

Public Works (189 &) Department.

7411.

G.O., No.

7112

712

DATED 16th September '98

[Despatch Abstract.]

Bank Canal, Gadawari Central Delta

Estimate of Rs 23,000 for Constructing a Combined Drainage outfall Sluice, Aqueduct & Canal Surplus at 42 3/4 mile of the ———— Approved & a copy of the nos. ordered to be forwarded to the Govt of India, for Sanction.

Bank Canal, Gadawari Central Delta

Forwarding, for Sanction, Copy of nos. Approving an Estimate of Rs 23,000 for Constructing a Combined Drainage outfall Sluice, a Aqueduct & Canal Surplus at 42 3/4 mile of the ————

Indexed.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers:—

From W. C. DeMORGAN, Esq., M.I.C.E., Executive Engineer, in charge, I Circle, to the Chief Engineer for Irrigation, dated Waltair, 17th April 1898, No. 198 G.D.

With reference to your No. I./156 G.D. of 22nd September 1897, I have the honour to submit, for approval and sanction, plans and estimates, amounting to Rupees 13,000, for constructing a combined under-tunnel and surplus weir at $42\frac{3}{4}$ mile, Bank canal, Central delta, Gódávári.

2. The Amalápuram taluk was very badly drained, and the subject of improvement was carefully investigated by Mr. Howley, when in charge of the sub-division, and subsequently of the division. The proposal for which a design is now submitted, is one of the most important for remedying the evils. My predecessor went into the matter carefully and submitted inspection notes, No. C./558, on paragraph 10 of which the order to prepare plans and estimates was given in your memorandum under reference.

3. Plans and estimates, amounting to Rs. 10,900, for repairing the Ainapuram drain, have already been submitted with this office No. 112 G.D., dated 14th April 1898.

4. The report accompanying explains sufficiently clearly the necessity of the work.

5. The arrangement of the foundations at first sight appears open to question. As, however, the existing under-tunnel over the Vriddha Gowtami is built on a concrete platform and has stood well, there is no apparent reason why the same should not be the case with the new under-tunnel.

ENCLOSURE.

REPORT to accompany the Estimate for a combined new Under-tunnel and Surplus Weir at $42\frac{3}{4}$ mile, Bank Canal.

1. Amount of estimate, Rs. 13,000.

2. This estimate is prepared in accordance with the instructions contained in Superintending Engineer's No. C./588, dated 5th September 1897. The drainage area at this point is 46 square miles and the existing under-tunnel may be expected to dispose of the drainage from 29 square miles, leaving that from 17 square miles to be dealt with by the new under-tunnel. The existing under-tunnel has three vents—10 feet span, 3 feet height of pier, and rise of arch 2.5 feet—giving a discharge under an assumed head of 1 foot of 705 cusecs. Whereas the drainage from 46 square miles, using the formula $D = 80 m^{\frac{3}{2}} = 1,026$ cusecs.

3. The new under-tunnel is designed with four vents $6' 6" \times 4'$; total area of vent 4×26 square feet = 104 square feet, and, assuming the same head this will discharge = 520 cusecs. The drainage from 17 square miles is 528 cusecs. The floor will be at the same level as that of the existing work—3.50, and the vents will be provided with flap shutters similar to the one recently fitted to Kattunga outfall sluice. Top of parapet on river side will be + 15.00, and on the other side + 12.0. M.F.L. in river at this point is + 12.0; ordinary high tide is + 3.00; maximum water-level in drain is + 3.50.

4. Two vents $6' 6" \times 3' 6"$ fitted with screw-gearing shutters are provided in the middle of the face wall on the river side, sufficient to discharge $297\frac{1}{2}$ cusecs which is the quantity passing over Annampalli lock weir as per project proposal.

5. The approach channels for which a separate estimate is herewith submitted, amounting to Rs. 3,010, is to be 20 feet wide above the U.T. widening out to 36 feet close to the under-tunnel, and from the under-tunnel to the river it will be 36 feet throughout; side slopes $1\frac{1}{2}$ to 1. It is made wider, because the channel has to carry the surplus water from the canal.

6. Trial pits have been dug on both sides of the canal at the proposed site down to level of bottom of concrete, and a section of each pit is shown on the plan. Although fine sand and springs are met with in both pits, I do not think that wells will be necessary. All the material brought out of the pits is now caked hard, including the sand. An examination of the accounts of the existing under-tunnel (constructed in 1884) shows that no wells were used, the whole work being built in a bed of concrete. Provision has been made for pumping, which will certainly be necessary.

7. The work must be classed as unremunerative, as it will not directly bring in more revenue, though it may do so indirectly by discharging flood water sooner than the present arrangements admit of and thereby allowing lands usually submerged at high flood to be cultivated.

4th April 1898.

(Signed) A. C. LANGSTON,
Ex. Engr., Gódávári Central Divn.

No. 226 I.

Note by the Acting Chief Engineer for Irrigation.

With his letter read above the Superintending Engineer, I Circle, submits an estimate, amounting to Rs. 13,000, for the construction of a combined drainage outfall sluice, aqueduct and canal surplus, to be built at $42\frac{3}{4}$ mile of the Gódávári Central delta, Bank canal.

The drainage from 46 square miles of valuable delta land has to be passed under the canal into the Vriddha Gowtami Gódávári at this point, and the available means of surplus, an under-tunnel of three 10-ft. vents, being quite inadequate, instructions were given in this office No. I./156 G.D. of 22nd September 1897 for the preparation of the estimate, as proposed by Superintending Engineer, I Circle (the undersigned), in his inspection notes of 2nd September 1897. The design sent in does not provide sufficient waterway. A run off of $1\frac{1}{2}$ inches from the whole catchment of 46 square miles should be provided for, and accordingly a revised design has been prepared in this office allowing for five instead of four vents. The general arrangement of the wings, their thickness and the depth of foundations have also been altered, but when the work comes to be carried out these latter may require further revision. One and a half inches run off 46 square miles will amount to a discharge of 1,855 cubic feet per second, and this, the two outfall works will discharge with a velocity of 6 feet per second. Two surplus vents have been provided in the side walls of the aqueduct to relieve the canal in times of flood. The estimate, as revised in this office, amounts to Rs. 18,900 and is recommended for sanction chargeable to the Open Capital account of the Gódávári delta system. The work is classified as "unremunerative," and will probably be completed by the 31st March 1900.

26th August 1898.

(Signed) J. C. LARMINIE,
Ag. Chief Engineer for Irrigation.

ORDER—No. 711 I., dated 16th September 1898.

The following estimate, amounting to Rs. 18,900, or Rs. 23,000 including establishment and tools and plant charges, is approved:—

Gódavari Delta System.	
Central Section.	
Bank Canal.	
2. Main Canals and Branches.	
Unremunerative Work.	
Constructing a combined Drainage Outfall Sluice, Aqueduct and Canal Surplus,	
at 42 $\frac{3}{4}$ mile.	
	Rs.
2. Land—Compensation for land	1,220
6. Other cross drainage works—Combined drainage outfall sluice, &c.	15,900
12. Earthwork—Excavation	1,750
15. Miscellaneous—Demarcation stones	30
Total, I. Works	18,900
II. Establishment	4,066
III. Tools and plant	34
Total Estimate	23,000

2. Ordered that a copy of these Proceedings, together with the plan and estimate for the work, be forwarded to the Government of India with a request that sanction to the estimate may be accorded at an early date, under "49. Capital expenditure not charged to Revenue," Gódavari delta system.

[Here enter No. 712 I., dated 16th September 1898.]

(True Extract.)

(Signed) J. C. LARMINIE,
Ag. Joint Secy. to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.

ENDORSEMENT—No. 712 I., dated 16th September 1898.

Forwarded.

(By order.)

(Signed) J. C. LARMINIE,
Ag. Joint Secy. to Government,
Irrigation Branch.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

*Estimate for outfall sluice &c
in Godavari Central Section*

UNDER date the

READ the following

From the 1899: Enquiries 1st Circle - No. 198 G. D. dated 17th April 1898

No 226 J of 26-8-98

*Note by the Ag. Chief Enquiries
for Irrigation.*

Flag A.

Done

*JCL
31/8/98*

*PWE?
5/9/99*

*With his letter read above
the Superintending Enquiries, 1st
circle, submits an estimate,
amounting to Rs. 13,000, for the
construction of a combined
Drainage outfall sluice, aque-
-duct and canal surplus,
to be built at 42 $\frac{3}{4}$ mile
of the Godavari Central Delta
Bank canal.*

*The drainage from 4689
miles of valuable Delta
land has to be passed*

under

under the canal into the
Triddha Govtanu Godavari
at this point, and the available
means of surplus, an under-
tunnel of three ten-foot vents,
being quite inadequate, ins-
tructions were given in this
office No. $\frac{I}{156}$ of 22nd September 97
for the preparation of the estimate,
as proposed by Superintending
Engineer, 1st circle, (the undersigned)
in his Inspection notes of 2nd
September 1897. The design sent
in does not provide sufficient
waterway. A run off of
 $1\frac{1}{2}$ inches from the whole catch-
ment of 46 sq. miles should
be provided for, and accordingly
a revised design has been
prepared in this office allow-
ing for five instead of four
vents.

6.11.
vents. The general arrangement
of the wings, their thickness and
the depth of foundations have
also been altered, but when
the work comes to be carried
out these latter may require
further revision. $1\frac{1}{2}$ inches
run off 46 sq. miles will
amount to a discharge of
1855 C. feet per second, and
this, the two outfall works
will discharge with a velocity
of 6 feet per second. Two
surplus vents have been
provided in the side walls
of the aqueduct to relieve
the canal in times of flood.
The estimate, as revised in
this office, amounts to Rs. 1,89,000
+ is recommended for sanction
chargeable to the Open Capital

Account

CEJ
2-5-98

Public Works (1898) Department.

CURRENT No. 8268

It may thus be said - after
black. The ponds & rear wings
seem light - soil black cotton overlying
sand - the work is reported to be 1/2 m. m. m.
put up

17/5/98

From W. De Morgan Esquire
Executive Engineer in charge
I Circle

Order

No. 198 G.D

Dated 17th April 1898

Received } 2nd May 1898
Registered }

Enclosures 10 (including 3 tracings
not detached)
Spare copies

R 74 G.D/98 into file sent to
Madras office on 10/5 into a
memo to S.E. I for issue

12/5

Sent for
reference

Reference to and
written to and
of 10/5

Read today
16/5

SUBJECT.
Combined under tunnel and
surplus wire at 42 3/4 miles Bank
Canal Godavari Central Division
Submitting for his approval
and sanction an estimate amount
to Rs 13000 for constructing a
D.C.

Connected papers for trip
with Rno. 74 G.D/98 to send
to Secy on 6/5/98

19/5/98 This might have
been done on the
10/5/98

BACK PAPERS.

FURTHER PAPERS.

No.	Date.
I 15660	22.9.97

No.	Date.
113080	20.6.98

Books 3 & 4 No. 48 40 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Data to accompany the Estimate for constructing a combined
under Tunnel & surplus weir at 42 3/4 miles, Bank canal.

Quantity	Particulars	Rate	Per	Amount	Total
	(Broken Stone) Concrete in Surki Mortar.				
1 1/8 cyd	Broken stone at Dofaisluram	3-5-0	100 cft	1-0-1	✓
	Loading on punts	0-1-0	cyd	0-1-1	✓
	Puntage for 46 miles from Dofaisluram	0-0-5	do	1-5-6	✓
	Towing across river by steamer	0-0-9	do	0-0-10	✓
	Unloading	0-1-3	do	0-1-5	✓
	Screening stone	0-1-0	do	0-1-1 1/2	✓
2 parra	Line at Chittipetto	11-6-0	garce	0-6-1	✓
	Loading & unloading	0-11-3	do	0-0-4 1/2	✓
	Puntage for 51 miles from Chittipetto	0-0-5	cyd	0-3-7	✓
2 do	Sand at Bolberlaunka including				
	Loading & unloading	0-2-3	do	0-0-4 1/2	✓
	Puntage for 43 miles	0-0-5	do	0-3-0	✓
2 do	Surki at Dofaisluram	19-0-0	garce	0-10-1	✓
	Loading & unloading	1-0-0	do	0-0-8	✓
	Puntage for 46 miles	0-0-5	cyd	0-3-2	✓
4 do	Mixing mortar	0-0-9	para	0-3-0	✓
	Laying & ramming concrete	0-8-0	cyd	0-8-0	✓
	Sundries			0-3-7 1/2	✓
	Per cyd	5-4-0			✓
	Per 100 cft	19-7-1		19-7-0	✓
	Random rubble in mortar				
1 1/8 cyd	Rough Stone at Dofaisluram	3-14-0	100 cft	1-2-10	✓
	Loading on punts	0-1-0	cyd	0-1-1	✓
	Puntage for 46 miles	0-0-5	do	1-5-6	✓
				13-6	2-9-5

	Towing across river by steamer	0-0-9	do	0-0-10	✓
	Unloading	0-1-3	do	0-1-3	✓
2 parras	Lime as per above	"	"	0-10-1/2	✓
4 do	Sand — do —	"	"	0-6-9	✓
4 do	Mixing mortar	0-0-9	parras	0-3-0	✓
1 do	Mason	0-9-0	each	0-9-0	✓
1 1/2 -	Man cooly	0-3-0	do	0-4-6	✓
2 "	Woman coolies	0-2-0	do	0-4-0	✓
	Sundries	"	"	0-1-1/2	✓

per cyd — 5-2-0 ✓
per 100 cft — 19-0-0 ✓ 19-0-0

Brick arch work in Surki Quarters.

500 do	Bricks delivered on pinto at				
	Dowfaisluram	8-8-0	1000	4-4-0	✓
	Puntage for 46 miles	0-0-5	cyd	1-3-2	✓
	Towing across river	0-0-9	do	0-0-9	✓
	Unloading	0-4-0	1000	0-2-0	✓
2 parras	Lime as per above	"	"	0-10-1/2	✓
2 parras	Sand — do —	"	"	0-3-4 1/2	✓
2 do	Surki — do —	"	"	0-13-11	✓
4 do	Mixing mortar	0-0-9	parras	0-3-0	✓
	Labour	1-8-0	cyd	1-8-0	✓
	Sundries	"	"	0-1-9	✓

per cyd — 9-2-0 ✓
per 100 cft — 33-12-9 ✓

add Rs two for extra labour
Extra cost for centring

Total — 38-12-9 or 38-13-0

100 cft	cutstone in chumam				
	cutstone at Dowfaisluram	54-0-0	100 cft	54-0-0	✓
	Loading on pinto	1-0-0	do	1-0-0	✓
	Puntage for 46 miles	0-0-5	cyd	4-7-0	✓
	Towing across river	0-0-9	do	0-2-9	✓
	Unloading	1-4-0	100 cft	1-4-0	✓
6 parras	Lime as per above	"	"	1-14-1/2	✓
12 do	Sand — do —	"	"	1-4-3	✓
12 do	Mixing mortar	0-0-9	parras	0-9-0	✓
15 1/2 do	Masons for building	0-9-0	each	8-11-6	✓
4 "	Man coolies	0-3-0	do	0-12-0	✓
3 "	Woman coolies	0-2-0	do	0-6-0	✓
2 "	Smiths for repairing chisels	0-8-0	do	1-0-0	✓
	Sundries	"	"	0-2-3 1/2	✓

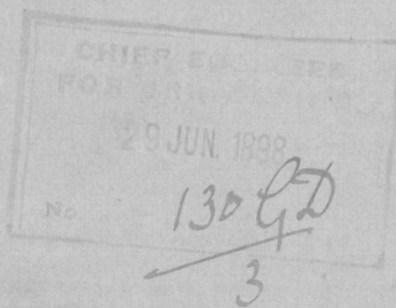
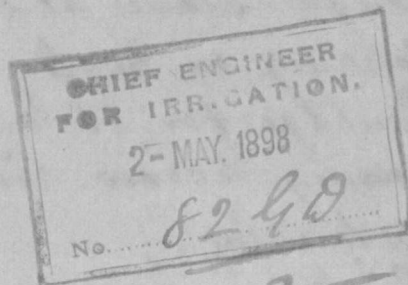
per 100 cft — 75-12-0 ✓
or 75-12-0

1 cyd	apron & restraints				
	Rough stone at Dowfaisluram	3-14-0	100 cft	1-0-9	✓
	Loading on pinto	0-1-0	cyd	0-1-0	✓
	Puntage for 46 miles	0-0-5	do	1-3-2	✓
	Towing across river	0-0-9	do	0-0-9	✓
	Unloading	0-1-3	do	0-1-3	✓
	Packing charges	"	"	0-4-0	✓
	Sundries	"	"	0-1-1	✓

per cyd — 2-12-0 ✓
per 100 cft — 10-2-11 ✓ or 10-3-0

W. De Morgan
28/4/98
Executive Engineer in ch.
First Circle

A. Changanston
Executive Engineer
Godavari C.D.
1/4/98



Pl 3
5776/77

5624
7411/58



R 19-1/97

205.141
5
ent area = 14144 ft
only .82" rise off
26' hatched

264 ft and not incline
segment of arch say 44 ft
more or 304 ft each
x 1.13' rise of
26' hatched

Embs 2 & No. 147 1/2 D. of S. E. 1/4 Sec. 16 T. 12 N. R. 10 E.

Report to accompany the Estimate for a combined new Underdrain & Surplus weir at 42 3/4 miles Bank Canal. 15900
1. Amount of Estimate Rs. 13260
13370
13000
2. This Estimate is prepared in accordance with the instructions contained in Supr Engineer's No. 588 dated 5-9-97. The drainage area at this point is 46 square miles and the existing Underdrain may be expected to dispose of the drainage from 29 1/2 miles leaving that from 17 1/2 miles to be dealt with by the new Underdrain. The existing Underdrain has 3 vents - 10 feet span 3 feet height of pier and rise of arch 2.5 feet - giving a discharge under an assumed head of 1 foot of 705 cusecs - whereas the drainage from 46 1/2 miles using the formula $D = 80m^{3/2} = 1208$ cusecs. $D = 1855$ cusecs. $1 1/2$ " rise off 46 1/2 miles
3. The new Underdrain is designed with 4 vents 6' 6" x 4' 0" total area of vent $4 \times 26.56 = 106.24$ sq ft and assuming the same head this will discharge = 520 cusecs. The drainage from 17 1/2 miles is 528 cusecs. The floor will be at the same level as that of the existing work - 3.50 and the vents will be provided with flap shutters similar to the one recently fitted to Kattunga Outfall sluice. Top of parapet on riverside will be +15.00 and on the other side +12.00 M.T.L. is

River at this point is +12.0 Ordinary
high tide is +3.00 - Maximum Water
Level in Drain is + 3.50

4. Two vents $6'6" \times 4'6"$ fitted with
screw gearing shutters ~~are~~ ^{are} provided
in the middle of the face wall
on the River side. ~~vents~~

sufficient to discharge $297\frac{1}{2}$ cusecs
which is the quantity passing over
Annampalli Lock weir as per
project proposal.

5. The approach channels for which
a separate estimate is herewith
submitted amounting to Rs ~~20/0~~ ^{30/0}
is to be 20 feet wide above the U.T.
widening out to 36 feet close to the
Under Tunnel and from the Under
Tunnel to the River it will be
36 feet throughout. side slopes $1\frac{1}{2}$ to 1
It is made wider because the channel
has to carry the surplus water from
the Canal.

6. Trial pits have been dug on both
sides of the Canal at the proposed
site down to level of bottom of channel
and a section of each pit is shown
on the plan. Although fine sand
and springs are met with in both
pits I do not think that wells will
be necessary. All the material brought

480
out of the pits is now caked hard
including the sand. An examination
of the accounts of the existing Under
Tunnel (constructed in 1884) shows
that no wells were used the whole
work being built in a bed of concrete.
Provision has been made for
pumping which will certainly be
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7. The work must be classed as
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though it may do so indirectly
by discharging flood water sooner
than the present arrangements
admit of and thereby allowing
lands usually submerged at high
floods to be cultivated.

A. K. S. S. S.
4/4/98

Executive Engineer
Godavari Central Circle

Mk
1/4/98

17/4
M. K. S. S. S.
EE (I)

CHIEF ENGINEER
FOR IRRIGATION.
2-MAY. 1898
No. 82 GD

CHIEF ENGINEER
FOR IRRIGATION.
29 JUN. 1898
No. 130 GD

Aug 9
5796/99

Dec 3
7411/98

S. E. L. 500-15-1-98.

No. 198 GD

FROM

W. C. De Morgan Esq M. C. E.
SUPERINTENDING ENGINEER, *in Ch.*
Equilibrium
FIRST CIRCLE.

Enclosures, 10

TO

THE CHIEF ENGINEER
FOR IRRIGATION.

WALTAIR, 17. 4 1898.

Camp, *Desp* 28-4-1898

1 Classified abstract
4 Estimates
1 Data Sheet
Survey
Plan of Under Tunnel
Sheet of Sections of drain
Report

SIR,

With reference to your No. $\frac{I}{156}$ GD
of 22.9.97, I have the honour to
submit for approval and
sanction plans and Estimates
amounting to Rs 13,000 for
Constructing a Combined
Under Tunnel and Surplus
weir at 42 $\frac{3}{4}$ Miles, Bank
Caua 6, Central Delta, Goda-
-vari.

2. The Analaapur Taluq was
very badly drained, and
the subject of improvement
was carefully investigated
by Mr. Howley, when in charge
of the Sub Division, and
Subsequently of the Division.
The

Public Works (189⁸) Department.

CURRENT No. 7411

From

The Chief Engineer
for Irrigation

No. 226-J

Dated 26-8-98

Received

Registered

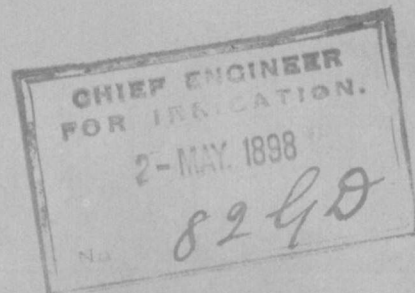
5-9-98

Enclosures 12 (4 blanks)

Spare copies

SUBJECT.

Combined Drainage
outfall sluice, Agwedet
and Canal surplus at 42 1/4
mile. Bank Canal
Estimate of Rs 23000 as
passed in this office for
Constructing a - hole mem-
- mending for sanitation the -



Order

226.167
7411

CURRENT No. 130. G.D.

From W. De Morgan Esq.
Ex. Esq. in charge
1st file

No. 652. 82.

Dated 20th June 1898

Received 29 — do —

Registered

Enclosures ⁺ / 2 .

Spare copies

SUBJECT.

Combined under tunnel
and surplus - Bank
Canal - Godavari Central
Delta - Resubmits
plans & Estimates for
Constructing a —

BACK PAPERS.

FURTHER PAPERS.

N^o 652. GD

From

W.C. De Morgan Esq.^r M.A.C.E.
Executive Engineer in Ant. Chile

The Chief Engineer for Frigates in
Madras.

Wattair Dated 20. 6. 98.

Despd 24-6-1898

Sir,

With reference to your Memo
No. I
5592 dated 23. 5. 1898, I have the
honour to inform you that there is no
doubt that the Under Tunnel will not
act when the River is in high flood-
- Vide Para 7 of Mr. Howley's Letter no. 348
of 22. 2. 97, a copy of which is
forwarded. Mr. Howley in this
report proposed a complete alter-
- native line of drainage, which would
be effective when the Upiddha Goutani
Under Tunnel, and the new Under
Tunnel could not act. Mr. Lammie,
however, was of opinion that the
Under Tunnel would, as a rule,
afford

afford the best means of drainage,
and did not consider the necessity
of an alternative line completely
established (vide Para 12 of his
Inspection Notes no: C/558 of 1.9.97). ^{Page I}

2. The preparation of an
Estimate for an additional Under
Tunnel was therefore ordered in
your Memo no: I and submitted
accordingly. ^{1566D}

3. I am disposed to agree
with Mr. Howley's views. They have
however the disadvantage of requiring
some time to work out, as it is only
for the improvement of the Ainapuram
drain that an Estimate was
submitted with this office no: 1126D
and I am not aware that levels, or
surveys have been taken for any
of the other parts of his Scheme. The
Under Tunnel, if sanctioned, could
be built in a season, and would,
be combined with the improved
Ainapuram drain, afford a large
and immediate measure of relief

4

4. I forward a tracing, illus-
trating Mr. Howley's proposals for
favor of return when no longer
required, and also the plans and
Estimates for the new Under Tunnel
at 42 3/4 and Surplus weir, in
case you wish to refer to them.

5. Whatever Conclusion is
arrived at, I think it would be
advisable to commence the improve-
ments to the Ainapuram drain
as early as practicable, as they
must in any case form part of
the Scheme.

I have the honor to be,
Sir

Your most Obedt Servt.

W. H. Howley
22.6.98

Executive Engineer in Ch.
First Circle

21/6

Enclum 1 to NO 652GD of 20-7-96 of S.E.I

Letter no. 348 dated 20th Feb.

- ary 1897 from W. J. Howley Esquire,
Executive Engineer, Godanari Circle
Division, to the Superintending
Engineer First Circle.

In returning herewith the Encl.
- sure received with your Endorse-
- ment no. 826 GD, dated 20.7.96,
on the District Collector's letter no.
1872 dated 10.7.96, I have the honor
to report as follows taking the Tah-
- sildar's letter para by para.

Para 1. The drainage system of
the whole taluq is certainly bad
and requires the expenditure
of a large sum before it can
be considered to be in even mo-
- derately good order. The di-
- mensions of the existing drains
are in almost every case wholly
insufficient; their alignment
is bad; and they are mostly
in thoroughly bad order. Much
of this unsatisfactory state of
things is due to the fact that
the available fall for the prin-
- cipal drains of the Central Delta

is very small indeed, varying from nil up to about 6" a mile. The result of this is that these drains rapidly silt up and get choked up with weeds; and as if they were not already insufficiently had order they are being continually humded up by ryots, either so that they may take from them, or for fishing purposes, or sometimes merely to have a convenient supply of drinking water for themselves and their cattle. Village officers take no notice of these irregularities, and with the single exception of the present Tahsildar, I have never known any Revenue Inspector or Tahsildar to do so either. I have recently inspected nearly every drain in the Amalapur Taluq, and several in Nagaram Island, and there was scarcely a single one that I did not find humded up in numerous places.

The general remedies I propose for this state of things are: first; that not a rupee should be

5
be spent in repairing any drain until the alignment of that drain has been straightened and improved as much as possible so as to take advantage of every inch of available fall; and secondly, that the number of 'delta lascars' employed in the Division should be increased from 11 to at least 33, and that each should have certain definite portions of channels & drains, not amounting to more than 25 miles in all, in his charge. The average mileage of channel and drain (excluding main Canals) at present in charge of each delta lascar is 73 miles, 34 miles being drain and 39 miles irrigation channel; and as the delta lascar must look after the channels to some extent and cannot possibly look after both, the result is that the drains are entirely neglected during the irrigation season and the rains.

The reason for most of the drains having such a bad alignment

alignment is that they are nearly all merely old "Kodus" that with-
-out being improved or straighten-
-ed in any way have simply been given the name of some drain and perhaps had a few local shoals cleared away. These "Kodus" have never been demar-
-cated and generally by degrees the owners of the adjoining fields have encroached right up to the water's edge and in some cases in zemindari lands have even cultivated the whole bed of what is nominally a drain.

To turn now to the points spe-
-cially raised by the Tehsildar.

Para 2. As this para stands, it is quite meaningless. No one who had not an intimate know-
-ledge of the locality could possibly understand what the Tehsildar is trying to explain. What he means to say is that the land between Amalapur and Bank Canals in the limits of Ralli village is badly drained and he proposes

proposes a drainage under Am-
-nel under Amalapur canal & near Ralli to drain these lands into Gorinkala Drain. There is no necessity at all for this under-
-tunnel if Palivela Drain is re-
-paired and enlarged, as the lands can then easily be drained by it. Proposals for the improvement of this drain were submitted to you with this office no. ³²⁹⁸ 3.2.97 and an Estimate and Land Statements are now being prepared in ac-
-cordance with your orders & passed thereon.

Para 3. The lands between Amalapur canal & Vadapaluru Channel (about 1 square mile) are drained by Billakurru side Drain. Levels of this drain, which re-
-quires improvement, have been taken and an Estimate is under preparation. The lands between Vadapaluru Channel, Bank Canal and Billakurru Canal (about 2½ square miles) are drained by an old Kodu locally called "Ro-
-binson Kodu". This drain is not in charge of this Dept. but I propose to take it up
now

now and put it in proper order.
align. The upper part of the Kodu is
all now little more than a shallow
-out depression in the fields and
-ed its bed has been entirely culti-
-ated, although it has to drain
drain at this place well over 1 sq. mile
local of land. It is not surprising
"Kod. that the ryots complain that this
-cate Kodu is silting up and that their
the lands are very badly drained.
for Levels are being taken and
up an Estimate will be submitted.
Some The "tunnel" referred to by
has the Tahsildar is the drainage
by Syphon under Amalapur
dr Canal at 25^m - 13^{ch}. This is a very
To old work, cracked, with a single
-current of 16.9 sq ft area, which
para I consider insufficient to dis-
is -charge the drainage of 4 square
miles (201½ cft per second, taking
the low coefficient of 80 in the
formula $M = 80 M^{\frac{2}{3}}$)

Para 4. Vakkalanka Drain
has entirely disappeared among
the paddy fields of Neorumur
(Pittapur Estate). There are no
signs of there ever having been
anything

anything but a natural shallow
depression which was marked on
the map by a green line and
given the name of Vakkalanka
drain. There is therefore no
question of repairing this drain
but of excavating an entirely
new drain through valuable
wet cultivation of Neorumur.
The "tunnel" referred to is
Kammara Kalua Aqueduct at
the 31st mile Amalapur Canal.
It has 5 vents each of $38\frac{3}{4}$ sq ft.
total $193\frac{3}{4}$ sq ft. The drainage
area to be provided for above
the aqueduct is 20 square miles,
this with a coefficient of 80 gives
a discharge of 589 cft per second,
which could be passed with a
velocity of only 3.04 ft per second.
This velocity would be generated
by a head of about 6", so I con-
sider that the vents of the aque-
-duct are quite sufficient.

Para 5. The Kammara Kalua
drain below the aqueduct is in
very bad order (please see enclosed
drawing) I propose by making
a new cut as shown in pencil
to

to save a distance of no less than 6 furlongs in a length of ^{1.5} 1.6. The cutting in this portion will be very heavy (about 9 feet deep) but I consider it is well worth the expense and much of the abandoned drain can be sold for cultivation. An estimate will be prepared if the suggested line is approved.

Lower Kousika is in fairly good order and requires very little money spent on it.

Perur parallel drain runs along the outer toe of Brudamur Lanka canal left bank. It is crossed by a large number of aqueduct spouts, which carry water from the canal to lands on the opposite side of the drain. As long as these spouts remain I don't think it is any use spending any money on the drain.

Deikodu drain (not mentioned by the Tahsildar) which is a continuation of Perur parallel and Lower Kousika drains & leads up to Allaram Aqueduct, is in bad order & is far too small. An estimate for its improvement is under preparation. Allaram

Remarks by Supp. Engr. Mr. Laminie.

Approved as suggested.
Alternative on red ink.

Replies by Ex. Engr.

The alternative line suggested makes a very sharp curve just below the aqueduct. The curve of the existing drain at this point is certainly too sharp as the left bank is being scoured away a good deal and a shoal is extending out from the right bank. The line shown in red pencil may however be adopted if the line shown in black pencil is considered too expensive.

A survey of the drain along the aqueduct is now also submitted with the proposed center line marked thereon in pencil.

No estimate for the repairs of any of these drains can be prepared until the proposed center lines are finally approved and instructions given as to bed widths &c. where necessary it is decided as in the case of Pali-

-vela drain that the usual formula $D = 80 m^{\frac{2}{3}}$ should not be strictly adhered to.

Very well.

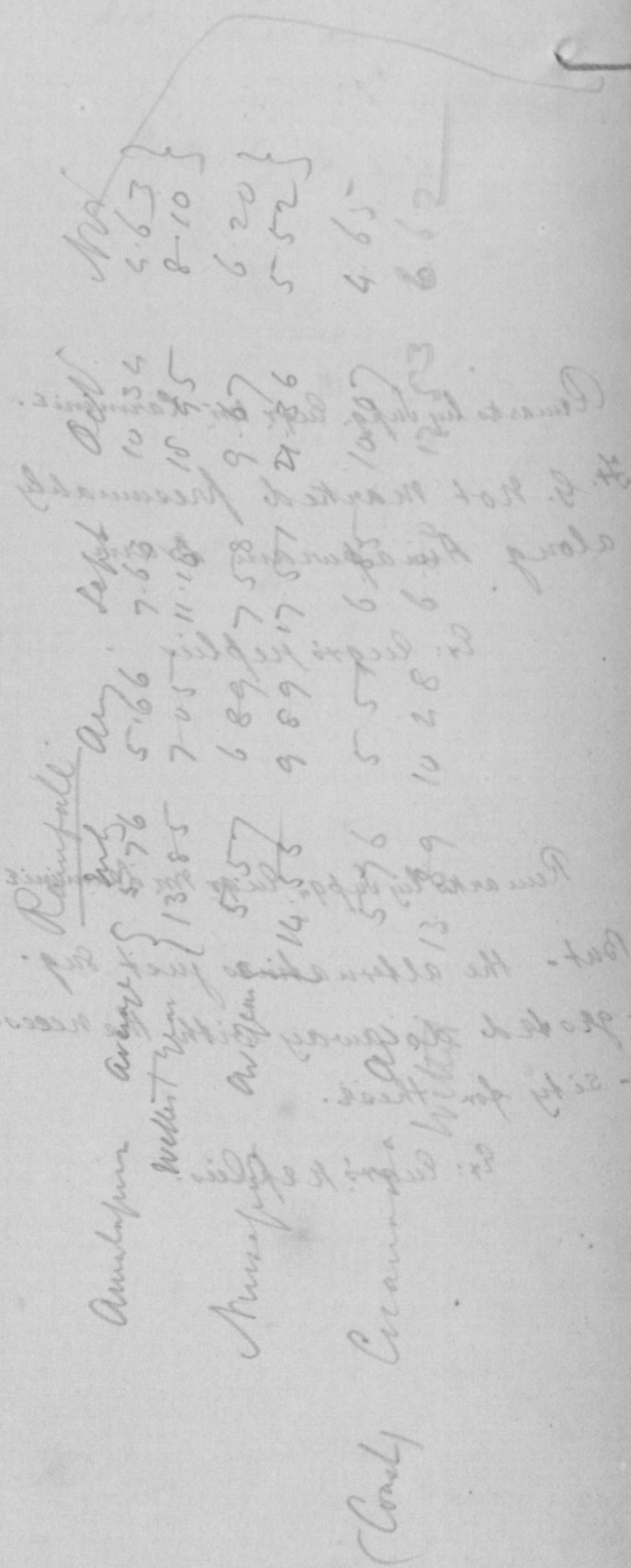
Supp. Engr. Mr. Laminie's remarks.

Allaram aqueduct is in good order but its vents are undoubtedly totally insufficient. An estimate amounting to Rs 35,000 for a supplementary aqueduct and outfall was submitted to you by the Executive Engineer, Godavari Western Division with his no. ²⁰²⁵ 127.95. This estimate has not yet been sanctioned. I would suggest that if a sufficient number of vents are allowed in the new outfall, flap shutters might be provided instead of the expensive screw gearing shutters.

Para 6. The greater portion of Bondakodu drain was repaired last year at a cost of Rs 6340. A survey and levels of the remaining portion have been called for & are also being taken for preparing an estimate for the improvement of Sinapur drain, the work has been delayed owing to the Suboverser placed on special duty for the purpose of taking these levels having had to go on leave.

Para 7. The low lands of Cheyyeru
Mummidivaram

to mummidiaram and gunnepalli
 b. Suffer a good deal from bad
 cu drainage and always will suffer
 knowing that they are at a level of
 Co + 4.00 to + 5.00 and are some 15
 miles from the point where Anna
 ram Drain discharges into the
 salt swamps along the sea.
 These swamps, moreover, have
 no connection with the sea except
 near Kottapalem about 12 miles
 still further north. Although
 the drainage of these lands
 can never be entirely satisfac-
 tory, it may be very much
 improved by building an
 under tunnel and outfall
 at $42\frac{3}{4}$ miles Bank Canal
 (marked E on the enclosed
 tracing) and making the
 drain A.B.C.E. high enough
 to take the whole discharge
 of the Amalapur Drain (whose
 basin is coloured light red
 on the tracing) But as neither
 this outfall nor the existing
 Vriddha Goutami outfall can
 act when the river is high, I
 propose that the Rangarajukodu
 drain (head at point A) should



Remarks by Supg. Engr. Mr. Lammie.
 But will river usually be high
 when drains are in floods.
 Ex: Engr's replies.
 As the level of the low lands

to be drained is only about +5.00
 the river is frequently too high bet-
 -ween July and October. The drains
 are often in flood in July & September
 and excess water in the former month
 does much damage to the recently
 transplanted paddy.

Remarks by Supg. Engr. Mr. Lammie.
 H.G. Not marked presumably
 along Annapuram Drain.

Ex: Engr's replies
 were marked in pencil now
 inked in.

Remarks by Supg. Engr. Mr. Lammie.
 But the alternatives just sug-
 -gested do away with the neces-
 -sity for these.

Ex: Engr's replies.
 The other proposals were not sug-
 -gested as alternatives but as
 additional measures to be taken
 for the improvement of the drain-
 -age system. I consider that in
 any case Rangarajukodu Drain
 must be repaired & improved,
 the levels, survey etc. are now com-
 -pleted and estimates will be
 prepared as soon as orders are
 passed regarding the proposal to
 make the drain high enough to take
 the whole discharge of Amalapur Drain.
 The available fall for Rangarajukodu
 Drain is only about 4" per mile.

15/11/1901 W. J. Howley
 Ch. A. Central Engr.

Should be made large enough
 to carry all the drainage of
 Amalapur Drain; that the
 ruined Annapur aqueduct
 should be rebuilt with vents suf-
 -ficient to discharge all the
 drainage of Vriddha Goutami
 Drain; and that the drain
 D.C.B.F.G. should be made large
 enough to carry all this drainage.
 As soon as orders are passed on
 these proposals, estimates will
 be prepared accordingly. I
 would begin with Rangarajukodu
 Drain as it is in very bad order
 and as the suggested improve-
 -ments to the other drains would
 be effective only after the out-
 -fall at E and the new aque-
 -duct at B have been built.
 Oversee Mr. Ananthanarayana
 -now has been placed on
 special duty taking charge
 of Rangarajukodu and I have
 had these levels connected
 with those of Bank Canal
 and of Amalapur canal with
 satisfactory result.
 The Tahsildar's statement
 about

to about the water from Rangara-
b-yukodu and Bondakodu drains
accumulating within the limits
of Cheyer and Gannepalli
villages is absurd; a glance
at the map will show that
Rangaragukodu drain leads
away from these lands and
not to them; and as regards
Bondakodu, the pyot of Cheyer
and Gannepalli actually
breached its right bank last
year so that their lands might
be relieved by this drain.

The Tahsildar's remark about
lands being under submersion
for several days seems to point
to a misapprehension as to what
the drains are supposed to do.
Again fall of 4" or 5" in a day
is not uncommon and in 1892
we had 19" in one day at An-
nampalli and again in 1895
13" also in one day; but the
drains are only designed for
a run off of 1" to 1½" in 24 hours,
and in the case of Palivela
drain you considered even
this

this to be one-third too much.
Obviously then after any heavy
rain all low lands must ex-
pect to remain submerged
for some days even if the drains
were in perfect order.

Para 8. The necessity for a
surplus weir for Bank Canal
was brought by me to the
notice of the Executive Engineer,
Godavari Western Division
in April 1894 and copies of
my letter were forwarded to
you with his no. 48 S. ^{24.4.94.} The
first site proposed (at the head
of Romanapalli drain) has
been objected to as being too
near the river and I think
the next best place is at 42¾
miles Bank Canal (point E on
the tracing). As soon as any
site is finally approved an
estimate will be submitted at
once for sanction.

(True Copy)

Dehorgha 22.6.

Executive Engr. in ch. I fore

Public Works (189⁸) Department.

IRRIGATION BRANCH.

ISSUE No. ^I5598

To

The Supg Engineer
First Circle

(Reply to letter No. , dated)

Dated 23 5 98

Despatched 27.5 98

Enclosures * 10

* Particulars of Enclosures.*

- 1 Classified abstract
- 4 Gates
- 1 Data sheet
- 1 Survey
- 1 Plan of under tunnel
- 1 Sheet of sections of drain
- 1 Report

Please say what is
to be done with the Enclosures
received with Rms 8280/98

Mr

27/5

Return to SE
They will come
back with his report

27/5/98

SUBJECT.

Constructing an under
tunnel at 4 3/4 miles. Bank
Canal. Godavari Central. On
SE requested to report on
the suggestion made regarding
the enlargement of Annapurna
drainage instead of —
and to forward a copy
of Mr. Borsley's report upon
to me SE's inspection notes
of 5 Sept 1897

Indexed



PW/2
5796/98

025.2
744/98

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No.	Date.
N 280	17-4-58

Sent to Government with No. I.,
dated 1897.
Printed with G.O., No. I.,
dated 189

REMINDERS ISSUED.

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" 3 "	
" 4 "	
" 5 "	

KEEP-WITHS.

FURTHER PAPERS

No.	Date.
N 130 82	20-6-98

85.1. for personal & return

I
No 556 8 dy 23.598

S.2.I.

S.2. no 195 & dy 17 46 1098

It appears from the plans that the proposed under tunnel would not act efficiently when the river is in high flood. As the Airapman chd is now breached occasionally to relieve the accumulation of drainage it would appear probable that the Airapman drain if sufficiently enlarged would be a more reliable means of getting rid of the drainage than an under-tunnel discharging into the river. The Sup^{ts} Engr is requested to report on this and also to submit for approval send a copy of Mr. Hensley's report referred to in para 11 of the F.E. inspection notes dy 5 Sept 1897.

PLW 813
5726/09

R 29-7/97 H. J. R

23 598 W.H

Wes
27/7/98

Wes
23/7/98

51.370
51.417
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81