

Meantime, would you be good enough to write my instructions on the subjects which you wish me to attend to.

The Chairman of the Greymouth Harbour Board.

I am, &c.,

C. NAPIER BELL.

No. 6.

SIR,—

Greymouth Harbour Board, Greymouth, 6th June, 1892.

In reply to your letter asking for written instructions on the subjects which the Board wishes you to attend to, I am directed to inform you that the Board wishes you to report on the following subjects, namely (1) On the dredging operations in river now in progress and lately completed, (2) on the advisability or otherwise of completing the training-banks, or of either of them, (3) generally on works in progress, (4) in respect of any work on which you may have suggestions to make, or which you may consider to be advisable for the Board to undertake for the improvement of the harbour.

I have, &c.,

C. Napier Bell, Esq., Civil Engineer, Greymouth.

THOMAS ALLEN, Secretary

No. 7

SIR,—

Greymouth, 9th July, 1892.

Herewith please receive my report on the training-walls, dredging, and harbour-works generally, as required in my instructions from your Chairman.

The report is accompanied by a sheet of cross-sections of the river, the object and use of which is explained in the report. Also a plan of the harbour, on which is shown contour-lines of depths, soundings at sea, and proposed works.

I shall leave by the first boat for Christchurch, where I shall be glad to receive any further orders from your Board at any time.

I am, &c.,

The Secretary of the Harbour Board.

C. NAPIER BELL.

Enclosure in No. 7

*Report on Training-walls, Dredging, and Works generally.*

SIR,

Greymouth, 6th July, 1892.

Acting under your instructions to report to you on the effect of the training-walls, the dredging, and the works generally I have had a number of cross-sections of the river taken, also a set of soundings outside the breakwaters, with observations on the velocities and direction of ground-floats, which are useful to enable an opinion to be formed of the effect of the works both inside the river and in the sea outside the breakwaters.

*Comparison of Depths.*—On the sections across the river I have shown the depths of the water in June, 1892, and, for comparison, the depth just after the great flood of the 6th July, 1887, also, the depth in November, 1888, before the training-walls were built, and the depths in November, 1890, after they were built.

*Effects of Jubilee Flood.*—The effect of the great flood appears to have shoaled the upper part of the river, from the bridge to just above the sheds, but from the sheds to the signal-station there was a great deepening of the water as the result of the floods. From the date of that flood to the present time the depths in different parts of the river have varied considerably, and, although the excessive scouring caused by the flood near the wharf has filled up, yet, on the whole course of the river, from Tainui Street to the signal-station, the deepening produced by the flood has been preserved to this time, and in some places the present water is deeper than that produced by the flood.

*Effect of Training-walls.*—Before the training-walls were erected the river was narrower than it is now, and, although there are constant variations in depth as fresh gravel is brought down by the floods, there appears to be a progressive increase in depth, taking the river as a whole—that is to say, since the walls were erected some parts are shoaler on one side and deeper on the other than they were before the walls were erected, but, generally, the river is deeper now than it was then. I do not think the current in the river is capable of maintaining a uniform depth between the walls, unless these were narrowed to an inconvenient extent. As it is at present there is good water close beside the wharves, and shallow water towards the centre of the river, but at the part of the wharf near the cranes there is sufficient depth right across to allow of vessels swinging, and the depth from the lower end of the wharf down the river is always ample for all purposes. As the shingle travels down the river the depths vary, but no serious shoaling has occurred, and I am of opinion that the river will always preserve about the average depth found at present, although irregularities of depth, caused by floods, may require some dredging to be done from time to time.

*Training-walls.*—The training-walls which have been built to guide and regulate the current and its scour have apparently had a somewhat uncertain effect, probably due to the material of the river-bed being rough heavy shingle, which is shifted down by floods in an irregular manner, and afterwards slowly sorted out to a more regular bed.

*Effect of Tainui Street Wall.*—In the lower parts of the river—that is, from the lagoon mouth to the bar—there is good water right across the river, and the tendency is to get deeper. An inspection of the soundings shows that the erection of the Tainui Street training-wall has produced a considerable deepening of the river opposite and below it, as far as Boundary Street, but the sharp curve in the root of the wall has the effect of concentrating too much of the scour of the wharf, causing the river to shoal on the right side, from the end of the wall downward. In order, if possible, to correct to some extent this irregularity of the scour, it is necessary to prevent the current from