

No. 1279 w of 2^d June/85

Communicated to the
S. E. IV Circ
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4. C. No 286 W. 1-2.82.	No 505 E. 18.8.84
" " 287 W. 1. 2. 82	" 260 C. 9.2.85
3. No 2679 W. 14. 10. 82.	" 588 C. 20.3.85
4. C. No 1190 W. 10. 5. 82.	" 722 C. 4. 4. 85.
" " 1667 W. 3. 7. 82	
5. No 311 W. 29. 1. 83.	
6. No 1241 W. 26. 4. 83	
" " 1588 W. 6. 6. 83	
" " 314 W. 29. 1. 83	
" " 1536 W. 2. 6. 83.	
" " 3059 W. 29. 10. 83	
" " 145 W. 10-1-84	
" " 682 W. 13. 3. 84	
" " 1112 W. 5-5. 84	
" " 1497 W. 16. 6. 84	

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(1) No. 4535

Govt. of (1885) Madras.

FINANCIAL.

546

Issued

Recd. 21/5/85

Encl.

G.O., 1st May 1885, No. 53 M.

No. 1279 w of 2^d June 1885

MAY.

Water-supply.

Forwarding, with remarks, for the consideration of the Municipal Council, Ootacamund, estimates for improving the — of the town.

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

READ—the following papers :—

From Colonel J. BEATTY, R.E., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works department, dated Coimbatore, 17th December 1884, No. 556-E.W.

I have the honor to submit herewith a revised estimate, amounting to Rs. 1,70,000, for improving the water-supply to that portion of the station of Ootacamund lying to the north of the lake.

2. The object of these improvements is to protect the gathering ground and storage reservoir, as well as the lines of distribution, from those many causes of impurity that now affect them, and to deliver the water to the inhabitants as nearly as possible in its natural state. The works proposed will also have the effect of checking that very great waste of water which must strike every visitor to Ootacamund, and which is inseparable from a system of distribution by means of open channels.

3. The original estimates were prepared by Mr. G. T. Walch, and those now submitted by Mr. J. C. Larminie. The latter have been examined and checked by the present Executive Engineer, Major A. C. Smith, R.E. The scheme is Mr. Walch's, with certain modifications since found expedient, which are fully explained in the report. Mr. Walch's estimate amounted to Rs. 1,62,896; Mr. Larminie's, as now corrected, comes to Rs. 1,63,790.*

* Exclusive of the special provision for unforeseen contingencies Rs. 6,210.

4. The Marlimund reservoir, where the supply for the northern part of the station is stored, has hitherto been assumed to hold 50 millions of gallons. From soundings taken by Lieutenant Speed, it is now calculated that its content, between the level of the off-take pipe and the bed of the byewash, is 62,110,150 gallons, sufficient to supply the present population with 20 gallons per man per day for ten months. The estimates provide for fencing round the reservoir, so as to prevent men or cattle entering it, and for widening the byewash.

5. Provision is made for cutting out of the present catchment basin an objectionable area of 188.65 acres, and supplementing the supply from the remainder of the present drainage area by leading into the reservoir the drainage of 210 acres on Snowden.

6. The catchment basin, as now proposed, will be 290 acres in extent, and a rainfall of 9.36 inches flowing off it would fill the reservoir; while the least quantity of rain recorded as falling in one year, that of 1876, was 25.16 inches. In July 1884 the water-level in the reservoir fell to 8.50 on the gauge, which was lower than on any previous occasion. In 1876 it fell to 9 feet.

7. The additional supply from Snowden will be conveyed to the reservoir in a covered masonry duct, 2 feet wide by $1\frac{1}{2}$ feet high to springing of arch, from the junction of the catch channels on Snowden to the reservoir. The masonry duct will commence in a masonry sump at the junction, run through the Snowden grounds, and then alongside the road with a fall of 19 feet in a length of 5,000 feet. When flowing $1\frac{1}{2}$ feet deep, it will be capable of discharging the drainage from a rainfall of

2 inches in 24 hours and will be provided with waste weirs to relieve it in times of greater floods. It will be underground, and the land along it reserved to prevent tree-planting near it.

8. The population to be supplied on the north side of the lake is taken at 10,500; and at 20 gallons per man per day, the quantity of water required daily would be 210,000 gallons; but it has been considered best to allow for a discharge of 240,000 gallons per day between the Marlimund and the Snowdon service reservoirs. Iron piping, 11 inches in diameter in the upper part of the present water-course and 9 inches in the lower part, will carry the water from the Marlimund reservoir to the Snowdon tunnel. The total fall is only 2.18 feet.

9. Immediately below the Snowdon tunnel comes the service reservoir with its full supply level + 424 (the same level as that of the invert floor of the tunnel) and its off-take at + 416. This 8 feet of depth gives a capacity in the reservoir of 328,000 cubic feet or 2,050,000 gallons, sufficient to supply the place for nine days.

10. Below the service reservoir the main pipe will run for 2,249 feet to a point near Stover Cottage on a line a little way below the existing water-course. At this part the pipe will be 10 inches diameter, with a fall of 1 in 500. Below Stover Cottage the fall increases to 1 in 175 and the size of pipe is reduced to 8½ inches. From Snowdon downwards the dimensions of pipes have been fixed with a view to delivering the required supply in 12 hours.

11. Between Snowdon and St. Stephen's Church two minor lines of piping take off from the main line; these are marked 9 and 10 on the survey sheet.

12. Below St. Stephen's the system of distribution is the same with some trifling alterations of direction and sizes of piping as that laid down in the Ootacamund Improvement Committee's map.

13. Stand-pipes,* a list of which is given, have been provided at all convenient points where water is likely to be wanted.

* 32 in number.

No provision has been made for fountains, but these can be added afterwards if thought desirable. The total length of piping provided in the estimate is 47,619 feet.

14. In addition to the lines of supply proposed by the Improvement Committee, the present estimate provides for improving the supply to Stonehouse Hill, by means of 3,800 feet of 2½-inch piping from a cistern to be built at the spring above old Ooty; with cisterns and stop cocks along the line at old Ooty, the sappers' lines, peons' quarters, &c.

15. I have added a sum of Rs. 6,210 to meet unforeseen demands, such as extra claims for compensation, or additional works † connected with the scheme not at

present thought of; this item to be applied only on estimates specially sanctioned by Government.

16. The principal items of the estimate are as follow:—

	RS.
I. Diverting drainage of objectionable area	1,000
II. Fencing round reservoir	4,500
III. Catch drains on Snowdon	1,000
IV. Compensation for land	7,000
V. Masonry duct from Snowdon to reservoir	26,000
VI. Widening byewash	2,400
VII. Cast iron main pipes from Marlimund to St. Stephen's	48,200
VIII. Service reservoir	8,250
IX. Distribution piping	63,000
X. Stand-pipes	2,440
XI. Unforeseen contingencies	6,210
Total	1,70,000

17. I send herewith two skeleton maps of the northern section. One of the maps shows the proposals of the Improvement Committee, and the other those now estimated for.

From C. E. PLUNKETT, Esq., Vice-President, Ootacamund Municipality, to the Under Secretary to Government, Public Works department, dated Ootacamund, 13th February 1885, No. 90.

I have the honor to forward herewith the statement called for in your letter No. 260-C, dated the 9th instant, exhibiting the following aggregate sums expended under the heads referred to:—

	RS.	A.	P.
(a) Unremunerative works	19,976	12	11
(b) Remunerative works	6,700	0	0
	26,676	12	11
Deduct Government grant	25,000	0	0
Amount spent from Municipal funds	1,676	12	11

ENCLOSURE.

(a) Unremunerative.

	RS.	A.	P.
Acquiring Joachim pettah	3,731	8	0
Do. Thoppa Mudaliar's lines, &c.	10,000	0	0
Do. Tom's bungalow and land	2,500	0	0
Minor improvements	3,745	4	11
	19,976	12	11

(b) Remunerative.

Constructing cooly lines at Kandal	6,700	0	0
	26,676	12	11
Amount sanctioned	25,000	0	0
Amount spent from Municipal funds	1,676	12	11

From Deputy Surgeon-General M. C. FURNELL, M.D., F.R.C.S., Sanitary Commissioner for Madras, to the Secretary to Government, Public Works department, dated Madras, 25th March 1885, No. 381.

I have the honor to acknowledge receipt of memorandum, No. 585 C., Public Works department, giving cover to a letter from the Superintending Engineer, IV Circle, No. 556, dated 17th December 1884, with plans and estimates herewith returned.

2. The question, putting aside expense, seems narrowed to these two points—

1st—Is it better to have a catchment area free from contamination to feed our water reservoir, or

2nd—May we make use of a contaminated and impure catchment area so long as we can filter the water afterwards.

I unhesitatingly say it is better to have a catchment area free from contamination.

3. People are apt to forget what it is exactly a filter does for water. Its only function is to separate matters suspended. It renders a thick turbid water clear, but it does not and cannot separate salts or other impurities held in solution. The impure and dangerous salts and compounds of decomposing and decomposed faecal matter

held in *solution* would pass on through a filter, and come out at the point of delivery almost as dangerous as at the place of entry. No amount of filtration would enable us to say of a water, impregnated with sewage filth at Marlimund, that by passage through a filter, however carefully constructed, it had become pure and fit for drinking purposes. This is well illustrated by the famous Lausen Epidemic of Typhoid fever. See Appendix A.

4. Besides, a filter after a time, unless very carefully attended to, becomes itself the contaminating source of water passing through it. The great desideratum in all water-supplies is to have an uncontaminated and uncontaminable source.

ENCLOSURE.

APPENDIX A.

"A severe outbreak of typhoid fever broke out in Lausen, in the canton of Basel, in August 1872. The public water-supply was a spring rising at the foot of a mountain (the Stockhalden) which was received into a sealed reservoir, and so conveyed to Lausen, that any pollution by the way or at its source was out of the question. Suspicion attached itself to the public supply as it was found that all houses supplied from other sources were exempt from the attack. Investigation led to the discovery that cases of typhoid had occurred at a farm-house in a valley, the other side of the Stockhalden, and the drainage from which farm went into a brook called the Furler. Finally it was discovered that part of the stream lost itself in the Stockhalden, and after travelling for about a mile through the mountain, reappeared as the spring which forms the Lausen supply. Several hundred-weights of salt were thrown into the stream and salt was detected after a time in the Lausen stream, thus establishing the connection between the two. Then several hundred-weights of flour were thrown in, but not a vestige appeared the other side of the mountain, showing the thoroughness of the filtration. The case which is given at great length, and which was most elaborately investigated, proved beyond doubt that the fever poison was conveyed by water, and is interesting chiefly as showing that no amount of filtration, no matter how efficient, will keep back the typhoid poison."—From "Potable Water" by Charles Ekin.

No. 722 C.

Endorsement on the above.

Transferred to the Financial department, with note in the Public Works department, and remarks by the members of Government.

CHEPÂK,
4th April 1885.

(Signed) J. SHAW-STEWART, Col., R.E.,
Secretary to Govt., P.W.D.

To the Financial department, with papers in original and a note
for the Chief Secretary.

ORDER—dated 1st May 1885, No. 53 M., Financial.

The estimates for improving the water-supply of the north side of Ootacamund will be forwarded to the Chairman of the Ootacamund Municipal Council, for the consideration of the councillors.

2. It will be observed that the total cost of the scheme including the cost (Rs. 75,152) for the south side, as roughly estimated by the Improvement Committee, will be about 2½ lakhs. This sum the Government will be prepared to advance to the municipality for expenditure upon the work upon the following terms:—The execution of the work will be entrusted to the department of Public Works, and the municipality will, by levy of water-rate on lands and buildings, raise a sufficient annual income to pay Government 4 per cent. upon half the outlay 1¼ lakh), and a further 2 per cent. upon the same, in order to form a sinking fund for finally extinguishing the debt. The Government, it will be seen, are ready to bear one half of the whole cost of the work, and to advance the other half to the Council upon easy terms.

3. The Chairman of the Council is requested to obtain the opinion of the Council upon the above proposals, and forward the same to Government. The Government will be then prepared, if these proposals are accepted, to address the Government of India for their sanction to the scheme.

(True Extract.)

Mammick
Chief Secretary.

To the Chairman of the Municipal Council, Ootacamund,
through the Collector of Nilgiris, with plans and estimates
and papers in original to be returned.

Copy to the Public Works department.

Exd. J. Henricus.

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