M.R.O. 1—77,000—5-4-37.

(1) Number of pages 32

(2) Date of repair 7 – 10 – 38

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Local and Municipal **DEPARTMENT.**

Municipal

G.O. No.	496 M	Press Mis.
Dated	11 – 4 –	1893 .

Not to be folded or roughly handled

Read - also the filing papers
G.O. 31-4-93 No. 496 M L&M

FORM A.

No. ~~2774~~

Recd - the filing papers

GOVERNMENT OF MADRAS.

OFFICE OF SANITARY ENGINEER,

Fort St. George, 6th December 1892.

CURRENT No. 2896 M

Lm 1114 m 8m/8

From

J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E.,

SANITARY ENGINEER TO GOVERNMENT,

To

The Chief Secretary to Government
Local and Municipal Department

SIR,

I have the honor to send as per annexed list, plans and estimates for the improvement of the water supply of the town of Kurnool.

2. In my report dated 10th April 1891, No. 272 it will be noticed that of the two schemes under consideration I preferred the scheme which had for its source the Hindri River as opposed to the canal supply & this was practically the source which had the very strong support of Dr W. G. King, who had long been District Medical and Sanitary Officer of Kurnool.

G.O. 709 M
17-8-91

3. He had indeed fair grounds for

or considering that the source of supply was a pure one for the most favored water used in Kurnool is that drawn from the Cutcherry well on the South Bank of the Hindri which was supposed to be perfectly pure water.

4. When experiments were made to test the available supply in the Hindri during the dry season water was taken from it as well as from the well to which I have referred and it is regretted that the results were anything but favorable as is shewn by the following analyses:-

	A Water from experimental well in the bed of Hindri after allowing the water to stand still for 20 hours	B Water from experimental well in the bed of Hindri while a pump was working	Water from pump well in Collectors Cutcherry
Total Solids — Grms per litre	0·330	0·320	0·440
Volatile Solids — do — do	0·100	0·090	0·120
Chlorine — do — do	0·024	0·021	0·032
Total hardness — Clark's scale	8°·750	8°·750	11°·550
Permanent hardness — do — do	1°·750	1°·750	0°·700
Free ammonia — Mlgrms per litre	0·280	0·240	trace
Albumenoid ammonia — do — do	0·120	0·080	0·080
Nitric acid — do — do (as ammonia)	0·450	0·450	2·250
Apparent quality of water as inferred from the results obtained on examination	Suspicious	Suspicious	Suspicious

The samples A & B are condemned as Suspicious on account of the high amount of Ammonia;

in

in some respects the water from the Cutcherry well is worse, but this water is used by a great many people. The people of Kurnool have also, I find, a strong prejudice against using water drawn from the bed of the Hindri and I am informed that Cholera travels, when it gets into the Kurnool district and adjacent to the Hindri very rapidly down that river. For these reasons & also in view of the fact that the cost of the scheme would have been much greater than I anticipated, I was compelled to abandon the proposal to make the Hindri the source of supply.

5. The figures, on which I based the cost of that scheme, viz those in an estimate for Rs 81,094, were, I find, for only a portion of the work. The original estimate for the work was Rs 1,14,225 (see para 18 following) and this without engines, pumps &c which are absolutely necessary for the supply of the town.

6. The scheme now submitted has for its source of supply the Kurnool canal and there are two reasons why the first large item, indeed the larg

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tem in the scheme except pipes, is a settling tank; on the capacity of this tank depends its cost. I accepted in my first estimate, the Public Works Department figures and placed the cost at Rs 18,000. But from enquiries made and after consultation with the Executive Engineer, Kurnool I am of opinion that for one reason, viz to allow for the closure of the Canal, the tank should contain at least a fortnights supply. There is at present great inconvenience to the Canal during closure and water has to be stored for the benefit of the Municipality by erecting bunds across the canal & thus forming a reservoir to keep up the supply.

7. Were this the only reason for the tank it might have been possible to let ~~the~~ matters go on as now, but the water of the Kurnool Canal which is supplied by the Toongabudra carries in it such a very large proportion of silt about 30-38 grains per pint, during the monsoon & slightly less ordinarily) that a settling tank is a positive necessity. It is impossible to admit water in such a state as the water in

the

the canal is into the distribution pipes and further though I have not included the cost of filter beds in the estimate, I fear that they will eventually be found necessary & this is also the opinion of the Chemical Examiner, vide the following analyses:-

	Kurnool Cuddapah Canal water obtained from the Canal on the 29th October 1890
Total Solids ——— Grms per litre	0·330
Volatile Solids ——— do —— do	0·100
Chlorine ——— do —— do	0·021
Total hardness ——— Clark's scale	4°·550
Permanent hardness ——— do —— do	0°·700
Free ammonia ——— Mlgrms per litre	0·040
Albumenoid ammonia ——— do —— do	0·120
Nitric acid ——— do —— do (as ammonia)	0·300
Apparent quality of the water as inferred from the results obtained on examination	usable after filtration, as large amount of fine clays being in suspension

8. The settling tank included in the estimate will contain a fortnights* supply and this is none too large either for the convenience of the Canal officers or the necessity for settling the water before admission to the pumps. The settling tank is divided into halves & each portion will contain a week's supply

9. The

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* The Municipal Council before the first estimate was prepared asked for a 6 weeks storage.

9. The depth of the proposed settling tank is 9 feet below inlet level and therefore if the deposit took place with a rate of fall of only 12" per day the water ought to be perfectly clear in a week after delivery; as a matter of fact the deposit will take place much quicker than this. The inlet level to the settling tank is placed three feet below ordinary canal level so that the water may be drawn from the canal almost up to the last minute before closure.

10. Before describing the further portions of the scheme I may say that the arrangements made are such that a very slight lowering of the pump well will allow of the introduction of filters if found necessary.

11. The water from the settling tank will be drawn off by means of floating pipes which will draw off the top water first; these pipes are connected outside the settling tank to a main 12" in diameter which will carry the water to the pump well.

12. From the Hydraulic gradients it will be seen that it is impossible, if water is to be delivered to the town of

Kurnool

Kurnool above ground level (and I cannot recommend dip wells or pumps if they can be precluded) to avoid the use of Pumping Machinery & hence the reason for its provision. The machinery will be of a simple character; two direct acting centrifugal pumps are proposed which will raise the water to the necessary level 12.52 feet above ground at the Pump House site.

13. The Pump House will contain the Engines, Pumps & Boilers and the water will be raised into a tank which is under the same roof. This tank is merely to regulate the pressure & not for storage in any respect.

14. The population of Kurnool at the last census was 24,523 and the scheme has been designed for the supply of 15 gallons per head to 30,000 people which is not a very great allowance in view of increased population. The daily supply will therefore be 450,000 gallons per 24 hours, of which 225,000 gallons will be delivered in six hours or at the rate of 630 gallons per minute. The water has to be lifted at the pumping

station

station after being drawn off from the settling tank from a level of 920.00 to a level of 946.50 or 26.5 feet and with this level at the pumping station there will be only in some parts of Kurnool a pressure of ten feet during periods of maximum draught & supply.

15. The following will be the Pump Horse Power required:-

$$\frac{630 \times 26.5 \times 10}{33,000} = 5 \text{ P.H.P.}$$

16. The distribution it is proposed to effect through about 6 miles of pipes varying in size from 12" in diameter (3720 feet) to 3" in diameter (16539); there will be 30 fountains or one to each thousand of the population with 15 hydrants, valves air valves &c. To keep the expenditure as low as possible the ends of certain of the branch mains have not been connected to each other, but instead thereof & to facilitate the exit of silt from the pipes scour valves have been allowed for at the end of each such branch; scour valves have also been provided on the other mains. It would have been advisable to have had more mains in certain localities, but

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the estimate being larger than anticipate every means consistent with suitable arrangements have been adopted to lessen the cost.

17. The cost of the scheme is howeve very considerably more than my approximate estimate for the Hindri scheme, but it is, as will be seen, very much about the same amount (if contingencies are omitted) as the estima prepared by the Public Works Departm (Mr Carless & Col: Smalley) in 1887.

18. The following statement shou all the estimates already referred to. The items which call particularly for attention are the cost of the settling tank & that of the pipes; the former cannot be reduced & very low estima rates have been used in calculating its cost. What the pipes will cost can only be seen when they are actuall tendered for, but their cost is base on the assumption that they will be delivered in Madras at about present rate Rs 105 per ton & taken to Kurnool via rail to Kistnapuran & thence by canal.

	Estimate prepared by Col: Smalley D.W. Dept in 1887	Estimate prepared by Mr Carless D.W. Dept in 1889	Estimate for the Hindri scheme as in my report No 272 dated 10.4.91	Detailed estimate for the Hindri scheme as now revised	Detailed estimate for scheme now proposed
	Rs.	Rs.	Rs.	Rs.	Rs.
Offtake at Channel	"	"	"	"	1,040
Settling reservoir or silting bed	13,402	7,472	"	"	33,150
Engine and Boiler House	"	"	4,000	5,922	5,100
Fencing, levelling the site, forming road & compensation for land	"	"	"	1,600	1,600
Engines, Pumps and Boilers including erection	"	"	10,800	22,000	12,000
Pipes, valves, Fountains, Hydrants &c	50,000	73,094	50,000	82,881	57,850
Laying and jointing pipes	"	"	"	14,700	11,900
Filter beds	29,147	"	"	"	"
Repairing present conduit and cisterns	15,206	"	"	"	"
Storage reservoir	6,470	"	"	"	"
Infiltration gallery	"	"	8,000	10,700	"
	1,14,225	80,566	72,800	1,37,803	1,22,640
Contingencies including cost of establishment	"	528	9,100	20,687	18,360
Total	1,14,225	81,094	81,900	1,58,490	1,41,000
Annual cost of pumping				6,200.	2,500.

19. The figures shew how unsafe is to make approximate estimates (even though the present scheme is different from that originally proposed), but it may now be taken as a fact that Kurnool is not likely to get a water supply for less than Rs 1,41,000 & this may be called cheap for it amounts to only Rs 4.7 per head.

20. If Government will still carry out its promise (based no doubt on an incorrect anticipation of the cost) to contribute 75% of the amount, the balance to be met by the Municipality will be Rs 35,250. Government have directed the entry of Rs 61,000 as a grant for 1893-94 & a loan of Rs 20,000 & this will be sufficient to allow the works to start.

21. The annual charges to the Municipality will be

	Rs
Interest & Sinking fund on Rs 35,250 at 5.96 %	2,100
Pumping charges	2,500.
Maintenance of pipes &c	1,000.
	Rs 5,600.

But the Municipality at present

pay

	Estimate prepared by Col: Smalley P. W. Dept in 1887	Estimate prepared by Mr Carless P. W. Dept in 1889	Estimate for the Hindri scheme as in my report No 272 dated 10·4·91	Detailed estimate for the Hindri scheme as now revised	Detailed estimate for scheme now proposed
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Engines, Pumps and Boilers including erection	"	"	10,800	22,000	12,000
Pipes, Valves, Fountains, Hydrants &c	50,000	73,094	50,000	82,881	57,850
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Pumping charges	2,500.
Maintenance of pipes &c	1,000.
	Rs 5,600.

But the Municipality at present

pay

of Rs 3,500 per annum for water; this will however be reduced to a payment for 450,000 gallons daily × 365 at Rs 1 per 1,000 cubic yards or 2·66 thousands of cubic yards daily. This will cost Rs 2·66 per diem or Rs 970 per annum & I doubt if at present so much water will be used but if it be so a saving of Rs 3,500 − 970 = 2,530 will be effected so that the extra charges to the Municipality will be Rs 3070 per annum or only about 2 annas per head per annum. The tax on buildings is levied at only 6% & yielded in 1891-92 Rs 5,580 so that a water tax of a little above 3% will be all that is required and even then Kurnool will remain one of the most lightly taxed towns of the Presidency.

I have the honor to be,

Sir,

Your most obedient servt

Sanitary Engineer to Govt.

GSh

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I have the honor to be,

Sir,

Your most obedient servt.

Sanitary Engineer to Govt.

~~Local & Municipal Dept~~
~~Current No.~~ 2896 M

1892

P. W. CURRENT No. 12326 S

From

The Sanitary Engineer
to Government,

8 DEC 92

To

The Chief Secretary
to Government
Local & Muncl. Dept.

No. 2774

Dated 6th
Despd. 7th
Recd.
December 1892.

Recd 13.12.92

Encs. 6 5 (1 plans & estimate)
7 (4 plans)

Subject.

Kurnool Water Supply

Submitting plans & estimates for the improvement of the

TO BE RETURNED WITH REPLY.

78

No 1055

Referred to the Chief Engineer Public Works Depart. for remarks.

(By order)

J. H. Brodie
Ag. Under Secretary

[illegible] 12/92
Fort St. George
December 1892

To the Chief Engineer Public Works Depart.
with plans & Estimates

[illegible] 7-1-93
1311 L 9-8-92
231 L 6-7-92
709 LL 13-5-91
1898 LL 1-11-90
1705 LL 15-11-90
75 LL 24-1-88
[illegible] 13-11-90

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For check
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14/12

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No. 1338 C

Government of Madras.

& Municipal Dept
CURRENT No. 694 M

8

PUBLIC WORKS DEPARTMENT.

MEMORANDUM.

Dated Madras, 21st March 1893.

With reference to endorsement No. 1055 of 12 December 1892 from the Local and Municipal department, on the scheme of the Sanitary Engineer for the supply of the Town of Kurnool with water, the undersigned has the honor to say that as a whole that scheme as far as it goes seems a judicious one, but he is convinced that the "settling tank" should be capable of holding a supply for six weeks instead of only for two weeks (see para 7 of Mr. Jones' report). Copy of a letter No. 677 dated 27th February 1893 from the Executive Engineer Kurnool division bearing on this portion of the subject is sent herewith. It will also be advisable to to use Portland Cement plaster instead of surki plaster in these tanks.

2. There can be no doubt that, as noticed in para 7 of the Sanitary Engineer's report, filter beds will have to be provided.

Acting Chief Engineer
P.W.D.

The Local and Municipal Dept.

Letter No. 677 dated 27th February 1893 fro
the Executive Engineer Kurnool Division to the
Superintending Engineer III Circle, Bellary.

In reply to your endorsement No. 3077 dated 13.2.93 on memo from the Chief Engineer No. 587C/9.2.93 asking for a report as to whether a storage reservoir containing a fortnight's supply would be sufficient for the Kurnool water supply, I have the honor to state that keeping the town supplie during the closure has always proved a troublesome matter.

2. The practice has been to throw a dam above the Regulator at Kurnool and to form a reservoir containing about a week's supply.

This reservoir contained about three to four millions Cubic feet and supplied the town as well× as the gardens in Kurnool and had to be replenished once a week. This of course, interferes greatly with the clearance of silt below the Head Sluice. The year before last I had a second dam erected in the 12th mile and from this replenished the lower one (Last year we had no closure at all). We found this arrangement fairly convenient, as there is generally but little silt

× 3 miles & 80 feet & $\frac{6}{2}$ feet average depth.

silt to be removed in the miles occupied by the reservoirs, still the time thus allowed is not sufficient for proper check measurement of silt clearances and if we could be allowed a full 6 weeks it would be more satisfactory. If then the permanent Storage reservoir could have a supply for 3 or 4 weeks, we could store a further supply for 2 weeks or so in the canal itself and then there need be no great danger of hurriedly taken measurements and check measurements.

It must be borne in mind that the Canal Reservoirs will hold water not only for the Town Reservoir but also for sugar cane and other gardens. In other words that the town cannot claim all the water held up in the Canal Reservoirs.

3. The flow of water through the Head Sluices during the dry weather is very small as a rule. it does not actually cease but it takes 2 or 3 days to refill a reservoir.

No. 3184. d/ 6. 3. 93.

Copy forwarded to the Chief Engineer P.W.D with reference to Memo No. 587C dated 9th February/93.

(Sd) A. T. Fraser Col. R.E.
Supdg Engineer III Circle

Supdg Engineer's Office
III Circle

(True Copy)

R. W. Lons.

Head Clerk P.W. Secretariat

1893. 19

Public Works Department.

[illegible] & Municipal Dept

CURRENT No. 694 M

1055

1311 9-8-92

231 4-2-92

709 12-5-91

1818 1-12-90

1705 15-11-90

75 30-1-88

No. 1338 C.

Dated 21st March/93

Despatched 21st

Received

Cuts 2896 m of 92

Subject.

Memo from the Chief Engineer P.W.D on the Kurnool water supply scheme.

10

Cuts 2896 m of 1892 & 694 m of 1893.

order.

~~The Sanitary Engineer is requested~~ The Sanitary Engineer should to revise the estimates with reference to the Chief Engineer's remarks.

1/4

29/3

To The Sanitary Engineer with plans & estimates.

694 m 93

Desptd 12/4

FURTHER PAPERS, No. [illegible] of 18

Miscellaneous.

LOCAL AND MUNICIPAL DEPT.
G.O., DATED 11-4-93
No. 496 M

When given for copying.

[Despatch Abstract.]

Water Supply.

Stating that the Sanitary Engineer should revise the estimates for the Kurnool — scheme, with refce to the Chief Engineers remarks.

4-7-
17-9-06
11-5-07
6-12-07
24-10-13 B4
19-3-17
13-7 30 B11