M.R.O. 1—20,002—12-8-65.

(1) Number of Pages 8

(2) Date of repair 10.10.68

(3) Initials of the Referencer 14.10.68

MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

Revenue DEPARTMENT

G.O. No.	2307	Press
B.P. No.		Mis.

Dated 28.10.1875 196 .

Not to be folded or roughly handled

Read the following :—

No. 1,131.

No. 182. *Note by the Chief Engineer for Irrigation.*

THE requirements of the important tar of Nundial in the Kurnool District have been under investigation for some years, a great delay has unfortunately occurred in dealing with them. At one time th adras Irrigation and Canal Company proposed to take over the tanks and conn hem with their canal, and their rough estimate for their repair amounted to Ru 25,000. The tanks have been getting more and more out of repair for many years ast, owing in part to the great length of the bunds, about 5 miles, making the amount required to place them in good order necessarily large, and partly to the circumstance that the means of disposing of surplus were known to be insufficient, while the requisite information as to the additional means necessary needed to be obtained. Added to this, there were doubts as to the proper full tank level, and there being inam and putta lands in the bed of the tanks it became requisite that the Revenue Officers should settle this point.

2. In G. O., 5th February 1868, No. 400, the Superintending Engineer, 3rd Division, was instructed to estimate the cost of the repairs required, and in July 1871 an estimate, amounting to Rupees 18,290 was submitted, but an examination into the details of the requirements of the tank showed that a complete revision of the arrangements would be necessary. It was, however, at that time clear that a large addition to the means of disposing of the surplus from the South Tank was imperative, and it was settled that No. 3 escape should be lengthened from 116 to 356 feet. By some misunderstanding this weir was reconstructed of the original length of 116 feet at the altogether unnecessary cost of Rupees 4,660, and nothing was done beyond keeping the crest below F. T. L. to add to the means of disposing of surplus.

To District Engr., No. 190, 27th March 1873.
From „ „ 38, 11th April „
Proceedings, Madras Government, No. 2,592, 23rd October 1873.

Proceedings, Madras Government, No. 1,711, 25th June 1874.

3. In August 1874, the then Acting District Engineer submitted a report on the tanks, and an approximate estimate of the outlay required. This report was reviewed, and instructions given.

No. 75, 3rd August.
„ 934, 7th November 1874.

4. In February 1875, the District Engineer submitted designs for the surplus weirs needed, with the calculations on which the dimensions had been determined. The proposals were—

No. 5, 6th February.

North Tank.

	FEET.
1*st*.—To lower the existing No. 1 Weir to the same level as No. 2 Weir, length	30
2*nd*.—To close No. 2 Weir, length 88½ feet.	
3*rd*.—To construct a new Weir south of No. 1 Weir, length	224
Total length of escape for North Tank ...	254

South Tank.

	FEET.
1st.—To raise No. 3 Weir to the level of No. 2 Weir (North Tank), its length being	116
2nd.—To construct a new Weir to the east of No. 3 with a length of ..	710
Total length of escape for South Tank ...	826

It will be seen therefore that 1,080 feet of escape were proposed instead of the 234 feet hitherto available.

The North Tank receives the drainage of 12 square miles, and the South Tank of 71 square miles. The information given did not admit of a conclusive determination of the water-way required, but from the data afforded by a very heavy rainfall in July 1874, it was deduced that probably 175 feet of surplus weir for the North Tank and 450 feet for the South Tank would suffice. It was also remarked that there appeared to be no sufficient reason for the proposal to lower the F. T. L. permanently some $1\frac{3}{8}$ feet. A temporary lowering while the repairs and improvements were in progress might, it was thought, be probably expedient, but otherwise the retention of the original F. T. L. was considered to be desirable. The correspondence regarding the inam and puttah lands in the bed of the tanks is contained in the papers as per margin.

No. 422, 27th April 1875.

From District Engineer, No. 1, 7th Jan. 1875.
To " " 71, 18th " "

5. With his letter No. 22, of the 13th May 1875, the District Engineer transmitted alternative estimates, amounting to Rupees 55,378 and 32,330 respectively, for the repair only, exclusive of new surplus weirs, of the tanks. Part of the work however, such as new revetment, appertained rather to new works than repairs, and it was noticed that information as to past outlay on repairs would be required, while in connection with the lowering of the assessment of the lands under the tanks it was observed that a report on the results to be expected from the large outlay contemplated would be necessary.

No. 723, 6th July 1875.

6. As the result of this extended discussion and correspondence, the District Engineer has now forwarded a revised estimate, amounting to Rupees 41,000, providing for all the work required. The items are—

No. 30, 16th September 1875.

		RS.
Capital.		
Improving Bund.—New revetment and backing, &c. ...	24,125	
(South Tank).—New surplus Weir, 410 feet	6,370	
(North do.). " " 90 "	1,230	
		31,725
Revenue.		
Repairing bund and eight sluices	8,400	
" No. 1 calingulah, 30 feet	78	
" " 2 " $88\frac{1}{2}$ "	797	
		9,275

Appended to the estimate is a statement showing that from the year 1859-60 up to 1873-74 inclusive, the outlay on these tanks has amounted to Rupees 12,530, of which Rupees 4,558 were for improvements, reconstructing No. 3* escape chargeable to capital, and Rupees 7,972 for repairs.

* South Tank.

7. With regard to the proper F. L. of the tanks, it would have been desirable that the Collector should have recorded an opinion on the subject, after taking such evidence as appeared to him necessary. The old calingulahs, as is generally the case, were at different levels, but it appears that it has been ascertained by the Deputy Collector from the ryots that when the water is 8 or 9 inches above the under side of the cross stone of No. 5 sluice, the quantity of water stored is that which is required, and this level corresponds almost exactly with the crest of No. 1 escape weir in the North Tank. Consequently the F. T. L. has been fixed at this level. The Deputy Collector, at the end of his No. 176 of the 2nd September 1875, alludes to an equitable settlement with the owners of lands in the bed of the tank to be submerged, but it would seem to be unnecessary, if no alteration in the original full tank level be made, and no such alteration is contemplated, to give any compensation. The fact that for some years past, owing to the inefficient state of the tanks, a full supply has not been retained clearly gives no claim.

8. In order to avoid the expense of raising the very long bunds of these tanks to the height which would be necessary were the crests of the escapes built up to F. T. L., the District Engineer proposes, and has provided for placing all the crests at a uniform level of 1·62 feet below F. T. L., and he estimates M. W. L. to be 2·50 feet above the crests, or 0·88 feet above F. T. L. Water is proposed to be retained to F. T. L. by means of upright stones 6 inches thick, placed at 3 feet from centre to centre, with movable slab stones, to dam the spaces between the upright stones. The District Engineer states the effective length of the calingulahs of the North Tank to be 175 feet. Their total lengths are—

	FEET.
No. 1, 30 feet, and deducting for the upright stones $5\frac{1}{2}$ feet, the effective length becomes	$24\frac{1}{2}$
No. 2, $88\frac{1}{2}$ feet, upright stones 15 feet	$73\frac{1}{2}$
New calingulah 90 feet, do. 15 feet	75
Making the actual effective length	$173\frac{1}{2}$
Similarly for the South Tank—	
No. 3, 116 feet, upright stones (39) $19\frac{1}{2}$ feet	$96\frac{1}{2}$
New calingulah 410 feet, do. (137) $68\frac{1}{2}$ "	$341\frac{1}{2}$
Making the actual effective length ...	438

against 450 feet intended.

The communication between the two tanks being by means of small tunnels in the dividing bund is unimportant in considering the arrangements for the disposal of surplus. The data available for determining these arrangements are, *first*, the arrears of the catchment basin; and, *secondly*, the flood drainage of July 1874 as deduced from water-levels at that time. Taking the latter first, from a register enclosed with the District Engineer's letter, No. 5 of the 6th February 1875, it appears that $3\frac{3}{4}$ feet of water passed over the only escape weir of the South Tank, and this being 116 feet long, the discharge must have been about 2,830 cubic feet a second. All the

water received by the tank passed under the larger aqueduct of the Madras Irrigation and Canal Company's Canal, which has 22 spans of 10 feet each. The water rose to 35·68 on the upper side of the aqueduct, and the maximum water-level in the tank on the lower side was 32·50. The District Engineer has not given the area of the water-way of the aqueduct, but he calculates the discharge at 11,576 cubic feet a second. And as the velocity would have been from 8 to 9 feet a second, taking the lower figure, the area would be 1,447 square feet, or 65·8 feet for each span. As the discharge from the tank was so small most of the water must have been absorbed in filling the tank, and the flood must have lasted for a very short time. In the next place, the catchment basin of this South Tank being about 71 square miles, the maximum flood discharge may be estimated therefrom at from 7,650 cubic feet to 9,675 cubic feet a second. The discharge over the calingulahs with the assumed M. W. L. shown on the plans would be about 6,100 cubic feet a second, or considerably more than twice that of 1874. Though it is not desirable that water should rise higher than to $3\frac{1}{2}$ feet below the top of the bund, yet on emergency another foot of rise could be allowed, and then the discharge would be 10,400 cubic feet a second, which, with the large capacity of the tank will, it is thought, be ample. It may, therefore, be assumed that maximum water-level will be 33·50 or 1·88 feet above F. T. L. The top of the bund is to be at 36·00 and the top of the revetment at 33·00, F. T. L. being 31·62. Above the stone revetment the slope of the bund is to be turf revetted, which must be taken to mean not merely sods laid flat on the slope, but sods built up like a revetment. The drainage of the top of the bund should be turned to the rear slope, by making the bund 3 inches higher in front than in rear. Where the bund carries a road-way there may be a small side ridging, 6 inches high, to prevent water flowing on to the interior slope.

The datum is 30 feet below crest of No. 2 Calingulah, North Tank.

$2\frac{1}{2}$ feet above crest of weirs 0·88 feet above F. T. L.

9. With regard to the design of the new calingulahs, it may be noticed that the proposed water cushion for the 410 feet weir of the South Tank would, as drawn, not be an advantage but rather the reverse. If the masonry apron be well constructed with hydraulic mortar, and if care be taken to keep it moist for a month after construction, by covering it with wet mud to a depth of a few inches, it will stand the overfall of 4 feet very well. The outer rough stone apron should have its surface placed 1 foot below that of the masonry apron. The remarks on the plan as to other details should be attended to. The outer rough stone apron of the new 90 feet calingulah of the North Tank should be placed 1 foot lower than the masonry apron. The use of slab stones for closing the spaces between the upright stones of the calingulahs is not considered a good arrangement. They are heavy to move and carry; they would be likely to occasion damage to the masonry of the crests, and it will be better in all respects to employ either planks or the usual stuffing of earth and turf. With planks the top would not be above proper F. T. L., but if the earth and turf be not allowed to be more than 9 inches above F. T. L., corresponding with the tops of the upright stones, the calingulahs can be readily cleared to any extent necessary.

10. It will be observed from paragraph 7 of the District Engineer's letter,* that against these estimates Rupees 6,348 have been expended (1871-72) in collecting stone for revetment, and this will be a charge against Capital, while about Rupees 6,000 have been spent in the current year on work considered to be emergent; the District Engineer will have to explain to the Controller what portion of this work appertains to Capital and what part to Revenue.

* No. 30, 16th September 1875.

11. It is expected that there will be an increase of revenue of about 1,200 Rupees when the tanks are put into proper order, while the necessity for supplementing the tank-supply by water from the Madras Irrigation and Canal Company's Canal, which latter in 1872-73 is reported (paragraph 8) to have cost Rupees 6,000, will but rarely occur. The natural supply of the tanks is good, and with their safety provided for they may be expected to yield a steady revenue.

12. For the new work and improvements provision will require to be made in the Budget, and the entry of the estimate of Rupees 31,725 on this account in the Budget of 1876-77 is recommended, and, looking to the expenditure already incurred, probably an allotment of Rupees 20,000 will be sufficient. The rest of the work or that chargeable to Revenue can be met from the grant for agricultural repairs, and it may be expected that this will be completed or nearly so by the close of the current year, while by this time next year the tanks should be in perfect order.

13. The following revenue particulars are noted on the estimate:—

Ayacut Area	Acres 976
„ Assessment...	Rs. 5,877
Average Revenue	„ 8,300

consequently nearly four years' revenue are proposed to be laid out on improvements, and the repairs of eighteen years will be as follows:—

	Rs.
From 1859-60 to 1873-74	7,972
Present estimate, which will cover outlay from 1874-75 to 1876-77 ...	9,275
Total ...	17,247

average outlay per annum Rupees 958, or $11\frac{1}{2}$ per cent. on the average revenue, a somewhat high percentage, which it may be hoped will be lowered when the means of disposing of surplus shall have been made adequate.

OOTACAMUND, 29*th September* 1875.

(Signed) JOHN MULLINS, Lieut.-Col., R.E.,
Chief Engineer for Irrigation.

No. 183. ORDER THEREON, 12th October 1875, No. 2,915.

IRRIGATION, No. 19-A.

Account.

THE Honorable the Governor in Council is pleased to sanction the following estimates for the repair of the Nundial Tanks in the Kurnool District, and for rendering them safe and efficient:—

	Rs.
Repairs.—Revenue	9,275
Improvements.—Capital	31,725

The estimate for Improvements will be entered in the Budget of 1876-77 with an allotment for that year of Rupees 20,000.

2. It is observed that the revenue of these tanks, which are the most important in the Kurnool District, is Rupees 8,300. They have never been provided with

adequate escapes, and for many years past they have been out of repair. It is now intended to do all that is necessary for their safety and efficiency, and it is hoped that not only will there be some increase of revenue, which has been estimated at Rupees 1,200, but that by the extension of second crop cultivation, which will be possible with a much greater quantity of water than it has been found practicable to retain in recent years, there will alt[illegible]her be secured an adequate return on the large outlay now sanctioned.

3. With regard to the full tan[illegible]el as arranged for in these estimates, it would seem that inquiries have been [illegible], and that the District Engineer has acted upon the information given him by t[illegible]Deputy Collector. The matter is however one of considerable importance, and the Collector should satisfy himself conclusively that the full tank level proposed is that to which formerly water was retained, in which case the arrangements intended will in no way prejudice the holders of inam or puttah lands in the bed of the tank, but on the contrary the enlargement of the surplus works will reduce very considerably the time during which the water will remain at a higher than full tank level.

4. It being of great moment that the risk of accidents to the tanks should be removed as early as possible by the construction of the new calingulahs, the District Engineer should make such arrangements as will ensure their completion before the rains of 1876, and he will report what funds he will require in the current year to enable him to make adequate progress with the escapes.

(True Extract.)

[illegible] Major-General, R.E.,
Secretary to Government.

To the District Engineer, Kurnool.
" Chief Engineer for Irrigation.
" Controller of Public Works Accounts.
" Collector of Kurnool.
" Revenue Department.

Exd. S. T. Austin.

15 Spare Copies

Revenue 1875 Depto
No 2307

Govt. of {1875} Madras.

PUBLIC WORKS.

To

THE DISTRICT ENGINEER,
KURNOOL,
&c., &c., &c.

Dated October 12th.

Issued

Rcd. —a— 27.

Encl.

G. O., 12th October 1875, No. 2,915.

OCTOBER.

Nos. 182-183

12 Encls. Plan & Copy Rec. Os. & 2 Abs.

Nundial Tanks in the Kurnool District.—Passing orders on Note by the Chief Engineer for Irrigation on the revised estimate of Rupees 41,000 for the repair of the —

No 2307
Commd to the
Board of Revenue
23 Octr 75.