If it should appear that the damage to the railway is the result of the Harbour Board's operations, it would be well for you to communicate personally with the Chairman, with a view to the Board taking such steps as may be necessary to protect the line from being washed away.

The Engineer in Charge of the Middle Island has been directed to meet you at Timaru, and the Chairman of the Harbour Board has been apprised that you will probably be there on Saturday.

I have, &c.,

The Colonial Marine Engineer. J. Macandrew.

No. 3.

The Colonial Marine Engineer to the Hon. the Minister for Public Works.

Sir,— Marine Office, Wellington, 3rd July, 1879.

In accordance with the instructions contained in your memorandum of the 26th ultimo, I proceeded to Timaru, accompanied from Christchurch by Mr. J. H. Lowe, Resident Engineer, Working Railways, and there met by appointment Mr. W. N. Blair, Engineer in Charge of Middle Island.

We made a careful examination of the coast to the north and south of the Timaru Breakwater, and collected evidence on facts requiring elucidation; then, after due consideration, arrived at an agreement as to the terms of a report which I now beg to lay before you, and in which, I may state, Mr. Blair fully concurs. The report deals with the heads laid down in your memorandum, in their order of succession, viz.:—

1. The damage consists of encroachments on the shore by the sea at four different points, all to the north of the breakwater. The first affects land held by the Harbour Board, and the buildings connected with their boat service, but does not at present affect the railway station. The Harbour Board are taking steps to prevent further encroachment, by sheet-piling and other works.

The second and third points are in the cliffs between the railway and the sea, and the fourth is at Whale's Creek Viaduct, in Caroline Bay. The cliffs consist chiefly of clay, with a thin bed of basaltic rock about midway up the face, and another forming a floor or causeway on the foreshore at the foot. The second and third encroachments are at points where there are gaps in the rock, each of them about two chains long. The fourth encroachment—that at Whale's Creek—is about four chains long. It occurs in a gully or sharp depression between two bluffs, where the shore had formerly an easy slope, the ground being clay, with a thick layer of shingle covering it. The railway crosses this gully on a viaduct which originally stood about a chain from high-water mark; the sea has now washed away the shingle completely, and cut into the slope close up to the piers of the viaduct, leaving a steep face of clay. It is from the encroachment at this place that immediate danger to the railway is to be apprehended.

2. There is no doubt whatever that the encroachments are to a very considerable extent attributable to the operations of the Timaru Harbour Board; but I am not prepared to apportion exactly the damage between these operations and the action of the very severe storms that have lately swept the coast. The breakwater certainly is the cause of the almost entire removal of the shingle from the shore immediately to the north of it, as exactly the same thing occurred on two previous occasions when an obstruction to the passage of the shingle took place at the site of the breakwater. One occasion was on the erection of an experimental concrete groin by the late Mr. Balfour, and the other the wreck of the "Princess Alice." The groin and the wreck stopped the passage of fresh shingle from the south, and so allowed the sea to denude the shore on the northern side of the obstruction. Serious damage was done to the landing service on both occasions. Relief came in the first instance by the sea carrying away the groin in a storm; but the wreck had to be blasted and otherwise broken and burnt to pieces for removal before the encroachment ceased the second time. On the other hand the late storms, which were unusually severe, have to some extent denuded the beach of shingle in places south of the breakwater; so it is clear that a share of the encroachments on the northern side may be attributable to the same cause. Until a period of ordinary weather has restored matters to their normal condition, it is impossible to say how far north the action of the breakwater extends. The vicinity of Whale's Creek should be watched, with a view of ascertaining whether the shingle there is ever replaced to its former thickness and quantity; and the result will determine, to a certain extent, the share the breakwater may have had in causing the damage.

3. It will be necessary to stop the encroachments at Whale's Creek at once—the viaduct is already in danger; and the first thing to be done is to drive additional piles in the end piers (south), and protect them with large masses of rock. For a permanent protection, I recommend that two rows of hardwood piles be driven into the foreshore about a chain from the viaduct, also two transverse rows reaching from them to the cliff, and that the intervening space be filled in with masses of rock; this will cost about £3,500. Also, that the southern abutment of the bridge be reconstructed in solid rubble masonry in cement; the foundation of this to be laid at once, and built up as the filling-in with rock proceeds. The cost of this and the necessary alteration to the superstructure, with the filling-in behind the abutment, will be about £1,000. As this matter is urgent, Mr. Lowe has arranged for a supply of rock, and is placing it in position. The protection of the two encroachments in the cliffs, executed in the same manner, will probably cost at each place about £1,750; and if piles cannot be driven their place must be taken by heavy concrete blocks. The work at the one nearest the station should be proceeded with at once, and arrangements should be made for carrying out the whole of the works described with as little delay as possible.

For your information, I append a copy of a report addressed by Mr. Lowe to the Commissioner of Railways, Middle Island, on this subject, which contains an estimate for works of a different character amounting to £12,000: but this sum would not be sufficient to provide for a length of protective works of the character described equal in length to those estimated for above; it would probably be increased by £2,000 to £3,000—say, total, £14,500. The contingency of being obliged to protect the