Public Works (1898) Department.

Print Separately

G.O., No. 117 W

DATED 17 January 1898

[illegible]

19/11/97

[Despatch Abstract.]

Observatory building at Kodaikanal.

Sanctioning with remarks the estimate of Rs. 34,800, drawn up by the Chief Engineer for the ~~[illegible]~~ supersession of the one sanctioned in G.O. No. 445 W 15.2.97.

35,850

110/8

17-1-98

Indexed

BACK PAPERS.

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

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		Errata 307 W	7-2-98		For papers re: ~~Rev~~ Drums vide CV 1637/98		

BUILDINGS AND ROADS.
CIVIL WORKS.

Government (1898) of Madras.

PUBLIC WORKS.

Recd.	1898.	*Enclosures*
Regd.		*Spare copies*

G.O., No. 117 W., 17th January 1898.

JANUARY.

Observatory building at Kodaikanal

Sanctioning, with remarks, the estimate of Rs. 34,800, drawn up by the Chief Engineer, for the — in supersession of the one sanctioned in G.O., No. 445 W., dated 15th February 1897.

35,850

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers:—

From Lieutenant-Colonel O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Camp Madura, 6th August 1897, No. 1110 M.D.

I have the honour to inform you that notices calling for tenders for the construction of the Observatory buildings at Kodaikánal were published both in the District and Fort St. George Gazettes, and that in response thereto but one tender was received from Syed Mohomed Ibrahim Sahib, a contractor in the Madura district.

2. His tender is herewith forwarded for your information and also a statement comparing his rates with the estimate rates. There is a third column in this statement in which the rates as now revised by the Executive Engineer are entered. It will be seen that for the items tendered the estimate amount is exceeded by Rs. 3,412.

3. I have also the honour to forward a copy of letter, No. 225 S.E., dated 2nd August 1897, from the Executive Engineer and also the data on which he found the rates entered in the third column of the statement.

4. This question of rates is a difficult one. No large work has been built by this department at Kodaikánal. All the materials, with the exception of stone, tiles and sand, have to be brought up the ghât. The site of the observatory is about 2½ miles from the bazaar at Kodaikánal, and it is some 700 feet higher than the top of the head of the ghât at the lake bund.

5. I consider that the contractor's tender should be accepted and that the estimate should be revised, the Executive Engineer's data for rates being accepted. The revised estimate will then be approximately Rs. 39,500. I have the honour to request your approval to this proposal, in which case the contractor will be ordered to proceed with the work at once.

6. The quality of the stone is not good as a rule. The Executive Engineer proposes to blast out some hard stone and use it on the exterior face of all the walls. This description of work may be pointed, but it is considered that with the ordinary stone available pointing will not suffice, and that the walls would have to be plastered. I recommend the blasted stone to be used.

7. Another important point is the width of the walls; the estimate allows a width of 1′ 6″ (with the exception of the tower walls). I am strongly of opinion that, with the material available, these wall should not be less than 2 feet thick, and I have directed the Executive Engineer to use this dimension in revising theestimate.

8. I am also of opinion that teakwood should be used throughout, as vengai is difficult to obtain, and being so much heavier than teak, the cost of the two descriptions of wood at site will be practically the same.

9. The Executive Engineer proposes to omit the concrete foundations to the walls; but I do not agree with this and have directed him to allow for concrete to ground level in the revised estimate.

10. I have also to report that the Government Astronomer has recently visited Kodaikánal and has finally selected sites for the buildings sanctioned in G.O., No. 2792 W., dated 29th September 1896.

11. For these buildings concrete foundations are allowed, but I do not consider that for these small buildings such foundations are necessary. None of the residences at Kodaikánal have such foundations, and looking to the fact that there will be extreme difficulty in obtaining sufficient lime for the observatory building, I consider that foundations such as are usually used in the locality, viz., stone in clay, should be substituted.

12. I beg also to point out that to enable these buildings and the observatory building to be properly supervised and to ensure good work which is essential, it is highly desirable that an European or East Indian subordinate be placed in charge, but that from my present establishment I can spare no one for this work.

From the Consulting Architect to Government, No. 1558, dated 2nd September 1897.

From Lieutenant-Colonel O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 2nd September 1897, No. 1237 M.D.

In continuation of my letter, No. 1110 M.D., dated 6th August 1897, I have the honour to forward, herewith, an estimate for constructing the Solar Physics Observatory at Kodaikánal, amounting to Rs. 41,150, in which effect has been given to the recommendations I made in the above quoted letter.

The deviations from the original estimate consist in—

(*a*) Putting in foundations to ground level in concrete, instead of part concrete and part rough stone in mortar.

(*b*) Increasing the thickness of walls from 1′ 6″ to 2′.

(*c*) Constructing the towers, spirals and pedestals and also the exterior of walls for a thickness of 1 foot of blue stone to be obtained by blasting.

(*d*) The substitution of teakwood for vengai.

(*e*) The substitution of the rates as arrived at by the Executive Engineer (*vide* data forwarded with above quoted letter).

2. I have already given my reasons for recommending these deviations.

As regards the rates we have no experience to go on, but I consider that the difficulty of doing good work at this site will be as great as at the Periyár. When at Kodaikánal lately I looked at many likely places for good sand, and I find that none is obtainable. I found that one contractor had resorted to washing earth to get a little sand out of it.

Probably we shall have to crush rock to obtain this material, and I am having some experiments made on mortar using this material.

I do not think that we are likely to get any other contractor than Syed Mohomed Ibrahim Sahib to tenter for this work—and the great difficulty in the transport of material stands in the way of doing the work departmentally. I can only again recommend that the tender of the contractor be accepted.

From Lieutenant-Colonel O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 27th September 1897, No. 1369 M.D.

I have the honour to forward herewith, for your orders, copy of endorsement No. 313 S.E., dated 8th September 1897, of the Executive Engineer, Madura division, on letter from the Sub-Divisional officer, Dindigul, No. —, dated 30th August 1897.

I have already referred to this question in my letter, No. 1110 M.D., dated 6th August 1897, and No. 1236 M.D., dated 2nd September 1897. The sites now selected by the Government Astronomer for the Assistant's quarters and peons' huts are on very sloping ground and they must be levelled to permit of the quarters being built and to allow of space around. The cost of this cutting has been estimated to be Rs. 250. Surveying the new sites cost Rs. 6, and the charges owing to change of site are Rs. 113. The total sum of Rs. 369 not provided for in the estimates is therefore a necessary extra charge.

I have already reported that for these small buildings the foundations may well be built of rubble of clay, and the Sub-Divisional officer shows that if so constructed a saving of Rs. 788 may be expected which will cover the cost of the above mentioned charges of Rs. 369.

He also points out that if the foundations are laid as originally proposed (*vide* letter from the Acting Consulting Architect, No. 2122, dated 22nd July 1896, printed with G.O., No. 2792 W., dated 29th September 1896), a saving of Rs. 514 may be expected, which would also cover the charges of Rs. 369. The original proposals were concrete foundations 3′ wide and 2′ high over this rubble in clay. This appears to have been altered into a block of concrete 3′ 6″ wide and 3′ high, and in my opinion this is not at all necessary. If concrete is to be employed in the foundations, I request that the original proposals may be allowed to be reverted to.

Enclosure.

From the Sub-Divisional Officer, Dindigul, to the Executive Engineer, Madura Division, dated 30th August 1897.

In returning your No. 715 S., dated 3rd August 1897, with enclosures, I beg to submit a site plan with levels showing nature of soil selected by the Government Astronomer and Executive Engineer for the construction of the three quarters for Observatory establishment at Kodaikánal.

The cutting that is required on these sites is as follows:—

						RS.
Second Assistant's quarters,	14,324 cubic feet	at	Rs. 5-12-0	=	...	82
Third or Writer's quarters,	11,401	do. at	do.	=	...	66
Peons' huts for three peons,	17,813	do. at	do.	=	...	102
					Total ...	250

The surveying of these sites has cost Rs. 6.

The levelling and cutting of the sites selected near Mr. Dholl's house, and subsequently given up on account of their not being approved by the Government Astronomer and on account of its being found that they would drain into the proposed reservoir at Kodaikánal, has cost Rs. 113.

These sums, amounting to Rs. 369, require sanction as there is no provision in the estimates for cutting and levelling the sites.

The plan and estimates provide for concrete for foundations, but for these small buildings concrete is not necessary.

Uncoursed rubble in clay foundations of the same width and height of concrete would be quite sufficient, and if concrete is thus dispensed with, the following will be the saving:—

	Concrete.		Rubble in clay.	
		RS.		RS.
Second Assistant's quarters,	2,161 cubic feet at Rs. 26 =	562	2,161 cubic feet at Rs. 10 = ..	216
Writer's quarters,	1,568 ,, at ,, 26 =	408	1,568 ,, at ,, 10 = ..	157
Peons' ,,	1,151 ,, at ,, 26 =	310	1,191 ,, at ,, 10 = ..	119
Total ..	4,920	1,280		492

Saving Rs. 1,280—492 = 788.

and this saving can go to meet the additional amount requiring sanction Rs. 369 and other charges for making roads, drains, &c.

If, however, it is considered necessary to lay concrete, a work which is never laid in private buildings, I consider that foundations partly with concrete and partly with rubble in clay as originally proposed—*vide* plans and estimates—will also do, and in that case the following will be the savings to meet the additional outlay required:—

	Originally proposed.	Since sanctioned.
	RS.	RS.
Second Assistant's quarters—		
Estimate ...	2,759	2,950
Writers ...	1,980	2,090
Three huts for peons ...	1,657	1,870
Total ...	6,396	6,910

Saving will be Rs. 6,910—6,396 ... 514

I consider the soil good enough to construct the foundations as proposed in the original, and the same plans revised or modified.

No. 313 S.E.

Copy submitted to the Superintending Engineer, VI Circle, Trichinopoly, with reference to his endorsement No. 1047 M.D., dated 26th July 1897.

(Signed) A. JOYCE,
Executive Engineer, Madura Division.

8th September 1897.

From O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 14th October 1897, No. 1486 M.D.

With reference to G.O., No. 2355 W., dated 25th August 1897, sanctioning an estimate for Rs. 19,663 for constructing a residence for the Government Astronomer at Kodaikánal, I have the honour to forward herewith copy of a letter, No. 369 S.E., dated 1st October 1897, from the Executive Engineer, Madura Division, also copy of another letter, No. 389 S.E., dated 7th October 1897, from the same officer, together with a deviation statement.

2. I am myself strongly of opinion that the thickness of all the walls should not be less than 2 feet; the material rough stone in clay requires this thickness, and I request that this deviation be sanctioned.

3. I also agree with the Executive Engineer that it is advisable to face all the exterior walls with picked blue stone, which will, however, result in an increase of rate as this stone must be blasted out.

4. I think the doors could be made at Kodaikánal a little cheaper than at Madras by substituting blue gum for mangoe, but blue gum is not good wood. In roofs its life does not exceed 15 years.

5. As regards the rates which the Executive Engineer considers necessary, I have already reported on this point in connection with the observatory building in my letter, No. 1110 M.D., dated 6th August 1897, with which I submitted data for these rates. I have had no reply to that letter at present.

6. In the deviation statement which I submit the items of concrete in mortar and of uncoursed rubble in mortar have been omitted, and rubble in clay has been substituted. I have reported on this question with reference to the observatory buildings. Lime is very difficult to obtain. In this case, however, in order to keep the cost of the work within the estimate amount, the substitution proposed is essential.

7. I have the honour to request that you will let [illegible] now, if these proposed deviations are approved, as soon as possible, and I will then [illegible] stimate revised.

ENCLOSURES.

From A. JOYCE, Esq., Executive Engineer, Madura Division, to the Superintending Engineer, VI Circle, dated 1st October 1897, No. 369 S.E.

I have the honour to address you concerning the plans, estimates, &c., lately received for the house of the Government Astronomer at Kodaikánal—

(1) *First, the rates, &c.*—Concrete, Rs. 25 is given in the estimate, whereas the rate at the observatory site has been fixed at Rs. 30.

Stone in lime.—The rate given is Rs. 30, whereas the rate at observatory site should be Rs. 33.

Cement flooring.—The rate given is Rs. 18, whereas the rate at observatory site should be Rs. 30.

Plastering with lime.—The rate given is Rs. 5–8–0, whereas the rate at observatory site should be Rs. 7–8–0.

Pointing with cement.—The rate given is Rs. 5, whereas the rate at observatory site should be Rs. 12.

Pointing.—The rate given is Rs. 5, whereas the rate at observatory site should be Rs. 5–8–0.

Doors and windows, &c.—The rate given for these when of teak is Rs. 1–10–0, whereas the rate fixed finally for observatory site is Rs. 2.

(2) I notice, however, that these are to be prepared in Madras and then forwarded on. By this means a saving is supposed to be made. This may possibly be the case; but I rather doubt if it would be cheaper than having them prepared in the ordinary way by Messrs. Brown and Co. of Calicut and then forwarded on. I notice also that some of the more ordinary or common doors, &c., are to be made of mangoe wood. Now I am very much of opinion that I could make much better and cheaper doors at Kodaikánal itself out of blue gum. I am making accurate inquiries about this now.

(3) I would further desire to point out what I also consider grave defects in the design. I notice that it is proposed to build almost all the walls of stone in mud. Now, none of these walls are more than 18 inches thick, indeed some few are only 15 inches thick. From my experience of buildings on the Palni Hills, I am most decidedly of opinion that no wall built of rubble, more especially rubble in mud, ought to be less than 2 feet thick. In the month of August last, and I suppose even now, there was standing, not very far from the observatory site, but in a much less exposed position, a house in a very dilapidated condition showing what rain can do to stone in mud walls in Kodaikánal. This disaster happened in the cyclone about Christmas 1895. It is absolutely impossible to make sure of having good bonding stones in walls of less thickness. I am also of opinion, derived from experience of building in Kodaikánal, that all outside walls should be faced on the outside with picked blue stone. This, at the observatory site, will require blasted stone. Thus, the total rate of outside walls would be raised from Rs. 12 to Rs. 16.

(4) All these circumstances would of necessity increase the cost of the house in question. But, I think, that I can arrange some savings in other items. I notice that, there is a considerable sum proposed to be spent on concrete in foundations and also stone in lime. Now this, I consider, totally unnecessary. In fact, it is never customary to build in this manner ordinary dwelling houses in Kodaikánal. If these unnecessary items are omitted and essential precautions as to stability taken, I believe most firmly that I can, without altering the design in any detail, so reconstruct the estimate that the house in question could be built for the sum at present allowed. I would further bring forward, as showing the unsatisfactoriness of building walls in Kodaikánal less than 2 feet thick, the case of the cemetery. Here I consider that the failure was due to want of good bonding stones and thinness of the wall, not to defective foundations.

(5) I am now preparing a deviation statement which I hope to forward in a few days showing the extra expenditure and savings on certain items in detail. In order that there shall be as little delay as possible, I am now about calling for tenders. If you can obtain sanction of Government to these alterations quickly, I shall be very much obliged. I intend at present not beginning a new estimate or the alteration in the plans until I know that Government approve of my proposals.

(6) I would desire to point out that I should very much like to commence all work with regard to the observatory immediately after Christmas. The rains will then be over and I have a full working season before me.

From A. JOYCE, Esq., Executive Engineer, Madura Division, to the Superintending Engineer, VI Circle, dated 7th October 1897, No. 389 S.E.

In continuation of this office, No. 369 S.E., dated 1st instant, I have the honour to forward herewith for sanction a deviation statement for constructing a residence to the Astronomer at Kodaikánal.

2. The superstructure walls of main building and out-houses are now made 2 feet thick and rubble in clay is substituted for concrete and rubble in mortar in foundations and basements.

3. The increased rates allowed in the proposed arrangement are similar to those provided in the revised estimate for observatory for which data have been submitted.

4. Data in support of rates provided for rubble in clay in foundation and superstructure are enclosed herewith.

5. The excess is trifling when compared with the importance and the stability of the building and I request that the deviation statement may be sanctioned.

From A. JOYCE, Esq., Executive Engineer, Madura Division, to the Superintending Engineer, VI Circle, dated 27th October 1897, No. 429 S.E.

In returning herewith your endorsement No. 1529 M.D., dated 20th instant, I have the honour to inform you that in your endorsement No. 1487 M.D., dated 14th October 1897, you have stated that the deviation statement submitted by me for increasing the thickness of walls of the main building as well as of the out-houses of the residence of the Government Astronomer at Kodaikánal and also revising rates has been forwarded to the Chief Engineer for approval, but in your endorsement under reference you call for a report whether the work cannot be constructed as per sanctioned plan and estimate.

2 The necessity for the deviation has been fully explained in my letter No. 369 S.E., dated 1st October 1897.

3. Under these circumstances I request to know whether the out-houses are either to be constructed as per sanctioned plan or as per deviation statement.

4. As I reported in my letter, No. 369 S.E., dated 1st October 1897, I have invited tenders for the work and the date fixed for opening them is 1st November 1897. A copy of my tender notice has been sent to Mr. Lloyd.

No. 1598 M.D.

Copy submitted to the Chief Engineer, Public Works Department, for orders with reference to paragraph 3 of G.O., No. 2708 W., dated 29th September 1897. A deviation statement for the residence for the Government Astronomer at Kodaikánal has been forwarded with this office letter No. 1486 M.D., dated 14th October 1897.

4th November 1897. (Signed) O. V. BODDY, Lt.-Col., R.E.,
Superintending Engineer, VI Circle.

From A. JOYCE, Esq., Executive Engineer, Madura Division, to the Superintending Engineer, VI Circle, dated 1st November 1897, No. 438 S.E.

With reference to my letter No. 133 E., dated 10th August 1897, submitting for sanction revised plan and estimate for constructing an observatory building at Kodaikánal, I have the honour to inform you that the best working season that could be availed of at Kodaikánal for commencing the work is from January next. I request therefore that you will be good enough to furnish me with the required sanction as early as possible.

No. 1623 M.D.

Copy forwarded to the Chief Engineer, Public Works Department, for information and with reference to this office No. 1237 M.D., dated 2nd September 1897.

6th November 1897. (Signed) J. INGLIS,
for Suptg. Engineer, VI Circle.

From Lieutenant-Colonel O. V. BODDY, R.E., Superintending Engineer, VI Circle, to the Chief Engineer, Public Works Department, dated Camp Pápanásam, 15th December 1897, No. 1851 M.D.

With reference to your Memo. No. 4571 C., dated 5th November 1897, I have the honour to forward herewith a revised estimate, with comparative statement and plan, for constructing a residence with out-houses for the Government Astronomer at Kodaikánal.

2. I also forward the estimate and plans sanctioned in G.O., No. 2355 W., dated 25th August 1897.

3. In the revised estimate provision has been made for the same description of work as that provided for in the original estimate by the Consulting Architect with the following deviations:—

(a) The thickness of all walls has been made 2′.
(b) Blasted blue stone has been allowed as a facing for one half the thickness of all exterior walls.
(c) Rates as tendered have been entered throughout.

4. I have also allowed the same footings in foundations as in the original estimate. This makes the breadth of concrete 4′ 6″; it might, I consider, be reduced to 3′ 6″ and the walls built up therefrom 2′ thick.

5. The total amount of the estimate at tendered rates comes to Rs. 26,768.

6. In paragraph 2 of the above quoted Government Order it has been ordered that all the materials, with the exception of the masonry, should be prepared in Madras and forwarded to Kodaikánal.

7. In the comparative statement which accompanies the estimate I have placed the letter M against those items which I presume are to come from Madras, and the letter K against those items which will be wholly carried out at Kodaikánal.

8. The estimate may therefore be divided into—

	RS.
Kodaikánal work	13,590
Madras work	11,812
Sundries and supervision	1,366
	26,768

9. If the rates as entered by the Consulting Architect for the Madras work be adhered to, the estimate would be—

	RS.
Kodaikánal work	13,590
Madras work	10,107
Sundries and supervision	1,366
	25,063

or Rs. 1,705 less than the amount of the revised estimate, but still much in excess of the limit of Rs. 20,000 which has been placed on the cost of this building.

10. I forward herewith, for your information, a deviation statement in which, besides allowing for building all walls of a thickness of 2′, facing exterior walls with blue stone and entering tendered rates, the following deviation has been made—concrete in mortar, and uncoursed rubble in mortar in foundations and basement have been dispensed with, and rubble in clay has been substituted in the place thereof.

11. The total amount of the estimate with these deviations comes to Rs. 22,320. This amount may be sub-divided into—

	RS.
Kodaikánal work	9,142
Madras work	11,812
Sundries and supervision	1,366
	22,320

and if, as before, the Consulting Architect's rates be taken for the Madras work, then a saving of Rs. 1,705 can be effected, and the amount of the estimate reduced to Rs. 20,615, or nearly to the limit of cost placed on the building.

12. In paragraph 3 of your memorandum under reply, I have been asked to state my opinion definitely on the suitability of stone in clay as a building material at a hill station exposed to heavy rainfall.

13. Stone in mortar is of course an infinitely better material than stone in clay, and I should much prefer to build with it. The Executive Engineer, Madura division, Mr. Joyce, who has had considerable experience with buildings at Kodaikánal, is strongly of opinion that stone in clay is a sufficiently good material of which to construct this building, and points out that this material has been almost universally used on the houses already built at Kodaikánal.

14. From motives of economy only did I suggest that stone in clay should be used in the foundations, and I consider that if great care is taken in laying the stones, which should be selected, and if the soil on which they are laid is hard, such as at the site of the Astronomer's residence, this material can be used without danger of failure.

Note by the Chief Engineer, Public Works Department.

The Superintending Engineer, VI Circle, having found it impossible to obtain a contractor to undertake the construction of the observatory buildings at Kodaikánal at the rates provided in the sanctioned estimates, the works were, in G.O., No. 3460 W., dated 10th December 1897, transferred to the charge of the Consulting Architect for execution departmentally. Revised estimates, based on the tendered rates, have been submitted by the Superintending Engineer, VI Circle, and these compare as follows with the sanctioned estimates:—

	Sanctioned estimate.	Superintending Engineer's revised estimate.
	RS.	RS.
Observatory	35,060	41,150
Astronomer's residence	19,663	26,768

2. The original and revised estimates for the observatory building have been carefully examined by the Chief Engineer, in communication with the Consulting Architect, and by ~~obtaining~~ altering some of the materials of construction, and carrying out other suggestions of the latter officer, the amount of the estimate has been reduced to 35,850 Rs. 34,800. It is recommended that this sum be sanctioned in supersession of the estimate of Rs. 35,060 sanctioned in G.O., No. 445 W., dated 15th February 1897.

3. The estimate provides for three revolving drums for the towers at a total cost of Rs. 9,600. The Consulting Architect has proposed that only one of these drums be obtained by indent on the Home Government and that after its receipt, the remaining two should be made up locally, by copying from the first. This suggestion might be referred to the Government Astronomer for remarks. The Consulting Architect is convinced that it can easily be done.

4. The revised estimate for the Astronomer's residence might be transferred to the Consulting Architect for scrutiny and for consideration as to whether, as the work is to be done departmentally, it cannot be carried out at a cost not exceeding the sanctioned amount.

5. The Superintending Engineer's remarks regarding the constructive details of the Assistant's quarters will also be considered by the Consulting Architect.

10th January 1898. (Signed) W. B. deWINTON,
Ag. Chief Engineer.

Order—No. 117 W., dated 17th January 1898.

The estimate drawn up by the Chief Engineer, amounting to Rs. 34,800, for the observatory building at Kodaikánal, is sanctioned* in supersession of the estimate of Rs. 35,060, sanctioned in G.O., No. 445 W., dated 15th February 1897.

2. The Government Astronomer will be requested in the Public Department to report on the Consulting Architect's proposal with respect to the supply of the revolving drums.

3. The Consulting Architect's attention will be drawn to the other remarks in the Chief Engineer's note, to which he will give due consideration.

(True Extract.)

(Signed) W. B. deWINTON,
Ag. Secretary to Government.

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* Imperial No. 2 W. of 1897-98, Civil Buildings—Original Works.

To the Consulting Architect to Government, with enclosures.
" Superintending Engineer, VI Circle.
" Examiner, Public Works Accounts.
" Public Department.

Exd. A. F. Eccleston.

[500—14-10-97.]

A / [illegible]

P.W. DEPARTMEN

Print urgently

Papers to be read in proceedings :—

No 117 W 9 17

189 , No.

Again G.O., dated 189 , No.

Again G.O., dated 6-8-97, from the S.E. VI circle

Current No. 7950 of 1897, dated 2-9-97, " - C.A. to Govt.

" " 8867 " 1897 " 2-9-97 " - S.E. VI circle

" " 8916 " 1897 " 27-9-97 - - - —do—

- 9700 - 97 - 14-10-97 - - - —do—

- 10258 - 97 - 4-11-97 - - - —do—

- 11032 - 97 - 6-11-97 - - - —do—

- 11172 - 97 - 15-12-97

- 12616 - 97 ~~ORDER.~~ Note by the Chief Engr. P.W.

Print

Print

Print with enclosures

Print

Print

Print

Print

The Supdg. Engr. VI Circle having found it impossible to obtain a contractor to undertake the construction of the Observatory buildings at Kodaikanal at the rates provided in the sanctioned estimates the ~~[illegible]~~ works were, in G.O. No. 3460 W dated 10 Decr 1897, transferred to the charge of the Consulting Architect for execution departmentally. Revised estimates, based on tendered rates, have been submitted

- cost not exceeding

M.O. [illegible]

[illegible] the Chief Secy for favour of counter-initials. -

Engr. VI Circle, &
e compare as follows
ith the sanctioned
estimates :—

	Sanctioned estimate	S.E.'s revised estimate
Observatory	Rs 35,060	Rs 41,150
Astronomer's residence	19,663	26,768

2. The original and revised estimates for the Observatory building have been carefully examined by the Chief Engr., in communication with the Consg. Architect, and by altering some of the materials of construction, & carrying out other suggestions of the latter officer, the amount of the estimate has been reduced to Rs. 34,800 – It is recommended that this sum be sanctioned in supersession of the estimate of Rs 35,060 sanctioned in G.O. No 445 W of 15 July 1897

The estimate provides for three revolving drums for the towers at a total cost of Rs. 9,600 – The Consg. Architect has proposed that one [illegible] of these drums be obtained by indent on the Home Govt., & that after its receipt, the remaining two should be made up locally, by copying from the first. This suggestion might be referred to the Govt. Astronomer for remarks. The Consg. Architect is convinced that it can easily be done.

4. The revised estimate for the astronomer's residence might be transferred to the Consg. Archt. for scrutiny and for consideration as to whether, as the work is to be done departmentally, it cannot be carried out at a cost not exceeding

Rs 35850
vide G.O. 307 W
7 Engg

sanctioned amount.

3. The Supdg. Engr's remarks regarding the construction details of the assistants' quarters will also be considered by the Cons. architect.

10.1.98

Order.

The estimate drawn up by the Chief Engr., amounting to Rs 34,800, for the Observatory building at Kodaikanal, is sanctioned× in supersession of the estimate for Rs 35,060, sanctioned in G.O. No 445 W dated 15 July 1897.

2. The Govt. Astronomer will be

Rs 35850 307W 2.5.98

A.H. 14.1.98

× Imperial No 2 W of 1897-98 Civil Buildings, Original Works.

A.H. 14.1.98

requested in the Public Dept., to report on the Cons. architect's proposal with respect to the supply of the revolving drums.

3. The Cons. architect's attention will be drawn to the other remarks in the Chief Engr's note, to which he will give due consideration.

Ces 10.1.98

A.H. 11.1.98

Plans & estimates handed personally to CA's Manager. Per 17.1.98

T / B [illegible] Received [illegible] 17/1/98

To the C.A. & Govt.

write enclos. (send all the enclos, except those to be forwarded)

" S.S. VI Circle

" [illegible]

" Public Dept.

2/2/98

D.10

Please see addn
to draft, & despatch
today.
T. shd submit
Observatory estimate
com

8.11.97

---

shd be asked to return
e estimate for the Residen
tri statement improper
full explanation of
proposed – The statement
ing explains some of
it in that incomplete
waste of time.
ear is not likely to
shd be surrendered

29.10.97

L.E. VI shd be asked to return the sanctioned estimate for the Residen with a deviation statement in proper form giving full explanation of the deviations proposed — The statement now submitted only explains some of them, & to submit it in that incomplete form is only a waste of time. If the grant for the year is not likely to be spent now shd be surrendered at once

29.10.97

D.L.

Draft.

29-10-97

Astronomer's Residence at Kodaikanal.

W.

The Executive Engineer, Madura Division while entering into the question of rates for the Residence of the Astronomer at Kodaikanal prescribes what should be the rates for the Observatory at that place. He says that the rates for concrete and rubble masonry for the Observatory would be R^s 30 and R^s 33 respectively, but as he proposes – vide deviation statement – to substitute rubble in clay for both these subheads as regards the Residence the question is in no way affected, provided the deviations be approved. He represents lime to be very difficult to obtain, and unless the deviation be sanctioned there will no doubt be considerable delay, but he should submit sections of his walls in superstructure and foundations. The rates for cement flooring, lime plastering

1) Has work commenced in
(1) Observatory
(2) Residence

× What is the grant for each in current year?

2) Where is the latest estimate for Residence?

29/10/97

W

I (1) - Work commenced
Expenditure to end of Septr 1897 - Rs 2337.
Grant for 1896-97 - Rs 28,200

(2) Work not yet commenced
Grant for 1896-97 - Rs 12,000

II. The sanctioned estimate for the Residence was returned to the Supdg. Engineer

29/10/97

cement pointing, and painting are as shewn in the data statement for the Observatory | and may be approved

put up in linked file

2. The above remarks are made with reference to the main building, but they apply to the outhouses etc. except as regards the servants' huts and latrine where rubble in clay (Rs 12) is shewn to be more expensive than rubble in mortar (Rs 10) — the latter, however, being in foundations & the former in superstructure. But it seems absurd.

C.W.H.
29/10 97.

P.S. Mr Joyce also goes into the question of woodwork, but as that is being undertaken by C.A., he need not, it is presumed, concern himself at all in that respect. But C.A. should I think be authorised to put up his own work so as to avoid a dual [illegible]sibility cons.

G.O. No 117 W of 17 January 1898.

List of Estimates &c. Observatory buildings Kodaikanal

Solar Physics Observatory	Cons. Archt's original estimate for	Rs 35,053
	Madura Exe. Engineer's estimate with Comparative statement	Rs 41,150
	Sanctioned estimate revised in Wo office	Rs 34,800
Astronomers residence & out offices	Cons. Archt's original estimate	Rs 19,663
	Exe. Engineer's revised estimate & Comparative statement	Rs 26,768

Data statement prepared by Executive Engineer Madura.

Deviation statement for residence do.

Tenders for Residence & observatory given by Syed Mahomed Ibrahim Saib Madura.

Jm. Lewis
7/1/98

List of plans of Kodaikanal Observatory.

Solar Physics observatory.	2 Copies Cons. Archts' original design	2 tracing
	Plan revised by Ex: Engineer, Madura	2 tracing
	Floor plan revised in W's office	1 tracing
	Triangular & round iron pipes to carry instruments in Towers	1 drawin
	Balcony in Tower	1 pencil d
Astronomer's Residence.	Consulting Architects' original plan	1 tracing
	Floor plan shewing walls 2 ft. thick	1 tracing
Huts for Astronomers Servants.–	Cons. Architects' original plan	1 tracing
Coach house & stalls for Astronomer.	do. do.	1 tracing
	Revised plan by S.E. VI circle	1 drawing
2nd. Asst: Astronomers quarters	do. do.	1 tracing
Writers quarters	do. do	1 tracing
Three huts for peons	do. do	1 tracing
Site plan for subordinates quarters.	Madura Ex: Engr's plan	1 drawing
Levels of .do.	do– do	1 drawing
	Total	17–

Jm Lewis.

17/1/901

H.C.

Where is the
Observatory
Is it sanc
Et?

N. [illegible] Let C [illegible] the plans
1.10

W. File herewith submitted. The Estimate has been sanctd. & the G.O. is going today to press for H.C.

17

C. No. 12616

H.C.

This can now go on in [illegible].

10/8/98

C.S. for [illegible]

---

lic Works (1897) Department.

Circle

CURRENT No. ~~7950~~ 88677.

From
The Supg. Engineer
N. Circle

No. 1110. I.D.

Dated 6th August 1897
Received 9.8.97
Enclosures 5.
Spare copies

SUBJECT.

Observatory buildings at Kodaikanal — Informing of the rates the Contractor tendered, and with remarks on the different details of the — and requesting sanction for some alteration in the Estimate.

I [illegible] sanctioned
C.S.
10/8/97

O.L.S. 394 R 23/8

D.W.
I propose to place these 2 buildings under C.A. & do them departmentally.
Where is the revised estimate for the Observatory?

24.11.97

S.A.W.
For reply. Is it not write the Sec: Eng? The work is said to be in progress; in any case there is an expenditure of over Rs 2000 to date.

24/11/97.

D.W. W asks for the revised estimate for

From the Consltg. Arct. to Govt
No. 1558. 2.9.97
I.W. No. 8867

Observatory buildings at Kodaikanal: Returning with remarks the estimate for the—

The above sent to T.O. on 10-9-97.

S.A.W.
Where are the data in support of the large increase in the rates? The data for the Observatory may answer the purpose.

25/10/97.

P.S. The question which I asked on 23/10/97 regarding the dual control of C.A. & the Sec. Eng. is, I see, answered in this file.

8867

Please revise the estimate on the lines indicated by C.A. in his note of 2-9-97

8/9/97

D.W.
Estimate duly revised & the amount altered from Rs 35060 to Rs 34800.
The revision has been based on C.A.'s notes. C.A. has initialled the abstract estimate in pencil.

27/12

C.No. 8916 removed from this file & put up with D. C.No. 9/97 for W

22-11-97

Cur. 8916

OW.

The accompanying letter from S.E. VI Circle enclosing a revised estimate for the Observatory at Kodaikanal, is submitted for orders, in connection with the contract papers, which were recently referred to C.A. — C.A.'s reply (Current No 8867) was sent to you on 3rd inst —

Have not had the revised estimate checked by T, as this does not seem necessary until the question whether the revised estimate will be accepted, is settled

C
6/12/97

Two papers (Current Nos 8917 & 8919) in which the same subject is mentioned, are linked to this file. C

T should be

W/

The rates entered in the revised estimate prepared in this office are the same as those entered in the original estimate except for rock cutting which has been increased from Rs 7 to Rs 10 and for boarded floor reduced from Rs 80 to Rs 50 owing to the use of red cedar in lieu of teak.

The S.E.'s revised rates are entered in pencil against the several subheads and by adopting these rates the revised estimate will be increased by Rs 4300, viz. from Rs 34,800 to Rs 39,100 or an excess of Rs 4,040 over the original sanction.

The causes of deviation are as under

(a) reduction in the size of the towers, viz. from 15 ft to 13 ft interior diameter. vide revised tracing of ground plan.

(b) Increase in thickness of walls from 1'6" to 2'0".

(c) Provision of concrete foundation to ground level instead of partly concrete & partly rubble masonry

(d) Construction of towers & spirals also the outer face of walls to a thickness of one foot with stone obtained by blasting.

Current No 8867

Sew

The estimate for Kodaikanal Observatory has been revised on the lines indicated by the Consulting Architect in his note dated 2nd Sept. 97 also on personal instructions given by that officer.

The amount of the estimate has been reduced from Rs 35,060 to Rs 34,800.

The rates entered are those given by the Consulting Architect. He has approved of the revised estimate & has initialed the abstract in pencil dated 18/12/96.

20/12/97

How do rates now submitted compare with S.E.'s rates, & what are the causes of reduction in estimate. I am very unwilling

---

W.C.

Let me see please

20-12-97

T

The papers stand marked against you.

20/12

10218

OW

The data in support of increased rates in the case of the observatory estimate, has been taken out of the file in the Technical Section, & is submitted herewith, in the linked board.

Am unable to obtain a note comparing the rates, as Mr D'Monte is sick today.

26/12/97

the Observatory – this is in the top file – please see paper flagged I and its accompaniments.

9/98

C.S.
26-11-97

S.W.

Should not the Estimate be sent to T for scrutiny?

C.W.B.U.
24/11/97.

I shd. like if a complete this revised est. before anything else

[illegible] 25/11/97

Papers sent to I with your note on ~~[illegible]~~ Consultation 8916, but all the papers with I on this subject were recalled on W.S. requisition & submitted with these files.

The paper flagged I is the revised estimate.

C.S.

W Submitted with $\frac{24}{d}$ 26/11/97

---

guided by C.A.'s note of 2-5-97 as far as possible: but the S.E.'s rates for local labour and materials will have to be accepted: but it would be ~~better~~ well to make up everything in Madras as far as possible. As regards thickness of stone the S.E.'s statements should be accepted.

In a separate note, I am asking T to revise the estimate on the lines indicated by C.A.

C.W.B.U.
8.5.97.

(e) Substitution of cast iron spiral steps for cut stone steps.

(f) Substitution of cast iron tubes in lieu of cut stone ~~[illegible]~~ piers for holding instruments. vide detail plan.

(g) Substitution of wooden gallery around the domes instead of stone gallery carried on stone corbels. vide pencil detailed plan.

(h) Substitution of red cedar boarded floor for teak floor.

Regarding obtaining sand, nothing is mentioned, except that the S.E. proposes to crush stone for the purpose and use the material for making mortar.

This estimate was revised in consultation with C.A. under Mr. Bultons orders consequently the rates entered are those mentioned by C.A.

Jno.
8/1/98.

Noted. I have seen C.A. & he assures me that he has gone into the matter most carefully with Mr. Mackie Smith & Mr. Hughes, & is certain that his rates are fair. I therefore accept them.

10.1.98

the Observatory – this is in the top file – please see papers flagged I and its accompaniments.

24-11-97

S.W.

Should not the estimate be sent to I for scrutiny?

24/11/97

I shd like if a complete this would c.k. before anything else

Papers sent to I with your note on Current No ~~[illegible]~~ 8916, but all the papers with I on this subject were recalled on his requisition & resubmitted with these files.

The paper flagged I is the revised estimate.

W Submitted with $\frac{\text{rg}}{\text{d}}$ 24/11/97

Public Works (1897) Department.

CURRENT No. ~~7950~~ 8867

Order

From
The Supg Engineer
N. Circle

No. 1110. L.D.

Dated 6th August 1897
Received 9-8-97
Enclosures 5.
Spare copies

SUBJECT.

Observatory buildings at Kodaikanal — Informing of the rates the Contractor tendered and with remarks on the different details of the — and requesting Sanction for some alteration in the Estimate.

I [illegible] sanctioning
10/10/97

√

O.L.S. 394 R 23/8

BACK PAPERS.

No.	Date.
525 W	4-6-97
361 C	6-5-97
900 W	30-3-97
1646 C	22-3-97
445 W	15-2-97
3513 W	8-12-96
2793 W	29-9-96
2792 W	29-9-96
2681-82 W	19-9-96
2120 W	21-7-96
1589 W	23-5-96
1588 W	23-5-96
3197 C	30-10-95
2265 W	12-9-95
831 D	24-8-95
696 D	7-8-95
671 D	3-8-95
648 D	30-7-95
339 C	22-7-95
1407 W	12-6-95
929-30 C	8-3-95
281 W	31-1-94
185 W	20-1-94

FURTHER PAPERS.

No.	Date.

No. 1110 L.D.

Supg Engineer's Office, 6 circle
Camp. Madura. 6th August 1897.

D/7.

1P

From
Lt. Col. A. V. Boddy, R.E.
Supg Engineer, VI Circle

Print

To
The Chief Engineer
P.W.D.

Enclosures. 5.
1 Tender
1. Comp: Statt.
1. Data for rates
1. Abs. Estte
} original
1. Copy Ex: Engr's Letter No. 2255.G / 2-8-97

Sir,

I have the honor to inform you that notices calling for tenders for the Construction of the Observatory buildings at Kodaikanal were published both in the District and Fort St. George Gazettes, and that in response thereto but one tender was received from Syed Mohomed Ibrahim Sahib a contractor in the Madura District.

2. His tender is herewith forwarded for your information and also a statement comparing his rates with the estimate rates. There is a third Column in this statement in which the rates as [illegible] revised by the Executive Engineer are entered. It will be seen that for the items tendered the estimate amount is exceeded by ₨ 3,412.

I have also the honor to forward a copy of letter No: 225 S.E. d/2 August 1897, from the Executive Engineer and also the data on which he founds the rates entered in the 3rd Column of the statement.

4. This question of rates is a difficult one. No large work has been built by this Department at Kodaikanal. All the materials, with the exception of stone, tiles and sand have to be brought up the ghât. The site of the Observatory is about 2½ miles from the bazaar at Kodaikanal, and it is some 700 feet higher than the top of the head of the ghât at the Lake bund.

5 I consider that the Contractor's tender should be accepted and that the estimate should be revised, the Executive Engineer's data for rates being accepted. The revised estimate will then be approximately Rs 39,500. I have the honor to request your approval to this proposal, in which case the Contractor will be ordered to proceed with the work at once.

6 The quality of the stone is not good

as a rule. The Executive Engineer proposes to blast out some hard stone and use it on the exterior face of all the walls. This description of work may be pointed, but it is considered that with the ordinary stone available pointing will not suffice, and that the walls would have to be plastered. I recommend the blasted stone to be used.

7. Another important point is the width of the walls; the estimate allows a width of 1'-6" (with the exception of the tower walls). I am strongly of opinion that with the material available these walls should not be less than 2 feet thick, and I have directed the Executive Engineer to use this dimension in revising the estimate.

8. I am also of opinion that teakwood should be used throughout, as Vengay is difficult to obtain, and being so much heavier than teak, the cost of the two descriptions of wood at site will be practically the same.

9. The Executive Engineer proposes to

omit the concrete foundations to the walls; but I do not agree with this & have directed him to allow for concrete to ground level in the revised estimate.

10. I have also to report that the Government Astronomer has recently visited Kodaikanal and has finally selected sites for the buildings sanctioned in G.O. No: 2792 W dated 29th September 1896.

11. For these buildings concrete foundations are allowed, but I do not consider that for these small buildings such foundations are necessary. None of the residences at Kodaikanal have such foundations, and looking to the fact that there will be extreme difficulty in obtaining sufficient lime for the Observatory building I consider that foundations such as are usually used in the locality - viz. Stone in Clay should be substituted.

12. I beg also to point out that to enable these buildings and the Observatory building to be properly supervised and to ensure good work

SP

which is essential, it is highly desirable that an European or East Indian subordinate be placed in charge, but that from my present establishment I can spare no one for this work.

I have the honor to be
Sir,
Your most obed't Servant

O. V. Boddy Lt Col. R.E.
Supg Engineer, Vth Circle

Public Works (1897) Departr

117W
17-1-98

CURRENT No. 8867

From
The Consulting Architect
to the Government
of Madras

Order

No. 1558

Dated 2nd September 1897
Received
Registered } 3-9-97
Enclosures 9 7 (1 Plan)
Spare copies

SUBJECT.

Returning with remarks the Estimate &c for the Observatory building at Kodaikanal, as to the rates entered in the Estimate & tendered by the contractor

Dw
Draw orders
CW
3-9-97

OWS.6
8867/97

0LS442
R10/9

BACK PAPERS.

No.	Date.
3627-C	24-8-97
1525-W	4-6-97
2361-C	6-5-97
900-W	30-3-97
1646-C	22-3-97
445 W	15 2-97
3513-W	8-12-96
2793 W	27-9-96
2792 W	29-9-96
2681-2 W	19-9-96
2120-W	21-7-96
1589-W	23-5-96
1588 W	23-5-96
3197-C	30-10-95
2265-W	12-9-95
831-D	24-8-95
656-D	7-8-95
671-D	3-8-95
648-D	30-7-95
929-30-C	30-3-95
3254 W	18-12-94
281-W	31-1-94
185 W	20-1-94

FURTHER PAPERS.

No.	Date

Sow No. 1558 d/ 2.9.97 Recd

P.W. [illegible] 8767

No. 3627 C

Government of Madras.

PUBLIC WORKS DEPARTMENT.

Madras, 24th August 1897.

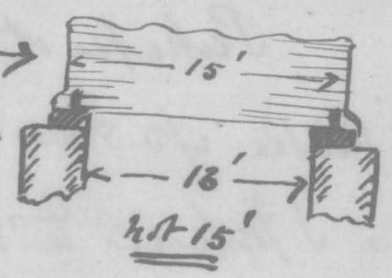
OFFICE NOTE.

From W

To C.A.

In my estimate for Astronomer's Residence – the rates were carefully taken out – the Observatory is probably to be estimated somewhere close to the Residence – so one set of rates shd approxy cover the other:– Apart from rates – take.

(i) The Towers – the drums are 15 ft & their drips overhang – that is the section of Tower shd be with internal diam 13' not 15' – this means ⊙ce = 47 instead of 53 – & supposing 2 ft walls necessary – there will be considerable saving from foundations up:–



(ii) The piers are great blocks of Ashlar in cement to carry an instrument weighing less than 1 cwt:– A cast iron column of 7/16" metal – with pierced sides – cast say in 3 lengths with muff couplings – (to afford easy running up hill) wd be neater, as effective & far cheaper:–

(iii) Dressed stone in steps &c. 1462/-/-
Light iron strong ⊙lar stairs wd cost here about 110/120 th say 200/- at site – 600/- shd cover all.

As this estimate was prepared in your office I should be obliged for the favour of your remarks on the points now raised. To increase the estimate thus will entail going up to the Government of India again which is not desirable.

for W

21.8.97

(4)—1,000—17-12-96.

(iv) Cost of galleries will of course be de-
creased owing to smaller diam: –

(v) Roofing with C. Iron – 18 B.W.G. is
specified 18 is unnecessarily heavy. 22
wd. be all that is reqd. –

(vi) Teak boarded floor 2024/- about
1200/- red cedar quite as serviceable
(with no white ants) cd. be put in

(vii) Revolving Drums – 2600/-

The area of each is about 400 sq. ft. @ 3200/- say 8/- a ft. –
They cd. be prepared in beaten copper & erected for 3/- a ft. including fra-ming & accessories – probably far less.
There are other coverings for frames which cd. be used all very light –

(a) canvas
(b) Papiermaché
(c) Wove wire.

£130.

the best of which is decidedly (c)
but beaten copper is best & wd. last for any time: –

I believe instead of, the estimate of 35060/- being enhanced to 39317/- the work ought to be done for 30,000/- 31000/- at outside: – I base this on the estimate I prepared for the Residence – this note is an hurried one to cause no delay – If an estimate & correct detail drawings are wanted it wd. take me quite a fortnight to prepare: –

With ref to Major Beddy's remark about 2 ft. walls – they seem thick for such small walls – but he knows the stone & I don't: – it may prove not inexpensive – but in any case I wd. advocate 1.7½ walls with 2 ft. courses & perhaps a pier here & there –

Perhaps it wd. be advisable to make up everything here as I proposed for the Residence. it cd. all be very rapidly be got out of hand: –

C.A.

2/9

ERS.

Public Works (1897) Department.

CURRENT No. 8916

Cu 8917

Order

Revolving Drums

Mr. Smith wants them from Europe – perhaps one might be obtained, & the other 2 copied in Madras wh. I am convinced cd. easily be done

13
16
65
135

From
The Superintending Engineer
VI. Circle

No. 1237. L.D.

Dated 2nd September 1897
Received 6-9-97
Enclosures 5. 9 (3 plans)
Spare copies

SUBJECT.

Observatory at Kodaikanal — Forwards with remarks an Estimate of Rs 41,150 for Constructing the Solar Physics —

OK.S. 447
R 10/9

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

No. 1237. M.D.

OFFICE OF THE SUPERINTENDING ENGINEER,
6TH CIRCLE,

Trichinopoly, 2nd. September 1897:
D/4

Pruned

5 P

From
Lt Col. O. V. Boddy R.E.
~~The~~ Sperintending Engineer,
6th Circle.

To

The Chief Engineer,
P. W. D.

SIR,

5. ENCLOSURES.
1. Origl. tracing plan.
1 — Do — Estimate
2. Revised tracing plans
1 — Do — Estimate with Comp: Statt. & ca Complete

× Sent to B.W with No. 8867 on 3-9-97.

In continuation of my letter No: 1110 M.D. dated 6 August 1897, I have the honor to forward herewith an estimate for Constructing the Solar Physics Observatory at Kodaikanal, amounting to Rs 41,150 in which effect has been given to the recommendations I made in the above quoted letter.

The deviations from the original estimate consist in :-

(a) Putting in foundations to ground level in Concrete, instead of part Concrete and part Rough Stone in Mortar

(b) Increasing the thickness of walls from 1'-6" to 2'

(C) Constructing the towers, Spirals and pedestals and also the exte

200—20.4.96

of walls for a thickness of 1 foot of blue Stone to be obtained by blasting.

(d) The substitution of teak wood for Vengai

Rescued as will do for floor

(e) The substitution of the rates as arrived at by the Executive Engineer - Vide data forwarded with above quoted letter.

2. I have already given my reasons for recommending these deviations.

As regards the rates we have no experience to go on, but I consider that the difficulty of doing good work at this site will be as great as at the Periyar. When at Kodaikanal lately I looked at many likely places for good sand, and I find that none is obtainable. I found that one contractor had resorted to washing earth to get a little sand out of it.

Probably we shall have to crush rock to obtain this material and I am having some experiments made on mortar using this material.

I do not think that we are likely to get any other contractor than Syed Mahomed Ibrahim Sahib to tender for this work - and the great difficulty in the transport of material stands in the way of doing the work departmentally. I can only again recommend that the tender of the contractor be accepted.

I have the honor to be
Sir,
Your most obedt. Servant

J. V. Bradley
Lt.Col. R.E.
Superintending Engineer
VI Circle

P. W. D. 6th CIRCLE.

FROM
THE SUPERINTENDING ENGINEER,
6TH CIRCLE.

TO
THE CHIEF ENGINEER,

NO.

Dated.
Received. 189

Enclosure.

Public Works (1897) Department.

Loose

CURRENT No. 9700

Order

From
The Supdg Engineer
VI Circle

No. 1369 Ind.

Dated 27 September 1897
Received 30-9-97
Enclosures 6 (5 plans)
Spare copies

SUBJECT.

Quarters for the Observatory Establishment at Kodaikanal — Submitting for orders Copy of Subordinate officer's letter regarding the foundation proposed for the —

W.

P. W. D. 6th CIRCLE.

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

No. 1369 Ind.

OFFICE OF THE SUPERINTENDING ENGINEER,
6TH CIRCLE,

Trichinopoly, 27 September 1897.

D/29/-

From
Lt Col. O. V. Boddy R.E.
~~The~~ Sperintending Engineer,
6th Circle.

To

The Chief Engineer,
P.W.D.

SIR,

6. ENCLOSURES.
1. Site Plan
3. Plans of Quarters with 4 slips
1. Level Section
1. Copy of E.E's Endt.

I have the honour to forward herewith for your orders Copy of Endorsement No. 313 S.E. of 8 September 1897, of the Executive Engineer, Madura Dn, on letter from the Sub Divisional officer, Dindigul, No. -nil- of 30 August 1897.

I have already referred to this question in my letters Nos: 1110 Ind. of 6 August 1897 and 123 Ind. of 2 September 1897. The sites now selected by the Govt. Astronomer for the Assistants quarters and Peons huts are on very sloping ground and they must be levelled to permit of the Quarters being built and to allow of space around. The cost of this cutting has been estimated to be Rs 250. Surveying the new sites cost Rs 6, and the charges owing to change of site are Rs 113. The

* 3627 C / 20.8.97 with CMO 8667 with J

* CMO 8917 sent to Dn on 6/9

200--20.4.96

total sum of Rs 369 not provided for in the estimates is therefore a necessary extra charge.

I have already reported that for these small buildings the foundations may well be built of rubble of Clay and the Sub Divnl officer shows that if so constructed a saving of Rs 788 may be expected which will cover the cost of the above mentioned charges of Rs 369.

He also points out that if the foundations are laid as originally proposed. Vide letter from the Acting Consulting Architect No: 2122 dated 22 July 1896, printed with G.O. No: 2792 W d/29 September 1896, a saving of Rs 514 may be expected, which would also cover the charges of Rs 369. The original proposals were Concrete foundations 3' wide & 2' high, over the Rubble in clay. This appears to have been altered into a block of Concrete 3'-6" wide & 3' high, and in my opinion this is not at all necessary. If Concrete is to be employed in the foundations, I request that the original proposals may be allowed to be reverted to.

I have the honor to be,
Sir,
Your most obedt. Servant

J. V. Bradley
Lt Col. R.E.
Supg Engineer, VI Circle

24/9/97

P. W. D. 6th CIRCLE.

FROM
THE SUPERINTENDING ENGINEER,
6TH CIRCLE.

TO
THE CHIEF ENGINEER,

NO.

Dated. } 189 .
Received. }

Enclosure.

Public Works (1897) Department.

CURRENT No. 10218

Order

From
The Supdg Engineer
VI. Circle

No. 1486.L.D.

Dated 14th October 1897
Received 15-10-97
Enclosures 3.
Spare copies

SUBJECT.

Residence for the Govt. Astronomer at Kodaikanal — Forwards with remarks a deviation statement for the work of constructing —

For
[illegible]
20/10/97

P. W. D. 6th CIRCLE.

BACK PAPERS.

No.	Date.
2850-1W	11. 10. 97
2708W	29. 9. 97
2355W	25. 8. 97
2255W	17. 8. 97
2045W	28. 7. 97
2776C	5. 6. 97
900W	30. 3. 97
587W	2-3. 97
445W	15-2-97
360-1W	5-2-97

FURTHER PAPERS.

No.	Date.

SUPG. ENGINEER'S OFFICE.
No. [illegible]
9 OCT. 1897
P.W.D.
SIXTH CIRCLE.

Division - Madura
Month - October 1897

—

Residence for the Government Astronomer at Kodaikanal. Statement showing Deviations from the estimate sanctioned for the construction of —

[P. W. D. Form No. M 62.—Inner Sheet.]

Name of Work.	Sub-head in which Departure occurs.	Nature of Departure.		Reasons.	Results anticipated.	Orders of the Superintending Engineer in each Case.
		Original or Sanctioned Arrangement.	Arrangement as being or to be carried out.			
Residence	Earthwork for Excavating foundations	9927 cft at Rs6 per 100 cft 60	10396 cft at Rs7 per 100 cft — 73	Excess due to increase of rates		
	Concrete with stone jelly in mortar	6628 cft at Rs 25 per 100 cft - 1657				
	Uncoursed rubble in mortar in foundations & basement	6497 cft at Rs 30- per 100 cft - 1949 Total 13125 cft	12388 cft at Rs10- per 100 cft — 1239	Rubble in clay is substituted. Hence savings		
	Uncoursed rubble in clay in Superstructure	11325 cft at Rs12 per 100 cft - 1359	13696 cft at Rs13- per 100 cft — 1780 5000 cft at Rs 15-8- per 100 cft 775	Inner walls are made 2 feet thick. and the rate increased from Rs 12 to 13 (vide data attached) Outer walls are to be built with ½ blasted blue facing stones		
	Archwork country brick in mortar	318 cft at Rs40 per 100 cft - 125	426 cft at Rs40 per 100 cft — 170			
	Flooring with concrete 4" thick & plastered with ½" thick Portland cement thread lined 1·6" square	1932 s.ft at Rs18 per 100 sft - 348	1674 s.ft at Rs30- per 100 sft — 502			
	Flooring with mangoe wood boards 1" thick	1944 s.ft at Rs 81 per 100 sft — 603	1811 sft at Rs31- per 100 sft — 561			
	Plastering with chunam 2 coats	15765 sft at Rs 5-8- per 100 sft - 867	15000 s.ft at Rs7-8- per 100 sft — 1225			
	C. over.	6968	6325 6350			

[P. W. D. Form No. M 62.—Inner Sheet.]

NAME OF WORK.	Sub-head in which Departure occurs.	NATURE OF DEPARTURE.		Reasons.	RESULTS ANTICIPATED.	Orders of the Superintending Engineer in each Case.
		Original or Sanctioned Arrangement.	Arrangement as being or to be carried out.			
	B. J	Rs 6968	Rs 6325			
	Plastering with cement	4154 s.ft. at Rs 5- per 100 sft. — 208	4500 sft at Rs 12 per 100 sft. — 540			
	Painting with 3 coats of silicate paint	4111 sft at Rs 5 per 100 sft. — 206	4111 sft. at Rs 5-8- per 100 sft. — 226			
		7382				
Servants' Huts and Latrine	Excavation for foundations	472 cft at Rs 6 per 1000 cft. — 3	618 cft at Rs 7 per 1000 cft. — 4			
	Uncoursed rubble in mortar in foundations & Basement	698 cft at Rs 10 per 100 cft. × — 70	431 cft at Rs 10 per 100 cft. — 43			
	Uncoursed rubble in clay in Superstructure	1387 cft at Rs 12 per 100 cft. × — 166	1172 cft. at Rs 15-8- per 100 cft. — 182 951 cft. at Rs 13 per 100 cft. — 124			
	Plastering 2 coats in mortar	829 sft at Rs 5-8- per 100 sft. — 46	900 sft at Rs 12 per 100 sft. — 108			
	Painting with 3 coats of silicate paint	150 sft at Rs 5 per 100 sft — 8	150 sft. at Rs 5-8- per 100 sft. — 8			
oach house and Stables	Excavation for foundation	1192 cft at Rs 6- per 1000 cft. — 7	1058 cft at Rs 7- per 1000 cft. — 7			
	Concrete with stone jelly in mortar	795 cft at Rs 25- per 100 cft. 199	"	Rubble in clay substituted for concrete (see next item)		
C. over		7881	7567 7584			

NAME OF WORK.	Sub-head in which Departure occurs.	NATURE OF DEPARTURE.		Reasons.	RESULTS ANTICIPATED.	Orders of the Superintending Engineer in each Case.
		Original or Sanctioned Arrangement.	Arrangement as being or to be carried out.			
	B. F.	Rs 7881	Rs 7567			
	Uncoursed rubble in clay in foundations & basement	345 cft at Rs 10 per 100 cft. — 35	1149 cft. at Rs 10 per 100 cft. — 115			
	Uncoursed rubble in superstructure	1838 cft at Rs 12 per 100 cft. — 221	1903 cft at Rs 15-8-0 per 100 cft. — 304 483 cft. at Rs 13 per 100 cft. — 63			
	Archwork - Country brick in mortar	20 cft at Rs 40. per 100 cft. — 8	27 cft at Rs 40 per 100 cft. — 11			
	Plastering with chunam 2 coats	2110 sft at Rs 5-8- per 100 sft. — 116	1423 sft at Rs 7-8- per 100 sft. — 107 1050 s.ft at Rs 12 per 100 sft. — 126			
	Painting with 3 coats of silicate paint	250 sft at Rs 5 per 100 sft. — 13	250 sft. at Rs 5-8-0 per 100 sft. — 14			
Total		8274	8307			

Excess Rs 33 - is within 5 per cent

A. Joyce
Executive Engineer
Madura Division
7-10-97

O. T. [illegible] Lieut Col RE
Supdg [illegible] Circle
14/10/97

R.s.2
1021/8/97

Print

From the Sub Divnl Officer, Dindigul, to the Executive Engineer, Madura Dn, No:– d/ 30 August 1897:—

In returning your No: 715 S. dated 3 August 1897 with enclosures, I beg to submit a site plan with levels showing nature of soil selected by the Government Astronomer and Executive Engineer for the construction of the 3 quarters for Observatory Establishment at Kodaikanal.

The cutting that is required on these sites is as follows:—

2nd Assistant's quarters 14,324 cft.
at Rs 5-12-0 - - - = Rs 82.
3rd or Writers' Quarters 11401 cft: at:do– = " 66
Peons huts for 3 peons 17813 – do – do = " 102
Total Rs 250.

The surveying of these sites has cost Rs 6. The levelling & cutting of the sites selected near Mr: Dholl's house & subsequently given up on account of their not being approved by the Govt: Astronomer & on account of its being found that they would drain into the proposed Reservoir at Kodaikanal has cost Rs 113.

These sums amounting to Rs 369 require

sanction as there is no provision in the estimates for cutting & levelling the sites.

The Plan & estimates provide for concrete for foundations, but for these small buildings, concrete is not necessary. Uncoursed Rubble in clay foundations of the same widths and height of concrete would be quite sufficient and if concrete is thus dispensed with, the following will be the saving.

		Concrete	Rubble in clay	
II assistants quarters.	2161 cft. at 26-0-0 =	562	2161 @ 10 Rs =	216
Writers ..	1568 " at —do— =	408	1568 @ -do- =	157
Peons ..	1151 " at —do— =	310	1191 @ -do- =	119
	4920	1280		492

Saving Rupees 1280 - 492 = Rs 788.
and this saving can go to meet the additional amount requiring sanction Rs 369 & other charges for making roads, drains &ca.

If however it is considered necessary to lay concrete, a work which is never laid in private buildings, I consider that foundations partly with concrete and partly with rubble in clay as originally proposed - Vide Plans and estimates - will also do & in that case, the following will be the savings to meet the additional outlay required:

	Originally proposed	Since sanctioned
II Assistants quarters ...		
Estimate	Rs 2759	Rs 2950
Writers ...	" 1980	" 2090
3. Huts for Peons	" 1657	" 1870
	6396	6910

Saving will be Rs 6910 - 6396 = 514.

I consider the soil good enough to construct the foundations as proposed in the original and the same plans revised or modified.

No. 313 S.E. d/ 8 September 1897.

Copy submitted to the Supg: Engineer, VI Circle, Trichinopoly, with reference to his Endorsement No. 1047 M.S. d/26 July 1897.

Signed/ A. Joyce
Executive Engineer
Madura.

/ True copy /

J. V. B[illegible] Lt Col. R.E.
Supg Engineer, VI Circle
27-9-97

24/9/97

11P

No: 1486. Ir. D.

Supg Engineer's office, VI Circle
Trichinopoly. 14th October 1897.

From

Lt Col. O. V. Boady R.E.,
Supg Engineer, VI Circle

Print

To

The Chief Engineer
P. W. D.

Sir,

Enclos: 3.
2. copies of letter of Ex. Engr
1. Dev: Statt.

With reference to G.O. No: 2355 W d/ 25th August 1897, sanctioning an estimate for Rs 19,663 for constructing a residence for the Govt. Astronomer at Kodaikanal, I have the honor to forward herewith copy of a letter No: 369 S.E. d/ 1st October 1897 from the Executive Engineer, Madura Dn, also copy of another letter No: 387 S.E. d/ 7th October 1897 from the same officer together with a deviation statement.

2. I am myself strongly of opinion that the thickness of all the walls should not be less than 2 feet; the material rough stone in clay requires this thickness, and I request that this deviation be sanctioned.

3. I also agree with the Executive

Engineer that it is advisable to face all the exterior walls with picked blue stone, which will however result in an increase of rate as this stone must be blasted out.

4. I think the doors could be made at Kodaikanal a little cheaper than at Madras by substituting Blue Gum for Mango, but Blue Gum is not good wood. In roofs its life does not exceed 15 years.

5. As regards the rates which the Executive Engineer considers necessary I have already reported on this point in connection with the Observatory building in my letter No: 1110 Md. d/6 August 1897 with which I submitted data for these rates. I have had no reply to that letter at present.

+3629 G.O.
Sent 6.7
10-9-97
Ans 8867

6. In the deviation statement which I submit the items of Concrete in mortar and of uncoursed rubble in mortar have been omitted, & Rubble in Clay has been substituted. I have reported on this question with reference to the Observatory buildings. Lime is very difficult to obtain. In this case however in order to keep the cost of the work within the estimate amount, the substitution proposed is essential.

7. I have the honor to request that you will let me know, if these proposed deviations are approved, as soon as possible, and I will then have the estimate revised.

I have the honor to be
Sir,
Your most obedt. Servant,

O. V. Bodley Lt. Col. R.E.
Superintending Engineer
VI Circle

13/10/97

Public Works (1897) Department.

CURRENT No. 11039

Order

I Endorse with this.
with the deviation
statement

Cursd
D
8/11/97.

m/

From The Supg Engineer
V. Circle

No. 1598. L. D.

Dated 4th November 1897.

Received 6. 11. 97

Enclosures

Spare copies

SUBJECT.

Outhouses of the Observatory at Kodaikanal — Forwards for orders Copy of Madura Ex: Engr's letter requesting to know whether the ____ are to be built according to the Sanctioned plan or as per Deviation Statement.

us | Pointing:— The rate given is

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

---

13 S.P

Print

From A. Joyce Esquire, Executive Engineer, Madura Dn, to the Superintending Engineer, VI Circle, No: 369 S.E. dated 1st October 1897:—

I have the honor to address you concerning the plans estimates &ca lately received for the house of the Govt. Astronomer at Kodaikanal.

1. First the rates &ca:- Concrete. 25/- is given in the estimate, whereas the rate at the Observatory site has been fixed at 30/-.

Yes

Stone in Lime:- The rate given is 30/- whereas the rate at Observatory site should be 33/-

It is not a question what the rate should be at the Observatory site but at the Residence site. The data shows the rate at Observatory site as Rs 30

Cement flooring:- The rate given is 18/- whereas the rate at Observatory site should be 30/-

Yes - including 4" concrete

Plastering with lime:- The rate given is 5/8 whereas the rate at Observatory site should be 7/8.

Rs 7 8 given in data for Observat.

Pointing with Cement:- The rate given is 5/- whereas the rate at Observatory site should be 12/-

Yes

Pointing:- The rate given is 5/-

Yes

whereas the rate at Observatory site should be 5/8-

Doors & windows &ca:- The rate given for these when of Teak is 1/10, whereas the rate fixed finally for Observatory site is Rs 2/-

CAS work

2. I notice however that these are to be prepared in Madras & then forwarded on. By this means a saving is supposed to be made. This may possibly be the case, but I rather doubt if it would be cheaper than having them prepared in the ordinary way by Messrs Brown & co of Calicut, and then forwarded on. I notice also that some of the more ordinary or common doors &ca are to be made of mangoe wood. Now I am very much of opinion that I could make much better and cheaper doors at Kodaikanal itself out of blue gum. I am making accurate enquiries about this now.

3. I would further desire to point out what I also consider grave defects in the design. I notice that it is proposed to build almost all the walls of stone in mud. Now, none of these walls

are more than 18" thick; indeed some few are only 15" thick. From my experience of buildings on the Pulni Hills, I am most decidedly of opinion that no wall built of rubble more especially rubble in mud ought to be less than two feet thick. In the month of August last and I suppose even now, there was standing not very far from the Observatory site, but in a much less exposed position, a house in a very dilapidated condition — showing what rain can do to stone in mud walls in Kodaikanal. This disaster happened in the Cyclone about Christmas 1895. It is absolutely impossible to make sure of having good bonding stones in walls of less thickness. I am also of opinion, derived from experience of building in Kodaikanal, that all outside walls should be faced on the outside with picked blue stone. This at the Observatory site will require blasted stone. Thus the total rate of outside walls would be raised from 12/- to 16/-.

4. All these circumstances would

of necessity increase the cost of the house in question. But I think that I can arrange some savings in other items. I notice that there is a considerable sum proposed to be spent on concrete in foundations & also stone in lime. Now this I consider totally unnecessary. In fact it is never customary to build in this manner, ordinary dwelling houses in Kodaikanal. If these unnecessary items are omitted & essential precautions as to stability taken, I believe most firmly that I can without altering the design in any detail, so reconstruct the estimate that the house in question could be built for the sum at present allowed. I would further bring forward as showing the unsatisfactoriness of building walls in Kodaikanal less than 2 feet thick, the case of the cemetery. Here I consider that the failure was due to want of good bonding stones and thinness of the wall, not to defective foundations.

5. I am now preparing a deviation statement which I hope to forward in a few days showing the extra expenditure & savings on certain items in detail. In that there shall be as little delay as possible, I am now about calling for tenders. If you can obtain sanction of Government to these alterations quickly I shall be very much obliged. I intend at present not beginning a new estimate or the alteration in the plans until I know that Government approve of my proposals.

6. I would desire to point out that I should very much like to commence all work with regard to the Observatory immediately after Christmas. The rain will then be over and I have a full working season before me.

True copy

Lt Col. R.E.
14-10-97
Supdg Engineer, VI Circle

19/10/97

PWC.1/1021.8/57

From A. Joyce Esquire, Executive Engineer, Madura Dn, to the Superintending Engineer, II Circle, No: 389 S.E. d/7 October 1897:—

Print

In continuation of this office No: 369 S.E. d/1st instant, I have the honor to forward herewith for sanction a deviation statement for constructing a residence to the Astronomer at Kodaikanal.

2. The superstructure walls of main building and outhouses are now made 2 feet thick and rubble in clay is substituted for concrete and rubble in mortar in foundations and basements.

3. The increased rates allowed in the proposed arrangement are similar to those provided in the revised estimate for Observatory for which data have been submitted.

4. Data in support of rates provided for rubble in clay in foundation and superstructure are enclose

herewith.

5. The excess is trifling when compared with the importance and the stability of the building and I request that the deviation statement may be sanctioned.

/ True Copy /

O. V. Bodley Lt Col. R.E.
14-10-97
Supdg Engineer, V Circle

13/10/97

17

print

From A. Joyce Esquire, Executive Engineer, Madura Dn, to the Superintending Engineer, V Circle, No: 429 S.E. dated 27 October 1897:—

In returning herewith your Endorsement No: 1529 M.S. d/20 Instant, I have the honor to inform you that in your Endorsement No: 1487 M.S. dated 14 October 1897, you have stated that the Deviation Statement submitted by me for increasing the thickness of walls of the Main building as well as of the out houses of the Residence of the Govt. Astronomer at Kodaikanal and also revising rates, has been forwarded to the Chief Engineer for approval, but in your endorsement under reference you call for a report whether the work cannot be constructed as per sanctioned plan and estimate.

2. The necessity for the deviation has been fully explained in my letter No: 369 S.E. d/1-10-97.

3. Under these circumstances I request to know whether the out houses

are either to be constructed as per sanctioned plan or as per Deviation statement.

4. As I reported in my letter No: 369 S.E. d/1-10-97, I have invited tenders for the work and the date fixed for opening them is 1st November/97. A Copy of my Tender notice has been sent to Mr: Lloyd.

No: 1598. L.D. dated 4th November 1897

Copy submitted to the Chief Engineer, P.W.D., for orders with reference to para 3 of G.O. No: 2708 W dated 29th September 1897. A deviation statement for the residence for the Government Astronomer at Kodaikanal has been forwarded with this office letter No: 1486 M.D.* dated 14th October 1897.

* Cu 10218 sent to I on 26.10.97

J. V. Bodley Lt Col. R.E.
Supg Engineer, VI Circle

Public Works (1897) Department.

CURRENT No. 11172

Order

From
The Supg Engineer
VI. Circle

No. 1623. L.D.

Dated 6th November 1897
Received 10.11.97
Enclosures — u —
Spare copies

SUBJECT.

Observatory Buildings at Kodaikanal — ~~Com~~ Forwards Copy of the letter of Exe: Engineer Madura Dn: Stating that the best Season for Commencing the work of the —— is January & to get the Sanction before thi

I/ to expedite disposal.

11-11-97

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

18P

Press

From A. Joyce Esquire, Executive Engineer, Madura Dn, to the Suptg: Engineer, IV Circle, No: 438 S.E. dated 1st November 1897: ——

With reference to my letter No: 133 E. dated 10-8-97, submitting for sanction Revised plan and estimate for constructing an Observatory Building at Kodaikanal, I have the honor to inform you that the best working season that could be availed of at Kodaikanal for commencing the work is from January next. I request therefore that you will be good enough to furnish me with the required sanction as early as possible.

No: 1623. L.D. dated 6th November 1897
D/8.

Copy forwarded to the Chief Engineer P.W.D. for information and with reference to this office No: 1237 Ms of 2 September /97.

Cno 8916 emb to
T 10/9/97

John. Inglis
Executive Engineer
for Supg Engineer, IV Circ

FURTHER

Public Works (1897) Department.

CURRENT No. 12616

Order

From
The Superintending Engineer
VI Circle

No. 1851. M.O.

Dated 15th December 1897.
Received 20.12.97
Enclosures 11. (4) 1 Plans
Spare copies "

SUBJECT.

Residence with outhouses for the Government Astronomer at Kodaikanal:—

Submitting a revised estimate of Rs 26,768 for constructing a ——

W.

BACK PAPERS.

No.	Date.
3460W	10-12-97 ✓
4571C	5-11-97 ✓
2850W	11-10-97 ✓
2708W	29-9-97 ✓
2355W	25-8-97 ✓
2255W	17-8-97 ✓
2045W	28-7-97 ✓
1525W	4-6-97 ✓
2361C	6-5-97 ✓
900W	30-3-97 ✓
587W	2-3-97 ✓
445W	15-2-97 ✓
360-1W	5-2-97 ✓
2950W	17-10-96 ✓
2681-2W	19-9-96 ✓
1030D	10-8-96 ✓
969D	4-8-96 ✓
915D	30-7-96 ✓
2120W	21-7-96 ✓
1588W	23-5-96 ✓
281W	31-1-95 ✓
185W	20-1-95 ✓

FURTHER PAPERS.

No.	Date.

No: 1851. M.D

Superintending Engineer's Office
VI Circle
Camp. Papanasam D/. 15th December 1897.
O/18:

Print

From
Lt Col. C. V. Boddy R.E.
Superintending Engineer
VI Circle

To
The Chief Engineer,
Public Works Department.

Enclos: 11.
1. Revised Detail Estimate
1 -do- abs: Este:
1. Comparative Statt.
Tracing Plan
Plan of outhouses.
Deviation Statt.
Tender.
original Este ~~with~~
Tracing Plan
sent separately by book post

Sir,

With reference to your Memorandum No: 4571C dated 5 November 1897, I have the honor to forward herewith a revised estimate, with comparative statement and Plan, for constructing a residence with outhouses for the Government Astronomer at Kodaikanal.

2. I also forward the estimate and plans sanctioned in G.O. No: 2355 W dated 25 August 1897.

3. In the revised estimate provision has been made for the same description of work as that provided for in the original estimate by the Consulting Architect with the following deviations.

(a) The thickness of all walls has been made 2 feet.

(b) Blasted Blue Stone has been allowed as a facing for one half the thickness of all exterior walls.

(c) Rates as tendered have been entered throughout.

4. I have also allowed the same footings in foundations as in the original estimate. This makes the breadth of concrete 4'-6", it might, I consider, be reduced to 3'-6" and the walls built up therefrom 2' thick.

5. The total amount of the estimate at tendered rates comes to Rs 26768.

6. In para 2 of the above quoted G.O. it has been ordered that all the materials, with the exception of the masonry, should be prepared in Madras and forwarded to Kodaikanal.

7. In the Comparative Statement which accompanies the estimate I have placed the letter M against those items which I presume are to come from Madras, and the letter K against those items which will be wholly carried out at Kodaikanal.

The

8. The estimate may therefore be divided into:-

Kodaikanal Work	Rs 13,590
Madras Work	" 11,812
Sundries & Supervision	" 1,366
	Rs 26,768

9. If the rates as entered by the Consulting Architect for the Madras Work be adhered to, the estimate would be:-

Kodaikanal Work	Rs 13,590
Madras Work	" 10,107
Sundries & Supervision	" 1,366
	Rs 25,063

or Rs 1705 less than the amount of the revised estimate, but still much in excess of the limit of Rs 20,000 which has been placed on the cost of this building.

10. I forward herewith for your information a deviation statement in which, besides allowing for building all walls of a thickness of 2 feet, facing exterior walls with blue stone and entering tendered rates, the following deviation has been made — Concrete in mortar, and uncoursed rubble in mortar in foundations and basement have been dispensed with,

and

and rubble in clay has been substituted in the place thereof.

11. The total amount of the estimate with these deviations comes to Rs 22,320. This amount may be subdivided into—

Kodaikanal Work	Rs 9,142
Madras Work	" 11,812
Sundries & Supervision	" 1,366
	Rs 22,320

and if, as before, the Consulting Architect's rates be taken for the Madras Work, then a saving of Rs 1,705 can be effected, and the amount of the estimate reduced to Rs 20,615, or nearly to the limit of cost placed on the building.

12. In para 3 of your Memorandum under reply, I have been asked to state my opinion definitely on the suitability of Stone in clay as a building material at a hill station exposed to heavy rain fall.

13. Stone in mortar is of course an infinitely better material than Stone in clay, and I should much prefer to build with it. The Executive Engineer, Madura Division, Mr: Joyce, who has had considerable experience with buildings at Kodaikanal, strongly of opinion that Stone in clay is a sufficiently good material of which to construct this building, and point out that this material has been almost universally used on the houses already built at Kodaikanal.

14. From motives of economy only did I suggest that stone in clay should be used in the foundations, and I consider that if great care is taken in laying the stones, which should be selected, & if the soil on which they are laid is hard, such as at the site of the Astronomer's residence, this material can be used without danger of failure.

I have the honour to be
Sir,
Your most obedient Servant,

J. V. Bodley Lt. Col. R.E.
Superintending Engineer
VI Circle

15/XII/11