(1) Number of pages 128

(2) Date of repair

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

public works. **DEPARTMENT.**

G.O. No. 3030. Press Mis.

545-546.

Dated 30 - 11 — 1871.

Not to be folded or roughly handled

No. 515. Read the following letter from the Acting Consulting Engineer for Railways, to the Secretary to Government, Public Works Department, dated Madras, 6th October 1871, No. 433 :—

I HAVE the honour to submit, for the approval of the Government, the trial surveys of the Carnatic Railway from the Palar River to the Adyar, with the trace of the line proposed from thence into Madras, terminating at the triangular plot of ground between the Penitentiary and the People's Park.

The Government expressed their views generally on the direction to be taken by the Carnatic Railway in their Order No. 910, of the 27th March 1871, and, in approving of a line to be taken from Cuddalore through Panrooty, Villapuram, and Tindivanum to Chingleput, called for a survey from Chingleput into the Presidency town, with a view to the final adoption of the line from Madras itself, in supersession of the former proposal for the Railway to run through Conjeveram by the line of the old Tramway to Arconum.

2. From the south a modification has been made in the approach to the Palar River from Madraaticum, and three routes are shown between the river and Chinglepat: of these, the one marked in black is preferable, as shown in Mr. Dibblee's report, for several reasons. There is certainly a higher summit to be attained by this line than by the others; but the ruling gradient is 1 in 140, instead of 1 in 124 or 1 in 138. The length is 15 miles 78 chains against 16 miles 34 chains and 15 miles 63 chains, while the quantity of earthwork is considerably in favour of the line selected.

As regards the point of crossing the river there is probably no advantage, except in a saving of expense, in the bridge being at the narrower part of the river; but the Deputy Consulting Engineer reports favourably of the site, and of the bed of the river as shown by the borings that have been taken.

The large tank at Chingleput and the hills adjoining determine the location of the line, which passes through a corner of the fort, skirting the town, and then follows the line of the tank bund. From thence the trace runs parallel to the Trunk Road on the east, and crosses the road 3½ miles from Chingleput, in order to take the lowest point of the ridge separating the Chingleput from the adjoining valley. The line then taking the general direction towards the Mount, bends eastwards to avoid the Tricachoor tank, and again returns westward, passing the village of Colagalatoor. A deviation will probably be effected near to Goodoovanchari, to bring the line above the tank and nearer to the village. The direction next is nearly straight to the foot of the Vandaloor Hill, on its west side, and on, parallel to the road, towards the Palaveram Hill, where the small ridges leave little choice of alignment. Another deviation is advisable for the improvement of the gradients, mentioned by Mr. Dibblee in paragraph 11; the trace should cross the Trunk Road further south than shown on the survey, and from the foot of Palaveram Hill it keeps to the east of the Native town at the Mount, passing between the high road and the small rocky ridge on the edge of the race course, and then crosses the Mount Road to the Adyar, within 600 yards above the Marmalong bridge.

The exact site for the Adyar bridge will be determined after an accurate survey is made of the property in Sydapet. There is good rock foundation in

this river, while at the Palar it is proposed to carry the girders on cast iron cylinders, let down well into the clay bed.

3. From the Adyar it is proposed to carry the line northwards, through Sydapett, above the long tank and the Nungumbakum tank; then crossing the latter and the Cooum, about three-quarters of a mile above the Munro bridge, the trace turns to the east, and runs through the Spur tank, close to the Male Asylum buildings and Saint Andrew's church, terminating near the General Hospital bridge and the new Central Station of the Madras Railway.

This line of approach to Madras has been chosen after the consideration of other alternative lines, and is, in my opinion, the best, as it will take up but very little valuable land and house property; it comes almost into contiguity with the passenger station of the Madras Railway, and not far (about a mile) from the goods station; while it gives access, without much difficulty, to the beach and the shipping.

4. If the route were laid out along the coast through Saint Thomé, or, more centrally, near the Cenotaph, many houses would come in the way, through Saint Thomé, Triplicane, and Chintadripett. No convenient site for a station could be found to the south of the Cooum, as the merchant's offices and depôts are all far to the north, and one or more expensive bridges would be required to get over the river.

For passengers the terminal station near the Penitentiary is in a convenient central position, the same as has been chosen (the canal only intervening) for the general passenger station of the Madras Railway. But as the line will also pass within about a quarter of a mile of the Munro bridge, a small passenger station on Mr. Nickoll's road will be of much service to the inhabitants of Chetpett, Kilpauk, Nungumbakum, etc.

The goods station cannot be at the same site as the passenger station for want of space; but there is a sufficiency of ground to be obtained, I believe at little cost, near the Male Asylum buildings. A portion of these premises I understood were to be sold on the part of the Government; but the Collector of Madras has been requested to defer the sale of the land, pending the orders of the Government, on these papers, in case it is found that the land is required for the Railway. The Chamber of Commerce would prefer the goods station to be brought to adjoin the goods station of the Madras Railway; but I consider that there are no advantages in that scheme to compensate the great additional expenditure that would be involved in building on an unsuitable site, and the inconveniences to the public, in the Railway passing, on the level, through a crowded part of the town.

5. The Chief Engineer gives, in paragraph 14, approximate estimates of cost of earthwork, masonry, etc., which he points out to be not the actual expected cost on average per mile; but, for the sake of comparison with his former report, he gives the figures as calculated for the Indian gauge. Thus the only object in giving these figures is to show that this section of the line is likely to be cheaper in construction than the portion to the south.

6. As regards the occupation of land within the municipal limits, and the termination of the line alongside the Penitentiary, there are possible objections to the site of the terminus itself, which is now occupied by Warder's quarters. The

Workshop of the Friend in-Need Society would be removed, a narrow strip of the enclosure of Saint Andrew's church is proposed to be taken up, and there is required a good deal of land attached to the Male Asylum. A portion of this latter ground has already been surrenderd for sale, and it is believed that there will not be opposition to the Railway Company taking over as much more as will be wanted for the goods station.

From the Deputy Consulting Engineer for Railways, to the Acting Consulting Engineer for Railways, dated Madras, 16th September 1871.

I HAVE the honour to report that I have inspected the proposed line for the Railway from Sydapet to the Palar River.

The question of the best point at which to enter Madras being undecided, the requirements of "the Mount," "Chingleput," and the "Palar River" have next to be considered.

At "the Mount" to avoid interfering with the Palaveram Parade Ground, and the Military buildings, it is necessary that the line should pass parallel to, and east of, the main road, and on trial the gradients and description of property affected were found very favourable.

At Chingleput, the large tank and hills adjoining have determined the location of the line, I think, beyond question; it will follow the line of the bund through a corner of the fort, skirting the town to the east of it. Three routes thence to the river present themselves; accompanying this report are the sections on each line of the river crossings, the chainage and gradients in each case, and the earthwork required for each. From these it will be seen that, although a higher summit has to be reached by the route C, the ruling gradient is 1 in 140 instead of 1 in 124, or 1 in 138 in the others; the distance to Madranticum (a village to be reached by either route) is 15 miles 78 chains by route C, as against 16 miles 34 chains and 15 miles 63 chains by routes A and B. The quantity of earthwork per mile is greatly in favour of route C, and as regards the district accommodation, the Chief Engineer is in favour of the second route. As regards the crossing of the river, I am not inclined to regard as an advantage the fact that the river is narrower on route C; but it is, I think, sufficiently large, and the borings in the bed show that the section is at least as favourable as on the alternative route.

I am, therefore, on the whole in favour of route C.

From Chingleput to the northward the line leaving the tank bund runs parallel and to the east of the Trunk Road, which it crosses in order to gain the lowest point of the summit, separating the Chingleput from the adjoining valley; it here bends to the eastward towards the general direction of the Mount, and a little further on bends to the east to avoid the Tricachoor Tank. It here curves to the westward to regain the general direction, skirts the village of Colagalatoor, and, when nearly abreast of Teilavarum, bends westward to avoid the Goodoovanchari Tank; an alternative line here has since been selected, passing above the tank and nearer the village. From this point the line runs nearly straight to the west foot of Vundaloor Hill, and thence parallel to the main road towards Palaveram Hill, the small ridges of hill intervening leaving but little choice in locating the line.

The point for crossing the public road, to the west of which the line is laid out till within a mile or two of Palaveram, is, however, not that which will be adopted; a better line is evidently to be found by crossing the road further south, and to this the Chief Engineer agreed.

From the foot of Palaveram Hill it is proposed to carry the line between the range of hills and the bungalows east of the road, thence skirting the east of the Native town at the Mount, it will pass close to the main road between it and the small rocky ridge abreast of the race course, cross the road a little east of the bungalow and the river about half a mile above the Marmalong bridge.

It is proposed to carry the line thence through the Mylapoor Tank, across the Spur Tank to the site at present occupied by the Friend-in-Need Society Workshops.

The exact position for crossing the Adyar river must depend to some extent upon the surveys of the property in Sydapet, and the position of the terminal station is open to discussion; with those exceptions I think the line as proposed the best that can be found.

For the bridge across the Adyar the foundation can be laid on rock; for that across the Palar cast-iron cylinders carried down well into the clay would, I think, be best suited to the site. No other stream of any importance is crossed.

From the Agent and Manager of the Carnatic Railway Company, to the Acting Consulting Engineer for Railways, dated Madras, 22nd September 1871, No. 194.

With reference to the last part of paragraph 2 of your letter, No. 191, and G.O., No. 910, I have the honour to submit, herewith, a report and estimate by the Chief Engineer, with plans of the trial surveys between Chingleput and Madras, and to state further that the working survey is now being proceeded with as directed in your letter under reply.

2. Paragraphs 27 and 35 of the Chief Engineer's report allude to interviews which took place between myself, the Chief Engineer, and the Chairman and several Members of the Chamber of Commerce, and the President of the Municipal Commission. At the Meeting with the former gentlemen, the reasons for the suggestion of a site near Salt Cotaur being selected for the terminal station in Madras were not very clearly stated; an impression seemed to be entertained by one or two of the gentlemen that it would be found convenient for the merchants to be enabled to have their business at the two stations conducted by one representative. As, however, the interchange of the goods traffic between the Madras Railway Company and this Company is not expected to be considerable at Madras, I do not think that any great convenience or advantage would accrue to the merchants in this or other respects by the two stations being placed together, while the inconvenience and disadvantages pointed out by the Chief Engineer, would, I venture to affirm, more than counterbalance it.

3. In our interviews with the President of the Municipal Commission, we learned that the suggestion to approach Salt Cotaur would not be viewed so favourably by the Commissioner as the sites recommended by us; first, because of the important roads which would have to be crossed, among others the Poonamallee and Pursewaulkum main roads, and also because of the inconvenience which would result from the traffic from another Railway establishment in its approach to the pier and godowns in the neighbourhood being thrown upon a line of very narrow streets, already very much over-crowded, and which the Municipality have not the present means to improve.

4. I may also state that we were led to believe that a station near to the Salt Cotaur, or as would be the case on the Municipal Sewage Farm, would be very objectionable in a sanitary point of view, owing to the ground having been formed to a considerable depth of sweepings and refuse collected in the town.

5. I have thought it proper to submit these observations as additional reasons to those furnished by the Chief Engineer for our adhering to the recommendation of the two sites which we originally proposed, having ascertained that they were approved by the President of the Municipal Commission, that they were very generally acceptable to Madras and others with whom we had spoken; and believing from their central position that they would afford the greatest convenience to the largest number at the most moderate cost.

From the Chief Engineer, to the Agent and Manager of the Carnatic Railway Company, dated Chingleput, 18th September 1871, No. 793.

In accordance with the order conveyed to me in the G. O., No, 910, of the 27th March last, I proceeded with a trial survey between Chingleput and Madras, and I now have the pleasure to hand you, for the information of Government, the plan and section showing the result of that survey. I also append tables of quantities, curves, and gradients and of bridges and culverts which I would propose for this line if the location meets with the approval of Government.

2. The quantities, etc., have all been taken for the same standards as those on the other surveys, which were those laid down in the contract with the Company as originally proposed. I apprehend that this will afford a better opportunity of comparing this part of the line with others, and make the surveys and reports, as a whole, more intelligible, than if I calculated for a gauge of 3′ 3″, whilst the change in the estimates that will be occasioned by the adoption of a different gauge will be as conveniently made in one case as in the other, the difference being a proportional one.

3. Where the line leaves that of the old survey from Conjeveram, I take advantage of the bund of the large Chingleput Tank, this necessitates running through the outer part of the fort, but a saving will be effected in earthwork, and by taking up property of little value without interfering with the main Post Road. Three and a half miles from Chingleput the Railway wil cross the main Trichinopoly to Madras Road, and from thence to near Palaveram it keeps the road on the east, without crossing or interfering with it.

4. The most direct route obtainable has been selected that would enable me to keep the gradients within the limit which must be fixed for the rest of the line (1 in 140), and I have succeeded not only in finding a very direct line as far as Palaveram, but the earthwork will be less on an average than was estimated for the other surveys.

5. Near Palaveram two lines have been examined, and are shown on the plan; one (shown in red) running through the centre of the Cantonment, the other (in black) on the east. I have adopted the latter as it interferes with no property of great value, and requires less earthwork than the other, the only objection to it being the crossing of the Post Road; the inconvenience to arise from this, however, I consider would be counterbalanced in the other line by the value of the property required to be taken and by difficulties that would be caused by running through the Palaveram Parade Ground. From this place to the river-crossing three lines are shown as having been examined; that in black is the one I would recommend, and is that of which I send a section and quantities; this passes around the outskirts of the Cantonment of St. Thomas' Mount near to the Native bazaar, and within a short distance of the centre of the European inhabitants, and will, I think, serve all classes of traffic to better advantage than could be by any other line, unless valuable property is taken up.

6. The line again crosses the main road for the purpose of approaching the River Adyar at a favourable place for a bridge, which is immediately opposite the Native village, Sydapet. Beyond this point I have not continued my survey, there being correct detail maps and plans obtainable, and the question of approach and entering Madras being one to be decided upon grounds of public utility and convenience rather than upon questions of engineering detail.

7. It will be seen by the tables appended that the quantities of earthwork, masonry, and iron work will be much less than on the other portions of the line; there is very little drainage to provide for, and I am, therefore, enabled to keep the openings and the embankments to pass over them at the smallest dimensions.

8. The only bridge of importance on the whole length of the survey is that over the Adyar.

9. I propose for this a bridge of seven openings, with masonry piers and abutments, and iron girders of 60 feet clear span, which I estimate approximately will cost Rupees 90,000; this will give at the site selected an area of waterway 5,000 square feet below the highest flood level, being 25 per cent. more than is allowed in the total area of the arches of the Marmalong Bridge for the Post Road, 25 chains lower down the stream. By the time the working survey is carried to this point, I hope to be in possession of information to enable me to calculate accurately the area of catchment basin of the river, and also to ascertain with more certainty the circumstances attending the highest flood of which there is record. I shall thus be in a position to fix upon the correct dimensions for the bridge before completing the design in detail.

10. I propose for stations at 5 miles, Singapermalcoil ... ... Occasional.

12 (or 10) miles	do.	Goodoovanchary or Teilaveram ...	3rd Class.
17	do.	Vundaloor	3rd do.
23	do.	Palaveram	2nd do.
26	do.	St. Thomas' Mount	2nd do.
27½	do.	Guindy	Occasional

and in addition there will probably be two 3rd class stations required in the suburbs of Madras before reaching the terminus.

11. There are two deviations which, I think, will be found to improve the line, and which shall have attention during the working survey: the first near to Goodoovanchari, which must be decided upon as will best suit the position for a station, the second at Cudapany Choultry (21st mile) where, I think, the gradients can be improved by a slight detour, to the east of the line now shown. With these exceptions I think but little improvements can be made in the alignment as shown upon the plan (in black).

12. Table of gradients marked A.

The steepest I have found necessary to use is 1 in 140, of which there are 3 miles 63 chains.

Under 1 in 200	...	...	...
From 1 in 200 to 1 in 300	...	3 ,,	69 ,,
,, 1 in 300 to 1 in 500	...	4 ,,	44 ,,
,, 1 in 500 to 1 in 800	...	6 ,,	33 ,,
Above 1 in 800	...	...	66 ,,
Level portions	...	1 ,,	76 ,,
	...	6 ,,	65 ,,

13. The straight portions of the line form an aggregate of 23¼ miles.

Curves 4 miles 50 chains. A list in detail is herewith marked B.

The other Appendices are—Quantities of Earthwork, C.
Do. Masonry, D.
Do. Ironwork, G.
List of Bridges and Culverts, F.

14. Reducing the quantities to an average per mile throughout this length of survey, in the same manner as was done in my previous report, there are—

	Cubic yards.	Rs.
Earthwork embankment	13,898	2,606
cutting	864	432
Masonry	114	1,710
Ironwork	1 ton 8 cwt.	420
		5,168

the other items will be the same as for the other parts of the line.

15. In my former estimate the amounts corresponding to the above equal Rupees 8,618, showing that this portion of the line can be somewhat more cheaply built than the other.

16. I also have the pleasure to hand you the plan and section of the alternative line between Chingleput and Madranticum *via* Battalen. Will you be good enough to submit them with the others for the information of Government.

17. In my Report on the other surveys this alteration of the line was referred to, and, after completing the examination of it, I am of opinion that it offers many advantages over the other lines at first surveyed.

18. The difficulty in selecting a good line, in this part of the country, arises from the abrupt rocky hills immediately to the south of, and surrounding Chingleput, and from the course of the Palar River being nearly parallel to the direction required for the Railway, the latter would render necessary an objectionable turn in the line to enable it to cross the river at right angles, whilst the former causes a summit which can be passed only by a steeper gradient than is required in any other part of the line.

19. It will be seen from the plan that the line, *via* Battalen, crosses the river in a much more favourable manner as regards direction than the other, and a reference to the section will show that the length of the bridge required is not only much less (six chains less than the shorter of the

Proceedings of the Madras Government, Public Works Department,
30th November 1871.

others), but that the banks are better defined on both sides of the river. There is no record or tradition of a flood having overtopped the banks in this vicinity.

20. The length of line between the two extremites of these alternative lines differs but little in either case; but, in the case of that by Battalen, there is an advantage in the summit being at a greater distance from the river, making it possible to keep the gradients within the same limit as on another side with small quantities of earthwork.

21. I have explained in detail to the Consulting Engineer (during his inspection) the relative differences in the quantities, etc., of these three lines:—

	Embankment.	Cutting.
Line No. 1 (in blue) has	26,019	1,512
,, ,, 2 (in red) ,, ...	24,047	3,004
,, ,, 3 (in black) ,, ...	24,370	455

average cubic yards per mile.

22. A list of gradients is enclosed, and a section on a large scale showing the borings taken of the river bed.

23. As I have before remarked, a regular survey with levels has not been made through the suburbs of Madras. I have, however, procured from the Revenue Survey Office Maps on a large scale of that part of the town were I am led to think the most suitable site for stations will be found, and I now beg to hand you a map of the 5th Division of the Municipality, on which I have marked what I proposed should be applied for as land to be taken for stations, and the line by which they should be approached. I also send a sheet on a smaller scale, which shows the line for the rest of the distance within the Municipal limits. Should these suggestions meet the approval of Government, I will then be in a position to complete the section throughout, fix the correct alignment and quantities of land required to construct the works.

24. From the Adyar where it is shown on the other plans the line passes through the village of Sydapet, thence across the open country above Mylapore and Nungumbakum Tanks to the River Cooum, thence curving to the east it passes through the Spur Tank to reach the open space adjoining the buildings which were occupied as the Male Orphan Asylum.

25. Up to this place but one house of value and its compound is interfered with, and although no inconvenient curves are required, the property to be occupied is probably less expensive than would be taken up by any line entering Madras from this direction.

26. From this place the line will pass towards the compound of St. Andrew's church; skirting which and taking up a narrow strip (30 feet) it passes through the enclosure of the School of Arts and on towards the site for a passenger station.

27. With the object of ascertaining the views of the leading men of Madras and the commercial community, whose interests are specially to be served, as you are aware, I attended with you the meetings you arranged with the Chamber of Commerce and with the President of the Municipal Commission. I have also had opportunities of discussing the question, as to the best sites for stations, with some members of the Trade Association. I have also considered several alternative modes of approaching a central position for a station and passing through the suburbs of Madras, that suggested themselves to me from a professional point of view.

28. I am now inclined to the opinion that, for the passenger station, the triangular piece of ground tinted on the map, near the Penitentiary, will be found to present more advantages to the Railway Company, to the majority of the travelling public, and also prove to be more popular with all classes of the community of Madras than any other.

29. In support of this view, I beg to urge the following, among other reasons, for arriving at this conclusion. The site referred to is in the closest possible proximity to the Madras Central station, which has been fixed upon after many years of consideration and after a tentative use of one, and an opportunity of availing themselves of a second site with little expense. I refer to Royapooram and Salt Cotaur. The position of the Madras station would appear to be approved of, with

scarcely an exception, by every one I have had an opportunity of speaking with on the subject. It is, therefore, I think fair to conclude that the immediate neighbourhood will be equally popular as a site for a similar station for our Railway.

30. For convenience of transfer of passengers from parts of the Madras Railway and its connections to our line, the short distance between stations offers great facilities. The approaching this station necessitates the destruction of no property of great value; will be most favourable as regards direction and from the line not crossing the great thoroughfares; will be found to cause less inconvenience by the running of trains than any other that would seem in any way practicable.

31. It will, I think, be found necessary to have communication by rail to a landing place on the beach for stores and material, which might be used by goods trucks drawn by bullocks without using locomotives. This communication can be made from this station with great facility, the roads being of such width as to make it possible to lay rails on the side without interfering in any way with ordinary traffic, whereas any position further to the north would necessitate crossing the rails of the Madras Railway, and, from the streets of the native portion of the town being very narrow, would require the destruction of property of much value to make room for additional traffic.

32. The land which will be occupied, as far as I have been able to ascertain, has been heretofore lying waste with but two small houses on it. It is now being converted into an ornamental garden, which would undoubtedly be most useful in a crowded portion of the town; but would appear in this neighbourhood not to be indispensably necessary—with the People's Park on one side, the open Esplanade and the Island such a short distance away.

33. Immediately at the entrance to the station ground it will be seen that a street crosses, communicating with the bridge over the river Cooum, known as Colonel Law's bridge. I have taken some levels on the streets and approaches to this bridge and find that it will be quite feasible to pass the traffic by a bridge over the Railway at this place, and by a short diversion this bridge can be made available for the crossing of the Male Asylum and Lang's Garden roads also; there will thus be only one level crossing (near St. Andrew's church) on which there is any considerable traffic.

34. The land available at the place I have referred to will not be sufficient for the accommodation required for the goods, general, and locomotive purposes, and I would suggest that the land intented between Whannel's road and the Police Commissioner's road (about 30 acres), be applied for to meet these requirements.

35. At the meeting, to which I have alluded, with the Chamber of Commerce, it was proposed by the members of that body that a site near the present Madras Railway Goods Station at Salt Cotaur should be selected for our goods station, as being more convenient for the reception and despatch of large consignments of goods. This proposition has had the most careful consideration. I have examined the ground and had an approximate valuation taken of the property that would be interfered with by the line. Although there is every desire to meet the views of the Chamber of Commerce, I cannot discover any grounds upon which I could recommend the selection of the site suggested by them. The principal objection, as I understand it, which can be made to the site near the Male Asylum, is that of having a distance to cart goods from one station to another, or from and to the godowns and warehouses already built by merchants near the Salt Cotaur. This, I think, it will be found can be overcome by laying rails to be used with bullocks along the roads to that neighbourhood, and I have reason to think that facilities will be afforded for this object by the Municipal authorities.

36. If the site suggested for a passenger station is selected, it will be necessary to connect it, with the shortest distance, by a line to the goods and general station. To do this with Salt Cotaur will be found very expensive from the cost of the property, and inconvenient from the necessity of crossing four of the principal thoroughfares on a level.

37. There is but little choice between the two sites as regards the distance from the centre of traffic (the Pier and Custom House), and I am told that the increased traffic brought through

the narrow streets of Black Town by the Madras Railway has proved them to be quite insufficient for its passage; it will be found, therefore, that widening the streets for additional traffic, or diversion of it, will become necessary; the latter alternative would give the Male Asylum site the advantage in point of distance from the pier, whilst the other would necessitate a destruction of property and consequent expense, such as the Municipal authorities would be unwilling to incur.

38. The close proximity of the native godowns for jaggery, in which we may expect a large traffic, would, to great extent, compensate for the inconvenience of being at a distance from the warehouses at Salt Cotaur.

39. The land at Salt Cotaur, where a station can be built, is very unsuitable for the purpose, being so much below the proper level; a large outlay would be necessary to raise it, and the foundations being exceedingly bad will require a great deal of extra masonry. The increased cost to the Railway Company of a station here will therefore be very considerable.

40. Another cause of inconvenience will be found in the fact of a long detour being necessary between the goods station and a landing place for material on the beach, which could only be avoided by crossing the Madras Railway rails, if Salt Cotaur be selected.

41. In conclusion, I would sum up the relative advantages and objections which can be urged with regard to two sites that I have considered for a goods and general station. The distance from the Pier and Custom House, which I have taken as the centre of traffic, is in effect the same in either case, unless the Municipal authorities will incur the expense of widening the streets for the additional traffic. The comparative cost of approaching the station forming the ground, and constructing the foundations of buildings, is very much in favour of the Male Asylum site. There is no inconvenience from level crossings over crowded thoroughfares in the line I have marked on the map, whilst that caused in the other line would be very considerable, not only for the public generally but to the Railway Company itself.

42. The vicinity of the jaggery godowns is an advantage, in the one case, to set against the inconvenience of distance from the merchants' warehouses, and which could be diminished by rails laid along the road. The facility of approaching the beach, for landing materials as well as for a line of rails to the Pier for large consignments of goods, (as I think may in future be found desirable) is very much against the Salt Cotaur station.

43. For the above reasons, as affecting the Government in respect of the cost of property, the public generally in the matter of convenience to them, and the Railway Company for facility in working their undertaking, I would venture to recommend that the site marked near the Male Asylum for a general and goods stations, and that near the Penitentiary for passenger accommodation be selected.

44. I would propose also to have a small station in Chetputt, facing Mr. Nicholl's road, for the convenience of the residents in Chetputt, Elamboor, Nungumbaukum, and that vicinity.

Trusting that I have explained myself clearly, and given information sufficient to enable the Government to arrive at a decision upon the subjects of this communication, I remain, etc.

CARNATIC RAILWAY.

A.

TABLE OF GRADIENTS.

From Chingleput to Sydapet.

Mileage. From		Mileage. To		Rate of Gradient.	Ascending or descending
MILES.	CHAINS.	MILES.	CHAINS.		
0	4·50	1	51·50	Level.	
1	51 50	1	76·80	1 in 330	Ascending.
1	76·80	2	25·40	1 in 150	Do.
2	25·40	2	56·80	Level.	
2	56·80	3	3 70	1 in 140	Ascending.

TABLE OF GRADIENTS.

From Chingleput to Sydapet.—(Concluded.)

Mileage. From		Mileage. To		Rate of Gradient.	Ascending or descending.
MILES.	CHAINS.	MILES.	CHAINS.		
3	3·70	3	58·50	1 in 319	Descending.
3	58·50	4	1·10	1 in 140	Do.
4	1·10	5	13·90	1 in 805	Ascending.
5	13·90	5	39·50	1 in 152	Do.
5	39·50	6	17 90	Level.	
6	17·90	7	0·80	1 in 140	Ascending.
7	0·80	7	13 50	Level.	
7	13·50	7	71 90	1 in 154	Descending.
7	71·90	8	12·00	Level.	
8	12·00	8	29·30	1 in 328	Ascending.
8	29·30	9	19·20	1 in 418	Descending.
9	19·20	9	50 00	1 in 150	Do.
9	50 00	10	0·20	Level.	
10	0·20	11	3·70	1 in 269	Descending.
11	3·70	11	22·10	1 in 526	Do.
11	22·10	12	55·80	1 in 327	Do.
12	55·80	13	32·50	Level.	
13	32·50	13	72 40	1 in 345	Ascending.
13	72·40	14	35 60	1 in 218	Do.
14	35·60	15	0·50	Level.	
15	0·50	15	26 90	1 in 187	Ascending.
15	26·90	15	56·90	1 in 198	Descending.
15	56·90	16	32 00	1 in 280	Do.
16	32·00	17	8·10	1 in 140	Descending.
17	8·10	17	32 30	Level.	
17	32·30	17	76·60	1 in 140	Ascending.
17	76 60	18	53·50	1 in 273	Do.
18	53·50	18	76 30	1 in 178	Descending.
18	76·30	19	9·70	Level.	
19	9·70	19	45·10	1 in 140	Ascending.
19	45·10	20	20·00	1 in 140	Descending.
20	20·00	20	65·20	1 in 1,107	Do.
20	65·20	21	25·20	1 in 204	Do.
21	25 20	21	69·40	1 in 471	Do.
21	69·40	22	52·40	1 in 315	Ascending.
22	52·40	22	75·30	Level.	
22	75·30	23	9·30	1 in 250	Descending.
23	9·30	23	36·60	1 in 150	Ascending.
23	36·60	23	77·50	1 in 178	Descending.
23	77·50	24	27·00	Level.	
24	27·00	24	72·45	1 in 429	Descending.
24	72·45	25	19·30	Level.	
25	19·30	25	64·10	1 in 233	Descending.
25	64·10	26	30·60	Level.	
26	30·60	26	66·70	1 in 450	Descending.
26	66·70	27	32 80	1 in 608	Do.
27	32·80	27	58·40	1 in 1,309	Do.
27	58·40	27	73·10	1 in 195	Ascending.
27	73·10	28	15·70	1 in 240	Descending.

Proceedings of the Madras Government, Public Works Department,
30*th November* 1871.

B.

Table of Curves, Chingleput to Sydapet.

Mileage. From		Mileage. To		Rate of Curve.	Remarks.
MILES.	CHAINS.	MILES.	CHAINS.		
0	000	0	16·50	18 Chains	East.
0	44·80	0	49·20	40 do.	West.
0	66·40	1	0·70	30 do.	East.
1	16·40	1	32·90	40 do.	West.
2	49·50	3	0·00	80 do.	East.
4	29 30	4	39·80	80 do.	East.
5	31·50	5	48·70	80 do.	West.
6	76·90	7	12·00	80 do.	East.
10	10·40	10	17 30	80 do.	West.
11	46·50	11	55·80	80 do.	East.
13	71·70	14	3·30	80 do.	West.
15	39·40	15	49·50	80 do.	East.
16	58·10	16	76·40	80 do.	East.
17	48·90	17	58·00	80 do.	West.
20	20·30	20	30·20	80 do.	East.
20	79·80	21	25·10	80 do.	West.
22	18 40	22	33·20	40 do.	East.
22	71·40	22	78 30	80 do.	West.
23	32·50	23	48 00	40 do.	East.
24	6·60	24	28·40	80 do.	West.
25	17·10	25	39·80	40 do.	East.
26	37·70	26	67·10	30 do.	West.
27	17·30	27	33·90	40 do.	East.
27	77·20	28	13·80	40 do.	West.
Length of Curves				80 do.	2 Miles 42·50
Do. of ,, ...				40 to 30 Chains.	1 ,, 70 90
Do. of ,, ...				18 do.	16·50
				Straight ...	23 ,, 40·10
				Total length...	28 Miles 10

C.

Quantities of Earth work from Chingleput to Sydapet.

——	Mileage. From		Mileage. To		Bank, Cubic yards.	Cutting, Cubic yards.	Bank, average per mile.	Cutting, average per mile.
	M.	CHS.	M.	CHS.				
Cutting		0·00	1	80		1,043		
Bank	1	80	3	00	228			
Cutting	3	00	7	50		531		
Bank	0	50	0	29·60	5,600			
Cutting	0	29·00	0	62·50		3,894		
Bank	0	62·50	0	68·00	4,180			
Cutting	0	68 00	0	70·50		915		
Bank	0	70·50	2	72·60	46,934			
Do.	3	22·00	4	22·00	23,284			
	4		22		80,226	6,388	18,877	1,966

Quantities of Earth work from Chingleput to Sydapet.—(Concluded.)

	Mileage. From	Mileage. To	Bank, Cubic yards.	Cutting, Cubic yards.	Bank, average per mile.	Cutting, average per mile.
	M. CHS.	M. CHS.				
Cutting	4 22·00	4 32·00		748		
Bank	4 32·00	6 44·50	37,069			
Cutting	6 44·50	6 46·00		177		
Bank	6 46·00	7 11·00	4,580			
Cutting	7 11·40	7 22·50		1,298		
Bank	7 22·50	8 18·00	12,528			
	3	76·00	54,177	2,223	13,544	556
Cutting	8 18·00	8 43·00		1,790		
Bank	8 43·00	8 65·50	2,603			
Cutting	8 65·50	9 0·00		1,416		
Bank	9 0·00	9 18·20	3,259			
Cutting	9 18·20	9 38·00		999		
Bank	9 38·00	12 35·00	48,696			
	4	17·00	54,558	4,205	12,837	989
Bank	12 35·00	14 42·00	32,913			
Cutting	14 42·00	14 56·00		1,180		
Bank	14 56·00	15 9·90	6,048			
Cutting	15 9·00	15 41·50		2,508		
Bank	15 41·50	16 6·50	6,024			
Cutting	16 6·50	16 8·50		88		
Bank	16 8·50	16 31·50	3,290			
	3	76·50	48,275	3,776	12,069	944
Cutting	16 31·50	16 34·50		401		
Bank	16 34·50	18 34·00	21,892			
Cutting	18 34·00	18 67·00		1,104		
Bank	18 67·00	19 39·00	9,030			
Cutting	19 39·00	19 66·00		1,294		
	3	34·50	30,922	2,799	8,835	800
Bank	19 66·00	21 23·00	26,738			
Cutting	21 23·00	21 31·00		312		
Bank	21 31·00	22 57·00	11,210			
Cutting	22 57·00	22 71·00		708		
Bank	22 71·00	23 29·00	14,290			
Cutting	23 29·00	23 47·00		550		
Bank	23 47·00	24 67·00	13,254			
	5	1·00	65,492	1,570	13,038	316
Cutting	24 67·00	24 78·00		208		
Bank	24 78·00	25 55·00	15,504			
Cutting	25 55·00	25 61·00		78		
Bank	25 61·00	26 8·00	2,288			
Cutting	26 8·00	26 23·00		904		
Bank	26 23·00	26 32·00	468			
Cutting	26 32·00	26 38·00		1,248		
Bank	26 38·00	27 74·00	9,630			
Cutting	27 74·00	28 7·00		1,142		
Bank	28 7·00	28 21·00	10,992			
	3	34·00	38,972	3,580	11,135	966
Total...	23	20·00	372,622	24,441	13,898	865

Proceedings of the Madras Government, Public Works Department, 30th November 1871.

D.

Quantity of Masonry in Bridges and Culverts, Chingleput to Sydapet

No.	Description.	Cubic yards per bridge or culvert.	Total Cubic yards	
	FT. IN.			FT. IN.
1	6 0 Culvert	80	80	
22	3 0 Do.	21	462	
1	20 0 Treble girder	184	184	7 0 height.
1	10 0 Do. do.	158	158	5 9
1	10 0 17 span do.	828	828	8 0
1	10 0 Single do.	88	88	5 6
1	10 0 Double do.	79	79	3 6
1	6 0 Do. do.	145	145	7 0
23	6 0 Single do.	95	2,185	6 0 average.
			4,209	

E.

Weight of Iron-work for Bridges and Culverts, line from Chingleput to Sydapet.

No. of Bridges.	Description of Bridges.	Weight per pair of girder.	Total weight.	Remarks.
	FT. IN.	TONS. CWT. QRS.	TONS. CWT. QRS.	
1	Three 20 0 openings ...	2 10 0	7 10 0	
1	Three 10 0 do. ...	0 17 0	2 11 0	
1	Two 10 0 do. ...	0 17 0	1 14 0	
1	Seventeen 10 0 do. ...	0 17 0	14 9 0	Calingulah of Chingleput Tank.
1	Single 10 0 do. ...	0 17 0	0 17 0	
1	Two 6 0 do. ...	0 10 1	1 0 2	
23	Single 6 0 do. ...	0 10 1	11 15 0	
			39 16 2	Exclusive of bridge over the river Adyar.

Length of line, 28 miles 1 furlong.
Iron-work per mile of line, 1 ton. 7 cwt. 3 qrs.

F.

List of Bridges and Culverts from Chingleput to Sydapet.

Mileage. MILES.	Mileage. CHAINS.	Span. FEET.	Height. FT.	Height. IN.	Description.	
0	76·00	17) 10	8	0	Girder.	
1	36·00	6	6	0	Culvert.	
2	26·00	6	4	0	Girder.	
	71·00	6	4	0	Do.	
3	58·00	6	7	0	Do.	
3	60·00 to 4 20·00	3) 3	4	0	Culvert Irri. ...	Average.
	49·00	3	5	0	Culvert.	
	69·00	3	3	0	Do.	
5	9·00	6	3	6	Girder.	
	40·00	3	3	0	Culvert.	
6	5·00	10	5	6	Girder.	

List of Bridges and Culverts from Chingleput to Sydapet.—(Concluded.)

Mileage.	Span.	Height.		Description.	
MILES. CHAINS.	FEET.	FT.	IN.		
7 34·00	6	6	0	Girder.	
8 4·00	6	4	0	Do.	
54·00	3	3	9	Culvert.	
9 9·00	3	6	0	Do.	
63·00	2) 10	3	6	Girder.	
10 32·00 to 70·00	2) 3	3	0	Culvert Irri.	
11 2·00	6	5	0	Girder.	
39·00	3) 10	5	9	Do.	
12 70·00	3) 20	7	0	Do.	Adyar.
13 10·00 to 72·00	3) 3	4	6	Culvert Irri.	
74·00	6	5	0	Girder.	
14 61·00	3	3	0	Culvert.	
77·00	3	4	0	Do.	
15 56·00	3	2	9	Do.	
16 4·00	6	3	0	Girder.	
16 30·00	6	1	0	Do.	With off-take.
43·00	6	6	0	Do.	
16 70·00 to 17 10·00	2) 3	3	0	Culvert Irri.	
20·00	6	3	9	Girder.	
25·00	2) 3	2	0	Culvert Irri.	
54·00	6	6	0	Girder.	
18 22·00	6	6	0	Do.	
78·00	6	6	0	Do.	
21 12·00	6	3	0	Do.	
65·00	6	1	9	Do.	
22 28·00	6	2	0	Do.	
23 18·00	2) 6	7	0	Do.	
40·00	6	1	0	Do.	With off-take.
72·00	3	4	0	Culvert.	
24 52·00	6	5	0	Girder.	
25 18·00	6	10	0	Do.	
20·00 to 45·00	3) 3	4	0	Culvert Irri. ...	Average.
77·00	6	3	0	Girder.	
26 62·00	6	4	0	Do.	
65·00	6	3	0	Do.	

TABLE OF GRADIENTS.

Alternative line—Chingleput to Madranticum via Battalen.

Mileage. From	Mileage. To	Rate of Gradients.	Ascending or descending.
MS. CHS.	MS. CHS.		
20 50·00	21 35·00	1 in 1,341	Ascending.
21 35·00	21 65·00	1 in 2,614	Descending.
21 65·00	22 61·60	Level.	
22 61·60	23 21·60	1 in 145	Ascending.
23 21·60	23 35·00	Level.	
23 35·00	23 70·00	1 in 140	Do.
23 70·00	24 36·40	1 in 2,775	Descending.

Proceedings of the Madras Government, Public Works Department, 30th November 1871.

Alternative line—Chingleput to Madranticum via Battalen.—(Concluded.)

Mileage. From	Mileage. To	Rate of Gradients.	Ascending or descending.
MS. CHS.	MS. CHS.		
24 36·40	24 54·30	1 in 140	Descending.
24 54·30	26 54·10	1 in 261	Do.
26 54·10	27 20·00	1 in 173	Do.
27 20·00	28 70·20	1 in 1,224	Do.
28 70 20	29 20·30	1 in 249	Ascending.
29 20·30	29 60·00	Level.	
29 60 00	30 30·00	1 in 235	Descending.
30 30·00	31 20·00	1 in 660	Do.
31 20·00	32 50·00	Level.	
32 50·00	33 10·00	1 in 338	Ascending.
33 10·00	36 00·00	Level.	
36 00·00	37 33·00	1 in 688	Do.

No. 546. ORDER THEREON, 30th November 1871, No. 3,030.

RAILWAY, No. 75.

THE Consulting Engineer will inform the Carnatic Railway authorities that the Government entertain serious objections to the site near the Penitentiary proposed for the terminal station of their line The ground desired to be appropriated by the Company has been put in order with considerable trouble and labour; it is valuable to the Jail as a vegetable garden in which convict labour can be employed with a large saving to Government, and it affords a convenient site for Warders' quarters recently erected at considerable cost, and which could not be placed in convenient contiguity to the Jail or any other ground available for the purpose, nor would the Government deem it advisable, with reference either to the security or the sanitary condition of the Jail, that additional buildings should be raised in its immediate neighbourhood unconnected with the establishment.

2. In addition to these disadvantages the Government have a strong impression that the introduction of a line of railway skirting one of the main roads of the town for a considerable distance, and traversing another would be attended with considerable inconvenience to the street traffic.

3. If considered indispensable, the Government would not absolutely decline to assist the Railway Company in obtaining possession of the ground now occupied by the premises of the Friend-in-need Society; but they believe that, on due consideration, it will not be found expedient to push the passenger station further into the heart of the town than the Male Asylum ground selected for the goods station. By adopting this course the Company would effect a considerable saving and would not apparently sacrifice any sensible amount of traffic, while the united stations might still be joined to the terminus of the Madras Railway and the Port by means of an ordinary tramway worked by horse-power.

Proceedings of the Madras Government, Public Works Department,
30th November 1871.

4. Major Prendergast will state precisely the position of the line and station at the Mount, with reference to the proposed fortifications or entrenchments there, and he will forward a sketch map showing clearly the direction of the line from Sydapet to the terminus at Madras, as well as the projected stations and the proposed deviations of present roads.

(True Extract.)

Railway Depart

Dy: Cons: Engr's Office

17

From.

Captain C. J. Smith R.C.E.

Dy: Cons: Engr: for Railways

To

Major H. L. Prendergast R.C.E.

Dy: Cons: Engr: for Railways

Madras.

Sir.

I have the honour to report that I have inspected the proposed line for the Railway from Sydapet to the Palar River.

The question of the best point at which to enter Madras being undecided. The Requirements of the Mount. Chingleput and the "Palar River" have next to be considered.

At the Mount to avoid interfering with the Palaveram parade ground, and the Military buildings, it is necessary that the line should pass parallel to and east of the main road, and on that the gradients and description of property affected were found very favourable.

At Chingleput. The large tank and hills adjoining have determined the location of the line. I think beyond question it will follow the line of the bund, through a corner of the Fort, skirting the town, to the east of it. Three Routes thence to the River present themselves, accompanying this Report are the sections on each line of the three crossings; the chainage and gradients on each case, and the earthwork required for each. From these it will be seen that although a higher summit had to be reached by the Route C, the rising gradient is 1 in 140 instead of 1 in 124 on 1 in 138 on the others. The distance to Madambakkam (a village) to be reached by either Route is 15 miles 78 chains by Route C as against 16 miles 34 chains and 15 miles 60 chains by Routes A and B. The quantity of earthwork per mile is greatly in favour of Route C, and as regards the district accommodation, the Chief Engineer is in favour of the second

second Route. As regards the crossing of the Gauk, I am not enclined to regard as an advantage the fact that the Gauk is narrower on Route C; but it is sufficiently large and the soundings on the bed show that the section is at least as favourable as on the alternative Route. I am therefore on the whole in favour of Route C.

From Chingleput to the northward the line leaving the bank bends runs parallel and to the east of the bank Road which it crosses in order to gain the lowest point of the summit separating the Chingleput plain the adjoining valley; it thence bends to the eastward towards the general direction of the Mount and a little further on bends to the east to avoid the Gudiachoor Gauk. It then curves to the westward to regain the general direction North to the village of Calagoolatoor and when nearly abreast of Gedavaram bends westward to avoid the Gudiachoor Gauk, the alternative line, here has since been selected passing above the Gauk and nearer the village. From this point the line runs nearly straight to the west foot of Vandalore Hill and thence parallel to the main Road towards Palaveram hill, the small ridges of hill intervening

intervening leaving but little — choice in locating the line.

The point for crossing the public road to the west of which the line is laid out, till within a mile or two of Palaveram, is however not that which will be adopted, a better line is evidently to be found by crossing the road further south, and to this the latest Engineer agreed.

From the foot of Palaveram hill, it is proposed to carry the line between the range of hills and the bungalows east of the road, thence skirting the east of the native town at the Mount, it will pass close to the main road between it and the small rocky ridge abreast of the race course, cross the road a little east of the bungalow and the river about half a mile above the Nameloog bridge.

It is proposed to carry the line thence through the Nylapoor Bank. across the open waste to the site at present occupied by the Friend in Need Society workshops.

The exact position for crossing the Adayar River must depend to some extent upon the survey of the property in Sydapet, and the position of the terminal station is open to discussion, with these exceptions I think the line

as

P. W. 4785/71

as proposed, the best site that can be found.

For the bridge across the Adyar the foundation can be laid on rock for that across the Palar, cast iron cylinders carried down well into the clay would I think be best suited to the site, no other stream of any importance is crossed.

Madras 16th September 1871

I have the honour to be Sir, Your most obedt Servt

Allcutt Captain RE

Dy Chief Engr for Railways

25

CONSULTING ENGINEER'S OFFICE.

Railway Department.

No. 433

From Major Al L. Brandreth RE Consulting Engineer for Railways,

To Colonel J. Carpendale RE Secretary to Government, Public Works Department, Fort Saint George.

Sir,

I have the honour to submit for the approval of the Government the detail surveys of the Carnatic Railway from the Palar Bund to the Adyar, with the trace of the line proposed from thence into Madras, terminating at the triangular plot of ground between the Penitentiary and the People's Park.

The Government expressed their views generally on the direction to be taken by the Carnatic Railway in

intervening leaving but little — choice in locating the line.

The point for crossing the public road to the west of which the line is laid out, till within a mile or two of Palaveram, is however not that which will be adopted, a better line is evidently to be found by crossing the road further south, and to this the Railway Engineer agreed.

From the foot of Palaveram hill, it is proposed to carry the line between the range of hills and the bungalows east of the road; thence skirting the east of the native town at the point, it will pass close to the main road between it and the small rocky ridge abreast of the race course, cross the road a little east of the bungalow and the river about half a mile above the Nameloog bridge.

It is proposed to carry the line thence through the Nylapoor Bank, across the open waste to the site at present occupied by the Friend in Need Society workshops.

The exact position for crossing the Adayar River must depend to some extent upon the surveys of the property in Sydapet, and the position of the terminal station is open to discussion, with these exceptions I think the line as

in their order. No 911 of the 27th March 1871; and in approving of a line to be taken from Kadelabone through Kaurale Villapuram, and Vindivanam to Chingleput, called for a survey from Chingleput into the Presidency town, with a view to the final adoption of the line from Madras itself, in supersession of the former proposal for the Railway to run through Conjeveram by the line of the old Grand Trunk Road to Arcot.

2 From the South, a modification has been made in the approach to the Park from Madras; and three routes are shown between the river and Chingleput. Of these, the one marked in black is preferable, as shown in Mr. Pibbles Report.

for several reasons. There is certainly a higher summit to be attained by this line, than by the other: but the rising gradient is 1 in 140, instead of 1 in 124 or 1 in 138. The length is 15 miles 78 chains against 16 miles 24 chains and 15 miles 68 chains, while the quantity of earth work is considerably in favour of the line selected.

As regards the point of crossing the river, there is probably no advantage; except in a saving of expense, in the bridge being at the narrowest part of the river: but the Deputy Consulting Engineer reports favourably of the site, and of the bed of the river as shown by the borings that have been taken.

The

The large bank at Chingleput and the hills adjoining, determine the location of the line, which passes through a corner of the Fort, skirting the town, and then follows the line of the bank round. From thence the line runs parallel to the Mount road, on the East, and crosses the road 3/4 miles from Chingleput, in order to take the lowest point of the ridge separating Chingleput from the adjoining valley. The line then, tending the general direction towards the Mount, bends Eastward to avoid the Pincaboor tank: and again returns westward passing the village of Colagadalam. A deviation will probably be effected, and it [illegible]

to bring the line alone the bank and nearest to the village. The direction next is nearly straight to the foot of the Vandaloor hill, on its west side, and on, parallel to the road, towards the Palavaram hill, where the small Judge leave little choice of alignment. A slight deviation is advisable, for the improvement of the gradients, mentioned by Mr Pribble in para 11. The line crosses the Mount road farther South, than shown on the survey, and from the foot of Palavaram hill it keeps to the East of the native town at the Mount, passing between the high road and the small rocky ridge on the edge of the Race-course and then crosses the Mount road

to

to the Adyar, within 600 yards above the Meandering bridge.

The exact site for the Adyar bridge will be determined after an accurate survey is made of the ground in hydrafft.

There is good rock foundation in the river bed, while at the Palar it is proposed to carry the girders on cast iron cylinders, let down well into the clay bed.

3 From the Adyar it is proposed to carry the line northward, through hydrafft, above the Long Tank and the Ranganna-thum Tank, then crossing the Cattle and the Cooum, about three-quarters of a mile above the Pursuit bridge, the trace turns to the East, and runs through the Spur Tank

close

to the Male Asylum building, and Saint Andrews Church, terminating near the General Hospital bridge, and the New Central Station of the Madras Railway.

This line of approach to Madras has been chosen, after the consideration of other alternative lines; and is in my opinion the best, as it will take up but very little valuable land and house property, it comes almost into contiguity with the Passenger station of the Madras Railway, and not far (about a mile) from the goods station, while it gives access without much difficulty to the beach and the shipping.

4 If the route were laid

out

not along the coast through Saint Thome; or more centrally near the Cenotaph, many houses would come in the way through Saint Thome, Triplicane, and Chintadrepett. No convenient site for a station could be found to the South of the Cooum, as the Government offices and Depôts are all far to the North, and one or more expensive bridges would be required to get over the River.

For passengers the terminal station near the Penitentiary is in a convenient central position, the communication been shewn (the canal only intervening) for the General passenger station of the Madras Railway. But as this line will also [illegible] about

a quarter of a mile of the Rivers bridge; a small passenger station on Mr Nicholls Road, will be of much service to the inhabitants of Chetpett, Kilpauk, Purasawalkam &c.

The goods station cannot be at the same site as the passenger station for want of space; but there is a sufficiency of ground to be obtained, I believe at little cost, near the Male Asylum building. A portion of these premises, I understood, were to be sold on the part of the Government, but the Collector of Madras has been requested to defer the sale of the land, pending the orders of the Government, on these papers; viz

can

case it is found that the Canal is required for the Railway. The Chamber of Commerce would prefer the Goodwin station to be brought out to adjoin the Goodwin station of the Madras Railway; but I consider that there are no advantages in that scheme, to compensate, the great additional expenditure that would be involved in building on an unsuitable site, and the inconvenience to the public, in the Railway passing on the level through a crowded part of the town.

5 The Chief Engineer gives, in para 14, approximate estimates of cost of earth-work, masonry, &c, which he points out, to be not the actual expected cost on an average per mile; but for the sake of comparison with his former Report, he gives the figures as calculated for the Indian gauge. Thus the only object in giving these figures, is, to show that the section of the Line, is likely to be cheaper in construction, than the portion to the South.

6 As regards the occupation of land within the Municipal limits, and the termination of the line along side the Penitentiary, there are possible objections to the site of the terminus itself, which is now occupied by Native Quarters. The Workshops of the Railway in need Locality would be removed; a narrow strip of the enclosure of Saint Andrews Church is proposed to be taken up; and there

Canada Railway
Office of Engineer in Chief
Ottawa 18th Sept 1871

No 493

J. U. Walker Esqre
Secretary & Manager

Dear Sir

I have the honor to enclose herewith
Tracings of Plans & Sections of the
Proposed Deviation of the Line of
the Intercolonial Railway at Rivière
du Loup, and to request that you will
be so good as to submit the same for
the approval of the Government.

I have &c

Sd Sandford Fleming
Engr in Chief

Tracings
Collection
1871

625 Sheet 28
Bic Rivière du Loup

No 525

Ro 27 Franks 71 No 645
645

P. Dr. 1871 Department
Dept. of Public Works

RAILWAY DEPARTMENT

No 47

From
The Consulting Engineer
for Railways

To
The Secretary to Government
P. W. Department
Fort St. Geo

Dated 6 October 1871
Received
Encs 10 No. 2303

Submitting for the approval of Government the Deviation of the Intercolonial Railway from the Bay of Rivière du Loup

No 3030 30 Nov 1871

of a different gradient will be as conveniently made in one case as in the other. the difference being a proportional one.

3. Where the line leaves that of the old Survey from Conjeveram, Stake advantage of the Bund of the large Chingleput Tank - this necessitates running through the outer part of the Fort but no Tanning will be effected in Earthwork and by taking up property of little value without interfering with the main Post Road. Three and half Miles from Chingleput the Railway will cross the main Trichinopoly to Madras road and from thence to near Palaveram it keeps the road on the East without crossing or interfering with it.

4. The most direct route obtainable has been selected that would enable me to keep the Gradients within the limit which must be fixed for the rest of the line (1 in 150) and I have succeeded not only in finding a very direct line as far as Palaveram but the Earthwork will be less on an average than was estimated for the other Surveys.

5. Near Palaveram two lines have been examined and are shown on the Plan. one (shown in red) running through the centre of the Cantonment the other (in black) on the East. I have adopted the latter as it interferes with no property of great value and requires

less

less Earthwork than the other, the only objection to it being the crossing of the Post Road, the inconvenience to arise from this however I consider would be counterbalanced in the other line by the value of the property required to be taken and by difficulties that would be caused by running through the Palamcottah Parade Ground. From this place to the River Crossing, three lines are shown as having been examined:- that in Black is the one I would recommend and is that of which I send a Section and Quantities- this passes around the Outskirts of the Cantonment of St. Thomas' Mount near to the Native Bazaar and within a short distance of the centre of the European inhabitants and will I think serve all Classes of Traffic to better advantage than could be by any other line unless valuable property is taken up.

The line again crosses the Main Road for the purpose of approaching the River Adyar at a favorable place for a Bridge which is immediately opposite the Native Village Sydapet. Beyond this point I have not continued my Survey, there being correct detail Maps and Plans obtainable and the question of approach and entering Madras being one to be decided upon grounds of public utility and convenience rather than upon questions of Engineering detail.

7

7. It will be seen by the Tables appended that the Quantities of Earthwork, Masonry and Iron work will be much less than on the other portions of the line. there is very little drainage to provide for and I am therefore enabled to keep the openings and the Embankments to pass over them at the smallest dimensions.

8. The only Bridge of importance on the whole length of the Survey is that over the Adyar.

9. I propose for this, a Bridge of Seven openings with Masonry Piers and Abutments, and Iron Girders of 60 feet clear Span, which I estimate approximately will cost Rs 90,000; this will give at the tide selected an area of waterway 5000 Square feet below the highest flood level, being 25% more than is allowed in the total area of the Arches of the Manmalong Bridge for the Post Road; 25 Chains lower down the Stream. By the time the Working Survey is carried to this point, I hope to be in possession of information to enable me to calculate accurately the area of Catchment basin of the River, and also to ascertain with more certainty the circumstances attending the highest flood of which there is record. I shall thus be in a position to fix upon the correct dimensions for the Bridge before completing the design in detail.

10. I propose for Stations at

5 45 17

at 5 Miles	Singaperumacoil	Occasional
12 (or 10)	Gootavanchary or Pilaveram	3d Class
17	Vendalloor	3d do
23	Pulaveram	2d do
26	St Thomas' Mount	2d do
27 3/4	Guindy	Occasional

and in addition there will probably be two 3d Class Stations required in the Suburbs of Madras before reaching the Terminus.

11. There are two deviations which I think will be found to improve the line and which shall have attention during the Working Survey:- the first near to Gootavanchary which must be decided upon as will best suit the provision for a Station the second at Pudupaukum Choultry (21st Mile) where I think the Gradients can be improved by a slight detour to the East of the line now shown. With these exceptions I think but little improvement can be made in the alignment as shown upon the Plan (in Black)

12. Table of Gradients marked A

The steepest I have found necessary to use is 1 in 110 of which there are 3 M. 63 Chs:

under 1 in 200	3	69
from 1 in 200 to 1 in 300	4	44
from 1 in 300 to 1 in 500	6	33
1 in 500 to 1 in 800		66
above 1 in 800	1	76
Level portions	6	65

13. The straight portions of the line form an aggregate of 23½ Miles

Curves 4 " 50 Chs:

4

a list is detailed is herewith marked B.
The other Appendices are
Quantities of Earthwork G.
do Masonry H.
do Ironwork C.
List of Bridges and Culverts J.

14. Retaining the Quantities to an average per mile throughout the length of Survey, in the same manner as was done in my previous report, there are

	Cubic	Pr.
Earthwork Embankment	13,898	2,606
Quilting	864	432
	114	1710
Masonry		
Ironwork	Ton. & Cwt	420
		5,168

the other items will be the same as for the other parts of the line.

15. In my former Estimate the amounts corresponding to the above equal Pr. 8,678. showing that this portion of the line can be somewhat more cheaply built than the other.

16. I also have the pleasure to hand you the Plan and Section of the Alternative line between Shingle Point and Madras through Battalore will you be good enough to submit them with the others for the information of Government.

17. In my Report on the other Surveys this alternation of the line was referred to, and after completing the Examination of it, I am of opinion that it offers many advantages over the other lines at present surveyed

The

18. The difficulty in selecting a good line, in this part of the Country, arises from the abrupt, rocky hills immediately to the South of, and surrounding Ishinglepur, and from the course of the Bolan River being nearly parallel to the direction required for the Railway; the latter would render necessary an objectionable turn in the line to enable it to cross the River at right angles, whilst the former carries a Summit which can be shaped only by a Steeper gradient than is required in any other part of the line.

19. It will be seen from the Plan that the line, via Battalen, crosses the River in a much more favorable manner as regards direction than the other, and as reference to the Section will show that the length of the Bridge required is not only much less (6 chains less than the shorter of the others) but that the Banks are better defined on both sides of the River. There is no record or tradition of a flood having overtopped the banks in this vicinity.

20. The length of line between the two extremities of these Alternative lines differs but little in either case. but in the case of that by Battalen, there is an advantage in the Summit being at a greater distance from the River making it possible to keep the gradients within the same limits as on another side with small quantities of Earthwork.

57 20

21. I have explained in detail to the Consulting Engineer (during his inspection) the relative differences in the Gradients &c. of these three lines:-

	Embankment	Cutting
Line No 1 (in blue) has	26.019	1.512
" No 2 (in red) "	24.647	3.004
" No 3 (in black) "	24.370	455

average Cubic yards per Mile.

22. A list of Gradients is enclosed and a Section on a large scale showing the Borings taken of the River bed.

23. As I have before remarked, a regular Survey with levels has not been made through the Suburbs of Madras. I have however procured from the Revenue Survey Office Maps on a large Scale of that part of the Town where I am led to think the most suitable Site for Stations will be found and I now beg to hand you a Map of the 5th Division of the Municipality on which I have marked what I propose should be applied for as land to be taken for Stations and the lines by which they should be approached. I also send a Sheet on a smaller Scale which shows the line for the rest of the distance within the Municipal limits. Should these suggestions meet the approval of Government, I will then be in a position to complete the Section throughout, fix the correct alignment and Quantities of land required to construct the works.

From

24. From the Adyar where it is shewn on the other Plans the line passes through the Village of Sydapet thence across the open Country above Mylapoor and Teantumbantum Tanks to the River Cooum. thence curving to the East it passes through the Spur Bank to reach the open Space adjoining the Buildings which were occupied as the Male Orphan Asylum.

25. Up to this place but one house of value and its Compound is interfered with and although no inconvenient curves are required the property to be occupied is probably less expensive than would be taken up by any line entering Madras from this direction.

26. From this place the line will pass towards the Compound of St Andrew's Church. Skirting which and taking up a narrow strip (60 feet) it passes through the enclosure of the School of Arts and on towards the Site for a Passenger Station.

27. With the object of ascertaining the views of the leading men of Madras and the Commercial Community whose interests are specially to be served, as you are aware, I attended with you the meetings you arranged with the Chamber of Commerce and with the President of the Municipal Commission. I have also had opportuni-

of

5152.2

of discussing the question, as to the best Sites for Stations, with some Members of the Trade Association. I have also considered several Alternative modes of approaching a Central position for a Station and passing through the Suburbs of Madras that suggested themselves to me from a professional point of view.

28. I am now inclined to the opinion, that for the Passenger Station, the triangular piece of ground tinted on the Map, near the Periambaur will be found to present more advantages to the Railway Company, to the majority of the travelling Public and also prove to be more popular with all Classes of the Community of Madras than any other.

29. In support of this view I beg to urge the following among other reasons for arriving at this conclusion. The Site preferred to is in the closest possible proximity to the Madras Central Station, which has been fixed upon after many years of consideration and after a tentative use of one, and an opportunity of availing themselves of a second Site with little difference - I refer to Royapuram and Salt Colour. The position of the Madras Station would appear to be approved of with scarcely an exception by any one. I have had an opportunity of speaking with on the Subject. It is

therefore

therefore I think fair to conclude that the immediate neighbourhood will be equally popular as a Site for a Similar Station for our Railway.

30. For convenience of transfer of Passengers from parts of the Madras Railway and its connections to our line the short distance between Stations offers great facilities. The approaching this Station necessitates the destruction of no property of great value - will be most favorable as regards direction - and from the line not crossing the great thoroughfares, will be found to cause the inconvenience by the running of Trains than any other that would seem in any way practicable.

31. It will I think be found necessary to have communication by Rail to a Landing place on the Beach for Stones and Material, which might be used by Goods Trucks drawn by Bullocks without using Locomotives - this communication can be made from this Station with great facility, the roads being of such width as to make it possible to lay Rails on the side without interfering in any way with ordinary Traffic, whereas any position further to the North would necessitate crossing the Rails of the Madras Railway and, from the Streets of the Native portion of the Town being very narrow, would require the

destruction

deodemchion of property of much value,
to make room for additional traffic.

32. The land which will be occupied, as far as I have been able to ascertain, has been heretofore lying waste with but two small houses on it & it is now being converted into an Ornamental Garden, which would undoubtedly be most useful in a crowded portion of the Town, but would appear in this neighbourhood not to be indispensably necessary with the People's Park on one side, the open Esplanade and the Island, such a short distance away.

33. Immediately at the entrance to the Station ground it will be seen that a Street proper, communicating with the Bridge over the River Coomera known as Col. Lang's Bridge. I have taken some levels on the Streets and approaches to this Bridge and find that it will be quite feasible to pass the Traffic by a Bridge over the Railway at this place and by a short diversion this Bridge can xxx be made available for the Cropping of the Male Asylum and Lang's Garden Roads also; there will thus be only one level croping (near St. Andrew's Church) on which there is any considerable Traffic.

34. The land available at the place I have referred to will not be sufficient for the accommodation required

for

for the Goods, General and Locomotive purposes and I would suggest that the land lineded between Whannell's Road and the Police Commissioner's Road about (30 acres) be applied for to meet these requirements.

35. At the meeting, to which I have alluded with the Chamber of Commerce, it was proposed by the Members of that Body that a Site near the present Madras Railway Goods Station at Salt Cotaur should be selected for our Goods Station, as being more convenient for the reception and dispatch of large Consignments of Goods. This proposition has had the most careful consideration, I have examined the ground and had an approximate valuation taken of the property that would be interfered with by the line. Although there is every desire to meet the views of the Chamber of Commerce I cannot discover any grounds upon which I could recommend the Selection of the Site suggested by them. The principal objection, as I understand it, which can be made to the Site near the Male Asylum is that of having a distance to Cart Goods from one Station to another, or from and to the Godowns and Warehouses already built by Merchants near the Salt Cotaur. This, I think it will be found, can be overcome by Looping Rails to be used with

with Bullocks along the Roads to that
neighbourhood, and I have reason
to think that facilities will be afforded
for this object by the Municipal Autho-
rities.

36. If the Site engaged for
a Passenger Station is selected it will
be necessary to connect it with the short
est distance by a line to the Goods and
General Station:- to do this with Salt
Cotaun will be found very expensive from
the east of the property, and inconvenient from
the necessity of crossing four of the principal
thoroughfares on a level.

37. There is but little choice
between the two Sites as regards the
distance from the Centre of Traffic (the
Pier and Customs House), and I am
told that the increased traffic brought
through the narrow streets of Black
Town by the Madras Railway, has proved
them to be quite insufficient for its
passage: it will be found therefore,
that widening the Streets for additional
Traffic, or diversion of it, will become
necessary: the latter alternative would
give the Male Asylum Site the advantage
in point of distance from the Pier, whilst
the other would necessitate a destruction
of property and consequent expense
such as the Municipal Authorities
would be unwilling to incur.

38. The close proximity of
the

65.27

the native Godowns for Jaggery, on which one may expect a large traffic, would to great extent compensate for the inconvenience of being at a distance from the Warehouses at Salt Cotaur.

39. The land at Salt Cotaur where a Station can be built is very unsuitable for the purpose, being so much below the proper level - a large outlay would be necessary to raise it, and the foundations being exceedingly bad will require a great deal of extra Masonry. The increased cost to the Railway Company of a Station here will therefore be very considerable.

40. Another cause of inconvenience will be found in the fact of a long detour being necessary between the Goods Station and a Landing Place for Material on the Beach which could only be avoided by crossing the Madras Railway Rails - if Salt Cotaur be selected.

41. In conclusion, I would sum up the relative advantages and objections which can be urged with regard to two sites that I have considered for a Goods and General Station. The distance from the Pier and Custom House, which I have taken as the Centre of Traffic, is in effect the same in either case, unless the Municipal Authorities will insure the expense of widening the

the

the Streets for the additional traffic. The comparative cost of approaching the Station forming the ground, and constructing the foundations of buildings is very much in favor of the Male Asylum Site. There is no inconvenience from level crossings over crowded thoroughfares in the line I have marked on the Map - whilst that caused in the other line would be very considerable not only for the public generally but to the Railway Company themselves.

42. The vicinity of the Jaggery Godowns is an advantage in the one case to set against the inconvenience of distance from the Merchants' Warehouses and which could be diminished by rails laid along the road. The facility of approaching the Beach, for landing Materials, as well as for a line of rails to the Pier for large Consignments of Goods, (as I think may in future be found desirable) is very much against the Salt Cotaur Station.

43. For the above reasons, as affecting the Government in respect of the cost of property, the Public generally in the matter of convenience to them, and the Railway Company for facility in working their undertaking I would venture to recommend that the site marked near the Male Asylum

for

for a General and Goods Station,
and that near the Penetentiary, for
Passenger Accommodation be decided.

44. I would propose also to
have a small Station in Chetputt
facing Mr Nicholls Road, for the
convenience of the residents in Chet-
putt, Elambore, Nungumbaukum
and that vicinity.

45. I putting that I have ex-
plained myself clearly and given
information sufficient to enable
the Government to arrive at a decision
upon the Subjects of this communi-
cation.

I remain Sir
My dear Sir
Your most Humble
Servant
Fred Dobbs
Chief Engineer.

A

71

30

Tramroads Railways

Table of Gradients

Rowe Clough Pleasant to Sykehead

Distance from Rowe		Rate of Gradient			Ascending or Descending
M.	Ch.				
0	00.00	Level			
1	01.00	1	in	960	Ascending
1	21.00	1	in	160	Do
1	76.00	Level			
2	25.40	1	in	160	Ascending
2	66.00	Level			
3	3.70	1	in	319	Descending
3	68.00	1	in	160	Do
4	1.40	1	in	805	Ascending
5	18.90	1	in	102	Do
6	39.00	Level			
6	47.90	1	in	160	Ascending
7	0.00	Level			
7	13.00	1	in	164	Descending
7	71.90	1	in	328	Ascending
8	12.00	Level			
8	39.00	1	in	418	Descending
9	19.20	1	in	160	Do
9	60.00	Level			
10	0.20	1	in	209	Descending
11	3.70	1	in	128	Do
11	22.10	1	in	327	Do
12	65.80	Level			
13	32.00	1	in	345	Ascending
13	72.40	1	in	218	Do
14	35.60	Level			
15	0.00	1	in	187	Descending
15	26.90	1	in	198	Do
15	56.90	1	in	280	
16	22.00				

P.R. 4785/71

Beilagen Fran.	Lo		Kosten gefahrdiebt			Kundigt Kosten Fl.
16	15.10	17	2.10	1	Lin.	120	Brandrif
17	18.10	17	22.30		Kosten		
17	22.30	17	25.10	1	Lin.	165	Brandrif
17	25.10	18	28.10	1	Lin.	345	"
18	28.10	18	31.30	1	Lin.	175	Brandrif
18	31.30	19	9.30		Kosten		
19	9.30	19	16.10	1	Lin.	120	Brandrif
19	16.10	20	20.10	1	Lin.	120	Brandrif
20	20.10	20	65.20	1	Lin.	1105	"
20	65.20	21	25.20	1	Lin.	204	"
21	25.20	21	69.10	1	Lin.	1171	"
21	69.10	22	63.10	1	Lin.	315	Brandrif
22	63.10	22	31.30		Kosten		
22	31.30	23	9.20	1	Lin.	210	Brandrif
23	9.20	23	16.60	1	Lin.	110	Brandrif
23	16.60	23	22.60	1	Lin.	195	Brandrif
23	22.60	24	27.20		Kosten		
24	27.20	24	32.10	1	Lin.	119	Brandrif
24	32.10	25	9.30		Kosten		
25	19.30	25	64.10	1	Lin.	229	Brandrif
26	64.10	26	30.60		Kosten		
26	30.60	26	66.70	1	Lin.	660	Brandrif
26	66.70	27	32.60	1	Lin.	604	"
27	32.10	27	63.40	1	Lin.	1329	"
27	63.40	27	78.10	1	Lin.	195	Brandrif
27	78.10	28	16.30	1	Lin.	210	

Carnatic Railway

Table of Curves Employed to Lay Down Part

Mileage From		Mileage To		Rate of Curve		Remarks
M.	ch.	M.	ch.			
0	.000	0	16.50	18	Chains	East
0	44.80	0	49.20	40	Do	West
0	66.40	1	0.70	30	Do	East
1	16.40	1	32.90	40	Do	West
2	49.60	8	0.00	80	Do	East
4	29.30	4	39.80	80	Do	Do
5	31.80	5	48.70	80	Do	West
6	76.90	7	12.00	80	Do	East
10	10.40	10	17.30	80	Do	West
11	46.60	11	55.80	80	Do	East
13	71.70	14	8.30	80	Do	West
15	39.40	15	49.60	80	Do	East
16	58.10	16	76.40	80	Do	Do
17	48.90	17	58.00	80	Do	West
20	20.30	20	30.20	80	Do	East
20	79.80	21	25.10	80	Do	West
22	18.40	22	33.20	40	Do	East
22	71.40	22	78.30	80	Do	West
23	32.50	23	48.60	40	Do	East
24	6.60	24	28.40	80	Do	West
25	17.10	25	39.80	40	Do	East
26	37.70	26	67.10	30	Do	West
27	17.30	27	33.90	40	Do	
27	77.20	28	13.80	40	Do	

Length of Curves

80 Chains 2 M. 42.50
40 & 30 Do 1 . 70.90
18 Do 16.80
Straight 23 . 40.10
Total length 28 . 10

Carnatic Railway

Quantities of Earthwork from Chengalpet to Sydapett.

	Mileage from		to		Bank Cyds.	Cutting Cyds.	Bank Average per mile	Cutting Average per mile
	M.	ch.	M.	ch.				
Cutting	0	00	1	80		1,048		
Bank	1	80	3	50	228			
Cutting	3	00	7	50		531		
Bank	0	50	0	29.60	5,600			
Cutting	0	29.00	0	62.50		3894		
Bank	0	62.50	0	68.00	4,180			
Cutting	0	68.00	0	70.50		915		
Bank	0	70.50	2	72.60	46,934			
Do.	3	22.00	4	22.00	23,284			
	4 M. 22 ch.				80,226	6388	18,877	1,966
Cutting	4	22.00	4	32.00		748		
Bank	4	32.00	6	44.50	37.069			
Cutting	6	44.50	6	46.00		177		
Bank	6	46.00	7	2.00	4,580			
Cutting	7	11.40	7	22.50		1,298		
Bank	7	22.50	8	18.00	12528			
	3 M. 76.00				54,177	2223	13,544	556
Cutting	8	18.00	8	43.00		1790		
Bank	8	43.00	8	65.50	2,603			
Cutting	8	65.50	9	0.00		1,416		
Bank	9	0.00	9	18.20	9,259			
Cutting	9	18.20	9	38.00		999		
Bank	9	38.00	12	36.00	18696			
	4 M. 14.00				69,558	4,205	12,837	989

	Mileage. Dam		Lo		Bank. C & H	Cutting C & H	Bank Average per mile	Cutting Average per mile
	Ft:	Ins:	Ft:	Ins:	5	5	5	5
Bank	12.	35.00	14	42.00	32,913			
Cutting	14	42.00	14	56.00		1,180		
Bank	14	56.00	15	9.90	6,048			
Cutting	15	9.00	15	41.50		2,508		
Bank	15	41.50	16	6.50	6,024			
Cutting	16	6.50	16	8.50		88		
Bank	16	8.50	16	31.50	3290			
	3	Ft:	76.	50	48,275	3,776	12,069	944
Cutting	16.	31.50	16	34.50		401		
Bank	16	34.50	18	34.00	21892			
Cutting	18	34.00	18	67.00		1104		
Bank	18	67.00	19	39.00	9030			
Cutting	19	39.00	19	66.00		1294		
	3.	Ft.	34.	50	30,922	2,799	8,835	800
Bank	19	66.00	21	23.00	26,738			
Cutting	21	23.00	21	31.00		312		
Bank	21	31.00	22	67.00	11,210			
Cutting	22	67.00	22.	71.00		708		
Bank	22	71.00	23	29.00	14,290			
Cutting	23.	29.00	23	47.00		550		
Bank	23	47.00	24	67.00	13,254			
	5	Ft.	1.	00	65,492	1570	13.038	316

	Mileage From	Mileage To	Banks C & St	Cattle C & St	Banks Average per Mile	Cattle Average per Mile
	In. ch.	In. ch.				
Cattle	24. 67.00	24. 78.00		208		
Banks	24 .78.00	25 .65.00	15,594			
Cattle	25 .65.00	25 .61.00		78		
Banks	25 .61.00	26 . 8.00	2,288			
Cattle	26 8.00	26 .23.00		904		
Banks	26 23.00	26 . 32.00	668			
Cattle	26. 32.00	26 . 38.00		1,248		
Banks	26 .38.00	27 .74.00	9,630			
Cattle	27 .74.00	28 .7.00		1,162		
Banks	28 .7.00	28 .21.00	10,992			
	3 In: 34.00.		38,972	3,580	11,135	966
Total	28 In. 20.00		3,72,622	24,441	13,898	865

D.

Carnatic Railway

Quantity of Masonry in Bridges and Culverts Height 6 feet 6 Sq. Feet

No.		Description	Quantity Bridges & Culverts Cub. Yds	Total Cub. Yds	
1	6.0	Culvert	80	80	
22	3.0	Do	21	462	
1	20.0	Double Girder	184	184	7.0 high
1	10.0	Do Do	18.8	18.8	5.9
1	10.0	1 Span Do	828	828	8.0
1	10.0	Single Do	88	88	5.6
1	10.0	Double Do	79	79	3.6
1	6.0	Do Do	165	165	7.0
23	6.0	Single Do	95	2185	6.0 average
				1209	

E.

85-31

Carnatic Railway

Weight of Iron work for Bridges and Culverts Line from Chingleput to Cyd Dapett.

No. of Bridges	Description of Bridges	Weight for Pair of Girders			Total weight			Remarks
		Tons	Cwts	qrs	Tons	Cwts	qrs	
1	Three 20. 0 Openings	2	10	"	7	10	"	
1	Three 10. 0 Do.	"	17	"	2	11	"	
1	Two 10. 0 Do.	"	17	"	1	14	"	
1	Seventeen 10. 0 Do.	"	17	"	14	9	"	Exclusive of Chingleput Gate
1	Single 10. 0 Do.	"	17	"	"	17	"	
1	Two 6. 0 Do.	"	10	1	1	"	2	
23	Single 6. 0 Do.	"	10	1	11	15	"	
					39	16	2	exclusive of bridges over the river Palar

Length of Line 28 Miles 1 Fur.

Iron work per mile of Line 1 Ton 7 Cwt 3 qrs.

F.

87 39

Carnatic Railway

List of Bridges & Culverts from Egmore to Sydapett

Subage Dr.	Cls.	Span	Height	Description
0	76.00	17	10' 8'.0	Girder
1	36.00	6	6.0	Culvert
2	26.00	6	4.0	Girder
	71.00	6	4.0	Do.
3	58.00	6	7.0	Do.
3	60.00			
4	4 20.00	31. 3	4.0	Culvert Inv. Arches
	69.00	3	5.0	Culvert
	69.00	3	3.0	Do.
5	9.00	6	3.6	Girder
	40.00	3	3.0	Culvert
6	5.00	10	5.6	Girder
7	34.00	6	6.0	Do.
8	4.00	6	4.0	Do.
	54.00	3	3.9	Culvert
9	9.00	3	6.0	Do.
	63.00	21. 10	3.6	Girder
10	32.00			
	4 70.00	2). 3	3.0	Culvert Inv.
11	2.00	6	5.0	Girder
	39.00	3). 10	5.9	Do.
12	70.00	3). 20	7.0	Do.
13	4 10.00			
	72.00	3) 3	4.6	Culvert Inv.
	74.00	6	5.0	Girder
14	61.00	3	3.0	Culvert
15	77.00	3	4.0	Do.
16	56.00	3	2.9	Do.
	4.00	6	6.0	Girder

N Yard

Mileage Kr.	Cts.	Span	Height	Description	
16	30.00	6'	1.0	Girder	with offsets
	43.00	6	6.0	do	
16	70.00				
17	6 10.00	2) 3	3.0	Culvert	
	20.00	6	3.9	Girder	
	25.00				
	34.00	2) 3	3.0	Culvert	
18	22.00	6	6.0	Girder	
	78.00	6	6.0	do	
21	12.00	6	3.0	do	
	68.00	6	1.9	do	
22	28.00	6	2.0	do	
23	18.00	2) 6	7.0	do	
	40.00	6	1.0	do	with offsets
	72.00	3	4.0	Culvert	
24	52.00	6	5.0	Girder	
25	18.00	6	10.0	do	
	20.00				
	to 46.00	2) 3	4.0	Culvert	Skewages
	77.00	6	3.0	Girder	
26	62.00	6	4.0	do	
	65.00	6	3.0	do	

Carnatic & Bantwar

Table of Gradients

Alternative lines & Ghats subject to Madras Sanction June 1st Battalion

Mileage From		Mileage To		Rate of Gradients			Ascending or Descending
Mrs.	chs.	Mrs.	chs.				
20	50.00	21	35.00	1	in	1361	Ascending
21	35.00	21	65.00	1	in	2614	Descending
21	65.00	22	61.60	Level			
22	61.60	23	21.60	1	in	1165	Ascending
23	21.60	23	35.00	Level			
23	35.00	23	70.00	1	in	1160	Ascending
23	70.00	24	36.40	1	in	2775	Descending
24	36.40	24	54.30	1	in	1160	Descending
24	54.30	26	54.10	1	in	261	Do.
26	54.10	27	20.00	1	in	173	Do.
27	20.00	28	70.20	1	in	1224	Do.
28	70.20	29	20.30	1	in	269	Ascending
29	20.30	29	60.00	Level			
29	60.00	30	30.00	1	in	235	Descending
30	30.00	31	20.00	1	in	660	Do.
31	20.00	32	50.00	Level			
32	50.00	33	10.00	1	in	338	Ascending
33	10.00	36	00.00	Level			
36	00.00	37	33.00	1	in	688	Ascending

93 SP 11

Carnatic Railway Co. Limited
Agent and Manager's Office
Madras 22nd September 1871

No. 194

From. J. G. Fisher Esq.
Agent and Manager. Carnatic Railway Co.
To. Major H. L. Prendergast R.E.
Off: Consulting Engineer for Railways
Madras.

Sir.

With reference to the last part of para 2 of your letter No 191 and G.O. 910, I have the honor to submit herewith a report and Estimate by the Chief Engineer, with plans of the trial Surveys between Chengalpat and Madras. and to state further, that the working Survey is now being proceeded with, as directed in your letter under reply.

2 Paragraphs 27 & 35 of the Chief Engineers report allude to interviews which took place between myself, the Chief Engineer, and the Chairman and several members of the Chamber of Commerce, and the President of the Municipal Commission. At the Meeting with the former Gentlemen, the reasons for the Suggestion of a Site near Salt Cotaur being selected for the terminal station in Madras were not very clearly stated. an impression seemed to be entertained by one or two of the Gentlemen, that it would be found convenient for the Merchants to be enabled to have their business at the two stations conducted by one representative. however the interchange of the Goods Traffic between the Madras Railway Co. and this Company is not expected to be considerable at Madras, I do not think that any great convenience or advantage would accrue to the Merchants in this

or others respects by the two Stations being placed together, while the inconvenience and disadvantages pointed out by the Chief Engineer, would I venture to affirm, more than Counterbalance it.

3. In our interview with the President of the Municipal Commission, we learned that the Suggestion to approach Salt Cotaur, would not be viewed so favorably by the Commissioners as the Sites recommended by us, first because of the important roads which would have to be crossed, Amongst others the Poonamallee and Purswawalkum main roads and also because of the inconvenience which would result from the Traffic from another Railway Establishment in its approach to the Pier and Godowns in the neighbourhood, being thrown upon a line of very narrow streets, already very much overcrowded, and which the Municipality have not the present means to improve

4. I may also state that we were led to believe that a Station near to the Salt Cotaur, or as would be the case on the Municipal Sewage Farm, would be very objectionable in a Sanitary point of view, owing to the ground having been formed to a considerable depth of Sweepings and refuse collected in the Town.

5. I have thought it proper to submit these observations as additional reasons to those furnished by the Chief Engineer for our adhering to the recomendation of the two Sites which we originally proposed, having ascertained that they were approved by the President of the Municipal Commission, that they were very generally acceptable to Traders and others with whom we had spoken, and believing from their central position that they would afford the greatest

95 12

Convenience to the largest number at the most moderate Cost.

I have the honor to be
Sir
Your most obedient Servt.

[signature]
Asst Manager

P. Dr. 4785/11

Rec'd 30th Nov 1911

Memorandum

For orders.

With these papers the Acting Consulting Engr for Railways submits, for the consideration and decision of Govt, the question, firstly, of the direction in which the proposed extension of the Carnatic Railway should be carried between Conjeevaram and Tindivanam, taking these two places

From

The Agents and Managers
Carnatic Railway Co. Ltd.
Madras

To

The Consulting Engineer
for Railways,

Dated 22nd September
Rec'd 23rd
1911
No. 1944

Forward Plans and Plan of Alternative Lines between Conjeevaram and Madras with Remarks

as fixed points and
assuming that Arconum
shall be the northern ter-
-minus, and secondly the
direction in which the
line should be taken
from Villupooram or
Kilpar to Cuddalore.

When the general
subject of Railway
extension was under
consideration, the
Government expressed
an opinion that any
prolongation to the
Southward of the Arconum
and Conjeeveram line

that might be undertaken
should be carried through
Wandiwash, Tindivanum
and Vieravandy, that being
the direct line and one
which would open out
to the most advantage
the interior and at present
less accessible portions
of the South Arcot District
and place them in direct
communication with
the sea board. An
examination of the
Country has however
led not only the Officers
of the Tramway Company
(now absorbed into

the Carnatic Railway Com-
-pany, but also the Con-
-sulting Engr., to the
opinion that the preferable
direction is by the cir-
-cuitous route of Walla-
-jabad and Chingleput
to Tindivanum, and
accordingly the Engineers
sent out by the Carnatic
Railway Company to
survey the country for
the proposed extension
have confined their
operations almost ex-
-clusively to this line,
and

and have completed the
trial survey, which the
Consulting Engr. has now
submitted with the expla-
-nations of the Chief
Engineer and his own
remarks.

From these it will
be observed that, taking
Villupooram (Belfar), Tin-
-divanum and Conjeevaram
as fixed points, the
question is shall the
extension follow the
direct line from the
latter place to Tindiva-
-num, through Wandiwash,
a distance of 41½ miles,

or shall it take the
direct route by Walla-
jabad, Chengleput and
Cuddapah, a distance
of 63½ miles.

In the selection
of a line of country for
the construction of a
railway direct alignment
is a point to which
the Govt of India, only
one and not the most
important of the consi-
derations that are to
be taken into account
in coming to a decision.
Keeping this in view, as
well

well as that his engineering difficulties are to be met with on either route, the advantage of adopting the direct route in the case of the proposed extension would be that, penetrating further into the interior than a line taken round by Chengleput, it would tend to the creation of a movement of traffic which at present does not exist, and it would afford accommodation to the existing Southern through traffic to and from Madras which the

lines from Arconum via
Conjeevaram and Chengleput
would be likely to prove
from its great length.
This will be seen by com-
paring the distance of
Tindivanum from Madras
with that which goods
and passengers would
have to be carried by
Rail between the two
places by the respective
routes. Tindivanum
which is the most Southern
of the points common
to both routes, is 76½
miles from Madras by road,
while

while by the alternative
lines of rail it would be
either 102½ or 124 miles ac-
cording as the route
by Wandiwash or by
Chengleput may be elec-
ted. Thus a merchant
at Tindivanum wishing
to despatch a ton of
goods to Madras would
hesitate to put it on
the railway to be carried
via Arconum in a direction to bring
it at Chengleput within
35 miles of its destination
and thence to be taken
round by Conjeevaram
and Arconum, a distance
of

22+18+42½=82½ miles.
He would certainly have
this goods transferred
to Carbis Bay or Chyandour,
or, what is more prob-
able, he would from
the first prefer the
ordinary road with all
its delays, and avoid
a rail which offered
such doubtful accom-
modation.

A railway from
Arcoum round by
Chyangleseal would not
therefore be in a position
to attract to it more
than a portion of the

great through traffic
which now flows along
the Southern Trunk Road
from Marazion to Triche-
nopoly, and the advan-
tage of intercepting
which forms the chief
argument in favor of
the adoption of that
indirect route. On the
other hand the direct
line by Wandiwash
though not at present
offering more than a
fraction of the appear-
ance of traffic which
is found on the more
(long) line, would at

additionals to secure to the railway the whole of that which exists or is likely to be created, and would, in all probability, draw to it a large proportion of the through traffic which, for the reasons above stated, would not be likely to be put on a railway running in the round about a direction as by Chengleput. This is evidently foreseen by the Chief Engineer of the Carnatic Railway Wks, advocating the line by Chengleput, alludes to the construction at some future date of a branch thence to Madras which there can be no doubt will be a necessary addition to a line taken in that direction.

So far it has been assumed that Arconum is to be the northern termi- nus of the Carnatic Com- pany's undertaking and that their railway is to be of the Indian standard gauge, but these points are still open for discus- sion, and if, on further reflection, the Govt are disposed to advo- cate the adoption of the narrow gauge for

this line as well as for the extension of the Great Southern of India Rail-way to Tuticorin, it will perhaps be advisable to consider whether the Carnatic Railway should not rather start from Madras instead of Arconum and be taken in the direction of Chengleput, Caroongoly, Tindivanum and Villu-poorum, to Cuddalore through Panrooty, which would then become the point from which an extension Southward to

to join the Great Southern of India line to Tuticorin might hereafter be carried.

The question of guage for both the Car-natic and Great Southern of India Railway exten-sions has hitherto been considered by this Government as settled by the terms of the Contracts which both Companies have entered into with the Secretary of State, but this, from a despatch from the Secretary of State which was communicated

to this Govt by the Govt
of India per their letter
of the 17th September 170
No 1588 R, it would
appear, is not the case,
but on the contrary both
the Home Govt and that
of India are desirous
that the subject should
receive consideration
and be further reported
on by this Govt

The Govt of India,
when calling for an
expression of the views
of the Madras Govt
on the subject of the
extension of the Railway
System of this Presidency,
suggested

× With the Govt

suggested that any line
taken in a southern
direction should start
from Madras and not
from Arconum, and
on this Major Shaw &
Stewart concurred. The
proposal did not meet
with acceptance, partly
because the Madras Govt
were under the impression
that the French Govt
made it a sine qua
non of their constructing
a branch to Pondicherry
that they should have
an inland terminus,
and partly because, not
knowing in contemplation

a continuation of the railway further South than Cuddalore; the Madras Govt. looked upon an interior line as more suitable to the wants of the country than one running nearer the coast.

The adoption of a gauge different from that of the Madras Railway, if such be decided upon, will change the aspect of the question not only in relation to the point from which such an extension of railway construction, as is about to be undertaken by the Carnatic Railway Company,

should be commenced and carried, but as to the direction in which it should be continued to form a junction with the Great Southern of India line, in such a manner as to afford the greatest possible accommodation to the traffic of the country. A new gauge would seem to involve the selection of a new line, and it is submitted that the one which appears most likely to meet all requirements is that which, starting directly from Madras and following generally the direction of the Southern

Trunk road to Trichinopoly would then join the Great Southern of India extension to Tuticorin. By this arrangement direct railway communication would be established by the two extensions on the narrow guage system without entailing the necessity of laying a third line of rail on the Madras and Great Southern of India Railways from Arconum to Madras on the one hand and from Tanjore to Trichinopoly on the other.

30th June/71

No 3030

Public Works Dept

Proceedings of the Madras Govt
under date the 30th June 1871
Read the following

No 3030.

From

The Secy. Comp. Govt
for Railways

Dated 24th October 71

No

exterior Stations
Objections

The Consulting
Engineer will inform the
Carnatic Railway au-
thorities that the Govern-
ment object to the site
near the Penitentiary pro-
posed for the ~~proposed~~ terminal
of their line
Station. The ground in-
tended
denied to be appropriated
by the Company has been
put in order with consi-
derable trouble and labor;
it is valuable to the Jail
for as

a Sketch Map showing clearly the direction of the line from Sydapett to the terminus at Madras, as well as the projected Stations and the proposed deviations of present roads.

W. Mc

To The Consg Engineer
for Railways &c &c &c

Rec. 5th Sept. 27/11/71.
C-C — 16/12/71.

In 26 Mem R. 781

121

Memorandum.

Circulated for Orders.
will be brought before next Council.

The Plans forwarded with this Memo and the distinctive projected Line or Line from Sydapett. I therefore consider it definitive as previously the same Line as Surveyed & the Passenger Station is to be placed close to the Winderbury & the Ground same occupied as the Jail Garden I certainly decide

In the Orders of the 27th March 1871, No 910, the Government, while approving of the Carnatic Railway being carried by Chingleput, Caranjoody, Veravandy, Vellegoody, Perumbe and Paroor to Cuddalore, were of opinion that, looking to the general poverty of the Country

Country between Chingleput and Arcoonum, and the increased distance to Madras which a prolongation of the line to Arcoonum would involve, the Railway should be carried direct to Madras from Chingleput in the direction of the New Trunk Road. With this view the Consulting Engineer for Railways was instructed to complete a trial survey from Chingleput so as to bring the line to some convenient Central spot for a terminal station in Madras. In accordance with these instructions Major Pendergast now submits trial surveys from the Palar river to the Adyar and a trace of the line from thence into Madras.

Crossing the Palar at the most favorable site, the line skirts the town of Chingleput, and the road, after running parallel to the trunk road for 3½ miles crosses that line of communication. The Railway continues to follow the direction of the road till within about 2 miles of the Cantonment of Pallaveram, within it again crosses and

it would be another site I like convenience could be found. The ground has been under water considerable trouble and labour, [illegible] the Jail [illegible] the requisite quantity of the prisoners could from there with considerable saving + Got. and there are but Mark of borders houses recently erected a large cost besides another house of Adeer date. all these buildings must commence the situated in the Jail + I do not know where they could be erected if removed from here.

A single Chief of Madras Police has been circulated with the papers showing I think that

Gov. would do well to have the Consulting Engineer & the Railway Engineer & Major Bowen Engineer & Cantonment to discuss the various alternatives which may be offered by the Engineers before the Railway Station must be [illegible] advantageously with the Railway or in a corner of the Pedlier Park.

the line runs diametrically from Sydapet to the Station proposed to the Arcot & the Penitentiary as well as the proposed deviation of the present road.

N

Passenger Station.

In the event of the route above sketched being adopted, and for the reasons explained in the papers submitted by Major Pendergast it appears on the whole the best that can be selected for the Consulting Engineer proposes to have a small Passenger Station at Mr Nicholls' roads for the accommodation of the inhabitants of Chetpett, Nilgaunk, Nungumbaukum, &c, and to locate the Goods Shed near the Male Asylum buildings, at which

and thence, keeping to the East of the Native town at the Mount, passes the race course, and intersects the Mount road above the Marmalong bridge.

From the Adyar it is proposed to carry the line through Sydapett and Nunguinbaukum, whence, running through the Spur bank, and passing close to the Male Asylum Buildings and Saints Andrews Church, it will terminate in the Plot of ground between the Penitentiary and the Peoples' Park, where it is proposed to build the terminal Passenger

I think that it would be very desirable to appropriate a site proposed for the terminus of the Carnatic Railway. I would adopt either the Egmore site or that at Pursewaukum which it is proposed for a goods station or that of Nungumbaukum as the Friend in Need Society would prefer the latter in case of

Adyar.

It is impossible to form a definite opinion without a knowledge as to the site called for. Then only could I decide it by the best. In the

Salt Chowkee Station - As far as I can judge from the Chart, I should select the site for the terminus on the Madras Esplanade - The line from the first station is very short. I think the latter site would be sufficient for the purpose.

Would the site of the School of Arts with the land adjoining Old Jail Road do?

I should like to know the

which place ground is reported
to be available.

The Chamber of Commerce prefer that the Goods Station should be erected near the Salt Cottages; but the attending disadvantages of such an scheme appear to them much counter balance any good results that might be gained from carrying out their suggestion.

Govt. of Madras.

PUBLIC WORKS.

To

Dept.

Sect.

G. O. No. 1871.

Nos.