

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

READ—the following papers :—

From J. A. JONES, Esq., Acting President, Municipal Commission, to the Chief Secretary to Government, dated Madras, 12th May 1886, P.W. No. 200-W.W.

I have the honor, with reference to the undernoted resolution of the commissioners passed at a general meeting held on the 6th May, to forward the plans and sections of the scheme for the improvement of the water-supply of this city :—

“That the report and plans for the improvement of the water-supply be sent to Government for their information and for criticism by their officers, accompanied by a letter asking that, in view of the circumstances detailed in the report and in Mr. Mackenzie's memorandum, the Government will be pleased to recommend to the Government of India that either a loan of the amount necessary to carry out the scheme be granted without interest repayable in thirty years, or that a moiety of the cost be paid to the commissioners as a free grant; the works proposed in the report being very necessary for the immediate wants of the people, while municipal funds, as at present constituted, will not bear any very heavy additional burden upon them.”

2. For very many years past, the present supply to the city has been found to be wanting, in respect of both quantity and quality; and while the continuity of the supply has during most years been a question for doubt, the lowering of the calingulah of the Red Hills lake by some three feet has very much decreased the chance of any continuous supply from year to year.

3. As to the quantity and quality of the supply, I need not enter into this at any length. These points were most fully considered in my report dated June 1877. I may add that in these respects no improvement has taken place, nor is any likely to do so under the existing conditions of an open conducting channel with an off-take at a high level. The supply is now, however, distributed over a very much larger area, and, of course, the pressure over the whole town has decreased, much to the annoyance and inconvenience of the inhabitants, especially in the higher parts of the city, where at many hours of the day no water is available in the pipes.

4. As to the continuity of the supply, I need only quote the opinion of the Chief Engineer for Irrigation (*vide* G.O., dated 6th March 1886, No. 224 I., Public Works) :—

“4. The water level will now be 3 feet lower than it formerly was when the reservoir was full; but as during the time the restoration was in progress, the municipality has constructed a water tower, which, when the proposed new works for the improvement of the Madras water-supply have been carried out, will enable water to be drawn from the reservoir at a low level, there is, as has already been explained to Government, quite as much water available for the supply of Madras and also for the irrigation under the reservoir as there was formerly. It must, however, be borne in mind that until the proposed new water-supply works are carried out, it will be necessary to raise water by pumping to supply Madras through the existing good-water channel for the greater part of the year.”

5. Having thus shown to Government the necessity for some action on the part of the commissioners, I would draw attention to the scheme now sent forward, the cost of the works included in that scheme as being immediately necessary amounting to Rs. 11,82,636, less Rs. 85,581-4-0, cost of works already executed and paid for; and this provides for pumping station and engines, stand pipe, pumping main, settling tanks, filters, and service reservoir, and finally a long main 36" diameter extending to Madras, a length of six miles.

6. The details of the scheme and a detailed estimate will be found in the report accompanying, of which six copies are herewith forwarded.

7. It was suggested at the meeting of the commissioners that (1) the settling tanks, filtrations, and service reservoirs might be for the present omitted; (2) that in addition the pumping station and engines might also be omitted, and the main carried round the base of the Red Hills and joined immediately to the pipes which have already been laid through the bund. This last proposal would require an additional mile of 36" piping in cutting of 8' to 10' deep, all of which additional work would be useless if the complete scheme should be carried out.

8. The first of these suggestions would merely save original expense; and the cost for pumping, maintenance, &c., would remain as in the complete scheme. The second suggestion would increase the cost of the main by some Rs. 90,000; but there would be no pumping and no filtration, and the pressure in the city would vary directly with the fall or rise of the lake; but probably the supply would be continuous, so that the latter proposal has something to recommend it. The line the pipe would take in this latter scheme is shown by a red dotted line on plan No. 1.

9. I need enter no further into the engineering details of the scheme, but may add that the schemes would compare thus:—

	Cost.	Annual maintenance.
	RS.	RS.
Complete scheme	11,82,636	64,320
Do. without filtering	7,82,834	61,900
Main alone, neither pumping nor filtering ..	6,34,205	250

10. The latter scheme commends itself to me as a temporary expedient, on the ground that one of the chief objects to be aimed at is purity of supply; and while a supply thus obtained will be much purer than our present supply, though it will be very far from perfect, yet the complete scheme may at any time hereafter be proceeded with.

11. In drawing attention to the resolution of the commissioners, I would respectfully urge that His Excellency in Council will be graciously pleased to consider the peculiar circumstances of the city of Madras, her poverty as compared with the large area of the city, increasing thus the cost of almost every municipal purpose, and (2) the distance from which her water-supply is obtained.

12. The marked decreased death-rate from cholera and other epidemic diseases has demonstrated most fully the advantages to be derived from the improved water-supply; and while it has been the object of the commissioners to distribute that supply as far and as widely as possible, it is felt that many much-needed extensions are quite impossible unless we are able to assure ourselves of a continuous supply and a supply with a much increased pressure. I need not point out to Government that Madras is a city of great distances, and that to reach the many outlying villages and parcherries of the city (which latter are in most need of water, not only for their own needs but for the safety and immunity from disease of the rest of the city), a very extensive network of pipes is necessary.

13. It is to these difficulties that I would wish to direct the earnest attention of Government, and it is on such grounds that the commissioners would desire to ask for the special aid indicated in their resolution to enable them to proceed with the works now in view.

14. I would venture further most respectfully to ask that Government will be pleased to consider this request, not alone from an equitable point of view, but rather as a matter of special favor to this city.

15. So far as their means will allow, the commissioners will not hesitate in appropriating them for these necessary works; but having raised within the last few years loans amounting to Rs. 9,50,000 for drainage and water-supply, the amount at their disposal for additional loans is extremely small.

16. I forward as an appendix to this letter a memorandum by my predecessor, Mr. Mackenzie, who had studied the question in its financial aspect; but I would add that, so far as I am now able to judge, the commissioners at present without additional sources of income could not set aside more than a sum of Rs. 20,000 per annum, which, allowing for sinking fund, would only meet a loan of some Rs. 3,00,000—a sum quite inadequate for the works in view.

No. 341.

Transferred to the Public Works Department, for an expression of opinion on the proposed scheme.

(By Order.)

MADRAS,
3rd June 1886.

(Signed) E. S. LAFFAN,
Under Secy. to Govt.

To the Public Works Department, with plans and estimate, in original, to be returned.

No. 257 D.

To the Chief Engineer for Irrigation, for favor of opinion upon the scheme generally, and especially with respect to paragraphs 61 and 62 of the report.

OOTACAMUND,
17th June 1886.

(Signed) J. SHAW-STEWART, Col., R.E.,
Secretary to Govt., P.W.D.

Note by the Chief Engineer for Irrigation.

Your office note, No. 257-D, dated 17th June 1886.

2. I have already had the advantage of discussing with Mr. Jones the arrangements he has proposed in his new scheme for the water-supply of Madras, and may state that I generally approve of them.

3. Former discussion has settled to the satisfaction of Government that the proper way of supplying Madras from the Red Hills reservoir is by pumping up the water to the top of the Red Hills, there settling and filtering it and conveying it in pipes to Madras; the construction of the water tower while the reservoir was empty formed part of the scheme, and has pledged the municipality to its completion.

4. Having stated that I generally approve of the scheme which has been so carefully worked out by Mr. Jones, I may proceed to mention some points on which the Government will probably require that a definite opinion should be expressed.

5. I agree that the details of the engine house should not be worked out until the details of the engines and boilers are known, and consider that the estimate based on a rate per cubic foot may be accepted. That these should be obtained from a firm in England whose past work is a guarantee of their efficient performance of the work is undoubtedly the most satisfactory arrangement. Estimates of the machinery based on the information given by such a firm must be as accurate as any that can be framed; and it is observed that in the general abstract of estimate, 10 per cent. on the total amount, including the cost of machinery, has been allowed for "Contingencies and Engineering," which should give a sufficient margin to allow for any unforeseen expenditure.

6. The supply allowed to be pumped up is fifteen gallons per head per diem for a population of 400,000, and the main is calculated to supply double this amount to allow for the greater demand at certain hours of the day. For the population of an eastern town, allowing that the water is not used for washing clothes, this supply should be ample, but when the watering of gardens is taken into account, it is certainly not excessive, and it may be found that, even with this supply, it may be necessary to restrict the supply for garden cultivation within the municipality when the whole population has been supplied.

7. I approve of the proposal to have three engines, two of which are capable of raising the full supply, and consider that it would be a mistake on grounds of economy to dispense with one of the engines even for a time.

8. The settling tanks and filters have been well arranged and their extent is not considered excessive. In talking over the subject with Mr. Jones, I agreed that puddling the tanks would be sufficient lining. If the laterite lining of the filter-beds is plastered with cement, the proposed arrangements should do.

9. The service reservoir is calculated to hold 2,357,000 gallons, or less than half a day's supply, and this, I think, is the weakest part of the scheme; the settling tanks will, however, hold, if three are in use, two days' supply in addition to water passing through the filters, and the provision of further capacity in the service reservoir would be very costly. Considering the situation and that the reservoir is on the highest ground in the neighbourhood and removed from any houses, I think a covering is unnecessary.

10. Regarding the light railway along the pipe track for carrying and laying the pipes, I believe that such an arrangement will be economical, but I doubt the sufficiency of the estimate of cost of the railway; at all events, the railway as estimated for would not carry the fuel and road metal, &c., from which a considerable saving is expected hereafter, and I should think the best arrangement would be, if practicable, for the South Indian Railway Company to make a light railway and rent it to the municipality for the time they are laying the pipes.

11. I do not agree to the proposal to reduce the estimate by omitting for the present the western settling tank and filter-bed. I have already stated that there is in my opinion too little storage capacity in the service reservoir, and I think it is better to face the ultimate expenditure at once.

12. As regards the use to which the present delivery channel could be turned and the suggestion that it should be utilized for extending irrigation, I would remark that arrangements are being made for the extension of irrigation as far as possible in another direction, and it would not be advisable to take off water for new irrigation at a comparatively high level when it is possible that, in a time of drought, when water would be most required, it would be considered necessary in the interests of the town of Madras to restrict irrigation. Looking to the fact that Madras will in future be dependent on one line of pipes and that any accident to this line would entirely cut off the supply, I think it would be wise to maintain the existing channel and to hold it available as an alternative means of supply in case of accident.

13. With reference to the statement that there will be about eighteen million cubic yards additional supply available for irrigation in consequence of taking off the supply for Madras at a low level, I have already stated, in a report on the restoration of the Red Hills reservoir, that the irrigation will be actually better off under the altered circumstances of the reservoir than it was before, but no extension of irrigation beyond that originally intended is contemplated, and there is still the possibility that in very dry seasons it might be necessary to restrict irrigation. I do not think, therefore, any credit to Government can be legitimately assumed on account of increased supply available, but I consider that the improved supply to Madras which the present scheme provides is an immense public benefit, and the scheme therefore deserves liberal aid from Government.

OOTACAMUND,
25th June 1886.

(Signed) J. O. HASTED, Col., R.E.,
Chief Engineer for Irrigation.

To the Secretary to Government, Public Works Department.

Note by the Consulting Engineer for Railways.

Your office note, No. 256-D, dated 17th June 1886.

Mr. Jones suggests the construction of a tramway suitable for the laying of pipes and conveyance of materials during the construction of his works, and considers that

such a line might hereafter be utilized for the conveyance of coal and gravel and possibly for sweepings, passengers, and general merchandize; he apparently contemplates such a line being eventually handed over to the South Indian Railway to own and to work.

2. The first questions raised by this suggestion are—

(a) Would a line of the type suggested be as suitable for use, after construction of the water-supply works is completed, as a branch line from, and in connection with, the South Indian Railway?

(b) Could a branch of the South Indian Railway be made available for the pipe-laying?

3. As regards the first question, the suggested type of line would involve a break of gauge for all material landed from the beach, which in the case of coal would be both expensive and injurious. For town sweepings and fodder—the commodities most likely to be carried—the South Indian trucks would be far more suitable.

As regards the second question, it seems doubtful whether a branch of the South Indian Railway could be made to serve for construction. I gather from Mr. Jones' remarks that he requires a line laid on existing roads and following so closely the pipe trench as to minimize the handling and transport of pipes and other material; whether a metre-gauge line of the South Indian Railway type could be laid to serve the end in view can be determined only by a working survey; if it can, the questions arise whether the traffic in the future will be such as to warrant so expensive a type of line.

The cost of such a line cannot be arrived at without a working survey; the traffic in coal and gravel alone is said to be worth Rs. 3,623 per month = 43,476 per annum. The cost of working the branch might amount to Rs. 60 per diem, (say) Rs. 22,000 per annum, or, estimating the cost of working at three-fifth gross receipts, = (say) Rs. 26,000; this would leave (say) Rs. 17,391 available as interest at 6 per cent. on a capital expenditure of (say) Rs. 2,80,000 for eight miles at a rate of Rs. 35,000 per mile—a rate sufficient, it is thought, to cover the cost of a line on which South Indian Railway engines and stock could be worked.

Assuming, then, that it would pay the municipality to make such a line, there is no doubt that the South Indian Railway could work it more cheaply than either the municipality or a private company; they cannot, however, under the orders of the Secretary of State, find the capital for, or hold possession of, the line. The municipality would have to raise the capital, the South Indian Railway Company would doubtless consent to lay and to work the line, and the surplus profits which would accrue to the municipality could be devoted to the gradual extinction of the debt; if, therefore, a line of the South Indian Railway type can be made to serve for constructional purposes, it seems to me that it would be unwise of the municipality to hamper themselves with a break of gauge and inferior carrying capacity, by laying a line of inferior type.

It remains to consider what type of line should be adopted in the event of the South Indian Railway type being found impracticable. Mr. Jones' estimate is not in sufficient detail for review; but the following are details of a line constructed in Kattiawar, which appears to be of much the same character as the one Mr. Jones proposes, and it seems very improbable that a similar line in Madras would cost more, if as much:—

Gauge—2' 6".

Rails—19 lb. steel.

Sleepers—transverse, steel, 3' 6" x 5", spaced 10 to a 24-foot rail.

Engines—weight 10 tons, load 3½ tons, on a pair of driving wheels.

Wagons on bogies carrying 5 tons.

Smaller stock carrying 3 tons.

Cost—Rs. 16,000 per mile.

Such a line could hereafter be employed in carrying coal and gravel; it would not cost half as much as the line of heavier type, and would therefore be well within the means of the municipality to construct, but it would require more spare stock, be

costly in break of gauge, costly in the carriage of bulky goods and could not be worked by the South Indian Railway, while its want of carrying capacity might often limit its usefulness and lessen its receipts.

MADRAS,
6th July 1886.

(Signed) C. J. SMITH, Col., R.E.,
Consulting Engineer for Railways.

To the Secretary to Government, Public Works Department.

Note by the Chief Engineer, Public Works Department.

Mr. Jones' scheme for the improved water-supply of Madras has been drawn up with great care, and his proposals appear to be on the whole thoroughly sound. The salient points of the scheme are dealt with by the Chief Engineer for Irrigation in the accompanying note, and as Colonel Hasted has had the opportunity of discussing them in detail with Mr. Jones, I need only say that I concur generally in the conclusions at which he arrives.

2. Especially I deprecate the proposal to effect a slight reduction in the estimated cost by postponing the construction of one of the settling tanks and filter-beds. The efficient supply of Madras will require all the storage power of the four settling tanks, assuming that one of them will generally be out of use.

3. The question of the proposed line of railway is discussed at length in the accompanying note by the Consulting Engineer. Mr. Jones proposes to construct a light, metre-gauge line, with 18 lb. steel rails, to serve for the conveyance of pipes and other materials during construction of the works, and afterwards to be used permanently for municipal purposes and for passenger and goods traffic.

4. Colonel Smith arrives at the conclusion that, if a line of the South Indian type could be made available for construction purposes, its greater cost would not prove unremunerative, while it would in many ways be ultimately more useful than the light line proposed by Mr. Jones; and in that conclusion I concur. In order to determine the point at issue, and to estimate the probable cost of the line, a working survey is necessary.

5. The water-supply from the Red Hills reservoir has proved an immense boon to the town of Madras; but the present arrangements are defective in many respects. The scheme now before the Government will remove those defects, and will, without doubt, tend greatly to improve the public health and comfort. On those grounds, I am of opinion that it deserves a liberal grant-in-aid from Provincial funds.

OOTACAMUND,
7th July 1886.

(Signed) J. SHAW-STEWART, Col., R.E.,
Chief Engineer, P.W.D.

No. 359-D.

Transferred to the Financial Department, with advertence to endorsement from that department, No. 341, dated 3rd June 1886, herewith returned with enclosures.

OOTACAMUND,
7th July 1886.

(Signed) J. SHAW-STEWART, Col., R.E.,
Secretary to Govt., P.W.D.

To the Financial Department, with papers, plans, &c.

ORDER—dated 21st July 1886, No. 696 M., Financial.

The Government regret their inability to help the municipality at present in carrying out this useful work.

(True Extract.)

John Shaw-Stewart
For Chief Secretary.

To the President, Municipal Commission, Madras.

„ Public Works Department.

„ Sanitary Commissioner for Madras.

Exd. A. Raiff.

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No 2026 Way 13th August/86

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Gobt. of (1886) Madras.
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Encl.

G.O., 21st July 1886, No. 696 M.

No 2026 Way 13th August/86

JULY.

Water-supply.

Expressing inability to help the Madras Municipality at present towards the improvement of the — scheme.

C.R. for S ✓
C.R. for S ✓
C.R. for R ✓
S.E. Circle ✓
S.E. Circle ✓

13/8/86

2 copies sent to

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Introductions