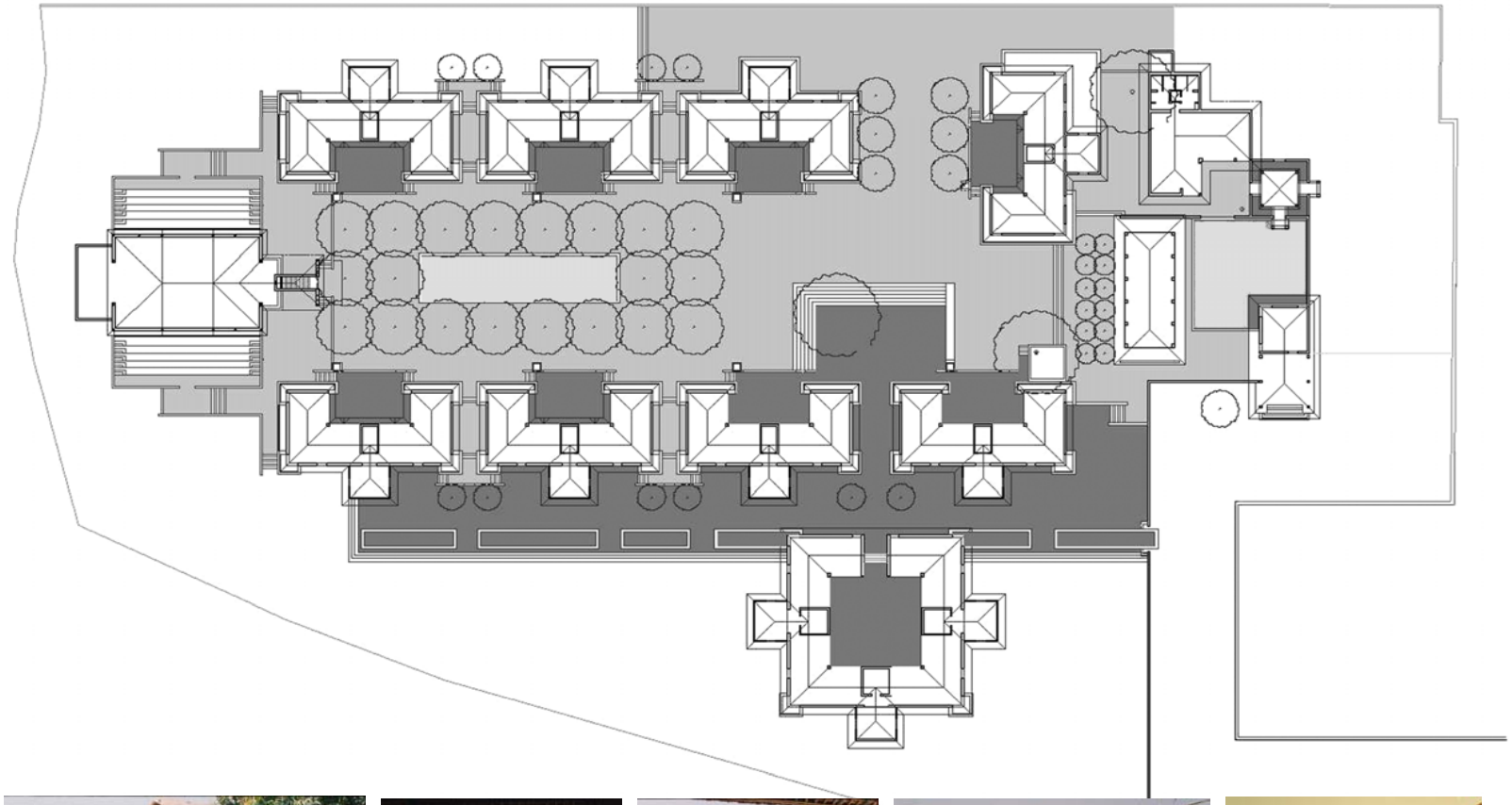
Architecture as

Re

use
cycle
configure

kakani associates
mail@kakani.in

GALAXY SCHOOL
RAJKOT



MADHU INDUSTRIES
AHMEDABAD

KEY FEATURES

80m x 50m 3 Storey Factory

10.2m Spans – Industrial

Load bearing Exposed Brick Box

Flyash/EPS Hollow Block Flat Slabs

Exposed Concrete Tapering Columns

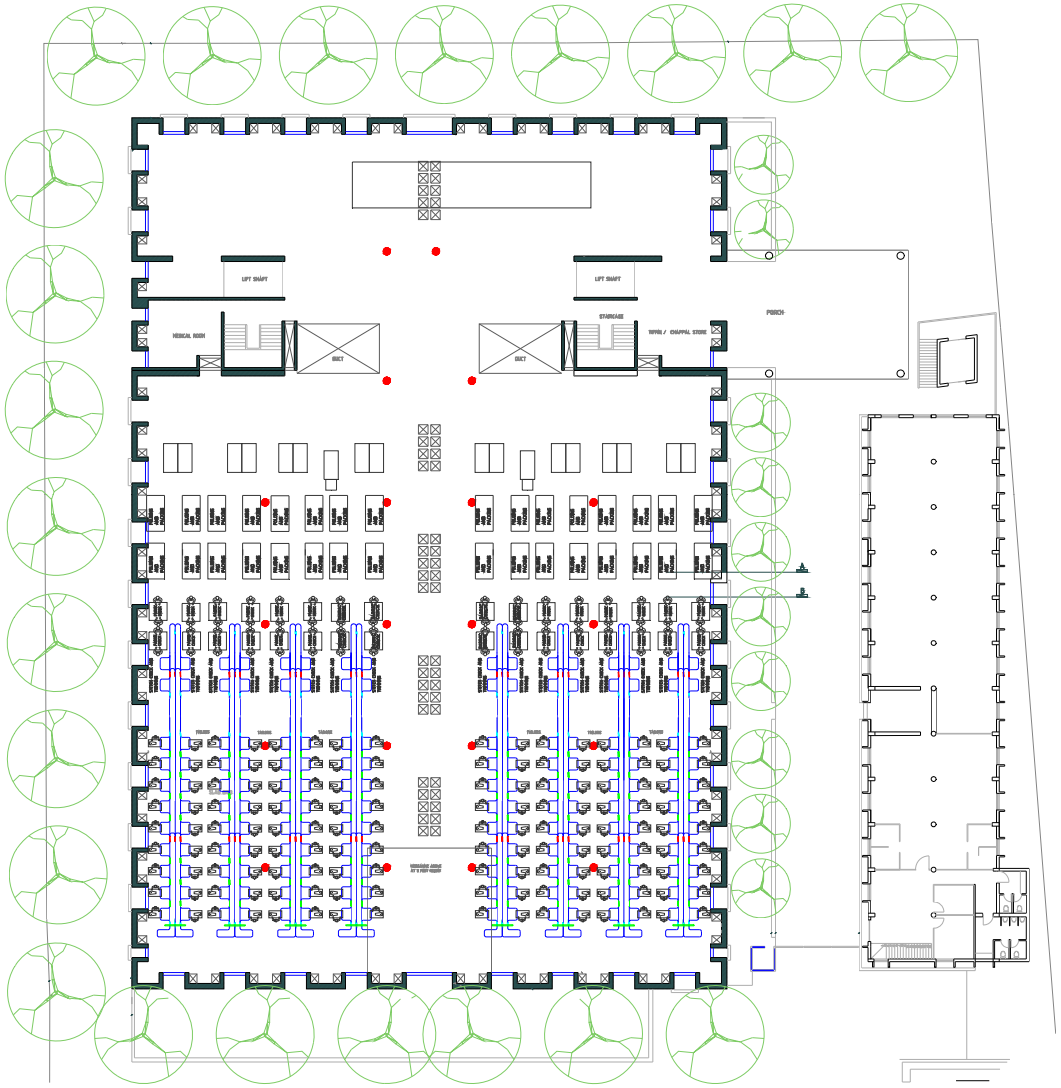
Earthquake Resistant

Natural Cooling

No Lintels

Cost Rs. 550/square foot

Steel Saving - 300 Tons



BETTER MATERIALS

FLYASH

Out of the total cost of construction, building materials contribute to about 70 percent costs in developing countries like India. Therefore, the need of the hour is replacement of costly and scarce conventional building materials by innovative, cost effective and environment friendly alternate building materials. The new material should be environment friendly and preferably utilize industrial/agro wastes because as a result of rapid industrialization, the generation of wastes has increased several fold during the last few years, which needs to be utilized/disposed safely on priority. . Fly Ash, a industrial by-product from Thermal Power Plants



Fly ash bricks (Approx. 14 lac) used in combination with Red clay bricks (Approx. 1 lac) in the load bearing walls of the structure

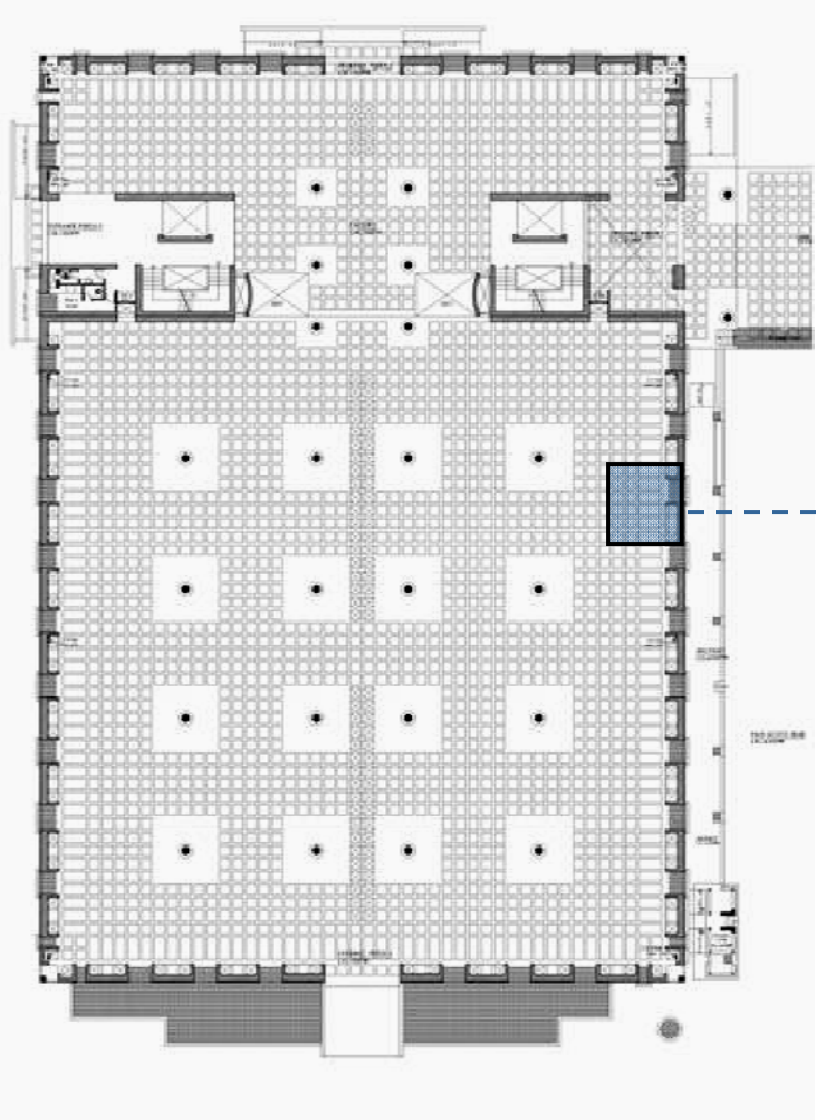
Thermocol waste used in hollov blocks made of fly ash concrete produced at site

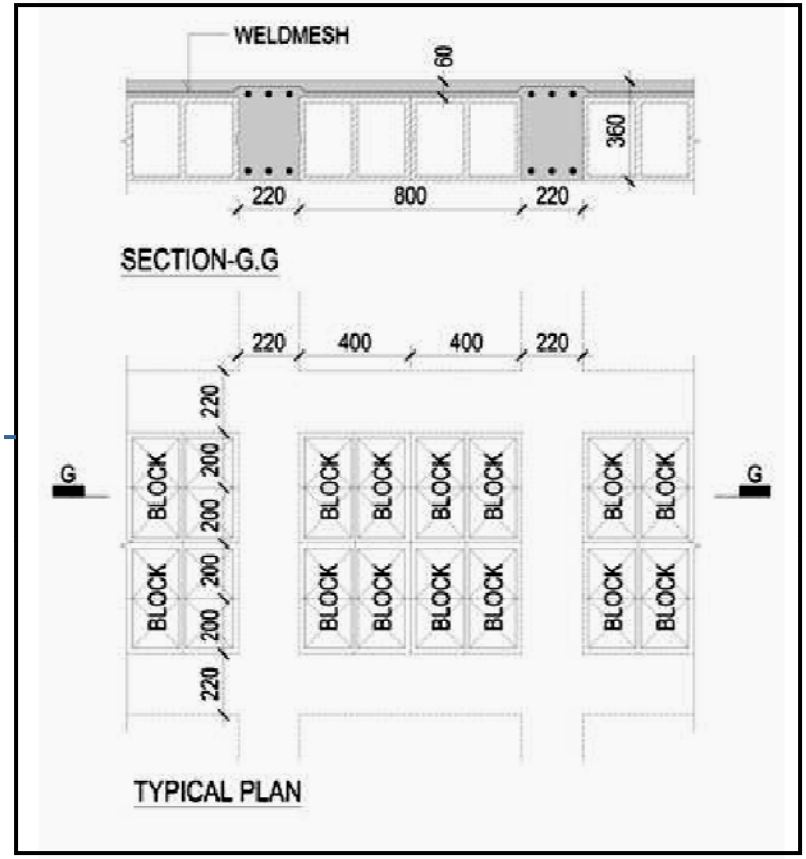
Rice husk as a low weight high volume

Rice husk ash with fly ash and cement acts as good insulator

Rice husk ash with fly ash and cement to create slope for rain water

Broken white tiles to reflect light and allow smooth flow of water




WELDMESH
60
360
220
800
220
SECTION-G.G
220
400
400
220
220
200
200
200
200
220
G
BLOCK
G
TYPICAL PLAN



Hollow blocks used in the slab reducing the dead load of the slab and in turn the percentage of steel used in the structure

RESULTS:

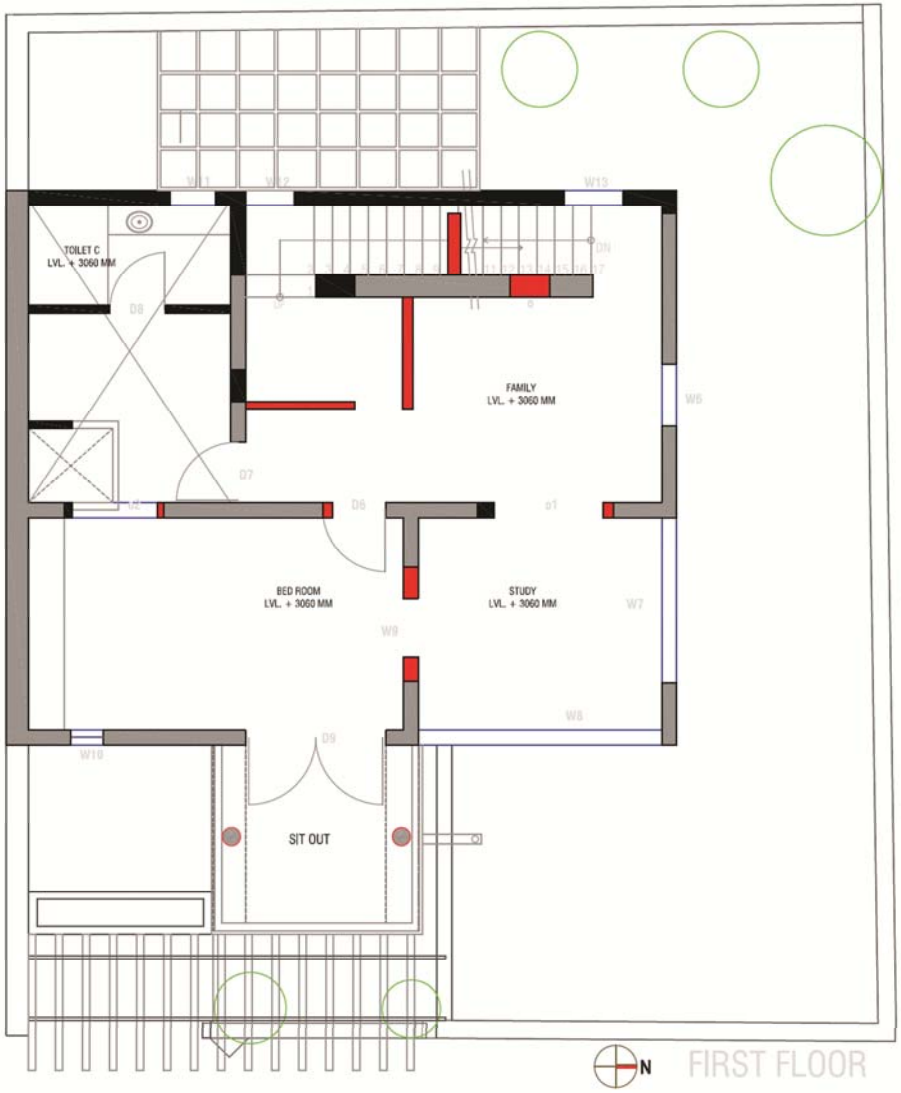
•The Building saves concrete and steel required for 96=32 x 3 (Three floors in the building) peripheral columns by using load bearing walls all along the periphery of the structure.
•The structure uses flat hollow block slab which effectively reduces the amount of concrete used.
•The use of hollow blocks in the slab reduces its dead weight and in turn saves on the steel used in the slab.
• The slab Minimizes the stirrups used to tie the horizontal reinforcement, thus saving huge sums of time and energy.



394 RESIDENCE
AHMEDABAD

OLD WALLS
UNDISTURBED WALLS
DEDUCTED WALLS

GROUND FLOOR



FIRST FLOOR

LIME PLASTER:

Lime plaster is a mixture of calcium hydroxide and sand (or other inert filler materials). Carbon dioxide in the atmosphere causes the plaster to set by transforming the calcium hydroxide into calcium carbonate (limestone).
Whitewash is based on the same chemistry.
To make lime plaster, Limestone (calcium carbonate) is heated to produce quicklime (calcium oxide).
Water is then added to produce slaked lime (calcium hydroxide), which is sold as a white powder.
Additional water is added to form a paste prior to use. Once exposed to the atmosphere, the calcium hydroxide turns back into limestone, causing the plaster to set
Lime plaster - ingredients and proportions.

LAPTI: lapti is molasses, also called 'rasi no gud' in Guajarati . It should be fluid, dark brown in color.

Dilution 15 lit lapti + 200 lit water (store)

chuna +lapti

Alternatively, a wash of 'lime-lapti' mix is prepared for use before the first plaster coat. The proportions in the case are 10 liters of lapti and 1 tagara kali chuna. (Hydrated lime)

Methi (fenugreek) / guggle (commiphora)

Boil methi and guggle in desired proportions mixing in about 2 lit of water, boil and dissolve to obtain a resinous solution. Mix this solution in 20 lit.
Solution of methi and gugal .

Summer use: 20 liters water + 200 gms Methi + 100 gms guggal.
Winter use : 20 liters water + 200 gms Methi + 200 gms guggal.

METHI

GUGGAL

LIME

RIVER SEIVED SAND

GRINDER OR CHAKKI(GANI)

A) surface preparation
The surface to be plastered should be thoroughly wet with water and chuna lapti.

B)external plaster mix preparation-in lime mixer
lime: 6 tagara
sand: 8 tagara
surkhi:7 tagara
jute fiber: 5gms per ghani
Lapti: 1 lit per ghani
methi-guggle soluation:1 lit per ghani

Step -1
Throw plaster mix with trowel onto wet wall, use wood planer to spread and leave coarse. Ensure even thickness even thickness of 6 mm.

Step -2
curing: the setting time is recommended to 24 hours after which curing should begin (water to be sprayed thrice a day in summer, twice in winter over a jute cover on plaster, not directly). The curing should be carried out for a minimum period of 3 days. The application of the second coat should not be earlier than 4 days after the first coat is applied.

2nd plaster coat-

Same mix as in first coat (patra finish) jute not to be used.
Note: this is the final leveling coat. Live and level to be checked and finalized in this coat. Roughen surface lightly to prepare base for the final coat.

Step 4 – Curing:

The setting time is recommended to be 24 hours after which curing should begin (water to be sprayed thrice a day in summer ,twice in winter over a jute cover on plaster , not directly)
The curing should be carried out for a minimum period of 4 days. The application of the final coat should not be earlier than 4 day after the first coat is applied. The final coat can be done even after a month, but not with out proper wetting of the wall surface.

ROOF INSULATION FOR LIBRARY:

Waste has been recycled for the insulation of roof above library. Brick waste produced from broken old walls of the house and constructional waste was mixed with thermocol balls and lime and sand mix.

Preparation:

Lime sand mix: 1:2
Brick is broken in to small rubble.
Thermocol waste.

Lime sand mortar is first prepared and mixed with waste rubble and thermocol .

Lime sand mortar:	5
Waste:	4
Thermacol:	10

Lime mortar was prepared in chakki and the waste rubble was mixed and grinded in the grinder with thermocol with required amount of water and gudd ka pani. Thermocol plays a important part as it insulates the slab. Weight of the layer above the slab is very low as it contains more amounts of themocol in it and recycled waste.

Thermocol was used as an insulating material and lime and sand mix was bonding agent as well as they are naturally cool.

The slurry which was made was thrice less weight than cc when weighted for 1 tagara.

APPLICATION:

Plaster was spread on the slab with required slope. Applied surface has to be well cleaned and has to be watered. A layer of waterproofing has been done in the top of slab.

1) CONSTRUCTION WASTE
2) THERMOCOL WASTE
3) LIME: SAND(1:2)
4) MOLASISSIS
5) PREPRATION OF RUBBLE
6) GRINDING OF RUBBLE
7) THERMOCOL
8) WASTE, LIME, THERMOCOL
9) MIX

CURING:

The layer must be exposed to direct sunlight it has to be covered with jute cloth. The layer has to be left for drying and curing for nearly a week. The layer contains huge amount of water which has be evaporated slowly. The surface tends to crack by the end. After two days the layer has to be watered slightly on the jute cloth but not directly. A slurry of lime and as and mix was preparec and was filed in the cracks after drying. After this a thin layer of lime plaster has been plastered on the surface.

Surface treatment: has to be covered with jute and water has to be sprinkled after two to three days.

A thin layer of jiki is done on the insulated roof to reflect heat

A LAYER OF JIKKI IS PLASTERED ON THE TERRACE SO THAT IT REFLECTS A GOOD AMOUNT OF HEAT

VEGETABLE ROOF GARDEN: Vegetable roof garden acts as an insulating layer for the bed room. Vegetable roof garden is on the second floor directly opening from the library. Slab has been given a wash of water proofing and a metal net is laid on it and a layer of pebbles on the mesh and soil on it.

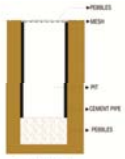
PERCOLATION:

Two different kinds of percolation have been done

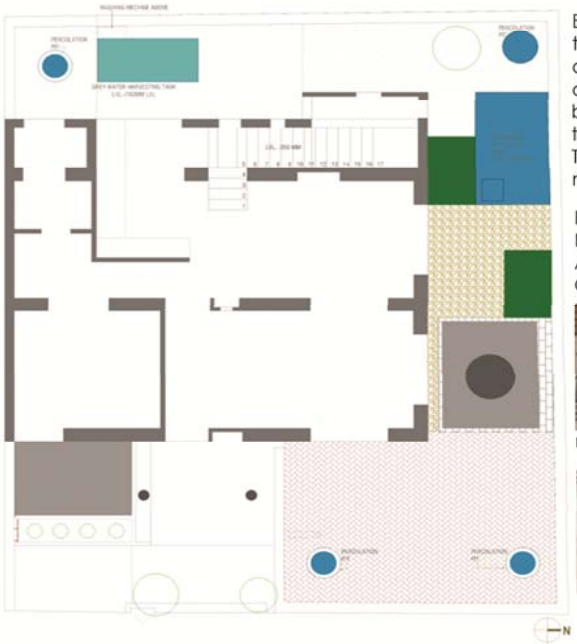
Rain water percolation.
Waste water percolation.

Four percolation pits have been dug up in site.

Each pit is 7 ft deep. The base of the pit has been laid with 1 ½ ft layer of pebbles and rest is left open. The pit has a cement pipe has been inserted in to the pit so that it doesn't allow soil erosion in the pit. Two pits are in the front and two in the back. The pits in the back are used for gray water percolation and the front for rain water percolation.



PERCOLATION PIT



Bricks will placed in the front lawn so that rain water can enter in to the soil as soon as it falls on earth than being drained in to the gutter. There is no bonding material is used in between the bricks.
This lawn has two percolation pits mainly for rain water percolation.

P – PERCOLATION PITS
R - RAIN WATER HARVESTING TANK
A - WATER BODIES
G - GREY WATER COLLECTION TANK

LOTUS POND AT ENTRANCE

LOTUS POND -COURT YARD

RAIN WATER HARVESTING TANK

PERCOLATION AT KITCHEN

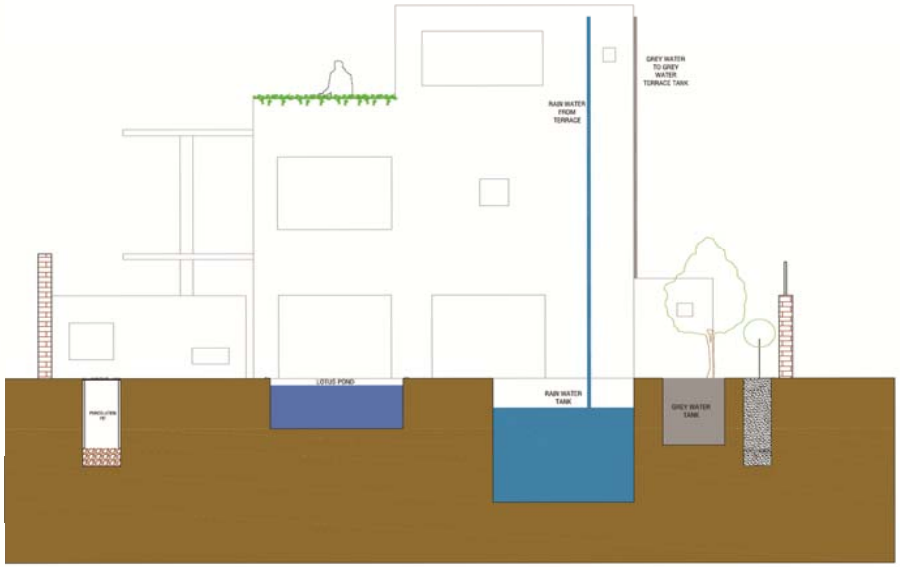
Waste water from kitchen, washing machine and bathrooms is collected and recycled to a separate grey water tank above and reused in flush in bathrooms.
Water from kitchen is sent in to a percolation pit just behind the kitchen. Pit starts from 2 ft under the surface. Flow is directed to pit in such a way that water is first used for the garden and the rest remaining water is driven in to the pit. Small cement pipes are placed in opposite manner and left open so that water escapes out of the pipe and help in gardening.

GREY WATER HARVESTING TANK:

Grey water of washing machine cannot be used for gardening so this is stored in a tank under the washing machine and pumped up and recycled as water for flush in bathrooms.

RAIN WATER HARVESTING:-

A rain water tank is designed on the ground level which is used for drinking water. The first two to three showers are left to drain as they



R U M I N A T I O N S

All design is goal-directed play. Only our questions change. We no longer ask, ‘How does it look? Or ‘How does it work?’ We are more intersted now in the answer to. ‘How does it relate?’

-Victor Papanek

The Green Imperative

The question is no longer how we might utilize the biosphere but rather how we are going to live with the biosphere.

-Gosta Ehrensvärd

The Biosphere and Man

Some reflections on technology and tact

THE HEGEMONY OF VISION AND RETINAL ARCHITECTURE

As a consequence of the power of the eye over the other sensory realms, architecture has been transformed into an art form of the instant visual image. Instead of creating existential microcosms, embodied representations of the world, contemporary architecture projects retinal images for the purpose of immediate persuasion.

-Juhani Pallasmaa

Notes on Fragile Architecture

Thank you