted to Parliament, and formed the foundation for the annual appropriations.

The following defects in this system can be pointed out:—

- (a) Each Department was concerned primarily with its own affairs and was not specifically required to consider the proposals of other Departments. This left little possibility of securing the economy which in certain instances—notably in the construction of public buildings—might be effected by the grouping of departmental proposals:
- (b) Insufficient time was available for complete examination of proposals:

- (c) The system of annual appropriations did not put any direct responsibility on a Government Department to plan for any period of years ahead. Some Departments had long-range plans, but others could hardly plan ahead without knowledge of the overall position. In the case of most Government Departments, long-range planning is necessary to ensure that physically the Department's interests are not interfered with and any steps necessary are taken to secure land, even if this is not required for some years ahead:
- (d) Parliament did not have an opportunity of reviewing estimates until the working year was well advanced, and until, indeed, many works for which the money was asked had been commenced:
- (e) Departmental proposals framed in this way could not properly be related to Government policy, and, except within the limited time available to Cabinet, there was little chance of adjusting these or reconciling the proposals of one Department to another:
- (f) Questions of material supply and man-power available were not usually taken into account. In order to implement a policy of full employment and full production much greater weight must be given to these factors than in the past:
- (g) Government expenditure is only part of the total national expenditure on buildings and constructional works, and under the system referred to there was no opportunity of relating Government works to the works of local authorities, or to the proposals of private interests who would also have some claim on materials and labour and the use of land.

In order to overcome these defects and to secure the advantages associated with a positive approach to forward planning, steps have now been taken to ensure that all major proposals arising in Government Departments are made known in advance to the Ministry of Works.

For reasons of convenience it is not desirable to draw up detailed programmes running too far ahead. The adoption of too short a period, on the other hand, would not secure all the benefits arising from adopting a longer view. For practical purposes a plan embodying proposals which will require consideration within a ten-year period has been adopted, with emphasis on detail in the first two years of that period. Programmes, even when drawn up from these proposals, will need to be revised each year in the light of progress and recent changes in emphasis and urgency.

In the future, works programmes must be drawn up with a view not only to the further and more intensive development of the Dominion, but also to the stabilization of the constructional industries, and the provision at all times of a volume of work which will be appropriate to the needs of an economy geared to full employment. Three cardinal factors require to be taken into account—(a) finance; (b) man-power; and (c) materials.

(a) *Finance*.—Dealing with the question of finance, which is fundamentally a question of more direct concern to Treasury, it is quite evident that the amount of money which can be made available for major developmental projects must be related each year to the national income, national expenditure, and savings. Government expenditure cannot be considered alone; on the contrary, if the Ministry of Works is to fulfil one of its most important functions—namely, to stabilize the constructional industries as a whole—the expenditure on Government works must be varied to some extent to compensate variations in the expenditure on

works which are to be carried out by private interests. The question of overseas funds is also involved in regard to plant and materials required for construction which have to be obtained from overseas.

(b) *Man-power*.—The policy of full employment virtually means that budgeting must be done on a man-power basis. It will be the responsibility of the National Employment Service to supply advance information as to the numbers of men who will be likely to be available for employment in the building and constructional industries, after due allowance is made for the employment position in primary and secondary industries and services.

(c) *Materials*.—At the present time material supplies constitute the most serious problem. Serious shortages of almost every critical commodity have made it necessary for the Ministry of Works to survey the whole material supply position in the light of future demands as indicated by proposals which have been put forward, and to prepare recommendations for Government consideration as to the steps necessary to increase production or to supplement local resources by imports from overseas.

During the immediate post-war period there is not likely to be much trouble in the finding of finance, so that the problem resolves itself into equating the essential works to the man-power and material available. This must be done on a national basis and not in regard to Government works alone, and brings up immediately the additional problem of what proportion of the constructional potential should be utilized by private enterprise as against the construction of local-body and Government works.

After a very careful review of the position it has been found necessary to divide all the works over which the Government has direct control (those for which they find the whole of the money or a substantial portion by way of subsidy) into two main classes—works which are absolutely essential and must be carried out at once (hydro-electric works, housing, and certain primary productive works are in this category), and works of a developmental character, the construction of which, even at some sacrifice, can be postponed.

The ultimate end in view is to obtain some measure of stability within the building industry and to offset any effects which may arise from cyclical booms and depressions. The building industry has always been very susceptible to these, and, as far as it can be arranged, Government-sponsored works should in future be utilized as a reservoir to be drawn upon in order to keep the level of investment for both private and public constructional works as stable as possible.

In arranging for works programmes it is necessary to give some consideration to the spread of employment created by the prosecution of works regionally through New Zealand. If this is not done it will be necessary to face up to the transport of people away from their homes with added expense and inconvenience. At the same time it should be pointed out that in the interests of the country generally some considerable movement of selected classes of workmen will in the future be unavoidable.

To summarize the position in regard to public-works programming, it is proposed to attack the problem on the following basis:—

- (a) To ascertain the number of workmen each year ahead who will be available for constructional work after the claims of other interests have been considered;
- (b) To cover the employment of this labour force by the appropriation of sufficient funds;
- (c) To make such adjustments in (a) and (b) as are necessary to equate the programme of work to the material supply available, and take such steps as are necessary to secure an increase in material supply either by production or by importation.

DETAILED EXAMINATION OF IMMEDIATE POSITION

An economic and statistical analysis has therefore been prepared in the Ministry of Works covering the following aspects:—

- (1) The overall capacity of the Dominion to construct works and buildings and whether steps should be taken to increase this capacity;
- (2) The appropriate proportion of the Dominion's capital construction which might be undertaken—
 - (i) For the Government.
 - (ii) For local authorities.
 - (iii) For private enterprise having regard to prevailing economic conditions;
- (3) The allocation of Government and subsidized work—
 - (i) As between the various types of work,
 - (ii) As between the various parts of the Dominion.

Though the conclusions reached as a result of this analysis are under consideration at the present time and will be embodied in the actual programme of works when this is finalized, it is possible to outline the method and to quote certain of the preliminary results which have been arrived at.

(1) *Overall Capacity*

New Zealand's capacity to carry out building and constructional work is limited at the present time, apart from a shortage of trained personnel, principally by four major factors—man-power, timber, cement, and steel.

A close examination of the *man-power* position in the building and constructional industries has been made through the National Employment Service and directly with the Departments employing substantial numbers of men. The following is a summary of information received:—

*Estimate of the Building and Constructional Labour Force as at
31st January, 1946*

Item.	Total Men.	Estimated Number employed on Work for—		
		Government.	Local Authorities.	Private.
National Employment Service Survey—				
Apprentices and trainees	3,700	1,200	200	2,300
Own account workers	1,900	300	100	1,500
Other workers	23,100	7,900	1,400	13,800
Public Works Department	6,600	6,600	..	..
Railways Department	900	900	..	..
Lands Department	640	640	..	..
Native Department	160	160	..	..
Armed Forces	150	150	..	..
Post and Telegraph Department	100	100	..	..
Local authorities (maintenance)	12,000	..	12,000	..
Total labour force	49,250	17,950	13,700	17,600
Percentage of whole building and constructional labour force	100.0	36.5	27.8	35.7

NOTE.—The above total of 49,250 may be compared with a total labour force in all industries of some 720,000.

On the basis of this information, together with an estimate of the rate of net inflow into the building and constructional labour force and the number of off-seasonal workers to be employed for part of the year, a rough estimate has been made of the number of *man-years* available in each of the next two years. The results of this estimate are as follows:—

	1945-46.	1946-47.	1947-48
Estimated man-years available to the industry	47,400	54,100	58,450
Percentage increase over previous year .. ..	..	14	8

As shown in this table, an overall increase in man-years can probably be anticipated of 14 per cent. in 1946-47 as compared with 1945-46, and of 8 per cent. in the ensuing year.

Turning now to the question of *supplies of the principal materials*, it has been ascertained from the State Forest Service that there are good prospects of at least 14 per cent. more *timber* being available to the building and constructional industries in the coming year, owing mainly to a reduction in the demand for boxmaking timber (the food requirements of the Allied Forces in the Pacific having diminished).

The immediate outlook for *cement* is not encouraging. For the time being production is hampered not by a shortage of plant-capacity, but by coal and shipping difficulties. There are definite prospects that the coastal shipping position will have improved to some extent during the coming year, though it is not clear that the increase will be sufficient to meet requirements. Accumulated maintenance and demands for replacements of structures in permanent materials, the heavy hydro-electric programme, and the use of concrete where unavoidable in house building, industrial, and commercial buildings, will place a heavy load on the industry, and it is likely that unusual steps will have to be taken to ensure that there will not be a shortage of this critical commodity.

Steel supplies have been a critical factor in the building and constructional industries for some years owing to the diversion of steel to war needs, the shortage of dollars, and, more recently, the protracted strike in the Australian steel industry. This commodity will therefore cause much difficulty for some time yet. With larger shipments of structural and reinforcing steel expected to come to hand from Australia, however, the outlook is for an easing of the position over the next few months. This item does not therefore seem likely to prevent a 14 per cent. increase (or more) in the physical volume of construction.

In the foregoing paragraphs the volume of construction has been referred to in physical rather than in financial terms. This is because:—

- (a) There is at present a greater financial demand to carry out constructional work than the physical capacity of the industry will permit. In other words, finance is not at present a limiting factor:
- (b) From the point of view of full-employment policy it is essential to measure the programme in terms of the size of the labour force it will employ:

- (c) The cost of constructional work per man-year unit (as well as per unit of construction) has been increasing over a period of some years, and money is not therefore so direct a measure of activity as is provided by the number of man-years (except when working-hours are radically altered, as occurred during the war).

At the same time it is necessary for budgeting and similar purposes to convert the various sections of the programme into terms of money. This has accordingly been done.

(2) *Overall Allocation between Government, Local Authority, and Private Expenditure*

Trial plans for the overall allocation of resources as between the above three major fields of employment have been made, and these have been weighed up in the light of the present circumstances and with the following economic principles in mind:—

- (a) Relative necessity and merit of different classes of work:
- (b) Need to ensure long-term stability to the building and constructional industries as a whole:
- (c) Need for Government to offset variations in private constructional activity:
- (d) Need to secure balance between savings throughout the community and the level of investments:
- (e) Other considerations: Questions of supply, resource development, geographical pattern or location of the work, decentralization of industry, and day-to-day co-ordination of works with local employment problems.

As mentioned earlier, these matters are now receiving consideration, and it would be premature to discuss them more fully at the present stage.

(3) *Allocation of Government Expenditure*

The overall volume of Government expenditure for the year being determined, the next step in the whole process is to break this down by a double system of subdivision—(a) into quotas of expenditure available for each main class of work (*i.e.*, irrigation, soil conservation, highways, &c.), and (b) into allocations for each main district, and each region within each district.

In arriving at quotas for each main *class* of work, account has had to be taken principally of (i) the priority factor (which is based on questions of urgency, productivity, &c.), (ii) the problems associated with material supplies and plant-capacity of the particular type concerned, the existence of plans, &c., and (iii) the inevitability of providing a certain continuity from the present position and some measure of gradualness in making changes in the overall distribution of resources.

Under a system of overall control through the Ministry of Works these quotas must be linked up with the estimates for public works and capital expenditure of the various Departments, so that what is estimated and planned in the Ministry of Works, and approved by Government in the form of a single overall policy, shall in fact guide the policies of all Departments in this particular respect.

The current two years may be regarded in this respect as trial years. The programme is being compiled and quotas allocated for the first time this year, and the technical problems involved are being worked out between the Treasury, the Ministry of Works, and the various Departments involved.

Apart from the determination of quotas in the manner outlined, there is the problem of fixing overall allocations for each *area*. Research into this problem indicates that this is best dealt with in a series of steps, as follows:—

- (a) From the total of all works, an amount is deducted in respect of very large schemes, such as hydro-electric stations, large Government buildings, &c., which serve an area wider than any one district, and which draw labour from a wide field. These schemes must be located where dictated by the geographical features and resources of the country, the location of the capital city, the main ports, &c. They cannot become the subject of a normal allocation among the various districts:
- (b) The remaining items which comprise the programme are then allocated among the major public-works districts by giving due weight to factors such as population, capital value, national income located or arising in the district, and capacity for development:
- (c) The next step is to divide the resulting district allocations into the regions which make up the districts. In making this step a number of special factors must be taken into account. Not every part of the district is expanding its population at a uniform rate. Some areas which require development are not yet populated, and require to be “carried” by the district as a whole until they reach a higher degree of productivity. Again, maintenance work, which is high-priority work, must be carried out where the need arises for it; it cannot be “shifted” as between one part of a district and another.

The following procedure has therefore been followed in arriving at a tentative system of allocations:—

- (i) Estimated maintenance has been deducted from the district quota:
- (ii) The balance of the quota has been spread among regions on a population basis.

This gives a rough guide, to be departed from only as necessary to meet the special needs of high-priority work, difficult country, undeveloped areas for development, and so on. Under this system, elasticity in dealing with these matters is confined to the public-works district, the more rigidly determined district allocations ensuring that justice is done as between the major areas of the Dominion.

The tremendous importance of the aspects which have been discussed in this and the preceding sections to the economy and development of the Dominion will be realized when it is pointed out that the total cost of all the projects which comprise the raw material from which the programme is built up amounts to several hundreds of millions of pounds.

If all this work is spread over a period of ten or more years it will not require anything in the way of a revolutionary expansion of the labour force as it is now gradually building up. But the drawing-up of the estimates and policies which will govern the triple allocation of each year's work—(i) as between Government, local body, and private interests; (ii) as between the various classes of work requiring to be done; and (iii) as between the various areas of the Dominion—is obviously a task of supreme importance and responsibility.

PART III—ADMINISTRATION

13. REORGANIZATION OF PUBLIC WORKS AND ASSOCIATED DEPARTMENTS

The establishment of an organization with functions so far reaching as those which have been delegated to the Ministry of Works has naturally resulted in some adjustments in structure and procedure affecting particularly such Departments as are concerned with physical planning or building and constructional work in one form or another. However, this is not the only factor which has led to changes in the administrative structure. With the gradual change in the character of the constructional work carried out by the Public Works Department the necessity for alterations in its administration had become increasingly apparent. The Department's district offices were located to some extent in areas where there had been, in former years, considerable road and railway activity. Although very considerable changes had, in the course of years, been made to the structure of the Department, its framework remained essentially that of an organization constituted to undertake large engineering works connected with the initial development of the country.

Over a long period of time the Hydro-electric Branch of the Department had grown to become one of the Dominion's most important commercial undertakings, and its continued association with a Department whose purpose was to construct works was becoming increasingly illogical. Steps have therefore been taken to segregate it as a separate Department of State under the name of the State Hydro-electric Department.

Housing construction, originally prosecuted by a branch of the State Advances Corporation, had reached such magnitude as to have practically attained independent departmental status. In view of the extent of its operations in the years ahead, and also the desirability of avoiding any possibility of conflict in demands on materials, man-power, and plant, arrangements have been made for it to become a division of the Public Works Department. By this the technical facilities in the whole of the Department can be made available as required to the Housing Division, which, quite apart from the actual erection of houses, is itself faced with major architectural and engineering problems.

The activities of the Public Works Department itself have also increased in range and complexity. In recent years it has had separate and considerable responsibilities to the Main Highways Board, to the Local Bodies' Loans Board, and to the Soil Conservation and Rivers Control Council, and has carried out much work related to the classification of land for other State Departments, as well as independent reviews, on behalf of Treasury, of proposals arising in other Departments. Apart from these Government activities, it has been involved in local-authority administration throughout the country. Consideration of the above developments led the Government to authorize a review of the organization of the Department by the first Commissioner of Works, Mr. James Fletcher, and the Public Service Commissioner, Mr. J. H. Boyes. The report of these gentlemen was made available to the Government towards the end of 1944, and instructions were

received by the Ministry of Works and the Department to put the recommendations of the report into operation. The recommendations of the report were designed principally to obtain:—

- (a) A clearer definition of responsibilities amongst the senior officers of the Department;
- (b) Decentralization of much of the Department's work from Wellington;
- (c) Specialization in senior technical appointments; and
- (d) Amalgamation of some of the public-works districts with a view to eliminating those in which large construction works had practically ceased and in which there appeared to be no prospect of large works being undertaken in the years immediately ahead.

The Department itself was reconstituted in four divisions, these being the Engineering, Architectural, Housing, and Administrative Divisions. The Engineer-in-Chief remained responsible for the design and construction of all engineering work carried out by the Department. The Government Architect was similarly given control over the Architectural Division of the Department, and made responsible for the design and construction of public buildings. The Director of Housing Construction was given administrative control over the Housing Construction Division, and made responsible for the implementation of the Government's housing policy. The Under-Secretary was given control over the non-technical administration of the whole Department.

Prior to this reorganization, the Engineer-in-Chief, Mr. W. L. Newnham, had been both Permanent Head and Under-Secretary of the Department. Under the new arrangement he retained the position of Permanent Head until his retirement on the 31st March last, when the Department came under the administrative control of the Commissioner of Works.

In the light of actual experience it has become evident that certain of the recommendations referred to above cannot be given full effect, and further readjustments will probably be necessary. While the general nature of the recommendations are not in any way disputed, considerable difficulties have arisen in effecting any real degree of decentralization to the six new public-works districts, and consideration is now being given to the grouping of these districts for administrative purposes. Further, it has emerged in practice that the reduction in the number of districts has been carried rather too far, and that a further district will have to be constituted.

In dealing with these changes which have taken place in the Public Works Department it is fair to point out the close association which has always existed since the earliest colonial days between public-works policy and the development and progress of New Zealand. The Department is now faced with the blending of the older traditions with fresh ideas as the techniques of physical planning are brought into operation. With the transition from extensive to intensive forms of development, a very great task now lies ahead of the Department, and it is essential that every possible step should be taken to ensure that it should be properly constituted and adequately manned to undertake this task. There is at present an acute shortage of technical staff, and the departure of trained personnel to more lucrative positions outside the Department can only be viewed with alarm.

The necessity for an improved system of estimating and costing has been apparent in the Department for many years, and the time has long since been reached when this work should be put on a better basis. What is required is a system of costing which will permit details of costs to be obtained quickly

enough on the job for checks to be applied by the responsible officers controlling works. Costs which come to hand many months after jobs are completed are quite useless for this purpose and do not indicate what the Engineer or other officer in charge of a work wants to know—*i.e.*, whether his work is exceeding the estimate, and for what reason. The lack of an effective costing system throughout the Department has resulted at times in heavy overexpenditure not being realized until works are nearing completion, and has also made it difficult for the Department to prepare estimates. In this respect New Zealand lags behind most other countries. Arrangements have therefore been made to send an Engineer, who will specialize in this field, together with a qualified accountant, to the United States with the object of examining systems of job costing on large construction works and machinery for handling the detailed work. Costing on large projects in the United States has been known for many years to be on a much more efficient basis.

BUILDING CONTROL

The issue of building permits, which virtually meant the application of a system of building priorities, had, until August, 1945, been the responsibility of Mr. G. W. Albertson, who acted in the dual capacity of Building Controller and Director of Housing Construction. This was a wartime arrangement, and in order to allow Mr. Albertson to devote his whole time to the increasing responsibilities connected with the erection of State houses his appointment as Building Controller was revoked, and the Chief Housing Inspector in the Ministry of Works, Mr. R. L. MacPhail, thereupon became the Building Controller. In this respect the Building Controller is responsible direct to the Minister of Works, who took over the administration of building-control policy from the Minister of Supply. The Minister of Works is now responsible for recommendations to Government regarding building-control policy, the office of the Building Controller being attached to that of the Commissioner of Works.

PHYSICAL PLANNING

A final change of great importance occurred in November, 1945, when the responsibility for all physical planning passed to the Ministry of Works. Previously under action in the Organization for National Development, which had established twenty-five Regional Councils and built up the nucleus of a town-planning design staff, and which had contained the Secretariat of the Town-planning Board, this work now became the function of the newly-created Planning Division of the Ministry of Works, which took over the whole of the staff engaged on it. Secretarial assistance to Regional Councils, hitherto provided by the Rehabilitation Department, was, however, withdrawn, though arrangements were made for a 25 per cent. subsidy to be paid to Councils employing their own secretaries.

The vesting for the first time in the one authority of the whole responsibility for physical planning has been a very important step. The association of the *planning* with the *execution* of works, which is now possible within the Ministry of Works enables the principles of forward planning to be given direct and practical application. The setting-up of the necessary staff has been difficult, and the organization of this section in the Ministry of Works

is still far from complete, especially as regards the relation which it must bear to the Regional Councils and local authorities, who, by Government invitation, are now asked to take a very definite part themselves both in the development and in the application of forward plans.

INVESTIGATION AND REPORTS ON BEHALF OF TREASURY

The mere listing-out of large numbers of suggested projects into a preliminary order of priority is, of course, a beginning only, and before major schemes can be approved for implementation much detailed checking and examination of a technical nature must be carried out. A preliminary economic analysis of a scheme carried out by the Ministry of Works in conjunction with Treasury may reveal weaknesses in its whole conception or in the level of priority which is at first attached to it. Provided the project passes this preliminary check, detailed survey work must be carried out on the site, plans and specifications drawn up in the initiating Department, and closer estimates made of costs and quantities. To comply with the requirements of Treasury, these technical aspects must finally be checked in the Ministry of Works and the project reviewed in the light of any changes since the first estimates were made.

While a very great deal of the checking and investigational work referred to has yet to be carried out, following the initial sorting of the many thousands of projects now on record in the Ministry of Works, the current phase of technical examination has been going on steadily ever since the establishment of the office of Commissioner of Works. Very considerable economies were obtained by scrutiny of wartime proposals, and in a measure these have continued to be made as a result of the review of peacetime proposals. Over a period of time the office of the Commissioner of Works has carried out investigations into many hundreds of projects, a large proportion of them urgent, and many involving the expenditure of very large sums indeed. Many instances could be given of the savings which have been effected as a result of these checks, and the many errors arising from the lack of co-ordination which have been avoided.

The Ministry of Works generally, and in particular the Commissioner of Works, is responsible to the Minister of Finance, through Treasury, to ensure that all projects involving Government funds are sound from an economic and technical point of view and are properly carried out. In this respect the Ministry of Works acts between authorities originating proposals and the Department whose responsibility it is to find these funds and to see that they are properly expended.

MATERIAL SUPPLY

The accumulation of proposals relating to constructional undertakings in the Ministry of Works enables a review of the material supply position to be made in the light of a knowledge of the overall demand. Major proposals have been broken down into their critical material components and recommendations made to the Government in regard to the supply of these, either by increased production or by import from overseas. In this respect, of course, the Ministry of Works is not concerned only with Government works, but with the materials required for the whole of the building and construction industry in the country. On account of staff difficulties this responsibility which has been exercised since the defence-construction period, has not been carried out as fully as it should have been, but, with more staff becoming available, steps are being taken to put this on a more satisfactory basis.

14. CONCLUSION

Prior to the establishment of the Ministry of Works there was a tendency to regard Government works, like the functional activity of Government Departments, in isolation. Similarly, local-body works and developments by private enterprise were separately conceived and separately carried out. It should be clear that the operations of these separate agencies have the same basic origin and purpose—namely, to satisfy the needs of the people in any given area or region—the needs of the same people. All works and developments which are initiated by the Government or other interests are therefore complementary and must be fitted into the same economic and social pattern. When they are completed all these developments contribute to the creation of the same physical environment, so as to meet the needs of the community in a convenient and orderly way.

Even though a development may be conceived on the national scale, at least part of its effect is always local. On the other hand, locally conceived development must conform, where necessary, to national plans. It is essential, therefore, that urban, regional, and nation-wide plans should all be evolved in constant collaboration and with complete mutual understanding. Successful co-ordination of the many interests involved in the evolution of any comprehensive plan of physical development is perhaps the most important determinant of its success as a plan. In order that this co-ordination may in fact be achieved it is clear that a co-ordinating authority must exist. By placing the responsibility for physical planning with the Ministry of Works, the Government has made this Ministry responsible for securing that practical co-ordination, without which physical planning work could not be successfully done.

APPENDIX A

NOTE ON LEGAL ASPECTS OF PLANNING

"And whereas the inhabitants themselves are best qualified, as well by their more intimate knowledge of local affairs as by their more direct interest therein, effectually to provide for the same: And whereas the habit of self-government in such cases hath been found to keep alive the spirit of self-reliance and a respect for the laws, and to prepare men for the due exercise of other political privileges"

This wording, taken from the recital to an Ordinance passed by the New Zealand Parliament as far back as 1842—which was aimed at the establishment and regulation of Municipal Corporations "for the good order, health, and convenience of the inhabitants of towns and their neighbourhoods"—bears striking testimony to the deep-rooted nature of the relation which has always been seen to exist between problems of physical development and the encouragement of local interest in the planning of such development; at least in so far as they have a direct impact on the affairs of each locality.

By 1926 it had become evident that co-ordination of planning was necessary, and the Town-planning Act, 1926, was enacted to provide for the making and enforcement of town and regional planning schemes. A Town-planning Board was established. Amendment in 1929 renamed the "regional planning schemes" as "extra-urban planning schemes," and applied the former term to a much broader field.

The purpose of a town-planning scheme was stated to be "the development of the city or borough to which it relates (including, where necessary, the reconstruction of any area therein that has been already subdivided and built on) in such a way as will most effectively tend to promote its healthfulness, amenity, convenience, and advancement."

The purposes of an extra-urban planning scheme were expressed thus: "Every extra-urban planning scheme shall have in relation to the rural area to which it relates the same general purposes as a town-planning scheme in relation to a city or borough, but, save in cases where exceptional conditions prevail, every extra-urban planning scheme shall primarily be prepared and dealt with in relation to and as complementary of the town-planning scheme of any city or borough in the vicinity of the rural area."

The general purpose of a regional planning scheme was stated to be "the conservation and economic development of the natural resources 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 best be adapted, and by 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 authority; or do not relate exclusively to the development of any one such district."

Town and extra-urban planning are obligatory and are the responsibility of existing local authorities within the boundaries of their own districts. Regional planning as contemplated by the Town-planning Amendment Act, 1929, is based on a voluntary combination of a number of local authorities, and the boundary of the planning area is a matter for determination by the Town-planning Board upon the recommendation of the authorities concerned.

Matters to be dealt with in planning schemes are set out in the schedules to the principal Act and the 1929 Amendment. The objectives are to provide for the best use of land and other natural resources and for the co-ordination of national, regional, and local public utilities, services, and amenities.

All plans are to be preceded by careful and comprehensive surveys, the procedure for which is set out generally in the Acts and, particularly, in the Town-planning Regulations 1927.

Apart from the establishment of the Ministry of Works, with functions in relation to planning as described in the main report, progress in planning legislation subsequent to the 1929 Act has been principally as follows:—

In 1944, by section 31 of the Finance Act (No. 3), the Government and local authorities were empowered to combine for the purpose of acquiring, executing, controlling, and managing any work or scheme of development that in the opinion of the Minister of Finance and the Minister of Works is of both national and local importance. By section 29 of the same Act provision was made for public notice of schemes of development and reconstruction, and, although this provision was primarily designed to stabilize compensation for land required for works while the proposals were publicly discussed, the effect is very helpful in enabling Regional Councils, local authorities, and interested Government Departments to discuss freely, fully, and publicly the details as to where and when development should take place.

In 1945, by section 34 of the Finance Act, 1945, the Main Highways Board and the Soil Conservation and Rivers Control Council were authorized to join with local authorities in agreements for joint undertaking of development works. By section 30 of the same Act the Minister of Works was empowered to carry out the subdivision and development of land for industrial, commercial, residential, and recreational purposes, and the carrying-out of such works became a “public work” within the meaning of the Public Works Act, 1928.

While a great deal of progress has been made during the past year in the co-ordination of the plans of Government and local authorities affecting the same areas, and all concerned are evidently realizing the possibilities inherent in the legislation as it stands, practical application has shown that this legislation will require even further amendment before it can be regarded as entirely satisfactory.


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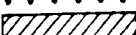
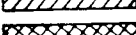
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AUCKLAND METROPOLITAN AND ADJACENT AREAS

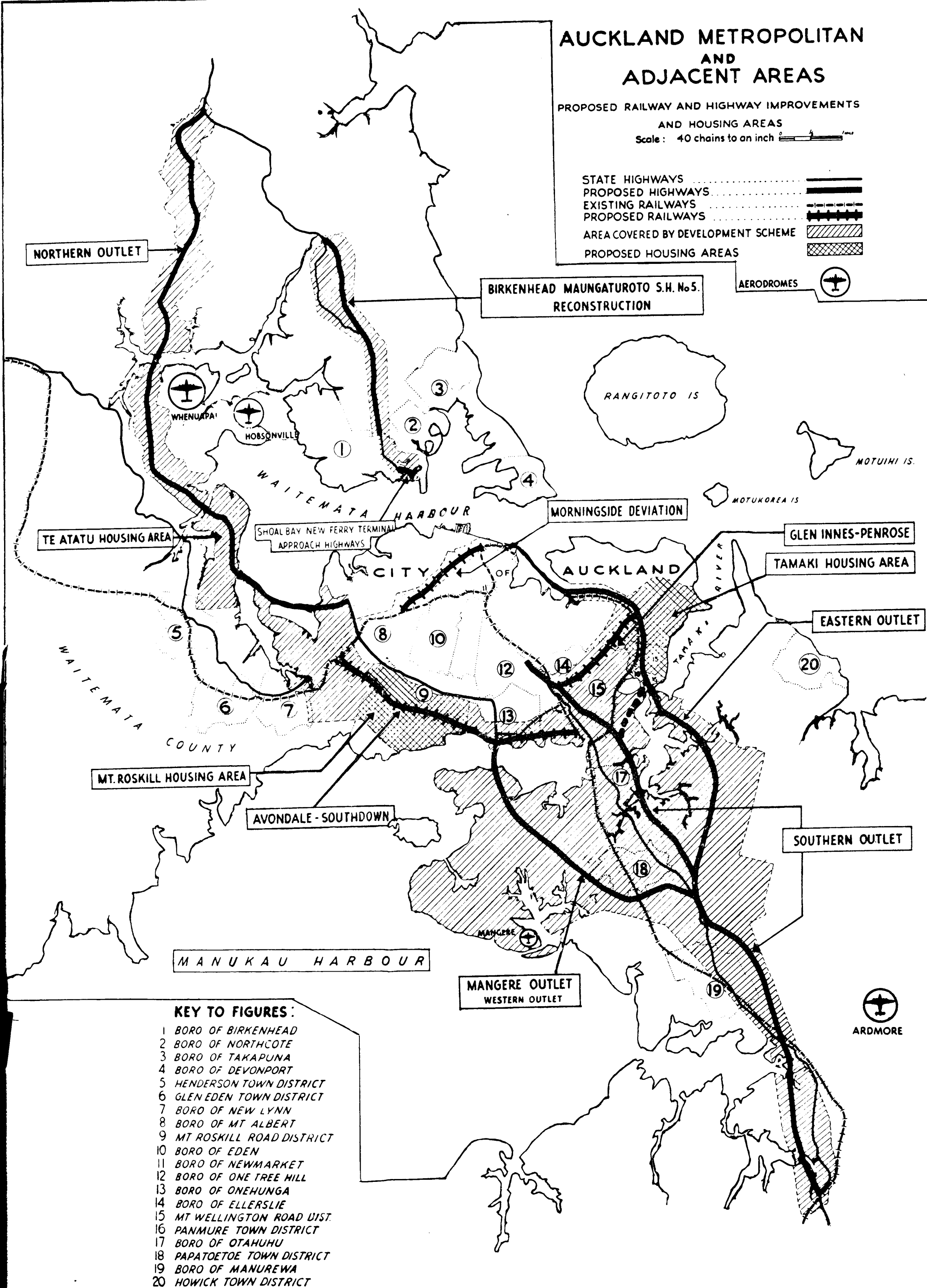
PROPOSED RAILWAY AND HIGHWAY IMPROVEMENTS
AND HOUSING AREAS

Scale: 40 chains to an inch 

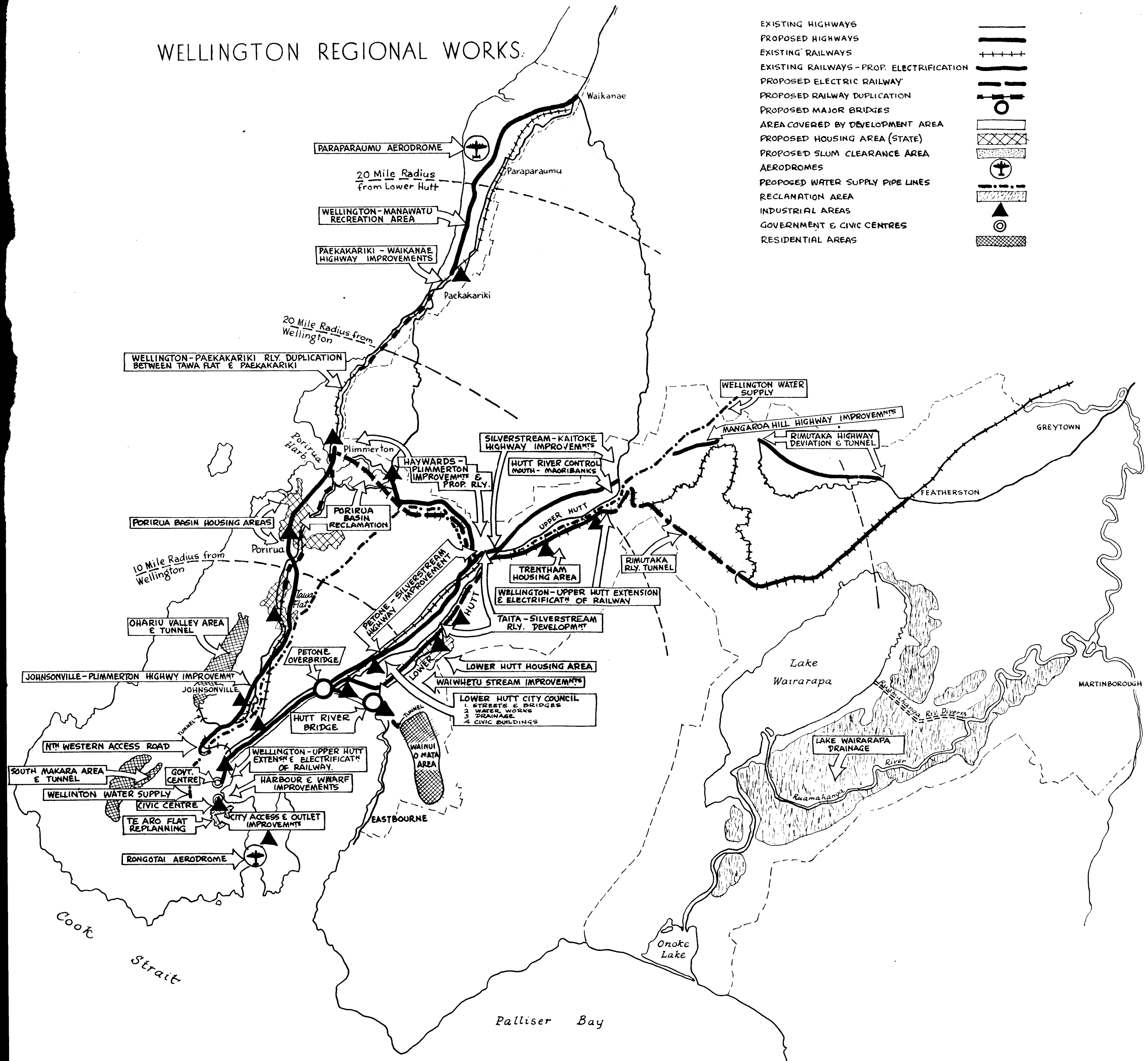
STATE HIGHWAYS
PROPOSED HIGHWAYS
EXISTING RAILWAYS
PROPOSED RAILWAYS
AREA COVERED BY DEVELOPMENT SCHEME 
PROPOSED HOUSING AREAS 

AERODROMES 

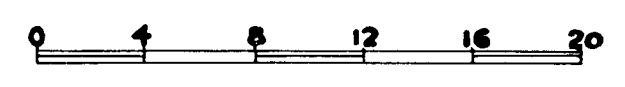
BIRKENHEAD MAUNGATUROTO S.H. No. 5.
RECONSTRUCTION



WELLINGTON REGIONAL WORKS.



NORTH CANTERBURY REGIONAL WORKS



AFFORESTATION
1. HANMER: 2. BALMORAL
3. ASHLEY: 4. EYREWELL
① LAND DEVELOPMENT

QUEEN MARYS HOSP:
HANMER
EXTENSION
⑦ SOCIAL SERVICES

M.H. 108 IMPROVEMENTS
RED POST - JOLLIES PASS
RED POST - HANMER
④ COMMUNICATIONS

KOWHAI RIVER
PROTECTION
WORKS
① LAND DEVELOPMENT

S.H. 51 RECONSTRUCTION
PICTON - CH'CH
KAIKOURA - WAIPARA
④ COMMUNICATIONS

S.H. 51 RECONSTRUCTION
RARAMAI - PARATITAH
TUNNELS DUPLICATION
④ COMMUNICATIONS

WAIKARE-HAWARDEN
RURAL WATER SUPPLY
IMPROVEMENTS
① LAND DEVELOPMENT

EYRE - CUST
DRAINAGE CONTROL
WORKS
④ COMMUNICATIONS

BELFAST RIDING
SEWERAGE SCHEME
⑤ UTILITIES

WAIMAIRI COUNTY
MINOR DEVELOPMENT
& FORESTRY WORKS
① LAND DEVELOPMENT

CHRISTCHURCH
METROPOLITAN
AREA
○

LAND DEVELOPMENT
SCHEMES
THROUGHOUT REGION
① LAND DEVELOPMENT

VARIOUS SUBSTATIONS
THROUGHOUT
REGION
⑤ UTILITIES

S.H. 57 IMPROVEMENTS
H-M'LYNDON - KUMARA
④ COMMUNICATIONS

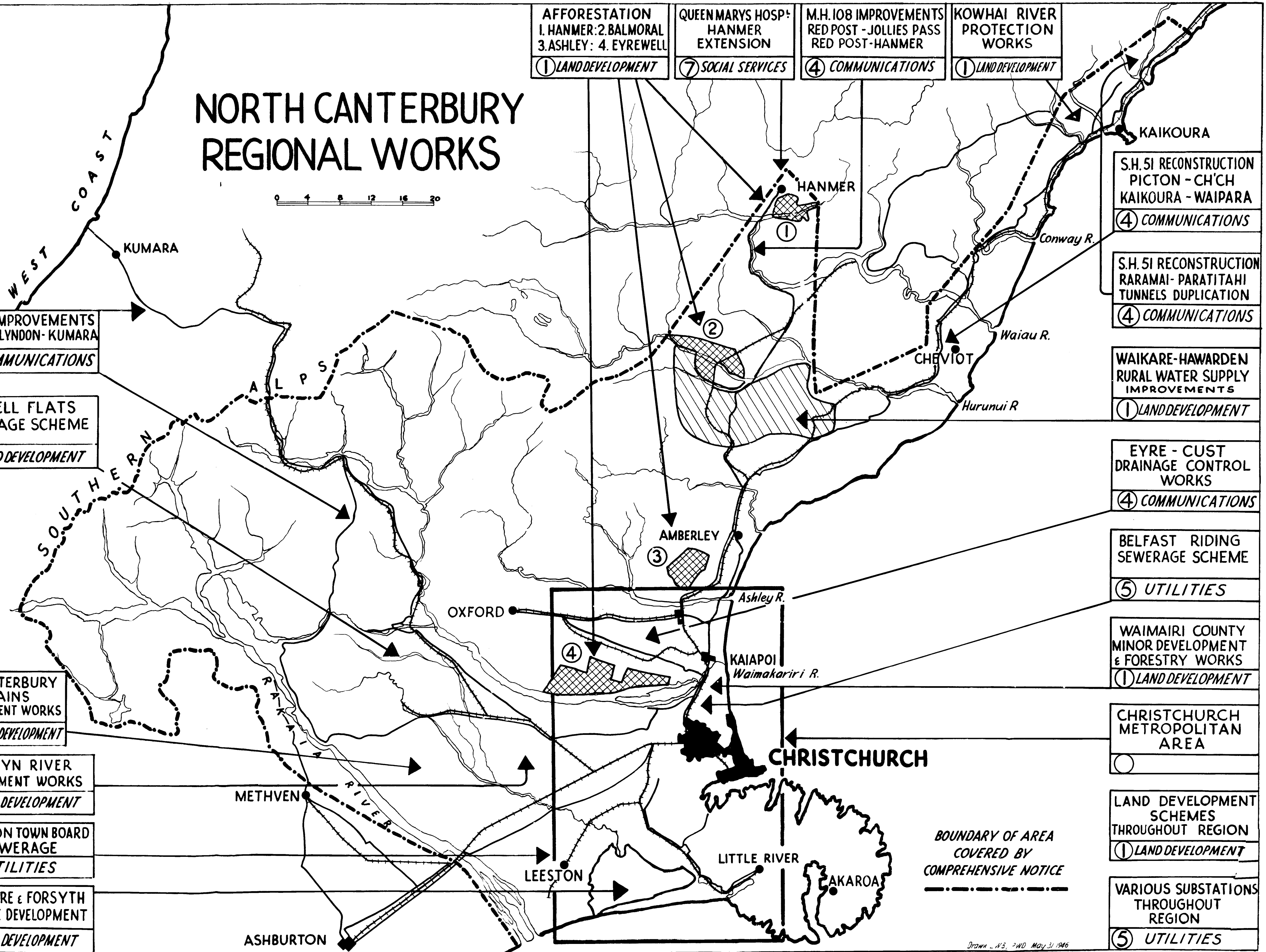
SELWYN FLATS
DRAINAGE SCHEME
① LAND DEVELOPMENT

NTH CANTERBURY
PLAINS
DEVELOPMENT WORKS
① LAND DEVELOPMENT

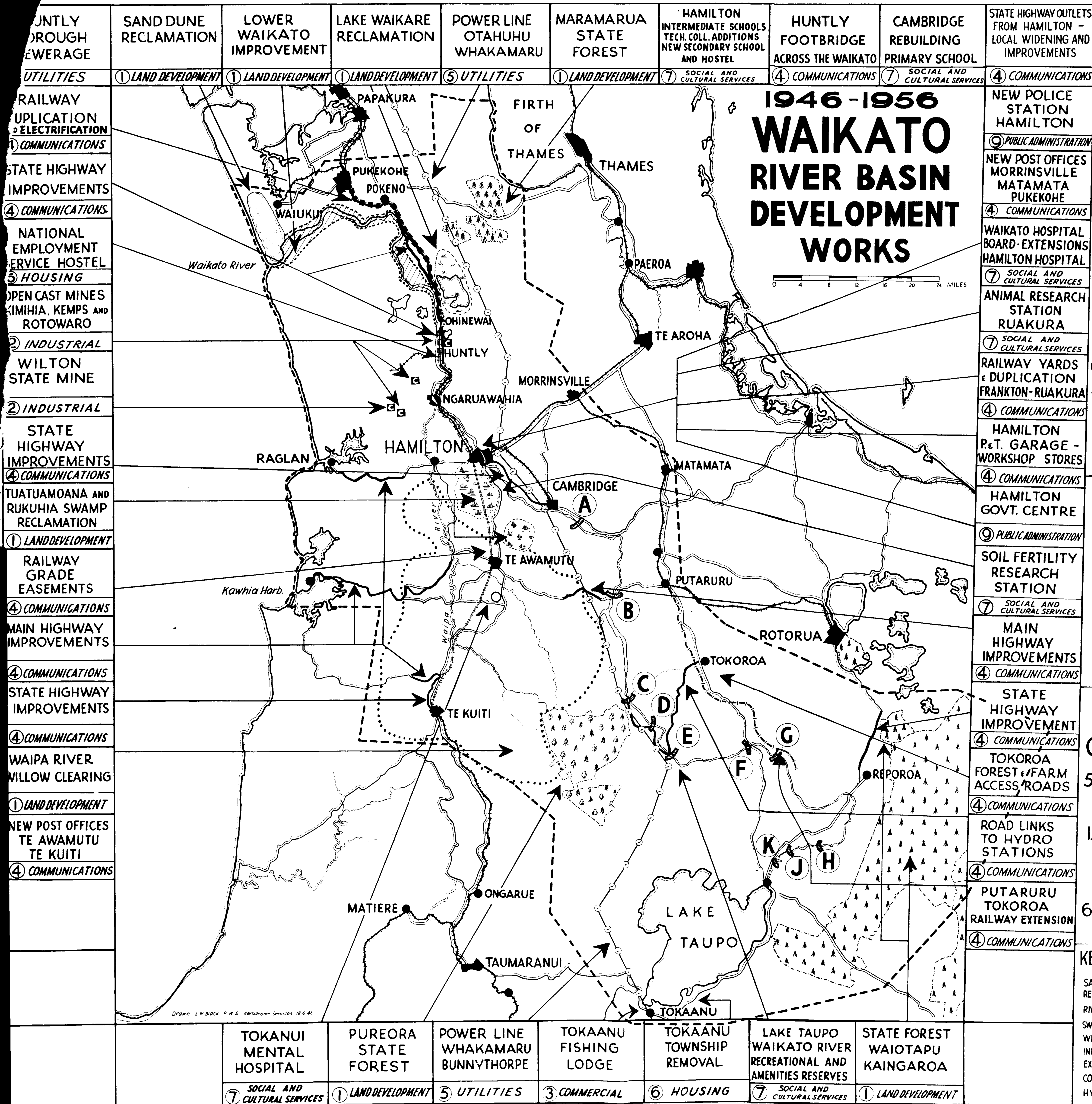
SELWYN RIVER
DEVELOPMENT WORKS
① LAND DEVELOPMENT

LEESTON TOWN BOARD
SEWERAGE
⑤ UTILITIES

ELLESMERE & FORSYTH
DRAINAGE DEVELOPMENT
① LAND DEVELOPMENT



BOUNDARY OF AREA
COVERED BY
COMPREHENSIVE NOTICE



HAMILTON CITY WORKS

2. **INDUSTRIAL** Development of Industrial Areas
3. **COMMERCIAL** Expansion of Business areas
4. **COMMUNICATIONS** ROAD AND STREET: Replanning extension and improvements: elimination of level crossings: additional river crossings: parking areas and road transport terminals.
AIRPORT: Development
RIVER PORT: Development
5. **UTILITIES** EXTENSIONS AND IMPROVEMENTS: Electricity supply; Water supply Gas supply. Sewerage and storm water system.
6. **HOUSING** Development of New Residential Areas
7. **SOCIAL AND CULTURAL** Provision of: Town Hall and Cultural Halls; Community centre: showgrounds; baths and crematorium; improved parks, reserves and playing fields.

STATE HYDRO ELECTRIC SCHEMES: 5. UTILITIES

- | | |
|-------------|---------------|
| A KARAPIRO | F ATIAMURI |
| B ARAPUNI | G OHAKURI |
| C WAIPAPA | H PARARIKI |
| D MARAETAI | J SITES TO BE |
| E WHAKAMARU | K SELECTED |

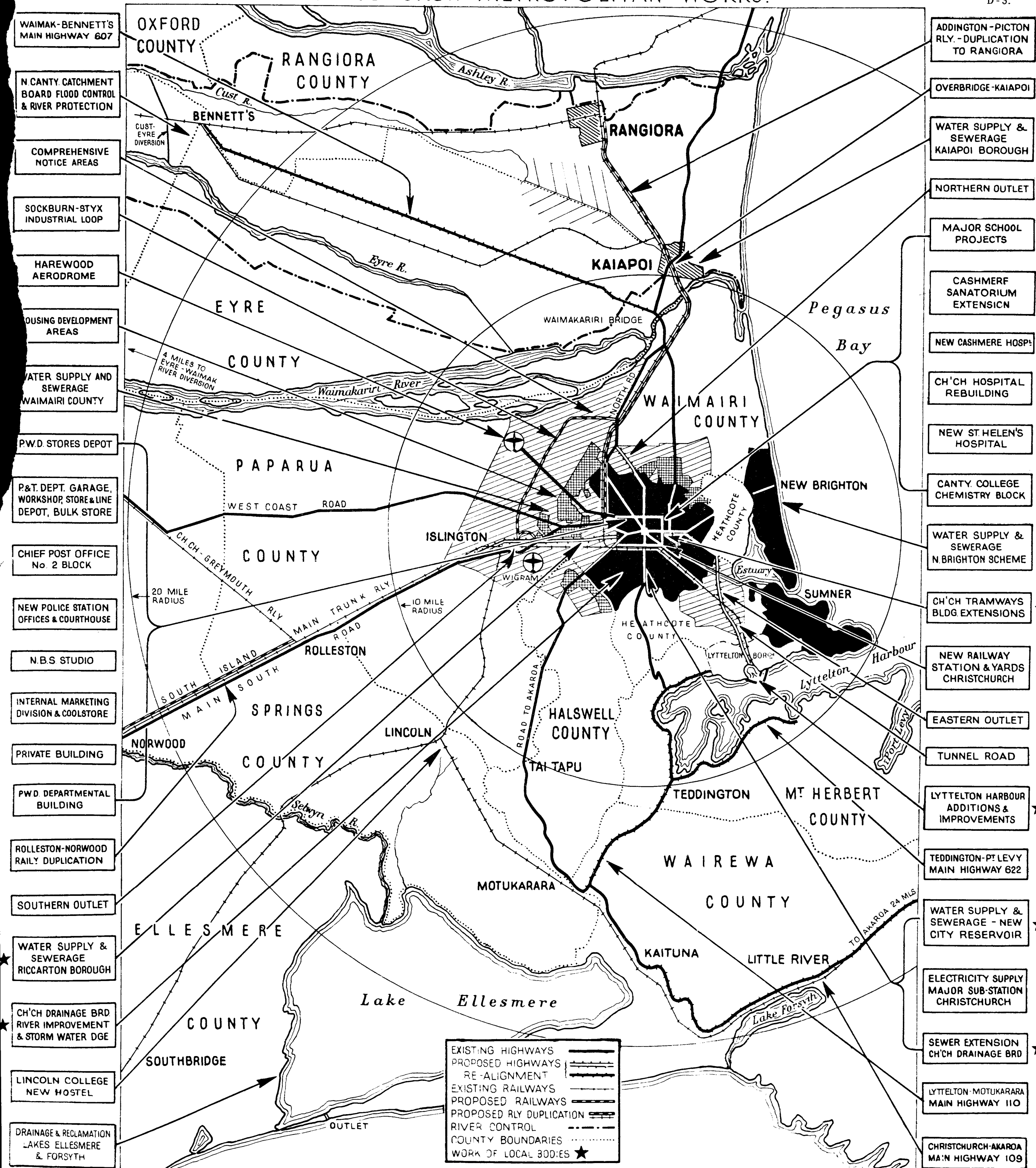
PROJECTS DISPERSED OVER THE BASIN AREA

5. **UTILITIES** STATE HYDRO: Transmission lines sub-stations and miscellaneous works.
1. **LAND DEVELOPMENT** Land settlement schemes: Native land development: Waikato Catchment Board Soil Conservation programme
6. **HOUSING** State Housing. Native Housing.

- KEY TO SYMBOLS:**
- | | |
|---------------------------------------|-------------------------------|
| BOUNDARY OF COMPREHENSIVE NOTICE AREA | EXISTING RAILWAYS (SINGLE) |
| | EXISTING RAILWAYS (DOUBLE) |
| | PROPOSED RAILWAYS (SINGLE) |
| | PROPOSED RAILWAYS (DOUBLE) |
| | GRADE EASEMENTS |
| | EXISTING HIGHWAYS |
| | HIGHWAY AND ROAD IMPROVEMENTS |
| | POWER LINES |

CHRISTCHURCH METROPOLITAN WORKS.

D-3.



CENTRAL OTAGO WORKS PROGRAMME



TIMARU

B I G H T

C A N T E R B U R Y

WANAKA
HAAST PASS
PROPOSED ROAD

EXISTING
WAITAKI DAM
AND HYDRO SCHEME

UPPER CLUTHA
IRRIGATION

FALLS DAM

EXISTING
RIVER CONTROL

MOUTERE TERRACES
IRRIGATION

QUEENSTOWN
GLENORCHY
PROPOSED ROAD

HOPES CREEK
EXTENSION

POOLBURN
DAM

NEW AERODROME

FRASER DAM

MANORBURN
DAM

MANIOTOTO
IRRIGATION

COAL CREEK
PROJECTED
HYDRO
DEVELOPMENT

PROPOSED
STYX DAM

HIGHWAY
IMPROVEMENT

HIGHWAY
IMPROVEMENT

- EXISTING SCHEMES
- PROJECTED SCHEMES
- EXISTING HIGHWAYS
- PROPOSED HIGHWAYS
- RAILWAYS
- BOUNDARY OF AREA
COVERED BY COMPREHENSIVE
NOTICE

