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G.O.No. 2688 W

dt. 24.10.1893

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers:—

G.O., dated 29th August 1889, No. 1092 M., Mis.
" " 30th April 1890, " 674 M., Mis.
" " 21st October " " 1575 M.
" " 14th November " " 813, Financial.
" " 1st December " " 700 I.

G.O., dated 29th January 1892, Mis. No. 194 M., Local and Municipal.

Read—the following paper:—

From the Collector of Kistna, dated 29th December 1891, No. 9205.

I have the honour to request the sanction of Government to the following proposals for completing the arrangements for extended canal navigation and business facilities in the town of Bezvada. The plan and estimates have been prepared by the Superintending Engineer, and advantage was taken of the recent visit of the Chief Engineer for Irrigation, Mr. Walch, to write his inspection of the localities and a discussion of the whole matter, and I believe I am correct in saying that all the proposals meet with his entire approval.

2. In G.O., No. 700 I., Public Works, dated 1st December 1890, the rebuilding of the regulating sluices of Ryves' canal at a spot three-quarters of a mile from the canal head was sanctioned among other things and this work has been completed, thus throwing open a new stretch of canal to boat traffic.

3. It is found, however, that the present bridge at the head of Ryves' canal is too low to allow full-sized boats to pass under and it is therefore necessary to increase the headway. Moreover, the bridge does not allow of tow-paths for boats passing below, and this with the strong current there running is a serious drawback to navigation. The raising of the bridge will allow both the foregoing defects to be rectified and will improve the roadway for wheeled traffic by allowing an increase of width and by reducing the declivity of the approach at either end. The estimated cost of this alteration is Rs. 8,500, which it is proposed to meet out of the Canal and Ferry fund about to be transferred to the District Board.

4. The East Coast Railway runs from the Kistna bridge across the main canal into Bezváda, a few yards from the bridge at the head of the Ellore canal, and the line of the bridge strikes the lines of the railway at an awkward angle. The roadway of the bridge is too narrow even now for the traffic across it, and the double curve made by this bridge, that over Ryves' canal and the railway crossing, will form a serious impediment to the traffic which will be blocked from time to time by the passing of trains. Moreover, the waterway of the bridge allows of only one tow-path on the western side, while another tow-path on the eastern side is required to allow boats to get round into Ryves' canal. It is therefore desirable to rebuild the bridge

at the head of the Ellore canal and thus rectify the existing defects once for all and provide for the requirements of wheeled traffic as well as of boats. A reference to the plan will show the great improvement that will be effected.

5. The cost of the new bridge over the Ellore canal is estimated at Rs. 13,500. It is proposed, with the sanction of Government, to provide this amount by transfer of the sum of Rs. 13,680 provided in the anicut project for a bridge over the Lazzabanda drain in the Masulipatam taluk. There is at present no need for a bridge over this drain in any way comparable with the requirements at Bezváda, and the District Board has therefore resolved to request the sanction of Government to the transfer and to forego all claim to a bridge being erected by Government out of anicut funds over the Lazzabanda drain. The resolution of the District Board on the subject is enclosed.

6. The projecting spits of land at the head of Ryves' canal must, to allow of free navigation, be rounded off at a cost of Rs. 1,500.

7. One more important work remains to be provided for. This is the cutting down and levelling of the spoil banks on both sides of Ryves' canal and on the east side of the Ellore canal. At present the lands, which should be rendered accessible for business purposes and for residence by the newly made facility for navigation, remain inaccessible owing to the high spoil banks that lie alongside the canals, and the removal of these banks is essential to complete the improvements in view. The work will cost Rs. 23,959 according to the Superintending Engineer's estimates enclosed.

8. The land on which the spoil banks stand is the property of Government. The land over which it is proposed to spread the earth belongs (1) as regards the right bank of the Ellore and the left bank of the Ryves' canal to the Municipality which is selling the bulk of it to the Court of Wards, and (2) as regards the right bank of Ryves' canal to private purchasers who have consented to have their sites raised by the deposit of earth and to raise the basements of their houses to correspond.

9. It is needless for me to repeat the reasons arising from the exceptional position of Bezváda which render necessary the various improvements already laid before and approved by Government. They apply with equal force to the proposals which form the subject of this letter and which have met with the concurrence of the Chief Engineer for Irrigation after personal investigation. I beg leave therefore to request that Government will be pleased to express its approval of the schemes now laid before it and to make provision for the amounts noted in the two preceding paragraphs, viz., Rs. 1,500 for rounding off the head between the canals and Rs. 23,959 for levelling the spoil banks, or Rs. 25,459 in all, out of Provincial funds. These large earthworks will provide for unskilled labour abundant occupation, which is specially needed owing to the unfavorable season.

10. Copies of the Superintending Engineer's letters, with his plans and estimates in original, are enclosed.

Order—dated 29th January 1892, Mis. No. 194 M., Local and Municipal.

The proposed raising of the Ryves' canal bridge, the construction of a new bridge over the Ellore canal and rounding of the angle between the two canals meet with the approval of Government. Before, however, finally sanctioning these projects, the Public Works Department (Irrigation Branch) will be requested to state whether there is any objection to the substitution of the proposed bridge for that over the Lazzabanda drain.

2. The request for a grant, preferred in para. 9 of the Collector's letter, cannot, in the present state of the provincial finances, be considered.

(True Extract.)

(Signed) J. F. PRICE,
Chief Secretary.

2588/2

G.O., dated 20th February 1892, Mis. No. 350 M., Local and Municipal.

Read—the following paper:—

From the Public Works Department, dated 10th February 1892, No. 682 C.

Abstract.—Retransferring G.O., dated 29th January 1892, No. 194 M., passing orders on the proposal for extending canal navigation in the Bezváda Municipality.

Order—dated 20th February 1892, Mis. No. 350 M., Local and Municipal.

Communicated to the Collector of Kistna, the projects referred to in para. 1 of G.O., dated 29th January 1892, No. 194 M., being sanctioned.

(True Extract.)

(Signed) J. F. PRICE,
Chief Secretary.

From A. T. ARUNDEL, Esq., Collector of Kistna, to the Chief Secretary to Government, dated Masulipatam, 12th May 1892, No. 3886.

With reference to G Os., Mis. Nos. 194 and 350 M., dated 29th January and 20th February 1892, sanctioning certain proposals for the improvement of communication and navigation in Bezváda and deferring the grant of an allotment for removing certain spoil banks of the canals owing to the present state of the Provincial finances, I have the honour to request that Government will consider the propriety of debiting the charge in question to the Kistna anicut project and that it will, at the same time, enforce its orders by requiring definite and effectual measures to be taken for the removal of all future silt from the canals either to the river or to some place where it will not be a nuisance to the town.

2. With regard to the first point, it should, I think, be recognized that the deposit of the spoil banks beside the canals and their gradual increase by the annual clearance of silt from the canals must be regulated by public needs and requirements. For many years past no silt has been deposited on the north bank of the main canal because it is a public wharf and road. The extra charge in this case is debited to the anicut project. The spoil banks have now become an obstruction and a nuisance and I would urge that the cost of levelling them down, estimated to cost about Rs. 24,000, be debited to the project. The work is of vital importance to the development of those plans for the improvement of Bezváda which have received the approval of Government, and its postponement will be a permanent mischief to the town. There has been a saving of many lakhs of rupees in the execution of the Kistna anicut project thus far; the rejection of the extension of the East bank canal in favour of extended irrigation elsewhere has alone effected a saving of several lakhs, and there is thus no difficulty as to funds and no apprehension that the cost of removing the spoil banks will reduce the amount available for any other proposed or anticipated work.

3. Secondly, I beg that complete arrangements with suitable mechanical contrivances may be made without delay to remove all future deposits of silt in the canals to a suitable distance. The annual cost of this work has already been sanctioned in G.O., No. 700 I., Public Works, dated 1st December 1890, but I regret to say that the work thus approved by Government is not being efficiently performed. Last year the canal silt was deposited on the spoil banks as usual. This year the same arrangement was proposed, and it was only upon my official and personal solicitations that the Superintending Engineer ordered the silt from a portion of Ryves' canal above the new regulator to be removed to the river. For about two-thirds of the reach in Ryves' canal and for the whole of the reach in the Ellore canal the silt is being thrown on the spoil banks as before. I must admit that I have sympathized with Mr. Hannan's reluctance to remove the whole of the silt to the required distance by ordinary cooly labour owing to the great cost of this method, but this is the second year since Government ordered the work to be done, and the adoption of proper

mechanism either by dredges and lifts or by a light line of railway ought no longer to be delayed. I beg leave therefore to request orders that another season be not allowed to pass without the completion of all necessary arrangements to carry out the work which Government has approved.

No. 585.

Transferred to the Public Works Department (Irrigation Branch).

Fort St. George,
23rd May 1892.

(Signed) D. COWIE,
Ag. Asst. Secretary.

No. 119 I.

Note by the Chief Engineer for Irrigation.

In the orders of Government quoted and printed above, certain works for improvement of the new portion of the town of Bezváda, known as "Buckinghampetta," were approved and funds provided for execution of some of them.

2. In dealing with the various proposals, I have consistently objected to any of the cost being charged against "Irrigation;" one of the proposals is to level down the spoil banks along the portion of the "Ryves' canal," on either side of which the new petta has been laid out. These banks are composed chiefly of the earth taken out when the canal was dug some 30 years ago, but they have from time to time been added to by silt clearances and this was unobjectionable under the old state of affairs. When the head of the canal was last year widened to suit the new arrangements, 66,925 cubic yards of spoil were thrown on the rear slopes of the banks in accordance with the provisions in the estimate, of which the Collector was, it is believed, well aware.

3. In his letter No. 9205, dated 29th December 1891, printed above with Proceedings of the Madras Government, No. 194 M., dated 29th January 1892, the Collector himself recommends that the cost of levelling down these banks, in order to improve the value of the building sites at the back of them and in order to allow of the free circulation of air in the new petta, shall be met from "Provincial funds," but in the letter now under consideration he asks that the cost may be debited "to the Kistna anicut project;" against such a course I would strongly protest; as already said in one of my "notes"* on the subject, this work and the others connected with it "are undertaken solely in the interests of the town, sanitary and mercantile," and it would be inequitable to weight the Kistna delta system with a charge which in nowise appertains to it.

Estimate Rs. 23,959.

* No. 68 to the Examiner.

4. The Collector bases his request chiefly on the grounds that there will probably be a large saving on the sanctioned estimate for the Kistna delta system; whether there would be a saving or not does not, it appears to me, materially affect the question, but I may say that I do not believe that there will be any such large saving as the Collector imagines; the drainages are costing much more than was anticipated; only quite recently revised estimates for the Peddalanka and Tungabhadra drains and their affluents have been sanctioned† with an excess of Rs. 1,04,385 over the originally estimated cost, and it is not improbable that the provision of apparatus adequate to deal with the ever increasing difficulty of disposal of silt clearances will absorb any savings that may be made by securing the ultimate area to be irrigated in a more economical way than originally proposed.

† See Proceedings of the Madras Government, No. 546 I., dated 18th June 1892, and No. 447 I. of 9th May 1892.

2696/3

5. With reference to para. 3 of the Collector's letter, it is true that it has not been found possible to carry out the intention of removing to a distance the whole of the silt clearances of this portion of the *Ryves' canal* during the last two years and that a portion has been added to the existing spoil banks; but the quantity so added is comparatively small, only about 5,000 cubic yards; a further quantity of 4,539 cubic yards was temporarily deposited on the canal berms and is now being boated away and thrown into the river.

6. The disposal of the silt clearances from the heads of all the large canals is a difficult matter to deal with; it has been recognized that the simple and inexpensive method of digging them out during the closure of canals and adding them to the banks, which has hitherto obtained, cannot be much longer continued, and it is proposed in the Eastern delta to dredge them into punts and then lift them from the punts by means of "elevators" which will discharge them over the river bank into the river; this will require costly machinery and I am now in correspondence with the Director-General of Stores, India office, on the subject preparatory to making proposals to Government.

7. In the meantime the Superintending Engineer will be instructed to make every possible effort to have the whole of future silt clearances of the head of the Ryves' canal removed to a distance by the appliances now at his disposal, the "extra cost" of the clearances rendered necessary by the new arrangements being "borne by Provincial Funds" (see G.O., No. 813, dated 14th November 1890, Financial).

CHEPÁK,
4th July 1892.

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

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 12th August 1892, No. 685 I., Public Works.

His Excellency the Governor in Council cannot accede to the Collector's request to charge the Kistna delta system under "Imperial," "49. Capital Expenditure," with the cost of levelling down the spoil banks of the head of "Ryves' canal."

2. The portion of the order of 14th November 1890, No. 813, Financial, with regard to the recurring outlay "for the *extra* cost of removing silt from the head of the Ryves' canal," was, however, issued under a misapprehension, and instead of such outlay being borne by "Provincial funds" as laid down in that order, the *whole* cost of the silt clearance will be charged to the Kistna system under "42. Major Works, Working expenses;" this ruling will have retrospective effect, and any sums not charged in accordance with it will be adjusted in the current year's accounts.

3. The deposit of silt clearances on the canal banks within the limits of the town of Bezváda must cease at whatever cost, and the Superintending Engineer will, with as little delay as possible, remove the silt clearances referred to in para. 5 of the note of the Chief Engineer for Irrigation.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.
" Local and Municipal Department.

Exd. C. A. Munisawmy.
Spare Copies

IRRIGATION.

Govt. of {1892} Madras.

PUBLIC WORKS.

Dated August, 12th.

Read.

Encl.

G.O., 12th Aug. 1892, No. 685 I.

AUGUST.

Ryves' Canal

Stating, with remarks, that the Government cannot accede to the request of the Collector of Kistna to charge the Kistna delta system with the cost of levelling down the spoil banks of the head of — in connection with the proposed improvements in Bezvada.

7TH APRIL 1893, No. 304 I., PUBLIC WORKS.

2688/2

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers:—

From J. W. MARTIN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezvada, 23rd January 1893, No. 2547 K.S.

I have the honour to forward herewith, for your approval and sanction of Government, an estimate, amounting to Rs. 11,300, for constructing a wharf wall on the left bank of Ellore canal, 39 miles 6 furlongs, opposite to the Railway station at Ellore, which appears to have been prepared at the request of the Railway authorities.

2. This is one of the stations at which a wharf was already proposed to be constructed. Please see paragraph 3 of your memo. No. II/147 K.S. of the 14th November 1890. The general question of providing wharves will be taken up by and bye.

3. The enclosed estimate is classed under Capital; but in your memo. referred to in the previous paragraph, it was proposed to build such wharves as may be necessary from Provincial funds.

ENCLOSURE.

REPORT to accompany the estimate and plan for constructing a wharf wall in the left bank of the Ellore canal at 39 miles 6 furlongs.

	Rs.
Amount of estimate	11,300

It is proposed to build a wharf wall 1,200 feet long on the left bank of the Ellore canal at 39 miles 6 furlongs opposite the Ellore Railway station.

The estimate provides for widening 1,200 running feet of the canal 35 feet and constructing a wharf wall of rough stone in mortar and of the dimensions shown in the accompanying drawing. The wall will be built on concrete foundations of broken stone in mortar, and have a cut stone coping of red Pedavegi stone 9 inches in depth. The estimate also provides for revetting the bank at the ends of the wharf wall, gravelling 1 foot in depth to the platform, and putting up stone mooring posts set in concrete at 100 feet intervals. Rs. 100 are also provided for baling during the progress of the work if found necessary.

The length of the wall has been settled in consultation with the East Coast Railway authorities.

3rd December 1892. (Signed) W. JOPP,
Ex. Engr., Kistna Eastern Division.

Office-note to the Joint Secretary to Government, Public Works Department, Railway Branch, dated 2nd February 1893, No. 24.

The plan and estimate for constructing a wharf wall on the left bank of the Ellore canal at 39 miles 6 furlongs received with the accompanying letter No. 2547 K.S., dated 23rd January 1893, from the Superintending Engineer, II Circle, are forwarded for favour of your counter-initials, in token of approval.

From the Engineer-in-Chief, East Coast Railway, to the Joint Secretary to Government, Public Works Department, Railway Branch, dated Waltair, the 21st February 1893, No. 1027/18.

I approve of the proposed wharf wall at Ellore, as shown in the drawings herewith returned, which accompanied your No. 592 C., dated 9th February 1893. The wharf will be extremely useful. I think, however, that one or two flights of narrow steps would do no harm, but of that the Canal authorities are the best judges.

Office-note from the Joint Secretary to Government, Public Works Department, Railway Branch, to the Chief Engineer for Irrigation, dated Madras, 2nd March 1893, No. 972 C.

The papers received for my counter-initials with your office-note No. 24, dated 2nd February 1893, are returned with the remark that the Engineer-in-Chief, East Coast Railway, to whom they were forwarded, considers the plans suitable, and that the work will prove extremely useful. He adds that one or two flights of narrow steps would do no harm; but of that the Canal authorities are the best judges.

No. 49 I.

Submitted to Government. The construction of the wharf wall on the left bank of Ellore canal at 39 miles 6 furlongs is recommended for sanction from the balance of the provision for unforeseen works of the Kistna Delta system as it is apparently undesirable to defer its execution until the question of constructing such wharves from Provincial funds is settled. The submission of the information called for in this office memo. No. II/147 K.S., dated 14th November 1890, to enable this question to be settled should be expedited by the Superintending Engineer, II Circle.

CHEPAK,
21st March 1893.

(Signed) F. W. ASHPITEL,
for Ag. Chief Engr. for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 7th April 1893, No. 304 I., Public Works.

The following estimate, amounting to Rs. 11,300, is sanctioned from the balance of the lump sum provision available for unforeseen works of the Kistna Delta system, which will then be reduced to Rs. 33,917:—

Capital Expenditure not charged to Revenue.
49. Irrigation.
Kistna Delta system.
Eastern Section.
I. Works.
Ellore Canal.
(2) Main Canals and Branches.
9. Navigation works.

	Rs.
Constructing a wharf wall on the left bank, 39 miles 6 furlongs, estimate	11,300

2698/5

2. This sanction is registered as No. 2 I. of 1893-94.

3. The attention of the Superintending Engineer, II Circle, is invited to the concluding portion of the foregoing endorsement of the Acting Chief Engineer for Irrigation.

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Lt.-Col., R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Consulting Engineer for Railways.
" Superintending Engineer, II Circle, with plans and estimate (5).
" Examiner, Public Works Accounts.
" Revenue Department.
Editors' table.

Exd. A. Grubert.
Spare Copies

IRRIGATION.
ACCOUNT.

Govt. of {1893} Madras.

PUBLIC WORKS.

Dated April, 7th.

Read. *Encl.*

G.O., 7th April 1893, No. 304 I..

APRIL.

Ellore Canal

Estimate of Rs. 11,300 for constructing a wharf wall on the left bank of the — at 39 miles 6 furlongs, Kistna Delta system, sanctioned with remarks.

2688/6

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From J. W. MARTIN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezwada, 6th October 1892, No. 1663 K.S.

Adverting to G.O., dated 12th August 1892, No. 685 I., in the matter of the disposal of the silt clearances from the canals within the municipal limits of Bezwada town, I have the honour to explain that there is no special difficulty about depositing in the Kistna river bed the silt removed from the Main and Masulipatam canals. In actual practice hardly any silt is removed from the Main canal, but the little that is removed can be temporarily placed on the right bank and subsequently removed by coolies into the river after the re-opening of the canals; and this plan can also be adopted as regards the Masulipatam canal, as there is an ample berm on the right side, on which the silt can be temporarily placed pending its final removal to the river bed by coolies after the re-opening of the canals.

2. In regard to the silt clearances from Ryves' and Ellore canals, there is a difficulty inasmuch as there is no suitable place conveniently near the canals on which the silt can be deposited, except the bed of the Kistna river; but taking the silt to the river involves carrying it a long distance and crossing the Masulipatam canal, so it is not practicable to remove the silt by manual labour only to the river during the time (about 3 months) the canals are closed each year; and to temporarily place it on the banks and afterwards remove it on boats to the river is almost impracticable for this would take a long time to do on account of it being necessary to haul the boats through the Main canal in which there is a strong current and the further difficulty of passing boats into the river during floods. Moreover we have not got a sufficient number of boats to carry the silt to the river and take materials, &c., to the works in progress in the Eastern and Western deltas. In these circumstances, I think special plant must be provided for the disposal of the silt clearances from Ryves' and Ellore canals, and what I recommend is a light tramway, by means of which the silt can be carried directly to the river over the flood bank as soon as it is removed from the canals.

3. I am forwarding a survey showing the position and length within municipal limits of Main, Ryves', Ellore and Masulipatam canals. What I propose is at a short distance below the railway bridge to make an incline to the river over the flood bank. An incline of 1 in 30 can be easily made by cutting the flood bank, which at present is unnecessarily high, as it is partly a spoil bank, down to + 70·00, which is 22·75 feet above crest of anicut. The silt can be easily taken over this incline by means of a tramway. The tramway should, I think, be 2′ 6″ gauge, rails [illegible] lb. per yard run, capacity of wagon $\frac{3}{4}$ cubic yard, and light sleepers made of steel should be used. A tramway of this description can be easily and expeditiously removed from place to place according to requirements, so I think a line sufficient to remove the silt from only one canal at a time will be sufficient. On the incline there must be a double line, one for the full wagons and one for the empty ones, but along the bed of the canal one line with sidings at intervals will be sufficient.

About moving the wagons, they can be pushed along the canal by coolies; but going up the incline I think bullocks must be employed to pull the wagons, but this will not lead to much expense.

4. The accounts show that about 500,000 cubic feet of silt is the total quantity removed each year from Ryves' and Ellore canals within municipal limits during the closure of the canals. To remove the whole of this quantity to the river within 3 months, the time the canals are usually closed, I think the total length of the tramway, including sidings and the double line up the incline, must be about two miles and that there must be 40 wagons. The cost of a tramway of this length and 40 wagons at rates furnished by Messrs. Richardson and Cruddas, Bombay, is as follows:—

	Rs.
2 miles of tramway 2' 6" gauge, rails 10 lb. per yard run and steel sleepers complete	9,000
40 wagons, capacity ¾ cubic yard	6,000
Total ...	15,000

I think the cost of excavating the silt and taking it by means of the tramway direct to the river will be about 2 annas and 6 pies per cubic yard.

5. The tramway will, of course, last for many years, as at the close of each working season it can all be taken up including the steel sleepers and be stored in a place of safety until it is again required; but should any special earthwork involving long lead require to be carried out when the tramway is not required for the canals, it will be most useful, and, I believe, it may often be used with advantage in the quarries removing quarry rubbish.

6. I am forwarding a report prepared under my instructions by the Assistant Engineer in charge of the Head Quarter sub-division of the Kistna Eastern division exhibiting all the data required to form an opinion as to whether a tramway will answer, &c., from which you will see how the particulars given above have been arrived at.

7. I notice that in the correspondence printed with the Government Order under reference "elevators" are suggested as suitable for removing the silt from the canals. I think, however, that an "elevator" cannot be more suitable for the work than a tramway, as excavating under water is always troublesome, expensive and unsatisfactory.

ENCLOSURE.

REPORT on the method proposed to be adopted for clearing the silt collected in the heads of canals within municipal limits, Bezwada.

1. In G.O., No. 685 I., dated 12th August 1892, it is laid down in para. 3 that "the deposit of silt clearances on the canal banks within the limits of the town of Bezwada must cease at whatever cost" and this report is drawn up with the object of pointing out the most suitable way of disposing of the silt.

2. *Quantity of silt to be disposed of.*—The quantities of silt removed from the beds of the canals during the closure in the years 1891-92 and 1892-93 are given in the table below:—

Name of canal.	Year.	Quantity.	Rate.	Amount.	Length of canal cleared.	Remarks.
			Rs. A. P.	Rs. A. P.	M. F.	
1. Main canal ..	1892-93.	111,714	8 1 6	904 0 0	0 1	All cleared below railway bridge.
2. Ellore ,, ..	Do.	110,991	7 11 6	736 7 1	1 2	
			5 9 6			
3. Ryves' ,, ..	1891-92. / 1892-93.	371,497	..	1,552 13 0	1 0	Includes silt cleared in February 1892.
4. Masulipatam canal ..	1892-93.	488,642	..	3,085 15 9	1 3	

2688/7

It should be noted that these quantities only represent the silt cleared after the closure of the canals. Besides this extensive dredging operations were done from October to January, but as this is done more or less every year it is not thought necessary on this account to make any addition to the quantity to be cleared. Moreover a considerable quantity of the silt dredged from Ellore canal and Bandur canal within municipal limits was, owing to the want of sufficient boats to convey it away, again deposited at the head of Ryves' canal and this has swelled out the quantity cleared in Ryves' canal, so that a reduction in the quantity to be cleared from this canal of the odd 71,497 is necessary and more accurate figures are not available. The total quantity of silt then to be removed from the head of all canals within the limits of the municipality is 1,080,844 — 71,497 = 1,009,347 cubic feet.

3. *Proposals as to disposal of silt.*—We have now to consider the cheapest as well as the quickest way to dispose of this quantity of silt counting upon a period of closure of canals of three months, and, taking 25 working days in each month, in a period of 75 working days. The only place where there is plenty of room available for the deposit of this large quantity of silt, year by year, is out in the river, so it only remains to investigate the most expeditious way of getting it there. As the Masulipatam canal runs parallel to the river bank the 486 units of silt to be disposed of in this canal may be treated in the ordinary way, it being necessary only that the earth, after being removed over the bank, be trimmed down to correct level of the top of the river bank so as not to increase the size of the river bank which is already excessive both in height as well as width. The quantity now remaining to be disposed of is 1,009,347 — 486,642 = 522,705 cubic feet, or, say, 500 units.

In order to dispose of this quantity it is proposed to lay down a light portable tram line 30" gauge worked by hand and to run the wagons through a cut in the river bank and tip the silt on the outside keeping it to the proper level of top of the river bank.

4. *Cost of plant required.*—It is thought that the capacity of a wagon, worked by hand, should not be more than ¾ cubic yard or say 19 cubic feet and the extreme lead is 1 mile 1,980 feet in Ellore Canal *plus* 500 feet to foot of slope over river bank, making a total 1 mile 2,480 feet; taking half of this or roughly ¾ mile as the average lead we can now arrive at the number of wagons required. One wagon can be pushed along at the rate of about 2 miles an hour full and 3 miles an hour empty. Total distance to be travelled in one journey is ¾ mile going and the same returning; total time occupied at the above speed is 37½, or, say, 40 minutes. To this must now be added the time taken to haul the wagon up a slope of 1 in 30 which is proposed to be done by bullocks a distance of about 700 feet, tipping the wagon and return down the slope, say, 10 minutes. Therefore the total time occupied in one journey would be 50 minutes.

In one working day of 9 hours one wagon would do $\frac{9 \times 60}{50} = 11$ trips and would carry $11 \times 19 = 209$ cubic feet daily or in 75 working days would convey 15,675 cubic feet; therefore number of wagons required is $\frac{500,000}{15,675} = 33$, or, say, 40.

Length of line required is as follows:—

	Ml.	Ft.
Length of single line in Ellore canal	1	1,980
Do. double line to foot of slope	0	1,000
Sidings at every ¼ mile at 50 R. feet each No. 5	0	250
Double line up incline 700 feet	0	1,400
Total length ...	1	4,630

Or, say, 2 miles.

4. (*a*) *Cost of the above plant.*—The cost of this plant at rates quoted by Messrs. Richardson and Cruddas, Bombay, is—

	Rs.
2 miles of do.	9,500
40 wagons at Rs. 150 each	6,000
Total ...	15,500

This plant would not be lying idle for the remaining 9 months of the year; a portion of it could be used in the quarries where such a line would be invaluable where the quarry refuse has to be carried a long distance at great cost.

5 The present rate paid for silt clearance in *Main canal* is Rs. 8-1-6 per 1,000 cubic feet or As. 3-5½ per cubic yard and the cost of clearing by the tram line can be taken as follows :—

	As.	P.
Cost of filling at 1 anna per cubic yard	0	9
Two men to push the wagon to foot of slope, say, 400 feet average at 4 annas each	0	6
Hauling wagon up the gradient of 1 in 30 by one pair of bullocks at 12 annas each bullock per diem making 3 trips per hour, working day being 9 hours—⅓ of one anna—say	1	0
Tipping wagon and returning it down gradient—say	0	3
Total per cubic yard ...	2	6

The silt cleared at the second mile of Ellore canal would cost somewhat more owing to the longer lead. The cost of silt clearance by means of tram line would therefore cost less than it does at present cleared by hand labour.

6. *Earthwork.*—The first two hundred feet of gradient of *1 in 30* would be made up in the canal bed and the remaining 500 feet would be cut out of the slopes and made permanent. The level of the cut through the river bank is proposed to be + 70·00 and this would be permanently left open ; this level is 22·75 above the crest of anicut as raised, viz., 47·25 ; rough estimate of cost of earthwork Rs. 500.

7. *General remarks.*—No silt clearance is likely to be required in the Main canal above the railway bridge ; if any is ever required it is likely to be very little and can be removed to the berms and punted away afterwards or despatched to work as sand of which the deposit, such as it is, is composed. A deeper cut might with safety be made in the river bank, but it would lessen the depth on the river side to be filled in and would therefore increase the lead outside the bank. Of the double line up the incline one line would be used for loaded wagons and the other for return empties.

4th October 1892. (Signed) A. C. PEREIRA,
Assistant Engineer.

From the Superintending Engineer, II Circle, dated 14th November 1892, No. 2017 K.S.
To " " II " " 22nd " " " 234 "
From " " II " " 13th January 1893 " 8 "
" " " II " " 20th " " " 2518 "
To " " II " " 26th " " " 2587 "
From " " II " " 30th " " " 16 "
To " " II " " 6th February " " 2707 "
From " " II " " 11th " " " 24 "
" " " II " " 20th " " " 2851 "

No. 52 I.

Submitted to Government. For the disposal of the silt clearances from the canals within the municipal limits of the town of Bezwada referred to in the papers embodied in Proceedings of the Madras Government, No. 685 I., dated 12th August 1892, it has been decided in correspondence with the Superintending Engineer, II Circle, to provide a light tramway with the necessary rolling stock. The accompanying estimate, amounting to Rs. 16,800, prepared in this office for providing the necessary plant and meeting the incidental charges for the erection of the line, is recommended for the sanction of Government.

Chepak, (Signed) R. R. E. DRAKE-BROCKMAN, Lt.-Col., R.E.,
31st Mar. 1893. Ag. Chief Engineer for Irrigation.

To the Acting Joint Secretary to Government,
Public Works Department, Irrigation Branch.

2688/B

Order—dated 15th April 1893, No. 344 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
42. Major Works (Working Expenses).
Kistna Delta System.
Eastern Section.
III. Tools and Plant.
3. Railway Plant and Rolling Stock.

	Rs.
Providing a tramway and wagons for removal of silt from canals at Bezwada, estimate	16,800

2. This sanction is registered as No. 12 I. of 1893-94.

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Lt.-Col., R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with estimate.
" Examiner, Public Works Accounts.
" Revenue Department.
" Local and Municipal Department.
Editors' Table.

Exd. A. D. Xavier.
Spare Copies

IRRIGATION.
ACCOUNT.

Govt. of {1893} Madras.

PUBLIC WORKS.

Dated April, 15th.

Recd.

Encl.

G.O., 15th April 1893, No. 344 I.

APRIL.

Tramway and Wagons for Removal of Silt

Estimate of Rs. 16,800 for providing a — from canals at Bezwada, sanctioned.

2688/9

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

EAD—the following papers:—

From J. N. ATKINSON, Esq., Acting Collector of Kistna, to the Chief Secretary to Government, dated Perala, 29th April 1893, Dis. No. 112-Tour.

I have the honour once more respectfully to invite the attention of Government to e question of the spoil banks within the municipal limits of Bezwada town. The atter has formed the subject of voluminous correspondence ending with G.O., Mis. o. 1901 M., dated 17th November 1892.

2. In various letters to Government, my predecessor, Mr. Arundel, had urged the tal importance of removing these spoil banks. In his letter to Government in the ocal and Municipal Department, No. 225 extra, dated 30th August 1890, Mr Arundel, describing the schemes he had in view for the improvement of Bezwada, included e "throwing open to traffic of both sides of Ryves' canal at Bezwada for a distance a mile from its head." Since the spoil banks rose directly from the banks of the nal, it is obvious that this proposal connoted the removal of these banks.

3. In its order, No. 1575 M., dated 21st October 1890, in the Local and Muni- pal Department on this letter, Government approved of the Collector's proposals.

4. With this office letter No. 3748, dated 20th May 1891, two estimates, amount- g to Rs. 9,500 and Rs. 13,000 respectively, for cutting down the spoil banks, were bmitted to Government with a request that the cost of the latter might be met from rovincial Funds. Further information was, however, called for by Government in legram No. 398, dated 24th June 1891.

5. Meanwhile in his memorandum No. II—147-K.S., dated 14th December 1890, e Chief Engineer for Irrigation had asked the Superintending Engineer, II Circle, r proposals for building wharves along Ryves' canal head. Since, therefore, wharves uld not be constructed without at least a [partial removal of the spoil banks, it ay be taken that the Chief Engineer had also given in his adhesion to the necessity r this work.

6. In his letter No. 9205, dated 29th December 1891, Mr. Arundel laid before overnment certain further proposals for improving Bezwada, including the cutting own and levelling of the spoil banks on both sides of Ryves' canal and on the east de of Ellore canal. He forwarded estimates prepared by the Superintending Engi- eer to an amount of Rs. 23,959 for these works, and asked Government to sanction e works out of Provincial Funds. He noted in his letter that the Chief Engineer r Irrigation had had an opportunity of inspecting the locality and discussing the atter, and that the proposals contained in the letter had met with the Chief Engi- eer's concurrence.

7. In its order, Mis. No. 194, Local and Municipal, dated 29th January 1892, overnment, however, stated that in the then state of the provincial finances, the pro- osal to remove the spoil banks at provincial expense could not be considered.

8. A subsequent request by Mr. Arundel that the cost of the scheme should be ebited to the Kistna anicut project was negatived in G.O., No. 685 I., dated 12th ugust 1892, Public Works.

9. A similar answer was given in G.O., Mis. No. 1901 M., dated 17th November 1892, to a like appeal from the Bezwada Municipal Council.

10. Matters then stand thus, that while everybody is agreed that the spoil banks are a nuisance, an impediment to traffic and the development of trade, and obnoxious to public health, the funds to remove them cannot be found.

11. Now, however, there is an additional factor to be considered. Government is aware that it is intended to construct a large new hospital at Bezwada. The estimates which are still under revision amount to about Rs. 60,000, half of which will be borne by the District Board and half by the Municipal Council. It is considered a matter of utmost importance by both Boards that the hospital should be constructed with the least possible delay, and an allotment has been made in the current year's budget. The first thing to be done, however, is to fix on the site definitely. Indeed, until this is done, the Sanitary board will presumably decline to pass the plans and estimates and no work can be commenced.

12. Now undoubtedly the best site as being the healthiest, most central, most accessible and least liable to crowding by adjacent houses would be in the angle formed by the divergence of the Ellore and Ryves' canals. I enclose a plan * of the site for the information of Government, and as the prevailing winds are south-west and north-east, it will be readily seen that ventilation, immunity from insanitary surroundings and the other advantages mentioned above could hardly be better attained anywhere.

* Will follow.

13. Unfortunately the site is enclosed on all except the north-east by the high spoil banks which form the subject of this letter. The banks are 20 to 25 feet high, and in cutting off all ventilation will probably very seriously affect the hygienic qualities of any hospital that might be built at that spot.

14. The site was inspected by His Excellency the Governor and by the Honorable Mr. Garstin at the time of their recent visit to Bezwada, and I cannot but think that they were impressed with the extreme desirability of getting these spoil banks removed at once. Sooner or later I have no doubt that the removal will be admitted as a work of necessity, expensive perhaps, but imperative. What I submit now is that Government may be pleased to give an assurance that the work of removal shall be put in hand at once. If the matter be again delayed, it will follow of necessity that we must find another and much less suitable site for our hospital. This is no light matter, that for a matter of Rs. 25,000, we should be compelled to locate a hospital costing Rs. 60,000 in an unsatisfactory and perhaps unhealthy locality.

15. I respectfully claim that the District Board and Municipal Council are in this matter entitled to consideration at the hands of Government. The whole of the large staff of Government employés at Bezwada will come to this hospital for treatment and will get it gratis. It is certain that relatively to population by far the larger part of the patients attending hospital will be Government servants; and while the District Board and Municipal Council will ask no contribution from Government for this large institution, and will gladly treat all Government servants free, they ask that they should be given an opportunity to locate the hospital in the one site that will best serve all interests.

From the Acting Collector of Kistna, dated 30th May 1893, Dis. No. 484-Eng.

Abstract.—Forwarding the plan as promised in letter No. 112-Tour of 1893.

From the Public Works Department, dated 22nd June 1893, No. 2413-C.

Abstract.—Furnishing a copy of G.O., No. 344 I., dated 15th April 1893, sanctioning an estimate for providing a tramway and wagons for removal of silt from canals at Bezwada.

Order—dated 17th July 1893, No. 926 M., Local and Municipal.

The estimates, amounting to Rs. 23,959, which were prepared by the Superintending Engineer in 1891 for the removal of the spoil banks along a portion of Ryves' canal, will be approved.

2. Further orders will be passed in the Public Works Department in regard to the allotment of funds from the Provincial reserve or by transfer.

3. The tramway and rolling stock sanctioned in G.O., dated 15th April 1893, No. 344 I., will, when the canals are open, be available for the removal of the spoil banks.

(True Extract.)

Under Secretary, P.W.D.,
for *Chief Secretary.*

To the Collector of Kistna.
" Public Works Department.

Ed. A. Grubert.

P. W. CURRENT No. 6732

Govt. of {1893} Madras.

LOCAL AND MUNICIPAL.

Issued

Recd. 2-8-93 Encl. 85 c

G.O., 17th July 1893, No. 926 M.

JULY.

Spoil Banks at Bezwada.

Approving the estimates, amounting to Rs. 23,969, for the removal of the spoil banks along a portion of Ryves' canal at Bezwada, and stating that further orders will be passed in the Public Works Department in regard to the allotment of funds from the Provincial reserve or by transfer.

C. 17. VIII

Nos 2688 & 92 & 93
" 3144 & 3147 & 4 & 93
" 3443 & 3445 & 4 & 93
" 2413C & 22 & 6 & 93

No 2105 Way 16 August 1893

Communicated to the Supdg. Engineer II Circle who will submit the estimate in question for the sanction of Govt and report what sum can be spent over the work during the current official year.

D 4/3
12 Aug 93

DESPATCHED
17 AUG 93

To The S. E. Kurnool
" Exec Engr Bezwada
" Chief Engr for Irrign

5/22/8

1/1213

A 14/8

Government of Madras.

1893.

2688/11

P. W. DEPARTMENT.

CURRENT No. 5611

From

The Chief Secretary

No. Nil

Dated 14th June 1893

Received 21st June 1893

ENCLOS.—4 (4 Nos)

SUBJECT.

Requesting to be furnished with the G.O. conc. + masons for removal of silt from Canals at Bezwada referred to by the Honourable Mr. Garstin in his note on the subject of the removal of spoil banks from the Municipal limits of Bezwada, brought to the notice of Govt by the Collector of Kistna.

DISPOSAL.

No. 2413 C dated 22 June 1893

Forwards a copy of P. W. G. No: 344 I dated 15th April 1893.

(Sd) F. W. Ashpitel
Under Secretary to Govt
P. W. D
Irrigation Br.

DESPATCHED
23 JUN. 93

2684/17

OF THE

COLLECTOR & MAGISTRATE,

MASULIPATAM,

KISTNA DISTRICT.

31st August 1893.

From,

J. N. Atkinson Esqre.

Actng Collector, Kistna District.

To,

The Chief Secretary to Government,

Local and Municipal Department,

Fort St. George.

Sir,

In gratefully acknowledging the orders issued in Government Order No 9262 (G.O.R. 21053 16-8-93) L. Municipal, for the removal of the spoil bank between the Eellore and Ryves canals at Penpada, I beg that I may be pardoned for coming forward like Oliver Twist to ask for more. Government has directed that the removal of the bank shall take place in the dry weather after the closure of the canals, and by means of the tramway sanctioned in Government Order No 3441 (15473) Public Works department.

this is impossible. I am quite certain that the Executive Engineer, the Superintending Engineer and the Chief Engineer will all agree with me when I say that during the closures of the canals neither time nor labour can be found for any work in addition to the ordinary silt clearance from the beds of the canals.

3 Even when no exceptional or additional works are to be executed, it rarely happens that the full programme of silt clearance, or canal widening or whatever it may be, is completed in the three months of closure.

4 Next year there would be even less chance of carrying out an extra work of this nature, because in consequence of the recent extension of irrigation in the Delta, it is essential that much widening of canals should be done.

5 It has occurred to me that the clearance of the spoil bank might very easily be effected by laying a tramway

C 2685
13

the bank, across the Bridge at head of the Ellore canal to join the broad gauge Railway line, and from there across the canal Railway bridge, and so by a diversion into one or other of the large triangular spaces between the old river flood bank and the new Railway training walls. Some little inconvenience would be thereby caused to the traffic across the Ellore Canal bridge; and no doubt the Railway officials would require certain guarantees that the working of the Railway line should not be interfered with. These considerations are however not insurmountable difficulties. I respectfully request that Government will be pleased at any rate to reconsider its order that the spoil bank shall be removed during the 3 months closure of the canals. I believe it will be found that the work

I have the honor to be,

Sir,

Your most obedient Servant,

Acting Collector.

Comptr

3

[illegible] M. CURRENT No. 8061

~~LOCAL AND MUNICIPAL DEPARTMENT.~~

~~Local & Municipal Dept~~

OU~~RRENT~~ NO. ~~1893/11~~

- 685 dy 12.8.93
- 3043 dy 7.4.93
- 3443 dy 15.4.93
- 2413 dy 22.6.93
- 2105 dy 16.8.93

2685/14

No. 668

From

The Collector of Kistna.

Transferred to the Public Works department.

There is no objection on this department to the commencement of the work as soon as funds have been provided.

Recd: 21.9.93

Under Secretary P.W.D.
for Chief secretary

Dis. No. 844/Eng.

Dated 31st August 1893.

Received

Enclosures

Fort St. George,
28th September 1893

To

The Public Works Depatt.

RECEIVED
29 SEP 93

SUBJECT.

Requesting sanction for the removal of the spoil banks between the Eluru and Ryves canals at Bezwada, at an earlier date than the one prescribed before.

No. 2485 Dy/28 September 1893.

Communicated to the Supdg. Engr. II Circle who will expedite his reply to G.O. No. 2105 W dated 16th August 1893 in view to an immediate commencement of the work.

D.C. 2-4 / 2/10

Dft. 307

25/9

5 C. II Circle 25/9

25.9.93

Government of Madras.

1893.

P. W. DEPARTMENT. No. dated

CURRENT No. 8540

From

S/E II Circle

2684/16

Encls.

Tel No.—

Dated 6th Octr 93

Received 7—10—93.

Reptd: 10.10.93

SUBJECT.

Spoil banks along a portion of Ryves' Canal at Bezwada. Requesting to be informed whether the work, removal of —— may be commenced at once, expenditure being limited to Rs 5000 for the present.

19—1,000—23-3-93.

2nd October 1893, No. 1323 M., Local and Municipal.

2684/16

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

Read—the following paper:—

From J. A. JONES, Esq., Mem. Inst. C.E., F.R.S.E., Sanitary Engineer to Government, to the Chief Secretary to Government, dated Fort St. George, 15th September 1893, No. 1950.

With reference to my No. 2976 of 24th December 1892, I have the honour to inform you that I visited Bezwada last month, and when there had a meeting with the Manager and Engineer of the East Coast Railway and with the Municipal Council.

2. The result of the meeting with the Manager and Engineer will be seen from the correspondence attached.

3. At the meeting with the Municipal Councillors on the 16th August 1893 a resolution to proceed with the water-supply and to leave the question of drainage over for the present was unanimously carried, and I then undertook to prepare a scheme for the town.

4. The Engineer and Manager's proposal has since been made and I feel assured that neither Government nor the Municipality will object to the scheme as proposed by Mr. Bell; acting on that belief, I have asked Mr. Bell to undertake the preparation of the plans for wells and for a joint scheme.

5. My work will now be limited to preparing the estimates as regards the distribution works, reservoir, pipes, &c., and this will be put in hand.

6. I have the honour to request that Government will be pleased to approve of the proposals made.

Enclosures.

From J. R. BELL, Esq., Manager and Engineer-in-Chief, East Coast Railway, to the Sanitary Engineer to Government of Madras, dated Waltair, 29th August 1893, No. 6454.

I have the honour to apologize for delaying my official reply to your inquiries and to now enclose copy of an Inspection-note embodying my conclusions as to the proposals for supplying Bezwada with water from our wells. As therein mentioned I still think that a joint scheme could very well be arranged with mutual advantage and I very heartily commend the matter to your careful consideration.

Inspection Note of 12th to 15th August 1893—Kistna Bridge Water-supply.

It has been proposed to use the Bezwada abutment foundation wells to supply water, not only to the Railway station, but to the town of Bezwada. Owing to pressure of work Mr. Spring's data as to safe minimum delivery were left incomplete till now, when Mr. Jones, the Sanitary Engineer to the Government of Madras, made a joint inspection with the present writer.

2. Exhaustive experiment now proves that the reliable amount of daily yield, with two sets of pumps, is only 120,000 gallons, of which the Railway wants 40,000, leaving but 80,000 surplus in place of the 300,000 at which the town service is calculated.

3. The town must therefore draw its supply from wells of its own and a convenient site on Railway land where coal for the pumping engines can be delivered by rail with a minimum of handling is shown on the accompanying plan.

4. Under these circumstances the question of combining the railway requirements with that of the town takes another form and I incline to abandon the use of the abutment wells *in toto* on three several grounds, viz.—

(*a*) wasteful organisation in keeping up two establishments;
(*b*) the abutment water contains a prohibitive quantity of lime in solution; and
(*c*) there is reason to fear that this lime is being withdrawn from the concrete of the wells, at the risk of serious injury to the foundation.

5. It seems fairly probable that the last-named contingency owing to variety of causes entirely escaped Mr. Spring's consideration, and before laying this part of the case further open, a demi-official reference is being made to that officer, who is happily within easy call.

6. The Railway branch, possessing as it does both appliances for well-sinking and surplus machinery for pumping, might well, it is thought, undertake to erect such wells as Mr. Jones may approve and deliver their waters into a rising main to be laid and maintained by the town, at a rate of payment calculated to cover labour, stores, renewals, &c., and interest on capital.

From J. A. JONES, Esq., Mem. Inst. C.E., F.R.S.E., Sanitary Engineer to Government, to the Manager and Engineer-in-Chief, East Coast Railway, dated Fort St. George, 13th September 1893, No. 1925.

I have the honour to acknowledge, with thanks, your No. 6454 of 5th September 1893, enclosing your inspection notes in reference to the proposed water-supply from the Kistna bridge wells.

2. I presume that it may now be taken that the town of Bezwada in any case cannot be supplied from the Kistna bridge wells, and as that is the case, I feel sure that, if further works are definitely decided on to supply Bezwada station, both Government and the Municipality will gladly, if it be found more economical as there is little doubt it will, concur in a joint scheme on the lines you mention.

3. I shall now send forward a copy of the correspondence to Government and to the Municipality.

4. Meantime, I shall be glad to know whether you can at once prepare plans and estimates for the construction of the wells, engine-house and boiler-room machinery, &c. As the dimensions of the three latter are dependent on the lift required at the pumping station to deliver the water into the proposed service reservoir, I will put in hand the calculations required in regard to the pipes and reservoir and advise you.

5. I agree with you that the work of sinking the wells can be much better carried out by the Railway Department than by any other as you have all appliances and practised labour at hand.

Order—dated 2nd October 1893, No. 1323 M., Local and Municipal.

The proposals of the Sanitary Engineer are approved.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Sanitary Engineer.
" Chairman, Municipal Council, Bezwada.
" Collector of Kistna.
" Public Works Department.

Fxd. A. Raitt.

Govt. of {1893} Madras.

LOCAL AND MUNICIPAL.

1893/17

No. 2683 Way 24 October 1893

Recorded.

(21) J. H. W

Issued

Encl. *Recd.*

G.O., 2nd Oct. 1893, No. 1323 M.

OCTOBER.

Water-supply.

Approving the proposals of the Sanitary Engineer regarding the — scheme for the town of Bezwada.

S.2. II circle for information

With order

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

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ENCLOSURES.

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5. It seems fairly probable that the last-named contingency owing to variety of causes entirely escaped Mr. Spring's consideration, and before laying this part of the case further open, a demi-official reference is being made to that officer, who is happily within easy call.

6. The Railway branch, possessing as it does both appliances for well-sinking and surplus machinery for pumping, might well, it is thought, undertake to erect such wells as Mr. Jones may approve and deliver their waters into a rising main to be laid and maintained by the town, at a rate of payment calculated to cover labour, stores, renewals, &c., and interest on capital.

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Sanitary Engineer to Government, to the Manager and Engineer-in-Chief, East Coast Railway, dated Fort S. George, 13th September 1893, No. 1925.

I have the honour to acknowledge, with thanks, your No. 6454 of 5th September 1893, enclosing your inspection notes in reference to the proposed water-supply from the Kistna bridge wells.

2. I presume that it may now be taken that the town of Bezwada in any case cannot be supplied from the Kistna bridge wells, and as that is the case, I feel sure that, if further works are definitely decided on to supply Bezwada station, both Government and the Municipality will gladly, if it be found more economical as there is little doubt it will, concur in a joint scheme on the lines you mention.

3. I shall now send forward a copy of the correspondence to Government and to the Municipality.

4. Meantime, I shall be glad to know whether you can at once prepare plans and estimates for the construction of the wells, engine-house and boiler-room machinery, &c. As the dimensions of the three latter are dependent on the lift required at the pumping station to deliver the water into the proposed service reservoir, I will put in hand the calculations required in regard to the pipes and reservoir and advise you.

5. I agree with you that the work of sinking the wells can be much better carried out by the Railway Department than by any other as you have all appliances and practised labour at hand.

ORDER—dated 2nd October 1893, No. 1323 M., Local and Municipal.

The proposals of the Sanitary Engineer are approved.

(True Extract.)

Under Secretary, P.W.D.,
for Chief Secretary.

To the Sanitary Engineer.
" Chairman, Municipal Council, Bezwada.
" Collector of Kistna.
" Public Works Department.

Exd. A. Batt.

P. W. CURRENT No. 8676

Govt. of {1893} Madras.

LOCAL AND MUNICIPAL.

No 2688 Way 22 October 1893

Recorded

Issued

Encl. Recd. 13.10.93.

G.O., 2nd Oct. 1893, No. 1323 M.

OCTOBER.

Water-supply.

Approving the proposals of the Sanitary Engineer regarding the — scheme for the town of Bezwada.

S.E. II circle

for information