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MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 1226	Press <u>Mis.</u>
164-65	
Dated 10. 5	1870 .

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
10th May 1870.*

No. 164. Read the following letter from Colonel J. CARPENDALE, R. E., Acting Consulting Engineer for Irrigation and Canal Company, to the Secretary to Government, Public Works Department, dated Madras, 6th April 1870, No. 3:—

REFERRING to Order of Government, No. 800, 23rd March 1865, returning for further revision the estimates for the distribution works connected with the 6th Section of the Company's Main Canal, I have now the honour to submit the letter noted in the margin from the Agent and Manager, accompanied by the plans and revised estimates particularized at foot. The 6th Section of the Main Canal commences at the 73rd mile and extends to 92nd, and the arrangement of the principal and subsidiary channels

No. 124, 17th March 1870, with Chief Engineer's No. 393.

- 1 Abstract Estimate.
- 1 Detailed do.
- 1 Estimate of earthwork quantities to channels.
- 1 Tabular Statement.
- 9 Plans.

13

will be seen on the General plan called "Distribution channels, Toordacherla." This subsidiary project commences with a head-sluice in the Main Canal near the village of Toordacherla in the 78th mile, from thence a supply is taken off for the Toordacherla main channel which extends for a length of 5 miles and 16 chains through the Toordacherla and Wanalah lands. This main channel is twenty-four feet wide at bed, has a fall of two feet per mile, and with a depth of three-and-a-half feet of water is calculated to carry 44,000 cubic yards an hour. At 5 miles and 16 chains it crosses the Ragady Goodoor Vagoo by an aqueduct, and with reduced dimensions calculated to carry 12,000 cubic yards an hour extends for 1 mile and 15 chains to a Vagoo which it crosses by an aqueduct called work No. 29, and is prolonged for a further length of 39 chains in the lands of Korapole. This latter portion, 1 mile 15 chains *plus* 39 chains, is called a secondary channel and designated U. At the aqueduct, work No. 12, the Wanalah Vagoo is connected into a secondary channel 2 miles and 5 chains in length, from which minor channels numbered 10, 11, 14 and 15 branch off, obtaining their supply by means of weirs marked work Nos. 16, 18, 20 and 22, crosses the connected Vagoo in combination with which are sluices for regulating the admission of the water. At the aqueduct work No. 15 on the Toordacherla main channel, the Ragady Goodoor Vagoo is connected into a channel called a supply channel, and is 3 miles and 45 chains in length, for the purpose of supplying the secondary channel marked A. and the minor channels Nos. 12, 21 and 17.

2. It is unnecessary that I should thus describe in detail all the features of the distribution scheme, but the above remarks will explain the general plan, and I need only add that the large numerals from 1 to 70 on it denote the portions of land to be irrigated from each sluice or each minor channel bearing a corresponding number.

3. The estimate amounts to Rupees 71,400, and is composed of the following items:—

	RS.	A.	P.
Earthwork	31,177	14	11
Masonry	24,279	10	10
Grant to Ryots to aid in distributing the water to their fields, at six annas an acre ...	9,452	10	0
	64,910	3	9
Contingencies including store and store charges	6,489	12	3
Total ..	71,400	0	0

*Proceedings of the Madras Government, Public Works Department,
10th May 1870.*

for 27,970 acres being Rupees 2-8-6 per acre which seems moderate, but this it must be observed is the acreage commanded, while from the 3rd paragraph of the Chief Engineer's letter, No. 393, 11th ultimo, it appears improbable that so great an area is capable of being irrigated or available for cultivation, so that it may be considered the supply of water is sufficient. At the end of his 2nd paragraph the Chief Engineer says, "Lastly, six annas an acre is allowed for assisting the ryots in the distribution over their fields, a work which will be best carried out by the Revenue Officers" to which I beg to draw the special attention of Government.

4. The total length of channels:—

Main, Secondary, and Minor is	Miles.	Chains.
to which is to be added supply channels, being existing drainages improved for the purpose	80	52
In all...	13	4
	93	56

5. The rates are very liberal, and are as follow:—

Channel excavation, 8 to 10 cubic yards	per Rupee.
Side-cutting to complete banks, 10 cubic yards	per "
Puddle,	4 cubic yards per "
Rubble masonry, Rupees 3 8 0	per cubic yard.
Cut-stone,	" 8 0 0 per do.
Coping,	" 7 0 0 per do.
Arch-work,	" 5 0 0 per do.

The formula used in calculating the dimensions of the channels appears to be $V = .91 \sqrt{(2 f \times H.M.D.)}$ per c. ft. per second, or $V = 55 \sqrt{(\text{twice fall per mile} \times H.M.D.)}$ per cubic foot per minute. The paper called tabular statement of channels which accompanies and which has been prepared agreeably to the Consulting Engineer's suggestions in letter published with Government Order, 9th August 1866, No. 2,509, gives the dimensions and other particulars for each channel including the discharge in cubic yards per hour and the area of land commanded by each channel. The discharge of the minor channels is in almost all cases calculated on the basis of two cubic yards per hour per acre.

6. I have tested the results in several instances, as also in the main channel, and find the dimensions correctly calculated. In some cases the channels are of much larger capacity than there appears to be reason for by an inspection of the list thus:—

Minor channel No.	Discharge in Cubic yards per hour.	Acreage.
No. 15	2,466	292
No. 34	534	88
No. 65	2,350	421

But on examining the general plan it will be seen that No. 15 channel supplies also Nos. 16, 18 and 19, in all 1,233 acres. In like manner channel No. 34 supplies No. 33, in all 267 acres; and channel No. 65 besides watering 421 acres under it gives a supply for 753 acres under channel No. 64. The project appears to have been fully investigated and carefully drawn up, and I beg to submit it for sanction estimated expenditure Rupees 71,400; noting that an advance of Rupees 10,000 for the collection of materials for this work was sanctioned in Government Order, No. 24, 6th January 1865.

*Proceedings of the Madras Government, Public Works Department,
10th May 1870.*

From the Acting Agent and Manager, to the Consulting Engineer for the Madras Irrigation and Canal Company, dated Madras, 17th March 1870, No. 124.

I HAVE the honour to forward, for the sanction of Government, plans and estimates for distribution works in the 6th Section, as per list appended to the Chief Engineer's letter, No. 393, of 11th March 1870, copy of which is enclosed.

From J. H. COX, Esq., for Chief Engineer, to the Agent and Manager for the Madras Irrigation and Canal Company, dated Kurnool, 11th March 1870, No. 393.

I HAVE the honour to submit, for Government sanction, plans and estimates for the distribution in the 6th Section Rupees 71,400 for an area of about 28,000 acres. The schemes consists of 93 miles 56 chains of channels to be constructed by the Company on land made over by the Government. Of these channels 80 miles 52 chains are entirely new, and 13 miles 4 chains are improvements of existing Vagoos. The cost of these channels is estimated at Rupees 61,000, or Rupees 2-2-10 per acre of the land to irrigate which the water suffices. Of this total Rupees 19,517-7-6 is for a main channel carrying from 44,000 to 42,000 cubic yards per hour; which alone costs 11 annas 2 pies per acre for the whole acreage for which the water suffices, while what are more strictly distributing channels cost Rupees 41,482-8-6 or 1-7-8 per acre; and some of these are so large running up to a size sufficient for 30,000 cubic yards per hour, that they might perhaps be more strictly called main channels. Lastly, 6 annas an acre (Rupees 10,400) is allowed for assisting the ryots in the distribution over their fields, a work which will be best carried out by the Revenue Officers.

2. In his measurement of the area of arable land commanded by his channels, I cautioned Mr. Ridley against including any worthless land or sites of villages, roads, etc. On checking his areas of arable land, however, some seem to me to come improbably near the total area of the land and to vary from about two-thirds the total area to, as near as we can scale, the total area. I am, therefore, engaged in a survey of the strip of land between the canal and the River Caulee, in order that, if on further investigation there appear any doubt as to the sufficiency of the channels at present proposed, sanction may be applied for for extending them in this direction.

3. The channels are diminished below each off-take from them so as not to suffice for more than the irrigation required. The general character of the country is rock on the surface at the northern end and at some intermediate patches, elsewhere an ample depth of cotton soil or red soil overlying gravel. The latter formation is esteemed by Natives the best soil for irrigation, and is certainly the one which irrigation improves the most.

4. Mr. Ridley stated to me that he had given the fall per mile allowed in his channels his careful consideration, and considered them suitable to the ground.

No. 165.

ORDER THEREON, 10th May 1870, No. 1,226.

IRRIGATION, No. 14.

WITH his letter of the 2nd March 1865, No. 218, the Consulting Engineer for the Madras Irrigation and Canal Company laid before Government estimates received from the Agent for the distribution works connected with the 6th Section of the Company's Main Canal, but, with reference to the remarks made by Major Mullins in that letter, His Excellency the Governor in Council returned the estimates for revision. The

Proceedings of the Madras Government, Public Works Department,
10th May 1870.

Acting Consulting Engineer now submits a revised estimate of Rupees 71,400 providing for the following items:—

	RS.	A.	P.
Earthwork	31,177	14	11
Masonry	24,279	10	10
Grant to Ryots to aid in the distribution of water to their fields, at six annas per acre ...	9,452	10	0
Contingent charges, etc.	6,489	12	3
Total...	71,400	0	0

2. Colonel Carpendale states that the scheme of distribution appears to have been fully investigated and carefully prepared, and that it is designed to command for irrigation an area of 27,970 acres. The Government accordingly sanction the estimate.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

To the Consulting Engineer for the Madras Irrigation and Canal Company.
,, Agent and Manager for do. do.
,, Revenue Department.

Exd. E. C. Shunker.

Consulting Engineer's Office
Irrigation and Canal Co.
Madras 6th April 1870.

No. 3.

From,

Colonel J. Carpendale A.C.
At. Consulting Engineer & Co.
To,

The Secretary to Government
(Department of Public Works)
Sir,

Referring to order of Govern-
ment No. 800. 23rd March 1869, returning
for further revision the Estimates
for the Distribution works connected
with the Sixth Section of the Company's
Main Canal, I have now the honor
to submit the letter noted in the
margin from the Agent and
with Chief Engineer
No. 398. Manager, accompanied by the Plans
1. Abstract Estimate
1. Detailed — and revised Estimates particular-
1. Estimate of Earth- ized at foot. The Sixth Section of
work quantities
to Channels the Main Canal commences at the
1. Tabular Statement 73rd Mile and extends to 92nd and the
2. Plans.
14.
arrangement of the principal and
subsidiary Channels will be seen
in the General Plan called
"Distribution Channels Soordachurda".
This subsidiary project commences
with

No. 124-17 March 1870
with Chief Engineer

No. 398. Manager, accompanied by the Plans

1. Abstract Estimate

1. Detailed — and revised Estimates particular

1. Estimate of Earth-

work quantities

to Channels

1. Tabular Statement

2. Plans.

14.

of the following items

Earthwork	31,177	14	11
Masonry	24,279	10	10
Grant to Ryots to aid in distributing the water to their fields at Anamasare	9,452	10	0
Contingencies including stone and stone charges	64,910	3	9
	6,489	12	3

Total Rupees 71,400 — " — "
 for 27,970 acres being Rupees 2-8-4 per acre which seems moderate, but this it must be observed is the acreage commanded while from the third paragraph of the Chief Engineer's letter N^o 393-II Ultimo it appears improbable that so great an area is capable of being irrigated, or available for cultivation, so that it may be considered the supply of water is insufficient. At the end of his second paragraph the Chief Engineer says "Lastly six annas are now allowed for assisting the Ryots in the distribution over their fields work which will be best carried out by the Revenue Officers" to which they to draw the special attention of



of Government.

The total length of channels Main, Secondary and Minor is ^{Miles - Chain} 80 - 52 to which is to be added supply channels being existing drainages improved for the purpose 17.4 in all Miles 97-56

The rates are very liberal and are as follow

Channel excavation 8 to 10 C ^y per Rupee	
Side Cutting to complete banks 10 C ^y " "	
Puddle 4 C ^y " "	
Rubble Masonry N ^o 5-8- " per Cubic yard	
Cut Stone 8 " " " "	
Coping 7 " " " "	
Arch work 5 " " " "	

The formula used in calculating the dimensions of the channels appears to be $V = .91 \sqrt{2.5 \times H.M.D}$ per Cubic foot per second or $V = 55 \sqrt{2.5 \times H.M.D}$ per twice fall per mile $\times H.M.D$ per Cubic foot per minute. The paper called Tabular Statement of Channels which accompanies and which has been prepared agreeably to the Consulting Engineer's suggestions in letter published with Government Order 9th August 1866 N^o 2509, gives the dimensions and other particulars for each Channel

Channel including the discharge in Cubic yards per hour and the area of land commanded by each channel. The discharge of the minor channels is in almost all cases calculated on the basis of two Cubic yards per hour per acre. I have tested the results in several instances as also in the Main channel, and find the dimensions correctly calculated. In some cases the channels are of much larger capacity than there appears to be reason for by an inspection of the list. Thus:

	Discharge in Cubic yds per hour	Acreage
Minor channel N ^o 15	2466	292
" " " N ^o 34	584	88
" " " N ^o 65	2350	421

but on examining the General Plan it will be seen that N^o 15 Channel supplies also N^o 16, 18 and 19, in all 1233 acres. In like manner Channel N^o 34 supplies N^o 33, in all 267 acres, and Channel N^o 65 besides watering 421 acres under it, gives a supply for 753 acres under Channel N^o 64. The Project appears to have been fully investigated and carefully drawn up, and I beg

11 H
beg to submit it for sanction, estimated expenditure Rupees 71,400, noting that an advance of Rupees 10,000 for the collection of materials for this work was sanctioned in Government Order N^o 24-6th January 1865.

I have the honor to be,
Sir,

Your most Obedient Servant,
James W. Col. R.E.
Consulting Engineer
J.W.C.

W.M.B.

C. 27. dated 1870 Q. 28

164

1226-104470

Submitted for consideration
after further revision & amendments
for the distribution of the
the 6th Section Main Canal.

Case: 14

Noted & Co. 13 April 70

Submitted for consideration
after further revision & amendments
for the distribution of the
the 6th Section Main Canal.

P. W. Department.

1226

Proceedings of the Madras Govt.

Under date the.

No 1479

Read the following

From The Ag. Consulting Engineer for I. C. Company
{ H. E. No 3 of 6 April 70

With his letter of the
2nd March 1865 No 218 the
Consulting Engineer for the
Madras Irrigation and Canal
Company laid before Govt.
estimates received from the
Agent for the distribution
works connected with the
sixth section of the Company's
Main Canal, but, with re-
ference to the remarks
made by Major Mullins
in

in that letter, His Excellency
 the Gov^r in Council returned
 the ^{Estimate} for revision. The
 Acting Consulting Engr^r
 now submits a revised
 estimate of Rs 71,400 pro-
 viding for the following

items:—
 Earthwork — Rs 31,177-14-11
 Masonry — " 24,279-10-10
 Grant to ryots to aid in the
 distribution of water to their
 fields at 6 Annas per acre 9452-10-"
 Contingent charges ^{1/2} anna 6489-12-3
 Total Rs 71,400-0-0

Col^l Carpenter states
 that the scheme of distri-
 bution appears to have
 been fully investigated
 and carefully prepared
 and that it is designed

to command for irrigation
 an area of 27,970 acres. The
 Gov^r accordingly sanctioned
 the estimate.

Ab

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 To The Comm^r Engr^r I & C of Compt^r in the
 " Agent and Manager of the
 " Revenue Dept^y
 Dec^r 11/5/70

(10)

27. 28 April 1870 28

C. No 479

Govt. of 1870 Madras.

PUBLIC WORKS.

To
The Consulting Engineer
for the Madras I.
H. W. A. C. Camp

Dated

Recd.

G. O. 10 May 1870, No. 226

Nos. 164-165

Distribution Works -
(I. & C. Co.) - Revised
estimate for the
Distribution Works
of the 6th Section,
Main Canal, sanc-
tioned.