

sarily considered and settled in their earlier stages simultaneously with the drawings of the works to be executed by them.

Estimate.—I estimate the cost of the breakwater, pier, and root, if executed to the extent coloured red on drawing No. 1, which corresponds with the length out to YY referred to in my report of February, 1879, at £285,800. If the expenditure is confined to £200,000, then the pier can, for this amount, be carried only to a point 1,420ft. from low-water mark of spring-tides, or 565ft. short of YY.

The above amounts include the cost of all plant, and provide a sufficient allowance for contingencies, sea-risk, and supervision. They are, however exclusive of the outlay already incurred in the colony in works executed to this date, and do not cover the cost of the excavation necessary for the formation of the workyards, as shown on drawing No. 5, sufficient particulars in the way of levels not being available here to enable the quantities to be ascertained, neither is the preparation of the surface of the workyard included, nor the erection of the sheds, workshops, nor the railways in the yard, the permanent lines on the pier and root have, however, been provided for in the amounts named.

I have, &c.,

The Chairman of the Harbour Board, New Plymouth.

JOHN COODE.

G.—SPECIFICATION FOR BREAKWATER PIER AND OTHER WORKS CONNECTED THEREWITH.

SPECIFICATION of Works to be executed in the Construction of a Breakwater Pier, Workyard, Root, and Approaches at New Plymouth, in the Province of Taranaki, New Zealand, for the Harbour Board of that Port, in accordance with the Modified Design and Working Drawings prepared by the Consulting Engineer, Sir John Coode, dated March, 1880.

It is understood to be the wish of the said Commissioners that the works should be carried out departmentally and without the intervention of a contractor. The following specification has therefore been framed in this sense, and does not include binding and other clauses as to qualities of materials, workmanship, &c., which it would have been necessary to introduce were the works to be executed under a contract. The materials and workmanship throughout are to be the best of their respective kinds, the operations being carried on as hereinafter more particularly described.

Drawings.

There are seven sheets of drawings accompanying this specification, giving full details of the permanent works, to which will be added hereafter in due course, the contract drawings and designs for the plant. No. 1 is a general plan showing, by red colour, the position, form, and extent of the intended pier and works, with soundings, reduced to a common datum of low-water of an ordinary spring-tide. The termination of the coloured portion of the pier shown on this sheet corresponds with the point YY on the report-plan of the 28th February, 1879. No. 2 shows a general plan and distorted elevation of the pier, with large scale sections and details of the root. Nos. 3 and 4 give full details of the pier and its fittings from the root seawards. No. 5 furnishes particulars of the proposed arrangement of the workyard and buildings, with outline views of the block-making and lifting machinery. No. 6 shows details of a typical block mould, and of the T-head lifting-bars, core-boxes, &c. It is assumed that the wood- and iron-work for the whole of the moulds will be prepared in the colony, in accordance with this drawing, modifying the dimensions of the sides to provide for the different sizes of blocks. No. 7 gives details of a wrought-iron box, in which the bags of concrete to form the substructure and foundations of the pier to the extent shown on drawings 2, 3, and 4 would be lowered into position from a portable overhanging machine, the latter being used also for setting the concrete blocks. The drawing of this box has been furnished now in order that two of them might be prepared in the colony, should the Commissioners so desire, in preference to sending them out from England.

General Levels and Dimensions

All the drawings are referred to a common datum of low water of ordinary spring-tides, which tides are assumed to rise 12ft. above that level.

The total length of the root, to be constructed in accordance with the details on drawing No. 2, from the starting-point of the pier just above high-water mark to the abutment near low water, is 335ft. From the abutment to 805ft. from the starting-point the section will be in accordance with Fig. 1, drawing No. 3, modified to suit the varying conditions of depth. From 805ft. to the point YY the pier will be of the character indicated on Fig. 1, drawing No. 4. The total length of the permanent work from the starting-point to YY is 2,320ft.

It will be seen that the section from the root abutment out to 805ft. from the starting-point 30ft. wide over all at the coping-level, having a quay-surface of 23ft. in width within the parapet, whereas the remainder of the pier seawards will be 34ft. wide at the coping-level, and the quay will be 25ft. between the edge of the coping and the inner face of the parapet. The junction between these two widths is to be formed in the manner shown on drawing No. 3, the difference on the harbour-face being made good by a flight of boat-steps (see Figs. 1, 3, and 4).

The finished level of the workyard, from C to D, drawing No. 5, is to be 10ft. above high-water spring-tides, or 22ft. above datum. From D to E the yard will fall over a length of 150ft. at a gradient of 1 in 75, so that the point E will be 8ft. above high-water spring-tides, which will be the level of the edge of the coping on the harbour side throughout the entire length of the pier.

Plant and Machinery

In addition to the plant which has already been ordered by the Resident Engineer, it will be requisite to arrange for the preparation of the special machinery adapted for dealing with the manufacture, lifting, and setting of the bags and blocks of concrete, of which the permanent work will consist.