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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Revenue DEPARTMENT

G.O. No.	<u>6011.</u>	Press.
B.P. No.		Mis.
Dated	<u>2-10-1877.</u>	197 F.

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GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

30th August 1877, No. 267 I.

Irrigation.
Account.

Read the following papers :—

No. 108. From Major H. R. MEAD, R.E., District Engineer, South Arcot, to the Chief Engineer for Irrigation, dated Camp at Cuddalore, 19th May 1877, No. 41.

With reference to your memoranda Nos. 1,495-A and 1,497, dated 30th December 1875, 4 S.A. of 5th and 5 S.A. of 8th February 1877, I have the honor to submit a revised comparative statement for the Pelandorai anicut system. For this an estimate of Rupees 1,98,233 was sanctioned first in G.O., No. 3,880, dated 10th December 1869, and in G.O., No. 171, dated 19th January 1872, a further sanction of Rupees 2,320 was granted on account of revision of design for the head sluice, or in all the original estimate amounted to Rupees 2,00,555.

2. The statement recast, as far as possible, according to your instructions, now amounts to Rupees 3,22,247, that is :—

	RS.
Items involving direct disbursements	2,45,725
Establishment	51,999
Tools and Plant	2,963
Capitalized assessment of lands taken up for the project	21,560

3. The whole history of the project is perfectly known to yourself and to Government, as also the mismanagement of the work when under execution and the unsatisfactory way in which its accounts were kept up from the beginning ; it does not

appear necessary to go over the same ground at any length. An abstract of the comparative statement is given in the first page of the statement; this shows in one view the amount of excess in each item or sub-work; the cause of these, as far as can be gathered from records available (in the absence of officers and subordinates who had the executive charge of the project or range), is however briefly noticed in the column of remarks, and also in this letter with a view of facilitating prompt disposal of the matter.

4. I am however on the whole of opinion that the excess over the sanctioned estimate is to be attributed chiefly to the frequent changes of officers and subordinates in charge of the project and the range, and the long period (six years) the work was in progress; in fact, had a special officer of some standing and experience been placed in charge of the project from its commencement, the results should have been quite the reverse. The project was commenced in April 1870 and completed (or rather supposed to have been finished) in April 1876; within these six years there had been nine changes of officers or subordinates in direct charge of the project, and eleven changes of Range Officers as may be seen from the following. Mr. Assistant Engineer Bell, who was sent for special charge of the project, does not appear to have been employed on it for more than six months:—

Officer or Subordinate in charge of Project.	PERIOD OF CHARGE.		Officer or Subordinate in charge of the Range.	PERIOD OF CHARGE.	
	From	To		From	To
1. Mr. C. H. Norfor, (Temporary Establishment).	15th Apl. 1870.	1st October 1870.	1. Mr. R. E. Norfor, Executive Engineer.	Apl. 1870.	10th July 1870.
2. Mr. J. M. Bell, Assistant Engineer.	1st October 1870.	3rd Nov. 1870.	2. Lieutenant Purchas, Assistant Engineer.	11th July 1870.	17th July 1870.
3. Mr. C. H. Norfor, Assistant Engineer.	3rd Nov. 1870.	3rd Dec. 1870.	3. Mr. J. M. Bell, Assistant Engineer.	18th July 1870.	10th Sept. 1870.
4. Mr. J. M. Bell, Assistant Engineer.	3rd Dec. 1870.	22nd Apl. 1871.	4. Mr. R. E. Norfor, Executive Engineer.	11th Sept. 1870.	21st April 1871.
5. A. Coopooasamy Moodelliar, Overseer.	22nd Apl. 1871.	9th April 1872.	5. Mr. C. Norfor, Assistant Engineer.	22nd Apl. 1871.	25th July 1871.
6. Manikam Moodelliar, Supervisor.	10th Apl. 1872.	12th Dec. 1872.	6. Mr. J. M. Hawksworth, Assistant Engineer.	26th July 1871.	23rd June 1872.
7. A. Coopooasamy Moodelliar, Overseer.	13th Dec. 1872.	11th May 1873.	7. Mr. J. M. Bell, Assistant Engineer.	24th June 1872.	13th June 1873.
8. M. Hicken, Supervisor.	12th May 1873.	3rd Oct. 1873.	8. Conductor G. E. Wiffen, Sub-Engineer.	14th June 1873.	3rd Oct. 1873.
9. D. Coopooasamy Moodelliar, Overseer.	12th May 1873.	8th April 1876.	9. Mr. J. A. Hicken, Supervisor.	4th Oct. 1873.	13th Aug. 1874.
			10. Mr. R. E. Norfor, Executive Engineer.	13th Aug. 1874.	6th July 1875.
			11. Mr. P. O'Ratigan, Executive Engineer.	7th July 1875.	19th June 1876.

Besides the above, portions of the channel appear to have been placed in charge of Overseer Valoomyloo Moodelliar, now a pensioner.

5. From the abstract in the first page of the comparative statement it will be observed that the total excess over the sanctioned estimate of Rupees 2,00,555, or in the items involving direct disbursements amounts to Rupees 45,170, or leaving out altogether the item of storage, the estimate, outlay and excess come respectively to Rupees 1,74,505, 2,21,780, and 70,665; of this excess Rupees 23,390 are for drainage and certain other works now proposed, and the remainder Rupees 47,275 is the excess

outlay incurred on works completed. This last amount comprises the excesses in the undermentioned items:—

	RS.
1. Anicut, excess	25,412
2. Bungalow, excess	1,890
3. Extra works, cost	5,242
4. Head sluice, excess	4,094
5. Other masonry works on main and branch channels, excess	3,620
6. Earthwork, main and branch channels, excess	7,495

I.—*Anicut*.—The increase in the quantities of concrete and brick and chunam is ascribed to extra depth of foundations put in in the centre of the river owing to firm soil not having been met with at 9 feet, and also to a change in the west wing wall in which steps were introduced by order of the late Colonel Boileau. The excess in the rates for these items is partly due to the difficulty in obtaining bricks of good quality and to the outturn of burnt lime having been less than anticipated, as fuel was not as expected procurable from private topes near the works and had to be obtained not without great difficulty from a distance.

The excess in the rate for stone is said to be due to the distance (12 miles) whence it had to be brought in.

Frequent freshes in the river carrying away temporary dams and refilling foundations are said to have necessitated the renewal of excavations and baling of water. Hence the large excesses of Rupees 4,087 and 5,025 in the items of excavating foundations and temporary dams and baling.

The long period the work was in progress is attributed to the excess of Rupees 4,860 in sundries and contingencies, work establishment having been maintained for a longer period than anticipated, and sheds, &c., repaired or rebuilt.

II.—*Building or Bungalow at the anicut, excess Rupees 1,890*.—In the estimate only Rupees 350 were allowed for a small building, but a bungalow was built without a regularly sanctioned plan or estimate; the cost of this building was before estimated at different sums, but the amount shown in the comparative statement appears to be that finally arrived at. The irregularity in this matter has been already noticed in G.O., No. 2,262, dated 15th August 1874.

	RS.
III.—Extra works, cost, Rupees 5,243—	
a. Branch road to anicut	1,110
b. Flood banks	3,206
c. Zinc sheet roofing	927

As these are closely connected with the head works, or rather as the object of these was to facilitate the progress of head works, they are noticed here.

There was no provision made in the estimate for these three items, and the irregularity in having carried out without a regular estimate or sanction, the item (a) has been already noticed in the G.O. of 15th August 1874 above quoted. The road which is being maintained from Local Funds is however useful.

(b). These banks were also not provided for in the estimate; they are said to have been carried out on the orders of the late Colonel Boileau, and include also the cost of relaying out the head of the channel as ordered by Colonel Mullins.

(c). Fifty zinc sheets at a cost of Rupees 1,829-10-8, including carriage from Madras were purchased in the beginning of 1872 by Mr. Assistant Engineer Hawksworth on the sanction of Major Vertue, then Acting Superintending Engineer of the 5th Division, for using for sheds, but were not done so, and have remained unutilized at the anicut.

Every endeavour has been made to dispose of these sheets, but I could not succeed, the Public Works Stores, to which an offer was made, as directed by you,

having refused to take them, and the advertisement in the *Gazette* proved of no use. Only about 8 sheets have been used on other works in the district or disposed of to the Public Works Stores, crediting their value to the project. There is no probability of the remaining sheets being used or disposed of in the district at an early date. I have therefore, with a view of closing the accounts of the project, directed the transfer of these sheets to stock account at a value of Rupees 15 a sheet, or a total of Rupees 633-4-10 for 42 $\frac{22}{100}$ sheets, crediting this amount to the project. The remainder of the original cost of the sheets, Rupees 927-3-4, stands of course as a debit to the project. It is to be much regretted that these sheets were ever purchased.

IV.—*Main Channel and Branches—Head Sluice.*—Excess in item of brick in chunam is due partly to some extra work done and partly to the increase in the rate owing to the same cause explained for the item in anicut.

The rate of 6 Annas allowed in the estimate for stone is considered a mistake, the rate for this work in anicut being 10 Annas, which was also found inadequate.

The estimate provided for only teak shutters; but shutters with iron screw gearing have been substituted, and these had to be obtained from the Presidency Workshop. Apron in front and repairs to south wing are altogether an extra work, not provided for in the estimate.

V.—*Other Masonry Works.*—The excess of Rupees 3,620 is attributed chiefly to the high rate for brick in chunam. It would appear that bricks were expected to be made along or by the line of the main channel, but the earth was found unsuitable and bricks had consequently to be obtained from distant villages on the bank of the river; also that in some instances the original designs had been altered by the Chief Engineer for Irrigation in sanctioning the project.

VI.—The excess in the item of earthwork, according to the final settlement of the contractors' accounts made on the final measurement of the channels by Mr. O'Ratigan in October 1875, comes to Rupees 7,495. There has been as reported in my letters Nos. 205 and 57, dated 1st February and 15th July 1876 (of which the latter is recorded in G.O., dated 25th idem, No. 1,879) a great difficulty in settling the accounts of the channel which were allowed to remain unclosed for more than four years; in fact it would appear that no regular complete measurement had been taken before, nor were there in some cases detailed measurements forthcoming, by which each petty contractor's work can be traced.

The state of the channel, when it was measured by Mr. O'Ratigan in October 1875, had been already reported in my letters above quoted; and the excess is, as already stated before, I consider due to a great extent to the long delay in the completion of the work and closing of its accounts, to want of method in carrying on this work and to the removal of silt from the slopes, cross drainage, &c.

Again the original estimate did not provide for the maintenance of the channel during the long period it was in progress.

6. All the works noticed in the foregoing paragraphs have been carried out although with great differences from sanctioned estimates and at increased cost and their accounts closed; but, owing to the length of period the project was in progress and the great number of officers in its charge, it is now quite impossible to trace out the responsibility in each case.

7. *Storage.*—The sanctioned estimate allowed Rupees 26,050 for increasing the storage capacity of the tanks to be supplied. The investigation of this portion of the project was commenced in 1872, and an outlay of Rupees 555-4-4 incurred on account of survey establishment, but the investigation was not finished, nor has any

been done in the matter since the beginning of 1874; in fact it has been given up as it is observed that the cost of the enlargement of the tanks is in several cases prohibitory, and as the channel will however, when its repairs have been completed, do much good. If any of the tanks can be improved at a reasonable cost, it may hereafter be dealt with in the ordinary course.

8. *Cross Drainage.*—For this portion of the project including certain works omitted in the original estimate for the anicut system, an estimate of Rupees 23,390 with plans, &c., was sent up with my letter No. 188, dated 11th January 1877; they have been returned to be included in the revised estimate; these are now resubmitted herewith. The works included in this estimate are most essential, and until they are provided for, the project cannot be, as I have already stated, expected to give a reasonable return.

9. As required in your memorandum of 30th December 1875, the cost of Establishment and Tools and Plant, as also the capitalized assessment of lands taken up, are included in the statement in column 3. The first two sums have been ascertained from the Examiner, and the last is the result of the assessment (Rs. 849-10-2) capitalized at 4 per cent. as laid down in G.O., No. 2,184, dated 14th September 1872.

10. I take the opportunity of informing you that the General Superintendent, Public Works Stores, was asked in June last to take back or transfer to any other district, where it may be required, the brick-making machine which was obtained in 1870 on account of the project, but he suggested that it should, on the score of economy, be kept in the division for the present, as there was no demand for it. The machine is therefore still lying in the range, and I think that the debit to the item Tools and Plant includes the value of this.

11. From the amount of work done, or from that in column 3, Rupees 3,343-12-0 are deducted as the amount advanced to Civil Officers in March 1872 for fuel supplied and not brought to account. It would appear that fuel to the full extent* was actually supplied by the Revenue Department and used in burning bricks; but the Examiner states in his letter No. 162^{S.A.}, dated 21st March 1877, that the amount was paid† into treasury to the credit of the Public Works Department, and that it cannot therefore be taken as expenditure chargeable to the anicut system.

*For Rupees 2,948-5-0 for anicut and Rupees 395-7-0 for head sluice.

	RS.	A.	P.
† In December 1872 ...	2,000	0	0
In May 1873 ...	1,343	12	0
	3,343	12	0

12. The anicut and head sluice were finished in 1876, and these and other masonry works have not since suffered any damage. Water was let down the channel in October 1875, but the revenue derived from the project in 1875-76 was but very small. There was not any increase of cultivation of nunjah, but only some extent of dry land was brought under wet cultivation by the aid of the anicut water; and as the supply of water was small owing to the bad season and the silted state of the main channel and ceased shortly, the whole extent undertaken could not be cultivated, and the water-rate had consequently to be remitted to a large extent. The net increase under water-rate or kassar was only Rupees 1,257.

13. In the last season of the fourteen branches from the channel, irrigation has been conducted by six, and the rest had to be kept closed owing to the want of water in the river. It is not likely that the results anticipated from the project will be derived to any appreciable extent for years, and moreover the past two years have been unusually dry and the supply of water quite inadequate.

14. The repairs to the main channel sanctioned in G.O., No. 2,255, dated 25th August 1876, are in progress, and it is hoped will be finished very soon.

15. With regard to rates for the work now proposed I have entered that of brick-work as 2 Annas 3 Pies per cubic foot; the cost of the work done has been 2 Annas 9 Pies and 2 Annas 6 Pies. I consider that if the work to be done is carried out without delay and with proper superintendence and establishment, that the rate, 2 Annas 3 Pies, should prove ample; the rate in the original estimate was 2 Annas a foot.

16. In conclusion, I regret the long delay in the submission of the revised comparative statement; this was in the first instance due to my having concluded that a revised estimate was not necessary, as a completion bill was called for in G.O., No. 1,636, dated 10th June 1875, and No. 1,586, dated 24th June 1876, and also because the works originally estimated for were carried out; then to the references that had to be made to the Examiner and the range since the completion report was returned by you.

APPENDIX A.
SOUTH ARCOT DISTRICT, VIRDACHELLAM RANGE.

IRRIGATION—CAPITAL EXTRAORDINARY.

Comparative Statement showing the difference between Original and Revised Estimate for the Peludurai Ancient System.

Mileage.	Description of Work.	Original Estimate as sanctioned.	Work done up to March 1877.	Work remaining to be done.	Revised Estimate.	Increase.	Decrease.	Remarks.
1	2	3	4	5	6	7	8	9
M. F.	CAPITAL EXTRAORDINARY.	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
	I.—WORKS.							
	(1.)—Head Works.							
	C. Works—							
	Ancient ...	48,634	71,097 15 0	...	71,097 15 0	22,463 15 0	...	
	River flood bank ...	...	3,205 4 10	...	3,205 4 10	3,205 4 10	...	
	Total, C. Works ...	48,634	74,303 3 10	...	74,303 3 10	25,669 3 10	...	
	K. Buildings—							
	Bungalow ...	350	2,240 0 0	...	2,240 0 0	1,890 0 0	...	
	O. Miscellaneous—							
	Branch road ...	...	420 0 0	...	420 0 0	420 0 0	...	
	Tunnels on do. ...	...	690 0 0	...	690 0 0	690 0 0	...	
	Zinc sheet roofing ...	...	927 3 4	...	927 3 4	927 3 4	...	
	Total, O. Miscellaneous ...	...	2,037 3 4	...	2,037 3 4	2,037 3 4	...	
	Total, (1.) Head Works ...	48,984	78,580 7 2	...	78,580 7 2	29,596 7 2	...	
	(2.)—MAIN CANALS AND BRANCHES.							
	Main Canal.							
	B. Land—	2,000	1,522 0 0	...	1,522 0 0	...	478 0 0	
	Compensation for land ...							
	D. Regulators—	6,240	9,938 5 7	...	9,938 5 7	3,698 5 7	...	
	Head sluice ...							
0 0								

G.O. No. 2,262
of 15th Aug.
1874.
Do.
Do.

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Comparative Statement showing the difference between Original and Revised Estimate for the Pelandora Aicut System—(Continued).

Mileage.	Description of Work.	Original Estimate as sanctioned.	Work done up to March 1877.	Work remaining to be done.	Revised Estimate.	Increase.	Decrease.	Remarks.
1	2	3	4	5	6	7	8	9
M. F. 8 1	Supply Channel to Konaravangulam Tank.	RS.	RS. A. T.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
0 0	C. Works— Sluice ...	345	457 9 0	...	457 9 0	112 9 0	...	
0 0	L. Earthwork— Deepening the supply channel...	30	...	...	...	...	30 0 0	
	Total, Supply Channel ...	375	457 9 0	...	457 9 0	112 9 0	30 0 0	
0 0 0 2 0 4 0 4 1 1 2 1 2 2	Branch Channel from Kasamangulam Tank.	300	385 6 3	...	385 6 3	85 6 3	...	
	C. Works— Head sluice ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Field sluice ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Do. ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Do. ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Do. ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Do. ...	63	80 4 0	...	80 4 0	17 4 0	...	
	Total, C. Works ...	678	866 14 3	...	866 14 3	188 14 3	...	
0 0 to 4 1	L. Earthwork— Branch channel ...	1,800	1,642 14 6	...	1,642 14 6	...	157 1 6	
	Total, Branch Channel ...	2,478	2,509 12 9	...	2,509 12 9	188 14 3	157 1 6	

9 2	Branch Channel.							
0 0	C. Works— Tunnel ...	255	334 4 9	60 0 0	334 4 9	79 4 9	...	
0 2	Head sluice ...	...	...	60 0 0	60 0 0	60 0 0	...	
	Total, C. Works ...	255	334 4 9	60 0 0	394 4 9	139 4 9	...	
0 0 to 0 5	L. Earthwork— Branch channel ...	148	123 0 0	...	123 0 0	...	25 0 0	
	N. TANKS AND RESERVOIRS.							
	Matapoliengoody Tank.	215	266 6 9	...	266 6 9	51 6 9	...	
	Calingulah ...	618	723 11 6	60 0 0	783 11 6	190 11 6	25 0 0	
	Total, Branch Channel ...							
9 7	Branch Channel.							
0 0	C. Works— Tunnel ...	323	441 9 5	...	441 9 5	118 9 5	...	
0 0	L. Earthwork— Branch channel ...	265	239 13 0	...	239 13 0	...	25 3 0	
0 3	Total, Branch Channel ...	588	681 6 5	...	681 6 5	118 9 5	25 3 0	
	Supply Channel to Vuckaramady Tank.							
	C. Works— Sluice ...	320	438 6 6	...	438 6 6	118 6 6	...	
	Total, Supply Channel ...	320	438 6 6	...	438 6 6	118 6 6	...	
11 1	Supply Channel.							
	C. Works— Sluice ...	190	237 11 4	...	237 11 4	47 11 4	...	
	Total, Supply Channel ...	190	237 11 4	...	237 11 4	47 11 4	...	

Comparative Statement showing the difference between Original and Revised Estimate for the Pelandaba Aicut System—(Continued).

Mileage.	Description of Work.	Original Estimate as sanctioned.	Work done up to March 1877.	Work remaining to be done.	Revised Estimate.	Increase.	Decrease.	Remarks.
1	2	3	4	5	6	7	8	9
M. V. 11 6	Supply Channel.	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
	C. Works— Sluice	190	245 11 4	...	245 11 4	55 11 4	...	
	Total, Supply Channel ...	190	245 11 4	...	245 11 4	55 11 4	...	
11 7	Supply Channel to Nagarajady and Satasey Tanks.	255	321 14 9	...	321 14 9	66 14 9	...	
	C. Works— Sluice	255	321 14 9	...	321 14 9	66 14 9	...	
	Total, Supply Channel ...	255	321 14 9	...	321 14 9	66 14 9	...	
12 5	Supply Channel.	190	235 5 2	...	235 5 2	45 5 2	...	
	C. Works— Sluice	190	235 5 2	...	235 5 2	45 5 2	...	
	Total, Supply Channel ...	190	235 5 2	...	235 5 2	45 5 2	...	
13 6	Supply Channel to Nadunary Tank.	345	483 7 0	...	483 7 0	138 7 0	...	
	C. Works— Sluice	345	483 7 0	...	483 7 0	138 7 0	...	
	Total, Supply Channel ...	345	483 7 0	...	483 7 0	138 7 0	...	
	Branch Channel from Nadunary Tank.							
0 2 0 2	C. Works— Sluice Regulator	290 424	338 12 11 504 5 6	...	338 12 11 504 5 6	48 12 11 80 5 6	...	...

2 4 2 4	Do. Do. Do. Do.	63 63 63 63	62 15 6 62 15 6 62 15 6 62 15 6	...	62 15 6 62 15 6 62 15 6 62 15 6	...	...	0 0 6 0 0 6 0 0 6 0 0 6
0 0 6 1 5 4	Total, C. Works ... L. Earthwork— Branch Channel ... Minor Branch of do. ... Total, L. Earthwork ... Total, Branch Channel ... Branch Channel.	1,092 2,280 247 2,527 3,619	1,221 1 4 2,271 4 10 244 6 0 2,515 10 10 3,736 12 2	...	1,221 1 4 2,271 4 10 244 6 0 2,515 10 10 3,736 12 2	129 3 5 129 3 5	0 2 1 8 11 2 2 10 0 11 5 2 11 7 3	...
13 8	C. Works— Sluice L. Earthwork— Branch Channel ... Total, Branch Channel ... Supply Channel.	...	...	60 0 0	60 0 0 ... 60 0 0	60 0 0 ... 60 0 0	...	...
14 4	C. Works— Sluice Total, Supply Channel ... Branch Channel from Canoor Tank.	...	...	155 0 0	155 0 0 ... 155 0 0	155 0 0 ... 155 0 0	...	...
0 4 1 1 1 1	C. Works— Sluice Field sluice Do. Do.	280 63 63 63	331 10 9 63 0 0 63 0 0 63 0 0	...	331 10 9 63 0 0 63 0 0 63 0 0	51 10 9	...	...

Comparative Statement showing the difference between Original and Revised Estimate for the Palanpur Ancient System—(Continued).

Mileage.	Description of Work.	Original Estimate as sanctioned.	Work done up to March 1877.	Work remaining to be done.	Revised Estimate.	Increase.	Decrease.	Remarks.
1	2	3	4	5	6	7	8	9
M. F.	Branch Channel from Quator Tank— (Continued).	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
2 2	C. Works—	560	554 3 6	...	554 3 6	...	5 12 6	
2 2	Calingulah ...	63	63 0 0	...	63 0 0	...	...	
2 3	Field sluice ...	63	63 0 0	...	63 0 0	...	...	
2 3	Do. ...	380	379 15 0	...	379 15 0	...	0 1 0	
2 2	Tunnel ...	...	...	...	...	...	...	
0 0	Total, C. Works ...	1,535	1,580 13 3	...	1,580 13 3	51 10 9	5 13 6	
to	L. Earthwork—	...	...	...	...	...	...	
3 3	Branch Channel ...	1,910	1,888 14 4	...	1,888 14 4	...	21 1 8	
	Total, Branch Channel ...	3,445	3,469 11 7	...	3,469 11 7	51 10 9	26 15 2	
	Branch Channel.							
0 0	C. Works—	63	63 0 0	...	63 0 0	...	...	
to	L. Earthwork—	424	420 5 11	...	420 5 11	...	3 10 1	
2 4	Branch channel ...	487	483 5 11	...	483 5 11	...	3 10 1	
	Total, Branch Channel ...	...	...	...	...	...	...	
14 5	Supply Channel to Odlinganary Tank.	...	...	...	...	...	...	
	C. Works—	190	235 2 2	...	235 2 2	45 2 2	...	
	Sluice ...	190	235 2 2	...	235 2 2	45 2 2	...	
	Total, Supply Channel ...	...	...	...	...	...	...	

Types of
at 1 mile
at 1 furlong
of the
above
Branch
Channel.

15 3 1	Supply Channel to Pondien Tank.	...	...	...	...	...	...	...
	C. Works—	880	385 11 3	...	385 11 3	...	494 4 9	
	Regulator ...	...	...	...	...	...	...	
	Total, Supply Channel ...	880	385 11 3	...	385 11 3	...	494 4 9	
	Branch Channel from Peria Pondien Tank.	...	...	...	...	...	...	
0 0	C. Works—	280	303 12 9	...	303 12 9	23 12 9	...	
0 3	Sluice ...	63	63 0 0	...	63 0 0	...	...	
1 0	Field sluice ...	63	63 0 0	...	63 0 0	...	...	
1 2	Do. ...	63	63 0 0	...	63 0 0	...	...	
2 2	Do. ...	61	61 0 0	...	61 0 0	...	...	
2 1	Tunnel ...	380	379 15 0	...	379 15 0	...	0 1 0	
	Total, C. Works ...	910	933 11 9	...	933 11 9	23 12 9	0 1 0	
0 0	L. Earthwork—	...	...	...	...	...	...	
to	Branch channel ...	1,186	1,180 10 3	...	1,180 10 3	...	5 5 0	
2 4	Total, Branch Channel ...	2,096	2,114 6 0	...	2,114 6 0	23 12 9	5 6 9	
15 3 1	Branch Channel to Supply Pottem-cotta Tank.	...	...	...	...	...	...	
	L. Earthwork—	534	538 9 0	...	538 9 0	4 9 0	...	
	Branch channel ...	...	...	...	...	...	...	
	N. Tanks and Reservoirs—	830	827 9 6	...	827 9 6	...	2 6 6	
	Improving Pottemcotta tank ...	26,050	555 4 4	25,494 11 8	26,050 0 0	...	...	
	Storage works ...	...	...	...	...	...	...	
	Total, N Tanks and Reservoirs ...	26,880	1,382 13 10	25,494 11 9	26,877 9 6	...	2 6 6	
	Total, Branch Channel ...	27,414	1,921 6 10	25,494 11 8	27,416 2 6	4 9 0	2 6 6	
	Total, (3) Distributories ...	45,241	20,377 0 0	25,769 11 8	46,146 11 8	1,763 2 8	857 7 0	

604
B

Comparative Statement showing the difference between Original and Revised Estimate for the Pelandora Anicut System—(Continued).

Mileage.	Description of Work.	Original Estimate as sanctioned.	Work done up to March 1877.	Work remaining to be done.	Revised Estimate.	Increase.	Decrease.	Remarks.
1	2	3	4	5	6	7	8	9
M. F.								
	Total, I. Works	RS. 2,00,555	RS. A. P. 2,19,146 5 3	RS. A. P. 48,884 11 8	RS. A. P. 2,68,031 0 11	RS. A. P. 70,261 7 11	RS. A. P. 2,785 7 0	
	II. Establishment	...	47,321 0 0	14,565 0 0	61,986 0 0	61,986 0 0	...	
	III. Tools and Plant	...	2,963 0 0	588 0 0	3,501 0 0	3,501 0 0	...	
	Total, Direct Charges ...	2,00,555	2,69,430 5 3	64,087 11 8	3,33,518 0 11	1,35,748 7 11	2,785 7 0	
	Indirect Charges.							
	(53) Capitalization of abatement of land revenue.	...	21,559 0 0	...	21,559 0 0	21,559 0 0	...	
	(25) Leave and Pension Allowances.	...	15,496 0 0	...	15,496 0 0	15,496 0 0	...	
	Interest charges ...	...	...	...	60,000 0 0	60,000 0 0	...	
	Total, Indirect Charges ...	...	...	...	97,055 0 0	97,055 0 0	...	
	Grand Total ...	2,00,555	...	...	4,30,573 0 11	2,32,803 7 11	2,785 7 0	
		...	...	...	2,00,555 0 0	2,785 7 0	...	
		...	...	...	2,30,018 0 11	2,30,018 0 11	...	

* At 30 per cent. on the amount of work remaining to be done.

14th July 1877.

(Signed) JOHN MULLINS, Colonel, R.E.,
Chief Engineer for Irrigation.

APPENDIX B.

General Abstract of Estimates for Additional Works required in connection with the Pelandora Anicut System.

Mileage.	Names of Works.	No. on Plan.	Amount of Estimate.
CAPITAL EXTRAORDINARY.			
I.—WORKS.			
(2).—MAIN CANALS AND BRANCHES.			
F, (1) other cross Drainage Works.			
M. P.			RS.
1 4	Aqueduct ...		
3 0	Do. ...	II.	1,600
3 6	Do. ...	III.	1,510
7 4	Inlet ...	IV.	2,130
7 4	Outlet ...	V.	485
8 4	Inlet ...	VI.	1,010
8 4	Outlet ...	V.	710
8 7	Inlet ...	VI.	1,290
9 5	Do. ...	V.	485
9 5	Outlet ...	V.	575
9 5	Under tunnel ...	VI.	1,430
11 0	Inlet ...	VII.	1,030
11 0	Outlet ...	V.	575
11 0	Under tunnel ...	VI.	1,010
12 2	Inlet ...	IX.	1,215
12 2	Outlet ...	V.	575
15 1/2	Inlet ...	VI.	1,150
15 1/2	Outlet ...	V.	485
15 3	Inlet ...	VI.	1,010
		V.	400
Total ...			18,715
G. Bridges.			
1 0	Bridge ...	I.	1,980
10 0	Do. ...	VIII.	1,330
13 3	Do. ...	X.	1,090
Total G. Bridges ...			4,400
Total, (2) Main Canals and Branches ...			23,115
(3).—DISTRIBUTARIES.			
C. Works.			
9 3	Head sluice ...	XII.	60
13 7	Sluice ...	XII.	60
14 2	Do. ...	XI.	155
Total, C Works ...			275
Total, (3) Distributaries ...			275
Grand Total ...			23,390

FORT ST. GEORGE,
14th July 1877.(Signed) JOHN MULLINS, Colonel, R.E.,
Chief Engineer for Irrigation.

APPENDIX C.
Statement showing the Description of the Drainage, &c., works proposed to be built on the Palandori ancient main channel.

Number of Work.	Site Miles and Furlongs.	Description of Work.	Area of Drainage and Cubic feet per 1 inch to be disposed of.	REDUCED LEVELS ABOVE DATUM.			Soil.	Remarks.
				Of Ground and Channels.	Of Work.	Benches Marks.		
1	1 0	Bridge of 26 feet span, 9 feet road-way.	—	Channel bed 115.9 .. Max. water 121.9 .. Ground 126.0 ..	Floor 115.9 .. Springing 127.9 .. Road level 136.0 ..	7th F.S. 137.4 .. 8th " 137.6 .. 9th " 138.8 ..	Hard soil ..	Bridge for Palandori village. Bottom breadth of channel 20 feet depth 21 feet. Slopes 1 to 1.
2	1 4	Aqueduct 24 feet span, 6 feet width, 3 1/2 feet depth.	7 square mile, 355 cubic feet per 1 inch.	Channel bed 114.9 .. Max. water 120.9 .. Ground 130.3 ..	Floor 114.9 .. Springing 122.4 .. Aquaduct floor 130.3 ..	11th " 135.7 .. 12th " 131.8 .. 13th " 131.5 ..	Hard soil ..	To pass over the supply to a tank and also to drain at 1 1/2 miles to be brought down to 1 1/4 miles by a side channel and then carried over the aqueduct. Bottom breadth of channel 20 feet.
3	3 0	Aqueduct two vents of 10 feet, 5 feet width, 3 feet depth.	6 square mile, 283 cubic feet per 1 inch.	Channel bed 111.9 .. Max. water 121.9 .. Ground 121.9 ..	Floor 111.9 .. Springing 117.9 .. Aquaduct floor 121.9 ..	23rd " 122.2 .. 24th " 120.9 .. 25th " 120.2 ..	Hard soil ..	To pass over the supply to Karachangari tank. There are two streams to be connected; floor of aqueduct raised above ground level to give roadway; this will cause no damage. Bottom breadth of channel 20 feet.
4	3 9	Aqueduct through two vents 12 feet, 3 feet depth.	3 square mile, 244 cubic feet per 1 inch.	Channel bed 110.4 .. Max. water 116.4 .. Ground 110.4 ..	Floor 110.4 .. Aquaduct floor 116.4 ..	26th " 117.1 .. 27th " 116.6 .. 28th " 116.9 ..	Hard soil ..	To pass supply to Pothichur tank. Bottom breadth of channel 20 feet.
5	7 4	Inlet, 25 feet water-way.	Do. do.	Ground level 108.4 .. Channel bed 98.7 .. High water 104.7 ..	Crest 104.7 .. Floor 98.7 ..	29th " 105.2 .. 30th " 104.1 .. 31st " 104.1 ..	Sandy Loam ..	Water from small half ruined tank, south side of channel.
6	7 4	Outlet of four vents.	Do. do.	Ground level 104.7 .. Channel bed 98.7 .. High water 104.7 ..	Crest 104.7 .. Floor 98.7 ..	32nd " 105.2 .. 33rd " 104.1 .. 34th " 104.1 ..	Sandy Loam ..	To discharge surplus and to supply some lands in Sathamungalam village.
7	8 4	Inlet of 50 feet ..	1.25 square mile, 622 cubic feet per 1 inch.	Channel bed 99.3 .. Max. water 104.0 .. Ground level 104.0 ..	Crest 99.3 .. Floor 96.9 ..	35th " 104.0 .. 36th " 104.0 .. 37th " 104.0 ..	Do. ..	To pass drainage into channel.
8	8 4	Outlet of six vents.	Do. do.	Channel bed 97.0 .. Water level 103.0 ..	Crest 101.5 .. Cill 98.0 ..	38th " 104.0 .. 39th " 104.0 .. 40th " 104.0 ..	Do. ..	A small stream draining about half a square mile, and the surplus of a tank draining three-fourths of a square mile.
9	8 7	Inlet of 35 feet ..	3 square mile, 202 cubic feet per 1 inch.	Channel bed 98.2 .. High water 102.2 .. Ground level 98.7 ..	Lower apron 97.0 .. Crest 102.2 .. Floor 96.2 ..	41st " 104.0 .. 42nd " 104.0 .. 43rd " 99.4 ..	Do. ..	To pass the surplus out of the channel.
10	9 3	Head sluice on branch channel C.	To discharge 3 cubic feet per second.	Bed of channel 93.9 .. Do. main channel at head 95.2 ..	Cill 93.9 .. Face-wall 95.2 ..	44th " 99.3 .. 45th " 99.3 .. 46th " 99.3 ..	Do. ..	To pass drainage into channel. No defined stream.
11	9 4	Inlet of 33 feet ..	75 square mile, 371 cubic feet per 1 inch.	Bed of channel 94.6 .. High water 100.6 .. Ground level 93.2 ..	Crest 97.9 .. Crest 95.6 .. Floor 93.2 ..	47th F.S. 93.4 .. 48th " 93.4 .. 49th " 99.1 ..	Do. ..	For the supply of a tank the supply of which has been cut off a drainage of 3 square miles.
12	9 5	Under-tunnel of 3 feet vent.	Do. do.	Bed of channel 94.6 .. High water 100.6 .. Ground level 93.2 ..	Floor 89.0 .. Front 93.1 .. Top of arch 93.5 ..	50th " 97.8 .. 51st " 76.8 .. 52nd " 77.4 ..	Do. ..	No defined stream drainage at 9 1/2 miles to join drainage of this point; this inlet is to pass high floods into the channel.

13	0 6	Outlet of 7 vents ..	Do. do.	Bed of channel 94.6 .. Water level 100.6 .. Ground level 93.2 ..	Crest 93.6 .. Cill 95.6 .. Lower apron 92.1 ..	53rd " 100.9 .. 54th " 108.6 .. 55th " 113.3 ..	Sandy Loam ..	To pass off the drainage that enters the channel here and at the 8 7 inlet.
14	10 0	Bridge of 24 feet span, 9 feet width, 3 feet depth.	Do. do.	Bed of channel 93.9 .. Water level 100.6 .. Ground level 93.2 ..	Springing 104.9 .. Floor 93.9 .. Face-wall 93.5 ..	56th " 108.6 .. 57th " 113.3 .. 58th " 89.1 ..	Do. ..	Accommodation bridge for Sreemustam village.
15	11 0	Under-tunnel of 3 feet vent.	75 square mile, 371 cubic feet per 1 inch.	Bed of channel 94.6 .. High water 100.6 .. Ground level 93.2 ..	Floor 89.0 .. Front 93.1 .. Top of arch 93.5 ..	59th " 97.8 .. 60th " 76.8 .. 61st " 77.4 ..	Loam ..	To drain off water from low cultivated land south side of channel.
16	..	Inlet 35 feet ..	Do. do.	Ground, south side, 86.0 ..	Crest 93.5 ..	Do. do. ..	Loam ..	To pass high floods into channel.
17	..	Outlet four vents ..	Do. do.	Ground, north side, 86.5 ..	Floor 87.7 .. Crest 92.0 .. Cill 83.5 ..	Do. do. ..	Loam ..	To pass high floods out of channel.
18	12 2	Inlet of 35 feet long.	75 square mile, 371 cubic feet per 1 inch.	Channel bed 85.0 .. High water 91.0 .. Ground 90.1 ..	Flooring 84.5 .. Crest 91.0 .. Floor 85.0 ..	62nd " 89.6 .. 63rd " 89.4 .. 64th " 90.4 ..	Loam ..	Drainage at 12 1/2 miles is carried to 12 1/4 miles to inlet and outlet.
19	..	Outlet five vents ..	Do. do.	Bed of stream 85.3 .. Channel bed 85.0 .. High water 91.0 ..	Crest 89.5 .. Cill 86.0 .. Apron 84.0 ..	Do. do. ..	Loam ..	For Nalliarpet village.
20	13 3	Bridge two arches of 10 feet, 9 feet between parapets.	Do. do.	Bed of stream 84.5 .. Channel bed 84.5 .. High water 90.1 ..	Roadway 83.9 .. Springing 82.3 .. Floor 82.3 ..	65th F.S. 84.5 .. 66th " 84.5 .. 67th " 84.5 ..	Loam ..	Sluice to supply Sathavattam tank or Sreemustam tank to be built 100 yards from head of the channel to supply also, being equivalent to 1/4 of an acre per day, an area of drainage cut off taken as 1/4 a square mile.
21	13 7	Sluice of open vent 4 feet wide.	Discharge taken as 3 cubic feet per second.	Bed main chan. 81.0 .. Bed of channel 77.6 ..	Cill 77.3 .. Face-wall 81.8 ..	68th " 85.4 .. 69th " 85.4 .. 70th " 85.4 ..	Loam ..	For supply of Sathavattam small tank to compensate for about 1/2 of drainage cut off by main channel.
22	14 2	Sluice vent 1 foot X 1 1/2.	Do. do.	Bed of channel 79.7 .. High water 85.7 .. Ground 81.1 ..	Cill 79.7 .. Face-wall 87.2 ..	71st " 83.7 .. 72nd " 82.2 .. 73rd " 83.1 ..	Loam ..	No defined stream, but to pass drainage of land south of channel.
23	16 1/2	Inlet 25 feet ..	5 square mile, 283 cubic feet per 1 inch.	Bed of channel 76.9 .. High water 82.9 .. Ground 79.9 ..	Crest 82.9 .. Floor 76.9 ..	74th " 79.9 .. 75th " 79.9 .. 76th " 79.9 ..	Sandy Loam ..	To discharge surplus brought in by the inlet above at 13 1/2 and that at 15 1/2.
24	..	Outlet four vents ..	340 cubic feet per 1 inch.	Ground 79.9 ..	Crest 79.9 ..	Do. do. ..	Do. ..	To pass drainage into channel.
25	16 3	Inlet of 20 feet ..	25 square mile, 180 cubic feet per 1 inch.	Bed of channel 75.8 .. High water 81.8 .. Ground 78.9 ..	Crest 81.9 .. Floor 75.8 ..	77th " 78.9 .. 78th " 78.9 .. 79th " 78.9 ..	Loam ..	

CUDALORE,
11th January 1877.

(Signed) H. R. MEAD, Major, R.E.,
District Engineer, South Arcot.

103 I.

No. 108-A. *Note by the District Engineer for Irrigation.*

THE District Engineer, South Arcot, has transmitted a revised estimate in the comparative statement* form for the Pelandurai anicut project, which was sanctioned by Government in G.O., No. 3,880, dated 10th December 1869, and subsequently allowed by the Government of India to be carried out from Loan Funds.

No. 41, dated 19th May 1877.
 " 52, " 28th " "
 * Appendix A.
 No. 78 I, dated 9th February 1870.
 Proceedings, Madras Government, No. 691, dated 3rd March 1870.

2. The amount sanctioned was	RS.
And in G.O. No. 171 of the 19th January 1872 a further sanction was given by Government on account of a revision of the design of the head sluice	1,98,235
	2,320
	<u>2,00,555</u>

These sanctions provided only for works.

3. The revised estimate including the original provision for additional storage, which there appears to be no sufficient reason for omitting amounts to, for—

Works	RS.	A.	P.	RS.
	2,68,031	0	11	say 2,68,031
				Difference... 67,476

Of this difference Rupees 23,390 are accounted for by cross drainage and other works not provided for in the former estimate, but since found essential for the efficiency of the channel or for the convenience of the neighbouring villages. The remainder of the excess is due to enhanced cost of sanctioned works, the principal items being—

	RS.
Anicut	22,464
Bungalow	1,890
Extra works	5,242
Head sluice	3,698
Other masonry works	3,620
Earthwork	7,650

The work was much mismanaged, partly through the default of the officers in charge, but undoubtedly in a great measure through the frequent change of executive charge. The facts were brought to the notice of Government as soon as it became apparent that the estimate would be exceeded, and the orders of the 15th August 1874, No. 2,263, were then passed. There is nothing of importance to add to what was then made known, and the District Engineer's summary of the circumstances need not be further alluded to.

4. With regard to the provision of additional storage on which against a lump sum sanction of Rupees 26,050 only Rupees 555 have been spent, the District Engineer proposed to omit the balance on the ground that, so far as the subject has been investigated, the cost of enlarging certain tanks has been found to be prohibitory, while if any tanks can be found capable of improvement at a reasonable cost they can "hereafter be dealt with in the ordinary course." To deal with them however requires a sanction in some form, and it will be desirable therefore to retain the item. The subject must be further investigated as soon as possible, but the Engineer Establishment in South Arcot has been for long under-officered, and even the current work of the department cannot be carried on properly while that is the case. It will be somewhat remarkable if in this part of the country the means of storing water on the moderate scale required cannot be found.

* Appendix B.

5. The additional works required apart from storage are shown in a general abstract* and are as follow:—

Cross drainage works, 19	RS.
Bridges, 3	18,715
Distribution works, 3	4,400
	275
Total	<u>23,390</u>

* Appendix C.

The object of each work is shown in a statement* in which all the principal particulars are likewise recorded.

6. The total of the estimates requiring sanction is not that shown by the District Engineer, as he has made insufficient provision for establishment to complete the works, and some further small outlay on tools and plant may be needed. He has not, moreover, distinguished between direct and indirect charges. The amounts will therefore be—

Works	RS.	RS.
Establishment, actual	47,321	2,68,031
Do. future 30 per cent. on further expenditure,		
Rupees 48,885	14,665	
Tools and plant	8,501	
	<u>65,487</u>	
Total, direct charges...	3,33,518	

The only indirect charge on which information has been given is capitalized value of assessment of land taken up, which amounts to Rupees 21,559. The interest charges will amount to a considerable sum, probably Rupees 60,000, and the leave and pension allowances at 25 per cent. on Establishment charges amount to Rupees 15,496, making the total of indirect charges Rupees 97,055. Consequently to obtain a return of 5 per cent. on the direct and indirect capital outlay of, in round numbers, Rupees 4,30,600, a net revenue of Rupees 21,530 will be required. The working expenses were in 1869 estimated at Rs. 9,054, so that a gross revenue of about Rupees 30,584 is needed, which is not much more than half the gross revenue* shown in the Revenue statements.

G.O., 10th December 1869, No. 3,380.
 * Rupees 58,664, vide paragraph 7 of Note in above Proceedings, Madras Government.

With regard to actuals there is no definite information. The standard revenue with which the revenue realized since the completion of the anicut is to be compared has not yet been determined, neither has the revenue under the anicut in each year been authoritatively reported. The District Engineer says that in 1875-76, the first year in which water was let down the channel some small extent of dry land was converted into wet and yielded a water-rate of Rupees 1,257. In 1876-77 there was apparently a larger extent of irrigation, but the results when the District Engineer wrote were not, it would seem, known. It is desirable that the revenue information should be made complete as soon as possible.

7. The early completion of the works and careful attention to the distribution of water are necessary to the success of the project, and the District Engineer should ascertain during the irrigation season to what extent the water is being made use of and with what results.

8. The following remarks on the design of works should receive attention in carrying them out:—

PLANS Nos. I, VIII AND X.—*Bridges.*—Bridges are to be built at 1, 10 and 13½ miles. In the designs for the two former, the wings are shown as stepped up. It

5. The sanction of the Government of India to the revised estimates will be applied for at once.

(Here enter No. of order, dated 30th August 1877.)

(True Extract.)

W. H. H. H.

Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the District Engineer, South Arcot.
" Chief Engineer for Irrigation.
" Collector of South Arcot.
" Board of Revenue.
" Revenue Department.
" Examiner of Public Works Accounts.

Exd. E. C. Shunker.

Spare Copies

25/9

704968/77

No. 6011
No orders are
necessary in this
Department on para 3
of the foregoing G.O.
which it is observed
has been communicated
by the P.W.D. direct to
the Board of Revenue
and Collector of S. Arcot.
B^d of Rev^d

2^d Oct^r 77

3 To H^d of Revenue 25-10-77

Revenue Department
No 4158
IRRIGATION
ACCOUNT.

Govt. of 1877 Madras.
PUBLIC WORKS.

To

THE DISTRICT ENGINEER,
SOUTH ARCOT,
&c. &c. &c.

704968/77
Mi 80 2-10-77 No. 6011.

Dated August 30th.

Issued

Recd.

25 Sept 77

Encl.

G. O., 30th August 1877, No. 267-1.

AUGUST.

Nos. 108-109.

Pelandarai Aicut Project, South Arcot
District.—The sanction of the Government
of India applied for to the revised estimates
for the —.

With Orders