

water accumulating in it for the first one and a half days. Taking the Kyeburn area as 140 square miles, and 1 inch running off, the yield would be at the rate of 225,866 cubic feet per minute.

			Cubic Feet per Minute.
Average discharge from sluices in the upper reservoir	...	...	312,000
" " " Kyeburn area	...	...	225,866
Amount flowing into lower reservoir	...	...	537,866

It would be exceedingly difficult to say what amount would be discharged from the sluices in the lower reservoir during the time, as it depends entirely upon the storing capabilities of the bottom of the reservoir, which would regulate the rapidity with which the water level was raised. In order to discharge the whole amount the water must be nearly up to its highest level, while the sluices when running full can discharge 228,000 cubic feet per minute; consequently we shall not be far from correct if we take the average discharge from the lower dam at 300,000 cubic feet during the time that the upper reservoir was filling.

The following table will show the reduced amount of flood water at Outram, based upon the foregoing:—

			Cubic Feet per Minute.
Maximum flow from lower Taieri area	...	...	2,569,400
Estimated discharge from lower reservoir	...	...	300,000
Reduced maximum flow at Outram	...	...	2,869,400
Least capacity of river channel	...	...	1,081,248
Amount of water overflowing banks	...	...	1,788,152

Consequently during the first day and a half of a flood, which is the time the upper reservoir would take to fill, the above would represent the maximum discharge of the river; while by the time the lower reservoir had commenced to fill, the flood water from the lower Taieri area would have run off, and the increased discharge of the sluices consequent upon the rise in the lower reservoir would not be felt.

The amount of overflow from the river, as shown above, occurs between Outram Railway Bridge and Greytown, and is most difficult to provide for. It must be enclosed by parallel embankments, constructed far enough apart to give the necessary water-way, or be allowed to spread itself over the area of the land adjoining the Silverstream, as has hitherto been the case, rejoining the river lower down in conjunction with the Silverstream at Greytown, where its capacity is larger.

We have endeavoured to adopt the former alternative, but we find that, in order to obtain the required additional sectional area of water-way, the new embankment would have to be placed a considerable distance back from the river, in low ground, owing to the river bank being so high that no water-way can be obtained without doing so. This would expose the best land to the action of the floods protecting the low swampy ground only. It would also be enormously costly, as the banks would be 12 or 14 feet high, and have the disadvantage of deep water running alongside them. The discharge of this portion of the river could be increased by enlarging the river channel itself, but the cost of such an undertaking precludes its adoption. We therefore reluctantly recommend that from Outram Railway Bridge, as far as Greytown, the Silverstream area be left open, and on the other side of the river that the existing banks be maintained in their present position and at their present level.

Opposite Greytown Railway Station the river channel is very much confined now that an embankment has been constructed on the western side, the high ground being also in close proximity on the other: there is no space available for the flood water, except in the channel itself. The flood of 1879 rose here some 15 inches above the rail level in the station, and was running with considerable velocity, owing to the contraction having pounded up the water over the Silverstream area. This becomes very evident upon examining the longitudinal section of the river attached. Upon this section the levels of that flood are denoted as observed by the Engineer of the West Taieri Board of Conservators, and it will be noticed that above the point in question the surface of the flood was very flat, while below there was a considerable fall. We therefore consider it absolutely necessary that from this point down to the Taieri Railway Bridge the existing embankments should be removed, and constructed some distance further back from the river, on the line shown upon the plan, and to the height denoted upon the longitudinal section. At the same time the flat land between the hills and river must be left open, thus affording sufficient flood water-way to pass the maximum amount discharged on to the plains. The embankment from a little below the boundary between the West Taieri and Henley Districts, having been constructed since last flood, the level of water during that time is no indication of what it will be when the next occurs. We have therefore shown upon the longitudinal section the probable raised flood level, and the height the embankment should be constructed to withstand it.

At the Taieri Railway Bridge, near Otakia, the channel is most seriously contracted, so much so that there is no possibility of even an ordinary flood passing that point without damaging either the flood embankment or the land upon the opposite side, including the railway works. We have indicated upon the plan the position to which this embankment should be removed, and at the same time point out that it will involve the construction of about 20 chains of flood openings for the railway on the south bank of the river. This should be sufficient to enable the flood waters to pass without destroying the land and railway works. Below this point, the water being upon the eastern side of the railway, we propose to raise the railway embankment the whole distance between the two bridges, to the levels shown; such culverts as are necessary for the drainage of the Henley estate being protected by shutters, thereby converting the railway into a flood bank.

From a point near the Waibohla Railway Bridge, the flood bank constructed by the Henley proprietors should be raised to the same height as the railway bank, and carried at that height to the Lea Canal, or far as it is necessary to shut out the raised flood waters of the lakes.