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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 1844-48 Press / Mis.

440-442

Dated 20-6- 1867.

Not to be folded or roughly handled

No 440. Read the following Proceedings of the Board of Revenue, dated 21st May 1867, No. 3,141:—

Read the following letter from the Acting Collector of Nellore, to the Secretary to the Board of Revenue, dated 6th May 1867, No. 130.

1. I have the honour to forward, herewith, the plans and estimates for improvements to the irrigation works in the Pennair Delta, prepared by the Superintending Engineer at an outlay of Rupees 4,12,100, and request that they may be forwarded on to Government at as early a date as possible, with the Superintending Engineer's letter to the Secretary to Government, Public Works Department, inclosed. As Government have allotted Rupees 25,000 in the Budget estimate of the current year for the work, it is desirable that as early sanction as possible be obtained in order that work up to that amount may be executed before April next.

2. From the information I have collected, it appears that the irrigable area under the present project is Acres 77,121, of which 31,633 are either already irrigated, or unfit for cultivation From the remainder, Acres 45,488, it is again necessary to deduct a large amount on account of land that for various causes may not be available. The Superintending Engineer has, accordingly, taken Acres 25,500 only as the area to be benefited by these works Allowing Rupees 4 per acre for water cess, according to Mr. Dykes' proposal, and excluding the dry or punjah shist which would be levied on waste brought under cultivation, the proposed expenditure on these works, viz, Rupees 4,12,100, is calculated to secure a revenue of Rupees 1,02,000 per annum, *i. e*, 24 74 per cent. on the outlay. I, therefore, trust that the Board will recommend that the sanction of Government be acceded to this project in its present form, as the work promises to be so remunerative.

From the Superintending Engineer, 2nd Division, to the Secretary to Government, Department of Public Works, dated Masulipatam, 3rd May 1867, No. 17.

1. I have the honour to forward plans and estimates as per margin, relative to a project for extending the irrigation from the anicut across the Pennair at Nellore, amounting to Rupees 4,12,100.

Enclosures *
21 Surveys and plans as per list attached
27 Detailed estimates
30 Abstract do.
15 Specification Reports
1 General abstract estimate.
1 Synopsis of the general state of Pennair river from 1861 to 1865
1 Statement of rise of do.
1 Revenue Return

* By Banghy

2. The surveys and levels were commenced last year under my direction by R. Smith, Esq, Executive Engineer at Nellore, to whose able assistance I am indebted for much the greater portion of the labour involved in bringing forward the project. The arrangement of the details, the calculations of the dimensions and discharges of the channels, and the designs, most of the masonry works, are his entirely. The surveys and levels were made by Overseer Coopoosawmy Raju, who has proved himself a very efficient Surveyor.

3. As I considered that the channels hitherto executed in the Nellore District had been designed too much on the supposition that the Pennair was a constant flowing river, instead of an uncertain stream, having the character of a mountain torrent, rather than of an even flowing river, I requested Mr. Smith to make the channels considerably in excess of what would have been necessary had it been otherwise. I enclose a synopsis and statement of the general state of the Pennair from 1831 to 1865, inclusive, from which it appears that on an average for only 61 days per annum, the water was full with, or above the crown of the anicut. It is, therefore, evident that to fill the numerous tanks in the Delta so as to receive sufficient to supply two cubic yards per hour per acre, the channels should be capable of conveying a very large quantity during the freshes, and those now projected accordingly, have capacity sufficient to carry from five to six times the water which would be necessary, if the lands were cultivated direct from the channels.

4. The principal features in the present scheme are:—

First—The enlargement of the head sluice by lowering the existing sluices two feet for four feet of their breadth, and the construction of an auxiliary sluice of 6 vents of 3½ feet each, at the site of the old head, which was closed some years ago. This is desirable, as otherwise the loss of head during low freshes by contrasted head works would considerably affect the supply.

Second—The deepening of the main feeder two feet in preference to widening it. The velocity generated* will entail the necessity of pitching the side slopes with stone for about 3,000 yards, where sand is traversed; but on account of the close proximity of the heavy banks already formed by the excavation of the channels, and the desirability of obtaining a maximum supply in low freshes or when the water is below the crest of the anicut, this has been considered the expedient course to adopt. The estimates for these two improvements amount to Rupees 15,300.

* 220 feet per minute.

Third—The construction of regulating sluices at the heads of the Jaffer Sahib and Kistnapatam channels. By the aid of these structures, and the regulating sluices for the Survapully and Wollaru branches in the sixth mile, perfect command over all the main irrigating ducts of the Delta will be obtained within a radius of 3½ miles from Nellore.

Estimate, Rupees 90,300.

Fourth—The deepening of the Survapully new cut, and the enlargement and improving of the old Ramereddy channel, and the masonry works connected with it as far as the sixth mile from the head sluices.

Estimate, Rupees 1,26,500

Fifth.—The construction of a new channel from the sixth mile skirting the high ground by Kulloor Pully, Bommichitty, and Gogumudy, to supply the Survapully reservoir with the necessary irrigation and drainage works.

Sixth—The construction of a main reservoir at Survapully, by the enlargement of the present tank, which shall contain 525,80,000 cubic yards of water. Mr. Smith calculates that *after* supplying "all demands when the water is flush with "the crown of the anicut, the channels will be found sufficiently capacious to "provide 18,36,400 cubic yards daily, which would enable the reservoir to be filled "in 28½ days, excluding loss by evaporation," and remarks "that as the direct daily

"supply can only be depended on for 61 days, annually, and as the reservoir must "supply any deficiency that may arise during the other 80 days, the total quantity "during the period would be 956,30,400 cubic yards of water, or 95,20,600 cubic "yards *less* than the reservoir would contain on being filled a second time each "season."

Seventh—The abandonment of the Yepuru, Kamini, Pudiparty, and Tutty tanks, which after the construction of the Survapully reservoir and the Wolluru channel, respectively, will no longer be needed. Their beds can then be cultivated, and the irrigated area considerably increased.

Estimate, Rupees 33,440

Eighth—The construction of a channel from the Survapully channel to the Idagally tank, so that when water is available, the opportunity may be taken to fill it in a short time by allowing its channel to flow 7 feet deep. A sluice has been provided for it to regulate the supply, and permit the water returning into the channel.

Estimate, Rupees 27,840.

Ninth—The construction of an Irrigation channel from the sixth mile to Wolluru tank, and in continuation to near Gudiving, and the Kundlairoo river irrigating the land as far as the main drainage channel.

Tenth.—The conversion of the present supply channel of the Survapully tank into a main drainage, which on being extended will effectually take off the water from the irrigated fields under the Survapully tank and the Wolluru channel, and relieve a considerable tract of land now swamped

5 It may eventually be found that the supply is sufficient to justify an extension of the channel from the Idagally tank in the direction of Trunk Road No. 6. At first it was intended to construct a high level channel from near the present head of the Survapully branch, which should have supplied all the tanks in the neighbourhood of Puddoor, Sudulur, Kullivapully, &c; but as those tanks already generally receive a fair supply from the Pottitla, and the expense would have been very great, I decided that the idea should not be further entertained as regards the present project.

6. In explanation of the necessity of the principal masonry works which I have not yet noticed, I beg to add that the new ridge proposed at Stonhousepett is rendered imperative, owing to the impossibility of lowering the floors of the present structure. An attempt was made some years ago to do this, and the result was that the arch became considerably cracked.

7. The surplus sluice in the sixth mile is designed to pass off into the main drain, (alluded as the tenth chief feature the scheme,) the local drainage of 18 square miles of country that falls into the Survapully channel at its junction with the old Rameredy.

8 The falls adjacent to the Pudipar Yepuru, Kamini, and Tutty tanks are designed to adjust the difference between slopes of the channel and the country when the tanks are abandoned, otherwise the tanks would suffer severely from erosion.

9. The rates entered for the masonry works have been carefully fixed by the Executive Officer, with reference to the distance the materials have to be carried, and the style of work proposed.

10. The irrigable area under the present project, as shown by the Collector's statement attached, is Acres 77,121, of which 31,633 are either watered already or are not fit for cultivation. From the remainder, (45,488 acres,) however, it is necessary, in the absence of specific information, to deduct a very large amount on account of land that, from various causes, may not be available, and I, therefore, propose estimating the receipts on 25,500 acres only. Allowing 4 Rupees per acre for water cess, and excluding the dry shist which would be levied on waste to be brought under cultivation, the expenditure now contemplated would secure a revenue of 1,02,000 Rupees per annum, *i. e*, 24 74 per cent. on the outlay. Under these circumstances, I therefore lay the project before Government with great confidence.

11. Rupees 25,000 have been allotted in the current year's Budget (Item 148,) and pending the formal sanction of the Government of India to the scheme, I request permission for the Executive Officer to spend a portion of the money in collection of materials, &c., so that the present working season may not be lost.

Enclosures Nos 2 to 101.—Plans and Estimates.

Submitted for the early sanction of Government accordingly.

Specification to accompany the Plan and Estimate for constructing the auxiliary Head Sluice.

1. The sluice will consist of six vents, 10 feet × 3½ feet. The front wings to be 26 feet in height for a length of 10 feet, and then decrease by steps of a foot, for 16 feet, measured horizontally, which will reduce the height to 9 feet. The face walls to be 13 feet 7½ inches in height, the breadth at bottom and [illegible] being 5 feet and 2 feet respectively. The space between the face walls to be filled in with concrete

2. The laterite at the site to be cut down to the required depth 29·49 feet above mean tide, and the superstructure built on it; no masonry is necessary in the foundation.

3. The wings in rear to be built [illegible] the surface of the laterite, the height being, on the average, 10 feet, and the mean [illegible] adth 3½ feet.

4. The vents to be provided with [illegible]ak shutters, 4 feet × 3 inches × 11½ feet, these will have a margin of iron 3 inc[illegible]es × ½ inch on the inner face to reduce friction, the working gear will consist [illegible] screw ⅞ths of an inch pitch; a horizontal teak beam 1 foot square laid over the [illegible], through which the extremity of the screw will pass and project 6 inches under[illegible]ut for elevating or depressing the screw. An iron plate 9 inches × 9 inches [illegible]nch will be let into the beam to a depth of half an inch. The nut to be worke[illegible] a movable lever 24 inches in length. The beam will be retained in its position [illegible]on ties built into the masonry.

5. The masonry to be of dressed [illegible]erite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an auxiliary Head Sluice, enlarging old Channel, and deepening the Main Feeder from the existing Head Sluice to the head of the Sarvapully Channel.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth	No	Cubical contents.	Rates per Cubic yard. Rs.	A.	P.
	Feet.	Feet.	Feet		Feet.			
HEAD SLUICE.								
Enlarging old Channel.								
Laterite cutting	30	42	2	1	2,520	0	8	0
Clearing silt	30	31	3⅗	1	3,410	0	1	6
Laterite cutting	26	42	2	1	2,184	0	8	0
Do do.	27	23	2	1	1,242	0	8	0
Do do.	26	11	17¾	1	5,076½	0	8	0
Earth-work	26	11	8	1	2,288	0	1	6
Clearing silt	53	23	3⅗	1	4,469⅗			
Removing and re-packing laterite revetment	27	1½	8	1	324	0	8	0
Laterite cutting	45	24½	2	1	2,182½	0	8	0
Do. do.	45	1½	15⅓	1	1,220⅝	0	8	0
Earth-work	45	1½	10¼	1	807 9/16	0	1	6
Clearing silt	45	24½	3	1	3,273¾	0	1	6
Removing and re-packing laterite revetment	45	1½	10¼	1	691⅞	0	8	0
Laterite cutting	45	26	2	1	2,340	0	8	0
Do. do.	22	17	½	1	192½	0	8	0
Clearing silt	45	26	3¾	1	4,387½	0	1	6
Laterite cutting	90	26	2	1	4,680	0	8	0
Clearing silt	90	27	3⅗	1	8,910	0	1	6
Laterite cutting	145	26	2	1	7,540	0	8	0
Clearing silt	145	27	3⅗	1	14,355	0	1	6
Removing bund .	27	92	13⅝	1	34,332	0	1	6
Demolishing bridge over old supplying channel, and clearing the latter out underneath it	...	...	...	...	...	...		
Connecting existing and proposed head sluices by a parapet wall	...	...	...	...	...			
Foundation	276	2⅓	3	...	2,070			
Wall above	276	1½	3	.	1,242			
Total cubic feet of laterite in chunam	...	..	...	..	3,312			
Lowering floor of head sluice ...	...	..	...	.	80	1	4	0
Laterite cutting	...	..	...					
Altering shutters	...	.	...	.	...	...		
Deepening Main Feeder.								
Laterite cutting	1,000	52	2	..	1,04,000	0	8	0
Earth-work	1,000	20	1½	.	30,000	0	1	6
Do do	1,000	34	1	.	34,000	0	1	6
Do do.	1,000	40	1	..	40,000	0	1	6
Do do.	900	75	3	...	2,02 500	0	1	6
Do do	900	30	1½	...	40,500	0	1	6
Rubble pitching	900	23	1½	2	62,100	0	2	0
Gravel backing	900	23	1	...	41,400	0	8	0
Compensation for land... ...	...	...	...	...	...	...		

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate.	Amount	Total.
		RS. A. P.	RS. A. P.	RS. A P
1	Head sluice—*vide* separate estimate.	...	...	6,350 0 0
	Enlarging old channel.			
1,118	Cubic yards of laterite cutting ..	0 8 0	559 0 0	
2,710	Do. of clearing silt ..	0 1 6	254 1 0	
114	Do. of earth-work ...	0 1 0	7 2 0	
				820 3 0
	Demolishing bridge over old supplying channel and clearing the latter out underneath it	...	...	125 0 0
	Connecting existing and proposed head sluices by a parapet wall.			
3,312	Cubic feet of laterite in chunam ...	0 2 9	569 4 0	
	Deduct value of old materials ...	...	216 0 0	
				353 4 0
	Lowering floor of head sluice ..	...	...	100 0 0
	Altering shutters	...	...	216 0 0
	Deepening Main Feeder.			
3,852	Cubic yards of laterite cutting ...	0 8 0	1,926 0 0	
12,852	Do. of earth-work	0 1 6	1,204 14 0	
2,300	Do of rubble pitching ..	1 2 0	2,587 8 0	
1,533⅓	Do. of gravel backing ...	0 8 0	766 10 8	
				6,485 0 8
	Compensation for one tiled and a small compound	...	...	800 0 0
	Sundries	...	...	50 8 4
	Total estir .	...	...	15,300 0 0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an auxiliary Head Sluice adjacent to the Anicut.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical contents.
	Feet.	Feet.	Feet.		Feet.
Concrete	35½	14	12⅝	...	6,216 5⅞
				Total...	6,216 5⅞
Abutments					
Piers	23½	4	10	2	1,880
Caps	27½	2½	10	5	3,416⅔
Skew backs	2½	2½	2½	5	67⅞
Do.	23	2½	½	5	143¾
Spandril	23	4	½	2	92
Face walls	41½	23	½	...	715⅞
Do.	41½	3½	13⅝	2	3,958 1/16
	41½	2	13⅝	...	1,130⅞

DETAILED ESTIMATE No. 4.—*(Concluded)*

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth	Number.	Cubical contents.
	Feet.	Feet.	Feet		Feet.
Side walls	23½	3⅛	12⅛	2	1,879 1/16
Portion of cut-waters	2½	2⅛	16	5	375⅝
Front wings	10	6½	26	2	3,380
Do.	15	5	18	2	2,700
Do	10	3½	10	2	700
Rear wings	26	3½	10	2	1,820
String course	124	¼	¾	...	23¼
Parapet	200	1½	3	...	900
Arch work	23	5¼	1½	6	1,190¼
				Total...	24,373 1/12
Pointing ... Squares	...	...	...	...	87
Earth-work .. Cubic yards	...	...	...	...	1,248
Metaling ... ,,	...	...	...	..	66⅔
Teak-wood beam . Cubic feet	.	...		..	35⅝
Teak-wood shutters with working gear	..	...	.	..	6
Centering	...	...	...	..	...
Sundries	...	...	...	..	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate PS. A. P	Amount RS A. P	Total. RS.
6,216	Cubic feet of concrete	0 2 0	777 0 0	
24,373	Do of laterite in chunam ..	0 2 9	4,189 1 9	
87	Squares of pointing	2 0 0	174 0 0	
1,248	Cubic yards of earth-work	0 4 0	312 0 0	
66⅔	Do of metaling	0 4 0	16 10 8	
35½	Cubic feet of teak-wood beam .	3 8 0	124 4 0	
6	Teak-wood shutters with working gear	78 0 0	468 0 0	
	Centering	...	150 0 0	
	Sundries	...	138 15 7	
				6,350

Specification to accompany the Plan and Estimate for the Regulating Sluice at the head of the Jaffer Sait's Channel.

1. The sluice to consist of five vents of 6 feet span. The front wings to be 13 feet 6 inches in height, the breadth at bottom and top to be 5 feet 4 inches and 1 foot 6 inches respectively, the foundations of pier to be laid at a depth of 4 feet, the average breadth being 4 feet 3 inches and of abutments 6 feet. The rear wings to be 13 feet in height at the abutments and 9 feet at the returns, the average section

at the former point being $3\frac{1}{4}$, and $2\frac{1}{2}$ at the latter; the foundation will have an uniform depth of 6 feet, but the section will vary from an average thickness of $6\frac{1}{2}$ at the abutments to 5 at the returns.

2. The flooring in the bays to be inverts of $1\frac{1}{2}$ in thickness, resting on concrete 1 foot thick. The flooring from the bays to the front and rear retaining walls will be $1\frac{1}{2}$ feet in depth, with a bed of concrete 1 foot in thickness. The piers on the up-stream side will project 3 feet to admit of small arches being turned to facilitate the working of the shutters; these will consist of teak planks $6\frac{1}{2} \times 3$ inches $\times 13\frac{1}{2}$ feet. Firm iron bars, varying from 4 inches to $2\frac{1}{4}$ in diameter, to be fixed in each vent to strengthen the shutters, and enable them to be worked easily. The rubble apron in rear to be $35 \times 20 \times 2\frac{1}{2}$, that in front 58 feet $\times$ 12 feet $\times 1\frac{1}{2}$. The side slopes of the channel, in rear of the sluice, to be protected for a length of 20 by rubble pitching. The whole of the masonry to be built of dressed laterite in chunam. The floor of the sluice, to be 29 05 feet above mean tide; the level of this has been fixed 2 feet below the bed of the channel, to enable it to be lowered 2 feet at any future time, should it be desirable to increase the discharge in the Jaffer Saib's branch.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing a Regulating Sluice at the head of Jaffer Saib's Channel.

Particulars of Work.	Measurement. Length	Breadth	Height or Depth	No.	Cubical contents.
	Feet.	Feet	Feet.		Feet.
Concrete —Below Inverts	$9\frac{1}{2}$	$4\frac{1}{2}$	1	3	$117\frac{9}{16}$
	$9\frac{1}{2}$	$4\frac{1}{4}$	1	2	$80\frac{3}{4}$
Front apron	$39\frac{1}{2}$	7	1	....	$276\frac{1}{2}$
Rear do	$41\frac{1}{8}$	$21\frac{5}{16}$	1	....	$880\frac{3}{4}$
Front retaining wall	$50\frac{1}{2}$	$4\frac{1}{2}$	1	... .	$227\frac{1}{4}$
Spandril	20	$5\frac{1}{2}$	$2\frac{1}{2}$	.....	275
Total	.. ...	.. .	. ...	.....	$1,857\frac{13}{16}$
Foundation.—Abutments	$9\frac{1}{2}$	$6\frac{1}{2}$	6	2	
Piers	$12\frac{5}{8}$	$3\frac{3}{4}$	4	4	741
Do front portion	$4\frac{5}{8}$	$3\frac{3}{4}$	4	4	$737\frac{1}{2}$
Front wings	27	$6\frac{5}{8}$	$5\frac{1}{2}$	2	$277\frac{1}{2}$
Rear do	24	$6\frac{1}{2}$	6	2	$2,029\frac{1}{2}$
Returns	$9\frac{3}{8}$	5	6	2	1,872
Front retaining wall ...	$50\frac{1}{2}$	$2\frac{1}{2}$	$4\frac{1}{2}$	2	585
Rear do	$34\frac{3}{8}$	$2\frac{1}{2}$	6	1	$568\frac{1}{8}$
Superstructure —Abutments	$9\frac{1}{2}$	$3\frac{3}{8}$	9	1	$571\frac{1}{2}$
Piers	11	$2\frac{1}{2}$	9	2	$619\frac{7}{8}$
Do front portion ...	$4\frac{1}{2}$	$2\frac{1}{2}$	$9\frac{1}{2}$	4	999
Caps	$2\frac{1}{2}$	$2\frac{3}{8}$	2	8	$427\frac{1}{2}$
Skew backs	$10\frac{1}{2}$	$2\frac{1}{2}$		4	95
Front wings	$26\frac{1}{8}$	$3\frac{5}{12}$	$13\frac{1}{2}$	2	$261\frac{1}{4}$
Coping	$28\frac{1}{8}$	2	$\frac{3}{4}$	2	$2,421\frac{9}{16}$
Rear wings	$24\frac{1}{2}$	$2\frac{7}{8}$	11	2	$84\frac{3}{4}$
				2	1,518

DETAILED ESTIMATE No. 4—*(Concluded)*

Particulars of Work	Measurement. Length	Breadth	Height or Depth	No	Cubical contents.
	Feet	Feet.	Feet.		Feet.
Superstructure—Coping	$26\frac{1}{4}$	2	$\frac{3}{4}$	2	$78\frac{3}{4}$
Returns	$12\frac{1}{2}$	$2\frac{1}{2}$	9	2	$562\frac{1}{2}$
Coping	$14\frac{1}{4}$	2	$\frac{3}{4}$	2	$42\frac{3}{4}$
Backing to arch	11	$2\frac{1}{2}$	$\frac{1}{2}$	2	$27\frac{1}{2}$
Face walls	$23\frac{3}{4}$	$2\frac{1}{4}$	$1\frac{1}{2}$	2	$160\frac{5}{16}$
Blocking courses ...	$44\frac{1}{2}$	$1\frac{1}{4}$	1	2	$111\frac{1}{4}$
Parapets	44	$\frac{3}{4}$	1	2	66
Arch work	$9\frac{1}{2}$	9	1	5	$427\frac{1}{2}$
	1	9	1	5	45
	$9\frac{1}{1}$	$6\frac{1}{2}$	$1\frac{1}{2}$	5	$463\frac{1}{8}$
Flooring	$39\frac{1}{2}$	$7\frac{1}{2}$	$1\frac{1}{2}$	.....	$444\frac{3}{8}$
	$41\frac{1}{8}$	22	$1\frac{1}{2}$	.....	$1,357\frac{1}{8}$
Total...	..	. ....	.....	. ..	17,321
Rubble stone (laterite)	35	20	$2\frac{1}{2}$	.....	1,750
	58	12	$1\frac{1}{2}$	.. .	1,044
	20	17	2	2	1,360
					4,154
Or cubic yards	.....	.....	. ....	.....	$153\frac{23}{27}$
Pointing .. .. Squares	... ..	.....	.....	... ..	78
Earth-work ... ... C. yards	.. ..	.....	.. ...	.....	1,470
Metaling ... ... do.	....	.....	....	.....	$9\frac{1}{2}$
Iron bars... ... ... R. feet.	... ..	..	.	....	150
Shutters	$6\frac{1}{2}$	3"	$13\frac{1}{2}$	5	$109\frac{11}{16}$
Centering	. ..	.....	. . .	.....	.... .
Baling	.. ..	.....	.....	....	.....
Sundries	.....	.....	.....	.....	.....

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate RS A. P.	Amount. RS A. P	Total. RS. A. P.
$1,857\frac{13}{16}$	Cubic feet of concrete	0 2 0	232 3 8	
17,321	Do. of laterite in chunam ...	0 2 9	2,977 0 9	
78	Squares, pointing	2 0 0	156 0 0	
$153\frac{23}{27}$	Cubic yards of rubble stone (laterite)	1 2 0	173 1 4	
1,470	Do. of earth-work	0 1 0	91 14 0	
$9\frac{1}{2}$	Do. of metaling	0 4 0	2 6 0	
$109\frac{11}{16}$	Cubic feet of teak-wood shutters ...	3 8 0	383 14 6	
150	R feet of iron bars	...	184 0 0	
	Centering	...	150 0 0	
	Baling	...	250 0 0	
		...	4,600 8 3	
	Sundries	...	119 7 9	4,720 0 0

DETAILED ESTIMATE No 4.

PENNAIR DELTA.

Deepening the Sarvapully New Cut, and improving the old Ramireddy Channel.

No. of Cross Sections.	Particulars of Work.	Measurements: Length.	Breadth	Height or Depth.	Number.	Cubical contents.	Work to be executed: Cutting	Banking	Rubble Pitching	Gravel Backing	Turfing	Rate per Cubic yard. Rs	A	P
		Feet	Feet.	Feet		Feet	Feet.	Feet	Feet.	Feet	Feet.			
1	Cutting .. .	660	68	10	1	4,48,800								
	Deduct present work ..	660	73	5	1	2,40,900								
							2,07,900	...	..	..	...	0	1	6
	Cutting	660	25	1	1		16,500	...	.	.	...	0	1	0
	Do.	660	14	2	1	..	18,480		...	...	...	0	1	0
	Turfing .. .	660	25	.	1	. .	...	...	...	..	16,500	0	1	4
	Do.	660	14	.	1	...			...	.	9,240	0	1	4
	Rubble pitching	660	23	1½	2	. .	...	. .	45,540	..	...	1	2	0
	Gravel backing	660	23	1	2		.	. .	.	30,360		0	8	0
2	Cutting	1,320	68	10	1	8,97,600								
	Deduct present work .	1,320	77	5	1	5,08,200								
							3,89,400	.	...	.	.	0	1	6
	Cutting	1,320	13	3	1	...	51,480	...	..	.		0	1	0
	Turfing	1,320	13	.	1	...	..	...			17,160	0	1	4
	Rubble pitching ...	1,320	23	1½	2	.	.	...	91,080	..		1	2	0
	Gravel backing	1,320	23	1	2			.	..	60,720	...	0	8	0
3	Cutting	1,320	68	10	1	8,97,600								
	Deduct present work ...	1,320	59	4	1	3,11,520								
							5,86,080	...	..	..	...	0	1	6
	Rubble pitching ...	1,320	23	1½	2	..	...	..	91,080	..	..	1	2	0
	Gravel backing	1,320	23	1	2		...	...	.	60,720	...	0	8	0
4	Cutting	165	68	10	1	1,12,200								
	Bridge of two Arches.													
	Cutting	1,155	68	10	1	7,85,400								
						8,97,600								
	Deduct present work .	1,320	77	4½	1	4,57,380								
							4,40,220	...	...	..	.	0	1	6
	Rubble pitching ...	1,290	23	1½	2	. .	...	...	89,010	..	..	1	2	0
	Gravel backing	1,290	23	1	2	. .	..	...		59,340	...	0	8	0
5	Cutting	462	68	10	1	3,14,160								
	Iron Aqueduct piers to be demolished and re-built.													
	Cutting	858	68	10	1	5,83,440								
						8,97,600								
	Deduct present work ...	1,320	74	4¾	1	4,63,980								
							4,33,620	...	...		...	0	1	6
	Cutting	1,320	15	2	1	...	39,600	.	..	...	...	0	1	0
	Do	1,320	13	1½	1	...	25,740	. .	...	. .	...	0	1	0
	Turfing	1,320	15	...	1	.	...	. .	..		19,800	0	1	0
	Do.	1,320	13	..	1	..	.	...	.	...	17,160	0	0	10
	Rubble pitching ..	1,308	23	1½	2	...	..	.	90,252	...	..	0	0	10
	Gravel backing	1,308	23	1	2	...	.	...		60,168	.	1	2	0
6	Cutting	814	63	10	1	5,12,820						0	8	0
	Iron Aqueduct to be substituted for Syphon													
	Cutting .	506	63	10	1	318,780								
						831,600								
	Deduct present work . .	1,320	70	3¼	1	346,500								
							485,100	.	.	...	..	0	2	0
	Cutting	1,320	7	1½	1	..	13,860	.	.	...	...	0	1	0
	Do.	1,320	8	1½	1	...	15,840					0	1	0
7	Laterite cutting .	1,320	63	10	1	831,600			...	...				
	Deduct present work	1,320	64	4	1	337,920								
							493,680	...	...	...	...	0	4	0

DETAILED ESTIMATE No. 4.—*(Continued)*

PENNAIR DELTA.

Deepening the Sarvapully New Cut, and improving the old Ramireddy Channel.

No of Cross Sections.	Particulars of Work.	Measurements. Length.	Breadth.	Height or Depth.	Number.	Cubical contents.	Work to be executed. Cutting.	Banking.	Rubble Pitching.	Gravel Backing	Turfing.	Rate per Cubic yard. Rs.	A.	P.
		Feet.	Feet	Feet		Feet.	Feet	Feet.	Feet.	Feet.	Feet.			
	Cuttting... ...	1,320	7	2	1	..	18,480	.	...		...	0	2	6
	Do.	1,320	4	2	1	...	10,560	...	..		...	0	2	6
8	Laterite cutting ...	374	54	10	1	201,960				...				
	Iron Aqueduct to be substituted for Syphon													
	Cutting	187	54	10	1	100,980								
	Bridge Floor to be lowered.													
	Cutting	759	54	10	1	409,860								
						712,800								
	Deduct present work ..	1,320	64	4½	1	380,160	332,640	..	.	...		0	4	0
						712,800								
9	Laterite cutting	1,320	54	10	1	319,770								
	Deduct present work ..	1,320	51	4¾	1		393,030	...	...	.	..	0	4	0
	Cutting	1,320	7	1	1	...	9,210	...	...	...	..	0	1	6
	Do	1,320	4	2¼	1	213,840	13,200	...	...	..	..	0	1	6
10	Do.	396	54	10	1									
	Iron Aqueduct to be substituted for Syphon.													
	Cutting	924	54	10	1	498,960								
						712,800								
	Deduct present work ...	1,320	55	4½	1	326,700	386,100	..	...	...	...	0	2	6
	Cutting	1,320	4	1	1	...	5,280	..	...	...	...	0	1	6
	Do	1,320	4	1½	1	...	7,040	..	...	...	..	0	1	6
11	Do	1,320	54	10	1	712,800								
	Deduct present work ...	1,320	45	4½	1	257,400								
							455,400	...	...	...	...	0	2	0
	Cutting	1,320	9	1½	1	.	17,820	...	...	..	..	0	1	6
	Do.	1,320	7	1½	1	...	13,860	...	...	...	...	0	1	6
12	Do.	1,320	56	10	1	739,200								
	Deduct present work ..	1,320	55	4½	1	326,700								
							412,500	...		...	..	0	4	0
	Cutting	1,320	9	2	1	..	23,760	...	.	...	..	0	2	6
	Do.	1,320	8	½	1	.	5,280	...	..	...	...	0	1	6
13	Do.	1,320	56	10	1	739,200								
	Deduct present work ...	1,320	41	4	1	216,480								
							522,720	...	...	...	...	0	1	6
	Cutting	1,320	14	¾	1	...	13,860	...	..	...	.	0	1	0
	Do. . .	1,320	15½	1½	1	...	30,690	...	..	..	...	0	1	2
14	Do.	1,320	56	10	1	739,200								
	Deduct present work ..	1,320	56	3¾	1	277,200								
							462,000	.	...	...	...	0	1	6
	Cutting	1,320	7	1½	1	...	13,860	...	...	...	.	0	1	2
	Turfing	1,320	26	...	1	...	..	...	...	...	34,320	0	0	4
15	Cutting	1,320	48½	5½	1	...	330,770	...	.	..		0	0	6
16	Do	1,320	51	4⅛	1	..	280,500	...	..	...	..	0	1	0
	Turfing	1,320	35	...	1	...	..	...	...	...	46,200	0	0	4
17	Cutting	1,320	52	4½	1	...	308,880	.	...	...	...	0	1	3
	Banking	1,320	14	1	1	..	.	18,480	.	...	...	0	0	10
	Turfing	1,320	67	...	1	...	..	...	...	..	88,440	0	0	4
18	Cutting ..	1,320	26	5¾	1	..	197,340	.			..	0	0	3
	Turfing	1,320	78	...	1	...	...		.	.	102,960	0	0	4
	Banking .. .	1,320	84	2	1	...	..	221,760		..	...	0	0	1
19	Cutting	1,320	37	6	1	...	293,040	...	.	...	...	0	0	1
	Do	1,320	11	2	1	...	29,040	.	...	.	..	0	0	1
	Banking	1,320	94	2	1	...	...	218,160	...	.	...	0	0	1
	Turfing	1,320	92	..	1	...	...	.	...	...	121,440	0	0	1
20	Cutting	1,320	68	5½	1	...	493,680	...	..	...	...	0	0	1
	Banking	1,320	29	½	1	...	...	76,560	..	..	..	0	0	1
	Turfing	1,320	92	..	1	..	..	...	.	...	121,440	0	0	1
21	Cutting	1,320	67	4⅓	1	.	383,240	.	..	...	.	0	0	1
	Banking . ..	1,320	115	2	1	...	...	303,600	...	...		0	0	1
	Turfing	1,320	100	...	1	..	...	.	...		132,000	0	0	1
						Or Cubic yards	8,681,310	868,560	406,962	271,308	726,660			
							321,530	32,169	15,072⅔	10,048	80,740			

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate	Amount.	Total
		RS. A. P.	RS A. P.	RS. A P
60,439	Cubic yards of laterite cutting ...	0 4 0	15,109 12 0	
1,956	,, of gravel do .	0 2 6	305 10 0	
49,133	,, of do. ...	0 2 0	6,141 10 0	
1,37,961	,, of cutting	0 1 6	12,933 13 6	
10,853	,, of do.	0 1 4	904 6 8	
51,227	,, of do	0 1 3	4,002 1 9	
1,650	,, of do.	0 1 2	120 5 0	
8,311	,, of do.	0 1 0	519 7 0	
3,21,530				40,037 1 11
11,244	,, of banking	0 1 3	878 7 0	
12,027	,, of do.	0 1 2	876 15 6	
8,213	,, of do.	0 1 1	556 1 5	
685	,, of do.	0 0 10	35 10 10	
32,169				2,347 2 9
15,072⅔	,, of rubble pitching ...	1 2 0	16,956 12 0	
10,018	,, of gravel backing ...	0 8 0	5,024 0 0	16,956 12 0
4,767	Square yards of turfing	0 1 4	397 4 0	5,024 0 0
4,107	,, of do	0 0 10	213 14 6	
71,866	,, of do.	0 0 4	1,497 3 4	
80,740				2,108 5 10
	Compensation for land	...	..	200 0 0
2	Distributing channels	100 0 0	...	200 0 0
	Masonry Works.—Vide separate estimates			
1	Bridge of 2 arches across the Sarvapully channel, near Stonehousepet	...		8,300 0 0
1	Demolishing and re-building the iron aqueduct piers	...	...	680 0 0
1	Substituting iron aqueduct for syphon No. 1	...	..	2,100 0 0
1	Do. do. No. 2 ...	...	...	2,100 0 0
1	Lowering floor of Kristnapatnam road bridge	...	...	70 0 0
1	Substituting iron aqueduct for syphon No 3	...	...	2,100 0 0
1	Converting bridge across head of Kristnapatnam channel into a head sluice for that branch	...	...	990 0 0
2	Irrigation sluices, *vide* Plan No. 1 ..	250 0 0	...	500 0 0
1	Constructing a surplus sluice, adjacent to the Sarvapully branch head sluice, across the old Ramreddi channel		...	6,470 0 0
	Sundries		...	116 9 6
	Total Estimate ..	...	...	90,300 0 0

Specification to accompany the Plan and Estimate for constructing a bridge over the Sarvapully Channel near Stonehousepetta.

The bridge to consist of 2 arches of 30 feet span; the rise being 7½ feet; the flooring to be an invert with a versed sine of 1½ feet; the invert will rest on a bed of concrete 6 inches in thickness; the piers to be 5 feet in breadth at bottom, with a batter of 6 inches on each side; the abutment to be 6 feet in thickness, and 12 feet in height; the thickness of the arch to be 2¼ feet at the springing line, and 1½ feet at the crown; the wings to be 22 feet in height, the breadth at bottom being 8 feet, which will be reduced by offsets, on the inside, to 2 feet 2 inches at the top; the foundations of the wings to be 6 feet in depth, the average breadth 10 feet; the foundations of the abutments and pier to be 6 feet in depth also, the average breadth of the former will be 8½ feet, and that of the latter 7½ feet; the foundations throughout to rest on a bed of good concrete 1 foot in thickness; the wings to be set out with a radius of 66 feet. The whole of the masonry to be of dressed laterite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing a bridge of two arches across the Sarvapully Channel, near Stonehousepetta.

Particulars of Work.	Measurement. Length.	Breadth	Height or Depth	No.	Cubical Contents
	Feet	Feet	Feet.		Feet.
Concrete.—Abutments	35⅛	11½	1	2	808⅝
Piers	35⅛	10⅓	1	1	369¼
Wings	31	13	1	4	1,612
Retaining wall	26	6	1	4	624
Inverts	28½	28	½	2	798
Spandril	16⅔	18	2	1	600
Total ...	...	...	...	...	4,812½
Foundation.—Abutments	32½	8½	6	2	3,281
Piers	32⅛	7½	6	1	1,447½
Wings	31	10	6	4	7,440
Retaining wall	28	3½	5½	4	2,156
Superstructure.—Abutments	29⅔	6	12	3	4,272
Piers	29½	4½	12	1	1,575
String courses	124	¼	½	..	15½
Caps	3½	4	3½	2	117⅝
Do.	4½	5	4⅓	2	187⅞
Skew backs	21	4	1	1	84
Do	21	5	1⅝	2	385
Backing to arches... ..	21	10	1½	2	630
Wings	31	5 1/12	22	4	13,867⅓
Spandril	21	6	2½	1	315
Face wall	30	2⅛	2½	...	162½
	14	3⅓	4½	...	210
	66	3⅓	4½	...	990
Parapets	141⅔	1½	1¾	2	759½
	144⅔	1	1¾	2	506⅓
	2	2	3½	4	56
Total ...	...	...	...	...	38,454

DETAILED ESTIMATE.—*(Continued)*

Particulars of Work.	Measurement. Length	Breadth	Height or Depth	No.	Cubical Contents.
	Feet	Feet.	Feet.		Feet.
Cornice ... ... Running feet.	...	..	...	...	300
Arch-work	39	21	$1\frac{1}{6}$	2	$3,071\frac{1}{4}$
	31	27	1	2	1,674
Total ..	...	...	...	..	$4,745\frac{1}{4}$
Pointing .. .. Squares	...	...	...	...	$102\frac{1}{2}$
Excavation . ... Cubic yards	...	...	...	...	1,540
Metaling ... ... ,,	...	...	...	...	15
Guard stones	...	...	..	..	4
Centering...	...	..	...	...	
Baling	...	...	...	...	...
Sundries	...	...	...	...	...
	...	...	...	...	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate. Rs. A. P	Amount Rs. A P.	Total. Rs
4,812	Cubic feet of concrete	0 2 0	601 8 0	
38,454	,, of laterite in chunam ..	0 2 9	6,609 4 6	
4,745	,, of arch-work with laterite in chunam.	0 3 0	889 11 0	
$102\frac{1}{2}$	Squares of pointing	2 0 0	205 0 0	
300	Running feet of cornice	0 4 0	75 0 0	
1,540	Cubic yards of excavation	0 1 0	96 4 0	
15	,, of metaling	0 6 0	5 10 0	
4	Guard stones	4 0 0	16 0 0	
	Centering	.....	370 0 0	
	Baling	.....	200 0 0	
	Sundries	.....	236 10 6	
			9,300 0 0	
	Deduct value of old materials ...	...	1,000 0 0	
				8,300

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Deepening the Sarvapully New Cut, and improving the old Ramireddy Channel.

Masonry Works

Particulars of Work	Measurement. Length.	Breadth.	Height or Depth	No.	Cubical contents
Demolishing and re-building Iron Aqueduct Piers.	Feet	Feet.	Feet.		Feet.
Foundation to piers	17	5	5	4	1,700
Piers above	16	3	11	4	2,112
Total cubic feet of laterite in chunam. .	...	...	.	...	3,812
Demolishing existing piers	...	...	...	...	...
Scaffolding, shoring, and sundries	...	...	...	..	..
Baling water	...	...	...	...	...
Substituting Iron Aqueduct for Syphon No. 1.					
Foundation to abutments	7	4	3	2	168
Do. to wings	$17\frac{1}{2}$	4	3	4	840
Do to piers	$9\frac{1}{4}$	4	3	4	444
Abutments above	7	$2\frac{1}{2}$	4	2	140
Wings do.	$17\frac{1}{2}$	$2\frac{1}{2}$	6	4	1,050
Piers do	$8\frac{1}{4}$	3	$11\frac{5}{6}$	4	$1,171\frac{1}{3}$
String course	$3\frac{1}{2}$	$3\frac{1}{2}$	$\frac{2}{3}$	8	$65\frac{1}{3}$
Between beams	$1\frac{1}{3}$	3	$\frac{2}{3}$	4	$10\frac{2}{3}$
Caps	3	$2\frac{5}{8}$	2	8	126
Skew backs	$7\frac{1}{2}$	2	$\frac{1}{4}$	4	30
Backing to arches	2	$\frac{1}{2}$	$\frac{1}{4}$	4	1
Face walls	7	1	$\frac{1}{2}$	4	14
Parapets...	7	$\frac{3}{4}$	$\frac{3}{4}$	4	$15\frac{3}{4}$
Arches	$7\frac{1}{2}$	4	$\frac{3}{4}$	2	45
Total cubic feet of laterite in chunam ...	...	...	...	..	$4,121\frac{1}{4}$
Running feet of sheet iron trough complete ...	...	..	...	...	80
Pointing ... ... Squares.	...	...	...	.	$12\frac{1}{2}$
Teak girders	$15\frac{1}{3}$	4″	$8\frac{1}{2}$″	6	$21\frac{3}{80}$
Do. do.	$15\frac{7}{10}$	4′	$8\frac{1}{2}$	4	$14\frac{149}{360}$
Total cubic feet of teak-wood .	.	...	...		36
Excavating foundation	..	.	.	...	...
Baling	...	...	...	.	...
Syphon No. 2, same as No 1	...	...	...	..	...
Lowering floor of Krishnapatnam road bridge.					
Rocky cutting	24	44	$3\frac{1}{2}$	1	3,696
Or cubic yards ..	...	...	...	...	137
Syphon No. 3 same as No 1.	.	...	...	...	

DETAILED ESTIMATE No. 4.—*(Concluded)*

Particulars of Work.	Measurement				Cubical contents.
	Length.	Breadth	Height or Depth.	No.	
Converting bridge across head of Krishnapatnam Channel into a Head Sluice for that branch.	Feet.	Feet	Feet		Feet.
Foundation piers	15½	4	4	3	732
Do	6	4	4	2	192
Retaining wall	30	2½	4	2	600
Above piers	8⅝	3	10	3	776½
Do	5⅝	3	8	5	675
Arch	3	7½	1	4	90
Skew backs	3	2½	½	5	18¾
Spandrils	30	3	½		45
Flooring	30	1½	1½	...	67½
Do	21	6	1½	..	189
Do.	21	4½	1½	...	141¾
Total cubic feet of laterite in chunam ...	...	...	...	...	3,527¼
Pointing ... . Squares		..	..	..	13½
Iron bars .. ... Running feet	.		...	...	54
Teak shutters	4	5¾	3"	12	69
Total cubic feet of teak-wood .	...	...	..		69
Excavation ... ... Cubic yards	...	...	...	...	95
Baling					
Centering and sundries					

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate	Amount.	Total.
		RS. A. P	RS A. P	RS. A. P
	Demolishing and re-building Iron Aqueduct Piers			
3,812	Cubic feet of laterite in chunam ...	0 2 9		
	Demolishing existing piers	...	655 3 0	
	Scaffolding, shoring, and sundries	.	40 0 0	
	Baling water, &c.	..	50 0 0	
			34 13 0	
	Deduct value of old materials ...	...	780 0 0	
		...	100 0 0	
	Substituting Iron Aqueduct for Syphon No. 1.			
4,121	Cubic feet of laterite in chunam ...			680 0 0
12½	Squares of pointing	0 2 9	708 4 9	
80	Running feet of iron trough complete	2 0 0	25 0 0	
36	Cubic feet of teak-wood	15 0 0	1,200 0 0	
	Excavating foundation . .	3 8 0	126 0 0	
	Baling, &c.	...	20 0 0	
		...	20 11 3	
				2,100 0 0

ABSTRACT ESTIMATE No 4.—*(Concluded)*

Quantities	Description of Work.	Rate	Amount	Total
		RS. A. P.	RS A. P	RS. A P.
	Syphon No. 2, same as No. 1 ...	.		2,100 0 0
	Lowering floor of Krishnapatnam Road Bridge.			
137	Cubic yards of rocky cutting ..	0 8 0	68 8 0	
	Sundries	...	1 8 0	
			...	70 0 0
	Syphon No 3 same as No 1 .	...	...	2,100 0 0
	Converting bridge across head of Krishnapatnam Channel into a Head Sluice for that branch.			
3,527	Cubic feet of laterite in chunam ..	0 2 9	606 3 3	
13¼	Squares of pointing	2 0 0	26 8 0	
54	Running feet of iron bars		71 4 0	
69	Cubic feet of teak-wood	3 8 0	241 8 0	
95	Cubic yards of excavation	0 1 0	5 15 0	
	Baling		10 0 0	
	Centering and sundries	. .	28 9 9	
				990 0 0
	Total Estimate ..	...	. .	8,040 0 0

Specification to accompany the Plan and Estimate for the Surplus Sluice proposed for constructing across the old Ramireddy Channel, adjacent to the Sarvapully branch Head Sluice.

This sluice will consist of five vents of 2½ feet span, the height of the piers being 7 feet. This work has been designed to discharge the local drainage, brought into the Sarvapully channel by the old Ramireddy; as this would be great, in heavy rain, in the event of the Nellore tank being full, provision has been made for dealing with a considerable surplus. The level of the floor to be the same level as the bed of the old Ramireddy at the site of the sluice, which is about 19·32 feet above mean tide, or 5 feet below the level of the bed, of the main channel, immediately in front of it. The sluice when required to act will discharge with a considerable velocity, as the head will never be less than 6 or 7 feet. The front wings to be 17½ feet in height, the average breadth being 4½, the foundations to be 5½ feet deep, with an average breadth of 8½ feet. The rear wings to be 10 feet in height, the breadth at bottom and top being 3½ and 1½ respectively, the foundations to be 6 feet deep with an average breadth of 5¼ feet. The spandrils to be filled in solid, and a course of masonry, 1 foot in thickness, to be built over these and the arches. The face falls to be 6¾ feet in height, the breadth at bottom and top being 3 feet and 1½ feet respectively. The space between the face walls to be filled in with concrete. The retaining walls will connect the wings front and rear, the section between the former will be as follows: depth 5½ feet, breadth at bottom 4 feet, and top 1½ feet, the rear retaining wall to be 6 feet with an average

breadth of 3¼ feet. The front flooring, between the vents and retaining walls to be 1½ feet in thickness, resting on a bed of concrete 9 inches in thickness. The rear apron and the flooring between the vents to be 2 feet in thickness, the concrete under the former to be 9 inches thick, the space under the flooring of the vents to be filled in with concrete. The shutters will be worked by a screw, the general arrangement being the same as the working gear for the shutter of the auxiliary head sluice. The whole of the masonry to be built of dressed laterite in chunam. The side slopes of the channel in rear will be protected, for a length of 20 yards, by rubble pitching. Beyond the rear retaining wall there will be a rubble apron 16 feet 6 inches × 20 feet × 3 feet

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an Irrigation Sluice—*vide* Plan No 1.

Particulars of Work	Measurement				Cubical contents
	Length.	Breadth.	Height or Depth	No.	
	Feet	Feet.	Feet.		Feet
Concrete	6½	8½	¾	...	48 6/16
	1½	4½	1	...	6¾
	15	4¾	1	2	142½
	12½	4½	1	2	112½
Total					305
Barrel		...	...		
Retaining wall	10	8			
Front do.	2	2½	1½	1	100
Foundation.—Front wings	1	2½	4½	1	20¼
Rear do.	13	2¾	4½	1	10½
Above.—Front do.	10½	2½	4½	2	321¾
Rear do.	12	1'-5½"	3½	2	236¼
Front face wall	9½	1½	4	2	120¾
Rear do	3'-9½"	1¼	3¾	2	114
Parapets	3'-9½"	1¼	1¾	1	17¾
		¾	¾	1	3½
Total	...	..	..	...	951
Rubble stone —(Laterite)	10	7	1½	...	105
	7	3½	2	...	45½
Or cubic yards	...	.			150½
Pointing .. Squares			...	..	5½
Excavation .. Cubic yards		...	...	...	3
Teak beam ... Cubic feet.	...	...	...	...	129
Shutter with working gear		...	..	..	½
Baling	..	...	..	...	...
Sundries	...	...	...	...	..
					...

ABSTRACT ESTIMATE No. 4.

Quantties	Description of Work.	Rate			Amount.			Total.		
		RS	A.	P.	RS.	A.	P	RS.	A.	P.
305	Cubic feet of concrete	0	2	0	38	2	0			
951	Cubic feet of laterite in chunam .	0	2	9	157	3	3			
3	Squares of pointing	2	0	0	6	0	0			
5½	Cubic yards of rubble stone (laterite)	1	2	0	6	3	0			
129	Cubic yards of earth-work	0	1	0	8	1	0			
1/16	Cubic feet of teak-wood	3	8	0	2	6	6			
1	Shutter with working gear .. .		...		12	0	0			
	Baling		..		10	0	0			
	Sundries		...		10	0	3			
								250	0	0

Specification to accompany the Plan and Estimate for the Head Sluice of the Sarvapully Branch Channel.

The sluice to consist of eight vents of 6 feet span. The front wings to be 15 feet in height, the breadth at bottom and top to be 5½ feet and 2 feet respectively; the foundations to be laid at a depth of 5½ feet, the average breadth being 7 feet. The rear wings to be 14½ feet in height at the abutments and 10 feet at the returns, the average section at the former point being 3⅜ feet and 2½ feet at the latter, the foundation will have the depth of 5½ feet at abutments and front wings, 4½ at piers and 6 feet at rear wings and returns, but the section will vary from an average thickness of 6¼ at the abutments to 6½ feet at the returns. Piers 4¾ feet at bottom, 2½ feet at top on a bed of concrete 6¼ in breadth and ¾ in depth. The flooring in the bays to be inverts of 1½ in thickness, resting on concrete 9 inches thick. The flooring from the bays to the front and rear retaining walls will be 1½ feet in depth, with a bed of concrete 9 inches in thickness. The piers on the up-stream side will project 2½ feet to admit of small arches being turned to facilitate the working of the shutters, these will consist of teak planks 6½ feet × 3 inches × 15. Four iron bars, varying from 4 inches to 2¼ inches in diameter, to be fixed in each vent to strengthen the shutters and enable them to be worked easily. The rubble apron in rear to be 51½ feet × 20 feet × 2¼ feet. The side slopes of the channel, in rear of the sluice, to be protected for a length of 20 feet by rubble pitching. The whole of the masonry to be of dressed laterite in chunam and pointed with chunam. The floor of the sluice to be 24·32 feet above mean tide.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing a Surplus Sluice adjacent to the Survapully Branch Head Sluice across the old Ramireddy Channel.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No.	Cubical contents
	Feet.	Feet.	Feet.		Feet.
Concrete.—Abutments					
Piers	10¾	7	4	2	112½
Front wings	24½	20	4	1	367½
Rear do.	41	10¾	4	2	361½
Returns	21	9	4	2	283½
Rear retaining wall	19	7½	4	2	213¾
Front do.	12½	6	4	...	56¼
Front flooring	30½	5	4	...	136¼
Rear do.	26½	7½	4	...	142⅞
Below flooring between piers	20¾	17	4	...	264⅞
Spandril	16	¾	3	5	180
Total ...	29½	⅝	5½	...	10,23⅛
	...	...	...	...	3,143⅛
Foundation.—Abutments					
Piers	10¾	5¾	6	2	741¼
Front wings	24½	17¾	6	1	2 609¼
Rear do.	39¼	8½	5½	...	3,7⅜
Returns	22½	6¼	6	2	1,792½
Rear retaining wall	16⅜	5½	6	2	1,055¼
Front do.	14¼	3¼	6	...	287½
Superstructure.—Abutments	38¾	2¾	5½	...	586⅜
Piers	10¾	4½	7	2	677½
Caps	14¼	3	7	4	1,197
Skew backs	1¾	3	1¼	4	36¼
Front wings	10¾	3	¼	4	32¼
Coping	39	4½	17⅛	2	5,620⅜
Rear wings	30¼	2	1	2	157
Coping	25	3¼	13⅜	2	2,334⅜
Returns	25	2	1	2	100
Coping	15	2½	10	2	750
Backing to arches	15½	2	1	2	62
Spandril	10¾	3⅜	2½	2	201⅜
Flooring over arches	10¾	3	1¾	4	225¾
Side walls	32½	10¼	1	...	349⅜
Do.	32½	2¼	6¾	2	975
Front flooring	6⅛	1⅝	5¾	2	101⅜
Rear do.	33½	13⅓	1⅛	...	678⅜
Flooring between piers	24¾	23	2	...	1,138⅛
Parapets	28	2½	2	5	268¾
		1	1	2	56
Deduct for vents	16	¾	3	5	25,675⅜ 180
					25,19
Arch work	10¾	5½	1¼	5	443⅞
Pointing Squares	...	...	...	...	56
Rubble stone (laterite)	10½	20	3	...	990
	20	17	2	2	1,360
Or cubic yards ...	...				2,352

DETAILED ESTIMATE No. 4.—*(Continued.)*

Particulars of Work.	Measurement. Length.	Breadth	Height or Depth	No.	Cubical Contents.
	Feet.	Feet.	Feet.		Feet.
Excavation ... Cubic yards.	...	..	...	...	959
Metaling ... ... "	..	...	...	...	8
Teak-wood beam	28	1	1	...	28
Shutters	3	3"	9	5	...
Baling	...	...	...	...	...
Centering	...	...	...	...	...
Sundries	...	...	...	..	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate. Rs. A. P.	Amount. Rs. A. P.	Total. Rs. A. P.
3,143	Cubic feet of concrete	0 2 0	392 14 0	
25,195	,, of laterite in chunam .	0 3 1	4,913 1 7	
443	,, of arch work with laterite in chunam.	0 3 4	92 4 8	
56	Squares of pointing	2 0 0	112 0 0	
87	Cubic yards of rubble stone (laterite)	1 2 0	97 14 0	
959	,, of excavation	0 1 0	59 15 0	
8	,, of metaling	0 14 0	7 0 0	
28	Cubic feet of teak-wood beam ..	3 8 0	93 0 0	
5	Shutters with working gear... ...	49 0 0	245 0 0	
	Baling	...	200 0 0	
	Centering	...	90 0 0	
	Sundries	...	161 14 9	
				6,470 0 0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Excavating the Sarvapully Channel, and constructing the necessary irrigation and drainage works connected with it.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth	No	Cubical contents.	Rates per cubic yard.
	Feet	Feet.	Feet.		Feet.	Rs. A. P.
Head sluice						
Cutting	1,320	56½	3¼	1	2,42,385	0 1 0
Banking	1,320	115½	2	2	609,800	0 1 0
Turfing	1,320	56	.....	2	147,840	0 0 4
Banking	264	64	1	2	33,792	0 1 0
Cutting	264	32⅕	5⅚	1	49,703½	0 1 0

DETAILED ESTIMATE No. 4.—*(Continued)*

Particulars of work.	MEASUREMENTS. Length.	Breadth	Height or Depth.	No	Cubical contents	Rates per cubic yard. RS	A	P.
	Feet.	Feet.	Feet		Feet.			
Aqueduct								
Cutting (partly gravel) ..	3,696	34¼	7⅜	1	981,057	0	2	0
2nd mile, cutting gravel, loam, and laterite	683	34½	8	1	188,508	0	3	0
Cutting do. do	1,297	42½	7 11/16	1	386,623	0	3	0
Bridge of two arches ...								
Cutting laterite, gravel, and loam	2,310	36¼	9⅜	1	825,311½	0	3	0
Cutting do do. do	990	36¼	9⅜	1	353,705	0	3	0
3rd mile, cutting do. do	5,280	43	8	1	1,816,320	0	3	0
4th mile, cutting .. .	1,620	43¾	8⅜	1	613,080	0	2	0
Bridge of two arches.								
Cutting	3,060	43¾	8⅜	1	1,385,106½	0	1	6
5th mile, cutting .	2,310	42 15/16	7 15/16	1	726,760½	0	1	9
Cutting loam and gravel	2,970	41¾	6¾	1	856,383	0	1	6
6th mile, cutting stiff clay and laterite . ..	2,310	43 1/16	8 1/16	1	804,473½	0	3	0
Bridge of two arches								
Cutting stiff clay and laterite	1,650	43 1/16	8 1/16	1	574,624	0	3	0
Cutting laterite and hard gravel	660	37½	11	1	272,250	0	4	0
Cutting do do	660	38	11¼	1	288,420	0	4	0
7th mile, cutting .	4,290	35	8½	1	1,276,275	0	4	0
Bridge of two arches.								
Cutting laterite and hard gravel	990	35	8½	1	294,525	0	4	0
8th mile, cutting laterite and gravel ...	2,012	35¼	8¾	1	620,576¼	0	4	0
Do. do	1,460	31⅓	4⅝	1	212,022½	0	4	0
12 distributing channels								
Compensation for land.								
11 Irrigation sluices as per Plan No 1								
1 do. do as per Plan No. 2								
Bund across Anikapalli tank supplying channel and valley								
Drainage channel from culvert to old Ramireddy channel.								
Drainage channel fro n near Anikapalli to Pottempadu swamp								
Cutting	2,640	36¾	8½	1	824,670			
Do. do. .	1,320	57½	9	1	445,500	0	1	2
Do. do. ...	1,650	34½	7	1	330,960	0	1	2
Total cubic feet of cutting	.....	.....	....	...	1,600,230	0	1	2
Or Cubic yards .	..	...	... ..	...	61,712 6/27			
Deepening and Improving old drain from the Pottempadu swamp to near the village of Darbalamitta								
Cutting	3,260	33	6					
Do.	3,560	30	4	1	645,480			
	3,030	28½	3	1	463,200	0	1	0
Total Cubic feet of cutting .	.... .	.....	.....	1	260,775	0	1	0
Or Cubic yards	.....	.....	.....	...	1,369,455	0	0	10
Surplus channel from Sarvapully reservoir escape to Main Drain				...	48,498½			

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate. RS.	A.	P	Amount. RS.	A.	P.	Total. RS.	A.	P.
		.....			.....			7,340	0	0
1	Head sluice, *vide* separate estimate									
109,781	Cubic yards of cutting	0	4	0	27,445	4	0			
183,317	Do. of do.	0	3	0	34,371	15	0			
36,335	Do. of do	0	2	0	4,541	14	0			
26,915	Do. of do.	0	1	9	2,943	13	3			
105,006	Do. of do.	0	1	6	9,844	5	0			
10,821	Do. of do.	0	1	0	676	5	0			
								79,823	8	3
		0	1	3	1,764	7	3			
22,585	Cubic yards of banking	0	1	0	78	4	0			
1,252	Do. of do.							1,842	11	3
		0	0	4	342	3	8			
16,427	Square-yards of turfing							342	3	8
		200	0	0	.....			2,400	0	0
12	Distributing channels	..	.....		.....			3,000	0	0
	Compensation	300	0	0	.....			3,300	0	0
11	Irrigation sluices, *vide* Plan No. 1...									
1	Do do., *vide* Plan No. 2 ..	.....			.....			280	0	0
	Bund across Anikapally tank supplying channel and valley	.....			.....			150	0	0
	Drainage channel from aqueduct to old Ramireddy channel	.....			.....			770	0	0
	Drainage channel from near Anikapally to Pottempadu swamp.									
61,712	Cubic yard of cutting	0	1	2	4,499	13	4	4,499	13	4
	Deepening and improving old drain from Pottempadu swamp to near the village of Darbalamitta.									
38,840	Cubic yards of cutting	0	1	0	2,427	8	0			
9,658	Do. of do.	0	0	10	503	0	4	2,930	8	4
	Sarvapully channel from Sarvapully reservoir escape to main drain ...	.....			.....			550	0	0
1	Aqueduct, *vide* separate estimate ...	.....			.....			5,000	0	0
4	Bridges of 2 arches, *vide* separate estimate	3,540	0	0	.....			14,160	0	0
	Sundries	.....			.....			111	3	2
	Total Estimates ..	.....			.....			1,26,500	0	0

DETAILED ESTIMATE No 4.

PENNAIR DELTA.

Constructing a Head Sluice for Sarvapully Branch.

Particulars of Work.	Measurement				Cubical contents
	Length.	Breadth.	Heigth or Depth.	Number.	
	Feet.	Feet	Feet.		Feet.
Concrete.—Abutments	11	8¼	¾	2	136½
Piers	19¼	6¼	¾	7	631⅝
Front wings	29	8¼	¾	2	358⅞
Rear do.	29	9⅜	¾	2	307 13/16
Do. returns	11	8	¾	2	132
Front retaining wall	94	5	¾	1	352½
Rear do.	55½	5	¾	1	208⅛
Inverts	9½	5½	¾	8	313½
Front flooring	73½	19½	¾	...	1,074 15/16
Rear do.	64	21½	¾	...	1,032
Spandril	29¾	5½	1½	...	245 7/16
Total					4,792 15/16
Foundation.—Abutments	11	5¼	6	2	693
Piers	12½	3⅝	4⅛	7	1,378⅝
Do. front portions	4⅜	3⅝	4	7	444 1/16
Front wings	28	5¼	5½	2	1,617
Rear do.	29	5⅞	6	2	2,044½
Do. returns	10½	5	6	2	630
Front retaining wall	95	2½	5½	...	1,187½
Rear do.	54	2½	6	...	810
Superstructure.—Abutments	11	3¾	10	2	825
Piers	11½	2⅛	9	7	1,811¼
Do. front portion	4	2½	9½	7	665
Caps	31½	2⅛	2⅜	...	187
Skew backs	11	2½	¼	7	48⅛
Front wings	28	2⅞	9¾	2	1,541
Coping	28¼	2½	1	2	141¼
Rear wings	29	3 1/16	12½	2	2,220 5/16
Do. returns	10½	2⅛	10	2	525
Coping with returns	38	1½	1	2	114
Front flooring	73½	19¾	1½	...	2,177 1/16
Rear Do.	64	22	1½	...	2,112
Face walls	66	2¾	1½	2	544½
Backing to arches	11	3	1½	2	33
Blocking courses	70	1¼	1	2	175
Parapets	69½	¾	1	2	104½
Total	...	.....	.....	...	22,028 7/16
Arch work	9½	9	1½	8	1,026
	1	9	1½	8	108
	9½	6½	1½	8	741
Total	...	.....	.....	...	1,875
Pointing squares	.....	.....	.....	...	951
Rubble stone laterite.	51½	20	2¼	1	2,317½
	20	17	2	2	1,360
Or Cubic yards	...	.....	.....	...	3,677½
	...	.....	.....	...	136 13/16

DETAILED ESTIMATE.—*(Concluded)*

Particulars of Work.	Measurement.				Cubical contents
	Length.	Breadth	Heigth or Depth	No	
	Feet	Feet.	Feet.		Feet
Earth-work, Cubic yards	.....	.....	.....		1,650
Teak-wood shutters	6½	3"	15	8	195
Metaling Cubic yards.	.....	.....	.....		16⅓
Iron bars, R. feet		.....	.....		240
Baling					
Centering					
Sundries					

ABSTRACT ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Head Sluice for Sarvapully Branch

Quantities	Description of Work	Rate.	Amount.	Total
		RS A P.	RS. A. P	RS. A. P
4,793	Cubic feet of concrete	0 2 0	599 2 0	
22,028½	Do of laterite in chunam	0 3 1	4,245 1 3	
1,875	Do of arch work	0 3 4	390 10 0	
95¼	Squares of pointing	2 0 0	190 8 0	
136 11/64	Cubic yards of rubble stone (laterite)	1 2 0	153 3 8	
1,650	Do. of earth-work	0 1 0	103 2 0	
16⅓	Do of Metaling	0 14 0	14 4 8	
195	Cubic feet of teak-wood shutter	3 8 0	682 8 0	
240	R. feet of iron bars	.....	295 0 0	
	Baling	.....	250 0 0	
	Centering	.....	240 0 0	
			7,163 7 7	
	Sundries	.....	176 8 5	
				7,340 0 0

ABSTRACT ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an Irrigation Sluice, *Vide* Plan No. 1.

Quantities.	Description of Work	Rate.	Amount.	Total.
		RS. A P.	RS. A. P.	RS. A. P.
305	Cubic feet of concrete	0 2 0	38 2 0	.....
951	Do of laterite in chunam	0 3 4	198 2 0	.....
3	Squares of pointing	2 0 0	6 0 0	.....
5½	Cubic yards of rubble stone (laterite)	1 2 0	6 3 0	.....
129	Do of excavation	0 1 0	8 1 0	.....
1 1/16	Cubic feet of teak-wood	3 8 0	2 6 6	.....
1	Shutter with working gear	.....	12 0 0	.....
	Baling	.....	10 0 0	.....
	Sundries	.....	19 1 6	.....
	Total Estimate	.....	.....	300 0 0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an Irrigation Sluice—*Vide* Plan No. 2.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth	Number.	Cubical Contens
	Feet.	Feet.	Feet		Feet.
Concrete	$4\frac{3}{4}$	$8\frac{1}{2}\frac{1}{4}$	$\frac{3}{4}$	0	28-7$\frac{1}{2}$
	$9\frac{1}{2}$	$5\frac{1}{4}$	1	2	97-4$\frac{1}{4}$
	$8\frac{1}{2}$	$4\frac{3}{4}$	1	2	80-9
	4	$4\frac{1}{2}$	1	1	18-0
Total	.. ...	... ..	.....,	...	224-9
Bund	6	12	$1\frac{1}{4}$	1	90-0
Front retaining wall	2	$7\frac{3}{4}$	$3\frac{1}{2}$	1	12-0
Rear do	$1\frac{3}{4}$	$1\frac{1}{4}$	$3\frac{1}{2}$	1	10-9
Do. do.	4	2	$4\frac{1}{2}$	1	36-0
Foundation —Front wings	$8\frac{1}{2}$	$2\frac{3}{4}$	$4\frac{1}{2}$	2	210-4$\frac{1}{2}$
Rear do	$7\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	2	210-11
Above.—Front wings	3	$1\frac{1}{2}$	$4\frac{1}{2}$	2	108-0
Coping	$8\frac{1}{4}$	2	$\frac{3}{4}$	2	24-9
Rear wings	7	1-9$\frac{3}{4}$	$5\frac{1}{2}$	2	139-7
Coping	$7\frac{1}{4}$	2	$\frac{3}{4}$	2	21-9
Face wall	$5\frac{1}{2}\frac{1}{4}$	$1\frac{1}{2}$	$3\frac{1}{2}$	2	52-11
Parapets	$5\frac{1}{2}\frac{1}{4}$	1	1	0	5-0$\frac{1}{2}$
Total...					922-4
Deductions for retaining walls	$2\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	0	1-9
Net cubic feet	.... .	.....	.....		920-6
Pointing Squares	.....	.....	.. . ...	...	$3\frac{1}{4}$
Rubble stone laterite	5	$4\frac{1}{4}$	$1\frac{1}{2}$	...	32
	$4\frac{1}{4}$	6	2	...	51
Total ..	.... .	.....	.....	...	83
Or Cubic yards	.....	.....	....	...	$3\frac{3}{2}\frac{3}{7}$
Earth-work Cubic yards	.....	.....	....	...	100
Teak-wood beams Cubic feet	... ..	.. ...	.....	...	$2\frac{1}{3}\frac{1}{4}$
Shutting with working gear No.	.....	.....	.....	...	1
Baling	.....	.....	..... .	...	.....
Sundries	.....	.....	... .	...	.....

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate. Rs.	A.	P	Amount. Rs.	A.	P.	Total. Rs.	A.	P.
$224\frac{1}{4}$	Cubic feet of concrete	0	2	0	28	1	6	.....		
$920\frac{1}{2}$	Do. of laterite in chunam ...	0	3	4	191	12	4	....		
$3\frac{1}{4}$	Squares of pointing...	2	0	0	6	8	0	.....		
$3\frac{2}{2}\frac{7}{7}$	Cubic yards of rubble stone laterite.	0	14	0	2	11	0	.....		
100	Do. of earth-work	0	1	0	6	4	0	.....		
$2\frac{1}{3}\frac{7}{4}$	Cubic feet of teak-wood beam ...	3	8	0	8	13	9	....		
1	Shutter with working gear				20	0	0	..... .		
	Baling				10	0	0	.. ..		
	Sundries				5	13	5	....		
								.....		
								280	0	0

Specification to accompany the Plan and Estimate for the Aqueduct proposed for construction near Kanupartipadu

This structure will carry the Sarvapully branch channel over the drainage from the land in the vicinity of Kanupartipadu, and the surplus from the Kanupartipadu tank; it will contain four vents of 4 feet span, the piers being 3 feet in height, and $2\frac{1}{2}$ in breadth. The abutments to be 3 feet in height with an average breadth of $3\frac{1}{4}$ feet. The foundations of the piers and abutments to be 4 feet deep, the breadth of the former at top and bottom $2\frac{1}{2}$ feet and $4\frac{1}{2}$ respectively, the dimensions of the latter at same points being $3\frac{1}{2}$ feet and $5\frac{1}{2}$ feet. At the abutments, the wings will be 18 feet in height, the breadth at bottom being 9 feet and at top 3 feet, this will be increased by a corbel of 1 foot on each side to form a roadway, the wings will be reduced in height by steps of 1 foot up and 2 feet on to 11 feet 6 inches, and be carried at this height 11 feet, making the total length $23\frac{1}{2}$ feet. The outer faces of the side walls to be plumb, the inner to be described with a radius of $14\frac{1}{2}$ feet. The floor of the aqueduct to be 20 in breadth at the level of the bed of the channel, and 28 at the maximum water mark. The floor of the aqueduct and the inner faces of the side wall for a height of 7 feet measured on the curve will have a coat of asphalte half an inch thick.

The masonry to be of dressed laterite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an Aqueduct near Kanupartipadu.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	Number.	Cubical contents.
	Feet.	Feet	Feet		Feet.
Concrete	34	3	9"	4	306
Total cubic feet ...	...	...	...	..	306
Foundation —Abutments	$39\frac{1}{3}$	$4\frac{1}{2}$	4	2	1,416
Do. to piers	$39\frac{1}{3}$	$3\frac{1}{2}$	4	3	1,652
Do to wings	11	$9\frac{1}{6}$	4	4	1,618$\frac{1}{3}$
Do to do.	$11\frac{2}{3}$	8	4	4	1,493$\frac{1}{3}$
Abutments above	$35\frac{1}{2}$	$3\frac{1}{4}$	3	2	692$\frac{1}{4}$
Piers do.	37	$2\frac{1}{2}$	3	3	832$\frac{1}{2}$
Skewback	34	$2\frac{1}{4}$	$\frac{1}{2}$	3	127$\frac{1}{2}$
Do	34	3	$\frac{1}{2}$	2	102
Backing to arches	34	$5\frac{1}{2}$	$1\frac{1}{4}$	2	467$\frac{1}{2}$
Spandril	34	$6\frac{1}{2}$	$\frac{3}{4}$	3	497$\frac{1}{4}$
Caps	$2\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	6	33$\frac{3}{4}$
Wings do.	$11\frac{1}{2}$	8	$3\frac{3}{4}$	4	1,380
Do face walls.	$75\frac{1}{2}$	$4\frac{5}{1}\frac{1}{2}$	$10\frac{1}{2}$	2	6,971$\frac{7}{4}$
Do top courses	$75\frac{1}{6}$	4	$\frac{1}{2}$	2	300$\frac{2}{3}$
Do do	$75\frac{1}{6}$	5	$\frac{1}{2}$	2	375$\frac{5}{6}$
Arch works	34	$6\frac{3}{8}$	2	4	1,813$\frac{1}{3}$
Inverts	34	$4\frac{3}{4}$	$1\frac{1}{4}$	4	807$\frac{1}{2}$
Total cubic feet ...	...	..	...	...	20,576$\frac{5}{1}\frac{1}{2}$
Pointing .. .. Squares	...	...	...	...	69$\frac{1}{2}$
Excavating foundation	...	...	...	...	859
Asphalte	...	29$\frac{1}{2}$	34	...	1,003 or 10$\frac{1}{3}\frac{1}{5}$
Baling	...	...	...	...	...
Centering and Sundries	...	..	...	...	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate.	Amount.	Total.
		RS. A. P.	RS. A. P.	RS.
306	Cubic feet of concrete	0 2 0	38 4 0	
20,57[illegible]	Do. laterite in chunam	0 3 4	4,286 12 4	
69[illegible]	Squares of pointing	2 0 0	139 0 0	
83[illegible]	Cubic yards of excavation	0 1 0	52 7 6	
10[illegible]	Squares of asphalte	19 0 0	190 9 3	
	Baling	...	189 0 0	
	Centering and Sundries	..	112 14 11	
	Total Estimate ...	...	.....	5,000

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Bridge of two arches 15 feet span across the Sarvapully Branch Channel.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	Number.	Cubical contents.
	Feet.	Feet	Feet.		Feet.
Concrete	18	12	1½	1	270
	14	14½	¾	2	304½
Total ...	...	...	...	...	574½
Foundation—Abutments ..					
Pier	21⅓	6	5	2	1,280
Wings	21	4¼	5	1	416¼
Pilaster to the end	23	6⅓	5	4	2,798⅓
Retaining wall	2	¼	5	4	10
Do	28	2½	4	4	560
Above—Abutments	28	1½	1	2	84
Pier	20¼	5	10	2	2,025
Caps	18½	3	10	2	555
String course	3	2	2	1	48
Wings	84	¼	½	4	10½
Pilaster	23	3'-3½"	11⅛	...	3,369[illegible]
Facewall	2	3'	6	4	12
Spandril	18	1½	1½	4	67⅓
Skew backs	25	1½	2⅝	2	178⅛
Do	14½	8	1⅓	2	151⅓
Backing to arches...	14½	3	[illegible]	...	24[illegible]
Do.	14½	2¾	½	1	39[illegible]
Parapets	14½	2¾	½	2	39[illegible]
Blocking course	90	7	[illegible]	...	88[illegible]
Pedestals	43	1⅛	3	2	607⅛
	1¾	1½	1	2	129
Total ...	...	..	3	4	36¾
Arch work	14½	19½	...	...	12,059[illegible]
Inverts	14½	11½	1⅛	2	918½
Total cubic feet ...	...	...	1	2	333¼
Cornice work .. .. R. feet	...	...	...	...	1 252¾
Pointing ... ... Squares	...	...	...	..	194
Earth-work ... . Cubic yards	...	...	...	...	55
Metaling .. ... . Cubic yards.	...	...	...	...	666
Guard stones ... . No. 1.	...	...	...	...	52
Centering	...	...	...	4	...
Baling	...	...	...	...	...
Sundries	...	...	...	...	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work	Rate.	Amount.	Total.
		RS A P.	RS A. P.	RS.
575	Cubic feet of concrete	0 2 0	71 14 0	
12,144	Do. of laterite in chunam ...	0 3 4	2,530 0 0	
1,253	Do. of arch work	0 3 7	280 9 11	
55	Squares pointing	2 0 0	110 0 0	
194	Running feet of cornice work ...	0 4 0	48 8 0	
666	Cubic yards of earth-work	0 1 0	41 10 0	
52	Do of metaling	0 14 0	45 8 0	
4	Guard stones	4 0 0	16 0 0	
	Centering	...	200 0 0	
	Baling	...	100 0 0	
	Sundries	.	95 14 1	
				3,510

Specification to accompany the estimate for converting the Sarvapully tank into the Main Reservoir for the southern portion of the Pennair Delta.

1. The embankment to be raised to 6 feet above future tank level ; the breadth at top being 6 feet, with side slopes of 2 to 1 ; the interior to be protected, for a length of 5,270 yards, by a revetment of roughly dressed laterite, carefully packed at right angles to the slope ; the thickness of the revetment at bottom to be 2 feet, and at top (*i. e.*, 2 feet above proposed full tank level) 1 foot ; in rear of the revetment there will be a gravel backing 6 inches thickness.

2. The exterior slope of the work, and the portion of the interior, above the revetment, to be well turfed.

3. The present calingulah to be closed, and a new one constructed adjacent to the village of Anikapally ; the crest being 2 feet below tank high water mark.

4. The five existing sluices to be lengthened and improved. On the completion of the proposed new supply channel the old one will be closed by continuing the tank bund to the high land at Anikapally. In the event of the revetment, as planned, being considered too expensive, a reduction of Rupees 27,248 might be made by altering the interior slope of the bank from 2 to 1 to 1 to 1.

DETAILED ESTIMATE, No. 4.

PENNAIR DELTA.

Converting Sarvapully Tank into Main Reservoir for the southern portion of the Pennair Delta.

Particulars of Work	Measurement. Length	Breadth	Height or Depth.	No	Cubical contents.
	Feet	Feet	Feet.		Feet.
Banking from Station 2 to Station 6 ..	1,650	23 68	8 84	...	345,396·4,800
Banking from Station 6 to present calingulah	525	34 94	14 47	..	265,430 4,450
Banking site of calingulah	255	36 02	15 01	...	137,868 3,510
Banking Transverse Section No. 1 .	1 200	40 88	17·44	..	855 536 6,400
Do. do. ,, 2 .	1,320	38 14	16 07	..	809,040 9,360
Do. do ,, 3 ..	1,140	42 46	18 23	...	882 412 2,120
Do. do. ,, 4 ...	1,500	41 22	17 61	..	1,088 826 3,000
Do do. ,, 5 ...	1,320	38 62	16 31	...	841,457·7,040
Do do. ,, 6 ..	1,320	38 00	16 00	..	802,560 0000
Do. do. ,, 7 ...	1,320	38 92	16·46	...	845,622 6,240
Do. do ,, 8 ...	1,800	39 98	16 99	..	1,223,668 3,600
Do. do. ,, 9 .	660	38 02	16 01	...	401,742 1,320
Do do. ,, 10 ...	1,500	35 08	14 54	...	765,094 8,000
Do. do ,, 11 ..	1,260	35 62	14 81	.	664,090 5,720
Banking from Station 52 to Station 55 .	720	35 64	14 82	..	380,293 0560
Banking from Station 55 to Station 56 exclusive of channel	465	33 44	13 72	..	213,340 5,120
Banking in channel	30	39 44	16 72	..	19,783 1,010
Banking from Station 56 to 60 .. .	1,600	31 34	12 67	..	635·24·4 800
Do. from do 60 to 62	800	26 40	10 20	..	215,424·0000
Do. from do. 62 to 65	1,200	12 98	3 49	.	54,360 2,400
Total...	21,585		...		11,436,872 9,400
Deduct for existing Bund as follows.					
From Station 6 to present calingulahs ...	525	18 50	8 50	...	82,556 2,500
Transverse Section No 1	1,200	47 25	5 78	.	327,726 0000
Do do ,, 2	1,320	55 50	5 29	..	387,545 4,000
Do. do. ,, 3	1,140	54 00	5 76	...	354,585 6,000
Do. do. ,, 4	1,500	75 25	5 21	.	588,078 7,500
Do. do. ,, 5 .. .	1,320	54 25	3 92	...	280,711 2,000
Do do. ,, 6	1,320	60 75	3 62	...	290,287 8,000
Do. do. ,, 7	1,320	60 75	4 67	...	374 187 3,000
Do. do. ,, 8	1,800	56 00	4 73	...	476,784 0000
Do. do ,, 9 .. .	660	73 00	3 79	...	182,602 2,000
Do do. ,, 10 ...	1,500	47 00	2 62	...	184,710 0000
Do do. ,, 11	1,260	31 50	1·68	...	78,586·2,000
From Station 52 to Station 55	720	31 50	3 13	...	70,988·4,000
From Station 55 to Station 56	465	15 75	1·64	...	12,010·9,500
Total...	.....	. ..	. .	..	3,691,660 0500
Balance of Cubic feet .. or Cubic yards ..	. ...	... ..	.....	...	7,745 212 8,980
Sundry earth-work...	5,270	3⅛	.....	..	2,86,859·
Total Cubic yards of earth-work ..	... ..	.....	.....	...	2,388·
					2,89,247·

DETAILED ESTIMATE No 4.—*(Concluded)*

Particulars of Work.	Measurement. Length	Breadth	Height or Depth.	No.	Cubical contents.
	Feet	Feet.	Feet.		Feet.
Laterite revetment	5,270	8⅛	½	...	21,409⅜
Deduct for existing revetment	640	1½	½	...	480
	640	½	½		160
Total...	... ..	.. ...	.. . .	...	640
Total Cubic yards of laterite stone revetment	.....	.....	.. ...	...	20,769⅜
Gravel backing, ... Cubic yards.	5,270	8⅛	⅛	..	7,136¹¹⁄₂₄
Turfing	725	Not	required.		
	85	16	.....	...	1,360
	400	16¼	.....	...	6,700
	440	16⅜	.....	...	7,205
	380	17¼	.....	...	6,555
	500	17⅝	.....	..	8,812½
	440	15⅞	.....	...	6,985
	440	15⅞	.....	...	6,985
	440	15⅞	.....	...	6,985
	600	16½	.....	...	9,900
	220	15⅝	.....	...	3,437½
	500	13½	.....	..	6,750
	420	14½	.....	...	6,090
	240	14⅞	.....	...	3,570
	155	13¾	.....	...	2,131¼
	10	13¾	.....	..	137½
	533	19⅛	.....	...	10,093⅝
	267	14¼	.....	...	3,938¼
	400	4¾	... ..	...	1,900
Total Square yards of turfing ...	.....	.....	.. ...	...	99,634⅝

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate Rs.	A.	P.	Amount. Rs.	A.	P	Total. Rs.	A.	P.
289,247	Cubic yards earth-work, inclusive of tamping	0	1	6	27,116	14	6			
20,769	Cubic yards of laterite stone revetment	3	0	0	62,307	0	0			
7,136	Do gravel backing	0	9	0	4,014	0	0			
99,634	Square yards of turfing	0	0	4	2,075	11	4			
640	Cubic yards of removing and re-constructing old revetment	0	6	0	240	0	0			

ABSTRACT ESTIMATE No. 4.—*(Concluded)*

Quantities.	Description of Work.	Rate.	Amount.	Total.
		RS. A. P.	RS. A. P.	RS. A. P.
1	New calingulah	.....	1,670 0 0	
	Lengthening and improving five Irrigation sluices	700 0 0	3,500 0 0	
	Compensation for land			
165	Acres			
165	Do.	40 0 0	6,600 0 0	
478	Do.	5 0 0	825 0 0	
477	Do.	8 0 0	3,824 0 0	
		1 0 0	477 0 0	
	Compensation for houses, &c., in the hamlet of Nappatuiu.			
1	Chuttrum, with thatched roof ...	....	100 0 0	
10	Huts	.....	200 0 0	
1	Bourie	.....	150 0 0	
1	Do.	.....	300 0 0	
6	Wells	40 0 0	240 0 0	
1	Do. belonging to the village of Nagalaram	.....	40 0 0	
	Total ..	.....	1,13,179 9 10	
	Deduct value of old materials ...	.....	320 0 0	
	Sundries	.....	1,13,179 9 10 320 6 2	
	Total Estimate ..	.....	.....	1,14,000 0 0

Specification to accompany the Estimate and Plan for the Escape proposed for the Sarvapully Reservoir.

1. The length of the body to be 170 feet and flush with the apron, the surface being 2 feet below the future tank high water mark; to retain the water tothis level, the body will be furnished with 33 cast-iron posts 2 feet in height, and 68 teak shutters (*i. e.*, two for each vent). The front wings and returns to be $6\frac{1}{2}$ feet in height, the breadth at floor level being $2\frac{7}{8}$ feet, and at top $1\frac{1}{2}$ feet; the batter being on the outer faces. The rear returns to be 3 feet in height with a breadth of $1\frac{1}{2}$ feet at floor level, and $1\frac{1}{4}$ feet at top, the batter being also on the outer faces. The rear returns to be connected by a retaining wall, 4 feet in depth, the breadth at bottom being 2 feet 3 inches and $1\frac{1}{4}$ at top. The apron to be 12 feet in breadth and to consist of laterite on edge 1 foot in thickness, resting on a bed of concrete 6 inches thick; it will cover the entire space between the body, rear wings, and retaining wall.

2. In rear of the laterite apron there will be one of rubble 19¼ feet in length, 10 feet in breadth, and $1\frac{1}{2}$ feet in thickness.

3. The foundations of the whole structure to be 2 feet in depth, with the exception of those of the retaining wall and rear returns, these will be laid at 4 feet below floor level.

4. The masonry to be of dressed laterite in chunam.

NELLORE DISTRICT No. 4.

PENNAIR DELTA.

Constructing an Escape in the Sarvapully Reservoir.

Particulars of Work.	Measurement. Length	Breadth	Depth.	Number.	Cubical contents.
	Feet	Feet.	Feet.		Feet
Concrete —Apron	178	10-9	6"	.....	934½
Foundation —Body	170	2-9	2	1	935
Wings	14-6	2-5	2	2	149⅝
Do.	12⅞	2-4	2	2	100
Returns	7-6	1⅞	4	2	120
Retaining wall	186	1-9	3	1	976½
Superstructure.—Wings	14-6	1⅝	6 6	2	369⅝
Do.	12⅞	1-7¼	4-9	2	182⅞
Returns .. .	7-6	1⅜	3	2	66
Apron	178	12	1	. . ..	2,136
Total cubic feet of laterite in chunam . .	.. .	..	...	.. .	5,035¾
Rubble apron	19¼	10	1-6	... ..	2,910
Cubic yards	... .	.	...	.. ...	107⅝
Pointing, ... Squares ...	...	.....	....	.	30
Cast-iron posts	.... .	..	..	.	33
Teak-wood shutters ...	.. ..	.. .	. ...	..	34
Excavation					
Sundries					

ABSTRACT ESTIMATE No. 4.

Quantities.	Particulars of Work.	Rate.	Amount	Total.
		RS A P	RS A P	RS.
934½	Cubic feet of concrete	0 2 0	116 13 0	
5,036	Do. of laterite in chunam	0 2 3	708 3 0	
30¼	Squares of pointing...	1 8 0	45 6 0	
107⅝	Cubic yards of rough stone	1 0 0	107 12 5	
33	Cast-iron posts	12 0 0	396 0 0	
68	Teak-wood shutters	3 0 0	204 0 0	
	Excavation...	... .	25 0 0	
	Sundries	.. ...	66 13 7	
	Total...	. ...	.....	1,670

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Lengthening and Improving Iskapalem Sluice in the Sarvapully Reservoir.

Particulars of Work.	Measurement. Length.	Breadth.	Depth.	Number.	Cubical contents.
	Feet.	Feet.	Feet.		Feet.
Concrete	64	7½	9"	.....	360
	23-9	6¾	9"	.....	120 9/16
	20-9	5⅝	9"	.....	83 13/16
	26	3	9"	.....	58½
	8	2-6	6"	.....	10
	9	11-6	6"	.....	51¾
	21	3-9	9"	.....	59 1/16
	17	3-9	9"	.....	47 11/16
	4	4-6	9"	.....	13½
Total Cubic feet of concrete ..	.....	.....	.....	.....	804½
Deduct for existing work...	50	7½	9"	.....	281¼
Total Cubic feet of concrete ..	.....	.....	.....	.....	523
Foundation.—Front cistern side walls ...	20	5	4½	.....	450
Wings	20-9	3¾	3¾	2	551¼
Rear cistern side walls ...	11	2-6	3'	.....	82½
Wings	15-6	2 6	4'	.....	155
Retaining wall	26	1-3	2-9	.....	89¾
Sluice flooring	64	6	2	.....	768
Superstructure.— Do. side walls ...	64	1-9	2'	2	448
Arch	64	5-3	1-6	.....	504
Front apron	8	2-6	9"	.. ...	15
Do. do.	11-6	9	1-6	.....	155¼
Rear	4-3	4-6	1-6	.....	28 11/16
Side walls (at head) ...	11-6	3	11	... ..	379½
Blocking course ...	3	2⅝	7-6	.. ..	59 1/16
Wings	20-9	2½	6-6	2	629 5/16
Rear cistern side walls	11-6	1-6	5	.....	86¼
Wings	12	1-6	5	.....	90
Rear cistern arch ...	4-6	1-6	1-3	.....	8 7/16
Front face walls	3	1-6	3	.....	13½
	3	1-9	1	.....	5¼
Parapets ...	6 6	1-6	1-6	.....	14¼
	7-6	1-3	1	.....	9¾
Total Cubic feet of laterite in chunam...	.....	.....	.....	.....	4,543
Deduct old works ..	50	6	2'	.....	600
	50	1-9	2	2	350
	50	5-3	1-6	.....	393¾
Total...	.....	.....	.....	.....	1,343¾
Total Cubic feet of laterite in chunam ...	.....	.....	.....	.. ...	3,199¼
Cut granite ...	8	3½	½	.....	21
	2½	1½	¾	.. ...	2 1/16
	5¼	4	1	.....	15
	5¼	4	1	.....	23
	1½	4	¾	.....	5¼
	3½	½	1	.....	2¼
Total...	.....	.....	.....	.....	69¼

DETAILED ESTIMATE No. 4.—*(Concluded.)*

Particulars of Work.	Measurement. Length.	Breadth.	Depth	Number.	Cubical contents.
	Feet.	Feet.	Feet.		Feet.
Deduct... ...	8	1	¾	.....	6
	7	¾	¾	.....	3 15/16
					9 15/16
Total Cubic feet of granite...	.....	.....	.....	.....	59¾
Pointing .. .. Squares...	.....	.....	.. ...	.....	10
Excavation					
Sundries					
Four others same as above...					

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate. Rs. A. P.	Amount. Rs. A. P.	Total. Rs.
523	Cubic feet of concrete	0 2 0	65 6 0	
3,199¼	Cubic feet of laterite in chunam... ...	0 2 6	499 14 1	
59¾	Cubic feet of cut granite...	1 2 0	89 8 0	
10	Squares of pointing	1 8 0	15 0 0	
	Excavation...	.....	30 0 0	
	Sundries	.....	0 3 11	
	Total Estimate...	.....	.....	700
	Four others same as above...	.....	.....	2,800
	Grand Total Estimate...	.....	.....	3,500

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Excavating Idagaly Branch Channel, and constructing the required masonry works.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No.	Cubical contents.	Rates per Cubic yard
	Feet	Feet.	Feet.		Feet.	Rs. A. P.
Head sluice.						
Cutting hard gravel	2,310	44¾	5⅚	1	603,006	0 2 6
Cutting stiff clay	2,640	41¾	3⅚	1	422,510	0 1 2
Cutting laterite	330	42⅓	4⅓	1	60,537	0 4 0
Banking	330	17⅓	5½	1	32,113	0 1 6
Second mile, cutting laterite ...	1,320	39½	5	1	260,700	0 4 0
Banking	1,320	16	5	1	105,600	0 1 6
Cutting stiff clay ...	2,640	39¼	4⅚	1	500,880	0 1 2
Cutting	1,320	39¼	4⅚	1	250,415	0 1 1
Third mile, cutting...	1,320	39¾	4½	1	212,355	0 1 1
Cutting	462	30½	1	1	14,091	0 1 0
Do.	3,498	31¼	5½	1	658,936	0 1 2
Ipuru and Pudiparty Branch takes off—						
Fourth mile, cutting	660	17¾	6½	1	76,147	0 1 2
Regulating sluice						
Cutting	1,980	13¼	3½	1	91,823	0 1 2
Six irrigation sluices as per Plan No 1.	..	...	...	...	...	
Six distributing channels	...	...	...	..	...	
Minor branch channel	...	...	...	...	...	
Compensation for land	...	...	...	...	...	
Ipuru and Pudiparty Branch. Head sluice.						
Cutting	3,960	25½	5½	1	538,560	
Do.	2,865	17¾	1½	1	76,280	0 1 1
Banking	2,865	27¼	2	2	312,285	0 1 1
						0 1 1
Pudiparty Branch takes off—						
Cutting	4,185	13	4	1	217,620	0 1 0
Regulator and fall	...	...	...	...	...	
Four irrigation sluices as per Plan No 1.	...	...	...	...	...	
Compensation for land	...	...	..	...	..	
Minor branch channels	...	...	...	...	...	
Pudiparty Branch.						
Cutting	3,910	12	2⅔	1	125,120	0 1 0
Banking	940	31	2	2	116,560	0 1 0
Regulator and fall	...	...	...	...	...	
Two irrigation sluices as per Plan No. 1	...	...	...	...	...	
Minor branch channels	...	...	...	...	...	
Compensation for land	...	...	...	...	...	

Abstract Estimate No. 4.

Quantities.	Description of Work.	Rate Rs. A P	Amount. Rs. A. P.	Total. Rs A. P
				4,440 0 0
1	Head sluice, *vide* separate Estimate.	0 4 0	2,974 8 0	
11,898	Cubic yards of cutting	0 2 6	3,489 8 6	
22,353	Do. of do.	0 1 2	4,726 12 0	
64,864	Do. of do.	0 1 1	1,160 8 4	
17,140	Do. of do.	0 1 0	32 10 0	
522	Do. of do.			12,383 14 10
5,111	Do. of banking	0 1 6	479 2 6	
				479 2 6
1	Regulating sluice, *vide* separate Estimate	...	.....	800 0 0
6	Irrigation sluices as per Plan No. 1 .	260 0 0	.....	1,560 0 0
6	Distributing channels	50 0 0	.....	300 0 0
	Minor branch channel	...	.. ..	1,760 0 0
	Compensation for land	...	.....	1,875 0 0
	Ipuru and Pudiparty Branch	...	... ..	1,100 0 0
1	Head sluice, *vide* separate Estimate.	0 1 1	1,541 13 8	
22,772	Cubic yards of cutting	0 1 0	503 12 0	
8,060	Do. of do.			2,045 9 8
11,566	Do. of banking . .	0 1 1	783 1 10	
				783 1 10
1	Fall, *vide* Plan No 3	...	.. ..	970 0 0
4	Irrigation sluices as per Plan No. 1.	260 0 0	.. ..	1,040 0 0
4	Distributing channels	50 0 0	.	200 0 0
	Compensation for land	..	.... .	500 0 0
	Minor branch channels	...	... .	880 0 0
	Pudiparty Branch.			
4,634	Cubic yards of cutting	0 1 0	289 10 0	
4,317	Do of banking	0 1 0	269 13 0	
1	Fall, *vide* Plan No 2 ..	0 0 0	1,040 0 0	
2	Irrigation sluices as per Plan No. 1.	260 0 0	520 0 0	
2	Distributing channels	50 0 0	100 0 0	
	Minor branch channels	...	1,320 0 0	
	Compensation for land .		200 0 0	
				3,739 7 0
	Sundries	...	...	83 12 2
	Total Estimate .	...	.....	34,940 0 0
	Deduct value of laterite that will be obtained from the excavation ...	.	.....	1,500 0 0
	Total Estimate .	.	.....	33,440 0 0

Specification to accompany the Plan and Estimate for the Idagali Branch Channel Head Sluice.

1. This work to be constructed at the southern extremity of the Sarvapully reservoir, adjacent to the site of the present calingulah; it will consist of eight vents of 3 feet span, the height of the piers to be four feet, and the breadth 2½. The front wings to be 14¼ in height, the breadth at bottom and top being 5½ feet and 2 feet respectively, the rear wings to be 8 feet in height with an average breadth of 2¾ feet. The wings in rear and in front to be connected by retaining walls; the rear one to be 5 feet in depth with an average breadth of 2½, the front retaining wall to be the

same breadth, but only 4¾ feet in depth. The flooring throughout to be 1½ in thickness with a bed of concrete 1 foot thick. The face walls to be 7½ in height, the bottom breadth being 3½, and the top 1½ feet. The space between the face walls to be filled in with gravel. The floor of the sluice to be 11·59 feet above mean tide. This sluice is designed to be capable of discharging the required quantity of water when there is but comparatively a small supply in the reservoir.

2. The shutters to be worked by screws, the general arrangement being the same as detailed for the auxiliary head sluice.

3. The masonry to be of dressed laterite in chunam and pointed with chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing a Head Sluice for Idagali Branch.

Particulars of Work	Measurement. Length.	Breadth.	Height or Depth.	No.	Cubical contents.
	Feet.	Feet.	Feet.		Feet.
Concrete	50	15½	¾	...	581¼
	44¼	15½	¾	...	514 11/32
	16	1¼	2	8	416
Total...	...	..	...	...	1,511 11/32
Foundation —Abutments	10½	5½	5	2	577¼
Piers	15	3½	3½	7	1,286¼
Front wings	28	4¾	4¾	2	1,268¼
Rear do	18	5¾	5	2	1,020
Returns	15	4½	5	2	650
Front retaining wall ...	69	2½	4¾	...	819¾
Rear do. ...	40½	2½	5	...	506¼
Superstructure —Abutments	10½	3¾	4	2	315
Piers	12¾	2½	4	7	886¼
Caps	2½	2¼	2¼	7	82 11/16
Cutwaters	2½	2¼	14¼	7	540 5/16
Skew backs	10½	2½	¼	7	45 11/16
Do	10½	3	¼	2	15¾
Spandril	41½	10¼	¾	..	326 13/16
Face walls	45½	2¼	7¼	2	1,706¼
Side do	3½	2¼	6¼	2	98 5/16
Front wings	28	2¼	9¼	2	1,489¼
Coping	28¼	2¼	1	2	141¼
Rear wings	18	5¼	11	2	1,320
Coping	18¼	2¼	1	2	91¼

Proceedings of the Madras Government, Public Works Department, 20th June 1867.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No	Cubical contents
	Feet	Feet	Feet.		Feet.
Superstructure —Returns ...	15	2⅔	8	2	640
Coping	15¼	2½	1	2	76¼
Blocking courses	46	1½	1	2	138
Parapets	45½	1	2	2	182
Flooring	50	18	1½	...	1,350
Do	44½	18	1½		1,201½
Do.	10½	2¾	1½	8	346½
Arch work	10½	6	1½	8	756
Total ..	...	..	.	...	17,872 49/144
Tamped graveling for spandrils ...	41½	3½	6½	...	944⅛
Or cubic yards	.	.		...	35
Pointing ... Squares.	...	..	...	...	63¼
Earth-works .. ... Cubic yards	...	...	..	...	940
Teak wood beam ... Cubic feet.	...	..	...	...	43½
Do shutters with working gear	1	.	...	...	8
Baling		.		...	...
Centering	.	..	..	...	...
Sundries	...	...	.	...	...

Abstract Estimate No. 4.

uantities	Description of Work.	Rate. RS. A. P.	Amount. RS. A. P.	Total RS. A. P.
1,511 11/32	Cubic feet of concrete	0 2 0	188 15 4	
17,872 49/144	Do of laterite in chunam ...	0 2 8	2,978 11 7	
35	Cubic yards tamped graveling	0 2 0	4 6 0	
63¼	Squares of pointing	2 0 0	126 8 0	
940	Cubic yards of earth-work	0 1 0	58 12 0	
43½	Cubic feet of teakwood	3 8 0	152 4 0	
8	Teakwood shutters with working gear.	40 0 0	320 0 0	
	Baling	...	450 0 0	
	Centering	...	50 0 0	
	Sundries	...	114 13 1	
				4,440 0 0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Regulating Sluice at the Idagali Tank.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth	No.	Cubical contents
	Feet.	Feet.	Feet		Feet.
Concrete	35½	6	1	2	426
	9	4½	1	...	40½
	12	12	¾	...	108
Total	...	...		...	574½
Foundation.—Body	1¾	4¼	3½	.	21[illegible]
Wings	33½	4	5	2	1,340
Retaining wall	11	2½	5	1	137½
Above.—Abutments ...	3½	2¼	7	2	110¼
Backing to arch ...	2⅞	3½	¾	2	13[illegible]
Wings ...	30	2¼	9	2	1,215
Coping	30½	2	¾	2	91½
Flooring	12	12	1¼	...	189
Arch work	4½	3	1⅛	...	15[illegible]
Invert	3½	4	1¼	...	17½
Total...	...	...			3,142¼
Rubble stone (laterite)	15	12	1½	..	270
	15	3	1½	.	67½
	5¾	3	1½	...	25⅞
Or Cubic yards ..	...	...		...	363½
Teakwood shutter	3¼	3"	10	...	13½
Pointing ... ... Squares					8½
Iron bar .. .. R. feet					
Earth work ... ... Cubic yards					10
Centering					4½
Sundries					194
					....

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work	Rate Rs. A. P.	Amount Rs. A. P.	Total. Rs. A. P.
575	Cubic feet of concrete ...	0 2 0	71 14 0	
3,143	Do laterite in chunam ...	0 2 8	523 13 4	
10	Squares of pointing ...	2 0 0	20 0 0	
13¼	Cubic yards of rubble stone laterite.	1 8 0	20 3 0	
194	Do. of earth-work ...	0 1 0	12 2 0	
4½	R feet of iron bar	..	7 0 0	
4⅛	Cubic feet of teakwood shutter ...	3 8 0	24 [illegible] 0	
	Baling	...	10 0 0	
	Centering and sundries	...	16 8 8	
				899 0 0

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate. Rs. A. P.	Amount Rs. A. P.	Total. Rs. A. P.
205	Cubic feet of concrete ...	0 2 0	38 2 0	
951	Do. laterite in chunam	0 2 8	158 8 0	
5½	Cubic yards of rubble stone (laterite).	2 8 0	13 12 0	
3	Squares of pointing ...	2 0 0	6 0 0	
129	Cubic yards of earth-work	0 1 0	8 1 0	
1¼	Cubic feet of teak beam	3 8 0	2 6 6	
1	Shutter with working gear		12 0 0	
	Baling		10 0 0	
	Sundries		11 2 6	
	Total Estimate ...	..	...	260 0 0

Specification to accompany the Plan and Estimate for the Ipuru and Pudiparty Branch Head Sluice.

The barrel to be oval and 1¼ feet in thickness, the upper diameter being 4½ feet, and the lower 3¼ feet; the sides to be described with a radius of 9 feet; the length of the barrel to be 9 feet; it will rest on a bed of concrete one foot thick; and be backed up by masonry on each side, for a height of 7½ feet above concrete level. The front wings at the abutments will be 9 feet in height, and at the extremities 4 feet; the rear wings will be the same height at the abutments, but 5 feet at the extremities. The front wings to be 13½ feet in length measured at right angles to the face of the work, and to be set out with a splay of 10 feet at the extremities, which will be connected by a retaining wall. The rear wings to be described with a radius of 11 feet and to be 18 feet in length measured perpendicularly from the face; the extremities to be connected by a retaining wall 5 feet in depth, with an average breadth of 2½ feet. The flooring between the retaining walls and vent to be of laterite 1¼ feet in thickness, resting on a bed of concrete one foot thick. The shutters will consist of planks 5 feet × 3 inches × 10 feet; to facilitate the working of these and retain them in position two iron bars well be fixed I across the vent. The masonry to be of dressed laterite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Head Sluice for Ipuru and Pudiparty Branch.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No.	Cubical contents
	Feet	Feet.	Feet		Feet
Barrel	9	22	1¼	..	247½
Sides	9	1½	7	2	189
Foundation.—Front wings	16½	3¾	5	2	595⅛
Rear do	26	3¾	5	2	975
Front retaining wall ...	24	2½	5	1	270
Rear do do. ...	13½	2½	5	1	219⅜

DETAILED ESTIMATE No. 4.—(*Concluded*)

Particulars of Work.	Measurement. Length.	Breadth	Height or Depth.	No.	Cubical contents
	Feet.	Feet.	Feet		Feet
Above—Front wings	16½	2 1/16	6½	2	442 13/16
Coping	17	2	¾	2	51
Rear wings	26	2 1/8	7	2	773½
Coping	26	2	¾	2	78
Face wall	8	3	1½	1	36
Do	8	1½	1½	1	18
Blocking course .	8½	1½	1	2	25½
Parapets	8	1	1	2	16
Front flooring	15	12¼	1¼	1	229 11/16
Rear do .. .	20½	18	1¼	1	461¼
Total cubic feet of laterite in chunam.	.	...	...	...	4,630 13/16
Concrete ... . a	9	10	1	..	90
b	27½	5¾	1	2	316¼
c	18	5⅝	1	2	202½
Total cubic feet .	20	18	1	...	360
Pointing ... ... Squares	15	12	1	...	180
Excavation ... Cubic yards ..	...	...	...	..	1,148¾
Iron bars ... . Running feet ..	...	...	...	...	12
Teak-wood shutters	..	..	..	...	343
Baling	..		...	..	11½
Centering and sundries ...	5	3″	10		12½ C ft.
	...	...	.	...	...
		...	...	...	..

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate RS	A.	P.	Amount RS.	A.	P.	Total. RS	A.	P.
1,149	Cubic feet of concrete .	0	2	0	143	10	0			
4,631	Do. of laterite in chunam ...	0	2	8	771	13	4			
12	Squares of pointing .	2	0	0	24	0	0			
343	Cubic yards of excavation ..	0	1	0	21	7	0			
11½	Running feet of iron bars				13	8	0			
12½	Cubic feet of teakwood shutters .	3	8	0	43	12	0			
	Baling		...		50	0	0			
	Centering and sundries		...		31	13	8			
	Total Estimate...				..			1,100	0	0

ABSTRACT ESTIMATE No. 4.

PENNAIR DELTA.

Constructing fall in Idagaly Branch Channel, *vide* Plan No. 3.

Quantities	Description of Work.	Rate RS	A.	P.	Amount RS	A.	P.	Total. RS.	A.	P.
640	Cubic feet of concrete	0	2	0	80	0	0			
4,377	Do of laterite in chunam ...	0	2	8	729	8	0			
10½	Squares of pointing	2	0	0	21	0	0			
19 2/27	Cubic yards of rubble stone (laterite)	1	8	0	29	11	7			
280	Do of earth-work . ..	0	1	0	17	8	0			
4 1/6	Running feet of iron bars		.		6	12	0			
5⅓	Cubic feet of teak-wood shutters .	3	8	0	18	10	8			
	Baling		..		50	0	0			
	Sundries		..		16	13	9			
	Total Estimate...		...		...			970	0	0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing fall to the Pudiparty Tank, *vide* Plan No 2.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	No.	Cubical contents.
	Feet.	Feet.	Feet		Feet.
	2 1/12	7	1	...	2 1/12
	7	8	1	2	112
	10½	6½	1	2	136¼
Concrete	12½	7	1	2	175
	7½	6	1	2	90
	12	5	1	...	60
	12	12	¾	..	108
Total...	...	...	...	...	684
	2 1/12	5	5	1	60 5/12
Foundation—Body	7	6	5	2	420
Wings	9½	4½	5	2	427½
Front returns	13	5	5	2	650
Wings	6½	4	5	2	260
Rear returns	12	3	5	...	180
Retaining wall	3 5/12	3½	7	...	83 17/24
Above—Body	7	3¼	13	2	591½
Wings	4	2	¾	2	12
Coping	9	2½	10	2	450
Returns	9¼	2	¾	2	27¾
Coping	13	2¾	11	2	786½
Wings	13¼	2	¾	2	39¾
Coping	6	2¼	9	2	243
Returns	12	2	3	1	72
Retaining wall	12	12	1¼	.	180
Flooring	6⅚	½	½	...	1 17/24
String course	4½	2½	⅝	...	9 9/24
Arch-work					
Total. .	...	..	...	...	4,514

DETAILED ESTIMATE No. 4.—*(Concluded.)*

Particulars of Work.	Measurement Length.	Breadth.	Height or Depth.	No.	Cubical contents.
	Feet.	Feet.	Feet.		Feet.
Rubble stone (laterite)	12	10	1½	...	180
	10	2	10	2	400
				C. yards..	580 or 21 7/27
Teak-wood shutter	3 1/2	3"	6¾	...	6¾
Earth-work ... ... Cubic yards	..	...	...	..	300
Iron bars ... ... R feet.	...	...	...	...	5
Pointing ... ... Squares.	...	...	...	...	11½
Baling	...	...	...	..	...
Centering and sundries	...	...	...	...	...

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate. RS.	A.	P.	Amount. RS.	A.	P.	Total. RS	A.	P.
684	Cubic feet of concrete	0	2	0	85	8	0			
4,514	Do. of laterite in chunam ...	0	2	8	752	5	4			
11½	Squares of pointing	2	0	0	23	0	0			
21 3/27	Cubic yards of rubble stone laterite.	1	8	0	32	3	7			
300	Do. of earth-work	0	1	0	18	12	0			
5	R feet of iron bars		...		8	2	0			
6¾	Cubic feet of teak-wood shutter ..	3	8	0	23	10	0			
	Baling		...		75	0	0			
	Centering and sundries		...		21	7	1			
	Total Estimate...		...		...			1,040	0	0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Excavating Valluru Branch Channel.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth	No.	Cubical contents.	Rates per Cubic yard. RS.	A.	P.
	Feet.	Feet.	Feet.		Feet.			
Head sluice, *vide* separate Estimate.								
Cutting	1,320	17	4	1	89,760	0	1	0
Banking	1,320	20	2	1	52,800	0	1	0
Turfing	1,320	23	...	2	60,720	0	0	4
Cutting	3,960	15	4	1	237,600	0	1	0
Banking	3,960	24	2	1	190,180	0	1	0
Turfing	3,960	23	...	2	182,160	0	0	4
2nd mile—Cutting	1,980	18½	5¼	1	204,187½	0	1	1

DETAILED ESTIMATE No. 4.—*(Concluded)*

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No.	Cubical contents	Rate per Cubic yard. RS.	A.	P
	Feet.	Feet.	Feet.		Feet.			
2nd mile—Cutting	1,320	17½	4⅜	1	107,800	0	1	0
Cutting	1,980	18¾	5½	1	204,187½	0	1	1
3rd mile—Cutting	2,640	17¼	4½	1	204,930	0	1	0
Cutting	2,640	13½	3⅔	1	130,680	0	1	0
Banking	2,640	37	2	1	195,360	0	1	0
Turfing	2,640	25	...	2	132,000	0	0	4
4th mile—Cutting	5,280	10	2½	1	132,000	0	1	0
Banking	5,280	86½	2	1	913,440	0	1	2
Turfing	5,280	32	...	2	337,920	0	0	4
5th mile—Cutting	2,640	8	2	1	42,240	0	1	0
Banking	2,640	105	2	1	554,400	0	1	2
Turfing	2,640	34	...	2	179,520	0	0	4
Fall	...	...	...		...	.....		
Cutting	2,640	24¾	4⅛	1	272,250	0	1	0
6th mile—Cutting	1,980	25½	4⅔	1	235,620	0	1	0
Regulator	...	...	...		...	.....		
Irrigation Sluices (six)	...	...	...		...	.....		
Minor branch channels, aggregate length 6 miles	...	...	...		...	.....		
Compensation for land	...	...	...		...	.....		

ABSTRACT ESTIMATE No. 4.

Quantities.	Description of Work.	Rate. RS.	A.	P.	Amount. RS	A.	P.	Total. RS	A.	P.
		.....			.....			3,080	0	0
1	Head-sluice, *vide* separate estimate	0	1	1	1,024	1	5			
15,125	Cubic yards of cutting ..	0	1	0	3,363	2	0			
53,810	Do. of do. ...							4,387	3	5
		0	1	2	3,964	0	8			
54,364	Do of banking ...	0	1	0	1,014	11	0			
16,235	Do. of do. ...							4,978	11	8
		0	0	4	2,065	8	8			
99,146	Square yards of turfing							2,065	8	8
		.. .			.. .			3,100	0	0
1	Fall, *vide* separate estimate ..	.....			.....			1,730	0	0
1	Regulator do do ..	340	0	0	.....			2,040	0	0
6	Irrigation sluices, *vide* Plan No. 1.	... .			....			2,640	0	0
	Minor branch channels									
1	Fall in Pantapollem branch channel,	.....			.....			1,350	0	0
	vide Plan No. 3	.. . .			.....			1,800	0	0
	Compensation for land	100	0	0	.....			600	0	0
6	Distributing channels	... ..			.....			68	8	3
	Sundries									
	Total Estimate..	.....			. ....			27,840	0	0

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Head Sluice for Valluru Branch Channel.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	No.	Cubical contents.
	Feet	Feet	Feet.		Feet.
Concrete.—Abutments	7½	8¾		2	98⅞
Piers	11	17½		..	144½
Front wings	31½	7½		2	345¾
Rear do.	23¾	7½		2	267⅜
Front retaining wall	38½	5		2	144½
Rear do. do	4½	5		..	16⅞
Below flooring	15½	⅞	4	3	160½
Front apron	20½	1½		...	338⅜
Rear do	12	1½		...	130½
Spandril	11	3⅞	4½	...	202½
Total cubic feet of Concrete ..	...	.	...	...	1,897½
Foundation —Abutments	8¼	5½	6	2	663½
Piers	15½	4½	6	2	777½
Front wings	30⅝	5	5½	2	1,750⅛
Rear do	21⅝	5½	6	2	1,362½
Front retaining wall ..	40½	2¾	5½	...	611⅜
Rear do do .	6¾	2½	6	...	111½
Superstructure.—Abutments	8¼	3½	5½	2	360⅛
Piers . .	11⅜	3	5½	2	375½
Front portion ..	25⅝	3	14½	2	221⅞
Caps	25⅝	3	2½	2	40½
Skew backs	8¼	3	¼	2	12½
Front wings	30	2⅝	9¼	2	1,456½
Coping	30½	2	1	2	121
Rear wings ..	21	2¾	10½	2	1,212½
Coping	21¼	2	1	2	85
Front flooring	27½	17¾	1½	...	854⅜
Rear flooring . .	13	18½	2	...	481
Flooring between arches	10¼	2½	2	3	461½
Backing to arches ..	8¼	4	1	2	70
Spandril	12	8¾	1½	.	157½
Face walls	17	2¼	6½	2	471½
Do sides	4¼	1½	4¾	2	60⅜
Parapets.	16½	1	1	2	33
Total cubic feet of Laterite in chunam ..	...	...	...	...	11,439½
Arch work	8¼	5½	1½	3	216⅜
Pointing, ... Squares ..	...	.	...	...	31½
Rubble stone (laterite)	20	8	2¼	...	400
Do. do.	20	9	2	2	720
Total...	...	...	...	...	1,120
Or cubic yards.	...	...	...	..	41½
Excavation, Cubic yards	...	...	...	...	1,133
Metaling, Cubic yards	...	..	...	...	4

DETAILED ESTIMATE No. 4 —*(Concluded.)*

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth.	No	Cubical contents
	Feet	Feet.	Feet		Feet
Shutters	16½	1	1	..	16½ C feet
Teak beam	...		..	...	
Baling		...	.	...	
Centering	...	...	.	.	
Sundries					

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work	Rate. RS	A	P.	Amount. RS	A.	P.	Total RS	A	P
1,898	Cubic feet of concrete	0	2	0	2,37	4	0			
11,440	Do. of laterite in chunam .	0	3	1	2,204	9	4			
217	Do. of arch-work	0	3	4	45	3	4			
31½	Squares of pointing . .	2	0	0	63	0	0			
41½	Cubic yards of rubble stone (laterite)	1	2	0	46	11	0			
1,138	Do of earth-work	0	1	0	71	2	0			
4	Do. of metaling . ..	0	14	0	3	8	0			
3	Shutters with working gear... ..	40	0	0	120	0	0			
16½	Cubic feet of teakwood	3	8	0	57	12	0			
	Baling				150	0	0			
	Centering	. . .			15	0	0			
	Sundries	.... .			65	14	4			
	Total Estimate .	..			...	...		3,080	0	0

Specification to accompany the Plan and Estimate for the Fall proposed for construction near the Bramadavum Tuti Tank.

The body wall to be 8 feet in height, the breadth at bottom and crest being $4\frac{3}{4}$ and 3 feet respectively. The length of the body wall to be $4\frac{3}{4}$, in rear of the body wall a cistern with curved flank and 15 feet in length and $16\frac{1}{2}$ in greatest breadth to be constructed to retain a depth of 4 feet of water, the flooring of the cistern to consist of $1\frac{1}{4}$ feet of laterite and 9 inches of concrete. The rear wings to be connected by a retaining wall 5 feet in depth, the breadth at bottom being $4\frac{1}{2}$ feet, and 2 feet at the level of the flooring. The rear wings to be $16\frac{1}{2}$ in height and the front 12 feet, the average breadth of the former being 4 feet $1\frac{1}{2}$ inches, and that of the latter 3 feet. A foot-bridge to be thrown over the crest of the weir with a groove of 6 inches in it to admit of the shutters being worked, and to prevent these getting jammed during the working. Three iron bars will be built in, above the crest of the weir, at 1 foot 10 inches apart.

The masonry to be of dressed laterite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Fall near the Bramadavum Tuti Tank, in the Valluru Branch Channel No 1

Particulars of Work.	Number	Measurement. Length	Breadth	Height	Cubical contents.
		Feet.	Feet	Feet.	Feet.
Concrete	2½	8¼	1	..	20¼
	23½	8½	1	2	406½
	18½	9⅛	1	2	340⅜
	7½	8	1	2	120
	15	13⅜	9	..	153
	13¼	5½	1	...	72⅞
Total	.	.	..	...	... 1,114⅛
Foundation—Body	4¾	6	5	..	142½
Front wings	11	8	5	2	880
Returns	12	8	5	2	960
Rear wings	18⅜	6⅞	5	2	1,283⅛
Returns	7½	5¾	5	2	431¼
Retaining wall	13¼	3½	5	...	215⅛
Above—Body	4¾	3⅞	8	1	147⅞
Front wings	11	4⅛	16½	2	1,497⅜
Coping	7¾	2	¾	2	23¼
Returns	12	4⅛	13½	2	1,336⅛
Rear wings	18⅜	3⅝	14¼	2	1,895¼
Coping	1⅜	2	¾	2	56
Returns . . .	7½	3	12	2	540
Coping	7¾	2	¾	2	23¼
Retaining wall	13¼	2	4	1	106
Flooring	15	1⅝	1¼	...	255⅛
Parapets	4¾	¾	¾	2	5¼
Arch-work.	4¼	6	¾	..	21¼
Total ..	..	...	..	—	9,819⅛
Rubble stone (laterite)	18	15	2	...	540
	18	2	13	2	936
Or cubic yards	..	...	.	...	1,476
Pointing ... . Squares	..	..	...	...	54⅔
Iron bar .. .. R. feet	.	.	...	...	23⅛
Teak-wood shutter .. .	5¼	3⅜	2¼	...	18⅜
Earth-work ... . Cubic yards	.	...	...	..	12⅛
Baling	.	..	...	..	700
Sundries	.	...	...	...	...

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate Rs A P.	Amount. Rs. A. P.	Total Rs A. P.
1,114	Cubic feet of concrete	0 2 0	139 12 0	
9,819	Do. of laterite in chunam ...	0 4 0	2,454 12 0	
23½	Squares of pointing...	2 0 0	47 0 0	
54⅔	Cubic yards of rubble stone (laterite)	2 8 0	136 10 8	
700	Do. of earth-work	0 1 0	43 12 0	
18¾	Running feet of iron bars	.....	25 11 0	
12⅛	Cubic feet of teakwood shutters ...	3 8 0	42 7 0	
	Baling...	.....	150 0 0	
	Sundries	.....	59 15 4	
	Total Estimate...	.....	....	3,100 0 0

Specification to accompany the Plan and Estimate for the Regulator proposed for construction near the Valluru Tanks.

The Regulator to consist of two vents one 4 feet span, the other 11½ feet. The front wings to be 6 feet in height and 2 feet in breadth on the average; and returns to be 6 feet in height and 2¼ in breadth on the average, there will be two retaining walls on each vent. The two vents to be connected by a curved-wall as shown in plan. Each sluice will be adapted to carry a stone bridge for foot passengers. The planks for regulating the supply of water will be fitted immediately in front of the bridges; and two iron bars will be built in, across each vent, to guide the planks, and retain them in position. The masonry to be of dressed laterite in chunam. The front and rear aprons to be of packed rubble 1½ feet and 2 feet thick respectively, with revetted slopes.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing Regulator near Valluru Tank in the Valluru Branch Channel.

Particulars of Work.	Measurement. Length	Breadth.	Height or Depth	Number	Cubical contents
	Feet.	Feet.	Feet		Feet.
Concrete.—Wings	17¾	6	1	1	106½
Do	21¾	6	1	1	130½
Curved portions .	9½	6½	1	1	61¾
Returns . . .	5	6½	1	4	130
Abutments	11	7	1	2	154
Do.	11	6	1	2	132
Retaining wall	8	4½	1	1	36
Do.	8	5	1	1	40
Do.	½	4½	1	1	2¼
Do. . .	½	5	1	1	2½
Flooring	10¾	5¾	1	1	61⅛
Do	3	5¾	1	1	17¼
Total cubic feet...	.....	.....	...	...	874⅜
Foundation—Wings	16⅝	3¾	5	1	311⅜
Do	20⅝	3¾	5	1	386⅜
Curved portions	9½	4¼	5	1	201⅛
Returns	5	4¼	5	4	425
Abutments	9⅞	4¾	5	2	469⅛
Do ...	9⅞	3¾	5	2	370⅝
Retaining wall	10¼	2⅝	5	1	140⅝
Do	10¼	2¼	5	1	115⅝
Do	2¾	2¾	5	1	37⅛
Do.	2¾	2¼	5	1	30⅛
Wings	16	2	6	1	192
Do	20	2	6	1	240
Curved portions	9½	2⅝	6	1	137¾
Returns . . .	5	2¼	6	4	270
Abutments	8½	3	4⅝	2	214⅝
Do.	8½	2	6	2	204
Skew backs	8½	2	⅝	2	25½
Do	8½	1	⅝	2	10⅝
Backing to arch .	8½	4½	⅜	2	28⅛
Do	8½	1⅝	⅛	2	3⅜
Face walls	16½	1½	1⅝	2	80⅞
Do.	7	1½	¾	2	15¾
Blocking course	17	1½	¾	2	38¼
Do	7⅛	1½	¾	2	16⅞
Parapet	16½	1	1	2	33
Do	7	1	1	2	14
Flooring	11½	6⅜	1½	1	107⅞
Do.	3¾	6⅜	1½	1	35⅝
Arch-work	8½	14½	1¼	1	154⅛
Do.	8½	6¼	1⅛	1	73⅜
Total cubic feet of laterite in chunam...	.. ...	. ....	...	...	4,386⅛

DETAILED ESTIMATE No. 4.—*(Concluded).*

Particulars of Work	Measurement. Length	Breadth.	Height or Depth	Number	Cubical contents.
	Feet.	Feet	Feet.		Feet.
Pointing, squares	..	..		...	13
Rubble stone for outer apron	16½	8	2		264
Do.	7	8	2	...	112
Do inner do	11¼	5	1¼	1	103⅛
Do do.	5¾	5	1¼	1	45⅛
Do do	10½	1	1½	1	15¾
Revetment	5	5⅛	1½	4	251¼
Total cubic feet	...	...	...	.	793 or
Cubic yards .	...	...	.	.	29⅜
Excavation, Cubic yards	295	..		..	
Teakwood shutters	12	3"	11	..	33
Do.	4½	3"	11	...	12⅜
Total cubic feet .	...	.		.	45⅜
Iron bars .. ... Running feet	...	...		..	37
Baling					
Centering and sundries					
.. ...					

ABSTRACT ESTIMATE No 4.

Quantities.	Description of Work	Rate. RS	A	P	Amount RS	A	P	Total. RS
875	Cubic feet of concrete	0	2	0	109	6	0	
4,386	Do of laterite in chunam	0	4	0	1,096	8	0	
13	Squares of pointing .	2	0	0	26	0	0	
29½	Cubic yards of rubble stone (laterite) ..	2	8	0	73	12	0	
295	Do of excavation	0	1	0	18	7	0	
45⅜	Cubic feet of teakwood shutters	3	8	0	158	13	0	
37	Running feet of iron bars				47	6	0	
	Baling				150	0	0	
	Centering and sundries				51	12	0	
	Total Estimate ..				...			1,730

Specification to accompany the Plan and Estimate for the Valluru Branch Head Sluice.

The front wings to be 14 feet 3 inches at the abutments, and 4½ feet at the extremities; the average breadth of the former being 3½ feet, and that of the latter 1½ feet. The front wings to be connected by a retaining wall 5 feet in depth, the breadth at bottom being 4 feet, and at floor level 1½ feet; between this retaining wall and the vents there will be a floor of laterite 1¼ feet in thickness, and a bed of concrete 9 inches thick. The flooring in the bays to consist of 2 feet of laterite and 9 inches of concrete; the flooring between the bays and the rear retaining wall to be of like section. The sluice will have three vents of 2½ feet span; the height of the piers being 5½ feet The face walls to be 6¼ feet in height with an average breadth of 2¼ feet; the space between the spandrils to be filled in with concrete. The rear wings to be 14 feet in height at the abutments, and 7 feet at the extremities, these will be connected by a retaining wall 6 feet in depth with an average breadth of 2¾ feet. The side slopes of the channel in rear will be pitched for a length of 20 feet. Beyond the rear retaining wall there will be a rubble apron 20 feet × 8 feet × 2½ feet. The length of the floor to be 24·32 feet above mean tide.

The shutters to be worked by screws.
The masonry to be of dressed laterite in chunam.

DETAILED ESTIMATE No. 4.

PENNAIR DELTA.

Constructing an Irrigation Sluice as per Plan No 1.

Particulars of Work.	Measurement Length.	Breadth	Height or Depth	No.	Cubical contents.
	Feet	Feet.	Feet		Feet.
Concrete	6 1/4	8½	¾	...	43 57/192
	1½	4½	1	..	6¾
	15	4¾	1	2	142½
	12½	4⅜	1	2	112½
Total		....	.....	...	305
Barrel	10	8	1¼	1	100
Retaining wall...	2	2½	4½	1	20¼
Do	1	2¼	4½	1	10⅛
Foundation—Front wings	13	2¾	4½	2	321¾
Rear wings	10½	2½	4½	2	236¼
Above—Front do. ...	12	1-5¼	3½	2	120¾
Rear do	9½	1½	4	2	114
Front face wall ..	3-9½	1¼	3¾	1	17¾
Rear do.	3-9½	1¼	1¾	1	8¼
Parapet -	3-9½	¾	¾	1	2⅛
Total	. ...	.....	.....	.	951
Rubble stone (laterite)	10	7	1½	..	105
	7	3¼	2	...	45¼
Total .	. . .	. ..	.....	...	150½ or 5½
Cubic yards.	.....	.. ..	.....		
Pointing ... Squares	.. ...	.....	.....	..	3
Earth-work ... . .. Cubic yards	.....	.. . .	. .	.	129
Teak beam ... . Cubic feet.	.....	.....	... ..	.	11/16
Shutter with working gear . .	... ..	. ...	— . .	..	
Sundries	. ..	..	.. ..	...	.

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work.	Rate RS.	A.	P.	Amount. RS	A.	P	Total. RS	A.	P
					38	2	0			
305	Cubic feet of concrete	0	2	0	237	12	0			
951	Do. of laterite in chunam . .	0	4	0	13	12	0			
5½	Cubic yards of rubble stone (laterite) ..	2	8	0	6	0	0			
3	Squares of pointing	2	0	0	8	1	0			
129	Cubic yards of earth-work	0	1	0	2	6	6			
11/16	Cubic feet of teak beam	3	8	0	12	0	0			
1	Shutter with working gear	.....			10	0	0			
	Baling	. ....			11	14	6			
	Sundries	..								
	Total Estimate...	.....			.....			340	0	0

DETAILED ESTIMAE No. 4.

PENNAIR DELTA.

Constructing Fall in Pantapalem Branch Channel, *vide* Plan No. 3.

Particulars of Work	Measurement: Length	Breadth	Height or Depth.	Number	Cubical contents
	Feet	Feet	Feet		Feet
Concrete	7	8	1	2	112
	10½	6½	1	2	136½
	12½	7	1	2	175
	7½	6	1	2	90
	9	5	1	.....	45
	12	9	¾	.....	81
Total cubic feet of Concrete	...	...	....	...	639½
Foundation—Body wall	1⅔	5	5	1	41⅔
Wings	7	6	5	2	420
Front returns	9½	4½	5	2	427½
Wings	13	5	5	2	650
Rear returns	6½	4	5	2	260
Retaining wall	9	3	5	... ..	1.5
Above—Body wall	23/3	3½	7	...	65½
Wings	7	3¼	13	2	591½
Coping	4	9	¾	2	12
Returns	9	2½	10	2	450
Coping	9½	2	¾	2	27¾
Wings	13	2¼	11	2	786½
Coping	13¼	2	¾	2	39¼
Returns	6	2¼	9	2	243
Coping	6¼	2	¾	2	28½
Retaining wall	9	2	3	1	54
Flooring	12	9	1¼	.....	135
String course	5⅓	½	⅓	.....	1⅓
Arch	4	2½	⅚	.....	8⅓
Total cubic feet of laterite in chunam ..	..	..	.....	.....	4,376¾
Pointing ... .. . Squares	...	.	... ..	... ..	10½
Rubble Stone	9	10	1½	.....	135
Do.	10	2	10	2	400
Total cubic feet ...	.....	.....	.....	.....	535
Or Cubic yards ..	.....	.....	.....	.....	19¹³/₁₇
Excavation .. ... Cubic yards ..	.....	.....	.....	.....	280
Iron bars ... ... Running feet.	.....	.....	.....	.....	4½
Teak wood shutter	3¼	3"	6¾	.....	5½ C. ft
Baling	.....	.....	.....	.....	.....
Sundries	.....	.....	.....	.....	.....

ABSTRACT ESTIMATE No. 4.

Quantities	Description of Work	Rate RS A. P	Amount RS. A P.	Total RS. A P.
640	Cubic feet of concrete ...	0 2 0	80 0 0	
4,377	Do of laterite in chunam ...	0 4 0	1,094 4 0	
10½	Squares of pointing	2 0 0	21 0 0	
19²²/₂₇	Cubic yards of rubble stone (laterite)	2 8 0	49 8 7	
280	Do of earth-work	0 1 0	17 8 0	
4½	Running feet of iron bars	... .	6 12 0	
5⅓	Cubic feet of teak-wood shutters .	3 8 0	18 10 8	
	Baling	... ..	50 0 0	
	Sundries	... .	12 4 9	
	Total Estimate	. . .	. ..	1350 0 0

Specification to accompany Plan No. 2 (General) for Irrigation Sluices.

The wings to be 7 feet in height, the breadth at bottom and top being 2½ and 1½ feet respectively. The barrel to be 6 feet in length, and 1½ feet in thickness, the inside diameter being 2 feet 6½ inches, it will rest on a bed of concrete 9 inches in thickness. The barrel will be backed with masonry, on each side to a height of 2 feet 6 inches above concrete level. The front wings to be 8, in length measured at right angles to the face of the arch and let out with a splay of 2½ at the extremities. The rear wings to be also 7½ feet in length, described with a radius of 4¼ feet. There will be three retaining walls, one under the shutter, the second at the opposite end of the barrel, and the third at the extremities of the rear wings; the space between the second and third to be filled in with 2 feet of rubble stone carefully packed immediately in front of the first retaining wall; there will be a rubble apron 5 in length and 1½ feet in depth. The shutter to be worked by a screw. The masonry to be of dressed laterite in chunam.

Specification to accompany the General Plan for Bridges proposed for construction across the Sarvapully Main Branch Channel.

The bridge to consist of two arches of 15 feet span, the rise being 4 feet. The height of the pier and abutments to be 10 feet, the former being 3 feet and the latter 5 feet in breadth. The arches to be 2 feet in thickness at the springing line, 1¼ at the crown. The floor to be an invert 1 foot in thickness with a versed sine of 1 foot; the invert will rest on a layer of concrete 9 inches thick. The wings to be 16 feet in height at the abutments, and 6 feet at the extremities. The depth of the foundation to be reduced by steps of 1 foot up and 2 feet or for a length of 16 feet, and carried on this level 7½, making the total length 23½ feet.

The road-way to be 12 feet in breadth with parapets of 3 feet in height.

The masonry to be of dressed laterite in chunam and pointed with chunam.

SYNOPSIS showing the General state of the Pennair from 1861 to 1865 inclusive

Years.	Water 3 feet and upwards on Crest of Anicut	Water 2½ feet on Crest of Anicut.	Water 2 feet on Crest of Anicut	Water 1½ feet on Crest of Anicut	Water 1 foot on Crest of Anicut	Water ½ foot on Crest of Anicut	Water flush with Crest of Anicut.	Water ½ foot below Crest of Anicut	Water 1 foot below Crest of Anicut
1861	2	...	4	6	12	5	32	10	21
1862	10	2	11	5	12	2	40	7	11
1863	1	1	4	5	9	1	26	1	21
1864	11	1	4	4	5	5	25	21	22
1865	11	5	5	4	9	2	27	21	25
Total days	35	9	28	24	47	15	150	60	100
Average during the five years . . .	7	1⅘	5⅗	4⅘	9⅖	3	30	12	20

Flush with or above Crest for 62 days only.

STATEMENT showing the number of days in each year, from 1861 to 1865, inclusive, in which the Pennair rose to three feet and upwards, above the Crest of the Anicut, and fell to one foot below it.

Years.	Months.	Water 3 feet and upwards on Crest	Water 2½ feet on Crest	Water 2 feet on Crest	Water 1½ feet on Crest	Water 1 foot on Crest	Water ½ foot on Crest	Water flush with Crest	Water ½ foot below Crest	Water 1 foot below Crest
1861.	January ...	...	..	...	...	.	..	.		
	February ..	.	...	...		...	...	...	..	...
	March .	...	..	...	...	.	...	...	..	...
	April .	...	...	...	.		..	..	...	..
	May ...	...	...	..	...	...	..	..	...	
	June ..	...	.		..	1	1	1	4	5
	July .		...	..		...	...	2		4
	August ...		..	...	..	3	1	9	1	2
	September	...	..	1	2	6	1	1	1	.
Max. 3′ 9″	October .	2	...	...			1	6	2	4
	November	...	..	3	4	2	1	11	1	.
	December . .		...	...	.	.	.	2		6
	Total ..	2	...	4	6	12	5	32	10	21
1862.	January ...	...	...	..	...	...	...	...	...	2
	February ..	...	...	.	...	...	...	...	...	.
	March ...	...	...	..	...	...	...	...	...	...
	April ..	...	...	...	...	...	..	...	...	
	May ..	...	..	...	...	...	...	...	...	
	June ..	...	.	.	...	1	1	...	...	.
	July ...	...	...	...	...	...	...	1	1	1
Max. 5′ 2″	August ...	...	.	...	..	...	...	...	...	...
Max. 3′ 9″	September...	5	1	7	1	1	1	10	1	2
	October ...	5	1	3	4	9	1	10	1	...
	November ...	...	...	1	...	1	...	8	...	...
	December ..	...	...	...	...	...	...	20	3	1
	Total ...	10	2	11	5	12	2	40	7	11

STATEMENT showing the number of days in each year, from 1861 to 1865, inclusive, in which the Pennair rose to three feet and upwards, &c —(Concluded.)

Years.	Months.	Water 3 feet and upwards on Crest	Water 2½ feet on Crest.	Water 2 feet on Crest.	Water 1½ feet on Crest.	Water 1 foot on Crest.	Water ½ foot on Crest.	Water flush with Crest	Water ½ foot below Crest	Water 1 foot below Crest
1863.	January ...	...	...	...	...	...	...	...	. .	...
	February ...	...	...	...	..	...	...	...	...	...
	March ...	...	...	...	...	...	...	...	1	1
	April ...	...	...	...	...	..	...	...	...	...
	May ...	...	...	...	...	...	...	...	...	...
	June ...	...	...	...	...	...	...	...	...	...
	July ...	...	...	...	...	...	...	...	...	...
	August ...	...	...	...	...	...	...	2	...	...
Max. 3′ 0″	September ..	1	...	1	1	4	...	14	...	2
	October ...	...	1	3	4	4	1	1	...	2
	November...	...	...	...	...	..	...	...	...	11
	December ...	...	...	...	...	1	...	9	...	5
	Total ..	1	1	4	5	9	1	26	1	21
1864.	January ...	...	..	...	...	...	...	...	...	...
	February ...	...	...	...	...	...	...	...	...	...
	March ..	...	...	...	...	...	...	...	. .	. .
	April ...	...	...	...	...	...	...	...	...	...
	May ...	...	...	...	...	...	...	...	...	...
	June ..	...	...	...	1	...	...	...	1	1
	July ...	..	...	...	...	...	...	...	..	...
Max. 5′ 3″	August ...	5	...	2	...	...	...	...	1	4
Max 4′ 3″	September...	3	...	1	2	2	3	5	3	7
Max. 3′ 6″	October ...	2	...	1	1	3	2	6	5	7
Max. 3′ 0″	November ..	1	1	...	...	...	...	2	2	2
	December ...	...	...	...	...	...	..	12	9	1
	Total ..	11	1	4	4	5	5	25	21	22
1865.	January ...	...	...	...	...	...	.	...	...	..
	February ...	...	...	...	...	...	...	...	...	...
	March ...	...	...	...	...	...	...	...	...	...
	April ...	...	...	...	..	...	...	1	...	...
	May ...	...	...	...	...	...	...	2	...	3
	June ...	...	2	2	1	1	..	1	2	8
	July ...	...	...	...	...	1	...	2	...	..
Max 5′ 0″	August ...	9	2	3	1	4	1	3	8	...
	September ..	...	...	...	...	1	...	7	5	8
	October ...	...	...	...	...	...	...	...	...	...
Max. 3′ 4″	November...	2	...	...	...	2	...	2	1	1
	December ...	...	1	...	2	...	1	9	5	5
	Total...	11	5	5	4	9	2	27	21	25

CAMP, NELLORE,
3rd April 1867.

(Signed) R. SMITH,
Executive Engineer, Nellore Range.

(Signed) G. V. WINSCOM, Lieut.-Colonel, R. E.,
Superintending Engineer, 2nd Division.

Estimated Acreage available as marked down by Department

Public Works under the Sarvapally Project.

No	Names of Villages.	Deduct.						Remainder available under the Sarvapally Project						Remarks.
		Total area.	Area reserved for public purposes.	Area not fit for cultivation.	Wet and garden area irrigated under the existing irrigation sources.		Total.	Ordinary rates.			Favourable or Inam.		Total.	
					Koru or Government land on ordinary rates.	Inam or favourable tenure.		Dry area.	Wet and garden area.	Probable assessment in average rates.	Dry area	Water rate at 4 Rs per acre.	Area.	Probable gross income of Revenue.	
	Guduru Talook.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres	Acres.	Rs.	Acres.	Rs.	Acres.	Rs.	
1	Sarvapally...	22,364	3,887	71	2,793	449	7,200	10,376	3,791	45,700	997	3,988	15,164	49,688	The Department Public Works will have to estimate the probable irrigable area under the project, with reference to the level of the channel and the surrounding country. The Acting Collector has not sufficient details on the subject.
2	Anikepally and Golagamudi	2,813	820	3	182	24	1,029	1,336	444	11,662	4	16	1,784	11,678	
3	Idagaly and Kakarlapalem.	4,349	1,134	21	717	128	2,000	1,685	458	6,540	206	824	2,349	7,364	
4	Ipuru	15,648	3,326	1,156	2,131	295	6,908	7,641	615	24,768	484	1,936	8,740	26,704	
5	Pudiparty	5,113	82	...	568	147	797	4,140	...	27,945	176	704	4,316	28,649	
6	Penubarty...	3,066	115	...	862	148	1,125	1,399	542	12,880	...	...	1,941	12,880	
7	Brawhadam and Lingapalem	3,418	669	...	1,243	503	2,415	714	161	3,603	128	512	1,003	4,115	
8	Tallapudy and Valluru ...	2,610	491	...	830	529	1,850	220	164	868	376	1,504	760	2,372	
9	Narikelapally	2,113	160	...	620	166	846	980	146	4,740	141	564	1,267	5,304	
10	Idiempalli	2,843	405	...	400	65	870	1,371	585	6,539	17	68	1,973	6,607	
11	Kolavukyduru	4,447	1,031	...	675	197	1,903	2,116	403	7,754	25	100	2,544	7,854	
		68,784	12,120	1,251	10,921	2,651	26,943	31,978	7,309	1,52,999	2,554	10,216	41,841	1,63,215	
	Nellore Talook.														
	Kanapartipadu	3,840	254	...	658	284	1,196	2,250	73	9,087	321	1,283	2,644	10,370	
	Kakapalli, Kolivelapalem, Madirazu Guduru.	4,497	1,746	...	1,450	298	3,494	537	322	10,322	144	574	1,003	10,896	
		8,337	2,000	...	2,108	582	4,690	2,787	395	19,409	465	1,857	3,647	21,266	
	Total ...	77,121	14,120	1,251	13,029	3,233	31,633	34,765	7,704	1,72,408	3,019	12,073	45,488	1,84,481	

Nellore,
15*th April* 1867.

(Signed) J. A. C. BOSWELL,
Acting Collector.

(Signed) G WINSCOM, Lieut.-Colonel, R. E.,
Superintending Engineer, 2nd Division.

No. 441. ORDER THEREON, 20th June 1867, No. 1,844.

IRRIGATION, No. 21.

1. With the above letter the Superintending Engineer of the 2nd Division forwards plans and estimates, aggregating Rupees 4,12,100, connected with a project for further developing irrigation in the Nellore District under the Pennair anicut, by the enlargement, improvement, and extension of the main channel and some of its branches, and by adding to the capacity of the Sarvapully tank to enable it to contain water sufficient to supplement the supply of the channels during those periods of the cultivating season when, the river failing, the channels are low.

2. The Government observe that, by the proposed improvedarrangements of the head works, a maximum supply will be secured in low freshes, or when the water in the river is below the crest of the anicut, and a perfect command be obtained over all the main irrigating ducts of the delta, and that the enlarged reservoir at Sarvapully will be made capable of holding upwards of 52 millions of cubic yards, which, with additions, from time to time when the river is high, will it is calculated, suffice to make good any deficiency of direct supply from the channels.

3. The project recommends itself as likely to be not only highly beneficial, but also most remunerative. The area stated to be commanded by the extension of the channels and under the influence of the tank is given in round numbers at 77,000 acres. Of this, after making what appears to the Government to be an extremely liberal deduction for land already under wet cultivation, and for waste and uncultivable tracts, about 25,500 acres will, it is confidently expected, be irrigated, yielding, at an assessment of Rupees 4 per acre as water-rate, a sum of Rupees 1,02,000 per annum. This is equivalent to a return of nearly 25 per cent.

4. Under these circumstances, the Superintending Engineer is authorized to proceed with the works from the allotment of Rupees 25,000 provided for the purpose in the Budget, and the Government will have much pleasure in recommending the project to the Government of India for sanction.

5. His Lordship in Council considers the manner in which the project has been prepared in a short time highly creditable to Mr. R. Smith.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R E,
Secretary to Government.

To the 15.
" Cont. Superintending Engineer, of the 2nd Division.
" Accountroller of Public Works Accounts.
" Revenue Dtant General.
" epartment.

Exd. S. T. Augustin.

PUBLIC WORKS DEPARTMENT,
FORT SAINT GEORGE,
20th June 1867.

No. 1,845.

No. 442.
To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
PUBLIC WORKS DEPARTMENT.

SIR,

IRRIGATION, No. 22.

1. I am directed to forward herewith plans and estimates, relating to the project for which a sum of Rupees 25,000* is provided in the current year's Budget, and having for its object a further development of irrigation in the Nellore District under the Pennair Anicut.

* Item No. 148.

2. The estimates provide for the following works :—

	RS.
Enlargement of head sluice near the anicut, construction of an auxiliary sluice, and deepening main feeder to the head of the Sarvapully channel	15,300
Construction of regulating sluices at the heads of the Jaffer Saib and Kistnapatam channels	4,720
Deepening Sarvapully New Cut, and enlarging and improving the old Ramareddy channel and masonry works as far as the 6th mile from head sluice	90,300
Construction of a new channel from 6th mile to the reservoir at Sarvapully	1,26,500
Conversion of the present Sarvapully tank into a main reservoir	1,14,000
Construction of branch channel from Sarvapully channel to the Idagally tank	33,440
Construction of channel to Wolluru tank	27,840

3. It will be observed that, by the proposed improved arrangements of the head works, a maximum supply of water from the river will be secured in low freshes or when the water is below the crest of the anicut, and a perfect command be obtained over all the main irrigating ducts leading into the delta, and that the enlarged reservoir at Sarvapully, being made capable of holding upwards of 52 millions of cubic yards, will be useful to maintain the supply of the channels when, the river being low, they would be in want of water.

4. The project now submitted, being a continuation of one which has fully realized the great expectations which were formed of it, offers fair promise of being highly useful and reproductive. It is expected to bring under wet cultivation 25,500 acres of land, which, at an assessment of Rupees 4 per acre as water rate, will yield Rupees 1,02,000 per annum, or a return of nearly 25 per cent. The details of the project have been very carefully considered, and as it is most desirable that

the execution of the work should be proceeded with without delay, His Lordship in Council has authorized its commencement from the Budget grant of Rupees 25,000. In expressing a hope that this proceeding will meet with the approval of the Government of India, I am to request the early sanction of that Government to the estimates, amounting to Rupees 4,12,100, in the aggregate.

I have the honour to be,
Sir,
Your most obedient servant,
(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

Exd S. T. Augustin

No. 17.

Supt. Engrs. Office 2nd Dn.
Masulipatam
3d May 1867.

From Lieutenant Colonel G. V. Winscom R.E.
Superintending Engineer 2nd Dn.

To Colonel Charles A. Orr R.E.
Secretary to Government
D. P. Works
Madras.

Sir

I have the honor to forward plans and Estimates as per margin, relative to a project for extending the irrigation from the Anicut across the Pennair at Nellore. amounting to Rs. 4,12,100.

Enclosures.
4 Surveys and Plans as per list attached.
7 Detailed Estimates
0 Abstract do
5. Specification Reports
1 Genl. Abstract Estimate
Synopsis of the general state of Pennair River from 1861 to 1865.
1 Statement of rise of do
1 Revenue Return.

× by baughy.

2 The Surveys and levels were commenced last year under my directions by R. Smith Esqr. Executive Engineer at Nellore, to whose able assistance I am indebted for much the greater portion of the labour involved in bringing forward the project. The arrangement of the details, the Calculations of the dimensions and discharges of the Channels, and the designs of most of the masonry works are his entirely. The Surveys and levels were made by Overseer Coppoosamy Raju

who has proved himself a very efficient Surveyor.

3rd. As I considered that the Channels hitherto executed in the Nellore District had been designed too much on the supposition that the Pennair was a Constant flowing River, instead of an Uncertain stream, having the Character of a Mountain torrent rather than of an even flowing river, I requested Mr. Smith to make the Channels Considerably in excess of what would have been necessary had it been otherwise. I enclose a Synopsis and a statement of the general state of the Pennair from 1861 to 1865 inclusive, from which it appears that on an average for only 61 days per Annum the water was flush with, or above the Crown of the Anicut. It is therefore evident that to fill the numerous tanks in the Delta so as to receive sufficient to supply 2 Cubic ft. per hour per acre, the Channels should be Capable of Conveying a very large quantity during the freshes, and those now projected accordingly have a Capacity sufficient to carry from 5 to 6 times the water which would be necessary if the lands were cultivated direct from the Channels.

4th The principal features in the present scheme are-

1st. The Enlargement of the Head sluices by lowering the existing sluices 2 ft. for 4 ft. of their breadth, and the Construction of an auxiliary sluice of 6 Vents of 3½ ft. each at the site of the old Head, which was closed some years ago. This is desirable, as otherwise the loss of Head during low freshes by Contracted Headways would considerably affect the supply.

2nd The deepening of the Main feeder 2 ft. in preference to widening it. The velocity generated will entail the necessity of pitching the side slopes with stone for about 3600 Jds. where sand is removed, but on account of the close proximity of the heavy banks already formed by the Excavation of the Channels and the desirability of obtaining a Maximum supply in low freshes or when the water is below the Crest of the Anicut, this has been Considered the expedient Course to adopt. The Estimated for these two improvements Amount to Rs. 15300-- 220 ft. per Minute

3rd The Construction of Regulating sluices at the heads of the Vaffoor and Kistnapatam Channels. By the aid of these structures and the regulating

sluice for the Surnapully and Wolaree branches in the 6th Mile perfect Command over all the Main irrigating ducts of the Delta will be obtained within a radius of 3½ miles from Vellore.

4th The deepening of the Surnapully new Cut, and the enlargement and improving of the old Rameredy Channel, and the Masonry works connected with it as far the 6th Mile from the Wd sluice. Estd Rs 90,500

5th The Construction of a new Channel from the 6th Mile, skirting the high ground by Kulloorpully, Bommichetty & Gogumudi to supply the Surnapully Reservoir with the necessary irrigation and drainage works. Estd Rs 126,000

6th The Construction of a Main Reservoir at Surnapully, by the enlargement of the present tank, which shall contain 52,580,000 Cyds of water. Mr Smith calculates that "after supplying all demands when the water is flush with the Crown of the Anicut, the Channels will be found sufficiently capacious to provide 1836400 Cyds daily which would enable the Reservoir to be filled in 28⅓ days excluding loss by Evaporation" and remarks "that as the direct daily supply can only be depended on for 61 days annually and as the Reservoir must supply any deficiency that may arise during the other 89 days. the total quantity during the period would be 95639400 Cyds of water or 9520600 Cyds less than the Reservoir would contain on being filled a second time each season".

7th The abandonment of the Yeapur Kamini Peddaparti and Tutti Tanks which after the Construction of the Surnapully Reservoir and the Wolaree Channel respectively will no longer be needed. Their beds can then be cultivated and the irrigated area considerably increased.

Estimate Rs 33440 8th The Construction of a channel from the Surnapully Channel to the Nagally Tank so that when water is available the opportunity may be taken to fill it in a short time by allowing its channel to flow 7 ft deep. A sluice has been provided for it to regulate the supply and prevent the water returning into the Channel.

Estimate Rs 27,840. 9th The Construction of an Irrigation Channel from the 6th Mile to Wollaree Tank and in continuation to near Gudiving & the Kundlairos river, irrigating the land as far as the Main drainage Channel.

10th The Conversion of the present supply Channel of the Surnapully Tank into a Main drainage, which on being extended

will effectually take off the water from the irrigated fields under the Survapully tank and the Wollusee Channel and relieve a Considerable tract of land now swamped.

Para 5 It may eventually be found that the supply is sufficient to justify an extension of the Channel from the Eadagali Tank in the direction of Trunk Road No 6. At first it was intended to Construct a high level Channel from near the present head of the Survapully branch which should have supplied all the tanks in the neighbourhood of Puddur, Budahali, Kulliwapulli &c but as those tanks already generally receive a fair supply from the Pottella and the expense would have been very great, I decided that the idea should not be further entertained as regards the present project.

6 In explanation of the necessity of the principal Masonry works which I have not yet noticed, I beg to add that the new Bridge proposed at Stonhouse pett is rendered imperative owing to the impossibility of lowering the floors of the present structure. An attempt was made some years ago to do this and the result was that the Arch became Considerably Cracked.

7 The surplus sluice in the 6th Mile is designed, to pass off into the main drains (alluded as the 10° Chief, feature of the scheme,) the local drainage of 18 square miles of Country that falls into the Survapully Channel at its junction with the old Nameredy.

8 The falls adjacent to the Pudiparti Yepuru Kamini and Tutti Tanks are designed to adjust the difference between the slopes of the Channel and the Country when the tanks are abandoned, otherwise the banks would suffer severely from Erosion.

9 The rates entered for the Masonry Works have been Carefully fixed by the Executive Officer with reference to the distance the Materials have to be Carried, and the style of work proposed.

10 The irrigable area under the present project, as shown by the Collector's statement attached, is 77121 acres of which 31633 are either watered already or are not fit for Cultivation from the remainder (45488 acres) however it is necessary in the absence of specific information to deduct a very large amount on account of land that, from various Causes, may not be available and I therefore propose Estimating the receipts on 25500 acres only. Allowing 4 Rs. per acre for water Cess and Excluding

the dry Cist which would be levied on waste to be brought under Cultivation, the Expenditure now Contemplated would secure a Revenue of 102000 Rs. per Annum i.e. 24.74 per Cent on the outlay. Under these Circumstances, I therefore lay the project before Government with great Confidence.

11 — Rs. 25,000 have been allotted in the Current Year's Budget (Item 148) and pending the formal sanction of the Govt. of India to the scheme I request permissions for the Executive Officer to spend a portion of the Money in Collection of Materials &c. so that the present working season may not be lost.

I have the honor to be
Sir
Your Most Obl. Servant

Geo. F. Wilcolle Lieut. Col. R.E.
Supt. Engineer 2d Division

7)

13

From
The Supg Engr
2d Divn
To The Secretary
to Govt of Pub
Madras
Dated 3d May/67
Recd
No 17
Encl 1000

Forwards for sanction Plans and Estimates relative to Sawapilly Project for Extending irrigation from the Penner Amount (amounting to Rs 412100) in Nellore Distt

Estimated Acreage available as marked down by Department Public Works under the Iruvapalle Project.

No.	Names of Villages	Deduct — Total area	Area reserved for Public Purposes	Area not fit for cultivation	Hill & garden area irrigated under the existing irrigation sources — Home or Government land on ordinary rates	Inam or Unfavorable tenures	Total	Remainder available under the Iruvapalle Project — Ordinary rates — Dry area	Hill & garden area	Probable assessment on average rate	Favorable or Inam — Dry area	Wet in cultivable Inam	Total — Area	Probable gross assessment	Remarks.
		Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Rupees	Acres	Rupees	Acres	Rupees	
	Gudiwada Taluq.														
1	Iruvapalle	29364	3887	71	2773	449	7,200	10376	3791	45,700	997	3988	15,164	49,688	The Department Public Works will have to Estimate the probable irrigable area under the project, with reference to the level of the channel & the surrounding country. The Collector has not sufficient details on the subject.
2	Inchepalle & Golagamudi	7813	820	3	182	24	1029	1336	446	11,662	4	16	1784	11,678	
3	Idagalle & Pakkalapalem	4349	1134	21	717	128	2,000	1685	458	6540	206	824	2349	7364	
4	Pedana	15648	3326	1156	2131	275	1908	7641	615	24768	494	1936	8740	26704	
5	Pedapadu	5113	82	4	588	147	797	4140	..	27945	176	704	4316	28649	
6	Penabaka	3066	115	.	862	148	1125	1399	549	12880	.	.	1941	12880	
7	Brahmadevam & Lingapalem	3418	669	.	1243	503	2415	714	161	3603	128	517	1003	4115	
8	Pallapadu & Pallavaram	2610	491	.	830	529	1850	220	164	868	376	1504	760	2372	
9	Paritipalle	2113	160	.	520	166	846	980	146	4740	141	564	1267	5304	
10	Idamapalle	2843	405	.	400	65	870	1371	585	6539	17	68	1973	6607	
11	Pedaogirala	4447	1031	.	675	197	1943	2116	403	7754	25	100	2544	7856	
		68784	12120	1251	10921	2651	26943	31978	7309	152999	2554	10216	41841	163215	
	Nellore Taluq.														
	Kanuparti Padu	3840	256	.	658	284	1179	2250	73	9087	321	1283	2644	10370	
	Kotipalle, Koluvalapalem, Madiraju Gudivada	4497	1746	.	1450	798	3494	537	322	10322	146	574	1703	10896	
		8337	2000	.	2108	582	4679	2787	395	19409	465	1857	36147	21266	
	Total	77121	14120	1751	13029	3233	31543	34765	7704	172408	3019	12073	45688	184481	

Nellore Collector's Office,
15th April 1861

Compd

Acting Collector

Examined
Asst Engineer D.P.W.

75

1867. Departmt. In a docket from the Ex. Collector of Nellore, to the Executive Engr. Nellore, dated 15th April 1867, Rec. 87. p. 1965/67

Estimated Average available as a marked down by Department Public Works, under the Farrapalli project.

Enclosure in letter No. 17 of 30 Dec 1867 to the Secy to Govt. of Mad.

(12)

Synopsis showing the General state of the Penmair from 1861 to 1865 inclusive

Years	Water 3 feet & upwards on Crest of Anikat	Water 2½ feet on Crest of Anikat	Water 2 feet on Crest of Anikat	Water 1½ feet on Crest of Anikat	Water 1 foot on Crest of Anikat	Water ½ foot on Crest of Anikat	Water flush with Crest of Anikat	Water ½ foot below Crest of Anikat	Water 1 foot below Crest of Anikat	
1861	2	.	4	6	12	5	32	10	21	
1862	10	2	11	5	12	2	40	7	11	
1863	1	1	4	5	9	1	26	1	21	
1864	11	1	4	4	5	5	25	21	22	
1865	11	5	5	4	9	2	27	21	25	
Total days	35	9	28	24	47	15	150	60	100	Flush with or above crest for 62 days only
Average during the 5 years	7	1 4/5	5 3/5	4 4/5	9 2/5	3	30	12	20	

Ex Engineer's Office
Camp Nellore
3rd April 1867.

[illegible] Lieut. Col. R.E.
Supt. Engineer 2d Dn.

[illegible]
Executive Engineer 1st or Nellore Range N.D.C.

79

Enclosure in
letter No 17 d/3d
May 186 to the
Secy to Govt
P.W.D.

P W 1965/67

Synapsis showing
the General State
of Penmaru
from 1861 to 1865
inclusive

Enclosure in letter No 17 d/ 3d May 1867 to the Secy to Govt D. P. W.

P W 1965/67

Statement showing the number of days in each year from 1861 to 1865 inclusive in which the Penner rose, to 3 feet and upwards above the crest of the Anicut, & fell to 1 foot below it

List of Surveys, plans &c of the Survapully Project to accompany Superintending Engineer's letter No. 17 d/ 3rd May 1867 to the Secretary to Govt D. P. W.

√ Survey of Main feeder: Survapully New Cut and portion of the old Ramereddi Channel	1
√ Survey of the Survapully Reservoir and Channels connected with it	1
√ Survey of the Vallurce Branch Channel	1
√ Sections of the present & proposed bund of the Survapully Tank	1
√ Sketch Map of the Delta	1
√ Plan of Auxiliary Head sluice	1
√ Plan of Regulating sluice at the head of Jaffersaile Channel	1
√ Plan of Bridge across Survapully Channel near Stonehouse pitt	1
Plan of Iron Aqueducts	1
√ Plan of Hd sluice for Wallaru Branch	1
√ Plan of Fall No 1	1
√ Plan of Regulator [illegible] Tank	1
√ Plan of Hd sluice for Survapully Branch	1
√ Plan of Surplus sluice	1
√ Plan of Aqueduct for Survapully Branch Chanl	1
√ General Plan of Bridges	1
√ Plan of Irrigation sluice No 1	1
√ Do Do No 2	1
√ Plan of Hd sluice for Ioagale Branch	1
√ Plan of Falls No 2	1
√ Plan of Fall No 3	1
√ Plan of Regulating sluice at the Ioagale Tank	1
√ Plan of Hd sluice for Ipinin and Pudiparti Branch	1
√ Plan of Escape for Survapully Reservoir	1
	24

Supt Engrs Office 2d Dec
Masulipatam
3d May 1867.

Geo Mmcom Lieut/ I V E
Supt Engineer 2d Dn

83

Guard Abstract Estate
were taken by [illegible]
3rd July 73.

AP

[illegible]
No 17 of 3rd May/67
to the Secretary
to Govt. D. P. Col.

P.W. 19/5/69
Pros: 20th June/67
L.D. 440

List of Plans
& Surveys on
of Surveyed
Projects

Specification to accompany the Plan and Estimate for Constructing the Auxiliary Head Sluice.

85

The Sluice will consist of 6 Vents 10' × 3½ feet. The front wings to be 26' in height for a length of 10 feet, and then decrease, by steps of a foot, for 16 feet measured horizontally which will reduce the height to 10'. The face walls to be 13'-7½" in height; the breadth at bottom and top being 5' and 2' respectively. The space between the face walls to be filled in with Concrete

The laterite at the site to be cut down to the required depth 29.49 feet; above the mean tide and the superstructure built on it; no masonry is necessary in the foundation.

The wings in rear to be built on the surface of the laterite, the height being on the average 10' and the mean breadth 3½

The Vents to be provided with Teak Shutters 4"×3"×11½ these will have a margin of iron 3"×½" on the inner face to reduce friction; the working gear will consist of a Screw 7/8 inch pitch, a horizontal Teak Beam 1 foot Square laid over the piers, through which the extremity of the Screw will pass and project 6" under the nut for elevating or depressing the screw An iron plate 9"×9"×1" will be let into the beam to a depth of ½ an inch. The nut to be worked by a moveable lever 24" inches in length. The Beam will be retained in its position by iron ties built into the masonry

The masonry to be of dressed

Caterite in Chunam.

Camp Halloo
3rd April 1867

[illegible]
Exe Engineer 1st or Halloo Bank

[illegible] Lieut Col R E
Supt Engineer 2d Div

Enclosure in letter No 17 d/ 3d May 1867 to the Secretary to Govt D. P. W.

3.

P W 19 Oct/67

Constructing an Axiliary Head Sluice Enlarging Old Channel & deepening the Main Feeder from the Existing Hd Sluice to the Head of the Sawapally Channel

Rs 15,300

Specification to accompany the Plan and Estimate for the Regulating sluice at the head of the Jaffersaile Chaul.

The sluice to Consist of 5 Vents of 6' span. The front Wings to be 13'-6" in height, the breadth at bottom and top to be 5' 4" and 1'-6" respectively. the foundations of pier to be laid at a depth of 4' the average breadth being 4'-3" and of abutments 6'. The rear Wings to be 13' in height at the abutments & 9' at the Returns. the average section at the former point being 3/4 and 2/2 at the latter, the foundation will have an uniform depth of 6', but the section will vary from an average thickness of 6½ at the abutments to 5 at the Returns.

The flooring in the bays to be inverts of 1½ in thickness resting on Concrete 1' foot thick. The flooring from the bays to the front and rear retaining walls will be 1½ in depth with a bed of Concrete 1' in thickness. The piers on the up stream side will project 3 ft to admit of small arches being turned to facilitate the working of the Shutters; these will Consist of teak

Flo...

planks $6\frac{1}{2} \times 3'' \times 13\frac{1}{2}'$. From iron bars varying from 4" to 2¼ in diameter to be fixed in each vent to strengthen the shutters and enable them to be worked easily. The Rubble apron in rear to be $35 \times 20 \times 2\frac{1}{2}$ that in front $58' \times 12' \times 1\frac{1}{2}$. The side slopes of the Channel, in rear of the sluice to be protected for a length of 20 by Rubble pitching. The whole of the Masonry to be built of dressed Laterite in Chunam. The floor of the Sluice to be 29.05 feet above mean tide; the level of this has been fixed 2' below the bed of the Channel, to enable it to be lowered 2', at any future time, should it be desirable to increase the discharge in the Jaffersaile's branch.

Supt. Engr's Office
Masulipatam.
30th April 1867.

Geo Hmiscoll Lieut Colt E
Supt Engineer 2d Dn

Enclosure in letter No 17 of 3d May 1867 to the Secretary to Govt. P.W. D. Madras

2.

Constructing a Regulating Sluice at the Heads of Jeffersonbe's & of Kistnapatam Channels

No 4720

P W 1965/67

Specification to accompany the Plan and Estimate for constructing a Bridge, over the Sarvapalli Channel, near Stonehousepetta.

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The Bridge to consist of 2 Arches of 30' span; the rise being 7½ feet; the flooring to be an invert with a versed sine of 1½ feet; the invert will rest on a bed of concrete 6" in thickness, The piers to be 5' in breadth at bottom with a batter of 6" on each side. the abutment to be 6' in thickness and 12' in height - The thickness of the arch to be 2¼ at the springing line, and 1½ at the crown - The wings to be 22' in height - the breadth at bottom being 8', which will be reduced by offsets on the inside, to 2'-2" at the top. The foundations of the wings to be 6' in depth the average breadth 10'. The foundations of the abutments and piers to be 6' in depth also - the average breadth of the former will be 8½ and that of the latter 7½. The foundations throughout to rest on a bed of good Concrete 1' in thickness. The wings to be set out with a radius of 66 feet. The whole of the masonry to be of dressed laterite in Chunam.

A. Smith
Executive Engineer
1st or Nellore Range

Ex: Engr's Office
Camp Nellore
3rd April 1867

Geo Minstrom Lieut Col R.E.
Supt Engineer 2d Dn

Specification to accompany the Plan and Estimate for the surplus sluice proposed for Constructing across the old Ramereddy Channel, adjacent to the Surrapully Branch Head sluice.

This sluice will Consist of 5 Vents of 2½' span, the height of the piers being 7'. This work has been designed to discharge the local drainage, brought into the Surrapully Channel, by the old Ramereddy, so this would be great in heavy rain, in the event of the Pallore Tank being full, provision has been made for dealing with a considerable surplus. The level of the floor to be the same level as the bed of the old Ramereddy at the site of the sluice, which is about 19.32 feet above mean tide, or 5' below the level of the bed of the Main Channel, immediately in front of it. The sluice when required to act will discharge with a considerable velocity, as the head will never be less than 6or7 feet. The front wings to be 17½' in height the average breadth being 6½', the foundations the 5½'' deep, with an average breadth of 8½. The rear wings to be 10' in height; the breadth at bottom and top being 3½ and 1½ respectively. the foundations to be 6' deep with an average breadth of 5¼''. The spandrils

to be filled in solid and a course of Masonry 1' in thickness to be built over these and the arches. The face falls to be 6⅔' in height the breadth at bottom and top being 3' and 1½' respectively. The space between the face walls to be filled in with Concrete. The Retaining walls will connect the wings front and rear, the section between the former will be as follows. depth 5½', breadth at bottom 4', and top 1½', the rear retaining wall to be 6' ft. with an average breadth of 3¼'. The front flooring between the Vents and retaining walls to be 1½' in thickness, resting on a bed of Concrete 9" in thickness. The rear Apron and the flooring between the vents to be 2' in thickness, the Concrete under the former to be 9" thick, the space under the flooring of the vents, to be filled in with Concrete. The shutters will be worked by a screw, the general arrangement being the same as the working gear for the shutter of the auxiliary Hd sluice. The whole of the Masonry to be built of dressed laterite in Chunam. The side slopes of the Channel in rear will be protected for a length of 20 yards by rubble pitching. Beyond the rear retaining wall there will be a rubble apron 16'-6" × 20' × 3'.

Supg Engrs Office 2d Dn
Masulipatam
30 April 1867

Geo. F. Innocent Lt Col R.E.
Supg Engineer 2d Dn

Enclosure in letter No 17 dated 3d May 1867 to the Secretary to Govt P.W.D.

8.

V W 1965/67

Deepening the Sarvapilly New Cut and improving Old Ramireddi Channel & the Masonry work connected with it

Rs 90,300

Specification to accompany the Plan and Estimate for the Head sluice of the Sarvapilly Branch Channel.

The sluice to consist of 8 Vents 6' span. The front wings to be 15' in height the breadth at bottom and top to be 5½' & 2' respectively; the foundations to be laid at a depth of 5½' the average breadth being 7'. The rear wings to be 14½' in height at the abutments and 10' at the Returns. the average section at the former point being 3⅝ and 2½' at the latter. the foundation will have the depth of 5½' at abutments and front wings 4½ at piers and 6 feet at rear wings and returns, but the section will vary from an average thickness of 6¾ at the abutments to 6½' at the Returns. Piers 4¾' at bottom 2½' at top on a bed of Concrete 6¼ in breadth and ¾ in depth. The flooring in the bays to be inverts of 1½ in thickness resting on Concrete 9" thick. The flooring from the bays to the front and rear retaining walls will be 1½' in depth with a bed of Concrete 9" in thickness. The piers on the up stream side will project 2½' to admit of small arches being turned to facilitate the working of the shutters, these will consist

of teak planks 6½" × 3" × 15 - Four iron bars varying from 4" to 2¼" in diameter to be fixed in each vent to strengthen the shutters and enable them to be worked easily - The rubble apron in rear to be 51½" × 20' × 2¼" The side slopes of the Channel, in rear of the sluice, to be protected for a length of 20' by Rubble pitching - The whole of the Masonry to be of dressed Laterite in Chunam and pointed with Chunam. The floor of the sluice to be 24.32 ft above mean tide -

Supr Engrs Office 2d Div
Masulipatam
30 April 1867

Geo Minchin Lieut Col RE
Supr Engineer 2d Div

Specification to accompany the Plan and Estimate for the Aqueduct proposed for Construction near Kannpartipadu.

This structure will carry the Survapully Branch Channel over the drainage, from the land in the vicinity of Kannpartipadu, and the surplus from the Kannpartipadu Tank. it will contain 4 Vents of 4' span, the piers being 3' in height, and 2½ in breadth. The abutments to be 3' in height with an average breadth of 3¼' - The foundations of the Piers and abutments to be 4' deep the breadth of the former at top and bottom 2½' & 4½ respectively the dimensions of the latter at the same points being 3½' & 5½' At the abutments the Wings will be 18' in height the breadth at bottom being 9' and at top 3'. this will be increased by a Carbel of 1' on each side to form a Roadway the Wings will be reduced in height by steps of 1' up and 2' on to 11' 6" and be carried at this height 11 feet making the total length 23½ feet. The outer faces of the Side walls to be plumb - the inner to be described with a radius of 14½ ft. The floor of the Aqueduct to be 20 in breadth at the level of the bed of the Channel and 28 at the Maximum water Mark - The floor

of the Aqueduct and the inner faces of the side wall for a height of 7' measured on the curve will have a coat of asphalte 1/2" thick.

The masonry to be of dressed laterite in Chunam.

Supt Engrs Office 2d Dn
Masulipatam.
30th April 1867

Geo. T. Wiscoll. Lieut Col R.E.
Supt Engineer 2d Dn

P W 1965/67

Specification to accompany the Estimate for Converting the Sarvapalli Tank into the Main Reservoir, for the Southern portion of the Pennar Delta.

The Embankment to be raised to 6' above future Tank level; the breadth at top being 6', with side slopes of 2 to 1; the interior to be protected, for a length of 5270 yards, by a Revetment of roughly dressed laterite, carefully packed at right angles to the slope; the thickness of the revetment at bottom to be 2', and at top (i.e. two feet above proposed full Tank level) 1 foot; in rear of the revetment there will be a gravel backing 6" in thickness.

The exterior slope of the work, and the portion of the interior, above the revetment to be well turfed.

The present Calingula to be closed and a new one constructed, adjacent to the village of Anikapalli; the Crest being 2' below Tank High water mark.

The five existing Sluices to be lengthened and improved. On the completion of the proposed new supply channel the old one will be closed by continuing the Tank bund to the high land at Anikapalli. In the event of the revetment, as planned, being considered too expensive a reduction of Rs 27,248 might be made by altering the interior slope of the bank from 2 to 1 to 1 to 1.

Executive Engineer's Office
Camp Nellore
3rd April 1867

A. J. Smith
Executive Engineer
1st or Nellore Range

Geo. T. Wiscoll Lieut Col R.E.
Supt Engineer 2d Dn

Specification to accompany the Estimate and Plan for the Escapes proposed for the Sawapallo Reservoir.

The length of the body to be 170 and flush with the Apron, the surface being 2' below the Intake Sill & high water mark; to retain the water to this level, the body will be furnished with 33 Cast Iron Ports 2' in height, and 68 Seat & Shutters (i.e. two for each vent) The front wings and Returns to be 6½ in height, the breadth at floor level being 2'6, and at top 1½; the batter being on the outer faces. The Rear Returns to be 3' in height with a breadth of 1'2 at floor level, and 1' at top, the batter being also on the outer faces. The Rear Returns to be connected by a retaining wall, 4' in depth, the breadth at bottom being 2'-3" and at top 15" the Apron to be, 12-0 in breadth and to Consist of Patrick on edge 1' in thickness, resting on a bed of Concrete 6" thick; it will Cover the entire space between the Body, Rear Wings, and Retaining wall.

In Rear of the Patrick Apron there will be one of Pebble 194 feet in length, 10 in breadth, and 1½ in thickness.

The foundations of the whole Structure to be

be 2' in depth, with the exception of those of the Retaining wall and rear returns, these will be laid at 4' below floor level. The Masonry to be of dressed Laterite in Cleman -

Ex: Engr's Office
Cuttack - Kistnachellam's choultry
24th September 1866
Despatched
3rd April 1867

Ex: Engineer 1st or Nellore Range

Commission Lieut Col RE
Supg Engineer 2d Dy

Specification to accompany the Plan and Estimate for the Ioagali Branch Channel Head Sluice

This work to be constructed at the Southern extremity of the Turnapalli Reservoir, adjacent to the site of the present Calingula, it will consist of 8 Vents of 3' span, the height of the piers to be 4' and the breadth 2½ - The front Wings to be 14¼ in height, the breadth at bottom and top being 5½' and 2' respectively - the rear Wings to be 8 ft in height with an average breadth of 2⅔' - The Wings in rear and in front to be connected by retaining walls; the rear one to be 5' in depth with an average breadth of 2½ the front retaining wall to be the same breadth but only to ¾' in depth - The flooring throughout to be 1½ in thickness with a bed of Concrete 1' thick - The face walls to be 7½' in height the bottom breadth being 3½' and the top 1½' - The space between the face walls to be filled in with gravel - The floor of the sluice

to be 11.59 ft. above mean tide. This sluice is designed to be capable of discharging the required quantity of water when there is but comparatively a small supply in the Reservoir.

The shutters to be worked by screws the general arrangement being the same as detailed for the auxiliary Hd. sluice.

The masonry to be of dressed laterite in Chunam and pointed with Chunam.

Geo Minnicolle Lnt Col. R.E.
Supr Engineer 2d Dn

Supr Engrd Office 2d Dn
Masulipatam
30th April 1867

C.W. 1965/67

Specification to accompany the General Plan for Bridges proposed for Construction across the Surnapully main Branch Channel.

The Bridge to Consist of 2 Arches of 15' span, the rise being 4'. The height of the pier and abutments to be 10', the former being 3' and the latter 5' in breadth. The arches to be 2' in thickness at the springing line, and 1¼ at the Crown. The floor to be an invert 1' in thickness with a versed sine of 1', the invert will rest on a layer of Concrete 9" thick. The Wings to be 16' in height at the abutments and 6' at the extremities. The depth of the foundation to be reduced by steps of 1' up and 2' or for a length of 16' and carried on this level 7½ making the total length 23½.

The road way to be 12' in breadth with Parapets of 3' in height.

The masonry to be of dressed laterite in Chunam and pointed with Chunam.

Supr Engineer's Office 2d Dn
Masulipatam.
30th April 1867

Geo Minnicolle Lieut Col. R.E.
Supr Engineer 2d Dn

Specification to accompany Plan No 2 /General/ for Irrigation sluices-

The Wings to be 7' in height; the breadth at bottom and top being 2½ and 1½" respectively - The barrel to be 6' in length and 1¼' in thickness, the inside diameter being 2'- 6½" it will rest on a bed of Concrete 9" in thickness - The barrel will be backed with Masonry, on each side to a height of 2'- 6" above Concrete level - The front Wings to be 8 in length measured at right angles to the face of the arch and set out with a splay of 2½ at the extremities - The Rear Wings to be also 7½" in length, described with a radius of 4¼" - There will be three retaining walls one under the shutter, the second at the opposite end of the barrel, and the third at the extremities of the Rear Wings the space between the second and third to be filled in with 2' of Rubble stone carefully packed immediately in front of the first retaining wall there will be a Rubble Apron 5 in length and 1½' in depth - The shutter to be

worked by a screw. The masonry to be of dressed Laterite in Chunam

Supt Engrs Office 2d Dn
Masulipatam
30th April 1867

Geo. Minnolle Lt Col R.E.
Supt Engineer 2d Dn

S.W. 19 Oct/64

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Specification to accompany the Plan and Estimate for the Spence and Pudiparte Branch Head Sluice.

The barrel to be oval, and 1¼' in thickness, the upper diameter being 4½' and the lower 3¼'; the sides to be described with a radius of 9'; the length of the barrel to be 9'; it will rest on a bed of concrete 1' thick; and be backed up by masonry on each side, for a height of 7¼ feet above concrete level - The front wings at the abutments will be 9' in height and at the extremities 4'; the rear wings will be the same height at the abutments but 5' at the extremities. The front wings to be 13½' in length measured at right

angles to the face of the work, and to be set out with a splay of 10' at the extremities, which will be connected by a retaining wall. The rear wings to be described with a radius of 11' and to be 18' in length measured perpendicularly from the face; the extremities to be connected by a retaining wall 5' in depth, with an average breadth of 2¼ feet. The flooring between the retaining walls and vent to be of laterite 1¼' in thickness, resting on a bed of concrete 1' thick. The shutters will consist of planks 5' x 3" x 10'; to facilitate the working of these and retain them in position 2 iron bars will be fixed across the vent. The masonry to be

67

of dressed laterite in chunam.

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Camp Nellore
3rd April 1867

[signature]
Ex Engineer Nellore Rmx

[signature] Lieut Col R E
Supt Engineer 2d Dy

Specification to accompany the Plan and Estimate for the Fall proposed for Construction near the Bramadavum Intl Tank.

The body wall to be 8' in height, the breadth at bottom and Crest being 4 3/4 and 3' respectively. The length of the body wall to be 4 3/4 in rear of the body wall a Cistern with Curved flank & 15' in length and 16 1/2 in greatest breadth to be Constructed to retain a depth of 4' of water, the flooring of the Cistern to Consist of 1 1/4' of Laterite and 9" of Concrete. The rear Wings to be Connected by a retaining wall 5' in depth, the breadth at bottom being 4 1/2", and 2' at the level of the flooring. The rear Wings to be 16 1/2 in height and the front 12' the average breadth of the former being 4'-1 1/2", and that of the latter 3'. A foot Bridge to be thrown over the Crest of the weir with a groove of 6" in it to admit of the Shutters being worked, and to prevent these getting Jammed, during the Working. 3 Iron bars will be built in, above the Crest of the Weir, at 1'-10" a part.

The Masonry to be of dressed

O W 1965/69

laterite in Chunam

Supr Engineer's Office 2d Dn
Masulipatam
30th April 1867.

Geo Minnis Colls Lieut Col R.E.
Supr Engineer 2d Dn

S W 1965/67

119

Specification to accompany the Plan and Estimate for the Regulator proposed for Construction near the Vallur Tanks.

The Regulator to consist of 2 Vents one 4' span, the other 11½". The front wings to be 6'-0" in height and 2' in breadth on the average; and returns is to be 6' in height and 2¼ in breadth on the average. There will be two retaining walls, on each Vent. The two vents to be connected by a curved wall as shown in plan. Each sluice will be adopted to carry a stone Bridge for foot passengers. The planks for regulating the supply of water will be fitted immediately in front of the Bridges; and two iron bars will be built in, across each Vent, to guide the planks, and retain them in position. The Masonry to be of dressed laterite in Chunam. The front and rear Aprons to be of packed rubble 1½" & 2' thick respectively with revetted slopes.

Supr Engineer's Office 2d Dn
Masulipatam
30th April 1867

Geo Minnis Colls Lieut Col R.E.
Supr Engineer 2d Dn

P.W. 1965/67

Specification to accompany the Plan and Estimate for the Vallur Branch Head Sluice

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The front wings to be 14'-3" at the abutments and 4¼ at the extremeties, the average breadth of the former being 3½ and that of the latter 1½. The front wings to be Connected by a retaining wall 5' in depth, the breadth at bottom being 4', and at floor level 1½; between this retaining wall and the vents there will be a floor of laterite 1¾ in thickness, and a bed of Concrete 9" thick. The flooring in the bays to Consist of 2' of laterite and 9" of Concrete; the flooring between the bays and the rear retaining wall to be of like section. The sluice will have 3 vents of 2½ span; the height of the piers being 5½. The face walls to be 6⅙ feet in height with an average breadth of 2¼'; the space between the spandrels to be filled in with concrete. The rear wings to be 14' in height at the abutments, and 9' at the extremities, these will be connected by a retaining

wall 6' in depth with an average breadth of 2¾. The side slopes of the channel in rear will be pitched for a length of 20 feet. Beyond the rear retaining wall there will be a rubble apron 20'×8'×2½. The length of the floor to be 24.32 feet above mean tide —

The shutters to be worked by screws.

The masonry to be of dressed laterite in chunam.

Camp Nellore
3rd April 1867

[signature]
Ex Engineer Nellore Rent

[signature] Lieut Col R E
Sup Engineer Dr Dr

P W 1965/67
20th June/67 No. 1844 & 1845

Detailed Estimate No. 1 of 186 -6

1st or Nellore Range.

District Nellore—Taluq Pennaru Delta

Work Constructing an Auxiliary Head Sluice, enlarging old Channel and deepening the Main Sluice from the existing Head Sluice to the head of the Sarvapally Channel

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number	Cubical Contents	Rates per Cycle
	Feet	Feet	Feet		Feet	
Head Sluice						
Enlarging old Channel						
Laterite Cutting	30	42	2	1	2520	" - 8 - "
Clearing silt	30	31	3⅔	1	3410	" - 1 - 6
Laterite Cutting	26	42	2	1	2184	" - 8 - "
do do	27	23	2	1	1242	" - 8 - "
do do	26	11	17¾	1	5076½	" - 8 - "
Earthwork	26	11	8	1	2288	" - 1 - "
Clearing silt	53	23	3⅔	1	4469⅔	" - 1 - 6
Removing & Repacking Laterite Revetment	27	1½	8	1	324	" - 8 - "
Laterite Cutting	45	24¼	2	1	2182½	" - 8 - "
do do	45	1¾	15½	1	1220⅝	" - 8 - "
Earthwork	45	1¾	10¼	1	807 5/16	" - 1 - "
Clearing silt	45	24¼	3	1	3273¾	" - 1 - 6
Removing & Repacking Laterite Revetment	45	1½	10¼	1	691⅞	" - 8 - "
Laterite Cutting	45	26	2	1	2340	" - 8 - "
do do	22	17½	½	1	192½	" - 8 - "
Clearing silt	45	26	3¾	1	4387½	" - 1 - 6
Laterite Cutting	90	26	2	1	4680	" - 8 - "
Clearing silt	90	27	3⅔	1	8910	" - 1 - 6
Laterite Cutting	145	26	2	1	7540	" - 8 - "
Clearing silt	145	27	3⅔	1	14355	" - 1 - 6
Removing Bund	27	92	13⅚	1	34362	" - 1 - 6

Demolishing Bridge over old Supplying Channel and clearing the latter out underneath it

Connecting existing and proposed Head Sluices by a Parapet wall

Foundation	276	2½	3	.	2,070	
Wall above	276	1½	3	.	1,242	
Total Cubic feet of Laterite in Chunam					3,312	
Lowering floor of Head Sluice						
Laterite Cutting					80	1-4
Altering Shutters						
Deepening Main Feeder						
Laterite Cutting	1,000	52	2	.	104,000	1-8
Earthwork	1,000	20	1½	.	30,000	1-16
do	1,000	34	1	.	34,000	1-16
do	1,000	40	1	.	40,000	1-16
do	900	75	3	.	202,500	1-16
do	900	30	1½	.	40,500	1-16
Rubble Pitching	900	23	1½	2	62,100	1-2
Gravel backing	900	23	1	2	41,400	1-8
Compensation for land						

P W 1965/67

Detailed Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore—Taluq

Work Constructing an Auxiliary Head Sluice Adjacent to the Anikat Pennair Delta

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents
Concrete	35 1/6	14	12 5/8	.	6,215 11/24
			Total		6,215 11/24
Abutments	23 1/7	4	10	2	1880
Piers	27/3	2½	10	5	3416 2/3
Caps	2½	2½	2 1/6	5	67 17/24
Skew backs	23	2½	½	5	143 3/4
do	23	4	½	2	92
Spandril	41½	23	¾	.	715 7/8
Face walls	41½	3½	13 5/8	2	3958 1/16
do	41½	2	13 5/8	.	1130 7/8
Side Walls	23½	3 1/6	12 5/8	2	1879 1/48
Portion of Cut waters	2 1/6	2 1/6	16	5	375 5/9
Front Wings	10	6½	26	2	3380
do	15	5	18	2	2700
do	10	3½	10	2	700
Rear Wings	26	3½	10	2	1820
String Course	124	¼	¾	.	23¼
Parapet	200	1½	3	.	900
Arch Work	23	5¾	1½	6	1190¼
			Total		24,373 1/12
Pointing Sq. ft.					87
Earth Work Cyd.					1248
Metalling Cyd.					66 2/3

Teak Wood Beam Cft.					35½
Teak Wood Shutters with working gear					1
Centering					
Sundries					

J W 1965-67

Detailed Estimate No 40 of 1867-68

for Nellore Range Nellore District

Work Deepening the Sarvapally New Cut and improving the Old Ramweddy Channel

Pennair Delta

Numbers of Cross sections	Particulars of Work	Measurements: Length	Breadth	Height or Depth	Number	Cubical Contents	Work to be executed: Cutting	Banking	Rubble Pitching	Gravel backing	Turfing	Rate per cyd.
		Feet	Feet	Feet		Feet	Feet	Feet	Feet	Feet	Feet	
1	Cutting	660	68	10	1	448,800						
	Deduct present work	660	73	5	1	240,900	207,900	"	"	"	"	" 1 6
	Cutting	660	25	1	1	"	16,500	"	"	"	"	" 1 "
	do	660	14	2	1	"	18480	"	"	"	"	" 1 "
	Turfing	660	25	"	1	"	"	"	"	"	16,500	" 1 4
	do	660	14	"	1	"	"	"	"	"	9,240	" 1 4
	Rubble Pitching	660	23	1½	2	"	"	"	45,540	"	"	1 2 "
	Gravel backing	660	23	1	2	"	"	"	"	30,360	"	" 8 "
	Cutting	1,320	68	10	1	897,600						
	Deduct present work	1,320	77	5	1	508,200	389,400	"	"	"	"	" 1 6
	Cutting	1,320	13	3	1	"	51,480	"	"	"	"	" 1 "
	Turfing	1,320	13	"	1	"	"	"	"	"	17,160	" 1 4
	Rubble Pitching	1,320	23	1½	2	"	"	"	91,080	"	"	1 2 "
	Gravel backing	1,320	23	1	2	"	"	"	"	60,720	"	" 8 "
	Cutting	1,320	68	10	1	897,600						
	Deduct present work	1,320	59	4	1	311,520	586,080	"	"	"	"	" 1 6
	Rubble Pitching	1,320	23	1½	2	"	"	"	91,080	"	"	1 2 "
	Gravel backing	1,320	23	1	2	"	"	"	"	60,720	"	" 8 "
	Cutting	165	68	10	1	112,200						
	Bridge of 2 Arches											
	Cutting	1,155	68	10	1	785,400						
						897,600						
	Deduct present work	1,320	77	4½	1	457,380	440,220	"	"	"	"	" 1 6
	Rubble Pitching	1,290	23	1½	2	"	"	"	89,010	"	"	1 2 "
	Gravel backing	1,290	23	1	2	"	"	"	"	59,340	"	" 8 "
5	Cutting	462	68	10	1	314,160						
	Iron Aqueduct piers to be demolished & rebuilt											
	Cutting	858	68	10	1	583,440						
						897,600						
	Deduct present work	1,320	74	4¾	1	463,980	433,620	"	"	"	"	" 1 6
	Cutting	1,320	15	2	1	"	39,600	"	"	"	"	" 1 "
	do	1,320	13	1½	1	"	25,740	"	"	"	"	" 1 "
	Turfing	1,320	15	"	1	"	"	"	"	"	19,800	" " 10
	do	1,320	13	"	1	"	"	"	"	"	17,160	" " 10
	Rubble Pitching	1,308	23	1½	2	"	"	"	90,252	"	"	1 2 "
	Gravel backing	1,308	23	1	2	"	"	"	"	60,168	"	" 8 "
6	Cutting	814	63	10	1	512,820						
	Iron Aqueduct to be substituted for Syphon											
	Cutting	506	63	10	1	318,780						
						831,600						
	Deduct present work	1,320	70	3¾	1	346,500	485,100	"	"	"	"	" 2 "

Cutting	1,320	7	1½	1	"	13,860	"	"	"	"	"	1	"
do	1,320	8	1½	1	"	15,840	"	"	"	"	"	1	"
Laterite Cutting	1,320	63	10	1	831,600								
Deduct present work	1,320	64	4	1	337,920	493,680	"	"	"	"	"	4	"
Cutting	1,320	7	2	1	"	18,480	"	"	"	"	"	2	6
do	1,320	4	2	1	"	10,560	"	"	"	"	"	2	6
Laterite Cutting	374	54	10	1	201,960								
Iron Aqueduct to be substituted for Syphon													
Cutting	187	54	10	1	100,980								
Bridge Floor to be lowered													
Cutting	759	54	10	1	409,860								
					712,800								
Deduct present work	1,320	64	4½	1	380,160	332,640	"	"	"	"	"	4	"
Laterite Cutting	1,320	54	10	1	712,800								
Deduct present work	1,320	57	4¾	1	319,770	393,030	"	"	"	"	"	4	"
Cutting	1,320	7	1	1	"	9,240	"	"	"	"	"	4	6
do	1,320	4	2½	1	"	13,200	"	"	"	"	"	1	6
Cutting	396	54	10	1	213,840								
Iron Aqueduct to be substituted for Syphon													
Cutting	924	54	10	1	498,960								
					712,800								
Deduct present work	1,320	55	4½	1	326,700	386,100	"	"	"	"	"	2	"
Cutting	1,320	4	1	1	"	5,280	"	"	"	"	"	1	6
do	1,320	4	1½	1	"	7,040	"	"	"	"	"	1	6
Cutting	1,320	54	10	1	712,800								
Deduct present work	1,320	45	4⅝	1	257,400	465,400	"	"	"	"	"	2	"
Cutting	1,320	9	1½	1	"	17,820	"	"	"	"	"	1	6
do	1,320	7	1½	1	"	13,860	"	"	"	"	"	1	6
Cutting	1,320	56	10	1	739,200								
Deduct present work	1,320	55	4½	1	326,700	412,500	"	"	"	"	"	4	"
Cutting	1,320	9	2	1	"	23,760	"	"	"	"	"	2	6
do	1,320	8	½	1	"	5,280	"	"	"	"	"	1	6
Cutting	1,320	56	10	1	739,200								
Deduct present work	1,320	41	4	1	216,480	522,720	"	"	"	"	"	1	6
Cutting	1,320	14	¾	1	"	13,860	"	"	"	"	"	1	"
do	1,320	15½	1½	1	"	30,690	"	"	"	"	"	1	2
Cutting	1,320	56	10	1	739,200								
Deduct present work	1,320	56	3¾	1	277,200	462,000	"	"	"	"	"	1	6
Cutting	1,320	7	1½	1	"	13,860	"	"	"	"	"	1	2
Turfing	1,320	26	"	1	"	"	"	"	"	"	34,320	"	4

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Detailed Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq Delta

Work (constructing) Pungar Bridge of 2 arches across the Sarawaripalli Channel near Stonehouse pet—

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents
Concrete—Abutments	35 1/6	11 1/2	1	2	808 5/6
Piers	35 1/6	10 1/2	1	1	369 1/4
Wings	31	13	1	4	1612
RR Retaining wall	26	6	1	4	624
Inverts	28 1/2	28	1/2	2	798
Spandril	16 2/3	18	2	1	600
				Total	4812 1/12
Foundation—Abutments	32 1/6	8 1/2	6	2	3281
Piers	32 1/6	7 1/2	6	1	144 1/2
Wings	31	10	6	4	7440
RR Retaining wall	28	3 1/2	5 1/2	4	2156
Superstructure—Abutments	29 2/3	6	12	3	4272
Piers	29 1/6	4 1/2	12	1	15/5
Strong Courses	12 6	1/4	1/2	"	15 1/2
Cappings	3 5/6	4	3 5/6	2	117 5/9
Do	4 1/3	5	4 1/3	2	187 7/9
Key bricks	21	4	1	1	84
Do	21	5	1 5/6	2	385
Backing to arches	21	10	1 1/2	2	630
Wings	31	5 1/12	22	4	1086 1/3
Spandril	21	6	2 1/2	1	315
	30	2 1/6	2 1/2	"	162 1/2
Face Wall	14	3 1/3	4 1/2	"	210
	66	3 1/3	4 1/2	"	990
	144 2/3	1 1/2	1 3/4	2	759 1/2
Parapets	144 2/3	1	1 3/4	2	506 1/3
	2	2	3 1/2	4	56
				Total	38454
Cornice Work	Remaining Item				300

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Arch Work	39	21	1 7/8	2	3071 1/4
	31	27	1	2	1674
				Total	4745 1/4

Pointing	Sqrs	102 1/2
Excavation	Cyds	1540
Metalling	Cyds	15
Guard Stones		4
Centering		
Baling		
Sundries		

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Detailed Estimate No. 40 of 186 -6

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1st or Nellore Range.

District Nellore—Taluq Pennar Delta

Work Deepening the Sarawapalli New Cut and improving the Old Ramireddi Channel

Masonry Works

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents
Demolishing and Rebuilding Iron Aqueduct Piers					
Foundation to Piers	17	5	5	4	1700
Piers above	16	3	11	4	2112
Total Cubic feet of Laterite in Chinam					3812
Demolishing existing Piers					
Scaffolding, shoring & Sundries					
Baling water					
Substituting Iron Aqueduct for Syphon No 1					
Foundation to abutments	7	4	3	2	168
Do to Wings	17 1/2	4	3	4	840
Do to Piers	9 1/4	4	3	4	444
Abutments above	7	2 1/2	4	2	140
Wings do	17 1/2	2 1/2	6	4	1050
Piers do	8 1/4	3	11 5/6	4	1171 1/2
String Course	3 1/2	3 1/2	2/3	8	65 1/3
Between beams	1 1/3	3	2/3	4	10 2/3
Caps	3	2 5/8	2	8	126
Skew backs	7 1/2	2	1/4	4	30
Backing to arches	2	1/2	1/4	4	1
Face walls	7	1	1/2	4	14
Parapets	7	3/4	3/4	4	15 3/4
Arches	7 1/2	4	3/4	2	45
Total Cft. of Laterite in Chinam					4121 1/4
Running feet of sheet Iron trough Complete					80
Pointing Sqrs					12 1/2
Teak Girders	15 1/5	4"	8 1/2	6	21 37/60
do do	15 7/10	4"	8 1/2	4	14 169/360
Total Cft. of Teak Wood					36

Excavating Foundation					
Baling					
Syphon No 2 Same as No 1					
Lowering floor of Krishnapatnam Road Bridge					
Rocky Cutting	24	44	3½	1	3696
or Cubic Yards					137
Syphon No 3 Same as No 1					
Converting Bridge across head of Krishnapatnam Channel into a Head Sluice for that Branch					
Foundation Piers	15¼	4	4	3	732
Do	6	4	4	2	192
Retaining wall	30	2½	4	2	600
Above Piers	8⅝	3	10	3	776¼
Do	5⅝	3	8	5	675
Arch	3	7½	1	4	90
Skew backs	3	2½	½	5	18¾
Spandrils	30	3	½	"	45
Flooring	30	1½	1½	"	67½
Do	21	6	1½	"	189
Do	21	4½	1½	"	141¾
Total Cft of Laterite in Chunam					3527¼
Pointing Sqrs					13¼
Iron bars Running feet					54
Teak Shutters	4	5¾	3"	12	69
Total Cft of Teak Wood					69
Excavation Cyds					95
Baling					
Centering & Sundries					

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Detailed Estimate No. 4 of 186 -6-

1st or Nellore Range.

District Nellore—Taluq

Work Constructing an Irrigation Sluice Vide Permair Delta Plan No 1

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number	Cubical Contents
	6 17/24	8½	¾	"	43 57/192
	1½	4½	1	"	6¾
Concrete	15	4¾	1	2	142½
	12½	4½	1	2	112½
			Total		305
Barrel	10	8	1¼	1	100
Retaining Wall	2	2¼	4½	1	20¼
Front Do	1	2¼	4½	1	10⅛
Foundation Front Wings	13	2¾	4½	2	321¾
" Rear Do	10½	2½	4½	2	236¼
Above Front Do	12	1-5¼	3½	2	120¾
Rear Do	9½	1½	4	2	114
Front Face wall	3-9½"	1¼	3¾	1	17¾
Rear Do	3-9½"	1¼	1¾	1	3¼
Parapets	3-9½"	¾	¾	1	2⅛
			Total		951
Rubble stone (Laterite)	10	7	1½	"	105
	7	3¼	2	"	45½
					150½ or
			Cyds		5½
Pointing Sqrs					3
Excavation Cyds					129
Teak Beam Cft					11/16
Shutter with working gear					
Baling					
Sundries					

Detailed Estimate No. 4

1st or Nellore Range

District Nellore Taluq

Pennair Delta.

Work Constructing a Surplus sluice adjacent to the Surrapulli Branch Head sluice across the old Nameraddy Channel.

Particulars of Work	Measurement: Length	Breadth	Height or Depth	Number	Cubical Contents
Concrete Abutments	$10\frac{3}{4}$	7	$\frac{3}{4}$	2	$112\frac{7}{8}$
Piers	$24\frac{1}{2}$	20	$\frac{3}{4}$	1	$367\frac{1}{2}$
Front Wings	41	$10\frac{3}{4}$	$\frac{3}{4}$	2	$361\frac{1}{8}$
Rear Do	21	9	$\frac{3}{4}$	2	$283\frac{1}{2}$
Returns	19	$7\frac{1}{2}$	$\frac{3}{4}$	2	$213\frac{3}{4}$
Rear Retaining wall	$12\frac{1}{2}$	6	$\frac{3}{4}$	"	$56\frac{1}{4}$
Front Do	$36\frac{1}{2}$	5	$\frac{3}{4}$	"	$136\frac{7}{8}$
Front Flooring	$26\frac{1}{4}$	$7\frac{1}{4}$	$\frac{3}{4}$	"	$142\frac{47}{64}$
Rear Do	$20\frac{3}{4}$	17	$\frac{3}{4}$	"	$264\frac{9}{16}$
Below flooring between piers	16	$\frac{3}{4}$	3	5	180
Spandril	$29\frac{1}{2}$	6/8	$5\frac{2}{3}$	"	$1023\frac{43}{48}$
				Total	$3143\frac{13}{192}$
Foundation Abutments	$10\frac{3}{4}$	$5\frac{3}{4}$	6	2	$741\frac{3}{4}$
Piers	$24\frac{1}{2}$	$17\frac{3}{4}$	6		$2609\frac{1}{4}$
Frong Wings	$39\frac{7}{8}$	$8\frac{1}{2}$	$5\frac{1}{2}$	2	$3728\frac{5}{16}$
Rear Do	22/8	$6\frac{3}{4}$	6	2	$1792\frac{1}{8}$
Returns	$16\frac{3}{4}$	$5\frac{1}{4}$	6	2	$1055\frac{1}{4}$
Rear Retaining wall	$14\frac{3}{4}$	$3\frac{1}{4}$	6	"	$287\frac{5}{8}$
Front Do	$38\frac{3}{4}$	$2\frac{3}{4}$	$5\frac{1}{2}$		$586\frac{3}{32}$
Superstructure. Abutments	$10\frac{3}{4}$	$4\frac{1}{2}$	7	2	$677\frac{1}{4}$
Piers	$14\frac{1}{4}$	3	7	4	1197
Caps	$1\frac{3}{4}$	3	$1\frac{3}{4}$	4	$36\frac{3}{4}$
Skew backs	$10\frac{3}{4}$	3	$\frac{1}{4}$	4	$32\frac{1}{4}$
Front Wings	39	$4\frac{1}{8}$	$17\frac{1}{2}$	2	$5630\frac{5}{8}$
Coping	$39\frac{1}{4}$	2	1	2	157

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Rear Wings	25	3¼	13¾	2	2234⅜
Coping	25	2	1	2	100
Returns	15	2½	10	2	750
Coping	15½	2	1	2	62
Backing to Arches	10¾	3¾	2½	2	201 9/16
Spandril	10¾	3	1¾	4	225¾
Flooring over Arches	32½	10¾	1	"	349⅜
Side walls	32½	2¼	6⅔	2	975
do	6⅛	1½	5⅕	2	104⅛
Front flooring	33½	13½	1½	"	678⅜
Rear do	24¾	23	2	"	1138½
Flooring between Piers	10¾	2½	2	5	268¾
Parapets	28	1	1	2	56
					25675 3/32
Dowel for Centres	16	¾	3	5	180
					25495
Arch Stone	10¾	5½	1½	5	443 7/16
Pointing Squares					56
Rubble stone (Laterite)	16½	20	3	4	990
	20	17	2	2	1360
					2350
				Cy.s	87 27
Excavation	Cy.s ½				
Pretalling	do				959
Teak wood Beams	28	1	1	"	8
Shutters	3	3"	9	5	28
Balin					
Centring					
Sundries					

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Detailed Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore—Taluq Palla

Work Excavating the Narrapally Channel and constructing the necessary irrigation and drainage works connected with it

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents	Rate.
	Feet	Feet	Feet		Feet	
Head Sluice						
Cutting	1320	56½	8¼	1	242385	" -1- "
Lining (B.P.)	1320	115½	2	2	609800	" -1-3
Backing do	1320	56	"	2	147840	" - - 4
Turfing	264	64	1	2	33792	" -1- "
Pointing	264	32	5/8	1	4976	" -1- "
Cutting						
Aqueduct						
Cutting (Earthy gravel)	3696	34¼	7¾	1	98105	" -2- "
2nd Mile Cutting Gravel Loam & Laterite	6833	34½	8	1	188508	" -3- "
Cutting do do	1297	42½	7½	1	38662	" -3- "
Bridge of 2 Arches						
Cutting Laterite, Gravel & Loam	2310	36⅓	9⅚	1	825311	" -3- "
Cutting do do do	990	36⅓	9⅚	1	363705	" -3- "
3rd Mile Cutting do do do	5280	43	8	1	1816320	" -3- "
4th Mile Cutting	1620	43⅔	8⅔	1	613080	" -2- "
Bridge of 2 Arches						
Cutting	3663	43⅔	8⅔	1	1385106	" -1- 6
5th Mile cutting	2310	42½	7½	1	726703½	" -1- 9
Cutting Loam & Gravel	2970	41¼	6¾	1	836983	" -1- 6
6th Mile Cutting stiff clay & Laterite	2310	43½	8½	1	804632	" -3- "
Bridge of 2 Arches						
Cutting stiff clay & Laterite	1650	43½	8½	1	574624	" -3- "
Cutting Laterite & hard Gravel	660	37½	11	1	272250	" -4- "
Cutting do do	660	38	11½	1	288420	" -4- "
7th Mile Cutting	4290	36	8½	1	1276275	" -4- "

Detailed Estimate No 4
for Nellore Range
District Nellore Valley
Pennair Delta

Work Constructing a Headsluice for Swarnpully Branch

Particulars of Works

		Length	Breadth	Height or Depth	Number	Cubical Contents
	Brigge of 2 Arches					
	Cutting Puttu and hard Ground	990	36	8½	1	2,140·25 c.ft
	8th Mile Cutting Puttu and Ground	2012	35¼	8¾	1	6,205/6¼ c.ft
	do do	11400	31⅓	4·8	1	21,202 2/3 c.ft
	12 Distributing Channels					
	Compensation for land					
	11 Irrigation Sluices as per Plan No 1					
	1 do do as per Plan No 2					
	Bund across Anikapallic Vank supplying Channel and Valley					
	Drainage Channel from Channel to Old Channel by Channel					
	Drainage Channel from near Anikapally to Pottempasu Swamp					
	Cutting	2640	36¾	8½	1	824,625 c.ft
	do	1320	37½	9	1	445,500 c.ft
	do	1640	34½	7	1	326,060 c.ft
	Total Cubical of Cutting					1666,233
	or Cubical Yards					61712 6/27
	Deepening & Improving old Drain from the Pottempasu Swamp to near the Village of Darbalamettu					
	Cutting	2260	33	6	1	64,548 c.ft
	do	3360	30	4	1	403,200 c.ft
	do	3050	28½	3	1	260,775 c.ft
	Total Cubical of Cutting					1309,458
	or Cubical Yards					48498 1/3
	Surplus Channel from Swarnpally Reservoir Escapes Main Drain					

Concrete —

Abutments	11	8¼	¾	2	136⅛
Piers	19¼	6¼	¾	7	631 5/8
Front Wings	29	8¼	¾	2	358 7/8
Rear do	29	9⅜	¾	2	307 13/16
do Returns	11	8	¾	2	132
Front Retaining Wall	94	5	¾	1	352½
Rear do	55½	5	¾	1	208⅛
Inverts	9½	5½	¾	8	313½
Front flooring	73½	19½	¾	"	1074 15/16
Rear do	64	21½	¾	"	1032
Spandrils	29¾	5½	1½	"	245 7/16
				Total	4792 15/16

Foundation —

Abutments	11	5¼	6	2	693
Piers	12½	3⅝	4½	7	1378 6/8
do Front portions	4⅜	3⅝	4	7	444 1/16
Front Wings	28	6¼	5½	2	1617
Rear do	29	5⅞	6	2	2044½
do Returns	10½	5	6	2	630
Front Retaining wall	95	2½	5½	"	1187½
Rear do	54	2½	6	"	810

Superstructure — Abutments 11 3¾ 10 2 825
Piers 11½ 2½ 9 7 1811¼
do Front portion 4 2½ 9½ 7 665
Caps 31½ 2½ 2⅗ " 187
Spandrils 11 2½ ¼ 7½ 48⅛
Front Wings 28 2 7/8 9¾ 1541

Coping	28 1/4	2 1/2	1	2	141 1/4
Rear Wings	29	3 1/16	12 1/2	2	2280 5/16
do Returns	10 1/2	2 1/2	10	2	525
Coping with the returns	38	1 1/2	1	2	114
Front flooring	73 1/2	19 3/4	1 1/2	"	2177 1/16
Rear do	64	22	1 1/2	"	2112
Face walls	66	2 3/4	1 1/2	2	544 1/2
Backing to Arches	11	3	1/2	2	33
Blocking Courses	70	1 1/4	1	2	175
Parapets	69 1/2	3/4	1	2	104 1/4
				Total	22028 7/16
Arch Work	9 1/2	9	1 1/2	8	1026
	1	9	1 1/2	8	108
	9 1/2	6 1/2	1 1/2	8	741
				Total	1875
Pointing Spaces					95 1/4
Rubble stone Cutwater	51 1/2	20	2 1/4	1	2317 1/2
	20	17	2	2	1360
					3677 1/2 cy
				Cyds	136 11/54
Earth Work Cyds					1650
Teak wood Shutters	6 1/2	3"	15	8	195
Installing Cyds					16 1/3
Imbarso Rft					240

Paling
Centering
Sundries

per Memo 10/6/69

Detailed Estimate No 24
1st or Nellore Range
District Nellore Taluq
Pennair Delta
Work Constructing an Irrigation Sluice Vide
Plan No 2.

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Particulars of Works	Measurement Length	Breadth	Height or depth	Number	Cubical Contents
Concrete	4 3/4	8 1/24	3/4	"	28-7 1/2
	9 1/2	5 1/8	1	2	97-4 1/2
	8 1/2	4 3/4	1	2	80-9
	4	4 1/2	1	1	18-0
				Total	224-9
Dwarf	6	12	1 1/4	1	90-0
Front Retaining wall	2	1 3/4	3 1/2	1	12-3
Rear do	1 3/4	1 3/4	3 1/2	1	10-9
do	4	2	4 1/2	1	36-"
Foundation. Front Wings	8 1/2	2 3/4	4 1/2	2	210-4 1/2
Rear do	7 1/2	3 1/8	4 1/2	2	210-11
Above Front Wings	8	1 1/2	4 1/2	2	108-0
Coping	8 1/4	2	3/4	2	24-9
Rear Wings	7	1-9 3/4	5 1/2	2	139-7
Coping	7 1/4	2	3/4	2	21-9
Face walls	5 1/24	1 1/2	3 1/2	2	52-11
Parapets	5 1/24	1	1/2	"	5-0 1/2
				Total	922-4
Deductions for Retaining walls	2 3/4	1/2	1 1/4	"	1-9
				Net Cubic ft	920-6

Pointing Squares					$3\frac{1}{4}$
Rubble stone Laterite	5	$4\frac{1}{4}$	$1\frac{1}{2}$		32
	$4\frac{1}{4}$	6	2		51
			Total		83
				Cyds	$3\frac{2}{27}$
Earth work Cyds					100
Teak wood Beams Cft					$2\frac{17}{32}$
Shutting with working gear etc					1
Baling					
Sundries					

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Detailed Estimate No 4
1st or Nellore Range
District Nellore Talu q
Pennair Delta
Work Constructing an Aqueduct near Kanumparti Road

Particulars of Work	Measurement: Length	Breadth	Height or Depth	Number	Critical Contents
Concrete	34	3	9"	4	306
			Total Cft		306
Foundation Abutments	$39\frac{1}{3}$	$4\frac{1}{2}$	4	2	1416
Do to Piers	$39\frac{1}{3}$	$3\frac{1}{2}$	4	3	1652
Do to Wings	11	$9\frac{1}{6}$	4	4	$1613\frac{1}{3}$
Do to Do	$11\frac{2}{3}$	8	4	4	$1493\frac{1}{3}$
Abutments above	$35\frac{1}{2}$	$3\frac{1}{4}$	3	2	$692\frac{1}{4}$
Piers Do	37	$2\frac{1}{2}$	3	3	$832\frac{1}{2}$
Skewback	34	$2\frac{1}{2}$	$\frac{1}{2}$	3	$127\frac{1}{2}$
Do	34	3	$\frac{1}{2}$	2	102
Backing to Arches	34	$5\frac{1}{2}$	$1\frac{1}{4}$	2	$467\frac{1}{2}$
Spandril	34	$6\frac{1}{2}$	$\frac{3}{4}$	3	$497\frac{1}{4}$
Caps	$2\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	6	$33\frac{3}{4}$
Wings Do	$11\frac{1}{2}$	8	$3\frac{3}{4}$	4	1380
Do face Walls	$75\frac{1}{6}$	$4\frac{5}{12}$	$10\frac{1}{2}$	2	$6971\frac{17}{24}$
Do Top Courses	$75\frac{1}{6}$	4	$\frac{1}{2}$	2	$300\frac{2}{3}$
Do Do	$75\frac{1}{6}$	5	$\frac{1}{2}$	2	$375\frac{5}{6}$
Arch Works	34	$6\frac{2}{3}$	2	4	$1813\frac{1}{3}$
Inverts	34	$4\frac{3}{4}$	$1\frac{1}{4}$	4	$807\frac{1}{2}$
			Total	Cft	$20576\frac{5}{12}$

Pointing — Squares					69½
Excavating foundation					839
Asphalte		29½	34		1003 or 10 1/33
Baling					
Centering & Sundries					

P W 19 Oct/64

Detailed Estimate No 4

1st or Nellore Range

District Nellore Taluq

Pennair Delta

Work Constructing Bridge of 2 Arches 15' span across the Surrapully Branch Channel.

Particulars of Work		Measurement: Length	Breadth	Height or Depth	Number	Cubical Contents
Concrete		18	12	1¼	1	270
		14	14½	¾	2	304½
					Total	574½
Foundation	Abutments	21⅔	6	5	2	1300
	Pier	21	4¼	5	1	446¼
	Wings	23	6½	5	4	2798⅓
	Pilaster to the End	2	¼	5	4	10
	Retaining Wall	28	2½	4	2	560
	Do	28	1½	1	2	84
Above	Abutments	20¼	5	10	2	2025
	Pier	18½	3	10	1	555
	Caps	3	2	2	4	48
	String Course	84	¼	½	-	10½
	Wings	23	3' 3½"	11⅛	4	3369 1/48
	Pilaster	2	3"	6	4	12
	Face wall	18	1½	1¼	2	67½
		25	1½	2⅜	2	178⅛
	Spandril	14½	8	1⅓	..	154⅔
	Skew backs	14½	3	9/16	1	24 15/32
	Do	14½	2¾	½	2	39⅞
	Backing to arches	14½	2¾	½		39⅞
	Do	14½	7	7/16	2	88 13/16
	Parapets	90	1⅛	3	2	607½
	Blocking Course	43	1½	1	2	129
	Pedestals	1¾	1¾	3	4	36¾
					Total	12059 25/48

Arch Drains	14½	19½	1 5/8	2	9[illegible]
Idem to	14½	11½	1	2	333½
		Total Cubic Feet			12523/4
Cornice Work — Rft.					194
Pointing — Sqrs.					55
Earth Work — Cyds.					666
Metalling — Cyds.					52
Guard Stones — No.				4	
Centum					
Datin					
Sunonies					

P.W. 1965/69

Detailed Estimate

District Nellore Taluq Gudura

Work Conveying Varnepalli Canal into main Reservoir for the Southern portion of the Pennair Delta

Particulars of Work	Measurements: Length	Breadth	Height or Depth	Number	Cubical Contents
Banking from Station 26 to Station 6	1650	23.68	8.84	"	345,396.4800
Banking from Station 66 present Ca. Calingula to	525	34.94	14.47	"	265,430.4450
Banking sole of Calingula to	255	36.02	15.01	"	137,868.3510
Banking Transverse Section No 1	1200	40.88	17.44	"	855,536.6400
do do 2	1320	38.14	16.07	"	809,040.9360.
do do 3	1140	42.46	18.23	"	882.412.2120
do do 4	1500	41.22	17.61	"	1,088,826.3000
do do 5	1320	38.62	16.31	"	831,457.7040.
do do 6	1320	38 00	16.00	"	802,560.0000.
do do 7	1320	38.92	16.46	"	845.622.6240.
do do 8	1800	39.98	16.99	"	1,222,668.3600
do do 9	660	38.02	16.01	"	401,742.1320.
do do 10	1500	35.08	14.54	"	765.094.8000
do do 11	1260	35.62	14.81	"	664.690.5720
Banking from Station 56 to Station 55	720	35.62	14.82	"	380,293.0560.
Banking from Station 55 to Station 56 exclusive of Channel	465	33.44	13.72	"	213.340.5120.
Banking in Channel	30	39.44	16.72	"	19.783.1040.
Banking from Station 56 to 60	1600	31.34	12.67	"	635,324.4800.
do from 60 to 62	800	26.40	10.20	"	215,424.0000

Banking from Station 62 6 65	1.200	12.98	5.49	"	54.360.2400
Total	21,585				11,436,[illegible]:9480
Deduct for existing Bunds as follows					
From Station 66 present Calingula 6	5.25	18.50	8.50	"	82.556.2000.
Transverse Section No 1	1.200	47.25	5.78	"	327,726.0000
do " 2	1,320	55.00	5.39	"	387,545.4000
do " 3	1,140	54.00	5.76	"	354,080.6000.
do " 4	1,500	75.25	5 21	"	388,078.7500.
do " 5	1,320	54.25	3.92	"	280,711.2000.
do " 6	1,320	60.75	3.62	"	290,287.8000
do " 7	1,320	60.75	4.67	"	374.487.3000
do " 8	1,800	56.00	4 73	"	476,784.0000.
do " 9	660	73.00	3.79	"	182,602.2000
do " 10	1,500	47.00	2.62	"	184,710.0000
do " 11	1,260	31.50	1.98	"	78,086.2000.
From Station 52 6 Station 55	720	31.50	3.13	"	70,988.4000.
From Station 55 6 Station 56	465	10.75	1.64	"	12,010.9000
Total					5.691,660.0000
Balance of Cubic feet					7,740,212.8944
or Cubic yards					286,859.
Sundry Earthworks	5.270	3 5/8	1/8	"	2,388
Total Cubic yards of Earthworks					289.247
Calcrete Revetment	5.270	8/8	1/2	"	21409 3/8.
Deduct for existing Revetment	640	1 1/2	1/2	"	480
	640	1/2	1/2	"	160
Total					640.
Total Cubic yards of Calcrete Stone Revetment					20769 1/8
Gravel Backing Cubic yards	5.270	8/8	1/6	"	7136-1/2

Turfing

725	8 to 6 required		
85	16	"	1360.
400	16 3/4	"	6700
440	16 3/8	"	7205
380	17 1/4	"	6555.
500	17 3/8	"	8812 1/2
440	15 7/8	"	6985
440	15 7/8	"	6985.
440	15 7/8	"	6985
600	16 1/2	"	9900
220	15 5/8	"	3437 1/2
500	13 1/2	"	6750.
420	14 1/2	"	6090
240	14 7/8	"	3570.
155	13 3/4	"	2131 1/4
10	13 3/4	"	137 1/2
533	19 1/8	"	10193 3/8
267	14 3/4	"	3938 1/4.
400	4 3/4	"	1900
Total Cubic yards of Turfing			99.634 7/8

Camp Nelson
3rd April 1867

Approved

Executive Engineer 1st Division
Nelson Range of D.C.

Quartermaster Vol R.C.
Supt Engineer 2d Div

Detailed Estimate 1864,

1st or Nellore Range

Work Lengthening and Improving Pennaur Delta Iskapalem Sluice in the Sarvapalli Reservoir

Particulars of work	Measurements L	B	D	N	Cubical Contents
Concrete	64	7½	9"	"	360
	23-9	6¾	9"	"	120 5/64
	20-9	5⅜	9"	"	83 83/128
	26	3	9"	"	58½
	8	2-6	6"	"	10
	9	11-6	6"	"	51¾
	21	3-9	9"	"	59 1/16
	17	3-9	9"	"	47 13/16
	4	4-6	9"	"	13½
Total Cfeet of Concrete					804¼
Deduct for existing work	50	7½	9"	"	281¼
Total Cfeet of Concrete					523
Foundation — Front Cistern side walls	20	5	4½	"	450
— Wings	20-9	3⅔	3⅝	2	551¾
— Rear Cistern Side walls	11	2-6	3'	"	82½
— Wings	15-6	2-6	4'	"	155
— Retaining walls	26	1-3	2-9	"	89⅜
— Sluice Flooring	64	6	2	"	768
Superstructure — do Side walls	64	1-9	2'	2	448
— Arch	64	5-3	1-6	"	504
— Front Apron	8	2-6	9"	"	15
— Do Do	11-6	9'	1-6	"	155¼
— Rear	4-3	4-6	1-6	"	28 11/16
— Side walls (at Head)	11-6	3	11	"	379½

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Blocking course	3	2 5/8	7-6	"	59 1/16
Wings	20-9	2 3	6-6	2	629 5/12
Rear Cistern Side walls	11-6	1-6	5	"	86 1/4
Wings	12	1-6	5	"	90
Rear Cistern Arch	4-6	1-6	1-3	"	8 7/16
Front face walls	3	1-6	3	"	13 1/2
	3	1-9	1	"	5 1/4
Parapets	6-6	1-6	1-6	"	14 5/8
	7-6	1-3	1	"	9 3/8
Total Cft of Laterite in Chinnam					4543
Deduct Old work	50	6	2	"	600
	50	1-9	2	2	350
	50	5-3	1-6	"	393 3/4
Total					1,343 3/4
Total Cft of Laterite in Chinnam					3,199 1/4
Cut Granite	8	3 1/2	3/4	"	21
	2 1/2	1 1/2	3/4	"	2 13/16
	3 3/4	4	1	"	15
	5 3/4	4	1	"	23
	1 3/4	4	3/4	"	5 1/4
	3 1/2	3/4	1	"	2 5/8
Total					69 11/16
Deduct	8	1	3/4	"	6
	7	3/4	3/4	"	3 15/16
					9 15/16
Total Cft of Granite					59 3/4
Pointing Squares					10
Excavation					
Sundries					

Four others same as above.

1965/64

Detailed Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq Pennair Delta

Work Excavating Idagaly Branch Channel and Constructing the required Masonry works

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number	Cubical Contents	Rates per cent
	Feet	Feet	Feet		Feet.	
Head Sluice						
Cutting hard Gravel	2310	44 3/4	5 5/6	1	603,006	" -2-6
Cutting stiff clay	2640	41 3/4	3 5/6	1	422,570	" -1-2
Cutting Laterite	330	42 1/3	4 1/3	1	60,537	" -4-
Banking	330	17 1/3	5 2/3	1	32,413	" -1-6
2nd Mile Cutting Laterite	1320	39 1/2	5	1	260,700	" 4-
Banking	1320	16	5	1	105,600	" -1-6
Cutting stiff clay	2640	39 1/4	4 5/6	1	500,830	" 1-2
Cutting	1320	39 1/4	4 5/6	1	250,415	" -1-1
3rd Mile Cutting	1320	35 3/4	4 1/2	1	212,355	" 1 1
Cutting	462	30 1/2	1	1	14,091	" 1-
Cutting	3498	34 1/4	5 1/2	1	658,936	" 1-
Ghuru and Cudiparty Branch takes off						
4th Mile Cutting	660	17 3/4	6 1/2	1	76,147	" -1-
Regulating Sluice						
Cutting	1980	13 1/4	3 1/2	1	91,823	" 1-
6 Irrigation Sluices as per Clauses						
6 Distributing Channels						
Minor branch Channel						
Compensation for lands						
Ghuru and Cudiparty Branch						
Head Sluice						

Cutting	3960	25½	5⅓	1	538,560 " 1
do	2865	17¾	1½	1	76,285 " 1
Banking	2865	27¼	2	2	312,285 " 1
Pudeparty Branch takes off					
Cutting	4185	13	4	1	217,620 " 1
Regulator and Fall					
4 Irrigation Sluices as per Planch					
Compensation for land					
Minor Branch Channels					
Pudeparty Branch					
Cutting	3910	12	2⅔	1	125,120 " 1
Banking	940	31	2	2	116,560 " 1
Regulator and Fall					
2 Irrigation Sluices as per Planch					
Minor Branch Channels					
Compensation for land					

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Detailed Estimate of 4 of 1867/68.
1st or Nellore Range
District Nellore Taluq
Pennair Delta
Work. Constructing a Hd. sluice for Idagali Branch

Particulars of Work		Measurement: Length	Breadth	Height or Depth	Number	Actual Contents
	Concrete	50	15¼	¾	"	581¼
		44¼	15½	¾	"	514 13/32
		16	1⅛	2	8	416
					Total	1511 21/32
Foundation	Abutments	10½	5½	5	2	577½
	Piers	15	3½	3½	7	1286¼
	Front Wings	28	4¾	4¾	2	1263½
	Rear Wings	18	5⅔	5	2	1020
	Returns	15	4⅓	5	2	650
	Front Retaining Wall	69	2½	4¾	"	819⅜
	Rear Do	40½	2½	5	"	506¼
Superstructure	Abutments	10½	3¾	4	2	315
	Piers	12⅔	2½	4	7	886⅔
	Caps	2½	2⅙	2⅙	7	82 11/72
	Cut waters	2½	2⅙	14¼	7	540 5/16
	Skew backs	10½	2½	¼	7	45 15/16
	Do	10½	3	¼	2	15¾
	Spandril	41½	10½	¾	"	326 13/16
	Face walls	45½	2½	7½	2	1706¼
	Side walls	3½	2⅙	6½	2	98 7/12
	Front Wings	28	2⅞	9¼	2	1489¼
	Coping	28¼	2½	1	2	141¼
	Rear Wings	18	3⅓	11	2	1320
	Coping	18¼	2½	1	2	91¼

Returns	15	2 2/3	8	2	640
Coping	15 1/4	2 1/2	1	2	76 1/4
Blocking Courses	46	1 1/2	1	2	138
Parapets	45 1/2	1	2	2	182
Flooring	50	18	1 1/2	..	1350
Do	44 1/2	18	1 1/2	..	1201 1/2
Do	10 1/2	2 3/4	1 1/2	8	346 1/2
Arch Work	10 1/2	6	1 1/2	8	756
				Total	17872 49/144
Tamped gravelling for Spandrils	41 1/2	3 1/2	6 1/2	..	944 1/8 or Cyds 35
Pointing — Squares					63 1/4
Earth Works — Cyds					940
Teak wood Beam Cft					43 1/2
Teak wood shutters with working Gear — Nos	1				8
Baling					
Centering					
Sundries					

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Detailed Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq Penn air Delta

Work Constructing Regulating Sluice at the Idagali Tank

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents
Concrete	35 1/2	6	1	2	426
	9	4 1/2	1	"	40 1/2
	12	12	3/4	"	108
			Total		574 1/2
Foundation Body	1 3/8	4 1/4	3 3/4	"	21 117/128
Wings	33 1/2	4	5	2	1340
Retaining wall	11	2 1/2	5	1	137 1/2
Above — Abutments	3 1/2	2 1/4	7	2	110 1/4
Backing to Arch	2 7/8	3 1/2	2/3	2	13 5/12
Wings	30	2 1/4	9	2	1215
Coping	30 1/2	2	3/4	2	91 1/2
Flooring	12	12	1 1/4	"	180
Arch Work	4 3/4	3	1 1/12	"	15 7/16
Inverted arch	3 1/2	4	1 1/4	"	17 1/2
			Total		3142 1/3
Rubble Stone (Laterite)	15	12	1 1/2	"	270
	15	3	1 1/2	"	67 1/2
	5 3/4	3	1 1/2	"	25 7/8
					363 3/8 or
			Cyds		13 11/24
Teak Wood shutter	3 1/4	3"	10	"	8 1/8
Pointing — Sqrs					10
Iron bar — Rft					4 1/4
Earth Work — Cyds					194
Centering					
Sundries					

Detailed Estimate No. 4 of 186 -3 8

1st or Nellore Range.

District Nellore—Taluq

Work Constructing Head Sluices for Supply and Subsidiary Branch

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents
Barrel	9	22	1 1/4	"	247 1/2
Sides	9	1 1/2	7	2	189
Foundation—Front Wings	16 1/2	3 3/8	5	2	598 1/8
Rear Wings	26	3 3/4	5	2	975
Front Retaining wall	24	2 1/4	5	1	270
Rear Retaining wall	19 1/2	2 1/4	5	1	219 3/8
Stone—Front Wings	16 1/2	2 1/8	6 1/2	2	442 13/32
Coping	17	2	3/4	2	51
Rear Wings	26	2 1/8	7	2	773 1/2
Coping	26	2	3/4	2	78
Face wall	8	3	1 1/2	1	36
Do	8	1 1/2	1 1/2	1	18
Blocking course	8 1/2	1 1/2	1	2	25 1/2
Parapets	8	1	1	2	16
Front Flooring	15	12 1/4	1 1/4	1	229 11/16
Rear do	20 1/2	18	1 1/4	1	461 1/4
Total Cubic Contents in Chunam					4,630 19/32
	9	10	1	"	90
	27 1/2	5 3/4	1	2	316 1/4
Concrete.	18	5 5/8	1	2	202 1/2
	20	18	1	"	360

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Concrete	105	12	1	.	180
" Slate & Cable Jack					1140 3/4
Pointing					12
Excavation					3140
" Iron bars					11 1/2
" Teakwood shutters	5'	5"	10	.	12 1/2 Jobs
" Railing					
Centering and Sundries					

No 26 1865/67

Detailed Estimate No. . of 1867-68

1st or Nellore Range.

District Nellore—Taluq Penpair Dellie

Work Constructing Tall to the Undersluices Sam No. Vide Plan No 2

Particulars of Work.		Measurement. Length.	Breadth.	Height or Depth.	Number	Cubical Contents
	Concrete	5/12	1	1	.	2 11/12
		1	8	1	2	112
		10 1/2	6 1/2	1	2	136 1/2
		12 1/2	1	1	2	175
		7 1/2	6	1	2	90
		12	5	1	.	60
		12	12	3/4	.	108
				Total		684
Foundation	Body	2 5/12	5	5	1	60 5/12
"	Wings	1	6	5	2	120
"	Short Returns	9 1/2	4 1/2	5	2	427 1/2
"	Wings	13	5	5	2	650
"	Rear Returns	6 1/2	4	5	2	260
"	Retaining wall	12	3	5	.	180
Above	Body	3 5/12	3 1/2	1	.	83 11/24
"	Wings	1	3 1/4	13	2	591 1/2
"	Coping	4	2	3/4	2	12
"	Returns	9	2 1/2	10	2	450
"	Coping	9 1/4	2	3/4	2	27 3/4
"	Wings	13	2 3/4	11	2	786 1/2
"	Coping	13 1/4	2	3/4	2	39 3/4
"	Returns	6	2 1/4	9	2	243
"	Retaining wall	12	2	3	1	72
"	Flooring	12	12	1 1/4	.	180
"	String Course	6 5/6	1	1/2	.	11 7/24

Arch Work	4½	2½	5/6	"	9 9/24
			Total		4514
Rubble stone (Laterite)	12	10	1½	"	180
	10	2	10	2	400
					580
			Cyds		21 13/27
Teak Wood Shutter	3 11/12	3"	6¾	"	6¾
Earth Work — Cyds					300
Iron Bars — Rft					5
Pointing Lyds					11½
Baling					
Centering & Sundries					

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Detailed Estimate No. 4 of 1867-68.

1st or Nellore Range.

District Nellore—Taluq

Work Excavating Pallura Branch Channel

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number.	Cubical Contents	Rate per cent
	Feet	Feet	Feet		Feet	
Head Sluice Vide separate Estimate						
Cutting	1320	17	4	1	89,760	" 1 "
Banking	1320	20	2	1	52800	" 1 "
Turfing	1320	23	"	2	60,720	" " 4
Cutting	3960	15	4	1	237,600	" 1 "
Banking	3960	24	2	1	190,180	" 1 "
Turfing	3960	23	"	2	182,160	" " 4
2nd Mile Cutting	1980	18¾	5½	1	204,187½	" 1 1
Cutting	1320	17½	4⅔	1	107,800	" 1 "
Cutting	1980	18¾	5½	1	204,187½	" 1 1
3rd Mile Cutting	2640	17¼	4½	1	204,930	" 1 "
Cutting	2640	13½	3⅔	1	130,680	" 1 "
Banking	2640	37	2	1	195,360	" 1 "
Turfing	2640	25	"	2	132,000	" " 4
4th Mile Cutting	5280	10	2½	1	132,000	" 1 "
Banking	5280	86½	2	1	913,440	" 1 2
Turfing	5280	32	"	2	337,920	" " 4
5th Mile Cutting	2640	8	2	1	42,240	" 1 "
Banking	2640	105	2	1	554,400	" 1 2
Turfing	2640	34	"	2	179,520	" " 4

Fall					
Cutting	2640	24 3/4	4 1/6	1	272,250
6th Mile Cutting	1980	25 1/2	4 2/3	1	235,620

Regulator

Irrigation Sluices — 1 Six 1

Minor Branch Channels aggregate

Length 6 Miles

Compensation for land

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Detailed Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq Penneaur Delta

Work Constructing Head Sluice for Vallura Branch Channel

Particulars of Work.		Measurement: Length.	Breadth.	Height or Depth.	Number	Cubical Contents
Concrete	Abutments	7 1/2	8 3/4	3/4	2	98 7/16
	Piers	11	17 1/2	3/4	"	144 3/8
	Front Wings	31 3/4	7 1/4	3/4	2	345 9/32
	Rear Wings	23 3/4	7 1/2	3/4	2	267 3/16
	Front Retaining wall	38 1/2	5	3/4	"	144 3/8
	Rear Retaining wall	4 1/2	5	3/4	"	16 7/8
	Below Flooring	15 1/4	7/8	4	3	160 1/8
	Front Apron	26 1/2	14 1/2	3/4	"	388 3/16
	Rear Apron	12	14 1/2	3/4	"	130 1/2
	Spandrel	11	3 7/4	4 3/8	"	241 13/24
	Total Cubic feet of Concrete					1936 7/8
Foundation	Abutments	8 3/4	5 3/4	6	2	603 3/4
	Piers	15 1/4	4 1/4	6	2	777 3/4
	Front Wings	30 5/8	5	5 3/4	2	1,760 15/16
	Rear Wings	21 5/8	5 1/4	6	2	1,362 3/8
	Front Retaining wall	40 3/4	2 3/4	5 3/4	"	644 23/64
	Rear Retaining wall	6 3/4	2 3/4	6	"	111 3/8
Superstructure	Abutments	8 3/4	3 3/4	5 1/2	2	360 15/16
	Piers	11 3/8	3	5 1/2	2	375 3/8
	Front Portion	2 5/8	3	14 1/4	2	224 7/16
	Caps	2 5/8	3	2 5/8	2	40 11/32
	Skewbacks	8 3/4	3	1/4	2	13 1/8

DETAILED ESTIMATE No. 4 of 1867/68, 80 172

District Nellore

Work Constructing Tail race at the Pennair Delta Branch Anicut Tank in the Pallmru Branch Channel No 1.

Particulars.	Number.	Measurement. Length.	Breadth.	Height.	Cubical Contents.
Concrete	2 1/2	8 1/4	1	..	20 5/8
	23 1/4	8 3/4	1	2	406 7/8
	18 2/3	9 1/8	1	2	340 2/3
	7 1/2	8	1	2	120
	15	15 5/8	9"	.	153
	13 1/4	5 1/2	1	..	72 7/8
			Total		1114 1/32
Foundation & Body	4 3/4	6	5	..	142 1/2
" Front Wings	11	8	5	2	880
" Returns	12	8	5	2	960
" Rear Wings	18 2/3	6 7/8	5	2	1283 1/3
" Returns	7 1/2	5 3/4	5	2	431 1/4
" Retaining Walls	13 1/4	3 1/4	5	..	215 5/16
Above Body	4 3/4	3 7/8	8	1	147 1/4
" Front Wings	11	4 1/8	16 1/2	2	1497 3/8
" Coping	7 3/4	2	3/4	2	23 1/4
" Returns	12	1 1/8	13 1/2	2	133 1/2
" Rear Wings	18 2/3	3 2/16	14 1/4	2	1895 1/4
" Coping	18 2/3	2	3/4	2	56
" Returns	7 1/2	3	12	2	540
" Coping	7 3/4	2	3/4	2	23 1/4
" Retaining wall	13 1/4	2	4	1	106
" Flooring	15	13 5/8	1 1/4	..	255 15/32
" Pavement	4 3/4	3/4	3/4	2	5 11/32
" Inlet Drain	4 1/4	6	5/6	..	21 1/4
			Total		9819 1/2

Trough Wings	30	2 5/8	9 1/4	2	1466 7/8
Coping	30 1/4	2	1	2	121
Rear Wings	21	2 3/4	10 1/2	2	1212 3/4
Coping	21 1/2	2	1	2	86
Front flooring	27 1/2	17 3/4	1 3/4	"	5074 7/12
Rear flooring	18	18 1/2	2	"	1481
Flooring between Arches	10 3/4	2 1/2	2	03	161 1/4
Packing to Arches	83/4	4	1	2	70
Spandrils	12	83/4	1 1/2	"	157 1/2
Fine walls	17	2 1/4	6 1/2	2	471 3/4
Do Side	4 1/4	1 2 1/4	4 3 5	2	2 6 8 18
Parapets	16 1/2	1	1	2	33
Stat Gaging Calculation Sluices					1114 1/32
Brickwork	83/4	3 1/2	1 1/2	03	216 9/16
Counting Squares					31 1/2
Rubble Stone (Calculation)	20	8	2 1/2	"	400
do do	20	9	2	2	720
Slab					1120
Guards					41 13/27
Excavation Guards					1038
Metalling Yards					4
Shutters					
Teak Beams	16 1/2	1	1	"	16 1/2 cft.
Baling					
Centering					
Sundries					

P W 1965/69

Particulars.	Number.	Measurement. Length.	Breadth.	Height.	Cubical Contents.
Rubble Stone / Vatcreta /	18	15	2	"	540
	18	2	13	2	936
					1476
					00
Pointing Square o					54 2/3
Iron Bar Rf 1/4					28 1/2
Teak wood Shutter	5 1/4	3"	9 1/4		18 3/4
Earth Work Cyds					12 1/8
Packing					700
Sundries					

Detailed Estimate No 4. 1965/64

1st or Hollow Range

District Hollow Taluq
Pennair Delta

Constructing Regulator near Vallimir Tank in the Vallimir Branch Channel

Particulars of Works	Measurement Length	Breadth	Height or Depth	Number	Cubical Contents
Concrete					
Wings	17 3/4	6	1	1	106 1/2
Do	21 3/4	6	1	1	130 1/2
Curved portions	9 1/2	6 1/2	1	1	61 3/4
Returns	5	6 1/2	1	4	130
Abutments	11	7	1	2	154
Do	11	6	1	2	132
Retaining walls	8	4 1/2	1	1	36
Do	8	5	1	1	40
Do	1/2	4 1/2	1	1	2 1/4
Do	1/2	5	1	1	2 1/2
Flooring	10 3/4	5 3/4	1	1	61 13/16
Do	3	5 3/4	1	1	17 1/4
				Total Cft.	874 9/16
Foundation Wings	16 5/8	3 3/4	5	1	311 25/32
Do	20 5/8	3 3/4	5	1	388 25/32
Curved portions	9 1/2	4 1/4	5	1	201 7/8
Returns	5	4 1/4	5	4	425
Abutments	9 7/8	4 3/4	5	2	469 1/16
Do	9 7/8	3 3/4	5	2	370 5/16
Retaining walls	10 1/4	2 3/4	5	1	140 15/16
Do	10 1/4	2 1/4	5	1	115 5/16
Do	2 3/4	2 3/4	5	1	37 13/16
Do	2 3/4	2 1/4	5	1	30 15/16

Dr W 1965/64

Wings	16	2	6	1	
Do	20	2	6	1	24
Curved portions	9½	2 5/12	6	1	137¼
Returns	5	2¼	6	4	270
Abutments	8½	3	4 5/24	2	214 5/8
Do	8½	2	6	2	204
Skew backs	8½	2	3/4	2	25½
Do	8½	1	5/8	2	10 5/8
Backing to Arch	8½	4½	3/8	2	28 11/16
Do	8½	1¾	1/8	2	3 23/32
Face walls	16½	1½	1 5/8	2	80 7/16
Do	7	1½	3/4	2	15¾
Blocking Course	17	1½	3/4	2	38¼
Do	7½	1½	3/4	2	16 7/8
Parapets	16½	1	1	2	33
Do	7	1	1	2	14
Flooring	11¼	6 3/8	1½	1	107 37/64
Do	3¾	6 3/8	1½	1	35 55/64
Arch work	8½	14½	1¼	1	154 1/16
Do	8½	6½	1⅓	1	73 2/3
Total Cft of Laterite in Chunam					4386 1/16
Pointing — Squares					13
Rubble stone for Outer Apron	16½	8	2		264
Do	7	8	2		112
Do Inner Do	14¼	5	1½	1	106 [illegible]
Do Do	5¾	5	1½	1	43 [illegible]
Do Do	10½	1	1½	1	15¾
Renetment	5	8 3/8	1½	4	251¼
Excavation — Cyds 295			Total	Cft	795
Teakwood Shutters	12	3"	11"		33
Do	4½	3"	11		12 [illegible]
Iron bars — Running ft.			Total	Cft	45 [illegible]
Baling					37
Centering & Sundries					

O.W. 1965/67

Detailed Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq

Work — Constructing an Irrigation sluice as per Genuair Delta Plan No 1.

Particulars of Work.	Measurement. Length.	Breadth.	Height or Depth.	Number	Cubical Contents
Concrete	6 19/24	8½	¾	..	43 87/192
	12	4½	1	..	6¾
	15	4¾	1	2	142½
	12½	4½	1	2	112½
			Total		305
Barrel	10	8	1¼	1	100
Retaining Wall	2	2¼	4½	1	20¼
Do	1	2¼	4½	1	10⅛
Foundation — Front Wings	13	2¾	4½	2	321¾
" — Rear Wings	10½	2½	4½	2	236¼
Above — Front Do	12	1-5¼	3½	2	120¾
Rear Do	9½	1½	4	2	114
Front Face Wall	3-9½	1¼	3¾	1	17¾
Rear Do	3-9½	1¼	1¾	1	8¼
Parapet	3-9½	¾	¾	1	2⅛
			Total		951
Rubble stone (Laterite)	10	7	1½	..	105
	7	3¼	2	..	45½
			Total		150½ or
			Cyds		5½
Pointing — Sqrs					3
Earth Work — Cyds					129
Teak Beam — Cft					11/16
Shutter with working gear ~~Complete~~					
Sundries					

Abstract Estimate No. 4 of 1867

1st or Nellore Range.

District Nellore--Taluq

Work - Constructing Pennaw Delta Fall to the Indiperti Tank Vide Plan No 2.

179

Quantities	Description of Work.	Rate.	Amount.	Total.
684	Cft of Concrete	. 2 "	85 8 "	
4514	Cft of Laterite in Chunam	. 2 8	752 5 4	
11½	Lyds of Pointing	2 " .	23 " "	
21 13/27	Cyds of Rubble Stone Laterite	1 8 "	32 3 7	
300	Cyds of Earth Work	. 1 "	18 12 "	
5	Rft of Iron Bars		8 2 "	
6¾	Cft of Teak Wood hutter	3 8 "	23 10 "	
	Baling		75 " "	
	Centering & Sundries		21 7 1	
				1,040

Cleopinicotte. Lieut Colt E
Supt Engineer 2d Dn

Ex: Engr's Office
Camp Nellore
3rd April 1867

A Smith
Executive Engineer
1st Nellore Range

P W 1965/67

Sellore

Ex Co. or Nellore Dr. ing.

Pennar Delta

Work Constructing an Escape in the Sarvapalle Reservoir

181

Quantities	Particulars of work	Rate			Amount			Total
934½	Cft of Concrete.	"	2	"	116	13	"	
5036	Cft of Laterite in Chunam	"	2	3	708	3	"	
30¼	Sqrs of Pointing	1	8	"	45	6	"	
107⅞	Yds of Ploughstone	1	"	"	107	12	5	
33	Cast Iron Posts.	12			396	"	"	
18	Teak wood Shutters.	3	"	"	204	"	"	
	Excavation	"	"	"	25	"	"	
	Sundries				66	13	7	
	Total Rupees.							1670

Ex. Engr's Office
Camp Tristmachellan's Choultry
24th September 1866
Despatched
3rd April 1867

[signature]
Ex Engineer 1st or Nellore Dwgs.

[signature] Lieut Col R E
Supg Engineer 2d Dy

Abstract Estimate No. 4, 1867-68

1st or Nellore Range

District Nellore Taluq

Pennaur Delta

Work Excavating the Survapully channel and constructing the necessary irrigation and damage works connected with it.

Quantities	Description of work	Rate	Amount			Total		
1	Head sluice vide separate estimate					7340	0	0
109,781	Cubic yards of cutting	0 4 0	2,744	4	"			
183,317	do of do	" 3 "	34,371	15	"			
36,335	do of do	" 2 "	4,541	14	0			
26,915	do of do	" 1 9	2,943	13	3			
25,006	do of do	" 1 6	984	5	"			
10,821	do of do	" 1 0	676	5	"			
						79823	8	3
22,585	Cubic yards of Banking	" 1 3	1,764	7	3			
1,252	do of do	" 1 "	78	4	"			
						1,842	11	3
16,427	Square yards of turfing	" " 4	342	3	8	342	3	8
12	Distributing channels	200 0 0				2400	"	"
	Compensation					3,000	"	"
11	Irrigation Sluices vide Plan No 1	300 0 0				3300	"	"
12	do do do Vide Plan No 2					280	"	"
	Bund across Anikapully Tank supplying channel and Vally					150	0	"
	Drainage channel from Aqueduct to old Ramercoil channel					770	"	"
	Carried forward					99248	7	2

	Brought forward							99248	7	2
	Drainage channel from near Anikapally to Pottempaud swamp									
61,712	Cyarding of cutting	"	1	2	4499	13	4			
	Deepening and Improving old Drain from Pottempudvo swamp to near the Village of Darbalamitta							4499	13	4
38,840	Cyards of cutting	"	1	"	2427	8	"			
9,658	do of do	"	"	10	503	"	4			
	Sarvapally channel from Sarvapally Reservoir escape to Main Drain							2930	8	4
1	Aqueduct Vide separate estimate							550	"	"
4	Bridges of 2 arches vide separate estimate							5000	"	"
	Sundries	3540	0	0				14160	0	0
								111	3	2
	Total estimate Rupees.							126500	0	0

Supg Engineer's Office 2nd Div.
Masulipatam
30th April 1867

Geo. T. Mircolli
Supg Engineer 2nd Division

Lieut. Collins

P W 1965/67

Enclosure in letter No 17 dated 3d May 1869 to the Secretary to Government D. P. W. (4)

10.

P W 19 [illegible]

Excavating the Sarvapilly Channel and Constructing the Necessary Irrigation & Drainage Works Connected with it

No 126500

Abstract Estimate No 4 58

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1st or Nellore Range

District Nellore Taluq

Pennair Delta

Work. Excavating Idagaly Branch Channel and Constructing the required Masonry Works.

Quantities	Description of Work	Rate			Amount			Total		
1	Head sluice Vide Separate Estimate							4440	"	"
11898	Cubic yards of Cutting	"	4	"	2974	8	"			
22333	do of do	"	2	6	3489	8	6			
64864	do of do	"	1	2	4726	12	"			
17140	do of do	"	1	1	1160	8	4			
522	do of do	"	1	"	32	10	"			
								12383	14	10
5111	do of Banking	"	1	6	479	2	6	479	2	6
1	Regulating sluice Vide Separate Estimate							800	"	"
6	Irrigation sluices as per Plan No 1	260	"	"	"	"	"	1560	"	"
6	Distributing Channels	50	"	"	"	"	"	300	"	"
	Minor Branch Channel							1760	"	"
	Compensation for land							1875	"	"
	Ipuri & Pudeparti Branches									
1	Head sluice Vide Separate Estimate							1100		
22772	Cyds of Cutting	"	1	1	1541	13	8			
8060	do of do	"	1	"	503	12	"	2045	9	8
11566	do of Banking	"	1	1	783	1	10			
								783	1	10
1	Fall Vide Plan No 3							970	"	"
4	Irrigation sluices as per Plan No 1	260	"	"				1040	"	"
	Brought forward							29536	12	10

	Brought forward						29536	12	10
4	Distributing Channels	50	-	-	-	-	200	-	
	Compensation for land						500	-	
	Minor Branch Channels						880	-	
	Pudiparty Branch								
4634	Cyds of Cutting	-	1	-	289	10 -			
4317	Do of Banking	-	1	-	269	13 -			
1	Fall Vide Plan No 2	-	-	-	1040	- -			
2	Irrigation sluices as per Plan No 1	260	-	-	520	- -			
2	Distributing Channels	50	-	-	100	- -			
	Minor Branch Channels				1320	- -			
	Compensation for land				200	-	3739	7	-
	Sundries						83	12	2
					Total Estimate Rs		34940	-	-
	Deduct Value of Laterite that will be obtained from the Excavation						1500	-	
					Total Estimate Rupees		33440	-	-

Supt Engineer's Office 2d Dn
Masulipatam
30th April 1867

Geo. T. Wilcox Lt Col R.E.
Supt Engineer 2d Dn

C.W. 19 05/67

Enclosure in letter No 17 d / 3d May 1867 to the Secretary to Govt P W D

10.

P W 1965/67

Excavating Idu branch Channel & Constructing the requisite Masonry works

Rs 33,440

Abstract Estimate No 4 of 1867-68

1st or Nellore Range

District Nellore Taluq

Pennair Delta

Work Excavating Valluru Branch channel

Quantities	Description of work	Rate			Amount			Total
1	Head sluice Vide separate estimate							3080
15,125	Cubic yards of cutting	"	1	1	1024	1	5	
53,810	do of do	"	1	0	3363	2	"	4,387.[illegible]
54,364	do of Banking	"	1	2	3964	0	8	
16,235	do of do	"	1	0	1014	11	0	4978.[illegible]
99,146	Square yards of Turfing	"	"	4	2065	8	8	2,065.8
1	Fall vide separate Estimate							3100-0
1	Regulator do do							1730-0
6	Irrigation Sluices Vide plan No 1	340	0	0				2040-
	Minor branch channels							2640-
1	Fall in Pantapollem branch chl Vide Plan No 3							1350-
	Compensation for land							1800-
6	Distributing channels	100	0	0				600-
	Sundries							68.[illegible]
	Total Estimate Rupees							27840

Supg Engr's Office 2d Dn
Masulipatam
30th April 1867

Geo Minicom Lieut Col
Supg Engr 2d Division

195

OW 1965/64

Enclosure in letter No 17 dated 3rd May 1867 to the Secretary to the Govt P.W.D.

9.

P.W. 1965/67

Excavating Vallum branch Channel and Constructing Masonry works connected with it

Rs 27/840

Abstract Estimate No. 4 of 1867-68

1st or Nellore Range

District Nellore--Taluq

Pennair Delta

Work—Constructing an Irrigation Sluice as per Plan No 1

Quantities	Description of Work.	Rate.	Amount.	Total.
305	Cft of Concrete	" 2 "	38 2 "	
951	Cft of Laterite in Chunam	" 4 "	237 12 "	
5½	Cyds of Rubble stone (Laterite)	2 8 "	13 12 "	
3	Sqrs of Pointing	2 " "	6 " "	
129	Cyds of Earth Work	. 1 "	8 1 "	
11/16	Cft of Teak Beam	3 8 "	2 6 6	
1	Shutter with working gear ~~Complete~~	" . .	12 . "	
	Bolting		10 " "	
	Sundries	- - -	11 14 6	
	Total Estimate Rupees		340	

Executive Engineer's Office
Camp Nellore
3rd April 1867

Executive Engineer 1st Cl
Nellore Range

Lieut Col R E
Supg Engineer 2d Dn

P W 1965/67

Abstract Estimate No 4 of 1867/68
Pt or Nellore Range
District Nellore Taluq

Pennair Delta

Work Constructing Regulator near Valluru Tank in the Vallurie Branch Channel

Quantities	Description of Work	Rate	Amount	Total
875	Cft of Concrete	" 2 "	109 6 "	
4386	do of Laterite in Chunam	" 4 "	1096 8 "	
13	Squares of Pointing	2 " "	26 " "	
29½	Cyds of Rubble stone (Laterite)	2 8 "	73 12 "	
295	Cyds of Excavation	" 1 "	18 7 "	
45⅜	Cft of Teakwood Shutters	3 8 "	158 13 "	
37	Running ft of Inbars		45 6 "	
	Baling		150 " "	
	Centering and Sundries		51 12 "	

Total Estimate Rupees 1730 " "

Supt Engineer's Office 2d Dr
Masulipatam
30th April 1867

Geo Hammond Lieut Col RE
Supt Engineer 2d Dr

Abstract Estimate [illegible]

1st or Nellore Range

District Nellore - Taluq

Pennair Delta

Work Constructing Fall near the Bramadavum Tuti Tank in the Valluru Branch Channel -

Quantities	Description of Work	Rate			Amount			Total		
1114	Cfl of Concrete	"	2	"	139	12	"			
9819	Cfl of Laterite in Chunam	"	4	"	2454	12	"			
23½	Squares of Pointing	2	"	"	47	"	"			
54⅔	Cyds of Rubble Stone (Laterite)	2	8	"	136	10	8			
700	Cyds of Earth Work	"	1	"	43	12	"			
18¾	Rfl of Iron bar				25	11	"			
12⅛	Cfl of Teak wood Shutters	3	8	"	42	7	"			
	Baling				150	"	"			
	Sundries				59	15	4			
	Total Estimate Rupees							3100	"	"

Supt Engrs Office 2d Dn
Masulipatam
30th April 1867

[illegible] Lieut Col [illegible]
Supt Engineer 2d Dn

P Dr 1965/67

Abstract Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq

Work Constructing Head Sluice for Valluru Branch Channel (Pennaur Delta)

Quantities	Description of Work.	Rate.	Amount.	Total.
1909 1937	Cubic feet of Concrete	" 2 "	237 4 " ~~242 2 "~~	
11440 11478	do of Laterite in Chinnam	" 3 1	2204 9 4 ~~2211 14 6~~	
217	do of Arch work	" 3 4	45 3 4	
31½	Squares of Pointing	2 " "	63 " "	
41½	Cyards of Rubble Stone (Laterite)	1 2 "	46 11 "	
1138	Cyards of Earthwork	" 1 "	71 2 "	
4	Cyards of Metalling	" 14 "	3 8 "	
3	Shutters with working gear ~~Complete~~	40 " "	120 " "	
16½	Cfeet of Teakwood	3 8 "	57 12 "	
	Baling	- - -	150 " "	
	Centering		15 " "	
	Sundries		65 14 4 ~~53 11 2~~	

Total Estimate Rs 3,080

Executive Engineer's Office
Camp Nellore
3rd April 1867.

Geo Minicom. Lieut Col &c
Supt Engineer &c &c

[signature]
Executive Engineer 1st Or Nellore Range.

C N 1965/67

Abstract Estimate No. 4 **of 1867-68.**

1st or Nellore Range.

District Nellore--Taluq

Work Constructing Fall in Idagaly Branch Channel Pennair Delta

Vide Plan No 3.

Quantities	Description of Work.	Rate.			Amount.			Total.
640	Cubic feet of Concrete	.	2	.	80	.	.	
4377	do of Laterite in Chunam	.	2	8	729	8	.	
10½	Squares of Pointing	2	.	.	21	.	.	
19 22/27	Cyards of Rubble Stone (Laterite)	1	8	.	29	11	7	
280	Cyards of Earthwork	.	1	.	17	8	.	
4 4/6	Running feet of Ironbars				6	12	.	
5 1/3	Cfeet of Teakwood Shutters	3	8	.	18	10	8	
	Baling				50	.	.	
	Sundries				16	13	9	
	Total Estimate Rupees							970

Executive Engineer's Office
Camp Nellore
3rd April 1867.

Executive Engineer 1st Dn
Nellore Range

Lieut Colonel R.E.
Supg Engineer 2d Dn

C.W. 1965/67

Abstract Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq

Work Constructing Head Sluice for Spurn and Pudiparty Branch Penner Delta

Quantities	Description of Work	Rate	Amount	Total
1149	Cubic feet of Concrete	" 2 "	143 10 "	
4631	do of Laterite in Chinam	" 2 8	771 13 4	
12	Squares of Pointing	2 " "	24 " "	
343	Cyards of Excavation	" 1 "	21 7 "	
11½	Running feet of Iron bars		13 8 "	
12½	Cfeet of Teakwood Shutters	3 8 "	43 12 "	
	Baling		50 " "	
	Centering and Sundries		31 13 8	
	Total Estimate Rupees			1,100

Executive Engineer's Office
Camp Nellore
3rd April 1867

Ymith
Executive Engineer 1st Or
Nellore Range

Geo Minotolle Lieut Col R E
Supt Engineer 2d Div

Abstract Estimate No. 4 of 1867-68

1st or Nellore Range

District Nellore--Taluq

Work Constructing Irrigation Sluice Vide Plan No. 1. Pennair Delta

Quantities	Description of Work	Rate			Amount			Total
305	Cubic feet of Concrete	.	2	.	38	2	.	
951	Cfeet of Laterite in Chinam	.	2	8	158	8	.	
5½	Cyards of Rubble Stone (Laterite)	2	8	.	13	12	.	
3	Squares of Pointing	2	.	.	6	.	.	
129	Cyards of Earthwork	.	1	.	8	1	.	
1/16	Cfeet of Teak Beam	3	8	.	2	6	6	
1	Shutter with working gear				12	.	.	
	Baling				10	.	.	
	Sundries				11	2	6	
	Total Estimate Rupees							260.

Executive Engineer's Office
Camp. Nellore
3rd April 1867

[signature]
Executive Engineer 1st Dt
Nellore Range

[signature] Lieut Colonel R.E.
Supt Engineer 2d Dn

F W 1965/67

Abstract Estimate No. 4. of 1867-68

1st or Nellore Range.

District Nellore--Taluq

Work Constructing Permanent Delta Regulating Sluices at the Idagalis Tank

Quantities	Description of Work.	Rate.	Amount.	Total.
575	Cft. of Concrete	. 2 "	71 14 "	
3143	Cft. Laterite in Chunam	" 2 8	523 13 4	
10	Sqrs. of Pointing	2 " "	20 " "	
13 11/24	Cyds. of Rubble stone Laterite	1 8 "	20 3 "	
194	Cyds. of Earth Work	" 1 "	12 2 "	
4 1/4	Rft. of Iron bar		7 " "	
8 1/8	Cft. of Teak Wood Shutter	3 8 "	28 7 "	
	Baling		100 " "	
	Centering & Sundries		16 8 8	
				800

Ex: Engr's Office
Camp Nellore
3rd April 1867

Supg Engineer 2d Dn

Executive Engineer
1st or Nellore Range

Abstract Estimate No 4 of 1867/68
1st or Nellore Range
District Nellore Taluq
Pennair Delta

Work. Constructing a Head Sluice for Idagali Branch

Quantities	Description of Work	Rate			Amount			Total		
1511 21/32	Cft. of Concrete	"	2	"	188	15	4			
17872 49/144	Cft of Laterite in Chunam	"	2	8	2978	11	7			
35	Cyds Tamped Gravelling	"	2	"	4	6	"			
63 1/4	Sqrs. of Pointing	2	"	"	126	8	"			
940	Cyds of Earth Work	"	1	"	58	12	"			
43 1/2	Cft. of Teakwood	3	8	"	152	4	"			
8	Teakwood Shutters with working gear	40	"	"	320	"	"			
	Baling				450	"	"			
	Centering				50	"	"			
	Sundries				114	13	1			
								4440	"	"

P W 1765/67

Supr Engrs Office Dy
Masulipatam
30th April 1867

Recommd Comm Int Col R E
Supr Engineer 2d Dn

Abstract Estimate No 4

1st or Nellore Range

Work. Lengthening and Improving Iskapalem Sluice in the Sarvapalli Reservoir

Quantities	Description of work	Rate			Amount			Total
523	Cubic feet of Concrete	.	2	.	65	6	.	
3199¼	C. feet of Laterite in Chunam	.	2	6	499	14	1	
59¾	C. feet of Cut Granite	1	8	0	89	8	0	
10	Squares of Pointing	1	8	0	15	0	0	
	Excavation	.	.	.	30	.	.	
	Sundries	.	.	.	.	3	11	
	Total Estimate Rupees							700
	Four others same as above							2,800
	Grand Total Estimate Rupees							3,500

P W 1965

Executive Engineer's Office
Camp Kistnacheelamis Choultry
24th September 1866.

Despatched
3rd April
1867.

[signature]
Executive Engineer 1st or Nellore Range N.D.C.

[signature] Lieut Col R.E.
Supg Engineer 2d Div

Enclosure in Letter No 17 d/3d May 1867 to the Secretary to Govt D P W

P W 1965/67

Converting the Sarvapilly Tank into Main Reservoir for the Southern portion of the Pennar Delta

Rs 1,14,000

Abstract Estimate No. 4, of 186 -6

1st or Nellore Range.

District Nellore--Taluq

Work Converting Sarvapalli Tank into main Reservoir for the Southern portion of the Pennar Delta

Quantities	Description of Work.	Rate.			Amount.			Total.
289,247	Cubic Yards Earthwork inclusive of tamping	.	1	6	27116	14	6	
20,769	Cubyds of Laterite stone Revetment	3	.	.	62307	.	.	
7136	do Gravel backing	.	9	.	4014	.	.	
99,634	Square Yards of Turfing	.	.	4	2075	11	4	
640	Cyds of Removing and reconstructing old revetment	.	6	.	240	.	.	
1	New Calingula	.	.	.	1670	.	.	
	Lengthening and improving 5 Irrigation Sluices	700	.	.	3500	.	.	
	Compensation for land							
165	Acres	40	.	.	6600	.	.	
165	do	5	.	.	825	.	.	
478	do	8	.	.	3824	.	.	
477	do	1	.	.	477	.	.	
	Compensation for houses &ca in the hamlet of Nappaturu							
1	Chuttrum, with thatched roof	.	.	.	100	.	.	
10	Huts	.	.	.	200	.	.	
1	Bourie	.	.	.	150	.	.	
1	do	.	.	.	300	.	.	
6	Wells	40	.	.	240	.	.	
1	do belonging to the village of Nagalaram	.	.	.	40	.	.	

113679-9-10

Carried over

— Brought forward				113,679	9	10	
Deduct value of old materials				500	.	.	
				113179	9	10	
Sundries				820	6	2	
— Total Estimate Rupees —							114,000

Executive Engineer's Office
Camp Nellore
3rd April 1867

[signature]
Executive Engineer
1st or Nellore Range

[signature] Lieut Col R.E.
Supt Engineer 2d Dn

Abstract Estimate No 4
1st or Nellore Range
District Nellore Taluq
Penneair Delta

Work. Constructing an Aqueduct near Kannapartipaud

Quantities	Description of Work	Rate			Amount			Total
306	Cft of Concrete	.	2	.	38	4	"	
2057 6½	Do Laterite in Chunam	"	3	4	4286	12	4	
69½	Squares of Pointing	2	"	.	139	"	.	
839½	Cyds of Excavation	.	1	.	52	7	6	
10 1/33	Squares of Asphalte	19	.	.	190	9	3	
	Baling				180	.	.	
	Centering & Sundries				112	14	11	
					Total Estimate Rs			5000 . .

Supt Engineer's Office 2d Dn
Masulipatam
30th April 1867

[signature] Lieut Col R.E.
Supt Engineer 2d Dn

Abstract Estimate No. 4
1st or Nellore Range
District Nellore Taluq
Pennair Delta

Work Constructing Bridge of 2 Arches 15' ft span across the Surrapulli Branch Channel -

Quantities	Description of Work	Rate			Amount			Total -		
575	Cft. of Concrete	"	2	"	71	14	"			
12144	Cft. of Laterite in Chunam	"	3	4	2530	"	"			
1253	Cft. of Arch Work	"	3	7	280	9	11			
55	Squares Pointing	2	"	"	110	"	"			
194	Running ft. of Cornice Work	"	4	"	48	8	"			
666	Cyds. of Earth Work	"	1	"	41	10	"			
52	Cyds. of Metalling	"	14	"	45	8	"			
4	Guard stones	4	"	"	16	"	"			
	Centering				200	"	"			
	Baling				100	"	"			
	Sundries				95	14	1			
								3540	"	"

Supr Engineer's Office 2d Dn
Masulipatam
30th April 1867.

Geo. Minscoll Lieut Col Rle
Supr Engineer 2d Dn

P W 1965/67

Abstract Estimate No 4

1st or Nellore Range

District Nellore Taluq

Pennair Delta

Work Constructing an Irrigation sluice Vide Plan No 2

Quantities	Description of Work	Rate			Amount			Total		
224 3/4	Cft. of Concrete	"	2	"	28	1	6			
920 1/2	Cft. of Laterite in Chunam	"	3	4	191	12	4			
3 1/4	Squares of Pointing	2	"	"	6	8	"			
3 2/27	Cyds of Rubble stone Laterite	"	14	"	2	11	"			
100	Cyds of Earth work	"	1	"	6	4	"			
2 17/32	Cft. of Teakwood Beams	3	8	"	8	13	9			
1	Shutter with working gear				20	"				
	Baling				10	"	"			
	Sundries				5	13	5			
								280	"	"

Supg Engrs Office Dr.
Masulipatam
30th April 1867

[illegible] Capt Col R.E.
Supg Engineer 2d Div

P W 19/5/67

P W 1965/67

Abstract Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore--Taluq

Work Constructing an Irrigation Sluice Vide Plan No 1. Permair Delta

Quantities	Description of Work.	Rate.	Amount.	Total.
305	Cubic feet of Concrete	" 2 "	38 2 "	
951	Cfeet of Laterite in Chinam	" 3 4	198 2 "	
3	Squares of Pointing	2 " "	6 " "	
5½	Yards of Rubble stone (Laterite)	1 2 "	6 3 "	
129	Yards of Excavation	" 1 "	8 1 "	
4/16	Cfeet of Teakwood	3 8 "	2 6 6	
1	Shutter with working gear		12 " "	
	Baling		10 " "	
	Sundries		19 1 6	
	Total Estimate Rupees			300

Executive Engineer's Office
Camp Nellore
3rd April 1867

[signature]
Executive Engineer 1st Or
Nellore Range
Lieut Col R E

[signature]
Supg Engineer 2d Dn

No. 4

Abstract Estimate of 1867/68.
1st or Nellore Range
Nellore District.
Pennair Delta.

Work Constructing Hd. Sluice for Surrapully Branch

Quantities	Description of Work	Rate	Amount	Total
4793	Cfl. of Concrete	" 2 "	599 2 "	
22028½	Cfl. of Laterite in Chunam	" 3 1	4245 1 3	
1875	Cfl. of Arch Work	" 3 4	390 10 "	
95¼	Sqrs. of Pointing	2 " "	190 8 "	
136 11/54	Cyds. of Rubble stone (Laterite)	1 2 "	153 3 8	
1650	Do. of Earth Work	" 1 "	103 2 "	
16⅓	Do. of Metalling	" 14 "	14 4 8	
195	Cfl. of Teakwood Shutter	3 8 "	682 8 "	
240	Rfl. of Iron bars		295 " "	
	Baling		250 " "	
	Centering		240 " "	
			7163 7 7	
	Sundries		176 8 5	7340 " "

Supr. Engineer's Office 2d Dn.
Masulipatam
30th April 1867

Cust. Miscom. Lieut. Col. R.E.
Supr. Engineer 2d Dn.

Abstract Estimate No 4
1st or Nellore Range
District Nellore Taluq
Pennair Delta

Work Constructing a Surplus Sluice adjacent to the Surva=palli Branch Head sluice across the old Ramereddy Channel -

Quantities	Description of Work	Rate			Amount			Total		
3143	Cft of Concrete	"	2	"	392	14	"			
25495	Cft of Laterite in Chunam	"	3	1	4913	1	7			
443	Cft of Arch work with laterite in Chunam	"	3	4	92	4	8			
56	Squares of Pointing	2	"	"	112	"	"			
87	Cyds of Rubble stone (Laterite)	1	2	"	97	14	"			
959	Cyds of Excavation	"	1	"	59	15	"			
8	Cyds of Metalling	"	14	"	7	"	"			
28	Cubic feet of Teakwood Beam	3	8	"	98	"	"			
5	Shutters with working gear	49	"	"	245	"	"			
	Baling				200	"	"			
	Centering				90	"				
	Sundries				161	14	9			
								6470	"	"

Supy Engineer's Office W. Dn
Masulipatam
30 April 1867

Geo Minnitolle Lieut Col R.E.
Supy Engineer W. Dn

Abstract Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore--Taluq Penmair Delta

Work Constructing an Irrigation Sluice

Vide Plan No 1

Quantities	Description of Work.	Rate.	Amount.	Total.
305	Cft of Concrete	" 2 "	38 2 "	
951	Cft of Laterite in Chunam	" 2 9	157 3 3	
3	Sqrs of Pointing	2 " "	6 " "	
5½	Cyds of Rubble stone (Laterite)	1 2 "	6 3 "	
129	Cyds of Earth Work	" 1 "	8 1 "	
11/16	Cft of Teak Wood	3 8 "	2 6 6	
1	Shutter with working gear		12 " "	
	Baling		10 " "	
	Sundries		10 " 3	
				250

Geo Immoscolle Lieut Col R E
Supt Engineer 2d Dn

Ex: Engr's Office
Camp Nellore
3rd April 1867

A J Smith
Executive Engineer
1st or Nellore Range

D W 1965/67

(4)

Abstract Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore—Taluq Pennair Delta

Work Deepening the Saravapalli New Cut & Improving the Old Ramireddi Channel

Masonry Works

Quantities	Description of Work.	Rate.	Amount.	Total.
	Demolishing and Rebuilding Iron Aqueduct Piers			
3812	Cft. of Laterite in Chunam	2 9	655 3 "	
	Demolishing existing Piers		40 " "	
	Scaffolding, shoring & Sundries		50 " "	
	Baling water &ca		34 13 "	
	Deduct value of old materials		780 100	680 " "
	Substituting Iron Aqueduct for Syphon No 1			
4121	Cft. of Laterite in Chunam	2 9	708 4 9	
12½	Sqrs. of Pointing	2 " "	25 " "	
80	Rft. of Iron trough Complete	15 " "	1200 " "	
36	Cft. of Teak Wood	3 8 "	126 " "	
	Excavating foundation		20 " "	
	Baling &ca		20 11 3	2100 " "
	Syphon No 2 Same as No 1			2100 " "
	Lowering floor of Krishnapatnam Road Bridge			
137	Cyds. of Rocky Cutting	8 "	68 8 "	
	Sundries		1 8 "	70 " "
	Syphon No 3 Same as No 1			2100 " "
	Converting Bridge across head of Krishnapatnam Channel into a Head Sluice for that Branch			
3527	Cft. of Laterite in Chunam	2 9	606 3 3	
13¼	Sqrs. of Pointing	2 " "	26 8 "	
54	Rft. of Iron bars		71 4 "	
	[illegible]		703 [illegible] 3	705[illegible] " "

	Brought forward				703	15	3	7050
69	Cft of Teak Wood	3	8	"	241	8	"	
95	Cyds of Excavation	"	1	"	5	15	"	
	Baling				10	"	"	
	Centering & Sundries				28	9	9	
								990
	Total Estimate Rs							8040

Ex: Engr's Office
Camp Nellore
3rd April 1867

Executive Engineer
1st or Nellore Range

Geo Mansion Lieut Col R E
Supr Engineer 2d Dn

P W 1965

Abstract Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore--Taluq Penna Delta

Work Constructing a Bridge of 2 Arches across the Saranapalle Channel near Stonehouse pet

Quantities	Description of Work.	Rate.			Amount.			Total.
4812	Cft of Concrete	"	2	"	601	8	"	
38454	Cft of Laterite in Chunam		2	9	6609	4	6	
4745	Cft of Arch Work with Laterite in Chunam	"	3	"	889	11	"	
102½	Lgs of Pointing	2	"	"	205	"	"	
300	Rft of Cornice	"	4	"	75	"	"	
1540	Cyds of Excavation	"	1	"	96	4	"	
15	Cyds of Metalling	"	6	"	5	10	"	
4	Guard Stones	4	"	"	16	"	"	
	Centering				370	"	"	
	Baling				200	"	"	
	Sundries				236	10	6	
					9300	"	"	
	Deduct Value of Old Materials				1000	"	"	8300

Geo Mansion Lieut Col R E
Supr Engineer 2d Dn

Ex: Engr's Office
Camp Nellore
3rd April 1867

Executive Engineer
1st or Nellore Range

Abstract Estimate No. 4 of 136 -6

1st or Nellore Range.

District Nellore--Taluq Nellore Pennair Delta.

Work Deepening the Saravapalli New Cut and improving Old Ramireddi Channel -

Quantities	Description of Work.	Rate.			Amount.			Total.
60,439	Cyds of Laterite Cutting	"	4	"	15109	12	"	
1956	" of Gravel Do	"	2	6	305	10	"	
49,133	" of Do	"	2	"	6141	10	"	
137,961	" of Cutting	"	1	6	12933	13	6	
10,853	" of Do	"	1	4	904	6	8	
51,227	" of Do	"	1	3	4002	1	9	
1650	" of Do	"	1	2	120	5	"	
8311	" of Do	"	1	"	519	7	"	40037-1-11
321,530								
11,244	" of Banking	"	1	3	878	7	"	
12027	" of Do	"	1	2	876	15	6	
8213	" of Do	"	1	1	556	1	5	
685	" of Do	"	"	10	35	10	10	
32,169								2347-2-9
15,072	" of Rubble Pitching	1	2	"	16956	12	"	16956-12-"
10,048	" of Gravel Backing	"	8	"	5024	"	"	5024-"-"
4767	Sq yds of Turfing	"	1	4	397	4	"	
4107	" of Do	"	"	10	213	14	6	
71866	" of Do	"	"	4	1497	3	4	2108-5-10
80,740								
	Compensation for land							200-"-"
2	Distributing Channels	100	"	"				200-"-"
	Masonry Works Vide Separate Estimates							
1	Bridge of 2 Arches across the Saravapalli Channel near Stonehouse pet	"	"	"	"	"	"	8300-"-"
1	Demolishing & rebuilding the Iron Aqueduct piers	"	"	"	"	"	"	680-"-"
					Carried forward			75553-6-6

N 2 19 [illegible]

	Brought forward		75,553-6-6
1	Substituting Iron Aqueduct for Syphon No 1		2100--
1	Do Do No 2		2100--
1	Lowering floor of Krishnapatnam Road Bridge		70--
1	Substituting Iron Aqueduct for Syphon No 3		2100--
1	Converting Bridge across Head of Krishnapatnam Channel into a Head Sluice for that branch		990--
2	Irrigation Sluices Vide Plan No 1	250	500--
1	Constructing a surplus sluice adjacent to the Saravapalli branch Head Sluice across the Old Ramireddi Channel		6470-- ~~8500~~
	Sundries		116-9-6 ~~86-9-6~~
	Total Estimate		90,300

Ex: Engr's Office
Camp Nellore
3rd April 1867

Executive Engineer
1st or Nellore Range

Geo Minnicoke Lieut Col R E
Supt Engineer & Dn

P W 1965/67

Abstract Estimate No. 4 of 1867-68

1st or Nellore Range.

District Nellore—Taluq

Work Constructing an Auxiliary Head Sluice Adjacent to the Anikat Pennair Delta

Quantities	Description of Work.	Rate.	Amount.	Total.
6,216	Cft of Concrete	2	777 0	
24,373	Cft of Laterite in Chunam	2 9	4189 1 9	
87	Sqrs of Pointing	2	174	
1248	Cyds of Earth Work	4	312	
66 2/3	Cyds of Metalling	4	16 10 8	
35 1/2	Cft of Teak Wood Beam	3 8	124 4	
6	Teak Wood Shutters with Working gear	78	468	
	Centering		150	
	Sundries		138 15 7	
				6350

Geo Minnicoke Lieut Col R E
Supt Engineer & Dn

Ex: Engr's Office
Camp Nellore
3rd April 1867

Executive Engineer
1st or Nellore Range

Abstract Estimate No. 4 of 186 -6

1st or Nellore Range.

District Nellore—Taluq Pennair Delta

Work Constructing an Auxiliary Head Sluice; enlarging Old Channel and deepening the Main Feeder from the existing Head Sluice to the head of the Sarwapally Channel

Quantities	Description of Work.	Rate.	Amount.	Total.
1	Head Sluice. Vide separate Estimate			6,350 " "
	Enlarging old Channel			
1118	Cubic yards of Laterite Cutting	" 8 "	559 " "	
2710	do of Clearing Sell	" 1 6	254 1 "	
114	do of Earthwork	" 1 "	7 2 "	
				820-3-0
	Demolishing Bridge over old supplying Channel and Clearing the latter out underneath it			125-"-"
	Connecting existing and proposed Head Sluices by a Parapet Wall			
5,312	Cubic feet of Laterite in Chinnam	" 2 9	569 4 "	
	Deduct Value of old Materials		216 " "	353-4-"
	Lowering floor of Head Sluice			100-"-"
	Altering shutters			216-"-"
	Deepening Main Feeder			
3,852	Cubic yards of Laterite Cutting	" 8 "	1,926 " "	
12,852	do of Earthwork	" 1 6	1,204 14 "	
2,300	do of Rubble Pitching	1 2 "	2,587 8 "	
1,533⅓	do of Gravel backing	" 8 "	766 10 8	
				6485-"-8
	Compensation for one tiled house and a small compound			800-"-"
	Sundries			50-8-4
	Total Estimate Rupees			15,300

Executive Engineer's Office
Camp. Nellore
3rd April 1867

[illegible]
Supt. Engineer 2nd Div.

[illegible]
Executive Engineer 1st or Nellore Range

Public Works Department.

No 1844

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 20 June/67

Read the following

Proceedings of the Board of Revenue

(Here enter No. 3141 dated 21st May 1867 –

With the above letter the Superintending Engr. of the 2nd Dn. forwards plans and estimates, aggregating Rs. 412,100, connected with a project for further developing irrigation in the Nellore Distt. under the Pennair Anicut, by the enlargement, improvement, and extension of the main channel and some of its branches, and by adding to the capacity of the Sunnapully tank to enable it to contain water sufficient to supplement. The supply

of the Channels during
those periods of the
cultivating season when,
the river falling, the
Channels are low.

The Govt observe
that, by the proposed
improved arrangements
of the head works, a
maximum supply will
be secured in low freshes,
or when the water in the
River is below the crest
of the Anicut, and a
perfect command be
obtained over all the
main irrigating canals
of the Delta, and that
the enlarged reservoir
at Sunnapilly will be ma
capable of holding upwards
of 52 millions of cubic
yards, which, with
additions from time to
time when the river is
high, will, it is calculated,
suffice to make good any
deficiency of direct supply
from the Channels.

The project recommends itself as likely to be not only highly beneficial, but also most remunerative. The area stated to be commanded by the extension of the Channels and under the influence of the tank is given in round numbers at 77,000 acres. Of this, after making what appears to the Govt to be an extremely liberal deduction from land already under wet cultivation, and for waste and uncultivable tracts, about 25,500 acres will, it is confidently expected

be irrigated, yielding an assessment of Rs. 4 per acre as water rate, a sum of Rs. 102,000 per annum. This is equivalent to a return of nearly 25 per cent.

Under these circumstances, the Supt Engr is authorized to proceed with the works from the allotment of Rs. 25000 provided for the purpose in the Budget, and the Govt will have much pleasure in recommending the project to the Govt of India for sanction.

The Lordship in Council considers the manner in which the

the project has been prepared in a short time highly creditable to Mr Smith.

To The Supt Engr of the 2nd Dn

[illegible] 251

No 1845

To

The Secretary to the
Govt. of India

Sir,

I am directed to forward herewith Plans and estimates, relating to the project for which a sum of Rs. 25,000 is provided in the current year's Budget, and having for its object a further development of irrigation in the Nellore District under the Pennair Anicut.

The estimates provide for the following works.

Enlargement of head sluice near the anicut
Construction of an auxiliary sluice and [illegible] feeder to the head of the [illegible] } Rs: 15,300

[illegible]ing sluices at the heads [illegible] Rutnapatam channels } " 4,720

[illegible] cut, and enlarging and [illegible] channel and masonry [illegible] from head sluice } " 90,300

× Item No 148

N.
non

Construction of a new channel from 6 mile to the Reservoir at Surrapully ——— } Rs: 1,25,570

Conversion of the present Surrapully Tank into a main Reservoir ——— } " 1,14,000

Construction of branch channel from Surrapully channel to the Idagally Tank ——— } " 33,440

Construction of channel to Vellum Tank ——— " 27,840

It will be observed that by the proposed improved arrangements of the head works, a maximum supply of water from the River will be secured in low freshes or when the water is below the crest of the anicut, and a perfect command be obtained over all the main irrigating ducts leading into the Delta, and that the enlarged Reservoir at Surrapully being made available

to

the

when, the river being low, they would be in want of water.

The project now submitted, being a continuation of one which has fully realized the great expectations which were formed of it, offers fair promise of being highly useful and reproductive. It is expected to bring under wet cultivation 25,500 acres of land, which, at an assessment of Rs: 4 per acre as water rate, will yield Rs: 1,02,000 per annum or a return of nearly 25 P Cent. The details of the project have been very carefully considered, and as it is most desirable that the execution of the work should be proceeded with without delay, His Lordship in Council has authorized its commencement from the Budget grant of Rs. 25,000. In

expressing

expressing a hope that this proceeding will meet with the approval of the Govt: of India, I am to request the early sanction of that Govt to the estimates, amounting to Rs. 4,12,100. in the aggregate.

Fort St George
20th June /67

Despd. 22/6/67 with Copy of
G.O. No. 1844 of 1867.
24 Plans despd. 1st July /67

C. 5th June 1867 Pl. 7 III