1875.

NEW ZEALAND.

MIKONUI WATER RACE, WESTLAND.

(REPORT ON SURVEY OF MIKONUI WATER RACE, WESTLAND, ON ALTERED LINE.)

Presented to both Houses of the General Assembly by Command of His Excellency.

No. 1.

The DISTRICT ENGINEER, Hokitika, to the ENGINEER-IN-CHIEF.

SIR,— District Engineer's Office, Hokitika, 27th August, 1875.

I have the honor to forward herewith the plans, sections, schedules, and estimates of the recent re-survey of the Mikonui Water Race, and to report as follows:—

The total length of the race-line, as now proposed, is 15 miles 55 chains. This includes a branch race, 17 chains in length, in addition to the main race.

From its source on the Mikonui River to a point about 5 miles 72 chains along the original contour line, as shown on the general map in red, the old survey is followed, as the country for that distance admits of no alternative route.

From 5 miles 72 chains to 14 miles 48 chains, a new route along the Totara side of the range has been laid out, as shown on the map in green; and from 14 miles 48 chains to the end of main race, at 15 miles 38 chains, the original line is again taken up, as it cannot be improved upon.

At the time that a water-race from the Mikonui River was at first proposed, now several years ago, it was considered best to have it laid out in such a position as would enable it most readily to command the workings at Italians' and Redman's Gullies, on the southern declivity of the Greenland Range, as well as those at Ross, and from Ross to Donoghue's, on the northern side; and the Mikonui route was adopted for the survey with that object. It is now known, however, that the workings on the north side of the range are of far more importance than those on the south side; and it is believed that the workings at Ross and from Ross to Donoghue's alone would absorb all the water which a single race could conveniently be made to carry in such rugged country—namely, from 50 to 60 heads of 40 inches each.

Having now obtained a complete exploration of the whole district, it is possible to compare with certainty all the routes which are practicable, and the workings which each would command; and I believe that a race laid out principally with a view of supplying the workings at Ross, and from Ross to Donoghue's, would be the most remunerative one to construct, and that the route of the recent survey, above described, is the best which can possibly be attained for that object.

In the preliminary report upon this survey, forwarded with annual report in June last, a statement was given of the probable character of the works, which included a considerable quantity of boxing; but, after further consideration, I have thought it better to recommend that tunnelling should be adopted instead of boxing in every place where it is practicable, and the following is a list of the works as now recommended:—

	Miles	chs.	lks.
Fluming	0	70	94
Boxing	0	79	29
Tunnelling	6	69	66
Ditching	6	74	71
Total	15	54	61

Of the ditching, as above, 121 chains 71 links will require timber protection.

Had the estimate, which is given below, been based upon a larger quantity of boxing, and a corresponding amount less of tunnelling, it would have come to considerably less than it is now stated at. But I think the advantage gained in point of durability by the adoption of tunnels is more than commensurate with the difference in cost.

The total estimate for the work as now recommended, based upon a carrying capacity of 50 heads of water, which is as much as it would be advisable to calculate from the Mikonui as a source, is £68,000; and I believe that, in this case, the sum estimated may be looked upon as closely approaching to the probable cost.

In arriving at it, the greatest care has been used to ascertain the quantity correctly, and to adopt the highest scale of prices paid on the most recent similar works undertaken by the Government.

The fault in previous estimates for water-races in Westland has been not so much a want of care as a want of time, and an absence of such accurate information in the matter of surveyed details as would afford an opportunity of going into detail. It had therefore to be assumed that the prices would be similar to those paid on the then existing examples, and that the races themselves would also be similar to existing ones in the character of their works; but the rate of wages increased very considerably, and the Government races were constructed on a scale of efficiency and durability, particularly in the matter of the class of timber used, which had never previously been attempted in the locality, so that there was no real relation between the basis assumed for the estimate and the works as carried out.

In the present case, however, the most minute detail has been gone into, and the only elements of any degree of uncertainty existing in the estimate are the cost of the head-works and the price of the long tunnel.

The former of these is necessarily uncertain, as surveyors were most difficult to get, and there was not time for those obtainable to do more than lay out and plot the race-line itself.

I have, however, inspected the site on the ground, and observed that the head-works necessary there will be far simpler and less in extent than those at Lake Hochstetter, so that the sum put down for them, being nearly same as cost of Lake Hochstetter head-works, should be ample.

In the case of the long tunnel, the element of uncertainty is the question of the hardness or otherwise of the rock which may be met with, for although I have no doubt miners could be got here who would tender for it at a reasonable price, and take all the risk, it has to be borne in mind that, not being capitalists, they would have to throw it up if the price did not keep them in food.

As the rate estimated, however, for it is 30s. per cubic yard, I do not think that there would be much danger of that contingency arising.

Having already, in a report dated 1st August, 1872, given an estimate of the probable returns which might be expected from the sale of water if this race were brought in, it is not, I presume, desired that I should go further into that phase of the matter; but it is perhaps desirable that I should state, as the report itself I find bears no evidence of the fact, that it was made to and by the direction of the Government, but at the instance of Messrs. Brogden, who had it in contemplation at that time to undertake the work; and, in accordance with their request, the matter was viewed from a purely monetary point of view as a commercial undertaking and reported on accordingly, so that the report cannot be looked upon as at all favouring the merits of the scheme.

Even from the point of view from which the subject was then regarded, however, I should have been much more inclined to have given it a hearty recommendation had the then proposed line presented a reasonable prospect of security from slips and from damage which might cause heavy expenses for repairs; but it did not do so, and hence the large sum which I estimated for maintenance and supervision.

It is in this element of security perhaps more than in any other that the new line has the advantage over the old one, as tunnels are the most durable of all classes of water-race constructions, and in the new route tunnelling prevails.

There was also another item which I omitted to consider sufficiently when writing report of 1st August, 1872, above alluded to,—namely, the probability of the race water being used in connection with high-pressure turbines for the drainage of the Ross Flat, which drainage has since had to be abandoned in consequence of the great cost of steam power there. Roughly estimated, if the water were applied with the full head available, and carrying through reasonably large pipes, each head of water would be equal to 30-horse power net, and, if sold for £20 per head per week, the cost to the purchaser would be about 13s. per horse-power per week; and when it is put in comparison with that fact that the cost of steam-power averaged over £2 per horse-power per week, which I have ascertained from several inquiries to have been the case, it is evident that £20 per head per week would be a low charge for all water used in pumping. The anticipated returns, however, which were given in my report above alluded to, were based on a rate of £5 per head per week, so that, if some water were sold at £20, the returns would be considerably in excess of those estimated.

There is, finally, one more important point which I presume it is my duty to mention, as it has come prominently before me during the time I have been engaged on the supervision of this survey—namely, the very depressed condition of Ross at the present time, and the effect which this is producing on the trade of Hokitika.

Since the earliest settlement on the gold fields here the activity or otherwise existing in the mining of the Totara District has always been sensibly felt in Hokitika, and this is more evidently the case now than it has ever been before, so that I believe that if the workings in and about Ross were to entirely collapse, without reasonable prospect of their being resumed again, a large proportion of the population of Hokitika, who are dependent on the earnings of the Ross miners, would have to leave the country.

So far, however, the miners at Ross, though working under great disadvantages, have been imbued with such an amount of confidence in the ultimate richness of the district that they have held on there at a lower rate of remuneration than they would have done elsewhere. This they have done in the hope that some economical and efficient means might be adopted for draining the flat to the lower levels, which are at present almost untouched; but they cannot continue to live upon this hope for an indefinite period.

So far the Mikonui Water-race has been looked upon as the most effectual and probable means of getting this done, and latterly the hopes of the miners have almost centered upon it. If it is undertaken, or a guarantee given that it will be undertaken, the population in Ross will probably remain as at present until it is completed, when it would no doubt largely increase; but if it is finally determined not to undertake it, the majority of those now at Ross would leave the West Coast altogether, carrying with them a large number of the inhabitants of Hokitika, and thus a useful body of trained miners—trained, too, in the particular class of work required at Ross—would be lost to the country.

It may be as well also to mention that if this race is undertaken on the line at present recommended its progress will necessarily be slow, as it would take at least three years to complete the long tunnel. I would recommend, therefore, in the event of its being decided to undertake it, that this tunnel, which is estimated to cost about £12,000, should be let by contract first, and the remainder of the work then withheld for a year or two.

I have, &c.,
C. Y. O'Connor,
District Engineer.

The Engineer-in-Chief, Wellington.

No. 2.

The District Engineer, Hokitika, to the Engineer-in-Chief.

Re Mikonui Race.

Sir,— District Engineer's Office, 30th August, 1875.

In pursuance of report on above works dated 27th instant, I have the honor to state that I have thought, since forwarding it, that it is possible that the pipes therein alluded to as necessary in order to secure the full head available for pumping purposes at Ross might be regarded by the mining community as properly part of the main undertaking itself, though contemplated in report as works which would appertain to the individual mining companies who might carry out the drainage of the flat. This is the more likely to be the case, because any such drainage which might be undertaken would probably not be confined to one company alone, but distributed over a number of such, so that, if each were to carry its own supply from the main race, it would be far more costly than if one large pipe were brought down to some convenient spot, out of which the requirements of the individual companies could be supplied. I have therefore put in hand the compilation of data necessary to determine the length of such a pipe, with the pressure, &c., which it would have to sustain, and the probable carrying capacity likely to be required; and hope to be able to telegraph estimate of the cost in a day or two, but send this letter meantime, in order to explain the item to which estimate will allude. (Estimate since received, £5,300.)

The material which I would recommend for this pipe would be wrought iron, on account of its being more easily removable from place to place, if necessary, than cast iron, and also on account of the facility of making junctions with it, as it would be scarcely possible to judge in the first instance where such might be required.

I have, &c.,
C. Y. O'Connor, D.E.

The Engineer-in-Chief, Wellington.

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[*Price 3d.*]