GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers:—

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, dated 21st February 1890.

Government desires that you should fully consider the comparative merits of a direct line from Rajahmundry *viâ* Cocanada to Sámalkót or Tuni as well as those of the line suggested in the reconnaissance, having regard to cost of future working and convenience to trade.

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Telegram from the Engineer-in-Chief, East Coast Railway, to the Consulting Engineer for Railways, dated 1st March 1890.

Just returned to Waltair. Your telegram 21st February about line of railway not understood. What do you mean by a direct line from Rajahmundry *viâ* Cocanada to Sámalkót.

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Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, Waltair, dated 3rd March 1890.

Your telegram 1st. Reconnaissance suggests line Rajahmundry, Sámalkót, Tuni, survey to Cocanada by branch. Alternative line now suggested is Rajahmundry to Cocanada direct and thence to either Sámalkót or Tuni, thus putting Cocanada on main line.

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Telegram from the Engineer-in-Chief, East Coast Railway, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated 7th October 1890.

Please arrange to place another Deputy Collector at disposal of Collector, Godávari district, for acquiring land in Rajahmundry division.

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Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, dated 11th October 1890.

Your telegram 7th. Alignment through Rajahmundry district from Ellōre to Sámalkót not approved of. Orders under issue for a revised survey with stations on canals so that boats can be unloaded direct into wagons near Ellore, Bhimadole, Chebrole, Thadpalligudem and Chettipet on Ellore canal and at about miles 4, 8, 17, 24 and at Sámalkót on the Sámalkót canal. Please make arrangements for revised survey at once in anticipation of arrival detailed instructions.

Telegram from the Engineer-in-Chief, East Coast Railway, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated 14th October 1890.

Before settling finally about these new surveys, please consider fully bridging Godávari. In future only one place to do it, that is at Rajahmundry. Costs there fifty-four lakhs, low down eighty-seven lakhs. If bridge is built your proposal increases length of line over sixteen miles with no adequate return. Present line shorter than canal line six miles. Country you propose for line full of tanks and bad for railway. If you wish we can take line from Rajahmundry to Sámalkót near Dowlaishweram. Any other alteration is in my opinion a decided mistake.

From the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 16th October 1890, No. 4211 C.

I am directed to forward copies of notes by the Chief Engineer for Irrigation, Madras, and by the Officiating Consulting Engineer for Guaranteed Railways, relative to the alignment of the East Coast Railway between Ellore and Sámalkót.

2. The Government of Madras is of opinion that the modified alignment of the Railway suggested by Mr. Walch with stations on the banks of the Ellore and Sámalkót canals so as to admit of goods being unloaded direct from the boats into the Railway wagon is very desirable.

3. The following stations between Ellore and Rajahmundry would, it is thought, best serve the traffic that might be expected from the canals in the Western delta of the river :—

	MILES.
(1) Ellore	47.
(2) Bhimadole	36.
(3) Chebrole	26.
(4) Thadpalligudem	16.
(5) Chettipet	6.
(6) Nidadavól	4.

(7) Arangabad or Kovoor whichever may be found most suitable for crossing the river to Rajahmundry. There should be no difficulty in setting out an alignment which would give stations on the canal at the first five-named places, and a station at Nidadavól is most desirable and should, it is considered, be provided even if considerable extra cost is entailed thereby, as the canals of the western section of the Godávari delta begin to fan out from a little below that place.

4. Between Rajahmundry and Sámalkót it is believed that a much easier alignment with no inordinate increase in through length would be obtained by turning down to the junction of the Bank canal with the Sámalkót canal in mile 1 than to mile 4 where the Cocanada canal joins it and running thence parallel to it to Sámalkót with stations in suitable positions about miles 8, 17 and 24.

5. The Government of Madras feel very strongly that the alignment set out by the Engineer-in-Chief, East Coast Railway, between Ellore, Rajahmundry and Sámalkót will not properly serve the traffic of the rich and populous irrigated lands of the Godávari delta, and they consider that the interests of local traffic have been unduly neglected in favor of obtaining a short and direct through route. The main purpose for which the delta canals were constructed was irrigation which yields large returns. Navigation was and is a subsidiary matter, but the demands of navigation and the necessity which exists of keeping the water in the canals at a high level, for irrigation purposes, seriously interfere with the development of irrigation which might otherwise be possible. It is therefore to the interest of the irrigation revenue that the canals should be relieved as quickly and thoroughly as possible of the great bulk of the traffic on them by its transfer to the Railway and this can be easily effected by making a series of stations on the banks of the two main canals. Moreover, if the Railway is to run as a protective work in times of famine by transporting the grain of the Godávari delta to all parts of the Presidency such an arrangement is absolutely necessary. The Madras Government have therefore directed the Engineer-in-Chief to make a revised survey embodying the suggestions made in this correspondence and to report fully upon the original and revised alignments at a very early date, and they trust that their action in this matter will meet with the approval of the Government of India.

Forwarded to the Consulting Engineer for communication to the Engineer-in-Chief, East Coast Railway, who should be directed to put the revised surveys in hand at once and submit the required reports with the least possible delay.

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

ENCLOSURES.

No. 137 I.

Note by the Chief Engineer for Irrigation.

Colonel Gracey has been good enough to show me the index map of the alignment proposed for the East Coast Railway and from it I see that it is not intended to touch the Godávari system of canals anywhere except at its extreme western end (Ellore) and its extreme eastern end (Sámalkót).

2. When the general question of the line was being considered before the surveys were commenced, I strongly urged on the notice of Colonel C. J. Smith the great advisability of putting the railway in direct communication with the Godávari Western delta system of navigable canals (212 miles in length) near the *eastern* end of the Ellore canal, where the canals which fan out over the delta leave the main line ; all the canal traffic of the whole western delta goes from and comes to the Ellore canal at 6 * miles and 10 † miles from its head at Vizieswaram and it surely out of all reason that in order to get to the railway it should have to go on from 34 to 37 miles nearly parallel to the railway and at but a short distance from it, or be compelled to go into, and for some miles along, the *ricer* which is often troublous and sometimes impossible navigation for canal boats.

* Gostanaddi and Velpur, Bank and Narsápur canals.
† Venkiah and Weyeru, Akeed and Undi canals.

3. The line, as laid out between Ellore and the Godávari, seems to have the sole merit of straightness; it goes through a country of no great richness, past no town or large villages; it leaves untouched the delta with its teeming prosperity; and it seems to purposely avoid the splendid system of canals ready to become railway feeders, if the railway will but let them do so at some fairly convenient place or places.

4. The *best place* as regards the canal traffic, at which the communication between the railway and the canals could be established, is *Chettipet*, 6 miles from the head of the delta, but to take the main line there would probably entail some, though not great, difficulties and I therefore advocated and still advocate (even if a branch should be made to Chettipet) that the main line should touch the Ellore canal somewhere near Thadpalligudem (17 miles down the Ellore canal) to which place it might be taken with but slight deviation from a straight course with no great increase of length and without encountering a single difficulty.

5. At that place (Thadpalligudem) one of the chief roads from the delta crosses the canal and the largest grain market ‡ of the district lies only two miles or so away along that road, whilst boats coming from, or going to, the heart of the delta would in the case of those using the Venkiah and Weyeru, Akeed and Undi canals have only four miles further, and in the case of those using the Gostanaddi and Velpur, Bank and Narsápur canals have 11 miles further of good navigation to proceed along than would be the case were Chettipet, the point at which they had to meet the railway.

‡ Pentapadu.

6. As regards the eastern division of the delta, the alignment of the railway would be much better, from the point of view of convenience to traffic, were it to touch the canals somewhere between Dowlaishweram and 5 § miles down instead of doing so only at some 30 miles down the Sámalkót canal, and I do not think the extra cost of taking the line as suggested would be great, at all events would not be incommensurate with the advantages gained.

§ The canals which intersect this delta fan out from about four miles down from Dowlaishweram.

7. Of course in all cases in which the railway is supposed to touch the canals, it is absolutely necessary that it should really do so and not be ¼ or ½ a mile away or any distance which would necessitate the use of carts to effect the interchange of traffic.

CUDDAPAH,
25th September 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

From G. T. WALCH, Esq., Chief Engineer for Irrigation, to the Consulting Engineer for Railways, dated Madras, 29th September 1890, No. 304 M.

I have the honor to inform you that the length of navigable canals in each section of the Godávari delta is as follows :—

Eastern section,	159	miles.
Central do.	119	,,
Western do.	212	,,
Total	490	,,

Note by the Consulting Engineer for Railways.

I think it may be accepted that Ellore, Rajahmundry and Sámalkót are obligatory points on the railway and that any deviations from the existing alignment must be made between these points. (See maps put up—(1) index plan and section of the East Coast Railway (scale 1 mile = 1 inch) and (2), (3) and (4) plans of the delta irrigation canals (scale 2 miles = 1 inch).

2. It must be borne in mind that the East Coast Railway is meant to be a famine protective line, and it is therefore absolutely necessary that the wagons of the railway should be placed in direct communication with the boats on the navigable canals in the most convenient way possible for loading without the intervention of carts and it is clear that what is convenient in time of pressure will in this case be also convenient and economical for the requirements of ordinary trade.

3. It is also certain that in time of famine the river will be extraordinarily low and the difficulties of navigation which are described as at all times "troublous" will be greatly increased and it may be almost impossible to get large boats from the head works of the canal to the railway at Rajahmundry.

4. In time of famine there will also be scarcity of water for the canal and it may be found difficult to keep up an adequate supply in the Ellore canal for navigation purposes.

5. From the reasons given in paras. 2, 3 and 4 above, I draw the inference that at all places where the railway touches the canal the sidings should be so arranged so as to admit of direct loading from boats into wagons and that the proposed junctions of the East Coast Railway with the navigable canals of the delta at Ellore, Rajahmundry, Sámalkót and Cocanada are not sufficient.

6. The amount of the ordinary traffic to be dealt with will be best understood from the fact recorded by the Irrigation Department that the lengths of navigable canals are—

	MILES.
Eastern section	159
Central do.	119
Western do.	212

and that approximately 293,000 passengers and 375,000 tons of goods were carried over them in 1888-89.

7. With respect to the alignment between Ellore and Rajahmundry it appears from the index plans that the levels along the proposed alignment are as follows above mean sea-level :—

	FEET.
Ellore station, mile 37	45·00
Bhimadole station, mile 49	57·00
Prakasarowpalem, mile 61	164·00
Kormamadee, mile 70	80·00
Mile 74	174·00
Arangabad station, mile 84	62·00

It will thus be seen that proposed railway will rise 119 feet between miles 37 and 61, will then fall 84 feet in 12 miles to rise again 94 feet in the next 4 miles and fall again 112 feet in 10 miles to the Godávari river, whereas the canal runs with a gradient of less than 6 inches in the mile between Ellore and Rajahmundry and if the railway could exactly follow the canal it might be made almost level. So far as the plans show there should be no difficulty in setting

a satisfactory line which would touch the canal near Bhimadole, mile 36, Chebrole, mile 26, and again about mile 15 of the Ellore canal, from whence it might run nearly direct to the Rajahmundry crossing or touch the canal again at about * mile 3 if considered essential. Such a line would not, I think, be more than 3 miles longer than that set out, but would be approximately level, would be in touch throughout with the rich and populous lands of the delta and the navigable canals instead of passing through a district, from which very little traffic can be expected.

* Proper place for station Nidadavól—a large market on the banks of a navigable stream close to main canal; sidings might be along the navigable stream.

8. The works on the proposed alignment between Rajahmundry and Sámalkót are very heavy and the gradients are steep and it appears from the plans that a better alignment from an engineering point of view could be obtained for the railway from Rajahmundry to about mile 8 on the canal and running thence close to the canal through a level country to Sámalkót. Such an alignment would not apparently increase the length of the railway to any inordinate extent and would certainly carry it through a much richer country where I am told easy gradients could be obtained with much lighter works.

9. Copies of the note by the Chief Engineer for Irrigation and of this note might be sent to the Government of India for information and to Mr. Walker, who might be asked to set out a new alignment between Ellore and Sámalkót in accordance with the suggestions made and to then send in a full report on the two alignments in order that the Government of Madras might be in a position to pass final orders. The new section need not be traced and might be submitted in pencil in order to save time. If two survey parties are put in, one from Ellore to Rajahmundry and the other from Rajahmundry to Sámalkót the new sections should be ready in two months.

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Consulting Engineer for Railways.

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, dated 18th October 1890.

Government of Madras wish to have the alignment proposed in their telegram of 11th set out to enable them to come to a final decision. Any well considered modification in the suggested alignment that may be proposed by you will be carefully considered, and if necessary the Government will order the Consulting Engineer to visit the ground and report to them. The object to be gained is to place the railway closely in connection with the navigable canals which carry 268,000 passengers and 375,000 tons of goods and ensure full access to the canals in time of famine. Government are prepared to accept some increase to the through length of the line to ensure this object.

Telegram from the Engineer-in-Chief, East Coast Railway, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated Vizagapatam, 18th October 1890.

Do you wish any change in line from Cocanada to Vizagapatam *viâ* Sámalkót and Tuni. Please reply sharp as I have men ready to start work.

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, dated 20th October 1890.

Please consider propriety of carrying railway along spoil bank and berm of canal from Bezváda through Ellore to Nandamur aqueduct at mile 8 from anicut thence outside surplus channel to Chettipet at mile 6 and thence *viâ* Nidadavól to bridge site. Distance would probably not exceed 51 miles from Ellore to bridge site against 48 miles as laid out. Canal authorities will not object provided room is left for towpath and for widening canal.

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Collector of the Godávari District, Cocanada, dated 23rd October 1890.

Government Madras have objected to alignment East Coast Railway from Ellore through Rajahmundry to Sámalkót as it keeps away from canals and rich lands to run through comparatively poor uplands. Do you agree to alignment proposed by Engineer, East Coast Railway, through your district from Cocanada through Sámalkót to Tuni or to any part of it. Please wire reply as matter is urgent.

Telegram from the Collector of the Godávari District, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated Cocanada, 24th October 1890.

I agree to alignment of railway from Pithápuram to Tuni. Main line should run direct from Dowlaishweram to Cocanada, thence to Pithápuram. Sámalkót is of small importance may be connected by short branch. Five canals in Eastern delta converge on Dowlaishweram.

From the Collector of the Godávari District, to the Chief Engineer, Railway Works, dated Cocanada, 28th October 1890, No. 1353.

In reply to your telegram, dated 23rd instant *in re* East Coast Railway, I have the honor to submit the following report.

2. The line shown on the index plan enters the Godávari district about 3 miles north of the Bezváda canal. I have no objections to make to the alignment thence to Ellore, and even to the east of Ellore, as far as Bhimadole station on the 49th mile there is little fault to be found with it. The site of Ellore station is on the parade ground. It would be as well placed on the land between the trunk road and the canal bank. This is now a paddy-field, but the Engineer has the right to cut off the water at any time. If that were done, it would be as dry as the portion of the parade ground marked out for the station. The land could be acquired at a moderate price and the only piece of green turf in the neighbourhood would be preserved for the use of the townspeople and as a camping-ground.

3. There should be a platform, ticket office and siding, if not goods shed, on the Godávari canal bank near the lock. During the three or four months the Kistna canal is closed all passengers and goods coming by canal have to be landed near the lock.

4. It would probably pay to have small stations at Dendulur and Gundugolanu on the east and at Votlúr on the west of Ellore.

5. The Colair lake extends from the Kistna border to Kykaram about 20 miles east of Ellore, running roughly parallel to the canals at a distance varying from three to five miles. The tract between the canals and the lake is the richest part of the Ellore taluk and grows much more rice than is required for local consumption, but its villages are near enough to be sufficiently well served by the line which has been surveyed to the north of the canals.

6. At Ungutúr, about 22 miles east of Ellore, the Godávari Western delta proper begins. It consists of the three very rich taluks of Tanuku, Bhímavaram and Narsápur, which have a population of 497,058 and pay in land revenue and cess Rs. 21,78,352.

7. To the north of the Ellore canal, except in its immediate neighbourhood, the country is thinly inhabited, poor and unproductive, until the alluvial belt, six or eight miles wide, which borders the Godávari is reached.

8. The present alignment leaves the neighbourhood of the canal at Bhimadole, and at the next station, Prakasarowpeta, is eight miles distant from it. It is manifest that none of the immense traffic in goods and passengers of this delta will use the railway if the alignment is not altered. It will keep to the canals until it reaches Ellore and

Rajahmundry or even Bezváda and Cocanada. Neither goods nor passengers will leave the boats and go to a railway station eight or even five miles distant by road.

9. The present line was no doubt selected in order to avoid some very difficult country near Nidadavól where there is a succession of swamps, rivers and backwaters for several miles. But the country on the south of the canal presents no such difficulties. The Ellore, Attili, Venkayya, Narsápur and some minor canals would have to be bridged. The Ellore and, where it would be crossed, the Narsápur canals are on a high level and would require long approaches, but the extra expense would be trifling compared with the great advantages to be expected from tapping the delta traffic. Apart from the canals and irrigation channels the country to be crossed presents no difficulties. It is a dead flat and for fifteen miles or so above the level of the canals, and therefore not irrigated.

10. The Ellore canal might be crossed anywhere between Ungutúr and Prattipadu as was found most convenient. The nearer Ungutúr the better for serving traffic. There should be a station wherever a navigable canal is crossed, and every four miles or so at other places in the delta.

11. Merely to enter this delta would secure a great deal of traffic, but to thoroughly exploit it a branch about 30 miles in length taking off near Pentapadu or Prattipadu and running through the centre of Tanuku taluk to Víravásaram, Pálakole and Narsápur would be required. The District Board would I have no doubt guarantee interest on such a branch and would lose nothing by so doing. I intend to lay the question before the Board at its next meeting. The land cess of the district amounts to four lakhs and a half. Two pies in the rupee of it would meet the interest on 18 lakhs at 4 per cent.

12. The Ellore canal is a little more than 46 miles in length. From Viziesweram head-lock to the parade-ground is 47 miles. The distance therefore from Ellore to a point opposite Rajahmundry would be about the same if the line of the canal is followed, but its windings cut off, as by the line surveyed. A straight line from Ungutúr to Cocanada passes eight or ten miles south of Rajahmundry. I am not sure, but this would be the best line for the through line to take, leaving Rajahmundry to be connected by a branch through Dowlaishweram.

The distance in a straight line measured on the map is only 53 miles, *viâ* Rajahmundry it is about 70 miles. A branch of ten miles added would still leave the direct route and the branch shorter by seven miles. If the Godávari is to be bridged it could perhaps be as cheaply done below as above the anicut, and bridges below the anicut would serve the important central delta as well as the rest of the district.

If the utmost advantage was taken of the numerous permanent islands (lankas) it would perhaps be found that the two branches could be crossed as cheaply as the main river opposite Rajahmundry. Where the bridge or bridges should be is a question for the Engineers with which I do not desire to meddle further.

13. On the east of the Godávari the line surveyed goes direct to Sámalkót by a route which has nothing to recommend it except that it is short and easy ; thence to Pithápuram and Tuni leaving Cocanada, immeasurably the most important place on the whole line between Madras and Calcutta, to be provided for by a branch nine miles in length, and keeping five miles from Dowlaishweram, a place on which all the canals in the Eastern delta and indeed in the district converge. Boats are not taken up the river to Rajahmundry if it can be helped. Passengers are always landed at Dowlaishweram and start from the same place, and the same would be the case to a large extent with goods if they could be transferred at once to the railway. I therefore think that, whatever line be finally decided on, there should be a station at Dowlaishweram. If the present alignment is adhered to, there should be a branch from Rajahmundry. If my suggestion of a direct line below the anicut to Cocanada is adopted, there should be a branch through Dowlaishweram to Rajahmundry.

There is a third alternative to run from Rajahmundry through Dowlaishweram along the line of the Cocanada canal to Cocanada and thence to Pithápuram.

14. If it is finally decided to cross the river at Rajahmundry this third line is the one I would recommend, because it will serve the traffic at Dowlaishweram, tap the rich and populous delta and carry the main line through Cocanada.

15. The importance of Sámalkót seems to have been over-estimated. It is a poor place with little or no trade ; but there is a road from it through Pithápuram and Tuni to the Vizagapatam district, and being on the canal bank, most of the grain sent by road to the Vizagapatam district is landed there from the canal boats. The grain comes from the Western, Central and Eastern deltas, and would be transferred to the railway at any other station conveniently situated on the canal bank, such as Dowlaishweram or Cocanada. However Peddápuram, a more important place, is only three miles distant and there is a considerable extent of productive land lying along the Sámalkót canal, the surplus produce of which could be conveniently despatched from a station at Sámalkót, so if my suggestion to run direct to Cocanada and thence to Pithápuram is adopted, it may be worthwhile to make a branch—it would be four or five miles—to the canal bank at Sámalkót; or even to carry the main line from Cocanada round *viâ* Sámalkót to Pithápuram. This last suggestion would involve a detour of about five miles.

16. In approaching Cocanada from the delta one of the canals must be crossed. The Cocanada canal could only be crossed at a very inconvenient height considering the very low level of the land on which the station will be built, but the traffic on the Sámalkót canal is not large except when the other is closed and it is open, and intercommunication through a drawbridge once or twice a day would be quite sufficient to meet all wants.

17. The site selected for the station at Cocanada is about the best possible for goods and fairly convenient for passengers.

18. I have directed the Deputy Collector appointed for the acquisition of land to take up that required for the stations at Cocanada and Rajahmundry, and the line from the Kistna border to Ellore. If he completes this before a final decision is come to in regard to the rest of the line, he may return to his taluk for a time.

19. I hoped to have the advantage of discussing the question with Mr. Walker before sending up this report, but he has not yet been able to come here, so I think it better not to delay it longer.

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Collector of the Godávari District, dated 30th October 1890.

Land should only be taken up from Pithápuram awards towards Vizagapatam. No use in taking up land for stations when alignment is uncertain as changes in alignment will alter details of station requirements.

From the Consulting Engineer for Railways, dated Madras, 8th November 1890, No. 784.

From the Engineer-in-Chief, East Coast Railway, to the Consulting Engineer for Railways, dated Madras, 30th October 1890, No. C.-2.

I have the honor to acknowledge the receipt of your No. 2336 of 18th instant with a note by the Chief Engineer for Irrigation.

2. On receipt of your telegram on the subject I made immediate arrangements for the surveys and alignment ordered by Government.

3. It appears from the note of the Chief Engineer for Irrigation that in his opinion the railway does not touch the canal in a sufficient number of places, and I gather that he impressed his views on Colonel Smith when the idea of the line was first started.

4. On my receiving orders for the final survey of this line, Colonel Smith gave me the maps of the country with the line marked on in red that he and Mr. Molesworth approved of ; these officers went over the country selecting the line, and so

carefully did they do so that in Colonel Smith's notes which he gave me, the name of every town and village of any importance which it was desirable to go by is noted.

5. His line goes practically straight from Bezváda to Ellore; he states that a good station ground can be got near the parade-ground there, and that we should have a siding from it to the canal below the lock.

6. He notes the desirability of getting a good crossing of the Budimer, as that river floods the entire country on both sides, and then keeps on the higher and harder ground from the river to Ellore rather than the lower and softer ground near the canal. Colonel Smith thought, and so do I, that the country between Bezváda and Ellore would be well and sufficiently served by on touching the canal at these two points. There is a suggestion now of following the canal bank from Bezváda to Ellore, instead of keeping on the higher ground out of the flood influence of the Budimer. An examination of the index map will show that it would be most dangerous and inadvisable from an engineering point of view to place ourselves between the Budimer and the canal for the first ten (canal) miles from Bezváda, and we know, from the floods to which this river is subject, that the farther north we keep from its banks the better, so that, all things being taken into consideration, I am of opinion that any departure from the line as marked out in the direction of the canal for this length, will be a mistake, and lead us into permanent trouble.

7. It would no doubt be better for the village of Gunnávaram if the railway touched it, instead of being one mile away, but it is far better for the railway, both for construction purposes and maintenance, that it should be in the position marked.

8. Any one looking at the plan can see at once that the same reasoning influenced us in keeping the line by Núzvíd station so far north, and which obliged us, later on, to bend slightly south, in order to touch Ellore. A straight line could have been run from our station of Gunnávaram right into Ellore, which would have gone very near the canal at Veerilly, but the ground passed over would have been very much worse for our purpose than that over which we run. On this section I am of opinion that any change from the present alignment will be most unwise.

9. We now come to the section between Ellore and the Godávari. Colonel Smith says, "the railway should leave the canal a mile or two beyond Goondegole (say from Bhimadole) and run as straight as practicable for Chagulloo (near Kovoor). The crossing among the tanks between Bhimadole and Kovoor must be left for future consideration after examination and survey; a fairly direct line seems practicable." No doubt when Colonel Smith wrote these directions he had Mr. Walch's views before him, but well knew that the tanks and the country in which they lay were not desirable for a railway : we know what injury has been done, before now, by the bursting of tanks in Madras, and unless there were very strong reasons on the other side no Engineer of my experience would adopt the lower line.

10. It has been said that the upper or located one does not serve the requirement of this delta, as it obliges many boats, loaded in the branch canals, to return as far as Ellore, in order to meet the railway. In my opinion this is not the case.

11. The great mass of the canals are practically due south of the 10th mile of the canal, measured from the Godávari, and join the main channel between the 6th and 10th miles. If any produce intended (say) for Cocanada, entering the main canal between these points, had to go back to Ellore in order to catch the railway, no doubt great inconvenience would be felt; but this is not the case. During all the fair months in the year, when the Godávari is not in flood, boats can go direct into that river and up three miles to our station at Arangabad, and when the river is in high flood it can leave the canal near the first mile, and go direct to the Chagulloo station five miles up the large river, which there crosses our line, and which at this time of year has a much greater depth of water than is required for any canal boat.

12. This fact no doubt influenced Colonel Smith when he said "go as straight as possible from near Bhimadole and avoid the large tanks which here cover the country."

13. Thus we see that the railway is in perfect contact with the canal at Ellore, and can without difficulty be brought into immediate contact with it at Bhimadole, while at Chagulloo or Arangabad we can at all seasons bring boats to the line.

14. It may be said that this river by Chagulloo is not used for boating. Certainly not now, as it leads to nowhere in particular, but with a railway station on it it would soon become of great importance. At present it has no towing path, but would it not be better and cheaper to make one than five or six extra miles of railway?

15. It therefore becomes a question whether it is advisable or not to change 35 miles of railway, having access to the canals at each end from good and sound ground where it can be cheaply maintained to a lower and wetter, and more costly level subject to danger, and lengthen the line by five or six miles in order to get a couple of extra stations on the canal, one of which would be little used. My opinion is that such a change is not desirable.

16. The section between Rajahmundry and Cocanada is the next to be considered. Colonel Smith in his instructions is quite distinct when he writes "from Rajahmundry the line must go to Sámalkót, to shorten the branch to Cocanada, and keep in touch with the canals." My own impression is that the balance of reasons in favor of a partially direct line from Rajahmundry to Cocanada or one by Sámalkót are about equal; in the latter case we go over a far better country, we serve Sámalkót, an important place, well, and make things equal for Cocanada; in the former case we traverse a soft wet country, abandon Sámalkót, and do not improve Cocanada.

17. The gain, if any, being that the 30 miles of country passed through is richer and more populous on the lower than on the higher line.

18. So far as I know from conversation with Colonel Smith from whom I got my orders, and from his detailed notes carefully drawn up for my guidance, and from the lines laid down on the maps furnished to me, the above were his and Mr. Molesworth's reasons for taking the upper and higher level line, touching the canal at intervals, rather than a low level one along or near the canal bank.

19. I am bound to say that I agree with their views in the matter, but if Government think it more advisable to follow the canal more closely, I shall push the survey of the other line with all possible despatch.

20. The staff for the survey between Ellore and Cocanada have already got their orders for this work.

21. In an early part of this letter, I stated my reasons for not thinking it desirable to approach the canal bank between Bezváda and Ellore, I now request the favor of being informed whether the line between these points is to be changed, and if so, to what extent, also whether Government wishes a new line to be surveyed from Rajahmundry *viâ* Dowlaishweram direct to Cocanada or from Dowlaishweram to Sámalkót.

Submitted for the orders of Government with reference to Public Works Department endorsement No. 4211 C., dated 16th October 1890.

Telegram from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway, dated 8th November 1890.

The first 12 miles out of Bezváda as set out by you are accepted, beyond this Collector Kistna Suggestions should be followed as far as Ellore unless there are very great difficulties in the way. From Ellore to Rajahmundry Government have already expressed their opinion on alignment. From Rajahmundry Government consider that alignment should run *viâ* Dowlaishweram to about mile 13 of Sámalkót canal and thence by best alignment available direct to Cocanada and thence to Pithápuram. If Sámalkót important enough to call for railway branch 4 or 5 miles long can be

made afterwards. If found that orders issued involve very heavy work any particular place or considerable savings or improvements can be made by minor alterations you are requested immediately refer point Government Madras for orders.

Order—dated 11th November 1890, No. 1774 R., Public Works.

Communicated to the Consulting Engineer for Railways with reference to his endorsement No. 784, dated 8th November 1890, for communication to Engineer-in-Chief, East Coast Railway.

2. A copy of these Proceedings will be forwarded for the information of the Government of India.

(Here enter No. 1775 R., dated 11th November 1890.)

(True Extract.)

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

To the Consulting Engineer for Railways.
" Chief Engineer for Irrigation.
" Revenue Department.
" Collector of Godávari.
" " of Kistna.

Exd. A. D. Xavier.
Spare Copies

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" Collector of Godávari.
" " of Kistna.

Exd. A. D. Xavier.
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated November, 11th.

Recd. *Encl.*

G.O., 11th Nov. 1890, No. 1774 R.

NOVEMBER.

East Coast Railway

Correspondence relative to the modified alignment of the — from Ellore to Sámalkót, communicated to the Consulting Engineer for Railways for communication to the Engineer-in-Chief, East Coast Railway.

27TH NOVEMBER 1890, No. 1894 R., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper :—

From the Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 8th November 1890, No. 1004 R.C.

I am directed to acknowledge the receipt of your letter No. 4211 C., dated 16th October 1890, forwarding, with remarks, copies of notes by the Chief Engineer for Irrigation, Madras, and the Consulting Engineer for Guaranteed Railways, relative to the alignment of the East Coast Railway between Ellore and Sámalkót.

2. In reply I am to state that, under the circumstances represented, the Government of India approves of the action of the Madras Government in having instructed Mr. Walker, Engineer-in-Chief of the line, to investigate an alternative alignment to that originally adopted by him. I am to remark, however, that though the orders directing full consideration to be paid to the wants of local traffic are right in principle, it is much to be regretted that they were not issued while the survey was in progress instead of now when the working season has begun and when it is presumed that they will necessitate considerable delay in the commencement of work.

3. I am to add that if the consideration paid to local traffic and junctions with canals necessitates crossing of the Godávari at a site much more expensive than that selected by Mr. Walker, the Government of India should be consulted before any large increase of expenditure is incurred.

ORDER—dated 27th November 1890, No. 1894 R., Public Works.

Recorded with reference to Proceedings No. 1774 R., dated 11th November 1890.

(True Extract.)

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

To the Consulting Engineer for Railways.

Exd. J. Moses.
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated November, 27th.

Read. *Encl*

G.O., 27th Nov. 1890, No. 1894 R.

NOVEMBER.

East Coast Railway

Letter from the Government of India approving, with remarks, the action taken by this Government relative to the proposed alignment of the — between Ellore and Sámalkót, recorded.

I do not think that there is anything to be done upon the Telegram from Madras Nov 26th 90

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

READ the following:—

Letter No. 1004 R.C. dy 8th Nov from the Govt y Madras

FOR ORDERS.

The only point calling for notice in this letter is the latter portion of Para 2.

2. It will be seen from the telegram herewith put up (G. No. 275 dy 18-7-89) that Walker was deputed to report to the Govt. of Madras on the East Coast Railway (Pro 914 R dy 21st August 1889 in separate bundle)

3. It is known that Mr. Walker visited Ooty in Sept. 1889 and got definite instructions from Col Smalley but that those instructions were there is nothing in the office to show. Should be supplied to Mr. Walker for a Cly y Govt.

4. Since Sept 1889 it was within the knowledge of the Govt y Madras to say when they thought fit to Mr. Walker

28/11/90

FOR ORDERS.

1894R

Sir

Please say if
You would like this
letter from India printed
& a copy sent to E R.

Sd.
27/11

27/11

1004R.C

ENT OF INDIA.

S DEPARTMENT.

Construction

106

Secretary to the Government of Madras

Branch Public Works Department.

Simla, the 8th November 1890.

I am directed to acknowledge
your letter No. 4211C dated
16th October 1890, forwarding with remarks
copies of notes by the Chief Engineer for
Irrigation, Madras, and the Consulting
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to the alignment of the East Coast
Railway between Ellore and Samalcotta.

2. In reply I am to state that, under
the circumstances represented, the Government
of India approves of the action of the
Madras Government in having instruct-
ed Mr. Walker Engineer in-Chief

to C.R. Walker
Perhaps W. Public Works
to C.R. Such communi-
cation as they may think ap-
propriate when the Govt.
may see fit. Any com-
munication might then be
considered before action
is taken by Mr. Walker in
the line of disagreement.

HG
24/11/90

P.S. The Govt. of India
telegram of 18th July/89
very unwisely proposed
"to the Govt. of India" to send
"for F.S. Walker or Supt.
"Engr. Kurnool Cuddapah Railway
"and Directing him
"at Madras by 1st Oct. with
"our proposals and. - Mr.
"Walker may not agree
"with him entirely. It
was with this view
telegraphed 6th Sept/89 No.
2730 giving C.R. Railway
under the control of Chief
Engr. Madras that Govt.
have nothing to do with it.
Mr. Walker's views on
the letter of Govt. of
India of 25th Sept/89.

HG

Hm 20.XI.90
R 25.XI.90
HL 25.XI.90

the line, to m
alignment to that o
him. I am to rema
though the orders dir
to be paid to the wan
are right in principle,
regretted that they were
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when the working sea
and when it is presum
necessitate considerable delay
of work.-

to local traffic and junctions w
crossing of the Godavery at a sub
-pensive than that selected by
ment of India should be consult
large increase of expenditure is m

I have the

Encl Count file &
petition &

Your ma

R M Bourdi

Documents accompanying
Nil

Ry Dy No 1894 Rd 27 Nov 90

Recorded
with reference to
Progs: No 1774 R
dated 11th Nov: 90

Rd 17-11-

Consideration paid A

the Canals necessitate
much more ex-
Walker, the Govern-
id before any
curred.-

I have the honour to be
Sir,
Your most obedient servant
for Col: R.C.
Secretary

To The Comptroller & Auditor General

Rd