M.R.O. 1—77,006—8.6-31.

(1) Number of pages.....

(2) Date of repair.....

(3) Initials of the Reference.....

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 941 (IV) Press Mis.

Dated 7-10- 1897.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

9th October 1877, No. 941 W.

Buildings and Roads.
Military Works.

Read the following paper:—

No. 87. From Captain J. L. L. MORANT, R.E., District Engineer, Nilgiris, to the Chief Engineer, Public Works Department, dated Ootacamund, 29th September 1877, No. 387.

I REGRET to be obliged to submit a revised estimate for constructing the timber bridge over the Waterloo stream at Wellington. The present estimate was sanctioned in G.O., No. 140 W, dated the 28th May 1877.

2. The sanctioned estimate is Rs. 9,350; the revised estimate is Rs. 12,200, or the excess is 30 per cent.

3. When about to prepare the sanctioned estimate I visited the bridge with the late Chief Engineer and showed him a pit which I had sunk by the side of the south-western pier (now the south-west abutment). It showed that the foundations of that pier were shallow and had deteriorated. I suggested that the taking down of this pier and the rebuilding of it upon a proper foundation should be included in the estimate. But General Walker stated he saw no necessity for doing so; consequently in deference to his views I merely estimated for raising the south-west pier as it stood.

4. On proceeding to carry out the work, my fears regarding the stability of this pier (about to be turned into an abutment) were revived, and I had three fresh pits dug, when I found that not only was the foundation shallow, far too shallow in my humble opinion, but that the mortar in the interstices of the rubble stone of which it was formed had not set at all: it had not been hydraulic mortar and all its lime had been washed out. The nature of the work also was very poor. The mortar in the brickwork for some height up the wall had also decayed from damp. Thus looking to the three facts,—(1) that this bridge originally failed owing to bad work; (2) that its waterway would by the present arrangement be contracted, three spans being turned into one; and (3) that the stream coming obliquely on to the bridge would impinge with force against this abutment, I decided to pull down the pier, to refound it some 4 feet lower than it was originally, and to lay its foundations with broken granite concrete mixed with General Morgan's cement, this being the only lime with which I am acquainted here which sets immediately under water: the water could not be kept out of the foundation pit for more than half an hour; it rapidly percolated through the bed of the stream. These circumstances, which I trust may be considered sufficiently weighty to justify it, have caused the excess in the sanctioned estimate for which I now solicit sanction.

No. 88. ORDER THEREON, 9th October 1877, No. 941 W.

UNDER the explanation afforded in the above letter, His Grace the Governor in Council sanctions the revised estimate of Rupees 12,200 for constructing a timber bridge over the Waterloo stream, in lieu of the estimate of Rupees 9,350 sanctioned

in G.O. No. 140 W of 28th May 1877, the full amount of which was then appropriated. The Reserve at the disposal of Government under Military having now been exhausted, the additional amount of Rupees 2,850 cannot be provided from that source. The District Engineer will therefore suggest transfers to meet the expense.

2. This sanction has been registered as Imperial No. 69 B of 1877-78 and cancels Register No. 21 W of 1877-78.

(True Extract.)

(Signed) E. A. FOORD, Colonel, R.E.,
Secretary to Government, P.W.D.

To the District Engineer, Nilgiris.
" Examiner of Public Works Accounts.
" Military Department.

Detailed Revised Estimate No. 72 of 1877-78

Nilgiri District

Work. Revised Estimate of the cost of constructing a Timber Bridge over the Waterloo Stream at Wellington.

No.	Measurements L	B	D	Contents	Particulars
1	34	10	2½	850 ✓	Concrete foundation
1	20¼	7	5	1058 ✓	Abutment
1	20¼	7	15½	3282 ✓	Abutment
2	2½	7	20	6440 ✓	Abutments
4	7	1½	3¾	157½ ✓	Pedastals
4	7½	2	¼	10 ✓	Coping to do
				9889½ ✓	Total
				211½	Deduct
				9678. ✓	Total cub feet of Pyck in Chunam
				34	squares of Plastering
				136	Running feet of Cornice to do
6	1½	2	¾	13½ ✓	Under beams
6	1	2	2¾	33 ✓	Rear of beams
6	1¼	2	2	30 ✓	Sides of beams
12	1½	⅜	2	13½ ✓	Sides of Struts
				90 ✓	Total cub. feet of rough stone packing

3	45.0 0 - 9 1 - 0	101.3.0	Longitudinal Beams
3	15.6 0. 9 1 - 0	34.10.6	Straining Beams
6	14.6 0. 9 1. 0	65.3.0	Large Struts
6	5.9 0. 9 1. 0	25.10.6	Small struts
6	7.6 0. 9 1. 0	33.9.0	Corbels
6	2.3 0. 9 0. 9	7.7.1	Blocks between longitudinal beams & large struts
7	22.0 0. 4 0. 7	29.11.4	Joists
22	15.6 0. 3 0. 7	49.8.9	"
14	3.0 0. 4 0. 6	7.0.0	Posts to railing
14	4.0 0. 3 0. 5	5.10.0	Struts to Do
2	41.0 0. 9 0. 6	30.9.0	top railings
2	41.0 0. 3 0. 3½	5.11.9	Centre railings
2	41.0 0. 4½ 0. 7	17.11.3	Side boards
1	45.0 15. 0 0. 2	112.6.0	Planking to roadway
		528.3.2	Total
		132.8.10	Wastage
		661.0.0	Total cft of Teakwood wrought & put up
		48	Squares of tarring the wood work
36	2.0 1. 0 0. 4	-	Covering stones to chamber of Struts
6	2.0 2. 0 2. 6	-	Stone plates to struts.
6	2.0 2. 0 2. 6	-	Stone plates to Longitudinal Beams
1	17.0 36. 0 9. 0	5508.0	Throwing up Embankment for roadway
1	12.0 43. 9 16. 9	8793.9	"
1	17.0 52. 3 25. 3	22428.4	"
		36730.1	

		36730.1	
1	10.0 56. 6 29. 6	16667.6	Throwing up embankment for roadway
1	13.0 61. 0 34. 0	26962.0	"
1	9.0 49. 6 22. 6	10023.9	"
1	14.6 47. 9 20. 9	14366.9	"
1	11.6 45. 6 18. 6	9680.0	"
1	6.6 44. 3 17. 3	4961.6	"
2	116.0 4. 0 2. 0	1856.0	"
		121247.7	
		1044.0	Square yards of Turfing including watering for 3 months.
1	100.0 20. 0 4. 6	9000.0	Up stream side of Embankment
		9000.0	Total cft of rough dry stone rivetment
1	30.3 7. 0 21. 0	4446.0	Breaking down old pier & removing debris

Revised Abstract Estimate No. of 1877-78
Nilgiri District
Work. Cost of constructing a Timber Bridge over the Waterloo Stream at Wellington

Quantity	Particulars	Rate	Per	Amount	Total
850	Cub ft of Broken blue Metal in cement	60	100 ft	510	
1058	Cub ft of Brick in cement	60	"	634 12 9	
9678	Cub ft of Brick in Mortar	40	"	3871 3 2	
31	Squares plastering	10	sqr	310	
136	Run: feet of Cornice work	1	Rft	136	
90	Cft rough stone packing	6	100 cft	5 6 4	
661	Cub ft of Teakwood wrought & put up	4	Cft	2644	
	Carried over			8111 6 3	

	Brought forward			8111	6	3
48	Squares of Tarring the wood work	2	sqr	96		
36	Covering Stones to chamber of Struts 2'x1'x¼"	1 12	each	63		
6	Stone plates to Struts 2'x2'x2'6"	5		30		
6	Stone plates to Longitudinal Beam 2'x1'x9"	2		12		
302	lbs of Flat bar iron ¼" thick for straps	3	lb	94	6	
125	lbs of Flat bar iron ⅛" thick for straps	5		39	1	
55	lbs of round bar iron ½" diameter for bolts including nuts &c	5		17	3	
45	lbs of round bar iron ⅜" diameter for bolts including nuts &c	5		14	1	
4490⅔	Cubic yards of earth work for embankment	4	cyd	1122	10	8
1044	Square yards of Turfing slopes including watering for 2 months	10	100 sqr yds	104	6	4
9000	Cub ft of dry rough stone revetment including Pointing Blasting & Bond stones	10	100 ft	900		
	Carriage of timber from Ootacamund to work site			166		
4	Guard stones	4	each	16		
	Scaffolding &c			200		
4446	Cub ft Breaking down old pier & removing debris	10	100 ft	444	9	
				11430	11	3
	Sundries at 10%			1143	4	9
				12574		
	Deduct old materials to be utilized			374		
	Total Estimate Rupees			12200		

Passed for Rs 12200 [illegible] 9-10-77

District Engineer's office
Ootacamund
September 1877

J. H. Morant
Major R.E.
District Engineer

G.C.9. Oct. 77 [illegible] 87

Comparative Statement of Sanctioned and Revised Estimates of Constructing a Timber Bridge over the Waterloo Stream at Wellington.

Quantity in Sanctioned Estimate	Particulars	Rate	Per	Amount in Sanctioned Estimate		Decrease	Remarks
	cub ft of Broken Blue metal in cement	60	100 ft				To refound S.W. Pier now turned into an abutment.
	cub ft of Brick in Cement	60					— Do — Do —
6396	cub ft of Brick in Mortar	40		2558			— Do — Do —
31	Squares plastering	10	sqr	310			
136	Run: feet of Cornice work	1	Rft	136			
90	cub ft rough stone Packing	6	100 cft	564			
661	Cub ft Teakwood wrought and put up	4	cft	2644			
48	Squares of Tarring the wood work	2	sqr	96			
36	Covering stones to chamber of struts 2'×1'×1¼	1 12	each	63			
6	Stone plates to struts 2'×2'×2'6"	5		30			
6	Stone plates to Longitudinal beams 2'×1'×9"	2		12			
302	lbs of Flat bar iron ¼" thick for straps	5	lb	946			
125	lbs of Flat bar iron ⅛" thick for straps	5		391			
55	lbs of round bar iron ½" diameter for bolts including nuts &c	5		~~141~~ 173	173		
4490⅔	cub yards of Earth work for Embankment	4	cyd	1122 10 8	141		
1044	Sqr yards of Turfing slopes including watering for 3 Months	10	100 sqr yds	1046 4			
9000	cub ft of dry rough stone rivetment including pointing, blasting & bond stones	10	100 cft	900			
	Carriage of timber from Ootacamund to work site			166			
4	Guard stones	4	each	16			
	Scafolding &c			200			
	cub ft Breaking down old pier and removing debris	10	100 cft				— Do — Do —
				8528 ~~88~~ 24			
	Sundries			821 ~~74~~ 138			
				9350			
	Deduct Materials to be utilized					374	
	Total Estimate Rupees			9350		374	
					9350 .. 374 ..		

District Engineers Office
Ootacamund
September 1877

J. H. Morant
Major R.E.
District Engineer.

District Engineers Office
Ootacamund 29th September 1877

No. 387

From

The District Engineer
Nilgiris

To

The Chief Engineer
S. W. D.
Madras

Sir,

I regret to be obliged to submit a revised Estimate for constructing the timber bridge over the Waterloo Stream at Wellington. The present Estimate was sanctioned in G. O. No. 140 W dated the 28th May 1877.

2. The sanctioned Estimate is Rs 9350; the revised Estimate is Rs 12200; or the excess is 30 percent.

3. When about to prepare the sanctioned estimate I visited the bridge with the late

Chief

Chief Engineer and shewed him a pit which I had sunk by the side of the South-western pier (now the S.W. abutment). It shewed that the foundations of that pier were shallow and had deteriorated. I suggested that the taking down of this pier and the rebuilding of it upon a proper foundation should be included in the Estimate. But General Walker stated he saw no necessity for doing so. Consequently in deference to his views I merely estimated for raising the S.W. pier as it stood.

4. On proceeding to carry out the work my fears regarding the stability of this pier (about to be turned into an abutment) were revived, and I had three fresh pits dug, when I found that not only was the foundation shallow - far too shallow in my humble opinion, but that the mortar in the interstices of the rubble stone of which it was formed had not set at all: it had not been hydraulic mortar and all its lime had been washed out. The nature of the work also was very poor. The mortar in the brickwork for some height up the wall had also decayed from damp. Thus looking to the three facts (1) that this bridge originally failed owing to bad work, (2) that its waterway would by the present arrangement be contracted, three spans being turned into one and (3) that the stream coming obliquely on to the bridge would impinge with force against this abutment, I decided to pull down the pier, to refound it some four feet lower than it was originally and to lay its foundations with hot lime grouted Concrete mixed with General Morgans Cement, this being the only lime with which I am acquainted here which sets immediately under water: the water could not be kept out of the foundation pit for more than half an hour, it rapidly percolated through the bed of the stream. These circumstances, which

which I trust may be considered sufficiently weighty to justify it, have caused the excess in the sanctioned estimate for which I now solicit sanction.

I have the honor to be
Sir
Your most obedient Servant
Jos Morant Capt R.E.
District Engineer

Roads and Buildings

orgl fo 28th May 1877 No 140 W.

From

The District Engineer
Nilgiris

To

The Chief Engineer
S. W. D.
Madras.

No 387

Dated 29th September 1877.
3d

No of Enclosures. 2 S)

Waterloo-Bridge at Wellington — Submits the revised estimate for constructing the —

G.O. 9th Oct 77 [illegible]

Cor 6-10 Ag-10

No 941 W

Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 9th Oct 77

Read the following :—

From the District Engr Nilgiris. H. E. No 387 d/ 29th Septr 1877.

Under the explanation afforded in the above letter, His Grace the Governor in Council sanctions the revised estimate of Rs. 12,200 for constructing a timber bridge over the Waterloo stream, in lieu of the estimate of Rs. 9,350 sanctioned in G.O. No 140 W of 28th May 1877 — the full amount of which was then appropriated. The Reserve at the disposal of Government under Military having now been exhausted, the additional amount of Rs 2850 cannot be provided from that source. The District Engineer will therefore suggest transfers to meet the expense

D.E. Nilgheries
Ex. P.W.A.S.
Mily. Dept. S
Despd 13-10-77.

A.S.P.

EAF 5/10

This

This sanction has been registered as Imperial No. 69 B of 1877-78. and cancels Register No. 21 W of 1877-78.

Ca 9717

Sobt. of (1877) Madras.

PUBLIC WORKS.

To

Dated D. L. Nilgiris

Issued

Recd. Encl.

G. O. 9th Oct 1877. No. 941 W

P5

Nos. 87-88

Timber bridge over the Waterloo stream at Wellington Nilgiri Dr sanctions the revised estimate of Rs 12,200 for constructing a —

Sutdin Regr. 15-10-77

Ca 6.10.79-10