Public Works (1896) Department.

G.O., No. 3629

DATED 24/4/96

[Despatch Abstract.]

9th branch channel Periyar Project — Revised estimate for excavating the — sanctioned

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

IRRIGATION.
ACCOUNT.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated April, 24th.

Recd. *Encl.*

G.O. No. 362 I., 24th April. 1896.

APRIL.

Channel

Revised estimate of Rs. 77,000 for excavating the 9th branch —, Periyár project, sanctioned.

No. 362 I., 24TH APRIL 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers:—

From W. HUGHES, Esq., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 30th January 1896, No. 100 M.D.

I have the honour to submit a revised estimate, amounting to Rs. 77,000, being Rs. 20,360 in excess of the sanctioned estimate for the 9th Branch channel from Periyár main canal.

2. From a statement attached to the estimate it will be seen that the sections of the Main canal and branches were originally calculated according to a very incorrect and obsolete formula, and the works have been carried out according to these calculations in the 2nd to 11th reaches of the Main canal and the first eight branches. Although it cannot be said that Bazin's formula adopted in the revised calculations is altogether reliable, it at least gives results which are probably not more than a few per cent. wrong. Down to the 8th branch the capacity of each branch is less than the difference in capacity of the reaches of the Main canal. The difference in capacity of the 1st and 8th reaches is 643 cubic feet per second, while the capacity of the eight channels is only 321 cubic feet per second. The difference, if admitted to the channel, must be nearly all disposed of by the surplus works, as there are only a few small sluices for direct irrigation; or, to put the matters in another way, the quantity which can be usefully admitted to the first reach is 1,195 cubic feet per second instead of 1,500 originally intended. I doubt, however, if the Main canal will ever have to be enlarged as the difference between the intended and actual capacity nowhere exceeds 12½ per cent. The branches, no doubt, will have to be enlarged, but it would be quite premature to make any proposals in regard to this, as information is still wanting as to the probable demands for filling tanks and supplying direct irrigation.

3. The Executive Engineer has had under preparation for some months past, under instructions from this office, a map compiled from the village maps, showing existing irrigated land, irrigation works and their connections. Only when this is completed will it be possible to determine which of the tanks, numbering altogether over 1,000, it will be desirable to retain, and how it will be best to lay out the distributaries; and until the lines of the latter are determined and the area of land commanded by each approximately known, the required capacity of the different parts of the branch channels can only be very roughly estimated. There is not, however, so much difficulty in arranging the distribution of water from the 9th to 12th branches or determining the area commanded by them as in some of the other cases, and I think the required capacity of the 9th branch, as given in the Blue Book and by the Executive Engineer, may be accepted as sufficiently correct. As originally calculated, the discharge of the channel was 279 cubic feet per second, but Bazin's formula gives it only 178 cubic feet per second. To get the required discharge the depth has been increased from 2 feet to 3 feet, and the bed widths slightly altered. The excessive bed-fall of 6 feet per mile has been reduced to 3 feet almost throughout. It will be seen from the comparative statement that the excess is due to the higher rates which had to be paid for excavation and banking in rocky soil or rock. The original estimate provides for work only in earth and gravel. I cannot indicate savings on other works to meet the excess on this. The work has been in hand for a long time and is practically completed.

No. 362 I., 24th April 1896.

Enclosure.

From J. H. MEDLICOTT, Esq., Executive Engineer, Madura Division, dated 26th November 1895, No. 300 E.

With reference to your No. 695 M.D., dated 2nd November 1895, I have the honour to forward, herewith, the revised estimate for the 9th branch channel with the marginally-noted enclosures.

2. The cause of the excess is due to the alteration in the section of the channel—when calculated by Bazin's formula the original—sections of the head of the channel gave a discharge of 178 cubic feet per second only instead of 297 as required by the "Blue Book" (see page 7).

The formula used in calculating the original sections was—

$$D = A \times 9\sqrt{2f \times \frac{A}{B}}$$

where f is the fall in feet per mile; this gives a result approximating more to that given in the Blue Book.

3. I enclose a statement comparing the discharges of all twelve reaches and branches:

(1) As per Blue Book.
(2) As per original section by the formula above quoted.
(3) Do. by Bazin's formula.
(4) As executed (Bazin's formula is used).

I cannot discover how the discrepancies arose. The masonry works have been sanctioned in accordance with the sections as executed.

4. The alteration in the section and alignment is sufficient to account for the excess. There is no use in comparing the two estimates in detail as they are totally different. A statement of the alteration in the bottom widths, &c., and discharges (calculated by Bazin's formula) of the several reaches, as executed and as per original estimate, is attached.

No. 44 I.

Submitted to Government with a recommendation that the revised estimates forwarded by the Superintending Engineer, VI Circle, be sanctioned.

14th Feb. 1896.
(Signed) R. R. E. DRAKE-BROCKMAN, Col., R.E.,
Chief Engineer for Irrigation.

ORDER—No. 362 I., dated 24th April 1896.

The following revised estimate is sanctioned in lieu of the provision of Rupees 56,640 made for item 571 of the comparative statement printed in Proceedings of Madras Government, No. 97 I., dated 3rd February 1894, the excess of Rs. 20,360 being met from the balance of the amount reserved for unforeseen works of the Periyár project, which will then be reduced to Rs. 18,261:—

Capital expenditure not charged to Revenue.
49. Irrigation.
Periyar Project.
I. Works.
3. Distributaries.
4. Earthwork.
Excavating the 9th branch channel.

Estimate ... ... RS. 77,000

2. This sanction is registered as No. 20 I. of 1895-96.

(True Extract.)

Under Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, VI Circle, with five enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. T. K. Narayana Aiyangar.
Spare Copies

No. 362 I d/ 24th April 1896

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

From Supdg Eng, VI Circle, No 100 M.D. d/ 30 Jan/96
No 44 I d/ 14.2.96

Submitted to Govt with a recommendation that the revised estimate forwarded by the Supdg Eng, VI Circle, be sanctioned.

Order thereon:

The following revised estimate is sanctioned in lieu of the provision of Rs 56,640 made for item 571 of the comparative statement printed in Prog. No 97. I, d/ 3rd Feb/94, the excess of Rs 20,360 being met from the

The papers show that calculations made on an obsolete and inaccurate formula turn out (as might have been expected) all wrong. I should like to know whether the work alluded to is still in use in the P.W.D. or whether it has been withdrawn? Also if at the time the calculations were made, the work in question was a recognized authority - or was then considered obsolete? W 18 Feb

Please see Proft. Circular No 47 of 3/12/79. The formula referred to in the S.E.'s letter was then considered obsolete. The calculations for the channels appear to have been made in 1872, or prior thereto. W
× When the work was started, it should have been done on the modified calculations now in use. 18 Feb

This should be pointed out - & the Engineers responsible censured. It is most discreditable to the officers concerned. W 27 Feb

Recd 25/2

P. W. CURRENT No. 1566

Revised Estimate for excavating 9th Branch Channel, Periyar Project

Rec: 17.2.96

To H.E.

With reference to his remarks within.

RMcD
25/2

C. I. Form No. 1—500—14-5-95

Ag. to H.E. 26/2 R 28/2
H.E. 17/2 Rd 19/2

His Excellency Lord Wenlock's remarks dated 27th February 1896.

3629

The following officers held charge of the No:2 Periyar Division in which the Periyar Distributaries are situated.

No:11. DIVISION (Periyar)

		From	To
1	Mr Target	28/7/88	20/2/90
2	Mr Carless	21/2/90	14/4/94

and on the abolition of this Division in 1894 (Vide G.O. No:806.W. dated 21-3-94 the works were taken over by the ordinary Madura Division of which the following officers have since been in charge.

		From	To
1	Mr J.H. Medlicott	26/6/94	Decr/95
2	Mr Joyce	Decr/95	to date

The following are the names of the Suptg Engineers of the VIth Circle under whom No:2 Periyar Division was placed for purposes of supervision.

		From	To
1	Col A.C. Smith	23/5/89	18/2/91
2	Mr J.W. Martin	19/2/91	Novr/91
3	Mr W. Hughes	21/11/91	20/1/92
4	Col A.C. Smith	21/1/92	27/1/93
5	Mr Hughes	19/1/93	2/11/93
6	Col Smart	8/11/93	31/3/94
7	Major Boddy	1/4/94	21/12/94
8	Mr Hughes	22/12/94	to date.

This list of names is useless for the purpose. Can the responsibility be fixed on any particular individual or individuals.

A.S.H
28.3.96

Col. Pennycuick is the only officer to whom blame can be attached. He was in direct supervisional charge from the commencement of the work, and was frequently inspecting it up to the date of his retirement from the service.

RMcD
31/3

The papers may be recorded.

A.S.H
17.4.96

Colonel J. Pennycuick R.E. was from the commencement, in charge of the Periyar Project Works and in his absence on furlough the following officers were in charge.

	From	To
Mr Walch	17/10/92	21/4/93
Mr Hannan	22/4/93	29/10/93

when Colonel Pennycuick on his return from leave resumed charge.

The works were at no time during this period under the charge of the Chief Engineer for Irrigation.

Rnedh
"I" 23/3

H.E. 1/4.
H.E. 24/3. R 30/3.
H.E. 17/2 Rd 19/2

~~His Excellency the Govern~~

With reference to H.E. Lord Wenlock's remarks d/ 27.2 on P.W.C. No. 1566/96

His Excellency the Governor with reply to the remark within.—

F.E.D. 23/4

G.O. No. 446 d/ 16.2.96 sanctioned has now to be issued.

22/4

Issue G.O.
Rnedh
9

From J. H. Medlicott Esquire, Executive Engineer, Madura Dn, No: 300 E. d/. 26th November 1895:—

With reference to your No. 695 M.D. d/ 2nd November 1895, I have the honour to forward herewith the Revised estimate for the 9th Branch Chl with the marginally noted enclosures.

2. The cause of the excess is due to the alteration in the section of the Channel — when calculated by Bazin's formula the original sections at the head of the channel gave a discharge of 178 C.F.S only instead of 297 as required by the "Blue Book" (See page 7).

The formula used in calculating the original sections was,

$$D = A \times \cdot 9\sqrt{2f \times \frac{A}{B}}$$

— where f is the fall in feet per mile; this gives a result approximating more to that given in the Blue Book.

3. I enclose a statement comparing the discharges of all 12 reaches & branches.

(1) as per blue book

(2) as per original sections by the formula above quoted

(3) — do — do — Bazin's formula

(4) As executed (Bazin's formula is used)

I cannot discover how the discrepancies arose. The masonry works have been sanctioned in accordance with the sections as executed.

4. The alteration in the section and alignment is sufficient to account for the excess. There is no use in comparing the two estimates in detail as they are totally different. A statement of the alteration in the bottom widths &ca & discharges (calculated by Bazin's formula) of the several reaches as executed & as per original estimate is attached.

(True copy)

W. Hughes

Supdg Engineer, II Circle

30-1-96

29/1

Endo No. 5 to S.E. 6th No. $\frac{100\ md}{30 \cdot 1 \cdot 96}$

H. 112 Rd/712

OFFICE OF THE SUPERINTENDING ENGINEER,
6TH CIRCLE,

No. 100 md,

Trichinopoly, 30 January 1896.

D 30/-

FROM W. Hughes Esquire,
~~THE~~ SUPERINTENDING ENGINEER,
6th CIRCLE.

1 Pie

TO
THE CHIEF ENGINEER,
P.W.D.

SIR,

ENCLOSURES. 5

1. Det: Estimate
1. Abs: Estimate with Comp: Statt.
1. copy of Statt of Dis: Charges of Main & Branch Chls.
1. do Statt of Bottom width of 9 Branch Chl.
1. Copy of Chief Engineer's letter No $\frac{301 \cdot E}{26 \cdot 11 \cdot 95}$

5

I have the honor to submit a revised estimate amounting to Rs 77,000, being Rs 20,360 in excess of the sanctioned estimate for the 9th Branch Channel from Periyar Main Canal.

2. From a statement attached to the estimate it will be seen that the sections of the Main Canal and Branches were originally calculated according to a very incorrect and obsolete formula and the works have been carried out according to these calculations in the 2nd to 11th Reaches of the Main Canal and the first eight branches. Although it cannot be said that Bazin's formula adopted

in the revised calculation is altogether reliable, it, at least, gives results which are probably not more than a few per cent wrong. Down to the 8th Branch the capacity of each branch is less than the difference in capacity of the reaches of the main canal. The difference in capacity of the 1st and 8th reaches is 643 Cft per second while the capacity of the eight channels is only 321 C.f.S. The difference, if admitted to the channel, must be nearly all disposed of by the surplus works as there are only a few small sluices for direct irrigation, or, to put the matters in another way, the quantity which can be usefully admitted to the first reach is 1195 C.f.S. instead of 1500 originally intended. I doubt however if the main canal will ever have to be enlarged as the difference between the intended and actual capacity nowhere exceeds 12½ per cent. The branches no doubt will have to

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2 Pr

be enlarged, but it would be quite premature to make any proposals in regard to this, as information is still wanting as to the probable demands for filling tanks and supplying direct irrigation.

3. The Executive Engineer has had under preparation for some months past, under instructions from this office, a map compiled from the village maps, showing existing irrigated land, irrigation works and their connections. Only when this is completed will it be possible to determine which of the tanks, numbering altogether over 1,000, it will be desirable to retain and how it will be best to lay out the distributaries and until the lines of the latter are determined and the area of land commanded by each approximately known the required capacity of the different parts of the branch channels can only be very roughly estimated. There is not however so much difficulty in arranging the distribution of water from the 9th to 12th Branches or

determining the area commanded by them as in some of the other cases and I think the required capacity of the 9° Branch as given in the Blue Book and by the Executive Engineer may be accepted as sufficiently correct. As originally calculated the discharge of the channel was 279 cubic feet per second but Bazin's formula gives it only 178 cubic feet per second. To get the required discharge the depth has been increased from 2 feet to 3 feet, and the bed widths slightly altered. The excessive bed fall of 6 feet per mile has been reduced to 3 feet almost throughout. It will be seen from the comparative statement that the excess is due to the higher rates which had to be paid for excavation and banking in rocky soil or rock. The original estimate provides for work only in earth and gravel. I cannot indicate savings on other works to meet the excess on

this

this. The work has been in hand for a long time and is practically completed.

I have the honour to be
Sir,
Your most obedient Servant.

W Hughes.
Superintending Engineer
VI Circle

29/11

C.E.I.
4.2.96

P. W. CURRENT No. 985

Encls 6.

Recd: 31.1.96

P. W. D. 6th CIRCLE

FROM

THE SUPERINTENDING ENGINEER,
6TH CIRCLE.

TO

THE CHIEF ENGINEER,
P.W.D.

No. 100 m.d

Dated 30
Received 30 } January 1896

Enclosures. 5.

9th Branch Channel from Periyar main canal:—

Submits revised estimate of Rs 77,000 for the —

No. 806 W d/ 21-3-94 ✓
No. 97 I d/ 3-2-94. ✗
Prog: circ: No 47 d/ 3-12-79 ✗

I. P. For orders whether to sanction – est. provides for stress work practically completed on Periyar channels mainly:

1/2/96

Russell
3/2

31/1/96

C.E.I.

11/2/96