DESIGN OFFICE.

Electrical Section.

(*a*) *General.*

In the year under review a large amount of detail design work was involved in connection with the various hydro-electric systems controlled by the Department.

Following the purchase of the Cobb River Scheme the completion of the design work for power-station, substations, and transmission-lines was undertaken.

Considerable delay has been experienced in receiving drawings of machinery and apparatus from overseas manufacturers, due partly to diversion of their staffs to more urgent work and partly to losses of drawings and technical data in transit. As a result the completion of the design work for the field has in many cases been delayed.

The standardization of types and sizes of insulated cable to be used for power and control circuits was undertaken, and it is intended in future to carry sufficient stocks to provide for all except major works.

Considerable attention has been given to the subject of fire-protection with the object of reducing the hazard in existing stations and minimizing the fire-risk in the design of new stations.

(*b*) *Hamilton District.*

Arapuni Power-station.—Foundation drawings were prepared for Nos. 5 and 6 generating-units and for the additional 110,000-volt switchgear to control these units and additional outgoing transmission-lines to Bunnythorpe and Edgecumbe respectively. The cable installation for the above units for designed specifications were prepared for the CO_2 fire-protection equipment for the new generating-units.

Karapiro Power-station and Village.—Drawings and specifications were prepared for construction purposes for a reinforced-concrete water-tower for the village and for the village substation. Preliminary designs were prepared for the power-station building and outdoor station building. Drawings were prepared for tendering purposes for main and auxiliary generating-units, transformers, cranes, switchgear, and control equipment. As the heaviest lift in the assembly of the main generating-units will exceed 150 tons there will be two main cranes operating in parallel through an equalizer beam for the heaviest lifts, but normally operating independently for all lifts up to their separate capacities. In view of the acute shortage of structural steel it is proposed to use reinforced concrete throughout for supporting the outdoor switchgear, and a preliminary design has been prepared for these supporting structures.

Substations: Detail designs were prepared for building extensions to Penrose Substation to provide a separate control-room for indoor and outdoor equipment at that station and at Mount Roskill Substation, which will be remote-controlled from Penrose.

A switchroom building was designed for Belmont Substation, and a relay house for Hamilton No. 2 Substation.

A preliminary design was prepared for an administrative building at Hamilton No. 1 Substation, which will house the District Office staff.

Layout and foundation drawings were prepared for additional or replacement outdoor switchgear, steelwork, and transformers at a number of substations.

A preliminary layout was prepared for a new substation at Lichfield.

(*c*) *Palmerston North District.*

Waikaremoana Lower Development (Piripaua).—Details, layout, and foundation drawings were prepared for main and auxiliary generating units, machine auxiliaries, and control equipment, and arrangement drawings for pipework and cable.

Substations: Switch-room extensions were designed for Melling and Stratford Substations.

Drawings were prepared for the new substation at Central Park, which will form a second point of supply for Wellington City. The site chosen is very favourably situated for supplying the major portion of the city load. The initial installed capacity will be 60,000 kVA.

Preliminary layouts were prepared for new substations at Upper Hutt, Pahautanui, and Greytown.

Layout and foundation drawings were prepared for replacement or additional switchgear and transformer-banks at several substations.

Drawings and specifications were prepared for equipment for handling transformers and other heavy plant, including 45-ton crane for Central Park, 25-ton cranes for Bunnythorpe and Masterton, 45-ton traverser-truck for Melling, and traverser trucks for Paraparaumu, Te Kiri, and Waipawa Substations.

(*d*) *Christchurch District.*

Highbank Power-station.—Drawings and specifications for the power-station building contract were completed. Layout and foundation drawings for station equipment are in hand.

Tekapo Power-station.—A preliminary layout drawing was prepared for power-station and equipment. The station equipment will include a 30,000-horse-power turbine, 21,600 kW. main generator, auxiliary generating-unit for station and local service, and bank of 110,000 volts step-up transformers. Provision is also being made for a bank of step-down transformers to supply the neighbouring district. The main turbine will probably be a Kaplan, or variable-pitch-propeller type.