

Public Works (1896) Department.

RAILWAY BRANCH.

G.O., No. 586. R.

DATED 4th July

[Despatch Abstract.]

Bridges — Directing, with remarks, that the proposed scheme that the railway — on the Berwada - Madras line within the Nellore district should be so constructed as to carry cart and foot passenger traffic, be abandoned

Index.

[illegible]

FURTHER PAPERS.

[illegible]

No. 586 R., 4TH JULY 1896.

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers:—

Read the following papers:—

From the President, District Board, Nellore, to the Chief Secretary to Government,
dated 8th November 1895, No. 1623/D.B.

I have the honour to submit copies of this office letter No. 1552, dated 29th October 1895, to the Engineer-in-Chief, Bezwada-Madras Railway, and his reply thereto in connection with the proposal for the construction of railway bridges so as to admit of cart and passenger traffic as well as railway traffic, and to request to be informed (1) whether Government would sanction the proposal, and (2) whether Government would be pleased to lend the amount required to the Board.

ENCLOSURES.

From the President, District Board, Nellore, to the Engineer-in-Chief, Bezwada-Madras Railway,
dated 29th October 1895, No. 1552/D.B.

The District Board at its meeting held on 26th October 1895, expressed a wish that the railway bridge to be constructed over the Pennér may be so constructed as to admit of cart and passenger traffic. I shall be glad to be informed of the *probable* extra cost that may have to be incurred for the modification proposed. Without this information the formal sanction of the Board cannot be obtained, and I am not in a position to address Government with a view to ascertain if the proposal has the approval of Government, and further whether Government would be prepared to assist the Board by lending the required amount.

2. I request that separate figures may be given if provision is to be made only for a side way for passengers.

3. As I understand that the work will be taken up immediately, I request the favour of a very early reply. Similar information may also be furnished for bridges to be

4. I further request that similar information may also be furnished for bridges to be constructed over the Maunér, Pálár, Músi and Gundlakamma rivers.

From the Engineer-in-Chief, Bezwada-Madras Railway, to the President, District Board, Nellore,
dated Madras, 2nd November 1895, No. 1359/46.

I have the honour to acknowledge the receipt of your letter No. 1552/D.B. of 29th October, in which you ask—

First—The cost of constructing the Pennér, Mannér, Pálár, Músi and Gundlakamma bridges so as to admit of cart and passenger traffic, as well as railway traffic.

The bridges proposed for the rivers mentioned and the probable approximate cost are as under:—

						Rs.
Pennér,	{ 23 spans of 70 feet }	...	...	...	...	5,81,000
	{ 5 " of 40 " }	...	...	...	...	1,30,000
Mannér,	9 " of 60 "	...	...	...	...	1,61,000
Pálár,	18 " of 40 "	...	...	...	...	1,49,000
Músi.	17 " of 40 "	...	...	...	...	2,15,000
Gundlakamma,	13 " of 60 "	...	...	...	...	

The above estimates are approximate only. I am afraid that it is rather late in the day to take up the question of making these bridges suitable for cart and passenger traffic as well as for railway purposes, as the girders, in the design of which only railway requirements were considered, were ordered by the Director-General some months ago. The well curbs for the bridges have also been ordered.

There would be two methods of making the bridges suitable for cart traffic:

First—By making a separate roadway for vehicle traffic above or below or alongside the railway.

Secondly—By using the same roadway both for railway and vehicle traffic as in the Kistna bridge, protecting telegraph stations being provided at both ends of the bridges.

The first method would involve much heavier girders than those now ordered and larger piers and foundations, and I should estimate roughly that the cost would be twice as much for each bridge as above noted. The girders and well curbs already ordered for the bridges would not be suitable.

For all these bridges it is intended that the railway should run on the top of the girders on cross sleepers, and the second method would involve widening and decking the roadway on the girders, but would be much the cheaper. I do not think I could put the extra cost of widening and decking at less than Rs. 50 per lineal foot for a roadway 15 feet wide. At this rate the extra cost would, at a rough estimate, be—

	L. FT.	Cost.
		RS.
Pennér river	...	...
Mannér "	...	...
Pálár "	...	...
Músi "	...	...
Gundlakamma river	...	...
	5,049	2,52,450

Against the second method there is the fact that the use of the same road for railway and vehicular traffic is a source of delay and of some danger, and this objection would in the above cases apply all the more strongly, owing to the fact that the Bezwada-Madras Railway will ultimately become a trunk line with, it is expected, a large traffic.

As to the second question I estimate that the cost of a side way for passengers only would be about Rs. 6 per foot run, so that for the bridges in question the cost would be approximately—

	RS.
Pennér	...
Mannér	...
Pálár	...
Músi	...
Gundlakamma	...
	30,294

The above estimates are necessarily approximate only. Should orders on the subject be issued by Government, more careful estimates would be made; but as girders and iron-work for these bridges have been already arranged for some months ago and arrangements for work are advanced, I am afraid the question has been taken up too late.

No. 1658, Local and Municipal.

Referred to the Public Works (Railway) Department, for favour of remarks.

(By order.)

FORT ST. GEORGE,
20th November 1895.

(Signed) W. W. PHILLIPS,
Ag. Assistant Secretary.

MEMO. No. 4032 C.

Returned to the Local and Municipal Department, for favour of preparation of a statement of statistics as to cart and passenger traffic; also for consideration of the question of providing the connections required and the means for providing the funds.

(Signed) F. R. UPCOTT,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

16th December 1895.

No. 1.

Referred to the President, District Board, Nellore, for early report.

(By order.)

FORT ST. GEORGE,
6th January 1896.

(Signed) W. W. PHILLIPS,
Ag. Assistant Secretary.

From the President, District Board, Nellore, to the Chief Secretary to Government, dated 6th March 1896, No. 270/D.B.

With reference to No. 1, endorsement, dated 6th January 1896, on Current No. 3681 L., I have the honour to state that no complete and reliable information is at present available for the preparation of the statement of statistics as to the cart and passenger traffic therein called for. A statement, however, is enclosed giving approximate figures as the matter is urgent and will not bear delay.

2. I submit here that, when once the line is opened, it will probably absorb most of the traffic, and what little remains will mostly be from the neighbouring villages and hamlets not served by any near station on the railway. It will further, in my opinion, develop the local trades in the western portion of the district generally and new communications therein which may sometimes advantageously be connected with the cart ways in question. I think, then, that for this traffic, the second method proposed of using the same way for railway and for cart and passenger traffic is the most practicable and desirable one mainly on financial grounds. The other methods are positively prohibitive on the score of cost.

3. As the bridges will, to some extent, afford access to the railway and attract traffic of goods and passengers and so far benefit the line which, by the way, is protective and productive at the same time, it will be, I venture to suggest, expedient that Government should bear a part of the cost required, if not the whole.

4. With reference to the provision of funds for the purpose, the District Board, it is submitted, is not an opulent one and can certainly not bear more than half the cost; and this amount will have to be raised partly by a loan to be liquidated in thirty years by a levy of tolls on carts and passengers as in the case of the Kistna bridge, and partly from its own funds.

5. If the above proposals meet with the approval of Government, separate proposals in the matter of tolls will be submitted.

6. I beg to state also that if any action is to be taken in the matter, it will have to be done at once as work on the railway bridges will commence very shortly.

7. The papers received with the reference under reply are herewith returned.

ENCLOSURE.

STATEMENT of Statistics of Cart and Passenger Traffic on the Rivers in Nellore District for one year.

Names of rivers.							Carts.	Passengers.
1							2	3
Pennér	..	..	..	..	..	..	21,117	322,899
Músi	..	..	..	..	..	..	10,318	20,000
Mannér	..	..	..	..	..	..	10,800	25,200
Pálar	..	..	..	..	..	..	16,800	25,200
Gundlakamma	..	..	..	..	..	..	3,002	20,000
Total							66,037	413,299

No. 374, Local and Municipal.

Transferred to the Public Works (Railway) Department.

FORT ST. GEORGE,
21st March 1896.

(Signed) W. W. PHILLIPS,
Ag. Assistant Secretary.

From the Officiating Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, Bezwada-Madras Railway, dated 20th April 1896, No. 5 D.

I am directed to inform you that it appears to His Excellency the Governor in Council desirable that the bridges now being constructed on the Bezwada-Madras Railway over the Pennér, Mannér, Pálar, Músi and Gundlakamma rivers should be adapted for the use of cart and foot passenger traffic, if it be practicable so to do.

2. The matter has already been brought to your notice by the President of the Nellore District Board, to whom you furnished a rough estimate of cost in your No. 1359/46 of 2nd November 1895. That estimate, however, appears to be a very rough one, and it is accompanied by the remark that as the arrangements for these bridges were already far advanced, you were afraid that the question had been brought up too late.

3. Of the alternatives mentioned in that letter, the second, i.e., the decking of the bridges so as to carry the cart traffic on the same roadway as the railway, appears the most suitable and I am directed therefore to enquire whether it would now be practicable to deck any or all these bridges, and if so, what particular method you would recommend for so doing and what it would cost. I should feel obliged if you would be good enough to go into this matter in some detail (taking, say, the Nellore bridge as a type, that being the most important of those named), so that, if necessary, the Government of India may be addressed on the subject.

4. It is of course understood that there are objections to carrying cart and railway traffic on the same roadway, but it is presumed that by suitable arrangements of gates and signals the inconveniences and dangers consequent thereon could in large measure be overcome. The provision of such arrangements should therefore be included in your proposals.

5. I am further to request that you will favour this Government with any remarks that you may desire to make on the general question as to the expediency of utilizing these railway bridges for road traffic and as to the best method of doing it.

No. 4 D.

Endorsement of the Local and Municipal Department, dated 21st March 1896, No. 374.

Returned to the Local and Municipal Department in view to the District Board, Nellore, being asked to state the average annual cost of maintaining the causeways over the Pennér and the other rivers referred to. The Board should also be asked to state whether it would be necessary to keep up these causeways if the railway bridges are made available for cart traffic.

(Signed) C. W. HODSON,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

20th April 1896.

No. 508, Local and Municipal.

Referred to the President, District Board, Nellore, for report.

(By order.)

FORT ST. GEORGE,
4th May 1896.

(Signed) W. W. PHILLIPS,
Ag. Assistant Secretary.

From the Engineer-in-Chief, Bezwada-Madras Railway, to the Officiating Joint Secretary to Government, Public Works Department, Railway Branch, dated Madras, 22nd May 1896, No. F./2789-410.

I have the honour to acknowledge your No. 5 D., dated April 20th, 1896.

2. I enclose tracings as under:—

- (i) Tracing of pier heads for 40, 60 and 70 spans.
- (ii) Tracing of roadway of single and crossed planking on long sleepers and general arrangements for gates, signaller's and gateman's quarters, &c., at the north end of Pennér bridge.
- (iii) Tracing of roadway of trough plates on rolled beams.

3. Estimates forwarded are as under:—

- (a) Estimate for a single planked roadway 14 feet wide on long projecting sleepers for a length of 10 lineal feet.
- (b) Estimate for a crossed planked roadway 14 feet wide on long projecting sleepers for a length of 10 lineal feet.
- (c) Estimate for a road consisting of a (Westwood and Baillie's) trough plate floor and wooden decking supported on rolled beams for a length of 10 lineal feet.
- (d) Estimate for gates, signaller's and gateman's quarters and approaches at the two ends of the Pennér bridge.

4. Estimate (a) amounts to Rs. 34 per foot run.

" (b) " " 37 "

" (c) " " 70 "

" (d) " " 29,154 "

5. The tracing I of pier heads for 40, 60 and 70 foot girders is sent to show the limited accommodation, the type of piers adopted on this railway affords for a road. The piers of the 40 and 60 foot openings are supported on single circular wells, 12 feet in diameter, and those of the 70 foot openings on single circular wells 16 feet in diameter. All the girders have been ordered from home and a considerable number have arrived in the country. Tracing I of pier heads shows that decking the bridges so as to carry the cart traffic and rails on the same level is the only system applicable to bridges on this railway.

6. The width of the cart road between the side railings has been kept 14 feet, the minimum width allowable under standard dimensions.

7. The wooden roadways carried on long projecting sleepers shown in tracing No. II are of a semi-permanent nature, while the roadway of trough plates on rolled beams shown in tracing No. III is of a permanent nature. A wooden roadway on projecting sleepers could be adapted to any 40, 60 or 70 foot girder bridge after the line is opened for traffic. The roadway of trough plates on rolled iron beams is much the best, but a roadway of this kind interferes with the rivetting of the girders, and arrangements for such a roadway should preferably have been taken into account when the girders were designed.

8. The load assumed as resting on each sleeper or rolled beam is that of a cart carrying $1\frac{1}{2}$ tons which weight is doubled for a rolling load, and half of this weight or $1\frac{1}{4}$ tons could rest on a sleeper or rolled beam close to the guard plate or at a distance of 9 inches from the end of the sleeper.

9. Were the sleepers unsupported by struts, the tensile stress on the sleeper would be about .874 ton per square inch in the case of 40 foot girders and about .632 ton in the case of 60 and 70 foot girders, so that for 40, 60 and 70 foot girders the angle iron of the railings is continued to form a strut to the bottom boom of the girder.

10. The rolled beams do not require strutting. The stress per square inch on the rolled beam is 5.19 tons and on the outside channel iron 3.05 tons against the permissible stress of 7 tons. Wood for the flooring is reckoned at 55 lb. per cubic foot.

11. The roadway with single planking all in the direction of the rails may be left out of the question. It was only drawn out with the object of seeing what the cost would be, and it is very little cheaper than the road with crossed planking on a level with the rails. With single planking below rail level, carts could not pass each other on a bridge. The crossed planks are preferable as these can be removed when worn.

12. The choice, therefore, lies between a cross planked roadway supported on long sleepers and that of a trough floor supported on rolled beams. The cost of the former is estimated to be Rs. 37 per foot run and of the latter Rs. 70, or Rs. 33 per foot run in favour of the semi-permanent crossed planked roadway.

13. Telegraph offices would be required at both ends of any one of the bridges mentioned in your letter, if carts or any vehicles are allowed to pass over the bridges after dark. All trains would have to stop at the bridges and line clear have to be obtained to cross any bridge. Carts, &c., at night before crossing would have to obtain numbered passes, so that the signallers at both ends might know what vehicles were on the bridge.

14. The following is the estimate of cost of a crossed planked roadway on long sleepers for the Pennér bridge to which your letter under reply chiefly refers:—

Gates, &c., at the ends and cost of establishment capitalized	Rs.
2,020 lineal feet roadway at Rs. 37 per foot	29,154
and for a roadway on rolled beams—	74,740
Total	1,03,894

Gates at the ends and cost of establishment capitalized	Rs.
2,020 lineal feet roadway at Rs. 70 per foot	29,154
Total	1,41,400
	1,70,554

15. Taking the cost of gates, signalling arrangements, &c., and the cost of establishment capitalized at one end of any bridge at Rs. $\frac{29,154}{2}$ = Rs. 14,577, the cost of roadways over the other bridges mentioned in your letter will be—

(a) *The Mannér.*

For crossed planked roadway on long sleepers—

Two approaches at Rs. 14,577	Rs.
614 lineal feet roadway at Rs. 37 per foot	29,154
Total	22,718
	51,872

For roadway on rolled beams—	Rs.
Two approaches at Rs. 14,577	29,154
614 lineal feet roadway at Rs. 70 per foot	42,980
Total	72,134

(b) *The Pálár.*

For a crossed planked roadway on long sleepers—	Rs.
Two approaches at Rs. 14,577	29,154
950 lineal feet roadway at Rs. 37 per foot	35,150
Total	64,304

For roadway on rolled beams—	Rs.
Two approaches at Rs. 14,577	29,154
950 lineal feet roadway at Rs. 70 per foot	66,500
Total	95,654

(c) *The Músi.*

For a crossed planked roadway on long sleepers—	Rs.
Two approaches at Rs. 14,577	29,154
635 lineal feet roadway at Rs. 37 per foot	23,495
Total	52,649

For a roadway on rolled beams—	Rs.
Two approaches at Rs. 14,577	29,154
635 lineal feet roadway at Rs. 70 per foot	44,450
Total	73,604

(d) *The Gundlakamma.*

For a crossed planked roadway on long sleepers—	Rs.
Two approaches at Rs. 14,577	29,154
878 lineal feet roadway at Rs. 37 per foot	32,486
Total	61,640

For a roadway on rolled beams—	Rs.
Two approaches at Rs. 14,577	29,154
878 lineal feet roadway at Rs. 70 per foot	61,460
Total	90,614

16. The difference in cost between ordinary sleepers 10 feet long and special sleepers 14 feet long is considerable, but unavoidable as all these long sleepers must be of thoroughly sound and reliable wood.

17. At the joints of all rails recesses would be left with movable iron cover plates for inspection purposes. These are not shown in the drawings, and other small details would have to be taken into consideration if the proposal of using the bridges as roadways for ordinary cart and other traffic is carried out.

18. The roadways provided will not carry elephants or traction engines or heavy machinery.

19. With reference to paragraph 2 of your letter, therefore, I have to state that I consider it practicable to make a road for ordinary traffic in addition to railway traffic over the bridges above mentioned either of a semi-permanent nature with long projecting sleepers or of a permanent nature on rolled beams, but I think the type of bridges adopted in which type railway requirements only were taken into account is a very bad one for a combined road and railway bridge, especially the 40 foot spans. In the case of roadway on rolled girders the camber will have to be adjusted by packing pieces of different thicknesses under the Z and U irons.

20. The Pennér bridge is so long that the gates must be placed as close as possible to the abutments, or it would be a long time before the bridge could be cleared of traffic. This is the case with some of the other bridges mentioned in your letter. The approaches to the bridges are usually in high bank and arrangements at bridge ends would be therefore expensive, and the buildings will be on made earth.

21. I am still of the opinion that the use of the same road for ordinary traffic and for railway traffic as well on bridges of the type adopted on this railway is inadvisable and that whatever precautions are adopted, the use of the bridges by carts and other traffic will be a source of constant danger. A collision on any one of these bridges would be far more serious than in a station yard. The danger is increased when a series of bridges are so used for road traffic.

22. The use of the rolled beams to support the road will raise present formation height one foot at the Pennér bridge; this extra foot in height will involve raising the whole of Nellore station yard one foot more, and it has already to be raised about 4 feet above its present level.

23. It may, as I remarked in my letter No. 1359/46 of November 2nd to the President of the District Board of Nellore, who first raised the question of making railway bridges suitable for cart traffic, be expected that the Bezwada-Madras Railway will, before many years are over, become part of a through line from Calcutta to Madras with a considerable traffic, and the inevitable delays which will occur at these bridges will cause a loss of time and money.

24. I am unable to form any estimate as to whether these roadways would pay for themselves indirectly in the shape of increased revenue or to make an estimate of the number of carts, &c., that would cross daily. If these roadways for general traffic are decided upon, I must leave the question as to providing the necessary money for making them, and of tolls, &c., to be considered by the Governments of Madras and India.

25. To reckon the amount to be realized in the shape of tolls, 5 per cent. per annum on the cost of a roadway on rolled beams might be assumed and $7\frac{1}{2}$ per cent. on the roadway on long sleepers, as the repairs on the latter would be heavier:—

Names of bridges.	Roadway on rolled beams.				Roadway on long sleepers.			
	Cost, exclusive of establishment.	5 per cent. on previous column.	Yearly cost of establishment.	Total yearly cost.	Cost, exclusive of establishment.	$7\frac{1}{2}$ per cent. on previous column.	Yearly cost of establishment.	Total yearly cost.
Pennér	Rs. 1,54,554	Rs. 7,728	Rs. 800	Rs. 8,528	Rs. 87,894	Rs. 6,592	Rs. 800	Rs. 7,392
Mannér	56,134	2,807	800	3,607	35,872	2,690	800	3,490
Pálar	79,654	3,983	800	4,783	48,304	3,623	800	4,423
Músi	57,604	2,880	800	3,680	36,640	2,748	800	3,548
Gundlakamma ..	74,614	3,731	800	4,531	45,640	3,427	800	4,227

26. From a railway point of view I do not consider that the formation of a trunk road in competition with the railway at all desirable.

27. Had the question of using the railway bridges for cart traffic been brought up and decided on earlier, I have no doubt that wider piers would have been adopted with a roadway between the girders. The proposals I now make for the roadway for general traffic are at the best unsatisfactory.

28. I should myself propose that, if anything at all is required, considering the increased facilities for carriage that the railway itself will give, and that, except when prevented by floods, carts will probably avoid the bridges and tolls, a footway for passengers only would meet requirements. This would be supported on light iron brackets and would be fenced off from the line over the bridge.

29. I may mention that the Gundlakamma bridge is not on or near any road. It is $4\frac{1}{2}$ miles from the nearest point on the road from Ongole to Guntur.

ENCLOSURES.

BEZWADA-MADRAS RAILWAY.

ESTIMATE No. (a).

Name of work	...	...	...	...	Single planked roadway.
Amount Rs. 34	...	...	...	...	Per foot run of a bridge.
Main head	...	...	...	...	IV. Bridgework.
Sub-head	...	...	...	...	1. Large bridges.

[References.—Plan No. II accompanying.]

Letter No. 5 D., dated 20th April 1896, from the Officiating Joint Secretary to Government, Public Works Department, Railway Branch, Madras, to the Engineer-in-Chief, Bezwada-Madras Railway.

Letter No. F. 2789/410, dated 22nd May 1896, from the Engineer-in-Chief, Bezwada-Madras Railway, to the Joint Secretary to Government, Public Works Department, Railway Branch, Madras, accompanying.

Report and Specification.

The roadway, which is to be about 2' below the level of the railway, will consist of $3\frac{1}{4}$ × 31" teakwood longitudinal baulks with $\frac{1}{2}$ " clearance supported on transverse sleepers which must be of wood sounder than ordinary railway sleepers and be 14' wide, i.e., 7' on each side of the centre of the railway track. The ends of the sleepers will be supported by angle irons, $2\frac{1}{4}$ × $2\frac{1}{4}$ × $\frac{3}{8}$ ". The roadway will be protected on each side by a handrailing, 3' high from the top of the sleepers and the latter (handrailings) will be protected from the wheels of the carts running against it by a $\frac{1}{4}$ " plate iron guard plate inclined down at an angle of 45°.

DETAILS of Measurements.

Name of work—Single Planked roadway.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
Woodwork, sleepers— Fourteen feet sleepers will have to be used of better quality than ordinary sleepers and the extra cost is estimated at Rs 11 each ..	4	..	..	..	4	..	4
Total, Sleepers ..	..	..	..	..	..	..	..
Teakwood— Longitudinal baulks	38	10	$1\frac{1}{2}$	$1\frac{1}{2}$	28	..	28
Total, Teakwood ..	..	..	..	..	..	..	..
Petty ironwork— ∠ iron $2\frac{1}{4}$ × $2\frac{1}{4}$ × $\frac{3}{8}$ at 5.78 lb. per foot ..	8	$9\frac{1}{2}$	..	..	76.3	..	..
brackets and uprights, combined ..	2	10	..	..	20.0	..	..
Top rails	..	..	..	..	557 lb.	..	..
Total, ∠ iron 96.3' at 5.78 lb. ..	..	..	..	..	..	..	..
Knee plate $\frac{1}{4}$ " at 15 lb. per square foot ..	16	$2\frac{1}{2}$	$\frac{1}{2}$	..	0.97	..	..
Gusset plate joining the ∠ iron brackets to girder $\frac{1}{2}$ " at 15 lb. per square foot ..	8	$\frac{1}{2}$	$1\frac{1}{2}$	..	3.88	..	..
Gusset plate joining the ∠ iron brackets to girder $\frac{1}{2}$ " at 15 lb. per square foot ..	8	1	$1\frac{1}{2}$	..	6.33	..	..
Total, $\frac{3}{8}$ " plate iron 10.71 s. ft. at 15 lb. per s. ft.	..	..	..	..	161 lb.	..	..
Guard plate $\frac{1}{4}$ " at 10 lb. per square foot ..	2	10	$1\frac{1}{2}$	..	33.33	..	..
Total, $\frac{1}{4}$ " plate iron 33.33 s. ft. at 10 lb. s. ft.	..	..	..	..	333 lb.	..	..
Bolts for $\frac{1}{4}$ " with heads and nuts for holding ∠ iron and sleepers 11" long at 1.92 lb. each	16	..	..	..	31 lb.	..	..
Rivets, $\frac{3}{8}$ " diameter × $1\frac{1}{2}$ " long 28.7 lb. per 100 ..	64	..	..	..	18 lb.	..	..
Nails, $\frac{5}{8}$ " long 1 lb. per dozen	8	..	..	..	1 lb.	..	..
Do. $\frac{5}{8}$ " .. 1 lb. per 14	70	..	..	..	5 lb.	..	..
Total	..	..	..	..	1,106 lb.	..	..
Add—10 per cent. wastage	..	..	..	..	110	..	..
Total, Petty ironwork	..	..	..	..	1,216 lb.	..	10.86 cwt.

Name of work—Single Planked roadway with single planking.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
Galvanized wire rope	2	10	..	..	20 lb.	..	.
Total, wire rope at 3-6 lb. per fathom ..	..	..	..	..	12 lb.	..	0-11 cwt.

Abstract of cost.

Quantities.	Sub-head.	Rate.		Amount.	Total.
		Rs.	Per.		
4 No. ..	Additional cost of sleepers				
28 c. ft. ..	Teakwood	11	0 0	Each ..	Rs. 44
10-26 cwt. ..	Petty ironwork	4	0 0	C. ft. ..	112
0-11 „ ..	Galvanized wire rope	15	0 0	Cwt. ..	163
		25	0 0	..	3
	Total	..	..		322
	Add—contingencies at 5 per cent. ..	..	..		16
	Total for a length of 10 feet	..	..		338
	Or per foot run	..	..		
		..	..		

Rs. 33-8-0
(say, Rs. 34).

ESTIMATE No. (b).

Name of work—Crossed Planked roadway.

[illegible]

[References—Plan No. II accompanying.]

Report and Specification.

The roadway which is to be on the same level as the railway will consist of 3" x 3" teakwood longitudinal baulks with about 1½" clearance between each crossed at top by hardwood (babool) battens 5" wide by 1½" deep spaced 2' 14" apart and will be 14' wide, i.e., 7' on each side of the centre of the railway track. The roadway will be carried on 14' long transverse sleepers which must be of wood sounder than ordinary railway sleepers. The end of the sleepers will be supported by $\angle$ iron 2½" x 2½" x ½". The roadway will be protected on each side by a hand-railing 3' high from the top of the sleepers and the railing will be protected from the wheels of the carts running against it by a ¼" plate iron guard inclined at an angle of 45°.

DETAILS of Measurements.

Name of work—Crossed Planked roadway.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
Woodwork, sleepers— Fourteen feet sleepers will have to be used of better quality than ordinary sleepers and the extra cost is estimated at Rs. 11 each	4	..	..	..	4	..	4
Total, Sleepers	No.	..	..	..	..	..	..
Teakwood— Longitudinal baulks	30	10	$\frac{1}{2}$	$\frac{1}{2}$	18.75	..	18.75
Total, Teakwood	C. ft.	..	..	..	..	..	..
Hardwood (babool)— Battens	22x2 22	$3\frac{5}{8}$ $5\frac{3}{4}$	$1\frac{1}{2}$ $1\frac{1}{2}$	$1\frac{1}{2}$ $1\frac{1}{2}$	9.69 7.70	..	..
Do.	..	..	..	..	..	..	17.39
Total, Hardwood	C. ft.	..	..	..	..	..	..
Petty ironwork— ∠ iron $2\frac{1}{2}$ " x $2\frac{1}{2}$ " x $\frac{3}{8}$ " at 5.78 lb. per foot— Brackets and uprights combined Top hand rails	8 9	91.4 10	..	..	76.3 20.0	..	..
Total, ∠ iron 96.3 l. ft. at 5.78 lb. per ft. lb.	..	..	..	..	..	..	557
Knee plate $\frac{3}{8}$ " at 15 lb. per square foot Gusset plate joining the ∠ iron brackets to girders $\frac{3}{8}$ " at 15 lb. per square foot	16 8 8	$2\frac{1}{2}$ $\frac{3}{8}$ 1	$\frac{1}{8}$ $1\frac{1}{2}$ $2\frac{1}{2}$	..	0.97 3.38 6.33	..	..
Total, $\frac{3}{8}$ " plate, 10.71 sq. ft. at 15 lb. per sq. ft.	..	..	..	..	..	..	161
Plate, iron, $\frac{1}{2}$ " at 10 lb. per sq. foot guard plate. Hardwood ends protectors	2 4	10 10	$1\frac{1}{2}$ $\frac{1}{2}$	..	33.33 6.67	..	..
Total, $\frac{1}{2}$ " plate, 40 sq. ft. at 10 lb. per sq. ft. lb.	..	..	..	..	..	..	400
Bolts 11" long x $\frac{1}{2}$ " diameter with heads and nuts for holding ∠ iron uprights and sleepers at 1.92 lb. each Rivets $\frac{3}{4}$ " diameter x $1\frac{1}{2}$ " long at 28.7 lb. per 100 Nails, $3\frac{1}{2}$ " long at 32 per lb. " 5" " at 16 " " " 2" " at 163 " "	16 64 310 64 66	..	..	..	31 lb. 18 lb. 10 lb. 4 lb. 1 lb.	..	..
Total	..	..	..	..	1,182 lb.	..	..
Add—10 per cent. wastage	..	..	..	..	118.2 lb.	..	11.60 cwt.
Total, Petty ironwork	..	..	..	..	1,300 lb.	..	..
G. wire rope	2	10	..	..	26	..	0.11 cwt.
Total, G.I. rope at 3.6 lb. per fathom	..	..	..	..	12 lb.	..	..

Abstract of cost.

Quantities.	Sub-head.	Rate.		Amount.	Total.
		Ra.	Per.		
4 No. ..	Additional cost of sleepers	Rs. 11	Each	Rs. 44	
18-75 c. ft. ..	Teakwood	4	C. ft.	75	
17-39 ..	Hardwood (babool)	3	C. ft.	52	
11-60 cwt. ..	Petty ironwork	15	Cwt.	174	
0-11 ..	Galvanized iron rope	25	Cwt.	3	
	Total	..	..	348	
	Add—contingencies at 5 per cent. ..	..	..	17	
	Total for a length of 10 ft. ..	..	..	365	
	Or per foot run $\frac{365}{10}$	..	..	36½	(say Rs. 37).

ESTIMATE No. (c).

Name of work	...	...	...	Roadway consisting of Westwood and Baillies trough floor plate and wooden decking on rolled beams.
Amount	...	...	...	Rs. 70 per foot run.
Main head	...	...	...	IV. Bridgework.
Sub-head	...	...	...	1. Large bridges.

[References.—Plan No. III accompanying.]

Report and Specification.

This roadway, on the same level as the railway, is to be of Westwood and Baillies trough floor plate with hardwood (babool) decking carried by channel and Z irons over transverse rolled beams 14' long and 5' apart. The rails will be laid on longitudinal teak sleepers resting on the rolled beams and will each be protected by two longitudinal teak baulks which will be shod one by angle iron $2'' \times 2'' \times \frac{1}{4}''$ and the other by a flat bar iron $\frac{1}{4}''$ thick. These irons will prevent the edges of the baulks from being damaged by cartwheels. The roadway will be 14' wide with side railings 3' high and the side railings will be protected from the wheels of the carts running against them by $\frac{1}{4}''$ plate iron guard inclined inwards down from the standards carrying the railings.

DETAILS of Measurements.

Name of work—Roadway consisting of Westwood and Baillies trough floor plate with hardwood (babool) decking supported on rolled beams.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
1. Rolled beams— 6" $\times$ 4½" base at 19 lb. per foot ..	2	FEET. 14	FEET. ..	FEET. ..	28	..	
Total, Rolled iron beams 28 at 19 lb. per ft.	..	..	..	..	532 lb.	..	4-75 cwt.
2. Z iron— 6" $\times$ 3" $\times$ ½" at 14-5 lb. per foot ..	4	10	..	..	40	..	
Total, Z iron 40 l. ft. at 14-5 lb. lb.	..	..	..	..	580	..	5-18 cwt.

Details of Measurements—cont.

Name of work—Roadway consisting of Westwood and Baillies trough, &c.—cont.

Particulars.	Number.	Measurement.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
3. Channel iron— 6" $\times$ 3" $\times$ ½" at 16 lb. per foot ..	2	10	..	..	20	..	
Total [iron, 20 l. ft. at 16 lb. per l. ft.]	..	..	..	..	320 lb.	..	2-9 cwt.
4. Trough floor plate at 16 lb. per square foot ..	2	10	3½	..	72-5	..	
Do do.	1	10	4½	..	47-5	..	
	..	..	..	..	..	..	120-0
Total, Trough floor plate 120 s. ft. at 16 lb. per s. ft. ..	..	..	..	..	19-20 lb.	..	17-14 cwt.
5. Teakwood— In longitudinal sleepers	2	10	1	½	10	..	
In side curbs	4	10	½	½	6-25	..	
Total, Teakwood ..	..	..	..	..	..	..	16-25 c. ft.
6. Hardwood (babool)— In filling in trough plate	2	10	3½	½	30-21	..	
Do do.	1	10	4½	½	19-79	..	
	2 $\times$ 15	7½	½	½	50-00	9-06	
Deduct	1 $\times$ 15	4½	½	½	..	5-94	
Do deduction	..	..	..	..	..	15	
	..	..	..	..	..	..	35 c. ft.
Total, Hardwood ..	..	..	..	..	..	..	
7. Petty ironwork— Z iron 2½" $\times$ 2½" $\times$ ½" at 5-78 lb. per foot— In standards	4	4	..	..	16	..	
Top hand rail	2	10	..	..	20	..	
Total, 2½" $\times$ 2½" $\times$ ½" Z iron 36 l. ft. at 5-78 lb. per ft. ..	..	..	..	..	208 lb.	..	
Z iron 2" $\times$ 2" $\times$ ¼" at 3-13 lb. per foot curb protector (inside)	2	10	..	..	20	..	
Total, 2" $\times$ 2" $\times$ ¼" Z iron 20 at 3-13 lb. per ft. ..	..	..	..	..	63 lb.	..	
Plate iron ½" at 15 lb. per square foot, knee plate for top hand rail	8	2½	½	..	49	..	
Jointing standard and rolled beam	4	1½	½	..	79	..	
Total, ½" plate, 1-28 square feet at 15 lb. ..	..	..	..	..	19 lb.	..	
Plate iron ¼" at 10 lb. per square foot— Guard plate	2	10	1½	..	33-33	..	
Curb protected (inside)	2	10	½	..	8-33	..	
Total, ¼" plate 36-66 at 10 lb. ..	..	..	..	..	367 lb.	..	
Rivets ½" $\times$ 1½" long 28-7 lb. per 100 ..	88	..	..	..	25 lb.	..	
Nails 2" at 163 per lb.	30	..	..	..	1 lb.	..	
Do do.	150	..	..	..	..	..	
.. 3" at 66 per lb.	170	..	..	..	3	..	
Total, Petty ironwork ..	..	..	..	..	686 lb.	..	
Add—10 per cent. wastage ..	..	..	..	..	69 lb.	..	
Grand Total, Petty ironwork ..	..	..	..	..	755 lb.	..	6-74 cwt.
8. Galvanized wire rope 3-6 lb. per fathom ..	2	10	..	..	20	..	
Total, G.W. rope, 20 l. feet at 3-6 lb. per fathom ..	..	..	..	..	12 lb.	..	11 cwt.

Abstract of Cost.

Quantities.	Sub-head.	Rate.		Amount.	Total.
		Rs.	Per		
4.75 cwt.	.. Rolled beam ..	Rs. 17 8 0	..	..	..
5.18 "	.. Z iron ..	13 8 0	cwt.	83	..
2.9 "	.. Channel iron ..	13 8 0	"	70	..
17.14 "	.. Trough floor plate ..	13 8 0	"	39	..
16.25 cubic ft.	.. Teakwood ..	13 8 0	"	231	..
35 "	.. Hard wood ..	4 0 0	cubic ft.	65	..
6.74 cwt.	.. Petty ironwork ..	3 0 0	cwt.	105	..
0.11 "	.. Galvanized wire rope ..	15 0 0	"	101	..
		25 0 0	"	3	..
	Total ..	..	..	697	..
	Add—Contingencies at 5 per cent. ..	..	..	32	..
	Total for a length of 10 feet run ..	..	..	732	..
	Deduct cost of ordinary sleepers $9\frac{1}{2} \times 10 \times 7$..	8 8 0	each	34	..
	Net and total for a length of 10 feet ..	..	..	698	..
	Or per foot run $\frac{698}{10}$..	..	..	69.8	..
				(say, Rs. 70).	

ESTIMATE No. (d).

Name of work—Road approaches and gates at south and north abutments of the Pennér bridge.
 Amount Rs. 29,154.
 Main head IV. Bridge.
 Sub-head 1. Large bridges.

[Reference.—Plan No. II accompanying.]

Report and Specification.

The distance from and to end of the abutment of the Pennér bridge is 2,020 feet, and the gates at each end of the bridge are therefore 2,112 feet apart. The bank of the river on the north side is flooded to a distance of 1,350 feet from the face of the north abutment, and a long approach road is necessary. The arrangements for lodges and gates to protect the road over the bridge are shown in the accompanying tracing. Quarters for a signaller and gateman are provided, where the ramp leading to the gates makes it more than 4 feet above highest flood level. The road on the south approach is at formation level and is therefore fenced on both sides. It is 200 feet in length. Fencing to be of old rails.

Details of Measurements.

Name of work—Road approach, Pennér bridge, North Abutment.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
North Abutment.							
		FEET.	FEET.	FEET.			
Earthwork—							
Addition to bank	1	1,600	18	12	345 600		
Do.	1	50	18	22	19,800	..	
Do.	1	60	23	22	30,360	..	
Incline to gate lodge	1	8/2	240	18	17,280	..	
Platform for lodge	1	77	23	6	10,626	..	
Total, Earthwork..	C. ft.	..	..	..	..	..	423,666

Road approach, Pennér bridge, North Abutment—cont.

Particulars.	Number.	Measurements.			Quantities.		
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.
North Abutment—cont.							
Metalling, 6 inches thick—		FEET.	FEET.	FEET.			
Approach roads	1	1,650	12	$\frac{1}{2}$	9,900	..	
Between rails	1	46	14	$\frac{1}{2}$	322	..	
Total, Metalling..	C. ft.	..	..	..	..	..	10,222
Moorum topping	1	50	27	$\frac{1}{2}$	675	..	
Do.	1	4 $\frac{1}{2}$	14	$\frac{1}{2}$	144	..	
Total, Moorum topping..	C. ft.	..	..	..	..	..	819
Extra pitching—							
On river face of platform	1	41	63	2 $\frac{1}{2}$	6,458	..	
At opposite face	1	22	63	2 $\frac{1}{2}$	3,623	..	
Total, Extra pitching..	C. ft.	..	..	..	..	..	10,081
Kerbing—							
At side of metalling on line	2	46	1 $\frac{1}{2}$	1 $\frac{1}{2}$	207	..	
Total, Kerbing..	C. ft.	..	..	..	..	..	207
Fencing—							
Outside edge of incline	1	250	..	..	250	..	
On line	1	18	..	..	18	..	
Do.	1	32	..	..	32	..	
Do.	1	46	..	..	46	..	
Total, Fencing..	L. ft.	..	..	..	..	..	346
Guard rails, 75 lb. per yard	2	46	..	..	92	..	
Total, Guard rails..	Tons.	..	..	..	..	..	1.03
Gates with lamps and discs	1	..	..	..	..	..	
Total ..	No.	..	..	..	..	..	1
Quarters—							
Units	4	..	..	..	..	..	
Total ..	No.	..	..	..	..	..	4
Signals post—							
Post and fittings	1	..	..	..	..	..	
Total ..	No.	..	..	..	..	..	1
Office furniture—							
Telegraph instruments	1	..	..	..	..	..	1
Table	1	..	..	..	..	..	1
Stool	1	..	..	..	..	..	1

Establishment.

Signaller at Rs. 25 .. } Rs. 396 per annum; or with contingencies, say, Rs. 400 per annum.
 Gateman at " 8 .. }
 Capitalized at Rs. 5 per cent. .. Rs. 8,000.

Road approach, Pennér bridge, South Abutment.

Road approach, Finnerley, G.									
Particulars.	Number.	Measurements.			Quantities.				
		Length.	Breadth.	Height.	Contents.	Deductions.	Total.		
South Abutment.		FEET.	FEET.	FEET.					
Earthwork—	1	200	18	14	50,400	..			
Additional to bank	1	97	23	21	46,851	..			
Platform of gate lodge							97,251		
Total, Earthwork .. C. ft.	..	..	..	..	..	..			

Road approach, Penner bridge, South Abutment—cont.

Particulars.	Number	Measurements.			Quantities.		
		Length.	Breadth	Height.	Contents.	Deductions.	Total.
South Abutment—cont.							
Metalling—		FEET.	FEET.	FEET.			
Approach road	1	200	12	$\frac{1}{2}$	1,200		
Between rails	1	46	14	$\frac{1}{2}$	322	..	
Total, Metalling	..	..	..	..	..	..	1,522
Moorum topping—							
Same as per north approach .. C. ft.	..	..	..	..	..	..	819
Extra pitching—							
On river face of platform	1	41	50	$2\frac{1}{2}$	5,125	..	
On opposite face do.	1	23	50	$2\frac{1}{2}$	2,875	..	
Total, Extra pitching .. C. ft.	..	..	..	..	..	..	8,000
Kerbing—							
Same as for north approach .. C. ft.	..	..	..	..	..	..	207
Fencing—							
Both sides of road	1	410	..	..	410	..	
Same as north approach	1	96	..	..	96	..	
Total, Fencing .. L. ft.	..	..	..	..	..	..	506
Guard rails—							
Same as per north approach .. Tons	..	..	..	..	..	..	1-03
Gates with lamps and discs—							
Same as per north approach .. No.	..	..	..	..	..	..	1
Quarters—							
Same as per north approach .. No.	..	..	..	..	..	..	4
Signals—							
Same as per north approach .. No.	..	..	..	..	..	..	1
Furniture—							
Same as per north approach—							
Telegraph instrument	1	..	..	..	1	..	1
Table	1	..	..	..	1	..	1
Stool	1	..	..	..	1	..	1

Establishment—Same as per North Approach, Rs. 8,000.

Abstract of cost.

Quantities.	Sub-head.	Rate.		Amount.	Total.
		Rs.	Per		
Road approach and gates at north and south abutments.		Rb.	A. P.	Rs.	Rs.
423,666 c. ft.	Earthwork	8	0 0	1,000	3,389
97,261 "	Do.	5	0 0	1,000	486
11,744 "	Metalling	6	0 0	100	705
1,638 "	Moorum topping	4	0 0	100	66
18,081 "	Extra pitching	20	0 0	100	3,618
414 "	Kerbing	50	0 0	100	207
852 l. ft.	Fencing	0	8 0	L. ft.	426
2-06 tons	Guard rails, 46 feet long	85	0 0	Ton.	175
2	Gates with lamps and discs	100	0 0	Each.	200
8	Quarters	290	0 0	"	2,320
2	Signals	275	0 0	"	550
2	Furniture instruments	180	0 0	"	360
2	Table	10	0 0	"	20
2	Stool	4	0 0	"	8
	Total	..	..		12,528
	Add—Contingencies 5 per cent.	..	..		626
	Total	..	..		13,154
2	Add—Establishment Rs. 400 per annum capitalized at 5 per cent.	8,000	0 0	Each.	16,000
	Total	..	..		16,000
	Grand total for road approach and gates, &c., at both ends of Pennér bridge				29,154
	(Rupees twenty-nine thousand one hundred and fifty-four only.)				

Telegram from the Officiating Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, Bezwada-Madras Railway, dated 29th May 1896, No. 11 A.

Your 410 of 22nd. Are your girders strong enough to carry the roadways proposed in addition to railway under latest rules? and would they be strong enough if metalling be substituted for wood in type D?

From the Engineer-in-Chief, Bezwada-Madras Railway, to the Officiating Joint Secretary to Government, Public Works Department, Railway Branch, dated Madras, 1st June 1896, No. F. 2979.

With reference to your telegram No. 11 A., dated 29th May 1896, I have the honour to forward a drawing of a girder (to be used on this railway) for a 40 ft. clear span bridge. This drawing has only recently been received, and up to date we have not received drawings of either 60 or 70 ft. span girders.

From the President, District Board, Nellore, to the Chief Secretary to Government, dated 3rd June 1896, No. 718/D.B.

In reply to your reference No. 508, dated 4th May 1896—in which I am asked to report, for the information of the Railway Department, (1) the average annual cost to this District Board of maintaining the present Pennér, &c., causeways; (2) whether they would need to be maintained if the railway bridges over the rivers in question were made available for cart traffic—I beg to submit copy of a note on the subject by the District Board Engineer, who has recently inspected the various causeways in question, and to state that I concur in the opinions therein expressed.

2. The papers received with your reference under reply are herewith returned.

ENCLOSURE.

From the District Board Engineer, Nellore, to the President, District Board, Nellore, dated 3rd June 1896.

Your note of 28th ultimo (received last evening, 2nd instant) re utilizing the proposed railway bridges across the Pennér, Mannér, Pálár, Músi and Gundlakamma rivers for ordinary cart and passenger traffic on the Great Northern Road.

1. The average annual cost of maintaining the causeways across the first four of these rivers, as far as I can ascertain from the records of this office, is as follows:—

	Rs.
Pennér	600
Mannér	331
Pálár	300
Músi	363

The Gundlakamma has no causeway.

2. It would not be absolutely necessary to keep up these causeways if the railway bridges were made to accommodate cart and passenger traffic, but it would be very desirable to do so; and considering how little it takes to keep them up, I consider it would be very wrong to let them go to ruin; for except when the rivers are in flood they afford a much more convenient means of crossing them than the railway bridges would do. These bridges are to carry the rails on the upper flanges of their girders; this will necessitate high embanked approaches and that height, and in fact 18 inches above it (to rail level), every cart will have to rise to to get across the bridge. I have not seen the sections of the railway at the crossings of these rivers, but without seeing them I am satisfied that the rise out of the causeways is not half so much. Also of the five rivers named, only at two—the Pennér and the Mannér—does the railway cross the river near the road crossing. In the other three cases the railway crosses a mile or so off, necessitating making two roads (one on each side of the river) from the Great Northern Road to the railway in each case, and also giving every cart that *détour* in its journey.

These considerations establish the extreme desirability of retaining the causeways. So far I have only looked at the question from the cartman's point of view. From the Board's point of view it appears to me that Rs. 30,000, Rs. 40,750, Rs. 38,500 and Rs. 43,200 for the Mannér,

Palar, Músi and Gundlakamma rivers, respectively (Rs. 1,52,450 in all),—let alone the cost and subsequent upkeep of the approach roads which I have mentioned—is a great deal more than now; and there is good reason to believe that, when the railway is opened, it will be considerably reduced as it runs parallel to the road. I think, therefore, that getting the railway to accommodate cart and passenger traffic over these bridges may be put out of the question. What the nearest to these rivers on each side, just to take passengers across.

As regards the Pennér river, it would certainly be very desirable to have a roadway over the railway bridge as there is always a great deal of traffic across the river, roads running east and west as well as north from the north bank. It is for the Board to say if they are prepared to pay a lakh of rupees for it, which the Engineer-in-Chief of the Railway estimates would be the cost. But even if this roadway were made, I would still recommend keeping up the causeway along the anicut, for it is a more convenient way across the river when it can be used (which appears to be eight months in the year) than the railway bridge will be—let alone the dangers of using the same space for railway trains and ordinary cart and foot traffic pointed out by the Engineer-in-Chief. I would only allow the bridge to be used when the causeway was impassable through floods.

No. 684, Local and Municipal.

Transferred to the Public Works (Railway) Department.

FORT ST. GEORGE,
18th June 1896.

(Signed) W. W. PHILLIPS,
Ag. Assistant Secretary.

ORDER—No. 586 R., dated 4th July 1896.

In October 1895, the then President of the District Board of Nellore proposed that the railway bridges on the Bezwada-Madras line within the Nellore district should be constructed so as to carry cart and foot passenger traffic. The Government, anxious to comply with what seemed a reasonable suggestion, caused inquiries to be made and estimates prepared.

2. It was found that the expense would be very heavy, and that the bridges having been designed with the view to the railway only being carried, were not well adapted for the addition of a cart road.

3. The present President of the District Board is shown by his letter No. 718/D.B., dated 3rd June 1896, not to be in favour of the proposed scheme, apparently for the reasons given by the Engineer to the District Board. The Railway Engineers are moreover against the use of the railway bridges for the purposes of a road. The Government of Madras is therefore of opinion that the scheme should be abandoned.

4. The Engineer-in-Chief, Bezwada-Madras Railway, will be requested to state what could be done towards giving effect to the proposal made by the District Board Engineer in his note, dated 3rd June 1896, to provide temporary or flag stations in flood time near the ends of the bridges to enable passengers to cross, and particularly at Nellore where the institution of a ferry-train to carry carts as well as passengers would be a great convenience when the causeway is impassable.

(True Extract.)

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

To the Local and Municipal Department.
„ Engineer-in-Chief, Bezwada-Madras Railway.

Exd. T. K. Narayana Aiyangar.
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PUBLIC WORKS.

Encl.

G.O. No. 586 R., 4th July 1896.

JULY.

Bridges

Directing, with remarks, that the proposed scheme that the railway — on the Bezwada-Madras line within the Nellore district should be so constructed as to carry cart and foot passenger traffic, be abandoned.

is Excelling the former
 Rev. W. Davis
 Rev. W. J. J. J.

~~This letter contains the following~~
~~for information -~~

(a) I should be glad to hear what is decided on. As far as I can see no time should be lost in draining the river in such a manner that a good ferry will result - while the same works will do for the bridge. Is this prov. expected to move in the matter? Anyhow I think we should urge on the Sindia authorities the absolute necessity for immediate action.

(D) I am sorry to see that the new Ristow bridge is difficult to brook the cart traffic over. This seems a great pity. Can no arrangements be made to provide for this?

© The it stated somewhere that one
anna a head is charged for foot
passengers. This seems to me very high
considering the rate of daily wages in
this country - & must be prohibitory
to the ordinary coolie.

6
13 Aug

The E. C. Railway seems to have been made without the least thought of how it was to be worked.

AS
17/8/94

Letters received from
Managers East Coast
By - _____

Site of shops, vineyard &
stall quarters at Waltair

Central station and post
terminus in Vizagapa-
tam

Godwary Perry

Transshipping station on right bank of Ristna to relieve Beynada.

These are the principal matters requiring settlement and are being discussed between Manager and Director General of Railways, India -

F. R. M.

5-
894

(a) The decision of the Director General will be communicated to his Excellency ^{and} ~~as~~ ^{and} these points are settled - an estimate for the floating stock & for the tearing works is under preparation - I don't think this Govt. can expedite matters - a letter to Works Minister is put up.

(b) In the large bridges in the north - a ferry train consisting of high sided wagons often from end to end, have been run.

A hand-drawn geological cross-section diagram. At the top, a 'Road' is shown with a dashed line indicating a 'Spring' location. Below the road, a 'Fault' is depicted as a break in the ground surface. A 'Fault line' is shown as a dashed line extending from the fault. A 'Railway' is shown as a line with cross-ticks, running parallel to the fault line. A 'Fence' is indicated by a dashed line at the bottom. The diagram is labeled with 'Road', 'Spring', 'Fault', 'Fault line', 'Railway', and 'Fence'.

(c) I will inquire about this.

15
894

2 letters put up for
approval.

142. 7/8. Return 14/8
 Ar 15/8 R 20/8

The rates are
Adults 1 anna
Children $\frac{1}{2}$ anna
Kachidi load $\frac{1}{4}$ anna
In answer proposes to reduce
these rates to those charged by
about 100 private contractors.

ω
 $\sim$
 22 hr

NO 1552
D.B

29th October 1895.

From K.C. Manavedan Raja Esquire
President, District Board, Nellore.

To the Engineer-in-Chief. Bezwada-Madras Railway
Madras.

Sir.

The District Board at its meeting held on 26th October 1895 expressed a wish that the Railway bridge to be constructed over the Pennair may be so constructed as to admit of cart and passenger traffic. I shall be glad to be informed of the probable extra cost that may have to be incurred for the modification proposed. Without this information, the formal sanction of the Board cannot be obtained, and I am not in a position to address Government with a view to ascertain if the proposal has the approval of Government and further whether Government would be prepared to assist the Board by lending the required amount.

2. I request that separate figures may be given if provision is to be made only for a side way for passengers.

S. S. N Press. [24.5.95.]

3. As I understand that the work will be taken up immediately. I request the favor of a very early reply.

4. I further request that similar information may also be given furnished for bridges to be constructed over the Pennar, Palar, Musi and Gundlakamma rivers.

I have the honor to be.

Sir,

Your Most Obedient Servant.

(Signed) K.C. Mahalingam Pillai
President

(True Copy)

Chancellor
Vice President for
President

No. 1359
46

3 S.P.
Madras

Dated the 3rd November 1895

From The Engineer-in-Chief, Madras Railway

To The President, District Board, Nellore

Sir,

I have the honor to acknowledge the receipt of your letter $\frac{1552}{2.03}$ of October 29th in which you ask (1st). The cost of constructing the Pennar, Pennar, Palar, Musi and Gundlakamma Bridges so as to admit of cart and passenger traffic as well as Railway traffic.

(2^{ndly}). That separate figures may be given for a side way for passengers on those bridges:

Engine Station
Nellore M. 109 $\frac{1}{2}$
Bapatla M. 221 $\frac{3}{4}$

The bridges proposed for the rivers mentioned and the probable approximate cost are as under:

M. 110	Pennar	{ 23 spans of 70 ft } 5 " 40 "	Rs 581,000	l.f.
161.2	Pennar	9 " 60 "	Rs 1,30,000	l.f.
166.7	Palar	18 " 40 "	Rs 1,61,000	l.f.
173.1	Musi	17 " 40 "	Rs 1,49,000	l.f.
187.7	Gundlakamma	13 " 60 "	Rs 2,15,000	l.f.

The above estimates are approximate only. I am afraid that it is rather late in the day to take up the question of making these bridges suitable for Cart and passenger traffic as well as for Railway purposes, as the girders, in the design of which only Railway requirements were considered, were ordered by the Director General some months ago. The well curbs for the bridges have also been ordered.

There would be two methods of making the bridges suitable for Cart traffic. (1st) By making a separate roadway for vehicle traffic above or below or alongside the Railway. (2nd) By using the same roadway both for Railway and vehicle traffic as in the Krishna Bridge, protecting telegraph stations being provided at both ends of the bridges.

The first method would involve ^{much} heavier girders than those now ordered, and larger piers and foundations and I should estimate roughly that the cost would be twice as much for each bridge as above noted. The girders and well curbs already ordered for the bridges would not be suitable.

For all these bridges it is intended that the Railway should run on the top of the girders on cross sleepers and the second method would involve widening and decking the roadway on the girders, but would be much the cheaper. I do not think I could put the extra cost of widening

L.S.P.

widening and decking at less than Rs 50 per lineal foot. for a road way 15 feet wide. At this rate the extra cost would at a rough estimate be

	Lineal feet	Cost
Penner River	2000	Rs 1,00,000
Manner ..	600.	30,000
Palar ..	815	40,750
Abusi ..	770	38,500
Gundlakamma ..	864	43,200
	<u>5049</u>	<u>252,450</u>

Against the second method there is the fact that the use of the same road for Railway and vehicular traffic is a source of delay and of some danger, and this objection would in the above cases apply all the more strongly ^{owing} to the fact that the Bezwada Madras Railway will ultimately become a trunk line with, it is expected, a large traffic.

As to the 2nd question I estimate that the cost of a side way for passengers only would be about Rs 6 per foot run so that for the bridges in question the cost would be approximately

Penner	Rs 12,000
Manner	Rs 3,600
Palar	Rs 4,890
Abusi	Rs 4,620
Gundlakamma	Rs 5,184
	<u>30,294</u>

P.W. 604 + 11
9044/45
5594/91

3-7640696

S S. N. Press, [24.5.95.]

Local Municipal Dept.

From CURRENT No. 3314

The President, District Board.

Nellie.

To

The Chief Secretary to Government.

Local & Municipal Department

Madras

No 1623
S.D.

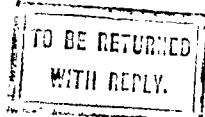
Encl. 2.

Dated 8th November 1895



Subject

Submitting proposals for the construction of Railway bridges over Pennair & rivers so as to admit of cart and passenger traffic as well as Railway traffic.



S.P.

Cs

No. 1658
Referred to the Public Works (Railway) Department for favour of remarks.

W. B. Phillips

Acting Assistant Secretary

18/11/95
Fort Saint George,
20th November 1895

The Public Works (Railway) Department.

2907/95

Recd. 21.11.95

No. 2

In execution of the order
of the M. C. Board
of the M. C. Board

H. J. seems to have overlooked this yellow bridging question. If the Yellow Local M. C. can come with the Railway authorities, I can see no reason why it should not be done. The money which will have to be spent to make the Railway bridge possible by carts (or passengers, as the case may be) - I regret that I don't know anything about the cost of the bridge at present crossing the river in question. I am not likely to do so, so that I cannot form any opinion as to whether it would be worth the while of the M. C. to incur the estimated expenditure or give it any advice on the subject. The matter has evidently been treated on without much consideration & has been submitted without any accompanying info.

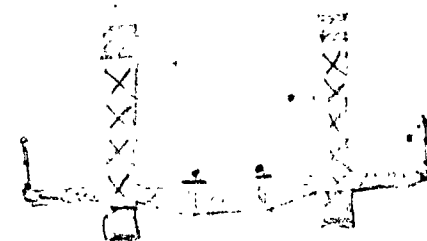
3/12/95

The circumstances in relation are such that it is very desirable that the bridge should be made available for carts & passengers to traffic.

5/12/95

The District Board of Madras ask that provision be made for either the passage of carts & passengers or passengers only over the Pennair, Man-
nar, Palar, Muvattur, & Alankulam Railway bridges.

- When the survey was made in 1893-94, the District officials were consulted but this question was not brought forward.
- As a rule provision for foot passengers is only made in girders of 150' span & upwards by extending the cross girders to form a foot path on side the main girders thus



- And in a few cases the floor of the main girders are boarded over to allow carts to cross.
- This is not generally advisable because of the detention to traffic the dirt and liability to fire - a better plan

From
No.
dated
Subj.
of
nature
has
traff.
C.S.
No.
of
of

in the north of India
is to run a train of
open high sided trucks
in which bullocks &
carts can be loaded
up from one end - ^{see sketch}
6. In this case, ^(last point 1) ^{however} most
of the piers are of 60'
span & unsuitable for
passengers and as they
have been already or-
dered and the cost
given by the Eng. in Chief
being 2 1/2 lakhs for
a road way and 30,000
for a side way - I
think the Govt. can
hardly be expected to
find the money -
7. A small roadside
stations at each end of
the bridges at which the
slow & mixed trains
would stop might meet
the difficulty -

F.R.U.
21/11/95

Papers should go to the
L. & M. Dept. with reference
to the proposed loan.

Cir 21.11.95
Rb/12

There is no doubt that it w^d
be a great convenience to the
Residents of the localities thro'
wh. every railway runs
that the bridges over the big
rivers should be made to carry
carts & passengers as well as
the railway. It is a great pity
that the local authorities did
not move in the matter sooner
and that though they were
consulted when the survey
was being made, they made no
sign, till it was too late.
The papers sh^d. now go to the
L. & M. Dept. for preparation
of Estimates etc. and for
considering the question of
providing the connections required
and the means for providing the
funds.

h
8 Dec

Issue
Free 11/12

The papers are again
submitted to His Exc^{cy} -
Agency with reference to
the remarks of the Hon
Mr. Allen & Hon Mr. Prov^{nt} -

2. The Engineer in Chief
Mr. Moore points out that
all the piers have already
been ordered & that he
feels the question has been
raised too late -

3. The District Board of
Malwa give no informa-
tion as to the amount
of local traffic crossing the
rivers & I submit in the
present case - the best way
of meeting the wants of the
C^{ty} will be by establishing
a ferry train - & to illus-
trate the working of this I
put up a note made about
the Distna bridge showing
what has been done in the
Punjab -

4. In reply to the District
Board - Question No 1 -
"whether Govt. would sanction
the proposal" - I suggest that
they be informed that, as
matters have gone too far to
allow of the construction
of a footway or roadway
that the ferry train system
might be suitable

F.R.U. 6/12

H.E.
12/12

4032

Construction of
Bridges over Penna. R.
to admit of cart & passenger
traffic.

4032 C

inc 2/11 R 6/12 2/11/12
H. 2.6/12

Str no: 9164/95
No 4032 C of 16th Decem^r 1895

Local and Municipal
Department Endorsement

No: 1658 of 20th November
1895

x with Encls.

Referring letter from the
President of Board
Hollows submitting proposals
for the construction of
Railway bridges over
Penna. R. bridges so
as to admit of cart
and a passenger traffic
as well as Railway
traffic.

Returned to the
Local & Municipal De.
partment for favor of
preparation of a state-
ment of statistics as to
cart & passenger traffic;
also for consideration
of the question of providing
the connections required
& the means for providing
the funds.

FRU 11/12 95

DESPATCHED
10 DEC 95

No. 4032C

GOVERNMENT OF MADRAS,

P. W. DEPT., RAILWAY BRANCH,

Dated 16th December

1895.

Local & Municipal Dept.
CURRENT No. 3681 1/2

MEMORANDUM.

Endorsement from the Local and Municipal Department
No. 1658 dated 20th November 1895.

6 P.

Returned to the Local and Municipal Department, for
of statistics
favor of preparation of a statement, as to cart and passenger
traffic; also for consideration of the question of providing
the connections required and the means for providing the ---
funds.

J. Russell

Joint Secretary to Government, P.W.D.

Railway Branch.

No 4032C of 16th December
1895

In file 29, 47

6/1/96

Page 8
5524/86

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1895.

Public Works Department.

Local & Municipal Dep

CURRENT No. 3681 L

COLLECTOR
NELLORE
8 11 36

No. 4032 C

Dated 16-12-1895

Despatched

Received

L. C. No. 3314 L act

RECEIVED
17 DEC 1895
GOVERNMENT OF MADRAS

SUBJECT.

Returning correspondence
regarding the construction
of railway bridges over
the Pennai and other rivers
in the Nellore District
of cart and passenger
traffic for report as
to the traffic &c.

No 1
Referred to the President, District
Board, Nellore, for early report
As (C 4 X) 1896 (By order)
W. D. Phillips
Asst. Secy to the District Board

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are positively prohibitive on the score of cost.

3. As the bridges will to some extent afford access to the Railway and attract traffic of goods and passengers and so far benefit the line which by the way is protective and productive at the same time, it will be I venture to suggest expedient that Government should bear a part of the cost required if not the whole.

4. With reference to the provision of funds for the purpose the District Board, it is submitted, is not an affluent one and can certainly not bear more than half the cost and this amount will have to be raised partly by a loan to be liquidated in 30 years by a levy of tolls on carts and passengers as in the case of the Krishna Bridge and partly from its own funds.

5. If the above proposals meet with the approval of Government, separate proposals in the matter of tolls will be submitted.

6. I beg to state also that if any action is to be taken in the matter, it will have to be done at once as work on the Railway bridges will commence very shortly.

7. The papers received with the reference under reply are herewith returned.

I have the honor to be,
Sir,
your most obedient servant

Platahan

Vice President for
President

Statement of Statistics of cart and passenger traffic on the rivers
in Bellary District for one year

95P

Names of rivers	Carts	Passengers	Remarks	
			Per day	Toll per day
Pennair	21,117	3,22,899	60	885
Musi	10,318	20,000	28	57
Udannair	10,800	25,200	29	69
Palair	10,800	25,200	29	69
Gundlakamma	3,002	20,000	9	152
	56,037	4,13,299		

Q
6-3-96

B
7/3

Platahan

Vice President for
President

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Suppose that a large proportion of this is long distance
traffic which will use the railway when opened. If
Govt. decide on adopting the 2nd proposal the Govt. of
India must be addressed with a view to allowing
the design of the bridge floor but before doing so it
would be desirable to find on the cost of the
ferry train proposal to which there are no objection
on the score of danger, delay to traffic, dirt and
liability for fire

SM

JH
.. 28/3

Accommodation for Cart & foot-passenger traffic over certain long bridges in Bagmati, Madras Ry.

H.E. to Govt.

Hon - Mr. Bhai

Hon - Mr. George

I do not think the application of the Dist. Bd. should be refused in the manner suggested by the Sec.

Of the four alternative schemes, the decking seems the best, all things considered. It has of course its disadvantages, but failing means to construct a separate bridge, these disadvantages must be put up with.

The Dist. Bd. should be. The cost of the decking and of its maintenance, and should receive the whole of the tolls collected. The rates of tolls proposed seem very high.

I should like the opinion of the Hon. Mr. B. whether a loan of about 2 1/2 lakhs, for the decking of all these bridges, could be properly made to the Local Bd.

A.I.H.
29.3.96

26.3.96 I don't see any objection to the loan as H.E. maintains, except R 4/4/96

The Dist. Board of Nellore desires that the Ry. bridge over the Pennar River at this city should be made suitable for Cart & foot passenger.

The circumstances are explained in the attached Nth on the case.

This bridge consists of 23 spans of 20 ft. each + 5 of 40 ft. each, is about 2000 ft. long. The girders are of the plate-type, with an open webbing track (i.e. rails on cross sleepers) on top, and consequently not suitable for either cart or foot traffic. It was ordered "some months prior to last November" to be strengthened on their way out, if not already secured in India.

Four alternatives have been proposed to meet the wishes of the Dist. Board.

- I. A separate roadway for carts & foot passengers - This independent of the Ry. track - This would maintain the same level as the bridge & cost about Rs 300/- per ft. (say Rs 6,00,000/-)
- II. Providing a continuous flow of rail line so that carts could cross the bridge above the rails - This would cost at least Rs 50/- per ft. (say Rs 1,00,000/-) and would necessitate special arrangement at each end of the bridge of telegraph stations & signals to control the cart traffic & minimize the danger of delay in the crossing of carts & railway traffic to use the same bridge roadway.
- III. A sidewalk for foot passengers only - There is no objection to this.

in separate distinctly connected
 will then. but it would cost at
 least Rs 50. for C.F. (say Rs 10000)
 and it would be even better, or better,
 for cart, or even better, or better,
 Cripps

IV. To run a local or "ferry train"

between the two banks of the river
 at certain times. The Ry. would
 doubtless be willing to do this, if
 it be likely to pay. But as
 the traffic is small, as only about
 60 carts $\frac{1}{2}$ per day
 880 foot passenger $\frac{1}{2}$ per day
 (of whom doubtless a very large
 proportion are long distance travellers, & the other
 I would go by railway anyway) I
 doubt if there is much chance of
 this.

According to the scale of fixing rates,
 that one half of the cart traffic are
 long distance travellers, & the other
 half would use the Mowatt road-
 bridge. Cart toll would
 be $\frac{1}{4}$ per cart & pedestrian $\frac{1}{16}$ per
 foot. The toll would be
 Cart - Rs 457 per day
 foot - Rs 28
 Rs 35 per day
 = Rs 12775 per annum

This would certainly not pay for
 either I or II, but might
 justify either III or possibly even
 II, if the whole of the toll is
 devoted to pay the interest on the
 roadway. But this would not be
 fair to the Ry. which provides the

that I fear the balance
 Dist. R. could not afford
 to have much to get as
 little. One anna seems a
 high toll for a passenger, but 4
 annas is not too much for a
 cart, which would have at least
 4 annas worth of time saved by
 avoiding the passage
 of the sandy bed of the river. But
 would there be enough carts to pay
 the interest & sinking fund on
 the loan? I doubt it. I incline to
 think the ferry train idea the

RS
 1/4/96
 I think so, too, but the
 Board should be asked.

JS
 2/4/96
 If foot passenger is charged $\frac{1}{16}$ per
 foot might be
 Cart - Rs 457
 foot - 14
 Rs 21 per day
 = Rs 7665 per annum

1. The Hon. Mr. Gane, who has, I believe, personal
 knowledge of the circumstances and wants of
 Nellore, wrote on 5.12.95, as follows: - "The
 circumstances in Nellore are such that
 it is very desirable that the Bridges should be

be made available for cart and
 "passenger traffic". Guided by
 this authoritative opinion and
 by the exercise of ordinary common
 sense, I read on 29.3.96, that I
 did not think the application of
 the Dist. Bd. should
 be refused in the
 manner suggested
 by the Sec. I still think the same,
 and I earnestly urge action in the
 matter.

2. I venture to think that the objections
 to a road-way over the bridge are
 exaggerated. But few trains will
 cross the bridge during road 24
 hours, and the cart and train traffic
 will interfere but little with one
 another. I still think the
 proposed scheme by far the best of
 the four suggested. If the Dist. Bd.
 cannot afford to bear the whole
 cost, I think the Govt. should
 contribute. The work is not one,
 in my opinion, which should be
 rejected on the ground that it would
 not pay fair interest on its cost.
 It appears to me that the first, if

by that the
 major part of the cost of the
 original bridge, which was the
 roadway would be improved -
 This is about Rs 300 per C.F. (or
 say Rs 60000 per the bridge) so
 that the Ry. would appear justified
 in claiming $\frac{6}{7}$ of the toll in II,
 or $\frac{59}{60}$ of it in III. Leaving
 only the following share for the
 Dist. Board is

$\frac{1}{7}$ of 12775 = Rs 1850 for Car II carrying Rs 10000
 or $\frac{1}{60}$ of 12775 = Rs 210 - - - - - Rs 10000

which is not sufficient to pay
 interest at 4% on the proposed
 outlay.

Considering the unreliability of
 the estimate, both of the cost of
 the work (which is probably under
 the mark) & of the quantity of
 traffic likely to pay toll, I
 think it is not desirable
 to encourage the proposal.

~~Recommendation~~
 I venture any attempt to carry
 out the plan of cart traffic on the same
 roadway as the train (Car II)
 is so fraught with danger &
 inconvenience that it should never
 be adopted if it can possibly be
 avoided.

As regards the other bridge
 named in the papers - all of which
 are shorter than that at
 Nellore, all the objection mentioned

also apply with increased force
and the reputation of toll to
cost, as per former.

Under the circumstances therefore
I suggest for the consideration of
the Council. The Dist. Board
is informed that the
cost of different committees will
the provision of a road bridge, as
such as to include the proposed
long extension, but that
sufficient traffic, from the
in hereafter arranged. C.M.

25/3/66

Up to now, considering the
attainment of a solution is to
ask the Railway Board to do it.
to my shelter or with the planning
scheme can be applied to these
bridges, and if so at what cost. In
seeking this information, my Hon.
colleagues and I will be com-
mitted to my decision in the
matter.

3. The most conspicuous objection to
the ferry train proposal is that, unless
we run very frequently, it would cause
considerable delay to both east and
west traffic.

A.H. 16.4.96

In the meantime, it might be of use to
ask the Dist. Bd. to state the average
annual cost of maintaining the
conduits over the Pannar and the
other rivers referred to. The Bd.
should say whether it would be necessary
to keep up these conduits if the
Railway Bridges are made available
for east traffic.

A.H.

17.4.96

Accommodation for Cars &
Post Traffic in certain long
pieces on the Beagoda road,
Ry.

See Mr. Leppitt's Note of 21.11.95
and my Note of 25.3.96 and the
remarks of H.E. & Mr. H. H. H. H.
thereon.

(2) H.E. Mr. Gov. is of opinion that
the decking (alternation II) will
be the best way of meeting the
wishes of the Dist. Board, and the
Engineer as to the expediency of the
loan.

(3) Mr. H. H. H. H. doubts whether
the work would form remuneration,
he considers the average toll of one
cent per trip for pedestrian & horse
the ferry train (alternation II).

(4) Further order on the Pannar
Bridges as to the action to be
taken. The questions asked by the
Nellor Board are—

(a) Will Gov. sanction the proposal?
(b) Will it lend the money?
I therefore submit the following for
consideration.

(5) On regard (a) — The Gov. of Madras
cannot sanction the proposal, as the
B.M.R. is not under its order. It
will be necessary to refer to the Gov.

H.E. Mr. Gov.
~~Mr. H. H. H. H.~~
~~Mr. H. H. H. H.~~

Not in a circular
to Mr. H. H. H. H.

17/4/96

of India - I do not think the
 Calcutta would be disposed to entertain
 any proposal to make such alterations
 to the bridge for the following reasons -

~~(i) The structure already arranged~~

(i) The structure already arranged
 for an all-India for the
 provision of a roadway.

(ii) no application for such a provision
 was brought forward when the
 project for the Ry was in hand.

(iii) a roadway occupying the
 railway track is so fraught
 with danger and inconvenience
 that it is seldom permitted
 if it can possibly be avoided.

(iv) The cost would be very heavy &
 it is very doubtful whether the
 traffic would pay enough tolls
 to justify the outlay.

(v) The figures available on hand
 which enough to justify the
 building of the Calcutta.

(6) As regards (b) - I gather from
 the remarks of Mr. E. & the Hon. Member that
 there would not be any objection to
 the loan. If the revenue Board would
 be likely to pay interest & sinking fund.
 On the information available it appears to
 me very doubtful whether the ~~revenue~~
 revenue would be sufficient even at the
 high toll first suggested. But if the
 toll is reduced in accordance to H.E.

Mr. Mr. B. B. It is pretty certain that
 the scheme would not pay. Thus -
 (7) Taking the Penna bridge at Stellen
 alone - the cost of the decked roadway
 would not be less than Rs 100,000

Therefore revenue required is -

Interest 4% —	Rs 4000
Sinking fund 2 1/2% —	2500
	6500

Establishment p.m.	
2 Clerks Rs 2400 =	80
2 Chakras do 12 =	12
	92 x 12 = 1104

Repairs say 100% for annum	400
----------------------------	-----

Total revenue reqd	Rs 8000
--------------------	---------

(8) The Anticipated toll (if it be assumed that
 the toll would be 1/4 for cart & 1/6 for foot passenger)
 rate of 1/4 for cart & 1/6 for foot passenger)
 rate is -

30 carts @ 1/4 =	7.50
4000 ft @ 1/6 =	14.00
21 1/2 x 365 =	Rs 7847

There is hardly enough to pay ~~interest~~
 and it is hardly doubtful whether the
 toll is likely to pay the existing traffic across the
 river will care to pay toll after the
 railway is opened.

(9) Taking the other four bridges the figures
 are still more unfavorable. The appraised
 length is 3049 ft & the cost of the decked
 roadway estimated at Rs 150,000 at least
 & the revenue reqd is -

Interest & sinking fund @ 6 1/2% =	9750
Establishment at 4 bridges @ 400 p.m. =	2208
Repairs say 100% each	400

Rs 12358

As the bridges are short, it is presumed

that only half the toll, ^{fixed} for
Nellor will be levied at the other
bridges - and half the existing toll
will then hold.

$$\begin{aligned} 48 \text{ cart } 2 \frac{1}{2} / &= 6 \\ 173 \text{ ft } 2 \frac{1}{2} / &= 3 \\ &\frac{3}{9} \times 365 = \text{Rs } 3285 \text{ per annum} \end{aligned}$$

which is barely a quarter of what
will be required to make the scheme
financially sound.

(10) Under the circumstances I fear
the ~~present~~ scheme for the linking on
the Nellor bridge is very risky, and
that for the other bridges it would not
do at all.

(11) The alternative proposal for a
"ferry train" is also very expensive, &
the Pannier bridge, as this is close to
Nellor station where engines are kept.
All the other bridges are 35 to 50 miles
away from any engine station & it will
be very costly to prohibit in
ferry trains there would be prohibitory in
cost.

(12) I estimate the cost of a ferry train
at Nellor at about Rs 100/- per day,
with a constant charge of Rs 5/- per day
for Establishment & interest on the extra stock
for plant, & other stock required, and a
minimum charge of Rs 50/- per day if only one
trip is run. If three trips were run, each
occupying the engine for 1 1/2 hours, the cost
would be about Rs 50/- per day.

(13) The tolls suggested therefore, would not
be likely to pay, but at any rate the
alternatives have the advantage that if

would not cost much to try, as an
experiment, and thereby ascertain what
amount of toll can be collected upon
it could be stopped & no
and if there were insufficient, no great
harm would be done. The Ry.
Administration would, however, prefer to
work a ferry train at a small loss, rather
than agree to the double roadways

(14) An alternative scheme to the above is to
build bridges in upper India more near
with special arrangements to carry road traffic
on the existing line. But the danger is
inconvenience for passengers thereon has been
found too great, the ferry trains have been
adopted instead. It is understood also that
the experience of the Krishna bridge is very
favourable.

(15) I had hoped to have been able to explain
these matters personally, on the last evening
last, but there was no time to do so, and
I therefore submit this note & other papers
in order as to the action to be taken.

C.V.M.

9/1/1906



GOVERNMENT HOUSE,

16 Apl. 1896.

Dear Mr. Hodson,

His Excellency wishes the references to the Chief Engineer and the Nellore Dist. Board, ordered in his note on these papers, to be made before the papers are re-circulated to Hon. Members, as this course will save time.

Yours sincerely
H. A. Stuart

P. W. D. Memo No. 4032C
 7/6 Decr 1895 with
 enclosure.

Ch 2947.
 L & M. Sept Endorse-
 Transferring letter from auct. No. 374 of 21st
 the President of Board Nelson March 1896..
 to submitting a statement
 of Statistics of cart & passenger
 traffic on the rivers in the Nelson
 District.

Reminder No. 4D of
 10-6-96

No. 4D of 20 April 1896
 Returned to the
 Local & Municipal Dept
 in view to the District
 Board Enrolle being asked
 to state the average
 annual cost of maintain-
 ing the causeways over
 the River & other
 rivers referred to. The
 Board should also be
 asked to state whether
 it would be necessary
 to keep up these causeways
 if the railway bridges
 are

are made available for
cart traffic. -

ew
25/4

see the order
last para of Govt
Revenue

HA 10/6

No 4 D of 20 April 97

R. Form No. 14.

No. 5 D.

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

To
THE Engineer-in-Chief

Beyrada-Madras Ry.

20 April 1896

SIR,

I am directed to
inform you that it appears
to His Excellency the Governor
in Council desirable that
the bridges now being con-
structed on the Beyrada-
Madras Railway over the
Penuar, Manner, Palur, Musi
and Gundlakamma Rivers
should be adapted for the use
of cart and foot passenger
traffic, if it be practicable
so to do.

2. The matter has already
been brought to your notice
by

by the President of the Malabar District Board to whom you furnished a rough estimate of cost in your No. 1357 of 2nd November 1895. That estimate however appears to be a very rough one, and it is accompanied by the remark that as the arrangements for these bridges were already far advanced you were afraid that the question had been brought up too late.

3. Of the alternatives mentioned in that letter, the second, i.e. the decking of the bridges so as to carry the cart traffic on the same roadway as the railway appears the most suitable and I am directed therefore to enquire whether it would now be practicable to deck any or all these bridges, and, if so, what particulars method you would recommend for

for so doing and what it would cost? I should feel obliged if you would be good enough to go into this matter in some detail (taking, say, the Malabar bridge as a type that being the most important of those named), so that, if necessary the Government of India may be addressed on the subject.

4. It is of course understood that there are objections to carrying cart and railway traffic on the same roadway, but it is presumed that by suitable arrangements of gates & signals the inconveniences and dangers consequent thereon could in large measure be overcome. The provision of such arrangements should therefore be included in your proposals.

5. I am further to request that you will furnish this Government with any remarks that you may desire to make on the general question as to the expediency of utilising these railway bridges for road traffic and as to the best method of doing it.

crw

18/4

No 52. d/20/4

R. Form No. 11

No.

4 D

13 1/2

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

MEMORANDUM.

Noted and
Dated Madras, 20 April 1896.

Public Works Department Memorandum No. 4032.C dated 16th December 1895 with enclosure.

Local and Municipal Department endorsement No. 374 dated 21st March 1896.

Returned to the Local and Municipal Department in view of the District Board No. 100 being asked to state the average annual cost of maintaining the causeways over the Palar and the other rivers referred to. The Board should also be asked to state whether it would be necessary to keep up these causeways if the railway bridges are made available for car traffic.

crw

18/4

Offg. Joint Secy. to Govt.
P.W.D. Railway Branch.

2. 10. 1954

121

16.4
594/16

100

COLLECTOR
MELBORE
5533

R. Form No. 21.
200-6-4-95.

1896.

Public Works Department,

Railway Branch.

Local Dept.

To - The Local & Municipal
Departments

No.

H. D.

Dated

20-4-96

Despatched

20-4-96

Received

21 APR 1896

Cuibo. 6.

SUBJECT.

Returning Correspondence re the construction of railway bridges over the Pennar & other rivers and asking for the survey cost of maintenance of the causeways over the rivers

0.554/26
13
17/4/96

The President, Dist. Board,
Nellore.

(With Encl.)

No. 508
Referred to the President,
District Board, Nellore, for report.

(By order)

W. D. Phillips

Acting Assistant Secretary

29th
Fort Saint George,
14th May 1896

BEZWADA-MADRAS RAILWAY.

Division.

Estimate No. (A)

Name of work Single Planked Roadway.

Amount Rs. 34/- per foot run of a bridge

Main Head IV Bridge work

Sub-Head 1 Large Bridges

REFERENCES.

Plan No. II accompanying
Letter No 5 D dated 20-4-96 from the Offs.
Joint Secretary to Govt. P. W. D. Ry, Branch
Madras to the Engineer-in-Chief, B. W. Ry.
Letter No F/2789 dated 22-5-96 from the Eng. in Chief
B. W. Ry to the Joint Secretary to Govt. P. W. D. Ry Branch
Madras
Accompanying

REPORT AND SPECIFICATION.

The roadway which is to be about 2' below the level of the railway will consist of $3\frac{1}{4} \times 3\frac{1}{4}$ " light wood longitudinal baulks with $\frac{1}{2}$ " clearance supported by transverse sleepers which must be of wood sounder than ordinary railway sleepers and be 14 ft wide i.e. 7 ft on each side of the centre of the railway track. The ends of the sleepers will be supported by angle irons $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{8}$ ". The roadway will be protected on each side by a hand railing 3 ft high from the top of the sleepers and the latter hand railing will be protected from the wheels of the carts running against it by a $\frac{1}{4}$ " plate iron guard plate inclined down at an angle of 45°

Details of Measurements.

Name of work *Single Planked roadway*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
<i>Woodwork. Sleepers.</i>	4						
<i>14 ft Sleepers will have to be used of better quality than ordinary Sleepers and the extra cost is estimated at 11/- each</i>	4				4		
<i>Total Sleepers</i>							4
<i>Teakwood</i>							
<i>Longitudinal baulks</i>	38	10'	$\frac{13}{48}$	$\frac{13}{48}$	28		
<i>Total teakwood</i>							28
<i>Petty ironwork</i>							
<i>L iron $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{8}$ @ 5.78 lbs per ft</i>							
<i>Brackets & uprights combined</i>	8	$\frac{9\frac{13}{24}}$			76.3		
<i>Top rails</i>	2	10			20.0		
<i>Total iron 96.3 ft @ 5.78 lbs. lbs</i>					557		lbs
<i>Knw plate $\frac{3}{8}$" @ 15 lbs per S. ft.</i>	16	$\frac{35}{96}$	$\frac{1}{6}$		0.97		
<i>pressed plate joining the L iron brackets to provide $\frac{3}{8}$" @ 15 lbs per S. ft.</i>	8	$\frac{4}{3}$	$\frac{61}{192}$		3.38		
<i>" " total $\frac{3}{8}$" plate iron 10.71 S. ft @ 15 lbs per ft</i>	8	1	$\frac{19}{24}$		6.33		
<i>Guard plate $\frac{3}{4}$" @ 10 lbs per S. ft.</i>	2	$\frac{10}{10}$	$\frac{1}{10}$		1.61		lbs
<i>Total $\frac{3}{4}$" plate iron 33.33 S. ft @ 10 lbs per ft</i>	33	$\frac{1}{2}$			33.33		lbs
<i>Bolts for $\frac{3}{4}$" with heads & nuts for holding L iron & Sleepers 11' long @ lbs 1.92 each</i>	16				31		lbs
<i>Rivets $\frac{3}{4}$ dia x $1\frac{1}{4}$" long 287 lbs per doz</i>	64				18		lbs
<i>nails $5\frac{3}{4}$" long - 1 lbs per doz</i>	8				1		"
<i>" $5\frac{1}{4}$" " 1 " " 14</i>	70				5		"
<i>Total</i>					1106		lbs
<i>Add 10 percent for waste</i>					110		
<i>Total Petty ironwork</i>					1216		lbs = 10.86 cwt

Details of Measurements.

Name of work *Single Planked roadway with Ring Plating*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
<i>Galvanized wire rope</i>	2	10			20		
<i>Total wire rope @ 3.6 lbs per fathom = 12 lbs.</i>							0.11 cwt.

Abstract of Cost.

Quantities.	Sub-Head.	Rate.		Amount.	Total.
		Rs.	Per.		
4 Nos	Additional Cost of Sleepers	11	Each	44	
28 C. ft	Teakwood	4/-	C. ft	112	
10.86 Cwt	Petty ironwork	15/-	Cwt	163	
0.11 "	Galvanized wire rope	25/-	"	3	
Total				322	
Add Contingencies at 15 per cent				16	
Total for a length of 10 ft. Rs				338	
or per foot run Rs				33-8	
Pay Rupees 34/-					
Engr. J. Moore					
Engineer in-charge					
B. M. Rly					

BEZWADA-MADRAS RAILWAY.

Division.

Estimate No. 16

Name of work Crossed Planked roadway

Amount Rs. 34/- per foot run

Main Head IV Bridgework

Sub-Head I Large Bridges

REFERENCES.

Plan No II Accompanying
 Letter No 5-D dated 24.4.96 from the Offg. Joint
 Secretary to Govt P. W. D. By Branch Madras
 to the Engineer in Chief, B. M. Rly
 Letter No F/2787 dated 22.5.96 from the Engr. in Charge,
 B. M. Rly to the Joint Secretary to Govt P. W. D. By Branch
 Madras Accompanying

REPORT AND SPECIFICATION.

The road^{way} which is to be on the same level as the railway will consist of 3"x3" teakwood longitudinal baulks with about 1 3/4" clearance between each cross at 4 mm top by hardwood (chakot) battens 5" wide by 1 5/8" deep spaced at 2 1/4 inches apart and will be 14 ft wide i.e. 7 ft on each side of the centre of the railway track. The roadway will be carried on 14 ft long transverse sleepers. The end of the sleepers will be supported by L-iron 2 1/2" x 2 1/2" x 3/8". The roadway will be protected on each side by a handrailing 3 ft high from the top of the rails sleepers and the railing will be protected from the wheels of the carts running against it by 6 1/4 inch plate iron guard inclined at an angle of 45 degrees.

COLLECTOR

Details of Measurements.

Name of work *Crossed Planked Roadway*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
Woodwork. Sleepers 14 ft sleepers will have to be used of better quality than ordinary sleepers And the extra cost is estimated at \$10/each 4					4	~~4~~	4 lbs
Total Sleepers							
Teakwood Longitudinal baulks 30	10	1/4	1/4		18.75		18.75 cft
Total teakwood							
(Hardwood) (Labor) Battens 22x2 3 5/8 5/12 3/12 9.69	22	5 5/8	5/12	3/12	7.70		17.39 cft
Total hardwood							
Petty ironwork L iron 2 1/2 x 2 1/2 x 3/8 @ 5.7 lbs per ft	8	9 13/24			76.3		
Brackets & uprights combined	2	10			20.0		
Top hand rails							
Total L iron - 963 l ft @ 5.78 lbs per ft					557		lbs
Transverse plate 3/8 @ 15 lbs per s ft	16	35/96	1/6		0.97		
Gusset plate joining the L iron brackets to Girders	8	4/3	6/12		3.38		
3/8 @ 15 lbs per s ft	8	1	19/24		6.33		
Total 3/8 plate 10.71 s ft @ 15 lbs per s ft					161		lbs
Carriage iron					718		lbs

Details of Measurements.

Name of work *Crossed Planked Roadway*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
Petty ironwork Continued Brought forward					718 lbs		
Plank iron 1/4 @ 10 lbs per s ft	2	10	12/3		33.33		
Guard plate	4	10	1/6		6.67		
Hardwood ends & bolsters	40	3 ft	@ 10	lbs per ft	400		lbs
Total 1/4 plate							
Bolts 11" long x 3/4" diam							
heads & nuts for holding L iron					31		lbs
uprights & sleepers @ 1.92 lbs per ft	16						
Nuts 3/4" diam x 1 1/4" long @	64				18		lbs
lbs 28.7 per 100					10		lbs
rails 3 1/2" long @ 32 per lb	310				4		"
" 5" " @ 16 " " "	64				1		"
" 2" " @ 163 lbs per ft	66				1182		"
Total					118		"
Add 10 per cent wastage					1300		lbs
Total Petty ironwork							11.60 cent saving
G. wire rope	2	10			20		
Total G. I. Rope @ 3.6 lbs per fathom					12		0.11 cent

also
rolled beam
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bolts in
near by
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Details of Measurements.

Name of work *Roadway consisting of hardwood & rails
rough floor plate with hardwood (black) decking supported on rolled beams*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
1. Rolled beams 6" x 4 1/2" base @ 19 lbs per foot	2	11 1/4			28		4.75 cu ft
Total rolled iron beams	28	@ 19 lbs per foot			532 lbs		
2. Z iron. 6" x 3" x 3/8" @ 14.5 lbs per foot	4	10			40		5.18 cu ft
Total Z iron	40	@ 14.5 lbs per foot			580		
3. Channel iron 6" x 3" x 3/8" @ 16 lbs per foot	2	10			20		2.9 cu ft
Total C iron	20	@ 16 lbs per foot			320 lbs		
4. Trough floor plate @ 16 lbs per sq ft	2	10	3 5/8		72.5		17.14 cu ft
" " " " " "	1	10	4 3/4		47.5		
Total trough floor plate	120	@ 16 lbs per sq ft			1920 lbs		
5. Teakwood In longitudinal Sleepers	2	10	1	1/2	10		16.25 cu ft
In side Curbs	4	10	3/8	5/12	6.25		
Total teakwood							
6. Hard wood (walnut) In filling in trough plate	2	10	3 5/8	5 1/2	30.21		35 cu ft
Deduct deduction	1	10	4 3/4	5 1/2	19.79		
Total hardwood	2 x 15 1 x 15	7 7/8 4 3/4	1 1/2 1/2	14 14	50.00	9.06 5.94 15	
7. Rddy ironwork L iron 2 1/2" x 2 1/2" x 3/8" @ 5.78 lbs per foot	4	4			16		
In standards	2	10			20		
Total hard iron					208		

Details of Measurements.

Name of work *Roadway consisting of sweatwood & Baillies trough floor plate with hardwood (halon) decking supported on rolled beams*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
7. Petty iron work Continued							
Brought forward					208 lbs		
L iron 2"x2"x1/4" @ 3.13 lbs per foot							
Curbprotector (inside)	2	10			20		
Total 2"x2"x1/4" L iron	20				63 lbs		
Plate iron 3/8" @ 15 lbs per sq ft							
True plate for top hand rail	8	35/16	1/6		49		
Joining Standard & rolled bars	4	19/48	1/2		79		
Total 3/8" plate	128				19 lbs		
Plate iron 1/4" @ 10 lbs per sq ft							
Guard plate	2	10	1 1/2		33.33		
Curbprotector (inside)	2	10	1/6		3.33		
Total 1/4" plate	36				367 lbs		
Rivets 3/4" x 1 1/4" long 8.7 lbs per 100	88				25 lbs		
Rails 2" @ 163 per lb	30						
Rails 2" @ 163 per lb	150				1 lb		
" 3" @ 66 per lb	170				3		
Total petty iron work					686 lbs		
Add 10 per cent wastage					69		
Grand total petty iron work					755 lbs		6.74 cu
8. Galvanized wire rope 3.6 lbs 2	10				20		
Total G. W. rope	20				12 lbs		1.1 cu

not seen the sections of the railway at the crossings of

Abstract of Cost.

Quantities.	Sub-Head.	Rate.		Amount.	Total.
		Rs.	Per.		
4.75 cwt	Rolled beam	17/8	cwt	83	
5.18 "	Z iron	13/8	"	70	
2.9 "	Channel iron	13/8	"	39	
17.14 "	Trough floor plate	13/8	"	231	
16.25 cwt	Teakwood	4/-	1 cwt	65	
35 "	Hardwood	3/-	1 "	105	
6.74 cwt	Petty ironwork	15/-	cwt	101	
1.11 "	Galvanized wire rope	25/-	"	3	
Total				697	
Add Contingencies 25 per cent				35	
Total for a length of 10 ft run Rs.				732	
4	Deduct cost of ordinary sleepers				
	9 1/2" x 10" x 7"	8/8/-	Each	34	
Net total for a length of 10 ft run Rs.				698	
Rs per foot run 69.8				69.8	
Pay Rupees 70/-					
Eng. Mr. B. M. Rly Chief					

BEZWADA-MADRAS RAILWAY.

Division.

Estimate No. (d)

Name of work Road approaches & gates at South & North

abutments of the Permer Bridge

Amount Rs. 29.154

Main Head IV Bridge

Sub-Head 1 Large Bridges

REFERENCES.

Plan No II Accompanying

Letter No 5 D. dated 24.4.96 from the Offs Joint Secretary to Govt P. W. D. By Branch Madras to the Engineer-in-Chief, B.M. Rly

Letter No F/2789 dated 22.5.96 from the Engineer-in-Chief B.M. Rly to the Offs Joint Secretary to Govt P. W. D. By Branch Madras. Accompanying

REPORT AND SPECIFICATION.

The distance from end to end of the abutment of the Permer Bridge 200 ft. and the gates of each end of the bridge are therefore apart. The bank of the river on the North side is flooded to a distance of 1350 ft. from the face of the North abutment, and a long approach ^{road} is necessary. The arrangements for lodges and gates to protect the road over the bridge are shown in the accompanying tracing. Quarters for signaller and gateman are provided together with a small telegraph office. The North end leading to the bridge is fenced where the ramp leading to the bridge gates is more than 4 ft above highest flood level. The road on the approach is at formation level and is therefore fenced on sides. It is 200 feet in length. Fencing to be of old rail

Details of Measurements.

Name of work Road approach Penner Bridge
North Abutment.

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
<u>Earthwork</u>							
addition to bank	1	1600	18	12	345.600		
Do Do	1	50	18	22	19.800		
Do Do	1	60	23	22	30.360		
Incline to gate lodge	1	8 1/2	240	18	17.280		
Platform for lodge	1	77	23	6	10.626		
Total Earthwork	C. ft.						423.666
<u>Installing biners thick.</u>							
Approach road	1	1650	12	1/2	9900		
Between rails	1	46	14	1/2	32.2		
Total installing	C. ft.						10.222
<u>Moorum topping</u>							
"	1	50	27	1/2	675		
"	1	4 1/2	14	1/2	144		
Total moorum topping	C. ft.						819
<u>Extra pitching</u>							
On river face of plat form	1	41	63	2 1/2	6,458		
At opposite face	1	23	63	2 1/2	3,623		
Total Extra pitching	C. ft.						10081
<u>Herbing</u>							
At side of installing on line	2	46	1 1/2	1 1/2	207		
Total herbing	C. ft.						207
<u>Fencing</u>							
Outside edge of incline to top	1	250			250		
Carried over					250		

Name of work

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
Brought forward					250		
on line	1	18	-	-	18		
"	1	32	-	-	32		
"	1	46	-	-	46		
Total Fencing	Lp						346
Guard rails 75 lbs per yd	2	46	-	-	92		
Total guard rails	Tons						1.03
Gates with Lamps & doors	1						
Total	ho						1
<u>Quarters</u>							
Units limits	7	4					
Total	ho						4
<u>Signals Post</u>							
Post & fittings	1						
Total	ho						1
<u>Officer Furniture</u>							
Telegraph Table Instruments	1						1
Table	1						1
Stool	1						1
<u>Establishment.</u>							
Signaller @ Rs 25/-							
Gate man @ Rs 8/-							
Rs 376 per annum							
to with contingencies							
Rs 400 per annum							
Capitalized @ Rs 5 percent							Rs 800/-

not seen the sections of the railway at the crossings of

Details Measurements.

Name of work *Road approach Penn Bridge S. Abutment*

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
Earthworks							
Additional to bank	1	200	18	14	50,400		
Plat form of Gate Long	1	94	23	21	46,851		
Total Earthworks	C.ft.						97,251
Installing							
Approach road	1	200	12	1/2	1200		
Between rails	1	46	14	1/2	322		66
Total installing							1,522
Ironwork topping							
Same as per north approach	C.ft.						819
Extra pitching							22
turnover face of platform	1	41	50	2 1/2	5,125		
on opposite face	1	23	50	2 1/2	2,875		
Total Extra pitching	C.ft.						8000
Kerbing							
Same as for north approach	C.ft.						201
Fencing							
Both sides of road	1	410			410		81
Same as h. Approach	1	96			96		
Total fencing	C.ft.						50
Guard rails							17
Same as per north approach	Long						1.03

Details Measurements.

Name of work

PARTICULARS.	Number.	Measurements.			Quantities.		
		L.	B.	H.	Contents.	Deductions.	Total.
Gates with Lamps & discs							1
Same as per north approach	do						
Quarters							4
Same as per north approach	do						
Signals							1
Same as per north approach	do						
Furniture							
Same as per north approach	do						1
Telegraph instruments	1						1
Table	1						1
Stool	1						1
Establishment							
Same as per north approach	No 8000/						

Enclosure

Feb 18 4

It will have to rise to get across the bridge. I have not seen the sections of the railway at the crossings of

Abstract of Cost.

Quantities.	Sub-Head.	Rate.		Amount.	Total.
		Rs.	Per.		
	Road, Approach and Gates at both ends of Penner Bridge				
Est. 423 666.	Earthwork	8	1000	3,389	
" 94,251	do	5	"	486	
" 11,744	Metalling	6	100	705	
" 1638	Ironwork Lapping	4	"	66	
" 18,081	Extra pitching	20	"	3616	
" 4114	Herbing	30	"	207	
Est. 852	Fencing	1/2	Est.	426	
Truss, 206	Guard rails 46 feet long	85	Truss	175	
Rs. 2	Gates with lamps & doors	100	ea.	200	
Rs. 8	Quarters	290	"	2,320	
Rs. 2	Signals	275	"	550	
Rs. 2	Furniture. Instruments	180	"	360	
Rs. 2	Sabls	10	"	20	
Rs. 2	Stools	4	"	8	
	Total			12,528	
	Add Contingencies 5 per cent			626	
	Total				13,154
Rs. 2	Add Establishment Rs. 100 per annum Capitalized @ 5% 1000 ea.			16000	
	Total				16,000
	Grand Total for road Approach & Gates &c At both ends of Penner Bridge				29,154
	Rs. twenty nine thousand one hundred and fifty four only				

Eng. J. Brown
Engineer-in-Chief
B. M. Ry.

guard plate or at a distance of 2 inches from the end of the sleeper.

9. Were the

ats the tensile stress on the

ers and

In your reply please quote number and date of letter.

No. F/2789
410

From

THE ENGINEER-IN-CHIEF,

BEZWADA-MADRAS RAILWAY,

To

THE Officiating Joint Secretary

to Government P. W. D. Ry. Branch

Madras.

Dated Madras, the 22nd May 1896.

Sir

1. I have the honor to acknowledge your No. 5 D dated April 20th 1893.

2. I enclose tracings as under:-

I. Tracings of pier heads for 40, 60 and 70 spans.

II. Tracing of roadway of single and crossed planking

on long sleepers and general arrangements for gates sig-

nallers and gateman's quarters etc., at the North end of

Penner Bridge.

III. Tracing of roadway of trough plates on rolled

beams.

3. Estimates forwarded are as under.

[a]. Estimate for a single planked roadway 14 feet wide on

long projecting sleepers for a length of 10 lineal feet.

[b]. Estimate for a crossed planked roadway 14 feet wide

on long projecting sleepers for a length of 10 lineal feet

[c]. Estimate for a road consisting of a [Westwood and

Enclosures.

not seen the section

Baillie's] trough plate floor and wooden decking supported on rolled beams-for a length of 10 l.ft.

[d]. Estimate for gates, signaller's and gateman's quarters and approaches at the two ends of the Penner bridge.

4. Estimate [a] amounts to Rs.34 per ft. run

.. [b] .. , , , 37 .. , , ,

.. [c] .. , , , 70 .. , , ,

.. [d] amounts to Rs.29,154

5. The tracing I of pier heads for 40, 60 and 70 foot girders is sent to show the limited accomodation the type of piers adopted on this Railway affords for a road. The piers of the 40 and 60 foot openings are supported on single circular wells 12 feet in diameter and those of the 70 foot openings on single circular wells 13 feet in diameter. All the girders have been ordered from home and a considerable number have arrived in the country. Tracing I of pier heads shows that decking the bridges so as to carry the cart traffic and rails on the same level is the only system applicable to bridges on this Railway.

6. The width of the cart road between the side railings has been kept 14 feet-the minimum width allowable under standard dimensions.

7. The wooden roadways carried on long projecting sleepers shown in tracing No:II are of a semi-permanent nature, while the roadway of trough plates on rolled beams shewn in ^{tracing} No:III is of a permanent nature. A wooden roadway on projecting sleepers could be adapted to any 40, 60 or 70 foot girder bridge after the line is opened for traffic. The roadway of trough plates on rolled iron beams is much the best, but a roadway of this kind interferes with the rivetting of the girders and arrangements for a such a roadway should preferably have been taken into account when the girders were designed.

8. The load assumed as resting on each sleeper or rolled beam is that of a

guard plate or at a distance of 2 inches from the end of the sleeper. 0 5

9. Were the sleepers unsupported by struts the tensile stress on the sleeper would be about .374 tons per sq.in. in the case of 40 foot girders and about .832 tons in the case of 60 and 70 foot girders -so that for 40, 60 and 70 foot girders the angle iron of the railings is continued to form a strut to the bottom boom of the girder.

10. The rolled beams do not require strutting. The stress per sq.in. on the rolled beam is 5.19 tons and on the outside channel iron 3.05 tons against the permissable stress of 7 tons. Wood for the flooring is reckoned at 55 lbs per c.ft.

11. The roadway with single planking all in the direction of the rails is left out of the question. It was only drawn out with the object of seeing what the cost would be and it is very little cheaper than the road with crossed planking on a level with the rails. With single planking below rail level carts could not pass each other on a bridge. The crossed planks are preferable as these can be removed when worn.

12. The choice therefore lies between a cross planked roadway supported on long sleepers and that of a trough floor supported on rolled beams. The cost of the former is estimated to be Rs.37 per foot run and of the latter Rs.70 or Rs.33 per foot run in favor of the semipermanent crossed planked roadway.

13. Telegraph offices would be required at both ends of any one of the bridges mentioned in your letter, if carts or any vehicles are allowed to pass over the bridges after dark. All trains would have to stop at the bridges and line clear have to be obtained to cross any bridge. Carts etc., at night before

cart will have to rise to to get across the bridge. I have not seen the sections of the railway at the crossings of

the estimate of cost of a crossed planked road-
way on long sleepers for the Penner Bridge to which your letter under reply
chiefly refers:-

Gates etc., at the ends and cost of establishment capitalized	Rs.29,154
L.ft. 2020 roadway at 37 per ft.	Rs. 74,740
Total	Rs.1,02,894

and for a roadway on rolled beams

Gates at the ends and cost of establishment capitalized	Rs.29,154
L.ft. 2020 roadway at 70 per ft.	Rs.1,41,400
Total	Rs.1,70,554

15. Taking the cost of gates, signalling arrangements etc., and the cost
of establishment capitalized at one end of any bridge at Rs. 22,154
the cost of roadways over the other bridges mentioned in your letter will be
Rs.14,577

[a] The Manneru

For crossed planked roadway on long sleepers

2 approaches at Rs.14,577	Rs.29,154
L.ft. 614 roadway at Rs.37 per ft.	Rs. 22,719
Total	Rs.51,872

For roadway on rolled beams

2 approaches at Rs.14,577	Rs.29,154
L.ft. 314 roadway at Rs.70 per ft.	Rs. 42,930
Total	Rs.72,134

[b] The Palar

2 approaches at Rs.14,577

L.ft. 950 roadway at Rs.37 per ft. Rs. 35,150

Total Rs.34,304

For roadway on rolled beams

2 approaches at Rs.14,577 Rs.29,154

L.ft. 950 roadway at Rs.70 per ft. Rs. 63,500

Total Rs.95,354

[c] The Musi

For a crossed planked roadway on long sleepers

2 approaches at Rs.14,577 Rs.29,154

335 L.ft. roadway at Rs.37 per ft. Rs. 23,495

Total Rs.52,349

For a roadway on rolled beams

2 approaches at Rs.14,577 Rs.29,154

335 L.ft roadway at Rs.70 per ft. Rs. 44,450

Total Rs.73,604

[d] The Gundlakamma

For a crossed planked roadway on long sleepers

2 approaches at Rs.14,577 Rs.29,154

373 L.ft roadway at Rs.37 per ft. Rs. 32,493

Total Rs. 61,340

For a roadway on rolled beams

2 approaches at Rs.14,577 Rs.29,154

8. The load assumed as resting on each sleeper or rolled beam

cart will have to rise to to get across the bridge. I have
not seen the sections of the railway at the crossings of

Total Rs. 20,314

16. The difference in cost between ordinary sleepers 10 feet long and special sleepers 14 feet long is considerable-but unavoidable as all these long sleepers must be of thoroughly sound and reliable wood.

17. At the joints of all rails recesses would be left with movable iron cover plates-for inspection purposes. These are not shewn in the drawings and other small details would have to be taken into consideration if the proposal of using the bridges as roadways for ordinary cart and other traffic is carried out.

18. The roadways provided will not carry elephants or traction engines or heavy machinery.

19. With reference to para 2 of your letter therefore I have to state that I consider it practicable to make ^a road for ordinary traffic in addition to railway traffic over the bridges above mentioned either of a semipermanent nature with long projecting sleepers of a permanent nature on rolled beams-but I think the type of bridges adopted in which type railway requirements only were taken into account is a very bad one for a combined road and railway bridge-especially the 40 foot spans. In the case of roadway on rolled girders the camber will have to be adjusted by packing pieces of different thicknesses under the Z and U irons.

20. The Penner Bridge is so long that the gates must be placed as close as possible to the abutments or it would be a long time before the bridge could be cleared of traffic. This is the case with some of the other bridges mentioned in your letter. The approaches to the bridges are usually in high bank and arrangements at bridge ends would be therefore expensive and the buildings will be on made earth.

21. I am still of the opinion that the use of the same road for ordinary traffic and for railway traffic as well on bridges of the type adopted on this Railway is un-

8. The load assumed as resting on each sleeper or rolled beam

one of these bridges would be a more serious danger is increased when a series of bridges are so used for road traffic.

22. The use of the rolled beams to support the road will raise present formation height one foot-at the Penner Bridge this extra foot in height will involve raising the whole of Nellore station yard one foot more and it has already to be raised about 4 feet above its present level.

23. It may, as I remarked in my letter 1359/43 of November 2nd to the President of the District Board of Nellore, who first raised the question of making railway bridges suitable for cart traffic, be expected that the Bezvada Madras Railway will before many years are over become part of a through line from Calcutta to Madras with a considerable traffic-and the inevitable delays which will occur at these bridges will cause a loss of time and money.

24. I am unable to form any estimate as to whether these roadways would pay for themselves indirectly in the shape of increased revenue or to make an estimate of the number of carts etc., that would cross daily. If these roadways for general traffic are decided upon I must leave the question as to providing the necessary money for making them, and of tolls etc., to be considered by the Governments of Madras and India.

25. To reckon the amount to be realized in the shape of tolls-5 per cent per annum on the cost of a roadway on rolled beams might be assumed and 7½ per cent on the roadway on long sleepers as the repairs on the latter would be heavier.

P. T. O.

cars will have to rise to to get across the bridge. I have not seen the sections of the railway at the crossings of

Names of Bridges.	Cost exclusive of Establishment	5 per cent on previous column	Yearly cost of Establishment	Total yearly cost	Cost exclusive of Establishment	7½ per cent on previous column	Yearly cost of Establishment	Total yearly cost
Penner	154,554	7,728	800	8,528	87,834	3,592	800	7,392
Manner	56,134	2,807	800	3,607	35,872	2,690	800	3,490
Palar	79,354	3,933	800	4,733	43,304	3,223	800	4,423
Musi	57,604	2,880	800	3,680	33,349	2,743	800	3,543
Gundlakamma	74,614	3,731	800	4,531	45,640	3,427	800	4,227

26. From a railway point of view I do not consider that the formation of a Trunk road in competition with the railway at all desirable.

27. Had the question of using the railway bridges for cart traffic been brought up and decided on earlier I have no doubt that wider piers would have been adopted with a roadway between the girders. The proposals I now make for the roadway for general traffic are at the best unsatisfactory.

28. I should myself propose that, if anything at all is required, considering the increased facilities for carriage that the railway itself will give, and that except when prevented by floods, carts will probably avoid the bridges and tolls, a footway for passengers only would meet requirements. This would be supported on light iron brackets and would be fenced off from the line over the bridge.

29. I may mention that the Gundlakamma Bridge is not on or near any road. It is 4½ miles from the nearest point on the road from Ongol to Guntur.

I

3. The load assumed as resting on each sleeper or roller beam is

Your most obedient servant

E. J. Moore

Engineer-in-Chief.

we will have to rise to to get across the bridge. I have not seen the sections of the railway at the crossings of

30 SP

FROM

L.R.

TO

ENC. BMR

Ento 47 (3/11/11)
Acas: 23.5-56

U.A/- Your 410 of twenty seven -

Are your girders strong enough
to carry the roadways proposed
in addition to railway under latest rules
~~and would~~ and would
they be strong enough ~~for~~ if
~~some~~ metalizing is substituted for
wood in type D

Despatched on 22.5.11

29/-

for Engineer-in-Chief.

Enclosures.

not seen the sections of the railway at the crossings of

8. The load assumed as

for
the
ma
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025156

30

President District Board

From

THE ENGINEER-IN-CHIEF, *recd*

BEZWADA-MADRAS RAILWAY,

To

THE Joint Secretary

Government of Madras Railway Department

Ootacamund.

Dated Madras, the 1st June 1898.

Sir

With reference to your telegram No:11 A dated 29-5-98 I have the honor to forward a drawing of a girder [to be used on this Railway] for a 40 ft. clear span bridge. This drawing has only recently been received and up to date we have not received drawings of either 60 or 70 ft. span girders.

I have the honor to be

Sir

Your most obedient servant

[Signature]
for Engineer-in-Chief.

Enclosures.

not seen the sections of the railway at the crossings of

Your note of 28th ultimo (received last evening 2nd Instat) re utilizing the proposed railway bridges across the Pennair, Mannair, Paleru, Musi, and Gundlacamma rivers for ordinary cart and passenger traffic on the Great Northern Road.

(1) The average annual cost of maintaining the causeways across the first four of these rivers, as far as I can ascertain from the records of this office, is as follows:

Pennair	—	Rs 600
Mannair	—	Rs 331
Paleru	—	Rs 300
Musi	—	Rs 363

The Gundlacamma has no causeway.

(2) It would not be absolutely necessary to keep up these causeways if the railway bridges were made to accommodate cart and passenger traffic but it would be very desirable to do so: and considering how little it takes to keep them up I consider it would be very wrong to let them go to ruin; for except when the rivers are in flood they afford a much more convenient means of crossing them than the railway bridges would do. These bridges are to carry the rails on the upper flanges of their girders; this will necessitate high embanked approaches, and that height, and in fact 18 inches above it (to rail level), every cart will have to rise to to get across the bridge. I have not seen the sections of the railway at the crossings of

these rivers, but without seeing them I am satisfied that the rise out of the causeways is not half so much. Also of the five rivers named, only at two, the Pennair and the Alannair, does the railway cross the river near the road crossing. In the other three cases the railway crosses a mile or so off necessitating making two roads (one on each side the river) from the Great Northern Road to the railway in each case, and also giving every cart that détour in its journey.

These considerations establish the extreme desirability of retaining the causeways. So far I have only looked at the question from the cartman's point of view. From the Board's point of view it appears to me that Rs 30,000, Rs 40,750, Rs 38,500 and Rs 43,200 for the Alannair, Paleru, Musi, and Gundlakamma rivers ^{respectively} (Rs 1,52,450 in all) let alone the cost, and subsequent upkeep, of the approach roads which I have mentioned, is a great deal more than the traffic on the Great Northern Road in those parts would justify, even if it remained as it is now; and there is good reason to believe that when the railway is opened it will be considerably reduced as it runs parallel to the road. I think therefore that getting the railway to accommodate cart and passenger traffic over these bridges may be put out of the question. What the railway might be asked to do, is to have temporary stations during flood times at the villages nearest to these rivers on each side just to take passengers across.

3150
As regards the Pennair river it would certainly be very desirable to have a road way over the railway bridge as there is always a great deal of traffic across the river, roads running east and west as well as north from the north bank. It is for the Board to say if they are prepared to pay a fee of rupees for it - which the Engineer-in-chief of the Railway estimates would be the cost. But even if this roadway were made I would still recommend keeping up the causeway along the anicut, for it is a more convenient way across the river when it can be used (which appears to be eight months in the year) than the railway bridge will be. Let alone the dangers of using the same space for railway trains and ordinary cart and foot traffic pointed out by the Engineer-in-Chief. I would only allow the bridge to be used when the causeway was impassable through floods.

Nellore }
3rd June 1896 }

(Signed) R.W. Thompson
District Board Engineer

(True Copy)

President

copy B
4-6-96
copy 1

NO 718
D.B.3rd June 1896From W. S. Meyer Esquire,
President, District Board, Nellore.To the Chief Secretary to Government, Local and Municipal
Department, Madras.

Sir.

In reply to your reference No. 508 dated 4th May
1896 in which I am asked to report for the information
of the Railway Department

- (1) The average annual cost to this District Board of
maintaining the present *Pennier* & causeways.
- (2) Whether they would need to be maintained if the
Railway bridges over the rivers in question were made
available for cart traffic—

I beg to submit copy of a note on the subject by
the District Board Engineer, who has recently inspected
the various causeways in question, and to state that I
concur in the opinions therein expressed.

2. The papers received with your reference under reply
are herewith returned.

I have the honor to be

Sir,

your most obedient Servant

President

Copy 6
2-6-96
Copy 16O.C. 2
5534/SL

16402/96

From the Collector and President,

District Board, Nellore.

To The Chief Secretary to Government
Local & Municipal Department
Madras

Dated 3rd June 1896
8 JUN. 96

No. 718
D.O.

Subject.

Submitting particulars regarding
causeways over the rivers Pennai,
Uthamain &c.

C.S.

No. 684

Transferred to the Public Works
(Railway) Department.

W. D. Phillips
Ag. Assistant Secretary.

For St. George
18th June 1896

To The Public Works (Railway) Department.

5594

Encls 12
Ans: 20.6.96

To

H. E. The Governor

Mrs. W. B. B. B.

Mrs. W. B. B. B.

1. I do not think it should be made a condition of the execution of this work, - that the profits of the toll should be sufficient to pay for interest on the cost of this work.
2. Referring to para. 8, the Res. B. should be passed for a reply.

Atk 4.6.96

I cannot agree that the financial aspect of the case is not of primary importance - The Nellore B. cannot afford a recurring exp. over a work of this kind, especially as all, a majority, its roads are in a bad state & require much expenditure - And if the Nellore B. also is to pay? but that is certainly - we have not the money - I also think that it is very doubtful whether, when the R. has been got into working order, there will

Accommodation for Cart & Foot
passenger traffic on certain
bridges on the Mysore Madras Ry

In answer with H.E.'s order
of 16th 17th April. The Engr. Chief of
the B.M.Ry has asked whether it is
practicable to deck these bridges & if
so what it would cost.
(2) Mr. Moore's reply is not submitted.
He has gone into the matter in
considerable detail, and I have
~~accepted his design~~ ^{accepted his design} ~~which may be~~
accepted.

(3) Then show the following results
(a) that it is practicable to make a
roadway across these bridges.
but that it cannot be done
in a satisfactory & very
as would be the case
if the ~~bridge~~ ^{bridges} had been
originally designed to suit
the loads required now
except for (Type B)
the cost of a plank deck,
will cost Rs 37/ for linear
foot (against Rs 50/- previously
estimated)

(c) the cost of decking of heavy
beams & barewood plank
will be Rs 70/ for l. foot
(against Rs 50/ previously estimated)

From

To

Date

No.

See
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C.S.

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(2) The rough decking is much more permanent than the plank decking, and that the amount of extra work involved in the construction of the rough decking is not so great as the cost of the plank decking for the same purpose.

(3) The cost of the rough decking is much less than the cost of the plank decking. The cost of the rough decking is about Rs 7400/- for the entire length of the bridge, while the cost of the plank decking is about Rs 8500/- for the same length. The rough decking is also much more durable than the plank decking, and will last for many years.

(4) The rough decking is much more fire resistant than the plank decking. The rough decking is made of concrete, which is much more fire resistant than the plank decking.

(5) The rough decking is much more comfortable for the passengers than the plank decking. The rough decking is made of concrete, which is much more comfortable for the passengers than the plank decking.

(6) The rough decking is much more economical than the plank decking. The rough decking is made of concrete, which is much more economical than the plank decking.

I have written to him & ask him to send the letter point, and to

There is a reply now to be made in form of a report. I am very much interested in the question of the rough decking, and I am very much interested in the question of the rough decking. I am very much interested in the question of the rough decking.

(7) The rough decking is much more fire resistant than the plank decking. The rough decking is made of concrete, which is much more fire resistant than the plank decking. The rough decking is much more fire resistant than the plank decking.

(6, the house dwell in parcel 21, 23, & 26, in the disconnection of the proposed roadway from a railway point of view, and the remarks contained that Mr. Upstart & myself have already visited and fully examined in them.

(7. I therefore invite reconsideration of my Note of 8.4.96 (S. 4. A), which has not yet been circulated to the Hon. Members, and venture to recapitulate my conclusions as

(a) The dashed cart roadway on which underlies from a railway point of view, and as not likely to be opposed by the Govt. of India, unless very strong reasons in their favour can be adduced

(b) They will either be constructed & be maintained, and will always be a source of danger or delay to the trains.

(c) it is very doubtful whether even the revenue which may be obtained at the Mallow bridge will be sufficient to cover maintenance, interest & sinking fund; and it is quite certain that the revenue at no other of the bridges mentioned has the remotest chance of doing so.

(d) it is somewhat doubtful whether there will be much cart traffic parallel to the railway after the line has been completed for a few years

I do not think this should be held to be of vital importance.
A.S.H.
4.6.96

should be passed
to the
A.S.H.
4.5.96
At the Dept. meeting
on 10.6.96

(8, The Rev. Dept. for the
Coke which is now running
to the top of the road. concerning
the railway bridge an adapted for
cart traffic, & also that the
annual cost of this is. But no
reply has yet been received

C.S.M.

20/5/96

a copy
Recommendation for Capt. Huggin
on the bridge of the B.M. Ry.

585
4/7/96

Circular to

H.E. the Governor

Mr. W. H. Blair

Mr. W. H. Joyce.

The reply of the local Municipal
Dept. has been received (Step F)
In it the District Board Engineer
states the cost of keeping up the
existing canals, and gives an
his opinion (in what the President
of the Dist. Board Nelson. Comm.)
that

(a) the canals should be kept
up whether the bridges are
decided or not.

(b) the canals are more
convenient than the bridges,
& should (I would) be
used in preference thereto,
except when the rivers are
in flood. What only occurs
during 4 months of the year

(c) there is good reason to believe
that when the Ry is opened the
road Huggin parallel to it will
diminish

(d) ~~even~~ if the Huggin could be
accommodated in flood time by
the opening of stations near
the ends of the bridges to
enable passengers to cross

(e) even if the Nelson bridge
be decided (at a cost estimated
by ENR B.M. Ry. to be about
Rs 103894 for a plank road crossing
& more for other items) it

In October 1895, the then President of
the Dist. Bd. of Nelson ^{present} agreed that
the Railway bridges on the alluvial
flats ^(within the Nelson Dist.) should be constructed
so as to carry both road and foot passenger
traffic. The foot, however, to comply
with what seemed a reasonable ^{suggestion} request,
certain enquiries to be made and
estimates prepared. ~~with the result~~
The present President is shown by letter
(Step F) not to be in favour of the
scheme which had been proposed,
apparently for the reasons given
by the Engineer to the Dist. Bd.
The railway Engineer ^{however} is against
the use of the Railway Bridges for
the purposes of a road. It would
seem with therefore to have done
the

A recommendation to build
foot passenger bridges over
certain alluvial flats in Nelson
District.

1/8. 2/6/96 8/6
Hms 3/6/96

would not be desirable to use
it except ^{when} the emergency is
unavoidable through storm.

As regards (2), I do not
doubt that the Ry. could
arrange ^{to carry} the local traffic
across the Pennine area at
Nelson. During storm times and
could, perhaps, do so if there
is a sufficient amount of it.
Also it might be able to do
so at some of the other rivers
if there is sufficient business
to enable it to set up
institute flag stations for the
same. The E.R. B.M.R.
might be asked what he could
do in the matter.

Orders are also desired
whether any deposit of money should
be sent to Dist. Board when
No 1623 of S. 1195. (Self E)

CR
25/6/96

the scheme.

2. As regards suggestion (3), the
Engineer of the B.M. Railway
might be asked to say what he
could be done towards giving
effect to it.

3. The Dist. Bd. letter No 1623 of
8.11.95, stated, I think, he
declined to do the same of the
above.

27.6.96

29/1/96 2/7/96

No 586 Recd 4.7.26
PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Letter from the President. District Board Release mls enclosure	HE No: $\frac{1623}{218}$ of 8 th Novr. 1898
Endorsement from the Local & Municipal Deptt.:	1658 of 20 th do
Dr. W.D. Endorsement.	4032 C of 16 th Decr
Letter from President Dist. Board Release mls	$\frac{270}{218}$ of 6 th March
Endorsement from the Local & Municipal Deptt.	374 of 21 st do
Letter to the Engineer. & Chief Revenue. Madras Ry	5 D of 20 th April
Dr. W.D. Endorsement.	4 D of do
Letter from Engr. in Chief B. M. Ry. with enclosure	$\frac{F 2789}{410}$ of 22 nd May
Telegram to do	11 A of 29 th do
Letter from do	F 2979 of 1 st June
Letter from President Dist. Board with enclosure.	$\frac{718}{218}$ of 3 rd do
Endorsement from the Local & Municipal Deptt.	6014 of 18 th do

16.8. 24/6 - 27/6
16.9. } 29/6 22.06

In October 1895 the then President of the District Board of Beloe proposed that the Railway Bridge on the Bayvada - Madras line within the Beloe District should be constructed so as to carry cart and foot-passenger traffic. - The Government anxious to comply with what seemed a reasonable suggestion caused inquiries to be made and estimates prepared.

2.3. The present President of the District Board of Beloe is shown by his letter No: 768 of 3rd June 1896, not to be in favour of the proposed scheme which had been proposed, apparently for the reasons given by the Engineer to the District Board. The railway engineers are moreover against the

(2. It was found that the expense would be very heavy and the bridge width. Long has designed ~~the~~ not the new & the railway ~~bridge~~ long cannot now not be adopted for the addition of a carriage.

use of the Railway Bridge for the purposes of a road. It would seem well that for to stand on the The Govt. of Mysore is therefore of opinion that the scheme should be abandoned. 4. The Engineer-in-Chief B.M.R. will be requested to state what could be done towards giving effect to the proposal made by the District Board Engineer in his note of 3rd June 1896, to provide temporary or flag stations in flood time near the ends of the bridge to enable passengers to cross and particularly at Beloe when the institution of a ferry from B. to carry carts & men & passengers would be a great convenience than the Contingency in unpermitted

Ex. I have indicated the amount to be paid

To The Local & Municipal Engineer - L. Eng. in Ch. B.M.R.

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No 586. Recd 4.7.96

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