

## Enclosure 2 in Appendix B.

REPORT No. 1 ON THE HUTT-WAIKANAĒ SECTION OF THE WELLINGTON-MANAWATU RAILWAY.

Mr. KNORPP to the ENGINEER-IN-CHIEF.

SIR,—

Wellington, 17th May, 1878.

I have the honor to report that, according to directions of the Hon. the Minister for Public Works, I have examined two of the proposed routes, designated below as No. 1 and No. 3, from the Wellington and Masterton Railway to Waikanae. The line which has been called No. 2 is not of such a character as to be worth reporting on.

Both these routes traverse very broken country, of which, at present, only parts have been surveyed, so that distance can only be estimated approximately. The levels could be taken by aneroid only, and may therefore require corrections hereafter.

*No. 1 Line.*

No. 1 line will start from the Upper Hutt Station and run over average country to above the place where the Hutt-Waikanae Road will cross the Hutt River: here a bridge of at least three 80-ft. spans, probably on cylinders, will be required. From this point it will have to follow generally the course of the Akatarawa Stream for a length of about nine miles, and then that of one of its tributaries for about three miles, until it arrives at the saddle dividing the Hutt from the Waikanae drainage. This saddle is 1,560 feet above sea-level. Of this height about 300 feet may be overcome by a curved tunnel about 30 chains long, leaving the summit of this line at 1,260 feet above the sea, or about 120 feet higher than the Rimutaka Tunnel, which is 29½ chains long. The country from the Hutt River to the saddle is of a very difficult nature for a railway, being a succession of precipitous spurs and deep gullies with only a few flats of small extent, and exceeds in roughness the country of the Mungaroa and Pakuratahi contracts. A ruling grade of 1 in 40 can be obtained through this part, but further extensive investigation of the ground alone can determine what ruling grade should be adopted. From the saddle to the foot of the hills at Waikanae the country nearly equals that of the Hutt side in roughness, and from a few readings at points through which the line must pass it is probable that a ruling grade of 1 in 40 cannot be obtained on this side, and that a much steeper grade will have to be adopted.

Assuming the length of this line to be 25 miles from the Upper Hutt Station to the Waikanae banks, which, with the numerous windings of the necessary contours, is probably a somewhat low estimate, I consider that its construction will cost not less than £250,000, exclusive of land and stations (at the present prices of labour and materials), unless specially steep grades are adopted, for which the country appears to offer special facilities.

*No. 3 Line.*

No. 3 line starts at the end of the 12th mile of the Wellington and Masterton Railway, and winds up a gully behind Mr. Hayward's house to a saddle 531 feet above the sea, where a short cutting of a maximum depth of 35 feet can with advantage be made. This length, estimated to be four miles, will contain some heavy cuttings and banks. From this saddle to the Pahautanui Small Farm Settlement, a distance of about three miles, some heavy earthwork will have to be provided for: it is expected that a ruling grade of 1 in 40 can be obtained on both sides of this saddle. At the head of the Pahautanui small farms two alternative routes exist. The one runs down to and follows the main road until the valley behind Mr. Abbott's homestead at Horokiwi opens out. The other continues in a straighter course across Mr. Mulhern's land through some very rough country to the same point. The lower line is estimated to be about three miles longer than the upper line, but the grading would be very light, although probably 100 feet in height would be lost in adopting it. The above valley leads to the Wainui saddle, which is 860 feet\* above sea level: 132 feet of this height may be overcome by a tunnel about 18 chains long; the country from the valley to the saddle will necessitate some heavy grading, with a ruling grade of 1 in 40. From the Wainui saddle to the foot of the hills (about three miles from Paikakariki Hotel) the country greatly resembles the "Incline" contract of the Wellington and Masterton Railway, and will occasion some heavy grading, with a few short tunnels. It is, however, expected that a ruling grade of 1 in 40 can be obtained.

From the foot of the hills the line would pass to the Waikanae through the valley between the main range and the sand-hills of the sea-coast, which appears to present no expensive feature.

It is estimated that the total length of No. 3 line, from end of 12th mile on the Wellington and Masterton Railway *via* the Pahautanui main road to the junction with No. 1 line, is 29 miles, and that its cost exclusive of land and stations will be about the same as that of No. 1, £250,000. It appears, therefore, that,—

1. The estimated cost of No. 1 and No. 3 are the same;
2. The estimated length of new line to be constructed is 25 miles and 29 miles respectively;
3. The estimated length of haulage from Waikanae to end of 12th mile is 32 miles along No. 1, and 29 miles along No. 3 line;
4. The estimated height to which load has to be lifted from the 12th mile is 1,179 feet along No. 1, and 1,137 feet along No. 3 line:

leaving thus a balance of 3 miles in length and 42 feet in height in favour of No. 3 line if the main road route at Pahautanui is adopted, and 6 miles in length and 142 feet in height if the straighter line near the Pahautanui Small Farm Settlement is adopted.

The trial surveys now being run will give further detail information; but, before any final decision is come to, I would recommend that further exploration be made between the Waikanae and the Otaki, as a lower saddle may possibly exist there between the east and west sides of the Tararua Range.

I have, &amp;c.,

C. B. KNORPP,

Superintending Engineer.

The Engineer-in-Chief.

\* Since ascertained by level to be 881 feet.