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MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

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Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
24th July 1874.*

Read the following papers:—

No. 532. From R. SMITH, Esq., District Engineer, Nellore, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Nellore, 23rd October 1873, No. 102.

I HAVE the honor to submit, for sanction, a plan* and estimate† of the sum required for the construction of a weir to discharge the surplus from the Iswaravaka Tank.

* By banghy.

† With Specification.

2. To reduce the cost of the structure I have fixed the level of the crest of the proposed weir at one foot below full tank level, a proceeding which I trust will meet with your approval, as it differs but little from the rule laid down in G. O., No. 1,776, dated 9th July 1873.

3. The basin of the Iswaravaka Tank is about 5 square miles in extent; it is situated on the south of the Soornamoorky, and about nine miles west of Dugarazapatam. The assessment on the land (934 acres) under the Iswaravaka Tank is Rupees 4,670.

NELLORE DISTRICT, GUDUR TALUQ.

DETAILED ESTIMATE.

Work—Constructing a Surplus Weir in the embankment of the Iswaravaka Tank.

Particulars.	No.	MEASUREMENTS.			Superficial contents.	Cubical contents.
		Length.	Breadth.	Depth.		
<i>Concrete</i>						
Under body wall	1	FT. IN. 63 0	FT. IN. 5 0	FT. IN. 0 6	FT. IN. ...	FT. IN. 157 6
Do wings and returns	2	37 0	4 3	0 6	...	157 3
Do. retaining wall	1	74 0	2 9	0 6	...	101 9
Do.. flooring	1	69 0	8 6	0 6	...	293 3
Total cubic feet of Concrete...	...	...	...	...	...	709 9
<i>Foundations.</i>						
Body wall	1	64 3	3 9	3 0	...	722 9½
Wings and returns	2	37 0	3 0	3 0	...	666 0
Retaining wall	1	72 3	1 10½	4 0	...	541 10½
Flooring	1	69 0	9 0	0 9	...	465 9
<i>Superstructure.</i>						
Wings, front and returns	2	19 0	1 9	5 4	...	351 8
Do.	2	10 0	1 9	4 2	...	145 10
Rear returns... ..	2	8 0	1 9	3 0	...	84 0
Total cubic feet of laterite in chunam...	...	...	...	...	...	2,980 11½

Proceedings of the Madras Government, Public Works Department,
24th July 1874.

Work—Constructing a Surplus Weir in the embankment of the Iswaravaka
Tank.—(Concluded)

Particulars.	No.	MEASUREMENTS.			Superficial contents.	Cubical contents.
		Length.	Breadth.	Depth.		
<i>Rough Stone.</i>						
Apron	1	79 0	9 0	1 6	...	...
Total cubic feet of rough stone...	...	...	...	...	...	1,006 6
Do. cubic yards of do. ...	...	...	...	...	...	39½ 0
<i>Pitching.</i>						
In front of rear returns	2	6 6	8 0	0 7½	...	...
Total cubic feet of stone pitching...	...	...	...	...	...	75 0
Cast iron posts	21	...	...	2 0	...	...
Total... ..	...	...	...	...	...	21 0
<i>Woodwork.</i>						
Teak wood shutters	22	2 10½	0 2	1 0	...	10 5½
Total cubic feet of Teakwood...	...	...	...	...	...	10 5½
<i>Pointing.</i>						
Body wall	1	65 0	3 0	...	195 0	...
Wings, front and returns	2	20 0	...	6 9	270 0	...
Do.	2	11 0	...	5 6	121 0	...
Rear returns... ..	2	9 0	...	4 6	81 0	...
Top of floor and retaining wall ...	1	69 6	10 6	...	729 9	...
Total square feet of pointing...	...	...	...	...	1,396 9	...
or do. squares... ..	...	...	...	...	13 96	...
<i>Excavating foundations.</i>						
Body wall	1	64 3	5 6	3 6	...	1,236 9½
Wings and returns	2	37 0	4 9	3 6	...	1,230 3
Retaining wall	1	72 3	3 3	4 6	...	568 11½
Floor... ..	1	69 0	9 0	1 3	...	776 3
Apron	1	79 0	9 0	1 6	...	1,066 6
Below pitching	1	6 0	8 0	2 4½	...	114 0
Total cubic feet of earthwork...	...	...	...	...	...	4,992 9½
Do. cubic yards of do. ...	...	...	...	...	...	184 ½
Water gauge to be painted on faces of wings	...	...	...	...	...	...
Baling	...	...	...	...	...	...
Superintendence and Sundries ...	...	...	...	...	...	...

Proceedings of the Madras Government, Public Works Department,
24th July 1874.

NELLORE DISTRICT, GUDUR TALUQ.

ABSTRACT ESTIMATE.

RS.

Ayacut. } Government, Acres 903. Full assessment... .. 4,666
 } Inam ,, 31. Do. 4

Work—Constructing a Surplus Weir in the embankment of the Iswaravaka Tank.

Quantity.	Description.	Rate.	Amount.	Total.
		RS. A. P.	RS. A. P.	RS. A. P.
710	Cubic feet concrete per C. ft.	0 1 6	66 9 0	.....
2,981	Do. of laterite in chunam do.	0 3 0	558 15 0	.....
39½	Cubic yards of rough stone ... per C. yd.	2 8 0	98 12 0	.....
2½	Do. of stone pitching ... do.	3 0 0	7 3 6	.....
21	Cast iron post each ...	8 0 0	168 0 0	.....
10 5½	Cubic feet of teakwood per C. ft.	3 8 0	36 10 0	.....
14 00	Squares of pointing per square.	2 0 0	28 0 0	.....
185	Cubic yards of earthwork ... per C. yd.	0 1 2	13 7 10	.....
	Water gauge to be painted on faces of wings	...	5 0 0	.....
	Baling	...	25 0 0	.....
	Superintendence and Sundries	...	52 6 8	.....
	Total Estimate ..	...	.....	1,060 0 0

Specification to accompany the plan and estimate of the surplus weir proposed for construction in the bank of the Iswaravaka tank.

The escape will consist of a body wall 65 feet in length, 3 feet and 9 inches in average breadth, and 3 feet in depth. This will be provided with twenty-one cast iron posts and with teakwood shutters to regulate the discharge.

The foundations of wings and returns to be 3 feet in average breadth and three feet in height.

The front returns to be 5 feet 4 inches in height and 1 foot 9 inches in average breadth above foundation level. The rear returns will be 3 feet in height and 1 foot 9 inches in average thickness.

The front and rear returns will be built with a batter of 1 foot on the outside.

The flooring to be 9 inches in thickness with a layer of concrete 6 inches in depth.

The foundations throughout will rest on beds of concrete 6 inches in thickness.

The concrete to project on all sides 3 inches beyond the lower course of masonry.

The escape will have a rubble apron 79 feet in length, 9 feet in breadth, and 1 foot and 6 inches in depth.

All exposed portions of the masonry to be neatly pointed.

The materials and workmanship to be of the best description procurable.

NELLORE,

(Signed) R. SMITH,

23rd October 1873.

District Engineer.

No. 533. From R. SMITH, Esq., District Engineer, Nellore, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Nellore, 13th June 1874, No. 17.

I HAVE the honor to acknowledge the receipt of your memorandum, No. 778, dated 3rd November 1873, on the capacity of the surplus weir, submitted by me for the Iswaravaka tank.

2. With reference to your remark that the extent of land under the tank seems high in comparison with the area of the catchment basin, I beg to observe

Proceedings of the Madras Government, Public Works Department,
24th July 1874.

that, from the Settlement Report of Fasli 1281, which I received lately, it appears that 744 acres only were irrigated in that year, and that the revenue realized was Rupees 4,134.

3. From the cross sections of the tank embankment, it is evident that the surface level of the water should not be allowed to rise more than 2 feet above the ordinary full tank level, and even this cannot be done without raising 2,400 feet of the embankment to an average height of 1 foot, for I do not think it would be safe to allow the water to attain a greater height than $2\frac{1}{2}$ feet from the top of the bund in the deep part of the tank. Annexed is a memorandum showing the height the remainder of the embankment would be above the surface of the water, with a depth of 3 feet over the crest of the proposed weir.

At 3,600 feet from escape	...	...	...	...	...	...	...	...	...	FEET
At 4,800 do. do.	...	...	...	...	...	...	...	...	...	2-28
At 6,000 do. do.	...	...	...	...	...	...	...	...	...	2-67
At 7,200 do. do.	...	...	...	...	...	...	...	...	...	2-87
At 8,400 do. do.	...	...	...	...	...	...	...	...	...	3-70
The total length of the bund is 9,600 feet.	...	...	...	...	...	...	...	...	...	1-13

4. I am a great advocate for capacious drains, but I must add that my experience does not lead me to suppose it is necessary to provide for passing the enormous volume to be allowed according to Ryves' formula. If it is to be taken as the standard for the coast taluqs, a very large expenditure will be necessary to bring our irrigation works up to that state of efficiency.

5. Generally it will be possible, as you observe, to have safety outlets for passing the surplus of extraordinary years, and, with reference to this arrangement, I beg to explain that the ground, at both ends of the Iswaravaka tank, is suitable for discharging surplus on extraordinary occasions. The surplus is now discharged by an opening near the southern extremity of the bund.

6. With regard to the masonry apron, I beg to explain that it is not more costly than one of rubble stone, 2 feet in thickness. In the revised design a rubble flooring has been allowed, and the front wings have been splayed, as suggested in paragraph 6 of your memorandum under reply.

7. In conclusion, I beg to submit, for your consideration, a revised plan* for the Iswaravaka Weir; this work will discharge, with a depth of 3 feet, the required volume according to Ryves' formula. The original plan and estimate are herewith returned.

* With estimate.

No. 534.

Note by the Chief Engineer for Irrigation.

The District Engineer, Nellore, has, with reference to the correspondence as per margin, transmitted with his letter No. 17, of the 13th ultimo, a revised design and estimate for constructing a surplus weir to the Iswaravaka Tank.

2. The ayacut area under the tank appears to be 934 acres, assessed at Rupees 4,670, and the revenue of Fasli 1281 is reported to have been Rupees 4,134 from the cultivation of 744 acres. The tank has at present no permanent escape weir, but surplus is discharged over the ground at the south end of the tank.

3. The District Engineer, with reference to the way in which, in the instructions sent from this office, the maximum flood discharge from the drainage basin of the tank was calculated, viz., by Ryves' formula, has remarked that his experience does not lead him to suppose that it is necessary to provide for passing such an enormous volume. He does not, however, give any instances of very heavy rainfall over areas of any size, and the consequent discharge therefrom, to show that the formula gives too high a discharge.

4. The subject is one of much importance, and as such it has received anxious consideration. For a considerable time past actual discharges when ascertainable have been compared with those calculated by the formula; and, though the information available is by no means conclusive, the few facts available have appeared to indicate that the results given by the formula are not too high. Last year the discharge over the Madranticum Tank weir in Chingleput was ascertained, and it was found to have been one-third more than that obtained by the formula, and on inquiry it was found that this was due to a number of tanks in the catchment basin having breached. In this case the area of the basin was about 333 square miles. The formula has been applied to the discharge of the Pennair itself, which drains about 13,000 square miles, and the results corresponded very fairly with the discharge calculated from cross sections and surface slope. Again, in recently examining the drainage across the Ellore canal, it was found that generally where the water-way allowed was such as the formula would indicate to be sufficient, no damage had occurred, while elsewhere breaches had been numerous. Lastly, the discharges obtained in this way are very much below those given by Colonel Dickens' formula, which is in use in Northern India, and this fact is to some extent negative evidence that the adoption of Ryves' formula will not lead to the construction of surplus weirs on an extravagant scale.

5. That very large sums have been wasted on tank repairs owing to accidents resulting from the utter inadequacy of the calingulaks or other means of disposing of surplus water, has been unfortunately made but too apparent, and it is known that very great lengths of additional escapes are in most cases necessary. To this conclusion Nellore forms no exception.

6. Mr. R. Smith also advocates placing the masonry crest of this weir at 1 foot below full tank level, retaining the water by cast iron posts and planks, and thus making the safety of the tank more or less dependent upon the care and attention of the villagers. There may be sufficient reasons in particular cases for this departure from the rule that all newly constructed escapes are to be self-acting, but here no reasons of a kind which should be allowed to influence a decision have been adduced. Moreover, turning to the estimate it appears that the posts and planking, with their proportion of sundries, will cost Rupees 355, while a raised masonry crest $2\frac{1}{2} \times 1$ would come to Rupees 51. Now, exclusive of the cost of post and shutters, the weir estimate comes to just Rupees 10 $\frac{1}{2}$ a foot-run, and adding half a rupee for a raised masonry crest this becomes Rupees 11 a foot-run. Then the Rupees 304 difference would allow of the crest being lengthened 28 feet without increasing the cost.

7. It is not practicable to determine with accuracy what will be the depth of water on the rear apron for any given depth on the crest, or rather measured

from the still head above, but assuming that, for 3 feet as the latter depth, there would be $2\frac{1}{2}$ feet on the apron, the discharge would be 11.31 cubic feet per foot of crest. The cast iron posts would probably occupy 9 feet, leaving a clear length of 100 feet, and the discharging capacity would be 1,131 cubic feet. With the raised crest and the greater length, $109 + 28 = 137$ feet, the depth on the lower apron with the same discharge would be about 1.78 feet. The discharge per foot with the same water level in the tank would be 8.745 cubic feet for each foot of crest, and that for 137 feet 1,193 cubic feet a second. Consequently for the same outlay it would seem that an escape with its crest at full tank level is somewhat the more effective, and that all the trouble of regulation with post and shutters, with the waste of water inevitable with such arrangements, is unnecessary.

8. Mr. R. Smith states that the ground at both ends of the tank is suitable for discharging surplus on extraordinary occasions, and definite arrangements for so utilizing it should be made. If the masonry escape be built as in the design dated 13th June 1874, with a length of crest of 109 feet, and with a crest raised to full tank level, with 2 feet going over, the discharge will be 953.2 cubic feet a second, equivalent to about 7 inches, draining off the 5 square miles of catchment basin in the twenty-four hours. This will suffice for all but extraordinary floods, but on the recurrence of these some 690 cubic feet a second in addition may have to be discharged, and the proper course will be to reduce the ground at one or both ends of the bund to full tank level, or 6 inches above full tank level, in the former case for a length of about 100 feet, and in the latter 130 feet, and then to construct upon this levelled ground a bund 1 yard wide at top and 6 inches above maximum water level, or $2\frac{1}{2}$ feet above full tank level. In the one case this small bund will be $2\frac{1}{2}$ and in the other 2 feet high, and it may very readily be cut down should the water rise a single inch above the intended maximum. Or, in levelling the ground, this bund may be left.

9. The surplus weir with a crest at full tank level and without posts and shutters will cost Rupees 1,200, and this amount may be sanctioned.

10. Should there be any tanks surplusing into the Iswaravaka tank, their safety should be similarly provided for. From the Atlas sheet it would seem that such is probably the case.

Latitude $13^{\circ}57'$.
Longitude $80^{\circ}51'$.

OOTACAMUND,
1st July 1874.

(Signed)

JOHN MULLINS, Lieut.-Colonel, R.E.,
Chief Engineer for Irrigation.

No. 535.

ORDER THEREON, 24th July 1874, No. 1,997.

IRRIGATION, No. 46.

THE reduced estimate of Rupees 1,200 for constructing a surplus weir with a crest 109 feet long on full tank level to the Iswaravaka Tank, in the Gudur Taluq of the Nellore District, is sanctioned.

2. The Chief Engineer for Irrigation has entered very fully into the various considerations bearing upon the arrangement of this escape, and has shown how the water in extraordinary floods, which the permanent escape may not be large

enough to discharge, should be disposed of. No doubt the observations made will be of much use to the District Engineer in deciding upon the arrangements to be adopted in the case of other tanks.

(True Extract.)

Lieut.-Colonel, R.E.,

Joint Secretary to Government.

To the District Engineer, Nellore.

.. Chief Engineer for Irrigation.

.. Officiating Controller of Public Works Accounts.

Exd. S. T. Austin.

Spare Copies

N^o 17

District Engineer's Office,
Mellore, 13th June 1874.

From. E. Smith Esquire,
District Engineer of
Mellore.
To. Lieutenant Colonel J. Mullins R.E.
Chief Engineer for
Irrigation,
Fort St. George.

Enclosures 4
Plans 2
Estimates 2

(By 10/11/74)

Sir,
I have the honor to acknowledge
the receipt of your Memorandum No. 778,
dated 3rd November 1873, on the capacity
of the Surplus Weir, submitted by me
for the Chwaravaka Tank.
2. With reference to your remark
that the extent of land under the
Tank seems high in comparison with
the area of the Catchment basin, I
beg to observe that, from the Settlement

Report of Fusli 1281, which I received lately, it appears that 744 acres only, were irrigated in that year, and that the Revenue realized was Rs 4134.

3. From the cross sections of the Tank embankment it is evident that the surface level of the water should not be allowed to rise more than 2 feet above the ordinary full Tank level, and even this cannot be done without raising 2400 feet of the embankment to an average height of one foot, for I do not think it would be safe to allow the water to attain a greater height, than 2'2" from the top of the bund, in the deep part of the Tank.

Annexed is a memorandum showing

the height the remainder of the embankment would be, above the surface of the water, with a depth of 3' over the crest of the proposed Weir.

At 3600 feet from Escape	2.28'
At 4800 — do — do	2.67'
At 6000 — do — do	2.87'
At 7200 — do — do	3.70'
At 8400 — do — do	1.13'

The total length of the bund is 9600 feet.

4. I am a great advocate for capacious drains, but I must add that my experience does not lead me to suppose it is necessary to provide for passing the enormous volume to be allowed, according

which will authorize
certain instances
of heavy floods
can be admitted
to the country -
within the last few
years in Bangalore
with Anant & Salim

the floods have it is thought a proportionate
+ in examining into the

to Ryves' Formula. If it is to be taken
as the Standard, for the Coast
Salugs, a very large expenditure
will be necessary to bring our
Irrigation works up to that
State of efficiency.

5. Generally it will be possible,
as you observe, to have safety outlets
for passing the surplus of extraordi-
nary years, and with reference to
this arrangement, I beg to explain
that the ground, at both ends of
the Iswarawaka Tank, is suitable
for discharging surplus on extra-
ordinary occasions. The surplus
is now discharged by an opening
near the Southern extremity of the
Pond.

6 With regard to the masonry

apron, I beg to explain that it
is not more costly than one of
rubble stone 2 feet in thickness.

In the revised design a
rubble flooring has been allowed,
and the front wings have been
splayed, as suggested in paragraph
6 of your Memorandum under reply.

7. In conclusion I beg to submit,
for your consideration, a revised
plan for the Iswarawaka Tank;
with Estimate plan for the Iswarawaka Tank;
this work will discharge, with a
depth of 3 feet, the required volume
according to Ryves' Formula.

The original plan and Estimate
are herewith returned.

I have the honor to be,
Sir,

District Engineer's Office,
Mellore, 23rd October 1893.

From. R. Smith Esquire,
District Engineer of Mellore.

To, Lieutenant Colonel J. Mullins. R.E.
Chief Engineer for
Irrigation.
Fort St. George.

Sir,
+ By B. Singh. I have the honor to submit, for
* With Specification sanction, a plan and estimate of the sum
required for the construction of a weir to
discharge the surplus from the Sumavata
Tank.
2. To reduce the cost of the structure I
have fixed the level of the crest of the
proposed weir at one foot below full
Tank level, a proceeding which I trust

From. R. Smith Esquire,
District Engineer of Mellore
To the Chief Engineer
Irrigation
Mellore.

Dated 13th June
1893-17th Dec
1894

Dec 17
1894.

Submitting a revised
plan for the Sumavata
Weir with a note
- stating to the observations
on the design &c for the
Weir.

Mr. Mullins
1/11/94

110533

will meet with your approval, as it
differs but little from the rule laid
down in G.O. No. 1776 dated 9th July 1873.

3. The basin of the Swaravaka tank
is about 5 square miles in extent; it
is situated on the south of the Soornamoochy
and about 9 miles west of Toggarayapatam.
The assessment on the land (934 acres)
under the Swaravaka tank is Rs. 4670.

I have the honor to be,

Sir,

Your most obedient servant,

Smith
District Engineer of
Mellore.

Ref

L.D. & Bellac ho 778 of 32 hamp

From Ch. N^o 1827

The District Engineer
of Bellac

To The Chief Engineer
for irrigation
Madras.

Date 23rd Oct. 1873
Recd. 24th do
Dec. 27th do

No. 102
Enc. 2

Forwards for sanction
a plan and estimate
of the sum required
for the construction of
a weir to discharge the
surplus water from
the Sivaravaka tank.

PM 4251/1/1/1/1/1
particulars

10.532

Nellore District

Gooden Satag

Detailed Estimate

Work Constructing a Surplus Weir in the embankment of the
Sivaravaka Tank

Particulars	Number	Length	Breadth	Depth	Superficial Contents	Cubical Contents
<u>Concrete</u>						
Under body wall	1	63-0	5-0	0-6	157-6	
Do Wings and returns	2	37-0	4-3	0-6	157-3	
Do retaining wall	1	74-0	2-9	0-6	101-9	
Do flooring	1	69-0	8-6	0-6	293-3	
<u>Total Cft. of Concrete</u>					709-9	
<u>Foundations</u>						
Body wall	1	64-3	3-9	3-0	722-9	722-9
Wings and returns	2	37-0	3-0	3-0	666-0	
Retaining wall	1	72-3	1-10	4-0	541-10	
Flooring	1	69-0	9-0	0-9	465-9	
<u>Superstructure</u>						
Wings front and returns	2	19-0	1-9	5-4	354-8	
Do	2	10-0	1-9	4-2	145-10	
Rear returns	2	8-0	1-9	3-0	84-0	
<u>Total Cft. of Lignite in Churnam</u>					2980-11	
<u>Rough Stone</u>						
Apron	1	79-0	9-0	1-6	1066-6	
<u>Total Cft. of Rough Stone</u>					1066-6	
Do Cft. of do do					37 1/2	
<u>Pitching</u>						
In front of rear returns	2	6-6	8-0	0-7 1/2	75-0	
<u>Total Cft. of Stone Pitching</u>					75-0	

Cast Iron Posts	21	2-0	
Woodwork			21
Teak wood Shutters	22	2-10 1/2 0-2 1-0	10-5 1/2
Total Cft. of Teakwood			10-5 1/2

Painting			
Body wall	1	65-0 3-0	195-0
Wings front and returns	2	20-0 6-9	270-0
Do	2	11-0 5-8	121-0
Rear returns	2	9-0 4-6	81-0
Top of floor & retaining wall	1	69-6 10-8	729-9
Total Sq. ft. of Painting			1396-9
or do Squares			13-9 1/2

Excavating foundations			
Body wall	1	64-3 5-6 3-8	1236-7 1/4
Wings and returns	2	37-0 4-9 3-8	1230-3
Retaining wall	1	72-3 3-3 4-6	568-11 5/8
Floor	1	69-0 9-0 1-3	776-3
Apron	1	79-0 9-0 1-6	1066-6
Below pitching	1	6-0 8-0 2-4 1/2	114-0
Total Cft. of Earthwork			4992-9 1/2
Do Cys. of do			184 3/4

Water Gauge to be painted
on faces of wings
Baling
Superintendence and Sundries

Nellor District
Gudalur Taluk
Abstract Estimate

Agacul. Government acres 903 Shall assessment Rs. 4666-
Inam 31 do
Work Constructing a Surplus Weir in the embankment
of the Swaravaka Tank

Quantity	Description	Rate	Amount	Total
710	Cft. Concrete	per Cft.	16 66 9	
2981	Do of Laterite in Chinnam	do	3 553 15	
39 1/2	Cys. of rough Stone	per Cys.	2 8 98 12	
2 1/4	Cys. of Stone pitching	do	3 7 3 6	
21	Cast iron post	each	8 168	
10-5 1/2	Cft. of Teakwood	per Cft.	3 8 36 10	
14-00	Sq. of Painting	per Sq.	2 28	
185	Cys. of Earthwork	per Cys.	1 2 13 7 10	
	Water Gauge to be painted on faces of Wings		5	
	Baling		25	
	Superintendence and Sundries		52 6 8	
	Total Estimate Proper		1060	

Specification to accompany the Plan and Estimate of the
Surplus Weir proposed for construction in the bank of the
Swaravaka Tank.

The Escape will consist of a body wall 65 feet
in length, 3-9 in average breadth, and 3-0 in depth.
This will be provided with 21 Cast Iron posts, teakwood
Shutters to regulate the discharge.

The foundations of wings and returns to be 3-0 in average breadth and 3-6 in height.

The front returns to be 5-4 in height and 1-9 in average breadth above foundation level. The rear returns will be 3 feet in height and 1-9 in average thickness.

The front and rear returns will be built with a batter of 1 foot on the outside.

The flooring to be 9" in thickness with a layer of concrete 6 inches in depth.

The foundations throughout will rest on beds of concrete 6 inches in thickness.

The concrete to project on all sides 3 inches beyond the lower course of masonry.

The Escape will have a rubble apron 9 feet in length 9 feet in breadth and 1-6 in depth.

All exposed portions of the masonry to be neatly pointed.

The materials and workmanship to be of the best description procurable.

District Engineer's Office
23 October 1873

Smith
District Engineer
of Bellin

Ch. 1/102/75.
Sh. 2/119/74.

The District Engineer
of Tellico

To
The Chief Engineer
for Irrigation
Fort Saint George
Madras

Dated 23rd October 1903
Recd.

Detailed and Abstract
Estimates with Specification
for Constructing a Surplus
Weir in the Embankment
of the Iswaravaka Tank

MR 4261/74
L

(Amounting to Rs. 1060-)

Pl. 17 24 July 1914
G. B. 1. 534

*From N. 102-23
Oct 1873.
N. 778-34
Nov 1873.

110
Note by the Chief Engineer for Irrigation
The District Engineer, Tellico has
with reference to the correspondence
as per margin, transmitted with his
letter, N. 17 of the 13th Ultimo, a revised
design and estimate for constructing
a surplus weir to the Iswaravaka
Tank.

2. The adjacent area under the
tank appears to be 934 acres, as
seped at Rupees 4670, and the
Revenue of Tashy 1281 is reported
to have been Rupees 4134 from the
cultivation of 744 acres. The tank
has at present no permanent
escape weir, but surplus is discharged
over the ground at the South end
of the tank.

3. The District Engineer, with re-
ference to the way in which, in
the instructions sent from this office,
the maximum flood discharge
from the drainage basin of the
Tank was calculated viz by Ryves'
formula has remarked that his
experience does not lead him to
suppose that it is necessary to
provide for passing such an enor-
mous volume. He does not however
give any instances of very heavy
rainfall over areas of any size
and.

and the consequent discharge there from, to show that the formula gives too high a discharge.

4. The subject is one of much importance, and as such it has received anxious consideration. For a considerable time past actual discharges when ascertainable have been compared with those calculated by the formula; and, though the information available is by no means conclusive, the few facts available have appeared to indicate that the results given by the formula are not too high. Last year the discharge over the Madranticum Tank weir in Chingleput was ascertained, and it was found to have been $\frac{1}{3}$ more than that obtained by the formula, and on enquiry it was found that this was due to a number of tanks in the catchment basin having breached. In this case the area of the basin was about 333 square miles. The formula has been applied to the discharge of the Pennair itself, which drains about 13,000 square miles, and the results corresponded very fairly with the discharge calculated from crop sections and surface

face slope. Again in recently examining the drainage across the Elford Canal, it was found that generally where the waterway allowed was such as the formula would indicate to be sufficient, no damage had occurred, while elsewhere breaches had been numerous. Lastly the discharges obtained in this way are very much below those given by Colonel Dickens' formula which is in use in Northern India, and this fact is to some extent negative evidence that the adoption of Ryves' formula will not lead to the construction of surplus weirs on an extravagant scale.

5. That very large sums have been wasted on Tank repairs owing to accidents resulting from the utter inadequacy of the calculations or other means of disposing of surplus water, has been unfortunately made but too apparent, and it is known that very great lengths of additional escapes are in most cases necessary. To

To this conclusion it seems forms
no exception

6. Mr R. Smith also advocates
placing the masonry crest of
this weir at 1 foot below full
tank level, retaining the water
by cast iron posts and planks
and thus making the safety
of the tank more or less depen-
dent upon the care and atten-
tion of the villagers. There may
be sufficient reasons in par-
ticular cases for this depar-
ture from the rule that all
newly constructed escapes are
to be selfacting, but here no
reasons of a kind which
should be allowed to influence
a decision have been adduced.
Moreover turning to the estimate
it appears that the posts &
planking with their proportion
of sundries will cost Rupees
355, while a raised masonry
crest $2\frac{1}{2} \times 1$ would come to 51
Rupees. Now exclusive of the cost
of post & shutters the weir
estimate comes to just $10\frac{1}{2}$ Ru-
pees a foot run, and adding
 $\frac{1}{2}$ a Rupee for a raised masonry
crest

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crest this becomes 11 Rupees a
foot run. Then the 304 Rupees difference
would allow of the crest being
lengthened 28 feet without in-
creasing the cost.
7. It is not practicable to de-
termine with accuracy what will
be the depth of water on the
rear apron for any given depth
on the crest, or rather measured
from the still head above, but
assuming that, for 3 feet as
the latter depth, there would
be 2 to 4 feet on the apron, the
discharge would be 11.31 cubic
feet per foot of crest. The
cast iron posts would proba-
bly occupy 9 feet leaving a
clear length of 100 feet and
the discharging capacity
would be 1131 cubic feet. With
the raised crest and the
greater length, $109 + 28 = 137$
feet, the depth on the lower
apron with the same dis-
charge would be about 1.78 feet.
The discharge per foot with the
same water level in the tank
would be 8.745 cubic feet for each
foot

foot of crest and that for 137
feet 119.8 cubic feet a second. Con-
sequently for the same outlay
it would seem that an escape
with its crest at full tank le-
vel is somewhat the more ef-
fective, and that all the
trouble of regulation with posts
and shutters with the waste
of water inevitable with
such arrangements is unneces-
sary.

8. Mr. R. Smith states that the
ground at both ends of the tank
is suitable for discharging sur-
plus on extraordinary occasions,
and definite arrangements for
so utilizing it should be made.
If the masonry escape be built
as in the design dated 13th June
1874 with a length of crest of
109 feet, and with a crest raised
to full tank level, with 2 feet
going over the discharge will be
953.2 cubic feet a second equiva-
lent to about 7 inches draining
off the 5 square miles of catch-
ment basin in the 24 hours. This
will suffice for all but extraordinary
floods, but on the recurrence of
these some 690 cubic feet a second

in addition may have to be dis-
charged, and the proper course will
be to reduce the ground ^{at one or} both
ends of the bund to full
tank level, or 6 inches above full
tank level, in the former case
for a length of about 100 feet,
and in the latter 130 feet, and
then to construct upon this level
ground a bund 1 yard wide
at top and 6 inches above maxi-
mum water level or $2\frac{1}{2}$ feet above
full tank level. In the one case
this small bund will be $2\frac{1}{2}$
and in the other 2 feet high,
and it may very readily be
cut down should the water rise
a single inch above the intend-
ed maximum. If, in levelling
the ground, this bund may
be left.

9. The surplus will with a
crest at full tank level and
without posts and shutters will
cost Rupees 1200 and this a-
mount may be sanctioned.
10. Should there be any tanks
surplusing into the Iswarava-
kank, their safety should be similarly
provided

provided for. From the atlas sheet
it would seem that such is pro- Lat: $13.57\frac{1}{2}$
bably the case. Long: $80.5\frac{1}{3}$

Obtained from the
1st July 1874
Chief Engineer for Irrigation

To The Secretary to Govt P.W.D.

P. W. 1874 Dept.
No. 4261

From

The Chief Engr.
for Irrigation

Del 1st July 1874
Rel 11th --

Enclod. 6.

Note on the
revised plan & estimate
for the construction
of a surplus weir for
the Iswaravalli tank
in the Sudur Taluq.
Nellore District.

10.2.1876

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...

D. 1. 1876

... ..

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Public Works Department
Proceedings of the Madras Government
1997. Read the following
From the Chief Engineer (H. C. No. 17 dated
13 June 1876)
to Chief Secy for Genl (H. C. No. 17 July 1876)

...

The reduced estimate of Rs. 1200 for constructing a surplus weir with a crest 109 feet long on full tank level, to the Iswaravaka Tank in the Gudur Taluk of the Nellore District is sanctioned.

2. The Chief Engineer for Irrigation has entered very fully into the various considerations bearing upon the arrangement of this escape, and has shown how the water in extraordinary floods, which the permanent escape may not be large enough to discharge, should

...

should be disposed
of so that the
observations made will
be of much use to
the District Engineer
in deciding upon the
arrangements to be
adopted in the case
of other tanks.

Wm. 3/1/74

G.W.

Wm.

34
4

To The D.R. Nelson
-- Chief Insp for the
-- Controller Mac
S. Capins decr 3/8/74.

532-535.

6/7/74 RD 9/7/74

Govt. of Madras.
PUBLIC WORKS.

To

Mr Dist. Ingr.
Bellare

Dated

Recd.

Encl. 1

G. O. 24 July 1874, No. 1997

Nos. 572-575

Sewarava ka Tank

The reduced Estimate
of Rs. 1200 for constructing
a surplus weir with a crest
109 feet long on full tank
level to the ~~low~~ tank in
the Quolur Taluk of the
Bellare Dist. sanctioned by
with observations -