

1925.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.

DRAINAGE OPERATIONS IN HAURAKI PLAINS.

REPORT FOR THE YEAR ENDED 31st MARCH, 1925, 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 and Survey, Wellington, 12th June, 1925.

I have the honour to present herewith the report of the Chief Drainage Engineer on operations carried out during the past year on the Hauraki Plains in accordance with the provisions of the Hauraki Plains Act, 1908.

I have, &c.,

J. B. THOMPSON,

The Hon. A. D. McLeod, Minister of Lands.

Under-Secretary for Lands.

REPORT OF CHIEF DRAINAGE ENGINEER.

SIR,—

I have the honour to submit herewith the seventeenth annual report on the construction, operation, and maintenance of the Hauraki Plains drainage system for the year ending 31st March, 1925.

The winters of the years 1923 and 1924 were remarkable for the excessive rainfall and the intensity of the storms. The average yearly rainfall at Kerepehi for the past nine years is 44.32 in., the total fall for the last year being 52.56 in., rain falling on 156 days. The following schedule gives rainfall figures at Kerepehi for the past nine years :—

Year.	Total Rainfall.	Wettest Month, and Fall.	Driest Month, and Fall.
1916-17	55.57 in.	Nov., 1916—6.65 in.	Jan., 1917—0.65 in.
1917-18	46.41 in.	April, 1917—5.67 in.	Dec., 1917—2.18 in.
1918-19	41.02 in.	Oct., 1918—7.47 in.	Feb., 1919—1.34 in.
1919-20	34.85 in.	Feb., 1920—6.10 in.	Dec., 1919—0.89 in.
1920-21	35.93 in.	Sept., 1920—5.10 in.	Feb., 1921—0.72 in.
1921-22	46.34 in.	Feb., 1922—6.62 in.	Nov., 1921—1.34 in.
1922-23	33.81 in.	Jan., 1923—4.14 in.	Mar., 1923—1.72 in.
1923-24	52.42 in.	April, 1923—9.76 in.	Nov., 1923—1.81 in.
1924-25	52.56 in.	April, 1924—8.55 in.	Mar., 1925—1.36 in.

Severe storms last May produced floods in the Waihou and Piako Rivers, which caused damage where the present incomplete protective systems do not yet provide permanent protection from overflow. An area of approximately 5,000 acres of occupied Hauraki Plains land, representing about one-eighth of the settled area, was flooded, necessitating the removal of stock. The settlers generally accepted these trying conditions with characteristic fortitude, and an encouraging development was the remarkable recovery of the pasture on return to normal conditions. In spite of the unfavourable conditions the farmers have experienced a successful season. Returns from the factories handling the most of the dairy-product of the plains continue to increase. The butter output was approximately 4,139,520 lb., and cheese 2,349,760 lb., for the year. The value of stock sold at Ngatea, Turua, Waitakaruru, and Patetonga was approximately £33,842. Water transportation of produce

and goods between the Piako River and Auckland, exclusive of coal, shingle, timber, &c., amounted to 8,319 tons. Peat lands in the district have in the past produced some remarkable returns of flax, and there are indications that the suitability of certain classes of peat lands for flax-production is becoming more generally recognized. There are four flax-mills at present operating in the district, and the combined output of hemp for the year was 1,014 tons and 127 tons of tow.

A recent development of importance is the formation of the Horahia Drainage Board to control the area, comprising approximately 13,000 acres, lying to the east of the Piako River and north of Kerepechi. The work for the reclamation of swamp land such as the Hauraki Plains necessarily falls into two phases. The work first planned and constructed provides a degree of agricultural drainage and public utilities sufficient to permit settlers to obtain cheap land capable of being profitably worked, and with possibilities for future development. After a period of years during which closer settlement follows development of the land there comes a demand for a greater degree of agricultural drainage. This stage has been reached in the area handed over to the newly constructed Horahia Drainage Board on the 15th November last. The sale price of this land to the original selectors was £5 to £7 per acre free of capital charges for drainage and roading, and the future policy of the settlers in the district should be directed towards perfecting the improvements and so increasing the production of the land.

DREDGES.

The principal work done by the Drainage Branch during the year has been construction, enlarging, and deepening of canals, river-improvement works, and stop-bank construction with the dredges of the Department. The existing plant was strengthened by the addition of another large steam dipper dredge, which was assembled on an 80 ft. kauri pontoon constructed at Kerepechi, and commenced work during the year. The nine dredges operating during the year excavated 822,286 cubic yards of material at an average cost of 5·86d. per cubic yard, a very creditable output. The average daily output is nearly 3,000 cubic yards.

The following table shows the amount of spoil dredged and machine-excavated, and cost per cubic yard, for the past ten years :—

Year.	Cubic Yards.	Cost per Cubic Yard.	Year.	Cubic Yards.	Cost per Cubic Yard.
1915-16	146,905	3·35d.	1920-21	158,865	7·42d.
1916-17	161,674	3·40d.	1921-22	246,022	7·29d.
1917-18	130,664	2·53d.	1922-23	440,092	8·20d.
1918-19	125,196	4·87d.	1923-24	508,654	7·27d.
1919-20	138,310	6·90d.	1924-25	822,286	5·86d.

No. 1 Priestman dredge has been dismantled, and the pontoon repaired on the slipway recently completed at Kerepechi. When reconditioned this dredge, which has seen over fifteen years' service, will be a very efficient plant.

No. 2 Priestman dredge is operating in difficult country on the Maukoro Canal. Forward progress has been much delayed by the caving-in of the banks, and the dredge has been mainly engaged in enlarging the existing canal to allow time for consolidation at the face. A large timber dam with earth filling, constructed last year, carried away, and was reconstructed farther up-stream by the dredge crew. The dredge is working two shifts, and excavated 36,174 cubic yards for the year, at a unit cost of 10·47d.

No. 6 Priestman dredge was recommissioned early last year after complete overhaul and mechanical alterations, and has been enlarging the Piako River channel between Kerepechi and Ngatea. The work is tidal, and the dredge has been equipped with acetylene lights for night-work. The output for the year was 62,500 cubic yards, at a cost of 5·97d. per cubic yard.

No. 11 Kingston dredge was also engaged on river improvements between Kerepechi and Ngatea. An electric-lighting unit has been installed on this plant for night tidal work. The quantity excavated during the year was 80,300 cubic yards, and the cost 6·04d. per cubic yard.

No. 15 Bucyrus drag-line has completed the widening of the Puhanga Canal, and is now building embankment for road and flood protection on the Piako River between the Puhanga Canal and Kaihere Landing. Working two ten-hour shifts daily, this plant handled 105,480 cubic yards of spoil at a cost of 7·60d. per cubic yard.

No. 16 Bucyrus drag-line is widening the Awaitei Canal and building road-embankment with the spoil. This machine has also been equipped with electric light, and is now working two shifts. The output for the year was 84,816 cubic yards, at a cost of 6·39d. per cubic yard.

No. 19 Michigan walking dipper dredge has been constructing collecting-ditches on the Awaitei Canal. This machine has been strengthened structurally, and provided with new 45 ft. boom built on the works, and is now doing very good work. The total quantity excavated was 57,968 cubic yards, at a cost 7·40d. per cubic yard.

No. 20 Rood land dredge has been extending the Piako River stop-banks southwards from Kaihere, and is now constructing large ditches on the Kerepechi Block. The very creditable performance for the year was 88,888 cubic yards of excavations, at an average cost of 6·45d. per cubic yard.

No. 23 American steam dipper dredge has made remarkable progress on the Awaitei Canal. For a total period of 245 working-days of eight hours the average daily output was 859 cubic yards, and the total output for the year 210,450 cubic yards, at an average cost of 3·65d.

No. 24 American steam dipper dredge is a recent addition to the plant, and commenced work in September, but owing to a defective casting had to be partially dismantled after three weeks' work. Since resuming work in November the dredge has been removing sand deposits in the Waitoa Canal. The quantity excavated was 95,710 cubic yards, and unit cost 4·53d. per cubic yard.

CENTRAL DISTRICT.

In this district a road-forming outfit, consisting of tractor, grader, disc, and scoop teams, has made good progress with the formation of new roads on the western embankment of the Pubanga Canal, and filling bridge approaches and culvert excavations. A mile and a half of 3-ft.-gauge tramway was laid to complete six-mile line for ballasting the Torehape Road, and 6,330 cubic yards of clay was delivered by means of this tramway along the deep peat section of the Torehape Road. In addition the hill section, of about 26 chains, was formed. Maintenance and improvements to drains and stop-banks have been carried out, and, where necessary, new drains dug. 332 cubic yards of gravel and 1,984 cubic yards of metal were delivered for metalling the Kaihere Road from the landing westward: 80 chains of this road was formed, and a section of about 30 chains of road-embankment, which had subsided below permanent grade owing to the compacting and lateral displacement of the marsh on which it is built, necessitated the carting of 9,524 cubic yards of filling. 1,479 white-pine logs were cut, hauled, and used for piling weak places in the canal-banks, earthwork timbering, and other purposes.

In the Kerepechi Block 100 chains of road and road-embankment was formed, and a large amount of stop-bank and other earthwork carried out, and 1,647 cubic yards of metal was laid on the Kerepechi-Kaihere Road: 53 chains of street-formation was completed at Kerepechi Township, which is the headquarters for a large number of men employed on various construction jobs, receiving and distributing stores, fuel, and supplies at the depot, and repair work in the workshops and yards.

WAITAKARURU-PIPIROA DISTRICT.

A heavy road-construction outfit, comprising two tractors, and graders, plough, disc, and scoop teams, has been employed on road-embankment on the western side of the Maukoro-Waitakaruru Canal. A distance of 1 mile 50 chains was completed. The stop-banks on the Piako River and a section of the foreshore have been strengthened, a distance of 7 miles 43 chains being completed. A large drain is under construction for the purpose of diverting the drainage of the area between the Pouarua Road and Waitakaruru-Maukoro Canal into the canal, and is effecting a marked improvement in the drainage-outlets leading to the foreshore and the Piako River. Of this, 1 mile 60 chains has been completed. About 38 chains of timber fluming is being constructed for the maintenance of the Apple-tree outlet through the mud-flats on the foreshore.

PATETONGA, AWAITI, AND TAHUNA DISTRICTS.

The principal works carried out in these districts have been drain improvements and maintenance. A large amount of earthwork is being carried out with dredges, teams, and manual labour in the Awaitei district. About 25 chains of the Mangawhero Road was formed, and 1,267 cubic yards of clay carted for repairs to the Patetonga and Mangawhero Roads. A daily goods service has been maintained on the Patetonga Tramway, and freights collected amounted to £822 2s. 6d. A large two-barrel flood-gate is being constructed by the Department for the Waitoa Drainage Board near Tahuna.

KOPUARAHU DISTRICT.

This district is now controlled by the Horahia Drainage Board. Prior to the Board taking control the drains were cleaned by the Department and some improvement works carried out. The scheme of drainage-improvement works carried out by the Department in the Horahia-Opou special-rating area was practically completed during the year.

ROADS.

Satisfactory progress was made with new road-formation during January, February, and March of this year. In the peat lands 17,121 cubic yards of clay and 1,322 fascines were carted for road formation and repairs. As funds for the metalling of roads were in some instances limited to subsidies of £2 to £1, metalling had to be curtailed, as the amounts required from the County Council were not provided.

The total quantity of metal and gravel received during the year was 3,963 cubic yards, for the following roads:—

	M. ch.
Kerepechi-Kaihere Road	0 70
Kaihere Landing Road	1 17
Total	2 07
The following roads were formed:—	
Kerepechi Block	1 20
Kaihere Landing Road	1 00
Torehape Road	0 26
Mangawhero Road	0 25
Kerepechi Township streets	0 53
Waitakaruru-Maukoro Canal Road	1 50
Total	5 14
The following peat roads were ballasted with clay:—	
Torehape Road	Cub. yd. 6,330 2 5
Kaihere Landing Road	9,524 1 50
Mangawhero Road (filling in holes)	20
Patetonga South Road	1,247 1 10
Totals	17,121 4 65

DRAINS.

The total length of new drains constructed during the year was 19 miles 52 chains, and the total constructed by the Department since the inception of the scheme 569 miles 13 chains.

An unusually large amount of ditch-improvement was carried out, and with few exceptions the drainage ditches throughout the whole area are in very good condition.

Details of subsidiary drainage construction and maintenance are :—

Drains cleaned :—						M.	ch.
Day labour	..	..	..	..	..	82	16
Piecework contracts	..	..	..	..	..	149	60
Total	..	..	..	..	..	231	76

Drains widened and deepened :—						Excavation. Cub. yd.	
Day labour	..	..	..	..	..	40,294	25 57
Piecework	..	..	..	..	..	94,301	31 50
Totals	..	..	..	..	..	134,595	57 27

Stop-bank improvements :—							
Piecework contracts	..	..	..	..	..	16,401	9 0

New drains :—							
Day labour	..	..	..	..	..	3,788	1 36
Piecework contracts	..	..	..	..	..	42,648	9 36
Excavating-machines	..	..	..	..	..	146,856	8 60
Totals	..	..	..	..	..	193,292	19 52

BUILDINGS.

An addition was made to office buildings at Kerepeehi, and the motor-truck shed enlarged. The floating quarters for No. 1 dredge were converted into a workman's hut. Six residences, four wharfs, and eight huts were painted during the year. The total number of buildings connected with the work is—Houses and small cottages, 21; double huts, 15; single huts, 24; sheds, 24; quarters for staff and workmen, 3; workshops, 2.

Rents received for huts and residences during the year amounted to £490 15s. 5d.

PLANT AND MACHINERY.

The construction of No. 24 steam dipper dredge was completed during the year, and also floating quarters for No. 19 dredge. A small kauri coal-pontoon, 24 ft. by 8 ft. by 2 ft. 4 in., and three dredge-boats were also constructed at the Kerepeehi yards, where a large pontoon, 65 ft. by 21 ft. by 5 ft. 1 in., is now under construction. A permanent slipway capable of docking the large dredge-pontoons has been constructed at Kerepeehi, and has been in constant use for the repair of metal barges, dredge-pontoons, and other floating plant, and a large staff is constantly employed in the fitting and erecting shop on repair and other work.

In addition to the ten dredges, the plant comprises one steam-tug, seven launches, two metal barges, three general-service barges, four tractors, one motor-truck, well-equipped machine-shop, and large road- and general-construction outfit.

WHARVES AND BRIDGES.

Minor repairs were carried out to wharves and bridges. Two small hardwood road-bridges were constructed, and pile abutments substituted for sills in three road-bridges. The Department has also maintained in good order its fifteen wharves on the Piako River, and one at Waitakaruru. These wharves are used free of charge by the settlers and general public, and it now appears time to take into consideration the imposition of dues for all cargo shifted and storage charges for goods left in the Department's sheds.

CONCRETE STRUCTURES.

One small ferro-concrete road-bridge and the following culverts and flood-gates were constructed during the year :—

Number.	Description.	Size of Openings.	Length.
1	Single-barrel box culvert with flood-gate and sluice-gate	4 ft. by 4 ft.	70 ft.
1	„ „	4 ft. by 4 ft.	19 ft.
2	„ „	4 ft. by 4 ft.	50 ft.
1	Two-barrel box culvert with flood-gates and sluice-gates	4 ft. by 4 ft.	50 ft.
1	„ „	4 ft. by 4 ft.	44 ft.
1	Concrete dam with two flood-gates	4 ft. by 4 ft.	..
1	Concrete-pipe culvert with flood-gate	3 ft. diameter	60 ft.
1	Concrete-pipe culvert with flood-gate and sluice-gate	3 ft. diameter	72 ft.
1	Concrete-pipe road-culvert	3 ft. diameter	76 ft.
1	„ „	3 ft. diameter	24 ft.

SURVEYS.

Engineering surveys carried out during the year involved 19 miles of traverse and 84 miles of levels. Full use was made of the opportunities afforded for gauging flood-flow and collecting and recording hydraulic data.

The survey commenced last year for the purpose of determining the topography, soil-characteristics, and possibilities for reclamation of an area of about 35,000 acres was continued this summer, and is nearing completion. The general work consisted of running base-line levels and lines of levels 40 chains apart across the area from east to west, and determining depth of peat and subsoil conditions by borings at 10-chain intervals along these lines: 151 miles of levels, 1,420 borings, varying in depth to 30 ft., have been completed to the present time, and 30 miles of levels and 536 borings carried out during the year.

FLAX LEASES.

During the year an area of 897 acres was opened up for flax-culture. This is in the nature of an experiment, which will be watched with the keenest interest, and I am hopeful that the results of the flax-cultivation will come up to expectations. The flax revenue received during the year amounted to £239 7s. 9d.

VALUATIONS.

As stated in last year's report, it was decided to delay opening further areas until the land had had time to properly consolidate. As a consequence no land was opened during the year. The total area handed over (including permanent reserves) is 43,904 acres.

ARTESIAN BORES.

No bores were put down during the year. The number sunk to date is 219, the total cost being £7,185 6s. 8d., most of which is recoverable. Interest at 5 per cent. is charged on all amounts outstanding, and the total receipts for the year were—Principal, £340 6s. 4d.; interest, £116 9s. 7d.

GRAZING-AREAS.

The total area under temporary grazing tenancy is 5,437 acres, divided into five holdings, the annual rent amounting to £242 18s. The sum of £211 18s. 4d. was received during the year.

WORKS EXPENDITURE.

The total expenditure for the year was £78,917. Of this amount, £46,163 was paid out of Thames Imprest Account. Day labour (including dredge crews) amounted to £38,817, piecework contracts £13,013, and hire of teams £1,453.

FUTURE PROPOSALS.

The works at present in hand will be continued. They are principally Piako River improvements and stop-banks, Awaiti Canal construction, Waitoa River improvements, and also roading and subsidiary drainage.

GENERAL.

The field and office staff, with headquarters at Kerepeehi, is charged with the designing, computations, draughting, and surveying necessary for the execution of the field-work, also the payment of wages, preparation of specifications, contract vouchers, wages-sheets, and general office-work. I desire to express my appreciation of the manner in which employees in all branches have co-operated in carrying out the undertakings of the Department. The Engineer in charge is Mr. E. Taylor, M.N.Z.Soc.C.E.

I have, &c.,

O. N. CAMPBELL,

Chief Drainage Engineer.

The Under-Secretary for Lands, Wellington.

HAURAKI PLAINS SETTLEMENT ACCOUNT—*continued.*

BALANCE-SHEET AS AT 31ST MARCH, 1925.

[illegible]

The Valuer-General has been requested to value all unlet lands within the area and lands in process of reclamation.

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

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F I R T H O F T H A M E S



