6926, 4910, 8582, 1370, 6883 &

Public Works (1896) Department.

G.O., No. 2953 W.

DATED 19th October 1896

[Despatch Abstract.]

Bridge: Estimate of Rs 11,500 for constructing
an iron girder — of two spans of 30 feet
each across the Kathwary at the 16th mile,
road No. 11 in the Trichinopoly Dt; Sanctioned.

T.C. 20/10
19/10

[P. W. 307.
200—18-9-96.]

BACK PAPERS.

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

FURTHER PAPERS.

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

BUILDINGS AND ROADS.
CIVIL WORKS.

Government {1896} of Madras.
PUBLIC WORKS.

Recd.	1896.	*Enclosures*
Regd.		*Spare copies*

G.O., No. 2953 W., 19th October 1896.

OCTOBER.

Bridge

Estimate of Rs. 11,500 for constructing an iron girder — of two spans of 30 feet each across the kathwary at the 16th mile, road No. 11, in the Trichinopoly district, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers :—

From Major O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 10th September 1894, No. 926 T.C.

I have the honour to forward herewith, for the sanction of Government, an estimate, amounting Rs. 9,100, for constructing an iron girder bridge of 45 feet span across the kathwary in the 16th mile of road No. 11 in the Trichinopoly district.

2. The bridge is intended to take the place of the old bridge which consisted of two arches of 18 feet span each, and which was destroyed by the floods of 1884.

3. The necessity for this bridge has been fully established.

4. The foundations allowed by the Local Fund Engineer of concrete and brick work, have been altered to concrete throughout.

5. No details of the iron work accompany the estimate, but as it is proposed to obtain this item of the estimate from those experienced manufacturers, Messrs. Burn and Co. of Calcutta, and as it is also of consequence that early sanction to the estimate be accorded to allow of advantage of the proper season being taken to get in the foundations, I have not delayed the submission of the estimate on that account.

6. The clear roadway is to be 13 feet which is sufficient.

Memorandum to the Superintending Engineer, VI Circle, dated 18th October 1894, No. 3174 C.

With reference to the plans and estimates for an iron girder bridge across the kathwary in the Trichinopoly district, received with letter from the Superintending Engineer, VI Circle, No. 926 T.C., dated 10th September 1894, the undersigned has the honour to observe that, with respect to the waterway, there is a total absence of hydraulic details, and that without cross sections and a longitudinal section of the river showing H.F.L., it is not possible to judge what discharge may be required.

2. It does not seem desirable to have one block of concrete on top of another with footings. In fact, it is doubtful whether it would be possible to put it in in that way without considerable difficulty. The masonry might be commenced on 3 feet of concrete as first intended; and this 3 feet might be carried right across the span as a floor, the top of it being 5 feet lower than the floor shown in the plan. This will allow 5 feet for scouring without ill effect. The wings do not seem to have been designed to fit the slope of the bank, which, moreover, is not shown. They are clumsy in design and weak, being at bottom one foot less than necessary for safety.

3. The plans and estimates are returned for revision and further information.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer.

From W. HUGHES, Esq., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 24th June 1895, No. 460 T.C.

In reference to your memo., No. 3174 C., dated 18th October 1894, I have the honour to submit, for sanction of Government, an estimate, amounting to Rs. 9,300, together with a revised plan prepared by the Local Fund Engineer, for constructing a girder bridge of 45 feet span across the kathwary in the 16th mile of road No. XI in the Trichinopoly district.

2. The Local Fund Engineer has revised the design in accordance with the instructions conveyed in the memorandum under reference, submitting the necessary level sections, together with hydraulic details, as ordered.

3. Though the drainage basin is nominally 216 square miles, the discharge in very heavy floods would really be equivalent to that from about 60 square miles, as the Marudar Nattu voikal is but a small channel and the bulk of the drainage would sweep across it. The railway bridge of three 15-feet arches a little above the road has been found quite large enough, and I think quite safe to make the road bridge also of 15-feet span.

Memorandum to the Superintending Engineer, VI Circle, dated 7th August 1895, No. 2456 C.

It may be calculated that, under the more favourable circumstances stated—that is, supposing we have only 60 square miles of drainage area to consider—it would not be safe to construct a bridge of less than 60 feet waterway, although there may be a depth of 20 feet available for discharge. If the railway bridge stands well, it is probably due to the fact that the area of country drained is less than 60 square miles. Before a waterway of only 45 feet can be accepted, it should be reported whether the railway bridge has withstood the highest recorded flood, or, if there is any doubt as to the flood noted being the maximum, the highest observed by riparian inhabitants.

2. Standing Orders 8 C.C. of 1876 have not received proper attention. The soil is stated on the plan to be silt and clay, and the sub-soil to be morum; but, as the depths are not mentioned, this information is valueless. It is proposed to build different parts of the abutments at different levels. If the soil is rock this can be done with impunity: otherwise it would be better to start from one level.

3. The nature of the soil at + 36 not being known, since the depth of the morum is not stated, it is not clear whether or not the concrete has been let into a bed of rock. If such is the case, the necessity for a concrete floor is not apparent. And if it rests on clay the absence of retaining walls to keep it together should be explained; as should also the reason for dispensing with an apron. It would be well to enter the level at which morum begins, and also at which it ends, *i.e.*, if it ends above + 36.

4. The estimate, giving details of the iron work, which the Superintending Engineer, as stated in his letter No. 926 of 10th September 1894, proposed to obtain from Messrs. Burn & Co. of Calcutta has not been received, and as it is expected that the girder will cost Rs. 5,000 out of the Rs. 9,300 provided for the entire bridge, it is important that those details should be obtained for scrutiny.

5. The space between H.F.L. and lowest point of girders should be sufficient to admit of the free passage during floods of trees or other floating bodies that may be brought down.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer.

From W. HUGHES, Esq., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 4th November 1895, No. 1198 T.C.

In reply to your reminder No. 2456 C./2, dated 30th October 1895, I have the honour to state that a new plan for the iron girder bridge across the kathwary on road No. 11, in the Trichinopoly district, has been made in accordance with your instructions, but the estimate is incomplete, pending enquiry which is being made as to rates for iron work. The estimate will be very shortly submitted.

From W. HUGHES, Esq., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 7th February 1896, No. 204 T.C.

In reference to your memo., No. 2456 C., dated 7th August 1895, I have the honour to submit, for sanction of Government, a fresh plan and an estimate, amounting to Rs. 11,500, for constructing a girder bridge across the kathwary in the 16th mile of road No. XI, Trichinopoly district.

2. The bridge now proposed will be two 30-feet spans with iron work according to standard design No. 13, dated January 1888. The rates for iron work are based on an estimate furnished by the General Superintendent, Public Works Stores.

From the Superintending Engineer, VI Circle, dated 29th July 1896, No. 1206 T.C.
„ „ „ VI „ „ 23rd Sept. „ „ 1547 „

Note by the Chief Engineer, Public Works Department.

A bridge of two spans, each 30 feet, may be accepted and the estimate may be passed subject to the following modifications as regards the design of the work:—

(1) As suggested in this office memo., No. 3174 C., dated 18th October 1894, the masonry might be commenced on 3 feet of concrete, and this 3 feet thickness carried right across the spans as a floor. The deviation is shown on a tracing attached to the design.

(2) A saving can be effected by eliminating the cut-waters on the down-stream side where they serve no useful purpose.

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
Chief Engineer.

3rd October 1896.

ORDER—No. 2953 W., dated 19th October 1896.

The estimate, amounting to Rs. 11,500, for constructing an iron girder bridge of two spans of 30 feet each across the kathwary at the 16th mile, road No. 11, in the Trichinopoly district, is sanctioned.

2. Attention is drawn to the Chief Engineer's note recorded above.

3. This sanction has been registered as local No. 10 W. of 1896-97.

(True Extract.)

Under Secretary to Government.

To the Superintending Engineer, VI Circle.
„ Local and Municipal Department, with eight enclosures.

Exd. T. K. Narayana Aiyangar.

~~118~~

A

PUBLIC WORKS DEPARTMENT.

No. 2953 W. d/ 19th October 1896.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

R. D. M.
Cart-works

READ the following

~~From~~ the Suptg: Engr. VI Circle, No. 926 T.C, d/ 10. Sept. 1894
Memo to —— do —— No. 3174 C, d/ 18. oct. 1894
~~From~~ the —— do —— No. 460 T.C, d/ 24. June 1895
Memo to —— do —— No. 2456 C d/ 7th Augt. 1895
~~From~~ the —— do —— No. 1198 T.C, d/ 4. Novr. 1895
Do —— do —— No. 204 T.C, d/ 7. Febry 1896
Do te 88 P —— do —— No. 1206 T.C, d/ 29. July 1896
Do te 93 P —— do —— No. 1547 T.C, d/ 23. Sept 1896.
Note by the Chief Engineer, P.W.D, dated October 1896

II

The estimate, amounting to Rs 11,500 for constructing an iron girder bridge of 2 spans of 30 feet each across the Kathwary at the 16th mile road No 11 in the Trichinopoly District, is sanctioned.

2. Attention is drawn to the Chief Engineer's note recorded above.

3. This sanction has been registered as Local No 10 W of 1896-97.

To The Chief Secretary to Govt for favour of Counter initials

A.S.K. 13.10.96

11 P.M.

The S. E. VI Circle
„ L & M. Department with 8 enclosures.

A.S.K. 5.10.96

9/10/96

W.W.D. 5.10.96

C.W.R. 3.10.96

D/ 450

i. e. C. 7/10 R.16

40—300—6-3-96.

T A
B CMP

P. W. Department
C. Nos 6926/94; 4910, 8582/
1370, 6883 & 8595/96.

8/10

Note by the Chief Engineer, P. W. Department:—

10 Prs

A bridge of two spans each 30 feet, may be accepted, and the estimate may be passed subject to the following modifications as regards the design of the work.

(1) As suggested in this office memo no 3174 C dated 18th October 1894, the masonry might be commenced on three feet of concrete, and this three feet thickness carried right across the spans as a floor. The deviation is shown on a tracing attached to the design.

(2) A saving can be effected by eliminating the cut-waters on the down-stream side where they serve no useful purpose.

3/10/96

EW

CHWS
3/10/96

Public Works (1896) Department.

CURRENT No. 8595

Order

From

The Supdt. Engineer
VI circle.

No. 1547 C

Dated 23rd. September 1896

Received 23/25. 9. 96

Enclosures .

Spare copies .

SUBJECT.

Girder Bridge across the Kattuvady : Trichinopoly Dt.

: Submits copy of letter from the President Dt. Bd. Trichinopoly enquiring when the estimate for the — is likely to be sanctioned —

Soon

I

Please keep this with the other papers, & expedite scrutiny of the estimate.

CE
29.9.96

EW

v.L.S.450

BACK PAPERS

G.O.	No.	Department.	Date.

FURTHER PAPERS

G.O.	No.	Department.	Date.

Letter from the President, District Board, Trichinopoly, to the Superintending Engineer VI Circle, No. R.C. 103 of 95 dated 17 September 96.

In continuation of my letter dated 17 July 1896, R.C. 103 of 95, I have the honor to enquire when the estimate for the Kattuvari Bridge work is likely to be sanctioned by Government and in what stage the matter is.

2. A sum of Rs 9300 has been provided on account of this work in the current year's Budget. If the estimate is not likely to be sanctioned at an early date steps will be taken to utilise this amount on other works.

No. 1547 TC

Copy submitted to the Chief Engineer P.W.D. with reference to this Office Nos $\frac{204.T.C}{7.2.96}$ and $\frac{1206.T.C}{29.7.96}$.

× C.N. 1370 sent to G 6/4

○ C.N. 6883 sent to G 31/7

D.S.
29.9.96.

Supdt Engrs Office Circle.
Trichinopoly.
23d September 1896

W. Hughes
Supdt Engineer
6 Circle

Letter from the President, District Board, Trichinopoly, to the Superintending Engineer VI Circle, R. C. No. 103 of 1895, dated 17 July 1896

Adverting to correspondence ending with your letter, dated 20' March 1896 No 433.T.C I have the honor to enquire whether the estimate and plan for constructing a girder bridge across the Kattuvari, therein referred to, has been sanctioned by Government, and if not, in what stage the matter is, and when the estimate may be expected to be sanctioned by Government

---

No. 1206 T.C.

Copy, submitted to the Chief Engineer P.W.D., for favor of a reply with reference to this office letter No 204 T.C, dated 7' February 96.

× CE No 1370 with J.

M Hughes
Supg Engineer
VI Circle

Supg Engrs office
VI Circle
Dt. 29' July 1896
D/29

in 11'5 feet per sec. [illegible] using
[illegible] VI Circle

CURRENT No. 68?

Ans: 30.?

From
The Supg Engineer
VI Circle

To
The Chief Engineer
P.W.D.

No. 1206 T.C.
Dt. 29 July 1896.

Girder Bridge across the Kattuvary in Tri-chinopoly Dt. submitting for favor of reply letter from the Dt. Board President enquiring when the esti-mate for the — will be sanctioned

V.L.S.450

Public Works Department.

Current No. 1370
Letter No 204 T.C.
Dated 7 February 1896
From the S.E. VI Circle

NOTE BY TECHNICAL SECTION.

Name of work Iron Girder Bridge across the Kattoovary on Road No 41. Trichinopoly District.

Amount of Estimate Rs: 11,500.

The plan and Estimate have been revised as directed by D.W. in his remarks on T's note of 7th Feb: 1896. The flooring of the Bridge has been lowered, and the concrete under abutments and Piers carried right across to form the new flooring. The excess cost is Rs: 70.

With reference to the statement in the Report that foundations of abutments and wings are 1.5 deep. this refers only to the mason (brick in mortar) portion of the foundations.

The Ironwork of the Bridge is in accordance with P.W.D. Type Design No 13. put up herewith.

F.W.C
30.9.96

DW

For orders
Two reminders have been received from the

District Board, through the S.E. VI Circle, vide Current Nos 6883 & 8595.

If the estimate can now be sanctioned, a note by E.W. to accompany the G.O. seems necessary to explain the revision carried out in this office.

30-9-96.

Note of the Chief Engineer P.W.D.

A bridge of two spans, each 30 feet, may be accepted, and the estimate may be passed subject to the following modifications as regards the design of the work:—

(1). As suggested in this office memo. No. 3174 C dated 18th Oct. 1894 the masonry might be commenced on three feet of concrete, and this three feet ~~thickness~~ thickness carried right across the spans as a floor. The deviation ~~this~~ is shown on a tracing attached to the design.

(2) A saving can be effected by eliminating the cut-waters on the down-stream side where they serve no useful purpose.

C.A.W.
2/10/96.

T.

A bridge of 2 spans of ~~60~~ 30 feet each may be accepted. But the instructions concerning the foundations issued in this office memo No. 3174 C dated 18th Oct. 1894 have not been observed. However the necessary correction can be made in this office— And cut-waters on the down-stream side may be cut out. I do not understand what is stated in the report about the foundations of abutments & wings being 1.59'. They are shown in plan to be 4.59'.

60—200—18-12-95.

NEER,

Public Works Department.

Current No. 1370 1896.
Letter No 204 T.C.
Dated 7th February 1896.
From the Supdg Engineer VI Circle.

NOTE BY TECHNICAL SECTION.

Name of work Iron girder bridge across Kattoovary on road No. 11, Trichinop

Amount of Estimate Rs 11,500

With reference to this office memo No. 2456 C dated 7th August 1895, the S.E. VI Circle submits for sanction a fresh plan and estimate, amounting to Rs 11,500, for constructing a girder bridge across the Kattoovary on the 16th mile of road No. XI, Trichinopoly District.

The bridge is now proposed to be of 2 spans of 30 feet each, having a total waterway of 60 ft. with iron platform as per design No. 13 circulated with G.O. No. 1387 W dated 11th May 1888.

Assuming that the drainage area at site of bridge is only 60 square miles as reported by the S.E. the discharge to be passed through the bridge will be 6,130 c.ft. per second, using the formula $CM^{2/3}$ with C as 400. The fall of the Kattoovary is stated to be 12 feet per mile & the velocity at site of brid be 11.5 feet per [illegible]

Formula $V = c\sqrt{r.s.}$

where $r = 7{\cdot}64$.

$S = 12$ feet per mile or $\cdot00227$

$c = 87{\cdot}54$ coefficient for earthen banks & bed

$\therefore V = 87{\cdot}54\sqrt{7{\cdot}64 \times 00227}$

$= 11{\cdot}5$ feet per second.

Area of waterway $= \frac{6130}{11{\cdot}5} = 533$ sq. ft.

Therefore 2 spans of 30 feet each or a total waterway of 60 feet to a height of 13 feet is ample.

The iron work will consist of 5 wrought iron rolled main girders each 18" × 7" spaced 3' 7¾" apart, carrying a platform structure of Westwood Baillie & Co's patent wrought iron corrugated flooring plates. The roadway is to be 14 feet clear in width and metalled 9 inches thick.

Slightly to be checked.

The following lump sum provisions are made. viz.

Spreading gravel & watering	Rs 25
Forming road & making approaches	„ 50
Baling water	„ 360
Guard stones	„ 6
Ring bund	„ 50
Scaffolding	„ 100
Shed for stores	„ 50
Cost of iron work complete for 2 spans vide P.W. workshops estimate	6,140
Add for Carriage & fitting charges	900

The rates for the iron work, it is stated, are based on an estimate [illegible]nished by the General Supdt. P.W. [illegible] rates are fair.

This velocity is la
But it is not likely t
occur, as a 45' span
bridge has stood -

The revised plan & estimate have not been countersigned by the President Dist. Board but the original ~~plan~~ papers have been countersigned & the original estimate of Rs 9100 for the work, approved in Dist. Board Proceedings dated 25th August 94 No. 40.

2.4.96

The President should countersign the latest plan before the work is put in hand -

6.4.96

OFFICE OF THE SUPERINTENDING ENGINEER,

6TH CIRCLE.

No 204 TC

Trichinopoly: 7 February 1896.

FROM

W. Hughes Esquire,

~~THE~~ SUPERINTENDING ENGINEER,

6th CIRCLE.

TO

THE CHIEF ENGINEER,

P.W.D.

SIR,

ENCLOSURES. 5

1. Plan of bridge
1. Estimate with specification Complete
1. Drainage map
1. Site Survey
1. Level Section

In reference to your Memorandum No: 2456 C d/7th August 1895, I have the honor to submit for sanction of Government a fresh plan and an estimate amounting to Rs 11,500 for constructing a Girder Bridge across the Kattowary in the 16th mile of Road No: XI, Trichinopoly Dt.

2. The bridge now proposed will be 2 – 30 feet spans with iron work according to standard design No: 13 dated January 1888. The rates for iron work are based on an estimate furnished by the General Superintendent, Public Works Stores.

I

[illegible], [illegible] Circle

250—29-3-94.
250—13-11-93.

Formula $V = c\sqrt{r.s.}$

where r = 7·64.

s = 12 feet per mile or ·00227

c = 87·54 coefficient for earthen banks & bed

$\therefore V = 87{\cdot}54\sqrt{7{\cdot}64 \times {\cdot}00227}$

= 11·5 feet per second.

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Slightly to be checked.

The following lump sum provisions are made. viz:-

Spreading gravel & watering	Rs 25
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Shed for stores	" 50
Cost of iron work complete for 2 spans vide P.W. workshops estimate	6,140
Add for Carriage & fitting charges	900

The rates for the iron work, it is stated, are based on an estimate furnished by the General Supdt. P.W. [illegible] The rates are fair.

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The revised plan & estimate have not been countersigned by the President Dist. Board but the original ~~plan~~ papers have been countersigned & the original estimate of Rs 9100 for the work, approved in Dist. Board Proceedings dated 25th Augt 94 No. 40.

2. IV. 96.

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6.4.96

OFFICE OF THE SUPERINTENDING ENGINEER,

6TH CIRCLE.

No. 204 TC

Trichinopoly, 7th February 1896.

FROM

W. Hughes Esquire,

~~THE~~ SUPERINTENDING ENGINEER,

6th CIRCLE.

TO

THE CHIEF ENGINEER,

P.W.D.

SIR,

ENCLOSURES. 5

1. Plan of bridge
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1. Drainage map
1. Site Survey
1. Level Section

In reference to your Memorandum No: 2456 C d/ 7th August 1895, I have the honor to submit for sanction of Government a fresh plan and an estimate amounting to Rs 11,500 for Constructing a Girder Bridge across the Kattowary in the 16th Mile of Road No: XI, Trichinopoly Dt.

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I

250 – 29-3-94.
250/13-11-93.

[illegible]

~~P. W.~~ No. ~~1370~~

P. W. D. 6th CIRCLE.

FROM

THE SUPERINTENDING ENGINEER,
6TH CIRCLE.

TO

THE CHIEF ENGINEER,
P. W. D.

No. 204 TC

Dated 7
Received 10 } February 1896

Enclosures. 5

roadway is to be
" clear in width

Girder Bridge across the Kattuvary in the 16th mile of Road No. XI, Trichinopoly D.

Submits for sanction of Govt. a fresh plan & an estimate of Rs 11500 for constructing a ———

No 2456 C d/ 7-8-95
3674 C d/ 18-10-94

P. W. CURRENT No. 1370

I have the honor to be,
Sir,
Your most obedt. Servant,

W. Hughes
Superintending Engineer
VI Circle

Encls: 8 (4 Plans)
Recd: 10.2.96

T Scrutiny

On

11.2.96

O.L.S. 450

OFFICE OF THE SUPERINTENDING ENGINEER,
6TH CIRCLE,

No. 1198 TC

Trichinopoly, 4th November 1895.
D 4/-

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

TO
THE CHIEF ENGINEER,
P. W. D.

SIR,

ENCLOSURES.

In reply to your reminder No: 2456 C / 2 of 30th October 1895, I have the honor to state that a new plan for the iron girder bridge across the Kattuvari on Road No: 11 in the Trichinopoly District, has been made in accordance with your instructions, but the estimate is incomplete pending enquiry which is being made as to rates for iron work. The estimate will be very shortly submitted.

I have the honor to be,
Sir,
Your most obedt. Servant,

W. Hughes
Superintending Engineer, VI Circle

250—13-11-93.

nly 45 feet can be accepted, it should be reported whether the railway bridge has withstood the highest recorded flood or – if there is any doubt as to the flood noted being the maximum – the highest observed by riparian inhabitants.

2. Standing Orders 8 C.C. of 1876 have not received proper attention. The soil is stated on the plan to be silt and clay, and the subsoil to be moorum; but as the depths are not mentioned, this information is valueless. It is proposed to build different parts of the abutments at different levels. If the soil is rock

this can be done with impunity; otherwise i would be better to start from one level.

3. The nature of the soil at + 36 not being known, since the depth of the moorum is not stated, it is not clear whether or not the concrete has been let into a bed of rock. If such is the case the necessity for a concrete floor is not apparent. And if it rests on clay the absence of retaining walls to keep it together should be explained; as should also the reason for dispensing with an apron. It would be well to enter the level at which moorum begins, and also at which it ends, i.e.

it ends above + 36.

The estimate, giving details of the iron work, which the Deputy Engineer as stated in his letter No. 926 of 10 September 1894 proposed to obtain from Messrs Burn & Co, of Calcutta, has not been received. And as it is expected that the girder will cost Rs 5000 out of the Rs 9300 provided for the entire bridge, it is important that those details should be obtained for scrutiny.

The space between H.F.L and lowest point of girders should be sufficient to admit of the free passage during floods of trees or other floating bodies that may be brought down.

E. W. S.
7/8

C.H.B.B.
22/7/95

No. 2456C. d/7-8-95

T. J. Ker
BGM

Reminder issued 2-10-95
2 Reminder issued 30/10/95

DESPATCHED
7 AUG. 95

To,
The S.E. VI Circle
with plans & Estes (10) returned.

9/8

2456C

Note by the Chief Engineer P.W.D.

It may be calculated that under the more favourable circumstances stated – that is supposing we have only 60 square miles of drainage area to consider – it would not be safe to construct a bridge of less than 60 feet waterway, although there may be a depth of 20 feet available for discharge. If the railway bridge stands well, it is probably due to the fact that the area of country drained is less than 60 square miles. Before a waterway of only 45 feet can be ~~passed~~ accepted, it should be reported whether the railway bridge has withstood the highest recorded flood or – if there is any doubt as to the flood noted being the maximum – the highest observed by riparian inhabitants.

Standing orders 8 C.C. of 1876 have not received proper attention. The soil is stated on the plan to be silt and clay, and the sub-soil to be morrum; but as the depths are not mentioned, this information is valueless. It is proposed to build different parts of the abutments at different levels. If the soil is rock this can be done with uniformity: otherwise it would be better to start from one level.

The ~~depth~~ nature of the soil at +36 not being known, since the depth of the sinking not stated, it is not clear whether or not the concrete has been let into ~~rests on~~ a bed of rock. If ~~it does do so~~ such is the case the necessity for a concrete floor is not apparent. And if ~~it does not do so~~ it rests on clay the absence of retaining walls to keep it together should be explained; as should also the reason for dispensing with an apron.

It would be well to enter the level at which sinking begins and also at which it ends, i.e. if it ends above +36.

The estimate, giving details of the ironwork, which the Superintending Engineer — as stated in his letter No. 926 of 10th September 1894 — proposed to obtain from Messrs Burn & Co. of Calcutta, has not been received. And as it is expected that the girder will cost Rs 5000 out of the Rs 9300 provided for the entire bridge, it is important that these details should be obtained for scrutiny.

CWHS
10/7/95

Note by the
Chief Engr
P 20 D

Public Works Department.

Current No. 4910
Letter No 460 TC
Dated 24th June 1895
From the Supdg Engineer VI Circle.

Note by Technical Section.

Name of work Iron girder bridge across the Kattuvary on road No. 11, in the Trichinopoly District.

Amount of Estimate Rs 9,300.

With reference to this office No. 3174 C dated 18th Oct 1894 the S.E. VI Circle submits for the sanction of Govt. plans & estimate, amounting to Rs 9300 for constructing an iron girder bridge of 45 feet span across the Kattuvary, in the Trichinopoly District and states that the District Board Engineer has duly revised the design in accordance with the instructions contained in the Memo under reference, submitting at the same time, levels and sections of the vary together with hydraulic details as ordered.

The area of the drainage basin of the Kattuvary is stated to be 216 sq. miles & the discharge from this area will be 14400 C a second by using the formula $CM^{\frac{2}{3}}$, with C as 400, of this

14400 is correct.
but 400 is a very
small coefficient

this discharge a small portion of 1,200 cft is stated to be carried into the ~~[illegible]~~ Wyacundan in floods by an irrigation channel about ½ a mile above the site of the proposed bridge, leaving 13,200 cft per second to be discharged through the bridge.

The fall of the Kattiwary is reported to be 12 feet nearly. The velocity will therefore be 10·66 feet per second by using the formula $V = c\sqrt{rs}$.

The cross section above the proposed site of bridge, viz No. 33 is not well defined, the flood levels are not marked in the sections, taking however H.F.L at site of cross section No. 33 at +58·00 as shown on longitudinal section, there will be about 2½ ~~four~~ feet of water above the supposed banks, therefore it is not possible to calculate r correctly from the sections submitted. Assuming that the side slopes of the Kattiwary are prolonged as shown in pencil on cross section No. 33, the area & wetted border will be as follows:

Area of Cross Section No. 33
& H.F.L. + 58·00

(a) $\frac{4·00}{2} \times 5·30$ —— = 10·60

(b) $\frac{4·00 + 10·06}{2} \times 8·00$ —— = 56·24

(c) $\frac{10·06 + 12·19}{2} \times 10·00$ —— = 111·25

(d) $\frac{12·19 + 10·04}{2} \times 12·00$ —— = 133·38

(e) $\frac{10·04 + 4·04}{2} \times 5·00$ —— = 35·20

(f) $\frac{4·04}{2} \times 3·35$ —— = 6·75

Total area sq ft 353·42

Height of banks +55·5
F.L at No. 33 +58·0

∴ Depth of water over country will be } 2·5 feet

That is no good. the flood will spread over the country, & we do not know to what extent

By Ryves's formula — taking C at 675 i.e for a limited area near hills

$D = 675 \times 216^{\frac{2}{3}}$

$\therefore \log D = \log 675 + \frac{2}{3} \log 216$

2.82930
1.55630
∴ log D = 4.38560

2.33445
2
3 | 4.66890
1.55630

∴ D = 24300 cft per

By Dicken's formula

$\log D = \log 825 + \frac{3}{4} \log 216$

2·33445
3
4 | 7·00335
1·75084

log 825 = 2·91645

∴ log D = 4·66729

∴ D = 45300.

Supposing 1200 c.ft to be carried into the Wyacundan — we [illegible] (taking it in whole numbers) discharge of 23000 by Ryves's formula, & [illegible] 45300 by Dicken's formula

Allowing 6 feet velocity — [illegible] the former case the area [illegible] water way will be Ω × 6 = 23000

∴ Ω = 3833

cpth at bridge = 12·5

Span = $\frac{3833}{12·5}$ = 306!

pass water flowing without a head.

the depth 20' can be [illegible]

[illegible] supposing we [illegible] water to head up a foot,

supposing we [illegible] accept so low a [illegible]fficient as 400 — as [illegible]ken by the S.E. — and a

as order

wetted border 52 ft.

$\therefore r = \frac{353}{52} = 6·8$.

$V = c\sqrt{rs}$

Where r = 6·8
s = fall in unity = ·00227
c = coefficient for earth bed & sides vide Bazin's table in page 141, in General Mullins' Irrigation manual for r as 6·8 or say 7·0
= 85·97

$\therefore V = 85·97 \sqrt{6·8 \times ·00227}$

$= 85·97 \sqrt{·015436}$

$= 85·97 \times ·125 = 10·66$
per second

Area of waterway required

$= \frac{13200}{10·66} = 1238$ sq ft, the waterway should [illegible] 62'0" × 20'0" instead [illegible] 45'0" × 20'0" as desig[illegible]

The SE in submitting the estimate for sanction states that though the drainage area is nominally 216 sq miles, the discharge in very heavy floods would really be ~~equil~~ equivalent to that from about 60 sq miles as the Marudur Nattuvaikal is but a small cutting and that the bulk of the drainage would sweep across it. He therefore considers it very safe to make the bridge of 45 feet span similar to the railway bridge situated a

…ttle above the proposed site, which …of 3 spans of 15 feet each.

Particulars of construction are the same as that noted on the original estimate.

The following lump sum provisions have been made.

Girder including fixing	Rs 5000
Baling water	475
Ring bund	50
Scaffolding	100
shed for stores	50

The rates are fair.

The plans & estimate have been countersigned by the President Dist. Board & the original estimate amounting to Rs 9100 was approved in Dist. Boards proceedings No 40 dated 25th August 1894.

Hw.

10.VII.95.

corresponding discharge of only 13200 c ft per". Then the length of waterway required will be

$$L = \frac{13200}{c\sqrt{2g}\sqrt{d_1}\left(d_2+\frac{2}{3}d_1\right)}$$

c may be taken at $\frac{5}{8} = .625$

d_1 = diffce of water level above & below bridge

d_2 = depth over floor = 20.

∴ Even under such favourable circumstances

$$L = \frac{13200}{0.625 \times 8.02 \times 20.66}$$

= 127 feet

+ [illegible] neglecting a certain diminution due to the velocity of approach.

Therefore for so large an area as 216 square miles a 45' span bridge would be totally inadequate —

But supposing we have only 60 square miles of drainage area to deal with & that so low a coefficient as 400 may be accepted

Then $\log Q = \log 400 + \log 60^{\frac{2}{3}} = \log 400 + \frac{2}{3}$

$\frac{2}{3} \log 60 = \frac{2}{3} \times 1.77815 = 1.18543$

$\log 400 = 2.60206$

$\log Q = 3.78749 \quad \therefore Q = 6130.$

$$\therefore L = \frac{6130.}{0.625 \times 8.02 \times 20.66} = 60 \text{ nearly.}$$

So under the most favourable circumstances stated 60 feet waterway is necessary.

C [illegible] $\frac{20}{55}$

Q = 24300 cft per

OFFICE OF THE SUPERINTENDING ENGINEER,
6TH CIRCLE,

No. 460 TC

Trichinopoly, 24 June 1895.

D 26/—

03

FROM

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

TO

THE CHIEF ENGINEER,
P.W.D.

30

SIR,

ENCLOSURES. 6.

1. Plan of Bridge
1. Site Survey
1. Drainage map
1. Level section
1. Estimate
1. Report, Specification & hydraulic details

In reference to your Memorandum No. 3174C dated 18th October 1894, I have the honor to submit for sanction of Government, an estimate amounting to Rs 9,300 together with a revised plan prepared by the Local Fund Engineer for constructing a Girder Bridge of 45 feet span across the Kattuvari in the 16th Mile of Road No: XI in the Trichinopoly District.

2. The Local Fund Engineer has revised the design in accordance with the instructions conveyed in the Memorandum under reference, submitting the necessary level sections together with hydraulic details as ordered.

500—13 11-93.

3. Though the drainage basin is
minally 216 S. miles the discharge in
y heavy flood would really be equi-
valent to that from about 60 S. miles as
Marudur Nattu Voikal is but a small
hannel and the bulk of the drainage
ould sweep across it. The railway bridge
three 15 feet arches a little above the
ze has been found quite large enough
d I think it quite safe to make the
d bridge also of 15 feet span.

I have the honor to be
Sir,
Your most obedt. Servant,

W. Hughes.

Supg Engineer, VI Circle

14/8

P. W. D. 6th CIRCLE

OM

THE SUPERINTENDING ENGINEER,
6TH CIRCLE.

S HE CHIEF ENGINEER,
P. W. D.

460 TC

24 } June 1895.
26 }
ived

Enclosures. 6,

ron Girder Bridge across
e Kattuvary in road
o. 11 in the Trichinopoly Dt—
Submits for sanction
n Estimate of Rs 9300 for
constructing a —

P.W. CORR No. 4910

No. 3174 C.d/18-10-94

Enclos 10 (4 plans)

Ans: 27.6.95

1/

0.L.S. 218 R 29/7

No. 3174 C.

2

2 No. 3174 C. 7/8/10/9

a top of another with footings. In fact, it is doubtful whether it would be possible to put it in in that way without considerable difficulty. The masonry might be commenced on three feet of concrete, as first intended. And this 3 feet might be carried right across the span as a floor, the top of it being 6 feet lower than the floor shewn in the plan. This will allow 5 feet for scouring without ill effect. The wings do not seem to have been designed to fit the slope of the banks which, moreover, is not shewn. They are clumsy in design & weak being at bottom one foot less than necessary for safety

CHMS
27/9/94

No 3174 C d/18th October 1894.

P. W. Department

Memo Pros 2

2 Pros

With reference to the plans and estimates for an iron girder bridge across the Kattavary in the Trichinopoly District, received with letter from the Superintending Engineer VI Circle No 926 I.P. da 10th September 1894, the undersigned has the honour to observe that with respect t the waterway there is a total absence of hydraulic details, and that without cross sections and a longtitudinal section of the river, showing H.F.L, it is not possible to judge what discharge may be required.

2. It does not seem desirable

to

o.L.S. 218 R 29/7

to have one block of concrete on top of another with footings. In fact, it is doubtful whether it would be possible to put t in in that way without considerable difficulty. The masonry might be commenced on three feet of concrete as first intended; and this three eet might be carried right ross the span as a floor, top of it being five feet lower than the floor shown in the plan. This will allow five feet for scouring without ill effect. The wings do not seem to have been designed to fit the slope of the bank which, moreover, is not shown. They are clumsy in design and weak, being at bottom one foot less than necessary for safety.

3. The plans and estimates are returned for revision and further information.

15/10

Cm

Edw.

No. 3174 C. of 18th Octr 1894.

DESPATCHED
19 OCT. 94

To
The Suptg: Engineer VI Circle
with 10 enclosures