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Local & Munl. (1897) Department.

PRINTED.

G.O., No. 22 M

DATED 11-1-97

[Despatch Abstract.]

Water Supply

Sanctioning the estimate of Rs 42,000 for the Scheme of — for the town of Vizagapatam, & sowing the proposal of the Council to levy water tax from 1st April 1897, and requesting the P. W. Dept. to get the work in hand at once.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No	Department.	Date

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Invol 15/2

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Government {1897} of Madras.

LOCAL AND MUNICIPAL.

C.A.

Proof for approval.

P.D.O.

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18/1/92

Recd. } 1897. *Enclosures*

Regd. *Spare copies*

G.O., No. 22 M., 11th January 1897.

JANUARY.

Water-supply.

Sanctioning the estimate of Rs. 4,21,000 for the scheme of — for the town of Vizagapatam, approving the proposal of the council to levy water-tax from 1st April 1897, and requesting the Public Works Department to put the work in hand at once.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—again the following paper:—

G.O., No. 1578 M., dated 16th September 1896.

Read—the following paper:—

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Secretary, Sanitary Board (Engineering Branch), to the Chief Secretary to Government, dated Fort St. George, 23rd July 1896, No. 2290.

I have the honour to forward plans and estimates for the supply of water to Vizagapatam with the resolution of the Sanitary Board thereon.

2. The revision by the Sanitary Board would have raised the Sanitary Engineer's estimate of Rs. 4,00,000 to Rs. 4,51,000, had not there been since omitted under terms of G.O., No. 847 M., dated 15th May 1896, the charges for establishment (Rs. 30,000).

3. The figures in the last paragraph of the report (signed by Mr. Ellis in January 1895) will now stand as follow:—

			Rs.
Interest and Sinking fund at 5·96 per cent. on $\frac{4,21,000}{2}$		.. ..	12,545
Establishment and repairs (including labour)	Head works	.. ..	2,000 *
	Town	.. ..	2,500 †
		Total ..	17,045

I think the figure Rs. 2,580 for establishment and repairs including labour as entered by Mr. Ellis is much too low.

APPENDIX I.

From G. T. WALCH, Esq., Superintending Engineer, I Circle, to the Collector of Vizagapatam District, dated Vizianagram, 5th February 1888, No. C. 29-V.

At your request I have the honour to forward the enclosed remarks with reference to the proposals for supplying the *town of Vizagapatam* with water; I do not include the civil station and village of Waltair in my remarks, because their provision with water other than from their present means of supply is a comparatively unimportant matter, and it seems evident to me the cost would be greater than the advantages gained would warrant.

*Head Works.**

Filter beds and tank.

	Rs.
Establishment—	
1 Superintendent	60
6 coolies at Rs. 7 each	42
2 watchmen at Rs. 7 each	14
Per month ..	116
For 12 months 116 × 12 = ...	1,392
Cleaning filters, &c.	608
Total ..	2,000

Town.†

	Rs.
Establishment—	
1 overseer	60
2 fitters at Rs. 15 each	30
4 turncocks at Rs. 7 each	28
4 fountain cleansers at Rs. 6 each	24
2 watchmen at Rs. 6 each	12
Per month ..	154
For 12 months 154 × 12 = ...	1,848
Repairs including labour—	
40 fountains at Rs. 16-3-0 each	652
Total ..	2,500

2. I must presume that the opinions and remarks which I offer are formed simply on a cursory inspection of the sites and ground dealt with and on the somewhat scanty information on the subject generally which has been placed before me, I have no means of checking correctness of that information.

3. It has been quite impossible, in the absence of information on the subject, for me to deal with the probable absolute cost of the various schemes; but I may say that I consider that neither of them would be very expensive as compared with similar water-supply works of other towns.

4. The following papers—some received from you and some from Mr. Ussher—are herewith returned:—

(1) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, dated 10th January 1888, on white paper.
(2) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, no date (on blue paper).
(3) Letter from Mr. Gauge to you, dated 9th December 1887, and enclosure.
(4) " " 10th " 1887.
(5) Memorandum by Colonel Frazer, R.E., dated 10th November 1887.

Remarks on the Scheme for supply of the Town of Vizagapatam with water.

To accompany letter to the Collector of Vizagapatam, No. C. 29-V., dated 5th February 1888.

Population to be taken as 35,000.
Allowance of water per head = 20 gallons per diem.
∴ Total quantity of water required per diem = 700,000 gallons.
Or per annum = 255,500,000.
Or per minute = 486.

1. *Scheme No. I, Colonel Frazer's.*—Supply to be drawn from the Hanumanthavaka stream at the gorge, constructing a small weir and also sinking a large well at the place to pump from and then raising the water by pumps to a reservoir on the side of the hill at such a height as to command by gravitation all the town of Vizagapatam below M.S.L + 60 below which level, it is believed, that all the true town lies.

2. The scheme is perfectly feasible if a sufficiency of water is obtainable *at all times of the year* from the natural flow of the stream; I do not believe that any appreciable addition would be obtained by the proposed well. That flow can easily be gauged by means of a small weir during the months of the year when there is least in the stream and should be it found that the daily discharge ever falls below the required quantity, then the scheme may be at once abandoned.

3. That quantity is given above as 700,000 gallons a day, but it would be no very serious matter if for a short time in each year only half that quantity, or at the rate of 10 gallons per head were given to the town.

4. The level of the bed of the stream at the gorge is stated to be + 36, and allowing 26 feet roughly for the slope * which would have to be given to a 12″ diameter pipe, and for loss † of head at a filter bed, the height to which the water would have to be lifted would be 50 ft., and for this steam-pumps would be necessary; but as neither the height to be lifted to nor the quantity to be lifted is very great, the pumps and engines would not be costly; a double set of each would be necessary, so that there might be no fear of stoppage for more than a day or whatever might be the time for which the service reservoir would hold a supply in cases of break down.

* 16 feet.
† 10 feet.

5. The *advantages* of the scheme are—

(*a*) Its small cost for impounding works.

(*b*) Its much shorter length of piping than in any other scheme; only 2⅞ miles as against 5¼ in scheme No. 3 and 8¼ in scheme No. 2; and the cost of iron piping, 12″ diameter, laid is stated to be about Rs. 17,000 a mile.

(*c*) The quickness with which it might be set going.

(*d*) The freedom from anxiety and risk that there would be in connection with the safety of the impounding embankments of other schemes.

(*e*) The absence of the trouble which in the other schemes will some day or other be inevitable from silting up the storage reservoir.

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2. The scheme is perfectly feasible if a sufficiency of water is obtainable *at all times of the year* from the natural flow of the stream; I do not believe that any appreciable addition would be obtained by the proposed well. That flow can easily be gauged by means of a small weir during the months of the year when there is least in the stream and should it be found that the daily discharge ever falls below the required quantity, then the scheme may be at once abandoned.

3. That quantity is given above as 700,000 gallons a day, but it would be no very serious matter if for a short time in each year only half that quantity, or at the rate of 10 gallons per head were given to the town.

4. The level of the bed of the stream at the gorge is stated to be + 36, and allowing 26 feet roughly for the slope * which would have to be given to a 12″ diameter pipe, and for loss † of head at a filter bed, the height to which the water would have to be lifted would be 50 ft., and for this steam-pumps would be necessary; but as neither the height to be lifted to nor the quantity to be lifted is very great, the pumps and engines would not be costly; a double set of each would be necessary, so that there might be no fear of stoppage for more than a day or whatever might be the time for which the service reservoir would hold a supply in cases of break down.

* 16 feet.
† 10 feet.

5. The *advantages* of the scheme are—

(*a*) Its small cost for impounding works.

(*b*) Its much shorter length of piping than in any other scheme; only $2\frac{7}{8}$ miles as against $5\frac{1}{4}$ in scheme No. 3 and $8\frac{1}{4}$ in scheme No. 2; and the cost of iron piping, 12″ diameter, laid is stated to be about Rs. 17,000 a mile.

(*c*) The quickness with which it might be set going.

(*d*) The freedom from anxiety and risk that there would be in connection with the safety of the impounding embankments of other schemes.

(*e*) The absence of the trouble which in the other schemes will some day or other be inevitable from silting up the storage reservoir.

6. The *disadvantages* of the scheme are—

(*a*) The cost of the pumps, engines, engine-house and attendant's quarters, which, however, would not bring the cost of the head works to nearly as much as that of the reservoir and its appurtenances of scheme No. 2.

(*b*) The cost of working the pumps, establishment, fuel, &c. It is believed that Mr. Gauge has made an estimate of what this would be, but I have not the information before me—whatever it may be, capitalized at the rate at which the municipality could borrow, would form an important item in the consideration of the cost of the scheme.

(*c*) The difficulty of getting the pumping machinery repaired when it went wrong, there being positively no workshops where such repairs could be carried out nearer than Dowlaishweram.

7. This last is undoubtedly by far the greatest of the disadvantages and is so serious that in my mind it turns the scale against this scheme. If, however, before any of the proposals should be carried out, there appeared a tolerable certainty of railway workshops coming into existence at Vizagapatam, then I should prefer this scheme to the others, always, of course, supposing the observations as to the flow of water in the stream show it to be sufficient.

Scheme No. 2.—Reservoir to be formed by restoring old tank at Simhachellam and supply taken therefrom by pipes to a "service" reservoir or tank near the jail from which the distribution to the town would be led off.

2. There would be absolutely no constructional difficulties about this and the cost of restoration of the old bund and necessary appurtenances would probably not be more than one-quater that of the reservoir in scheme No. 3.

3. As regards the levels, the bed of the tank is said to be M.S.L. + 129 and supposing the offtake to be at 10 feet above this and the slope required for the piping (8½ miles) to the "service" reservoir to be about 46 feet, and the loss of head at a filter bed 10 feet, the water could be delivered at the "service" reservoir at about + 83; this would be some 23 feet above what is contemplated under scheme No. 1.

4. The *catchment basin* is said to be upwards of 4 square miles which is more than sufficient * to give the required supply.

* See consideration of catchment basin scheme No. 3.

5. What would be the storage capacity of the reservoir there is nothing to show. Mr. Gauge, indeed, in his letter, † dated 9th December 1887, says it would contain two or three years' supply, but he is, I am confident, much mistaken unless, indeed, he contemplated not merely restoring the old bank but raising it and impounding water to a much higher level than was ever the case in the old tank. Supposing, however, it would contain ‡ a five months' supply, which I consider is the least that such a reservoir should contain, then the advantages and disadvantages of this scheme may be thus summarised.

† Returned herewith.

‡ Above + 139.

6. *Advantages*—

(*a*) Cheapness of construction of the impounding works.

(*b*) The fact that into its basin flows the water from the beautiful Simhachellam springs which give a very appreciable supply of the present water during a considerable portion of the year and never entirely cease to flow; though from a report by L. Vertue made in July 1858, it appears that in the hot weather their discharge falls to only 2 cubic feet per minute.

7. *Disadvantages*—

(*a*) The *distance* of the *reservoir from the point common to all the schemes* (viz., the "service" reservoir near the jail); this is stated to be 8½ miles against the 2⅞ miles of scheme No. 1 and 5¼ miles of scheme No. 3 and the extra cost of iron piping for this greater distance would amount to more than the difference between the cost of the impounding works in this scheme and No. 3.

(*b*) *The greater cost of compensation for land* for the reservoir—what this would be—I have nothing to show me but as the greater part of the proposed waterspread of the reservoir is under wet cultivation, it would certainly be considerably more than the compensation which would have to be paid for the reservoir of scheme No. 3, whilst for scheme No. 1 there would, of course, not be any such expenditure necessary.

(*c*) The *impossibility* of keeping the *gathering ground* of the reservoir free from extensive pollution during the great annual Simhachellam feast when many thousands of devotees and their followers assemble there.

8. This last disadvantage is so serious that in my mind it turns the scale against this scheme, though from the ease with which the reservoir might be formed and the beauty of its situation it is at first sight the most attractive of all the proposals.

Scheme No. 3.—Reservoir to be formed by throwing an embankment across the valley of the Hanumanthavaka stream at a place called "Moodoosellovah."

(2) According to the memorandum on the subject drawn up by the Local Fund Supervisor Vencata Rangam Pillai, the catchment basin would be 4 square miles, but some one has entered in the margin that it would be only 33 square miles. The rainfall in the valley is said to be 40″ per annum and taking only one-third of this or, say, 13″ to run off the supply from 3⅝ square miles would be 636,649,728 gallons per annum or considerably more than double the quantity required.

Square feet in one square mile.		Approximate.
27,878,400	×	3·4
= 94,786,560	×	1⅓ feet.
102,685,440	×	6·2
= 636,649,728 gallons.		

(3) The *capacity of the reservoir* given by the supervisor (and here I have no means of checking in any way the accuracy of his calculations) with water at level M.S.L. + 163 would be 23,372,118 cubic feet = 144,907,131 gallons and allowing one-third (a very large proportion) for soakage and evaporation during the whole time that it might be without supply, he takes the storage available for distribution supposing the reservoir to start full and not to receive during the time any fresh supply, as 15,581,412 cubic feet = 96,604,754 gallons or about 138 days' supply.

With the water level of the reservoir raised to M.S.L. + 169, he gives its capacity as 31,643,073 cubic feet and the final figures treated in the same way become 130,793,439 gallons or about 187 days' supply. As the take-off from the reservoir will of course not be from the lowest part of its bed and probably from not below ten feet above that, and as occasionally the reservoir may be five months without receiving any supply, it would be advisable if this scheme be adopted to take the higher of the two levels above noted as that to which water should be impounded and then, with care in drawing off, the capacity of the reservoir would be ample.

(4) As this higher level for the reservoir surface would, it appears, not require a bank with more than 27 feet of water against it in its deepest part, there would be no serious constructional difficulties.

(5) *As regards the levels*, the lowest part of the bed of the proposed reservoir is stated to be M.S.L. + 142 and the off-take would be at, say, about + 152. The distance from the "Service" reservoir near the jail is said to be 5¼ miles, the slope required for the piping in this distance would be about 29 feet and allowing 10 feet for loss of head in filtering the water could be delivered at the "Service" reservoir at about M.S.L. + 113 which would command some houses that neither of the other schemes would serve and would deliver through the town distribution pipes with a pressure that might be made useful in cases of fire.

(6) *Advantages*—

(*a*) Delivery at the "Service" reservoir at a considerably higher level than under either of the other schemes.

(*b*) The saving in cost for compensation for land as compared with scheme 2.

(*c*) The freedom of its gathering ground from liability to pollution.

(*d*) The less distance of the storage reservoir than in scheme 2 from the "Service" reservoir and consequent saving in piping.

(7) *Disadvantages*—

(*a*) The much greater initial cost of construction of the impounding works than under either schemes—No. 1 or No. 2—this advantage is, *as compared with* scheme No. 2, more than counterbalanced by advantage (*d*).

(8) In this scheme the comparative advantages more than counterbalance the disadvantages, and rejecting the other schemes for the reasons given, I consider this one (No. 3) the best. There would be no serious engineering difficulties in carrying it out, and as to the cost it would be moderate as compared with that of most town water-supply works.

No. 184.

Report on the Vizagapatam water-supply.

The Hanumantha Vanka has long been considered the best source of a water-supply for the town of Vizagapatam. In 1888 Mr. G. T. Walch, late Chief Engineer, Public Works Department, made a preliminary investigation into several schemes for the water-supply of the town, all having the Hanumantha Vanka as the source of supply, but differing in respect of the point on the stream at which it was proposed to bund it for forming a reservoir. The scheme he considered best was the one in which it was proposed to form the reservoir near the village called Moodarsalowa (*vide* Mr. Walch's report, Appendix I).

2. The question of the water-supply of Vizagapatam has engaged the attention of this department since 1891. After a careful investigation of the various schemes proposed, Mr. J. A. Jones, the Sanitary Engineer, concluded in favour of the scheme approved of by Mr. Walch. The details of the scheme were to a considerable extent settled by Mr. Jones before he went on leave, and the scheme as now forwarded is practically on the lines indicated by him.

3. The Hanumantha Vanka flows through a deep valley formed by two parallel ranges of hills. The valley measures from the Gorge to its head about 5 miles in length, with an average breadth of 2 miles. It is proposed to bund up this valley near the village of Moodarsalowa, or about 2½ miles above the Gorge.

4. Appendix II gives the results of the analysis of the water made at various times. Column 5 gives the limit of impurity in a water that may be classed as "usable"—*vide* Dr. MacNally's Handbook of Sanitation for India, page 80. The Chemical Examiner considers the water "suspicious," apparently because of the high quantity of chlorine in it. An inspection of the bed and banks of the Hanumantha Vanka and its tributary streams shows that some three or four feet of the top-soil consists of a porous red soil, and below this lies a deep bed of hard limy clay. Three trial pits along the line of the proposed bund showed similar results. The whole catchment area of the Hanumantha Vanka appears to be covered with this layer of limy clay, to which the presence of a large quantity of chlorine in the water must be attributed, and not to animal contamination. The popular opinion about the water is that it is good. Provision is made in the estimate for removing the villages of Moodarsalowa and Gollapalayam, which lie within the catchment area of the proposed tank, and the water will be filtered before delivering into the town. With these precautions no reasonable objection could be urged against the water.

5. The catchment area of the stream above the point at which it is proposed to form the reservoir is six square miles. From the statement (Appendix III) of rainfall at Vizagapatam for the past twenty years it will be seen that the lowest fall was in 1891, when it was 15·93 inches. The next lowest amount reached was 26·45 in 1875. During 1891 the monsoon fall, *i.e.*, from May to October, amounted to 14·68 inches. The gathering ground is steep and otherwise favourable for a large percentage of run off. A 33 per cent. run off, or say five inches may be safely assumed. The run off in a year like 1891 would be—

$$\frac{27,878,400 \times 6 \times 5}{12} = 69,696,000 \text{ cubic feet.}$$

6. The population of Vizagapatam was, according to the census of 1881, 30,291 and, according to the last census, 34,487. For the purpose of this scheme, the population is assumed at 40,000. Provision is made for a supply of 15 gallons per head per diem, which is equal to 417 gallons per minute, or 35 million cubic feet in a year.

7. The Hanumantha Vanka flows perennially. The dry weather flow was gauged in 1888—a year the rainfall of which stands the third lowest within the past twenty years—and was found to be about 420 gallons per minute.

8. It is considered sufficient if the tank be made large enough to hold eight months' supply, or say 24 million cubic feet.

9. The reservoir as designed will hold 24,720,086 * cubic feet above the outlet level. The loss by evaporation and absorption will be counterbalanced by the daily inflow into the tank.

* Appendix IV.

10. The reservoir will have a waterspread of 2,895,433 square feet at F.T.L. The reduced level of the full tank will be 166·00 above M.S.L. The level of the outlet will be 145·50. The tank will thus be 20·50 feet deep from the F.T.L. to the level of the outlet.

11. The bund will be 2,700 feet long with a top width of 12 feet. The inner slope will be 1½ to 1 from the toe of the bank to full tank level, and above this level the slope will be 1 to 1. The inner face of the bund will have a stone revetment 2 feet thick on a backing of gravel 1 foot thick. The top of the revetment will be finished off with a row of curb stones 1½ feet above the top of the bund. The outer slope will be 2 to 1.

12. Puddling has not been provided in the bund, because it is not considered necessary, and it would be difficult and costly to obtain the necessary clay. The soil available for the formation of the bund is a mixture of yellow clay and kunker which, when well consolidated, forms a very compact and impermeable mass.

13. A surplus weir, to be built in the solid ground at the northern extremity of the bank, is provided. It will be 130 feet long, and with a depth of three feet of water flowing over it, will discharge the maximum flow from the drainage area. The discharge from the drainage area of six square miles calculated by the formula $D = C M.^{\frac{3}{5}}$ (Major Ryves formula), assuming C. as 675 = 2,227 cubic feet per second. To discharge this quantity with a depth of three feet of water flowing over it the length of the calingulah should be 130 feet (*vide* Appendix V).

14. The water will be drawn by a vertical pipe 18 inches in diameter having three inlet arms 5 feet, 10 feet and 15 feet below full tank level. Each arm will be controlled by a sluice valve. The vertical pipes and the valves will be enclosed in a masonry tower. The outlet from the tank consists of an iron pipe 10 inches in diameter placed in a masonry conduit. The conduit will be constructed in excavation cut in the solid ground—thus the necessity of laying the outlet pipes in made bank, which sometimes endangers the bund, is obviated, and the pipe could be inspected whenever required under the arrangement adopted.

15. There will be two filter beds each 72 feet square. Each bed will filter about 300,000 gallons per 24 hours. When the population reaches 40,000 and the consumption attains the maximum of 15 gallons per head, a third bed will have to be constructed as a stand-bye for repairs, cleaning, &c.

16. The water will leave the filter bed at the level of 142·00. The service reservoir is located near the jail which is a distance of 29,000 feet from the filters. The filters and service reservoir will be connected with a 10″ iron main. The maximum water level in the service reservoir will be 84·00. The 10″ pipe will have a hydraulic fall of 2 feet in 1,000 feet which is sufficient for the delivery of 417 gallons per minute.

17. The distribution system will cover Vizagapatam Proper and the suburbs of Alipore. Waltair is at too high a level to be supplied from the reservoir. If necessary, arrangement can be made to pump up water to Waltair from the service reservoir. But Waltair possesses a good local supply from wells, and there is no urgent necessity for including it in this scheme.

18. The following is a statement of pipes and appendages in the distributing system:—

	FEET.
15″ cast-iron pipes	7,030
14″ „ „	1,940
8″ „ „	1,650
7″ „ „	1,760
6″ „ „	1,910
5″ „ „	2,930
4″ „ „	4,590
3″ „ „	11,160
Sluice valve from 2½″ to 15″	39
Air valves	2
Hydrants for fire service	20
Two tap pillar fountains	10
Wall tap fountains, single and double	30

19. The scheme is estimated to cost as below:—

	RS.
Collecting reservoir	69,760
Surplus weir	2,320
Surplus channel	7,880
Water tower and sluice	18,910
Filters	14,830
Delivery main from filters	98,140
Laying and jointing delivery main	8,320
Service reservoir	18,460
Pipes, sluice valves, fountains and hydrants, &c.	1,01,340
Laying and jointing pipes	14,960
Tools and plant	8,500
Establishment	18,500
Contingencies	18,080
Total	4,00,000

20. On the assumption that Government will pay a moiety of the cost the annual outlay will be—

	RS.
Interest and sinking fund at 5·96 per cent. $\left\{\frac{4,00,000}{2} \times 5·96\right.$	11,920
Establishment and repairs	2,580
Total	14,500

FORT ST. GEORGE,
25th January 1895.

R. E. ELLIS,
Ag. Sanitary Engineer to Government.

Enclosure.

Proceedings of the Sanitary Board, No. 2289, dated 23rd July 1896.

* * * * * *

Read—Report No. 184, dated 25th January 1895, from the Acting Sanitary Engineer to Government on Vizagapatam water-supply together with plans and estimates amounting to Rs. 4,00,000.

Resolution—The plans and estimates (Rs. 4,21,000) as amended by the Sanitary Board are approved.

The board considers that the scheme should be extended so as to include Waltair. This portion of the town must be supplied by pumping and its present omission does not affect the scheme for Vizagapatam as above approved. The municipal council should be requested to allot the sum of Rs. 1,000 for the necessary levels as soon as possible.

(True Extract.)

(Signed) J. A. JONES,
Secretary, Sanitary Board (Engineering Branch).

To the Chief Secretary to Government,
Local and Municipal Department.

Order—Mis. No. 1578 M., dated 16th September 1896.

The plans and estimates will be forwarded to the Municipal Council, Vizagapatam, for remarks, with the request that it will submit proposals for financing the scheme on the assumption that Government will make a grant of half the cost and a loan of the other half with interest at $4\frac{1}{4}$ per cent. repayable in thirty years.

2. The Sanitary Board will be requested to explain the great delay that has occurred in forwarding the Sanitary Engineer's report of 25th January 1895.

(True Extract.)

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

To the Chairman, Municipal Council, Vizagapatam.
„ Sanitary Board.

Read—also the following paper:—

From M.R.Ry. B. SURYANARAYANA SASTRI Garu, B.A., B.L., Chairman, Municipal Council, Vizagapatam, to the Chief Secretary to Government (through the Revenue Divisional Officer, Vizagapatam), dated 3rd October 1896, No. 1012.

With reference to G.O., Mis. No. 1578 M., dated 16th September 1896, I have the honour to state that the plans and estimates for supplying water to the Vizagapatam town were placed before the council at its meeting held on the 29th idem and approved of by the council.

2. As regards the question of financing the scheme, I beg to submit that the council can raise the requisite funds for the liquidation of the first instalment of the debt generously proposed to be given by Government should the Government be pleased to spend its quota in the commencement of the work. The work will at least take two years for completion, during which period funds to the extent of Rs. 17,530 * can be collected and kept in reserve if the Government sanctions the levy of the water-tax at Rs. 4 per cent. in advance—*vide* section 47 of the District Municipalities Act IV of 1884. This amount can be availed of for repayment of the first instalment and interest, namely, principal Rs. 7,016-10-8† + interest Rs. 8,946-4-0.†

	Rs.	A.	P.
*Tax on buildings at Rs. $7\frac{1}{2}$ per cent.	16,434	0	0
Water-tax at Rs. 4 per cent.	8,765	0	0
Do. for two years ...	17,530	0	0
†Estimated cost of water-works.	4,21,000	0	0
Deduct contribution from Government	2,10,500	0	0
Balance or loan from Government to be liquidated within thirty years ...	2,10,500	0	0
Instalment for the first year Rs. 2,10,500 ÷ 30 ...	7,016	10	8
Interest at Rs. $4\frac{1}{4}$ per cent.	8,946	4	0
Total ...	15,962	14	8

3. The other instalments can safely be paid in that the new Act will be passed meanwhile; and there will be no difficulty to get money since the Act provides the levying of house-tax at Rs. 10 per cent., or Rs. $2\frac{1}{2}$ per cent. more than the present rate and a water-tax at Rs. $6\frac{1}{2}$ per cent., and as the council resolved to raise the house-tax to 10 per cent. and water-tax to $6\frac{1}{2}$ per cent. when the new Act comes into force. The increase of income by so raising the house-tax and water-tax will amount to Rs. 19,721 * per annum. The small difference, if any, required for the maintenance of water-works can be met from the other sources of the municipal revenue.

	Rs.
*The amount at Rs. 4 per cent. as shown above	8,765
The amount at Rs. 9 per cent. ...	19,721
Average interest at $4\frac{1}{4}$ per cent. on Rs. 2,10,000 per year ...	4,600

4. The plans and estimates received with the order under reply are herewith returned.

An extract from the proceedings of the council is herewith submitted.

Enclosure.

Extract from the proceedings of the Municipal Council of the town of Vizagapatam at their meeting held on the 29th September 1896.

* * * * * *

Read—Proceedings of the Madras Government, dated 16th September 1896, No. 1578, forwarding plans and estimates, amounting to four lakhs and twenty-one thousand rupees, for the supply of water to Vizagapatam, with a request that the council will submit proposals for financing the scheme, &c.

Resolution.—Resolved that the generous proposals of the Government be accepted with thanks; that a water-tax of 4 per cent. be raised and, when the new Municipal Act is passed, to raise the water-tax to $6\frac{1}{2}$ per cent., and the house-tax to 10 per cent., to enable the council to clear the yearly instalment payable to Government with interest and to meet the maintenance charges.

Submitted.

(Signed) R. GOVINDA RAO,
Huzur Deputy Collector.

4th October 1896.

Endt. R.C. No. 865.

Submitted to Government.

2. The council apparently proposes to defer the first payment of interest and instalment of principal till the second year after the undertaking of the work. It calculates that the house-tax at the present rate of $7\frac{1}{2}$ per cent. *plus* a water-tax at the present maximum rate of 4 per cent. will yield in two years Rs. 17,530, which will enable it to pay in the second year the first instalment of principal—Rupees 7,016-10-8 *plus* interest at $4\frac{1}{4}$ per cent. on the whole loan Rs. 8,946-4-0; total Rs. 15,962-14-8.

3. Presuming that thereafter the new Municipal Act will have become law and that it will be enabled to levy house-tax at 10 per cent. and water-tax at $6\frac{1}{2}$ per cent., it anticipates an increase of income to the extent of Rs. 19,721 over that which it now realizes from a $7\frac{1}{2}$ per cent. house-tax, and with that sum expects no difficulty in meeting the annual interest and instalment.

4. Of course the present council's resolution to raise house-tax and water-tax to the maximum rates when the new Act shall have become law will not bind the council as it may then be constituted, but a substantial increase will be necessary and the council, even if its constitution shall have been modified, is not likely materially to change its opinion.

5. As the first annual call will only amount to Rs. 15,962–14–8, and as the interest will thereafter yearly decrease, it is doubtful whether the maximum rates will be necessary. The general scheme, however, seems to be the only practicable one for raising the necessary funds.

6. As Waltair is not to be benefited by the present scheme, the justice of charging the increased rate on house property in that portion of the municipality is doubtful.

7th October 1896. (Signed) W. O. HORNE,
Acting Collector.

ORDER—No. 22 M., dated 11th January 1897.

As the resources of the municipal council under the amended District Municipalities Act will, it is understood, be sufficient to meet the charges on account of the water-supply scheme, the estimate of Rs. 4,21,000 for the work is sanctioned. A moiety of the cost will be paid as a grant from Provincial funds and the balance advanced as a loan on the usual terms.

2. The council should lose no time in drawing the grant of Rs. 1,40,000 provided for this purpose in the revised estimate of Provincial grants for 1896–97. In order that the loan of Rs. 1,50,000 provided on this account in the revised estimate of Provincial advances for 1896–97 may be drawn before the end of the year, an application in the prescribed form will be published in the *Fort St. George Gazette*.

3. The council's proposal to levy the water-tax is approved, and steps should be taken to assess the tax, with effect from 1st April 1897, at the rate of 1 per cent. on the annual value of buildings and lands in Waltair, and at 4 per cent. in the other parts of the town which will be directly benefited by the works.

4. The Public Works Department will be requested to put the work in hand at once.

(True Extract.)

Secretary to Government.

To the Chairman, Municipal Council, Vizagapatam.
" Collector of Vizagapatam.
" Accountant-General.
" Sanitary Board.
" Sanitary Commissioner.
" Sanitary Engineer.
" Financial Department.
" Public Works Department.
Editors' Table.
Gazette.

Exd. T. K. Narayana Iyengar

ANNEXURES.

APPLICATION of the Vizagapatam Municipality for a loan from Government under the Local Authorities Loan Act of 1879.

The work or works for the construction or repair of which the loan is required and an estimate of the cost thereof.	The amount which it is proposed to borrow.	The fund or funds on the security of which it is proposed to borrow.	The law or laws under which the said fund or funds is or are levied, received or held.	The period for which the loan is required, the number and amount of the instalments, if any, in which it is proposed that the loan shall be taken, the dates proposed for receiving such instalments, and the instalments, if any, in which it is proposed to repay the loan.	A detailed account of the revenue and expenditure of the local authority for the three last preceding years.	All existing prior charges upon the funds of the local authority.
1	2	3	4	5	6	7
Vizagapatam water-supply, estimated to cost Rupees 4,21,000.	Rs. 2,10,500	The Vizagapatam Municipal fund.	The Madras District Municipalities Act, IV of 1884.	(1) The loan is required for a period of thirty years. (2) It is proposed to be taken in two instalments—Rs 1,50,000 in March 1897 and Rs. 60,500 in 1898—and to be repaid with interest at 4½ per cent. in thirty equal instalments of Rs. 12,545.	Attached hereto.	None.

A DETAILED Account of the receipts and charges of the Vizagapatam Municipality for 1893–94, 1894–95 and 1895–96.

	Actuals, 1893–94.	Actuals, 1894–95.	Actuals, 1895–96.
	RS.	RS.	RS.
Receipts.			
Balance brought forward	7,948	8,582	17,409
Tax on Arts	5,452	6,525	6,006
" on Buildings and Lands	12,943	19,358	14,575
" on Vehicles and Animals	2,512	3,155	2,570
" on Carts	349	396	373
Tolls	11,856	10,917	12,039
Realizations under Special Acts	..	155	210
Rent of Lands, Buildings, &c., and Sale-proceeds of Lands, &c.	132	853	3,333
Conservancy Receipts	14	18	28
Fees and Revenue from Educational Institutions	30	43	47
Income from Markets and Slaughter-houses	1,058	1,206	1,540
License Fees	293	207	205
Other Fees	529	584	563
Fines under Municipal and other Acts	742	545	621
Grants and Contributions from Government	8,971	901	174
" " from Local Boards	600	1,786	700
" " from other bodies	217	12,643	128
Recoveries for Services to Private Individuals	1,424	1,859	2,222
Miscellaneous	75	349	376
Advances Recovered	..	9	104
Total ..	55,145	70,091	63,223
Charges.			
GRANT I—			
New Works—	2,750	9,970	5,859
Communications	2,791	1,245	707
Buildings	233	14	683
Drainage	15	506	181
Water-supply	284	365	6
Miscellaneous			
Repairs—	6,589	5,760	7,010
Communications	485	556	1,120
Buildings	2,086	2,002	1,731
Drainage	65	199	478
Water-supply	1,183	1,151	984
Establishment	58	64	8
Tools and Plant and other Stores	..	972	..
Contributions for Public Works			
Total ..	16,539	22,804	18,767

A Detailed Account of the receipts and charges of the Vizagapatam Municipality for 1893–94, 1894–95 and 1895–96.

—	Actuals, 1893–94.	Actuals, 1894–95.	Actuals, 1895–96.
Charges—cont.	Rs.	Rs.	Rs.
GRANT II—			
Training Schools	52	188	207
Municipal Schools—			
On the Salary-result System	1,278	1,572	1,482
Grants-in-aid—			
Salary grants	617	812	1,031
Result grants	2,194	1,479	1,442
Building and Furniture grants	59	132	308
Inspection	277	252	212
Miscellaneous	163	231	383
Total	4,640	4,666	5,065
GRANT III—			
Hospitals and Dispensaries	2,400	2,400	2,400
Contributions	286	417	446
Vaccination	348	331	289
Registration of Births and Deaths	627	599	656
Conservancy, Road-cleaning and Road-watering	11,807	12,270	12,870
Total	15,468	16,017	16,661
GRANT IV—			
Lighting	1,384	1,425	2,481
Markets and Slaughter-houses	134	132	142
Choultries	2,605	2,229	1,777
Avenues	135	157	190
Public Garden, Survey of Land, Fire and other charges	1,264	1,044	1,085
Total	5,522	4,987	5,675
GRANT V—			
Supervision and Management	3,894	3,969	4,420
Advances Recoverable	76	100	..
Refunds	424	139	..
Balance	8,582	17,409	12,635
Total	55,145	70,091	63,223

Government {1897} of Madras.

LOCAL AND MUNICIPAL.

Recd. } 1897. Enclosures

Regd. Spare copies

G.O., No. 22 M., 11th January 1897.

JANUARY.

Water-supply.

Sanctioning the estimate of Rs. 4,21,000 for the scheme of — for the town of Vizagapatam, approving the proposal of the council to levy water-tax from 1st April 1897, and requesting the Public Works Department to put the work in hand at once.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—again the following paper:—

G.O., No. 1578 M., dated 16th September 1896.

Read—the following paper:—

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Secretary, Sanitary Board (Engineering Branch), to the Chief Secretary to Government, dated Fort St. George, 23rd July 1896, No. 2290.

I have the honour to forward plans and estimates for the supply of water to Vizagapatam with the resolution of the Sanitary Board thereon.

2. The revision by the Sanitary Board would have raised the Sanitary Engineer's estimate of Rs. 4,00,000 to Rs. 4,51,000, had not there been since omitted under terms of G.O., No. 847 M., dated 15th May 1896, the charges for establishment (Rs. 30,000).

3. The figures in the last paragraph of the report (signed by Mr. Ellis in January 1895) will now stand as follow:—

		Rs.
Interest and Sinking fund at 5·96 per cent. on $\frac{4,21,000}{2}$	.. ..	12,545
Establishment and repairs (including labour) Head works	.. ..	2,000 *
Establishment and repairs (including labour) Town	.. ..	2,500 †
Total	..	17,045

I think the figure Rs. 2,580 for establishment and repairs including labour as entered by Mr. Ellis is much too low.

APPENDIX I.

From G. T. WALCH, Esq., Superintending Engineer, I Circle, to the Collector of Vizagapatam District, dated Vizianagram, 5th February 1888, No. C. 29-V.

At your request I have the honour to forward the enclosed remarks with reference to the proposals for supplying the *town of Vizagapatam* with water; I do not include the civil station and village of Waltair in my remarks, because their provision with water other than from their present means of supply is a comparatively unimportant matter, and it seems evident to me the cost would be greater than the advantages gained would warrant.

*Head Works.**

Establishment— Filter beds and tank.	Rs.
1 Superintendent	
6 coolies at Rs. 7 each	60
2 watchmen at Rs. 7 each	42
	14
Per month ..	116
For 12 months 116 × 12 = ...	1,392
Cleaning filters, &c.	608
Total ..	2,000

Town.†

Establishment—	Rs.
1 overseer	60
2 fitters at Rs. 15 each	30
4 turncocks at Rs. 7 each	28
4 fountain cleansers at Rs. 6 each	24
2 watchmen at Rs. 6 each	12
Per month ..	154
For 12 months 154 × 12 = ...	1,848
Repairs including labour—	
40 fountains at Rs. 16-3-0 each	652
Total ..	2,500

2. I must presume that the opinions and remarks which I offer are formed simply on a cursory inspection of the sites and ground dealt with and on the somewhat scanty information on the subject generally which has been placed before me, I have no means of checking correctness of that information.

3. It has been quite impossible, in the absence of information on the subject, for me to deal with the probable absolute cost of the various schemes; but I may say that I consider that neither of them would be very expensive as compared with similar water-supply works of other towns.

4. The following papers—some received from you and some from Mr. Ussher—are herewith returned:—

(1) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, dated 10th January 1888, on white paper.
(2) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, no date (on blue paper).
(3) Letter from Mr. Gauge to you, dated 9th December 1887, and enclosure.
(4) " " " 10th " 1887.
(5) Memorandum by Colonel Frazer, R.E., dated 10th November 1887.

Remarks on the Scheme for supply of the Town of Vizagapatam with water.

To accompany letter to the Collector of Vizagapatam, No. C. 29-V., dated 5th February 1888.

Population to be taken as 35,000.
Allowance of water per head = 20 gallons per diem.
∴ Total quantity of water required per diem = 700,000 gallons.
Or per annum = 255,500,000.
Or per minute = 486.

1. *Scheme No. I, Colonel Frazer's.*—Supply to be drawn from the Hanumanthavaka stream at the gorge, constructing a small weir and also sinking a large well at the place to pump from and then raising the water by pumps to a reservoir on the side of the hill at such a height as to command by gravitation all the town of Vizagapatam below M.S.L + 60 below which level, it is believed, that all the true town lies.

2. The scheme is perfectly feasible if a sufficiency of water is obtainable *at all times of the year* from the natural flow of the stream; I do not believe that any appreciable addition would be obtained by the proposed well. That flow can easily be gauged by means of a small weir during the months of the year when there is least in the stream and should it be found that the daily discharge ever falls below the required quantity, then the scheme may be at once abandoned.

3. That quantity is given above as 700,000 gallons a day, but it would be no very serious matter if for a short time in each year only half that quantity, or at the rate of 10 gallons per head were given to the town.

4. The level of the bed of the stream at the gorge is stated to be + 36, and allowing 26 feet roughly for the slope * which would have to be given to a 12″ diameter pipe, and for loss † of head at a filter bed, the height to which the water would have to be lifted would be 50 ft., and for this steam-pumps would be necessary; but as neither the height to be lifted to nor the quantity to be lifted is very great, the pumps and engines would not be costly; a double set of each would be necessary, so that there might be no fear of stoppage for more than a day or whatever might be the time for which the service reservoir would hold a supply in cases of break down.

* 16 feet.
† 10 feet.

5. The *advantages* of the scheme are—

(*a*) Its small cost for impounding works.

(*b*) Its much shorter length of piping than in any other scheme; only 2⅞ miles as against 5¼ in scheme No. 3 and 8¼ in scheme No. 2; and the cost of iron piping, 12″ diameter, laid is stated to be about Rs. 17,000 a mile.

(*c*) The quickness with which it might be set going.

(*d*) The freedom from anxiety and risk that there would be in connection with the safety of the impounding embankments of other schemes.

(*e*) The absence of the trouble which in the other schemes will some day or other be inevitable from silting up the storage reservoir.

6. The *disadvantages* of the scheme are—

(*a*) The cost of the pumps, engines, engine-house and attendant's quarters, which, however, would not bring the cost of the head works to nearly as much as that of the reservoir and its appurtenances of scheme No. 2.

(*b*) The cost of working the pumps, establishment, fuel, &c. It is believed that Mr. Gauge has made an estimate of what this would be, but I have not the information before me—whatever it may be, capitalized at the rate at which the municipality could borrow, would form an important item in the consideration of the cost of the scheme.

(*c*) The difficulty of getting the pumping machinery repaired when it went wrong, there being positively no workshops where such repairs could be carried out nearer than Dowlaishweram.

7. This last is undoubtedly by far the greatest of the disadvantages and is so serious that in my mind it turns the scale against this scheme. If, however, before any of the proposals should be carried out, there appeared a tolerable certainty of railway workshops coming into existence at Vizagapatam, then I should prefer this scheme to the others, always, of course, supposing the observations as to the flow of water in the stream show it to be sufficient.

Scheme No. 2.—Reservoir to be formed by restoring old tank at Simhachellam and supply taken therefrom by pipes to a "service" reservoir or tank near the jail from which the distribution to the town would be led off.

2. There would be absolutely no constructional difficulties about this and the cost of restoration of the old bund and necessary appurtenances would probably not be more than one-quater that of the reservoir in scheme No. 3.

3. As regards the levels, the bed of the tank is said to be M.S.L. + 129 and supposing the offtake to be at 10 feet above this and the slope required for the piping (8½ miles) to the "service" reservoir to be about 46 feet, and the loss of head at a filter bed 10 feet, the water could be delivered at the "service" reservoir at about + 83; this would be some 23 feet above what is contemplated under scheme No. 1.

4. The *catchment basin* is said to be upwards of 4 square miles which is more than sufficient * to give the required supply.

5. What would be the storage capacity of the reservoir there is nothing to show. Mr. Gauge, indeed, in his letter, † dated 9th December 1887, says it would contain two or three years' supply, but he is, I am confident, much mistaken unless, indeed, he contemplated not merely restoring the old bank but raising it and impounding water to a much higher level than was ever the case in the old tank. Supposing, however, it would contain ‡ a five months' supply, which I consider is the least that such a reservoir should contain, then the advantages and disadvantages of this scheme may be thus summarised.

* See consideration of catchment basin scheme No. 3.

† Returned herewith.

‡ Above + 139.

6. *Advantages*—

(*a*) Cheapness of construction of the impounding works.

(*b*) The fact that into its basin flows the water from the beautiful Simhachellam springs which give a very appreciable supply of the present water during a considerable portion of the year and never entirely cease to flow; though from a report by L. Vertue made in July 1858, it appears that in the hot weather their discharge falls to only 2 cubic feet per minute.

7. *Disadvantages*—

(*a*) The *distance* of the *reservoir from the point common to all the schemes* (viz., the "service" reservoir near the jail); this is stated to be 8½ miles against the 2⅞ miles of scheme No. 1 and 5¼ miles of scheme No. 3 and the extra cost of iron piping for this greater distance would amount to more than the difference between the cost of the impounding works in this scheme and No. 3.

(*b*) *The greater cost of compensation for land* for the reservoir—what this would be—I have nothing to show me but as the greater part of the proposed waterspread of the reservoir is under wet cultivation, it would certainly be considerably more than the compensation which would have to be paid for the reservoir of scheme No. 3, whilst for scheme No. 1 there would, of course, not be any such expenditure necessary.

(*c*) The *impossibility* of keeping the *gathering ground* of the reservoir free from extensive pollution during the great annual Simhachellam feast when many thousands of devotees and their followers assemble there.

8. This last disadvantage is so serious that in my mind it turns the scale against this scheme, though from the ease with which the reservoir might be formed and the beauty of its situation it is at first sight the most attractive of all the proposals.

Scheme No. 3.—Reservoir to be formed by throwing an embankment across the valley of the Hanumanthavaka stream at a place called "Moodoosellovah."

(2) According to the memorandum on the subject drawn up by the Local Fund Supervisor Vencata Rangam Pillai, the catchment basin would be 4 square miles, but some one has entered in the margin that it would be only 3⅝ square miles. The rainfall in the valley is said to be 40″ per annum and taking only one-third of this or, say, 13″ to run off the supply from 3⅝ square miles would be 636,649,728 gallons per annum or considerably more than double the quantity required.

Square feet in one square mile.		Approximate.
27,878,400	×	3·4
= 94,786,560	×	1⅓ feet.
= 102,685,440	×	6·2
= 636,649,728 gallons.		

(3) The *capacity of the reservoir* given by the supervisor (and here I have no means of checking in any way the accuracy of his calculations) with water at level M.S.L. + 163 would be 23,372,118 cubic feet = 144,907,731 gallons and allowing one-third (a very large proportion) for soakage and evaporation during the whole time that it might be without supply, he takes the storage available for distribution supposing the reservoir to start full and not to receive during the time any fresh supply, as 15,581,412 cubic feet = 96,604,754 gallons or about 138 days' supply.

With the water level of the reservoir raised to M.S.L. + 169, he gives its capacity as 31,643,073 cubic feet and the final figures treated in the same way become 130,793,439 gallons or about 187 days' supply. As the take-off from the reservoir will of course not be from the lowest part of its bed and probably from not below ten feet above that, and as occasionally the reservoir may be five months without receiving any supply, it would be advisable if this scheme be adopted to take the higher of the two levels above noted as that to which water should be impounded and then, with care in drawing off, the capacity of the reservoir would be ample.

(4) As this higher level for the reservoir surface would, it appears, not require a bank with more than 27 feet of water against it in its deepest part, there would be no serious constructional difficulties.

(5) *As regards the levels*, the lowest part of the bed of the proposed reservoir is stated to be M.S.L. + 142 and the off-take would be at, say, about + 152. The distance from the "Service" reservoir near the jail is said to be 5¼ miles, the slope required for the piping in this distance would be about 29 feet and allowing 10 feet for loss of head in filtering the water could be delivered at the "Service" reservoir at about M.S.L. + 113 which would command some houses that neither of the other schemes would serve and would deliver through the town distribution pipes with a pressure that might be made useful in cases of fire.

(6) *Advantages*—

(*a*) Delivery at the "Service" reservoir at a considerably higher level than under either of the other schemes.

(*b*) The saving in cost for compensation for land as compared with scheme 2.

(*c*) The freedom of its gathering ground from liability to pollution.

(*d*) The less distance of the storage reservoir than in scheme 2 from the "Service" reservoir and consequent saving in piping.

(7) *Disadvantages*—

(*a*) The much greater initial cost of construction of the impounding works than under either schemes—No. 1 or No. 2—this advantage is, *as compared with* scheme No. 2, more than counterbalanced by advantage (*d*).

(8) In this scheme the comparative advantages more than counterbalance the disadvantages, and rejecting the other schemes for the reasons given, I consider this one (No. 3) the best. There would be no serious engineering difficulties in carrying it out, and as to the cost it would be moderate as compared with that of most town water-supply works.

Report on the Vizagapatam Water-supply:—

No. 184.

The Hanumantha Vanka has long been considered the best source of a water-supply for the town of Vizagapatam. In 1888 Mr G. T. Walch, late Chief Engineer, Public Works Department, made a preliminary investigation into several schemes for the water-supply of the town, all having the Hanumantha Vanka as the source of supply, but differing in respect of the point on the stream at which it was proposed to bund it for forming a reservoir. The scheme he considered best was the one in which it was proposed to form the reservoir near the village called Moodarsalowa (*vide* Mr. Walch's report, Appendix I).

2. The question of the water-supply of Vizagapatam has engaged the attention of this department since 1891. After a careful investigation of the various schemes proposed, Mr J. A. Jones, the Sanitary Engineer, concluded in favour of the scheme approved of by Mr. Walch. The details of the scheme were to a considerable extent settled by Mr. Jones before he went on leave, and the scheme as now forwarded is practically on the lines indicated by him.

3. The Hanumantha Vanka flows through a deep valley formed by two parallel ranges of hills. The valley measures from the Gorge to its head about 5 miles in length, with an average breath of 2 miles. It is proposed to bund up this valley near the village of Moodarsalowa, or about 2½ miles above the Gorge.

4. Appendix II gives the results of the analysis of the water made at various times. Column 5 gives the limit of impurity in a water that may be classed as "usable"—*vide* Dr. MacNally's Handbook of Sanitation for India, page 80. The Chemical Examiner considers the water "suspicious," apparently because of the high quantity of chlorine in it. An inspection of the bed and banks of the Hanumantha Vanka and its tributary streams shows that some three or four feet of the top-soil consists of a porous red soil, and below this lies a deep bed of hard limey clay. Three trial pits along the line of the proposed bund showed similar results. The whole catchment area of the Hanumantha Vanka appears to be covered with this layer of limey clay, to which the presence of a large quantity of chlorine in the water must be attributed, and not to animal contamination. The popular opinion about the water is that it is good. Provision is made in the estimate for removing the villages of Moodarsalowa and Gollapoliem, which lie within the catchment area of the proposed tank, and the water will be filtered before delivering into the town. With these precautions no reasonable objection could be urged against the water.

5. The catchment area of the stream above the point at which it is proposed to form the reservoir is six square miles. From the statement (Appendix III) of rainfall at Vizagapatam for the past twenty years it will be seen that the lowest fall was in 1871, when it was 15·93 inches. The next lowest amount reached was 26·45 in 1875. During 1891 the monsoon fall, *i.e.*, from May to October, amounted to 14·68 inches. The gathering ground is steep and otherwise favourable for a large percentage of run off. A 33 per cent. run off, or say five inches may be safely assumed. The run off in a year like 1891 would be—

$$\frac{27,878,400 \times 6 \times 5}{12} = 69,696,000 \text{ cubic feet.}$$

6. The population of Vizagapatam was, according to the census of 1881, 30,291 and, according to the last census, 34,487. For the purpose of this scheme, the population is assumed at 40,000. Provision is made for a supply of 15 gallons per head per diem, which is equal to 417 gallons per minute, or 35 million cubic feet in a year.

7. The Hanumantha Vanka flows perennially. The dry weather flow was gauged in 1888—a year the rainfall of which stands the third lowest within the past twenty years—and was found to be about 420 gallons per minute.

8. It is considered sufficient if the tank be made large enough to hold eight months' supply, or say 24 million cubic feet.

9. The reservoir as designed will hold 24,720,086 * cubic feet above the outlet level. The loss by evaporation and absorption will be counterbalanced by the daily inflow into the tank.

* Appendix IV.

10. The reservoir will have a waterspread of 2,895,433 square feet at F.T.L. The reduced level of the full tank will be 166·00 above M.S.L. The level of the outlet will be 145·50. The tank will thus be 20·50 feet deep from the F.T.L. to the level of the outlet.

11. The bund will be 2,700 feet long with a top width of 12 feet. The inner slope will be 1½ to 1 from the toe of the bank to full tank level, and above this level the slope will be 1 to 1. The inner face of the bund will have a stone revetment 2 feet thick on a backing of gravel 1 foot thick. The top of the revetment will be finished off with a row of curb stones 1½ feet above the top of the bund. The outer slope will be 2 to 1.

12. Puddling has not been provided in the bund, because it is not considered necessary, and it would be difficult and costly to obtain the necessary clay. The soil available for the formation of the bund is a mixture of yellow clay and kunker which, when well consolidated, forms a very compact and impermeable mass.

13. A surplus weir, to be built in the solid ground at the northern extremity of the tank, is provided. It will be 130 feet long, and with a depth of three feet of water flowing over it, will discharge the maximum flow from the drainage area. The discharge from the drainage area of six square miles calculated by the formula $D = C M.^{\frac{3}{5}}$ (Major Ryves formula), assuming C. as 675 = 2,227 cubic feet per second. To discharge this quantity with a depth of three feet of water flowing over it the length of the calingulah should be 130 feet (*vide* Appendix V).

14. The water will be drawn by a vertical pipe 18 inches in diameter having three inlet arms 5 feet, 10 feet and 15 feet below full tank level. Each arm will be controlled by a sluice valve. The vertical pipes and the valves will be enclosed in a masonry tower. The outlet from the tank consists of an iron pipe 10 inches in diameter placed in a masonry conduit. The conduit will be constructed in excavation cut in the solid ground—thus the necessity of laying the outlet pipes in made bank, which sometimes endangers the bund, is obviated, and the pipe could be inspected whenever required under the arrangement adopted.

15. There will be two filter beds each 72 feet square. Each bed will filter about 300,000 gallons per 24 hours. When the population reaches 40,000 and the consumption attains the maximum of 15 gallons per head, a third bed will have to be constructed as a stand-bye for repairs, cleaning, &c.

16. The water will leave the filter bed at the level of 142·00. The service reservoir is located near the jail which is a distance of 29,000 feet from the filters. The filters and service reservoir will be connected with a 10″ iron main. The maximum water level in the service reservoir will be 84·00. The 10″ pipe will have a hydraulic fall of 2 feet in 1,000 feet which is sufficient for the delivery of 417 gallons per minute.

17. The distribution system will cover Vizagapatam Proper and the suburbs of Alipore. Waltair is at too high a level to be supplied from the reservoir. If necessary, arrangement can be made to pump up water to Waltair from the service reservoir But Waltair possesses a good local supply from wells, and there is no urgent necessity for including it in this scheme.

18. The following is a statement of pipes and appendages in the distributing system :—

	FEET.
15″ cast-iron pipes	7,030
14″ „ „	1,940
8″ „ „	1,650
7″ „ „	1,760
6″ „ „	1,910
5″ „ „	2,930
4″ „ „	4,590
3″ „ „	11,160
Sluice valve from 2½″ to 15″	39
Air valves	2
Hydrants for fire service	20
Two tap pillar fountains	10
Wall tap fountains, single and double	30

19. The scheme is estimated to cost as below :—

	RS.
Collecting reservoir	69,760
Surplus weir	2,320
Surplus channel	7,880
Water tower and sluice	18,910
Filters	14,830
Delivery main from filters	98,140
Laying and jointing delivery main	8,320
Service reservoir	18,460
Pipes, sluice valves, fountains and hydrants, &c.	1,01 340
Laying and jointing pipes	14,960
Tools and plant	8,500
Establishment	18,500
Contingencies	18,080
Total	4,00,000

20. On the assumption that Government will pay a moiety of the cost the annual outlay will be—

	RS.
Interest and sinking fund at 5·96 per cent. $\left\{\frac{4,00,000}{2} \times 5·96\right.$	11,920
Establishment and repairs	2,580
Total	14,500

FORT ST. GEORGE,
25th January 1895.

R. E. ELLIS,
Ag. Sanitary Engineer to Government.

ENCLOSURE.

Proceedings of the Sanitary Board, No. 2289, dated 23rd July 1896.

* * * * *

Read—Report No. 184, dated 25th January 1895, from the Acting Sanitary Engineer to Government on Vizagapatam water-supply together with plans and estimates amounting to Rs. 4,00,000.

Resolution—The plans and estimates (Rs. 4,21,000) as amended by the Sanitary Board are approved.

The board considers that the scheme should be extended so as to include Waltair. This portion of the town must be supplied by pumping and its present omission does not affect the scheme for Vizagapatam as above approved. The municipal council should be requested to allot the sum of Rs. 1,000 for the necessary levels as soon as possible.

(True Extract.)

(Signed) P. L. GIMS,
Secretary, Sanitary Board (Engineering Branch).

To the Chief Secretary to Government,
Local and Municipal Department.

Order—Mis. No. 1578 M., dated 16th September 1896.

The plans and estimates will be forwarded to the Municipal Council, Vizagapatam, for remarks, with the request that it will submit proposals for financing the scheme on the assumption that Government will make a grant of half the cost and a loan of the other half with interest at $4\frac{1}{4}$ per cent. repayable in thirty years.

2. The Sanitary Board will be requested to explain the great delay that has occurred in forwarding the Sanitary Engineer's report of 25th January 1895.

(True Extract.)

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

To the Chairman, Municipal Council, Vizagapatam.
„ Sanitary Board.

READ—also the following paper:—

From M.R.Ry. B. SURYANARAYANA SASTRI Garu, B.A., B.L., Chairman, Municipal Council, Vizagapatam, to the Chief Secretary to Government (through the Revenue Divisional Officer, Vizagapatam), dated 3rd October 1896, No. 1012.

With reference to G.O., Mis. No. 1578 M., dated 16th September 1896, I have the honour to state that the plans and estimates for supplying water to the Vizagapatam town were placed before the council at its meeting held on the 29th idem and approved of by the council.

2. As regards the question of financing the scheme, I beg to submit that the council can raise the requisite funds for the liquidation of the first instalment of the debt generously proposed to be given by Government should the Government be pleased to spend its quota in the commencement of the work. The work will at least take two years for completion, during which period funds to the extent of Rs. 17,530 * can be collected and kept in reserve if the Government sanctions the levy of the water-tax at Rs. 4 per cent. in advance—*vide* section 47 of the District Municipalities Act IV of 1884. This amount can be availed of for repayment of the first instalment and interest, namely, principal Rs. 7,016-10-8 † + interest Rs. 8,946-4-0.†

	Rs.	A.	P.
*Tax on buildings at Rs. $7\frac{1}{2}$ per cent.	16,434	0	0
Water-tax at Rs. 4 per cent.	8,765	0	0
Do. for two years ...	17,530	0	0
†Estimated cost of water-works.	4,21,000	0	0
Deduct contribution from Government	2,10,500	0	0
Balance or loan from Government to be liquidated within thirty years ...	2,10,500	0	0
Instalment for the first year Rs. 2,10,500 ÷ 30 ...	7,016	10	8
Interest at Rs. $4\frac{1}{4}$ per cent.	8,946	4	0
Total ...	15,962	14	8

3. The other instalments can safely be paid in that the new Act will be passed meanwhile; and there will be no difficulty to get money since the Act provides the levying of house-tax at Rs. 10 per cent., or Rs. $2\frac{1}{2}$ per cent. more than the present rate and a water-tax at Rs. $6\frac{1}{2}$ per cent., and as the council resolved to raise the house-tax to 10 per cent. and water-tax to $6\frac{1}{2}$ per cent. when the new Act comes into force. The increase of income by so raising the house-tax and water-tax will amount to Rs. 19,721 * per annum. The small difference, if any, required for the maintenance of water-works can be met from the other sources of the municipal revenue.

	Rs.
*The amount at Rs. 4 per cent. as shown above	8,765
The amount at Rs. 9 per cent. ...	19,721
Average interest at $4\frac{1}{4}$ per cent. on Rs. 2,10,000 per year ...	4,600

4. The plans and estimates received with the order under reply are herewith returned.

An extract from the proceedings of the council is herewith submitted.

ENCLOSURE.

EXTRACT from the proceedings of the Municipal Council of the town of Vizagapatam at their meeting held on the 29th September 1896.

* * * * *

Read—Proceedings of the Madras Government, dated 16th September 1896, No. 1578, forwarding plans and estimates, amounting to four lakhs and twenty-one thousand rupees, for the supply of water to Vizagapatam, with a request that the council will submit proposals for financing the scheme, &c.

Resolution.—Resolved that the generous proposals of the Government be accepted with thanks; that a water-tax of 4 per cent. be raised and, when the new Municipal Act is passed, to raise the water-tax to $6\frac{1}{2}$ per cent., and the house-tax to 10 per cent., to enable the council to clear the yearly instalment payable to Government with interest and to meet the maintenance charges.

Endt. R.C. No. 865.

Submitted to Government.

2. The council apparently proposes to defer the first payment of interest and instalment of principal till the second year after the undertaking of the work. It calculates that the house-tax at the present rate of $7\frac{1}{2}$ per cent. *plus* a water-tax at the present maximum rate of 4 per cent. will yield in two years Rs. 17,530, which will enable it to pay in the second year the first instalment of principal—Rupees 7,016-10-8 *plus* interest at $4\frac{1}{4}$ per cent. on the whole loan Rs. 8,946-4-0; total Rs. 15,962-14-8.

3. Presuming that thereafter the new Municipal Act will have become law and that it will be enabled to levy house-tax at 10 per cent. and water-tax at $6\frac{1}{2}$ per cent., it anticipates an increase of income to the extent of Rs. 19,721 over that which it now realizes from a $7\frac{1}{2}$ per cent. house-tax, and with that sum expects no difficulty in meeting the annual interest and instalment.

4. Of course the present council's resolution to raise house-tax and water-tax to the maximum rates when the new Act shall have become law will not bind the council as it may then be constituted, but a substantial increase will be necessary and the council, even if its constitution shall have been modified, is not likely materially to change its opinion.

5. As the first annual call will only amount to Rs. 15,962-14-8, and as the interest will thereafter yearly decrease, it is doubtful whether the maximum rates will be necessary. The general scheme, however, seems to be the only practicable one for raising the necessary funds.

Submitted.
(Signed) R. Govinda Rao
Huzur Deputy Collector.
4-10-96.

6. As Waltair is not to be benefited by the present scheme, the justice of charging the increased rate on house property in that portion of the municipality is doubtful.

7th October 1896. (Signed) W. O. HORNE,
Acting Collector.

ORDER—No. 22 M., dated 11th January 1897.

As the resources of the municipal council under the amended District Municipalities Act will, it is understood, be sufficient to meet the charges on account of the water-supply scheme, the estimate of Rs. 4,21,000 for the work is sanctioned. A moiety of the cost will be paid as a grant from Provincial funds and the balance advanced as a loan on the usual terms.

2. The council should lose no time in drawing the grant of Rs. 1,40,000 provided for this purpose in the revised estimate of Provincial grants for 1896–97. In order that the loan of Rs. 1,50,000 provided on this account in the revised estimate of Provincial advances for 1896–97 may be drawn before the end of the year, an application in the prescribed form will be published in the *Fort St. George Gazette.*

3. The council's proposal to levy the water-tax is approved, and steps should be taken to assess the tax, with effect from 1st April 1897, at the rate of 1 per cent. on the annual value of buildings and lands in Waltair, and at 4 per cent. in the other parts of the town which will be directly benefited by the works.

4. The Public Works Department will be requested to put the work in hand at once.

(True Extract.)

Secretary to Government.

To the Chairman, Municipal Council, Vizagapatam.
" Collector of Vizagapatam.
" Accountant-General.
" Financial Department.
" Public Works Department.
" Sanitary Board.
Gazette.

Sanitary Commissioner
" Engineer
Editors' Table.

Exd. T. K. Narayana Iyengar.

Vizagapatam water supply

V.E.

[5]
500—27-5-95.

LOCAL AND MUNICIPAL DEPARTMENT.

Papers to be read in Proceedings:—

Pres.

Again G.O., ~~dated~~ No. 1578 M. ~~180 , No.~~ dated 16th September 1896.

Current No. 2753 of 1896, dated 7th October from the Collector of Vizagapatam.

Current No. of 189 , dated from the

Order. No. 22 M. d/11-1-97

H.M.

Why should it not be approved? The Water tax may be levied with effect from April 1, in Waltair at 1% & in the rest of the town which will be directly benefited by the works at 4%. Please alter accordingly.

12/1/97

Please see para. 6 of G.O. No. 1641 M. d/4-11-93 (Flag A), para. 3 (page 8) of G.O. No. 247 M., d/1-3-94 (Flag B) & para. 3 of G.O. No. 398 M., d/30-3-94 (Flag C) in which it has been held that the water tax should not be imposed before the works are in operation.

H.M. Vide the G.Os quoted. The Govt. appears to have held more than once that water tax cannot be levied prospectively of the completion of the works.

14/1/97

It is clear to me that under the Act the tax may be levied before the works are complete or even begun, & the G.Os quoted do not say anything to the contrary. On the contrary, I find at Flag B "The proposal may, however, be

~~The municipal council's proposal to levy the water-tax before the completion of the work cannot be approved. But~~ As the municipal resources of the council under the amended District Municipalities Act will, it is understood, be sufficient to meet the charges on account of the water supply scheme, the estimate of Rs 4,21,000 for the work is sanctioned. A moiety of the cost will be paid as a grant from Provincial funds and the balance advanced as a loan on the usual terms.

2. The council should lose no time in drawing the grant of Rs 1,40,000 provided for this purpose in the revised estimate of Provincial grants for 1896-97. In order ~~And it is also desirable~~ that

Rs 150,000 provided on account in the revised estimate of Provincial advances for 1896-97 ~~should~~ may be drawn before the end of the year, an application in the prescribed form will be published in the Fort St George Gazette.

~~3.~~ 4. The Public Works Department will be requested to put the work in hand at once.

(For orders).

V.R.
9/1/97

[signature] 9/1/97

3 The Council's proposal to levy the water tax is approved, and steps should be taken to assess the tax with effect from 1st April 1897 at the rate of one percent on the annual value of buildings and lands in Waltair and at [illegible] percent in the other parts of the town which will be directly benefited by the works.

(For orders S)

V.R.
19/1/97

[signature] 26/1/97

renewed later in the year when the works have made suff.t progress". What was decided in the G.Os quoted was that in the particular cases it was inadvisable to levy the tax. In this case we decide that it is advisable. I don't see why we should not.

[initials]
15/1/97

To The Chairman, M.C. Vizagapatam
" Collector of Do
" Accountant-General
" Financial Department
" Public Works Department
" Sanitary Board

Gazetted 26-1-97

Sanitary Commissioner [illegible]

[illegible] 28/1/97

Water supply scheme – Vizagapatam municipality

LOCAL AND MUNICIPAL DEPARTMENT.

Again G.O., ~~dated~~ No. 1578-M. dated ~~189 , No.~~ 16th September 1896.
Current No. 2753-M. of 1896, dated 7th October from the Collector of Vizagapatam
Current No. of 189 , dated from the

FOR ORDERS.

Secy

This, like the Cocanada scheme, on which I noted earlier today, must come through the F.D. so that the question, how far it is possible for Govt. to make any grants, may be considered.

[initials]
12/11/96

Note for the Secretary

Provision has been made in the Estimate of Provincial grants & loans for a grant of half the estimated cost of the scheme and a loan of the remainder as shown below:—

	1896-97 Lakhs	1897-98 Lakhs
Grant . .	1·40	·70
Loan . .	1·50	·51

V.R.
15/12/96

Then the work will be sanctioned & ordered to be put in hand at once

[signature] [illegible]/96

In G.O. No. 1578-M. dated 16th September 1896, the plans and estimates for a water supply scheme for Vizagapatam, costing Rs 421,000, were forwarded to the municipal council for remarks and the council were asked to submit proposals for financing the scheme on the assumption that Government would make a grant of half the cost and a loan of the balance on the usual terms.

2. With his letter read above, the chairman submits copy of the council's resolution approving the proposed scheme and agreeing to levy the water tax on buildings and lands at [illegible] percent on the annual value now and to raise the rate of this tax to 6½ percent and that of the tax on buildings and lands to 10 per[cent] when the proposed amendment

...pal act are passed into
... also stated that if the
...ment should sanction the
introduction of the water tax,
immediately, a sum of Rs 17,530.
may be collected during the pe-
riod of two years which the
work will take to be completed,
and that the first instalment
of the loan from Government (Rs 7016-10-8)
(Rs 7,016-10-8 on account of the prin-
cipal and Rs 8,946-4-0 on account
of interest) may be paid out of the
revenue so realised. It has how-
ever been repeatedly held by
Government that the water-tax
should not be imposed until the
work is in operation — Vide G.O.
No 1541.M.[x] / 4-11-93, 247.M.[x] / 1-3-94 and 398.M.[o] / 30-3-94.
The amount of ~~its~~ annual payment
arrived at by the municipal coun-
cil is incorrect, as a sum of
Rs 12,545[⊗] per annum will be
enough to repay to Government the
whole loan in the stipulated
period, and further the necessity
of paying any instalment of the
loan before the completion of the
works may be obviated, by

— to 1578 M. dated ... 2758 M.

|| S.K.

x Flag A x Flag B. o Flag C.

⊗ Vide the note for orders in G.O. No 1578 M / 16.9.96 Flag D.

The cost of maint.ce will
not come upon them till
the work is completed
S.K.

and then the loan, as propo-
sed by the council. As the amend-
-ments of the municipal act will
be passed ere long, it is submitted
that the scheme may be sanctioned

V.R.
6/11/96

H.M.

Please see notes with G.O.
16/9/96 No. 1578 M.

The resources of the Mty
seem sufficient to meet the
cost & to justify Govt sanction-
-ing the scheme.

The scheme itself has been
thro' the hands both of Mr Ellis
& Mr Jones.

S.K. 11.11.6

To Finl. Dept. w.o.

S.K. 13/11/6

FOR ORDERS.

Mfo no 22m.
11—1—97

Vizagapatam Water Supply Estimated to cost ~~4.21.000~~ 4.21.000	The work or works, for the construction or repair of which the loan is required, and, if made, of the cost thereof.
210.500 ~~2,10,500 00~~ Rs	The amount which it is proposed to borrow.
The Vizagapatam municipal fund.	The fund or funds on the security of which it is proposed to borrow.
The Madras District Municipalities Act IV of 1884	The law or laws under which the ~~said~~ fund or funds is or are levied, received or held.
(1) The loan is required for a period of thirty years. (2) It is proposed to be taken in two instalments—Rs 1,50,000 in March 1897 and Rs. 60,500 in 1898, and to be repaid ~~as follows~~ with interest at 4½ p.c. in thirty equal instalments of Rs 12545.	The period for which the loan is required, the number and amount of the instalments if any in which it is proposed that the loan shall be taken, the dates proposed for receiving such instalments, & the instalments if any in which it is proposed to repay the loan.
Attached hereunto.	A detailed account of the revenue and expenditure of the local Authority for the three last preceding years.
None	All existing prior charges upon the funds of the Local Authority

Vizagapatam municipal Loan Act of 1897.

Vizagapatam Loan appln

LOCAL AND MUNICIPAL DEPARTMENT.

Papers to be read in Proceedings :—

Current No.	of 189	, dated	from the
Current No	of 189	, dated	from the
Current No.	of 189	, dated	from the
Current No.	of 189	, dated	from the

Order—

A detailed account of the receipts and charges of the Vizagapatam Municipality for 1893-1894-95 1895-96, ~~as passed by Government, are compared below with the budget and revised estimates for the year and the actuals of 189 9~~.

Receipts.	Actuals 1893-94.	~~Budget Estimate~~ Actuals 1894-95.	~~Revised Estimate~~ Actuals 1895-96.	189 -9
	Rs.	Rs.	Rs.	Rs.
Balance brought forward	7948	8582	17409	
Tax on Arts	5452	6525	6006	
Tax on Buildings and Lands	12943	19358	14575	
Water-Tax on Buildings and Lands	.	.	.	
Tax on Vehicles and Animals	2512	3155	2570	
Tax on Carts	349	396	373	
Tolls	11856	10917	12039	
Realizations under Special Acts	.	155	216	
Rent of Lands, Buildings, &c., and sale-proceeds of Lands, &c.	132	853	3333	
Conservancy Receipts	14	18	28	
Fees and Revenue from Educational Institutions	30	43	47	
Fees and Revenue from Medical Institutions	.	.	.	
Income from Markets and Slaughter-houses	1058	1206	1540	
License fees	293	207	205	
Other fees	529	584	563	
Fines under Municipal and other Acts	742	545	621	
Interest on Investments and premium on Loans ..	.	.	.	
Grants and Contributions from Government	8971	901	174	
Do. from Local Boards	600	1786	700	
Do. from other bodies	217	12643	128	
Recoveries for services to private individuals	1424	1859	2222	
Miscellaneous	75	349	376	
Loans	.	.	.	
Sale-proceeds of Government Securities, &c., and Realizations of Sinking Fund	.	.	.	
Balances Recovered	.	9	104	
Total ..	55145	70091	63223	

Vizagapatam Loan Applns.

Part I. A

Vizagapatam Municipality Loan Scheme

LOCAL AND MUNICIPAL DEPARTMENT.

Papers to be read in Proceedings :—

Current No.	of 189	, dated	from the
Current No	of 189	, dated	from the
Current No.	of 189	, dated	from the
Current No.	of 189	, dated	from the

Order—

A detailed account of the ~~The estimated~~ receipts and charges of the Vizagapatam Municipality for 1893-1894-95 1895-96, ~~as passed by Government, are compared below with the budget and revised estimates for the year and the actuals of 189 9~~.

	Actuals 1893-94.	~~Budget Estimate~~ Actual 1894-95.	~~Revised Estimate~~ Actual 1895-96.	189 -9
	Rs.	Rs.	Rs.	Rs.
Receipts.				
Balance brought forward	7948	8582	17409	
Tax on Arts	5452	6525	6006	
Tax on Buildings and Lands	12943	19358	14575	
Water-Tax on Buildings and Lands				
Tax on Vehicles and Animals	2512	3155	2570	
Tax on Carts	349	396	373	
Tolls	11856	10917	12039	
Realizations under Special Acts		155	210	
Rent of Lands, Buildings, &c., and sale-proceeds of Lands, &c.	132	853	3333	
Conservancy Receipts	14	18	28	
Fees and Revenue from Educational Institutions ..	30	43	47	
Fees and Revenue from Medical Institutions				
Income from Markets and Slaughter-houses	1058	1206	1540	
License fees	293	207	205	
Other fees	529	584	563	
Fines under Municipal and other Acts	742	545	621	
Interest on Investments and premium on Loans ..				
Grants and Contributions from Government	8971	901	174	
Do. from Local Boards	600	1786	700	
Do. from other bodies	217	12643	128	
Recoveries for services to private individuals	1424	1859	2222	
Miscellaneous	75	349	376	
Loans				
Sale-proceeds of Government Securities, &c., and Realizations of Sinking Fund				
Balances Recovered		9	104	
Total ..	55145	70091	63223	

Charges	Actuals, 1893-94.	~~Actuals Budget Estimate~~, 1894-95.	~~Actuals Revised Estimate~~, 1895-96.	1896-97.
	Rs.	Rs.	Rs.	Rs.
GRANT I.				
New Works—				
Communications	2750	9970	5859	
Buildings	2791	1245	707	
Drainage	233	14	683	
Water-supply	15	506	181	
Miscellaneous	284	365	6	
	6589	5760	7010	
Repairs—				
Communications	485	556	1120	
Buildings	2086	2002	1731	
Drainage	65	199	478	
Water-supply	1183	1157	984	
Establishment	58	64	8	
Tools and Plant and other Stores	-	972	-	
Contributions for Public Works				
Total	16539	22804	18767	
	52	188	207	
GRANT II—				
Training Schools				
Municipal Schools—				
(*a*) On the Salary System	1278	1572	1482	
(*b*) On the Salary Result System	617	812	1031	
Grants-in-aid—				
(*a*) Salary grants	2194	1479	1442	
(*b*) Result grants	-	-	308	
(*c*) Combined grants	277	252	212	
(*d*) Building and Furniture grants	~~282~~ 163	363 231	383	
Inspection				
Miscellaneous				
Total	4640	4666	5065	
GRANT III—				
Hospitals and Dispensaries	2400	2400	2400	
Contributions	286	417	446	
Vaccination	348	331	289	
Registration of Births and Deaths	627	599	656	
Conservancy, Road-cleaning and Road-watering	11807	12270	12870	
Total	15468	16017	16661	
GRANT IV—	1384	1425	2481	
Lighting	134	132	142	
Markets and Slaughter-houses	2605	2229	1777	
Choultries	135	157	190	
Travellers' Bungalows	1264	1044	1085	
Avenues				
Public Garden, Survey of Land, Fire and other charges				
Total	5522	4987	5675	
	3894	3969	44	
GRANT V—				
Supervision and management	-	-		
Repayment of Debt	76	100		
Interest on loan	424	139		
Advances Recoverable	-	-		
Refunds	-	-		
Discount				
Pensions and Gratuities	8582	1740		
Investments				
Balance				
Total	55145	701		

Government of Madras.

LOCAL AND MUNICIPAL.

Recd. } 1897. *Enclosures*

Regd. } *Spare copies*

G.O., No. 22 M., 11th January 1897.

JANUARY.

Water-supply.

Sanctioning the estimate of Rs. 4,21,000 for the scheme of — for the town of Vizagapatam, approving the proposal of the council to levy water-tax from 1st April 1897, and requesting the Public Works Department to put the work in hand at once.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—again the following paper:—

G.O., No. 1578 M., dated 16th September 1896.

Read—the following paper:—

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Secretary, Sanitary Board (Engineering Branch), to the Chief Secretary to Government, dated Fort St. George, 23rd July 1896, No. 2290.

I have the honour to forward plans and estimates for the supply of water to Vizagapatam with the resolution of the Sanitary Board thereon.

2. The revision by the Sanitary Board would have raised the Sanitary Engineer's estimate of Rs. 4,00,000 to Rs. 4,51,000, had not there been since omitted under terms of G.O., No. 847 M., dated 15th May 1896, the charges for establishment (Rs. 30,000).

3. The figures in the last paragraph of the report (signed by Mr. Ellis in January 1895) will now stand as follow:—

		Rs.
Interest and Sinking fund at 5·96 per cent. on $\frac{4,21,000}{2}$	.. ..	12,545
Establishment and repairs (including labour) Head works	.. ..	2,000 *
Establishment and repairs (including labour) Town	.. ..	2,500 †
	Total ..	17,045

I think the figure Rs. 2,580 for establishment and repairs including labour as entered by Mr. Ellis is much too low.

APPENDIX I.

From G. T. WALCH, Esq., Superintending Engineer, I Circle, to the Collector of Vizagapatam District, dated Vizianagram, 5th February 1888, No. C. 29-V.

At your request I have the honour to forward the enclosed remarks with reference to the proposals for supplying the *town of Vizagapatam* with water; I do not include the civil station and village of Waltair in my remarks, because their provision with water other than from their present means of supply is a comparatively unimportant matter, and it seems evident to me the cost would be greater than the advantages gained would warrant.

*Head Works.**

Filter beds and tank.

	Rs.
Establishment—	
1 Superintendent	60
6 coolies at Rs. 7 each	42
2 watchmen at Rs. 7 each	14
Per month ..	116
For 12 months 116 × 12 = ...	1,392
Cleaning filters, &c.	608
Total ..	2,000

Town.†

	Rs.
Establishment—	
1 overseer	60
2 fitters at Rs. 15 each	30
4 turncocks at Rs. 7 each	28
4 fountain cleansers at Rs. 6 each	24
2 watchmen at Rs. 6 each	12
Per month ..	154
For 12 months 154 × 12 = ...	1,848
Repairs including labour—	
40 fountains at Rs. 16-3-0 each	652
Total ..	2,500

L., & M. 5,000—19-11-96.

2. I must presume that the opinions and remarks which I offer are formed simply on a cursory inspection of the sites and ground dealt with and on the somewhat scanty information on the subject generally which has been placed before me, I have no means of checking correctness of that information.

3. It has been quite impossible, in the absence of information on the subject, for me to deal with the probable absolute cost of the various schemes; but I may say that I consider that neither of them would be very expensive as compared with similar water-supply works of other towns.

4. The following papers—some received from you and some from Mr. Ussher—are herewith returned:—

(1) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, dated 10th January 1888, on white paper.
(2) Memorandum on Moodoosellovah reservoir by Local Fund Supervisor, no date (on blue paper).
(3) Letter from Mr. Gauge to you, dated 9th December 1887, and enclosure.
(4) " " 10th " 1887.
(5) Memorandum by Colonel Frazer, R.E., dated 10th November 1887.

Remarks on the Scheme for supply of the Town of Vizagapatam with water.

To accompany letter to the Collector of Vizagapatam, No. C. 29-V., dated 5th February 1888.

Population to be taken as 35,000.
Allowance of water per head = 20 gallons per diem.
∴ Total quantity of water required per diem = 700,000 gallons.
Or per annum = 255,500,000.
Or per minute = 486.

1. *Scheme No. I, Colonel Frazer's.*—Supply to be drawn from the Hanumanthavaka stream at the gorge, constructing a small weir and also sinking a large well at the place to pump from and then raising the water by pumps to a reservoir on the side of the hill at such a height as to command by gravitation all the town of Vizagapatam below M.S.L. + 60 below which level, it is believed, that all the true town lies.

2. The scheme is perfectly feasible if a sufficiency of water is obtainable *at all times of the year* from the natural flow of the stream; I do not believe that any appreciable addition would be obtained by the proposed well. That flow can easily be gauged by means of a small weir during the months of the year when there is least in the stream and should it be found that the daily discharge ever falls below the required quantity, then the scheme may be at once abandoned.

3. That quantity is given above as 700,000 gallons a day, but it would be no very serious matter if for a short time in each year only half that quantity, or at the rate of 10 gallons per head were given to the town.

4. The level of the bed of the stream at the gorge is stated to be + 36, and allowing 26 feet roughly for the slope* which would have to be given to a 12″ diameter pipe, and for loss† of head at a filter bed, the height to which the water would have to be lifted would be 50 ft., and for this steam-pumps would be necessary; but as neither the height to be lifted to nor the quantity to be lifted is very great, the pumps and engines would not be costly; a double set of each would be necessary, so that there might be no fear of stoppage for more than a day or whatever might be the time for which the service reservoir would hold a supply in cases of break down.

* 16 feet.
† 10 feet.

5. The *advantages* of the scheme are—

(*a*) Its small cost for impounding works.

(*b*) Its much shorter length of piping than in any other scheme; only 2$\frac{7}{8}$ miles as against 5$\frac{1}{4}$ in scheme No. 3 and 8$\frac{1}{4}$ in scheme No. 2; and the cost of iron piping, 12″ diameter, laid is stated to be about Rs. 17,000 a mile.

(*c*) The quickness with which it might be set going.

(*d*) The freedom from anxiety and risk that there would be in connection with the safety of the impounding embankments of other schemes.

(*e*) The absence of the trouble which in the other schemes will some day or other be inevitable from silting up the storage reservoir.

6. The *disadvantages* of the scheme are—

(*a*) The cost of the pumps, engines, engine-house and attendant's quarters, which, however, would not bring the cost of the head works to nearly as much as that of the reservoir and its appurtenances of scheme No. 2.

(*b*) The cost of working the pumps, establishment, fuel, &c. It is believed that Mr. Gauge has made an estimate of what this would be, but I have not the information before me—whatever it may be, capitalized at the rate at which the municipality could borrow, would form an important item in the consideration of the cost of the scheme.

(*c*) The difficulty of getting the pumping machinery repaired when it went wrong, there being positively no workshops where such repairs could be carried out nearer than Dowlaishweram.

7. This last is undoubtedly by far the greatest of the disadvantages and is so serious that in my mind it turns the scale against this scheme. If, however, before any of the proposals should be carried out, there appeared a tolerable certainty of railway workshops coming into existence at Vizagapatam, then I should prefer this scheme to the others, always, of course, supposing the observations as to the flow of water in the stream show it to be sufficient.

Scheme No. 2.—Reservoir to be formed by restoring old tank at Simhachellam and supply taken therefrom by pipes to a "service" reservoir or tank near the jail from which the distribution to the town would be led off.

2. There would be absolutely no constructional difficulties about this and the cost of restoration of the old bund and necessary appurtenances would probably not be more than one-quater that of the reservoir in scheme No. 3.

3. As regards the levels, the bed of the tank is said to be M.S.L. + 129 and supposing the offtake to be at 10 feet above this and the slope required for the piping (8½ miles) to the "service" reservoir to be about 46 feet, and the loss of head at a filter bed 10 feet, the water could be delivered at the "service" reservoir at about + 83; this would be some 23 feet above what is contemplated under scheme No. 1.

4. The *catchment basin* is said to be upwards of 4 square miles which is more than sufficient * to give the required supply.

* See consideration of catchment basin scheme No. 3.

5. What would be the storage capacity of the reservoir there is nothing to show. Mr. Gauge, indeed, in his letter, † dated 9th December 1887, says it would contain two or three years' supply, but he is, I am confident, much mistaken unless, indeed, he contemplated not merely restoring the old bank but raising it and impounding water to a much higher level than was ever the case in the old tank. Supposing, however, it would contain ‡ a five months' supply, which I consider is the least that such a reservoir should contain, then the advantages and disadvantages of this scheme may be thus summarised.

† Returned herewith.

‡ Above + 139.

6. *Advantages*—

(*a*) Cheapness of construction of the impounding works.

(*b*) The fact that into its basin flows the water from the beautiful Simhachellam springs which give a very appreciable supply of the present water during a considerable portion of the year and never entirely cease to flow; though from a report by L. Vertue made in July 1858, it appears that in the hot weather their discharge falls to only 2 cubic feet per minute.

7. *Disadvantages*—

(*a*) The *distance* of the *reservoir from the point common to all the schemes* (viz., the "service" reservoir near the jail); this is stated to be 8½ miles against the 2⅞ miles of scheme No. 1 and 5¼ miles of scheme No. 3 and the extra cost of iron piping for this greater distance would amount to more than the difference between the cost of the impounding works in this scheme and No. 3.

(*b*) *The greater cost of compensation for land* for the reservoir—what this would be—I have nothing to show me but as the greater part of the proposed waterspread of the reservoir is under wet cultivation, it would certainly be considerably more than the compensation which would have to be paid for the reservoir of scheme No. 3, whilst for scheme No. 1 there would, of course, not be any such expenditure necessary.

(*c*) The *impossibility* of keeping the *gathering ground* of the reservoir free from extensive pollution during the great annual Simhachellam feast when many thousands of devotees and their followers assemble there.

8. This last disadvantage is so serious that in my mind it turns the scale against this scheme, though from the ease with which the reservoir might be formed and the beauty of its situation it is at first sight the most attractive of all the proposals.

L. & M.
3,000—19-11-98.

Scheme No. 3.—Reservoir to be formed by throwing an embankment across the valley of the Hanumantavaka stream at a place called "Moodoosellovah."

(2) According to the memorandum on the subject drawn up by the Local Fund Supervisor Vencata Rangam Pillai, the catchment basin would be 4 square miles, but some one has entered in the margin that it would be only 33 square miles. The rainfall in the valley is said to be 40″ per annum and taking only one-third of this or, say, 13″ to run off the supply from 3⅝ square miles would be 636,649,728 gallons per annum or considerably more than double the quantity required.

Square feet in one square mile.		Approximate.
27,878,400	×	3·4
= 94,786,560	×	1⅛ feet.
102,685,440	×	6·2
= 636,649,728 gallons.		

(3) The *capacity of the reservoir* given by the supervisor (and here I have no means of checking in any way the accuracy of his calculations) with water at level M.S.L. + 163 would be 23,372,118 cubic feet = 144,907,131 gallons and allowing one-third (a very large proportion) for soakage and evaporation during the whole time that it might be without supply, he takes the storage available for distribution supposing the reservoir to start full and not to receive during the time any fresh supply, as 15,581,412 cubic feet = 96,604,754 gallons or about 138 days' supply.

With the water level of the reservoir raised to M.S.L. + 169, he gives its capacity as 31,643,073 cubic feet and the final figures treated in the same way become 130,793,439 gallons or about 187 days' supply. As the take-off from the reservoir will of course not be from the lowest part of its bed and probably from not below ten feet above that, and as occasionally the reservoir may be five months without receiving any supply, it would be advisable if this scheme be adopted to take the higher of the two levels above noted as that to which water should be impounded and then, with care in drawing off, the capacity of the reservoir would be ample.

(4) As this higher level for the reservoir surface would, it appears, not require a bank with more than 27 feet of water against it in its deepest part, there would be no serious constructional difficulties.

(5) *As regards the levels*, the lowest part of the bed of the proposed reservoir is stated to be M.S.L. + 142 and the off-take would be at, say, about + 152. The distance from the "Service" reservoir near the jail is said to be 5¼ miles, the slope required for the piping in this distance would be about 29 feet and allowing 10 feet for loss of head in filtering the water could be delivered at the "Service" reservoir at about M.S.L. + 113 which would command some houses that neither of the other schemes would serve and would deliver through the town distribution pipes with a pressure that might be made useful in cases of fire.

(6) *Advantages*—

(*a*) Delivery at the "Service" reservoir at a considerably higher level than under either of the other schemes.

(*b*) The saving in cost for compensation for land as compared with scheme 2.

(*c*) The freedom of its gathering ground from liability to pollution.

(*d*) The less distance of the storage reservoir than in scheme 2 from the "Service" reservoir and consequent saving in piping.

(7) *Disadvantages*—

(*a*) The much greater initial cost of construction of the impounding works than under either schemes—No. 1 or No. 2—this advantage is, *as compared with* scheme No. 2, more than counterbalanced by advantage (*d*).

(8) In this scheme the comparative advantages more than counterbalance the disadvantages, and rejecting the other schemes for the reasons given, I consider this one (No. 3) the best. There would be no serious engineering difficulties in carrying it out, and as to the cost it would be moderate as compared with that of most town water-supply works.

No. 184.

Report on the Vizagapatam water-supply.

The Hanumantha Vanka has long been considered the best source of a water-supply for the town of Vizagapatam. In 1888 Mr. G. T. Walch, late Chief Engineer, Public Works Department, made a preliminary investigation into several schemes for the water-supply of the town, all having the Hanumantha Vanka as the source of supply, but differing in respect of the point on the stream at which it was proposed to bund it for forming a reservoir. The scheme he considered best was the one in which it was propcsed to form the reservoir near the village called Moodarsalowa (*vide* Mr. Walch's report, Appendix I).

Enclosure.

Proceedings of the Sanitary Board, No. 2289, dated 23rd July 1896.

* * * * *

Read—Report No. 184, dated 25th January 1895, from the Acting Sanitary Engineer to Government on Vizagapatam water-supply together with plans and estimates amounting to Rs. 4,00,000.

Resolution—The plans and estimates (Rs. 4,21,000) as amended by the Sanitary Board are approved.

The board considers that the scheme should be extended so as to include Waltair. This portion of the town must be supplied by pumping and its present omission does not affect the scheme for Vizagapatam as above approved. The municipal council should be requested to allot the sum of Rs. 1,000 for the necessary levels as soon as possible.

(True Extract.)

(Signed) J. A. JONES,
Secretary, Sanitary Board (Engineering Branch).

To the Chief Secretary to Government,
Local and Municipal Department.

Order—Mis. No. 1578 M., dated 16th September 1896.

The plans and estimates will be forwarded to the Municipal Council, Vizagapatam, for remarks, with the request that it will submit proposals for financing the scheme on the assumption that Government will make a grant of half the cost and a loan of the other half with interest at $4\frac{1}{4}$ per cent. repayable in thirty years.

2. The Sanitary Board will be requested to explain the great delay that has occurred in forwarding the Sanitary Engineer's report of 25th January 1895.

(True Extract.)

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

To the Chairman, Municipal Council, Vizagapatam.
„ Sanitary Board.

Read—also the following paper:—

From M.R.Ry. B. SURYANARAYANA SASTRI Garu, B.A., B.L., Chairman, Municipal Council, Vizagapatam, to the Chief Secretary to Government (through the Revenue Divisional Officer, Vizagapatam), dated 3rd October 1896, No. 1012.

With reference to G.O., Mis. No. 1578 M., dated 16th September 1896, I have the honour to state that the plans and estimates for supplying water to the Vizagapatam town were placed before the council at its meeting held on the 29th idem and approved of by the council.

2. As regards the question of financing the scheme, I beg to submit that the council can raise the requisite funds for the liquidation of the first instalment of the debt generously proposed to be given by Government should the Government be pleased to spend its quota in the commencement of the work. The work will at least take two years for completion, during which period funds to the extent of Rs. 17,530 * can be collected and kept in reserve if the Government sanctions the levy of the water-tax at Rs. 4 per cent. in advance—*vide* section 47 of the District Municipalities Act IV of 1884. This amount can be availed of for repayment of the first instalment and interest, namely, principal Rs. 7,016-10-8 † + interest Rs. 8,946-4-0.†

	Rs.	A.	P.
* Tax on buildings at Rs. $7\frac{1}{2}$ per cent.	16,434	0	0
Water-tax at Rs. 4 per cent.	8,765	0	0
Do. for two years ...	17,530	0	0
†Estimated cost of water-works.	4,21,000	0	0
Deduct contribution from Government	2,10,500	0	0
Balance or loan from Government to be liquidated within thirty years ...	2,10,500	0	0
Instalment for the first year Rs. 2,10,500 ÷ 30 ...	7,016	10	8
Interest at Rs. $4\frac{1}{4}$ per cent.	8,946	4	0
Total ...	15,962	14	8

L. & M.
5,000—12-11-96.

3. The other instalments can safely be paid in that the new Act will be passed meanwhile; and there will be no difficulty to get money since the Act provides the levying of house-tax at Rs. 10 per cent., or Rs. $2\frac{1}{2}$ per cent. more than the present rate and a water-tax at Rs. $6\frac{1}{2}$ per cent., and as the council resolved to raise the house-tax to 10 per cent. and water-tax to $6\frac{1}{2}$ per cent. when the new Act comes into force. The increase of income by so raising the house-tax and water-tax will amount to Rs. 19,721 * per annum. The small difference, if any, required for the maintenance of water-works can be met from the other sources of the municipal revenue.

	Rs.
* The amount at Rs. 4 per cent. as shown above	8,765
The amount at Rs. 9 per cent. ...	19,721
Average interest at $4\frac{1}{4}$ per cent. on Rs. 2,10,000 per year ...	4,600

4. The plans and estimates received with the order under reply are herewith returned.

An extract from the proceedings of the council is herewith submitted.

Enclosure.

Extract from the proceedings of the Municipal Council of the town of Vizagapatam at their meeting held on the 29th September 1896.

* * * * *

Read—Proceedings of the Madras Government, dated 16th September 1896, No. 1578, forwarding plans and estimates, amounting to four lakhs and twenty-one thousand rupees, for the supply of water to Vizagapatam, with a request that the council will submit proposals for financing the scheme, &c.

Resolution.—Resolved that the generous proposals of the Government be accepted with thanks; that a water-tax of 4 per cent. be raised and, when the new Municipal Act is passed, to raise the water-tax to $6\frac{1}{2}$ per cent., and the house-tax to 10 per cent., to enable the council to clear the yearly instalment payable to Government with interest and to meet the maintenance charges.

Submitted.

8th October 1896. (Signed) R. GOVINDA RAO,
Huzur Deputy Collector.

Endt. R.C. No. 865.

Submitted to Government.

2. The council apparently proposes to defer the first payment of interest and instalment of principal till the second year after the undertaking of the work. It calculates that the house-tax at the present rate of $7\frac{1}{2}$ per cent. *plus* a water-tax at the present maximum rate of 4 per cent. will yield in two years Rs. 17,530, which will enable it to pay in the second year the first instalment of principal—Rupees 7,016-10-8 *plus* interest at $4\frac{1}{4}$ per cent. on the whole loan Rs. 8,946-4-0; total Rs. 15,962-14-8.

3. Presuming that thereafter the new Municipal Act will have become law and that it will be enabled to levy house-tax at 10 per cent. and water-tax at $6\frac{1}{2}$ per cent., it anticipates an increase of income to the extent of Rs. 19,721 over that which it now realizes from a $7\frac{1}{2}$ per cent. house-tax, and with that sum expects no difficulty in meeting the annual interest and instalment.

4. Of course the present council's resolution to raise house-tax and water-tax to the maximum rates when the new Act shall have become law will not bind the council as it may then be constituted, but a substantial increase will be necessary and the council, even if its constitution shall have been modified, is not likely materially to change its opinion.

No. 22 ...

A Detailed Account of the rec...

Charges—cont.

Grant II—			
Training Schools			
Municipal Schools—			
On the Salary-result System	1,278	[illegible]	[illegible]
Grants-in-aid—			
Salary grants	617	[illegible]	[illegible]
Result grants	2,194	1,479	..12
Building, Furniture, &c., grants	59	132	308
Inspection	277	252	212
Miscellaneous	163	231	883
Total ..	4,640	4,666	5,065
Grant III—			
Hospitals and Dispensaries	2,400	2,400	2,400
Contributions	286	417	446
Vaccination	348	331	289
Registration of Births and Deaths	627	599	656
Conservancy, Road-cleaning and Road-watering	11,807	12,270	12,870
Total ..	15,468	16,017	16,661
Grant IV—			
Lighting	1,384	1,425	2,481
Markets and Slaughter-houses	134	132	142
Choultries	2,605	2,229	1,777
Avenues	135	157	190
Public Garden, Survey of Land, Fire and other charges	1,264	1,044	1,085
Total ..	5,522	4,987	5,675
Grant V—			
Supervision and Management	3,894	3,969	4,420
Advances Recoverable	76	100	..
Refunds	424	139	..
Balance	8,582	17,409	12,635
Total ..	55,145	70,091	63,223

Balance ..

Total .. 55,145

[L. & M. 3,000—19-11-96.]

Number of copies required.	Order complete. ~~66~~ 170
	Letter only.
	Order complete with Letter.

...ed for signature. ...e. 25-2-97

...ed in print. 26-2-97

G.O. No. 1578 M. Date 16-9-96 — A

Water supply — forwarding to the Vizagapatam municipal council for remarks, the plans & estimates for the — of the municipality respecting the canal & submit proposals for financing the scheme & directing the Sanitary Engr. to explain the delay in forwarding the Sanitary Engineer's report of 25th January 1895.

2753 M — A

2753 M — A.

2
3
26
3

N. E.

Pres. Show print please. 23/1/97

... filed or being meant for despatch ... original.

A = Print in full.
B = Not to be printed.
P = Print abstract only.
Q = Print heading only.

9-3-06
27-7-06
4-3-08
26-5-09
1-10-21
2·3·54·H

[L. & M. 3,000—19-11-96.]

INDEXED.

Local & Munl (1897) Department.

[Ref. 4 13,000-24-3-05.]

Paper taken out of the Records from the charge of the Referencer. DEPARTMENT.

Press / Miscellaneous / Routine No. 22, dated 11 1 97 190 .

22 M D/ 11-1-97

26/7/54 NRO 55-H/54 Hl
Reg 2/8/56

	Date returned.	Initials of attender.
8	15/5/06	
2	29/1/07	
3	12.3.08	
26	5-7-09	M
3	13-9-09	

DESPATCHED