M.R.O. 1—77,006—8-6-37.

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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 2171-72 P.W.D. Press Misc

Dated 23rd August 1871.

Not to be folded or roughly handled

No 310 Read the following letter from the President and Members of the Committee appointed under the Orders of Government, dated 29th May 1871, No. 939, to report upon the anticipated returns from the outlay on the extension of the Red Hill and Cholaveram Reservoirs, to the Acting Secretary to Government, Revenue Department, dated Madras, 14th July 1871, No. 2-1 —

In accordance with the request contained in the Orders of Government, dated 8th June 1871, No 1,518, passed in the Department of Public Works, we have the honour to furnish our report upon the outlay necessary to complete the works appertaining to the Red Hill and Cholaverar Projects, and also upon the probable return which can equitably be deemed derivble from the above outlay.

2. As regards the first subject, we beg to submit Major Ryves' Report* and estimate drawn up after careful personal inspection of the works. The Government will observe that this more recent investigation into the necessary outlay enhances by Rupees 1,86,383 the sum with which the Acting Collector and the Acting Director of Revenue Settlement had to deal when they submitted their detailed views upon the probable returns.

* *Vide* Appendix A.

	RS
Major Ryves' present estimate .	12,25,558
Amount of former estimate as given in paragraph 3 of Major Mullins' Report, dated 21st January 1870	10,39,175
Difference ..	1,86,383

3. The Government will observe that he main items of increase are Rupees 9,776* on account of compensation for lands taken up by the works, and Rupees 32,000 for improving the supplying channel from the Cortelliar. Major Ryves likewise points out that the sluice through which the water is to be drawn off from the Red Hill Tank to Madras is far too small, and that its capacity of discharge must be largely increased, otherwise the town supply could not be delivered without retaining in the tank a head of water so extensive as to interfere most materially, even with the lands under irrigation, before the works of extension were contemplated. But the expenditure necessary to carry into effect this essential measure, and the cost of keeping up the supplying channel from this sluice to the town, appertain, we learn, to he Municipality of Madras.

* *Vide* Appendix B

4 The sum of Rupees 11,500* assigned for maintenance will, we conclude, be necessary for six or seven years until the earthworks become settled, the channel banks firm and stable, and all is in working order, when 7,000 or 8,000 Rupees may annually suffice. Under the item of maintenance, we have included the salaries of the establishment to work the sluices, and to distribute the supply to the main channels leading to the villages to be irrigated

* *Vide* paragraph 8 of Major Ryves' Memorandum

5. As the present alterations and improvements are suggested by Major Ryves with the view of securing the requisite supply both permanently and effectually, we must not expect that the increase in the estimate will furnish any increase in the storage of the water in he reservoirs. Thus Major Ryves estimates the quantity of water available for irrigation after deducting town supply,

evaporation, and permanent reserve required on account of the high level of the town sluice, at 83,000,000 cubic yards. This is almost exactly the sum taken by the Acting Director in paragraph 31 of his report, so that our calculations are unable to embrace any larger area of land to be hereafter brought under the influence of the project than that already dealt with by the Acting Director. Increased outlay in production, without any corresponding increase in the commodity produced, necessarily brings down the anticipated returns, so that our present report must, we regret to say, be more unfavourable to the financial aspect of the project than those already laid before Government

6 *Return to be anticipated.*—Although the conclusions arrived at by the Acting Collector of Chingleput* and the Acting Director of Revenue Settlement† were far less favourable to the project than had been looked for, our present scrutiny proves that those conclusions were correct upon the then available data. Major Ryves, in paragraph 8 of his memorandum, estimates the returns at Rupees 50,000, or 4 per cent, as shown in the margin Mr Banbury calculated they would yield 57,377 Rupees, or 5¼ per cent. When, however, we take into consideration the sum now allowed for maintenance, these receipts fall to Rupees 45,377, or in round numbers, 4⅜ per cent. upon Rupees 10,39,175, the outlay then sanctioned; but when, as must now be the case, we finally apply this estimated return of Rupees 45,397 to the enhanced outlay, the interest realizable falls to 3¾ per cent The annexed statement shows, at a glance, the financial aspect of the work under discussion.—

* Mr. Blair estimated a return of 5¼ per cent

† Mr Banbury estimated a return of 5¼ per cent

	Rs
6,000 Acres of punjah, at Rupees 3¾	22,500
Average remission	7,500
Town supply	32,000
	61,500
Deduct for maintenance ...	11,500
	50,000

Amount of capital to be expended on the project as estimated by Major Ryves	Rs 12,25,55

Return as per paragraph 33 of Mr Banbury's Report —		Rs.
1. By wet waste land to be brought under cultivation		5,239
2 By water-rate to be realized upon dry lands to be converted into wet		12,000
3 By second crop assessment		4,965
4 By water-supply to the Town of Madras		32,000
5 By cessation of annual remission ..		7,568
Total		61,772
Deduct assessment on lands taken up for water-spread and channels ..	4,895	
Cost of maintenance as estimated by Major Ryves ..	11,500	
		16,395
Net returns ..		45,377

The capital invested will, therefore, return 3¾ per cent, to which must be added ½ per cent. on account of the increase of revenue upon the old wet lands, owing to the higher groups into which the villages have been placed by the new settlement, and which increase is due to the improved supply in the reservoirs—*vide* paragraph 33 of Mr. Banbury's Report. Thus the annual returns may be

estimated at 4 per cent. We are glad to be able to state that a reference to the Collector's office shows that, although there is now an increase of Rupees 92,776 in the amount of compensation to be given, there is not, as might be expected, any corresponding increase in the sum of Rupees 4,835, the amount already taken as the assessment annually lost on the lands for which the indemnification is to be paid.

7. It has come to our knowledge that there are 8,000 Rupees worth of surplus timber and other materials to be disposed of at the Red Hill Works. This would decrease the estimated outlay; but it has also come to our knowledge that upwards of Rupees 16,000 have been taken from "Ordinary Agricultural" in order to repair the anicut at Villayur Damarapaukum, the head sluice, the supplying channel, and the slip in the Cholaveram bund, so that in reality the estimated outlay cannot be fairly diminished. We would also point out that the Rupees 7,568, credited to the project on account of cessation of remissions, can hardly be deemed an undeviating and perfectly secure asset, as seasons may turn out badly; and it may not unfrequently happen that consideration will have to be shown to the distant and high level lands to which water was not sufficiently served.

8. Full consideration of the case leads us to the conviction that this amount of interest cannot, with the exception of one small item hereafter to be noticed, be increased as far as land revenue is concerned, when we adhere, as directed by Government, to the acknowledged principles of settlement. Moreover, when Mr. Banbury's settlement proposals are criticised and examined by Government, we anticipate very probably the rates he arrives at, low though they are considered in many quarters, will be ultimately reduced. Thus, for instance, the deductions for cartage and merchants' profits will very likely be considered inadequate, and as the selling prices are now below Rupees 105 per garce, the commutation rate proposed, and likely to fall still more, Mr. Banbury's rate of conversion may not improbably be hereafter lowered.

9. The estimates already made in paragraphs 31, 32, and 33 of the Acting Director's Report are but slightly and immaterially altered by further investigation; and only one item of augmentation appears feasible, that is to raise the proposed water-rate from Rupees 3 to 3½ Among the witnesses examined were Bhojunga Row and Soondra Row, respectively, Tahsildars of Ponnery and Sydapet, and these officers both recorded their opinion that 3½ Rupees per acre might be levied. It must, however, be remembered that this rate, added to the dry assessment, would increase the demand upon these lands newly taken up, beyond the average of those under wet crops for years past, and would thus be a questionable proceeding as regards fairness and equity. But, on the other hand, it may be said the ryots need not take the water unless they elect to do so, and that Government has, under the Red Hill Tank, ample dry land available, so that there should be something like competition for the water. This matter, however, is one rather to be determined by the Board and Government than by our Committee. The result of this enhancement of half a rupee per acre would be an increase of Rupees 2,000 to the anticipated receipts. Our inquiries, moreover, induce us to believe that we must not look for any large breadth of the present wet lands being cropped a second time. The poverty of the soil and of its owners, the requisite heavy manuring, the diminished outturn on the land twice cropped, and, in fact, the little or no profit

frequently obtainable from the venture, prevent our being able to reckon upon more than one-seventh of the present area of wet cultivation being tilled twice in the same year. This, however, is rather a gain to the State, as the water thus rendered available can be taken to lands now devoid of irrigation, and the one crop raised thereon will, as a rule, pay a higher rate of assessment than would be leviable for a second crop.

10 We deem it hardly worthwhile to take up the time of Government by re-capitulating the facts adduced by Messrs Blair and Banbury to account for the apparently unduly low assessment upon tracts well irrigated and near the town of Madras. We can only say that our local inquiries corroborate what has been already recorded. The poverty of the soil and its cultivators are as patent to the eye as they are universally acknowledged. The present Government demand is realized with the greatest difficulty, and land when put up to auction on account of arrears of revenue realized, on the average of both "wet" and "dry," during the last four years only Rupees 11-10-10 per acre in the Sydapet,* and Rupees 6 3-8 in the Ponnery* Taluqs From the Registration Office returns we find that the average of 28 *bona fide* sales of wet lands, including even fields in close proximity to the town of Madras, was only 64 Rupees per acre. In Trichinopoly the Government are doubtless aware that Rupees 500 per acre is by no means an out-of-the-way price for lands watered by the Cauvery Again, it must not be supposed that the vicinity to the town of Madras is an unmixed benefit. Labour is far dearer than in the interior, and the prices ruling in Madras are, contrary to the generally received opinion, frequently lower than those of the inland towns of the district. Thus, Appendix D. shows that whilst in the town of Madras the average price of paddy per garce was Rupees 177 and Rupees 122 respectively for the two last Fushes, 1279 and 1280, the average of Madaranta-kum, Chingleput, and other towns gives for the same periods Rupees 191 and 130. This is easily accounted for when one considers the influx of grain to the city of Madras by sea, by rail, and by road.

* *Vide* Appendix C

11. Another point that may doubtless attract notice is, that the tentative rates proposed by the Settlement Department were based upon the outturn of the kar crop, generally deemed less productive than that of the sambah; but during the past season the opportune rains, and absence from anything like blight made the kar harvest unusually plenteous, so that when the far larger number of experiments came to be subsequently made in the sambah yield, it was found that the grain values based on kar were only just maintained. Again, many persons unacquainted with the locality would no doubt take exception to the low average of the proposed assessment for the wet lands situated within the tract under discussion, this average being only Rupees 3 10-10 per acre. The apparent leniency is readily accounted for by there being no really good regada or other rich lands to take into account, so that, with such poor data to work upon, the average must necessarily come out low.

12. During the local inquiry made one or two minor matters slightly favourable to the project came under discussion and observation; but when we have to deal with an expended capital of upwards of £120,000, the interest derivable

from these minor in-comings is barely appreciable, and not worth mentioning. Again, although localities to which the irrigation could be extended were pointed out, it was no practical use one taking up the question, as we have no larger supply of water to deal with than before, and the diverting a portion thereof from a locality already suggested, to one we were asked to advocate, would be purposeless. This is the case with regard to the tank beds, much of which will, owing to the extended system of channel irrigation, become superfluous as regards its original purpose and be available for tillage. But if this, as it were, newly created area is irrigated, a corresponding diminution in wet cultivation must take place elsewhere It may be considered whether these newly available lands should be sold at auction, as has been the course pursued in the Kistna and Godavery; but the peculiar characteristics of the Chingleput District might create some discontent and expressions of disapprobation, if the tracts were not disposed of according to the Durkast rules, without any payment for the right of occupation.

13. In conclusion, we must notice that the remarkable omission to gauge carefully, from year to year, the freshes in the Cortelliar, which are to supply these extensive reservoirs, leaves us without any ascertained data as to the quantity of water which they are really likely annually to receive. Major Ryves is however of opinion that the estimate we have worked upon, namely, 160,000,000 cubic yards, may be accepted as a safe figure.

(Signed) G. THORNHILL,
President.
(Signed) J. G. RYVES, Major, R E,
Acting Joint Secretary to Government, and Chief Engineer for Irrigation.
(Signed) G. BANBURY,
Acting Director of Revenue Settlement.

APPENDIX A

Memorandum from Major J. G. RYVES

Cost of the Works—The estimated cost of the works, as sanctioned by G. O, dated 20th September 1870, was Rupees 10,42,075, including 83,140 Rupees for compensation, and since the above date the additional estimates as per margin have been sanctioned, amounting to Rupees 26,040, and raising the total of the sanctioned estimates to Rupees 10,68,121

	Rs
Puddle to Red Hill Tank . .	.. 16 500
Katenkal Calingulah	... 7,145
Embanking Cortelliar .	2,400

2 The expenditure up to 30th April 1871 amounted to Rupees 9,24,298, and the further outlay required to complete the project is by the accompanying statement shown to be Rupees 2,69,260, making the total cost Rupees 11,93,558, or 1,23,037 Rupees more than the revised estimate sanctioned last September. Of this excess, Rupees 92,777 is for payments for land and compensation in excess of the sum (83,140 Rupees) sanctioned for that purpose, the remainder 30,260 Rupees representing the amount of error, 3 per cent, on the total in the estimates for works

3 Having carefully inspected the works throughout, I see no reason to doubt that the amount above stated, namely, Rupees 11,93,558, will fully cover the cost of the works as they are being carried out, but to this sum I propose to add Rupees 32,000 for the purpose of, firstly, widening the channel to 50 feet at bottom (with sides sloping 2 to 1) as far down as the bridge at the 5⅝th mile, secondly, revetting the slopes with grass rollers; and, thirdly, for reducing the velocity of the current

by fitting shutters to the bridge at the 3rd and 5th miles, and constructing entirely new regulators (piers and shutters) at the 1½, 2½, and 4 miles. I consider it very desirable, if not absolutely essential, that these extra works should be carried out. Adding 32,000 to 11,93,558, we have a total of 12,25,558 Rupees, or just over 12¼ lacs.

4. *The quantity of water available* —The data for determining the supply that may be relied upon in the Cortelliar at the (Chembrumbaukum) head of the Madras Water Works channel are very meagre, almost *nil*. I can find the record of only one season's freshes, namely, for last year, and even this does not give particulars as clearly and fully as is desirable.

5. It shows that between June and December 1870 the freshes rose—

Above 8 feet on 7 days
„ 7 feet and under 8 feet on 11 days.
„ 6 „ „ „ 8 „ „ 34 „
„ 5 „ „ „ 6 „ „ 5 „
„ 4 „ „ „ 5 „ „ 5 „

In such a season the channel would draw off 200 millions of cubic yards, and the whole could be stored in the tank

6 But I believe the Cortelliar freshes were more than usually favourable last year, and that it would not be safe to take the above quantity as the basis of calculation of profits. Perhaps 160 millions may be accepted as a safe figure

This quantity could not be stored in the Cholaveram and Red Hill Tanks at one filling; but as about one-third of the supply will be received in July and August and the remainder in October and November, there is no doubt that the whole would be stored and available for use.

7. *Probable profits* —Taking 160 millions as the average quantity of water stored in one year, we have, first, to strike off 45 million cubic yards for loss by evaporation; and, secondly, to reserve 32 millions for the town supply, leaving for irrigation 83 million cubic yards This would be enough for one crop of sumbah paddy on 11,000 acres

8. The average area of old wet cultivation under the two tanks is stated to be 4,980 acres (paragraph 40 of Mr Blair's Report), so that the additional area that could be irrigated will be a little over 6,000 acres The profits may then be briefly stated as follows —

	RS.
6,000 Acres of punjah, at 3¾ Rupees	22,000
Average remission	7,500
Town supply	32,000
Total ..	61,500
Deduct for maintenance...	11,500
Net profit ..	50,000

or just over 4 per cent. on the estimated expenditure of capital. 11,500 Rupees is a large annual allowance for maintenance, but during the first few years it will not, I think, be found more than sufficient Ultimately no doubt the maintenance need not cost more than seven or eight thousand Rupees.

9. *Head-sluice for Town supply* —I inspected this work which is under construction. The design is, in my opinion, unsuitable and should be revised At any rate it will be necessary to increase very largely the capacity of the sluice. At present the sectional area provided is barely 4 square feet; it should be at least 10 or 12 square feet; 16 or 18 would be better.

10 This is necessary, because otherwise the town supply could not be delivered through the sluice without keeping the tank surface at such a high level that little or no water would be available for irrigation, even for the old punjah lands

(Signed) J. G RYVES, Major, R E,
Acting Chief Engineer for Irrigation.

Proceedings of the Madras Government, Public Works Department, 23rd August 1871.

APPENDIX B

Abstract of Comparative Statement of the Madras Water Works Project, Chingleput District

Estimate No.	Name of Works	Amount of Estimate.	Amount spent up to 30th April 1871 A	Amount required to complete each. B	Total of A and B	Increase	Decrease.	Comparative statement, sheet No	Remarks
	Works included in the revised estimate	RS A P	RS A P	RS. A P.	RS A P.	Rs A P	Rs. A P		
1	Anicut at Cortelliar ..	60,076 8 2	60,179 14 9		60,179 14 9	103 6 7	. ..	1 1	
2	Head-sluice at do ...	28,944 4 1	31,029 8 4	1,533 13 8	32,563 6 0	3,619 1 11	. ....	1 2	Inclusive of Rs 2,702 5 9 for raising wing walls of sluice and amount
3	Channel from Cortelliar to Cholaveram, including Boosykal diversion channel	90,499 6 10	89,813 7 1	.....	89,813 7 1	...	685 15 9	2 2	
4	Bund across Katankal .	724 10 2	765 6 2	..	765 6 2	40 12 0	.....	3	
5	Boosykal upper and lower bund	8,035 4 3	8,870 12 6	.....	8,870 12 6	835 8 3	... .	4	
6 to 9	Five bridges and ten inlets on upper channel	53,501 9 7	51,538 10 0	... ..	51,538 10 0	.	1,962 15 7	4	
10	Calingulah at Boosykal diversion channel.	6,480 7 6	6,530 10 0	. ...	6,530 10 0	50 2 6	... .	4	
11	Allacherry aqueduct	6,199 8 7	6,285 13 4	....	6,285 13 4	86 4 9	.. ..	4	
12	Cholaveram lake bund ..	2,08,537 9 7	1,90,171 7 11	20,746 1 11	2,10,917 9 10	2,380 0 3	.. ..	5	
13&14	Do. calingulah	16,716 0 1	7,189 11 1	12,309 11 10	19,989 6 11	3,273 6 10	... ...	5	
15	Do irrigation sluice	8,461 13 4	9,171 8 5		9,171 8 5	709 11 1	...	6	
16	Do head-sluice for supply channel with irrigation sluice attached	23,763 12 5	30,843 12 3	333 4 0	31,177 0 3	7,413 3 10	. .. ...	7	
17	Channel between lakes	94,807 1 0	91,703 6 2	9 5 0	91,712 11 2	. ...	3,094 5 10	8	
18to20	Under tunnel, one inlet, one cart bridge on channel between lakes.	9,694 2 4	9,499 8 8	... .	9,499 8 8	. .	194 9 8	8	
21	Red Hill lake calingulah	10,244 14 3	4,992 11 3	5,252 3 0	10,244 14 3	.....	.....	9	
22	Masonry dam with irrigation sluice attached	22,471 15 8	24,231 13 3	14,196 12 1	38,428 9 4	15,956 9 8	.. ..	9	
23	Red Hill lake bund ..	1,50,233 7 4	1,28,286 15 6	15,511 10 4	1,43,798 9 10	.. .	6,434 13 6	10	
24	Soorapaloo and Seethapet bunds	24,257 9 6	14,435 4 2	11,674 12 7	26,110 0 9	1,852 7 3	. ...	10	
25&26	Red Hill two irrigation sluices	28,261 6 10	29,917 15 11	253 8 0	30,171 7 11	1,910 1 1	. .	11	

Abstract of Comparative Statement of the Madras Water Works Project, Chingleput District —(Concluded)

Estimate No.	Name of Works	Amount of Estimate	Amount spent up to 30th April 1871. A	Amount required to complete each B	Total of A and B	Increase.	Decrease	Comparative statement, sheet No	Remarks
	Works included in the revised estimate —(Conld)	RS. A. P	RS A. P.	RS A. P.	RS A P	RS A P.	RS A P		
27	Office and Store-shed on line of works	2,000 0 0	2,569 12 2	100 0 0	2,669 12 2	669 12 2	..	11	
28	Maintenance	4,996 12 9	5,179 6 6	..	5,179 6 6	182 9 9	..	11	
29	Contribution by Madras Government to delivery channel works, as per G Os, Nos 2,163 and 3,154, dated 3rd July and 29th Sept 1869, respectively.	30,832 0 0	30,832 0 0	..... .	30,832 0 0	... ...	..	11	
30	Distributing channels below bunds and Soorapadoo irrigation sluice	25,000 0 0	2,478 8 2	22,521 7 10	25,000 0 0	...	.. . .		
...	Contingencies and superintendence	44,194 14 11	42,518 0 9	5,226 10 1	47,744 10 10	3,549 11 11	.. ...	...	
...	Compensation for lands taken.	83,140 0 0	40,071 6 6	1,35,845 9 0	*1,75,916 15 6	92,776 15 6	. . ..	...	*Vide G O, No 60, dated 10th January 1871, P W D
	C ..	10,42,075 3 2	9,19,507 6 10	2,45,604 13 4	11,65,112 4 2	1,35,409 13 4	12,372 12 4		
	Works sanctioned since revised estimate forwarded								
...	Puddle to the toe of Red Hill Bund	16,500 0 0	4,241 1 1	12,258 14 11	16,500 0 0	.... ..	... . ..	.	
. .	Katenkal Calingulah . .	7,145 8 6	549 4 8	6,596 3 10	7,145 8 6	..	.. .	...	
...	Embanking the Cortelliar river.	2,400 0 0	.....	4,800 0 0	4,800 0 0	2,400 0 0	.. . ..	.	Under investigation ; estimate will be shortly submitted
	D ..	26,045 8 6	4,790 5 9	23,655 2 9	28,445 8 6	....	..		
	Total of C and D ..	10,68,120 11 8	9,24,297 12 7	2,69,269 0 1	11,93,557 12 8	1,37,809 13 4	12,372 12 4	...	
	Deduct .	. ....	.... . .	. ...	10,68,120 11 8	12,372 12 4		..	
	Increase	....	.. ...	... .	1,25,437 1 0	1,25,437 1 0	...		

MADRAS,
July 1871.

(Signed) G THORNHILL,
President

(Signed) G BANBURY,
Ag Director of Revenue Settlement.

Proceedings of the Madras Government, Public Works Department, 23rd August 1871.

APPENDIX C

Statement showing the extent of land sold, etc., for arrears of revenue in the Sydapet and Ponnery Taluqs of the Chingleput District during the past years

Years	Sydapet Taluq				Ponnery Taluq			
	Extent	Assessment	Amount realized by sale	Average sale proceeds per acre.	Extent	Assessment.	Amount realized by sale	Average sale proceeds per acre
	ACRES A P	RS A P	RS A P	RS A P.	ACRES A P	RS. A P	RS A P	RS A P
1867	645 0 10	1,667 3 7	5,037 9 10	7 12 11	771 11 14	2,130 5 1	3,626 4 11	4 11 2
1868	188 9 5	485 10 11	2,300 15 1	12 3 2	54 6 9	139 0 1	394 5 5	7 4 0
1869	603 10 0	1,746 8 2	6,066 5 4	10 0 9	683 5 12	1,775 2 7	5,428 6 5	7 15 1
1870 ..	216 9 12	745 2 7	3,607 5 5	16 10 6	1,657 1 11	3,785 15 8	8,330 0 8	5 0 5
Average for each year	. ... .	... .	... ...	11 10 10	... .	.	. . .	6 3 8

MADRAS,
14th July 1871.

(Signed) G. THORNHILL,
President

(Signed) G BANBURY,
Ag Director of Revenue Settlement

Proceedings of the Madras Government, Public Works Department, 23rd August 1871.

APPENDIX D

Statement comparing the price of Paddy per garce in the Taluqs of the Chingleput District and the Town of Madras during Fusilies 1279 and 1280

	Taluqs	Fasli 1279		Fasli 1280	
		1st sort Paddy	2nd sort Paddy	1st sort Paddy	2nd sort Paddy
		Rs	Rs	Rs	Rs
1	Sydapet	162	158	132	123
2	Chingleput	215	199	147	135
3	Madarantakum	218	192	135	115
4	Conjeveram	216	201	136	133
5	Trivellore	198	181	140	122
6	Ponnery	193	165	136	119
	Average price for the District	200	187	137	124
	Average price of the two sorts of paddy	194		130	
1	Madras	181	173	127	117
	Average price of the two sorts of paddy	177		122	

Madras,
14*th July* 1871.

(Signed) G. THORNHILL,
President

(Signed) G BANBURY,
Ag Director of Revenue Settlement.

No 311. Order thereon, 23rd August 1871, No. 2,171.

IRRIGATION, No 23

Ordered that the following letter be sent —

(Here enter No. 2,172, dated 23rd August 1871.)

(True Extract.)

(Signed) A. deC. SCOTT, Captain, R.E.,
Under Secretary to Government.

Exd E C Shunker.

Govt. of {1871} Madras.

PUBLIC WORKS.

To

Dated, August 23rd

Recd. *Encl.*

G. O, 23rd August 1871, *No* 2,171.

AUGUST.

Nos. 310-311

Madras Water Supply Project.—Passing orders on the Committee's report, etc.

No.312. Public Works Department,
Ootacamund, 23rd August 1871.

No.2172.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Public Works Department.

Sir,

I am directed to forward, for the favourable consideration of the Government of India, a revised and definitive estimate for the combined project of increased irrigation under the Cholaveram and Red Hill Tanks and the supply of water to the city of Madras.

IRRIGATION, NO.24.

2. The Governor in Council regrets that the submission of the scheme in its present form has been so long deferred, but His Excellency trusts that the Supreme Government will find a sufficient justification for the delay which has occurred in the desire of this Government to present the project in such a shape as to leave not the least uncertainty remaining either with reference to the maximum expenditure which may be incurred, or to the financial returns which may be expected.

3. In order to obtain that perfect security on these points which the Government of India have a right to require, this Government have deemed it necessary to refer the Revenue Statements which were furnished to the Department of Public Works

by the District Revenue officials for examination by the Board of Revenue in communication with the Director of Revenue Settlement, and the Report* of the Board having proved to be of a less satisfactory character than the Government had hoped in regard to the remunerative nature of the enterprise, the Government then deemed it necessary to remit the whole question to a Special Committee composed of a Member of the Board of Revenue, the Director of Revenue Settlement, and the Acting Chief Engineer for Irrigation, Major Ryves, so that the scheme might be reported on with reference to cost and with reference to returns by a combined agency embodying the most competent and responsible authorities to whom such a duty could be entrusted.

*G.O., Revenue Department, dated 29th May 1871, No.939.

4. The Proceedings of the Board of Revenue with the Orders of Government thereon, the Report* of the Director of Revenue Settlement, the Superintending Engineer's Report with a Note by the Chief Engineer for Irrigation, a Memorandum on the subject by Major-General C.A. Orr, late Secretary to Government in this Department, and the report of the Special Committee, referred to above, will be found among the accompanying papers, and will afford the Government of India ample information on the successive steps taken by this Government in their enquiries.

G.O.,No.1518, dated 5th June 1871.

*24th November 1870, No. 2031-71.

G.O.,No.1100, dated 26th April 1870.

5. The definitive estimates furnished by the Acting Chief Engineer for Irrigation, Major Ryves, and adopted by the Special Committee as embracing every conceivable source of expenditure, amount to Rupees 12,25,58, presenting an excess of no less than Rupees 6,13,799 over the original estimate of Rupees 6,11,759 sanctioned* by the Government of India, of Rupees 1,86,383 over the revised estimate framed by Major Mullins in January 1870 amounting to Rupees 10,39,175, and of Rupees 3,606 over the same estimate when increased by Rupees 92,777 on account of compensation for land.

*19th July 1866, No. 626C, in G.C. 16th October 1866, No.3298.

6. The items under which excesses to this large amount occur are shown in the usual comparative statement, and, with the exception of the demands for compensation, are explained in the Reports of the Superintending Engineer, the Executive Engineer, and the Acting Chief Engineer for Irrigation, as a Member of the Special Committee, while the causes which have contributed to enhance the cost of the work as well as the changes which have been adopted in the method of its execution have for the most part been fully explained and set forth by the Acting Chief Engineer for Irrigation, Major Mullins, in his Note dated January 21st, 1870.

7. The principal elements co-operating to form the immense excess of actual expenditure over

the original estimate which has gradually accumulated are to be found --

(1) In increased rates paid for every description of labour and material during the progress of the operations.

(2) In improvements introduced in the design of the works, ensuring greater solidity and a better adaptation to the purposes which they were intended to serve.

(3) In additions to the original plan of the works, rendered necessary in consequence of the omission of some obvious particulars in the first plan and for the purpose of giving greater efficiency to the general scheme.

(4) In a much larger charge for compensation to proprietors of land and buildings than had been contemplated at the outset.

8. The causes of increased expenditure here enumerated are commonly experienced in the protracted prosecution of all schemes of a novel and comprehensive character. Few extensive works, whether executed by Government or by private agency, have been carried out in India without revealing many unforseen sources of disbursement.

9. I am, however, to submit that His Excellency in Council cannot doubt that a reasonable amount of forethought and prudence on the part of the officers who designed and the officers who sanctioned these works at an early stage might have

saved the Government from erroneous conclusions, and His Excellency is unable to deny that the Government itself is to blame in having approached this project in too sanguine a spirit in lieu of subjecting it to every form of severe and hesitating scrutiny. While His Excellency considers it to be his duty to make these admissions, he is happy to be able to affirm that no part of the additional expenditure alluded to has been cast away; the works, now far advanced towards completion, might never have been undertaken had it been known that they would prove to be of so costly a character, but every correction and every addition sanctioned has been necessary or advantageous, and this Government can affirm with confidence that the project has been eventually carried out in a manner which is creditable to the Department of Public Works, and which affords every guarantee of usefulness and durability.

10. Turning from the question of expenditure to that of profit, I am to state that the Governor in Council regrets that he is under the necessity of submitting the scheme in the most discouraging colours to the Government of India.

11. From the statements furnished at an earlier period by the Revenue authorities of the district, the Government were led to believe that 8,714 acres were already watered by the tanks, and that there were 14,905 acres of waste land capable of being brought under cultivation on which an assessment of Rupees 82,160 for a double crop might be collected, giving, with Rupees 32,000

payable by the Municipality of Madras for water, an aggregate return of Rupees 1,12,166, or nearly 10 per cent. on the outlay as estimated in the year 1870.

12. Unhappily these calculations have proved to be absolutely fallacious. The irrigated area, the rate of assessment which could be imposed, and the amount of water available for irrigation have all been over-stated.

13. The Director of Revenue Settlement having been charged with the duty of ascertaining, by accurate investigation, the area of land actually irrigated, the area of land susceptible of receiving water in the village bounds and the rate of wet assessment which the irrigated land both old and new might legitimately be required to pay, having due regard to the current rates of assessment and those to be imposed hereafter throughout the district, the hopeful expectations entertained by the authors and advocates of the scheme were rudely dispelled. It would be superfluous to enter here upon a detailed analysis and comparison of the financial calculations and results which have been produced by the several authorities who have successively handled the question.

14. The Government deem themselves safe in adopting the conclusions of the Special Committee, and the more so as these are of a most unpromising character.

15. The annexed statement succinctly exhibits the true financial aspect of the work under discussion :--

Maximum amount of capital to be expended Rupees 12,25,558.

Returns to be expected --		Rs.
1. By waste land registered as wet to be brought under wet cultivation ..		5,239
2. By water rate on dry land to be converted into wet ..		12,000
3. By second crop assessment		4,965
4. By water-supply to the town of Madras		32,000
5. By cessation of remissions		7,568
		61,772
Deduct -		
Assessment on land taken up for water spread and chanel ..	4,895	
Cost of maintenance at first ..	11,500	
	16,395	16,395
		45,377

16. The capital laid out by Government would thus realise a net return of 3¾ per cent., to which

however, according to the estimate of the Special Committee, may be added ½ per cent. on account of the increase of assessment to be levied on old wet lands, the water-supply of which will be improved by the present scheme, making a total net return of 4 per cent.

17. It will not escape the Government of India that the water-rate which it is proposed to exact on the lands under these improved tanks in the immediate vicinity of the capital is materially lower than that which is obtained, without difficulty, in several districts of the Presidency, which at first sight might appear to be less favourably situated in regard to markets for agricultural produce, nor was it without much reluctance and hesitation that this Government acceded to the views of the Board of Revenue and the Director of Revenue Settlement on this subject. The arguments adduced by those authorities are, however, deemed convincing, due regard being had to the nature of the soil, the poverty of the people, the ruling prices of grain at Madras, and the assessment levied in other portions of the district. The ryots holding under the improved tanks cannot, justly, be rack-rented to redeem the errors of Government and its officers; they cannot, justly, be made to pay higher rates than ryots holding under other tanks with soil and water of the same quality; indeed they cannot be made to take the water at all unless it is profitable and they deem it to be so.

18. This Government cannot, therefore, flatter themselves with the hope of obtaining higher rates of

assessment from the ryots than those which are adopted by the Special Committee, nor can they expect a higher price for their water from the Municipality of Madras than that which is paid by the cultivators.

19. The Government, I am to state, must however candidly own their sincere regret that they did not undertake at an earlier date a searching investigation into the area and capabilities of the lands affected by the project under consideration, by prescribing a joint action on the part of the Revenue authorities and those of the Department of Public Works. Such an inquiry would have disabused the Government of impressions too lightly accepted and communicated to the Government of India.

20. In conclusion, I am directed to state that the Governor in Council ventures to entertain the hope that the Government of India will still sanction the execution of this scheme under favourable conditions, with a view to the important sanitary interests which are attached to it as a project for the water-supply of the capital.

21. The project promises, at the worst, to yield 4 per cent. on a capital invested of Rupees 12,25,558, that is, it will yield a net return of Rupees 49,000 in round numbers, or the interest on a capital of Rupees 8,16,666 at 6 per cent. This Government submit that the Government of India

may equitably sanction the completion of the scheme at once from Loan Funds, that the sum of Rupees 8,16,666 be permitted to stand permanently to that account, and that the sum of Rupees 4,08,892 be recovered from the Government of Madras in four annual payments to be made from the sums appropriated to this Presidency under the head of Ordinary, in the Department of Public Works.

22. It may be objected to this Government that it was their duty when the unprofitable character of the enterprise became apparent to them to stop the works at once, and refer the decision of the questions involved to the Government of India. In connection with this suggestion, should it be made, I am to state that it was not till the Government received the Report of the Special Committee that they abandoned all hope of a more favourable result; that the scheme was not a simple one for agricultural objects, which could be relinquished and resumed at will, but that it was complicated by the design for the water-supply of Madras and by engagements with the Municipal Commission of the city, who on their part had made contracts and executed works in well grounded expectation of the completion of the Government scheme in the present year.

I have the honour, etc.

(Signed) J. CARPENDALE, Colonel, R.E.

Secretary to Government.

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1 Port Folio Supplied 6-12-72

MEMORANDUM. 13

REQUESTED for reference the under-mentioned papers

The originals please Return the Madras note books Project - ~~Estimate~~ printed in Irrigation Series No 1

OFFICE OF THE CHIEF ENGR FOR IRRIGATION, P W. Department, 5 Dec 187 2

D. N. Hawkins

Head Clerk.

To

The Registrar of the P. W. Secretariat

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No 2171. Public Works Department

23rd August 1871. 15

Proceedings of the Madras Government

Under date the August 1871

Read the following

Telegram from the Govt of India Home enter dated 19th July 1871

President & Members of the Committee appointed to report upon the anticipated returns of the Madras Water Works Project } 11th Augt

Under Secretary to Government P. W. D. } 24th Augt

Ordered that the following letter be sent.

Ordered that the foregoing papers be forwarded to the Govt of India.

List of Plans to accompany Revised Estimate & Report on the Madras Water Works (Red Hill Lake) project.

Number on Plan.	Description	Remarks.
No 1	Plan & section of Proposed anicut at the Cortilliar river.	
2	Plan of Head sluice on the Cortelliar river	
3	Plan of sand vents for anicut on the Cortilliar river.	
4	Plan of thirty feet Inlet near Shamrapanikum	
5	General Plan of Inlet in upper channel	
6	Plan of aqueduct at Alicherri Tank.	
7	Design for cart bridges in upper supply channel	
8	Plan of Proposed. calingula at Boopykal	
9	Cholaveram Tank supply channel sluice.	
10	General plan of Head sluice at Cholaveram showing connection of Head sluice and Channel also Irigation sluice.	
11	Cholaveram Head sluice. Plan showing details of Iron works of shutters. frames &c	

Number on Plan	Description	Remarks
No 12	Plan of Cholaveram Lake Irigation sluice.	
13	Plan of Calingula - Cholaveram Lake	
14	Channel between Lakes under Tunnel near Attantangal.	
15	Plan of Inlet to Supply channel at Attantangal	
16	Plan of No 1 cart bridge on the channel between Lakes.	
17	Red Hill Lake Masonry Dam	
18	Plan of Irigation sluice for Red Hill Tank.	
19	Plan & section of Irigation sluice in masonry dam	
20	Cholaveram Lake. Plan of Bund showing position of masonry works.	
21	Plan of Red Hill Lake bund showing position of masonry works	
22		
22A	Index. Map.	

To accompany Appendices to Report.

Letter of Appendix	Description	Remarks
D	Survey plan: Upper channel showing position of the masonry works, inlet to diversion channel & Boosykal Bund & Lake. Longitudinal section. upper channel. miles 1 to 2.	

Letter of Appendix	Description	Remarks
D	Longitudinal section upper channel miles 2 to 4 3/4 do do do miles 4 3/4 to 8 miles 682 feet. Longitudinal section of Boosykal diversion channel.	
E	Upper Boosykal bund sections.	
F	Cholaveram Lake Longitudinal section of Bund showing works remaining to be executed on 31st March 1869.	
G	Survey plan of channel between Cholaveram and Red Hill reservoirs	
H	Longitudinal section of the Red Hill Lake Bund showing works remaining to be executed. Red Hill Lake Bund Cross sections. 2 sheets.	
I	Working sections of Sorapandu Bund	
K	Red Hill Lake. Survey about the Calingulahs showing proposed works.	
L	Longitudinal section of supply channel shewing depths of cuttings now required to give channel the required fall on account of silt accumulation. miles 1 to 4. do do do miles 4 to terminus.	

Appendix	Description	Remarks
L	Cholavaram Lake Bund cross sections 2 sheets.	
M	Lower Poonamallee Bund sections.	

Abel

List of Enclosures to Letter No. 2172 dated 23d August 1871.

1 Copy of the Committee's Report.

1 Pro: dated 26th April 1870 No. 1100 inta Coll. Orr's memorandum, 1 revised Estimate, 1 letter from the Collector of Madras, 2 statements, 1 Appendix from A to M and 1 Comparative statement.

1 Copy of Pro: in the Revenue Dept. No. 939 dated 29th May 1871 inta a copy of the Report by the Director of Revenue Settlement dated 24th November 1870, No. 2031.

1 Copy of Pro: No. 1518 dated 5th June 1871, Pr. Dept.

Draft.

314

B/A.

J.D.S.

I think we might try for better terms. put can we borrow for less than 5 per cent. If then for we calculate on that rate the Ltc will be no loser. that it will not be a direct gainer is a pity. but then here is the diff. not from the Govt

Sir

I am directed to forward for the favorable consideration of the Govt. of India a revised and definitive estimate for the Combined Project of increased irrigation under the Cholaveram and Red Hill Tanks and the supply of water to the City of Madras.

The Governor in Council regrets that the submission of the Scheme in its present form has been so long deferred but His Excellency trusts that the Supreme Govt. will find a sufficient justification for the delay which has occurred in the decision of

of this Government to present the project in such a shape as to leave not the least uncertainty remaining either with reference to the maximum expenditure which may be incurred or as to the financial returns which may be expected.

In order to obtain that perfect security on these points which the Govt of India have a right to require this Govt have decided it necessary to refer the Revenue Statements which have been furnished to the Dept of Public Works by the District Revenue officials for examination by the Board of Revenue in communication with the Director of Revenue

of a purely Municipality and the inhabitants of Calcutta for

city. I feel sure the Home Govt would be a one side of the question and

I do not think that

II.

G. G. Rev Dept dy 29 May/71 No 939

Scinde Despatch "Land Settlement"

G. G. No 1518 dy 5 June/71.

Settlement and the Report of the Board having proved to be of a less satisfactory character than the Govt had hoped to regard to the communication of the Govt then deemed it necessary to refer the whole question to a Special Committee composed of a Member of the Board of Revenue the Director of Revenue Settlement and the Acting Chief Engineer for Irrigation, Major Pyres, so that the Scheme might be reported on both with reference to Cost and with reference to returns by a combined Agency embodying the most competent and responsible authorities to whom such a duty could be entrusted.

The Proceedings of the Govt. of Bengal with the orders of Govt. thereon — the report of the Director of Revenue Settlement, the Superintending Engineer's report with a note by the Chief Engineer for Irrigation, a memorandum on the subject by Inspr. General C. A. Orr, Lieutenant to Govt. in this Department; and the Report of the Special Committee, referred to above, will be found among the accompanying papers. And will afford the Govt. of India ample information on the successive steps taken by this Govt. in their enquiries.

The definitive estimates furnished by the acting Chief Engineer for Irrigation, Insp. Reynes, and adopted by the Special Committee embracing every allowable source of expenditure amounts to Rs. 12.25.558 presenting an excess of Rs. 1.61.759 over the original estimate of Rs. 11.759 sanctioned by the Govt. of India, of Rs. 1.86.383 over the revised estimate framed by Insp. Ingalton in January 1870, and of Rs. 93.661 over the estimate submitted by the Executive Engineer in charge of the works at the end of the same year.

The items under which excesses to this large amount occur are shown in the usual comparative statement and with the exception of the demands for compensation are explained in the Reports of the Superintending Engineer, the Executive Engineer and the

G. O. No. 1518 of 5th June/71.

+ 24th Nov/70. No. 2031/71

G. O. No. 1100 of 26th April/70.

14th July/71, No. 2-1

+ 19th July/66, No. 626 C in
Y. D. 16 Oct/66, No. 3298

when received by
Rs 92777 on account
of Compensation for
land.

declare Chief Inspector for Irrigation as a Member of the Special Committee, while the Causes which have contributed to enhance the Cost of the Works as well as the Changes which have been adopted in the Method of its Execution have for the most part been fully explained and set forth by the Acting Chief Inspector for Irrigation, Mr. J. Mullens, in his Note dated January 21. 1870.

The principal elements contributing to form the immense excess of actual expenditure over the original Estimate which has gradually accumulated are to be found:

(1.) In increased Rates paid for every description of Labour and Material during the progress of the Operations.

(2) In Improvements introduced in the design of the Works conducing greatly and in a better adaptation to the purposes which they were intended to serve.

(3) In addition to the original plan of the Works rendered necessary in consequence of the omission of some obvious particulars in the first plan and for the purpose of giving greater efficiency to the general Scheme.

(4) In a small Larger charge for Compensation to proprietors of Land and Buildings than had been contemplated at the outset.

The Causes of increased Expenditure here enumerated are commonly experienced in the protracted prosecution of all Schemes of a novel and comprehensive character. Few extensive Works, whether executed by Govt. or by private

agency transferred
earned out the Irrigation
without necessarily having
the preceding services of
distinguished.
I am however to submit
that His Excellency in
Council cannot consider
that a reasonable amount
of foresight and prudence
on the part of the officers
who designed and the
officers who sanctioned
their works of an early
stage might have saved
the Govt from enormous
Expenditure and this
Excellency is unable to
deny that the Govt itself
is to blame in having
sanctioned this project in too sanguine a spirit
~~in a spirit of speculation~~
~~want of caution~~
in lieu of subjecting it
to every form of severe
and searching scrutiny.

the aggregate returns
Rs. 1.12.166. or nearly
ten per cent on the outlay
as estimated in the
Jan 1870.
Unhesitatingly these calcula-
tions have proved to be
absolutely fallacious.
The irrigated area
the rate of assessment
all
have been stated new
stated.
The Director of Revenue
Settlement having been
charged with the duty
of ascertaining, by
accurate investigation,
the area of land
actually irrigated, the
area of land susceptible
of receiving water, and
the rate of assessment
which the irrigated land
both old and new
ought legitimately be
required to pay, having
due regard to the
current rates of assess-
ment

which could be imposed
and the amount of water
available for irrigation

in the village boundaries

and there to be disposed
hereafter through the
District, the respectful
expectations entertained
by the authors and
advocates of the Scheme
were widely disappointed.
It would be superfluous
to enter here upon a
detailed analysis and
comparison of the
financial calculations
and results which
have been produced
by the several authorities
who have successively
handled the question.
The Govt. deem themselves
safe in adopting
the conclusions of the
Special Committee and
the more so as these
are of a most unpromising
character.
The annexed statement

while His Excellency
considers it to be his duty
to make these admissions
he is happy to be able to
affirm that no part of
the additional expendi-
ture alluded to has
been cast away; the
works, now far advanced
towards completion,
might never have been
undertaken had it been
known that they would
prove to be of so costly
a character but every
correction and every
addition sanctioned
has been necessary or
advantageous and this
Govt. can affirm with
confidence that the
project has been event-
ually carried out in a
manner which is credit-
able to the Dept. of Public
Works and which
affords every guarantee
of soundness and
durability.

journey from the
question of expenditure
to that of profit I am
to state that the Governor
in Council expects but he is
under the necessity of
submitting the scheme
in the most discouraging
colours to the Govt. of India.

From the statements
furnished at an earlier
period by the Revenue
authorities of the District,
the Government were led
to believe that 8714 acres
were already watered by
the Tanks and that there
were 14.908 acres of waste
land capable of being
brought under cultivation
on which an assessment
of Rs. 82.160 for a double
crop might be collected,
leaving with Rs. 32.000.
payable by the Municipality
of Madras for water,

the true financial
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under discussion
Irrespective Amount
of Capital to be
expended — Rs. 12.25.538.
Returns to be expected.
1. By waste land
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Wet-cultivation 5.239
2. By water rate on
dry land to be
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3. By second crop
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4. By water supply
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Deduct
Expenditure on
land taken up
for water spread
and channel ... 4.895
Cost of main-
tenance of
Tank 11.600
16.395 — 16.395
45.377

The Capital laid out
by Govt. would thus

realise a net return of 3 3/4 per cent to which however, according to the estimate of the Special Committee may be added 1/4 per cent on account of the increase of assessment to be levied on old Wet lands the water supply of which will be improved by the present Scheme, making a total net return of 4 per cent.

It will not escape the Govt of India that the water rate which it is proposed to exact on the lands under these improved Tanks in the immediate vicinity of the Capital is materially lower than that which is obtained without difficulty, in several districts of the Presidency, which although first sight might appear to be less favourably situated in regard to markets for agricultural produce, has been without much reluctance and hesitation that the Govt acceded to the views of the Board of Revenue and the Director of Revenue Settlement on this subject. The arguments adduced by those authorities are however deemed convincing by the Govt, that a levy bears to the nature of the soil, the poverty of the people, the ruling prices of grain in Madras and the assessment levied in other portions of the District. The Ryots

holding under the Im-
proved Tanks cannot,
justly, be rack-rented
to redeem the errors
of Govt. and its
Officers, they cannot,
justly, be made to pay
higher rates than Ryots
holding under other
Tanks with soil and
water of the same
quality; indeed they
cannot be made to
take the water at all
unless it is for sale
and they deem it to be so.

This Govt. cannot
therefore flatter them-
selves with the hope of
obtaining higher rates
of assessment from the
Ryots than those which
are adopted by the
Special Committee,
nor can they expect
a higher price for

their water from the
Municipality of Madras
than that which is
paid by the cultivators
Ryots.

The Govt., I am to
state, must however
candidly own their
sincere regret that they
did not undertake
at an earlier date a
searching investigation
into the area and
capabilities of the lands
affected by the project
under consideration by
prescribing a joint
action on the part of the
Revenue authorities and
those of the Department
of Public Works. Such an
enquiry would have
disabused the Govt. of
impressions too lightly
accepted and communi-
cated to the Govt. of
India.

In conclusion I am
directed to state that

the Governor in Council
ventures to entertain
the hope that the Govt.
of India will sanction the execution
of this Scheme under
such restrictions
with a view to the im=
portant Sanitary interests
which are attached to it
as a project for the water
supply of the Capital.

The Project promises,
at the worst, to yield
4 per cent on a Capital
invested of Rs. 12.25.558.
that is, it will yield a
net return of Rs. 49.000
in round numbers, on
the interest on a Capital
of Rs. 8.16.666. at 6. per
Cent. This Govt. submit
that the Govt. of India
may equitably sanction
the Completion of the
Scheme at once from

loan funds, that the
Sum of Rs. 8.16.666. be
permitted to stand
permanently to that
account: and that the
Sum of Rs. 4.08.892.
be recovered from the
Govt. of Madras in
four annual payments
to be made from the
sums appropriated to
this Govt. Presidency,
under the head of
Ordinary, in the Depart=
ment of Public Works.

It may be objected
to this Government
that it is their duty
when the unfitness of the
Channel of the
entrance became
apparent to
them to stop the works
at once and refer
the decision of the
Questions involved
to the Govt. of India.

In connection with
this suggestion, should
it be made, I am to
state that it was stat-
ed that Govt. received
the report of the Special
Committee that they
abandoned all hope
of a more favourable
result; that the Scheme
was not a simple one
for agricultural objects
which could be relinquished
and resumed at will
but that it was Com-
plicated by the
design for the Water
Supply of Madras
and by engagements
with the Municipal
Commission of the
City, who on their
part had made
Contracts and
executed works in
well grounded

43

expectation of the
Completion of the
Government Scheme
in the present year.

Thomas Lewis

Desp. 30/8/71 with enclosures
as per list

Rama desp. 8/9/71 as per
list annexed

Statement showing the Monthly discharge of the Cantuar River during the years 1869 & 1870.

Month.	Discharge in Million cubic Yards 1869	1870.	Remarks.
January	*	11 1/2	
February	*	*	
March	*	*	
April	*	*	
May	*	*	
June	*	6 1/2	
July	11 1/2	15	
August	11 1/2	37 1/4	
September	8 1/2	93	
October	8 1/4	425	
November	12	36	
December	12	3	
Total.	65 7/12	626 3/4	Million Cubic yards.

* The average daily discharge during these months was about 5000 Cubyds. as it cannot be utilised in the Supply channel it has been omitted

Adel. Scott Capt. M.
Dy Engr.
22. Dec 1870

15

Statement showing what works should under the conditions laid down in the 2d para of the G.O. No. 1026 dated 13th April 1871 be carried on during the year with particulars in connection with them.

	Nature of work	G.O. sanctioning Estimate	Amount of Estimate to be executed in 1871-72	Balance on 31st March	Remarks.
A	Raising the wings and body walls of the Head sluice to the Upper supply channel	No. 678 dt 7th March 71	2900	7 8 19677 8	
B	Embanking the Cortellian river in the vicinity of the Head sluice.		2400	2400	Project under examination will be forwarded.
C	Constructing a waste in the lower side of supply channel	No. 824 dt 20th March 71	714586	692886	
D	Excavating a supplus channel from the Cholaveram Lake to the Cortellian river		3749 46	3749 46	Included in the Revised Estimate
E	Raising the masonry Dam of the Red Hill tank one course or to a level 9 feet above the old Caliyulah creek and laying thereon an earthen bund 2 feet high		22471 58	1200	Balance none
F	Laying a puddle wall at the inner toe of the Red Hill bund.	No. 1959 dt 16th August 70	16,500	11929	
G	Completing the revetment and Earthwork of the Soorapadoo bund & the Red Hills lake.		24,25796	1878	Included in the revised Estimate
H	Completing the irrigation sluices in the Soorapadoo bund	No. 807 dt 17th March 71	5463	3823	Present Estimated cost of completion.
				3387548	

Madras Waters Works office
Red Hills 22d April 1871

/True copy/
Commn Col RE
Superintg 4th Div

/Signed/ A.W.S. Scott Captn RE
Executive Engr in W.W.

W/

51

Public Works Department.

Telegram from the Government of India dated 19th July 1871.

Circulated

I will write all the arrangements for the Committee work in Bombay. Mr Broomfield is the work going on at present? If so I suppose I must be stopped but this will be settled on Tuesday.

A. N

for orders —

Major Ryves informed me before he left Madras that he had revised the estimate, & in fact done all that he as the Engineer Member of the Special Committee could do, and that his Colleagues, Messrs Broomfield & Blenkinsop, have employed his time

to the Government of India.

at once -

[illegible] Coll R.E.

Secy to Govt PWD

Colaçamund

17 Aug/71

To

Captain A de C. Scott R.E.

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To

The Secretary to the
Govt of India. P.W. Dept.

Sir,

I am directed to forward for the favorable consideration of the Govt of India a revised estimate for the Madras Water Works Scheme (the Red Hill Lake Project) and to explain that its submission has been delayed by the necessity of referring the Revenue Statements that were furnished to this Dept.

by the District Revenue Officials for Examination by the Board of Revenue in communication with the Director of Revenue Settlement. The Board's report having at length been received it became necessary to remit the whole question to a Special Committee composed of a Member of the Board. the Director of Revenue Settlement. and the Acting Chief Engineer for Irrigation in order to their reporting whether the estimate, as revised, included everything that was necessary, and what returns of

G.O No. 1518. 5th June 1871

G.O No. 1518 - 57 5th June 1871.

×24 Revs. 1870 2 : 2031/71

G.O No. 1100 of 26th April 1870

14th July 1871 No. 2-1

Revenue might fairly be expected. The Board's Proceedings with the order of Govt. thereon. the × report of the Director of Revenue Settlement: the Supt. Engineer's report with note thereon by the Chief Engineer for Irrigation. a Memorandum on the subject by Major Severn & A. Opr. late Secretary to Govt. in this Department, and the Report of the Special Committee just referred to will be found amongst the accompanying papers.

The revised estimate as prepared by the Executive Engineer in charge of the works

amounted to Rs: 10,42,640, but after the receipt the demands for compensation for land taken up for the work, or submerged by the increased spread of the two Banks, have come in to such an extent as to show that the amount to be provided to meet that head of outlay could not be covered at less than Rupees 1,75,917 which raised the total to Rs: 11,35,417 or Rs: 5,23,658 in excess of the amount sanctioned

In remitting the whole question to a special Committee it was hoped that by a revision of the items of Revenue more favorable return on the capital to be expended might be exhibited, but unfortunately it is found that a still larger amount must be provided in the estimate of expenditure, while no improvement in the estimate of Returns is feasible, and the estimate as it now stands revised amounts to Rs: 12,25,558, or Rs: 6,13,799 in excess of the sanction. Thus:-

	Rs:
Original estimate -	6,11,759
By: Engineer's revised Do	11,35,417
Excess formerly estimated:	5,23,658
Original estimate -	6,11,759
Committee's revised estimate, now submitted	12,25,558
Excess now estimated	6,13,799

The items under which excesses to this large amount occur are shown in the usual Comparative Statement and with the exception of the demands for compensation, are explained in the reports of the Supt Engineer, Executive Engineer, and of the Acting Chief Engineer for Irrigation as a Member of the Committee, while their causes, as well as the manner in which the mode of carrying out the work that has been followed has operated to enhance its cost, have been fully commented on by the Chief

Engineer for Irrigation in his note dated 21st January 1870.

Greatly as it is to be regretted that the work has proved to be so much more costly than was anticipated, His Excellency the Governor in Council is not of opinion that the causes are difficult of discovery or are of such a nature as to have been easily foreseen or readily avoided. They are, as correctly stated by the Chief Engineer for Irrigation, due to some extent to misprints, and under-estimations in the original calculations of cost, but more especially to

a the somewhat hasty manner
in which, with a view of
affording relief to the dis-
tressed poor in and about
Madras in 1866/67, the
work was started and
subsequently pushed
forward. This led to
the employment for a
time of labor on wages
beyond its true value,
and to the acceptance
of contracts which, although
at first not unfavorable,
could not be abided
by in the face of advancing
rates, and had either to
be cancelled or con-
tinued on terms which
could not but involve
excess expenditure.
In short, the effect of

the great demand for
labour which the work
itself created was not
sufficiently taken into
account when the esti-
mates were under pre-
paration, nor was it
foreseen that the more
general employment of
stone at the Presidency,
since the Railway has
been made use of for its
transport from the interior,
would cause a demand
for stone dressers which
has enabled workmen of
that description to make
their own terms.

Certain modifications
of the original designs
have been it is true

adapted as the work proceeded, but they were all of a nature to be either indispensable to the efficiency and security of the work or essentially necessary on them, and in the opinion of the Madras Government, sufficient grounds. The Chief Engineer for Irrigation seems to think that some of these alterations of design would not have been carried out had it been known that their cost would turn out to be so heavy as it proved, but this, I am to say, is a mistake. The cost of such of the works as were modified in design

has been indeed more than was expected, but this may be said of every part of the undertaking. No alterations were made without the most careful consideration of the Executive Engineer in communication with the Supt. Engineer and with the approval of the Former Chief Engineer for Irrigation under the authority of the Govt., and there is no reason to believe that the cost of the modified works, if they had not been altered in design, would not have exceeded their estimates to the full extent of the sum spent upon them as improved. For example, it is very certain that on account of water being

found close to the surface in the bed of the Cartelleir in such excessive quantity as to have made any attempt to keep it clear of deep foundations quite hopeless, the anicut and head works which constitute the key to the whole project, could not have been built as they were designed at any reasonable outlay, if at all. It was therefore absolutely necessary to give up the idea of getting down solid foundations to the clay through a stratum of sand surcharged with water, and a design based on the principle of resting

foundations on wells was adopted and has answered so completely that, although tested last October by the most severe flood ever known to have occurred in the Cartellear, the work has sustained little injury.

In the same way it might easily be shown that where other changes in the designs have been made, there were good reasons for the proceeding. Earthwork in excess of the estimated quantity has unquestionably been executed, but this was done during the short time the Officer on

charge was unable to
give his personal attention
to the work in consequence
of the attack of the mortal
illness that ultimately
carried him off. The greater
part of the earth so thrown
up was nevertheless
needed to make good
deficiences in the quantity
allowed in the original
estimate for the bunds
of the two tanks, and it
is clear from what has
been seen since both
reservoirs having been
filled to several feet
above their former level,
that, whatever the esti-
mate may have intended,
neither bund, as made
up, is by any means

more massive than is
necessary.

Much attention has
been devoted to the work,
and His Excellency the
Governor in Council
has only to add that it has,
in the opinion of the Madras
Govt., been executed,
so far, in a careful
and most substantial
manner, in general
accordance with the
specifications, and of a
superior style of work-
manship.

According to the Revenue
statements furnished by
the Collector it appeared
that, without any increase
of assessment on the lands
already irrigated by the

a tanks, there was a defi-
ficiency of water under
there to yield when
watered a remunerative
return even on the
large outlay now found
to be necessary, if the
supply of water were
thoroughly to be relied
on. Strong doubts could
not but be entertained
on this point, for all
calculations have hither-
to been based on the
assumption that the
quantity of water that
would be available
was to be measured
by the capacity to
which the tanks were
to be enlarged, and
on the supposition

that they were to be filled
but once a year. Ex-
perience has shown that
this is fallacious, and
there can be no doubt
that, owing to the sources
of some of the chief affluents
of the Carbellair being par-
tially within the influ-
ence of the South West
Monsoon, that River
brings down waters from
July to December, inclu-
sive, in sufficient quan-
tities to replenish the
tanks several times during
the very period when
they are most heavily
drawn upon for the
purposes of irrigation.
Last year the Carbellair

more or less in fresh
From June to December
discharged in a very
moderate calculation
no less than 636 millions
of cubic yards, and, in
addition to this far
more than ample quan-
tity of water for all pur-
poses, the banks are
now brought into con-
nection with the two
large local Drainages
of the Kaben-Kal and
the Baoni-Kal, which
are found to be im-
portant supplementary
sources of supply.

There is thus, in
the opinion of this Govt.
little reason to fear

a deficiency of the supply
of water, and it is therefore
with the more regret that
His Excellency in Council
has learnt from the Re-
port of the Board of Revenue
confirmed by the Special
Committee that, according
to the results of the Revenue
Survey lately completed
of the Taluks in which
the tanks are situated,
it appears, that both the
extent of land already
irrigated from them and
the area of that which
can be cultivated under
them have been much
over rated in the Collectors
Statements.

From those statements
it appeared that 8714 Acres

were already watered by the tanks, and that of waste lands capable of being brought under cultivation there were 14,905 acres on which an assessment of Rs. 82,160 for a double crop might be collected, giving, with the Rs. 32,000 to be charged for water to the Municipality of Madras, a return of Rs. 1,12,160 or nearly 10 per cent on the outlay as estimated in last year. Unfortunately the information on which these calculations were made has proved erroneous, and it is shown

by the Director of Revenue Settlement that, while the existing cultivation is only 4052 acres, the extent of land, in addition, that is likely to be brought under irrigation by means of the new works and the Revenue derivable from them fall far short of the originally estimated quantity, but it would be of no advantage to repeat the figures here, and I am, in lieu thereof, to quote from the Special Committee's Report which gives the following Revenues.

By

By wet rnshe land to be brought under Cultivation	Rs 5,239
By water rate to be realized upon dry lands to be converted into wet	12,000
By 2nd Crop assessment	4,965
By water supply to the Town of Madras	32,000
By cessation of annual remission	7,568
Total	61,772
Deduct assessment on lands taken up for water spread and channels.	4,895
Cost of maintenance as estimated by Major Ryves	11,500
	15,895
Net returns	45,877

The total amount calculated to be received as a return for the Capital sunk on the Scheme is about 4 per Cent on the outlay but, over 3 3/4 say

disappointing as such a result is, the Govt: do not question the reliability of the statements, or the correctness of the considerations on which the assessments have been settled at rates so much below those they expected it would have been feasible to adopt.

The merits of the project do not however solely rest on its reproductive character. It was partly undertaken with the beneficient object of providing the city of Madras, including many public establishments and the garrison both European and Native, with a

a much needed supply of
a pure and wholesome water.
It will do this, and
deem that the returns,
low as they are estimated,
do not fall very far
short of the interest at
which the Govt. can
borrow the money re-
quired to be expended,
His Excellency the
Governor in Council
confidently trusts that
the work may be per-
mitted to remain in
the category of those to
be charged to loan
funds; or that only so
much of its cost as
will reduce the amount

Govt of Madras.

PUBLIC WORKS.

To

Dated

Recd. Ent

G. O. 23rd Sept 1871, No. 2171

Nos. 310 & 311

w Water Supply Project

ng Orders on the Committee's Report

debitable to those funds to a sum on which the expected returns may yield 7 per cent may be required to be met from the ordinary grant of this Presidency

No 2/1

Nasik
12th July 1891

From,

The President and Members of the Committee appointed under the Orders of Government, dated 29th May 1891 No. 909, to report upon the sufficiency of the retaining walls recently constructed to protect the Red Hill and Chalcavaram Reservoirs

To,

C. A. Carmichael Esqr
Acting Secretary to Govt
Revenue Department

Sir,

In accordance with the request contained in the Orders of Government dated 5th June 1891 No. 1518, passed in the Department of Public Works, we have the honor to furnish our report upon the outlay necessary to complete the works appertaining to the Red Hill and Chalcavaram Reservoirs, and also upon the probable effects which can equitably be deemed likely to follow the above outlay.

2. As regards the first subject, we beg to submit Major Ryves' report and estimate drawn up after careful personal inspection of the works. The Government will observe that this more recent

* Vide appendix A.

investigation into the necessary and-
less outlay over Rs 183,383, the
sum by which the Acting
Collector and the Relief
Director of Revenue Settle-
ment had dealt when they
submitted their detailed
views upon the probable
returns.

Major Ryves' present estimate Rs 1,225,558
Amount of former estimate as given in para 3 of Major Cullen's report dated 21st January 1871. Rs 1,039,175
Diffce Rs 186,383

3. The Government will observe that the main items of increase are Rs 93,996 on account of compensation for lands taken up by the works, and Rs 32,000 for improving the supplying channel from the Cottelipan. Major Ryves likewise points out that the sluices through which the water is to be drawn off from the Red Hill Sault & Redrey, is far too small, & that its capacity of discharge must be largely increased; otherwise, the town supply could not be delivered without retaining in the Sault, a head of water so extensive, as to interfere most materially, even with the lands under irrigation before the heads of distribution here contemplated. But the expenditure necessary to carry into effect this essential measure, & the cost of keeping up the supplying channel from the sluices to the town, appertain, we learn, to the Municipality of Madras.

* Vide Appendix B

4. The sum of Rs 11,500* assigned for maintenance will, we conclude, be necessary for 6 or 7 years, until

* Vide para 8 of Major Ryves' Memo

the earth works become sealed & the channel banks firm and stable, and all is in working order, when 9000 or 8000 Rupees may annually suffice. Under the item of maintenance, we have included the salaries of the establishment & work-the sluices, and for distributing the supply to the main channels leading to the villages to be irrigated

5 As the present alterations and improvements are suggested by Major Ryves with the view of securing the requisite supply to the permanent & effectually we must not suspect that the increase in the estimate will forewish any increase in the storage of the water in the Reservoir. Thus Major Ryves estimates the quantity of water available for irrigation after deducting town supply evaporation, and for-wastage required on account of the full head of the town sluice at 83,000,000 Cubic Yards. This is almost exactly the sum taken by the Acting Director in para 31 of his report, so that our calculations are enabled to embrace any larger area of land to be hereafter brought under the influence of the reservoir, than that already dealt with by the Acting Director. Increased outlay in production, without any corresponding increase in the commodity produced, necessarily brings down the anticipated returns, so that our present report must, we regret to say, be

more unfavourable to the financial aspect of the Project, than those already laid before Government.

Returns to be anticipated –

6. Although the conclusions arrived at by the retiring Collector of Chingleput and the retiring Director of Revenue Settlement were far less favourable to the Project than had been looked for, our present scrutiny proves that those conclusions were correct upon the then available data. Major Ryves in para 8 of his Memo estimates the returns at Rs 58,000 or 4 per cent as shown in the margin. Mr Bunbury calculated they would yield 5.377 rupees or 5½ per cent. It however be to be noted that the deduction allowed for maintenance the receipts fall to Rs 48,577 or in round numbers 4⅜ per cent upon Rs 10,99,175 the outlay if maintained, but when, as must now be the case, we finally apply the estimated return of Rs 46,877 to the enhanced outlay, the interest realizable falls to 3¾ per cent. The annexed statement shows at a glance the financial aspect of the work under discussion.

6000 acres of Project at Rs 3¾	Rs	22,500
Average cumlipon		7,500
Town supply		32,000
	Rs	61,000
Deduct for maintenance		11,500
	Rs	58,000

*Mr Blair estimated a return of 5% per cent

*Mr Bunbury an estimated a return of 5½ per cent.

Amount of Capital to be blended on the Project as estimated by Major Ryves

Rs 12,20,535

Return to be derived from the Bandaging expenditure

1 By Wet waste land to be supplied under cultivation	Rs	5,239
2 By water rate the realized when dry lands to be converted into wet		12,000
3 By land enhancement		4965
4 By water rate to be levied on the area of new irrigation		32,000
5 By saving of annual charges		7060
Total Rs		61,464

Amount of annual charges on lands to be taken up for new irrigation Rs 4,965

Cost of maintenance as estimated by Major Ryves Rs 11,000

15,895

Net return Rs 45,569

The capital invested will, therefore, return 3¾ per cent, to which must be added ½ per cent on account of the increase of revenue upon the old wet lands, owing to the higher grades into which the villages have been placed by the new settlement, and which increase is due to the improved supply in the Reservoir vide para 33 of Mr Bunbury's report. Thus the annual returns may be estimated at 4 per cent. We are glad to be able to state that a reference to the Collector's Office shows that although there is now an increase of Rs 92,776 in the amount of cumlipon to be given, there is not as might be expected, any corresponding

increase in the sum of Rs 4,895, the amount already taken on the assessment annually, last on the lands for which the indemnification is to be paid.

7 It has come to my knowledge that there are some rubbish mounds of surplus stones & other materials to be disposed of at the Red Hill works. This would decrease the estimated outlay; but it has also come to my knowledge that upwards of Rs 10,000 or Rs 12,000 have been taken from "Ordinary Agricultural" in order to obtain the necessary at Vellayi's Samaraweera, the head sluice, the subsidiary channel and the slip in the Chalanaram bund; so that in reality the estimated outlay cannot be fairly diminished. We would also point out that the Rs 9,580 credited to the Project on account of cessation of receipts can hardly be deemed an undertaking and probably never will be, as receipts may turn out badly, and it may not unfrequently happen, that consideration will have to be shown to the distant & high level lands to which water will not sufficiently extend.

8. Full consideration of the case leads us to the conviction that the amount of interest cannot, with the exception of one small item hereafter to be noticed, be increased as far as land revenue is concerned, when we adhere as directed by Government, to the acknowledged principles of settlement. However, when Mr Bunbury's settlement proposals are criticised, and examined by experienced Government, we anticipate very probably, the latter to arrive at, how thoroughly they are considered in many quarters, will be ultimately reduced. Thus for instance, the deductions for carriage & merchants profits will very likely be considered inadequate, and as the selling prices are now below Rs 10 per garce, the commutation rate proposed, and likely to fall still more, the Bunbury rate of conversion may not improbably be hereafter lowered.

9 The estimates already made in paras 31 & 33 of the Letting Lands Report are but slightly and unsatisfactorily followed by further investigation, and only one item of augmentation appears feasible, — that is to raise the proposed water rate from Rs 3 & 3/2 Among the witnesses examined were Bhupenga Row and Lacandra Row, respecting Tahsildars of Pannury and Cydapet, and these officers both recorded their opinion that 3½ rupees per acre might be levied. It must however be remembered, that this rate added to the dry assessment would increase the demand upon the lands newly taking up, beyond the average of those under wet crops for years past, and would thus be a questionable proceeding as regards fairness and equity. But on the other hand it may be said the ryots on

need not take the water unless they elect to do so, and that Government has under the Red Hill Lake ample dry land available, so that, there should be something like competition for the water this matter I am convinced is one rather to be determined by the Board and Government than by our Committee. The result of this enhancement of 1/2 a rupee per acre would be an increase of Rs 2000 to the anticipated receipts. On inquiries made we are led to believe that we must not look for any large breadth of the present wet land under being cropped a second time. The honesty of the soil and of its owners, the requisite labour and manuring, the diminished outturn on the land twice cropped, and in fact the little or no profit frequently obtainable from the venture, prevent any being able to reckon upon more than 1/3 of the present area of wet cultivation being tilled twice in the same year. This however is rather a gain to the State, as the water thus rendered available can be taken to lands now devoid of irrigation; and the one crop raised thereon will, as a rule, pay a higher rate of assessment than would be obtainable for a second crop.

10. We deem it hardly worth while to take up the time of Government by recapitulating the facts adduced by Messrs. Blair and Ranbury, to account for the apparently unduly low assessment upon tracts well irrigated and near the town of Madras. We can only say that our local enquiries corroborate what has been already recorded. The honesty of the soil and its cultivators are as extolled to the eye as they are commonly acknowledged. The present Government demand is realized with the greatest difficulty, and land when put up to auction on account of arrears of Government has fetched, on the average of both "wet" and "dry", during the last four years only Rs 11 10 10 per acre in the Sydapet, and Rs 6. 3 8 in the Poonery Taluk. From the Registration office returns, we find that the average of 28 bona fide sales of wet lands including even open fields in close proximity to the town of Madras, was only 64 rupees per acre. In Trichinopoly the Government are doubtless aware that even Rs 5.12 per acre is by no means an out of the way price for lands watered by the Cauvery. Again it must not be supposed that the vicinity of the town of Madras is an unmixed benefit. Labour is far dearer than in the interior and the prices ruling in Madras are, contrary to the generally received opinion, frequently lower than those of the inland towns of the district. Thus, Appendix B shews

*Vide Appendix C.

that whilst in the Town of Madras, the average price of paddy per parah was Rs 177 & Rs 122 respectively for the two East Indies — 1279 and 1293; the average of Madras Pantaleon, Chingleput and other towns given for the same period Rs 194 and 130. This is easily accounted for when one considers the influx of grain & the City of Madras by sea, by Rail and by Road.

11 Another point that may doubtless attract notice is that the tentative rates proposed by the Settlement Department were based upon the outturn of the Rabi crop, generally deemed less productive than that of the Samba, but during last season the opportunity arises, and chance from any such thing like blight, made the Rabi an harvest unusually plentiful, so that when the far larger number of Settlements came to be taken consequently made in the Samba yield, it was found that the grain values based on Rabi were only just maintained. Again, many persons unacquainted with the locality would no doubt take exception to the low average of the proposed assessment the wet lands situated within the tract under discussion, their average being only Rs 3. 10. 10 per acre. The apparent leniency is readily accounted for by there being so really good ayacuts, or other rich lands to take into account, so that, with such poor lands to work upon, the average must necessarily come out low.

11 During the local enquiry made, one or two minor matters of slight importance were brought to my notice, but when we came to deal with an expenditure of upwards of £120,000, the interest derivable from these minor items is barely appreciable, & not worth mentioning. Again, although localities in which the irrigation could be extended were pointed out, it was impossible at once to take up the question, as we have no larger supply of water to distribute than before, & the diverting a portion thereof from a locality already supplied, & one we were called to cultivate would be purposeless. This is the case with regard to the Tank beds, much of which will, owing to the extended system of channel irrigation become superfluous as regards its original purpose & be available for tillage. But if this, or if new, locally created area is irrigated, a corresponding diminution in wet cultivation must take place elsewhere. It may be considered whether these newly available lands should be sold at auction as has been the course pursued in the Godavery & Kistna districts; but the peculiar characteristics of the Chingleput ex-

district might create some discontent & interruptions of cultivation, if the lands were not disposed of according to the market Rates, without any payment for the right of occupation.

13. In conclusion we must notice that the remarkable variation & large excess yearly, in the Establishment, which are hardly those pertaining Peace times, however without any ascertained data as to the quantity of work which they are really liable annually to execute. Major Eyres is however of opinion that the estimate for same period shou[ld] [be] 16[0],000 rupees, as may be accepted as a safe limit.

We have the honor to remain
Sir
Your most obedient Servants

J Thornhill
President

J G Eyres Major
Engr. & Secy for Irrigation

Geo Bankes
Offg. Director of Revenue

[illegible]

Memorandum from Major J. G. Eyres.

Cost of the Works

The estimated cost of the works as sanctioned by G.O dated 20th September 1870 was Rupees 10,42,095 including 83,140 Rupees for Compensation, and since the above date the additional estimates as per margin have been sanctioned amounting to Rs 26,026 and raising the total of the sanctioned estimate to Rupees 10,68,121.

Puddle & Red Hill Tank	16,500
Retention Calingula	7,140
Embanking Cortellyar	2400

2 The expenditure up to 30th April 1871 amounted to Rs 9,24,298 and the further outlay required to complete the project is by the accompanying statement shewn to be Rupees 2,69,260 making the total cost Rs 11,93,558 or 1,23,037 Rupees more than the revised estimate sanctioned last September. Of this excess Rs 92,777 is for payments for land and compensation in excess of the sum (83,140 Rs) sanctioned for

that purpose, the remainder 80,260 Rupees representing the amount of error 3 per cent on the total in the estimates for works.

3. Having carefully inspected the works throughout, I see no reason to doubt that the amount above stated viz Rs 11,93,558 will fully cover the cost of the works as they are being carried out; but at this season I propose to add Rs 32,000 for the purpose of 1. Widening the channel to 50 feet at bottom (with sides sloping 2 to 1) as far down as the bridge at the 5 5/8 mile, 2 erecting the sloper with spare rollers, and 3. for reducing the velocity of the current by fitting shutters to the bridge at the 3rd and 5th miles and constructing entirely new regulators (Piers and shutters) at the 1/2, 2 1/4 & 4 miles. I consider it very desirable, if not absolutely essential that these extra works should be carried out. Adding 32,000 to 11,93,558, we have a total of 12,25,558 Rupees, or just over twelve &

a quarter lacs.

The Quantity of Water available.

4. The data for determining the supply that may be calculated upon in the Cottellaur at the (Kambrambakkum) head of the Madras water works channel are very meagre almost nil. I can find the record of only one one season freshes, viz, for last year, and even this does not give particulars as clearly and fully as is desirable.

5. It shews that between June and December 1890 there freshes were above 8 feet on 7 days, above 7 feet & under 8 feet on 11 days,
above 6 feet & under 8 feet on 34 days
" 5 " 6 " 5 "
" 4 " 5 " 5 "
In such a season the channel would draw off 200 millions of Cubic yards, and the whole can could be stored in the tanks.

6. But I believe the Cottellaur freshes were more than usually favorable last year, and that

it would not be safe to take the above quantity as the basis of calculation of profits. Perhaps 160 millions may be accepted as a safe figure.

This quantity could not be stored in the Cholavaram and Red Hill tanks at one filling; but as about one-third of the supply will be received in July and one August, & the remainder in October and November, there is no doubt that the whole would be stored and available for use.

Probable Profits - By taking 160 millions as the average quantity of water stored in one year, we have first to strike off 45 million cubic yards for loss by evaporation, and secondly 32 millions for the town supply leaving for Irrigation 83 million cubic yards. This would be enough for one crop of Samba Paddy on 11,000 acres.

8. The average area of old wet cultivation under the two tanks is stated to be 4,980 acres (para 40 of Mr Blair's Report), so that the additional area that could be irrigated will be a little over 6,000 acres. The profits may then be briefly stated as follows (97)

	Rs.
6,000 acres of Paanjah at 3⅓ Rs =	22,000
Average remission ..... =	7,500
Town supply ..... =	32,000
Total Rs	61,500
Deduct for Maintenance	11,500
Net profit Rs	50,000

or just over 4 per cent on the estimated expenditure of capital. 11,500 Rupees is a large annual allowance for maintenance, but during the first few years it will not, I think, be found more than sufficient. Ultimately no doubt the maintenance need not exceed more than seven or eight thousand rupees.

Head Sluice for Town supply - I inspected this work which is under construction. The design is, in my opinion, unsuitable and should be revised. At any rate it will be necessary to increase very largely the capacity of the sluice. At present the sectional area provided is about 4 square feet; it should be at least 10 or 12 square feet, 16 or 18 would be better.

10 There is necessary, because, otherwise the town supply could not be delivered through the sluice without keeping the tank surface at such a high level that little or no water would be available for irrigation save for the old Kenyah lands.

(Signed) A.G. Rymer.

(True copy)

J. Moorhouse
President

Secy & Govt for Irrigation

Geo Bamburgh
Engr Director of Rev Lds

Appendix A

to a letter from the Hon'ble
Public Project Committee
to the Secy to Govt of U.P.
dated 11th Jan 1971

C Dr 39 69/71
25th Aug 1971 Ln 4310

Abstract of Comparative Statement of the Madras Water Works Capital Expenditure Sanctioned

Reference	Name of Works	Amount of Revised Estimate	Amount Spent up to 30th June 1871	Amount required to complete	Total Cost of Works	Saving on Revised Estimate	Increase	Remarks
		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
	Works included in the Revised Estimate.							
1	Anicut at Cartelliyar	60,075 8 2	60,177 14 7	— — —	60,177 14 7	103 6 7	— — —	1
2	Head Sluice do	28,744 4 1	31,029 3 4	1,533 13 8	32,562 6 —	3,619 1 11	— — —	1 Inclusive of Rs 2762-5-9 for raising sides of sluice channel.
3	Channel from Cartelliyar to Cholavaram including Hydraulic diversion channel	90,499 6 10	89,813 7 1	— — —	89,813 7 1	— — —	685 15 9	2
4	Bund across Kalenkal	724 10 2	760 6 2	— — —	760 6 2	40 12 —	— — —	2
5	Boddykal upper & lower bund	3,055 4 3	3,870 12 6	— — —	3,870 12 6	835 8 3	— — —	2
6 to 9	5 Bridges & 10 culverts on upper channel	53,501 9 7	51,538 10 —	— — —	51,538 10 —	— — —	1,962 15 7	3.
10	Calingula at Boayeal surveing channel	6,480 7 6	6,530 10 —	— — —	6,530 10 —	50 2 6	— — —	4.
11	Allaceherry aqueduct &c ——	6,199 8 7	6,285 13 4	— — —	6,285 13 4	86 4 9	— — —	4
12	Cholavaram Lake & bund	20,537 9 7	1,40,171 7 11	20,746 1 11	2,10,917 9 10	2,350 — —	— — —	5
13 & 14	—— Regulator ——	16,770 — —	7,557 11 1	12,447 11 10	19,997 12 11	3,226 12 10	— — —	2
15	—— do —— Irrigation Sluice	8,461 3 4	9,171 8 5	— — —	9,171 8 5	709 4 1	— — —	6
16	—— do. Head sluice for supply channel with Irrigation sluice attached	23,763 12 5	23,12 3	333 4 —	31,177 — 3	7,413 3 10	— — —	7
17	Channel between Lakes	94,807 1 —	91,703 6 2	9 6 —	91,712 12 2	— — —	3,094 5 10	8
18 & 20	Under Tunnel 1 Culvert Bridge on channel between Lakes	9,694 2 4	9,499 8 8	— — —	9,499 8 8	— — —	194 9 8	8
21	Red Hill Lake Calingula b ——	10,244 14 3	4,992 11 3	5,252 3 —	10,244 14 3	— — —	— — —	9
22	Masonry dam with Irrigation sluice attached. ——	22,471 16 8	24,251 13 3	4,196 12 1	33,420 9 4	15,758 9 8	— — —	9
23	Red Hill Lake Bund ——	150,233 7 4	1,28,286 15 6	15,811 10 4	143,798 9 10	— — —	6,434 13 6	10
24	Sorrapadoo & Nettapet Bund	24,257 9 6	14,354 2	11,674 12 7	26,110 — 9	1,852 7 3	— — —	10
25 & 26	Red hill & Irrigation Sluices	28,261 6 10	29,907 15 11	253 8 —	30,171 7 11	1,910 1 1	— — —	11
27	Office & Store shed on line of Works	2,000 — —	2,561 12 2	100 — —	2,661 12 2	661 12 2	— — —	11
28	Maintenance ——	4,996 12 9	5,179 6 6	— — —	5,179 6 6	182 7 9	— — —	11
29	Contribution by Madras Govt & delivery channel works as per G O Nos 2163 and 3154 dated 3rd July & 29th September 1869, respectively	30,932 — —	30,932 — —	— — —	30,932 — —	— — —	— — —	11
30	Distributing channels below bunds & Escapes &c	2,500 — —	2,478 8 2	22 3 11	— — —	— — —	— — —	
	Contingencies & Superintendence	44,194 4 11	42,578 — 9	1,616 4 2	44,194 4 11	— — —	— — —	
	Compensations for lands taken	82,140 — —	40,071 6 6	135,318 9 —	175,916 15 6	93,776 15 6	— — —	* Vide G.O. No. 60 dated 10th January 1871 Page 9.
C		10,42,075 8 2	9,19,507 6 10	24,804 12 —	1165,112 4 2	135,449 13 4	12,372 12 4.	
	Works sanctioned since Revised estimate forwarded							
	Puddle b the bac of Red Hills bund ——	16,500 — —	4,241 1 1	12,258 14 11	16,500 — —	— — —	— — —	
	Kattenkal Kalingula bund	7,145 8 6	549 4 8	6,596 3 10	7,145 8 6	— — —	— — —	
	Enibanking the Cortelliyar river	2,400 — —	— — —	4800 — —	4,800 — —	2,400 — —	— — —	Under investigation, estimate to be shortly submitted.
D		26,045 8 6	4,790 5 9	23,655 2 9	28,445 8 6	— — —	— — —	
	Total of C. & D	10,68,120 11 8	9,24,297 12 7	2,6,924 —	1,193,557 12 8	137,819 13 4	12,372 12 4	
			Deduct		10,68,120 11 8	12,372 12 4		
			Increase		1,25,437 1 —	1,25,437 1 —		

Madras
July 1871

J Moorhill
President

13

Statement comparing the price of Paddy per Garce in the Talooks of the Chingleput District & the town of Madras during Fushies 1279 and 1280

115
107

	Talooks.	Fusly 1279		Fusly 1280	
		1st sort Paddy	2nd sort Paddy	1st sort Paddy	2nd sort Paddy
		Rs	Rs	Rs	Rs.
1	Sydapet	162	188	132	123
2	Chingleput	215	199	147	135
3	Madurantacum	218	192	135	115
4	Conjeveram	216	201	126	133
5.	Trivallore	198	181	140	122
6	Poonery	193	165	126	119
	Average price for the District	200	187	137	124
	Average price of the two sorts of Paddy	194		130.	
1	Madras.	181	173	127	117
	Average price of the two sorts of paddy	177		122	

Madras
14th July 1871

J Broadfoot
President

Secy & Cook for Engr

Geo Ramsay
Asst Director of Rlys

Appendix C

P. Ry 5969/71

23rd July 1871 Ld 5910.

p. Appendix · L.

L. a letter from the Secretary of State, Bogotá transmitting a list of Spanish Authors in the Department of Cauca Rio Magdalena

C. N. 3969/71

25th August 1871 L. Lee. -

Public Works 1871 Department

Letter C No 3969.

The Resident Engineer and Members of the Committee of Inquiry appointed upon the application for the extension of the Thames Water Works Report

to

The Survey of Canal

&c. &c. &c.

Dated 14th July 1871

Received 28th August 1871

No 2

Enclos: 4.

Reporting on the existing necessary & complete the Thames Water Works Project, & on the probable returns therefrom.

No 310

Ans. 21/9/23rd Aug. 71

24/5/75

Govt. of 1871 Madras.

PUBLIC WORKS.

To The Secretary to the Govt. of India

Dated

Recd. 2171/75

G O. 23 Augt. 2172.

3100

Nos. 312

Madras water supply project:- Submitting for sanction a revised & definitive estimate for the combined project- viz. canal irrigation under the Chalamcherla and Red Hills tanks and the supply of water to the City