Guidelines for

Jal Shakti Abhiyan (Urban)

Ministry of Housing and Urban Affairs

Government of India

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1. Context

Jal Shakti Abhiyan (Urban) - 2021 will be taken up in all cities from 22 March, 2021 to recharge the depleting aquifers and rejuvenate the surface water sources during the monsoon period. Campaign will be implemented in two phases.

a) First phases will cover South West Monsoon States/ UTs and will be implemented between 22 March, 2021 and 30 September, 2021.
b) Second phase will cover North East Monsoon States/ UTs and will be implemented between 1October, 2021 and 30 November, 2021.

2. Implementation Strategy

Urban Local Bodies (ULBs) are recommended to **develop a shelf of projects from 22 March, 2021 to 30 April, 2021.** These projects would focus on the seven key thrust areas namely:

- Renovation of old Rain Water Harvesting (RWH) Structures and creation of new RWH structures
- Tree plantation
- Clean water channels & use that for recharge of aquifers through wells
- Identification and rejuvenation of water bodies
- Reuse of treated wastewater
- Creation of permeable green spaces
- Jal Shakti" park (Rainwater Harvesting parks) in big/ capital cities

States/ UTs may further **encourage people participation through IEC activities** which may be a focus activity in the preparatory period.

2.1 Rainwater Harvesting

RWH is the collection and storage of rainwater from rooftops, roadside, open areas, etc. which can be stored for further usage or recharged into groundwater to augment water resources and reduce surface run-offs.

Figure 1: Effective and low cost RWH solution implemented in RWAs in Pavagada, Karnataka

A Rainwater Harvesting system will help to:

- Enhance the sustainable yield in areas where over-development has depleted the aquifer.
- Utilize the rainfall-runoff, which is going to sewer or stormwater drain.
- Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.
- Reduce seawater ingress in coastal cities.
- Improve the quality of existing groundwater through dilution

A typical rainwater harvesting systems comprise of:

- A system or catchment from where water is captured for storage;
- A system of pipes/ ducts to carry the harvested water to the storage facility;
- Filter unit for removal of dirt that comes with rainwater; and
- Storage tank or groundwater recharging structures

ULBs may undertake the following measures under JSA:

- Identify and ensure that all government (Central/ State/ ULB) and public buildings such as educational institutions, commercial establishments, hospitals, etc. have RWH structures. If such structures exist but not functional, then they may be made functional during this period. If these structures do not exist, as a special drive, RWH structures may be constructed in these buildings for which major work may start during this period.
- ULBs may check Group Housing Societies for availability of RWH structures to reduce urban flooding.
- ULBs may undertake de-concretizing of pavements around trees and lay perforated paver blocks which allow water to percolate into the ground along tree roots.
- Enforcement of Building Byelaws for RWH to be implemented as per the provisions of Model Building Byelaws (MBBL), 2016 shared with all States/ UTs for adoption. Cities to ensure that the RWH provisions are incorporated in their or State Building Byelaws (BBLs), as may be applicable. Further, ULBs may ensure that all future building permissions granted, include provisions for RWH structures, as per Building Byelaws BBLs. The same may be checked before the issuance of Occupancy-cum-Completion Certificate (OCC).

Thereafter, an effective enforcement mechanism may be put in place for providing RWH structures in all buildings, as stipulated under Building Byelaws of the city or State/ UT.

A Groundwater management Cell may be established at the ULB level under the Abhiyan. The cell will be responsible for the effective monitoring of Rainwater Harvesting in the city. The cell will monitor the extent of groundwater extraction and groundwater aquifer recharge. This information will be displayed at prominent locations for public awareness.

2.2 Tree plantation

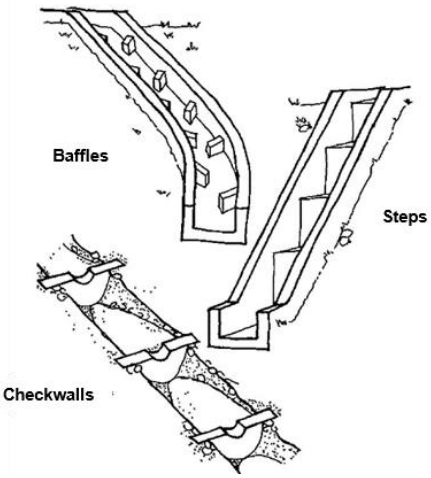
Plantations play a vital role in the absorption of storm and rainwater for maintenance of groundwater table, prevention of soil erosion and run-off and encourage the growth of natural habitat for flora and fauna. For the same reasons, ULBs may undertake plantation near water bodies, public spaces, parks and on roadside to improve green cover and water cycle. ULBs may undertake the following measures:

- Identification of plantation sites as per the phenological conditions of the area

- Water hardy indigenous variety of trees to be identified for plantation and preferably tall plants (4-6 feet) may be used.
- Collaborate with District Forest Department/ Horticultural Department, special drive needs to be taken up during JSA to plant such trees in identified areas.
- Adequate measures need to be taken up to protect and nurture such plants to ensure their survival.
- Targeted large-scale IEC campaigns may be taken up to motivate welfare associations and civil societies to plant trees in the resident complexes and colonies, schools, public buildings etc.

2.3 Clean Water Channels & Recharge Aquifers through Wells

As part of the campaign, the ULBs are expected to identify key open drain channels, natural and artificial, functioning as stormwater and grey water drainage. The ULBs with support from the local civil societies and volunteer groups may initiate a cleaning drive to desilt and remove solid wastes from these channels before the onset of monsoons.



- The ULBs may develop innovative strategies like baffles, steps, check walls, etc. to slow down the water flow for unlined drains to catch siltation and increase groundwater siltation.
- As part of the campaign, ULBs may identify water channels being negatively impacted by anthropogenic activities and take measures to restore the functionality of these channels and provide pre and post intervention pictures as part of the good practices.
- Water channels may be diverted to natural or manmade wells to recharge aquifers. Existing wells may be cleaned/ desilted to improve effectiveness.

Figure 2: Cleaning of Chitravathi Riverbed, Bagepalli, Karnataka

2.4 Water Body Rejuvenation

- Urban water bodies such as lakes, ponds, stepwells, and baolis have traditionally served the function of meeting water requirements of drinking, washing, agriculture, fishing and religious/ cultural purposes. Surface water bodies and traditional water harvesting structures in several cities have either dried up, or disappeared due to encroachment, dumping of garbage, and entry of untreated sewage. These water bodies, if revived, can store water and recharge groundwater besides improving the amenity value of the area.
- Every city may initiate action to revive at least one water body during Jal Shakti Abhiyan. ULBs may identify all the water bodies in the city and select one for rejuvenation through public consultations

ULBs may undertake the following measures to rejuvenate the water bodies:

- Waterbody may be cleaned through bio-remediation measures, de-silting, aeration, removal of floating and other invasive aquatic plant-species or any other technology suiting local conditions.
- Shoreline of the water bodies may be properly fenced to protect them from encroachment. Inlet and outlet of the water body may be strengthened.
- Inflow of domestic/ industrial sewage into the water body may be identified and arrested, and only treated effluent adhering to standards prescribed by CPCB may be allowed into the water body.
- Catchment area treatment via afforestation, stormwater drainage management, silt traps, etc. may be undertaken.
- Waterfront development around the water body may be taken up, keeping in view the eco-system-based approach for the aquatic body, conforming to prevalent environmental legislation and maintaining social and cultural sanctity of the place.
- Creation of public spaces may be taken up to ensure public eye and vigilance to protect from encroachment or throwing garbage.
- Street vendor zones may be developed close to the water body, in convergence with National Urban Livelihood Mission (DAY-NULM)
- Public toilets may be provided in convergence with SBM-Urban
- Participation of private sector, community-based organizations, philanthropic foundations may be encouraged in the rejuvenation and maintenance of water bodies.

Monitoring

- ULBs may monitor the quality of water in the selected body on weekly basis and undertake appropriate action to improve wherever necessary.
- Each water body may be geo-tagged with photographs.

Figure 3: Cleaning of Chaturbhuj Lake in Tonk, Rajasthan

2.5 Reuse of Treated Wastewater

Considering the growing need for water demand in urban areas and depleting water resources, there is a need to explore alternatives to freshwater. To optimize the use of water, it is important to undertake the treatment of wastewater and reuse it. Reuse of treated wastewater provides an alternative to freshwater where water is required for non-potable use. The water reclaimed from wastewater can be used for toilet flushing, agriculture/ horticulture, fire hydrants, industries, construction activities, power plants, etc.

National Urban Sanitation Policy 2008 mandates the reuse of at least 20% of treated wastewater.

To promote reuse of treated wastewater, State Government and ULBs may undertake the following measures:

- Provision of dual piping under Building Bye-Laws to be checked in all government (Central/ State/ UT/ ULB) buildings, commercial complexes, public buildings such as educational institutions, hospitals, and Group Housing Societies, whether the same is available so that the treated wastewater can be used for horticulture, toilet flushing and fire hydrants. If it already exists, then its functionality may be checked and made fully operational during JSA. If it is not there, then action may be taken to ensure that these buildings have dual piping systems.
- For new buildings/ Group Housing Societies, At the time of inspection for issuance of Occupancy-cum-Completion Certificate, compliance of provision of Building Byelaws for dual piping to reuse the treated wastewater may be checked thoroughly.

- In case, a city has Sewage Treatment Plants (STPs), ULB may ensure that treated wastewater is used for the following purposes:
  - Recycling for use in agriculture/ horticulture;

- Municipal use in public parks and gardens
- Sports centres and stadiums
- Fire hydrants
- Non-potable water needs of public transport systems (washing of buses, metro rail wagons, etc.)
- Large scale construction activities
- Made available to the industry if it consumes water in bulk
- Supply to power plants located within 50 km of the city. As per directions of the Ministry of Power, Tariff Policy Circular dated 28 January, 2016, it is mandatory that power plants within 50 km from STPs must develop a system for conveyance and use of treated wastewater.

2.6 Jal Shakti Park - "Rain Water Harvesting Park"

- This year the campaign will have special focus on utilising open spaces, specifically parks for harvesting rainwater for groundwater recharge. These parks may be called as "Rainwater harvesting Parks" where the objective of the park will be to demonstrate low cost interventions for capturing rainwater and channelizing it back into the shallow aquifer systems to replenish groundwater tables.

Figure 4: RWH Park in Hyderabad, Telangana

- Cities may identify at least one park within city limits, which can be converted into a Rain Water Harvesting Park. The cities may aim at completing these parks before the onset of monsoons.
- Rain Water Harvesting Parks may have different innovative ways of disseminating rainwater harvesting and groundwater recharge strategies for easy understanding of the citizens and increasing public awareness on the subject.
- Various techniques for Rain Water Harvesting in a park are showcased in Annexure 1.
- These Parks should be effectively used for developing awareness among citizens, specially women and children.

3. IEC Activities – *Jan Andolan to mobilize cities.*

People's participation will be at the core of JSA (Urban). Extensive **Information, Education and Communication (IEC) campaigns** will have to be undertaken on priority by all the cities across the country, supporting promotion of the interventions being undertaken by the ULBs, under this process. Interventions will have to be carried out in the ULBs around the key thrust areas of Abhiyan, through a multi-stakeholder approach,

involving the local officials, engineers, water, and sanitation workers, along with city residents.

ULBs may engage Residential Welfare Associations (RWAs), schools, colleges, businesses, Civil Society Organizations (CSOs), Nehru Yuva Kendras (NYKs), NSS volunteers, NCC cadets, SHGs formed under DAY - NULM, elected representatives to organize door to door outreach, community events, workshops, flyers, banners, wall paintings, street plays, social media, etc. for dissemination and building awareness for all the trust areas under the campaign. Leading personalities in films, sports, social work or public life may be invited to the campaigns to influence the local citizens.

The participation of people as a part of Jan Andolan is critical for the success of the Abhiyan. Steps may be taken to encourage citizens, especially children and youth participation, keeping the constraints of social distancing norms and precautions associated with the COVID -19 pandemic. ULBs may leverage common-use digital platforms, influencer advertising, and interactive community games along with a combination of traditional communication channels such as TV, radio etc. to optimize the engagement on the campaign, make it more personal in terms of importance in day to life, time and money.

Figure 5: Jal Andolan Snapshots

4. Funding

For the abovementioned key thrust areas, Cities may utilize State Funds, grants available under the 15th Finance Commission or State Finance Commission or financing through funds available as Corporate Social Responsibility. Funds available for Administrative & Office Expenses under AMRUT, PMAY-U, SBM-U and Smart Cities Mission, may be utilized for the same, with prior approval of the State nodal agencies for the respective MoHUA Missions.

5. Monitoring Jal Shakti Abhiyan

In order to ensure effective monitoring, MoHUA has created the 'Jal Shakti Abhiyan' portal (http://www.moud.in/jalshakti/) for capturing baseline data as well as the 'Daily Progress' of Abhiyan across the thrust areas of the Abhiyan. In order to ensure real-time monitoring of the progress made by the ULBs, the State Mission Directorate and AMRUT PDMC shall update data on the 'JalShakti' mobile application daily.

For managing the updatation of data, respective nodal ULB officers may be appointed. In this pursuit, States are directed appointment of a nodal ULB officer for every city. The login credentials for registering on the 'JalShakti' mobile application will be shared with the appointed ULB nodal officers.

The cities will also be required to update photographs/ videos of activities being undertaken across the thrust areas of the campaign. The photos will be updated on the websites and dashboards of the Ministry of Jal Shakti and the Ministry of Housing and Urban Affairs.

6. Documentation

ULBs are encouraged to document their experiences and innovative practices which have led to successful implementation of water conservation measures and upload the same on the website of Ministry of Housing and Urban Affairs. Such documentation may be used in future workshops, consultations, cross-learning and replicating best practices within and outside the States/ UTs with/ without local adaptive modifications.

Guidelines for

Rainwater Harvesting Parks in Cities

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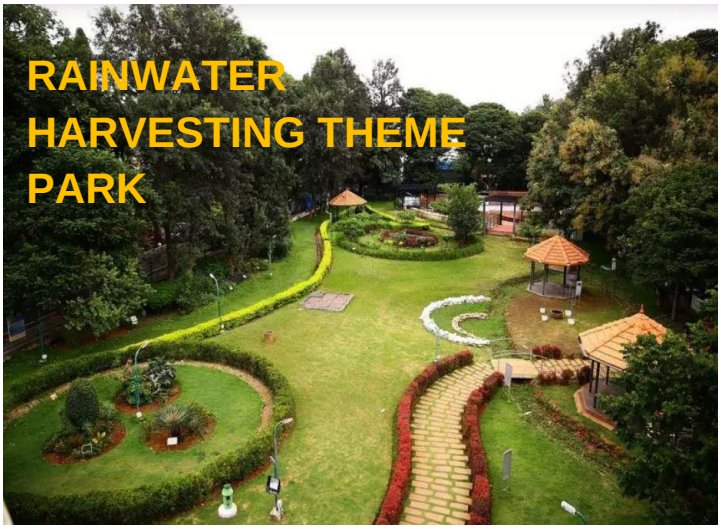
1.0 Introduction



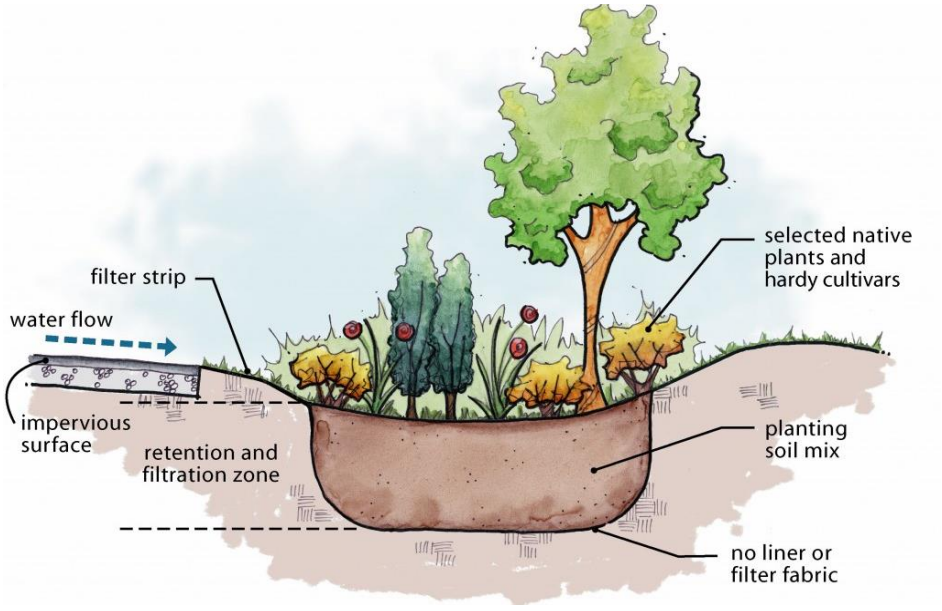
Rainwater harvesting is one of the prioritized projects under JJM (U) as a measure to mitigate water scarcity in the country. Different types of rainwater harvesting practices are established based on the types of land-use settings.

Rain water harvesting parks are one such practice that is used for conserving rainwater while also acting as recreational facilities. Rain water harvesting parks are shallow depressions in a landscape that act as a sponge to soak rainwater into ground. Rain water harvesting parks allow rainwater to creep down into the soil and replenish aquifers and improve the quality of ecosystem.

With right planning of rain water harvesting parks and cost effective simple construction techniques, rainwater can be conserved and used for recharging the ground water and rejuvenation of water bodies.

2.0 Structure of Rain Water Harvesting Parks

Rain water harvesting parks are common parks with specific features that distinguish them from ordinary parks. The four elements of rain water harvesting parks are (i) the catchment area, (ii) the transportation element, (iii) filtration and (iv) the storage.



Representation of rain water harvesting park

3.0 Construction of Rain Water Harvesting Parks

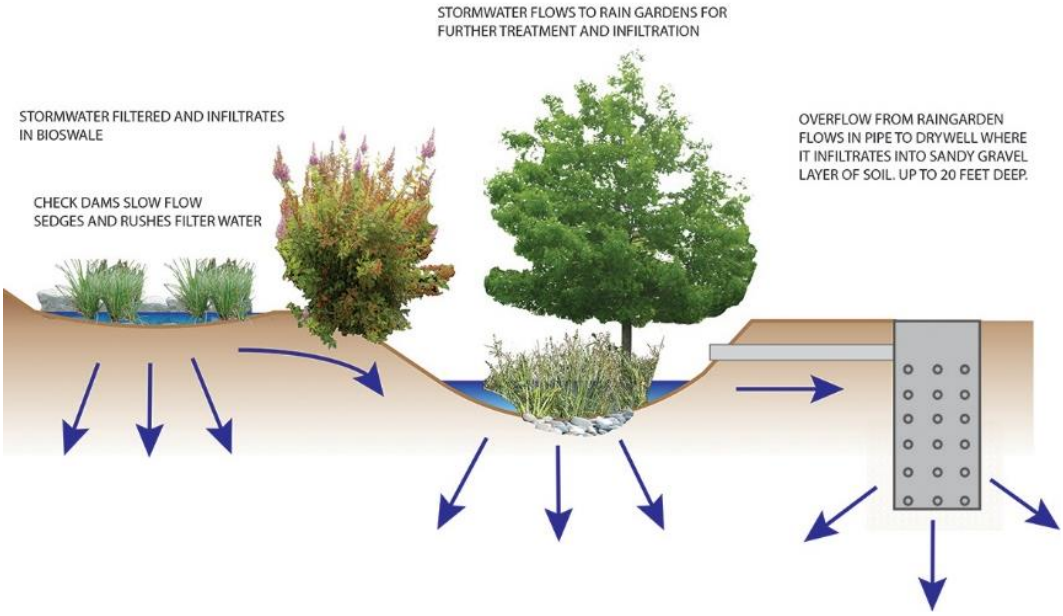
The important steps involved in construction of a rain water harvesting parks are as follows:

- Selection of a location
- Size and shape of park
- Determining type of rainwater harvesting structure
- Selection of plants to be grown and adding enhancements

4.0 Cost Effective and Sustainable Approach

4.1 Check Dams

A check dam is a small, sometimes temporary, dam constructed across a swale, drainage ditch, or waterway to counteract erosion by reducing water flow velocity. Check dams are cost effective method to help in conservation of water.



Representation of check dams

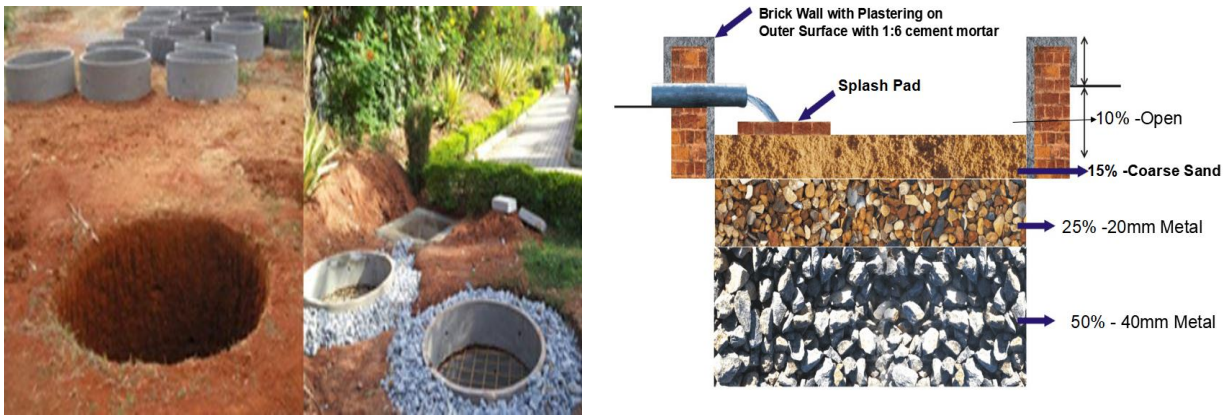
4.2 Discarded Tyre Reuse

Discarded tyres can be bound together and used as a barrier for rainwater runoff. Artificial waterbody structures can also be made out of discarded tyres to hold rainwater. Use of discarded tyres in rain water harvesting park allows percolation of rainwater into ground and rejuvenate water bodies in a cost effective and sustainable way.

Representation of tyres reuse in park

4.3 Percolation Pits/ trenches

Percolation pits/ trenches are suitable where a permeable stratum is available at shallow depth. The pit is filled with boulders, gravel, and sand for filtration of rainwater. Top layer of sand should be cleaned periodically for better ingression of rainwater into the subsoil.

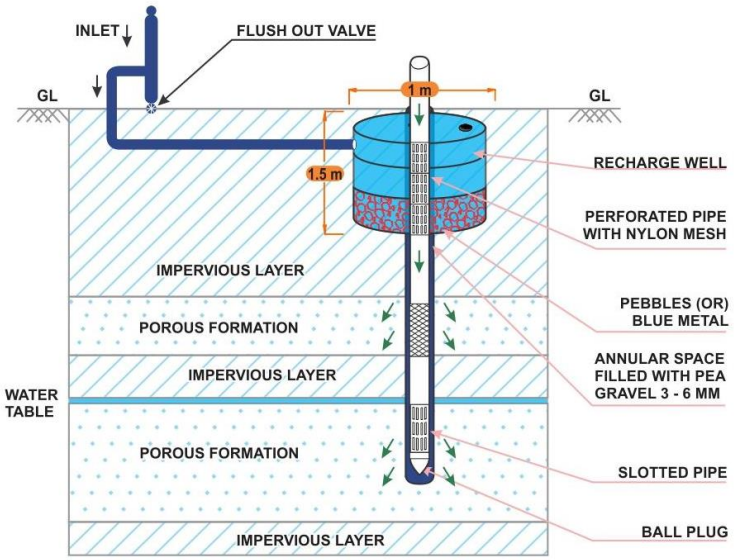


Representation of percolation pits

4.4 Abandoned Borewell/ Dug well

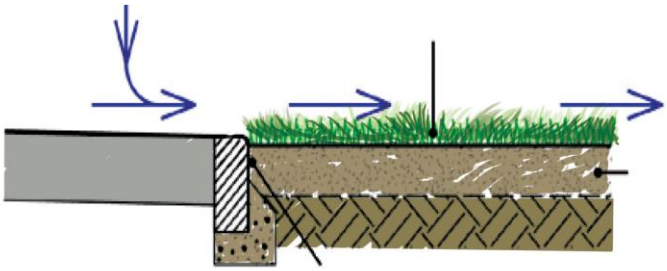
Abandoned dugwell/ borewell may be utilized as recharge structure. The rainwater is guided through a pipe to the bottom of well or below the water level. Well should be cleaned periodically and chlorinated to prevent microbial contamination.

Representation of dugwell recharge structure



4.5 Filter Strips

Filter strips are designed to accept overland sheet water flow. Runoff from an adjacent impermeable area must be evenly distributed across the filter strips for infiltration into ground.



Representation of filter strip

4.6 Detention basins

Detention basins are surface storage basins that provide flow control through attenuation of rainwater. They also enable some settling of particulate pollutants. Detention basins also function as a recreational facility.

Representation of detention basins

4.7 Terrain Modeling

Terrain modeling with dry stone retention walls are a sustainable construction technique since they are built with stone, local material readily available, and easy to recycle, with natural drainage, as the joints are not filled with cement mortar.

Representation of terrain modeling with dry stone retention walls

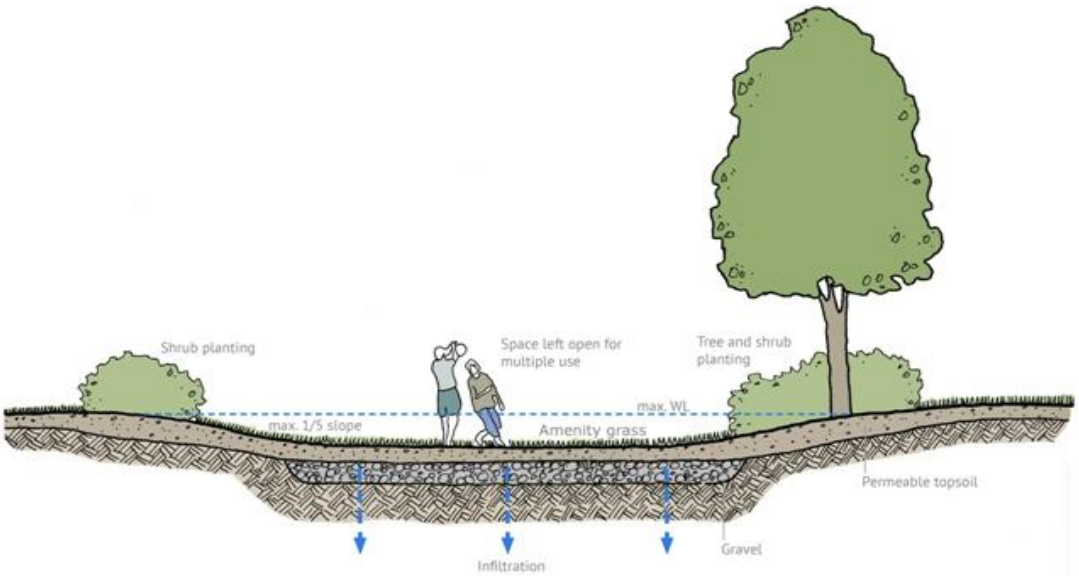
Retention walls allow the staggering of the slopes, creating horizontal terraces for plants & bushes, where rain water is filtered into the ground avoiding both water waste and surface soil erosion.

The design of open spaces involve terrain modeling in sloped sites and terraces in this case are for recreational purposes making them accessible and usable to the public.

4.8 Filtration basins

A filtration basin is filled with permeable granular material is designed to promote infiltration of surface water to the ground.

Representation of filtration basin



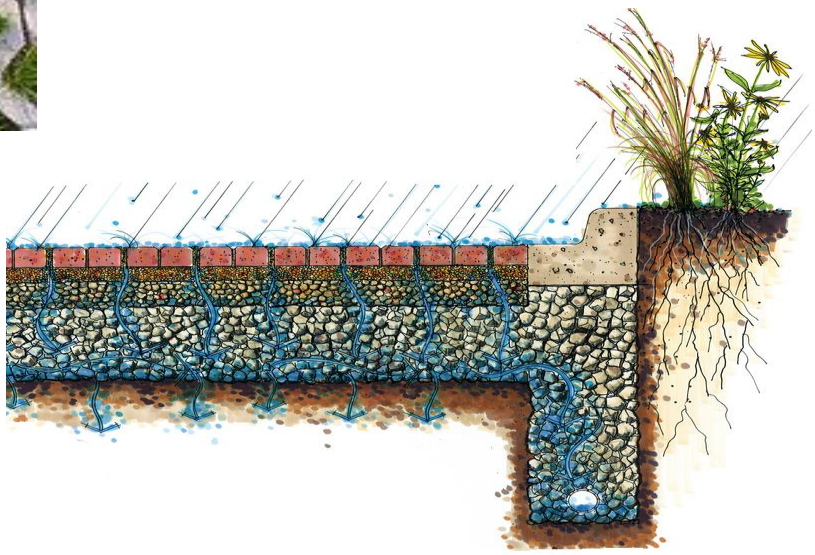
Representation of filtration basin in a park with space left open for multiple use

4.9 Permeable Pavers

Representation of permeable pavers

Permeable pavers allow rainwater to infiltrate into underlying soils promoting groundwater recharge. These surfaces are permeable, meaning they let the water through.

Permeable pavers or pavements are considered for areas which have hard surfaces. Preference should be given to water-friendly pavers, or porous pavement or asphalt.



Representation of permeable pavers

4.10 Infiltration Swales

Swale is a shallow channel with sloping sides used for rainwater harvesting. A swale may be either natural or human created. Artificial swales are often infiltration channels, designed to reduce rainwater runoff, filter pollutants and to increase rainwater infiltration into the ground.

Representation of swales

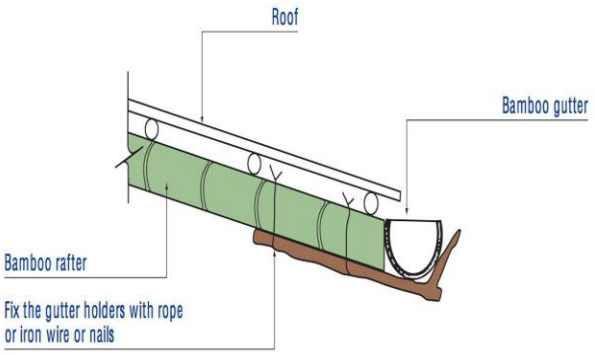
4.11 Sedge meadows

Sedge meadows are large natural or artificial wetland areas planted mostly with sedges and other native plants. Sedge meadow infiltrates water into the ground and also protects soil from erosion.

Representation of sedge meadows

5.0 Channelization and Filtration

Rainwater can be harvested via channelized gutters installed on sloping/ flat roofs on any structure available at a park. A filter system can be incorporated in the rain water channels to prevent debris, dirt and dust from entering the tank.



Representation of gutter in roof

5.1 Silt traps

Representation of silt traps

A silt trap is a structure used for preventing dirt and solid materials like grit and gravel from entering into the rainwater collection tank.

5.2 Wall Mounted filters

Representation of pop-up filter

The Pop-Up Filter has three components such as rainwater receptor, flush valve and filter element. Rainwater filtered through pop-up filter can be stored separately. There are different types of filters available in the market based on different requirements.

5.3 Sand Bed Filter

Sand bed filter is a traditional and cost effective method to filter the rainwater by using locally available materials like sand, aggregates, etc.

Representation of sand filter

5.4 Cloth filter

A piece of fine cloth is suspended over a container that functions as a sieve placed over the opening of the container. The suspended cloth would help in collecting the rainwater and filter the same into the container.

Representation of cloth filter

Representation of leaf slide

5.5 Leaf slide

Leaf slide is used to separate leaves from rain water in areas of high leaf litter. Relatively cleaner water passes through the filter for storing.

6.0 Storage

Different storage structures of various capacities such as masonry tanks, ferro-cement tanks, earthen pots, fiber storage tanks, HDPE tanks etc., can be installed. The capacity of storage device can be decided by considering parameters such as roof, catchment area/ surface, water usage and space availability etc.

7.0 Selection of Plants for Rain Water Harvesting Park

Rain water harvesting parks are planted with trees, shrubs, ferns, groundcover species, ornamental/ non-ornamental grass, perennial flowers and indigenous plants that are well adapted to wet/ dry conditions that do not require fertilizer. Taller plants are planted in the middle or back of the park and drier species on the berm and perimeter of the park.


Representation of selection of plants for rain water harvesting park

8.0 Benefits of Rain Water Harvesting Parks

- Rain water harvesting parks reduce rainwater runoff, store water for future use, replenish groundwater recharge, local aquifer replenishment, mitigate pollution and rejuvenate water bodies, etc.
- Stores rainwater which can be used for irrigation of parks.
- Rain water harvesting parks helps in filtration and retention of pollutants, decomposition, plant uptake, etc. to improve the quality of urban runoff.
- Plantings of flowers, grasses and ornamental plants, berms adding height, contrast, and texture to level areas adds to the beauty of place and provides a pleasing park view and beautify neighborhoods and parks
- Improve water quality
- Remove standing water and mosquito breeding
- Protect communities from flooding and drainage problems
- Create habitat for birds, butterflies and beneficial insects
- Create drought tolerant green areas

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