

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

READ—the following paper :—

From His Excellency Mons. CELORON DE BLAINVILLE, Governor of the French Settlements in India, to His Excellency the Right Honorable the Governor of the Madras Presidency, dated Pondicherry, 17th July 1886, No. 20.

In your letter, dated 9th January last, No. 32, you forwarded the remarks made by the Chief Engineer to the Government of Madras relative to the project for the reconstruction of the Chunnambar bridge on the road from Cuddalore to Pondicherry. At the same time you requested to be informed of the decision arrived at by me on this subject.

2. I have the honor to inform your Excellency that the note by Mons. Shaw-Stewart communicated to our Engineer has resulted in certain observations which will be found in the report, a copy of which is herewith attached.

3. By reason of the special restriction now placed on the Department of Public Works, we cannot undertake during this year the work of reconstructing the Chunnambar bridge simultaneously with that of the Ariancoopam bridge, which has already been commenced.

4. I should be glad if the British Government would be so good as to order the construction of the Chunnambar bridge so that communication may be re-established in a short time over the whole route. In case your Excellency accedes to this proposal, our colony will pay its contributory share towards the charge into your treasury, and the bricks required for the wells and work, which have been made under the direction of my administration, will be supplied to your Government.

ENCLOSURE.

From Mons. E. JUMEAU, Colonial Engineer and Chief of the Public Works Department, to Monsieur "the Directeur" of the Interior, Pondicherry, dated Pondicherry, 5th July 1886, No. 383.

I have the honor to return the accompanying file of papers containing the observations of the Chief Engineer to the Madras Government, relative to the project of the reconstruction of the bridge over the Chunnambar river on the road from Cuddalore to Pondicherry.

2. We were very much hurried in regard to the preparation of the project which was considered in November 1885, and which was to be submitted to the General Council. The height of the water in the Chunnambar having prevented us from taking the section across the river, we have only given the approximate height of the water level in reference to the river as also the mean sea level.

3. It results from the levels taken on the 16th, 17th, and 18th May 1886, that the former line marked on the design to show the height of high water level is 0m 25 higher than the one showing the maximum height of the tides, which is also 1m 20 higher than it should be.

4. In consequence of that alteration, the line of the spring of the arches of the bridge is now only 0<sup>m</sup> 75 (2½ English feet) under the maximum level of high flood.

5. We could quote different bridges constructed since 1855 under circumstances less favorable, especially the bridge across the Bidassoa (on the frontier of Spain) line from Bayonne to Trun, of which the line of spring of arches is 3<sup>m</sup> 40 under high flood level; the bridge across the "Dordogne" at Sibourne, of which the spring of arches is 3<sup>m</sup> 50 under the highest flood level; and also the bridge of "Plessis-les-Trouers" on the Loire of the spring of the arches is 7<sup>m</sup> 10 under the maximum water height.

6. However, these exceptions do not do away with the general principle admitted in constructing bridges, viz., that the springs of the arches should be fixed at the level of the highest floods.

7. The motives which have induced us not to observe that rule are:—

- (1) that the flood of December 1884 was altogether an exceptional one, considering that the greater part of the country was under water, and that the ascertained floods for more than a century were far from attaining the level of the flood of 1884;
- (2) the increase in the slopes of the two long inclines forming the approaches to that point, which were already very difficult to cross over in the case of the old bridge;
- (3) the enlargement of the span of the bridge under design by its extension to a length of 10<sup>m</sup>, and by the substitution of arches of 14<sup>m</sup> water-way in order to allow floating bodies to pass with greater ease, in lieu of the 9<sup>m</sup> water-way arches which belonged to the old bridge, of which several arches were obstructed during the flood of 1884 by up-rooted trees carried along by the current;
- (4) the solidity of the foundation of the project on wells of 3<sup>m</sup> 00 in depth in cement masonry, and joined by floors constructed also in cement masonry and protected by stone revetment; and
- (5) that the spring of the arches of the project, quoted 10·693, is about 0<sup>m</sup> 50 higher than the road on the north side for a distance of more than 400<sup>m</sup>, and about 0<sup>m</sup> 80 on the south side for a distance of more than 500<sup>m</sup>. So that the Chunnambar has two large calingulabs moderating its flow, by which the water runs into the fields as it did during the inundation of 1884.

8. These motives compel me to maintain my opinion that the spring of the arches of the project for the construction of the Chunnambar bridge is sufficiently elevated with reference to the solidity of the foundation and for the construction of a flooring and of two lines of stone revetment, which did not exist in the old bridge.

9. However, the opinion I hold ought not to be considered as absolutely opposed to raising the line of spring of the arches of the project; for in case the Chief Engineer to the Government of Madras, after examining the section across the river, still thinks of raising the height of the spring of the arches, I have prepared a supplementary estimate on the lines of the estimate for an increase in the height of the arches by 0<sup>m</sup> 5 which would bring the height of the piers to 3<sup>m</sup> 50.

10. The supplementary expenditure which would be necessitated by the increase in height by 0<sup>m</sup> 50 will amount to 22,000 francs including two rows of palmyra stakes intended to protect the two lines of stone revetment. These rows of palmyra, similar to the ones used for the Ariancoopam bridge, are absolutely necessary and have been omitted in the project.

11. In short, if the British Government insist upon the line of the spring of the arches being placed at the level of the height of the ascertained floods, it would be necessary to raise the height of the piers of the project by 0<sup>m</sup> 75, and thus increase the amount of the supplementary estimate from 22 to 25,000 francs. In the first case the soffit of the arches would be 1 metre higher than the ones of the old bridge; in the second case 1<sup>m</sup> 25; and in both cases the arches would have 0<sup>m</sup> 20 excess in thickness at the keystone. The apron of the bridge would be respectively 1<sup>m</sup> 20

and 1<sup>m</sup> 45 above the apron of the old bridge, that is, it would be necessary to raise the approaches of the bridge as much.

12. The bed of the Chunnambar is composed of coarse sand, at least to the depth of 2 metres, for it has not been excavated below that depth.

13. In the bed of the Ariancoopum we have found at a depth of 2<sup>m</sup> some imperfectly formed lignite with a thickness of 0<sup>m</sup> 60 at the north abutment of the bridge and with a thickness of 2<sup>m</sup> 50 at the adjacent pier. This lignite does not appear to extend as far as the 2nd pier to the north, where lignite has not as yet been found, though the wells have now sunk to a depth of 2<sup>m</sup> 50.

14. In regard to the speed of the current, it could not, whilst the floods were at their maximum height, be ascertained; but the speed ought to be very great and about the same as that of the Coleroon, which perhaps may have been observed near the bridge on the road from Cuddalore to Tranquebar.

15. I will add for your information that the excavations which the cross-section shows on both sides of the Chunnambar, on a line with the bridge, have been caused by the action of the current beating against the abutments (contournées?), and that the interior facing of the east abutment, the only one destroyed (demolished) corresponds exactly with the general line of the eastern bank of the river.

16. Our staff being at present very small, and our brick contractor having deceived us, we shall not be able to commence the work of reconstruction of the Chunnambar bridge until the beginning of May 1887. There is ground therefore, I think, to request the British Government if it would undertake that work and put it in hand before the above-named period. We could supply the British Government with the necessary bricks for the wells as also for the walls, which the French Government are getting manufactured near the Chunnambar in a kiln of a special model.

No. 460.

Referred to the Public Works Department for remarks, with reference to the report of the Colonial Engineer. The construction of the bridge should, it is thought, be undertaken by the District Board of South Arcot.

(By Order.)

MADRAS,  
26th July 1886.

(Signed) E. S. LAFFAN,  
Under Secy. to Govt.

To the Public Works Department, with 4 enclosures.

*Note by the Chief Engineer, Public Works Department.*

In the Chief Engineer's note of 7th January 1886, the following defects were noticed in the plan and estimate for reconstructing the Chunnambar bridge:—

1st.—The springing line of arches was 3·60' below M.F.L.

2nd.—No cross section of the river at site had been furnished.

3rd.—No information was given regarding velocity and discharge.

2.—The Colonial Engineer now explains that the value of M.F.L. previously given was only approximate, and that it was ·25<sup>m</sup> too high; so that the springing line is therefore only 2'9" below M.F.L.

3. He also gives reasons for thinking that there is no objection to the springing line being so low.

4. The undersigned does not, however, consider that those reasons are conclusive.

5. The Colonial Engineer submits a supplemental estimate for raising the piers by ·5<sup>m</sup> or 1'8" amounting to francs 22,000. This still leaves the springing 1'1" below M.F.L., and it is stated that to raise the piers to flood level would cost francs 25,000 extra. In the opinion of the undersigned the piers should be raised to flood level.

6. The Colonial Engineer submits a cross section of the river on a large scale, but states that he is unable to give the velocity of the water.

7. The arches are segmental and very flat, the rise being  $\frac{1}{4}$ th span, and they will require great care in building.

8. It is considered that it would be better if the flooring were continued to the end of the cutwater, and if the apron front and rear were placed in the ordinary way, not as shown in the cross section.

9. If the bridge is to be constructed by the Public Works Department, it would be more satisfactory, on many grounds, that the plan and estimate should be also prepared in the Public Works Department.

OOTACAMUND,  
3rd September 1886.

(Signed) J. SHAW-STEWART, Col., R.E.,  
Chief Engineer, P.W.D.

No. 606-D.

MEMORANDUM.

Transferred to the Financial (L.F.) Department, with advertence to its endorsement, No. 460, dated 26th July 1886, herewith returned with enclosed.

(Signed) J. SHAW-STEWART, Col., R.E.,  
Secretary to Govt., P.W.D.

To the Financial (L.F.) Department, with papers.

ORDER—dated 23rd September 1886, No. 1159 L.F., Financial.

The reconstruction of the Chunnambar bridge will be undertaken by the Public Works Department, in which fresh plans and estimates will be prepared as proposed. The cost of the work should, if possible, be not greater than that contemplated in the estimate furnished by the French Government. When the revised plans and estimates are ready, they will be forwarded to the French Government for acceptance.

2. His Excellency the Governor of Pondicherry will be addressed accordingly in the Political Department.

(True Extract.)

E. F. WEBSTER,  
Chief Secretary.

To the Public Works Department.  
„ Political Department.  
„ President, District Board, South Arcot.

No. 2733 W. of 16th Oct/86

Gobt. of (1886) Madras.  
FINANCIAL.



Communicated to  
the Suptg. Engr. & circle  
for submission of  
fresh plans and  
estimates, in view  
to the work being  
undertaken by the  
P. W. Dept.

(sd) J. O. H.

Issued

Recd.

Encl.

G.O., 23rd Sept. 1886, No. 1159 L.F.

No. 2733 W. of 16th Oct/86

SEPTEMBER.

Chunnambar Bridge.

Directing that the reconstruction of the — in  
South Arcot be undertaken by the Public Works  
Department, and that fresh plans and estimates  
be prepared by that department and forwarded to  
the French Government for acceptance.

S. E. & circle  
with 3 encl. & copy of  
Ch. Engr's note of 7-1-86.

With order