

PROVIDING CWSS TO REDDIARPATTI AND 63 RURAL HABITATIONS IN PALAYAMKOTTAI UNION OF TIRUNELVELI DISTRICT WITH RIVER TAMIRAPARANI AS SOURCE UNDER NABARD ASSISTANCE

Quantity	: 4.348 MLD	Estimate Cost	: Rs.28.71 Crore
Source	: Infiltration wells in River Tamirabarani	AM. Cost	: Rs. 0.635 Crore
		Per capita Cost	: Rs. 9792
		Cost per 1000 litres	: Rs.14.60

1.PREFATORY:

Tirunelveli District is located in the southern part of Tamil Nadu. Reddiarpatti and 63 Rural habitations are situated in seven village panchayats of Palayamkottai union in Tirunelveli District of Nanguneri Assembly constituency. The seven village panchayats namely Reddiarpatti, Nochikulam, Muthur, Sivanthipatti, Etteri, Puthukulam and Munnirpallam are situated in the East and southern side of Tirunelveli Corporation. Out of the above 7 village panchayats, Reddiarpatti and Nochikulam panchayats are situated at the outskirts of the Tirunelveli Municipal Corporation. The main occupation of the people is Agriculture and craft workers for beedi making.

2. PROJECT AREA:

The Project area comprises of 64 Rural Habitations in 7 Village Panchayats (Reddiarpatti, Munnirpallam, Etteri, Puthukulam, Muthur, Sivanthipatti and Nochikulam) of Palayamkottai Union in Tirunelveli District.

3. EXISTING WATER SUPPLY ARRANGEMENTS:

At present the water supply is effected to these habitations through various CWSS with River Tamiraparani as source and Individual Power Pump Schemes with bore well and open well as sources as detailed below.

Sl. No	Name of Union	Name of Panchayat	No.of habitations	Name of CWSS covered
1.	Palayamkottai	Reddiarpatti(3),Munnirpallam (3), Etteri(4), Puthukulam(1) Muthur(6), Sivanthipatti(4) and Nochikulam(9)	30	CWSS to 40 Habitations in palayamkottai union 143 Habitations in Nanguneri union 2 Habitations in Kalakadu union in Tirunelveli District.
		Nochikulam	2	CWSS to 76 Habitations in Karunkulam union of Tirunelveli District.
		Reddiarpatti(9) and Nochikulam(4)	13	Individual Power pump scheme with bore well @ open well
		Reddiarpatti(11),Etteri(4), Sivanthipatti(1) and Nochikulam (3)	19	Newly identified habitations and approved by District Collector,Tirunelveli.

Now, the present level of supply (average) for the habitations is 10 lpcd.

4. NECESSITY OF THE PROPOSAL:

Due to the depletion of bore well sources and formation of newly developed areas, the existing water supply arrangements in Reddiarpatti Village panchayat becomes inadequate. Frequent representations have been received from the Hon'able Minister for Hindu Religious and Charitable Endowments Department and the local bodies, requesting adequate water supply to Reddiarpatti Village.

In order to provide a sustainable water supply to the habitations of this Panchayat, a detailed ground study was made with the Superintending Engineer, TWAD, T.K.Circle,Tirunelveli, Executive Engineer/TWAD Board/ RWS Division/ Tirunelveli, Executive Engineer/TWAD Board/ Maintenance Division/ Tirunelveli and Executive Engineer/ TWAD Board/ P.F. Division/ Tirunelveli on 14.6.2014.

It was suggested to provide a new CWSS by locating the Head Works at Tamiraparani River Source near Thirumalaikolundupruam which is at a distance of about 24 kms from Reddiarpatti Village and the detailed report for providing a new CWSS to Reddiarpatti Village has been submitted to the Managing Director/TWAD Board/Chennai.

While formulating the above project to Reddiarpatty Panchayat, it has been suggested to extend the scope to some villages of 6 other panchayats of Palayamkottai Union getting partial water supply and are located in the proposed alignment. All these habitations are the beneficiaries under CWSS to 185 habitations in Palayamkottai Union(40 habitations), Nanguneri Union (143 habitations) and Kalakadu Union (2 habitations) in Tirunelveli District and at present getting insufficient water supply to cater their needs due to habitants growth rate and reflection of drastic reduction of in and around ground water potential. Eventually it has been concluded to formulate a new CWSS covering the 39 villages in Reddiarpatti and 6 other enroute Panchayats as below.

Sl.No.	Name of Panchayat	No.of habitations
1.	Reddiarpatti	12
2.	Nochikulam	9
3.	Sivanthipatti	4
4.	Muthur	6
5.	Itteri	4
6.	Pudukulam(Part)	1
7.	Munneerpallam (Part)	3
	Total	39

The Managing Director/TWAD Board/Chennai has issued order to take up the investigation works for formulating the new CWSS to Reddiarpatti and 38 other enroute habitations in Tirunelveli District with Head Works in River Tamiraparani near Thirumalaikolundupuram vide Managing Director/TWAD Board/Chennai's letter No.F.246/SGDO/PM/R/2014/ dt.15-07-2014. Also this scheme has been announced by the Hon'ble Minister for Municipal Administration, Rural Development ,Law,Courts & Prisons Departments in the floor of Assembly during the presentation of Demand No.34 for the year 2015-16 for taking up the investigation works.

While installing a new CWSS as detailed above, the quantity already provided (481200 litres) to the above habitations through CWSS to 185 habitations in Palayamkottai Union (40 habitations), Nanguneri Union (143 habitations) and Kalakadu Union (2 habitations) in Tirunelveli District can be diverted to balance habitations, as the CWSS were designed to provide only 10 to 30 lpcd of river water, after deducting the supply from the local sources and also this scheme is now reached its intermediate stage of year 2016.

While reconnaissance survey, it has been noted that out of 39 habitations as detailed above, 6 other enroute habitations in the 7 Panchayat as per IMIS have also to be covered and 19 nos of new habitations which were approved later by the District Collector, Tirunelveli have also been identified to be considered- Therefore it is necessitated to formulate a CWSS covering all the above 64 habitations inclusive of newly identified enroute habitations as follows.

Sl.No	Name of Panchayat	No of habitations as per IMIS	No of habitations newly identified	Total
1)	Reddiarpatti	12	11	23
2)	Nochikulam	15	3	18
3)	Sivanthipatti	4	1	5
4)	Muthur	6	---	6
5)	Itteri	4	4	8
6)	Pudukulam (Part)	1	---	1
7)	Munneerpallam (Part)	3	0	3
	Total	45	19	64

5. POPULATION AND REQUIREMENT:

Necessary Population forecast has been approved by the Chief Engineer, Madurai vide Letter F.Reddiarpatty CWSS/ AE3(D)/2017/dated.6.04.2017 for all the above 64 habitations covered in 7 village panchayats. Adopting the base year as 2020, the intermediate (2035), and ultimate (2050) population is computed as 40659 and 57468 respectively. Out of the above 7 village panchayats, Reddiarpatti and Nochikulam panchayats are situated at the outskirts of the Tirunelveli Municipal Corporation, for which the pro- rata supply of 70 lpcd is adopted as per urban agglomeration norms as per B.P.102 (PDC)/ dated.23.11.2010. For the remaining rural habitations ,55 lpcd is adopted in this proposal.

The intermediate and the ultimate requirement of water including 10% transmission loss after deducting the existing water supply for all the above 64 habitations are worked out to 2.948 MLD and 4.341 MLD for intermediate and ultimate respectively. Adopting 18 hours of pumping and by maintaining the minimum requirement at 10 lpm, the requirement of water is as tabulated below.Necessary bulk provision (10%) has also been made to meetout the commercial and industrial demand.

Sl.No	Name of village Panchayat	No.of Habitations	Pro rata of supply (LPCD)	Population			Requirement in MLD		Requirement Discharge (in LPM) @18 Hours pumping	
				Present 2020	Inter 2035	Ultimate 2050	Inter 2035	Ultimate 2050	Inter 2035	Ultimate 2050
1	Nochikulam	18	70	7090	11180	17640	0.798	1.295	739	1200
2	Sivanthipatti	5	55	3890	4160	4450	0.210	0.228	195	211
3	Muthur	6	55	3650	4500	5500	0.231	0.291	214	269
4	Etteri	8	55	2050	2160	2270	0.118	0.125	115	119
5	Pudukulam	1	55	298	331	368	0.016	0.018	15	17
6	Reddiarpatti	23	70	11790	17600	26280	1.269	1.937	1173	1796
7	Muneerpallam	3	55	552	728	960	0.038	0.052	35	38
	Total	64		29320	40659	57468	2.680	3.946	2486	3660
	Add 10% bulk supply (commercial and industrial)						0.268	0.395	249	366
	Grand Total	64		29320	40659	57478	2.948	4.341	2735	4026

The rate of discharge is worked out to 2735 lpm and 4026 lpm for intermediate and ultimate stage respectively.

6. BRIEF DESCRIPTION OF THE PROPOSAL:

It is proposed to construct 5 Nos of Infiltration Wells in River Thamirabarani near Thirumalaikolunthupuram Village as source for this CWSS. The water from each infiltration well will be pumped to the proposed 2.45 LL capacity sump at head works in Thirumalaikolunthupuram by means of 4 HP submersible pumpset of duty of 547 lpm x 19 m in each IW and through the connecting main of size of 125 mm CI LA Class D/F pipes to a total length of 2500 m.

The water from the proposed 2.45 LL capacity sump at head works in Thirumalaikolunthupuram will be pumped to the proposed sump of capacity 2.45 LL in Booster station at Achimadam through the pumping main of length 11.85 km (300 mm DI K7) by means of 30 HP HSC pumpsets of duty of 2735 lpm x 32 m. From this sump at Achimadam, water will be pumped by 30 HP submersible pumpsets of duty of 1996 lpm x 50 m to the Village sumps ie, Existing sumps at Reddiarpatti of capacity 10000

lit , 30000 lit at Muthur for Sivanthipatti and to the proposed sumps at Reddiarpatti of capacity 1.30 LL, Muthur of capacity 20000 lit and Etteri of capacity 10000 lit, through the pumping main and Branch pumping main of total length 16.515 km (250mm,200 DI K7pipes, 140,110,90 and 63 mm PVC Pipes)

Water from the Village sumps will be pumped to the proposed and existing service reservoirs through the proposed pumping and branch main of 34.82 km (Sizes from 160mm to 50mm PVC) and with the existing pipe line of 18.20 km (sizes 63 & 50mm PVC).

It is proposed to construct 15 Nos of Service Reservoirs and to utilize 42 Nos of existing Service Reservoirs. Water from the proposed and existing service reservoirs in the above 7 Village Panchayats will be distributed to the public through the proposed (90mm PVC 4KSC for 2.50 km and 63mm PVC 4KSC for 25.73 km) and existing Distribution System. 92 nos of Public fountains are proposed to be constructed in the proposed Distribution main in the above 7 village panchayats.

7. DETAILED DESCRIPTION OF THE PROPOSAL:

7.1 Head Works:-

It is proposed to draw the subsurface water from the River Tamiraparani by constructing 5 Nos of Infiltration Wells in River Thamirabarani near Thirumalaikolundupuram as source for this CWSS. The subsurface water will be pumped through submersible pumpsets by adopting 18 hours of pumping. The details are

Infiltration Well	:	5 Nos of 4.5 m dia, 6m depth in river Tamiraparani near Thirumalaikolundupuram
Connecting main	:	125 mm CI LA Class D/F pipes – Total length - 2500 m
Pump room	:	6 m X 4 m
Pumpset	:	IW - 4 HP SUB - 547 lpm x 19m Sump - 30 HP HSC - 2735 lpm x 32m

7.2 Pumping main from Head Works to Booster Station I at Achimadam:-

Clear water from the Head Works will be conveyed to Booster station I at Achimadam through

300 mm DI K7 pipes – 11850 m

The alignment of pumping main is along Thirumalaikolundupuram – Keelapattam – Bukitmanagar – Melapattam – Ariyakulam – Achimadam which includes rural roads, state highway road (Tirunelveli – Maniyachi – Rameswaram), one NHAI (Tirunelveli- Tuticorin) crossing.

7.3 Booster Station at Achimadam :-

It is proposed to provide one sump of 2.45 LL capacity at Achimadam, the enroute of Tirunelveli – Tiruchendur State Highways SH 39 road in S.F.No. 256 of Nochikulam village. The land is of Panchayat Promboke land. It is proposed to construct the Pumproom of size 6m x 4m to house the pumpsets as detailed below

Sump capacity	:	2.45 LL
Pump room	:	6 m x 4 m.
Cholorinator room	:	4 m x 3 m.
Pumpsets	:	30 HP SUB 1996 lpm x 50 m to Reddiarpatti existing sump 3 HP SUB 399 lpm x 28 m to Group I Service Reservoirs of Nochikulam panchayat. 3 HP SUB 340 lpm x 27 m to Group II Service Reservoirs of Nochikulam panchayat.

7.4 Pumping main from Booster Station I at Achimadam to existing sump at Reddiarpatti:-

Water from the Booster station I at Achimadam will be conveyed to existing sump of capacity 10000 lit at Reddiarpatti through

250 mm DI K7 pipes – 5100 m

200 mm DI K7 pipes – 3760 m

63 mm PVC 4KSC pipes – 10m

The alignment of pumping main is along Achimadam – Muthur – Reddiarpatti rural roads which includes one State Highways (Tirunelveli – Tiruchendur) crossing, one NHAI (Tirunelveli- Kanyakumari) crossing and one Railway crossing (Tirunelveli – Tiruchendur).

The branch pumping main for the remaining village sumps are as follows.

Branch to proposed Sump at Muthur for Muthur	140 mm PVC 4 KSC pipe - 2700m 110 mm PVC 4 KSC pipe - 90m 90 mm PVC 4 KSC pipe - 555m
Branch to existing Sump at Muthur for Sivanthipatti	90 mm PVC 4 KSC pipe - 10m
Branch to proposed Sump at Etteri	90 mm PVC 4 KSC pipe - 3550 m 80 mm GI (medium) pipe – 650 m
Branch to proposed Sump at Reddiarpatti	200 mm DI K7 pipe - 90m

7.5 Village sumps , Pump Room and Pumpsets:-

The requirement of all each village panchayat will be collected in separate village sumps and will be pumped to the proposed and existing service reservoirs in each village panchayat . The details of Village sumps , Pump Room and Pumpsets are as follows.

Sl No	Name of panchayat	Capacity of Sump	Pumproom	Pumpset
1	Nochikulam	2.45 LL (Booster sump @ Achimadam)	6m x 4m 4m x 3m	I-3 HP Sub 399 lpm x 28m II-3 HP Sub 340 lpm x 27m
2	Muthur	20000 (proposed)	2m x 2m	1 HP Sub 214 lpm x 16m
3	Etteri	10000 (proposed)	2m x 2m	1 HP Sub 130 lpm x 30m
4	Pudhukulam }			
5	Reddiarpatti	130000 (proposed)	3m x 3m	I-12.5 HP Sub 866 lpm x 42m II-4 HP Sub 307 lpm x 20m
6	Sivanthipatti	30000 (Existing @ Muthur)	3m x 3m (Ex)	1 HP Sub 195 lpm x 17m
7	Munneerpallam	10000 (Existing @ Reddiarpatti)	2m x 2m (Ex)	1 HP Sub 35 lpm x 20m

7.6 Pumping and branch main from Village sumps to Service Reservoirs

Water from the Village sumps will be pumped to the proposed and existing service reservoirs through the proposed pumping and branch main of 34.82 km and with the existing pipe line of 18.20 km as follows.

Sl No	Name of panchayat	Pipes Proposed	Existing Pipes to be utilized
1	Nochikulam	160 mm PVC 4 KSC pipe - 1330m 140 mm PVC 4 KSC pipe - 210m 110 mm PVC 4 KSC pipe - 2550m 90 mm PVC 4 KSC pipe - 870m 75 mm PVC 4 KSC pipe - 280m 63 mm PVC 4 KSC pipe - 3915m 50 mm PVC 6 KSC pipe - 3620m	63 mm PVC 4 KSC pipe - 700m
2	Muthur	110 mm PVC 4 KSC pipe - 25m 90 mm PVC 4 KSC pipe - 3390m 75 mm PVC 4 KSC pipe - 2400m 63 mm PVC 4 KSC pipe - 1040m 50 mm PVC 6 KSC pipe - 650m	
3	Etteri	90 mm PVC 4 KSC pipe - 60m 75 mm PVC 4 KSC pipe - 930 m 63 mm PVC 4 KSC pipe - 430m 50 mm PVC 6 KSC pipe - 1855m 50 mm GI pipe - 60m	50 mm PVC 6 KSC pipe - 3805m 50 mm GI pipe - 500m
4	Pudhukulam }		
5	Reddiarpatti	160 mm PVC 6 KSC pipe - 1020m 160 mm PVC 4 KSC pipe - 40m 140 mm PVC 4 KSC pipe - 1720m 110 mm PVC 4 KSC pipe - 1370m 90 mm PVC 4 KSC pipe - 1610m 63 mm PVC 4 KSC pipe - 450m 50 mm PVC 6 KSC pipe - 340m	63 mm PVC 4 KSC pipe - 370m

6	Sivanthipatti	110 mm PVC 4 KSC pipe - 310m 90 mm PVC 4 KSC pipe - 50m 75 mm PVC 4 KSC pipe - 60m 63 mm PVC 4 KSC pipe - 3550m 50 mm PVC 6 KSC pipe - 685m	50 mm PVC 6 KSC pipe - 4800m
7	Munneerpallam	-----	63 mm PVC 4 KSC pipe - 5620m 50 mm PVC 6 KSC pipe - 2400m

7.7 Service Reservoirs

It is proposed to construct 15 Nos of Service Reservoirs and to utilize 42 Nos of existing Service Reservoirs as follows.

Sl No	Location of Village sump	Proposed (capacity in LL)							Existing (capacity in LL)				
		0.10	0.20	0.30	0.4	0.50	0.60	Total	0.10	0.20	0.30	0.60	1.00
1	Nochikulam	1	-	2	-	-	-	3	6	-	7	1	-
2	Muthur	3	1	-	-	-	-	4	1	-	5	-	-
3	Etteri	1	-	1	-	-	-	2	2	-	2	-	-
4	Pudhukulam	-	-	-	-	-	-		1	-	-	-	-
5	Reddiarpatti	1	-	1	1	1	1	5	1	1	4	4	-
6	Sivanthipatti	1	-	-	-	-	-	1	1	-	1	1	1
7	Munneerpallam	-	-	-	-	-	-		2	-	1	-	-
	Total	7	1	4	1	1	1	15	14	1	20	6	1

7.7 Distribution System

Water collected in the existing and proposed Service Reservoirs in all the above 7 panchayats will be distributed to the public through the existing distribution main of 31.80 km and the proposed distribution main of 90mm PVC 4KSC for 2.50 km and 63mm PVC 4KSC for 25.73 km. 92 nos of public fountains are proposed in the newly developed area.

8. L.S.PROVISIONS

Necessary LS provisions have been made for the following works.

- ❖ Road restoration charges
- ❖ Railway crossing works
- ❖ Providing separate power feeder main
- ❖ Power supply arrangements
- ❖ TWAD Board lab testing charges for materials
- ❖ Conducting SBC of soil
- ❖ Cleaning of sump and SR site

9. CLEARANCES

Sl. No	Clearances	Proposal
1	Source	RSSFC cleared the proposal in its meeting held on 27.7.2016.
2.	Regional Technical Committee	cleared the proposal in its Meeting held on 27.7.2016
3.	SLTC	cleared the proposal in its Meeting held on 18.7.2017
4.	Administrative sanction	Accorded vide G.O.(Ms)No.18 .(WS1) dt.5.3.2018 for Rs. 28.71 crore to install and Rs.63.50Lakh towards annual operation and maintenace.

10. RATES:

Current TWAD Board Schedule of rates for the year 2017-18 is adopted. *The Annual Maintenance estimate has been corrected as per the orders in in B.P.No: 5 (Operation and Maintenance wing) dt. 22.02.2018*

11. COST:

Cost of installation	Rs	28.71 Crore
Anunal maintenance cost	Rs	<u>0.635</u> Crore
Per capita cost (present)	Rs	9792 /-
Cost per 1000 litres		
Installation	Rs	14.60
A.M	Rs	5.90

10. FUNDING:

Administrative sanction has been accorded vide G.O.(Ms)No.18 .(WS1) dt.5.3.2018 for Rs.28.71 crore to install and Rs.63.50Lakh towards Annual Operation and Maintenance with the following funding pattern.

NABARD loan assistance under RIDFXXIII (2017-18)	Rs.23.4279
The respective Capital Grant funds(CGF) i.e. from Town Panchayat CGF/Rural Development CGF	Rs. 5.2821

11. MAINTENANCE:

The scheme will be executed by TWAD Board. After completion of the project, the scheme will be maintained by TWAD Board.

[Signature]
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Tirunelveli

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