

1922.  
NEW ZEALAND.

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DEPARTMENT OF LANDS AND SURVEY.

RANGITAIKI LAND DRAINAGE.

REPORT FOR THE YEAR ENDED 31st MARCH, 1922, TOGETHER WITH STATEMENT  
OF ACCOUNTS.

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*Presented to both Houses of the General Assembly pursuant to Section 10 of the Rangitaiki Land Drainage Act, 1910.*

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SIR,— Department of Lands and Survey, Wellington, 19th June, 1922.

I have the honour to submit herewith the report upon drainage operations in the Rangitaiki Plains for the year ended 31st March, 1922, pursuant to the provisions of the Rangitaiki Land Drainage Act, 1910.

The report of the Acting Chief Drainage Engineer (attached) indicates that a very considerable acceleration of operations took place during the past year. The businesslike statement of works and machinery shows that the reclamation of the plains is being carried out on sound lines.

The accompanying statement of cash transactions and balance-sheet shows the financial transactions for the year, and the position of the account as at the 31st March last. A plan showing operations is attached.

The Hon. D. H. Guthrie, Minister of Lands.

I have, &c.,  
J. B. THOMPSON, Under-Secretary.

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REPORT OF ACTING CHIEF DRAINAGE ENGINEER.

SIR,—

In accordance with the provisions of the Rangitaiki Land Drainage Act, 1910, I have the honour to submit my report for the year ended 31st March, 1922.

Throughout the period steady progress has been maintained, and the country has benefited accordingly. Dredging operations particularly have been well advanced, thus permitting of more intensive cultivation of the various areas not yet fully developed.

The area under permanent pasture and crops is rapidly increasing, as will be judged from the following comparative returns from the two dairy factories located within the drainage area. The Tarawera Dairy Factory returns for 1920-21 were 170 tons cheese, and for the past year 280 tons cheese, besides 5 tons of whey butter; and the amount of money paid out in butterfat amounts to £21,488. The Rangitaiki Factory in 1920-21, with fifty-six suppliers, turned out 131 tons butter; and in 1921-22, with 116 suppliers, produced 320 tons: this year the suppliers will receive, roughly, £42,000. A similar proportional increase is confidently expected for the coming season.

The completion of these operations is now coming into view. Roadworks are now practically out of hand, and the smaller drainage-works are likewise on the verge of completion. A considerable amount of dredging is still required, but here again the works requiring further attention are rapidly decreasing, and the end can be seen. From now onward the expenditure will be largely in dredging and maintenance.

EASTERN DISTRICT.

A considerable amount of new work has been carried out in this district during the year, and the danger from floods is now greatly lessened. The 18 ft. drain on the east side of the White-pine Bush Road from Tohakawakawa Stream southwards through Section 30, Rangitaiki Parish, has been deepened throughout, considerably more fall being obtained in the upper reaches. A new drain, 12 ft. wide, was cut early in the period from Te Rahu outfall to the Tohakawakawa Stream, and now that Te Rahu has been deepened more fall is available, and the drain is being deepened approximately 3 ft. throughout.

Pearson's drain, from the Waioho Stream southwards through Sections 30 and 38, has been completed, and low-lying country in the latter section is now adequately drained.

The Eastern drain has been deepened throughout, and has also been carried farther south along boundary between Sections 83 and 85 to within a few chains of the Whakaire drain. The portion through the sandy ridge adjoining Sections 76 and 78 has been scooped out, and fascines and wattling to a height of 3 ft. have been placed along this troublesome section, so that a satisfactory channel is now kept open and danger from slips is obviated. The great amount of spoil scooped out of the drain has been carted away and spread on the adjoining roads, so that there is now no unnecessary weight on the banks. The task of keeping the Eastern drain to a sufficient depth has always been one of great difficulty, but now that it is successfully accomplished the resultant fall obtained has been taken up along the whole drain, and the country above has benefited materially.

Lawson's drain in Section 28 has been deepened, and fall has been taken up in several smaller drains in Sections 28 and 29.

Since November, 1921, two new Monigan drag-line excavators have been engaged deepening and widening Te Rahu outfall, and surprisingly good results have been obtained. The spoil from dredge 17, working from the Whakatane River southwards, has been deposited on the existing stop-bank along the west side of Te Rahu Road, and the present great size of the bank testifies to the excavating-capacity of the machines.

As a result of heavy rains up-country during March the Whakatane River was very high, and the water backed up considerably in the Kopeopeo bend. Levels taken at the dam in the Kopeopeo Canal showed the Whakatane River water to be 3 ft. 6 in. higher than the water in the canal. Moreover, the flood-water flowed back from the Whakatane River up the Tohakawakawa Stream, and caused the waters from the Waioho Stream, which in normal times comes down the White-pine Bush drain and flows into the Tohakawakawa Stream, to back up and spread over the northern portion of Section 30, eventually finding its way to Te Rahu Canal. To remedy this state of affairs it is proposed to cut a canal from Te Rahu Canal in a south-easterly direction on to the Waioho Stream, where it crosses the southern boundary of Section 38. The proposed cut is two miles in length, and when completed will divert the Waioho Stream into Te Rahu Canal. The Tohakawakawa Stream can then be blocked to prevent flood-waters from the Whakatane River coming back on to Section 30. One of the drag-line excavators will commence operations on this new canal early in the period 1922-23.

Reid's Central drain has been widened to a 30 ft. canal by means of a Priestman dredge, and at the close of the year the dredge was within a few chains of the railway. On reaching there it will return down the canal, cleaning it out and taking up further fall. All drains have been cleaned and dragged systematically, and in many cases have had to be cleared of slips.

#### WESTERN DISTRICT.

Marked progress has been made on the Omeheu Canal, and towards the end of the year the dredge had reached the southern boundary of Section 155. The effect of this canal is very evident in the surrounding country, which is drying rapidly, and ample fall is now available to settlers relying on this outlet.

The Omeheu Adjunct will now be blocked at its junction with the canal, and when the dredge reaches the south end of the Omeheu drain that drain will also be blocked. As a result all water from Kohohinau drain, Tengaroa drain, Murray's drain, and McIvor's drain will flow down the canal. The Omeheu drain will be blocked again at the Tarawera Cross-road, as a drain has been cut from the Omeheu Canal westwards along the northern boundaries of Sections 153, 152, and 151.

During last year Murray's drain has been continued westward along the southern boundary of Sections 156, 150, 149, and 148, and then southwards across the top end of Hallett's catchwater. From there McIvor's drain has been cut through the Crown land recently subdivided. The Tumurenu drain has been widened and deepened throughout, and now adequate fall is available for Section 164.

When the dredge at present engaged in cutting off two bends in the Tarawera River adjoining Section 147 has completed the cut the river will be blocked at the south end of cut, and some 2 ft. more fall will be available up the Mangaone Stream and Tumurenu drain. The cut in question should be completed about the end of May. The Tarawera Western drain was deepened from the Awaite Road drain southwards to boundary between Sections 136 and 139, and shortly afterwards a new walking dredge was put to work on the same drain, commencing operations at the railway. Great progress has been made in the dredging, the drain being deepened several feet, so that the Matuku Settlement, part of which has always been wet, will have considerably more freeboard. A good deal of timber has been encountered in this drain, retarding progress somewhat, but despite this drawback excellent work is being done.

The Awaite drain has been deepened by day labour as far as the Tarawera Cross-road, and though a great deal of timber was met with a good job was made of the drain.

The Awakaponga drain and Collins drain have been cleaned out periodically, and as soon as a dredge is available it will be placed on the Awakaponga Canal. Section 109 drain has been widened and deepened by a Priestman dredge, and there is now less than a mile left to complete this work.

All drains have been periodically cleaned out during the period under review, and when necessary slips have been thrown out.

#### DREDGES.

Four Priestman dredges have been working during the past twelve months, and a most satisfactory yardage has resulted. No. 3 dredge, working on the old Kopeopeo Canal through Section 62, and then up Reid's central drain, has done excellent work, a total of 122,017 cubic yards of spoil being excavated over a distance of 213 chains. During the first few months of the year progress was retarded owing to shortage of coal and necessity for repairing one "chute." In July, 1921, the dredge commenced working one shift only, and the results have proved completely satisfactory.

Very satisfactory work has been done by No. 4 dredge on the Omeheu Canal, a total of 111,866 cubic yards being excavated over a distance of 174 chains. At the end of August the staff of this dredge was reduced to three men, one ten-hour shift being worked, and very satisfactory results have been obtained. The dredge is now working along the southern boundary of Section 155, and has approximately 70 chains to complete before connecting up with the Tengaroa drain, where the canal is to finish.

No. 8 dredge has proceeded steadily with the work of straightening the Tarawera River and erecting a substantial stop-bank on the eastern bank. A distance of 153 chains has been completed, some 86,645 cubic yards of spoil being removed. Owing to the strong current running in the river every care has to be taken with this dredge, but the dredgemaster in charge has kept his machine running very satisfactorily.

No. 9 dredge commenced operations in the Awaiti Stream in May, 1921, and, after cleaning up as far as Section 109 drain, turned inland up the line of that drain. Very good progress was made for some months until an extremely hard ridge south of the Kohika Lagoon was encountered, when progress was very slow. However, better ground is now being encountered, and consequently the dredge is proceeding more rapidly. The effect of this canal is now being felt by the surrounding country, which, though formerly one of the wettest parts of the swamp, is now comparatively dry. Subdivisional drainage is now all that is required to "bring in" this first-class area of land. The distance dredged amounted to 119 chains, 68,684 cubic yards of spoil being shifted.

No. 17 Monighan dredge: In November, 1921, one of the Monighan drag-line excavators lately imported from America commenced operations on Te Rahu Canal at the Whakatane River end. It was at once evident that the Monighan was an ideal machine for the job, and splendid results have been obtained. This machine widened the cut to a full 30 ft., as well as deepening it by as much as 4 ft. and 5 ft. in places. The result is a fine canal of ample width and depth, and also a stop-bank of fine proportions composed of spoil from the canal. During the five months worked a distance of 152 chains was covered, and a total of 40,726 cubic yards of spoil removed from the canal.

No. 18 Monighan dredge: Late in November, 1921, the second Monighan commenced operations some two miles farther up Te Rahu Canal. The country traversed was of a peaty nature, and did not permit of the machine remaining very long in one spot, owing to subsidence. However, a satisfactory amount of spoil was taken out of the bottom of canal. Towards the end of the year the machine had picked up approximately 4 ft. of fall, and is giving the country round Awakeri just the relief it needs. Owing to the inequality of the ground along the bank of the canal the dredge has to level up a path for itself, and then as the spoil is removed from the canal it is spread behind the dredge and levelled roughly to permit of easy road-formation, should need arise for same at some future date. The dredge is now nearly up to the main Whakatane-Rotorua Road at Awakeri, and on reaching the junction of drains in Section 83 will dredge up the Mangaroa Stream for some 20 chains with the object of forming a silt-trap. During the four months worked the machine removed 24,306 cubic yards over a distance of 108 chains.

No. 21 Bay City dredge: This dredge commenced work on the Tarawera Western drain towards the end of August, 1921, but for about six weeks was engaged in cleaning up the bottom and sides of drain, for which it was impossible to gauge quantity shifted. However, in October a face to work on was obtained, and the machine immediately began to pick up fall in the drain. By the end of the period some 5 ft. was being taken from the bottom of the drain, and despite timber encountered progress remains satisfactory. From October, 1921, to March, 1922, a distance of 120 chains was completed, 19,750 cubic yards of spoil being removed.

The following table shows the total amount excavated, with the cost per cubic yard, for the past ten years:—

				Cubic Yards.	Cost per Cubic Yard.
1912-13	..	..	..	31,486	4.12d.
1913-14	..	..	..	272,370	3.07d.
1914-15	..	..	..	268,760	3.48d.
1915-16	..	..	..	224,740	4.54d.
1916-17	..	..	..	261,751	4.36d.
1917-18	..	..	..	320,614	3.72d.
1918-19	..	..	..	229,659	5.70d.
1919-20	..	..	..	176,672	6.62d.
1920-21	..	..	..	215,768	8.82d.
1921-22	..	..	..	473,994	6.68d.

#### ROADWORK.

Very little roadwork has been done during the last twelve months. Surfacing has been carried out on the White-pine Bush Road, Eastern Drain Road, McLean's Road, and Feist's Road.

The Awakaponga section of the Railway Road has been partially formed. This was a costly undertaking, particularly through the old lagoon, where alternate layers of fascines and spoil were deposited until at length a firm foundation was obtained. The preliminary work on this section is now finished, and when some 2 ft. of spoil is spread along the whole length the road will be ready for traffic.

#### BRIDGES.

The two bridge gangs have been constantly employed all over the swamp, erecting flood-gates and bridges. Nine new pile bridges (30 ft. span) have been erected, as well as twenty-five sill bridges over drains of widths varying from 6 ft. to 16 ft. The timber for these bridges has been obtained from Tauranga and Pongakawa mills, and is of good-quality rimu. Difficulty was experienced in obtaining hardwood piles, but latterly good supplies have been coming to hand from Australia.

## STOP-BANKS.

The Tarawera stop-banks have been kept in good repair during the year, and new banks have been erected where found necessary on the west bank of the river. The Priestman dredge working on this river northwards from the main Te Teko—Rotorua Road is erecting a fine bank as it proceeds, and this is now complete as far as the northern boundary of Section 147.

## DRAINS IN OPERATION.

The total length of drains in operation to date is as follows: Dredge cuts, 33 miles 55 chains; main outlet drains, 94 miles 0.06 chain; road-drains, 26 miles.

## ROADS IN OPERATION.

The total length of roads in operation is 106 miles.

## WORKSHOPS.

A great deal of repair work has been carried out in the workshops, and as a result dredges have been kept going very satisfactorily. A blacksmith was engaged and a new smithy erected during the latter part of the year, and now all ironwork for dredges, bridges, and general work is done on the job.

## BUILDINGS.

All buildings in connection with the works have been kept in good repair. A wooden store-shed near the Thornton Wharf was purchased and removed to headquarters to be used as a garage for the new Thornycroft lorry. The shed had to be enlarged considerably, but is now a fine roomy building, and serves its purpose excellently.

## ROLLING-STOCK.

In July, 1921, a new Thornycroft 4-ton lorry was purchased, and since then it has carted coal out to all the four dredges, as well as supplying the three new dredges with benzine, and carting timber out to the bridge-sites. With the exception of a few breaks caused by rough roads during bad weather the lorry has run well and is in good order.

## PLANT AND MACHINERY.

This consists of four Priestman dredges, one Bay City walking land-dipper, and two Monighan walking drag-line excavators, four coal-punts, three oil-launches, one towing-barge, and various small boats and punts. The No. 3 dredge pontoon is in a bad state of repair and will require renewal early in the next period.

## SUMMARY.

	M.	ch.	Cub. yd.
New drains .. .. .	4	61	38,340
Widening and deepening .. .. .	25	45	89,268
Cleaning drains .. .. .	73	24	..
Surfacing roads .. .. .	5	30	..
New stop-bank .. .. .	1	0	..
Fencing .. .. .	17	37	..
Pile bridge .. .. .	9	0	..
Sill bridge .. .. .	25	0	..
Flood-gates .. .. .	2	0	..
Spoil dredged .. .. .	13	21	473,994
Levels taken .. .. .	81	0	..
Survey traverses .. .. .	26	69	..

## PROPOSED WORKS.

Dredging new canal from Te Rahu Canal to White-pine Bush; redredging Te Rahu Canal and parts of Mangaroa Stream and Whakaire drain; redredging Reid's Central Canal and part Kopeopeo Canal; dredging Tarawera Western drain; completion dredging Section 109 drain; redredging Awakaponga Canal and drain; flood-gate on old Rangitaiki River; silt-traps in Mangaroa and Awakaponga Streams; new outlet drains, and general development and maintenance works.

## WORKS EXPENDITURE.

The total amount expended during the year was £81,839, which includes the purchase of the new American machinery. Day labour amounted to £26,610, piecework £13,774, and hire of teams £2,718.

## GENERAL.

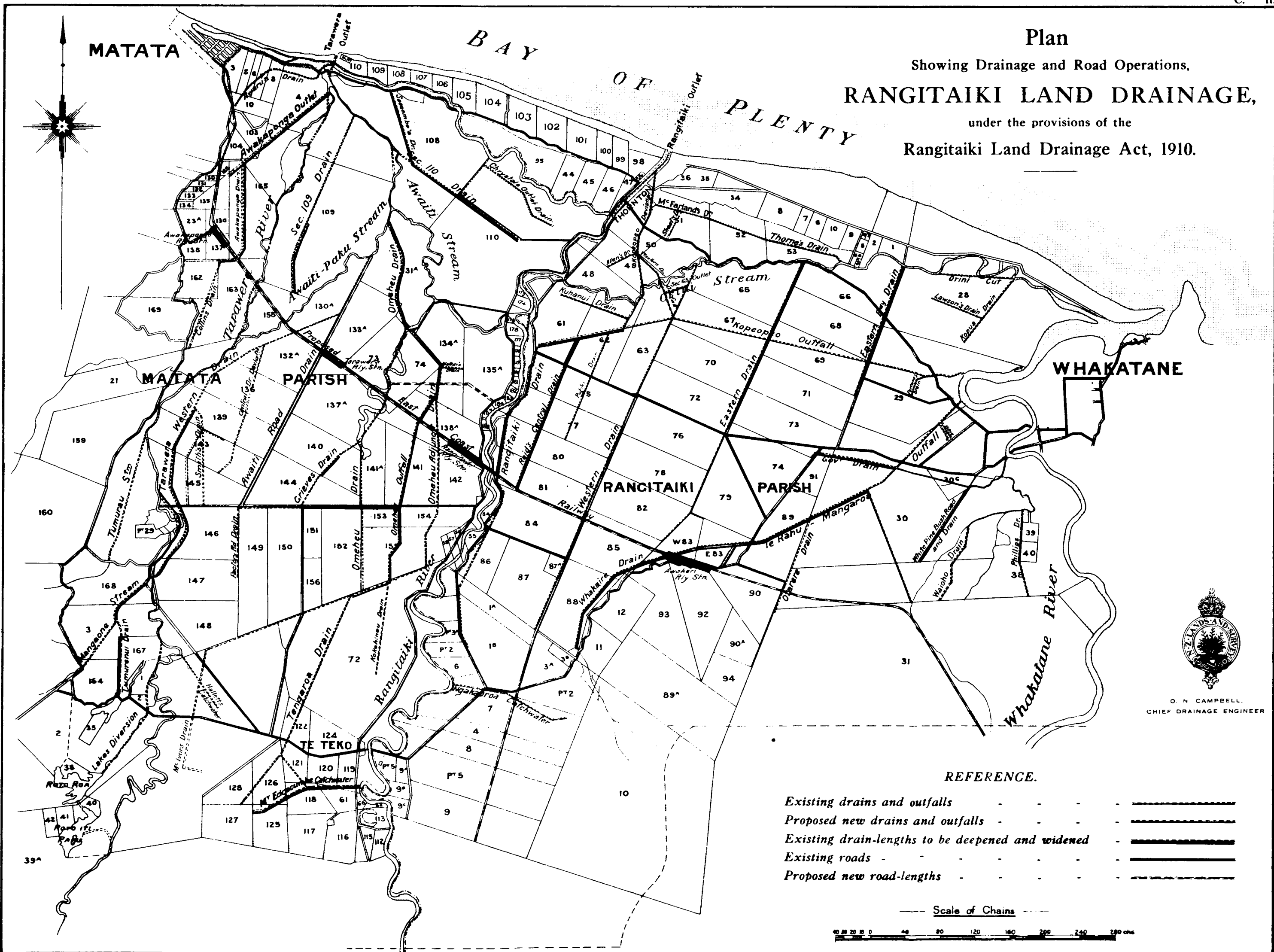
The local office at Thornton is responsible for the preparation of all wages-sheets, contracts, and team-hire vouchers, and this work was satisfactorily carried out. All vouchers are finally put through the Auckland Office, where the books are kept.

The local officer in charge is Mr. J. H. Treseder, Land Drainage Engineer.

I have, &c.,

The Under-Secretary for Lands, Wellington.

O. N. CAMPBELL,  
Acting Chief Drainage Engineer.



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## RANGITAIKI LAND DRAINAGE ACCOUNT.

## RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1922.

<i>Receipts.</i>			<i>Payments.</i>		
	£	s. d.		£	s. d.
Cash in hand, 1st April, 1921 ..	4,821	13 0	Drainage - works, stop - banks, clearing channels, and other expenditure incidental to drainage operations ..	46,905	19 7
Debentures issued under Rangitaiki Land Drainage Amendment Act, 1913 ..	80,000	0 0	Management expenses ..	2,556	7 1
“ Thirds ” and “ fourths ” ..	14	15 0	Travelling-expenses ..	197	9 9
Rent of buildings ..	11	16 0	Legal expenses ..	2	6 3
Rates, 1917-18 ..	214	19 6	Machinery and plant ..	20,691	19 8
„ 1918-19 ..	310	7 7	Live-stock ..	92	0 0
„ 1919-20 ..	500	3 1	Loose tools ..	139	15 2
„ 1920-21 ..	8,768	11 1	Material and stores ..	5,782	14 10
„ 1921-22 ..	1,128	8 6	Fuel ..	4,229	6 7
Rates paid in advance ..	5	19 3	Compensation for purchase of Native land under section 8, Rangitaiki Land		
			Drainage Act ..	19	10 0
			Rates refunded ..	191	2 3
			Interest on debentures ..	12,598	10 9
			Cash in hand ..	2,369	11 1
	£95,776	13 0		£95,776	13 0

## REVENUE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1922.

<i>Dr.</i>			<i>Cr.</i>		
	£	s. d.		£	s. d.
To Balance at 1st April, 1921 ..	6,897	13 8	By Proportion of rates, 1921-22 ..	12,903	16 5
Interest on loans ..	13,808	19 10	Rent of buildings ..	11	16 0
Rates written off ..	11	6 0	“ Thirds ” ..	14	15 0
			Interest on investments ..	40	13 6
			Balance transferred to Drainage-works Account ..	7,746	18 7
	£20,717	19 6		£20,717	19 6

## BALANCE-SHEET AS AT 31ST MARCH, 1922.

<i>Liabilities.</i>			<i>Assets.</i>		
	£	s. d.		£	s. d.
Loan Account ..	360,000	0 0	Drainage - works — Expenditure in connection therewith, including wages, supplies, administration and engineering expenses, and depreciation of plant	316,175	1 0
Loan Redemption Account ..	11,563	18 3	Plant and machinery ..	35,848	9 8
Unpaid purchase-money—Sundry Natives	410	3 1	Loose tools ..	706	19 8
Suspense Account ..	74	8 2	Live-stock ..	196	0 0
Sundry creditors ..	3,294	1 4	Buildings ..	1,623	0 0
Sundry creditors, for interest ..	3,321	8 10	Material and stores ..	1,533	17 10
			Fuel ..	459	15 0
			Investments—Public Trust Office ..	904	5 4
			Lands for Settlement Account ..	20	0 0
			Sundry debtors, for rates ..	18,827	0 1
			Cash in hand ..	2,369	11 1
	£378,663	19 8		£378,663	19 8

J. B. THOMPSON, Under-Secretary.  
J. H. O'DONNELL, Chief Accountant.

*Approximate Cost of Paper.*—Preparation, not given; printing (625 copies, including map), £22 10s.

By Authority: W. A. G. SKINNER, Government Printer, Wellington.—1922.

Price 1s.]

