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MADRAS RECORD OFFICE.**Government of Madras.****Public Works DEPARTMENT.**

G.O. No. 182

Press

Mis.

Dated 16-1-18

18-2-18

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
16th January 1869*

No 267. Read the following letter from the Superintending Engineer, 5th Division, to the Secretary to Government, Public Works Department, dated Camp at Ahtoor, 15th December 1868, No 167 —

1 Copy of a letter from the Executive Engineer
2 Plans

1. After my visit to Bangalore in June, I reported on the state of the pipes that had been laid from the Ulsoor tank to the cisterns on the Race Course, and recommended that an experienced Mechanical Engineer should be sent to relay them. Mr. MacGregor was sent to Bangalore for that purpose, and the relaying of the pipes was commenced at once.

2 While at Bangalore, in September, I saw so much of the piping as had then been laid, tested, and the joints were perfectly water-tight. Since then, I have had reports from the Executive Engineer of the successful laying of the pipes to all the cisterns on the Race Course, and of the distribution pipes to all the buildings occupied by the Horse Artillery.

3. I regret now to have to report that, at the first attempt to deliver water at the Horse Artillery Barracks, though there was no difficulty in getting the water to the cisterns, and thence to the stand-pipes at the barracks, yet the cisterns themselves showed signs of giving way, and the pumping had to be discontinued. These cisterns were built so long ago as 1864, in accordance with the plans prepared by Captain Tulloch, but they were floored with stone last year. I consider that the thickness of the walls, and the depth of the foundation, are both insufficient, but as the cisterns were not half full when tried, the leakage is to be attributed to the floorings not having been formed with sufficient care.

4. I forward a letter from the Executive Engineer, with sections of the walls, and a rough estimate of the cost of repairing and strengthening the cisterns. While at Bangalore, at the beginning of this month, I carefully examined the cisterns, and am of opinion that they can be rendered effective for less than the sum named. The interior lining of brick-work, resting on a foundation of concrete carried to a greater depth than the present foundation of the walls, I consider essential, but I think the flooring may be left as it is with the exception of the slabs adjoining the walls, which must of course be taken up and relaid. If the joints of the present flooring are remade carefully, no water should go through them. I have instructed the Executive Engineer to prepare a detailed estimate, with plan and specification, for repairing the cisterns in this way. As each cistern is divided into two parts by a cross wall, one-half can be repaired and tested before the other half is touched.

5 The filtering reservoirs were also tried while I was at Bangalore, the filtering materials having previously been removed. The leakage from them is so considerable, that it will be impossible to use them till they have been repaired and made water-tight. The walls are of sufficient thickness, but the flooring of brick work is so porous that the water passes readily through it. The remedy I propose is a flooring of stone slabs, bedded in concrete with the joints run with asphalt, over the present flooring. As the stones are on the spot, this part of the work may be quickly carried out.

French

*Proceedings of the Madras Government, Public Works Department,
16th January 1869.*

6 The filters were commenced by Captain Tulloch and completed by Lieutenant Pennyquick, but no plan nor specification was received from either. The imperfections in the work are to be attributed to the work being carried on, at one time under one Executive Officer, and at another, under another, and without plan and specification. It must, however, be remembered that so many large and important works were in progress at Bangalore at the same time, and so many plans and estimates had to be prepared, that the work could not receive the time and attention it deserved, this one project being quite sufficient to occupy one Officer wholly for several months.

From Captain H. W. WOOD, R. E., Executive Engineer, Bangalore, to the Superintending Engineer, 5th Division, dated Bangalore, 13th November 1868, No 929-

1 In reference to the verbal directions given by Colonel Orr and yourself, on Monday last, I have the honor to submit for your orders the steps proposed to be taken to remedy the failure of the cisterns.

2 These measures, I understand, are to be confined to one-half of the cistern at the Royal Horse Artillery Barracks, in order to test their sufficiency.

1st—It is proposed to excavate a trench twelve inches broad within the cistern close to the exterior walls, to a depth of twelve inches below the inner toe of these walls, and to fill this trench in with concrete.

2nd—It is proposed to remove the existing stone floor and replace it with twelve inches of masonry, either of bricks or of flat tiles set in mortar partially hydraulic, which can be made in Bangalore. The ends of this new floor to be curved round at its junction with the interior of the cistern walls.

3rd—I would respectfully beg to recommend that this masonry be carried up to the top of the cistern walls a thickness of nine inches. This will, I think, prevent any anxiety as to the stability of the walls.

For the half of the Royal Horse Artillery cistern these measures would cost as follows—

1st—Excavating trench and filling up with concrete 1,430 cubic feet at	RS
4½ Annas per cubic foot	402
2nd—Re-flooring with 12 courses of flat tiles, in partially hydraulic mortar, 26½ squares, at 30 Rupees a square	786
(Or re-flooring with brick-work this item would be at	660)
4 Annas per cubic foot	300
3rd—Masonry lining to walls 1,200 cubic feet at 4 Annas per cubic foot.	385
4th—Plastering with Portland cement 38½ squares, at 10 Rupees a square	385
Sundries	127
Total	2,000

or about 80 Rupees for each 100 feet superficial of cistern.

If this mode of remedying the evil is carried out, the cost for all the cisterns will be, therefore, about as follows—

Royal Horse Artillery Cistern	52½ squares
Rice Course Cistern	150 "
Royal Artillery Cistern	16 "
Filters	104 "
Total 322½ squares at 80 Rupees per square, or 25,800 Rupees	

*Proceedings of the Madras Government, Public Works Department,
16th January 1869.*

No 268

ORDER THEREON, 16th January 1869, No 132

MILITARY WORKS, No. 16

As it appears absolutely necessary that the floors of the cisterns and filtering reservoirs connected with the Ulsoor

Water Works should be strengthened and their walls made secure, His Excellency the Governor in Council approves of the arrangements proposed by Captain Wood. The work should be proceeded with at once at the cistern for the supply of the Horse Artillery Barracks, and, if it there prove successful, arrangements should be made without delay for completing the others in the same manner, an estimate of the cost being submitted in due course. It does not appear probable that the joints between the stone slabs forming the surface of the present flooring can be so made as to prevent water finding its way through, and the slabs should therefore be removed and the surface of the new floors of all the cisterns be finished with a coat of plaster, formed of cement or good hydraulic mortar well rubbed and polished.

(True Extract)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Superintending Engineer, 5th Division
,, Controller of Public Works Accounts
,, Accountant General
,, Military Department.

Ed S. T. Augustin

No 929

Executive Engineer's Office
Bangalore 13th November 1868

From

The Executive Engineer
Bangalore

To The Superintending Engineer
5th Division

Sir,

In reference to the verbal directions given by Colonel Orr and yourself, on Monday last, I have the honor to submit for your orders the steps proposed to be taken to remedy the failure of the cisterns.

These measures, I understand, are to be confined to one half of the cistern at the Royal Horse & Artillery barracks in order to test their sufficiency.

1st It is proposed to excavate a trench 12 inches broad within the cistern close to the exterior walls, to a depth of 12 inches below the inner toe of these walls, and to fill this trench

trench in with concrete-

2nd It is proposed to remove the existing stone floor and replace it with 12 inches of masonry either of bricks or of flat tiles set in mortar partially hydraulic - which can be made in Bangalore. The ends of this new floor to be curved round at its junction with the interior of the cistern walls.

3rd I would respectfully beg to recommend that this masonry be carried up to the top of the cistern walls a thickness of nine inches. This will, I think prevent any anxiety as to the stability of the walls.

For the half of the Royal Horse Artillery cistern these measures would cost as follows.

1st Excavating trench and filling up with concrete 1430 Cfts at 1 1/2 annas per Cft 1402 - "

2nd Reflooring with 12 courses of flat tiles in partially hydraulic mortar 26 1/5 squares at 30 Rs a sq 786 - "

{ Or Reflooring with brick work this item would be at 14 annas per Cft 660 - }

3rd Masonry lining to walls 1200 Cfts at 14 annas per Cft 300 - "

4th Plastering with portland cement 38 1/2 squares at 10 Rs a square 385 - "

Sumdries - 127 - "
Total Rupees 2000 - "

or about 80 Rupees for each 100 feet superficial of cistern -

If this mode of remedying the evil is carried out, the cost for all the cisterns will be therefore about as follows.

Royal Horse & Artillery cistern	57 1/2 squares
Race course cistern	150 "
Royal & Artillery cistern	16 "
Waters -	104 "
Total	322 1/2 at 80 Rs

per square or 25,800 Rupees.

I have the honor to be,
Sir,
Your most obedient servant
D^r H. W. Wood, Capt. R.E.
Ex Engineer Bangalore
(True Copy)

Edmd. Colonel (R.E.)
Super to Eng^r 5th Divⁿ

11/11/1891

9.6.18
Supg Engrs Office, 5th Divⁿ
Camp Station 5 December 1888

From
The Superintending Engineer,
5th Division
To
The Secretary to Government
D.P.W.

Enclosed 3.

of a letter
in the Engrs
and

After my visit to Bangalore
in June, I reported on the state
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the Teloor tank to the cisterns on the
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on the race course, and of the distribution pipes to all the buildings occupied by the Horse Artillery,

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I consider that the thickness of the walls, and the depth of the foundation, are both insufficient, but as the cisterns were not half full when tried, the leakage is to be attributed to the floorings not having been formed with sufficient care.

4 I forward a letter from the Executive Engineer with sections of the

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5. The filtering reservoirs were also tried while I was at Bangalore, the filtering materials having previously been removed. The leakage from them is so considerable, that it will be impossible to use them, till they have been repaired and made water tight. The walls are of sufficient thickness, but the flooring of brick work is so porous, that the water passes readily through it. The remedy I propose is a flooring of stone slabs, bedded in concrete with the joints run with asphalt, over the present flooring as the stones are on the spot, this part of the work may be quickly carried out.

6. The filters were commenced by Captain Tulloch, and completed by Lieutenant Pennycook, but no plan or specification was received from either. The imperfections in the work are to be attributed

13th 3
to the work being carried on, at one time under one Executive Officer, and at another, under another, and without plan and specification.

It must however be remembered that so many large & important works were in progress at Bangalore, at the same time, and so many plans and estimates had to be prepared, that the work could not receive the time and attention it deserved, this one project being quite sufficient, to occupy one Officer wholly for several months.

I have the honor to be
Sir,

Your most obt. servant
E A Dmd Colonel R.E.,
Superintendent, Bangalore, 5th Dec.

Under date 2-24

Page 132

I suppose there is nothing
 for it but to submit. The
 facts stated are however
 incontrovertible & they are
 a credit to the hall & the
 incentive & inspectors
 who have been employed
 in receiving on the works a number
 of brown floors - insufficient for
 the purpose of the
 the expense to the
 the

MA.

also had
reception
to. Brown floors
axis, after all
the expense to
which you look for
but are now
expensive alterations
has!

Arled 15th
Red 700 { Dec 1/68.

10/67.

Lucas 3.
2^d time

Reporting on the ending
of the prices at the
Albion tank water
works.

July

2. 19 Dec 1865

1662-1663

cisterns

of the House

of Barracks, and,

if ^{these} ~~it~~, prove successful,

arrangements should

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an estimate of the cost

being submitted in due

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W.B.

It does not appear probable that the joints between the stone slabs forming the surface of the present flooring can be so made as to prevent water finding its way through, and the slabs should therefore be removed and the surface of the new floors of all the cisterns be finished with a coat of plaster formed of cement or good hydraulic mortar well rubbed ^{and} polished.

" Cont^d

" Sect^d of Sewer

" Milly Def^t - 18/1/64

2-19/12/68

Cert. of 186

PUBLIC WORKS

To
The Superintending Engineer
5th Division

Further No. 274 of 28-3-71

Dated

Recd

No.

G O 165 Jany No. 132

Nos. 267 & 268

Ulsan Water Works The
arrangements proposed by
the En. Engr. Bangalore for
strengthening the floors of
the cisterns and filtering
reservoirs connected with
the Ulsan Water Works, &c.
approved with remarks.

2-19/12/68

July 1868 - 1868