

All such diversions and road approaches to the level crossings are to be completed in a convenient, substantial, and proper manner, with the necessary drains, water tables, and side slopes. Such approaches and road diversions are to be formed with an inclination not steeper than 1 in 30 for public roads, and 1 in 20 for private roads, except where the present inclination exceeds these rates, in which case the inclination of the new road shall not exceed that of the present road, unless, in the opinion of the Engineer, a steeper is unavoidable.

Public roads and approaches to first-class crossings are to be metalled with Metalling. coarse river gravel or approved hard stone, laid on and spread as directed, so as to average 38 cubic yards per lineal chain of road. Private roads are to be metalled with coarse river gravel or broken stone of approved quality, laid on and spread as directed, so as to average 15 cubic yards per lineal chain. The whole of the metal is to be broken to pass through a two and a half inch ring.

Two first-class, four second-class, and six third-class crossings, with two Level crossings. cattle-stops to each first-class crossing, as per Drawing No. 7, shall be constructed at public and private roads where directed. They shall be carefully placed as to line and level, and finished in strict conformity with the drawing and the notes thereon. Each level crossing shall be metalled for a length of 66 feet on each side of the centre line, as above specified for the roads, and tile or timber box drains shall be put in the formation ditches where necessary for the drainage of the line or road.

Cattle stops, as shown in Drawing No. 7, are to be put in where directed, not Cattle stops. exceeding thirty in number, besides those at level crossings.

MATERIALS.

12. Except where otherwise specified, all the materials used under this contract shall be of the following kinds and descriptions:—

All masonry, except archwork, coping, and string courses, to be of rubble Masonry. laid in cement mortar. Bond stones, 2 feet long, to be put in every square yard of both face and back of work. All spalls are to be set in mortar, and not laid dry, and afterwards grouted. Facework must have no stone containing less than one-quarter of a cubic foot. The work shall be grouted every foot in height. All wingwalls, parapets, and abutments shall be finished with a coping of brick on edge, one brick wide, set in cement. The coping is not generally shown on drawings. The whole of the masonry is to be neatly pointed.

Cement mortar shall consist of three parts, by measure, of sharp clean sand Cement. to one part of Portland cement.

Concrete shall be composed of three parts, by measure, of broken stone, two Concrete. parts of sharp sand, and one part of fresh Portland cement, or two parts of broken stone to two parts of gravel, one part of sand, and one part of fresh Portland cement. The cement shall be of approved brands, and subject to such tests as the Engineer may from time to time direct. The concrete shall be laid in 12-inch layers, and well rammed as the work progresses.

Rails, strings, and floor beams shall be of black birch, and all other timber Timber. shall be of matai or totara, or other timber specially approved; it shall be heart-wood, except as shown on Drawing No. 8, and shall be straight and sound, free from shakes, large knots, and other imperfections.

The whole of the straps and bolts shall be made of B.B. crown iron, or other Malleable iron. iron of equal quality, of the dimensions shown; the whole to be finished and fixed in a workmanlike manner.

Bolts shown or specified shall have a square head, of which the thickness Bolts and nuts. shall be equal to the diameter of the bolt, and the width twice the diameter of the bolt. They are to be tapped with a good clean thread, and shall have a nut equal in size to the head of the bolt, and shall be provided with one or more washers 3 inches in diameter.

BRIDGES AND TIMBER OPENINGS.

13. Bridges, as per detail drawings, shall be erected where shown on longi- Bridges. tudinal section.

All joints, shoulders, and sides of tenons and scarfs to be worked perfectly Joints.