Waikaremoana Power Development.

Work on the first stage of this power development has progressed at a substantial rate during the year. The intake race between the Waikaretaheke River and Lake Kaitawa, which was commenced in July, 1926, was completed in September, 1927, except for a temporary by-pass opening in the right wall, and the Waikaretaheke River turned into the race early in October. To bring the water into the race fourteen holes, 12 ft. to 16 ft. in depth, were drilled in the face of the excavation under the river-bed. The drilling of these holes was completed on the 3rd October, and charges were placed and fired the following morning. The soft rock at the intake was thoroughly shattered, and by using drags sufficient material was removed to permit of some 380 cusecs flowing through the race that evening. Dragging operations and the shooting of obstructions were continued to give the water a clear channel. At the same time a sand-bag wall was carried across the old bed of the river to completely divert the stream. In the main race the normal flow is about 600 cusecs, while leakage down the old river-bed amounts to about 2 cusecs. A temporary timber dam was erected near the Kaitawa end of the race and the water diverted temporarily to its normal channel through the by-pass opening.

When the above work was completed a commencement was made on the permanent diversion weir, which extends across the original river-bed to a length of 100 ft. The cut-off wall was taken down 5 ft. to a bed of tight pug. The weir was completed in April, 1928, 308 cub. yd. of concrete being placed at this point. Automatic water-level indicators and measuring-devices are being installed at the weir. These instruments will record graphically in the power-house the water-level at the weir and the volume of water passing over the weir, thus enabling future possibilities of this development to be gauged. To reduce the velocity of approach of the stream at the weir, and to reduce turbulence, the river-bed is being deepened and obstructions removed. Excavation for this purpose totalled 1,678 cub. yd. at the end of June, 1928.

As the design provides for the raising of the level of Lake Kaitawa 10 ft. above the original level, it was necessary to construct an earth dam at the south end of the lake. To achieve this a stratum of porous pumice at the dam-site was removed and a pug-core wall carried down to reach as nearly as possible an impervious layer. There is no solid-rock base available. The earth dam was completed in February, 1928, except for a spillway which was left to maintain the lake at a fixed level while the temporary power plant is in operation.

Material placed in the dam totalled 15,904 cub. yd. of clay and crushed rock. The dam has been stone-pitched on the lake side to prevent erosion, while the opposite face has been sown in grass.

Excavation of the approach canal from Lake Kaitawa to the tunnel-portal was completed in May, 1928, a temporary barrier being left at the lake end to exclude water until work at the tunnel-portal is completed. On the lake side of the barrier the bed of the lake has been deepened to provide an adequate waterway at periods of low lake-level, and vegetation growing there has been removed by dragging. The total excavation for the approach canal was 12,603 cub. yd. The sides of the canal have been stone-pitched and a stone toe placed at the foot of the batter to prevent scour.

Excavation of the main tunnel was carried on from both ends, the two headings meeting in January, 1928. Owing to the tendency of the country to slip and the consequent difficulty of maintaining a batter to the canal, it was deemed advisable to extend the tunnel approximately 70 ft. nearer to Lake Kaitawa than was originally intended. The tunnel proper, 773 ft. in length, was completed in May, 1928, and work commenced immediately on the portal, which is now almost complete. The adit opening was closed in June, and back-filling of the adit completed. Grouting of the tunnel was commenced in April and completed in June, cement mortar being forced under pressure into any open ground that existed behind the concrete lining of the tunnel.

Concreting of the surge-chamber was completed in March, 1928, a total of 1,803 cub. yd. of concrete being placed. Surge-chamber screens and gates and gate-operating gear have been erected, and the latter tested for hand operation. A water-level recorder will be installed to record graphically in the power-house the water-level at the surge-chamber.

The contractors for the pipe-line completed the installation of their plant in July, 1927, and immediately commenced the drilling and rolling of plates. Anchor-blocks were concreted to invert level, angle-pieces set in position, and blocks completed. In addition, three pipes were set at the surge-chamber and concreted into the gate-chamber wall. At the end of June, 1928, the south line was complete between No. 3 anchor-block at the power-house and the surge-chamber, except for expansion joints. In the north line 2,303 ft. of pipe were completed. The erection of pedestals was completed in February, 1928.

Steady progress has been maintained on the erection of the power-house. The shell of the building was almost completed by the end of June, and at the south end a portion of the roof over the machine-room is in place. The foundation for No. 1 machine has been concreted, while No. 2 foundation is nearing completion. Foundations for the two exciter sets now in operation in the temporary power-house were completed in February, 1928. To date 7,468 cub. yd. of concrete and 139 tons of steel have been placed in the building. Work is now proceeding on the erection of the 80-ton crane in readiness for handling the heavy plant which is expected at an early date.

At the outdoor transformer and switching station the transformer-house was completed, except for windows, in April. The erection of a 50-ton crane for the handling of transformers and oil circuit-breakers is now in hand. At the point where the access road meets the outdoor station site a 30-ton unloading-crab, electrically operated, has been erected, and thence heavy plant is moved into position on a 30-ton truck running on 6 ft. gauge traverser-tracks. The main traverser-track from the unloading-crab to the transformer-house has been laid, and the turntable at the entrance to the transformer house erected. Track C, giving access to the 50 kv. transformers and switch-gear, has been partly laid, and the turntable connecting it to track D is now in course of erection.

Erection of the outdoor switch-gear was commenced early in January, and at the end of June substantial progress had been made.