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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 2769	Press
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Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
22nd September 1864.*

No. 509. Read the following Endorsement of the Superintending Engineer, 4th Division, dated Madras, 6th September 1864, No. 26.

Read the following letter from B. M. HOLLOWAY, Esq., Resident Engineer, Indian Tramway Company (Limited), to Colonel A. J. M. BOILEAU, R. E., Superintending Engineer, 4th Division, dated Arcunum, 27th August 1864, No. 46:—

SIR,

1. With reference to your letter No. 24, dated 25th July 1864, enclosing Government Order No. 2,015, dated 13th July, I have the honor to forward tracings of station arrangements at Arcunum and Great and Little Conjeveram together with schedules, showing the quantity of land required by the Indian Tramway Company (Limited).

2. The land (colored green in the tracing), on the south side at Great Conjeveram station is not required now, as I only intend having a goods' shed, carriage shed and sufficient room for approaches to the station, but I think it necessary to have some in the north side which is colored purple.

3. As I shall require some more land at Little Conjeveram besides that already applied for in our letter dated 2nd July, No. 203, to give room for the buildings, approaches, &c., I think it necessary to apply for it.

- 1 Letter.
- 3 Plans of stations.
- 2 Schedules of land required.

1. Submitted to Government for orders, with reference to their Proceedings in the Public Works Department, No. 2,015A, dated 13th July 1864.

2. The position and dimensions of each building proposed to be erected by the Indian Tramway Company at Arcunum, Great Conjeveram, and Little Conjeveram, will be found on the plans of stations herewith forwarded.

(Signed) A. J. M. BOILEAU, Colonel, R. E.,
Superintending Engineer, 4th Division.

No. 510. ORDER THEREON, 22nd September 1864, No. 2,769.

1. In their Order of 13th July last, No. 2,015A Government stated that they considered the land applied for by the Tramway Company for stations, to be in excess of their requirements, and called for plans of the buildings which it is proposed to build at Arcunum, Great Conjeveram, and Little Conjeveram, respectively.

2. The plans and papers received with the Memorandum recorded above, are in reply to that Order.

3. At Arcunum the Company adhere to their demand for 21.63 acres. This is in addition to a large piece of land, about two-thirds of the above extent, which has been made over to them by the Madras Railway Company. Here the land applied for is all waste.

4. At Great Conjeveram the Company have struck off from their first application 2.79 acres of waste land, which is not required; but they have increased their demand by .60 acre of Nunjah land.

5. At Little Conjeveram they have increased their previous application by 1.05 acres of Garden land.

6. It seems to the Government that the land applied for is, in each case, particularly at Arcunum and Little Conjeveram, much in excess of the actual requirements of the Company. Before passing final orders on the subject, however, the papers will be referred to the Financial (Railway) Department, in view to the Consulting Engineer for Railways, or his Deputy, being instructed to meet the Engineer of the Tramway Company at the places named above, and after hearing Mr. Holloway's explanation, to report to Government his opinion on the application.

(True Extract.)

(Signed) J. H. M. SHAW STEWART, Major, R. E.,
Deputy Secretary to Government.

To the Financial Railway Department.

- „ Superintending Engineer, 4th Division.
- „ Revenue Department.

Exd. T. O'Connor.

*Executive Engineer
4th Division.*

class B land may again be brought under cultivation, and besides this the remainder of the land

* Paragraph 12 of letter No. 43, 14th May.

† Enclosure of Agent's letter No. 394.

however small in extent, must be considered and dealt with in some definite manner. I asked* what the intended arrangements were, but the only information given is that contained in paragraph 11 of Mr. East's letter† No. 156 of the 6th June, and he has regarded merely the

question as to whether the land is extensive enough to make it financially advantageous to the canal to water it, and that is only a very minor consideration in a case of this kind. There are three ways of getting over the difficulty, and, provided it is got over, it is of no consequence in which way this is effected—1st, by a slight diversion of the line so as to make the class A land reach to the margin of the wet cultivation; 2nd, by constructing a sluice in the canal bank, and giving the land canal water; 3rd, by passing Kullur tank water under the canal by a culvert.

5. As originally forwarded by the Chief Engineer, the estimates provided for making the banks above the Somaishweram anicut three feet above the level of the highest flood, and the left, or river bank of the canal below the anicut two feet above that level. The narrowness of

‡ No. 690, paragraph 6.

this margin was noticed‡ by General Ludlow, and again, in paragraph 3 of my letter No. 43,

I suggested the advisability of raising the banks of the head works to six feet above that flood, and the left bank below the anicut to five feet above the same level. I also recommended, or intended to recommend, for my meaning was mistaken, the revetting of the earthworks above

|| Estimated cost Rupees 820.

anicut to the level of the flood at least, and provision|| has been made for this by the Chief

Engineer; but, in addition to this, under the misapprehension just noticed, a revetment was entered in the estimates for the entire outer face of the left bank down to the end of the section, the cost being calculated to be Rupees 85,279-12-0. This revetment indeed, had it been necessary, at all, would not have been needed above the level of the highest flood, nor would it have been needful to make it one yard thick from bottom to top, added to which the rate Rupees 1-6-0 entered for it is higher than is requisite, and altogether probably a very efficient protection could, I estimate, have been provided for 30,000 Rupees, but general revetting is quite unnecessary and as the item was entered at my supposed request, I have withdrawn it merely leaving a small sum of Rupees 800 for any small works of this description, which it may seem advisable, during the construction of the canal works, to add.

6. The estimates, as revised by the Chief Engineer and modified in this Office, provide for the following works:—

	Estimated cost.
	Rs.
1. Navigation head, called in estimate Junction Canal	1,730
2. Head Lock	14,350
3. Raising head works.	820
4. Wing-wall stepping up bank south side	216
5. Retaining walls between Lock and Head Sluice... ..	2,265
6. Retaining wall east side Head Sluice	6,613
7. Scouring Sluice including addition to wings	2,428
8. Bridge of three arches	6,613
9. Two Irrigating Sluices	280
10. Aqueduct for Kalavoy tank surplus	23,400
11. Earthworks	50,650
12. Raising bank below Anicut with allowance for pitching	4,900
Total... ..	1,14,265

7. Items Nos. 1, 2, 3, and 5, and probably No. 4 also, for I do not clearly understand what that item is, provide for the navigation head with its lock, and for the defences of the bank between this head and the head sluice, including the formation of those banks to six feet above

Executive Engineer,
Nellur Division.

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22nd September 1861.

the highest flood level, and their revetment with dry stone, where not protected by masonry walls.

Vide paragraph 4 of my letter No 43; and paragraph 3 of Mr. East's letter No. 156. It is probable that no wells will be used for the foundations of the masonry works included in those items, as either rock or hard soil will, it is anticipated, be met with every where. For item No. 2, the lock, wells are provided in the estimate and shown in the plan. For the other walls, item 5, the wells appear only in the drawings.

In constructing the lock it will be better to make the out-fall of the culvert in or nearly in line with the canal, instead of at right angles thereto, as shown in the plan. Laterite is allowed for the groin stones. The material is hardly good enough for the purpose, and it cannot be obtained except from a long distance, which raises the rate to about six times its cost at Nellore. It would be better to use Kalavoy stone or gneiss.

The plans numbered 1 and 2 refer to these works.

8. It is intended to build the side walls of the lock with rubble stone in chunam. It is possible that the quantity, of a suitable description, required for a facing, may be picked out of the quarries, but the stone obtained from the quarries is not generally adapted for masonry, and I think brickwork will have to be substituted in those parts of the walls which are not exposed.

9. Item No. 6 provides for the retaining or dividing wall between the head sluice and the under-sluices. The arrangement is shown in plans Nos. 3 and 4 (in dark red). This latter plan I obtained from the Executive Engineer of the Division, as I found the site of the head sluice had been altered, and there was no plan in this Office which gave any idea of the relative positions of the works. Thirty-two wells are provided in the estimate for a part of the foundations of this wall. The soil is generally however too hard or rocky to allow of their being put down, so probably solid foundations will, in most places, be substituted. Brick masonry is to be used in this wall.

• Plan No. 5.

† My letter No. 43, paragraph 7.
Mr. East's „ 156, paragraph 6.

10. The scouring sluice,* item No. 7, appeared to me, as originally designed, to be extremely insecure at the outer or river end. The addition made upon my suggestion† by the Chief Engineer, was some pitching at the sluice, and a design and estimate for this work has still to be furnished: from paragraph 1 of the Chief Engineer's letter† No. — of the 11th June 1864, it will be seen that the item on this account has been withdrawn, and I hope the sluice will be revised so as to carry the railway to the anicut. I wrote on the 4th August 1864 to the Agent, asking him to request the Chief Engineer to forward the head sluice plan and estimate as soon as possible.

11. The bridge, item No. 8, calls for no remarks, except that it will probably be found advisable to substitute brick for the most part for rubble stone. The angles of the cut-waters and their junctions with the piers may perhaps with advantage be faced with either Kalavoy stone, or gneiss from the north side of the river, but these stones will be costly and their use must therefore be limited to the parts particularly liable to damage.

Plan No. 7.

12. Two irrigation sluices are included in item No. 9, a third will probably be built in the 2nd mile for the land referred to in paragraph 4 above, but otherwise these works will be sufficient for the limited extent of land available.

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Plan No. 8.

13. The aqueduct, item No. 10, for the Kalavoy tank surplus, is the principal masonry work of the section. It has been carefully designed, and, as will be seen from the cross section* of the surplus channel, the water-way is sufficient. The water-way of the canal is contracted at the aqueduct to 45' 6", which is just over half the mean width of the canal in this section. It will be seen that the spandril cells or compartments are not arched, and that they are to be filled with sand. There is risk, I think, of the flat masonry coverings of these cells giving, and in that case the pressure of a head of about 13 feet of water would be brought to bear on the arch, and this might lead to damage. Either the cells should be arched in or the spaces filled with a water-tight material. The unprotected state of the towing path, which was without parapet or railing, was noticed by me, and low thin parapets have consequently been added. These seem somewhat deficient both in substance and height. The masonry will be brick in chunam.

* Attached to letter from Agent and Manager No. 105, dated 12th May 1864.

Letter No. 43, paragraph 8.

14. The remaining items, Nos. 11 and 12, provide for all the earthworks below the head sluice; the average rate allowed is 1 Anna 4 Pice, which I think will be sufficient. The quantities of the two items do not show precisely the work to be done of each description, but the two together make up very nearly the total work to be done.

15. Some slight modification of the land plan No. 11 will be needed in laying out the work, as the changes of direction must be made by curves and not by straight lines.

16. It will have been observed that no mention has been made of an estimate for a head sluice, and a design and estimate for this work has still to be furnished: from paragraph 1 of the Chief Engineer's letter† No. — of the 11th June 1864, it will be seen that the item on this account has been withdrawn, and I hope the sluice will be revised so as to carry the railway to the anicut. I wrote on the 4th August 1864 to the Agent, asking him to request the Chief Engineer to forward the head sluice plan and estimate as soon as possible.

† Accompaniment to Agent's letter No. 394 of the 14th June 1864.

17. Communication across the canal will be kept up by means of the bridge in the 2nd mile and the aqueduct at the beginning of the 5th mile, and these means will, I think, be likely to prove sufficient.

18. This section of the canal is an extremely short one, and there would not have been any difficulty, I think, in extending it to about the end of the 10th mile. I do not know what the Chief Engineer's object may have been in terminating the section as he has done, but perhaps he wished to place it under the supervision of the Resident Engineer in charge of the anicut. The works as designed will suit whatever arrangements† may be decided upon for the line beyond the 10th mile, and though I think for the present the anicut works will absorb all the labor likely to be obtainable in the neighbourhood of Somaishweram, I see no objection to the early sanction of this section, and, even if but little progress be made, it may be an advantage to have alternative employment for anicut labor when the river is in fresh. In saying however there is no objection to the commencement of this section of the canal, I do not take into consideration the question of water supply. It is a very important one and it is touched upon in paragraph 3 of Colonel Cotton's letter of the 11th June last, where it is mentioned that of the 1,20,000 cubic yards of water per hour which this canal is calculated to carry "1,00,000 is supposed to be Toombuddra water and 20,000 occasional from the "Pennair in addition."

† Vide paragraphs 53, 54 and 55 of letter to Government No. 65, dated 5th August 1864.

Agent's letter No. 394, 14th June.

19. That at times some Toombuddra water will reach the Somaishweram anicut may be readily admitted, but I think it is certain that a regular supply of a quantity at all approximating

*Executive Engineer,
Nellore Division.*

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to 1,00,000 cubic yards per hour is out of the question, because, if the expenditure on the canal works north of the outfall into the Pennair at Adamapilly is to yield a fair return, it will be necessary to use all the Toombudda water for irrigation above that point. When sites for reservoirs have been found, the subject of the supply of the canal in the Nellore Division may be satisfactorily determined, but at present there is certainly no positive or reliable evidence that there will be the water, without which the proposed or necessary expenditure on a canal, of the dimensions and arrangements intended for that of the Nellore Division, cannot be remunerative.

No. 513. Endorsement of the Consulting Engineer for Irrigation and Canal Company, dated Madras, 19th September 1864, No. 100.
From Colonel H. C. COTTON, Chief Engineer, to F. H. HENSLOWE, Esq., Agent and Manager, dated Kurnool, 9th September 1864, No. 729.

SIR,
1. I have the honor to enclose copy of a letter from Mr. East, dated 3rd instant, showing the urgent necessity of sanction to the 1st Section works of the Nellore Division, and I beg to suggest a pressing request to the Consulting Engineer to obtain their sanction.
2. If the plans are not copied, a notification to Mr. East that any one particular work can be proceeded with on the plan furnished for sanction, would enable him to retain the skilled labor he has, while freshes disturb the anicut work. Our difficulty in procuring hands would render such an alternative as their discharge, a most serious loss to the Company.

From F. EAST, Esq., Executive Engineer, Nellore Division, to W. C. BEAUMONT, Esq., Assistant Officer in charge of Central Office, dated Nellore, 3rd September 1864, No. 486.

SIR,
The difficulty of keeping our skilled labor on our anicut works at a period of the year when river freshes of uncertain duration occur, shows more and more the importance of our having some other work besides that of the anicut to deal with. The Chief Engineer I am convinced appreciates this fully, and it may appear somewhat unnecessary for me to mention it. But I mention it simply to record a fact at the time of its occurrence. Had masonry works on the 1st Section been sanctioned, the bricklayers who are idle because of the fresh, and who may be idle again for the same reason, could have been employed, and if these works are not speedily sanctioned, I would submit to the Chief Engineer whether during a season of such uncertainty as to floods, and as to the employment of special labor, it may not be better to restrict operations to collecting and preparing materials.

(True Copy.)

(Signed) G. W. NEWMAN,
Manager, Chief Engineer's Office.

No. 1,214.

Copy forwarded to the Consulting Engineer, with the request that sanction may be at once obtained for the commencement of the whole or a portion of the works in the 1st Nellore Section.

MADRAS,
16th September 1864.

(Signed) F. H. HENSLOWE,
Agent and Manager.

Submitted for the consideration of Government, with reference to the letter No. 63, dated 12th August 1864, from this Office, forwarding for sanction the plans and estimates for the 1st Section of the canal in the Nellore Division.

(Signed) J. MULLINS, Captain, R. E.,
Cons. Engr. for I. & C. Company.

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22nd September 1864.

No. 514. ORDER THEREON, 22nd September 1864, No. 2,770.

The Government being of opinion, with reference to paragraph 4 of the Despatch from the Right Honorable the Secretary of State for India recorded above, that the Irrigation Company's guaranteed capital will not suffice for the completion of the works above Somaishweram, must withhold their sanction to the estimates submitted by the Consulting Engineer for the 1st Section of the Nellore Division of the Main Canal.

(True Extract.)

(Signed) J. H. M. SHAW STEWART, Major, R. E.,
Deputy Secretary to Government.

To the Consulting Engineer, Irrigation and Canal Company.
„ Agent for do. do.

Exd. T. O'Connor.

*Executive Engineer,
Nellore Division.*

N^o 729.

Madras Irrigation and Canal Co.
Chief Engineer's Office,
Kurnool, 9th September 1864.

V12

From,

Colonel. H. L. Cotton,
Chief Engineer,

To,

J. H. Henslow, Esquire,
Agent and Manager,
Madras.

Sir,

1. I have the honor to enclose copy of a letter from Mr. East dated 3rd instant shewing the urgent necessity of sanction to the 1st Section works of the Kallare Division, and I beg to suggest a pressing request to the Consulting Engineer to obtain their sanction.

2. If the plans are not copied, or notification to Mr. East that any one particular work can be proceeded with on the plan furnished for sanction, would enable him to retain the skilled labor he has, while fresher & disturb the Ancient work. Our difficulty in procuring hands would render such an alternative as their discharge a most serious loss to the Company.

I have &c.

(Signed) H. L. Cotton,
Chief Engineer.

N^o 186.

Madras Irrigation & C^o.
Kallare Division,
3rd September 1864.

From,

Frederick East, Esquire,
Executive Engineer,
Kallare Division.
To

H. C. Beaumont, Esquire,
Assistant Officer in charge
of Canal Office.

Sir,

The difficulty of keeping our skilled labor on our Ancient works at periods of the year when River
Fishes of uncertain duration occur, shows more and more
the importance of our having some other work besides that
of the Ancient to deal with. The Chief Engineer I
am convinced, appreciates this fully, and it may appear
somewhat unnecessary for me to mention it. But I
mention it simply to record a fact at the time of its
occurrence. Had masonry works on the 1st section
been sanctioned the Bricklayers who are idle because
of the Fish, and who may be idle again for the same
reason could have been employed, and if there were any
not speedily sanctioned, I would submit to the Chief
Engineer whether during a season of such uncertainty
as to floods, and as to the employment of special labor
it may not be better to restrict operations to collecting
and preparing materials.

I have the
honor to be, Sir,
Your obedient servant,

(True Copy)
Signed G. W. Newman

Manager
Chief Engineer's Office.

N^o 1211.

Copy forwarded to the Consulting Engineer
with the request that sanction may be at once

obtained for the commencement of the whole, or a
portion of the works in the 1st Alluvial Section.

Madras.

16 September 1866

(Signed) J. H. Kinslow

Agent and Manager.

(True Copy)

Captain R. E.
Consulting Engineer, S. & C. Co.

N^o 100.

Submitted for the consideration of Govern-
ment with reference to the letter N^o 69, dated 12th
August 1864, from this Office forwarding for sanc-
tion the Plans and Estimates for the 1st section
of the Canal in the Alluvial Division.

Caus. Eng. Office
Irrigation, S. & C. Co.
Madras 19 Sept 1866

Wm. Kinslow Captain R. E.
Consulting Engineer, S. & C. Co.

The Secretary to Government
Department of P. W.

Ed. M. S.

Consulting Engineer's Office
 Irrigation & Canal Company
 Madras, 12th August 1864.

X
13

N^o 69

To,
 Captain, J. Mullins, R.E.
 Consulting Engineer
 The Secretary to Government
 Department of Pub. Works.

1. I have the honor with reference to Proceedings of the Madras Government N^o 1058, 28 April 1863, to submit for the consideration of Government the plans, estimates and correspondence connected therewith as per margin for the 1st section of the Nellore Division of the Main Canal, the distance being 4 miles and 700 feet.

2. The principal dimensions of the canal as designed are,
 Mean width — 88 to 90 feet.
 Water surface — down 97 to 102.
 Depth — 6 feet.
 Fall per mile — 4 inches.
 Side slopes — 1 1/2 to 1 in cutting and 2 to 1 in embankment.

See Plans N^{os} 9 & 10.

Discharge 121,460 cubic yards per hour calculated from the cross section in embankment and 120,031 from that in cutting on round numbers 120,000 cubic yards per hour. — These calculations are made by Beardmore's formula, and the results are in species of those which would be obtained from Stoddard's tables which, with the above data, give 104,100 cubic yards per hour, as the discharge for the canal in embankment.

3. The estimates were first received from the Agent with that gentleman's letter N^o 2555 of the 9 April, but as some delay was necessarily occasioned by the absence of the requisite certificate from the Superintending Engineer of the 2^d Division, as to the non interference with the existing irrigation of the part of the Nellore District, through which the canal would

1. 1/2 mile plan
 2. 1/4 mile plan
 3. 1/8 mile plan
 4. 1/16 mile plan
 5. 1/32 mile plan
 6. 1/64 mile plan
 7. 1/128 mile plan
 8. 1/256 mile plan
 9. 1/512 mile plan
 10. 1/1024 mile plan
 11. 1/2048 mile plan
 12. 1/4096 mile plan
 13. 1/8192 mile plan
 14. 1/16384 mile plan
 15. 1/32768 mile plan
 16. 1/65536 mile plan
 17. 1/131072 mile plan
 18. 1/262144 mile plan
 19. 1/524288 mile plan
 20. 1/1048576 mile plan
 21. 1/2097152 mile plan
 22. 1/4194304 mile plan
 23. 1/8388608 mile plan
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 28. 1/268435456 mile plan
 29. 1/536870912 mile plan
 30. 1/1073741824 mile plan
 31. 1/2147483648 mile plan
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 33. 1/8589934592 mile plan
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would pass, the late Consulting Engineer availed himself of the opportunity to ask for additional information on certain points. This information was conveyed in the letter from the Executive Engineer of the Division, which accompanied the Agent's letter No. 78 of the 11 May last after carefully examining the plans and estimates it appeared to me that certain discrepancies required explanation, and some modifications seemed also desirable, and in my letter No. 43 of the 14 May, the papers were returned to the Agent for the reconsideration of the Chief Engineer. The estimates were resubmitted with the Agent's letter No. 394 of the 14 June, and the plans were received on the 4 July. As I was then on my way to Somasaram and the Bellare Division I took advantage of the opportunity to go over the ground and inspect the places where the more important works are intended to be constructed.

4. With regard to the Superintending Engineer's Certificate, alluded to above, it will be seen that Colonel Anderson in para 3 of his letter, which was transmitted to this Office with the Agent's endorsement No. 2665 of the 27 April last, supposes that whatever part of the Agent of the Kullur tank may be intercepted by the Canal will be watered by the latter. This is the case in the 4 mile, but not in the 2nd. It is true that the extent of land intercepted is very small, and that the greater portion of the area will be taken up under class B to form the canal embankments but in the first place class B land may again be brought under cultivation, and besides this the remainder of the land, however small in extent, must be considered and dealt with in some definite manner. I asked what the intended arrangements were, but the only information given is that contained in para. 11 of Mr. East's letter No. 156 of the 6 June, and he has regarded merely the question as to whether the land is rich enough to make it financially advantageous to the canal to water it, and that is only a very minor consideration in a case of this kind. There are 3 ways of getting over the difficulty, and provided it is not over, it is of no consequence in which way this is effected.

Not also para 52 of my letter No. 65 of the 5 Aug/64.

Para. 12 of letter No. 153-16 May.

Enclosure of Agent's letter No. 394.

* No. 690 para 6

* Estimated cost Rs. 820.

1st by a slight diversion of the line so as to make the class A land reach to the margin of the wet cultivation; 2nd by constructing a sluice in the canal bank, and giving the land a canal water; 3rd by passing Kullur tank water under the canal by a culvert.

5. As originally forwarded by the Chief Engineer the estimates provided for making the banks above the Somasaram Ament 3 feet above the ~~margin~~ level of the highest flood, and the left or river bank of the canal below the Ament 2 feet above that level. The narrowness of this margin was noticed by General Sudlow, and again, in para. 3 of my letter No. 43, I suggested the advisability of raising the banks of the headworks to 6 feet above that flood, and the left bank below the Ament to 5 feet above the same level. I also recommended, or intended to recommend for my meaning was mistaken, the raising of the earthworks above Ament to the level of the flood at least, and provision has been made for this by the Chief Engineer, but in addition to this, under the misapprehension just noticed, a revetment was entered in the estimates for the entire outer face of the left bank down to the end of the section, the cost being estimated at Rs. 85279-12-0. This revetment indeed, had it been necessary at all, would not have been needed above the level of the highest flood, nor would it have been needful to make it one yard thick from bottom to top, added to which the rate Rs. 100-1-6 entered for it is higher than is requisite, and altogether probably a very efficient protection could, I estimate, have been provided for 30000 Rupees, but general re-setting is quite unnecessary and as the item was entered at my suggestion, I have withdrawn it merely leaving a small sum of Rs. 800 for any small works of this description, which it may seem advisable, during the construction of the canal works, to add.

6. The estimates, as revised by the Chief Engineer and modified in this office, provide for the following works.

works.

- | | |
|---|-----------------|
| Navigation head. | Estimated cost. |
| 1. Called in estimate Emulation canal. | Rs. 1730. |
| 2. Head lock. | Rs. 14,350 |
| 3. Raising head works. | 820. |
| 4. Wing wall stepping up bank south side. | 216 |
| 5. Retaining walls between lock and head sluice. | 2265 |
| 6. Retaining wall east side head sluice. | 6613 |
| 7. Seaming sluice including addition to rings. | 2428 |
| 8. Bridge of 3 arches. | 6613 |
| 9. 2 Irrigating sluices. | 280 |
| 10. Aqueduct for Kalavay Tank surplus. | 23,400. |
| 11. Earthworks. | 50,650 |
| 12. Raising bank below ament with allowance for pitching. | 4900 |
| Total Rs. 1,14,255. | |

7. Items 1, 2, 3 and 5, and probably 4 also, for I do not clearly understand what that item is, provides for the navigation head with its lock, and for the defences of the bank between this head and the head sluice, including the formation of those banks to 6 feet above the highest flood level, and their revetment with dry stone, where not protected by masonry walls.

It is probable that no wells will be used for the foundations of the masonry works included in those items, as either rock or hard soil will, it is anticipated, be met with everywhere. For item 2, the lock, wells are provided in the estimate and shown in the plan. For the other walls, item 5, the wells appear only in the drawings.

In constructing the lock it will be better to make the outfall of the culvert in or nearly in line with the canal, instead of at right angles thereto, as shown in the plan. Laterite is allowed for the grain stones. The material is hardly good enough for the purpose, and it cannot be obtained except from a long distance, which raises the rate to about six times its cost at Kellore. It would be better to use Kalavay stone or quartz.

The plans numbered 1 and 2 refer to these works.

8. This intended to build the side walls of the lock with rubble stone in chunam. It is possible that the quantity of

vide para. 4 of my letter No. 153.
9 para. 5 of Mr. Easton's letter No. 156.

of a suitable description, required for a facing may be picked out of the quarries, but the stone obtained from the quarries is not generally adapted for masonry and I think brickwork will have to be substituted in those parts of the walls which are not exposed.

9. Item 6 provides for the retaining or dividing wall between the head sluice and the under sluices. The arrangement is shown in plans No. 3 and 4, in dark red. This latter plan I obtained from the Executive Engineer of the Division, as I found the side of the head sluice had been altered, and there was no plan in this office which gave any idea of the relative positions of the works. 32 wells are provided in the estimate for a part of the foundations of this wall. The soil is generally however too hard or rocky to allow of their being put down, so probably solid foundations will, in most places, be substituted. Brick masonry is to be used in this wall.

Plan No. 5.

My letter No. 153 para. 7.
Mr. Easton's letter No. 156 para. 6.

10. The seaming sluice, item 7, appeared some, as originally designed, to be extremely insecure at the outer or river end. The addition made upon my suggestion by the Chief Engineer was some pitching at an estimated cost of Rupees 35 and this which was, by mistake, placed in a wrong position on the plan, is still not enough, and the masonry wings shown in the trace attached to the plan have therefore been added and Rupees 110 allowed for them in the estimate. It would be better were they longer but to make them so would involve considerable modifications of the Chief Engineer's design. It will be seen that the wings on the canal side, where the action will be very small and the current slight, are of simple dimensions, while on the lower side no protection had been given. The arrangement for the shutters on the canal side is defective; there is nothing to prevent the shutters being forced out of their place when the water in the river is higher than in the canal. It will also be better to lay down for a width of 8 or 10 feet, on the upper side of the sluice, a masonry flooring, to prevent the eddies, which are always present in front of sluice shutters, undermining the front retaining wall. I overlooked this when the plan was first examined.

In the estimate rubble stone masonry is entered for the bulk of the work. As already remarked it will be difficult to find suitable stone.

11. The bridge item, 8, calls for no remarks, except that

It will probably be found advisable to substitute brick for the most part for rubble stone. The angles of the cutwaters and their junctions with the piers may perhaps with advantage be faced with either Kalavay stone, or gneiss from the north side of the river, but these stones will be costly and their use must therefore be limited to the parts particularly liable to damage.

12. Two irrigation sluices are included in item 11. This will probably be built in the 2nd mile for the land referred to in para 14 above, but otherwise these works will be sufficient for the limited extent of land available.

13. The aqueduct item 10 for the Kalavay tank, earthen plus, is the principal masonry work of the section. It has been carefully designed, and as will be seen from the cross section of the surplus channel, the water way is sufficient. The water way of the canal is contracted at the aqueduct to 45.6, which is ^{just} over half the mean width of the canal in this section. It will be seen that the span-drill cells or compartments are not arched, and that they are to be filled with sand. There is risk, I think, of the flat masonry coverings of these cells giving, and in that case the pressure of a head of about 13 feet of water would be brought to bear on the arch, and this might lead to damage. Either the cells should be arched in or the spaces filled with a water tight material. The unprotected edge of the towing path, which was without parapet or railing, was noticed by me, and low thin parapets have consequently been added. These seem somewhat deficient both in substance and height. The masonry will be brick in chimney.

14. The remaining items 11 and 12 provide for all the earthworks below the head sluice; the average rate allowed is 1-4, which I think will be sufficient. The quantities of the two items do not comprehensively the work to be done of each description, but the two together make up very nearly the total work to be done.

15. Some slight modification of the land plan 11 will be needed in laying out the work, as the changes of direction must

Plan 11

Plan 10

attached to letter from Ag. Manager 9th 1854 of 12 May 1854.

Letter no 43 para 8

accompanying to Agents letter 11.3.94 of the 11th Dec 1854

See paras 53. 54 & 55 of letter to Lt. 11.6.5 of 5 August 1854

Agent's letter 11.3.94 of the 11th Dec 1854

must be made by curves and not by straight lines. 5X 16. It will have been observed that no mention has been made of an estimate for a head sluice, and a design and estimate for this work has still to be furnished, from para one of the Chief Engineer's letter 11.6.5 of the 11th Dec 1854.

Item 64 it will be seen that the item on this account has been withdrawn, and I hope the sluice will be revised so as to carry the railway to the ancient. I wrote on the 14 August 1854 to the Agent asking him to request the Chief Engineer to forward the head sluice Plan and Estimate as soon as possible.

17. Communication across the canal will be kept up by means of the bridge in the 2nd mile and the aqueduct at the beginning of the 5th mile and these means will I think be likely to prove sufficient.

18. This section of the canal is an extremely short one, and there would not have been any difficulty, I think, in extending it to about the end of the 10th mile. I do not know what the Chief Engineer's object may have been in terminating the section as he has done, but perhaps he wished to place it under the supervision of the Resident Engineer in charge of the ancient. The works as designed will suit what other arrangements may be decided upon for the line beyond the 10th mile, and though I think for the present the ancient works will absorb all the labor likely to be obtainable in the neighborhood of Comaivaram, I see no objection to the early execution of this section, and even if but little progress be made, it may be an advantage to have alternative employment for ancient labor when the river is in fresh. In saying however there is no objection to the commencement of this section of the canal, I do not take into consideration the question of water supply. This is a very important one and it is touched upon in para 3 of Colonel Cotton's letter of the 11th June last, where it is mentioned that of the 120,000 cubic yards of water per hour which this canal is calculated to carry 100,000 is supposed to be Coombuddra water and 20,000 occasional from the Tennair in addition.

19. That at times some Coombuddra water will reach the Somavaram

Somaiwarum Amient may be readily admitted, but I think it is certain that a regular supply of a quantity at all approximating to 100,000 cubic yards per hour is out of the question, because, if the expenditure on the canal works north of the outfall into the Pennair at Adamapilly is to yield a fair return, it will be necessary to use all the Coombudra water for irrigation above that point. When sites for reservoirs have been found the subject of the supply of the canal in the Tellore Division may be satisfactorily determined, but at present there is certainly no positive or reliable evidence that there will be the water without which the proposed or necessary expenditure on a canal, of the dimensions and arrangements intended for that of the Tellore Division, cannot be remunerative.

I have the honor to be,
 Sir,
 Your most obedient servant,
 Whilhelms Captain,
 Secy. Eng. for S. C. Company.

No. 28 of 1864
 Official
 Copy to the Secy. of the S. C. Co. of 1864.

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Proceedings of the Madras Government.
 Under date the 22nd Sept/64
 Read the following Despatch
 from the Secy of State

Offering their remarks on
 certain despatches relative to
 the affairs of the Madras & C. Co.
 Submitting for sanction Plans
 & Estimates for the 1st section of the
 Nallur Div. of the main Canal
 1864
 1864
 1864
 Submit for the consideration
 of Govt. copy of the Eng. letter
 No 729 of 9 Sept/64 &c &c

The Govt. being of
 opinion, with reference
 to para 4 of the Despatch
 from the Right Honble
 the Secretary of State
 for India recorded above,
 that the Irrigation
 Company's guaranteed
 capital will not suffice
 for the works above
 Somaiwarum, that

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must withhold their
sanction to the estimates
submitted by the Comf.
Engineer for the 1st section
of the Yellow Cr. of
the Main Canal

M.

Congress I & C with
Agent - do ✓

7th 1864, Depts
Proc. of Govt for Sept

No 2769
Proc. of the Algon
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Memo from the Supy
Engineer 4th Division Submitting
with his remarks, letter from the
Resident Engineer Indian Territory
& forwarding tracings of Station
arrangements at Arcum &
Fresh and Little Conjowam
together with schedules, showing
the quantity of land required by
the Company.

No 509. 570