GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper :—

G.O., dated 21st March 1890, No. 403 R., Public Works.

From the Consulting Engineer for Railways, dated Madras, 12th March 1890, No. 182.

From the Agent and Manager, Madras Railway Company, dated Madras, 21st January 1890, No. E. 63/69.

ENCLOSURE.

From the Chief Engineer, Madras Railway Company, to the Agent and Manager, Madras Railway Company, dated Madras, 14th January 1890, No. 4140/39.

Reconstruction of Bridge at 258-10 *miles, North-West Line.*

I beg to forward a plan and estimate (in duplicate) (Rs. 37,763) for the reconstruction of the bridge at 258-10 miles, north-west line, which was seriously injured by the heavy floods in October last. The particulars of the damage which were reported in full to you in my letter No. 1212 of 22nd October 1889 may be briefly summarised as follows.

2. The bridge consists of four 64-feet openings, spanned by girders continuous over two openings, and supported on abutments and piers of masonry, with a provision for headway of 12 feet. On the 16th October 1889 the flood rose to the unprecedented height of within one foot of girder level, and above the revetment on the slope of the approaches; it broke through the bank, chiefly pure sand, and created a scour behind the south abutment which fell over. The unsupported end of the girder then dropped bringing down with it and overturning pier No. 1 and severely shaking pier No. 2. A temporary abutment and pier, formed of timber stagings, were erected on the sites of the ruined structures, the gap of 100 feet in the bank was rapidly filled up, and traffic was resumed over the bridge at restricted speed on the 20th October, or four days afterwards.

3. Owing to the flooded condition of the river a thorough examination of the cause of the failure was not practicable until the end of November, when it was found that this was due to defective foundations. Aided by a series of borings, it was discovered that the stratum of rock which crops up at the surface at the north bank slopes away to a depth of 21¼ feet. At the south bank, whereas the depths of foundations of the fallen abutment and pier were recorded at 8 feet only on "Morumboo." Pier No. 2 appears to be founded partly on rock and partly on soft morumboo, and its shaken and cracked condition renders its reconstruction from its very base imperative. Pier No. 3 and the north abutment are sound, but are not bedded uniformly on the rock; these, however, can be made secure by encasing the foundations below river bed with 3 feet of concrete as shown on the plan.

4. The removal of the débris and foundations of the fallen pier and abutment, and their reconstruction on the same sites, would involve extensive and costly coffer dams and heavy pumping; and in order to obviate the expenditure and delay which these operations would entail, it is proposed to utilize for the new piers C.I. cylinders 6 feet diameter which are available, and to rebuild the abutment of masonry founded on brick wells. It is further proposed to insert an intermediate span of 35 feet, so that the new piers may be located clear of all obstructions and built in the centre of the existing spans. A substantial dry stone flooring throughout the first span of the bridge and extending to 10 feet behind the south abutment is also provided for. This additional safeguard appears essential for the protection of this abutment.

5. The estimated cost of the work, including the temporary diversion of the line during the progress of reconstruction is Rs. 37,763, and it is requested that the sanction of Government may be obtained, as early as practicable, for the expenditure, which is wholly chargeable to Revenue.

6. A copy of the estimate has been forwarded to the Chief Auditor for the purpose of being checked and allocated, and Mr. Cramp has been requested to send on the allocation sheet to you at an early date.

7. In conclusion I desire specially to point out that, as unavoidable delay has already been incurred in the submission of the plan and estimate, it is of the utmost importance that the work should be put in hand forthwith. It is therefore hoped that immediate provisional sanction may be accorded to proceed with the temporary diversion of the line, and the collection of plant and materials for the main portion of the scheme.

From the Agent and Manager, Madras Railway Company, dated Madras, 8th March 1890, No. E. 63/264.

Submitted for transmission to the Government of India.

2. On 16th October 1889 very heavy floods occurred in the Gooty district by which the bridge of four 64-feet openings at 258-10, North-west line, Madras Railway, was seriously injured. The flood, after having washed away a training bund, rose to within one foot of girder bed level, broke through the embankment and created a scour behind the south abutment causing it to fall over. The unsupported end of the girder, which was a continuous one over two openings, then dropped, and brought down with it and overturned pier No. 1 and severely shook pier No. 2.

3. On examination, when the river had gone down, it was found that the cause of the failure was due to defective foundations, the pier and abutment having been founded on so called "Moorum" at a depth of 8 feet only instead of on rock which was $21\frac{1}{4}$ feet below the surface.

4. The Agent and Manager, Madras Railway, now submits an estimate (with plan), amounting to Rs. 38,145, for the reconstruction of the damaged portions of the bridge, which also includes the cost of the temporary diversion, chargeable to Revenue.

5. The Chief Engineer states "the removal of the débris and foundations of the fallen pier and abutment, and their reconstruction on the same sites, would involve extensive and costly coffer-dams, and heavy pumping; and in order to obviate the expenditure and delay which these operations would entail, it is proposed to utilise for the new piers C.I. cylinders 6 feet diameter which are available, and to rebuild the abutment of masonry founded on brick wells. It is further proposed to insert an intermediate span of 35 feet, so that the new piers may be located clear of all obstructions and built in the centre of the existing spans. A substantial dry stone flooring throughout the first span of the bridge and extending to 10 feet behind the south abutment is also provided for. This additional safeguard appears essential for the protection of this abutment."

6. The estimate is recommended for the sanction of the Government of India, but as it was indispensable that the work should be put in hand as soon as the water fell low enough to admit of it, provisional sanction was accorded for the work to be proceeded with, at the official meeting held on 23rd January 1890, in order that full advantage of the working season might be obtained, and the estimate is now forwarded for confirmation of the sanction thus given.

Order—dated 21st March 1890, No. 403 R., Public Works.

Ordered that the estimate provisionally sanctioned be forwarded for the confirmation of the Government of India.

(Here enter No. 404 R., dated 21st March 1890.)

(True Extract.)

(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

Endorsement—dated 21st March 1890, No. 404 R., Public Works.

Forwarded.

(By Order.)

(Signed) C. J. SMITH, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

Read also the following paper:—

From the Under-Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 8th May 1890, No. 408 R.C.

I am directed to acknowledge the receipt of your No. 404 R., dated 21st March 1890, and in reply to communicate the sanction of the Government of India to the estimate received therewith, amounting to Rs. 38,145, of the cost of reconstructing the damaged portions of bridge No. 316 at mile 258 on the north-western line of the Madras Railway, chargeable against Revenue.

2. In conveying this sanction I am to forward, for consideration and such action as may appear desirable, a copy of a note by the Consulting Engineer to the Government of India for State Railways pointing out the objection to the proposed adoption of wells for shallow foundations and the doubtful efficiency of the proposed flooring unless a drop wall is built on the down-stream side.

3. The sanction herein accorded has been registered as No. 1 R., Madras Railway, of 1890.

ENCLOSURE.

Note by the Consulting Engineer to the Government of India for State Railways, dated 20th April 1890, on the estimate for reconstructing the damaged portions of bridge No. 316 at mile 258 in the North-West Line, Madras Railway.

If Moorum existed within 8 feet of the surface at the old abutment it would seem to be easy to found the new abutment dry instead of using wells which I think are objectionable for shallow foundation from the difficulty of evenly bedding them on rock. I much doubt the efficiency of the flooring unless a drop wall is built on the down-stream side, and I fail to see the good of flooring *behind* the abutment. If the bank is washed away the flooring will to a certainty scour.

ORDER—dated 22nd May 1890, No. 709 R., Public Works.

Communicated to the Consulting Engineer for Railways with reference to his endorsement No. 182, dated 12th March 1890.

2. This sanction has been registered as No. 6 R. of 1890-91.

(True Extract.)

(Signed) SIDNEY SMITH, Major, R.E.,
Under-Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, Guaranteed Railway Accounts.

Exd. J. Moses.
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated May, 22nd.

Recd. *Encl.*

G.O., 22nd May 1890, No. 709 R.

MAY.

Bridge

Sanction of the Government of India to the estimate of Rs. 38,145 for reconstructing the damaged portions of — No. 316 at mile 258 on the North-West Line of the Madras Railway, communicated to the Consulting Engineer for Railways.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper :—

G.O., dated 20th October 1890, No. 1551 R., Public Works.

From the Consulting Engineer for Railways, dated Madras, 3rd October 1890, No. 653.

From the Agent and Manager, Madras Railway Company, dated Madras, 12th September 1890, No. E 63/970.

Submitted to Government with reference to G.O., No. 709 R., dated 22nd May 1890, and for transmission to the Government of India.

2. The Agent and Manager, Madras Railway, submits for sanction a revised estimate, amounting to Rs. 43,528, chargeable to Revenue, for restoring the bridge at mileage 258/10 North-West Line, damaged by the flood of 16th October 1889.

3. The original estimate for the work, which amounted to Rs. 38,145, has been exceeded by Rs. 5,383. The excess is attributable to the sinkage being extremely difficult, a thick bed of large granite boulders being encountered which could only be penetrated by the employment of divers, after the boulders had been shattered by dynamite. The rough stone flooring, to which exception was taken by the Consulting Engineer to the Government of India for State Railways, has not been laid, as the wells and cylinders have been taken down to rock.

4. The revised estimate is recommended for the sanction of the Government of India.

Order—dated 20th October 1890, No. 1551 R., Public Works.

Ordered to be forwarded for the sanction of the Government of India with reference to its letter No. 408 R.C., dated 8th May 1890.

(Here enter No. 1552 R., dated 20th October 1890.)

(True Extract.)

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Endorsement—dated 20th October 1890, No. 1552 R., Public Works.

Forwarded.

(By Order.)

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Read also the following paper :—

From the Officiating Under-Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 1st November 1890, No. 998 R.C.

I am directed to acknowledge the receipt of your No. 1552 R., dated 20th October 1890, and in reply to communicate the sanction of the Government of India to the revised estimate therewith forwarded amounting to Rs. 43,528, chargeable to Revenue, for reconstructing the damaged portions of bridge No. 316 at mile No. 258/10 on the North-Western Line of the Madras Railway, the above amount being Rs. 5,383 in excess of that sanctioned in Public Works Department letter No. 408 R.C., dated 8th May 1890.

2. The sanction herein conveyed has been registered as No. 2 R., Madras Railway, of 1890, and is in supersession of the provision sanction registered as No. 1 R. of 1890.

ORDER—dated 20th November 1890, No. 1851 R., Public Works.

Communicated to the Consulting Engineer for Railways with reference to his endorsement No. 653, dated 3rd October 1890.

2. This sanction has been registered as No. 22 R. of 1890-91 and is in supersession of the sanction registered as No. 6 R. of 1890-91 in G.O., No. 709 R., dated 22nd May 1890.

(True Extract.)

Major, R.E.,
Under-Secy. to Govt., P.W.D.
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, Guaranteed Railway Accounts.

Exd J. Moses.
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated November, 29th.

Recd. *Encl.*

G.O., 20th Nov. 1890, No. 1851 R.

NOVEMBER.

Bridge at 258/10 miles, North-West Line, Madras Railway

The sanction of the Government of India to the revised estimate for reconstructing damaged portions of the —, communicated to the Consulting Engineer for Railways.

From the Consulting Engineer for Railways, dated Madras, 3rd Octr 1890 No. 653

5,000—14-11-85.

(No. I.)

No. E63

970

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,

MADRAS, 12th September 1890

Despatched 23rd Sept 90.

From

The Ag. Agent and Manager.

M.R.C

To

The Consulting Engineer for Railways.

SIR,

Revised Estimate for restoring Bridge at 258/10 miles N. W. Line

I have the honour to forward herewith in duplicate, for the sanction of Government a revised Estimate amounting to Rs 43528/- for restoring the bridge at 258/10 miles, North West Line, damaged by the flood of 16th October 1889.

2. The unforeseen circumstances which have rendered the original estimate insufficient are explained in the following extract from a letter from the Chief Engineer.

"Enormous beds of boulders were met with and had to be cut in Situ by Divers and

by the employment of Divers, after the

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated November, 29th.

Recd. *Encl.*

G.O., 20th Nov. 1890, No. 1851 R.

NOVEMBER.

Bridge at 258/10 miles, North-West Line, Madras Railway

The sanction of the Government of India to the revised estimate for reconstructing damaged portions of the —, communicated to the Consulting Engineer for Railways.

From the Consulting Engineer for Railways, dated Madras, 3rd Oct 1890 No. 653

(No. I.) 5,000—14-11-85.

No. E63 / 970

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,

MADRAS, 12th September 1890

Despatched 23rd Sept/90.

From

The Agent and Manager.

M.R.C

To

The Consulting Engineer for Railways.

SIR,

Revised Estimate for restoring Bridge at $\frac{258}{10}$ miles. N. W. Line

I have the honour to forward herewith in duplicate, for the sanction of Government a revised Estimate amounting to Rs 43528/- for restoring the bridge at $\frac{258}{10}$ miles, North West Line, damaged by the flood of 16th October 1889.

2 The unforeseen circumstances which have rendered the original estimate insufficient are explained in the following extract from a letter from the Chief Engineer.

"Enormous beds of boulders were met "with and had to be cut in situ by Divers and

by the employment of Divers, after the

"and removed to enable the wells to be sunk
"Some idea of the difficulty of this work may
"be formed when I explain that four of
"the wells were sunk through beds of huge
"boulders 9 feet thick"

3 Information as to provision in the budget and the date on which sanction will lapse is given on the Estimate.

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

Ag. Agent & Manager

Form No. 2.

PUBLIC WORKS DEPARTMENT.

OFFICE OF CONSULTING ENGINEER FOR RAILWAYS,

Madras, 3rd October 1890.

2 dp

Letter from the Agent and Manager Madras Railway no. 8.63/970 dated 12th September 1890 with enclosures.

No. 653

SUBMITTED ——— to ——— Government.

With reference to G.O. No. 709 R dated 22nd May 1890 and for transmission to the Government of India Madras Railway

2. The Agent and Manager submits for sanction a revised estimate amounting to Rs 43,528 chargeable to Revenue for restoring the bridge at mileage 258/10 North West line damaged by the flood of 16th October 1889.

3. The original estimate for the work which amounted to Rs 38,145 has been exceeded by Rs 5,383. The excess is attributable to the sinkage being extremely difficult, a thick bed of large granite boulders being encountered which could only be penetrated by the employment of divers under the

MADRAS RAILWAY.

From The Agent and Manager.

To The Consulting Engineer for Railways.

Dated 12 September 1890.

Rcvd. 23.9.90 No. 8.63/970

Forwarding a revised estimate for restoring bridge at 258/10 N.W. line, Ch. Wks.

Pw Enel 9437/90

boulders had been shattered by dynamite. The rough stone flooring to which exception was taken by the Consulting Engineer to the Govern-ment of India for State Railways, has not been laid, as the wells and cylinders have been taken down to rock.

4. The revised estimate is recommend-ed for the sanction of the Government of India.

Sidney Smith
Major R.E.
For Offg: Cong: Engr for
R. Rys

Form No. 3.

B
No. 1551 R dy 20- Oct/90.

14/10/90 Jtf 13/10/90 3

Ordered to be for-
warded for the sanction of
the Government of India with
reference to its letter No. 408 R.C.
dated 8th May 1890.

H.C. No 1552 R dy 20 Oct 1890

Forwarded.

Dy: R

7/11/90

No. 709 R dy 22-5-90.

D.

Recei

Submitting. for transmission
to the Government of
India, a revised
estimate for restoring
the bridge at 258/10 miles
North West Line,
Madras Railway.

B
No. 1551-52 R dy 20- Oct/90.

R.

Dy 14/11/90

Dy 7-X-90.

to 1851 R

C

NDIA.

PARTMENT.

truction

Joint Secretary to the Government of Madras
(Railway Branch)
Public Works Department

Simla, The 1st November 1890.

I am directed to acknowledge the receipt of your No. 15 1552 R dated 20th October 1890 and in reply to communicate the sanction of the Government of India to the revised estimate therewith forwarded amounting to Rs 43528 chargeable to Revenue for re-constructing the damaged portions of Bridge No. 316 at mile 258/10 on the North Western line of the Madras Railway the above amount being Rs 5,383 in excess of that sanctioned in Public Works Department letter No. 408 R C dated 8th May 1890.

2 The sanction herein conveyed has been registered as No. 2 R. Madras Railway of 1890 and is in supersession of the provision sanction registered as No. 1 R of 1890.

I have the honour t
Sir,
Your most obedie

J. D. Ba

Offg. Under Se

Document accompanying.
Nil

No. 3.
1551

No. 1551-52 Rd/ 20-x-90
" 709 R d/ 22.5-90

14.xi.90.

MEMO.

Revised —

THE estimate for restoring Brid
No. 316 at 258 Miles Damage
by the flood of 16th October
1889.

amounting to Rs. 43528—0—0

has been checked by me.
Rect. on 24th } September 189
Retd. to. on 26th }

REMARKS.

Rates and Calculations
correct.

A Comparative
Statement for the above work
is prepared & put up herewith

D. C.

REMARKS BY D. E. R.

1851 R.

No. 1851 R

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 20th November 90

READ again the following

5 P

Progs: of the Madras Govt: P.W. Deptt: } No. 1551/1552 R dy 20th Octr 90

Read also the following.

Letter from the Govt. of India P.W. Deptt: } No. 998 R.C. dy 1st Nov 90

Communicated to the Consulting Engineer for Railways with reference to his endorsement No. 653 dated 3rd October 1890

2. This sanction has been registered as No 22 R of 1890-91 and is in supersession of the sanction registered as No. 6 R of 1890-91 in G.O. No. 709 R dy 22nd May 1890.

Dated 3/12/90

To The Consulting Engr for Rys
" Govt Records

A

No. 1851 Roy 20 Thom 90