ECORAIN WATER SOLUTIONS PVT LTD MUMBAI

JV BETWEEN ECORAIN AUSTRALIA &USA WITH 23 YRS EXPERIENCE IN RWH

&

VIKAS INDUSTRIES MUMBAI

&

ECOAQUA ENGINEERING SYSTEMS PVT LTD NASIK

Reasons of Shortage of Water

- Population increase
- Industrialization
- Urbanization
- Increase In Area under Cultivation
- Deforestation

- Results into :
- Increase in per capita utilization
- Lowering Water Table
- Decrease in Lake Areas

What is the solution ?

- **Rain Water Harvesting (RWH) & Storm Water Management.**

Will Help : Overcome Water Scarcity

- **Recharge of Shallow/ unconfined Aquifers**
- **Recharge of Deep/Confined Aquifers**
- **Arrest Saline Water Intrusion**
- **Reduce Water Table Depletion**
- **Reduce Flood and Stagnation in Urban Areas**

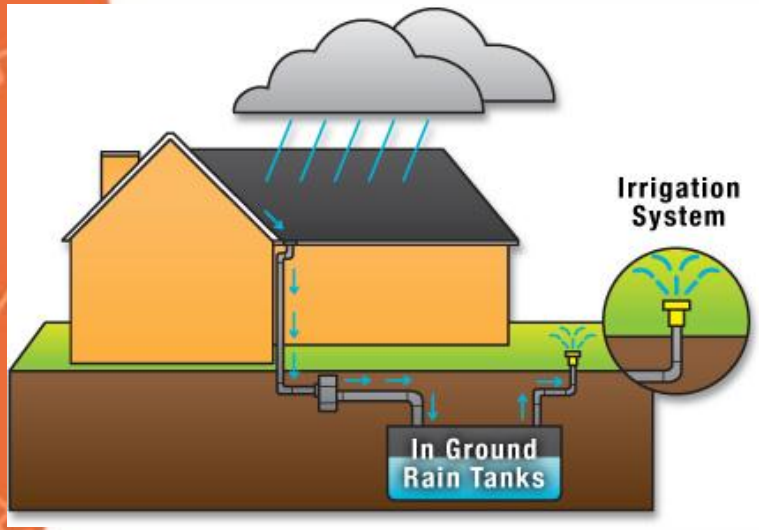
What is rain water harvesting ?

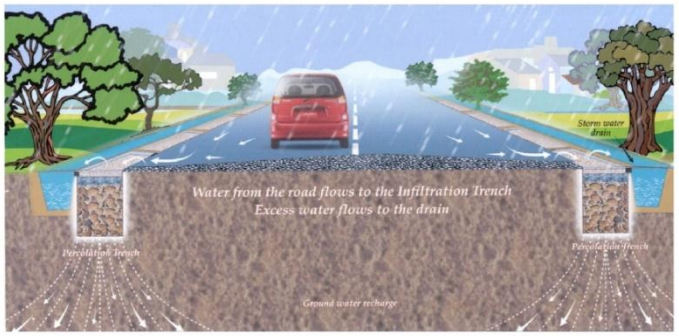
- **Direct collection of Rain Water and use for**

Storage & Reuse
Recharge of Ground Water Aquifers

Quality Source of Rain Water Harvesting

Roof Residential &
Commercial Buildings
Road & Highways



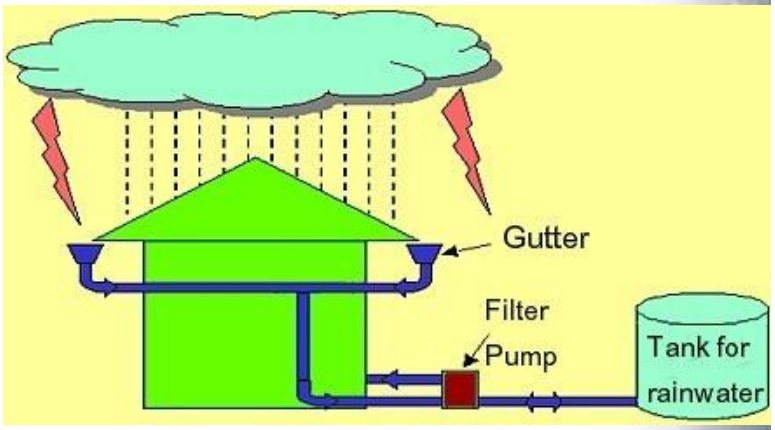


Ground water recharge - road side trench

RWH Cell, Karnataka State Council for Science and Technology, Indian Institute of Science, Bangalore-12

Components of Roof Top Rain Water Harvesting System

- Roof catchment
- Gutters
- Down pipe & first flushing pipe
- Filter Unit
- Storage Tank
- Percolation tank
- Retension/Buffer Tank for Bore Well for aquifer Recharging



Roof catchment

- The roof of the house is used as the catchment for collecting rain water.
- The style construction and material of the roof effect its suitability as a catchment.
- Roofs made of corrugated iron sheet , asbestos sheet, Tiles or Concrete can be utilized for RWH

Gutters

- Gutters are channels fixed to the edges of roof to collect Rainwater.
- Gutters can be made in semi-circular and rectangular shape with plain galvanized iron sheet, PVC pipes etc.
- Use of locally available material reduce the overall cost of the system.

Down Pipe

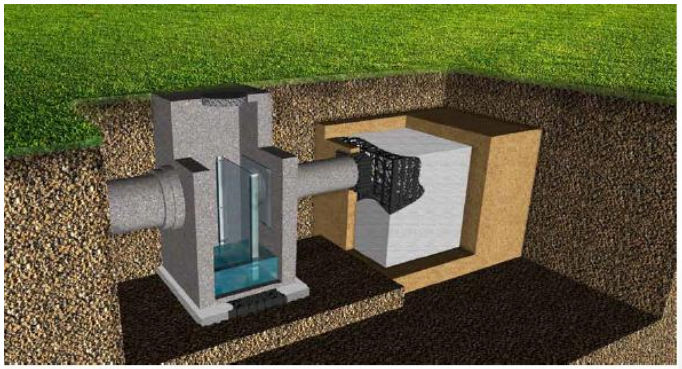
- Pipe which carries the rainwater from the gutters to the filter & storage tank.
- PVC pipe of 50mm to 110 mm (2 to 4”) are commonly used for down pipe.

First Flush Pipe

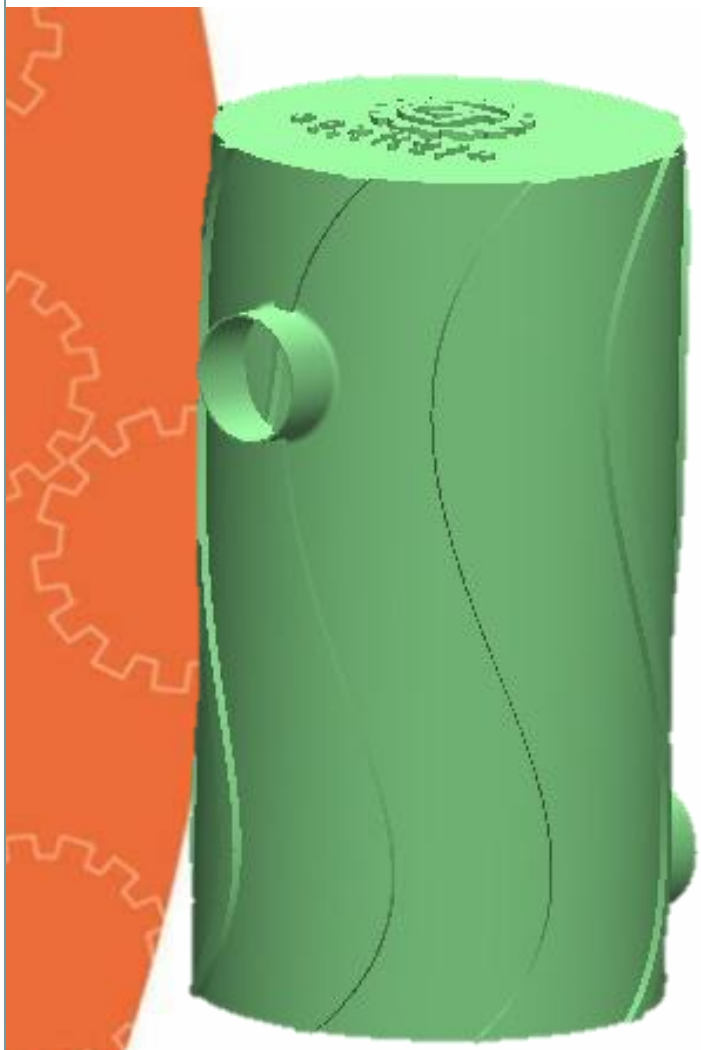
- Debris, dust & dirt collect on the roof during non rainy periods when the first rain arrive.
- A first flush system arrangement is made to avoid the entering unwanted material into the Filter media & storage tank.
- A simple manually operated arrangement or semi-automatic system with a valve below the ‘T’ junction

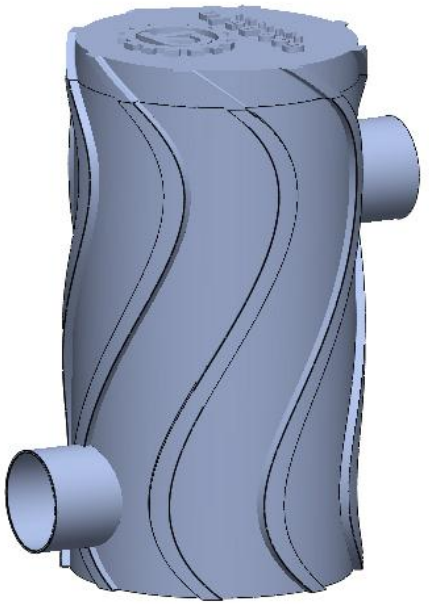
Filter Unit

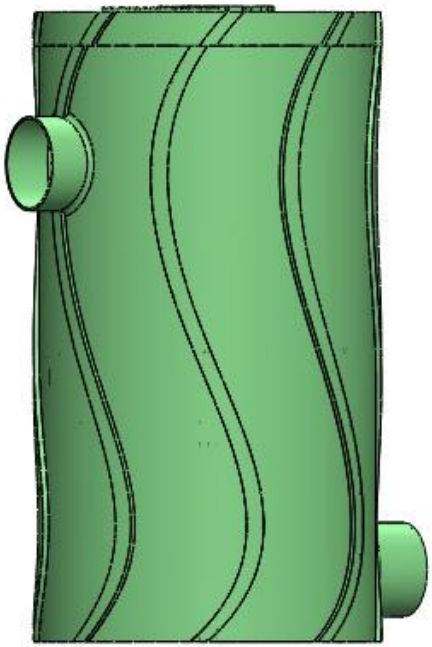
- The filter unit is a container or chamber with strainer filter to remove the debris & dirt from water that enters the tank.
- The filter unit is placed near the storage tank or separately.
- It may be of Ferro cement filter unit, Aluminum, Cement rings or Plastic bucket etc.

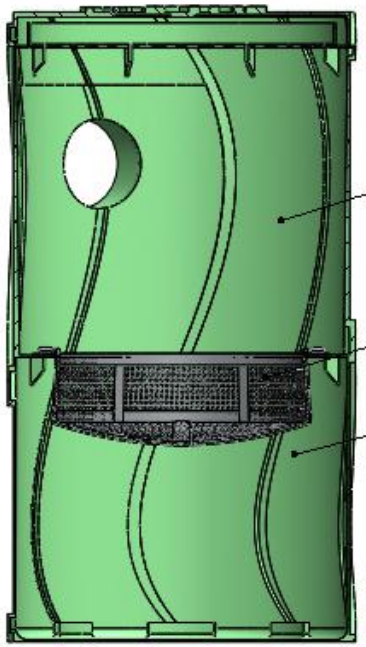


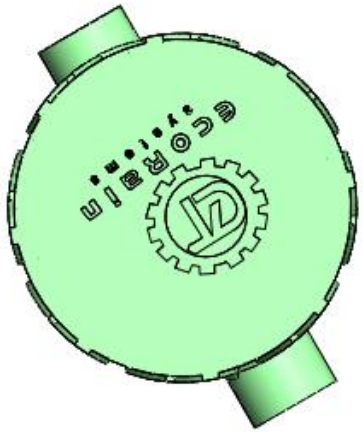
ECORAIN FILTER

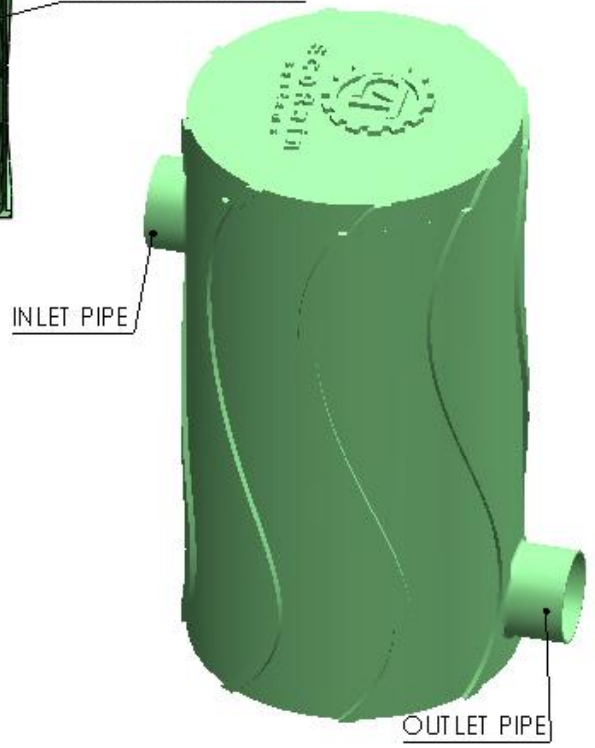




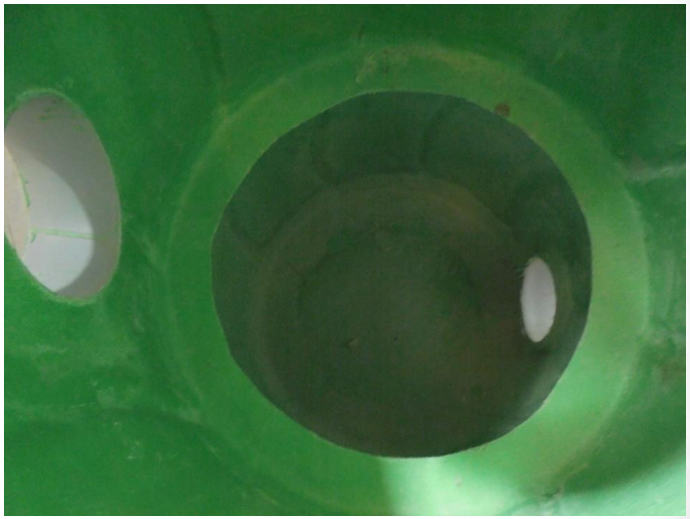



INWARD SECTION
SS FILTER
OUTWARD SECTION




INLET PIPE
OUTLET PIPE

INWARD SECTION: ABOVE SS FILTER



OUTWARD SECTION: BELOW SS FILTER

SS FILTER PLATE

Ecorain Modular RWH Storage Tank

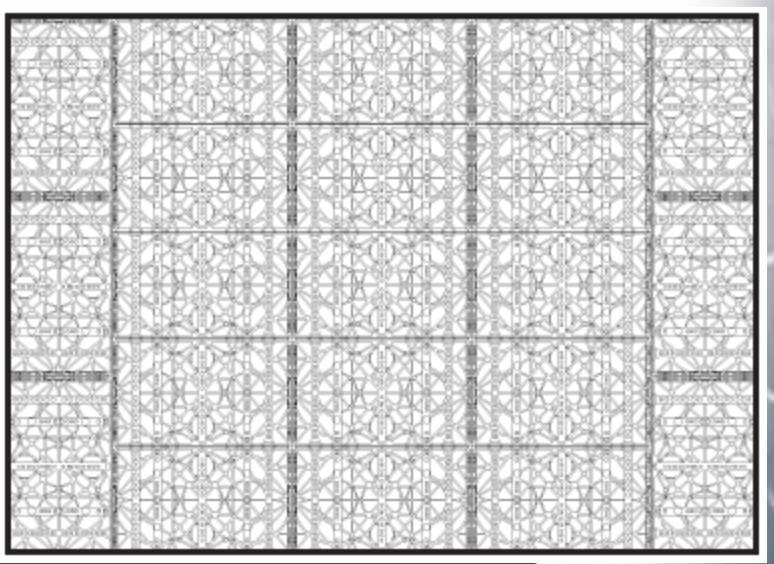
- State of the Art Technology Modular RWH Tanks is used after Filtration for
- Storage & Reuse
- (Toilet Flushing, Landscape & Agricultural Irrigation etc)
- Exfiltration or Recharge Tank
- (for Shallow/Unconfined Aquifers Recharge)
- Retension or Buffer Tank for Borewell Storage &
- (Recharge of Shallow/Deep Aquifers)

RWH Modular Tank Components (Ecorain)

- Large and Small 100% Recycled Polypropylene Plates.
- Polypropylene Or Polyester Geotextiles.
- EPDM Or HDPE Liner for Storage.
- 25 mm Draincells for Loading Support
- 50 mm Grass Pavers for inlet & Outlet Connection
- Upvc Pipes for Inlet/Outlet Connections
- RCC/GRP Observation Well or Chamber for Water Lifting

Sizing of Modular RWH Storage Tank

- Based on:
  - **No. of person in the House hold**
  - **Per capita water requirement**
  - **No. of days for which water is required**
  - **Irrigation Water Requirement**



Water available calculation from Roof

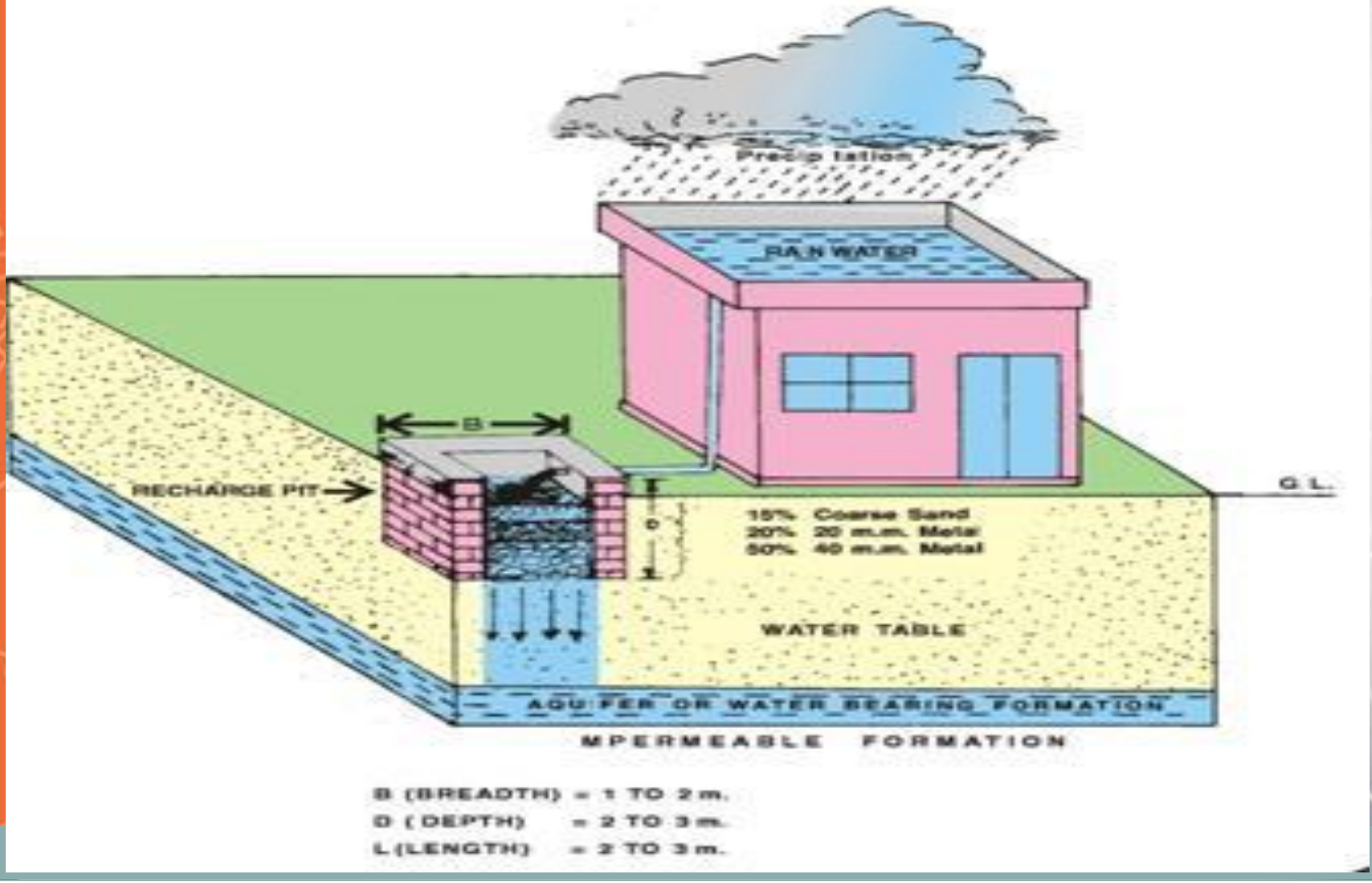
Annual rainfall (in mm) x roof area (in sq. m) x co-efficient of run off for roof

co-efficient of run off

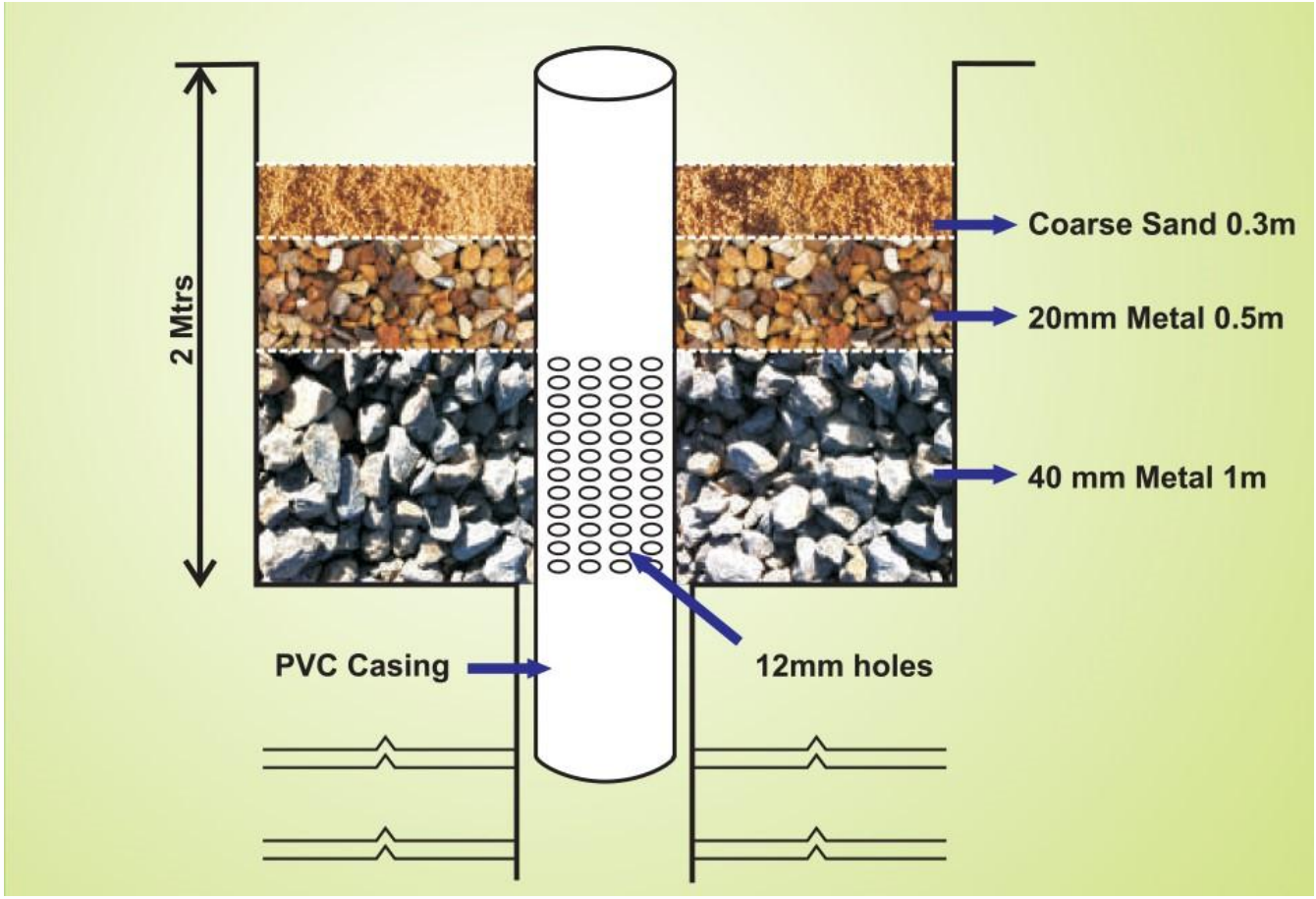
GI sheet	0.9
Asbestos	0.8
Tiled	0.75
Plaster on bricks/ Concrete	0.7

Water available from roof top 800mmx 20 sq.mx0.8=12800 Liters per annum

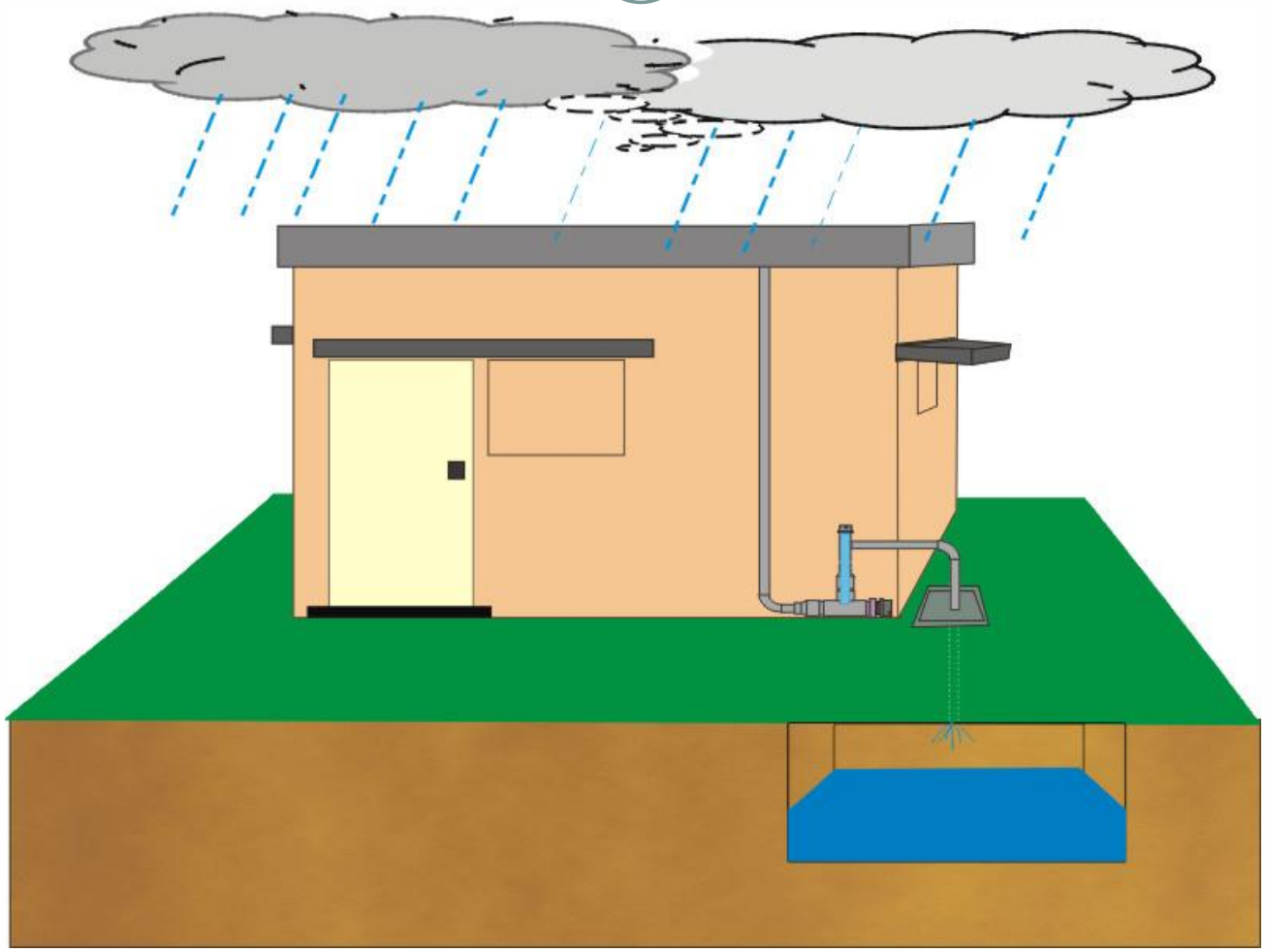
Conventional System of rain water Recharge



Conventional System of rain water Recharge



Conventional System of rain water Storage



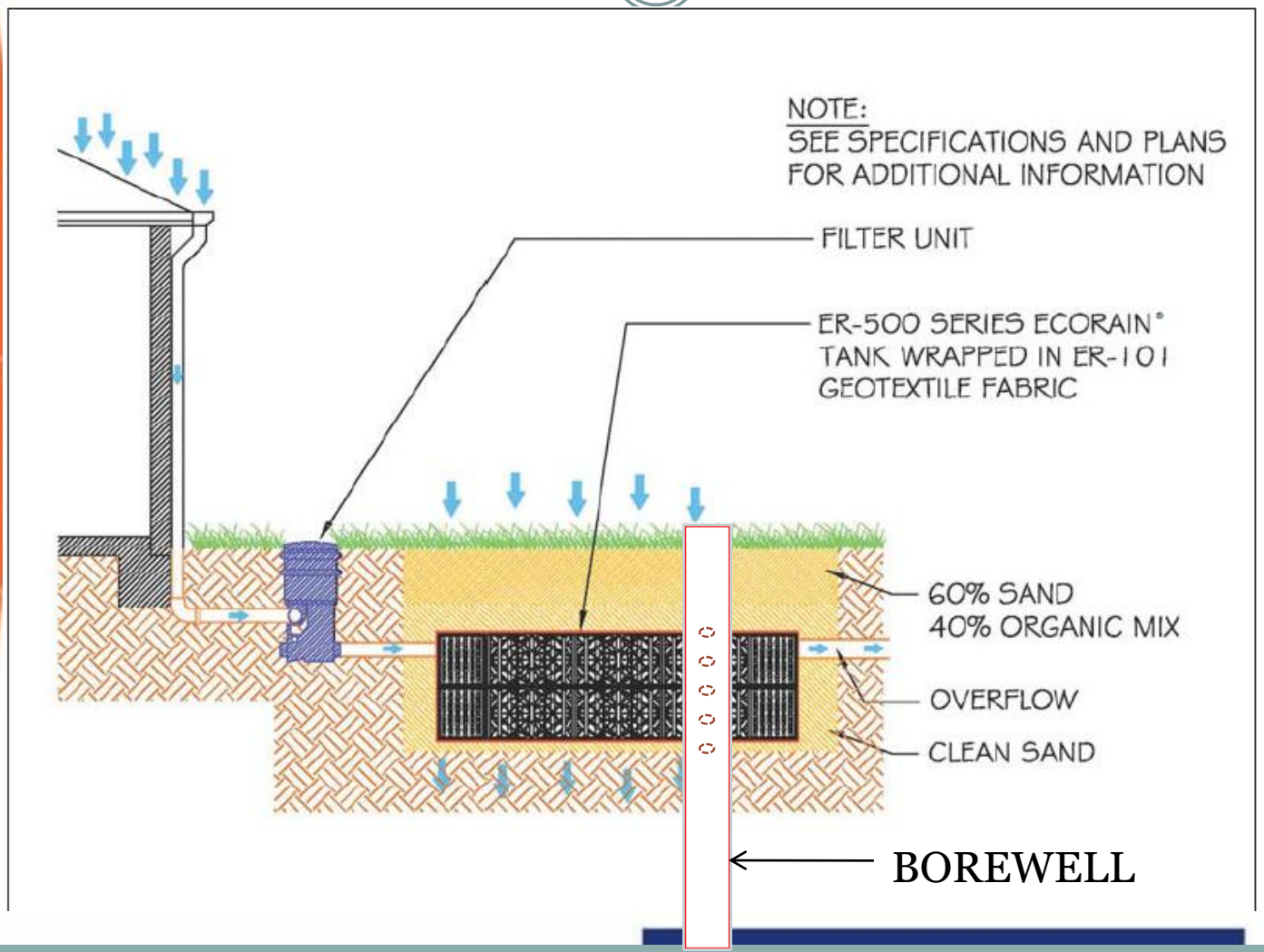
Advantages of Ecorain Tanks over RCC

- Thousands of Gallons Underground storage in couple of Days against months of construction time for RCC Tanks
- 100% Environment Friendly Recycled non Degradable Polypropylene with option of Virgin material.
- Light Weight hence no need of heavy machinery and skilled labour for construction.
- Supplied in Kit for ease of Transportation.
- Site Space utilization and Minimum site disruption.
- Can be placed under Landscape, Parking and Pathways.
- Cost effective, Low Maintenance solution for Rain/Storm Water Management and reduces liability issues.
- Heavy Load carrying Capacity.
- Onsite Storm Water Management.

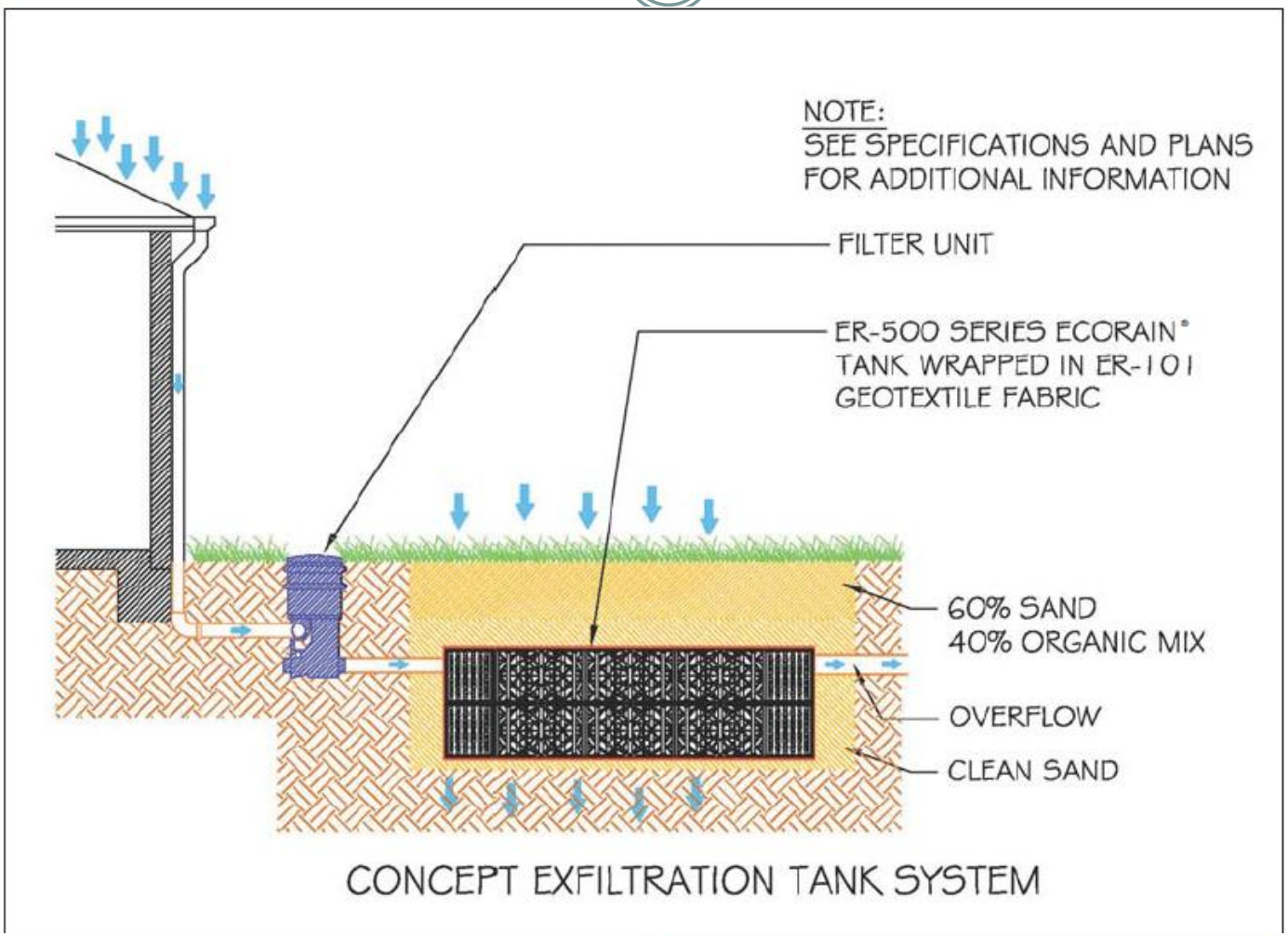
ECORAIN MODULAR TANK FOR RWH

- Modular Structure for design flexibility.
- Heavy load carrying capacity.
- High void surface ratio for quicker filtration as against boulder and gravel soak pit.
- Recharges ground water table through principle of infiltration.
- Mitigation of downstream flooding.
- Latest addition Eco-Rainwater tank clips secure tanks widths and lengths even lock the modular tanks.

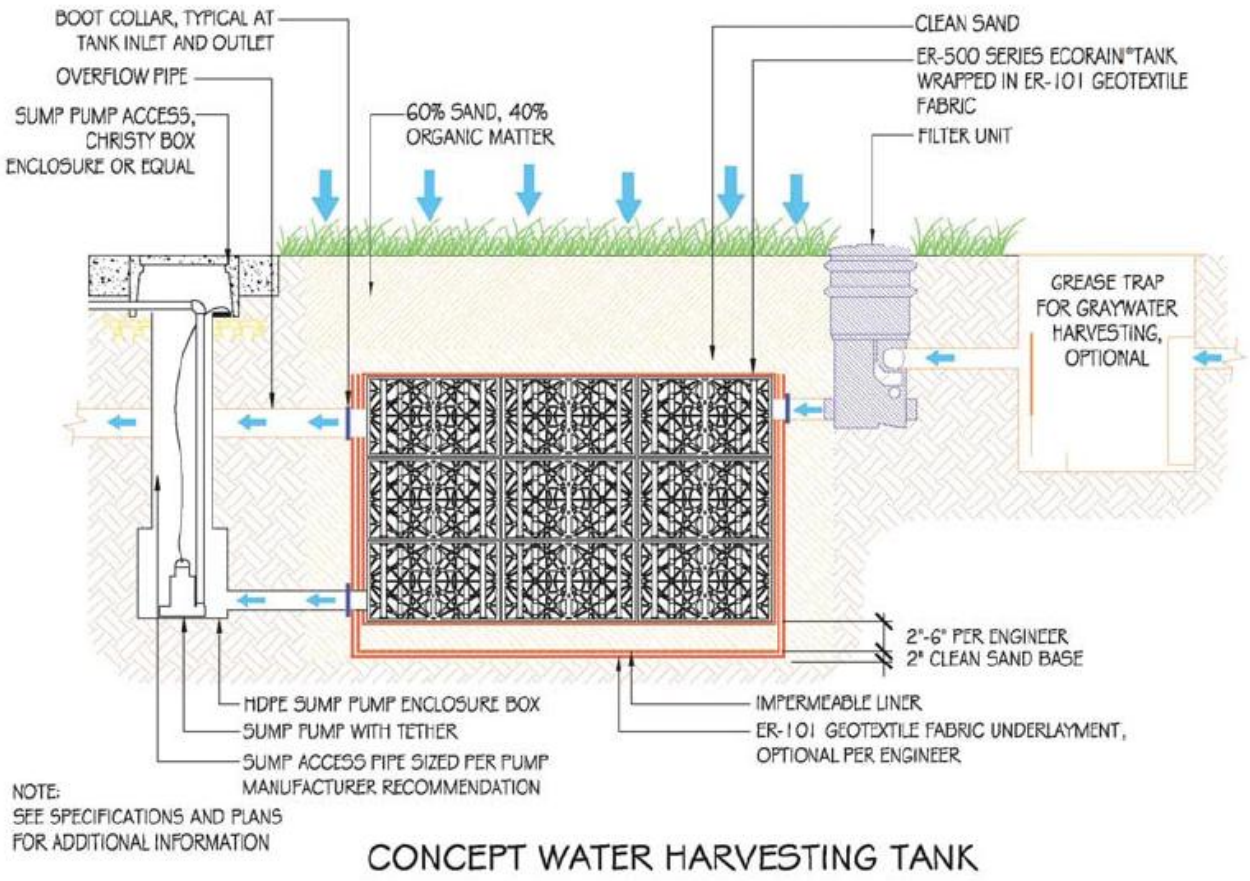
ECORAIN BOREWELL RETENSION TANK



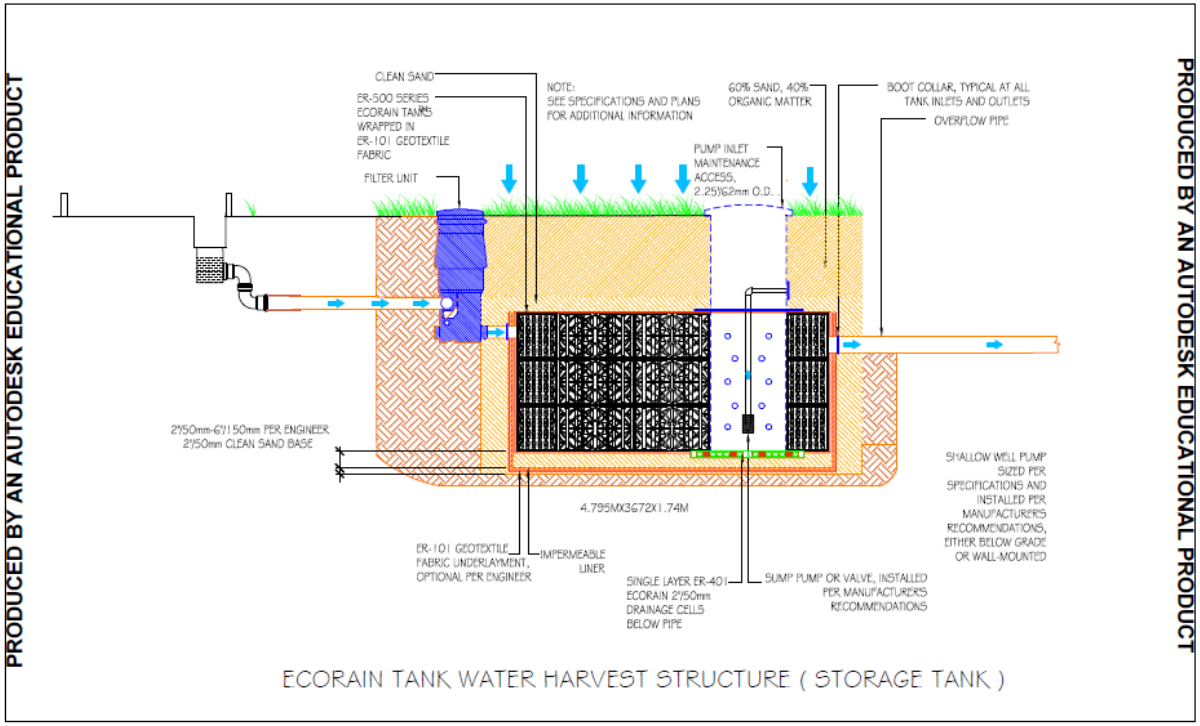
ECORAIN PERCOLATION TANK



ECORAIN STORAGE TANK

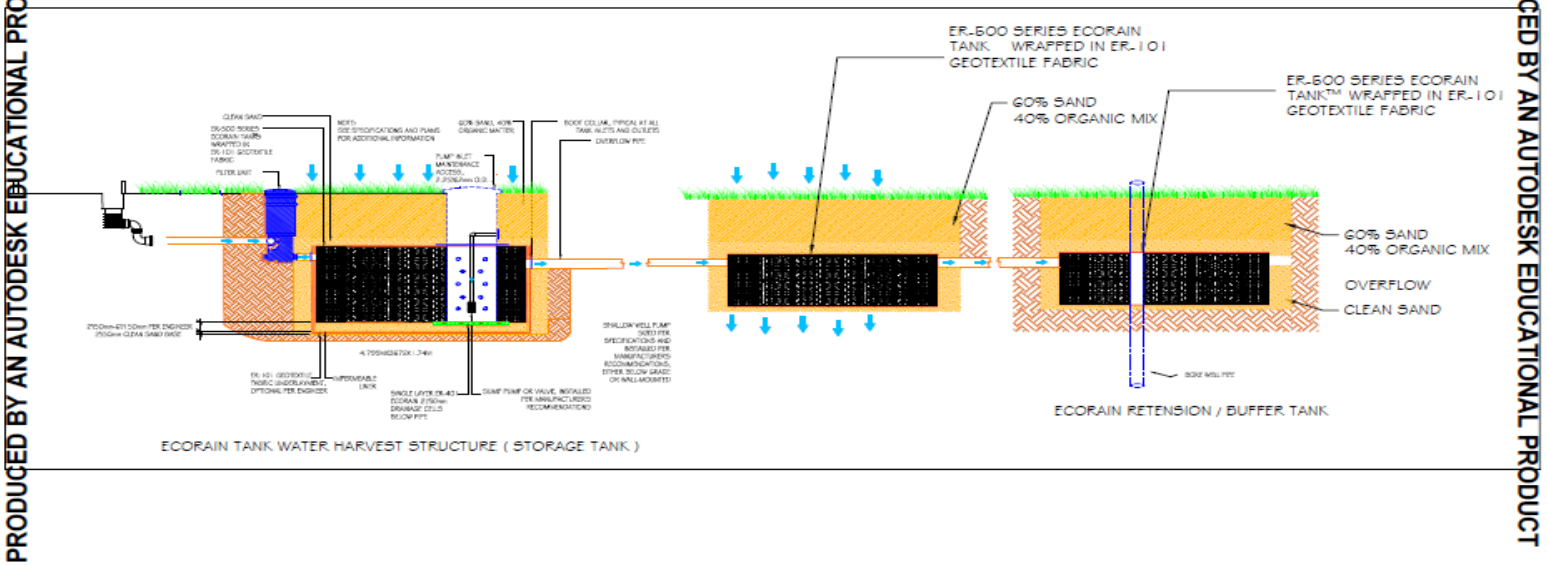


STORAGE TANK FOR SURFACE WATER



PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

STORAGE AND PERCOLATION TANK



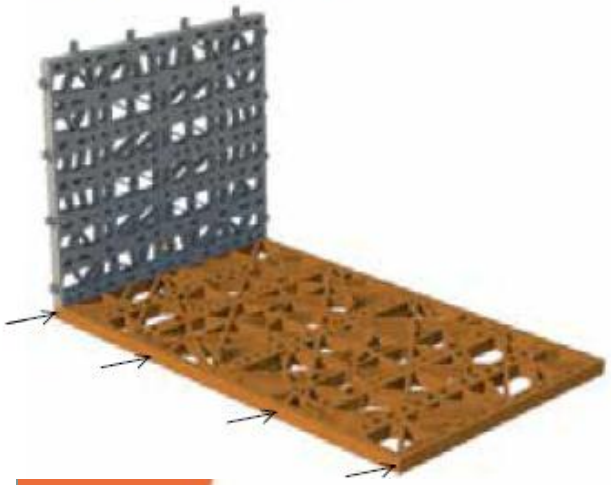
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

ASSEMLY OF ECORAIN TANK

Single Tank Assembly

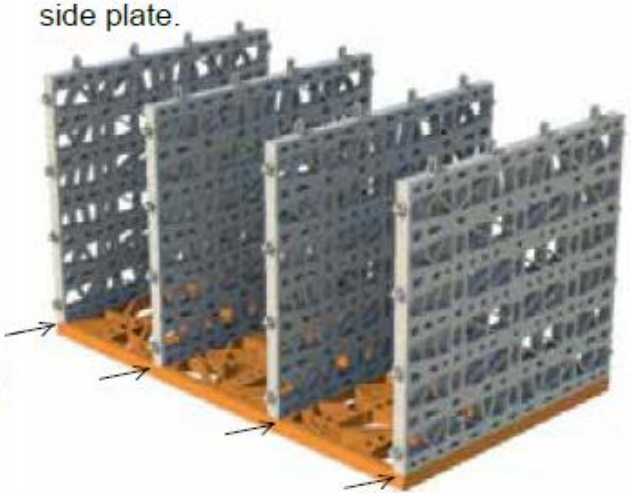
Step 1

Install large pegs of one small plate into holes of one side plate.



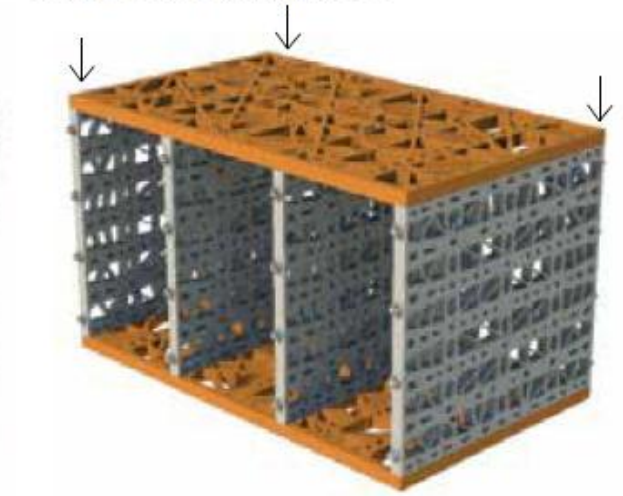
Step 2

Install large pegs of the second, third, and end small plates into holes of the side plate.



Step 3

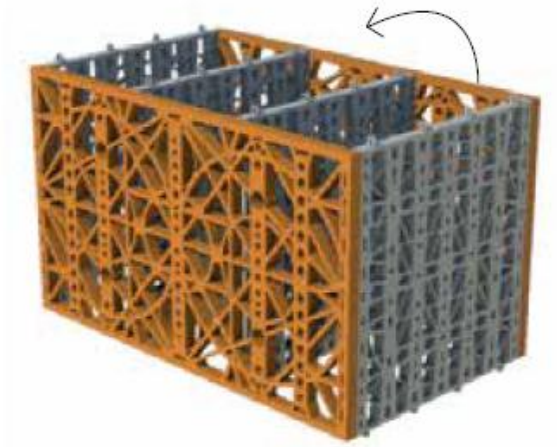
Place and align the second side plate on top of the small plates.



ASSEMLY OF ECORAIN TANK

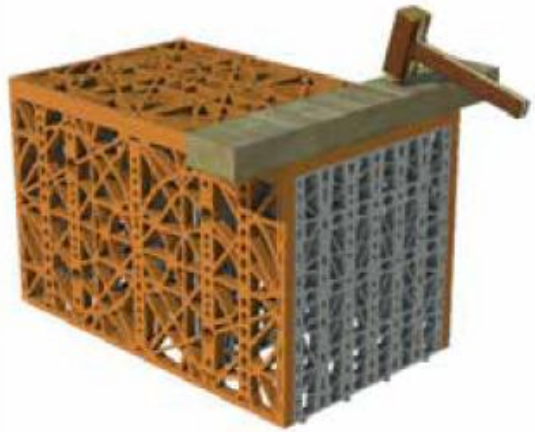
Step 4

Rotate the tank such that the side plates are now on the sides and the top and bottom are open.



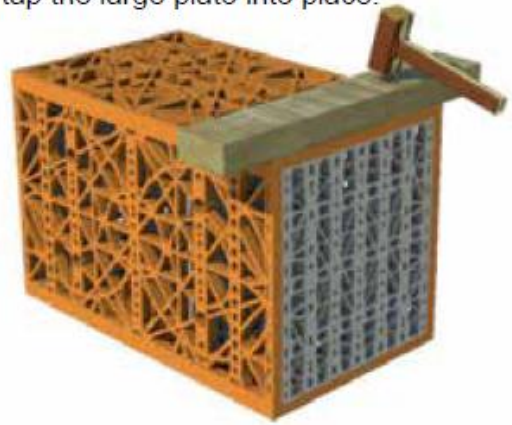
Step 5

Place and align a large plate with the pegs of the vertical small plates. Use a 2x4 timber log and a dead weight hammer to tap the large plate into place.



Step 6

Turn the tank upside down. Place and align the second large plate with the pegs of the vertical small plates. Use a 2x4 timber log and a dead weight hammer to tap the large plate into place.

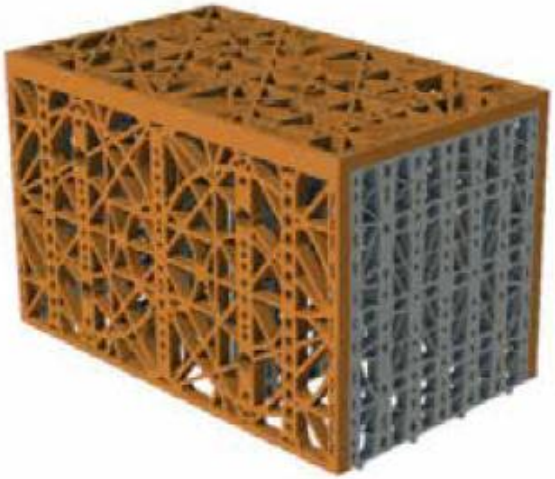


ASSEMLY OF ECORAIN TANK

Multiple Tank Assembly

Step 1

Repeat Steps 1 through 5 for Multiple Tank Assembly.

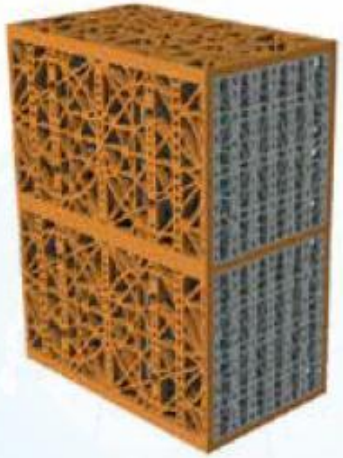


Step 2

Turn the tank upside down. Align a second tank (with one open end) over a complete tank for Double Tank Assembly.

Step 3

Use Multiple Tank Assembly Steps 1 and 2 for Triple, Quad and Pent Tank Assemblies. Check for full pin insertion and re-tap if necessary.



Eco-Rainwater Modular Tanks Configuration

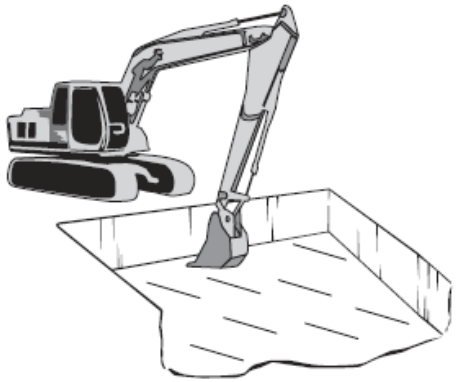
ECORAIN® TANKS

Assemble In Ten Sizes –

ER-500 Half Tank
ER-501 Single Tank
ER-502 Double Tank
ER-503 Triple Tank
ER-504 Quad Tank
ER-505 Pent Tank

INSTALLATION ECORAIN TANK

Step 1
Excavate Trench Larger than Specified Tank Size, per Engineered Detail

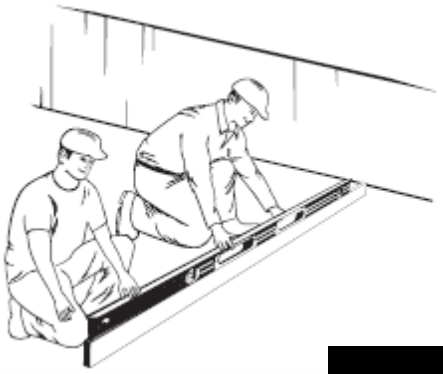


INSTALLATION ECORAIN TANK

Step 2
Compact Base to 35 psi

INSTALLATION ECORAIN TANK

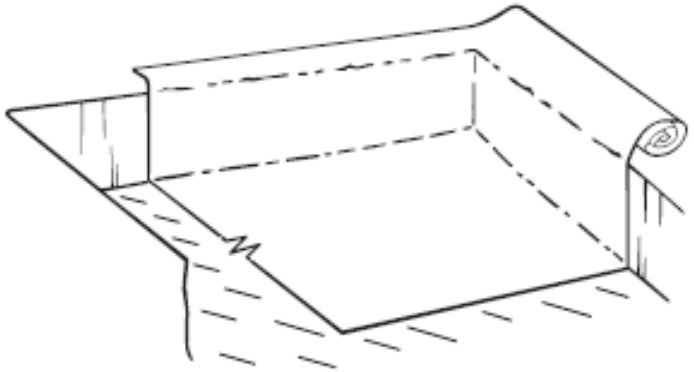
Step 3
Add **Sand** or Free Drainage Material* to Base, Compact and Level with a Straight Edge



INSTALLATION ECORAIN TANK

Step 4

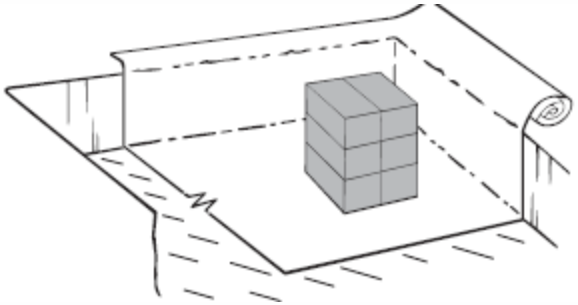
Lay Geotextile Material in Bottom and on Sides of Trench, Enough to Fully Wrap Tank, with 12″ Seam Overlaps



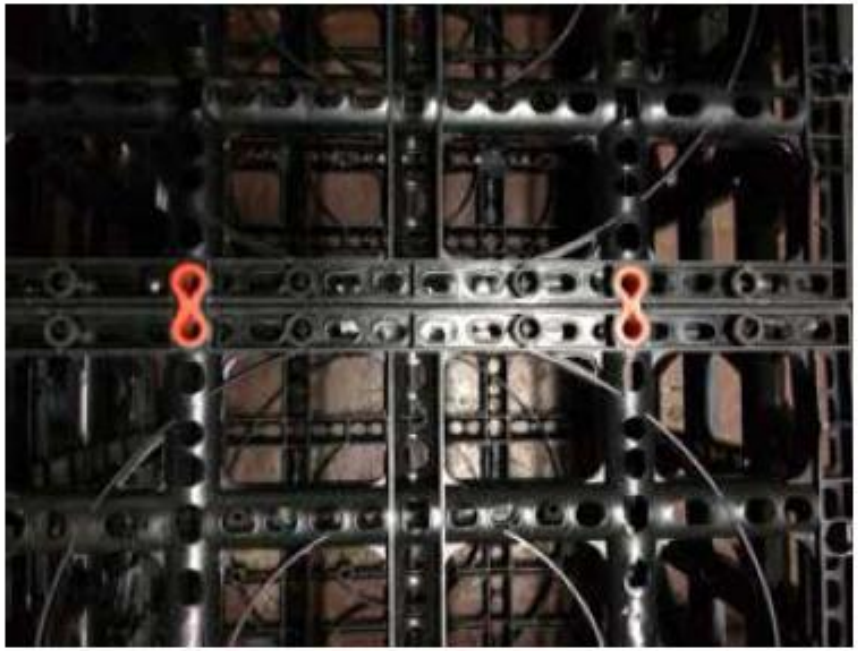
INSTALLATION ECORAIN TANK

Step 5

Install Tanks upright for Maximum Strength and per the Warranty:
Half Tank - .79' High
Single Tank - 1.48' High

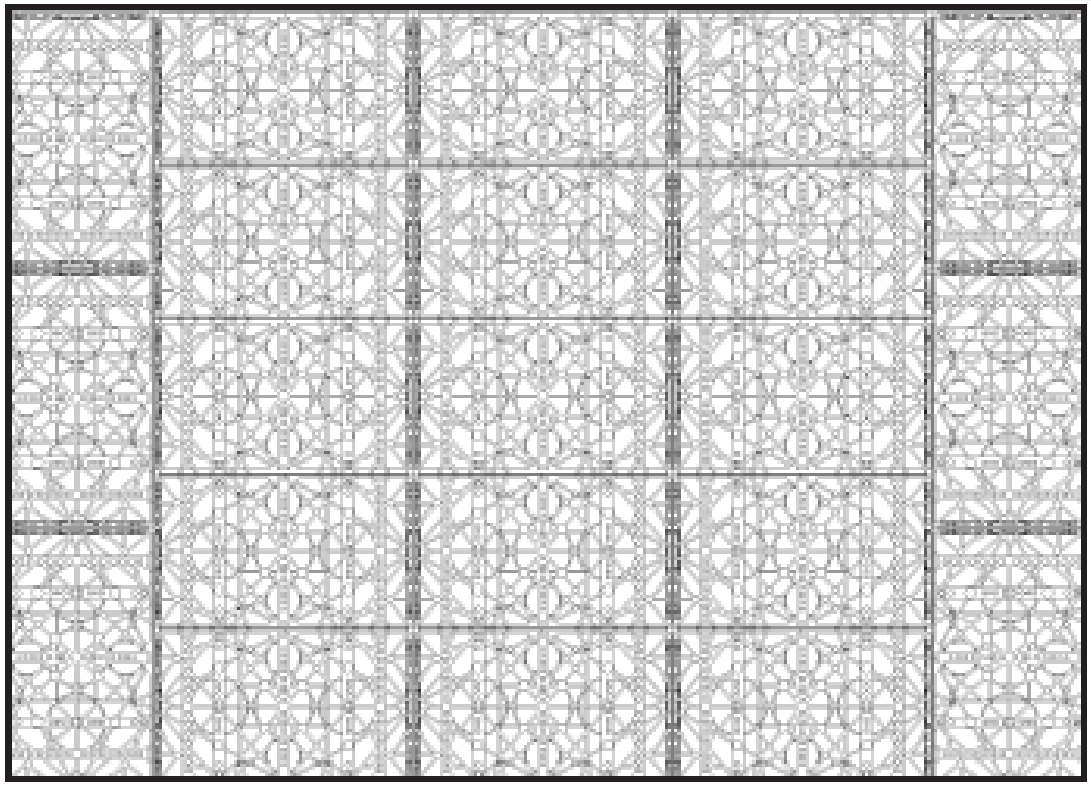


Eco-Rainwater Tank Joining Clips



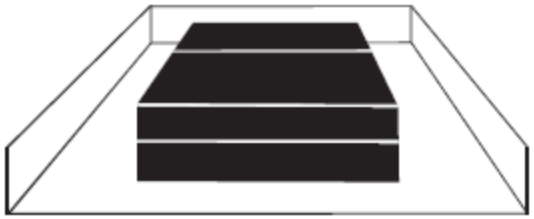
INSTALLATION ECORAIN TANK

Step 6
Orient Tanks Lengthwise along Perimeter



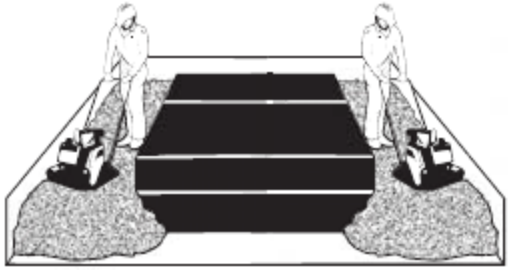
INSTALLATION ECORAIN TANK

Step 7
Cover EcoRain® Tanks with Geotextile Material - Wrap Tight, Cut Away Excess Folds, Overlap and/or Seal Joints with Tape



INSTALLATION ECORAIN TANK

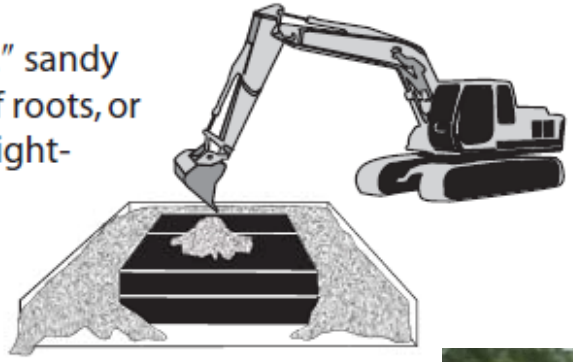
Step 8
Backfill Sides with Sandy Fill in maximum 12″ Layers - Compacting Each Layer at least 95%



INSTALLATION ECORAIN TANK

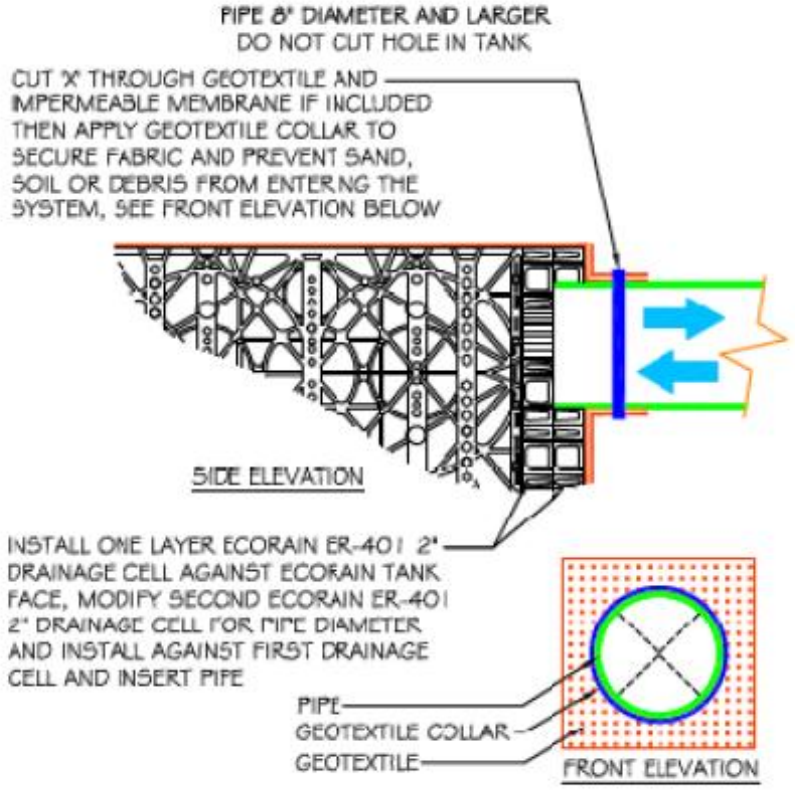
Step 9

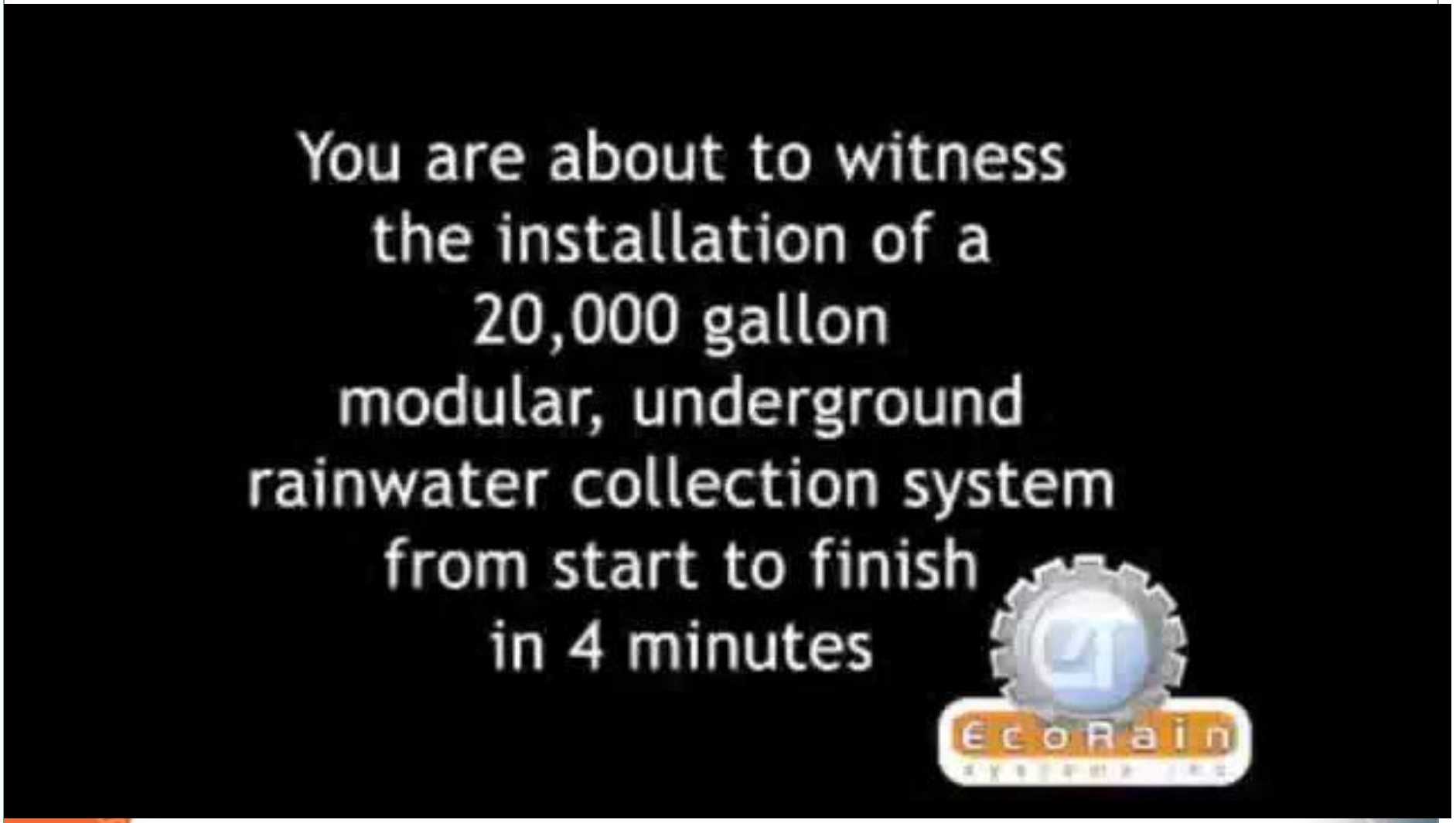
Backfill over Top with 12″ sandy backfill free of rocks, stiff roots, or debris - Compact with Light-weight Equipment



Correct

INLET CONECTION




You are about to witness
the installation of a
20,000 gallon
modular, underground
rainwater collection system
from start to finish
in 4 minutes
EcoRain

H-25 LOADING ON ECORAIN MODULAR RAIN TANKS

Approved in USA for government Installations by ICC Certification

NOTE:
SEE SPECIFICATIONS AND PLANS
FOR ADDITIONAL INFORMATION

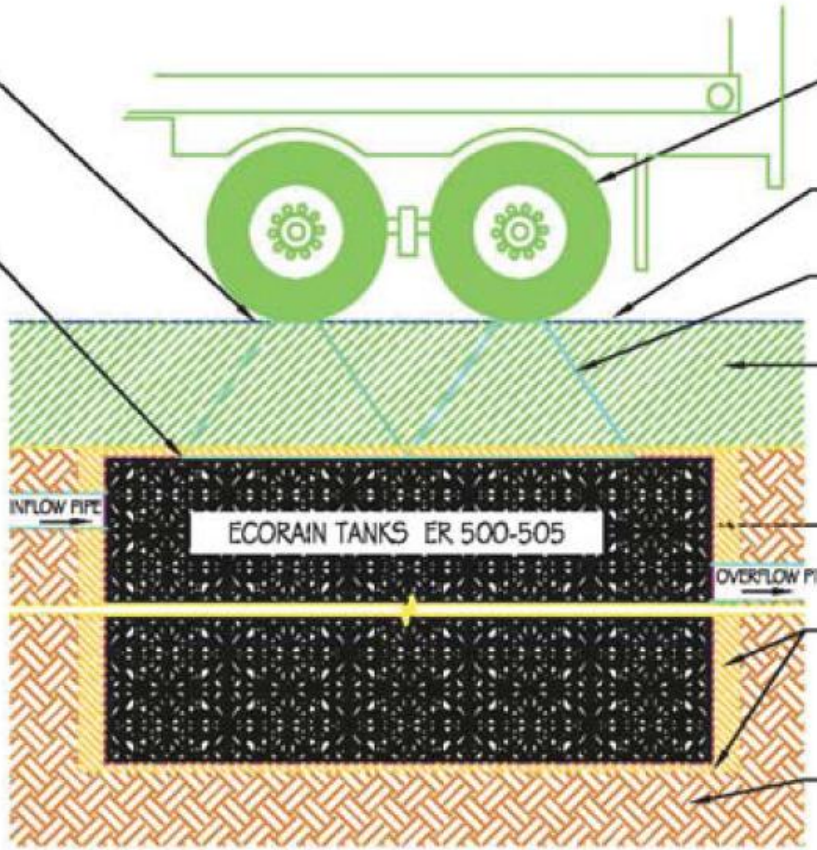
PRESSURE AT TIRE BASE = 80 PSI

PRESSURE IS DISTRIBUTED OVER LARGER AREA THROUGH ROAD BASE THEREFORE PRESSURE AT DEPTH OF 24" = 7.44 PSI

NOTES:

1. PER CODE, ENGINEERS INCREASE PRESSURE BY 20% TO ACCOUNT FOR A MOVING TIRE LOAD; THEREFORE, THE TOTAL PRESSURE, INCLUDING WEIGHT OF THE ROAD BASE IS INCREASED FROM 7.44 PSI TO 9.25 PSI

2. IN DOCUMENTED LABORATORY COMPRESSION TESTING, ECORAIN TANKS WITH 4 SMALL PLATES YIELDED 39 PSI; USING THE ABOVE SCENARIO WITH H25 LOADING AND A 24" ROAD BASE, THE FACTOR OF SAFETY IS:
39psi/9.25psi=4.22 FACTOR OF SAFETY



H25 LOADING SEMITRUCK, 40,000 LBS. REAR AXLES

ROAD SURFACE

TYPICAL WHEEL BASE DISTRIBUTED LOAD AREA

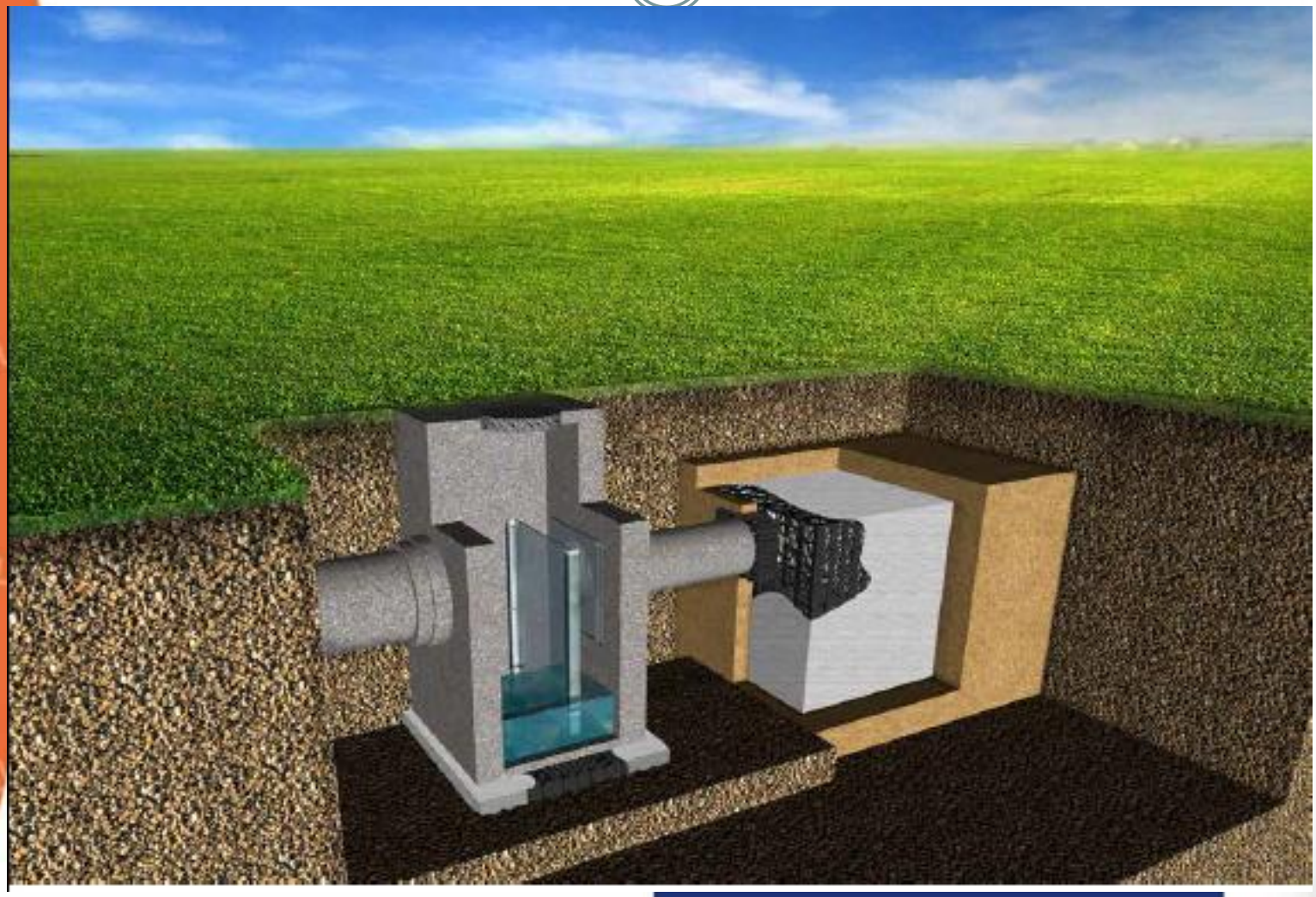
ROAD BASE PER CIVIL ENG. 24" MIN. DOES NOT INCLUDE ASPHALT OR CONCRETE COVER

WRAP TANKS WITH ER-101 GEOTEXTILE FABRIC

COMPACTED SAND, 6" WIDE AT SIDES, 2" THICK AT TOP AND BOTTOM OF TANKS

NATIVE SOIL > 95% COMPACTION MIN.

Eco-Rainwater Filter Separator



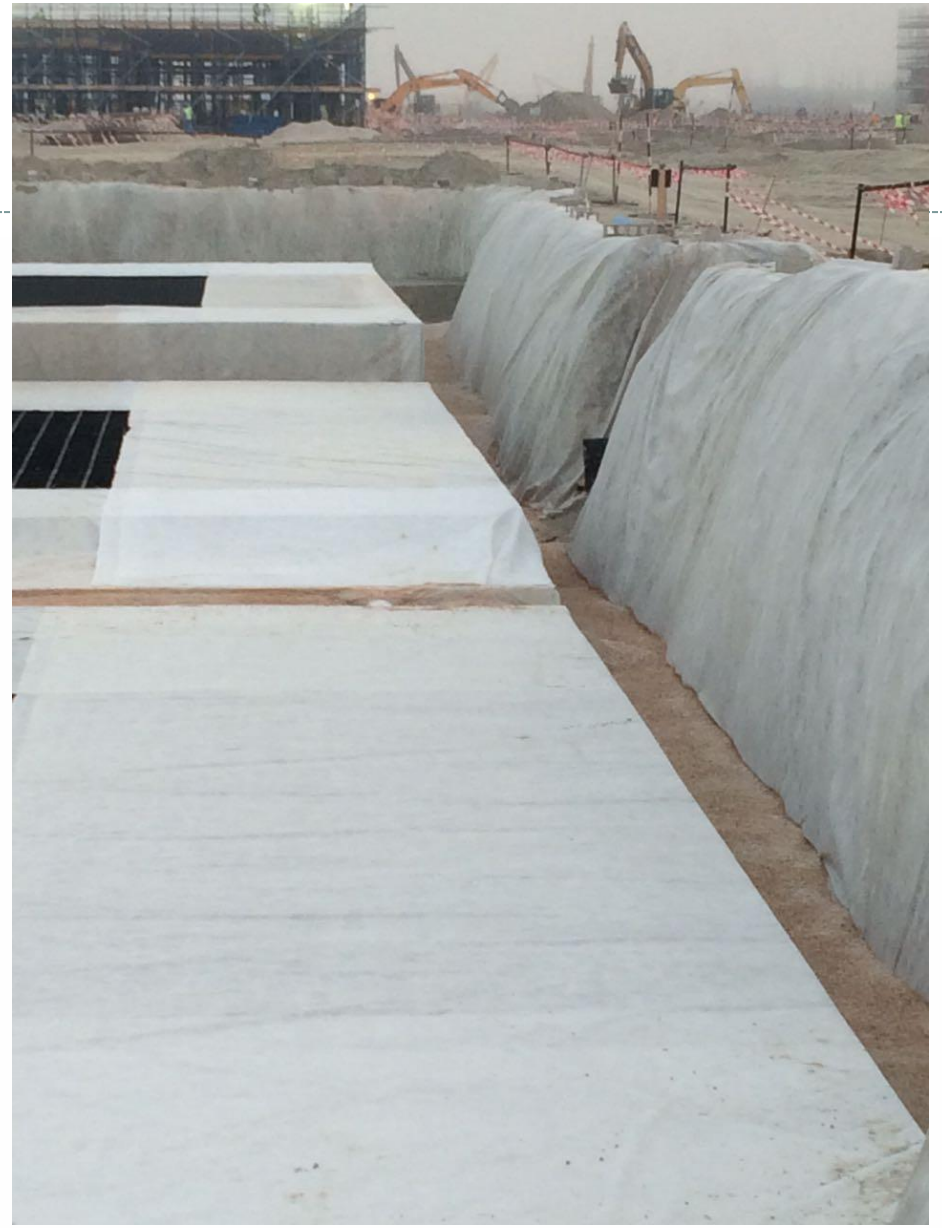
RWH Works with Eco-Rainwater Modular Tanks Just To Name Few .....

- Endurance Technology Uttaranchal.
- HIL Limited Allahabad.
- Lupin Laboratory in Pune.
- Smart city pune.
- 150 Schools Under Sarva Shiksha Abhiyan in Gujrath. Each with 10000 Lit Storage, 5000 Lit Recharge, 5000 Lit Borewell Retension Tank.
- Gujrat Tourism Development In Progress.
- Los Angeles Airport.
- Doha International Airport.
- Barwa (Qatar) International Truck Parking Terminal.
- Labour City in Doha

Endurance Technology Uttaranchal

Gujrat School

PROJECT IMAGES OUT SIDE INDIA




STORM WATER

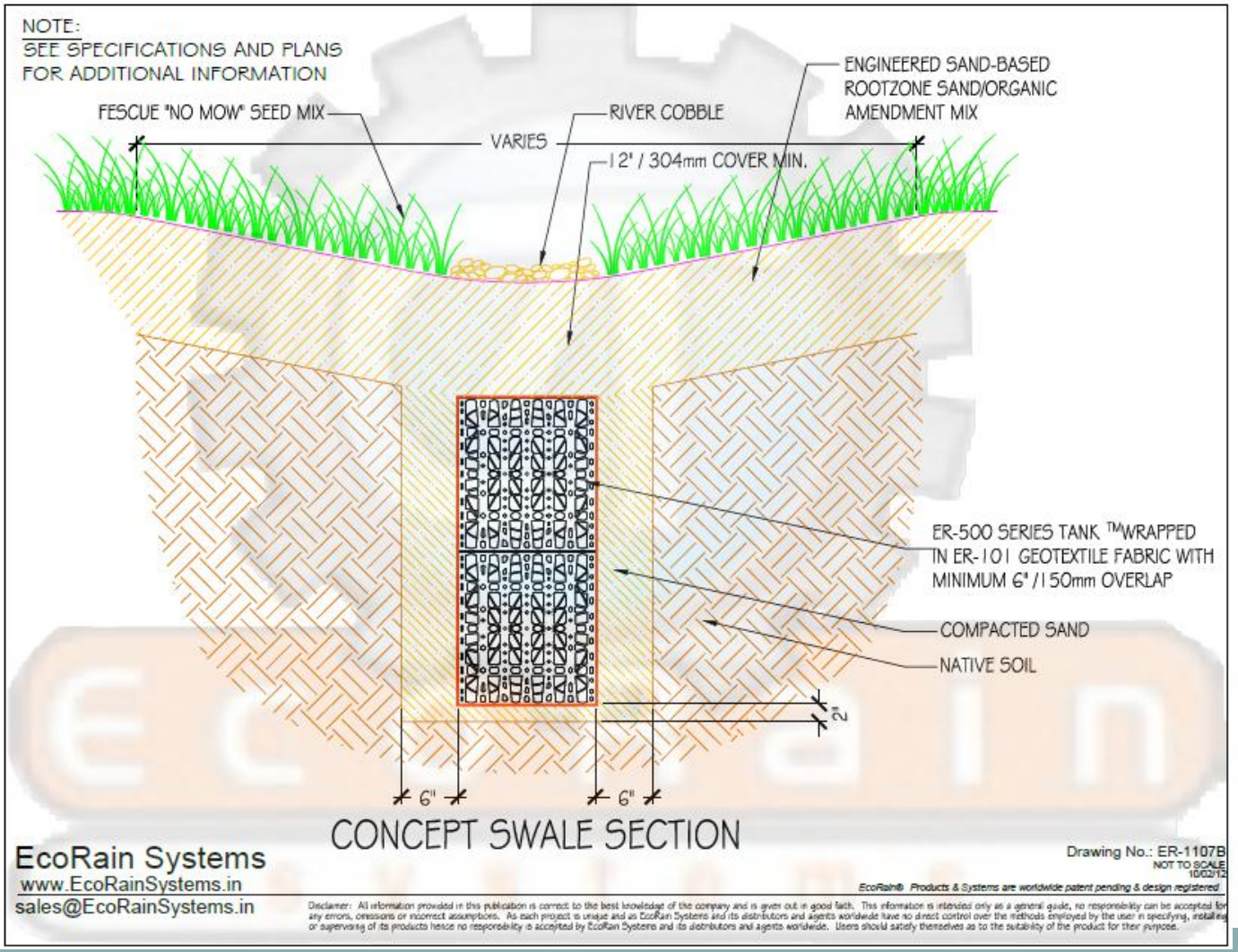
OTHER USE OF ECORAIN TANK

Bioswale Detention / Infiltration

EcoRain® Tanks provide underground void space to detain large storm water events for aquifer infiltration, filtered through sandy soil. Installed in 2007-08, LAX International Airport Runway 25L now has 11,095 linear feet of Eco-Rain® Tanks in a bioswale that has 455,000 cubic feet capacity. Tank design has an efficient 97% void space designed to mimic nature – it provides an aerobic environment that does not require cleaning.

Street Median Bioswales

Bio-filtration, with over 12,000 cubic feet of water storage in buried EcoRain® tanks, fits snugly between lanes of traffic and the industrial runoff from a major highway, sanitation processing plant, residential communities & the ocean. This urban street median storm water project is located on Imperial Highway between Pershing Drive and Main Street in El Segundo, CA. It is in a highly traveled street that divides LAX Airport and the residential neighborhoods of El Segundo. It also leads directly to Santa Monica Bay and the Pacific Ocean... just down the street. Keep that pollution out of our oceans!


NOTE:
SEE SPECIFICATIONS AND PLANS
FOR ADDITIONAL INFORMATION
FESCUE "NO MOW" SEED MIX
VARIES
RIVER COBBLE
12" / 304mm COVER MIN.
ENGINEERED SAND-BASED
ROOTZONE SAND/ORGANIC
AMENDMENT MIX
ER-500 SERIES TANK ™WRAPPED
IN ER-101 GEOTEXTILE FABRIC WITH
MINIMUM 6" / 150mm OVERLAP
COMPACTED SAND
NATIVE SOIL
2"
6"
6"
CONCEPT SWALE SECTION
EcoRain Systems
www.EcoRainSystems.in
sales@EcoRainSystems.in
Drawing No.: ER-1107B
NOT TO SCALE
10/02/12
EcoRain® Products & Systems are worldwide patent pending & design registered
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THANK YOU

Ashok Gaikwad
(M) +91 9922062981
Email salesag@vikasindus.com
Web www.ecorainwatersolutions.com