(1) பக்கங்களின் எண்ணிக்கை 30

(2) புதுக்கித் திருப்பிய நாள் 17-11.88

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் [illegible]

தமிழ்நாடு ஆவணக் காப்பகம்.

(7)

தமிழ்நாடு அரசு

P. W. D துறை

அரசாணை எண். —
மு. கோப்புத் தாள் எண். 7

அச்சகம்
பலவகை

நாள் : 7 - 1 - 1889

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மடிக்கவோ கண்டபடி கையாளவோ கூடாது

15 Sheets

ஆவண. கா-1—18,006—15-6-87.

7/1

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following papers:—

From M.R.Ry. C. RAGHAVA ROW, Pantulu Garu, Row Saib, Chairman, Municipal Council, Cuddapah, to the Chief Secretary to Government (through the Collector of Cuddapah), dated Cuddapah, 17th September 1888, No. 845.

In continuation of my letter No. 594, dated 3rd July 1888, I have the honor to submit, for early orders, copy of a letter No. 46, dated 15th September 1888, from the Executive Engineer in charge of Cuddapah water-works and of its enclosures.

ENCLOSURE.

From J. C. JOHNSTON, Esq., Executive Engineer, Cuddapah Division, to the Chairman, Cuddapah Municipality, dated Cuddapah, 15th September 1888, No. 46.

I have the honor to bring to your notice that the thickness of pipes as specified by Colonel Brockman are thinner than the standards in use in England. Messrs. Massey and Co explain that in order to reduce the cost of pipes as low as possible makers in England are obliged to keep to certain thickness which experience has shown to be desirable, and that if pipes of other thicknesses are required, special plant has to be prepared and that the cost of the pipes would be greatly enhanced; and, further, they very much doubt whether any maker would alter his plant for such a small order as has been given by the Cuddapah Municipality.

2. I have prepared a comparative statement showing the excess cost of the thicker pipes. This excess cost is Rs. 22,606 according to Colonel Brockman's rates. I have assumed that a 9″ main from the service reservoir will be sufficient. This point has, however, to be yet settled by the Chief Engineer.

3. The pipes will be made in England by a very eminent firm (Ransome's) and I would urge the speedy settlement of the question. There has already been great delay. There would be no saving in money in keeping to Colonel Brockman's thickness of pipes but great loss in time.

Quantity.	Description of Work.	Rate per ton.	Amount.	Total.
		Rs.	Rs.	Rs.
550·8	Ton main and sub-mains	130	71,604	
66·7	Ton distributaries and service	125	8,338	
	Total ..	..	..	79,942
	Original estimate—			
..	Masonry conduit	..	16,490	
..	Main and sub-mains	..	35,272	
..	Distributaries and service	..	5,574	
	Total ..	..	..	57,336
..	Excess over original estimate	..	..	22,606

Detail of Works.	Number.	Length.	Breadth.	Depth.	Total.
9" main pipe from service reservoir to town distributaries $\frac{5}{16}$" thick	..	18,930 at 59·11 lb. per ft.	..	..	1,118,952·30
7" sub-main pipe $\frac{1}{2}$" thick	..	2,840 at 40·44 ,, ,,	..	..	114,849·60
Total piping lb.	..				1,233,801·90
or Tons	..				550·8
4" distributaries $\frac{3}{8}$" thick	..	1,245 at 17·83 lb. per ft.	..	..	22,260·60
3" service $\frac{3}{8}$" thick	..	6,531 at 13·55 ,, ,,	..	..	88,495·05
$2\frac{1}{2}$" service $\frac{3}{8}$" thick	..	3,684 at 10·50 ,, ,,	..	..	38,682·00
Total lb.	..				149,437·65
or Tons	..				66·7
Number of pipes required—					
9" pipe	2,150				..
7" ,,	356				..
4" ,,	156				..
3" ,,	817				..
$2\frac{1}{2}$" ,,	690				..

No. 6650.

Forwarded.

(Signed) E. J. SEWELL,
Ag. Collector.

20th September 1888.

No. 4440-C.

Memorandum.

[From the Local and Municipal Department, No. 980, dated 10th November 1888.]

It is impossible for this office to say what is the cheapest and best thickness of pipe to be used for the Cuddapah water-works.

2. Cast-iron pipes are made of different qualities and different thicknesses, and they are as a rule always tested before being used for works.

3. The prices also vary considerably ; and of course pipes of certain thicknesses are not always available in the market.

4. In note No. 701-D, dated 21st September 1888, from this office, it was stated that a thickness of $\frac{3}{8}$" for the piping was sufficient, supposing that the pipes were properly tested.

5. It is considered that the pipes should be procured through the Store Department of the India office, that department being told the number and sizes required and the head of water or pressure they will as a maximum be liable to be subjected to.

6. It is not thought right to accept the statement of one firm with regard to a question of this sort which involves a very large expenditure.

(Signed) H. R. MEAD, Colonel, R.E.,
Ag. Chief Engineer, P.W.D.

To the Local and Municipal Department, with 3 enclosures.

From M.R.Ry. C. RAGHAVA ROW, Pantulu Garu, Row Saib, Chairman, Municipal Council, Cuddapah, to the Chief Secretary to Government (through the Collector of Cuddapah), dated 16th November 1888, No. 973.

In acknowledging receipt of G.O., Mis. No. 1099 M., dated 3rd October 1888, communicating, for the guidance of the Council, the remarks of the Secretary to Government, Public Works Department, in regard to the capacity of pipes required for the Cuddapah Bugga Water Project, I have the honor to report that the Executive Engineer in charge of the water-works is now of opinion that the pipes originally proposed by him are not suited for the project, inasmuch as such pipes cannot bear the full working pressure due to the head.

2. It is to be regretted that this matter has not been carefully considered and brought to the notice of Government earlier, and that the question should arise after the works are fairly in hand, and their completion is eagerly awaited by all.

3. Messrs. Massey and Co., whom the Executive Engineer consulted, inform him that they very much doubt whether any maker in England would alter his plant for a small order as that given by this Municipality, and that the cost of specially-made pipes would be great.

4. The cost of adopting the piping proposed by the Executive Engineer in modification of Colonel Brockman's scheme, and approved in G.O. above referred to, exceeds the sanctioned estimate of Rs. 73,850, and the proposal of thicker pipes, now recommended, would increase the said estimate by Rs. 31,161. But against this has to be set off the risk of breakage among the thinner pipes, and the further fact that thinner pipes are, according to the experience and practice of the best makers in England, unsuited and undesirable for such works as stated by the Executive Engineer. These facts were fully discussed in the Executive Engineer's letter No. 46, dated 15th September 1888, a copy of which was sent to you with the Collector's endorsement, No. 6650, dated 21st September 1888, and recorded in the G.O. under reference.

5. I have called two special meetings of the Council, and at one of them the Executive Engineer personally explained the *pros* and *cons* of this question, and the Council have, in their resolutions herewith submitted, agreed to the adoption of thicker pipes. As it is of the utmost importance that no further delay should occur in the completion of the water-works which are in fair state of progress, and for which the townspeople are already paying the water-tax, I request you will be pleased to obtain early orders of Government on the subject.

6. Relying on the liberality of Government who have already helped the Municipality with a grant of Rs. 32,000 for this project, which is of immense importance not only to the townspeople but also to people from the district, I beg respectfully to apply for the increase of the grant to meet the deficiency.

7. In doing this, it is scarcely necessary for me to review the financial position of this Municipality which is already well known to Government.

Enclosures.

Post-card to No. C-2, dated 19th October 1888, from the Executive Engineer, to the Chairman Municipal Council.

Your No. 917, dated 15th October 1888. The last G.O. received, intimated that the 9-inch pipe could be used and that it could be only $\frac{3}{8}$" thick. Since I recommended this thickness, I saw Messrs. Massey and Co., and they told me these thicknesses would not do. So I wrote again giving the proper thicknesses of the pipes. I also sent you a letter from Messrs. Massey and Co., giving their rates per ton for the pipes as specified by Colonel Brockman. Can I order pipes of thicknesses as ordinarily made and settle excess prices afterwards, if any ?

(Signed) J. C. JOHNSTON,
Executive Engineer.

COPY of letter No. 940, dated 6th November 1888, from the Chairman, to the Executive Engineer.

As the question of the thicknesses of pipes has to be finally decided in a meeting, I request you to be good enough to appear and favor the Council with your views at the next meeting to be held on Friday the 9th instant, at 7-30 A.M.

(Signed) C. RAGHAVA ROW,
Chairman.

DEMI-OFFICIAL of the Executive Engineer, to the Chairman, Municipal Council, dated 8th November 1888.

Your letter of the 6th instant was received by me this morning in camp. I shall most probably have to return to head-quarters on Saturday or Sunday next, and will be happy to express my views again on Monday if a meeting can be convened. But I have already expressed my views on the subject. The thicknesses of pipes as specified by Major Brockman are, according to the experience and practice of the best makers in England, too thin. The thicker pipes would increase the estimate by about Rs. 10,000 perhaps, and the risk of breakage among the latter would be greater and would still further increase the estimate. I recommend the thicker pipes which I have already ordered to be supplied. If, however, the Council wish the thinner pipes to be supplied, kindly telegraph to Messrs. Massey and Co., Madras, to stop supplying the thicker pipes. Taken all in all, I think the thicker pipes will be the cheaper in the end.

(Signed) J. C. JOHNSTON,
Executive Engineer.

EXTRACT from Proceedings of the Municipal Council, dated 12th November 1888.

I. Read again—

G.O., No. 1099 M., dated 3rd October 1888.
Executive Engineer's Post Card, dated 19th October 1888, No. C-2.
Executive Engineer's demi-official, dated 8th November 1888.

Resolution.—The Council learn that main pipes of $\frac{5}{8}$ inch in thickness as specified by the Executive Engineer are, according to the experience and practice of the best makers in England, too thin and unsuited for water works; that such thin pipes are not ordinarily made in England, but would require special plant for their construction; that it is doubtful whether any maker would alter is plant for meeting a small order from this Municipality; and that the adoption of thin pipes would be attended with greater risk of breakage and increase the estimate; and they, therefore, resolve that it would be advantageous in the interests of the rate-payers to accept the Executive Engineer's recommendation that thicker pipes be ordered from England. The Council are not unaware of the fact that the adoption of thicker pipes would, as shown by the Executive Engineer, entail an excess of Rs. 22,606 over the sanctioned estimate, but as that officer is clearly of opinion that thinner pipes cannot bear the full-working pressure due to the head, the best thing that they could do under the circumstances is, of course, to move the Government to sanction the excess expenditure of Rs. 22,606 over the estimate. As the Government are fully aware of the financial circumstances of this Municipality and as the grant of Rs. 32,000 sanctioned in G.O., No. 590, dated 6th June 1888, Financial, will not suffice to meet the cost, the Council resolve to apply to Government for increase of their grant to meet the deficit as explained below:—

	Rs.	Rs.
Estimate as finally sanctioned in G.O., No. 590, dated 6th June 1888		73,850
Cost of thicker pipes as now resolved		22,606
		96,456
Deduct—		
Amount of loan	43,168	
Do. of grant by Government	32,000	
		75,168
The deficit ..		21,288

The Council respectfully venture to note that the Executive Engineer has fully discussed the whole question in his letter No. 46, dated 15th September 1888, a copy of which was submitted with Collector's endorsement No. 6650, dated 21st September 1888, and recorded in the Government order quoted above.

(Signed) C. RAGHAVA ROW,
Chairman.

STATEMENT placed by the Executive Engineer before the Council at their Meeting of 12th November 1888.

Description of piping.	Thickness.	Weight in tons.	Price per ton.	Cost as delivered at Madras Railway Station.	
				Thinner pipes.	Thicker pipes.
			Rs.	Rs.	Rs.
9" Main	$\frac{5}{8}$"	318·5	110	35,035	..
Do.	$\frac{3}{4}$"	429·5	95	..	47,452
7" Sub-main	$\frac{5}{8}$"	46·3	111	5,139	..
Do.	$\frac{3}{4}$"	51·2	98	..	5,017
4" Distributaries	$\frac{5}{8}$"	9·7	114	1,105	..
Do.	$\frac{3}{4}$"	10	101	..	1,010
3" Distributaries	$\frac{5}{8}$"	34	116	3,944	..
Do.	$\frac{3}{4}$"	39·5	103	..	4,068
2½" Distributaries	$\frac{5}{8}$"	16·6	116	1,925	..
Do.	$\frac{3}{4}$"	17·2	103	..	1,771
Cost of pipes delivered at Madras Railway Station	..	..	..	47,148	59,318
Add for trainage and setting	..	..	..	20,624	20,624
	..	..	..	67,772	79,942
Estimate allows	..	..	..	57,336	57,336
Excess	..	..	..	10,436	22,606

CHAIRMAN'S Memorandum to the Executive Engineer, dated 13th November 1888.

The original estimate sanctioned by Government in G.O., No. 449, dated 14th May 1886, according to Major Brockman's scheme providing for conduit and pipes—Rs. 86,050.

In G.O., No. 355, dated 16th April 1888, Government ordered the reduction of this amount by Rs. 7,800 as proposed by the Executive Engineer. In this it was arranged to have an 8" bore pipe throughout, and the savings over Major Brockman's estimate were calculated.

In G.O.,* No. 590, dated 6th June 1888, which finally settled the amount to be spent on the works, the saving was taken into consideration, and the original amount was reduced by the amount, and the Municipality was placed in charge of funds to the extent of Rs. 73,850 including loans and contribution, Rs. 73,850.

* Particulars of other deductions which do not affect the case will be known from this Government order.

In the note by the Chief Engineer recorded in G.O., No. 355, dated 16th April 1888 (above quoted), he suggested that a 9" bore pipe is necessary; but the Government in passing this order or the final order in G.O., No. 590, dated 6th June 1888, did not take into consideration the financial changes this would have on the estimate, but allotted the amount required for the 8" bore pipe only. The remarks of the Chief Engineer were duly communicated to the Municipality and a revised estimate was asked for, which does not seem to have been forwarded with reference to the Chief Engineer's note. The Chief Engineer's suggestion of having a 9" bore pipe with $\frac{3}{8}$" thickness was finally approved in G.O., No. 1099, dated 3rd October 1888; but still the funds placed at our disposal were calculated on the basis of having an 8" bore pipe only.

In the statement placed before the Council yesterday proposing thicker pipes as suggested by Messrs. Massey and Co., the total cost for piping with thicker pipes was given as Rs. 79,942 and the total cost for having the thinner pipes with 9" bore as Rs. 67,772.

In calculating the excess expenditure that is involved by having the thicker or thinner pipes with 9" bore, it has been assumed that Major Brockman's scheme was finally sanctioned by Government, and funds are now on hand according to his estimate. For the sum of Rs. 57,336 which is designated "estimate allows" is the sum estimated for by Major Brockman for having conduit and various kinds of pipes, and thus the excess amount now required was calculated to be Rs. 10,436 for 9" pipe thinner, and Rs. 22,606 for 9" pipe thicker. But the sum of Rs. 57,336 was reduced by Rs. 7,800 in passing the final order about funds in G.O., No. 590, dated 6th June 1888, owing to the proposal of having an 8" bore pipe throughout, the probable savings from which was estimated at Rs. 7,800.

Therefore the sum that has to be deducted from the present estimated cost of having the thicker or thinner 9" bore pipes with other modifications in minor pipes, in order to find out the extra money now required is not Rs. 57,336, the amount in Major Brockman's estimate, but this sum *minus* Rs. 7,800, which is the amount that has been sanctioned.

This would increase the amount now required for the thinner or thicker pipes by Rs. 7,800. In other words the sums now required, and which must be obtained, would be —

Thinner pipes .. .. Rs. 10,436 + 7,800 = 18,236
Thicker pipes suggested by Messrs. Massey and Co... „ 22,606 + 7,800 = 30,406

In yesterday's resolution it was said that the amount required would be only Rs. 10,436 or Rs. 22,606, according as thinner or thicker pipes are used, which is erroneous.

(Signed) C. RAGHAVA ROW,
Chairman.

From J. C. JOHNSTON, Esq., Executive Engineer, to the Chairman of the Municipal Council, Cuddapah, dated Rájampet, 14th November 1888.

I have received your letter, dated 13th November 1888, and have given it due consideration. The Rs. 30,406 is due to an error on the part of Government. By proposing an 8″ pipe I showed a saving of Rs. 7,800 or so. In G.O., No. 355, dated 16th April 1888, however, a 9″ pipe or 10″ pipe was ordered instead of an 8″ one, but no notice of this larger pipe was taken in G.O., No. 590 M., dated 6th June 1888, and in which my proposed saving of Rs. 7,800 was still shown. You should call their attention to this; and say also that the thicker pipes are those ordinarily made and that these will increase the original estimate by Rs. 22,000. There is no time to write all over India asking for information regarding thicknesses of pipes. The rates for iron ware are rising fast, and soon you will have to pay the higher rates for the thicker pipes. It is of no use going into calculation regarding pressure, &c. Theoretically the thickness of the 7″ pipe need be only $\frac{3}{5}$ inch, but no sane person would order pipes of that thickness. There are other considerations besides pressure which determine the thickness, viz., transit, careless usage, &c.

Major Brockman's thicknesses will do as far as the pressure of water only is concerned, *but the risk of breakage with them will be doubled* than with the thicker ones. The thicknesses recommended by Messrs. Massey and Co., are those used for the Glasgow water works, and they are capable of bearing a pressure due to a head of 200 to 300 feet. The greatest pressure which our pipes will have to bear will be one due to about 50 to 70 feet, *but* it must be taken into consideration that in Glasgow the best appliances and workmen were available, that the pipes were cast in the country and that their transit was easy. Whereas here in our case, besides a long sea voyage, the pipes will have to bear the risk of unloading from the ship, loading in and unloading from railway wagons, and last and best of all manipulation by unskilful coolies. Obtaining pipes from Bombay is out of the question, for the railway fare would increase the cost per ton by at least Rs. 35. I have price list of Messrs Richardson and Cruddos before me, dated January 1888, and in that the rate for cast iron spigot and socket pipes is Rs. 87½ a ton, and if to this be added Rs. 50 for trainage, the total will be Rs. 137½ as only delivered at Cuddapah, against the estimate rate of Rs. 125 to Rs. 135 delivered and laid complete; since January last prices have risen considerably. I append a list of thicknesses for comparison.

Diameter.	Thickness as recommended by			
	Major Brockman.	Glasgow Works.	Messrs. Massey and Co., and myself.	Richardson and Cruddos.
2½″	½″	..	½″	$\frac{5}{16}$″
3″	½″	$\frac{5}{16}$″	½″	$\frac{5}{16}$″
4″	½″	$\frac{5}{16}$″	½″	$\frac{5}{16}$″
7″	½″	$\frac{5}{16}$″	½″	$\frac{11}{32}$″
9″	..	$\frac{5}{16}$″	$\frac{5}{16}$″	$\frac{11}{32}$″

The last three columns are practically identical.

If with all this overwhelming evidence in favor of the thicker pipes the Council still delay in coming to a decision, such delay will not be to their interests. I enclose a letter received this day from Messrs. Massey and Co., and from that you will learn that prices of iron work are fast advancing—*so delay will be fatal.*

I have recast the estimate, taking Major Brockman's rates for iron works. These rates were fixed at a time when exchange was higher and prices lower. Trade is now reviving in England and prices are rising, but I have still kept to Major Brockman's rates.

I have given you all the information I possess on the subject and it is for you to bring the matter to the notice of Government.

I may add that the pipes as specified by Major Brockman are called by Messrs. Massey and Co. "rain water pipes."

It is only a matter of funds. The estimate as originally sanctioned must be exceeded at least by Rs. 10,000, and that by using the thinner pipes, an excess of Rs. 22,000 will give the thicker pipes and pipes of double the strength of the thinner ones.

CUDDAPAH Water Works comparative statement showing excess due to extra thickness of pipes.

Description of Items.		As sanctioned in G.O., No. 449 M., of 14th May 1886.	As revised.
		RS.	RS.
Infiltration gallery		4,513	4,513
Well		450	450
Service reservoir		9,418	9,418
Value cistern		209	209
Masonry conduit	16,490		
Mains and sub-mains	35,272	.. .. ..	51,762	71,604
Distributaries		5,581	8,338
Special castings		600	600
Value, &c.		1,360	1,500
Jointing materials, &c.		1,000	1,000
Dry broken kunker		167	167
Hydrants		2,520	2,640
Fixing hydrants		420	440
Water-lift		750	750
Improving springs		200	200
Contingencies		1,800	1,800
Petty supervision		300	300
Engineer's pay, &c.		5,000	5,000
Total ..		86,050	1,08,929
			86,050
Excess ..			22,879

EXTRACT from Proceedings of the Municipal Council, dated 16th November 1888.

I. Read again Resolution No. I of the Council held on 12th instant.

Read Chairman's memorandum dated 13th instant.

Read demi-official, dated 14th instant, from the Executive Engineer, together with the statement accompanying it.

Resolution.—These papers will be submitted to Government with the following remarks: The former resolution was based on erroneous figures given by the Executive Engineer. That officer assumes that Rs. 86,050 have been sanctioned by Government for the water works according to Colonel Drake-Brockman's estimate and compares the figures in that estimate with his present revised scheme for thicker pipes. The Council find that the Government have only sanctioned Rs. 73,850 in their Order, No. 590 M., of 6th June 1888, deducting Rs. 5,000, the pay of Engineer, and Rs. 7,800, savings estimated by the Executive Engineer, by substituting 8″ pipe. But the Government have since sanctioned in their Order, No. 1099 M., of 3rd October 1888, the substitution of 9″ pipe to 8″ pipe retaining the ⅝″ thickness; this alteration in the piping not only absorbs the above savings, but considerably raises the estimate. Now the Executive Engineer states that the ⅜″ thickness is quite unsuited for the purpose, characterizes the thin pipes as "rain water pipes," and proposes substitution of thicker ones specified in the demi-official read above. This raises the estimate as follows:—

		RS.
The Executive Engineer's present revised estimate amounts to ..		1,08,929
Deduct—		
Engineer's pay wrongly included by the Executive Engineer ..		5,000
		1,03,929
Add—		
Horse allowance to the Executive Engineer sanctioned in G.O., No. 136 M., of 13th February 1888		600
Overseer's pay for two years		1,800
Total ..		1,06,329
Deduct—	RS.	
The realized proceeds of loan	43,168	
Contribution by Government	32,000	
		75,168
Net excess ..		31,161

The Council beg to solicit the Government will be pleased to make an additional grant of Rs. 31,161, to enable them to bring the work to completion, as they can find no means of meeting this expenditure.

* * *

(Signed) C. RAGHAVA RAO,
Chairman.

No. 8381.

Forwarded for the favorable consideration of Government. This demand for Rs. 31,000 odd additional comes as a complete surprise. It will be seen to be entirely due to the Engineers. Colonel Drake-Brockman's first estimate was about to be accepted. The Executive Engineer said he could reduce the cost by using more iron pipes and altering the position of the reservoir, and his plan and estimate were accepted and the money arranged for. This was for an 8-inch bore pipe.

Then the Chief Engineer (*vide* G.O., No. 355, dated 16th April 1888) remarked that a 9-inch bore pipe was necessary. And now the Executive Engineer declares that the 9-inch bore pipe must have a greater thickness than the Chief Engineer allowed. The Council are perfectly helpless in the matter. Their loan of Rs. 50,000 at 6 per cent. per annum not repayable for 25 years only fetched Rs. 43,168. Any further loan would be ruinous even if it could be raised. If the thicker pipes are absolutely necessary, there seems to be no help for it, but that the money should be advanced.

The Engineers will no doubt decide, but the reasons given for the thicker pipes do not appear convincing.

NANDIALEMPET,
20*th November* 1888.

(Signed) E. J. SEWELL,
Ag. Collector.

ORDER—dated 15th December 1888, No. 1432 M., Local and Municipal.

The original estimate for the water-supply project of Cuddapah as prepared by Major Drake-Brockman, R.E., amounted to Rs. 75,100. Including some improvements suggested by the Public Works Department, the cost was calculated at Rs. 87,300 in paragraph 1 of G.O., No. 248 M., Financial, dated 6th July 1885. Leaving a loan of Rs. 50,000 to be raised by the Municipality in the open market, the Government promised to contribute the remainder from Provincial Funds when the financial pressure then felt should cease.

2. Subsequently it was discovered that through a clerical error the sanctioned estimate of Rs. 87,300 included Rs. 7,500 on account of a water-lift, whereas the correct charge should have been Rs. 750. Deducting the difference Rs. 6,750, and adding Rs. 5,000 for the pay of an Engineer to carry out the work, and Rs. 500 for deepening one well and constructing another, with reference to suggestions made by the Superintending Engineer and approved by the Chief Engineer, Public Works Department, the amount of the revised estimate was fixed at Rs. 86,050 in G.O., No. 449 M., Financial, dated 14th May 1886.

3. The estimate as above settled, did not however provide for the extension of the water-supply to the railway premises. This was considered a defect which should be rectified, and Mr. Johnston, the Executive Engineer in charge of the work, proposed to effect this without any addition to the cost, but, on the contrary, with a saving of Rs. 7,800 in round numbers, by altering the position of the service reservoir and by substituting a uniform service of 8-inch iron main pipes for a masonry conduit and pipes of 11" provided by Major Brockman. The proposals for the shifting of the reservoir, and the use of iron pipes throughout, were accepted by the Chief Engineer, who, however, thought that 10-inch pipes would be necessary, and that piping of this dimension would increase the amount of the estimate.

With reference to these remarks, a revised estimate was called for in G.O., dated 16th April 1888, No. 355 M.

4. But before this could be received, a rough calculation had to be made (in G.O., dated 6th June 1888, No. 590 M.) as to the amount to be contributed from Provincial Funds in pursuance of the promise held out in paragraph 3 of G.O., dated 6th July 1885, No. 248 M. In this calculation, Rs. 7,800 were deducted from the amount of the estimate (Rs. 86,050) approved in G.O., dated 14th May 1886, No. 449 M., with reference to the saving suggested by Mr. Johnston. Further, as under G.O., dated 16th November 1887, No. 1200, and 13th February 1888, No. 136 M., the only extra remuneration to be given to Mr. Johnston for charge of the project was a house allowance of Rs. 25 monthly, the sum of Rs. 5,000 provided in the above-mentioned estimate for the pay of the Engineer was also deducted, while on the other hand Rs. 600 were added on account of horse allowance for two years. The estimated amount required to carry out the project was thus taken at Rs. 73,850.* Setting off against this sum the net proceeds of the loan of Rs. 50,000 (nominal capital) raised by the Municipality which had been reported by the Chairman in paragraph 2 of his budget letter for 1888-89 as Rs. 42,168, a lump grant of Rs. 32,000 was sanctioned from Provincial Funds in G.O., dated 6th June 1888, No. 590 M.

	Rs.
* Estimate as revised by Chief Engineer in G.O., dated 14th May 1886, No. 449 M.	86,050
Deduct Rs. 7,800 + Rs. 5,000 ..	12,800
	73,250
Add ..	600
Balance ..	73,850

5. In a later communication, Mr. Johnston suggested that instead of the 10-inch pipes recommended by the Chief Engineer, 9-inch pipes of $\frac{3}{8}$ inch thickness might be used, and this was approved by the Public Works Department in their Order, No. 701-D, dated 21st September 1888, communicated with G.O., Mis. No. 1099 M., dated 3rd October 1888.

6. A further change of plan has now been mooted by Mr. Johnston, with reference to the difficulty experienced in procuring ready-made pipes of the thicknesses provided for by Major Brockman. The thicknesses of the pipes as at present sanctioned, and as now recommended by Mr. Johnston, are noted below:—

As sanctioned.		*As now recommended.*	
Distributaries diameter—		Diameter—	
2½ inches	$\frac{1}{4}$ inch thick.	2½ inches	$\frac{3}{8}$ inch thick.
3 „	$\frac{1}{4}$ „	3 „	$\frac{3}{8}$ „
4 „	$\frac{1}{4}$ „	4 „	$\frac{3}{8}$ „
Sub-main pipe—			
7 inches	$\frac{3}{8}$ „	7 „	$\frac{1}{2}$ „
Main pipe from reservoir—			
9 inches	$\frac{3}{8}$ „	9 „	$\frac{9}{16}$ „

The thinner pipes are condemned by the Executive Engineer (*a*) on the score of risk of breakage, and (*b*) on the ground that the thickness is below the usual proportions and that the plant required will therefore have to be specially made with a consequent increase in expense.

7. From the rough revised estimates now submitted by Mr. Johnston and the Chairman of the Municipal Council it appears that, even if the thinner pipes are retained, not only does the saving of Rs. 7,800 anticipated by Mr. Johnston from the alteration of the position of the reservoirs and the use of the 8-inch pipes originally proposed by him entirely disappear, but there is an increase of Rs. 10,436 under cost of piping in the estimate of May 1886, while Rs. 1,800 are added for the pay of an overseer, and if the thicker pipes are used, the increase under piping rises to Rs. 22,606, and there is an excess of Rs. 273 under other items. This large increase

is said to be due to the fall in exchange and to a considerable rise in the price of iron. The result is that the total cost of the project is raised as shown below :—

A.—For pipes of the present sanctioned thickness.

	Rs.
(*a*) Estimate approved in G.O., dated 14th May 1886, No. 449 M.	86,050
(*b*) *Deduct* Rs. 5,000 for pay of Engineer	5,000
	81,050
(*c*) *Add* Executive Engineer's house allowance	600
	81,650
(*d*) *Add* excess now estimated in cost of piping	10,436
	92,086
(*e*) *Add* cost of an overseer	1,800
Cost of project according to present estimate	93,886

B.—For the thicker pipes proposed.

Items (*a*), (*b*), (*c*), and (*e*) as above given Rs. 81,650 + Rs. 1,800.	83,450
Add excess now estimated in cost of piping	22,606
Add sundries	273
Cost of project according to present estimate	1,06,329

8. The Council are in favor of the thicker pipes. As above shown, the cost of the project, if these pipes are used, is now estimated at Rs. 1,06,329. It appears that the net proceeds of the municipal loan amounted to Rs 43,168 and not to Rs. 42,168 as at first reported (*vide* paragraph 4 above), and adding to this the grant of Rs. 32,000 already sanctioned from Provincial revenues, the project fund amounts to Rs. 75,168. The Chairman now requests that the difference between this amount and Rs. 1,06,329, viz., Rs. 31,161, may be granted from Provincial Funds, with reference to paragraph 3, G.O., dated 6th July 1885, No. 248 M.

9. The question of the thickness of the pipes is a matter for disposal in the Public Works Department, and final orders on this point will be passed there. As regards the supply of the pipes, whatever their thickness may ultimately be, the Government agree with the view expressed in the Chief Engineer's note of the 13th November 1888, that in a matter of this magnitude it is not safe to trust to a single local firm and that the pipes should be procured through the India Office. The Chairman has already been directed by telegraph to stop the order to Messrs. Massey and Co., which from Mr. Johnston's letter to him of 8th November 1888, appears to have been given.

10. Turning now to the financial question, it is observed that the promise made in G.O., dated 6th July 1885, No. 248 M., was based on the supposition that the cost of the project would only be Rs. 87,300 and that more than half the cost would be borne by the Municipal Council. What the Council now propose is that out of a sum of Rs. 1,06,329, the Government shall contribute Rs. 63,161, *i.e.*, some 60 per cent. This is quite out of the question. All that the Government can now promise in the way of increased aid is to raise the sum granted in G.O., dated 6th June 1888, No. 590 M., by Rs. 7,800, the amount of the saving in the estimate taken credit for on the supposition that 8-inch main pipes would be used, or in round numbers to Rs. 40,000. If the Municipality cannot complete the scheme with the aid of this grant, the extent

of distributaries must be curtailed. At least the main object, which is to bring water to the town, will have been achieved. The Council should at once consider the position and decide what is to be done.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Chairman, Municipal Council, Cuddapah,
through the Collector of Cuddapah.
" Public Works Department.
" Financial Department.

Exd. W. H. French.

Govt. of {1888} Madras.

LOCAL AND MUNICIPAL.

Issued

Recd. Encl.

G.O., 15th Dec. 1888, No. 1432 M.

DECEMBER.

Water-supply.

Passing orders on the Cuddapah — scheme.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following papers :—

From M.R.Ry. C. RAGHAVA ROW, Pantulu Garu, Row Saib, Chairman, Municipal Council, Cuddapah, to the Chief Secretary to Government (through the Collector of Cuddapah), dated Cuddapah, 17th September 1888, No. 845.

In continuation of my letter No. 594, dated 3rd July 1888, I have the honor to submit, for early orders, copy of a letter No. 46, dated 15th September 1888, from the Executive Engineer in charge of Cuddapah water-works and of its enclosures.

ENCLOSURE.

From J. C. JOHNSTON, Esq., Executive Engineer, Cuddapah Division, to the Chairman, Cuddapah Municipality, dated Cuddapah, 15th September 1888, No. 46.

I have the honor to bring to your notice that the thickness of pipes as specified by Colonel Brockman are thinner than the standards in use in England. Messrs. Massey and Co explain that in order to reduce the cost of pipes as low as possible makers in England are obliged to keep to certain thickness which experience has shown to be desirable, and that if pipes of other thicknesses are required, special plant has to be prepared and that the cost of the pipes would be greatly enhanced; and, further, they very much doubt whether any maker would alter his plant for such a small order as has been given by the Cuddapah Municipality.

2. I have prepared a comparative statement showing the excess cost of the thicker pipes. This excess cost is Rs. 22,606 according to Colonel Brockman's rates. I have assumed that a 9″ main from the service reservoir will be sufficient. This point has, however, to be yet settled by the Chief Engineer.

3. The pipes will be made in England by a very eminent firm (Ransome's) and I would urge the speedy settlement of the question. There has already been great delay. There would be no saving in money in keeping to Colonel Brockman's thickness of pipes but great loss in time.

Quantity.	Description of Work.	Rate per ton.	Amount.	Total.
		Rs.	Rs.	Rs.
550·8	Ton main and sub-mains	130	71,604	
66·7	Ton distributaries and service	125	8,338	
	Total ..	..	..	79,942
	Original estimate—			
..	Masonry conduit	..	16,490	
..	Main and sub-mains	..	35,272	
..	Distributaries and service	..	5,574	
	Total ..	..	..	57,336
..	Excess over original estimate	..	..	22,606

Detail of Works.	Number.	Length.	Breadth.	Depth.	Total.
9" main pipe from service reservoir to town distributaries $\frac{15}{16}$" thick	..	18,930 at 59·11 lb. per ft.			1,118,952·30
7" sub-main pipe $\frac{7}{8}$" thick	..	2,840 at 40·44 ,, ,, ...			114,849·60
Total piping lb. ..	..				1,233,801·90
or Tons ..	..				550·8
4" distributaries $\frac{3}{8}$" thick	..	1,245 at 17·88 lb. per ft.			22,260·60
3" service $\frac{3}{8}$" thick	..	6,531 at 13·55 ,, ...			88,495·05
2½" service $\frac{3}{8}$" thick	..	3,684 at 10·50 ,, ,, ...			38,682·00
Total lb. ..	..				149,437·65
or Tons ..	..				66·7
Number of pipes required—					
9" pipe	2,150				..
7" ,, ...	355				..
4" ,, ...	156				..
3" ,, ...	817				..
2½" ,, ...	690				..

No. 6650.

Forwarded.

20th *September* 1888. (Signed) E. J. SEWELL,
Ag. Collector.

No. 4440-C.

Memorandum.

[From the Local and Municipal Department, No. 980, dated 10th November 1888.]

It is impossible for this office to say what is the cheapest and best thickness of pipe to be used for the Cuddapah water-works.

2. Cast-iron pipes are made of different qualities and different thicknesses, and they are as a rule always tested before being used for works.

3. The prices also vary considerably; and of course pipes of certain thicknesses are not always available in the market.

4. In note No. 701-D, dated 21st September 1888, from this office, it was stated that a thickness of $\frac{3}{8}$" for the piping was sufficient, supposing that the pipes were properly tested.

5. It is considered that the pipes should be procured through the Store Department of the India office, that department being told the number and sizes required and the head of water or pressure they will as a maximum be liable to be subjected to.

6. It is not thought right to accept the statement of one firm with regard to a question of this sort which involves a very large expenditure.

(Signed) H. R. MEAD, Colonel, R.E.,
Ag. Chief Engineer, P.W.D.

To the Local and Municipal Department, with 3 enclosures.

From M.R.Ry. C. RAGHAVA ROW, Pantulu Garu, Row Saib, Chairman, Municipal Council, Cuddapah, to the Chief Secretary to Government (through the Collector of Cuddapah), dated 16th November 1888, No. 973.

In acknowledging receipt of G.O., Mis. No. 1099 M., dated 3rd October 1888, communicating, for the guidance of the Council, the remarks of the Secretary to Government, Public Works Department, in regard to the capacity of pipes required for the Cuddapah Bugga Water Project, I have the honor to report that the Executive Engineer in charge of the water-works is now of opinion that the pipes originally proposed by him are not suited for the project, inasmuch as such pipes cannot bear the full working pressure due to the head.

2. It is to be regretted that this matter has not been carefully considered and brought to the notice of Government earlier, and that the question should arise after the works are fairly in hand, and their completion is eagerly awaited by all.

3. Messrs. Massey and Co., whom the Executive Engineer consulted, inform him that they very much doubt whether any maker in England would alter his plant for a small order as that given by this Municipality, and that the cost of specially-made pipes would be great.

4. The cost of adopting the piping proposed by the Executive Engineer in modification of Colonel Brockman's scheme, and approved in G.O. above referred to, exceeds the sanctioned estimate of Rs. 73,850, and the proposal of thicker pipes, now recommended, would increase the said estimate by Rs. 31,161. But against this has to be set off the risk of breakage among the thinner pipes, and the further fact that thinner pipes are, according to the experience and practice of the best makers in England, unsuited and undesirable for such works as stated by the Executive Engineer. These facts were fully discussed in the Executive Engineer's letter No. 46, dated 15th September 1888, a copy of which was sent to you with the Collector's endorsement, No. 6650, dated 21st September 1888, and recorded in the G.O. under reference.

5. I have called two special meetings of the Council, and at one of them the Executive Engineer personally explained the *pros* and *cons* of this question, and the Council have, in their resolutions herewith submitted, agreed to the adoption of thicker pipes. As it is of the utmost importance that no further delay should occur in the completion of the water-works which are in fair state of progress, and for which the townspeople are already paying the water-tax, I request you will be pleased to obtain early orders of Government on the subject.

6. Relying on the liberality of Government who have already helped the Municipality with a grant of Rs. 32,000 for this project, which is of immense importance not only to the townspeople but also to people from the district, I beg respectfully to apply for the increase of the grant to meet the deficiency.

7. In doing this, it is scarcely necessary for me to review the financial position of this Municipality which is already well known to Government.

Enclosures.

Post-card to No. C-2, dated 19th October 1888, from the Executive Engineer, to the Chairman Municipal Council.

Your No. 917, dated 15th October 1888. The last G.O. received, intimated that the 9-inch pipe could be used and that it could be only $\frac{3}{8}$" thick. Since I recommended this thickness, I saw Messrs. Massey and Co., and they told me these thicknesses would not do. So I wrote again giving the proper thicknesses of the pipes. I also sent you a letter from Messrs. Massey and Co., giving their rates per ton for the pipes as specified by Colonel Brockman. Can I order pipes of thicknesses as ordinarily made and settle excess prices afterwards, if any?

(Signed) J. C. JOHNSTON,
Executive Engineer.

COPY of letter No. 940, dated 6th November 1888, from the Chairman, to the Executive Engineer.

As the question of the thicknesses of pipes has to be finally decided in a meeting, I request you to be good enough to appear and favor the Council with your views at the next meeting to be held on Friday the 9th instant, at 7-30 A.M.

(Signed) C. RAGHAVA ROW,
Chairman.

DEMI-OFFICIAL of the Executive Engineer, to the Chairman, Municipal Council, dated 8th November 1888.

Your letter of the 6th instant was received by me this morning in camp. I shall most probably have to return to head-quarters on Saturday or Sunday next, and will be happy to express my views again on Monday if a meeting can be convened. But I have already expressed my views on the subject. The thicknesses of pipes as specified by Major Brockman are, according to the experience and practice of the best makers in England, too thin. The thicker pipes would increase the estimate by about Rs. 10,000 perhaps, and the risk of breakage among the latter would be greater and would still further increase the estimate. I recommend the thicker pipes which I have already ordered to be supplied. If, however, the Council wish the thinner pipes to be supplied, kindly telegraph to Messrs. Massey and Co., Madras, to stop supplying the thicker pipes. Taken all in all, I think the thicker pipes will be the cheaper in the end.

(Signed) J. C. JOHNSTON,
Executive Engineer.

EXTRACT from Proceedings of the Municipal Council, dated 12th November 1888.

I. Read again—

G.O., No. 1099 M., dated 3rd October 1888.
Executive Engineer's Post Card, dated 19th October 1888, No. C-2.
Executive Engineer's demi-official, dated 8th November 1888.

Resolution.—The Council learn that main pipes of $\frac{3}{8}$ inch in thickness as specified by the Executive Engineer are, according to the experience and practice of the best makers in England, too thin and unsuited for water works; that such thin pipes are not ordinarily made in England, but would require special plant for their construction; that it is doubtful whether any maker would alter is plant for meeting a small order from this Municipality; and that the adoption of thin pipes would be attended with greater risk of breakage and increase the estimate; and they, therefore, resolve that it would be advantageous in the interests of the rate-payers to accept the Executive Engineer's recommendation that thicker pipes be ordered from England. The Council are not unaware of the fact that the adoption of thicker pipes would, as shown by the Executive Engineer, entail an excess of Rs. 22,606 over the sanctioned estimate, but as that officer is clearly of opinion that thinner pipes cannot bear the full-working pressure due to the head, the best thing that they could do under the circumstances is, of course, to move the Government to sanction the excess expenditure of Rs. 22,606 over the estimate. As the Government are fully aware of the financial circumstances of this Municipality and as the grant of Rs. 32,000 sanctioned in G.O., No. 590, dated 6th June 1888, Financial, will not suffice to meet the cost, the Council resolve to apply to Government for increase of their grant to meet the deficit as explained below:—

		RS.
Estimate as finally sanctioned in G.O., No. 590, dated 6th June 1888		73,850
Cost of thicker pipes as now resolved		22,606
		96,456
Deduct—	RS.	
Amount of loan	43,168	
Do. of grant by Government	32,000	
		75,168
The deficit ..		21,288

The Council respectfully venture to note that the Executive Engineer has fully discussed the whole question in his letter No. 46, dated 15th September 1888, a copy of which was submitted with Collector's endorsement No. 6650, dated 21st September 1888, and recorded in the Government order quoted above.

(Signed) C. RAGHAVA ROW,
Chairman.

7/9

STATEMENT placed by the Executive Engineer before the Council at their Meeting of 12th November 1888.

Description of piping.	Thickness.	Weight in tons.	Price per ton.	Cost as delivered at Madras Railway Station.	
				Thinner pipes.	Thicker pipes.
			RS.	RS.	RS.
9" Main	$\frac{3}{8}$"	318·5	110	35,035	..
Do.	$\frac{7}{16}$"	499·5	95	..	47,452
7" Sub-main	$\frac{3}{8}$"	46·3	111	5,139	..
Do.	$\frac{7}{16}$"	51·2	98	..	5,017
4" Distributaries	$\frac{3}{8}$"	9·7	114	1,105	..
Do.	$\frac{7}{16}$"	10	101	..	1,010
3" Distributaries	$\frac{3}{8}$"	34	116	3,944	..
Do.	$\frac{7}{16}$"	39·5	103	..	4,068
$2\frac{1}{2}$" Distributaries	$\frac{3}{8}$"	16·6	116	1,925	..
Do.	$\frac{7}{16}$"	17·2	103	..	1,771
Cost of pipes delivered at Madras Railway Station	..	..	..	47,148	59,318
Add for trainage and setting	..	..	..	20,624	20,624
	..	..	..	67,772	79,942
Estimate allows	..	..	..	57,336	57,336
Excess	..	..	..	10,436	22,606

CHAIRMAN'S Memorandum to the Executive Engineer, dated 13th November 1888.

The original estimate sanctioned by Government in G.O., No. 449, dated 14th May 1886, according to Major Brockman's scheme providing for conduit and pipes—Rs. 86,050.

In G.O., No. 355, dated 16th April 1888, Government ordered the reduction of this amount by Rs. 7,800 as proposed by the Executive Engineer. In this it was arranged to have an 8" bore pipe throughout, and the savings over Major Brockman's estimate were calculated.

In G.O.,* No. 590, dated 6th June 1888, which finally settled the amount to be spent on the works, the saving was taken into consideration, and the original amount was reduced by the amount, and the Municipality was placed in charge of funds to the extent of Rs. 73,850 including loans and contribution, Rs. 73,850.

* Particulars of other deductions which do not affect the case will be known from this Government order.

In the note by the Chief Engineer recorded in G.O., No. 355, dated 16th April 1888 (above quoted), he suggested that a 9" bore pipe is necessary; but the Government in passing this order or the final order in G.O., No. 590, dated 6th June 1888, did not take into consideration the financial changes this would have on the estimate, but allotted the amount required for the 8" bore pipe only. The remarks of the Chief Engineer were duly communicated to the Municipality and a revised estimate was asked for, which does not seem to have been forwarded with reference to the Chief Engineer's note. The Chief Engineer's suggestion of having a 9" bore pipe with $\frac{3}{8}$" thickness was finally approved in G.O., No. 1099, dated 3rd October 1888; but still the funds placed at our disposal were calculated on the basis of having an 8" bore pipe only.

In the statement placed before the Council yesterday proposing thicker pipes as suggested by Messrs. Massey and Co., the total cost for piping with thicker pipes was given as Rs. 79,942 and the total cost for having the thinner pipes with 9" bore as Rs. 67,772.

In calculating the excess expenditure that is involved by having the thicker or thinner pipes with 9" bore, it has been assumed that Major Brockman's scheme was finally sanctioned by Government, and funds are now on hand according to his estimate. For the sum of Rs. 57,336 which is designated "estimate allows" is the sum estimated for by Major Brockman for having conduit and various kinds of pipes, and thus the excess amount now required was calculated to be Rs. 10,436 for 9" pipe thinner, and Rs. 22,606 for 9" pipe thicker. But the sum of Rs. 57,336 was reduced by Rs. 7,800 in passing the final order about funds in G.O., No. 590, dated 6th June 1888, owing to the proposal of having an 8" bore pipe throughout, the probable savings from which was estimated at Rs. 7,800.

Therefore the sum that has to be deducted from the present estimated cost of having the thicker or thinner 9" bore pipes with other modifications in minor pipes, in order to find out the extra money now required is not Rs. 57,336, the amount in Major Brockman's estimate, but this sum *minus* Rs. 7,800, which is the amount that has been sanctioned.

9

This would increase the amount now required for the thinner or thicker pipes by Rs. 7,800. In other words the sums now required, and which must be obtained, would be —

Thinner pipes .. .. Rs. 10,436 + 7,800 = 18,236
Thicker pipes suggested by Messrs. Massey and Co... „ 22,606 + 7,800 = 30,406

In yesterday's resolution it was said that the amount required would be only Rs. 10,436 or Rs. 22,606, according as thinner or thicker pipes are used, which is erroneous.

(Signed) C. RAGHAVA ROW,
Chairman.

From J. C. JOHNSTON, Esq., Executive Engineer, to the Chairman of the Municipal Council, Cuddapah, dated Rájampet, 14th November 1888.

I have received your letter, dated 13th November 1888, and have given it due consideration. The Rs. 30,406 is due to an error on the part of Government. By proposing an 8″ pipe I showed a saving of Rs. 7,800 or so. In G.O., No. 355, dated 16th April 1888, however, a 9″ pipe or 10″ pipe was ordered instead of an 8″ one, but no notice of this larger pipe was taken in G.O , No. 590 M., dated 6th June 1888, and in which my proposed saving of Rs. 7,800 was still shown. You should call their attention to this; and say also that the thicker pipes are those ordinarily made and that these will increase the original estimate by Rs. 22,000. There is no time to write all over India asking for information regarding thicknesses of pipes. The rates for iron ware are rising fast, and soon you will have to pay the higher rates for the thicker pipes. It is of no use going into calculation regarding pressure, &c. Theoretically the thickness of the 7″ pipe need be only $\frac{1}{25}$ inch, but no sane person would order pipes of that thickness. There are other considerations besides pressure which determine the thickness, viz., transit, careless usage, &c.

Major Brockman's thicknesses will do as far as the pressure of water only is concerned, *but the risk of breakage with them will be doubled* than with the thicker ones. The thicknesses recommended by Messrs. Massey and Co., are those used for the Glasgow water works, and they are capable of bearing a pressure due to a head of 200 to 300 feet. The greatest pressure which our pipes will have to bear will be one due to about 50 to 70 feet, *but* it must be taken into consideration that in Glasgow the best appliances and workmen were available, that the pipes were cast in the country and that their transit was easy. Whereas here in our case, besides a long sea voyage, the pipes will have to bear the risk of unloading from the ship, loading in and unloading from railway wagons, and last and best of all manipulation by unskilful coolies. Obtaining pipes from Bombay is out of the question, for the railway fare would increase the cost per ton by at least Rs. 35. I have price list of Messrs Richardson and Cruddos before me, dated January 1888, and in that the rate for cast iron spigot and socket pipes is Rs. 87½ a ton, and if to this be added Rs. 50 for trainage, the total will be Rs. 137½ as only delivered at Cuddapah, against the estimate rate of Rs. 125 to Rs. 135 delivered and laid complete; since January last prices have risen considerably I append a list of thicknesses for comparison.

Diameter.	Thickness as recommended by			
	Major Brockman.	Glasgow Works.	Messrs. Massey and Co., and myself.	Richardson and Cruddos.
2½″	¼″	..	⅜″	5/16″
3″	¼″	⅜″	⅜″	⅜″
4″	¼″	⅜″	⅜″	⅜″
7″	⅜″	½″	½″	½″
9″	..	9/16″	9/16″	11/32″

The last three columns are practically identical.

If with all this overwhelming evidence in favor of the thicker pipes the Council still delay in coming to a decision, such delay will not be to their interests. I enclose a letter received this day from Messrs. Massey and Co., and from that you will learn that prices of iron work are fast advancing—*so delay will be fatal.*

I have recast the estimate, taking Major Brockman's rates for iron works. These rates were fixed at a time when exchange was higher and prices lower. Trade is now reviving in England and prices are rising, but I have still kept to Major Brockman's rates.

I have given you all the information I possess on the subject and it is for you to bring the matter to the notice of Government.

I may add that the pipes as specified by Major Brockman are called by Messrs. Massey and Co. "rain water pipes."

It is only a matter of funds. The estimate as originally sanctioned, must be exceeded at least by Rs. 10,000, and that by using the thinner pipes, an excess of Rs. 22,000 will give the thicker pipes and pipes of double the strength of the thinner ones.

CUDDAPAH Water Works comparative statement showing excess due to extra thickness of pipes.

Description of Items.		As sanctioned in G.O., No. 449 M., of 14th May 1886.	As revised.
		RS.	RS.
Infiltration gallery		4,513	4,513
Well		450	450
Service reservoir		9,418	9,418
Value cistern		209	209
Masonry conduit	16,490		
Mains and sub-mains	35,272	.. .. ..	51,762	71,604
Distributaries		5,581	8,338
Special castings		600	600
Value, &c.		1,360	1,500
Jointing materials, &c.		1,000	1,000
Dry broken kunker		167	167
Hydrants		2,520	2,640
Fixing hydrants		420	440
Water-lift		750	750
Improving springs		200	200
Contingencies		1,800	1,800
Petty supervision		300	300
Engineer's pay, &c.		5,000	5,000
Total ..		86,050	1,08,929
			86,050
Excess ..			22,879

EXTRACT from Proceedings of the Municipal Council, dated 16th November 1888.

I. Read again Resolution No. I of the Council held on 12th instant.

Read Chairman's memorandum dated 13th instant.

Read demi-official, dated 14th instant, from the Executive Engineer, together with the statement accompanying it.

Resolution.—These papers will be submitted to Government with the following remarks: The former resolution was based on erroneous figures given by the Executive Engineer. That officer assumes that Rs. 86,050 have been sanctioned by Government for the water works according to Colonel Drake-Brockman's estimate and compares the figures in that estimate with his present revised scheme for thicker pipes. The Council find that the Government have only sanctioned Rs. 73,850 in their Order, No. 590 M., of 6th June 1888, deducting Rs. 5,000, the pay of Engineer, and Rs. 7,800, savings estimated by the Executive Engineer, by substituting 8″ pipe. But the Government have since sanctioned in their Order, No. 1099 M., of 3rd October 1888, the substitution of 9″ pipe to 8″ pipe retaining the ⅜″ thickness; this alteration in the piping not only absorbs the above savings, but considerably raises the estimate. Now the Executive Engineer states that the ⅜″ thickness is quite unsuited for the purpose, characterizes the thin pipes as "rain water pipes," and proposes substitution of thicker ones specified in the demi-official read above. This raises the estimate as follows:—

	RS.
The Executive Engineer's present revised estimate amounts to ..	1,08,929
Deduct—	
Engineer's pay wrongly included by the Executive Engineer ..	5,000
	1,03,929
Add—	
Horse allowance to the Executive Engineer sanctioned in G.O., No. 136 M., of 13th February 1888	600
Overseer's pay for two years	1,800
Total ..	1,06,329
Deduct— RS.	
The realized proceeds of loan 43,168	
Contribution by Government 32,000	
	75,168
Net excess ..	31,161

The Council beg to solicit the Government will be pleased to make an additional grant of Rs. 31,161, to enable them to bring the work to completion, as they can find no means of meeting this expenditure.

* * *

(Signed) C. RAGHAVA RAO,
Chairman.

No. 8381.

Forwarded for the favorable consideration of Government. This demand for Rs. 31,000 odd additional comes as a complete surprise. It will be seen to be entirely due to the Engineers. Colonel Drake-Brockman's first estimate was about to be accepted. The Executive Engineer said he could reduce the cost by using more iron pipes and altering the position of the reservoir, and his plan and estimate were accepted and the money arranged for. This was for an 8-inch bore pipe.

Then the Chief Engineer (*vide* G.O., No. 355, dated 16th April 1888) remarked that a 9-inch bore pipe was necessary. And now the Executive Engineer declares that the 9-inch bore pipe must have a greater thickness than the Chief Engineer allowed. The Council are perfectly helpless in the matter. Their loan of Rs. 50,000 at 6 per cent. per annum not repayable for 25 years only fetched Rs. 43,168. Any further loan would be ruinous even if it could be raised. If the thicker pipes are absolutely necessary, there seems to be no help for it, but that the money should be advanced.

The Engineers will no doubt decide, but the reasons given for the thicker pipes do not appear convincing.

NANDIALEMPET,
20th November 1888.

(Signed) E. J. SEWELL,
Ag. Collector.

ORDER—dated 15th December 1888, No. 1432 M., Local and Municipal.

The original estimate for the water-supply project of Cuddapah as prepared by Major Drake-Brockman, R.E., amounted to Rs. 75,100. Including some improvements suggested by the Public Works Department, the cost was calculated at Rs. 87,300 in paragraph 1 of G.O., No. 248 M., Financial, dated 6th July 1885. Leaving a loan of Rs. 50,000 to be raised by the Municipality in the open market, the Government promised to contribute the remainder from Provincial Funds when the financial pressure then felt should cease.

2. Subsequently it was discovered that through a clerical error the sanctioned estimate of Rs. 87,300 included Rs. 7,500 on account of a water-lift, whereas the correct charge should have been Rs. 750. Deducting the difference Rs. 6,750, and adding Rs. 5,000 for the pay of an Engineer to carry out the work, and Rs. 500 for deepening one well and constructing another, with reference to suggestions made by the Superintending Engineer and approved by the Chief Engineer, Public Works Department, the amount of the revised estimate was fixed at Rs. 86,050 in G.O., No. 449 M., Financial, dated 14th May 1886.

3. The estimate as above settled, did not however provide for the extension of the water-supply to the railway premises. This was considered a defect which should be rectified, and Mr. Johnston, the Executive Engineer in charge of the work, proposed to effect this without any addition to the cost, but, on the contrary, with a saving of Rs. 7,800 in round numbers, by altering the position of the service reservoir and by substituting a uniform service of 8-inch iron main pipes for a masonry conduit and pipes of 11" provided by Major Brockman. The proposals for the shifting of the reservoir, and the use of iron pipes throughout, were accepted by the Chief Engineer, who, however, thought that 10-inch pipes would be necessary, and that piping of this dimension would increase the amount of the estimate.

With reference to these remarks, a revised estimate was called for in G.O., dated 16th April 1888, No. 355 M.

4. But before this could be received, a rough calculation had to be made (in G.O., dated 6th June 1888, No. 590 M.) as to the amount to be contributed from Provincial Funds in pursuance of the promise held out in paragraph 3 of G.O., dated 6th July 1885, No. 248 M. In this calculation, Rs. 7,800 were deducted from the amount of the estimate (Rs. 86,050) approved in G.O., dated 14th May 1886, No. 449 M., with reference to the saving suggested by Mr. Johnston. Further, as under G.O., dated 16th November 1887, No. 1200, and 13th February 1888, No. 136 M., the only extra remuneration to be given to Mr. Johnston for charge of the project was a house allowance of Rs. 25 monthly, the sum of Rs. 5,000 provided in the above-mentioned estimate for the pay of the Engineer was also deducted, while on the other hand Rs. 600 were added on account of horse allowance for two years. The estimated amount required to carry out the project was thus taken at Rs. 73,850.* Setting off against this sum the net proceeds of the loan of Rs. 50,000 (nominal capital) raised by the Municipality which had been reported by the Chairman in paragraph 2 of his budget letter for 1888-89 as Rs. 42,168, a lump grant of Rs. 32,000 was sanctioned from Provincial Funds in G.O., dated 6th June 1888, No. 590 M.

	Rs.
* Estimate as revised by Chief Engineer in G.O., dated 14th May 1886, No. 449 M.	86,050
Deduct Rs. 7,800 + Rs. 5,000 ..	12,800
	73,250
Add ..	600
Balance ..	73,850

5. In a later communication, Mr. Johnston suggested that instead of the 10-inch pipes recommended by the Chief Engineer, 9-inch pipes of $\frac{3}{8}$ inch thickness might be used, and this was approved by the Public Works Department in their Order, No. 701-D, dated 21st September 1888, communicated with G.O., Mis. No. 1099 M., dated 3rd October 1888.

6. A further change of plan has now been mooted by Mr. Johnston, with reference to the difficulty experienced in procuring ready-made pipes of the thicknesses provided for by Major Brockman. The thicknesses of the pipes as at present sanctioned, and as now recommended by Mr. Johnston, are noted below:—

As sanctioned.		*As now recommended.*	
Distributaries diameter—		Diameter—	
2½ inches	$\frac{1}{4}$ inch thick.	2½ inches	$\frac{3}{8}$ inch thick.
3 „	$\frac{1}{4}$ „	3 „	$\frac{3}{8}$ „
4 „	$\frac{1}{4}$ „	4 „	$\frac{3}{8}$ „
Sub-main pipe—			
7 inches	$\frac{3}{8}$ „	7 „	$\frac{1}{2}$ „
Main pipe from reservoir—			
9 inches	$\frac{3}{8}$ „	9 „	$\frac{9}{16}$ „

The thinner pipes are condemned by the Executive Engineer (*a*) on the score of risk of breakage, and (*b*) on the ground that the thickness is below the usual proportions and that the plant required will therefore have to be specially made with a consequent increase in expense.

7. From the rough revised estimates now submitted by Mr. Johnston and the Chairman of the Municipal Council it appears that, even if the thinner pipes are retained, not only does the saving of Rs. 7,800 anticipated by Mr. Johnston from the alteration of the position of the reservoirs and the use of the 8-inch pipes originally proposed by him entirely disappear, but there is an increase of Rs. 10,436 under cost of piping in the estimate of May 1886, while Rs. 1,800 are added for the pay of an overseer, and if the thicker pipes are used, the increase under piping rises to Rs. 22,606, and there is an excess of Rs. 273 under other items. This large increase

is said to be due to the fall in exchange and to a considerable rise in the price of iron. The result is that the total cost of the project is raised as shown below :—

A.—For pipes of the present sanctioned thickness.

	RS.
(*a*) Estimate approved in G.O., dated 14th May 1886, No. 449 M.	86,050
(*b*) *Deduct* Rs. 5,000 for pay of Engineer	5,000
	81,050
(*c*) *Add* Executive Engineer's house allowance	600
	81,650
(*d*) *Add* excess now estimated in cost of piping	10,436
	92,086
(*e*) *Add* cost of an overseer	1,800
Cost of project according to present estimate	93,886

B.—For the thicker pipes proposed.

Items (*a*), (*b*), (*c*), and (*e*) as above given Rs. 81,650 + Rs. 1,800.	83,450
Add excess now estimated in cost of piping	22,606
Add sundries	273
Cost of project according to present estimate	1,06,329

8. The Council are in favor of the thicker pipes. As above shown, the cost of the project, if these pipes are used, is now estimated at Rs. 1,06,329. It appears that the net proceeds of the municipal loan amounted to Rs 43,168 and not to Rs. 42,168 as at first reported (*vide* paragraph 4 above), and adding to this the grant of Rs. 32,000 already sanctioned from Provincial revenues, the project fund amounts to Rs. 75,168. The Chairman now requests that the difference between this amount and Rs. 1,06,329, viz., Rs. 31,161, may be granted from Provincial Funds, with reference to paragraph 3, G.O., dated 6th July 1885, No. 248 M.

9. The question of the thickness of the pipes is a matter for disposal in the Public Works Department, and final orders on this point will be passed there. As regards the supply of the pipes, whatever their thickness may ultimately be, the Government agree with the view expressed in the Chief Engineer's note of the 13th November 1888, that in a matter of this magnitude it is not safe to trust to a single local firm and that the pipes should be procured through the India Office. The Chairman has already been directed by telegraph to stop the order to Messrs. Massey and Co., which from Mr. Johnston's letter to him of 8th November 1888, appears to have been given.

10. Turning now to the financial question, it is observed that the promise made in G.O., dated 6th July 1885, No. 248 M., was based on the supposition that the cost of the project would only be Rs. 87,300 and that more than half the cost would be borne by the Municipal Council. What the Council now propose is that out of a sum of Rs. 1,06,329, the Government shall contribute Rs. 63,161, *i.e.*, some 60 per cent. This is quite out of the question. All that the Government can now promise in the way of increased aid is to raise the sum granted in G.O., dated 6th June 1888, No. 590 M., by Rs. 7,800, the amount of the saving in the estimate taken credit for on the supposition that 8-inch main pipes would be used, or in round numbers to Rs. 40,000. If the Municipality cannot complete the scheme with the aid of this grant, the extent

of distributaries must be curtailed. At least the main object, which is to bring water to the town, will have been achieved. The Council should at once consider the position and decide what is to be done."

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Chairman, Municipal Council, Cuddapah,
through the Collector of Cuddapah.
" Public Works Department.
" Financial Department.

Exd. W. H. French.

Ho 7W dy 7-89
Commd: to the
DR III Circle
19 W.L.C.S.

Govt. of {1888} Madras.

LOCAL AND MUNICIPAL.

Issued

Recd. *Encl.*

G.O., 15th Dec. 1888, No. 1432 M.

GO 765 dy 7-89

DECEMBER.

Water-supply.

Passing orders on the Cuddapah — scheme.

DR III Circle.

with orders

No. 481 B.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Buildings.

Simla, the 7th September, 1888.

RESOLUTION.

Construction or Purchase of residences for Government Officials.

Read again—

Public Works Department Circular No. 1, dated 10th February 1885.

Public Works Department Circular No. 14, dated 2nd September 1885.

Read also—

Abstract of Proceedings of the Government of Bombay, Imperial Civil Works, for December 1886. Entry Nos. 740 C. W.—2059, regarding rents to be charged for quarters for the Mamlatdar's establishment at Mangaon.

Public Works Department Circular letter No. 365 B., dated 1st October 1887.

Letter from Chief Commissioner, Central Provinces, No. 7366, dated 25th October 1887.

" " " " Assam, No. 4718, dated 29th October 1887.

" " Resident, Hyderabad, No. 358 C. W., dated 2nd November 1887.

" " Government of Madras, Public Works Department, No. 2971 W., dated 7th November 1887.

" " Government of North-Western Provinces and Oudh, Public Works Department, No. C. 3681 B. R., dated 12th November 1887.

" " Government of Punjab, Public Works Department, No. 5779, dated 12th November 1887.

" " Agent to the Governor-General for Central India, No. 597, dated 17th November 1887.

" " Inspector General of Military Works, No. 3090 A., dated 22nd November 1887.

" " Chief Commissioner, Coorg, No. $\frac{2}{4}\frac{5}{1}\frac{4}{2}$, dated 22nd November 1887.

" " " " Burma, No. 8277, dated 24th November 1887.

" " Government of Bengal, Public Works Department, No. 3776 G., dated 2nd December 1887.

" " Agent to the Governor-General for Baluchistan, No. 8292, dated 1st December 1887.

" " Agent to the Governor-General for Rajputana, No. 2818 S., dated 10th December 1887.

" " Director General of Railways, No. 0147 E., dated 30th December 1887.

" " Government of Bombay, Public Works Department, No. 112 C. W.—342, dated 15th February 1888.

RESOLUTION.—The Governor-General in Council is pleased to lay down the following rules in connection with the construction or purchase of residences for Government officials :—

(1) When a house has to be built or purchased for the occupation of a Government official, its cost should be so regulated that the rental, calculated under the terms of Resolution No. 479 B. of this date, will not exceed 8 per cent. of the salary of the official who will usually occupy it.

1/13

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(2) In calculating the cost of a building to be erected, a sum should be included to cover the share of Tools and Plant and Establishment. The amount to be added for these charges may be specially approved by the Local Government, but should not be taken at less than 20 per cent. on the cost of "works."

(3) Any Local Government or Administration wishing to build or purchase a house, with regard to which the condition of rule (1) as to rent cannot be fulfilled, must, irrespective of the Fund from which the cost of the building is met, obtain the special sanction of the Government of India before construction is commenced, or the purchase concluded.

The Governments of Madras, Bombay, Bengal, the North-Western Provinces and Oudh, and the Punjab.
The Chief Commissioners of the Central Provinces, Burma, Assam, and Coorg.
The Resident at Hyderabad.
The Agents to the Governor-General for Central India, Rajputana, and Baluchistan.
The Accountant General, Public Works Department.
The Director General of Railways.
The Consulting Engineers to the Government of India for Railways, Calcutta, Central Division, and Lucknow.
The Director General of Telegraphs.

ORDER.—Ordered, that this Resolution be forwarded to the Local Governments and Administrations and Officers noted in the margin, for information and guidance.

Ordered also, that this Resolution be communicated to the various Departments of the Government of India noted in the margin, for information and favour of issue of any further instructions which may be necessary.

The Department of Finance and Commerce.
The Foreign, Home, Military and Legislative Departments.
The Department of Revenue and Agriculture.

R. C. B. PEMBERTON, Colonel, R.E.,
Secretary to the Govt. of India.

No. 482 B., dated 7th September 1888.

Copy of the Resolution forwarded to the Inspector General of Military Works, for information and guidance.

By order,

R. B. BUCKLEY,
Under-Secy. to the Govt. of India.

G. C. Press, Simla.—No. 289 P. W. D.—9-9-88.—1,800.

R. Dis 439/38
30.5.38

Government of Madras.

Public Works Department
(General).

Memorandum No.1372 B/38-1 dated 26th May 1938.

Records-Public Works Department-G.Os. Loss of.

Ref:- Letter from the Curator, Madras Record Office, No.439-D-III/38-4 dated 2nd May 1938.

The Curator, Madras Record Office is permitted to record the 27 missing miscellaneous G.Os. as lost and to substitute copies in the place of the 4 Press G.Os.

K.Ramunni Menon,
Secretary to Government.

To the Curator, Madras Record Office.

Forwarded
(By Order)
(Sd) x x x x x
Superintendent.