

Puhipuhi East Road (Kairourua County).—80 ch. of road formed 14 ft. wide and metalled.
Evans Pass-Godley Head Road (Lyttelton County).—4 m. 12 ch. widened from 4 ft. to 12 ft. in side cutting, mostly rock.
Cairn Road (Bruce County).—1 m. 40 ch. of metalling completed.
Switzer's Road (Tuapeka County).—1 m. 31 ch. formed, and 1 m. 10 ch. metalled.
Omarama-Lindis Pass (Waitaki County).—1 m. formed and 5 m. 16 ch. metalled.
Lawson Road North (Southland County).—1 m. 68 ch. formed, and 148 lin. ft. culverts laid.
Tokanui-Haldane (Southland County).—5 m. 1 ch. metalled.
Key-Te Anau (Wallace County).—5 m. 38 ch. formed and metalled, and 1,342 lin. ft. culverts laid.

HYDRO-ELECTRIC WORKS.

HORAHORA.

At the end of the period covered by my last report the construction work in connection with the erection of a permanent weir across the Waikato River to provide water at low-river stage for the enlarged power-station had almost been completed. Items such as the erection of the light footbridge along the crest of the weir, the concreting of the balance box of the Ransome-Rapier gate, the final adjustments of the gates, and some concrete-work raising the level of the head-race spillway, were completed. The work was finally completed in October, 1926.

ARAPUNI.

Although the contractors, Messrs. Sir W. G. Armstrong, Whitworth, and Co., have lately made substantial progress on No. 1 section of the contract, yet, having regard to the fact that the contract time expired on the 12th July, 1927, a review of the whole situation cannot but disclose disappointing and unsatisfactory progress. In particular, at the power-house and its foundations progress has been so small as to be practically negligible. The steps taken by contractors to overcome the inroad of water from the river into the excavation for the power-house foundations have been quite inadequate, and after months of time spent on insufficient effort that portion of the work is now at a complete standstill. The effect of this delay on the completion of the works is most serious, especially in view of the Department's commitments for power in the area to be supplied from this power-station. The obligation on the contractors to spare no effort to get on with this portion of the work is most urgent, and is being pressed on them to the utmost by the Department.

A summary of the progress made on the various portions of the contract is as follows:—

No. 1 Section of Contract.—The metalling of the access road, Putaruru to Arapuni, is complete, $1\frac{3}{4}$ m. being metalled during the year. The Waikato River diversion tunnel was completed on the 16th July, 1926. The method proposed for removing the barriers of rock and talus between the inlet and outlet ends of the tunnel was by the firing of charges of explosives placed in a series of galleries and a series of drilled holes respectively. A total of 1,421 lb. of explosives was used at the outlet end, and 6,475 lb. at the inlet end. This method proved effective. The next or associated step was the building of auxiliary dams in the bed of the river to enable the permanent-dam site to be unwatered. The upper one of these, located immediately below inlet to diversion tunnel, was built of gabions of rock spalls in wire-net crates. The lower auxiliary dam was built in the dead-water just above the outlet of the diversion tunnel, and consisted of two barriers of rock spoil with fine pumiceous material filled in between. These works were successful, and after some delay, due to floods, the dam-site was unwatered at the end of October, 1926.

The diversion-tunnel gates have been erected and riveted up and painted. The gate shaft has been concreted to ground-surface level, and a commencement made with the erection of the permanent operation gear.

At the dam-site the excavation for the dam-foundations proceeded vigorously, three shifts being employed, concreting of the side sections of the dam going on simultaneously. At the centre section and western side of the dam good foundations were obtained at approximately the level shown on the contract drawings. On the eastern side one section of the excavation had to be carried 32 ft. lower than level shown on drawings to remove a soft pocket of material unsuitable as a foundation. To the end of June last a total of 54,650 cub. yd. of excavation had been removed, and a total of 50,704 cub. yd. of concrete had been placed. In this latter work good outputs, up to 475 cub. yd. of concrete, have at times been placed per eight-hour shift.

For the penstock intakes all the material for the gates and screens is now on the works. Concreting of the intake structure was begun in November, and intakes 5, 6, 7, and 8 are well in hand. The spillway-weir and spillway-weir extension are practically completed except for a 20 ft. length left for construction purposes. An additional cut-off wall containing 100 cub. yd. is needed to secure a section of the foundations where pumiceous material underlies the rhyolite foundation. A further additional work is the putting-down of a concrete floor over a considerable area of the excavation below the spillway-weir, necessitated by the occurrence of softer beds of material in the floor disclosed by excavation. This work is in hand. The total quantities of excavation and concrete to the end of June are 42,957 cub. yd. and 8,118 cub. yd. respectively.

No. 2 Section of Contract.—In April last a start was made placing the steel lining of the penstock-tunnels, and No. 1 penstock is now almost completely lined and concreted, and similar work has been begun at No. 2 penstock. At the outdoor step-up transformer station the main outdoor building is practically complete. The concrete foundations for the 50,000-volt and 110,000-volt outdoor