

SESSION II.
1923.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.

DRAINAGE OPERATIONS IN HAURAKI PLAINS.

REPORT FOR THE YEAR ENDED 31st MARCH, 1923, 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, 5th June, 1923.
I have the honour to submit herewith the report on the drainage operations in the Hauraki Plains for the past year, in accordance with the provisions of the Hauraki Plains Act, 1908.
Attention is drawn to the table of spoil dredged for the past ten years, from which it will be seen that the amount dredged in the last twelve months was 78 per cent. greater than that of the preceding year, a result which is largely attributable to the use of the new American dredges, which were in full operation. The increase since 1913–14 was almost exactly 300 per cent., testifying to the activity of the Department's operations.
The total area opened is 42,166 acres, and it is hoped to open a further area of 2,600 acres during the current year.
The detailed report of the Chief Drainage Engineer is attached, together with a statement of accounts and balance-sheet.
I have, &c.,
J. B. THOMPSON, Under-Secretary.
The Hon. D. H. Guthrie, Minister of Lands.

REPORT OF CHIEF DRAINAGE ENGINEER.

SIR,—
I have the honour to present herewith the fifteenth annual report on the drainage operations and general development works on the Hauraki Plains. The report covers the work done during the year ending 31st March, 1923.
Very satisfactory progress has been made with the development works, and collateral activity in agricultural production has been very marked. The output from the factories handling the dairy-products of the plains has been 4,329,920 lb. of butter and 1,675,520 lb. of cheese. The value of stock-sales held at Ngatea, Waitakaruru, Patetonga, and Turua was approximately £34,500, and the amount of cargo carried to and from the Piako River was over 12,000 tons.
Weather conditions have been generally favourable to farmers, and the dry autumn experienced has been particularly satisfactory for the carrying-out of the various development works. Rain fell on 129 days during the year, and a total rainfall of 33·81 in. was recorded at Kerepeehi.
The following schedule gives particulars of rainfall for the past seven years :—

Year.				Total Rainfall.	Wettest Month, and Fall.	Dryest 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.

The average yearly rainfall for the past seven years was 41·99 in.

The following is a summary of the main features of the year's work :—

DREDGES.

Seven dredges have been engaged excavating canals and drains, constructing stop-banks, and dredging rivers. Next year this plant will be increased by the addition of three floating dredgers. One of these, a Kingston grab dredge, has just been assembled on a pontoon, 60 ft. long by 24 ft. beam, built on the works at Kerepeehi. This plant will be in commission as soon as the quarters for the crew are completed. A pontoon, 80 ft. long by 20 ft. beam, for a steam dipper dredge will shortly be launched, and material is on hand for a second plant of this type. During the year under review a total of 440,092 cubic yards of spoil has been excavated by these machines, at an average cost of 8-2d. per cubic yard.

No. 1 Priestman dredge has been operating in the Waitoa River, which now has been straightened and improved as far as the North Road, Tahuna Settlement. In the Kaikupenga cut heavy timber above a hard stratum made dredging very costly. Large quantities of sand brought down the Waitoa River are causing extensive silting in the dredge-channel, and the machine is now removing these deposits. This dredge excavated 42,504 cubic yards during the year.

No. 2 Priestman dredge has been working up the Maukoro Canal, and is now 3 miles 10 chains from the Waitakaruru road-bridge. The country along the canal route is rising rapidly, and the dredge is being elevated by dams, as the wet unstable nature of the land prevents deep digging. These dams are somewhat difficult to maintain, and are obstacles to the transport of coal, but nevertheless very fair progress has been maintained. The spoil excavated during the year was 52,360 cubic yards.

No. 6 Priestman dredge has been on the Awaiti Canal construction, and completed the cut on the south side of the Kerepeehi Block. Good excavating-material was encountered, and the output from this plant was 60,638 cubic yards.

No. 15 Bucyrus drag-line has been constructing stop-banks on the Piako River. This machine has been giving very satisfactory service, and, using a bucket of 1 yard capacity, has excavated 89,023 cubic yards.

No. 16 Bucyrus drag-line has been widening the Piako River and Puhanga Canal. Operating within a very limited space along a river-bank road which had to be kept open for traffic, the work of this machine is a proof of the adaptability of the type. Using an extension boom 50 ft. in length, with a half-yard bucket, and working two ten-hour shifts daily, this plant handled 80,337 cubic yards.

No. 19 Michigan walking-dredge has been constructing drains on the Kerepeehi Block. The output for the year was 53,204 cubic yards.

No. 20 Rood land-dredge has also been operating on the Kerepeehi Block, and 62,026 cubic yards of material was handled. This machine, like the Michigan dredge, is an excellent digger on firm ground, but difficult to handle in soft land.

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

		Cubic Yards.	Cost per Cubic Yard.			Cubic Yards.	Cost per Cubic Yard.
1913-14	..	147,740	3-20d.	1918-19	..	125,196	4-87d.
1914-15	..	176,196	2-67d.	1919-20	..	138,310	6-90d.
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.

CENTRAL DISTRICT.

The centre of operations is now at Kerepeehi, where an area known as the Kerepeehi Block, at the junction of the Awaiti Canal and the Piako River, is being dealt with. This block has been surrounded by levees, but the bank on the Awaiti Canal has yet to be raised to finished level. The internal drainage of the block is now completed, and a large three-barrel outlet equipped with flood-gates, and sluices constructed. The road-formation is being pushed ahead where the land is dry, but before the block is opened for settlement the low-water level at Kerepeehi must be lowered by extensive river-improvement works between Kerepeehi and Ngatea. The formation of the Kaikahu and Wairau Roads has been completed. 6,306 fascines and 9,504 cubic yards of clay were carted for formation of the Pouarua Road (southern section), and 2,724 fascines and 2,990 cubic yards of clay carted for formation of the eastern section of the Puhanga-Torehape Road. The formation of the stop-bank road along the northern bank of the Ngarua Canal is nearing completion, and a contract was let for the supply of 13,000 split black-birch sleepers for tramway to be used for the formation of the Puhanga-Torehape Road. The willows have been felled between Kerepeehi and Ngatea on both banks of the Piako River. The establishment of a central depot at Kerepeehi is progressing simultaneously with extensive and varied plant and machinery construction and repair work which is being carried out on the site. 1,757 cubic yards of metal were used for metalling the river-bank road from Ngatea Factory to Paul's Wharf, and 2,705 cubic yards delivered on to the Orchard East Road extension. For remetalling portion of the Orchard East Road, Kerepeehi-Ngatea Road, and Kerepeehi-Wharepoa Road 6,265 cubic yards of broken metal were used.

WAITAKARURU DISTRICT.

General repairs and maintenance work to roads, bridges, and drains have been attended to in this district and the adjoining Waitakaruru and Mahuta Settlement Blocks. In repairs to the Pipiroa-Waitakaruru and Ngatea-Pipiroa Roads 1,242 cubic yards of metal were used, and 3,309 cubic yards of spoil carted for the formation of the northern section of the Pouarua Road. On the eastern bank of the Waitakaruru-Maukoro Canal a temporary road has been formed for a distance of

216 chains, and good progress made with the permanent stop-bank road on the western bank of the canal. The Mahuta drain and several important outlets have been deepened, and 4,328 fascines and 4,291 cubic yards of spoil carted for road-formation at Torehape.

PIPIROA-KOPUARAHI DISTRICT.

In addition to the usual drain-maintenance, the following road construction and repairs have been carried out in this district: The Ngataipua Road was formed for a distance of 155 chains, repairs effected to the Kopuarahi and Turua Roads required 286 cubic yards of metal; 155 cubic yards of metal was used for repairs to Pipiroa Road.

AWAITI-PATETONGA-TAHUNA DISTRICT.

The Awaiti West Road has been metalled for a distance of 60 chains, 1,024 cubic yards of metal have been carted from the Paeroa Railway-station, and 278 cubic yards from Netherton Landing. The following quantities of spoil were carted for the formation of peat roads: Paeroa-Tahuna Road, 3,694 cubic yards; Whakahoro Road, 951 cubic yards; Mangawhero Road, 9,455 cubic yards; Patetonga Tramway Road, 5,395 cubic yards; Ngarua Road, 1,506 cubic yards spoil and 2,038 cubic yards gravel. Other undertakings include the deepening and cleaning of drains and road-maintenance. Freight for the cartage of goods on the Patetonga Tramway amounted to £741.

ROADS.

Under the provisions of the Hauraki Plains Amendment Act, 1922, the Crown lands previously exempt from general county rates now become rateable by the local bodies after being occupied for a period of five years. By a consequential arrangement with the Hauraki Plains and the Piako County Councils, control of 50 miles 48 chains of formed roads and 38 miles 43½ chains of metalled roads, originally constructed and hitherto maintained by the Department, is being handed over to these bodies. A feature of the year's work has been the extra attention given to these roads, and all the worn metal roads have been repaired or remetalled. In a district where perishable dairying-products must be transported summer and winter alike, the good metalled roads laid by the Department are an invaluable asset. The roads metalled during the year comprise 4 miles 30 chains, and 10,974 cubic yards of metal were used for remetalling and repairs.

For the construction and maintenance of roads through peat areas 44,510 cubic yards of spoil were carted and 18,069 fascines used. The total quantity of metal received during the year was 16,289 cubic yards.

The following is a schedule of roads metalled or remetalled during the year:—

New metalling—		M.	ch.	New roads formed—		M.	ch.
Ngatea to Paul's Wharf ..	..	1	9	Ngataipua Road ..	..	1	75
Orchard East Road ..	..	1	38	Shelly Beach Road ..	..	0	66
Awaiti West Roads ..	..	0	63	Ngarua Canal Road ..	..	1	10
Ngarua Road ..	..	1	0	Maukoko Canal Road ..	..	2	54
		4	30	Kaikahu Road ..	..	0	50
				Wairau Road ..	..	1	4
						8	19
Remetalling roads—				New peat roads clayed			
Orchard East Road ..	..	1	61	Reclaying roads ..	..	2	62
Kerepehi-Kopuarahi Road ..	..	1	73		..	5	33
Kerepehi-Wharepoa Road ..	..	1	18				
		4	72				

DRAINAGE.

Where practicable, excavating-machines are being used for the construction of drains, and the mechanical excavator shows to advantage where spoil from a large drain can be used for the construction of a road or stop-bank.

The total length of drains constructed during the year was 25 miles 3 chains, making a total of 533 miles 37 chains constructed on the Hauraki Plains to date. The following work was carried out during the year:—

By piecework contract—		M.	ch.
Cleaning drains ..	..	53	57
Widening and deepening (78,583 cubic yards spoil)	..	50	63
New drains ..	..	11	8
		115	48
By day labour—			
Cleaning drains ..	..	87	0
Widening and deepening (41,151 cubic yards) spoil	..	31	53
New drains ..	..	3	0
		121	53
By excavating-machines—			
New drains (115,230 cubic yards)	..	10	75
Stop-banks (88,681 cubic yards)	..	5	65
		16	60

BUILDINGS.

Two four-roomed cottages were erected for the masters of dredges Nos. 15 and 19, also a small four-roomed cottage remodelled for the blacksmith from a single and a double hut. Two single and six double huts were removed to Kerepeehi, and other huts shifted as the work necessitated. A detached room, 12 ft. by 8 ft., with fitted desk and washing-tray, was built, for making sun-prints. Painting and repairs were effected to buildings as required.

To the existing fitting-shop was added an engine-room, blacksmith-shop, and wheelwright-shop, thus comprising—Fitting-shop, 20 ft. by 40 ft., with office, 6 ft. by 8 ft., fitted with benches, lockers, large lathe, radial drill, and emery wheel; engine-room, 20 ft. by 10 ft., bench and lockers, fitted with a 20 h.p. motor for operating machines in fitting and blacksmith shop; blacksmith-shop, 20 ft. by 40 ft., benches and lockers, two forges, power shearing and punching machine, and grindstone; wheelwright-shop, 25 ft. by 15 ft., with bench and locker.

The number of buildings, excluding wharf-sheds, is as follows: Houses and small cottages, 19; double huts, 15; single huts, 24; sheds, &c., 20; quarters staff and workmen, 3; workshop, 1: total, 82.

WHARVES AND BRIDGES.

Repairs have been effected to Bond's, Pipiroa, Horahia, Hopai, Kopuarahi, Shelly Beach, Miller's, and Rawerawe wharves, and the Kaihere Wharf shed raised to the new road-level. On the depot site a wharf, 60 ft. by 10 ft., with a 10-ton crane and a store-shed, 29 ft. by 36 ft., is nearing completion. The number of wharves at present is sixteen. Two sill bridges of 18 ft. span were placed on the Mangawhero Road.

PLANT AND MACHINERY.

A pontoon, 60 ft. 6 in. by 24 ft., has been built for the No. 11 dredge (Kingston), and a coal-punt, 20 ft. by 4 ft. 6 in., for No. 6 dredge. The pontoon for the No. 23 dredge (American steel dipper) is nearly completed. The shops have worked at a very high pressure doing extensive running repairs to dredges and plant, and keeping the same in a very efficient state, besides supplying the necessary iron and wood work for the other jobs in progress.

The plant now comprises one steamer, seven oil-launches, four metal punts, four general-service punts, three grab dredgers, two drag-line excavators, and two walking land-dippers.

CONCRETE STRUCTURES.

The conduit on the Mangawhero Road has now been completed by placing culverts across the road at the intake and outlet. A retaining and dwarf wall with apron has been built into the Patetonga skew bridge. At the main outfall of the Kerepeehi Block has been placed a culvert containing three barrels, fitted at the intake with hardwood sluice-gates and at the outlet with 5-ft.-diameter Calco iron flood-gates. A girder and slab bridge of 18 ft. waterway and 16 ft. roadway is now under construction on the main road of the Kerepeehi Block. Repairs were effected to flood-gates as required, and five culverts with flood-gates and two road-culverts installed, as follows:—

Culverts with flood-gates: Three 4 ft. by 4 ft., length 110 ft.; one 3 ft. (Monier pipes), length 24 ft.; one 2 ft. (Monier pipes), length 32 ft. Road-culverts: Two 2 ft. (Monier pipes), length 44 ft.

The Monier Pipe-works have been kept at full pressure making pipes for future requirements. Numbers and sizes as follows: 3 ft. diameter, 245; 2 ft. 6 in. diameter, 102; 2 ft. diameter, 121; 1 ft. 6 in. diameter, 57: total, 525.

ARTESIAN BORES.

Three bores were sunk during the year, making a total to date of 216. The cost of the year's operations was £285 16s. 11d., making a total to date of £7,120 12s. 4d., practically the whole of which is recoverable. The sum of £610 was received during the year. A schedule of the bores sunk is attached hereto.

SURVEYS.

Considerable progress has been made with the hydrographic survey of the Piako and Waitoa Rivers and Awaite Stream. The plans which have been prepared from these surveys will be kept up to date, and will be the means of securing an adequate knowledge of the physical condition of the watercourses, by the improvement of which the unwatering of a large area is to be effected. Engineering surveys comprising 127 miles of levels, 12 miles of cross-sections, and 16 miles of river traverse were completed.

FUTURE PROPOSALS.

(1) Dredging Piako River; (2) dredging Waitoa River and continuation Waitakaruru-Maukoro Canal; (3) continuation of Awaite Canal; (4) widening Puhanga Canal; (5) drainage and roading of area between Piako River and Awaite Stream; (6) completion of depot at Kerepeehi; (7) construction of pontoons and erection of dredges; (8) general development works.

FLAX LEASES.

One area of 70 acres, containing approximately 2,000 tons, was opened, and was sold at the upset price of £400. It is expected that an area containing approximately 2,000 tons will be offered in the near future.

VALUATIONS.

These remain the same as last year, the total area opened being 42,166 acres. Owing to various causes it was found impossible to open any new land during the year. An area of 2,600 acres is now being valued, and it is expected will be opened in the year.

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





