

(1) Number of pages 106-
 (2) Date of repair 28-8-84
 (3) Initials of the Referencer Cond ✓

MIL NADU ARCHIVES

ERNMENT OF TAMIL NADU

Public Works DEPARTMENT

G.O. No.	5569 W.	Press.
B.P. No.		Mis-
Dated	9-9-1878.	197.

folded or roughly handled

3569
1

GOVERNMENT DRAS.
PUBLIC WORKS DEPARTMENT.

3569
1

9th September 1878, No. 3,569 W.

General
Account

Read the following paper:—

No. 108. From G. T. WALCH, Esq., Acting District Engineer, Godavari, to the Chief Engineer, Public Works Department, dated Cocanada, 5th July 1878, No. 1,163.

In accordance with your memorandum the honor to forward (by banghy post) Boat Canal as detailed in the accompanying list.

2. I sent these on just as handed c

3. It was intended that I should a the rates for the excavation of the canal and lifts, as Colonel Beatty feared the insufficient, but from your memorandum 21st ultimo, from the Deputy Chief En that the matter does not admit of delay.

4. It will be seen that there are tw

* There are also two others for Rupees 4,73,490 and Rupees 4,59,780, respectively, in which are entered an alternative design, No. 13A, for the escape at Bhadrachalam.

Beatty; these alterations consist in increasing and making the slopes to water surface 1 surface 1 to 1 instead of $1\frac{1}{2}$ to 1.

No. 109. ORDER THEREON, 9th Sept

THE plans and estimates, amounting to Boat Canal, are sanctioned. As the work be carried out in ordinary course on funds.

2. This sanction has been regist

(To act.)

(S

(To copy.)

E. A. FOORD, Colonel, R.E.,
Secretary to Govt., P.W.D.

provincial No. 100 B of 1878-79.

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the District Engineer, Godavari.
" Chief Engineer for Irrigation.
" Examiner of Public Works Accounts.
" Revenue (Famine) Department.

Encl. A. E. Goodall.

Spare Copies

GOVERNMENT OF INDIA
PUBLIC WORKS.

TO THE CHIEF ENGINEER
GODAVERY DISTRICT.

RECEIVED
10th JULY 1878.

Noted. The plan of the Canal is being prepared and will be forwarded to the Chief Engineer as soon as it is ready.

NO. 1163

FROM, *Ag. District*
THE OFFG. SUPERINTENDING ENGINEER
GODAVERY DISTRICT.
TO, THE CHIEF ENGINEER
FOR IRRIGATION

MADRAS.
Locanada
CAMP DOWLAISHWERAM, *5th July* 1878
Despatch

SIR,

By Bangalore Post. In accordance with your Memo No. 294^d dated 26th June 1878, I have the honor to forward plans, Estimates &c for the Bhadrachellam Boat Canal, as detailed in the accompanying list.

2. I send these on just as handed over to me by my predecessor.

3. It was intended that I should as soon as possible go to Dummagudism to settle the rates for the excavation of the Canal more clearly on the basis of nature of soils & lifts, as Colonel Beatty feared that the average rates put down might prove insufficient, but from your Memo under reply and Memo No. 2712 of 21st Ultimo from the Deputy Chief Engineer D.P.W. I gather that the matter does not admit of delay.

delay.

4- It will be seen that there are two
General Abstract Estimates amounting the
one to Rupees 4,67,150, and the other to Ru:
pees 4,53,840. - The former is that
prepared by Mr Vanstavern the latter is accord:
ing to alterations in the proposed cross sections
of cutting made by Colonel Deatty, those
alterations consist in increasing the bottom
width from 15' to 20', making the slopes
to water surface $1\frac{1}{2}$ to 1 instead of 2 to 1. &
above water surface 1 to 1 instead of $1\frac{1}{2}$ to 1.

+ There are
also two others
for Rs 4,73,090
& Rs 4,59,780
respectively
in which are
contained an
alternative
design -
H. 13 A - for
the bridge at
Bhadracllum

I have the honor to be
Sir

Your Most Obedient Servant

C. Sewal

Asst. District Engineer Godanery

CE No 294 of 26 June 78
 40-1232-10 April 77

The Ag. District Engineer
 Godavery.

The Chief Engineer
 P. W. Dept.

Dated 5th July 1878.
 Recd 9th July 1878.

10/11/53
 Enclos 37

Bhadrachellam
 Boat Canal - Forwarding
 Plans and Estimates Connected
 with the -

By Acty 16-7-78
 Recd 4-7-78
 C. S. 2/78. Vol 4-7-78

Godavery District
 Durgam Division

Estimate for excavating the proposed Boat
 Canal from Gungole to Bhadrachellam.
 (Map No 2)

VII Amount of Estimate, Rupees 2,43,010-0-0
 VIII To be carried out by, Public Works Department

For Quantity	Description of work	Rate	Per	Amount to be
1	2	3	4	5
19096100	Cft Earth excavation	12	1000	22913 3
232600	"	7	"	1628 3
164900	"	4	"	659 6
19493600				
Total Rupees 231440 15 6				
Superintendence & contingencies 11869 6				
Grand Total Rs				243010

Superintendence & contingencies 11869 6

W. S. S. S.
 Est. Engr. Durgam Division

Forwarded
 Ag. District Engineer, Godavery.

Andruen, District

Estimate for constructing an Escape at
Phadraschellam for the proposed Boat
Canal from Lumala to Phadraschellam
(Plan No 13 A)

Amount of Estimate, Rupees 9,120-0-0
To be carried out by, Public Works Department.

1/2 on Quantity	Description of work	Rate	Br	Amount	Total
1	2	3	4	5	6
27,600	Cft Rubble masonry in hydraulic Cement Body wall and pier	25	100 cft	6900	"
226	Cft Cut sand stone	170	100 cft	384	32
56	Cft Oak wood	2	cft	112	"
509	lbs Wrought Iron	4	lbs	2024	"
108	Lt Shutter Complete	18	Lt	162	"
6,000	Earth, Excavating foundation	5	1000 cft	30	"
2,000	Cft Rubble extra quantity of rubble masonry required for filling crevice	25	100 cft	500	"
			Total Rs	8290	72

Soldy Rs.	52907 2
Subscribed and contingencies at Bhopal	529850

Forwarded

Checked. Grand Total Papers 9,12
 Ag. District Engineer Godfrey Warrington
 S. B. Jones, Correspondent

W. h.

Plan. 13A

Dumaguadam Division
Godavery District

Estimate No 15 of 1877/78
for constructing an escape
at Bhadrachellam of
the proposed Boat Canal
from Gungole to Bhadrachellam
amounting to Rs 9,120 - - -

Enclosed in a letter
No 1163 dated 5 July/78
from the Dy District
Engineer Godavery

35/8
Godavery District - Dumaguadam Division

General abstract Estimate for constructing a
Boat Canal from Gungole to Bhadrachellam with
escape No 13 A. at Bhadrachellam and with the
Canal bottom width of 20'; side slopes $1\frac{1}{2}$ to 1 to water surface
and $1\frac{1}{2}$ to 1 above water surface.

Description	Amount of Estimate	Total	Grand Total.
-------------	--------------------------	-------	-----------------

Masonry Works.

Head Lock at Gungole	24170	1	..
Weir across Zooravagu	59000	1	..
Culvert at Seethampetta Reservoir	2560	1	..
Lock at Seethampetta	17,270	1	..
Escape at Bhadrachellam as per Plan No 13 A	9120	1	..
Tail Race at Bhadrachellam	100090	1	..

237 50
212,210

Earth Work.

Cutting Canal from Gungole to Bha- drachellam	229700	1	..
Embankment from Do - Do	29,450	1	..
Controlling Bank on Zooravagu	13,120	1	..

272,270

Carried Over - 484,480

Brought forward ——— 484680 " "

Tools & Plant.

Nil

Miscellaneous

Ferry Boat at Poravagu ——— 800 " "

Compensation for land ——— 700 " "

————— 1500 " "

————— 485980 " "

Deduct for rough stones now ready near the
sites of certain proposed masonry works ———

20200 " "

————— 483980
Grand total Estimate Rupees 4,83,980

P. Swaleh

Ag. District Engineer Lyda

Dowlaisheeram }
5th July 1878. }

compd by
E.

N.A

Dumaguete Division G.D.

General abstract of probable cost of constructing a boat Canal from Guigole to Bhadrachellam, with escape N 13 A at (Sail Locks) Bhadrachellam

3589

Enclosure in a letter N 4163 dated 5 July 78 from the Acting District Engineer

No of Estimates	Name of work	Amount of Estimate	Total	Grand Total
	Masonry works			
14	Head Lock at Guigole	24,570		
15	Weir across Sooravagu	59,000		
16	Culvert at Erthumpitta Reservoir	7,860		
17	Lock at Erthumpitta	17,272		
18	Escape at Bhadrachellam	9,120		
19	Sail Locks at do	10,000		
			210,733	
	Earth works			
20	Canal from Guigole to Bhadrachellam	24,340		
21	Embankment from do do	29,450		
22	Controlling Tank on Sooravagu	13,120		
			28,558	
	Carried over			496,313

Brought forward 496313

Tools and Plant

til

Miscellaneous

Ferry boat at Doravagu 800 ..

Compensation for land 700 ..

1500

Deduct from the total estimated amount for rough 497813

stone & now ready near the sites of certain proposed 26200

masonry works as per memo attached

Grand Total Rupees 471613 ..

Warranted
Executive Engineer
Mumagudem &c

Forwarded

Per S. D. S.

Ag. District Engineer Godavari

Memorandum Division
Godavari District

General District
estimate for constructing a
boat canal from Gungabati
Bhadrachallam with
Escape at 13 A - at
Bhadrachallam
Enclosure in a letter
No 1163 dated 5 July 78
from H.E. District
Engineer Godavari

Memo

3588/1

Materials rough stone (metamorphic) and dressed sand stone
which will be utilized in the construction of masonry works for which
the following deductions should be made in the total estimates—

Name of place	Quantity	Rate	Per	Amount
At Iovra vagu	cft 130,000	4	100 cft	5,200
At Sethumpetta Lock	42,000	4	do	1,680
Escape A Bhadrachallam	27,000	4	do	1,080
Rocks excavation to be quarried and used up in the masonry	"	"	"	7,940
Dressed stones (sand) at Sodarum	14,000	70	100 cft	9,800
Lime stone at Sodarum	10,000	5	100 cft	500
Grand Total				Ruprs 26,200

Forwarded
G. S. Swaleh -
Ag. District Engineer Godavari

W. M. S. S. S.
Executive Engineer
Munigaldevi &c

Enclosed is a letter
No 1163 dated 5 July 1900
from the Acting British
Engineer Portree.

LIB

Demagunda Division of D.

General abstract of probable cost of a Boat Canal from
Gungole to Bhadrachallam with escape No 13 B at Bha-
drachallam 3569
13

No. of Estimate	Name of works	Amount of Estimate	Total	Grand Total
Masonry works				
14	Head Lock at Guzgole	24170	"	
15	Weir across Sooravagu	59000	"	
16	Culvert at Sirthumpetta Reservoir	1080	"	
17	Lock at Sirthumpetta	17273	"	
18	Escape at Bhadrachellam	11660	"	
19	Tail Locks at do	10000	"	
			206273	
Earth works				
20	Canal from Guzgole to Bhadrachellam	24300	"	
21	Cutbankment from do do	2945	"	
22	Controlling Tank on Sooravagu	13120		205580
Tools and Plant				
do				
Carried over				491853

Brought forward Rs 491853

Miscellaneous

Ferry Boat at Boravagu 800 . .

Compensation for land 700 . .

1500

Grand Total Rupees 493353

Deduct from the total estimated amount

for rough stone & now ready near the sites

& certain finished masonry work as per

Memo attached

26200 "

Grand Total Rupees 467153 "

P. Narayana Rao

Executive Engineer

Kannagur District

Forwarded
Sd/-

Sd/- District Engineer, Bangalore

Dumaguadam Division
Cuddalore District

General Abstract of pro-
posed cost of constructing
a Boat Canal from Guayga
to Bhadrachellam with
Escape No 13 at Bhadrachellam

Enclosed in a letter
dated 5 July 70 from the
Engineering District Engineer

1
Waterway

2
Fall

3
Water supply

4
New work

Specification
Canal.

389
/ 5

1/- The Canal is to have a waterway of 15 feet
at bottom 5 feet depth giving a surface width
of 35 feet with 2' to 1' slopes.

2/- The Canal is to have a fall of 0.08 ft 2500
feet this is the same fall as designed by Colonel
Haig R. E. in the estimates for the long Canal.

3/- The Canal from the head Rock to Sec-
timpella Lock will be supplied with water
during the rains by rainfall and during the
dry season by water from Dumaguadam Canal.
The Canal from Sectimpella Lock to Bhadra-
chellam Tail Lock will be supplied with water
during the ^{rains from the small} water courses that enter it and
during the dry season from the Sectimpella re-
servoir.

4/- The Canal from the head Rock at Bo-
raigula to the Toranagu and in the Toranagu to
the point where the Tegu bottom falls below the
Canal bottom will constitute a new work. From
the place where the Canal leaves the Toranagu

to Sectumpella will constitute a new work.

From Sectumpella to Chintalagudem the canal already partially excavated will be made use of. From Chintalagudem to Yelapauka will constitute a new work. From Yelapauka to Bhadrachellam the canal already partially excavated will be utilized.

5/- The soil from the head Rock to the Toranagu is in most places a few feet of black soil and then gneiss and decayed felspar. In the Toranagu soft sand stone from the Toranagu to Sectumpella a few feet of black soil and then gneiss and decayed felspar. From Sectumpella to Chintalagudem very little requires doing to the old Canal; from Chintalagudem to Yelapauka black soil with some small boulders here and there; from Yelapauka to Bhadrachellam very little requires doing, some excavation in black soil and a little in rock gneiss. The heavy excavation in rock has already been made.

6/- The towing path along the canal will be formed on the natural soil except in

25
Soil

5
Towing path

places where the excavation is deep and then in excavation a path will be left some 4' above the water level.

356
16

7/- The general map will clearly show the canal where it requires new work and the parts where it has already been partially excavated.

Embankments

1/- The embankments are to have a top width of 7 feet with slope of 2 to 1 the fall per mile 1.33. This is the same as originally designed by Colonel Haig R. E. and corresponds with the average fall of the river.

2/- A new embankment will be required from the head Rock at Boragula up to the high ground on the river side and one piece from Chintalagudem for about one mile in length.

3/- For material for construction the soil excavated from the canal will be sufficient except in one short piece in the estimate an allowance has been made for this and also for extra superintendence to have the soil excavated for the other parts properly deposited the rates are

21
Designing &
fall

22
New embankment
to be required

23
Material for embankment

high to allow for extra carriage.

4/- On the line from Sectumpella Rock to Bhadrachellam the old embankment will be utilized. This requires a little raising widening and slopes repaired at several places.

When the embankment has to be widened the old slopes should be cut in steps before the new soil is put on, material required for this embankment the new piece alluded to in para 2 and also the old one the material from excavation can be utilized.

5/- A short piece of embankment will have to be made from Sectumpella Rock to the high ground to keep out the river floods.

6/- At Bhadrachellam Tail Rocks a short piece of embankment will be required if the proposition in para of the report is approved.

7/-

There is an old tramway embankment running from Sectumpella Rock to the high ground forming the bank of the Sectumpella tank in this a culvert has to be built

for supply of water to the canal. This embankment is in a very fair state of preservation and requires little doing to.

8/- On the General plan the old and new embankments are shown.

Masonry Works

Head Rock

1/- The embankment that runs from the Durgam Tail Rocks to the high ground will be cut through where the proposed Canal crosses it and in the cutting the Head Rock for the boat Canal will have to be built.

2/- The foundations will be built on rock (quarries).

3/- Head Rock 15' wide with 105 clear between mitres.

4/- The Rock is a level Rock.

5/- The entrance rises up with two piers to the height of the flood embankment the Tail wall is 10 feet high.

6/- The Head gate is a flood one and rises up to the height of the piers, the tail gate rises level

with the wall.

The gates work with a balance beam the upper gate is fitted with a broad gangway and railing the lower gate with the ordinary gangway.

7/- The lock has no culverts for filling or emptying. The gates have been fitted with shutters which is all that is required it will only be occasionally during a fresh that the gates will have to be worked the rest of the year they will both stand open.

8/- The foundations, flooring and walls will be constructed of rubble masonry (melamorphic rock) in hydraulic cement. Pier head coping steps leading down to body of lock and quoin stones sand stone, gate sill wood bedded in mortar and fastened down with bolts in such a manner that should it be necessary to remove them at any time it could be done without disturbing the masonry, the pinle stones should not be less than 30 cubic.

9/- The gates are to be constructed with good timber and iron. One of the rails is fitted

359/8
as a job in the part where there is the least pressure on the gate which supports it and does away with the necessity of suspension ties. The rails are bevelled and morticed in the main posts which arrangement under pressure takes the strain of the mortice. The main posts are bolted to the rails with clamps and tie bars the latter having a link with a right and left handed screw tapped on the ends of the tie bar and by turning the bolt the tie bar is tightened.

The anchorage extends across the pier head & lay in brackets the bar is fitted with key holes at back of brackets with driving these keys the anchorage can be tightened.

The pinle and gudgeons are cast metal. The gudgeons are cast of sufficient length to cover the lower rail joint at the post and have a rim through which two bolts will fasten it on to the post. The pinle has to be let in the masonry.

The gangway are supported on iron knees and have a railing. The shutters to be worked with a common ratchet. The planking of the gates to be

rivetted on the middle post to form the mitre
a separate piece has been bolted on the advantage
of this is that it preserves the face of the main
post and when worn out it can be removed
without removing the gate. Gates when complete
to be chinked and paid with coal tar.

Wier across the Toranaga

1/ The wier is to be built near the mouth
of the Tagu, ground is pretty high there on both
sides and there are also the old embankment
that come close to the edge of Tagu.

2/ Further up the Tagu there are no good
sites the ground is not sufficiently high to car-
ry up the wing walls to the height required
and keeping them lower that is level with the
land and during floods either in the Tagu or
from the river there would be the certain results
of the water cutting away the ground at end of
wing wall and leaving the wier standing by
itself. The foundation will be on very hard
soil which require removal with a crowbar
and pickaxe, no rocky place is available.

3/ The wier is a simple wall across the
Tagu with wing walls rising up to level of old
embankment; length of wier 145 feet the ac-
tual length of wier to discharge the ^{in full flood} Tagu would
be 120 feet the water going over at 8' depth the
Tagu has 7 1/2 miles of drainage area. The width
of the Tagu admitted of a longer wier than
actually necessary and it has therefore been
kept so as to be able to get rid sooner of the
river water which would overflow weir and
flood the country inland.

The wier is to have three culverts, these will only
be required to be opened at any time that it
may be necessary to get rid of the canal water
for repairs or otherwise than it would be by
emptying the Canal by the Tail Race at Bho-
-drachetan.

4/ The wier is to be constructed of sub-
ble masonry (metamorphic rock) and hy-
draulic cement with cut stone in the abutment
shutter grooves to have a large apron on the down
stream side with a heavy rivetment on both

banks. The overflow of the river will only take place during the rains and then the river will be up on the down side, so that when a heavy overflow takes place there will be a good cushion of water.

Seelumpetta Lock.

1/- The Seelumpetta Lock is of the same description as the Mead Lock. The flood gate in this Lock is necessary to keep out the river flowing into the Toranagur.

Seelumpetta reservoir culvert

1/- The site for this culvert is a little south of Seelumpetta village and is to be built in the breach of the old tramway embankment.

2/- The soil is hard clay with gravel.

3/- The design is a single culvert of a length equal to the toe of the embankment with a straight guard retaining wall built with the natural soil with stone pitching at both sides of culvert.

4/- The culvert is to be constructed walls rubble masonry (metamorphic rock)

in hydraulic cement; arch of culvert: trap or brick facing of arch grooves for shutter and coping of face wall canal side dressed stone. $\frac{25}{10}$

The shutter to be oak wood and to have lifting gear ratchet of double power worked with a lever the lifting gear block to be bolted on to a beam fixed on the face wall.

Construction of
seelumpetta
lock.

The size of culvert will discharge about 40,000 cubic yards per hour should this ever be required when the canal is empty to fill it but under ordinary circumstances only a small quantity will be required to keep the canal to its level and that the reservoir would supply.

The drainage area of the wagu that is to supply the reservoir is 7 $\frac{1}{2}$ miles.

The old tramway embankment kept the water in for years and during the heaviest rainfall the water has never stood higher than eight feet above the sill of the proposed culvert the low land at back of the tramway embankment extends for a large area.

Lock at Bhadrachellam

1/ The site chosen for the Locks is the best that can be found at that place the ledges of rocks full naturally, and have comparatively little to be excavated and there is no probability of silt being deposited at the entrance.

2/ The drop to be overcome is 50 feet from the bottom of the Canal to 5 feet below dead summer level. The Locks are 15 wide with a length of 105 feet from drop wall to mitre. are 4 Locks with a drop of 12'-6" each & consists. 1st of a head Lock which in addition to the ordinary gates has part of the walls rising up to the full height of the top of the flood embankment in which a reverse flood gate is fitted.

2^d of a short piece of Canal 275 in length to the head gate of the lower flight of Locks.

3/- The lower flight consists of three Locks in one continuous wall with a drop of 12'-6" each.

4/- The Locks are fitted with inlet and outlet culverts.

5/- The head Lock is fitted with a groove near the entrance so as to enable the water to be shut off should any repair be required to any of the masonry or wood work without the necessity of emptying the canal.

6/- The flood gate is worked by chains the rest of the gates by balance beams.

7/- The gates have no shutters.

8/- The upper culvert in upper lock and upper culvert in upper lock of lower flight is fitted with screw lifting gear, the rest of the culvert shutters are worked matched gearing of double power.

9/- The piers are to carry a wooden bridge as the public road which is now on the top of the embankment will be cut through by the lock.

10/- The upper and drop culverts to be fitted with vent holes.

Construction

1/- The locks will be constructed with

rubble masonry metamorphic rock in hydraulic
Cement face of entrance and it extends to
stones coping of piers and culvert shutter frames
dressed stone, gate sills wood bedded in mas-
-tic and bolted down in such a manner that
they can be removed when necessary without
disturbing the masonry. The arches of the culverts
either trap or grove brick.

2/ The construction of the gates &
anchorage is the same as for the head Lock, the
sizes are given in the plan. The gates in these
Locks are subject to floods and it will be
necessary for to weight them to keep them
from being floated up an arrangement for
locking them back is shown in the plan of the
gates. The arrangement is similar to what
I fitted in the Tail Locks here and answered
well.

3/ The bridge will be constructed
with 4 beams laid across from pier to pier.
then 3" planking with a strong lattice rail sup-
ported on outside by iron stays.

Fig. 10
Plan of
Lock

Fig 5
Saving on Esti-
mate in Construc-
-tion

Fig 12
See Section
designed

4/ The beams for closing the locks will
each be fitted with lin eye bolts at top the
next one to go on that with holes to admit
these bolts so that the beams will lay close.

5/ The flight of the lower three Drop
Locks will be constructed where the rock
will have to be excavated. When excava-
-ting the rock care should be taken to set
the locks out on the rock before commence-
-ment. Then the rocks can be leveled off for the
sills and also parts left for the walls. The con-
-struction required will be the walls where the
rock does not rise to sufficient height also the
piers and culverts. The material excavated
will be used up in the construction of the ma-
-sonry and a considerable saving will occur
in the estimate.

Escape at Bhadrachellam

Two Escapes have been designed and
plans and Estimates made out. Nos 13A & 13B.

2/ No 13B is the Escape approved of
by Colonel Mullins and Major Bratty when

up above a few days ago reference is made to
the Rock and construction of a bridge is referred
to in my letter of 429 dated 5th January 1878
accompanying the estimates.

3/ The site chosen for the Escape is
north of the Tail Race's rocky ground discharging
the water over rock into the river.

4/ The Escape is filled in to a cutting
through the flood bank the body of masonry
rising to the top of the flood bank consists
of a wall 9 feet thick with wing walls falling
with the slope of the Embankment and a
parapet wall the main wall is pierced with
6 culverts 5x5-6 ft on level of full water
in Canal. The culverts are fitted with self
acting shutters hanging by links fitted to eye
bolts fixed in a beam resting on pillars and
bolted through the parapet walls.

5/ The water falling on rock no apron
will be required.

6/ The Escape will be built with
rough stone (metamorphic) in hydraulic

Construction of
the bridge

Cement the arches and part of wall the shutters
rest against and the top of the piers and wall
the beam rests on dressed stone (Sand stone).

Controlling Tank on the Toranaga 387

1/ This tank has been referred to in
the report and also in my covering letter of 429
dated 5th January 1878. Send with the Estimates.

2/ The observations that have been
made the Tague at the point selected for the
Tank has a discharge of 325 cft per second
during heavy rains over the whole area of drai-
nage.

3/ The Embankment will have to be
made to such a height that the Escape can be
made through a cutting in the high ground &
discharge the surplus water in the low ground
where it will find its way into a water dis-
charging itself into the Toranaga in one of the
branch when it will do no harm to the Tague
which will be used for the Canal.

The position of the Tank and arrangement of
Escape is shown on the map and A-2. The cutting

of the high ground for the Escape necessitates
an Embankment to 199 level the Embankment
to be 7 wide with 2 to 1 slope.

A short piece of Embankment
will also be required on the down side of the Es-
cape for protection in heavy floods.

4/ The Escape will be led by a cutting
will be led of from 194 level by a short cutting
through the high ground and will be 100 feet
wide.

5/ No masonry works will be re-
quired the end of the Embankment at the Escape
will be rivetted with stone excavated out of the
cutting.

W. W. W. W.

Executive Engineer

Damagudem Division

I am, Sir,

Yours, Sir,

Ag. District Engineer, Godavari

Enclosure in letter No
dated 5th July 1878 from the
District Engineer

Dumaguaden Division
Iloilo District

Specification on differ-
ent works of the proposed boat
canal from Jurgale to Bhabrachellam

No 429

35/1

Dumaguaden

5th January 1878

From

The Executive Engineer
Dumaguaden D^o

To

The Superintending Engineer
Iloilo District

Sir

I have the honor to forward
you the Plans and Estimates for proposed
Boat Canal from the Dumaguaden
Sail Locks to Bhabrachellam.

2/- The rates entered in the estimates
are high based on the former works here.
I have however made a little deduc-
tions on account of materials and Tools
and Plant and am of opinion that
should the works be taken in hand
and conducted economically a good
saving and reductions on the estimates
now submitted would accrue.

3/- With the estimates I send
is a "memo" which shows the deductions
that

that should be made on the estimates for materials in hand and also Tools and Plant. No purchase or procuring otherwise will be necessary for the latter.

4- In the report I refer to the regulating tank. The estimates sent in now is only for that should the proposition of making it an irrigation tank be approved of a survey will have to be made of the ground but as far as merely walking over the area a laying tank.

5- The estimates for the proposed boat Canal now sent in exceeds the probable one sent in before but then the exact quantities of excavation through the high ground was taken from an old memo apparently erroneous.

6- Should the proposition of repairs to the sluice tank alluded to in para 28 of report and making the controlling tank on

on the Sooravagu into an irrigation tank is a survey could be made for both projects without any additional grant a sufficient balance being left of the sanctioned amount to meet that expense both the projects being advantageous absorbing a large quantity of water running to waste over the canal weir.

7- With the plans and estimates there are two projects 13A and 13B for an escape at Bhadrachellam. The latter is the one recommended in my report. The site has been seen by Colonel Mullins and he approves of 13B. For this project no bridge would be required over the Head Lock of Tail Lock but a bridge across the Canal above the escape which will be more convenient for Bandies there along the Embankment alluded to in para 17 & 2.

The bridge estimated for in Tail Lock estimate would do for bridging the Canal and the masonry saved by shortening the lock.

1. It is proposed to be building the bridge
over the river so that no extra cost would be incurred
in building a bridge over the river.

2. The bridge is to be built in line
with the lock and made to rise with the water.
The bridge is to be built in line with the lock
and the other end of the bridge is
designed. The bridge can be substituted
for the bridge the cost of both is the same.

3. When Colonel Smith and Major
Beatty visited the site for the Erie Lock and
the proposed canal. Colonel Smith recommended a
towing path along the locks to the locks, and
filling in a gap in the locks above the Erie
Locks. The first will be in these terraces
on a level with the top wall in the drop
locks. The second facilitates the towing
boats up to the lock. Both these additions
can be made without any extra cost.

I have the honor to be
Sir

Sir 3569/27

Your most obedt servant

J. Vanstaden
Executive Engineer
Almaguene D. G. D.

101162

The Chief Engineer
for Irrigation
Dated 5 July 1900

From
The Executive Engineer
Dumagadam D.
in a letter dated 11/1/00
The Superintending Engineer
Godavery District
Dated 5th 11/2/00
Recd 7th 11/2/00

Subject

Forwards the Plans
and Estimates re of the
proposed Boat Canal
from Guugole to Bhara
drachellam

Yr

No 519

Dumagadam

19th March 1878

3569
2/8

From

The Executive Engineer
Dumagadam Division G.D.

To

The Superintending Engineer
Godavery District

Sir

I have the honor to acknowledge
receipt of your "memo" No 3886 dated the 12th
last and in reply to give you the following
information and explanation regarding the
rates re of the excavation for the Boat Canal

1/- Your "Memo" states the rates at
Rs 4 re per 100 cubic feet this should be per
1000

2/- The red granite only occurs at Pan-
tinam point.

3/- Regarding rock metamorphic
includes the following which are the principal

1st Gneiss an aggregate of quartz
felspar and mica

- 1st. Syenitic Gneiss aggregate of
2. quartz feldspar and horn blende
- 3rd. Porphyritic gneiss consisting either ordinary or Syenitic with large irregular masses of quartz or feldspar
- 4th. Quartz rock or quartzite
- 5th. Mica schist laminated aggregate of mica and quartz
- 6th. Basic schist. Basic and quartz
- 7th. Chlorite schist. Chloride of quartz.
- 8th. Horn blende schist. Horn blende with feldspar or Quartz
- 9th. Actynolite schist foliated rock a mixture of feldspar quartz and mica
- 10th. Primary lime stone. Highly crystalline marbles.

The first 5 are found on the line of Canal and in addition to these rocks are the Talchur sand stone under lying the coal in the schist formation.

14. It will be observed that the feldspar alluded to in your Memo has not especially been

been mentioned as it belongs to the Syenitic rocks.

It would be a very difficult matter to give the exact cost of the excavation of the various description of rock the same rock being soft stratified in one place and hard in others.

On the line of Canal the ground has been examined and when no rock or decayed has been visible some pits have been sunk through the black soil which in no place examined exceed 5 feet in thickness.

It would not be possible for me to give an exact rate for the excavations without borings being put down at very short distances say at not more than one hundred feet distance to get at some thing near the correct nature of the rock as to their existence and hardness.

The reason for my making this statement is this in the canal when excavated from the Gooravagu to the village of Chintulgadani pits were dug, every two or three hundred feet to the depth of the Canal and only black soil met with and the estimate

estimate made for black soil excavation when the work was taken in hand Gneiss was met with in large boulders. Some of these had to be blasted and other smaller ones holes were dug and these were buried there are still several boulders remaining now in the part excavated which will have to be removed should the canal work go on.

9/- In the Canal at Dumagudem - some very soft rock was found on the surface and pits of eight feet deep showed the same stone. The estimate was based on this but on the excavation coming within four feet of the full depth the stone was found in many parts so hard that it could not be removed by pick and crow bar and blasting had to be resorted to.

10/- The talchairs rocks crop up in several places on the line of Canal where it passes - over the high ground. These talchair rocks I found in one place 5 feet thick in others 3 feet overlying broken Gneiss rock. The Soora wagu is

is mostly the soft laminated Talchairs.
11/- The rates I gave you have been carefully selected from the day books and was a conclusion of average rate come to and I find it impossible to give you rates for every description of rock where they all in distinct lots a bill to be gone through of the same description of rock as to hardness &c. therefore some near conclusion could be come to but in a place like this where the rock and different soils have been so mixed I find it impossible.

12/- The reason for so many mixtures here is that you have the old bed of the ocean to deal with of which the plateau of Rustar extending up to the 3rd Barrier was the foreshore.

13/- I regret that I cannot furnish you with the information you require but trust that the foregoing explanation will be satisfactory.

14/- I shall furnish you with the information about the land con-
-necation.

compensation whenever the Collector comes
here.

I have the honor to be

Sir

Your most obed^t Servant

Warstaverus
Executive Engineer

Quincy, Ind. 10th Feb

1878

Dumaguaden
30th May 1878

From

The Executive Engineer
Dumaguaden Division

To

The Superintending Engineer
Godavery District

Sir

I have the honor to acknowledge receipt of your "Memo" No 600 dated 25th May and in reply to inform you.

1/- I can only give you the statement as I find it in the estimate I have now copy of the sections here the office copy was sent to you on 25th February 1878.

2/- The rates in the estimate Rs 12-7 and 4. The first is for the deep cutting through the high ground the rate is high on account of the lift. The second is less average cutting and lift less. The third rate embraces the removal of the washed and fallen in earth in the bed of the ^{channel}

No 1163
To The Chief Engineer
Godavery District

From The Executive Engineer
Dumaguaden Division
No 600
Dated 25th May 1878

Regarding the rates of
the excavation for the canal

Sir

Received of the

cutting which I have got. It
 is as so much less than the other
 and the remark that the Canal
 to be a little deeper the
 you mention is the whole -
 the Canal where work has to

I have the honor to be
 Sir
 Your most Obedient
 Servant
 Executive Engineer
 Punaquaden

CC

12-11-63
 To the Honble Mr. Secretary
 Government
 Punaquaden

the high ground for the
 canals are situated in the
 in the estimate for 1872-73
 estimate for the year
 estimate for the year
 estimate for the year
 estimate for the year

Return of the Boats & Tonnage through the Canal and the Lock at Punaquaden
 June 1868 up to end of December 1877

		Arrival from the coast		Departure to the coast		Departure to the coast		Remarks	
Years	Boats	Tons	Value	Boats	Tons	Value	Boats	Tons	Value
From June/68 to 31 st May 1869	75	234	36,890	78	55	2,829			
do 1 st do 69 to 31 st December 1872	429	1,856	197,582	415	220 1/2	19,795	46,806	187,228	Consists of provisions, oil, and other miscellaneous articles for the laborers
do 1 st January to 31 st do 1872	191	731	31,722	161	483	9,065	15,482	61,808	Consists of machinery, tools, and provisions, oil, and other articles for the laborers principally 2 nd class
do 1 st do to 31 st do 1872	210	983	63,199	152	726	34,912	9,689	38,758	Consists of provisions, oil, and other articles for the laborers
do 1 st do to 31 st do 1872	241	1,268 1/4	77,243	242	676	34,328	22,594	99,964	Trade commodities from the coast, salt, cloths, cereals, and various miscellaneous articles such as sugar, &c
do 1 st do to 31 st do 1874	326	637 1/4	88,776	330	1,457 1/4	73,430	18,489	88,673	do
do 1 st do to 31 st do 1875	195	775	77,131	204	1,336	57,140	18,434	82,802	In 1875 the docks were closed for some months for repairs, cargo was shipped before the lock for which no account was kept
do 1 st do to 31 st do 1876	329	4,935	1,19,513	280	4,200	136,187	26,377	131,885	Consists of provisions &c
do 1 st do to 31 st do 1877	317	3,331	156,651	291	3,057	130,595	44,550	244,014	do
Grand Total	2313	14,750 1/2	878,707	2153	12,241 1/4	4,98,281	2,04,366	9,35,130	In 1877 less produce wheat &c was exported failure of the crop

Punaquaden

Submitted
 By District Engineer, Punaquaden
 Executive Engineer
 Punaquaden

^His evidence for the value

Brantecoren
Executive Ingénieur
Kleinaquedam Rijksw

present cutting which I paid for
 as this was so much less than
 rate I made the remark that the
 had only to be a little decrease
 mileage you mention is the
 length of the Canal where work
 be done.

I have the honor
 Sir
 Your most obedt
 Servant
 Executive Eng
 Quinagubon

Q

Quinagubon Division
 Godavery District

Statement of traffic return
 on Canal from June 1868
 upto 31st December 1877

Enclosed is a letter
 No 1163 dated 25th July 1878
 from the Chief District Officer

Quinagubon Division
 Godavery District

Informing that the rate
 in the estimate for 1878/79
 and 4 are proposed to be
 -by for such cutting through
 the high ground for the
 -irrigation cutting for the
 all of the irrigated and
 with in the bed of the
 canal.

9569
/ 357

51

Dated January 1878

References

Documents					Remarks
Description and number	Date	From	To	Subject	
G. O. No 1232	10 th April 1877	"	"	Sanctioning the investiga- tion of line of boat canal	

Report

Report
If the Upper Godavary Navigation
Long Canal project was designed by Colonel Haig M.C. a
Canal from Durgam Cheruvu to Solderum was intended
and Estimates of probable cost sent in.

2/ The works were commenced in 1860 in 1865 owing to the unexpected heavy outlay on the

was to the long project as that Canal was called
was abandoned and the short Canal from near
the river to the village of Booraigula a dis-
tance of 2 1/2 miles was decided on and the Tail
Rocks built there communication with the river.

3/2 Parts of the Canal and also the flood
embankments were partially made from the Por-
nagu to Sodaum 10 miles and the upper Tail
Rocks there commenced. From the Poranagu
up to Booraigula 9 miles no work has been done
nor was this part of the line investigated nor
fully surveyed when the long Canal project
was abandoned.

4/4 When the Tail Rocks at Booraigula
were decided on, it was found necessary
to make improvements in the river between
Booraigula Tail Rocks and Bhadrachellam, large
sums of money have been expended on the removal
of rocks which has not given any good permanent
results.

5/4 The river between the Tail Rocks
and Bhadrachellam is thickly studded with
extensive rocky ledges stretching across the river
and also large detached rocks. Through several
of these ledges passages were cut and some of the

by the boatmen
long project
and waste of
money to light
improvement.

detached rocks removed the cutting through of the
ledges lowered the water above them and revealed
new rocks; these cut passages also increase the
current and tend to draw the sand and gravel
down towards and through them thus forming
shallows below which is getting worse and worse
every year and dangerous in many places as has
been proved both in the up and down passages by
the total loss of some and damage to boats and
Cargo. The state of the river is very much complain-
ed of by all the boatmen and to try to make any
improvement in the river by the removal of
rocks or otherwise would I think only be a
waste of money.

6/4 The greatest difficulty of navigation
between Doulaishueneram and the foot of the 2^d
Barrier a distance of ^{about} 200 miles, is the short
reach of 16 miles between Booraigula and Bha-
drachellam it was for this reason that the boat
Canal and short Canal was proposed to the Superintending Engineer
Godavery District but before doing so I addressed
Colonel Haig R.E. Chief Engineer Irrigation Bengal
on the subject as he is thoroughly acquainted with
the river and he fully approved of my proposal
as per following extract from his letter (attached 14)

September 1875 "my dear Dr. Staurer I shall never
find time to answer all your letters about the canal
so fully as I could wish so I will say briefly
what I think of your proposal I think if the
Government are not likely to go in for any thing big-
ger than a boat canal to Bhadrachellam would be
a very good thing I would not care much about
its extension to Danapilly the serious ob-
structions are all above Bhadrachellam and
below that place the only difficulties are shoals
and there are no more than boats will meet with
between the 1st and 2nd Barrier I think if you
had the boat canal to Bhadrachellam you would
have gained nearly all you require for boat traffic.
Besides the Tail rocks could be much more cheaply
constructed at Bhadrachellam than at Danapilly
or rather Sodarum at the latter place there are some
difficulties at the former you could cut the chambers
out of the solid rock and merely put in sills and
gates. I shall be very glad if you succeed.

When large boats come to Bhadrachellam now after the freches they have to send up
small boats and canoes for their cargo to this place
and load up in that manner. This causes great

delay and expense. The boat canal would obviate
this difficulty and allow the large boats to come
up here or go on to the 2nd Barrier loaded from
Doulaislueram and vice versa.

The trade although it has now great
difficulties to contend with & is in its infancy
has largely increased as will be observed by
the traffic returns attached. There is no doubt of
its increase as the people on both sides of the river
find that a good deal of profit is to be made
on their produce, wheat, gingly seeds and
hemp &c. There is ground to any extent and
willing hands when they can get a good
return for their labor. In view of the increase
of trade and sites required for the houses of
merchants and also their ware houses, the sites
chosen for the new village is well adopted being
above flood level & near the canal and river. The
only thing required is the making and improve-
ment of a road to it which could be done for
some 1400 Rupees. There is also another matter
connected with the trade which at present is

land oppression that is 5 per cent. charged on the Chigams side on all imports and exports. If this 5 per cent. duty was lowered as agreed between the British Government and the Chigam of Eyderhad in 1832 it would not be a very heavy burden but as the collection along the river bank is farmed out, the farmer takes as much as he can get either by fair or foul means and thereby causes great obstruction to trade.

If Should the short canal be completed there is another branch of trade which will spring up which under present circumstances is impossible. Jungle wood is exported from the British and Chigam's sides below Bhadrachellam. Above Damagudem both on the British and Chigam's sides there are what may be called virgin forests of jungle wood available for trade and should the canal be constructed and exportation of wood commence. The felling of jungle wood in the forest on the British side below Bhadrachellam could be stopped and the forest be allowed to recover itself as it has been worked for many

years.

5569/40

10/ Junglwood will not float and has to be supported by sungadies (a sort of boat formed by hollowing out a large tree) this sort of transport requires a clear passage and owing to the large number of rocks between here and Bhadrachellam have never been attempted as it would certainly result in loss.

11/ For the boat canal from here to Bhadrachellam 16 miles there are two lines proposed as far as Sectampetta 10 miles from this place. One line from the Tail Rocks here round by Dandin point along the river bank crossing the Poruagu by an aqueduct and then to Sectampetta along the river bank. One line from the Tail Rocks here for about a mile and three quarter along the river bank then turns to the east and falls into the Poruagu, then the Tāgu is made use of as a canal, near the mouth a weir will be constructed above which by a cutting of one mile, the canal is taken to Sectampetta Rock. From Sectampetta the canal runs along the river

bank.

12/ Accompanying this report is a general map showing the features of the country & lines of proposed canal.

13/ The line around Danlinum point commences at the present Tail Rocks here with a cutting through the flood embankment in which a lock with flood gate would have to be built. From there the canal runs up to Danlinum point along the river bank round the point for distance of about a mile and a half the canal would have to be excavated in hard rock metamorphic with red granite here and there after going round the point the canal runs near the river bank up to the Toravagu where a Lock with flood gate to keep out the freshes would have to be built then the canal crosses the Toravagu by an aqueduct and continues along the river bank up to Suctumpella Lock embankment of earth would have to be made up to near Danlinum point there for about $\frac{3}{4}$ mile a wall would have to be constructed

the line of the canal is shown in the map

the line of the canal is shown in the map

the line of the canal is shown in the map

the line of the canal is shown in the map

the line of the canal is shown in the map

the line of the canal is shown in the map

3529/41
as no earth embankment would stand the risk of the current round it during a fresh south of the point an earthen embankment would run up to the Lock near the Toravagu and from the Lock to the high ground at back Torapaka village. This line with its costly rock cutting building a wall high embankment and two Locks and a aqueduct at the Toravagu is altogether too costly to be recommended.

14/ The line by the Toravagu commences at Tail Rocks here with a cutting through the flood embankment in which a Lock with flood gate is to be built from there it takes the same direction for a mile and a quarter where it turns to the east and on by cutting through the high ground falls into the Toravagu a distance of $2\frac{1}{2}$ miles from the Tail Rocks here. The place for cutting through the high ground is the lowest that could be found in the long ridge. On the Toravagu just above where the channel falls in a small controlling tank will have to be constructed. This was the line decided on vide letter No.

176 Latid 5" August 1863 from Captain King
R. E. Superintending Engineer Upper Golanery
Circle to the Executive Engineer S. Barrier Division
"Lieutenant Montgomery's levels down the Jag-
"garum branch of the Toranagur have decided
the question as to the line the Canal should fol-
"low from about the 14th mile to Toranagur.

"There is no question but that it must be taken
"on that line (The 14th mile refers to the distance
from the Head Rock at the station). From the
point where the Canal enters the Tugu, the
Tugu will have to be deepened for about a mile
and a half or so after that the Tugu bottom
is below the Canal bottom and only a few short
bunds will have to be cut through to straighten
the Canal a little above the point where the Canal
enters the Toranagur a controlling tank will
have to be constructed to regulate the flow of
water during the rains, near the mouth of the Tugu
a weir will have to be built with the crest on a
level with the full water in the Canal. About
one mile above the weir a cutting will have to be

made for the Canal to lead it up to Seetimpetta
Rock.

The only embankment required on this line is
from the present Tail Rock embankment to the
high ground on the river side a distance of about
two miles.

15/ The length of the lines by Dantinum
or Toranagur are about the same.

16/ On the Seetimpetta line to Bhadrachellam
a level Rock with floodgates will have
to be built at Seetimpetta from there the line
runs along the river bank up to Bhadrachellam
there the Tail Rocks are to be built four Rocks
having a drop of 12-6" each with a flood gate in
the upper Rock. The piers of the Rocks to be of a
width to carry a suitable bridge for Bandy
traffic.

17/ Arrangement will have to be made at
Bhadrachellam at end of Canal below the Tail
Rocks for keeping out the floods and also for the
escape of surplus water in Canal. For this two
methods are proposed.

1st To build an escape with wall rising up to a level to keep out the floods between the two small hills at end of Canal.

2^d To carry the embankment below the Tail Rocks across the Canal and up to the high ground. Both methods are shown in the Estimates, it will be seen that the first is the most expensive and has its draw back that should at any future time the long Canal go on the necessary rising above the bottom of Canal level would have to be broken down.

The second will require the escape to be built above the Rocks where there are good sites on rock and a short embankment will have to be made to the high ground should the long Canal go on at any time then would only be the embankment in Canal to be removed.

The first method will be the most expensive in compensation to be paid and I should recommend the second.

The handy track at present runs along the old embankment and leaves it a short dis-

245/3
- tance above the Tail Rocks by the first method a ferry boat or a bridge would have to be built across the Canal to keep open communication by the second method the handy track would run along the proposed short piece of embankment. The Canal embankment will run on the river side from Seelimpetta Rock to Bhadrachellam and a new short piece of embankment will have to be made from Seelimpetta Rock to the high ground.

18/10
By the Canal
bank and
high ground
limited.

18/- On the line from Seelimpetta to Bhadrachellam a considerable deal of the work to the excavation of the Canal and throwing up the embankment has already been executed.

18/11
The supply to
canal

19/- The Tora line will be supplied by water from the works here during the dry season when required.

At Seelimpetta there is an old Tramway embankment which runs across the Seelimpetta Taque this was breached by the villagers (but not intentionally) in this breach a culvert has to be

Relieve

built and the Seelimpulla branch can be supplied with water from this during the dry season.

20/- On the line from Seelimpulla to Bhadrachellam there are two large tanks they have been breached for years, are overgrown with large trees in the tank beds, the embankments are in a fair state of preservation, want a culvert and escapes constructing.

These tanks are an inconvenience; flooding a large area of land as the water cannot escape on account of the river embankment; they are on high ground and if repaired would irrigate a large area of good land all sloping away from the tanks.

These tanks are on Zamindari ground if the Zamindar would repair them good, if not the Government could do so and take a water rate which would give a high interest; if they remain as they are they would bring in a very large quantity of water which should be pressed to use at the same time that the water could not escape it would be an inconvenience in the Canal. At present the water escapes through part of the

21/- Small tanks on the line of Canal

Canal that has been excavated and discharges itself in a naga below Bhadrachellam. 21/- There are some small tanks on the line of Canal their discharge is insignificant and would be absorbed in the Canal.

22/- Soil through which the Canal will have to be excavated

22/- The soil in which the Canal will have to be excavated from the present Tail Rocks to the Toranaga, is for a few feet black soil & then gneiss and decayed felspar both easily excavated with pickaxe and crowbar rarely requiring blasting the cutting through the high ground is heavy but this is compensated by the little cutting required in the Toranaga. The cutting in the Toranaga is for a short distance in gneiss the rest is very soft sandstone (Tul chair rock).

The cutting from the Toranaga to the Seelimpulla Rock is through some feet black soil and then through gneiss. From Seelimpulla for a short distance a small cutting through gneiss. The heavy stone excavation of Canal near Bhadrachellam has already been done and all required is the slopes a little deepening.

23/ The embankment will be constructed with the material excavated for the canal should then be a want at any place the canal will have to be widened at that point.

24/ At the side of the Sectimpella Rock and escape at Bhadrachellam a large quantity of rough stone has already been stacked. There are also a large number of cut stones at Sodarum on the river bank prepared for the construction of Rock there which could be utilized in of the proposed works any more sand stone required for cut stone works can be got from the Torapaka quarry. Rough stone metamorphic required can be quarried near the sites of the proposed buildings. In the preparation of hydraulic cement any quantity of kunker lime can be got near the works, this lime treated with clay (Tufa) are equally good hydraulic cement as the lime stone used on the works here. The kunker now had resorted to when the supply of limestone which had to be brought from a long distance at a heavy cost failed and the result proved are equally good cement even

the kunker lime being slightly hydraulic in itself makes a splendid mortar which is proved by a small Rock built in 1856 in the bed of ^{the} river at Central at foot of the 1st Barrier. This piece of masonry although exposed to the fullest of the river during the freshes and to the hot sun during the dry season is in perfect order & the mortar so hard that it cannot be broken nor a stone removed with a crowbar, one thing however is in favor of both hydraulic cement and mortar in this Division that the stone for construction is so hard metamorphic and does not absorb water.

- 25/ The plans consist of
- 1 General map of the part of the District through which the Canal will run showing the features of the Country.
 - 2 Map and of levels along the line of Canal
 - 3 Books of Longitudinal sections for line of Canal
 - 4 Plan of Head Lock at Borsigula (Tail Lock of Dumagudem Canal)
 - 5 Plan and details of Head Lock gates.

- 6 Plan of regulating Tank on western branch of the Toranagu. See plan No 2
- 7 Plan of weir across the Toranagu
- 8 do of Seelimpella Rock.
- 9 do and details of Rock gates (Seelimpella Rock)
- 10 do of Seelimpella reservoir Culvert.
- 11 do of Rocks at Bhadrachellam.
- 12 " of Rock gates at Bhadrachellam
- 13 " A of escape at Bhadrachellam.
- 13 " B of do at do.

26/ All the plans being on small scale the figures should be taken as the exact measurement.

In calculating the areas for excavation in Canal the actual contents of them have been taken as the average and not the height ^{of the section} which is only the Centre of Canal rising and falling considerably in some places when the first ground will be excavated.

The rates of works have been based on the actual cost of the old works here and not with the heavy extra charges that have come on them, as there

will be no necessity for these. The procuring of ordinary labor on the spot will not be any difficulty a few skilled labor will have to be brought. The recruiting and housing of the Coolies and paying of batta which greatly increased the cost here will be avoided, as the laborers that will flock to the work will return to their own houses during the rains when no work can be done. The great point that must be kept in view and strictly acted on to procure local labor from our territories and the Chigams is that the officer in charge must see the men paid himself as without that they would leave and make no complaint we have had experience of that here. Even the mere rumour of a work here has given me more applicants than I could employ if the works were sanctioned. If not too much presumption on my part I would make the following suggestions should the work be sanctioned. The first work taken in hand should be the collection and preparation of materials for construction and also the construction of the

controlling tank on the Toranaga, this will be necessary for the supply of water to the coolies that will be employed on the excavation of the Canal in the Toranaga and east side of the high ground as there is none available in the dry season at all other parts of the works there is water. The works could be divided over four years and then settled what to be done so as to construct them economically. The contract system direct with the laborers and not with the middlemen should be adopted and for the supply of wood some tenders should be called for. These materials could be got cheaper than it would be by Departmental Agency.

27/- In para 14 I have mentioned a controlling tank on the Toranaga. The bottom of the Togu will have to be excavated some 12 feet deeper and therefore the necessity of controlling the water during the rains so as not to allow it to enter the Canal with a fall. This tank merely as a controlling one would of course give no revenue and only incur cost for keeping

28/-

it in repairs. For this reason I would propose to make a larger tank carrying the bank to the high ground and building culverts. The tank then would be irrigated a large area of good land (Government waste land). From a tank so constructed a good revenue would be derived. The complete survey for this scheme would however take some time as the land is covered with small trees and brushwood, and the estimate having already been a long time in hand (as little could be done during the rains) a simple sum has been entered in the estimate for a controlling tank. The survey for irrigation tank will not increase entire cost as there are sufficient funds left out of the money sanctioned for the survey.

28/- There is another matter which I allude to in this report that is the Putai tank on the eastern branch of the Toranaga although properly speaking it cannot be alluded to as part of the works still it has some connection with it as when repaired it would absorb a large quantity of water that now runs to waste and of course increases the current

in eastern branch where runs through the Canal.

The Fuloi tank is situated some 14 miles above the place where the cutting from the Vaga branches off, to the Seetimpella Lock. The tank and the land below it is Government and not Zamindar.

The bed of the tank and the land below it which is of large extent is overgrown with trees and brushwood, when I saw it a few years ago the embankment which connects two spurs was in fair order except of course where it has breached from stones on the spot there evidently had been a culvert. It is an old work and must have been abandoned many years ago has probably been constructed when this part of the Country was under Hindu dynasty it would be worth the repairs which I do not think would amount to a large sum. The revenue that would be derived from it would be fully compensated by the outlay.

29/ The sites of the masonry works there was no choice, the places selected are with reference to the floods.

The ground for foundations of all are good and with

the exception of Seetimpella reservoir culvert which is on hard clay soil.

The head Lock will be formed on gneiss.

The Toru weir on clay and kunkin resting on rock.

The Seetimpella Lock on felspar and kunkin.

The Tail Locks on granitoid rock & trap.

The escape A between two small hills composed of metamorphic boulders and B on gneiss.

The whole of the masonry works are designed slightly heavier than actually necessary if the best of the workmanship could be insured but in a place like this where only 2^d class labor can be counted on it, becomes a matter for consideration and the slight increase of cost will be balanced by scarcity.

30/ Establishment is for working the gates

The head Lock of the boat Canal would be worked by the establishment maintained for working the present Tail Locks at Buragula. At Seetimpella and Bhadrachellam, establishment would be required cost of lines and also a small inspection bangalore have been entered in the estimate.

31/ From this place the bandy track (it
cannot be called a road) crosses the Torangu of
- Course only in the dry season and not during the
rains but as building a weir across the Torangu
will keep it in flood some provision will have to
be made to cross the uage, for this I have enter-
ed a sum in the estimate. This boat would
only remain in service during the dry season
and during the freshes be removed to a safe place.

32/ For part of the Canal already exco-
- rated and embankment thrown up Compensation
has been paid. The new part of Canal runs
through Zamindari land the Tahsildar ju-
- forms me that no Compensation is required a
deduction for the ground taken up will be made
from the Zamindari ground. A short piece of
the Canal will run through private ground it
is very poor was bought for Rs 100/- and a
small sum will suffice for Compensation, the rest
of the Canal through Government waste land.

Forwarded
By District Engineer
Executive Engineer
Bodavay.

Enclosed in a letter
No 1163 dated 5 July 1878
from the Agt. District
Godavery

Dumagudem Division
Godavery District

Report on the works of proposed
brial canal from Gungoli Tail
Locks to Bhadrachellam—

47/52
List of plans & Estimates &c of
Bhadrachellam Brial Canal forwarded
with the District Engineer's letter No 1163 dated
5 July 78

- ✓ 1 Book of Longitudinal Sections —
- ✓ 1 Book of cross sections —
- ✓ 1. Plan of tail Locks at Bhadrachellam —
- ✓ 1. Plan of the tail Lock gates —
- ✓ 1. Plan of Head Lock —
- ✓ 1. Plan of Head Lock gates —
- ✓ 1. Plan of weir across Lorumaga. —
- ✓ 1. Plan of Escape at Bhadrachellam No 13 A —
- ✓ 1 Plan of Escape at Bhadrachellam No 13 B —

(said in Mr. Anstons letter No 29
to be the design approved by C. Eng. B.

Mullins —

- ✓ 1 Plan of Culvert at Seethampetta reservoir —
- ✓ 1. Plan of Lock at Seethampetta —
- ✓ 1 Plan of Seethampetta Lock gates —
- ✓ 1 Map of part of Bhadrachellam Taluk
showing Dumagudem Canal and
proposed lines to Bhadrachellam
- ✓ 1 Sheet of sections at the site of tail Locks
at Bhadrachellam —

1. Plan shewing levels along line of Canal
1. Estimate for cutting amounting to
Rupees 24,3010

1. Estimate for cutting Do. — 22,9700

1. Estimate for Embankment Do. — 29,450

1. Estimate for controlling tank at Turanagu

1. Estimate for Tail Locks at Bhadrachellam

1. Estimate for the head Lock.

1. Estimate for Weir across Turanagu.

1. Estimate for Escape at Bhadrachellam
amounting to Rupees — 9,120

1. Estimate for Do. — Do. — 4,660

1. Estimate for a Culvert at Sethampetta
Reservoir

1. Estimate for Lock at Sethampetta

2. General Abstract Estimates sent by
Mr Vanstam. —

2. Do. — Do. Revised by Colonel Peatty

1. Memo of Materials at the site of several
locks. —

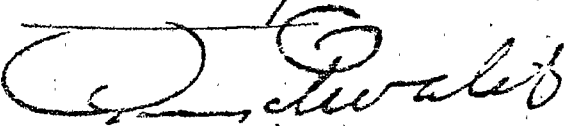
1. Report of Mr Vanstam. —

1. Specification —

3. Letters of Mr Vanstam Nos 429,519

1. Statement of Traffic return. and 87

Dist Engr's Office Goda
Coanada 5 July 1873
compd by 58


J. Swale
As Dist Engineer Godanery

Letter from the Agt. St. Aug. Goddard, No 1163
dated 5th July 1878.

FOR ORDERS.

Enclosed is a letter
No 1163 dated 5th July 78
from the Agt. St. Aug.
Goddard

The plans and
estimates have been duly
examined in the Chief
Engineer's Office and found
correct.

The Chief Engineer ap-
proving of St. J. B. Reath's
amended section, &c,
recommends that Es-
timate of Rs 45,3840 for
adoption and sanction.

The Chief Engineer has
not himself ever visited
the locality in question
but understands that

the

general design has met with the approval of the Chief Engineer for Irrigation who has inspected the work and is acquainted with its requirements.

FOR ORDERS.

Edm. G. M.
Chief Engr. M.D.

30th August 1878

Per order of
Secy to Govt.
Revenue. Madras

21/8

Revenue. Madras

Revenue. Madras

31/8
Civ. 30.8.78
16.7.8. 18.7.78

No 35696 Public Works Department.
PROCEEDINGS OF THE MADRAS GOVERNMENT.

Usual date the 9th Sept 78
Read the following:—

From
The Dy. District Engineer } (H.C. No 1163 of 5th July 1878)
Godavery
Note by the Dy. Engr. P.H. B. (4 — — — — 20th Aug — —)

The plans and estimates amounting to Rs 453,840 for the Bhadrachalam Boat Canal are sanctioned. As the work is not needed for Famine Relief it will be carried out in the ordinary course on funds being provided.

G. C. Godavari
Chief Engr. for Irrig.
By P. W. Secy. to Govt. Revenue. Madras
This sanction has been registered at the Secy. to Govt. Revenue. Madras
18-9-78

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Cir 4-9-78 Mtd. 9-9-78
11-7-78

Cir 30-8-78
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