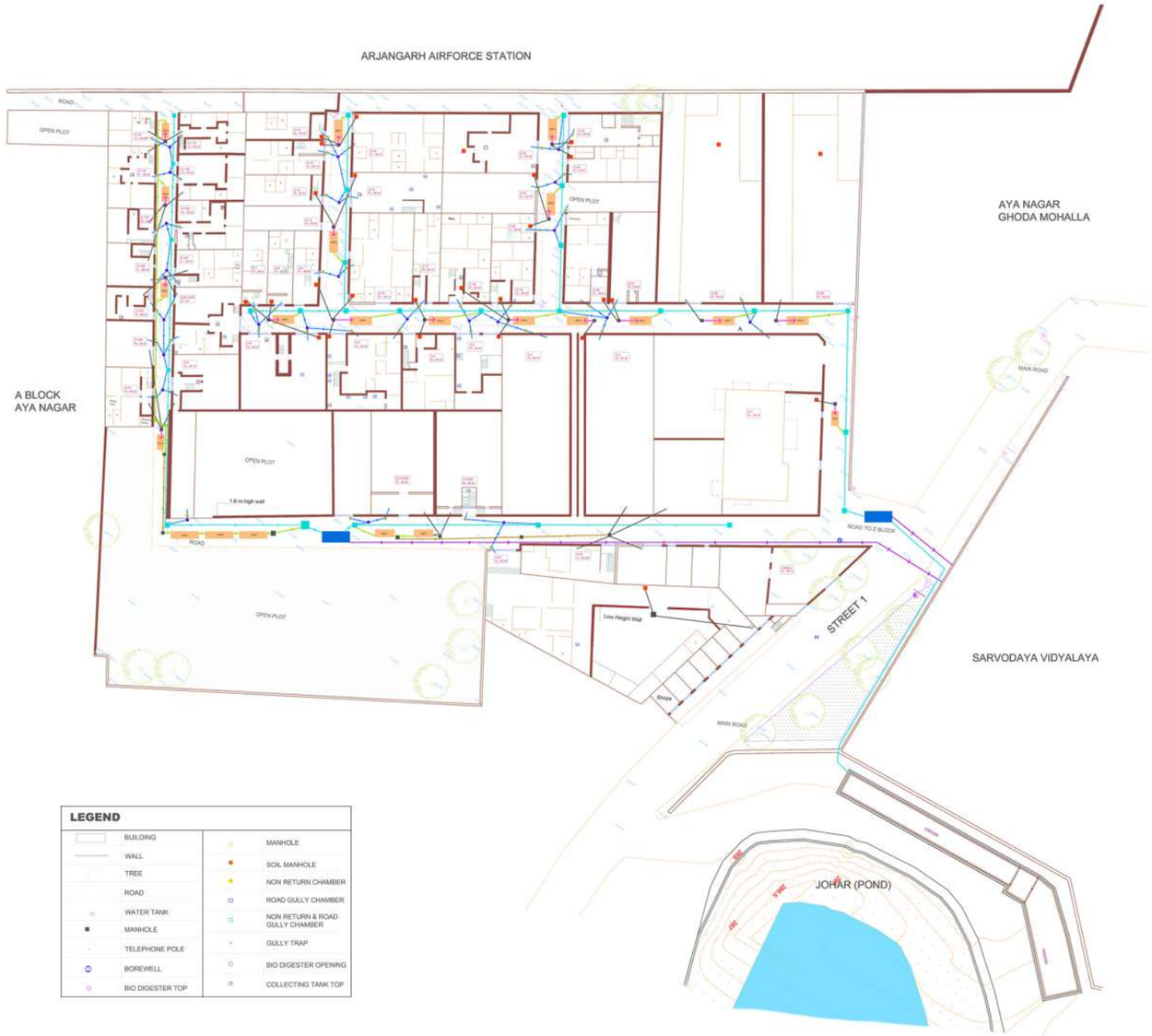
SANITATION IMPROVEMENT PLAN FOR AYA NAGAR, DELHI

PILOT PROJECT FOR DELHI URBAN SHELTER IMPROVEMENT BOARD

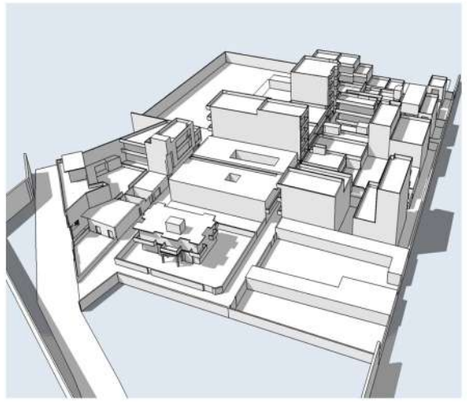
A pilot project for sanitation improvement by decentralised sewage treatment in a densely built-up urban neighbourhood.



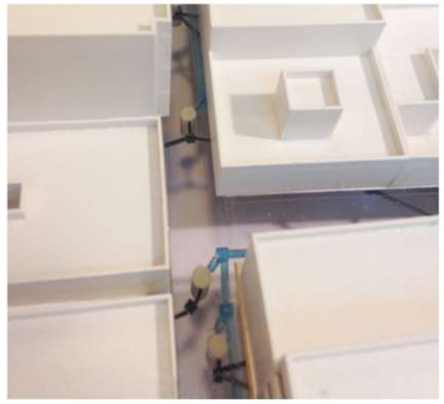
Installation of decentralised sewage management system in Z Block Aya Nagar, New Delhi

The system provides drainage and sewerage in a neighbourhood housing over 200 families without disturbing the privacy of households and with no specialised maintenance requirement.

There is no system for sewage treatment in Aya Nagar. The storm water which flows in open channels along roads is mixed with sewage. The open channels are an extended garbage dump; and are regularly choked with plastic bags and other forms of solid waste. The sewage of each house in Z Block was stored in a sump below the house. Sewage sumps when full were emptied by portable vacuum pumps. The sump contents were highly toxic and discharged in an unregulated manner leading to unsanitary and extremely unhygienic living conditions for all citizens.



Scale Model of Z Block



Sewage Managment below roads

The project was started with mapping and surveying the neighbourhood, which included physical surveys, documenting the internal layout of the houses, and conducting a demographic survey. An important part of the project was to engage and consult with community members. A variety of experts, including public health experts, ecologists and landscape architects, bio digester designers, plumbing experts, and planning communications experts were consulted. A scale model was created and used as a planning tool. Research conducted by Greha over the last decade became another planning tool. All project activities were documented in order to develop community communication and management tools for future projects.

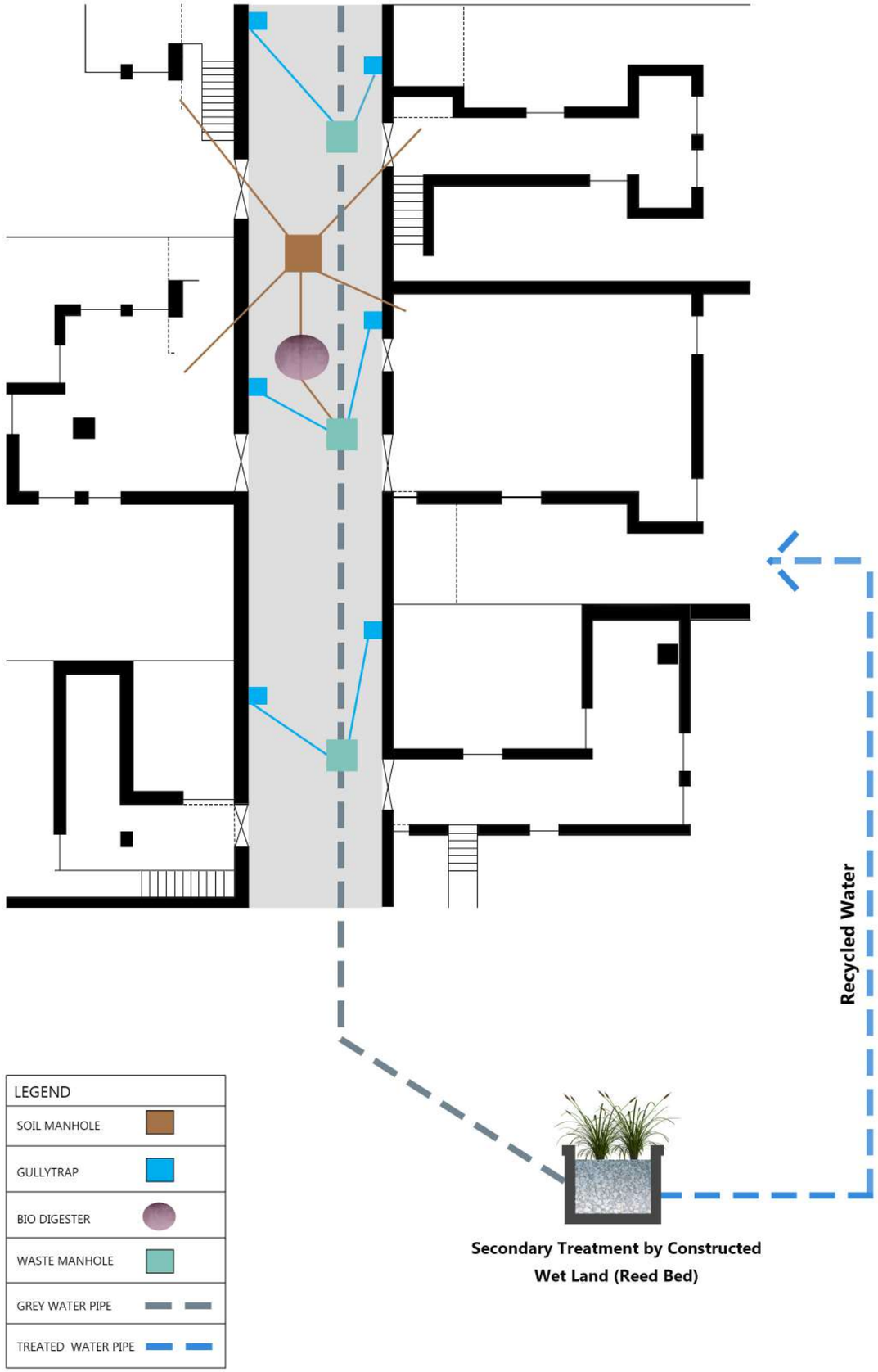
Community Meeting with Stakeholders

Aya Nagar is a 5 or 6 hundred years old village on the outskirts of Delhi, bordering Gurgaon in Haryana. Since the 1980's the village has been urbanising, its population having doubled since 2000 CE. Around this time Greha established itself in Aya Nagar and started to work with the local residents to understand and guide the development of the built environment.

Community Consultation

The village was extending in a proto-urban pattern without adequate infrastructure or social amenities. The most **urgent requirement**, agreed by all, was **drainage**, which included sewerage, waste water and surface drainage. Water supply to the village and its extensions was inadequate, the traditional system of rain water harvesting and shallow wells having been neglected and degraded. Spontaneous house building activity without environmental design or planning was rampant in all open spaces.

General Condition of Open Public Space

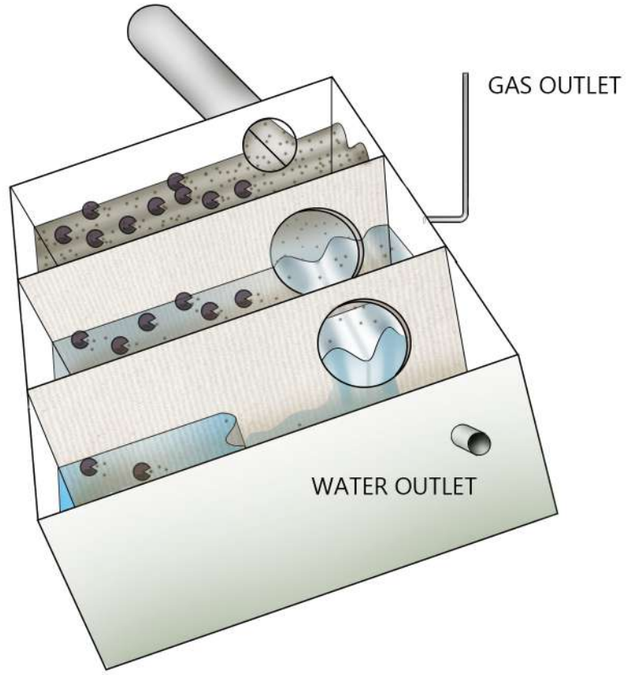


The bio digester is a customised product using innovative technology patented by the Defence Research and Development Organisation (DRDO) of the Government of India. A specially designed container made of glass reinforced plastic (GRP) charged with a DRDO patented bacteria which feeds on human excreta to produce treated waste water is used for sewage treatment. This treatment system requires no specialised maintenance for 10 -15 years.

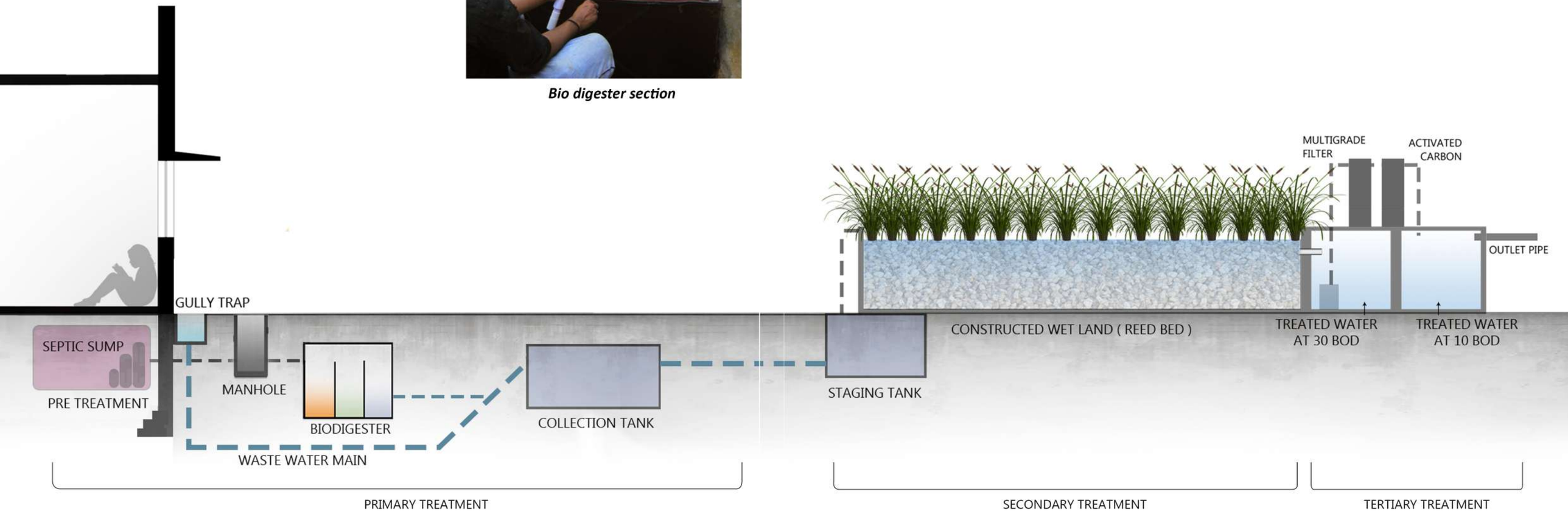
Bio digester being unloaded on site

Bio digester section

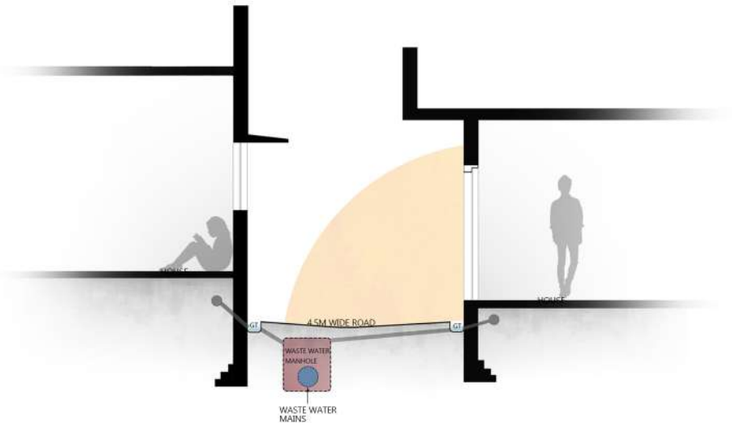
Sewage treatment in the bio digester takes place through the action of a specially designed bacteria which is the inoculum introduced into the airtight container. The inoculum has the property of regenerating through its action with feacal bacteria to produce treated effluent. The treatment system is therefore self regenerating.



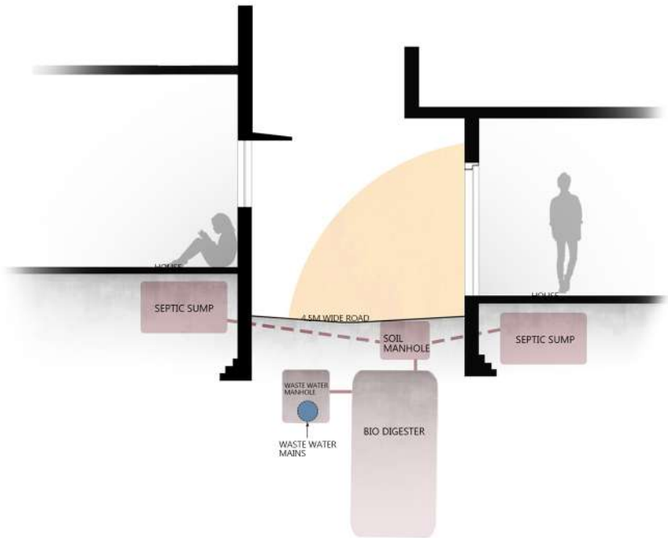
BIO DIGESTER



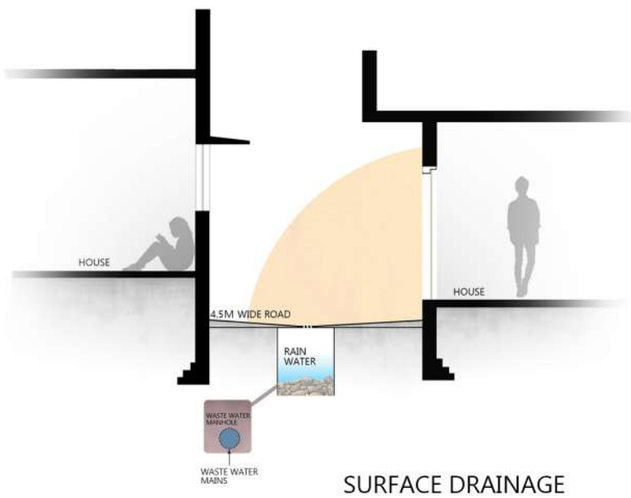
Installation of decentralised sanitation system below the neighbourhood roads.



WASTE WATER DISPOSAL



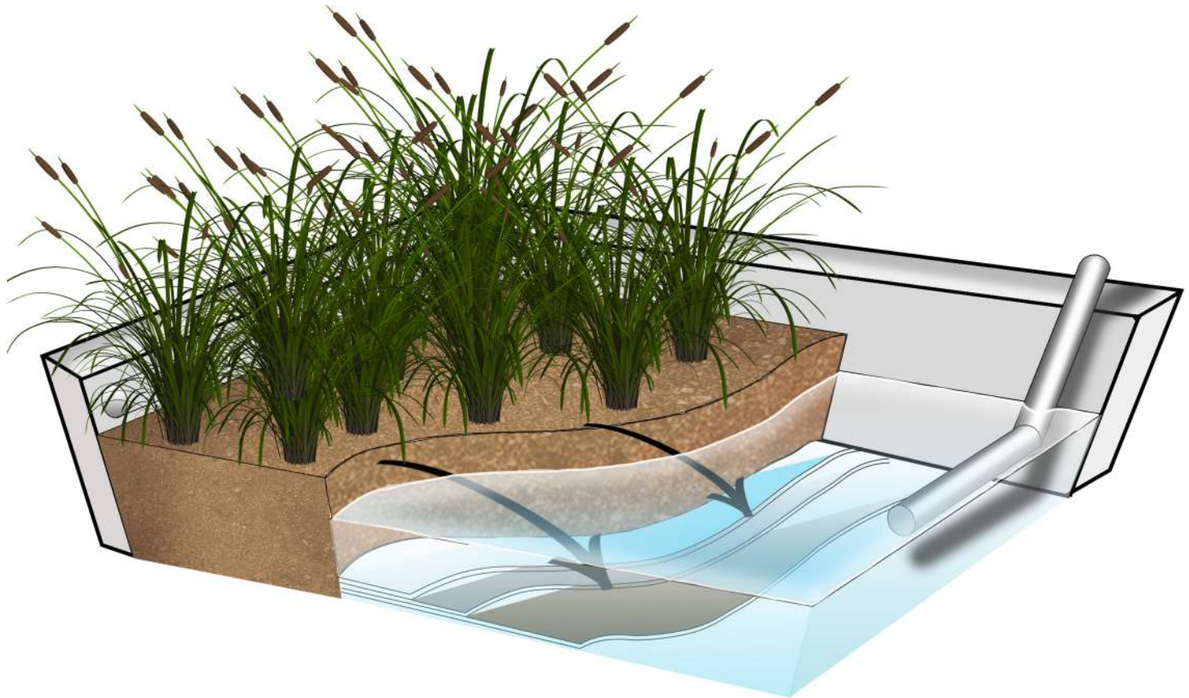
SEWAGE TREATMENT



SURFACE DRAINAGE

Waste water, after primary treatment by a series of bio-digesters produces a partially treated affluent which is pumped through a constructed wetland for secondary treatment.

Technical support was provided by the Centre for Science and Environment (CSE) who shared their expertiese in decentralised waste water managment.



Section through Reed Bed

In the wetland, waste water is circulated through a crushed stone medium within which are growing plants that have roots containing rhizomes which further clean the waste water.

Constructed Wetland (Reed Bed) adjoining the Village Johar

Root-zone treatment in the constructed Wetland

INSTALLATION OF THE SYSTEM

STREET BEFORE INSTALLATION

STREET EXCAVATION

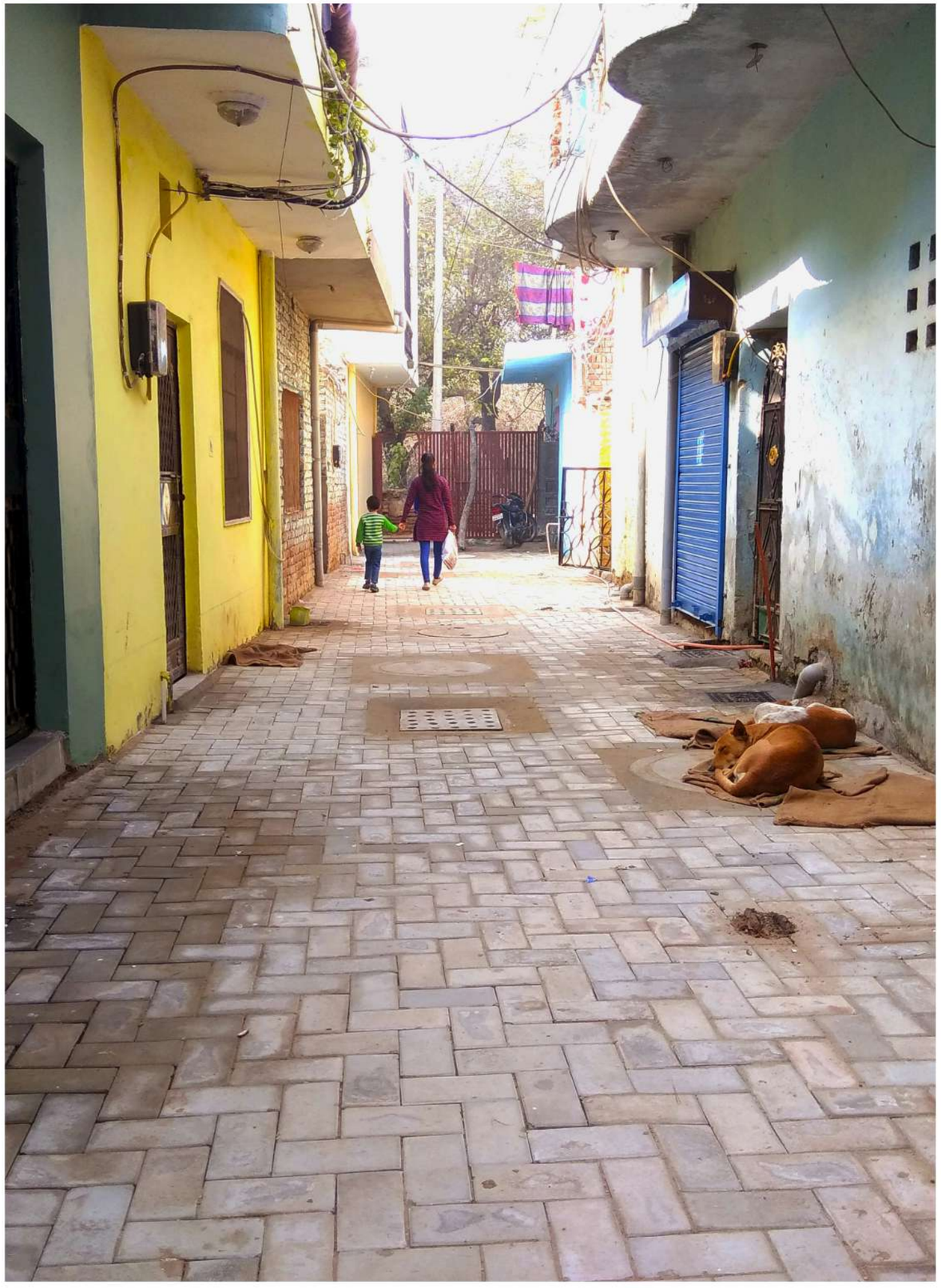
CONSTRUCTION OF RAFT FOR PLACEMENT OF BIO DIGESTER BELOW THE STREET

BIO DIGESTER READY FOR INSTALLATION

BIO DIGESTER IN PLACE BELOW THE STREET

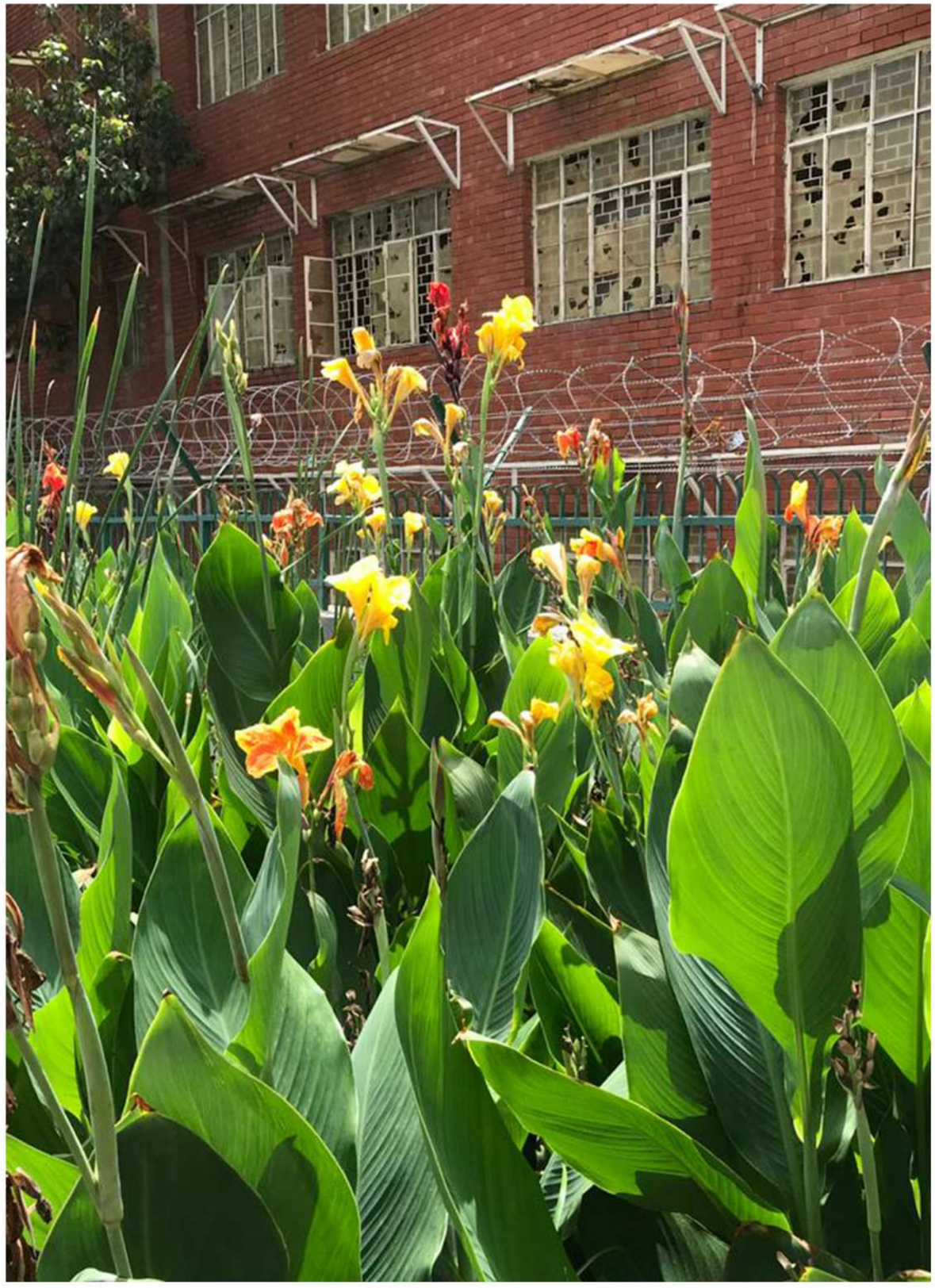
PLUMBING WORK BELOW THE STREET SURFACE

RESURFACING THE STREET



COMPLETED STREET

CONSTRUCTED WETLAND (REED BED) ADJOINING THE JOHAR



PLANTS IN THE REED BED GROWING BY ABSORBING NUTRIENTS FROM WASTE WATER

PILOT PROJECT FOR SANITATION IMPROVEMENT PLAN AT AYANAGAR, DELHI

PROJECT DETAILS

Treatment capacity : 100000 litres/day

Total area : 1 hectare

Capital cost : Rs. 2.25 crore

O&M cost : Rs. 20 Lac over 3 years

Year of Implementation : 2020

Proposed reuse option : Cleaning road, etc., horticulture, discharge into Johar.

Knowledge & Design Partner : Centre for Science and Environment (CSE), Delhi

Design Consultant : MN Ashish Ganju, Greha, New Delhi

Implementation Agency :

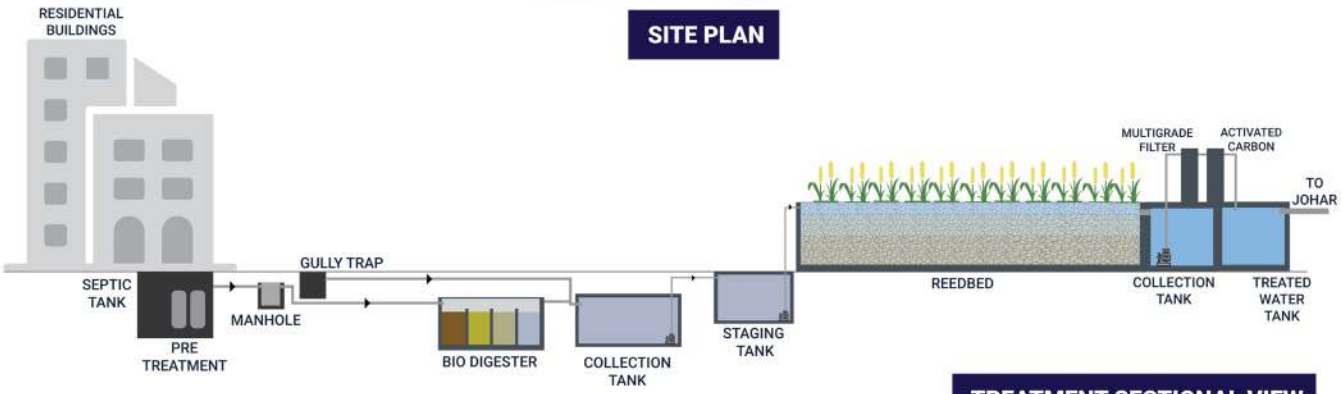
Arkin Creations Pvt. Ltd

Funding Agency : DUSIB

O&M Agency : Arkin Creations Pvt Ltd

Name : Manoj Jha
Organization : Arkin creations pvt ltd
Designation : Director
Contact number : 8826419995
Email address : manoj.jha@arkin.org.in ;
arkincreations@gmail.com

SITE PLAN



TREATMENT SECTIONAL VIEW

Treatment Method

In situ pre treatment
Anaerobic treatment
Constructed reedbed
Multi grade filter
Activated carbon filter