

- (1) பக்கங்களின் எண்ணிக்கை 30
 (2) புதுக்கித் திருப்பிய நாள் 1.8.88
 (3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் 10/9

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

P. W. D. துறை

அரசாணை எண். மு. கோப்புத் தாள் எண்.	<u>3260-W</u>	அச்சகம் பலவகை
நாள் :	<u>13.10.1888</u>	198 .

மடிக்கவோ கண்டபடி கையாளவோ கூடாது

செ. சி.

13TH OCTOBER 1888, No. 3260 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

General.
Account.

READ—the following paper :—

From C. VINCENT, Esq., Executive Engineer, Buckingham Canal Division,
to the Superintending Engineer, II Circle, dated Madras, 15th September
1888, No. 1173.

In G.O., No. 2497 W., dated 21st September 1887, the limit of reserve stock of this division was fixed at Rs. 5,000. I have now the honor to request that this limit may be increased to Rs. 10,000 under the following circumstances.

2. The construction of a flood-gate on the south bank of the Manneru river was contemplated during the current year and materials had begun to be collected for it. But the Chief Engineer for Irrigation in his Inspection notes, para. 12, printed in G.O., No. 170 L, dated 7th March 1888, ordered the work to be postponed till some training of the river had been completed, so that materials of the value of about Rs. 3,124 have to lie over, and there is no work under construction in the neighbourhood to which they can be transferred.

3. Again eight sets of lifting-gear for flood-gate shutters, value Rs. 1,029, had been procured from Messrs. Massey and Co. for gates under construction, but the new type of gates ordered by the Chief Engineer for Irrigation requires different lifting-gear, so those in hand must lie over for the present and will be utilised hereafter.

4. Lastly a pair of gates, value Rs. 2,052, had been built for the flood-gate proposed at the Arni river, but as that has been abandoned (*vide* G.O., No. 96 L, of 6th February 1888) these must be put into stock for the present and will be utilised hereafter.

5. The distribution of the stock reserve that I now propose is shown in the accompanying statement.

ENCLOSURE.

Statement showing proposed limits of stock reserve in Buckingham Canal Division.

Item.	Sub-head.	Sanctioned limit.	As now made up.	Difference requiring sanction.
		RS.	RS.	RS.
1	Building materials	2,500	6,654	4,154
2	Timber	1,000	3,096	2,096
3	Metal	1,000	...	— 1,000
4	Miscellaneous	500	250	— 250
	Total ...	5,000	10,000	5,000

MADRAS,
15th September 1888.

(Signed) C. VINCENT,
Executive Engineer, Buckingham Canal Divn.

No. 217 B.C.

Copy forwarded to the Chief Engineer, Public Works Department, with a request that the limit of reserve stock may be increased as requested by the Executive Engineer.

27th September 1888.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

No. 213.

The limit of reserve stock in the Buckingham Canal division may be increased to Rs. 10,000.

9th October 1888.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer, P.W.D.

ORDER—dated 13th October 1888, No. 3260 W., Public Works.

Sanctioned.

(True Extract.)

Captain, R.E.,
Under-Secy. to Govt., P.W.D.

To the Superintending Engineer, II Circle.
„ Chief Engineer for Irrigation.
„ Examiner, Public Works Accounts.

GENERAL.
ACCOUNT.

Govt. of (1888) Madras.
PUBLIC WORKS.

Dated October, 13th.

Recd.

Encl.

G.O., 13th Oct. 1888, No. 3260 W.

OCTOBER.

Reserve Stock

Limit of — in the Buckingham Canal
division increased to Rs. 10,000.

21st SEPTEMBER 1887, No. 2497 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Account.

READ—the following letter from J. W. RUNDALL, Esq., Superintending Engineer,
II Circle, to the Chief Engineer, Public Works Department, dated Bezvada,
2nd September 1887, No. 201 B.C. :—

I have the honor to forward herewith a statement showing the proposed limit of
reserve stock for the Buckingham Canal division for your approval and sanction of
Government.

2. There is at present no authorised reserve of stock in this division. There are
various articles, such as cement, demarcation stones, cill stones, and anchor stones for
flood-gates, stones and shutters for outlet sluices, &c., which are constantly being
required. It would therefore be better to have a reserve stock of these.

ENCLOSURE.

STATEMENT showing the proposed limit of Stock Reserve in Buckingham Canal Division.

Item No.	Sub-head.	Limit proposed.	Remarks.
		RS.	RS.
1	Building materials *	2,500	* Cement 2,000
2	Timber	1,000	Cut-stone 500
3	Metal	1,000	Total ... 2,500
4	Miscellaneous	500	
	Total ...	5,000	

PULICAT,
25th August 1887.

(Signed) C. VINCENT,
Executive Engineer, Buckingham Canal Division.

(Signed) J. W. RUNDALL,
Superintending Engineer, II Circle.

ORDER—dated 21st September 1887, No. 2497 W., Public Works.

The limit of reserve stock in the Buckingham Canal division is fixed at Rs. 5,000
as recommended by the Superintending Engineer, II Circle.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Secretary to Govt., P.W.D.

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

Exd. J. Moses.
Spare Copies

GENERAL.
ACCOUNT.

Gobt. of {1887} Madras.
PUBLIC WORKS.

Dated September, 21st.

Recd.

Encl.

G.O., 21st Sept. 1887, No. 2497 W.

SEPTEMBER.

Reserve Stock in the
Buckingham Canal Division
Fixing the limit of — at Rs. 5,000.

6TH FEBRUARY 1888, No. 96 I., PUBLIC WORKS.

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

Irrigation-
Account.

READ—the following paper:—

No. 19 I.

Note by the Chief Engineer for Irrigation.

With letter No. 134 C., dated 12th November 1887, the Superintending Engineer, II Circle, submitted revised estimates, amounting to Rs. 2,62,670, for improving the Buckingham canal from Ennore to Pulicat, the amount of the sanctioned estimates for this portion of the canal being only Rs. 1,94,135 as shown below:—

	RS.
L. Earthwork	1,35,860
I. Navigation Works—	
Floodgate south of the Chintamony backwater	17,650
Floodgate north of the Chintamony backwater	16,650
South end of the Pulicat lake	7,325
Siding basins	
Total ...	1,94,135

2. The line of canal originally decided on, after much consideration, was to run along the strip of land between the sea and backwater from the Ennore north floodgate as far as the channel leading up to the Chintamony bar, which channel was to be banked across. From this point the line followed very nearly the east edge of the backwater up to the south side of the Arani river (23 miles 6 furlongs) where a floodgate was to be provided. From 11½ to 20 miles (Chintamony backwater) the line as originally sanctioned has been accepted with little or no alteration and work on this portion has been steadily carried on.

3. From 20th mile northwards the sanctioned line cannot be adhered to, the cyclone of November 1886 having conclusively shown that, if carried out, it could not be maintained. This cyclone produced at Pulicat a wave 7 feet above the highest recorded tide level, the results being that the Chintamony bar opened out, and the sea broke into the backwater at 22 miles 6 furlongs.

4. The Executive Engineer, Buckingham Canal, has proposed that from 20 miles northwards the new line of canal should be on the west of the backwater, floodgates being provided on north and south side of the Chintamony backwater, and the section 11½ to 20 miles to be a closed canal.

5. The latter portion of this proposal is approved, but decision as to the best line for the diversion north of Chintamony backwater must be deferred pending reply of the Superintending Engineer, II Circle, to this office No. II/54 B.C., dated 29th November 1887. Meanwhile, it is considered advisable that the revised estimates, as far as they relate to the section 11½ to 20 miles, be sanctioned at once, so that this portion may be completed as soon as possible.

6. The following revised estimates are therefore recommended for sanction:—

	RS.
1. B. Land—	20,000
Compensation for land	
2. L. Earthwork—	
Improvements to the canal, Ennore to Chintamony backwater	80,000
3. I. Navigation Works—	
Floodgate south of Chintamony backwater	18,625
4. Siding basin at Pulidivakkam	1,160
5. Do. at Kattupally	1,160
6. Do. at Kalingo	
7. O. Miscellaneous—	540
Demarcation	
Total ...	1,22,645

For items 1, 2, 3 and 7 revised estimates have been prepared in this office from those received from the Superintending Engineer, while for items 4, 5 and 6 the sanctioned amounts have been retained (*vide* item 12, section 1 of the abstract of completion estimate for the canal printed with G.O., No. 841 W., of 14th March 1888).

Royadorivu	...	...	Rs.	canal from Ennore to Pulicat and the
Dugurajapatam	...	...	5,715	revised estimate now recommended for
Sodavaram	...	...	5,715	sanction, as well as Rs. 39,920 provided
Tummalapenta	...	...	5,715	in the completion estimates of the canal
Oolapaliem	...	...	5,715	on account of rest-houses at the places
Kothapatam	...	...	5,715	noted in the margin which are now consi-
Panayaur	...	...	5,630	dered unnecessary, making a total of
			5,715	Rs. 1,11,410, may be reserved for improv-
Total	...	...	39,920	ing the canal from Chintamony backwater
				to Pulicat.

CHEPÁK,
27th January 1888.

(Signed) H. R. MEAD, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 6th February 1888, No. 96 I., Public Works.

The following revised estimates, amounting to Rs. 1,22,645, for improving the Buckingham canal from Ennore to Chintamony backwater, are sanctioned, against Rs. 1,94,135 the amount of existing sanction for improving the canal from Ennore to Pulicat, the difference of Rs. 71,490 as well as Rs. 39,920 provided for rest-houses not now required, making a total of Rs. 1,11,410, being reserved for improving the canal from Chintamony backwater to Pulicat:—

Provincial.			
43. Minor Works and Navigation.			
Works for which Capital and Revenue Accounts are kept.			
Buckingham Canal.			
Capital Account.			
Improving the canal from Ennore to Chintamony backwater—			
B. Land—			
Land compensation	...	...	Rs. 20,000
L. Earthwork—			
Improvements	...	...	80,000
I. Navigation Works—			
Floodgate south of Chintamony backwater	...	...	18,025
Siding basin at Pulidivakkam	...	...	1,160
Do. at Kattupally	...	...	1,160
Do. at Kalingo	...	...	1,160
O. Miscellaneous—			
Demarcation	...	...	540
Total	...	...	1,22,645

2. This sanction has been registered as No. 124 I. of 1887-88.

(True Extract.)

(Signed) H. R. MEAD, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with thirteen enclosures.
" Examiner, Public Works Accounts, with three duplicate abstract estimates.
" Revenue Department.
" Chamber of Commerce.
Erst. J. Moses.
Spare Copies

IRRIGATION.
ACCOUNT.

Gobt. of (1888) Madras.

PUBLIC WORKS.

Dated February, 8th.

Recd.

Encl.

G.O., 6th Feb. 1888, No. 96 I.

FEBRUARY.

Buckingham Canal Project

Revised estimates for improving the
Buckingham canal from Ennore to Chintamony
backwater, sanctioned with remarks.

3280

INDEX TO NOTES OF INSPECTION BY THE CHIEF ENGINEER FOR
IRRIGATION, BUCKINGHAM CANAL, NORTH, II CIRCLE,
FEBRUARY 1888.

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

Notes of inspection by the Chief Engineer for Irrigation, Buckingham Canal, North, II Circle, February 1888.

The canal north of the Pedda Ganjam flood-gate in 195th mile is in fair order, and is kept so from maintenance. North of the flood-gate a drainage falls into the canal; for this no inlet is allowed, and I do not think any is required. Some rough stone has been put down; this should be renewed from maintenance as required, so that it may be prevented from forming holes into the canal; there is but little tendency to do this at present.

2. *Flood-gate at 195th mile.*—This work has been completed some time ago. The gates do not open fully, the heel part of the gate and the hollow quoins not being properly fitted. This is unfortunately the case in many of the gates, but it is corrected in the later ones built.

3. *Outlet, 191st mile, completed.*—The crest of this work and of all the outlets built have been made at highest high tide level. I see no necessity for this level being kept up, ordinary high tide level which is about 1 foot below the highest is sufficient. We do not want to keep water higher than this in the canal, and the lower they are built the sooner and quicker they will relieve the canal of surplus water. The design for these appears very suitable for the work they have to do, but there is no necessity for the expensive cut granite coping for the top of the wings and bridge over the work. In future this can be dispensed with, and Portland cement concrete 6 inches thick can be substituted for it. Rough stone revetments are required in front; this costs but little and is necessary.

4. *Flood-gate north of Gundlacumma, 187th mile.*—There was last year a serious hole below this gate caused by the scour. A rough stone retaining wall has been put down, the hole filled with sand and bags of clay, and paved with stone 3 feet deep; this has answered perfectly. This system should be adopted whenever scour holes form below flood-gates, but when new gates are built and scour anticipated a permanent masonry retaining wall resting on wells and a flooring should be put down. At this gate blocks and tackle have been fixed to enable the gate to be closed with safety when required and also opened if necessary against a small head. Orders have been also laid down for it to be closed when the water rises up to a black mark placed at about highest high tide level, and have worked fairly this last season.

The tackle is secured to the top of the mitre post. I fear the strain at this point must eventually twist and strain the gate, and should prefer it being fastened lower down, nearer the centre of pressure. This can be done I believe by means of a chain working through a block and over a roller. Orders have been given for this to be tried as soon as possible on one of the flood-gates. In the meantime blocks and tackle should be provided for all the flood-gates that are built. This is being done, but it is hoped that before April next, when floods may be expected, all will be provided with tackle.

5. The left flood-bank to the Gundlacumma river has been completed. The river was encroaching on this side. Mr. Vincent has put up some neat low spurs that are effectively doing what is required.

The diversion at Kanuparti is completed, except some of the turfing and grass-planting; the latter must be carried out as soon as practicable, and the former next July, or when there is rain.

The navigation between Pedda Ganjam and the Gundlacumma, 187th mile, is very fair.

6. Reach 183rd to 187th mile has practically had little or nothing done to it. Owing to the two rivers, Gundlacumma and Mudigundi, crossing the canal, the tidal action is considerable, and this has widened out the canal, and when this piece of canal is taken up, the sites for the flood-gates, &c., if built will have to be decided. At present the navigation is very fair and this portion of the canal can wait.

7. Flood-gate south bank Mudigundi river 183rd mile completed, no scour hole, and the work good and satisfactory.

The canal from here to the Moossee river, 169.3 mile, is practically completed, but planting is required, as in places the sides of the canal are ragged. The navigation is very fair, and the cost of maintenance not great.

8. *Kothapatnam Wharf at 178½ mile.*—This is eight miles from Ongole, a large trade centre, and the traffic has increased much. It will be necessary for the Executive Engineer to lay down rules as regards the time boats should be allowed to lie at the wharf for loading and unloading.

There were 24 boats lying at the wharf (this is 500 feet in length and consists of laterite steps) and 44 boats in the canal unable to get at the wharf.

The fee for landing and taking cargo is four annas a ton (in December the tonnage was 474 tons, January 680 tons, and in 15 days of February 621 tons). Seven days are allowed for a boat on one fee. Probably the best arrangement will be to allow a boat to come to the wharf only one day for unloading and one day for loading, and, when not taking or discharging cargo from the boat, not to be allowed at the wharf but to be tied up at the bank beyond it. Hereafter a basin should be dug out on the east side of the canal where there is ample space for boats when waiting to be tied up. Plans and estimates for this should be sent in; it must be done from Extensions and Improvements and not charged to Capital.

Rules as regards leaving goods on the landing stage will also be necessary in order that it should not be crowded up with bags of grain, &c., as it is now. The Executive Engineer has been requested after consideration of the circumstances to prepare rules for this and other wharves, and also for the erection of sheds that some of the merchants wish to put up. Leases for plots for this purpose might be let out on ground rents for periods not exceeding one year.

9. The iron bridge south of the wharf is completed and is a good work. The outlet in the 171st mile has a crack right through the work; as probably all settlement have now ceased, this should be cut out to a depth of say 6 inches by 2 inches wide and filled in with Portland cement concrete.

There is an old hand dredge lying up near here; it is worn out and useless. It should be dismantled, the crab on it which is good removed to store, and the materials sold and got rid of.

10. *North Flood-gates, Moossee River, 169.7 miles*—completed, and also the flood-gates on the south side of the Paleru river at 168.2 mile.

The crossings of these two rivers and the channel between them are very fair, and the cost of maintenance not much. The erection of flood-gates between the Moossee and Paleru rivers has been given up for the present. I do not think they ever will be necessary.

11. The canal between south side of the Paleru and the north of the Manneru at 160th mile is approaching completion. The new diversion from 162.3 to the flood-gate is in good progress, and the 1½ of it was opened for traffic on the 16th February. It is hoped that the whole length will be opened in four months and turfing and grass-planting completed before the end of the year.

In this reach the outlets should be built as soon as practicable, and, as before remarked, the crests should be made at ordinary high tide level.

The Manneru left flood-bank is completed both above and below the flood-gate, and is a nicely laid out work. The revetments at the entrance of the canal are in progress, but sufficient care has not been taken with regard to laying them and thin footings out. No plan for this work has been made. This is not as it should be, but it will be corrected.

An inlet is required in rear of the flood-gate to take the drainage behind the flood bank into the canal. A rough stone weir will do for the present, and probably will be sufficient hereafter.

12. The crossing of the Manneru is very bad, and I fear it will always be an expensive and difficult one. The present entrance on the south side is about 1½ miles above that on the north side of the river. Before the floods of 1882 the canal extended half a mile lower down, and it was proposed to build the new flood-gate there, but the 1882 floods destroyed this half mile of canal, and it is advisable, if practicable, to carry the canal down on another line south of the original line so that the southern entrance may be nearly opposite to that on the northern side. A line for this has been marked out; it is 1 mile 3 furlongs in length, starting about 2 furlongs south of the present entrance, and the cost is estimated at Rs. 13,000 more than the original estimate. The site proposed by the Executive Engineer for the flood-gate is about 1½ furlongs from the end of the proposed diversion.

There is no doubt but that the river is working to the south, and that the river once ran across the line of the proposed diversion and flood-gate. I consider therefore it is not safe to build the flood-gate on the site proposed, and, especially as the grant for next year is not sufficient to allow the work to be undertaken this season, it is advisable to defer the final settlement with regard to the site of this flood-gate and line for the diversion until we see how much further the river is likely to go to the south. In the meantime it should be tried what can be done by means of spurs (similar to those put up in the Gundlacumma), planting, &c., if the encroachment to the south can be checked.

Should this succeed and the proposed line of diversion or rather extension of the canal be decided on, I would advise the flood-gate being built well away from the river and a long leading channel from it to the river being accepted. If this is done, should the river go to the south the flood-gate will be safe and the only loss be a certain length of the leading channel. Our experience on the canal show that leading channels of this sort do not silt up to any extent except just at their heads, for example the leading channel to the Moossee north flood-gate. This south Manneru flood-gate therefore is not to be built as intended this season, but the money that was to have been reserved for it should be utilised in building the outlets north of the Manneru referred to in paragraph 11.

13. *Reach 160th mile to 151st mile*—not inspected, but reported to be very fair navigation at the 151st mile. The canal crosses the Elikeru river, the north and south flood-gates of which are built; the river crossing is good and gives little or no trouble.

Last year the river rose to within 6 inches of top of gates owing to the bar remaining closed for some time. There was a scour hole below the south gate, but this has been repaired with stone.

14. The reach from the Elikeru 151st mile to the Chippaluru river 132.6 mile is in fair navigation. The estimated improvement to the canal, 134th mile to 150th mile, is not commenced, and, until the surplus arrangements are completed, the canal which is fair should remain as it is. The diversion north of the Chippaluru river north flood-gate 1½ mile in length is completed, except planting Kulsa grass, &c., required in places. The work is good and now only requires careful maintenance.

15. On the west side of the canal there is a drainage of about 50 square miles that has to be taken across the canal and disposed of by a bar that opens during heavy rains in the 149th mile. An outlet of 10 vents has been built at 149.1, and an opening at the 148.3 mile. There is another opening to a tidal creek at the 134.3 mile; this last is made by the spill of the Chippaluru river over its left or north bank;

this will hereafter be kept out of the canal by means of a flood bank. At 133rd mile, there is a 10-vent outlet under construction now raised to crest level.

16. These two outlets at the 149.1 and 133rd miles should have as much water-way as possible, the crests being lowered about 1 foot to the level of ordinary high tide. The shutters of the completed one at 149.1 should be utilised for the outlet to be built at the 166th mile, the crest of the work be lowered 1 foot and new shutters made up for it 1 foot deeper.

The crest of the outlet at the 133rd is to be lowered 1 foot; this can be done at a small extra cost. Expensive cut granite coping is not necessary; good Portland cement concrete about 6 inches thick is much cheaper and will answer all purposes.

17. Of course these two outlets are not sufficient for the drainage to be passed, as, however, there are several tanks and a large swamp on the west side of the canal; these act as flood regulators, and it is only during extraordinary rains that much water has to be passed across the canal, and, as this is the case, it is hoped that in ordinary years the two outlets may do all that is required.

During very heavy rains the water-way across the canal must be supplemented, and for this the openings in the east bank of the canal at the 134.3 and 148.3 miles should be closed by a small bank, only made up to about 4 feet above high tide level. When heavy rains occur the bars at these places should be cut as soon as practicable, and if it is found that this and the discharge through the outlets is not sufficient to relieve the canal, the bank should be cut at these places and the flood water allowed to flow across into the sea.

To facilitate the openings of the bars it will be as well, when heavy rains are anticipated, to cut a channel yearly through the high sand of the bars.

18. At 146.6 mile on the west side of the canal is an old road bridge; this should be repaired and kept as an inlet and tow-path bridge. At 142nd mile there is an outlet 180 feet in length; it requires repair and allows the drainage of a large swamp to enter the canal. The banks west of it have been thrown up in a bad line, and in consequence a portion of them have been washed into the canal; this must be corrected as soon as possible.

19. At Ramiapatnam the Sub-divisional officer's bungalow and office, &c., are in good order and the place is well kept. There is a great deal of traffic at this place, and eventually a wharf will be, I think, required here.

20. The north and south flood-gates of the Chippaleru river are completed, but the river has a tendency to cut the south. Some protection is required; a few spurs should be put down. The crossing is fair, but a long length of hand-dredging is necessary yearly. I do not see that this can be avoided.

The Chippaleru north flood-gate has no retaining wall or advanced apron; this will, I think, be required as the reach north of it is liable to receive so much drainage, a great portion of which must find its way through the flood-gate. It is therefore advisable for rough stone, &c., for this to be collected and kept ready in case of a scour-hole forming.

A flood-bank is necessary above this north gate, and the work should be put in hand at once as it is most important for flood waters to be kept out of the canal.

21. On the south side of the Chippaleru a flood-bank above the gates will be required to prevent the river spill coming across the canal. This will be a heavy work and require much consideration. It cannot be undertaken at present, as there is more important work to be done.

22. The diversion south of the Chippaleru river is open for traffic and nearly completed. It is a good piece of work, nicely laid out, turfed and grassed. At 132.1 mile the outlet of 5 vents has been built. The wings are not as long as they should have been, and this will necessitate more revetment.

This work should be ample for drainage, but it is not enough for the spill of the river; therefore, until the south flood banks to the Chippaleru are taken up, the opening south of it, which is the junction of the old line of canal and the diversion, must remain open.

The canal beyond this as far as the Iskapilly river has had nothing yet done to it. The navigation is fair and maintenance not heavy. It should remain as it is until the Chippaleru south flood bank is taken up.

23. *Iskapilly River.*—The flood-gates on both sides of the river are completed; the river crossing is fair, and as the bar generally remains closed, it is not expensive to maintain it. I see no practicable means of avoiding the inconvenience caused by the old oyster bed.

The flood-bank east of the south flood-gate completed, and the diversion to the Pyderu river is in good progress, one mile completed, and the remainder should be finished in four months; the diversion will be opened, it is hoped, next year. For the present the drainage on the east side, which is but little, can be let into the canal by a low place being left into the tow-path; hereafter, if necessary, an inlet can be built.

24. *Pyderu River.*—North and south flood-gates completed, crossing fair, and costs but little to maintain.

The diversion south of the river, about 1 mile in length, is completed and is in very good order; good maintenance is all that is required. Outlet at 121.3 mile completed; this might with advantage have its crest lowered when an opportunity occurs.

South of this the improvements to the canal have not been taken up, and this cannot be done until the works on the north side of the Pennér river are in progress. These works are very heavy, and I regret, owing to the small grant available next official year, all that can be undertaken is building the north Pennér flood-gate and the rest-house.

25. The northern arm of the Pennér has been closed and a very good substantial bank put up from the site of flood-gate up the river. This bank is being extended, and the work will be completed this season, so hereafter we shall have no spill on the north side of the Pennér to deal with.

It is, however, useless to attempt a commencement of the diversion from the north flood-gate and the bank to carry the canal across the old north arm of the Pennér unless we have funds to complete the work, and this we have not at present.

The bank will be 1,600 feet in length and the contents about 1,660,000 cubic feet. The earth has to be brought from either end, and this will give a head of more than 1,000 feet; this being the case, it will be advisable to do the work with a tramway and trucks. Engines are being made. As to the plant available from Sangam project, it is hoped that with some addition this may be sufficient for the work.

26. The excavation for the north flood-gate has been commenced, but as yet but little material is collected; this work must be pressed on, as it is important that the foundations should be completed before the end of April.

This flood-gate should be built with a retaining wall on wells and extended apron, as there will be in all probability considerable scour through it.

The river has gone to the south; this should be encouraged, and the river driven as much as practicable to the south by planting, &c. This planting should be begun from the point below the old head of the north branch (that has been closed).

27. The present crossing of the Pennér is very bad; it is about 3 miles in length and costs about Rs. 6,500 a year to maintain. It is impracticable for boats except at high and half tide, and therefore boats are nearly always delayed twelve hours, and sometimes longer.

The cut across the island between the central and south branch is specially difficult to maintain as it is closed nearly always after each flood in the river. This cannot be helped now, but it is hoped that as the southern branch enlarges (as it is now doing) the head of the island may be washed away and eventually the boats be passed round its head.

The Pennér crossing will always be difficult and costly to maintain, but when the northern works are completed the flood-gates will be only about 1 mile apart; this will make it much easier; it is therefore most important that these works should be carried out as soon as practicable.

28. But little has been done to the canal south of the Pennér, and the navigation up to the Gungapatnam river in the 112th mile is not good, in fact loaded boats can only pass during half tide.

The south gate of Gungapatnam river at the 111½ mile might be built as soon as funds are available and the canal south of it made good, but the portion of the canal north of the Gungapatnam river up to the Pennér must remain as it is until funds are available to enable this portion to be completed properly. This, however, should be put off until the canal north of the Pennér is completed.

29. *Maipad Wharf and Buildings*—are completed and will be open on the 1st March; it has been made 40 feet deep, the other wharves are 30 feet. In future all wharves should be made 30 feet deep so that boats, if necessary, may lie lengthways in them. As this wharf is 16 miles from Nellore, it is believed that eventually there will be much traffic at it.

30. *General Remarks*.—With the exception of the crossing of Manneru and Pennér rivers and the canal from the 111th mile to the 119th mile (the portions north and south of the Pennér), the navigation of the canal is very fair, and by the end of the year, when the diversions that are now approaching completion are all opened, there will be a great improvement, and with careful maintenance there should be no difficulty with regard to the navigation. Every endeavour should be made to thoroughly complete these portions of the canal as soon as practicable. This the Executive Engineer Mr. Vincent is doing, and I am glad to be able to state that the work is all being carried out in a very satisfactory and creditable manner. The crossings of the Manneru and Pennér will always be difficult and expensive to maintain, but the works proposed when carried out will greatly improve matters. It is much to be regretted that the grants for next official year are so small that these works cannot be taken up and begun. They will take two or three years to complete, and therefore it is important that they should be commenced soon.

CHEPÁK,
23th February 1888.

(Signed)

H. R. MEAD, Colonel, R.E.,
Chief Engineer for Irrigation.

No. 42 I.

Submitted for the information of Government.

CHEPÁK,
3rd March 1888.

(Signed)

H. R. MEAD, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 7th March 1888, No. 170 I., Public Works.

Communicated to the Superintending Engineer, II Circle, for information and guidance.

(True Extract.)

(Signed)

H. R. MEAD, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.
" Chamber of Commerce.

Exd. J. Moses.
Spare Copies

IRRIGATION.

Govt. of (1888) Madras.

PUBLIC WORKS.

Dated March, 7th.

Recd.

Encl.

G.O., 7th March 1888, No. 170 L.

MARCH.

Buckingham Canal

Notes of inspection by the Chief Engineer for Irrigation, — North, II Circle, for February 1888, communicated to the Superintending Engineer, II Circle.

3260
4

No. 170927-3-88
 - 969-6-2-88
 - 24974-21-9-87

1888.

P. W. DEPARTMENT.

Current No. 9811

From

The Suptg. Engineer
 II circle.

ENCLOS.—

No. 21713.C.—

Dated 27th Sept. 1888

Received 1st October 88

SUBJECT.

Requesting to increase
 the reserve stock limit
 of Buckingham Canal
 Division from Rs 5000
 to Rs 10000 for certain
 reasons

DISPOSAL.

No. 3715.C Dated 3rd Oct. 1888

To.

E.I.

For favour of
 opinion.

(2d) W.L.C.B.

2-10-88

D.W.

24/10

Statement showing proposed limits of Stock Reserve in Buckingham Canal Division

Remarks.
 Sanction to new difference
 of limit made requiring
 up to sanction

1 Building materials	2500	6654	4154
2 Timber	1000	3091	2091
3 Metal	1000		
4 Miscellaneous	500	250	
Stock	5000	10000	5000

Buckingham Canal Division
 Madras, 15th September 88

J. H. Amos & Co.

Superintending Engineer
 II Circle

3260
 2
 1630
 P. W. Department
 Recd. Engrs
 P. W. D.

inclosed S. B. No. 217 W. O.
27-9-88

No 1173

Buckingham Canal W. O. Office
Madras, 15th September/88

From

C. Vincent Esquire,

1P

Executive Engineer,

Buckingham Canal W. O.

To

The Superintending Engineer,

II Circle.

Sir,

In G. O. No 2497 W. O. of 21st Sept/87
the limit of reserve stock of this Division
was fixed at Rs 5,000. I have now the
honor to request that this limit may be
increased to Rs 10,000 under the following
Circumstances.

2. The Construction of a flood-gate
on the South bank of the Mannar
river was Contemplated during the
Current year, and materials had begun
to be Collected for it. But the Chief
Engineer for Irrigation in his Inspection
Notes para 12 printed in G. O. No 1708
of 7th March 1888 ordered the work

to be postponed till some training
of the river had been completed, so that
materials of the value of about Rs 3,24
have to lie over, and there is no work
under construction in the neighbour-
hood to which they can be transferred.

3. Again 8 sets of lifting-gear
for flood gate shutters valued Rs 1,029
had been procured from Messrs.
Massey & Co for gates under
construction, but the new type of gates
ordered by the Chief Engineer for
Irrigation requires different lifting-
gear, so those in hand must lie
over for the present, and will be
utilized hereafter.

4. Lastly a pair of gates value
Rs 2,052 had been built for the
flood gate proposed at the Arni
River, but as that has been
abandoned (vide G.O. No 96 S.
of 6th February 1888) these must be

put into stock for the present and
will be utilized hereafter. 3/10 20
5. The distribution of the stock reserve
that I now propose is shown in the
accompanying statement.

I have seen
1st/ C. Vincent
Executive Engineer
B.C. Ids.

No 217 B.C.

Copy forwarded to the Chief
Engineer, Public Works Department,
with a request that the limit of Present
Stock may be increased as requested
by the Executive Engineer.

Suptg Engrs office
27th September 1888

Harrison
Superintending Engineer
B.C. Ids

H.
25-9-88.

96 I 6.2.88
17037 3.88

R. W. Deftt
10254

No. 3715C d/3rd October 1888 From,

To. E. I. R 155-

The Asstg. Engineer,
2nd Circle.

For favour of
opinion

To, The Chief Engineer,
P. W. Deftt.

Wm
2.10.88
D. W.

Dated 27th Sept 1888.

To D. W. No 213.

The limit of Reserve
Stock in the Buckingham
Canal division may be
increased to Rs 10,000.

No. 217 B.C.
Enclos. 1.

9 October 1888 W. Deftt
D. E. I.

No 3260W d/13th October/88

10th
9-10-88

Sanctioned

Buckingham Canal Div.
Reserve Stock limit of—
Requesting to increase the—
to Rs 10,000, for certain
reasons.

Supr. Engr 2nd Circle
Chief Engr for Design
Responsible P. W. Deftt.

With order

Govt. of (1888) Madras.

PUBLIC WORKS.

Dated

83/01/91

Recd.

Encl.

G.O. 13 Oct 1888, No. 32604

Revenue Street

Limit of the work -
improvement of the
road to Rs 10,000.

80
6

5/5/10

85