

its draining so small an area of country), I think the best way to cross it would be by the construction of two 40-foot or even 30-foot semicircular brick arches, which I feel certain would be quite sufficient water way to carry off the greatest flood that ever occurs in it: in short, it is but a mere stream, with very high banks.

There appears to be plenty of good brick-earth and limestone in the immediate locality, and the application of the design to this particular place would further benefit the work by utilizing a portion of the great quantity of material that will of necessity require removal from the heavy cutting on the north side of the stream; otherwise it will have to go to spoil, which will undoubtedly entail considerable expense. The curve when located at this place will reduce the cutting shown upon the section very much.

The line for the next mile and a half is over favourable ground, and when the line is located the section along this length can be improved so as to leave but a small amount of earthwork to do.

Near the station at the "Government reserve" there will be a bank of a little over 20 chains in length, and averaging about 35 feet in height. The material to form this bank, as will be seen by the plan, is close at hand, as the line has been surveyed along the edge of the bank, thereby affording the means of obtaining the material without incurring any great expense either in excavation or haulage.

Kahautara River.—The site of this bridge is also near the track of the dray-road across the river, and at the narrowest part that can be found. The dray-road has evidently been constructed in connection with this crossing of the river so as to take advantage of the side hill in rising on to the high terrace as shown upon the plan.

As will be seen by the section, the cutting on the east side of the river is a very deep one, but this is unavoidable, as the top of the terrace must be reached, and, although this is the case, yet it is as low, if not the lowest point that can be found.

The river upon the south side of the bridge as far as the bend, and where the Greenburn joins it about a mile and a half distant, increases in width the whole way, whilst the bank becomes higher until it merges into a high hill, situate at the above-mentioned bend. To attempt to cross the river higher up on the north side is entirely out of the question, as it very soon forms the junction of three or four tributary streams, as shown upon the plan, and more plainly still upon the index map.

From the top of the high terrace to the crossing of the Little Linton the line is favourable in every respect. As the Little Linton, although it has high banks, is but a stream, draining but a small district of country, it would be far cheaper, and equally effective, to cross it by two brick masonry arches of 30-foot span, and fill up with the earth from the cutting on the east side, similar to the crossing at the Greenburn.

The Big Linton, about a mile further on, is wider and partakes more of the character of a river, and will therefore require open bridging, but which need not exceed 15 to 20 feet in height, as no timber of large dimensions is brought down from the hills, nor are there any large trees growing along its banks in the valley. There is a gentle and gradual fall, and but little earthwork between the big Linton and Cribb Creeks.

An examination of a line was first made from the Kahautara River, crossing the two Lintons and Cribb Creek higher up under the hills and passing near to Swincombe Station to the crossing of the Kowhai River; but owing to the width of Cribb Creek at that high crossing, and the velocity of the water so close under the hills, it was abandoned in preference to the surveyed line, which is a far better one, and equally short as regards distance. The bridge across Cribb Creek, although lengthy, need not be of any great height, and the same remark made in this respect in connection with the crossing of the Big Linton is also applicable to this river.

The line from Cribb Creek, after passing over a low saddle, is of a uniform rise for about $3\frac{1}{2}$ miles to the crossing of the Kowhai River, with but a small amount of earthwork the whole way.

I may here remark that, should the diversion of the Kowhai River ever take place, the railway line can without injury of any kind be easily removed higher up under Limestone Hill, so as to procure an easy crossing of the new course.

The crossing of the Kowhai River has been principally determined upon by the position of the bluff upon the east side of the river, as affording a protection to the bridge, which does not occur at any other place along its banks. Higher up would give too high a level for the general section of the line (see index section), whilst lower down would throw us on to ground subject to inundation.

We are now getting into the locality of the timbered hills, and, although this is the case, a high bridge is not necessary at this crossing, as the timber that floats down the river from the hills is not of large growth. The line for the first mile from the river crossing is over rather rough ground, but the section shows alternate cutting and embankment, which, being nearly equalized, will not for that reason be costly in construction.

The line for the next $7\frac{1}{2}$ miles around the base of Mount Fyffe, namely from the 15th mile to the River Hapuka at $22\frac{1}{2}$ miles, is over very favourable ground, with but a small amount of waterway to provide for, and a section showing but little earthwork to be done; and as soon as the site of the station for Kaikoura shall have been decided upon, the line along this length can be located, so as to have but 3 or 4 feet of bank or cutting the whole way.

The crossing of the Hapuka River near its junction with the Buibui is by far the most difficult, in an engineering point of view, of any of the rivers before mentioned. It is not only of equal length with the Kowhai, but the bridge will be subject to disturbance by the floating timber that comes down the river, sometimes in large quantities and with great force during heavy floods. To cross the river higher up and above the junction of the Buibui would not improve it in any way, as the water becomes too rapid, the line considerably lengthened, the section much worse, and the Buibui still to be crossed, so that the length of the two crossings would be fully equal to, if not greater than, the present one. A survey was made up the river for a considerable distance for the express purpose of seeking for a better crossing, but with no favourable result. To cross it lower down would cause the bridge to be lengthened very considerably, and as there are no defined banks to protect the