1910.

NEW ZEALAND.

DRAINAGE OPERATIONS IN HAURAKI PLAINS:

REPORT FOR THE YEAR ENDED 31ST MARCH, 1910, TOGETHER WITH STATEMENT OF ACCOUNTS.

Presented to both Houses of the General Assembly pursuant to Section 10 of the Hauraki Plains Act, 1908.

SIR,— Department of Lands, Wellington, 2nd May, 1910.

I have the honour to attach herewith a report upon the drainage operations carried out for the past year under the provisions of the Hauraki Plains Act, 1908.

I have, &c.

WM. C. KENSINGTON,
Under-Secretary for Lands.

The Right Hon. Sir Joseph G. Ward, P.C., K.C.M.G.,
Minister of Lands.

REPORT.

THE attached report by the District Surveyor, Mr. J. B. Thompson, gives a full and detailed account of the excellent progress made during the past financial year. It has been demonstrated by the operations for the past year that for successive years it will be possible to open areas of land for profitable settlement. The proposed operations foreshadowed in last year's report have been vigorously prosecuted, the result being that some 17,500 acres of land have been opened for selection under the provisions of the Land Act, 1908. This includes the areas absorbed by reserves, roads, and drains, leaving 16,881 acres available for actual settlement. It is anticipated that another 12,000 acres will be ready for opening for selection during the ensuing spring and autumn. In order to make the Priestman dredges work more economically, new steel chutes have been erected on one of them: this will enable the spoil to be delivered automatically on each side of the dredge without loss of time and labour, a great improvement on the wooden structure formerly in use, and which was worked independently of the dredge. Messrs. Price Bros., of the Thames, made a capital job of the new automatic steel chutes in question. The other dredge will be treated in the same manner.

It is proposed during the coming year to take in hand the snagging of the upper portions of the Waitoa and Piako Rivers, and operations will probably be commenced early in October. The clearing of these rivers will undoubtedly allow the flood-waters to run away more quickly than at present.

Drainage-works are also being undertaken in connection with an area of Crown land within the sphere of the operations of the Waitoa Drainage Board. This will not only benefit the Crown land, but will give an outlet for the water discharged from the drains cut by the Board.

Another undertaking of considerable magnitude will be a scheme for draining the area of about 10,000 acres lying south of Kerepeehi and on the eastern side of the Piako River. This area is subject to inundations by the overflowing of the Waihou River during flood-time. The cause of the overflow is owing to the fact that the Waihou River, which carries a strong current for some fourteen or fifteen miles below Te Aroha, and runs a fairly straight course, is suddenly diverted to the eastward just below the flax-mills erected on the Waihou West No. 3 Block, and, not being able to find a vent for its flood-waters quickly enough, overflows to the westward, causing a large volume of water to find its way into the Awaiti Stream and over the Crown land to the south-west. This flood-water, together with the winter floods in the Waitoa and Piako, submerge a considerable area of Crown and Native lands. The remedy appears to be either by erecting many miles of stop-banks or possibly cutting a canal across the bends of the Waihou from the flax-mills to Thorp's Opukeko bend.

I am glad to place on record the praiseworthy efforts of all classes of officers and men to give effect to the Government's policy of opening the Hauraki Plains area for settlement as quickly as possible consistent with safety. Mr. J. B. Thompson has shown an intelligent interest in the whole scheme, and has been most indefatigable in giving effect to it. He has had the able assistance of Mr. George Purchas in carrying out the engineering details. In future it is intended, as being a more economical procedure, to keep the control of the whole operations under the District Surveyor, Mr. J. B. Thompson, Mr. Purchas being transferred to the staff of the Chief Surveyor, Auckland.

STATEMENT OF ACCOUNTS (as required by Section 10 of the Hauraki Plains Act, 1908) for the Year ended 31st March, 1910.

Receipts.

		£ s. d.
1909. April 1.	To Balance—Cash in Public Account	327 14 6
1910. Mar. 31.	To Advances from Loans to Local Bodies' Account, under clause 4 of the Hauraki Plains Act, 1908 ..	19,000 0 0
	Advances made by the New Zealand State-guaranteed Advances Office ..	10,000 0 0
		£29,327 14 6

Expenditure.

		£ s. d.
1910. Mar. 31.	By Expenditure—	
	Salaries	578 15 0
	Travelling allowances and expenses, camp allowances, and general expenses of administration	197 16 2
	Purchase and equipment of dredges and launches, maintenance and working expenses	4,262 5 9
	Buildings, erection and maintenance of ..	363 6 10
	Cattle, purchase of ..	1,129 16 6
	Drainage - works: Clearing channels, building stop-banks, tramways, and all expenses incidental thereto	15,703 2 8
		22,235 2 11
	Balance—Cash in Public Account	5,387 6 1
	Advances in hands of officers of the Government	1,705 5 6
		7,092 11 7
		£29,327 14 6

LOAN ACCOUNT.

		£ s. d.
1910. Mar. 31.	To Balance	42,108 19 9
		£42,108 19 9

		£ s. d.
1909. April 1.	By Balance due to Loans to Local Bodies' Account ..	12,125 2 11
„ 16.	Advance from Loans to Local Bodies' Account, under clause 4 of the Hauraki Plains Act, 1908 ..	1,000 0 0
May 7.	Ditto	5,000 0 0
July 6.	„	5,000 0 0
Sep. 20.	„	1,000 0 0
Oct. 16.	„	2,000 0 0
Nov. 15.	„	5,000 0 0
1910.	Interest on above to 31st March, 1910	983 16 10
Mar. 21.	Advance made by New Zealand State-guaranteed Advances Office	5,000 0 0
„ 31.	Ditto	5,000 0 0
		£42,108 19 9

REPORT UPON HAURAKI PLAINS DRAINAGE OPERATIONS FOR YEAR ENDED 31ST MARCH, 1910, BY THE DISTRICT SURVEYOR IN CHARGE.

Thames, 25th April, 1910.

SIR,—

In this my first annual report since taking control of drainage and survey operations, I would briefly state that on Mr. William C. Breakell, C.E., retiring from the service on the 30th September, 1909, I was appointed as District Surveyor in Charge of Drainage-works and Surveys, and, working under your instructions, have controlled same as from the 1st October, 1909. Mr. G. H. Purchas has been associated with me as Engineer in Charge of Drainage-works as from the same date.

I have to report that the various operations carried out during the past year have been very successful both as regards drainage and survey branches.

Many other works of an experimental nature have also been undertaken, and in the great majority of cases have been entirely successful.

There has been sufficient work done to date to clearly demonstrate the fact that the expenditure so far undertaken has been more than justified; that the ultimate successful settlement of the whole

of the lands contained within the Hauraki Plains is assured, and that this area will in the future carry a very large population.

Naturally it will be some years before the whole area is brought in, for the reason that not only have we to cope with our own waters, but have also to provide for the waters being sent down the Piako and Waitoa Rivers by Drainage Boards away to the south of the Crown Lands.

Another point to be taken into consideration is the silting up of the Waihou River. It is very evident that when this river is in flood a large volume of water finds its way across country to the Piako River, and will continue to do so until protective works are built, or the silting question is successfully solved.

It will be necessary to build continuous stop-banks on both banks of the Piako River, at least as far south as the junction of that river with the Waitoa River; and I propose that this shall be done—when the time arrives—by the dredges widening and deepening the river. The spoil will be used to build the stop-banks. This is the most economical way to deal with both matters, as the sectional area of the river will be increased, and in flood-time the waters will be confined between the stop-banks.

As the work of snagging and clearing out the upper reaches of the Piako and Waitoa Rivers proceeds, a larger volume of water must come down, but it will be disposed of more rapidly. The completion of the Maukoro-Waitakaruru Canal and Puhanga Canal will be the main factors in taking the overflows in flood season, and will greatly supplement the above scheme of stop-banks, &c.

Dredges.

Both dredges have been employed throughout the past year in cutting practically a new entrance from the Hauraki Gulf to the northern mouth of the Maukoro-Waitakaruru Canal. The old channel was extremely tortuous and quite unsuitable for navigation, and the new channel has been of great benefit in every way. Some dredging was done at the south end of this canal, but I did not consider it advisable to continue the work, as it created rather a *cul de sac*, and tended to give a lead for the flood-waters on to the peat country.

The mouth of the Awaiti Stream was also deepened, and many silt-deposits removed.

New steel chutes are now being erected on dredge No. 2, and I feel certain they will prove entirely successful in getting rid of the spoil. I anticipate a large saving in this connection, as the chutes will be used to build stop-banks and also roads along the canals. The new dredge-buckets, which will arrive very shortly, will be of great service. Although their capacity is one-third less than those now in use, yet more lifts will be made per diem. There will also be far less wear-and-tear on the engines, as the united weights of the new bucket and spoil will be very much lighter than before; and a corresponding gain will be made through less suction being experienced.

Maukoro-Waitakaruru Canal.

The above canal, as shown on the accompanying plan, has now reached another stage. Some 80 chains of channel leading to its northern end had to be dredged before the dredge could get to work at the canal-mouth. There has now been dredged some 50 chains in length by 40 ft. in width to a depth at low water of about 4 ft. Beyond this for a distance of 105 chains the canal-route has been stripped to its full width of the peat lying on the alluvial deposit. The average depth of stripping is about 5 ft., and the material was sent out to sea by sluicing. The spoil dredged up is being used to form roadways on either side of the canal. The adjacent lands have been greatly benefited, and flax is coming on well. Some little work was done at the south end; but I did not consider it advisable to go on with it, more especially as a dredge was required at the Puhanga Canal. A dam will shortly be built so as to lift the dredge to a higher level, and thus save depth of cutting.

Puhanga Canal.

Tenders are about to be invited for the cutting of this canal as an overflow only. The formation will be 1 ft. below high-water mark, and the width at the bottom 40 ft. by an average depth of 6 ft. I am of opinion that it will probably prove unneccessary to further deepen this canal, as the proposed cross-section should prove sufficient to carry off the flood-waters, and there is little doubt that in time the scour will materially deepen it. Dredge No. 2 will, however, dredge out some 5 chains of the canal at the northern end, so as to give the water a lead into same, and the mouth will be bell-shaped. It is not desirable to make this canal altogether navigable, as in the dry season the utility of the Piako River for navigation would be greatly impaired. The same applies to the Maukoro-Waitakaruru Canal as regards a couple of miles at the southern end.

Works performed.

The following works have been done during the past year by means of co-operative contracts: New drains, 56¾ miles; road and track formation, 27½ miles; stop-banks, 13½ miles; drains deepened and widened, 18½ miles; fencing, 3½ miles.

With reference to the stop-banks, a great deal remains to be done in the way of raising and strengthening same so as to meet all possible contingencies of a severe flood. I anticipate having all the stop-banks adjoining the lands to be offered for selection on 13th May next complete by the spring. Generally all roads and drains will be also greatly improved by that time.

The following works were done by day-labour, the nature of same being rather disjointed, and not lending itself to the co-operative principle: Stripping Maukoro-Waitakaruru Canal 40 ft. wide, and making road-bank 2 miles; combined stop-banks and drain-widening, 1¾ miles; road-formation, 40 chains; deepening and widening drains, 2¾ miles; felling and clearing of roads 1 chain wide, 7½ miles; sluicing and deepening drain on Puhanga Canal, 30 chains; fencing, 60 chains.

Flood-gates and Flappers.

Four large double-door flood-gates and five double flappers have been placed in position, and others are now in course of construction. Iron doors have lately been used on same with excellent results.

Wharves.

Two wharves have been erected during the year, and another is under construction. Improvements have been effected to jetties already erected, and several service wharves will be built later on, as it is more economical to provide wharfage at fairly close intervals than to construct roads.

Bridges and Culverts.

Eight small bridges and six culverts have been erected, and the material is on the ground for as many more.

Buildings.

One cottage and three sectional huts for workmen have been erected during the year, and one iron hut built at Orchard, which will be used later on as a goods-shed. A cookhouse and drying-shed were also built at Waitakaruru, and revenue is being obtained from the former. A goods-shed was also erected at Shortland Wharf, and general improvements effected on all existing buildings.

Private Telephone-line.

In accordance with authority issued, some fourteen miles of telepone-line has been erected between Waitakaruru and Kerepeehi. The line is very substantial, all poles being of heart of totara, and tapered. Cables were also laid across the Piako River and the main canal, and lightning-guards placed on same. Five telephone-stations are on the route, and all the works are in immediate touch by telephone with the Thames Office. The saving in time is very great, and the convenience to all concerned is of undoubted benefit.

Water.

Constant supplies of water were conveyed to the various works by the Department's steamer and launches, and, as a result, no sickness was experienced on the works through men drinking inferior water.

Flax Areas.

Some eleven flax-areas were traversed and estimated during the past year, and on three of these the cutting-rights were let. Unfortunately one area was badly burnt out about one week after the letting of the same. The experimental flax areas planted eighteen months ago appear to be coming on well, and, generally speaking, the drainage operations have brought much flax to light on areas where it was previously not seen at all. It is anticipated that a fair revenue will be obtained from these sources.

Artesian Bores.

Arrangements were made with Messrs. Mounce and Sutcliffe to put down bores on the plains, and up to date two bores have been sunk to a depth of about 393 ft. each. The bore at Pipiroa gave flows varying from 200 gallons to 34,500 gallons per day at different depths. The deepest flow showed a temperature of about 92° Fahr., and the water was of a soda nature. The proportion of sodium-bicarbonate seemed to increase with the corresponding greater depths.

The bore at Orchard is at a depth of 435 ft., and the highest temperature found was 73° Fahr. There was apparently not such a large proportion of sodium-bicarbonate in this water.

Generally speaking, the first flows found are quite palatable and fit for human consumption. However, as regards a water-supply for stock, the artesian water found quite clears up this question, as stock are fond of the water, and do very well on it.

Another bore is now about to be put down at Waitakaruru. I feel certain from the foregoing experiments that the artesian water is general, and I find that the flows will rise 12 ft. above the surface of the ground.

Another interesting result of the boring operations is that the geological formation of the plains is now made known, and shows that for the first 25 ft. to 35 ft. an alluvial deposit is found, and under that about 370 ft. of pumice sand (coarse and fine), the whole resting on rhyolitic rock.

Schedules giving the class of material met with during boring operations are attached.

As regards analyses of the various waters, I am waiting a little time to allow the bores to clear themselves somewhat, and will then forward samples duly labelled. There is also a gas issuing from the bores which can be lit, and I intend to make a small experimental gas-holder to see if it is possible to get any lighting results on a small scale.

Fires.

Very little damage was done from this cause, as incipient fires were taken in hand early, special instructions having been issued to all workmen to use every effort to suppress same.

Grass.

Some 400 acres has been sown in grass during past year, and the seed has come up very well, more especially the clovers.

Another 400 acres of burnt country will be sown early. Kentucky blue-grass will also be sown on all stop-banks, as it is particularly suitable for this purpose.

Cattle.

The cattle purchased during the past year numbered some 550, consisting of steers, cows, and heifers. The first two lots were brought by a scow, but the last herd was driven overland to the ground, the animals arriving in better condition than those sent *via* the sea.

The stockmen, since taking charge of the cattle, from October last, have been assiduous in their duties, and no losses have been reported. I anticipate a substantial profit at the clearance sale of stock to be held on the 19th May next. The presence of the cattle has been of great benefit to the land, having consolidated it greatly in many ways. Even if the Department only realised the cost of stock, the experiment would have proved successful, not only for the above reason, but also on account of the advertisement the property has obtained through the public seeing the excellent condition the cattle are now in. A more suitable object-lesson could not be found as to the ultimate value of the lands.

Surveys.

Three survey parties have been at work during the past year, and their energies have been fully taxed. Before any subdivisional scheme could be drawn out, some 140 miles of existing drains and stop-banks had to be traversed. I am pleased to say that very little of the existing drains was wasted.

Up to the 31st March, 1910, some 16,881 acres has been subdivided into 106 rural sections, 45 township sections, 30 suburban sections, and 19 reserves for various purposes.

The plans are almost complete, and a tracing for photo-lithographic purposes has also been made.

In addition to the above, many of the Crown awards were also cut out, and some ten miles of road on the eastern side of the Piako River was also laid out to give access to Turua, Paeroa, &c. Some of these roads were taken under warrant, and others under the Public Works Act.

Land now ready for Selection.

An area of 16,398 acres is to be offered about the middle of May next, and the valuation of same totals £75,660.

This is very satisfactory, and is a fair value in every instance. I am very sanguine of a record number of applications being received for all sections, especially as the land is to be opened under the optional system.

As you are aware, all the works are not complete, but will be so by the spring. The fact of the Department maintaining and improving all drains, &c., for two years on the area to be opened should prove very satisfactory to the fortunate selectors. The country has also been greatly improved by the stock running on the same.

The financial aspect proves that your early expressed opinion has been fully justified, and that the Dominion has a very valuable asset in the Hauraki Plains.

Land proposed to be opened.

Regarding land that can be made available during the current financial year, I estimate the area at, say, 12,000 acres, which will come in the following order: 4,300 acres on eastern side of Piako River; 2,000 acres in the locality of Waikaka; and 5,700 acres at extreme southern end of Hauraki Plains. Preparations are in progress for the suitable draining of these areas, and a great deal of the work is now in hand. These areas are all good land, and should command keen competition. The first-mentioned area will be ready by late spring, and the others by early autumn. Of course, everything depends upon a good season being experienced for the drainage operations.

Main Arterial Roads.

The roads shown on the plan do not cover all those necessary in this direction, but I consider it better that such proposals should be shown from year to year, as many circumstances have to be taken into consideration in laying them off.

Carriage of Stores and Timber.

During the past year the Department purchased the s.s. "Hauraki," and this vessel has been steadily engaged carrying timber and all stores to the various works on the Hauraki Plains, from both Thames and Auckland.

Three oil-launches are also engaged on the various works, and are in active commission every day on the rivers and streams.

Principal Works proposed.

The principal works to be carried out during the current financial year are as follows:—

1. The completion of stop-banks, flood-gates, culverts, bridges, wharves, and roads immediately connected with the area to be opened next May.
2. The continuance of dredging operations on Maukoro–Waitakaruru Canal, this work being the key to the whole scheme.
3. The construction of overflow on Puhanga Canal, which work affects the ultimate success of drainage-works.
4. The formation of roads between Kerepeehi and Turua to open up further Crown lands.
5. The construction of outfalls through Crown lands to enable the Waitoa Drainage Board to carry out their drainage proposals. This work will also open up our own country for settlement.
6. The further construction of stop-banks along the Piako River, together with necessary wharves, &c.

7. The construction of outfall through Te Whanake Blocks.

8. The snagging and clearing of upper reaches of Waitoa and Piako Rivers, such work to commence in October next.

9. The construction of the necessary drains to bring land into a fit condition for settlement.

There are also many minor works to be carried out, which, although in themselves of a small character, yet are very necessary to the successful issue of all general operations.

General.

The accompanying plan shows in distinct colours, &c., the present state of operations, and the reference-notes thereon clearly distinguish the various classes of drainage-works, lands now ready for selection, and future proposals in this connection.

In conclusion, I have every confidence in stating that the success of the drainage scheme is now assured, and that ultimately every acre of the Hauraki Plains will be rendered productive.

I have, &c.,

J. B. Thompson,

District Surveyor in Charge of Hauraki Plains Works and Surveys.

The Under-Secretary for Lands, Wellington.

ARTESIAN BORES.

Pipiroa.

Depth in Feet.	
0 to 30.	30 ft. blue and grey mud with shell.
36.	6 ft. of fine sand.
76.	40 ft. of soft pumice sand.
79.	3 ft. of blue mud.
159.	80 ft. of pumice-and-mud mixture.
179.	20 ft. of rough pumice and sand.
189.	10 ft. of blue clay.
191.	Flow of 200 gallons per day of soda-water.
197.	8 ft. of hard fine sand.
202.	5 ft. of sand.
206.	4 ft. of peaty swamp.
220.	14 ft. of blue mud.
236.	16 ft. of sand.
256.	20 ft. of soft grey mud.
268.	12 ft. of pumice and clay.
278.	10 ft. of clay (chalky).
285.	Flow of 14,400 gallons per day of soda-water.
301.	23 ft. of clay (chalky).
304.	3 ft. of sand.
316.	12 ft. of pumice.
356.	40 ft. of white clay.
388.	32 ft. of white clay and pumice.
383.	Flow of 34,500 gallons per day of hot soda-water, 89° to 93° Fahr.
391.	3 ft. of hard sandstone rock.

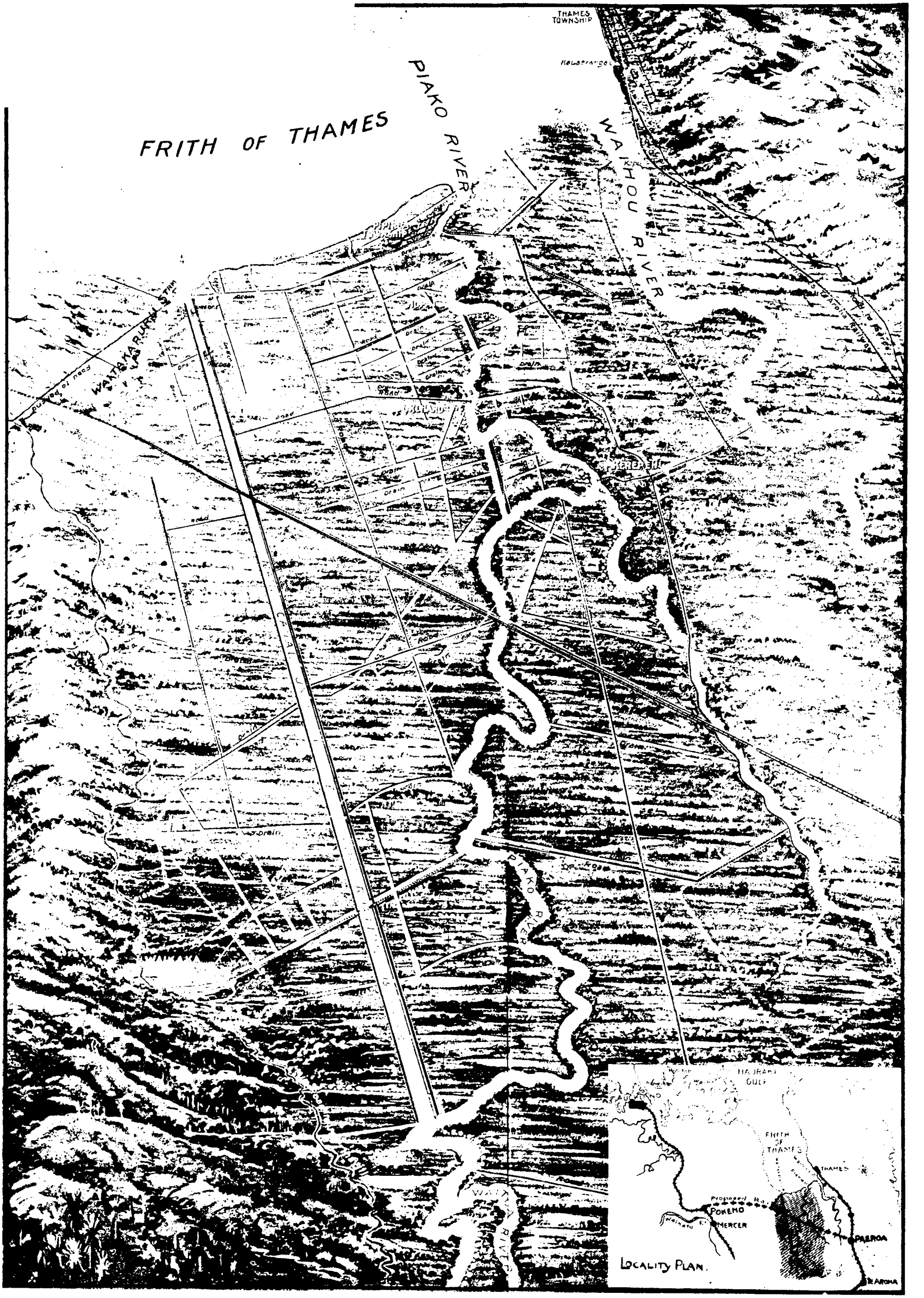
Orchard.

0 to 5.	5 ft. shell and mud.
11.	6 ft. blue mud.
21.	10 ft. hard sand.
23.	2 ft. peaty mud.
26.	3 ft. rough pumice.
46.	20 ft. slaty-coloured mud.
63.	17 ft. sandy pumice.
103.	40 ft. sandy pumice.
105.	2 ft. blue mud.
108.	3 ft. hard sand.
111.	3 ft. soft mud.
112.	1 ft. peaty mud.
117.	5 ft. pumice and clay.
137.	20 ft. sand (flow, 2,000 gallons per day).
167.	30 ft. sand.
169.	2 ft. peaty mud.
170.	1 ft. sand.
175.	5 ft. blue mud.
195.	20 ft. blue mud.
206.	11 ft. sand.
208.	2 ft. mud.
218.	10 ft. hard sand.
220.	2 ft. mud.
250.	30 ft. sand (flow, 3,000 gallons per day).
252.	2 ft. mud.
266.	14 ft. sand.
272.	6 ft. mud (flow, 2,000 gallons per day).
284.	12 ft. sand.
291.	7 ft. clay.
300.	9 ft. sand (flow, 4,000 gallons per day).
315.	15 ft. mud.
335.	20 ft. sand.
338.	3 ft. slaty clay.
340.	2 ft. sand (pumice).
354.	14 ft. sand.
357	3 ft. peaty mud.
368.	11 ft. sand.
388.	20 ft. sandy pumice.
404.	16 ft. fine sand.
408.	4 ft. peaty mud.
423.	15 ft. rough shingle.
435.	12 ft. clay (flow, 24,000 gallons per day).

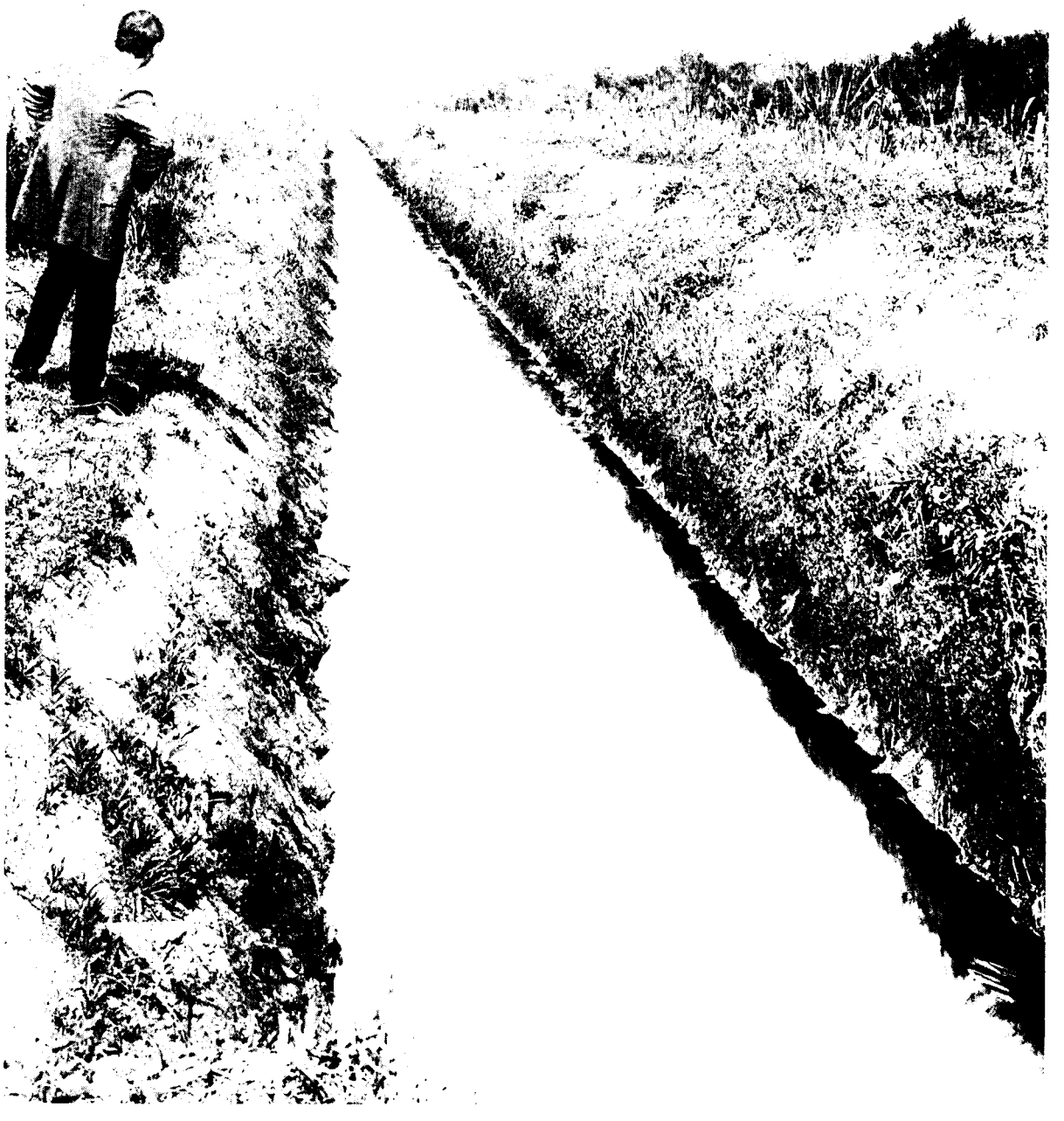
Approximate Cost of Paper.—Preparation, not given; printing (1,600 copies, including map and illustrations), £10 10s.

By Authority: John Mackay, Government Printer, Wellington.—1910.

Price 6d.



BIRD'S-EYE VIEW OF DRAINAGE WORKS.



One of the Drains.

Puhanga Canal.

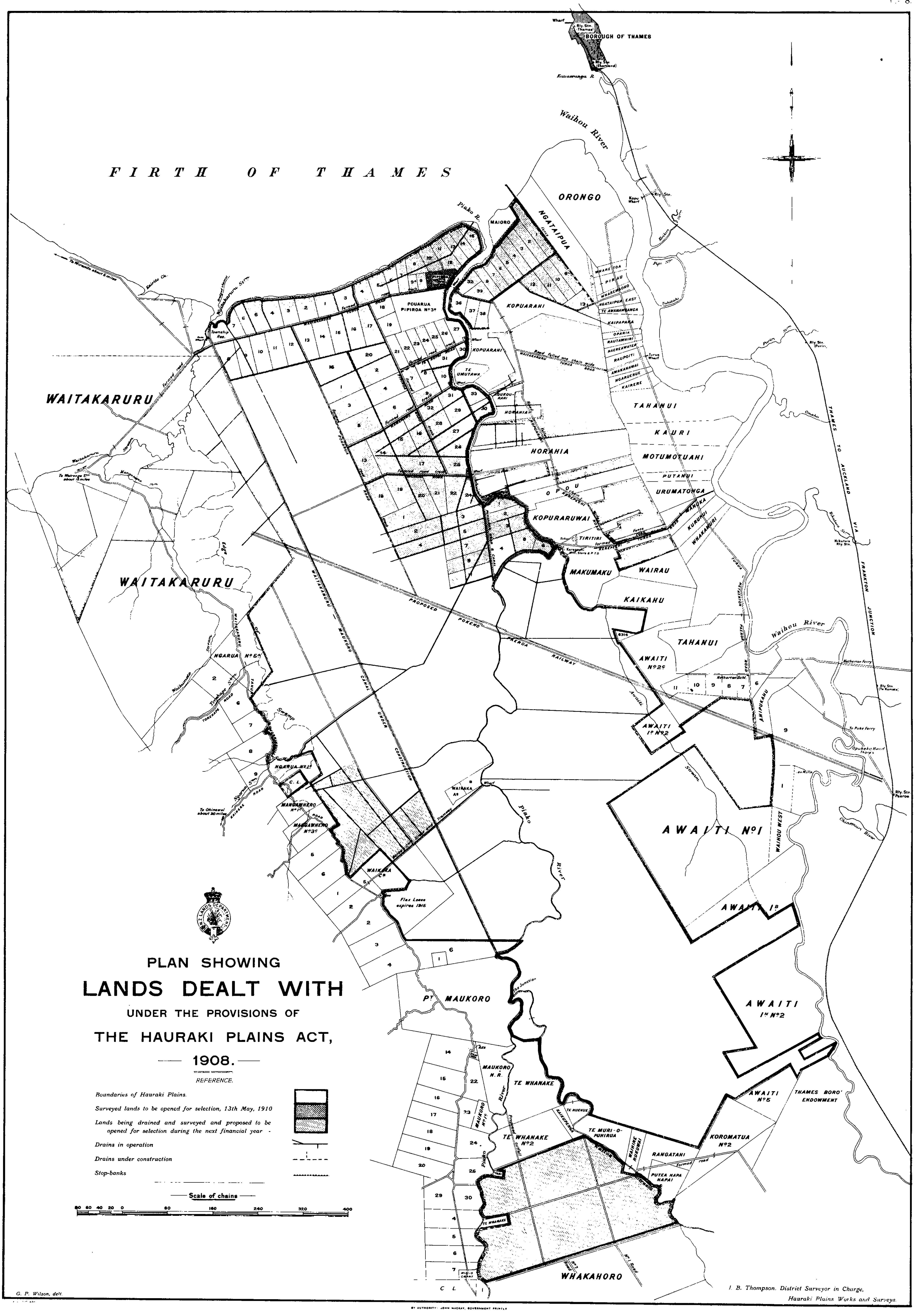
Stripping and Clearing Drains.

Stripping and Clearing Drains.

Sheeting and Clearing Drains.

One of the Drains.

Stripping Main Canal



PLAN SHOWING

LANDS DEALT WITH

UNDER THE PROVISIONS OF

THE HAURAKI PLAINS ACT, 1908.

REFERENCE.

Boundaries of Hauraki Plains.	
Surveyed lands to be opened for selection, 13th May, 1910	
Lands being drained and surveyed and proposed to be opened for selection during the next financial year -	
Drains in operation	
Drains under construction	
Stop-banks	

Scale of chains

80 60 40 20 0 80 160 240 320 400

G. P. Wilson, delt.

I. B. Thompson. District Surveyor in Charge, Hauraki Plains Works and Surveys.

By Authority: John Mackay, Government Printer.