
## Step by step method

# RAINWATER HARVESTING

**To save every drop of Rainwater join together**

Chennai Metropolitan Water Supply and Sewerage Board

CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD
METRO WATER
மாசைப் போற்றுதும், மாசைப் போற்றுதும்

## Importance of Rainwater Harvesting in Chennai City

The drinking surface water sources for Chennai City comes from Poondi, Cholavaram, Red Hills and Chembarambakkam reservoirs and ground water source from 6 well fields located on Arani and Koratalaiyar river basin. Distant sources like Veeranam lake in Cuddalore District and from Telugu Ganga Projects. In addition to this CMWSSB is drawing water from 2 sea water Desalination Plants. The Chennai City and its suburbs often face water scarcity due to the failure of monsoon and periodical insufficient rainfall. During the crisis Chennai city to depend mainly on ground water sources. Ground water is being extracted through domestic wells in Chennai City. Due to the extraction of ground water along the coastal zone leads to depletion of ground water level and also deterioration of quality. In order to avoid this situation, the recharge of ground water in this zone has to be enhanced by rainwater harvesting.

In coastal city like Chennai, there is no alternative method other than harvesting the rainwater during monsoon periods. So the rainwater methods are essential for the Chennai City and its areas surrounding it.

## Rainwater Harvesting

### What?

It is the activity of direct collection of rainwater for direct use or can be stored into ground water aquifer by various Rain Water Harvesting Method.

### Why?

- To avoid water scarcity
- To improve water resources

- To conserve and augment the storage of rainwater.
- To reduce water table depletion.
- To improve the quality of water.
- To arrest seawater intrusion in coastal areas.
- To avoid flood and water stagnation in urban areas.
- To control formation of cracks on walls.

**How?**

Broadly rainwater can be harvested in two ways:

- Collection of rain water directly in containers and sumps for direct use.
- Rain Water may be recharged into the ground to improve the water table

How much rainwater can be harvested?

| | |
|---|---|
| Average annual rainfall in | : 1,200 mm (or) 120 cm (or) 4 ft |
| Amount of Rainfall in 1 sq.ft | : 1 sq.ft x 4 ft = 4 Cubic feet |
| 1 Cubic feet = 28.3 litres. Hence one year rainfall in 1 sq.ft will be | : 113 litres |
| Amount of rainwater collected in one ground plot (2,400 sq.ft building area) will be | : 2,400 x 113 = 2,71,200 litres |
| Volume of water recharged into the ground (Considering of 60% of effective recharge) | : 1,62,720 litres / Year |

This means that in one year we are replenishing 1, 62,720 litres / year from an area of 2400 Sq.ft. By means of doing this we can able to control ground water scarcity and also can improve ground water depletion.

## Initiatives taken by Metro water on Rainwater Harvesting

- Chennai Metro Water, CMDA and Chennai Corporation jointly formed different types of rainwater harvesting Methods to be implemented by the citizens of Chennai.
- Accordingly the CMDA is to admit / accord Planning Permission for multi-storied buildings / special buildings only if RWH methods are incorporated in the planning permission.
- All new buildings irrespective of size should have a proposal for construction of RWH structures for issue of planning permission by Chennai Municipal Corporation.
- Since 2000 year for the Ground +3 floors building only water connection are given by CMWSSB if the RWH Structures are implemented.
- As per the Government of Tamil Nadu notification, from August 2003 all the buildings in the Tamil Nadu have implemented the Rainwater Harvesting Structures Method.
- Making Rainwater Harvesting Structures as compulsory for all the buildings (irrespective of size and area) when approaching CMWSSB for new water and sewer connections.

- Having achieved 100% coverage, Metro water Board launched a verification programme to ensure the adequacy and effectiveness of the structures provided to harvest rain water fully.
- Under this, officials of Metro water inspected every building and wherever inadequacies are noticed, the owners of the buildings are requested to either to improve the structures or to provide additional structures.
- In order to assess the impact of the scheme on the ground water potential in Chennai city about 200 Nos. of Digital Water Level Recorders (DWLR) were constructed in all the 200 Depot offices spread over 426 sq.km of chennai city. In addition to this 15 Automated Raingauges fixed in all the Area Offices.

## Benefits of Rainwater Harvesting

Broadly Chennai City's soil conditions have been divided into 3 major zones for recharge purposes.

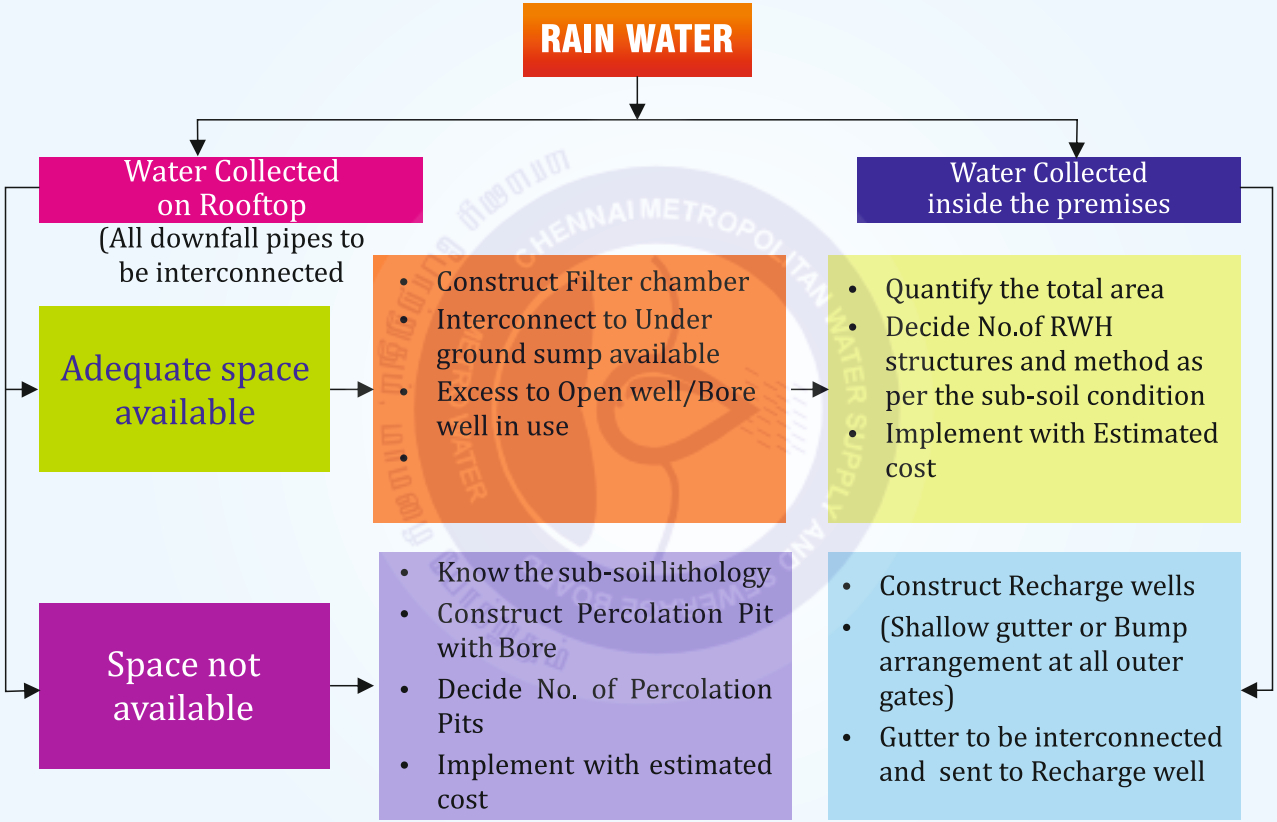
- Sandy area
- Clayey area
- Hard rock area

After the implementation of rainwater harvesting methods, ground water levels in sandy area raised from 2 to 3 metres below ground level, in clayey areas from 3 to 5 metres below ground level and in hard rock areas from 3 to 5 metres below ground level. Similarly the

Total Dissolved Solids (TDS) will also reduce from 500 to 250 ppm and from 3500 to 1500 ppm..

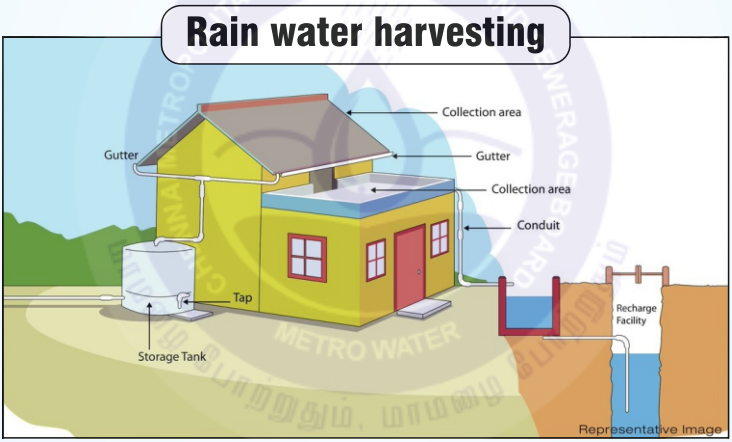
## Roof top rain water harvesting methods

- Rainwater harvesting from the roofs of thatched and hut houses.
- Rainwater harvesting through open wells
- Rainwater harvesting through Bore wells
- Rainwater harvesting through Percolation pits
- Rainwater harvesting through Percolation pits with bore
- Rainwater harvesting through Recharge pits
- Rainwater harvesting through Recharge pit with bore


RAIN WATER
Water Collected on Rooftop
(All downfall pipes to be interconnected
Water Collected inside the premises
Adequate space available
Construct Filter chamber
Interconnect to Under ground sump available
Excess to Open well/Bore well in use
Quantify the total area
Decide No.of RWH structures and method as per the sub-soil condition
Implement with Estimated cost
Space not available
Know the sub-soil lithology
Construct Percolation Pit with Bore
Decide No. of Percolation Pits
Implement with estimated cost
Construct Recharge wells
(Shallow gutter or Bump arrangement at all outer gates)
Gutter to be interconnected and sent to Recharge well

## STEP 1 - Rooftop Harvesting

- Assessment of Total area of the premises (Roof top and surface area)
- Mode of Ground water extraction
  - Open well
  - Bore well
- Know the sub surface lithology



# Chennai City Sub-soil Lithology

| Sl. | Location | Subsoil formation | | | Type of rain water Harvesting structures for recommended area |
|---|---|---|---|---|---|
| | | Sand | Clay | Clayey Sand | |
| 1 | Kodungaiyur | G.L-10' | 10'-30' | 30'-55' | Recharge well |
| 2 | Tondiarpet | G.L-40' | | 40'-60' | Recharge well |
| 3 | Royapuram | G.L-40' | | 40'-60' | Recharge well |
| 4 | Old Washermenpet | G.L-20' | 20'-30' | 30'-60' | Recharge well |
| 5 | Vysarpadi | 20'-60' | G.L.-20' | 60'-80' | Recharge well cum bore pit |
| 6 | Vysarpai North, Mullai Nagar | 20'-60' | G.L.-20' | 60'-80' | Recharge well cum bore pit |
| 7 | Perambur | G.L.-60' | | 60'-90' | Recharge well |
| 8 | Sembium, Thiru.Vi.Ka.Nagar | G.L.-60' | | 60'-90' | Recharge well |
| 9 | Periyar Nagar, GKM Colony | -- | G.L.-30' | 30'-90' | Recharge well |
| 10 | Kolathur, Kumaran Nagar | -- | G.L.-30' | 30'-90' | Recharge well cum bore pit |
| 11 | Villivakkam, Baba Nagar | -- | G.L.-30' | 30'-90' | Recharge well cum bore pit |
| 12 | Mugappair, Wavin India Ltd. | | G.L.-20' | 20'-60' | Recharge well cum bore pit |
| 13 | Anna Nagar West | | G.L.-20' | 20'-60' | Recharge well cum bore pit |
| 14 | Anna Nagar Central | | G.L.-20' | 20'-60' | Recharge well cum bore pit |
| 15 | Anna Nagar East | -- | G.L.-20' | 20'-60' | Recharge well cum bore pit |
| 16 | Villivakkam | -- | G.L.-30' | 30'-90' | Recharge well cum bore pit |
| 17 | New Avadi Road | 20'-40' | G.L.-20' | 40'-80' | Recharge well |

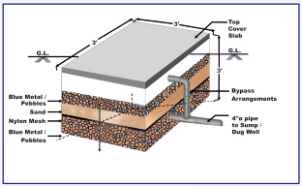
| | | | | | |
|---|---|---|---|---|---|
| | | | | | cum bore pit |
| 18 | Ayanavaram | 20'-40' | G.L.-20' | 40'-80' | Recharge well cum bore pit |
| 19 | Perambur | 20'-40' | G.L.-20' | 40'-80' | Recharge well cum bore pit |
| 20 | Pulianthope | G.L.10' | 10'-30' | 30'-60' | Recharge well |
| 21 | George Town | G.L.10' | 10'-30' | 30'-60' | Recharge well |
| 22 | Choolai | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 23 | Kelly's (Medavakkam) | G.L.10' | 10'-30' | 30'-65' | Recharge well |
| 24 | Mogappair West, Nolambur | G.L.10' | 10'-30' | 30'-65' | Recharge well |
| 25 | Thirumangalam | G.L.10' | 10'-30' | 30'-65' | Recharge well |
| 26 | Arumbakkam, MMDA Colony | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 27 | Aminjikarai | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 28 | Kilpauk | G.L.10' | 10'-30' | 30'-65' | Recharge well |
| 29 | Egmore | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 30 | Purasiwakkam | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 31 | Vepery | G.L.10' | 10'-30' | 30'-70' | Recharge well |
| 32 | Park Town | G.L.20' | 20'-40' | 40'-60' | Recharge well cum bore pit |
| 33 | Fort St.George, Secretariat | G.L.30' | 30'-40' | 40'-70' | Recharge well cum bore pit |
| 34 | Chinthadripet | G.L.20' | 20'-30' | 30'-65' | Recharge well |
| 35 | Egmore, Montieth Road | G.L.20' | 20'-30' | 30'-65' | Recharge well cum bore pit |
| 36 | Chetpet | G.L.20' | 20'-30' | 30'-70' | Recharge well cum bore pit |
| 37 | Koyambedu | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 38 | Alwar Thirunagar | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |

| | | | | | |
|---|---|---|---|---|---|
| 39 | Virugambakkam | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 40 | Vadapalani, Kumaran Colony | G.L.20' | 20'-40' | 40'-90' | Recharge well cum bore pit |
| 41 | Choolaimedu | G.L.20' | 20'-40' | 40'-90' | Recharge well cum bore pit |
| 42 | Nungambakkam | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 43 | Anna Salai, Thousand Lights | G.L.20' | 20'-30' | 30'-60' | Recharge well cum bore pit |
| 44 | Royapettah | G.L.20' | 20'-30' | 30'-60' | Recharge well |
| 45 | Triplicane | G.L.20' | 20'-30' | 30'-80' | Recharge well |
| 46 | Mount Road | G.L.20' | 20'-30' | 30'-60' | Recharge well cum bore pit |
| 47 | Chepauk | G.L.20' | 20'-30' | 30'-60' | Recharge well |
| 48 | Gopalapuram | G.L.20' | 20'-30' | 30'-90' | Recharge well cum bore pit |
| 49 | Teynampet | G.L.20' | 20'-30' | 30'-65' | Recharge well cum bore pit |
| 50 | T.Nagar, Panagal Park | G.L.20' | 20'-30' | 30'-90' | Recharge well cum bore pit |
| 51 | T.Nagar, GN Chetty Road | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 52 | T.Nagar, Burkit Road | G.L.20' | 20'-30' | 30'-90' | Recharge well cum bore pit |
| 53 | West Mambalam | G.L.20' | 20'-30' | 30'-90' | Recharge well cum bore pit |
| 54 | K.K.Nagar | G.L.20' | 20'-30' | 30'-90' | Recharge well cum bore pit |
| 55 | Nesapakkam | G.L.20' | 20'-30' | 30'-70' | Recharge well cum bore pit |
| 56 | Ekkatuthangal | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 57 | Ashok Nagar | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |

| | | | | | |
|---|---|---|---|---|---|
| 58 | Saidapet | G.L.40' | | 40'-50' | Recharge well cum bore pit |
| 59 | Nandanam | G.L.20' | 20'-30' | 30'-50' | Recharge well cum bore pit |
| 60 | Alwarpet | G.L.20' | 20'-30' | 30'-80' | Recharge well cum bore pit |
| 61 | Mandaveli | G.L.20' | 20'-30' | 30'-60' | Recharge well |
| 62 | Mylapore, Luz | G.L.20' | 20'-30' | 30'-60' | Recharge well |
| 63 | Santhome | G.L.20' | 20'-30' | 30'-65' | Recharge well cum bore pit |
| 64 | Raja Annamalaipuram | G.L.20' | 20'-30' | 30'-70' | Recharge well cum bore pit |
| 65 | Kotturpuram | G.L.20' | 20'-30' | 30'-45' | Recharge well cum bore pit |
| 66 | Guindy | G.L.10' | 10'-20' | 20'-30' | Recharge well cum bore pit |
| 67 | Besant Nagar | G.L.30' | | 30'-90' | Recharge well |
| 68 | Sastri Nagar | G.L.20' | 20'-30' | 30'-60' | Recharge well cum bore pit |
| 69 | Thiruvanmiyuur | G.L.40' | | 40'-90' | Recharge well |
| 70 | Velachery | G.L.20' | 20'-30' | 30'-60' | Recharge well cum bore pit |
| 71 | Taramani | G.L.20' | 20'-30' | 30'-40' | Recharge well |

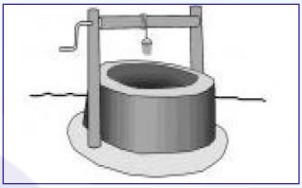
## STEP 2 - Rooftop Harvesting

- Identify the space availability
- Available
- Not available

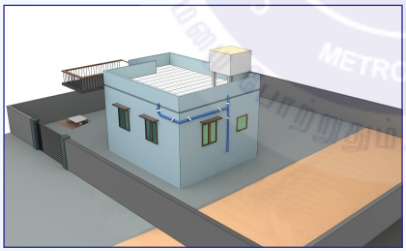


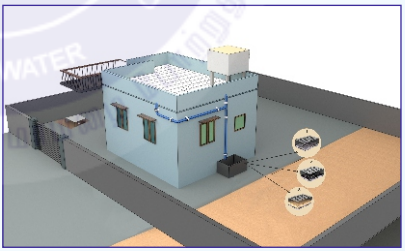

## STEP 3 – Rooftop Harvesting

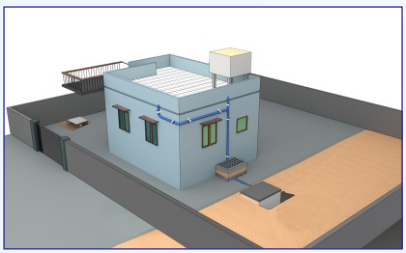
- If open well (source well) available
- If one or more rooftop rainwater pipes interconnect both of them and bring one pipe
- Construction of filter chamber
- Interconnection from filter chamber to existing sump
- Interconnection from filter chamber to source well

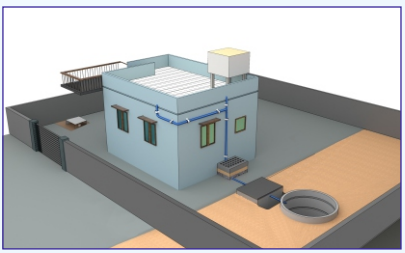


Open Well









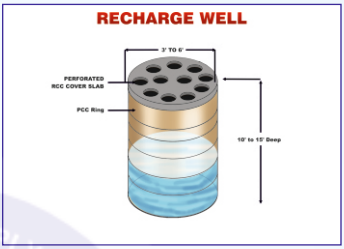
# Estimation for Filter Chamber

| Sl. No. | DESCRIPTION | UNIT | UNIT RATE in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Excavation for 2.5'x2.5'x2.5' size pit for filtering chamber | cft | 13.5 | 16 | 216 |
| 2 | 4.5" Brick work of size 2'x2'x2' including plastering | sft | 100 | 8 | 800 |
| 3 | Providing Top cover slab of 2" thickness | sft | 80 | 4 | 320 |
| 4 | Providing River sand | cft | 85 | 2 | 170 |
| 5 | Providing 1.5 inch thick railway jelly | cft | 100 | 2 | 200 |
| 6 | Providing Netlon mesh | Sq.ft | 50 | 4 | 200 |
| 7 | Transportation of Materials | Lumpsum | 494 | 1 | 250 |
| | **Total** | | | | **2156 Say 2200** |

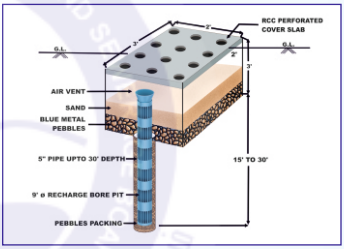
## STEP 4 – Rooftop Harvesting

**Other than rooftop the remaining areas If open well (source well) available**

If Bore well (source well) available and space available




- Refer the lithology
- Construct Recharge well
- If one or more rooftop rainwater pipes inter-connect both of them to recharge well




If Bore well (source well) available and space not available

- Percolation pit with bore

## Estimation for Recharge Well – 3 ft dia &10 ft depth

| Sl. No. | DESCRIPTION | Unit | Unit Rate in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Providing 3ft dia Recharge well upto 10ft depth | No | 1500 | 10 | 15000 |
| 2 | Top cover slab | Lumpsum | 900 | 1 | 900 |
| 3 | Transportation of Materials | | | Lumpsum | 600 |
| | **Total** | | | | **16500** |

## Estimation for Percolation Pit -10 ft depth

| Sl. No. | DESCRIPTION | Unit | Unit Rate in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Drilling of 10" dia auger drill up to a depth of 10 ft. | fft | 130 | 10 | 1300 |
| 2 | Supply of 6" PVC Slotted pipe | rft | 125 | 10 | 1250 |
| 3 | Providing collar for the bore pit as silt arrester | fft | 150 | 3 | 450 |
| 4 | Constructing Brick chamber | 2'x2'x2' | Lumpsum | 1350 | 11350 |
| 5 | Providing filter material like Bluemetal, Netlong mesh and river sand | Lumpsum | --- | ----- | 570 |
| 6 | Top cover slab | Lumpsum | 480 | 1 | 480 |
| 7 | Transportation of materials | Lumpsum | ----- | ----- | 300 |
| | **TOTAL** | | | | **5700** |

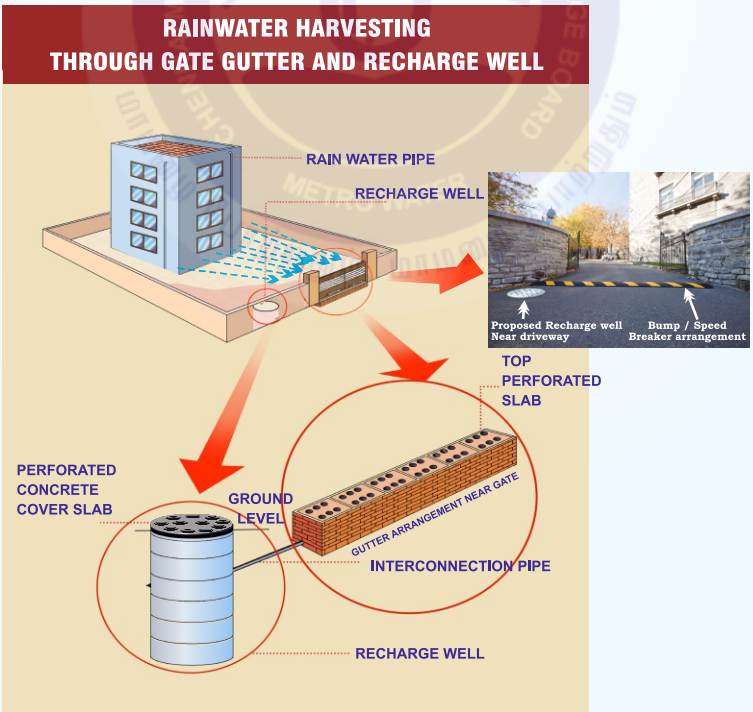
## Estimation for Percolation Pit - 20 ft depth

| Sl. No. | DESCRIPTION | Unit | Unit Rate in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Drilling of 10" pipe up to a depth of 20 feet. | fft | 130 | 20 | 2600 |
| 2 | Supply of 6" PVC Slotted pipe | rft | 125 | 20 | 2500 |
| 3 | Providing collar for the bore pit as silt arrester | fft | 150 | 3 | 450 |
| 4 | Constructing Brick chamber 2'x2'x2' | Lumpsum | 1350 | 1 | 1350 |
| 5 | Providing filter material like Bluemetal, Netlong mesh and river sand | Lumpsum | --- | ----- | 570 |
| 6 | Top cover slab | Lumpsum | 480 | 1 | 480 |
| 7 | Transportation of materials | Lumpsum | ----- | ----- | 300 |
| | **TOTAL** | | | | **8250** |

## STEP 5 – Surface runoff Harvesting

**Other than rooftop the remaining areas If open well (source well) available**

- Interception near gates with the help of a shallow gutter
- Gutter size – 1 ft wide, 1 ft depth and 10 ft width or simple bump arrangement
- Top cover slab with perforation
- Construction of Recharge well
- Interconnection from gutter to recharge well



## Estimate for providing Gate Gutter near Gate

| Sl. No. | DESCRIPTION | Unit | Unit Rate in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Excavation for 10'x 3'x 1'4"size pit for filtering chamber | cft | 13.5 | 90 | 1215 |
| 2 | Cement concrete using 1:1.5:3 using 20mm guage hard broken stone jelly for plain concrete works including laying ramming etc complete | cft | 210 | 12 | 2520 |
| 3 | Brick or stone masonry in cement mortor walls under 3m high | cft | 250 | 30 | 7500 |
| 4 | Perforated cover slabs | Lumpsum | | | 5250 |
| 5 | Transportation of Materials | | | Lumpsum | 515 |
| | **TOTAL** | | | | **17,000** |

## Estimate for providing Bump /Speed breaker arrangement near Gate

| Sl. No. | DESCRIPTION | Unit | Unit Rate in Rs. | Quantity | Cost in Rs |
|---|---|---|---|---|---|
| 1 | Thorough scrapping of old polished surface | Lumpsum | | | 500 |
| 2 | Cement concrete using 1:1.5:3 using 20mm guage hard broken stone jelly for plain concrete works including laying ramming etc complete | cft | 210 | 5 | 1050 |
| 3 | Transportation of Materials | | | Lumpsum | 200 |
| | **TOTAL** | | | | **1,750** |

# COST ESTIMATE FOR PROVING RWH INSTALLATION FOR ROOF TOP AREA UPTO 600 sq.ft

| Options | RWH Structure | 4" pvc pipe 8m | Cost of RWH structure | Total in Rs. |
|---|---|---|---|---|
| Building with existing sump/open well | Filter chamber | 1,280 | 2156 | 3436 |
| Building with bore well | Filter Chamber in the existing bore well | 1,280 | 2156 | 3436 |
| **If space available** Building without sump/ open well/ bore well - **sandy soil / Clayey Soil** | Recharge well | ----- | 16500 | 16500 |
| **If space is not available** Building without sump/ open well/ bore well- **sandy soil / Clayey soil** | Percolation Pit 20 ft depth (1no) | ----- | 8250 | 8250 |

**NOTE :**

- The well/bore well is assumed to be within a distance of 5 metres and the down fall pipe line is within 3 metres apart
- Refer cost for Recharge well and Percolation pit

# COST ESTIMATE FOR PROVING RWH INSTALLATION FOR ROOF TOP AREA UPTO 1000 sq.ft

| Options | RWH Structure | 4" pvc pipe 8m | Cost of RWH structure | Total in Rs. |
|---|---|---|---|---|
| Building with existing sump/open well | Filter chamber | 1,920 | 2156 | 4076 |
| Building with bore well | Filter Chamber in the existing bore well | 1,920 | 2156 | 4076 |
| **If space available** Building without sump/ open well/ bore well - **sandy soil / Clayey Soil** | Recharge well | ----- | 16500 | 16500 |
| **If space is not available** Building without sump/ open well/ bore well- **sandy soil / Clayey soil** | Percolation Pit 20 ft depth (2 nos.) | ----- | 8250 | 16500 |

**NOTE :**

- The well/bore well is assumed to be within a distance of 9 metres and the down fall pipe line is within 3 metres apart
- Refer cost for percolation pit and Recharge well

# COST ESTIMATE FOR PROVING RWH INSTALLATION FOR ROOF TOP AREA UPTO 1500 sq.ft

| Options | RWH Structure | 4" pvc pipe 8m | Cost of RWH structure | Total in Rs. |
|---|---|---|---|---|
| Building with existing sump/open well | Filter chamber | 3200 | 2156 | 5356 |
| Building with bore well | Filter Chamber in the existing bore well | 3200 | 2156 | 5356 |
| **If space available** Building without sump/ open well/ bore well - **sandy soil / Clayey Soil** | Recharge well | ----- | 16500 | 16500 |
| **If space is not available** Building without sump/ open well/ bore well- **sandy soil / Clayey soil** | Percolation Pit 20 ft depth (3 nos.) | ----- | 8250 | 24750 |

**NOTE :**

- Assumed that 3 recharge structures are provided on either side for building of size 30' x50' (one at either side and one near the entrance gate)
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level.

# COST ESTIMATE FOR PROVING RWH INSTALLATION FOR ROOF TOP AREA UPTO 2400 sq.ft

| Options | RWH Structure | 4" pvc pipe 8m | Cost of RWH structure | Total in Rs. |
|---|---|---|---|---|
| Building with existing sump/open well | Filter chamber | 4800 | 2156 | 6956 |
| Building with bore well | Filter Chamber in the existing bore well | 4800 | 2156 | 6956 |
| **If space available** Building without sump/ open well/ bore well - **sandy soil / Clayey Soil** | Recharge well | ----- | 16500 | 16500 |
| **If space is not available** Building without sump/ open well/ bore well- **sandy soil / Clayey soil** | Percolation Pit 20 ft depth (4 nos.) | ----- | 8250 | 33000 |

**NOTE :**

- Assumed that 4 recharge structures are provided on either side for building of size 60' x 40' (each 2 percolation pits on either side of the building)
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level.

# COST ESTIMATE FOR PROVING RWH INSTALLATION FOR ROOF TOP AREA UPTO 5000 sq.ft

| Options | RWH Structure | 4" pvc pipe 8m | Cost of RWH structure | Total in Rs. |
|---|---|---|---|---|
| Building with existing sump/open well | Filter chamber | 4800 | 2156 | 6956 |
| Building with bore well | Filter Chamber in the existing bore well | 4800 | 2156 | 6956 |
| **If space available** Building without sump/ open well/ bore well - **sandy soil / Clayey Soil** | Recharge well | ----- | 16500 | 16500 |
| **If space is not available** Building without sump/ open well/ bore well- **sandy soil / Clayey soil** | Percolation Pit 20 ft depth (4 nos.) | ----- | 8250 | 33000 |
| Provision of Gate Gutter near Gate | Gate gutter | ------- | 17000 | 17000 |
| Provision of Bump / Speed Breaker arrangement near gate | Speed breaker / Bump arrangement | -------- | 1750 | 1750 |
| | Recharge well | -------- | 16500 | 16500 |

**NOTE :**

- Assumed that 4 recharge structures are provided on either side for building of size 60' x 40' (each 2 percolation pits on either side of the building) and Gate Gutter arrangement / Speed breaker arrangement near gate . Provision of recharge well near Gate Gutter / Bump arrangement
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level.

## For 300 sq.ft Roof Top Area
## Necessary required RWH Structures

| Soil | open well | Bore well | 4" PVC Pipe | Filter chamber | Percol-ation Pit 10' depth | Percol-ation Pit 20' depth | Re-charge well | Cost in Rs. | Re-marks |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | 480 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 2636 | 3m length PVC pipe |
| | No | Yes | 480 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 2636 | 3m length PVC pipe |
| Sandy | No | No | No | No | 5700 | Not Nece-ssary | Not Nece-ssary | 5700 | |
| Clayey | No | No | No | No | No | 8250 | Not Nece-ssary | 8250 | -- |

## For 600 sq.ft Roof Top Area
## Necessary required RWH Structures

| Soil | open well | Bore well | 4" PVC Pipe | Filter chamber | Percol-ation Pit 10' depth | Percol-ation Pit 20' depth | Re-charge well | Cost in Rs. | Re-marks |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | 1280 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 3436 | 8m length PVC pipe |
| | No | Yes | 1280 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 3436 | 8m length PVC pipe |
| Sandy | No | No | No | No | 5700 | Not Nece-ssary | Not Nece-ssary | 11400 | |
| Clayey | No | No | No | No | No | 8250 | Not Nece-ssary | 18250 | 4m length PVC pipe |

**NOTE :**

- Assumed that 12 mts of 4" PVC pipe required for interconnection to Rooftop rain water pipe and to Open / Bore well
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level..

# For 900 sq.ft Roof Top Area
# Necessary required RWH Structures

| Soil | open well | Bore well | 4" PVC Pipe | Filter chamber | Percol-ation Pit 10' depth | Percol-ation Pit 20' depth | Re-charge well | Cost in Rs. | Re-marks |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | 3200 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 4076 | 20m length PVC pipe |
| | No | Yes | 3200 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 4076 | 20m length PVC pipe |
| Sandy | No | No | No | No | 11400 (2nos) | Not Nece-ssary | Not Nece-ssary | 11400 | — |
| Clayey If space available | No | No | No | No | No | Not Nece-ssary | 16500 | 16500 | -- |
| If space not available | No | No | No | No | 33000 (4 Nos) | Not Nece ssary | Not Nece ssary | 33000 | -- |

# For 1200 sq.ft Roof Top Area
# Necessary required RWH Structures

| Soil | open well | Bore well | 4" PVC Pipe | Filter chamber | Percol-ation Pit 10' depth | Percol-ation Pit 20' depth | Re-charge well | Cost in Rs. | Re-marks |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | 2800 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 5036 | 20m length PVC pipe |
| | No | Yes | 2800 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 5036 | 20m length PVC pipe |
| Sandy | No | No | No | No | 11400 (2nos) | Not Nece-ssary | Not Nece-ssary | 22800 | — |
| Clayey If space available | No | No | No | No | No | Not Nece-ssary | 16000 | 16000 | -- |
| Clayey If space available | No | No | No | No | No | 24750 (3 Nos) | Not Nece ssary | 24750 | – |

**NOTE :**

- Note: Assumed that 12 mts of 4' PVC pipe required for interconnection to Open / Bore well
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level. .

# For 2400 sq.ft Roof Top Area
# Necessary required RWH Structures

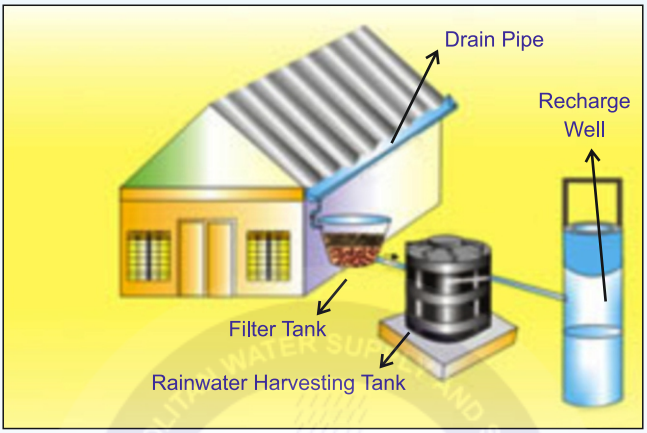
| Soil | open well | Bore well | 4" PVC Pipe | Filter chamber | Percol-ation Pit 10' depth | Percol-ation Pit 20' depth | Re-charge well | Cost in Rs. | Re-marks |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | 3200 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 5356 | 20m length PVC pipe |
| | No | Yes | 3200 | 2156 | Not Nece-ssary | Not Nece-ssary | Not Nece-ssary | 5356 | 20m length PVC pipe |
| Sandy | No | No | No | No | 22800 (4nos) | Not Nece-ssary | Not Nece-ssary | 22800 | — |
| Clayey If space available | No | No | No | No | No | Not Nece-ssary | 16500 | 16500 | -- |
| If space not available | No | No | No | No | 33000 (4 Nos) | Not Nece ssary | Not Nece ssary | 33000 | -- |

**NOTE :**

- Note: Assumed that 12 mts of 4' PVC pipe required for interconnection to Open / Bore well
- In sandy areas the depth of percolation pit is 10 ft and in clayey/ hard rock areas .the depth is 20 ft below ground level. .

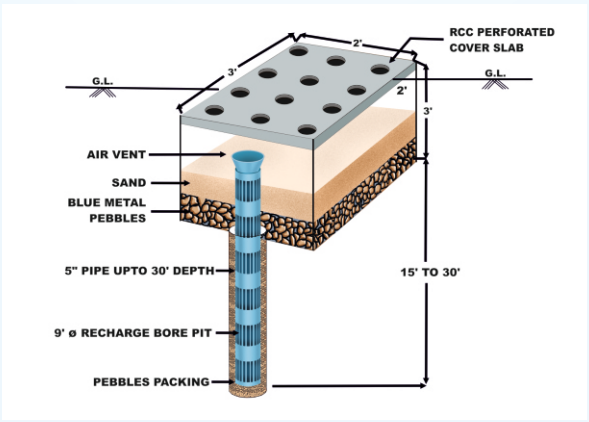
## Maintenance of Rainwater Harvesting Structure

## Rainwater Harvesting in Sloped Roof Houses



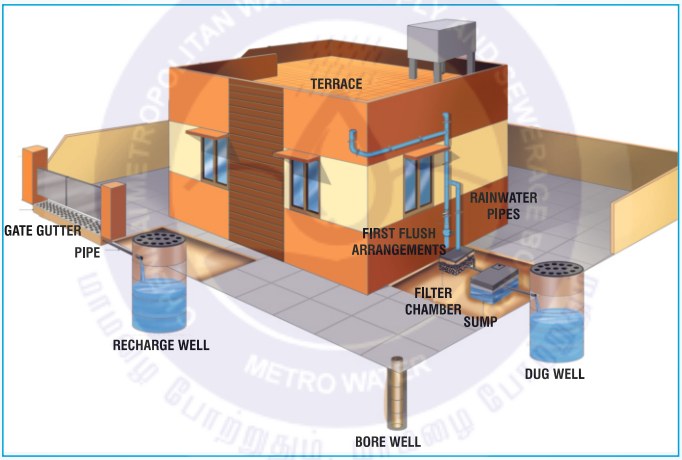

- Remove the dust / debris accumulated in the half round gutter and ensure that the rain water flows freely.
- Remove and clean the sand / blue metal / pebbles fill up in the Filtering Chamber by washing them with water and refill the chamber with blue metal at the bottom, pebbles at the middle and sand at the top.

## Maintenance of Percolation Pits



- Remove the Top cover slab of the Percolation pit and clean the sand / brick bats / pebbles with water and refill the chamber with blue metal at the bottom, pebbles at the middle and sand at the top.
- Ensure that there are no blocks or cracks in the existing rain water pipes from the roof top that connects the Percolation pits and also check whether the rain water percolates freely into the soil without any overflow.

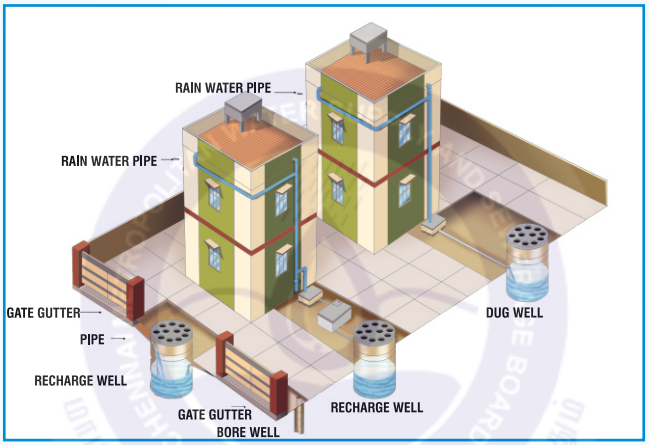
## 3. In Individual Houses




- Ensure that there are no blocks or cracks in the existing rain water pipes from roof and the pipes connecting Filter Chamber and the open well / bore well.
- Remove and clean the sand / blue metal / pebbles fill up in the Filtering Chamber by washing them with water and refill the chamber with blue metal at the bottom, pebbles at the middle and sand at the top.
- Clean the roof of the building before the rainy season.

## 4. In Multi-storied Buildings

- The top perforated cover slab of the gutter provided near the gate to prevent rain water going out of the campus has to be removed and the accumulated silt / debris are to be cleaned.
- Check and ensure that the rain water freely reaches the gutter and do not overflow outside the premises.




- Make sure that the rain water flows into the Recharge well constructed adjacent to the gate gutter.
- Remove the silt and debris at the bottom of the Recharge well. If necessary for providing a cushion effect and for ensuring the stability of the Recharge well fill the bottom of the well with sand / brick bats / blue metal for about one foot from the bottom.
- Ensure the working condition of water flowing PVC pipes / filter chamber and percolation pits by cleaning them.

- Ensure that there are no blocks or cracks in the existing rain water pipes from roof and the pipes connecting Filter Chamber and the open well / bore well.
- Remove and clean the sand / blue metal / pebbles fill up in the Filtering Chamber by washing them with water and refill the chamber wit blue metal at the bottom, pebbles at the middle and sand at the top.
- Clean the roof of the building before the rainy season.
- Remove the Top cover slab of the Percolation pit and clean the sand / brick bats / pebbles with water and refill the chamber with blue metal at the bottom, pebbles at the middle and sand at the top.
- Ensure that there are no blocks or cracks in the existing rain water pipes from the roof top that connects the Percolation pits and also check whether the rain water percolates freely into the soil without any overflow.

## THINGS TO BE REMEMBERED

- The place in which Rainwater stored / utensils used must be clean
- Rainwater used for drinking purpose must be boiled.
- The excess rainwater from the sump has to be recharged either through Recharge wells of Percolation pits.
- The nature of Rain Water Harvesting (RWH) structures and their design parameters remain the same for any building except the physical scale (size) and no. of structures which may increase corresponding to the size of the catchment.
- If manholes (waste water line) are present in the open space the height of which have to be raised a little to avoid draining of rain water along with waste water.
- The cost of RWH structures may vary depending on the availability of existing structures like wells / tanks which may be modified to be used, thereby reduce the cost.
- Grill / Mesh has to be fixed at the entrance / mouth of the rain water pipe in the terrace to filter large particles such as leaves etc.
- Avoid pavements since unpaved surfaces have more percolation rate. If paving of open space is unavoidable use perforated pavement blocks to allow percolation of rain water.
- For effective recharge of rain water combination of different structures may be used as per the site requirement viz. area of the building and soil conditions.
- All recharge structures must be properly maintained for effective recharge throughout the year. Maintenance is very easy and simple.

# ANNEXURE-I

# RAINWATER HARVESTING IN CHENNAI CITY

## 1. Chennai Scenario

The annual rainfall in Chennai is in the range of 1200-1300mm. However, the rainfall occurs in short spells of a few days. Hence, it is important to conserve the rainwater during these few days by installing suitable Rain Water Harvesting structures either to use it for recharging the aquifer or for direct use. Failure to do so will result in flooding of low-lying areas and wastage by means of run-off into the sea and water scarcity during summer months.

Therefore, it is to be considered necessary that

- The depletion of ground water table has to be arrested so that the variation in water level fluctuation would be minimized.
- The quality of ground water in Chennai has to be improved to certain extent possible so that the dependence on pipe water supply would be minimized.
- The possibility of saline water intrusion in the coastal areas of the city has to be arrested at any cost, in order to conserve this precious fresh water source.
- The city should be made self-sufficient for its water requirements.

It is obvious that the ground water aquifers must be recharged in all possible ways for maintaining the ground water level and quality in a sustainable manner. The Rain Water Harvesting (RWH) is the only answer to achieve this goal.

## 2. Types of Rain Water Harvesting Structures

The RWH can be done at micro level and macro level. The micro level harvesting can be done in individual buildings in residential areas and the macro level harvesting can be done by constructing check dams across the rivers.

### 2.1. Micro level Harvesting

In residential areas the rain water can be collected and recharged into the ground water aquifers through the following methods:

1. Harvesting rain water from the roof-top
2. Harvesting rainwater from the open spaces.

The CMWSS Board classified the methods of rainwater harvesting structure based on soil condition, suitable for sandy, clayey and rocky formation that exist in Chennai city. According to the soil lithology existing in Chennai city, the CMWSS Board has designed number of cost effective RWH structures, made it readily available to the public free of cost, and published in various media for ready application for easy installation of the RWH structures.

Rainwater can be collected directly or recharged into the ground. Since Chennai City is receiving heavy rainfall in short durations, it is advised to divert the rainwater to the RWH structures for recharge purpose.

#### 2.1.1 Types of Rain Water Harvesting

Roof-top Harvesting

1. Open well method
2. Bore well method

**Roof-top / open space Harvesting**

1. Percolation / recharge pit
2. Percolation /recharge pit with bore
3. Recharge trench
4. Recharge trench with bore
5. Recharge well (small diameter)
6. Recharge well (large diameter)

**2.2. Macro level Harvesting – Construction of Check dams**

The macro level harvesting has been done by constructing check dams across rivers. CMWSS Board has constructed three check dams at Melsembedu, Velliyur and Jaganathapuram in Arani-Koratalaiyar Basin (AK Basin) across the Koratalaiyar River. Due to the construction of these check dams, the ground water table in the neighboringareas is increasing considerably there by helps to increase the rate of extraction from the CMWSS Board's production wells, located near the check dams.

**3.0. Legislative measures**

Realizing the importance of regulatory mechanisms for providing Rainwater Harvesting, Tamil Nadu Government has taken the following legislative measures:

1. Mandatory provision for Rainwater Harvesting by CMWSS Board for New water / Sewer connections –Year2000.
2. Amendment in Chennai Metropolitan Area Ground Water (Regulation) Act 27 of 1987, for implementing

Rainwater Harvesting – Year24thOctober 2002.

3. Amendments to Tamil Nadu District Municipalities Building Rules, 1972 and Multistoried and Public Building Rules, 1973, Provision forconservation of Rainwater – Year11thOctober 2002.

4. Tamil Nadu Ordinance No.4 of 2003 issued to implement RWH –Year 31st August 2003

**WATER SAFETY AWARENESS CAMPAIGN BY CMWSSB – 2021.**

The Chennai Metropolitan Water Supply and Sewerage Board (Metro Water) conducted awareness campaign from August 31st, 2021, to September 9th, 2021. Self help Group women as 'Water Volunteers' created awareness about rainwater harvesting in Chennai.

Teams of 'Water Volunteers' were engaged in 15 zones, and they visited households to distribute awareness Pamphlets and interacted with public to sensitize them on rainwater harvesting methods and maintenance. In this campaign, two helpdesks had been setup at each of the200 Metro Water depots to create awareness about rainwater harvesting among the public and take their grievances if any, for further action. Each of these 400 helpdesks had a team of five women SHG members, 2,000 in all, who visited 35,000 streets in the city to interact with the families.

Apart from creating awareness, the Water Volunteers provided technical details about rainwater harvesting structures based on the type of building, water, and sewage connections. They collected the details about total dissolved solids in groundwater and Metro Water and also inspected all

the buildings to check the conditions of existing rainwater harvesting structures.

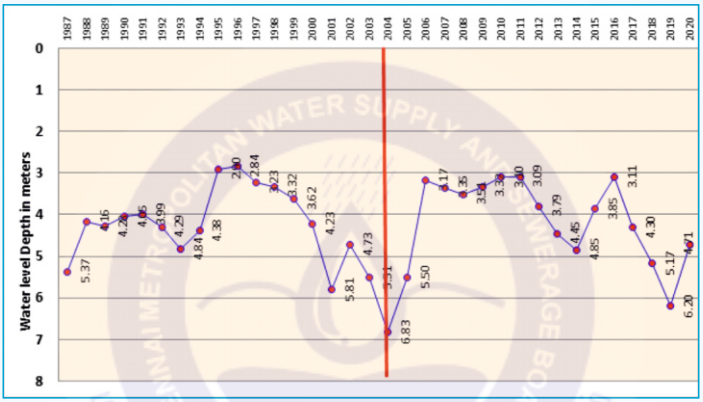
In Chennai City 7,92,019 premises surveyed during this campaign, in which about 74.23% premises have implemented Rainwater Harvesting structures.

- Overall, 7,92,019 premises Surveyed.
- 74.23% premises have implemented the Rainwater Harvesting.
- The Area wise percentage of premises implemented RWH structures

| RANK | AREA NUMBER | AREA NAME | RWH EXIST% | RWH NOT EXIST% |
|---|---|---|---|---|
| 1 | AREA09 | TEYNAMPET | 93.5% | 6.5% |
| 2 | AREA10 | KODAMBAKKAM | 93.3% | 6.7% |
| 3 | AREA08 | ANNANAGAR | 92.7% | 7.3% |
| 4 | AREA06 | THIRU-VI-KANAGAR | 92.0% | 8.0% |
| 5 | AREA13 | ADYAR | 83.7% | 16.3% |
| 6 | AREA04 | TONDIARPET | 82.2% | 17.8% |
| 7 | AREA05 | ROYAPURAM | 81.3% | 18.7% |
| 8 | AREA11 | VALASARAVAKKAM | 70.2% | 29.8% |
| 9 | AREA07 | AMBATTUR | 68.0% | 32.0% |
| 10 | AREA12 | ALANDUR | 60.8% | 39.2% |
| 11 | AREA01 | THIRUVOTTIYUR | 52.9% | 47.1% |
| 12 | AREA03 | MADHAVARAM | 52.6% | 47.4% |
| 13 | AREA14 | PERUNGUDI | 47.4% | 52.6% |
| 14 | AREA15 | SHOLINGANALLUR | 37.5% | 62.5% |
| 15 | AREA02 | MANALI | 34.7% | 65.3% |

CMWSSB initiated action to cover the non-compliance of Rainwater Harvesting buildings by giving notices and with technical guidance on the methods and it will be completed before the onset of monsoon 2022.

## Improvement in Chennai City Average Water levels before and after Rainwater Harvesting



## 1. RWH DESIGNS AND RELATED STRUCTURES FOR ORDINARY / MULTI-STOREYED / SPECIAL BUILDINGS AT MICRO LEVEL IN CHENNAI CITY – GENERAL RECOMMENDATIONS / GUIDELINES

The Chennai Metropolitan Water Supply and Sewerage Board, making rainwater harvesting structures as compulsory for all the buildings (irrespective of size and area) when approaching for new house service water and sewer connections as the Board has powers to control extraction, conservation and use of ground water in Chennai Metropolitan Area vide Section 6(2) (V) of CMWSS Board act 1978.

In this regard, the following recommendations / guidelines on rainwater harvesting designs and related structures for ordinary / multi storied / special buildings in Chennai City are furnished.

### 1. RAINFALL RECHARGE CALCULATION

Average annual rain fall in Chennai city : 100 to 120 cms/year

### INTENSITY OF RAINFALL :

a) Normal intensity : 1 cm / hour

b) Maximum intensity : 3 cms / hour

Average intensity : 2 cms / hour

**RAINFALL FOR AN INDIVIDUAL HOUSE MEASURING 2400 Sq.ft (223 Sq.mts)**

= 223 Sq.m X .02 m/hour

= 4.5Cu.m/hour

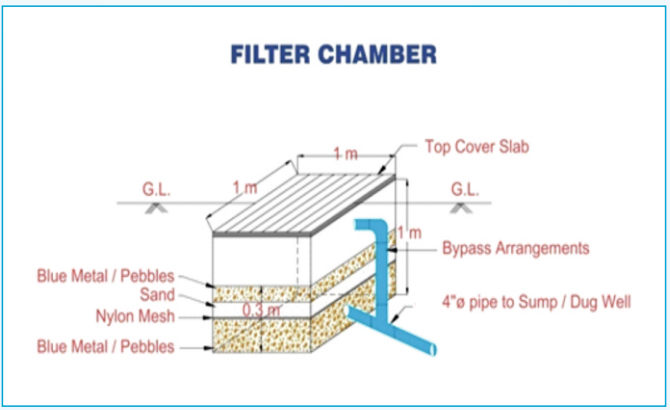
$= \frac{4.5\text{Cu.m X } 1000}{60}$ = 75 litres per minute

For harvesting the above rainwater the following methods to be adopted.

## 2. Methods to be adopted for roof-Top & Surface run-off rainwater harvesting:

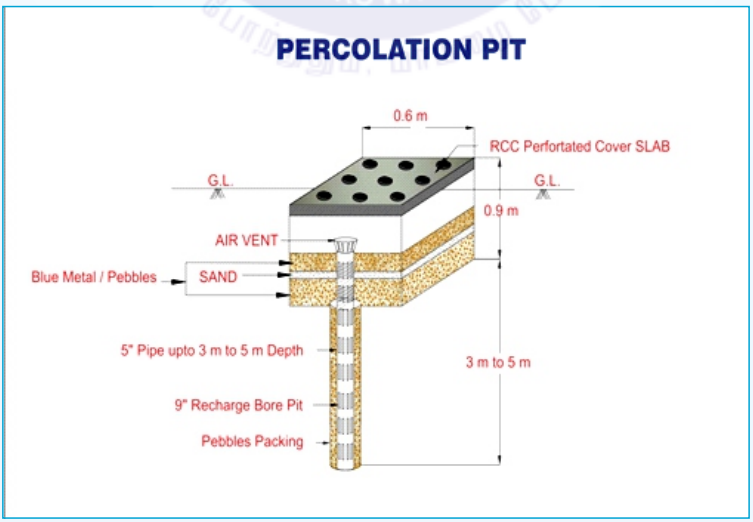
### 2. a)Roof top Collection

Rain water from the roof of the buildings such as tiled / sloped terrace building and flat / RCC (Reinforced concrete cement) roof shall be collected using appropriate size PVC (Poly Vinyl Chloride) pipes and stored either in a collection tank or storage tank of appropriate size placed over the ground of underground through a filter chamber. The filter chamber of appropriate size contains suitable filter materials such as pebbles / blue metals followed by nylon mesh and coarse sand at the top shall be provided to remove the dust particles usually present in the roof-tops of the buildings. The surplus water available after filling the storage tank / sump shall be diverted to the nearby open well / bore well recharge pits and recharge wells. Proper disinfection shall be made while storing the water for long use.



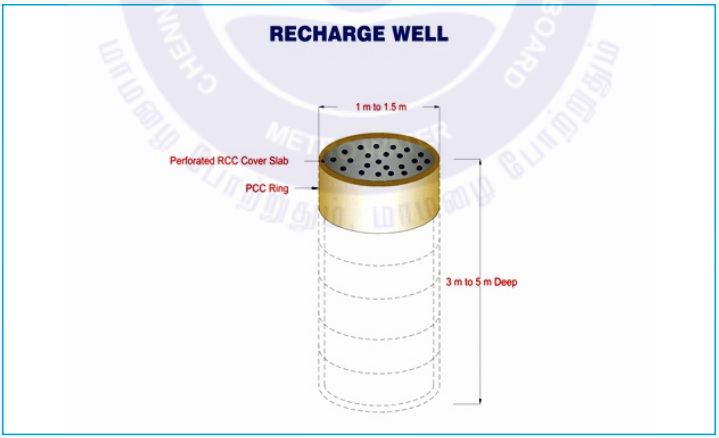
## 2.a.(1) Rainwater harvesting through Percolation Pits

Percolation pits are suitable for sandy area and Percolation pit with bore will be suitable in clay areas. In plots to be developed / buildings where the setback area is very small, or sewers, water line, electrical cable running below, the rooftop water brought down by pipes should be led to percolation bore pits. Percolation pits shall be provided around the buildings with minimum size of 0.6 m x 1m x 1 m and filledwith permeable filter media such as pebbles / blue metal / sand etc., The number of these pits shall vary based on the extent of the area of water collection. On an average one percolation pit is required for an area of 250 sq.ft (or) 23 sq.m. The bottom of the percolation pit should be reached up to sandy layer. These structures are suitable for individual house in general. The percolation pits are to be cleaned before the onset of monsoon every year.



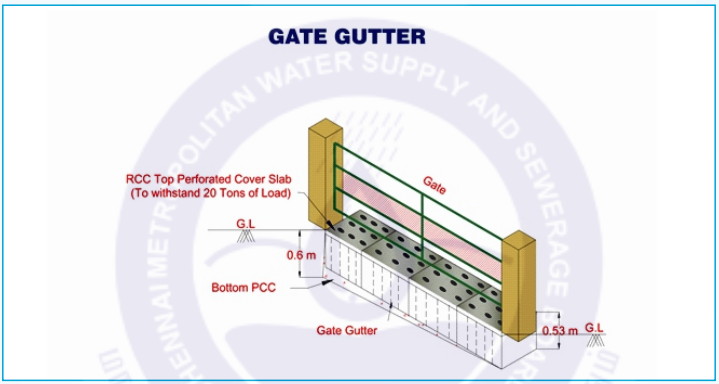
## 2.a.(2)Rainwater harvesting through Recharge wells

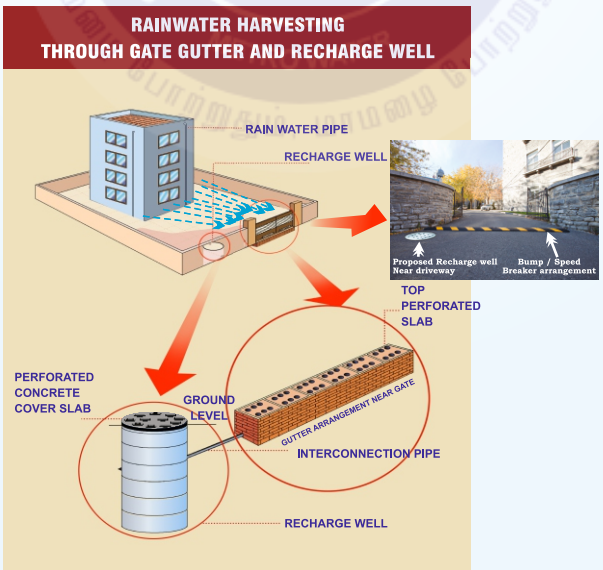
Recharge wells are suitable for apartment / commercial complexes. Shallow recharge wells are similar to the common open wells except in size and depth. Normally for an individual house with 1000 sq.ft area a recharge well with 1.0 metre dia and 3.0 to 5.0 metre depth is required. For apartments / commercial complexes two or three recharge wells are required based on the extent of the building. Either brick wall or RCC (Reinforced concrete cement) concrete rings shall be used for construction. The top of the recharge well should be covered with RCC slab. Recharge wells are to be desilted once in a year or two for its effective recharge.



## 2.a.(3) Surface run-off rainwater harvesting through Gate Gutter & Recharge wells

In a Multi-storeyed residential/ commercial complexes or Group Developments, Industries and Institutional Buildings the rooftop water is harvested for collection and use and/or for recharge through recharge wells. The remaining portion of rainwater which falling on the driveway or paved setback areas or from rooftop pipes not connected to the sump or recharge well to be intercepted near the gate(s) either by means of a gutter (provided with a perforated lid) or a bump and led to a recharge well.



# ANNEXURE-II

## ACT& RULES PROVISONS FOR RAINWATER HARVESTING MEASURES

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS |
|---|---|---|---|
| CHENNAI CORPORATION | CIRCULAR | 1994 | RWH made compulsory while sanctioning of P.P.As & B.As on 06.10.1994 |
| CMDA | RESOLUTION | 1994 | 7 (a) (b) & (c) Resolution on RWH - 1994 The enforcing authority would be Metro water for Multi-storied buildings/special buildings and the concerned Local Bodies for the ordinary buildings |
| CMWSSB | RESOLUTION | 1996-97 | RWH is compulsory for G+3 floors and above & Special buildings |
| | | 2000 | RWH is compulsory for all size of buildings |
| THE CHENNAI METROPOLITAN AREA GROUNDWATER (REGULATION) ACT, 1987 | THE CHENNAI METROPOLITAN AREA GROUND WATER (REGULATION) RULES, 1988. Rule 5-A was inserted by G.O. Ms. No. 68, Municipal Administration and Water Supply (Metro Water) Department, dated 21st November, 2002. | 2002 | 5-A. Implementation of rain water harvesting measures |
| | | | (a) Provide roof top rain water harvesting structure whenever a storage tank or an open well or a bore well is available in the building irrespective of the nature of sub-soil conditions; |
| | | | (b) Surface run-off water from the open spaces around the buildings, parks and playgrounds shall be harvested using appropriate recharge structures based on the nature of the sub-soil conditions. |
| | | | (i) Roof-top rain water harvesting |
| | | | (a) Direct collection |
| | | | (b) Recharging the open well/bore well |
| | | | (ii) Harvesting surface run-off water |
| | | | (a) Sandy sub-soil areas |
| | | | (i) Percolation/recharge pits |
| | | | (ii) Recharge trenches |
| | | | (iii) Shallow recharge wells |
| | | | (b) Clay sub-soil areas |
| | | | (i) Percolation/recharge pit with bore |
| | | | (ii) Recharge Trench with Bore |
| | | | (iii) Deep/large recharge wells |
| | | | (c) Hard rock areas (Weathered) |

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS | | |
|---|---|---|---|---|---|
| | AMENDMENTS & IMPROVEMENTS IN TAMILNADU DISTRICT MUNICIPALITES BUILDING RULES – 1972. (2002) | 2002 | Part III | 3(a) | Separation of bath and wash basin water and reuse - multistoried and public buildings |
| TAMIL NADU DISTRICT MUNICIPALITIES ACT. 1920 OF AND THAT ACT V OF 1920), | TAMIL NADU DISTRICT MUNICIPALITIES BUILDING RULES 1972 AND MULTI-STOREYED AND PUBLIC BUILDING RULES. 1973 G.O (MS) NO. 138 | 2002 | Sec. - 91 | 3-A | Water Conservation Methods in detail. |
| | | | | 3-B | Provision of Rain Water Harvesting structures in existing buildings |
| | | | | 17-A | Separation of bath and wash basin water and reuse |
| | | | | 16-A | Water Conservation |
| | | | | 16-B | Provision of Rain Water Harvesting structures in existing buildings |
| | | | | 16-C | Separation of bath and wash basin water and reuse |
| THE CHENNAI METROPOLITAN AREA GROUNDWATER (REGULATION) ACT, 1987 | GO NO. 701, 2002 | 2002 | Part IV | 2 | Inclusion of additional villages to the list of scheduled villages in the Act |
| | | | | | Revision of existing fine amount from Rs.1000 – Rs. 5000 |
| | | | | | Mandatory requirement of Rainwater Harvesting in all buildings |
| | | | | | No extraction of ground water for swimming pools, Industrial uses and other non potable purpose |
| | | | | | Restrictions to the depth of bore wells |
| | | | | | No water body, public or private, to be utilized for any other purpose, such us land fill, garbage dumps, building activities etc. |
| | | | | | Separation of bath and wash basin water and reuse |
| TAMILNADU PANCHAYATS ACT 1994 | GO NO. 209, 2003 | 2003 | Part IV | 2 | 257- A Provision of Rainwater Harvesting Structure |
| | | | | | RWH structures is mandatory for all buildings in Tamil Nadu |
| | | | | | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS | | | |
|---|---|---|---|---|---|---|
| TAMIL NADU DISTRICT MUNICIPALITIES ACT, 1920 (TAMIL NADU ACT V OF 1920), | TAMIL NADU DISTRICT MUNICIPALITIES BUILDING RULES, 1972.G.O. MS. NO.56, 2003 | 2003 | | 3-B & 16-B | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |
| TAMIL NADU DISTRICT MUNICIPALITIES ACT. 1920 OF AND THAT ACT V OF 1920), | TAMIL NADU DISTRICT MUNICIPALITIES BUILDING RULES 1972 AND MULTI-STOREYED AND PUBLIC BUILDING RULES. 1973 G.O (MS) NO. 138 | 2002 | Sec. - 91 | 3-A | Water Conservation Methods in detail. | |
| MADURAI CITY MUNICIPAL CORPORATION ACT, 1971 (TAMIL NADU ACT 15 OF 1971) | MADURAI CITY MUNICIPAL CORPORATION BUILDING (WATER CONSERVATION) RULES, 2002 G.O. MS. NO.56, 2003 | 2003 | | 4 | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS | | | |
|---|---|---|---|---|---|---|
| TAMIL NADU DISTRICT MUNICIPALITIES ACT, 1920 (TAMIL NADU ACT V OF 1920), | TAMILNADU MUNICIPAL LAWS (SECOND AMENDMENT) ORDINANCE GO (MS) NO. 207 | 2003 | Part IV Sec. 2 | 255 - A | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |
| AMENDMENT OF TAMIL NADU DISTRICT MUNICIPALITIES ACT, 1920 (TAMIL NADU ACT V OF 1920), | TAMILNADU MUNICIPAL LAWS (SECOND AMENDMENT) ORDINANCE GO (MS) NO. 207 | 2003 | Part IV Sec. 2 | 215-A | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| AMENDMENT TO THE COIMBATORE CITY MUNICIPAL CORPORATION ACT, 1981 | TAMILNADU MUNICIPAL LAWS (SECOND AMENDMENT) ORDINANCE GO (MS) NO. 207 | 2003 | Part IV Sec. 3 | 295-A | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS | | | |
|---|---|---|---|---|---|---|
| CHENNAI CITY MUNICIPAL CORPORATION ACT, 1919 (TAMIL NADU ACT IV OF 1919) | CHENNAI CITY CORPORATION BUILDING RULES, 1972 G.O (MS) NO. 57 | 2003 | | 3-B | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |
| | | | | | Provision of Rain Water Harvesting Structure.- Notwithstanding anything contained in these rules | |
| | | | | | (I) | Rain Water Harvesting Structure is Mandatoryevery building owned or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government |
| | | | | | (II) | Fail to provide Rain Water Harvesting Structure leads to penal action / Disconnection of Water supply. |
| GREATER CHENNAI CORPORATION | TAMIL NADU COMBINED DEVELOPMENT AND BUILDING RULES, 2019 | 2019 | 63. Water Conservation | | | |
| | | | (i) | Rain Water Harvesting | | |
| | | | | (a) | Non High Rise Buildings - Buildings of height upto 12m | |

| ACT | RULES / RESOLUTIONS | YEAR | PROVISIONS | | |
|---|---|---|---|---|---|
| | | | | (b) | Non High Rise Buildings more than 12m height and upto 18.3m height and Industries and International Buildings |
| | | | | (c) | High Rise Buildings (Residential/ Commercial) |
| | | | (ii) | Additional regulations for all buildings | |
| | | | | (a) | In the ground floor, floor level of water closets shall be at least 0.9 metre above the road level to ensure free flow |
| | | | | (b) | All centrally air conditioned buildings shall have their own wastewater reclamation plant and use reclaimed wastewater for cooling purposes. |
| | | | | (c) | separate sump shall be constructed for storing potable where the water is supplied by the Local Body and the volume of such sump shall not exceed 1,000 litres per dwelling unit |
| | | | (III) | Recycling of Grey Water - Each premise shall take measures for recycling of Grey water and structures to the following standards shall be provided, the same shall be shown in the plan applied for Planning permission. | |

CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD
METRO WATER
மாசைப் போற்றுதும், மாசைப் போற்றுதும்

**Chennai Metropolitan Water Supply and Sewerage Board**
No.1, Pumping Station Road, Chintadripet, Chennai - 600 002.
Phone : 044 - 2845 4080 / 2845 1300 - 15, Extn. : 295 / 381
E-mail : cmwssb@tn.gov.in
Website : www.cmwssb.tn.gov.in