SK SHARMA
HUDCO
DESIGN
AWARDS
2019-20

Housing & Urban Development Corporation Ltd.
(A Government of India Enterprise)
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MESSAGE

India is urbanizing at an unprecedented rate. It is estimated that by 2035 India will become predominantly urban compared to the current scenario where close to 70 per cent of the Indian population is living in rural areas. Census 2021 is round the corner and various indicators and academic research suggest that we could expect to witness a quantum jump in the level of urbanization in India.

In the last six years under the leadership of the Hon'ble Prime Minister, Shri Narendra Modi, the nation has embarked on the most comprehensive and planned urbanization initiative undertaken anywhere in the world through the flagship missions of the Ministry, i.e. Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana (PMAY-Urban), Swachh Bharat Mission, Heritage City Development and Augmentation Yojana (HRIDAY).

As India races to face the challenges of urbanization, it is imperative that we do not neglect the equally important aspects of design and aesthetics. Cities of the future must showcase the culture and ethos of the people and the society that live in them. Cities must not be seen merely as structures of steel and concrete.

I would urge all planners, architects and other stakeholders to reflect the heritage of our great country when they plan, design and build for the future even as they use modern techniques and technologies for construction.

It is in this context that I appreciate the ‘HUDCO Design Awards’ initiative of HUDCO. It provides a platform for urban professionals to showcase innovative projects that have the potential to positively impact urbanization. I congratulate the winners of the S K Sharma HUDCO Design Awards 2019-20 for their innovative design solutions for a sustainable urban future.

New Delhi
25 September 2020

(Hardeep S Puri)
MESSAGE

Our country is experiencing rapid urbanisation. As per experts’ studies, urban areas are poised to get over 50% population living by 2051 i.e. in the next three decades. This requires planned development and use of resources in the most optimum manner, so that the citizens get the best Quality of Life and experience Ease in Living, so that they are able to contribute maximum in the country’s economic growth. In the last six years, various urban missions have taken up this citizens centric development of urban landscape. It includes Swachh Bharat Mission – Urban (SBM-U), Atal Mission for Rejuvenation and Urban Transformation – (AMRUT), Smart City Mission (SCM), Pradhan Mantri Awas Yojana – Urban (PMAY-U) and the Deendayal Antyodaya Yojana – National Urban Livelihoods Mission (DAY-NULM), apart from Urban Transport in big cities. All these promote innovative approaches to make our cities liveable, inclusive, economically able to and sustainable.

I am happy that HUDCO Design Awards constituted in the year 2012 and now named after its former CMD Shri S K Sharma, who used to take lot of interest in the concept of Urban Design and Liveability provides platform for young budding Architects to show their talent and creativity in thinking for developing New India. I applaud that this endeavour has been pursued even during the challenging time of Covid-19 pandemic and it has now come to its culmination with release of the e-Book compiling all the winning entries, so that not only the good work is appreciated but it is available for dissemination to all stakeholders who are contributing towards transforming the urban landscape of our country.

I congratulate all the winners and also the participants for showing their talent which will be inspiration to others. My compliments to HUDCO for carrying out this task during the current pandemic.

New Delhi
25th September, 2020
SHRI S K SHARMA: A TRIBUTE

Shri S.K. Sharma was an 1956 batch IAS officer of Madhya Pradesh cadre and served as Chairman & Managing Director of HUDCO from 1985 to 1991. An accomplished academic with a Masters degree in Maths who started his career as a teacher in Jabalpur College went on to become one of the most accomplished administrators of our country. Even before joining HUDCO he had left his mark as a visionary leader and administrator through many initiatives that were first of its kind in the country. Conceptualizing Ring Road system as transportation network while in Delhi Transport Corporation (DTC), naming colonies after famous saints of India as Chairman of Ujjain Development Authority and initiating departments like Environmental Planning 

& Coordination Organization & MP Vikas Pradhikaran, while being the Secretary Housing & Environment, Govt. of Madhya Pradesh are few of the many notable achievements of late Shri S.K. Sharma. He joined HUDCO in 1985 as CMD. HUDCO was conceptualized as techno-financial organization since its inception in 1970. Under the leadership of Shri S.K. Sharma HUDCO reached new heights in its spatial outreach and established itself as an institution of excellence pioneering in technical & design innovation for sustainable urban development. In was in his tenure, architectural profession was recognized as a ‘lead discipline’ in building sector and architects were treated as leaders of developmental activities in the physical development sector. It was his commitment to urban design and aesthetics and in the concept of ‘land as resource’ that led to implementation of path breaking projects in Delhi that are still hailed as architectural landmarks that contributed to the image of Delhi. The successful implementation of urban design of Bhai Veer Singh Marg, HUDCO Place at Andrewsganj, and August Kranti Bhawan projects stand testimony to his visionary leadership and foresight. However, he is best remembered and respected for his leadership and pioneering role in creation of India Habitat Centre which is an architectural landmark of international repute. In creation of India Habitat Centre, his role is not limited to promoting urban aesthetics but also in the implementation strategy that required bringing together many institutions towards a shared vision and commitment. The Building Centre Movement promoting cost effective and energy efficient technology for construction also owes its success to the continued support of his leadership. It was during his tenure that Human Settlement management Institute was established by HUDCO to undertake training and capacity building in the urban sector. Similarly, He was also instrumental in creation of AIHDA.

Shri S.K. Sharma left for his heavenly abode on 3.01.2020. He is still remembered and respected in HUDCO for his leadership role in promoting HUDCO as the premier techno-financial institution in the country. In its golden jubilee year as a mark of respect and tribute HUDCO dedicated the Design Awards to Late Shri S K Sharma.
Urbanization is an important contributor to the development of any nation. At the same time, it also brings with it, a set of challenges. As one of the fastest growing economies in the world, India has laid a great emphasis on creation of equitable and aesthetic housing and urban living spaces. Presently, India is facing a new set of challenges. The resilience of our cities to climate change, pandemics and disasters is increasingly being tested, bringing into greater focus the persisting challenges of inequity, lack of affordable housing and inadequate infrastructure. Sensitive design can play a key role in creating a high quality living environment, while addressing the various challenges in urban development through planning and design of urban spaces.

Housing and Urban Development Corporation Limited (HUDCO) is a Public Sector Enterprise which plays a key role in the urban development of the country. Throughout its fifty year corporate history, it has also focused its efforts in the sector in a holistic manner, not only financing urban development projects but also in supporting good design practices and initiatives. HUDCO has always played an active role in promoting cost effective building materials and technologies, affordable and efficient design practices, and sustainable habitat development through its various initiatives.

HUDCO is committed to its vision and mission of promoting Sustainable habitat Development and as part of this vision and mission; it recognizes and rewards excellence in design of habitat through its HUDCO Design Awards initiative. The five categories of HUDCO Design Awards covering Cost effective Rural/Urban housing, New and Innovative Town Design Solutions/ Eco-cities, Conservation of Heritage, Green Buildings and Landscape Planning and Design, are well thought of, and cover the entire gamut of design interventions related to a sustainable habitat. The design awards honour excellence in design at various scales, from a building level to a city level / township level. These awards are recognition of the efforts of design related professionals working on urban spaces, and are also meant to encourage young professionals to bring innovation and excellence in their work.
This year, these awards have special meaning as they form part of HUDCO’s Golden Jubilee celebrations. In view of this, HUDCO Design awards are specially dedicated to HUDCO’s former Chairman and Managing Director, Shri S.K. Sharma, IAS, who played a big role in shaping HUDCO as an institution of excellence and who cared deeply about the urban design and environment. The India Habitat centre, a unique institution in its concept and design, is a testimony to his vision and commitment towards the Habitat sector.

This year’s HUDCO Design awards received an excellent response from all over the country. The entries were evaluated by an experienced and professional jury, and the award entries were selected based on creativity, innovation and sensitivity in design. I congratulate all those who were awarded, and appreciate the efforts of all the designers, architects, planners, engineers and landscape architects who sent in their entries and who put in considerable hard work and effort into their projects.

The publication of winning entries in the form of a compendium every year is an attempt to document and widely disseminate the excellent work being done by the design professionals at habitat level. I commend HUDCO employees who worked hard to produce this compendium at a short notice this year. I hope these prestigious projects will continue to receive excellent participation in the future as well.

M. Nagaraj
Director, Corporate Planning
On 25th April 2020, Housing & Urban Development Corporation (HUDCO) Ltd completed 50 glorious years as a premier techno financing institution of the country. Since its inception in 1970, HUDCO, a Central Public Sector Enterprise has worked earnestly and relentlessly for a better life and future for all. It’s institutional commitment to sustainable development and providing technical support goes beyond project financing. Appreciating that sustainable development and especially urban development is a multi-dimensional complex challenge, HUDCO on its mission to improve the living conditions of people at large rises to the challenge making itself flexible to the diverse needs of the times. One of the pioneering efforts of HUDCO includes its belief and commitment to understanding the dynamics and promoting/encouraging plausible alternatives for cohesive urban design and aesthetics, and encouraging sustainable urban development. The institution of HUDCO Design Awards in 2012 is one such expression of HUDCO’s commitment towards the same goal i.e. appreciating design & learnings from collective experience for a sustainable future. This year, as part of the golden jubilee celebration the Award was named S K. Sharma HUDCO Design Awards as a mark of tribute to the Late Shri S. K. Sharma who served as CMD HUDCO from 1985 to 1991. He is admired and respected and still remembered for his contribution in promoting architecture that is contextual, cost-effective, energy-efficient, and aesthetically vibrant.

First and foremost, I express my gratitude to all the participants for making this event a success and look forward to their continued participation in the coming years. I extend heartiest congratulations to the winners of S K Sharma HUDCO Design Awards 2019-20 for their impressive and innovative works. The winning projects elucidate the viable alternatives that have the potential to make a difference for better to our urban future – a future that is fraught with many challenges.

My special thanks to the members of the jury who honoured us by accepting this arduous task of evaluating the entries received for five separate categories. In the currently trying times of COVID-19 pandemic when safety concerns and maintaining social distance takes precedence over almost all activities, I am grateful to the jury members for painstakingly evaluating entries to choose excellence and extraordinariness. The event that culminates with the publication of e-book is a collaborative effort of many who worked in earnest and in tandem to make it a success. I thank my team for their commitment and effort and would also like to put on record the invaluable support extended by the Finance, Administration and Public Relations Wing of HUDCO to accomplish this event.

Last but most importantly, I would like to acknowledge the efforts put in by Shri M. Nagaraj, Director, Corporate Planning. He took out time from his busy schedule to fulfil his commitment as Chairperson of the Jury and guided and helped us with his support in every step of the way to make this event a success.

Akhilesh Kumar
Executive Director (Project)
Construction & Consultancy, HUDCO
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Category 1:
Cost Effective Rural / Urban Housing Deploying Innovative /Emerging & Disaster Resistant Technology

Housing shortage in India, especially in urban areas is a matter of concern since it is considered an essential component for inclusive development. Appreciating the importance of housing, Government of India has launched the Pradhan Mantri Awas Yojana (PMAY) that aims to provide housing for all by the year 2022. The success of this Mission will require adoption of modern, innovative and green technologies and building material for faster and quality construction of houses. It would also entail preparation of efficient layout designs and building plans suitable for various geo-climatic zones and deploying disaster resistant technologies so that the precious investment in housing is not lost to the occurrence of natural disasters like earthquake, flood or cyclone. The skills and efficiencies demonstrated by the professionals with regard to the same need to be appreciated and showcased for its suitable adaptation. The word housing is used as a generic term. Individual houses and houses with non-residential use are also eligible to apply under this category.
“Cost-effective houses are not just for the poor, they are for everyone”

Laurie Baker
Category: Cost Effective Rural / Urban Housing Deploying Innovative / Emerging & Disaster Resistant Technology

Project: Sublime Ordinariness, Vasind, Taluka: Sahapur, Maharashtra

By DCOOP Design Cooperative

FIRST PRIZE
Project History

The project is located in an industrial steel plant, 60 km to the north east of Mumbai. It came about with a need to provide housing for the lower management and floor worker staff. The chosen site had existing houses in the form of row houses, small one room houses and some larger houses. Most of the existing buildings were either ground floor or ground plus one storey. The project took two years to complete on site. It started with an extended understanding of the site and its surroundings, the needs of the existing residents at the level of the apartment and as a community. We met residents in the plant to understand the ground realities and understand the challenges being faced by the residents. A few points which came out of this research were:

1) Many of the houses had a greater number of people than they were designed for.
2) The kitchen was isolated from the activity areas.
3) Movement areas were dark and dingy.
4) There was an abrupt transition between the public and private spaces.
5) There was no designated public space for children to play and for adults to sit outdoors.

The budget for the project was very modest. We wanted to address the challenges within this budget. It took some effort and convincing from us as architects to move to a new typological spatial organization. Also, we had the support of the client and the engineers on site to be able to achieve this.
The Housing Project

The project houses 54 families of staff working in an industrial facility. 48 of these are small apartments of 50sqm (Type B) and 6 are larger apartments of 100 sqm (Type A). For people living in company housing, the comfort of the new neighborhood is crucial to the sense of wellbeing. The housing has been designed keeping these socio-cultural contexts in mind.

The single-loaded corridor typology drawn from the Mumbai chawls becomes a catalyst in fostering a sense of community. On the ground floor, apartments are accessible individually from their own small semi-private space, or “otla” (raised entrance plinth seen in traditional houses).

On upper floors, four ‘one-bedroom’ apartments are strung along this corridor space, at the end of which sits an open staircase. Each staircase is articulated differently with its first flight angled out giving each block an identity of its own. Three such Type B blocks come together along with one semicircular Type A ‘two-bedroom’ block to form an intimate courtyard which becomes the heart of the housing.

Each apartment comprises of a small multi-functional space at the entrance with the kitchen on one side and toilets on the other. This space opens into two non-designated rooms which can be used as per the needs of the family. The kitchen near the entrance enables the woman of the house to be connected to the outside.

Wind, sunlight and rain are the delights of living in tropical environments such as Mumbai and its surroundings. The semi-open corridors, staircases, balconies and entrance plinths give the residents the possibility of enjoying these natural phenomena and engender interaction and reinforce a sense of belonging and togetherness.
SUBLIME ORDINARINESS – HOUSING AT VASIND, MAHARASHTRA

Site Plan

Typical Floor Plan – Type B

Legend
1 Staircase
2 Corridor
3 1BHK unit

Legend
1 Multipurpose space
2 Room 1
3 Room 2
4 Kitchen
5 WC
6 Bath
7 Balcony

Sections
Material and Construction

The project uses common materials such as fly-ash bricks, concrete and plaster. This helps to keep the cost of the project in check. The structural system is a framed structure in concrete. The infill panels are made of fly-ash bricks. The corridor is lined with a commonly available local stone called “Kota Stone”, a lime stone with good weathering capacity. The challenge lies in how these commonly used, hardy materials can be transformed into a poetic expression. To this end, the structural framework is carefully articulated to get a balance in proportion externally and a more calibrated experience when moving through the building. This is achieved through a controlled expression of the column-beam framework with respect to the slab and infill par
Significance and Impact

The exploration in this project lay in reorganizing the standard layout for affordable housing at both the apartment and the building level. In high density housing such as this, the semi-open and non-programmatic in between spaces become critical as multi-use areas to absorb the overflows. The layout of the apartment allows for this flexibility, as do the corridor, otla, and staircase spaces in the buildings.

Our studies of the housing over two years of post-occupancy suggest that the flexibility of the internal apartment layout has been critical in allowing the residents to customize the space to their needs. For example, the multifunctional lobby like space is used in a number of ways such as to hold an extra cot for sleeping, as a dining space, a space for studying, as an ancillary living space to the main space or by women to do their sewing. It also becomes a buffer between the outside and the very private inside rooms so that the main doors are often left open.

At the building level these spaces become extensions to the activities of the home. We can see the residents using them as had been envisioned in the design. The play of solidity to openness in the corridor has enabled the residents to use the corridor as a sit-out during all times of the day. The location and open form of the staircase makes it a point of interaction. The organization of buildings on site and careful scaling of the central courtyard weaves together a community with both intended and chance encounters. The significance of this project then lies in the successful orchestration of public, semi-public and private spaces at the apartment, building and cluster levels courtyard to achieve a genuine sense of community.
SUBLIME ORDINARINESS – HOUSING AT VASIND, MAHARASHTRA
SUBLIME ORDINARINESS – HOUSING AT VASIND, MAHARASHTRA
Category:
Cost Effective Rural / Urban Housing including Innovative / Emerging & Disaster Resistant Technology

Project:
Parayarumalayil House, Vazhavatta, Wayanad, Kerala

By
George P J

SECOND PRIZE
Project Name: Parayarumalayil House

Location: Near Karappuzha Dam, Vazhavatta, Wayanad (D), Kerala

Building description: Two storied house with four bed rooms

Total Area: 2473 sq ft.


Date of Completion: May 2015.

Total Project Cost: Rs. 17 lakhs

Designed and executed around the principles of sustainability, eco friendliness and alternative construction techniques, Parayarumalayil House is a unique construction for many reasons. Arguably the largest bamboo-concrete house in Kerala, it’s the perfect example of a cost effective construction without compromising on luxury that is in absolute symphony with nature.
The Innovative construction techniques employed in building the house and the Cost effectiveness in its execution are the two major highlights of the house. Possibility to use alternative natural materials in construction was the primary focus area. The Volt- Dome design which is not so common and easy to construct was selected to incorporate the possibility of experimenting with locally available natural materials. Bamboo and Areca splits were identified as the major materials suitable for the experiment. This shape was chosen to best suite the recognized tensility and bending properties of bamboo and arecanut splits. The design
Ferro Cement Concrete without iron for walls and roofing is the other key point. Bamboo and Areca splits are used instead of Iron for reinforcement here. Considering workability and easiness of binding 1:3:1.5 mixture was used for concreting. In order to reduce the heat inside and to prevent the possibility of cracking due to thermal expansion, a layer of jute mat was given on the roof before final plastering. Specially designed air holes, windows that are larger than the normal size, wooden flooring and wooden staircase using otherwise wasted wood materials, double height roofing etc are other key features. This ensures that the house is naturally air conditioned and saves a lot on the energy front. The entire construction of 2640 sqft (245.5 m^2) was finished with in a budget of 16.20 lakhs. Including furnishing it came to Rs. 18.40 lakhs. Finishing a 4 BHK with in Rs. 700 per sq ft with out making any compromises on the front of luxury but by taking nature into account is definitely a fete to achieve in Kerala.
PARAYARUMALAYIL HOUSE, VAZHAVATTA, WAYANAD, KERALA

Key Features of the House

Energy efficiency/ Sustainability Quotient

- Almost all materials used in the construction revolves around the idea of sustainability and energy efficiency. Areca splits and bamboo are used instead of iron and steel for reinforcement. Jute mat was used as a second layer of roof over which cement was plastered. The jute mat acts as an insulation against possible cracks.

- Usage of cement has been reduced by 40 % compared to traditional construction.
- Usage of steel has been reduced by 95 %
- Usage of bricks can be reduced by 2%
- Energy and power consumption is very low in the completed structure because of more windows and circulation vents. The house does not use fans.
PARAYARUMALAYIL HOUSE, VAZHAVATTA, WAYANAD, KERALA

Structural Components
- The maximum wall thickness is 8 cms thus increasing the usable floor area
- The roof thickness is 8 cms
- The concave curves of the sunshades act as gutters for rain water thus allowing rain water to be collected into a ground pit. This saves upto Rs. 30-40,000 on a rain water harvesting unit.
- The air ducts allow maximum circulation and cooling of the interior

Cost Efficiency Factors
Use of locally available materials saves costs by upto 50%
Doors and window frames were reduced in size thus saving 30-40% on wood.
The costs for the house was estimated as Rs. 700/Sq ft. This is very economic in Kerala’s context, where the costs for conventional buildings is Rs. 1500-2000/sq ft. The total cost for the house is Rs. 17,40,000. In a conventional context for such a concrete house the total cost would come up to approximately Rs. 35,00,000. Thus in comparison this house has saved half the costs.
Shuttering needs are almost nil. This reduces the total construction costs tremendously by almost 80%.

Disaster Resistance:
The major portion of accidents and deaths during disasters such as earthquakes are caused by the collapse of the concrete and beams over the inhabitants. In such houses because the bamboo and arecanut splits are woven as a mesh and will not collapse vertically.
The weight of these materials is light and will not cause major damages on collapse.
More than just being another house Parayarumalayil is thus a complete innovation. This can be considered as a flagship construction using alternative materials and has the potential to become a new model in the construction
Category: Cost Effective Rural / Urban Housing Deploying Innovative / Emerging & Disaster Resistant Technology

Project: Student Housing at School of Planning & Architecture, Vijayawada, Andhra Pradesh

By Mobile Offices (MOOF)

SPECIAL MENTION
STUDENT HOUSING AT SCHOOL OF PLANNING & ARCHITECTURE, VIJAYAWADA, ANDHRA PRADESH

Project Name: The Social Labyrinth
Programme: Student Housing (for 750 students)
Location: School of Planning and Architecture (SPAV), Vijayawada, Andhra Pradesh
Architect’s Firm: Mobile Offices/ MO-OF
Site Area: 7 Acres
Built-up area: 16,441.23 SQ.M.
Month/Year of Commencement: September 2014
Completion: June 2017
The intent was to create social spaces that are embedded within its cultural context along with an environmentally sensitive response to create a built environment which enables learning and living as a community.

**Social sustainability:** Our concept was to focus on the diversity of individuals and the vastness of a community creating opportunities of variation and thereby learning. The approach was to avoid the hermetic dormitory organizational structure, which fosters a regimented form of social control that restricts learning, living and exchange. The attempt is to create organizational variation, change and flexibility by integrating program with non-programmatic spaces fostering both the collective and the individual. Spaces such as streets, courtyards, bridges, verandas and terraces with student living are integrated, creating a variety of chance interaction between the diverse student community.
Environmental sustainability: The site being in the Krishna river basin has a hot and humid climate with temperatures in the summer reaching 48 degrees. We have adopted the idea of traditional towns with narrow streets and courtyards to enable passive cooling and protection from harsh solar radiation. The lower floors are rendered porous as stilts allowing cooler air through the pre-cast block jali walls along the peripheres. Winds are channelled through courtyards, as they funnel the air naturally. The stilts are used as common activity spaces during hot afternoons. The middle section of the buildings has most of the student living program with efficient circulation. The top section of the building has living and terraces which are used in the evening as the temperature decreases. These terraces are used for evening activities of students as the weather temperatures start to fall.

The emphasis has been on detail and the use of local materials such as Tandur stone for flooring and cladding, flyash bricks, pre-cast block jali’s, rough-cast plaster. The furniture used has been re-purposed from their earlier campus.
Spatial Organisation: The housing is an active pedestrian ground which is simulated as the streetscape that gets transformed into stilts, verandas, decks and courtyards within. The housing breaks the strict definitions of the layers by fragmenting the program areas and other common or non-program areas.

Three modules with a mix of programs and non-program have been designed to allow for varied configurations around the living courtyards. The three modules seamlessly merge by virtue of the spatial continuum and connective spaces to form clusters. This creates a lively neighbourhood that fosters informal interactions creating a low rise high density student housing environment. An attempt was made to introduce streets, courtyards, bridges, verandahs and terraces with student living. These spaces we perceive create a variety of chance interaction between students for the diverse faculties and years. This fragmentation is continued on the floors above which allow for semi private interaction zones in the form of terraces and bridges. The Common room program has been broken down and distributed across the student housing thus allowing of stronger bonds with a smaller scale of the neighbourhood.
Three modules with a mix of programs and non-program have been designed and combined in varied configurations around the living courtyards.
STUDENT HOUSING AT SCHOOL OF PLANNING & ARCHITECTURE, VIJAYAWADA, ANDHRA PRADESH

Courtyards create shaded spaces and pedestrian connectivity

The exterior form made porous with screens allowing light and wind
STUDENT HOUSING AT SCHOOL OF PLANNING & ARCHITECTURE, VIJAYAWADA, ANDHRA PRADESH

The stilts enable the ground plane to be used informally.

Networks of interconnectivity through stairs and bridges.

Patterns of light and shadow through the screens.

Relationship of terraces, corridors and stairs around courtyards.
Urbanization is inevitable and desirable but throws many challenges. For cities to be engines of growth, they need to be vibrant, inclusive and appropriate to the specific demographic, cultural, functional and physiographic demand of the people and the place. It is imperative that we create new smart cities and also upgrade our old ones - so that they provide opportunities to the aspiring Indians without compromising the tenets of sustainable development.
“As an architect you design for the present, with an awareness of the past, for a future which is essentially unknown”

Norman Foster
Category:
New & Innovative Town Design Solutions / Eco Cities

Project:
HRRL Township at Barmer, Rajasthan

by
Dikshu C Kukreja

FIRST PRIZE
A self-sufficient township for the employees of Hindustan Petroleum Corporation Limited is being developed in the interiors of the Thar Desert. Adjacent to an upcoming oil refinery of HPCL, the region is known for its harsh climate.

The form and layout of the Township seeks inspiration from Johad (an oasis) – ‘an isolated area of desert vegetation, typically surrounding a water source which provides a protected habitat for flora and fauna including humans’. The planning for the project looks inward, accommodating a dense buffer throughout the periphery. A string of water stream ties the far ends of the Township, meandering in the midst of the landscape, and eventually culminating into a Central Lake on one end and into a Central Oasis Park on the other.
HRRL TOWNSHIP AT BARMER, RAJASTHAN

Design Inspiration

Concept - Johads

Johads are small earthen check dams that capture and conserve rainwater, improving percolation and groundwater recharge.

Campus Located within the Protective Confines of the Earthen Bund.
HRRI TOWNSHIP AT BARMER, RAJASTHAN

Water Regime of the Site

- Green buffers along highway to block winds.
- Desertification mitigation measures through a series of ridges and furrows.
- Landscape pattern emerges by juxtaposition of the various landscape infrastructures.

Water Reservoir as per Oil Refinery Requirement.
HRRL TOWNSHIP AT BARMER, RAJASTHAN

Site Plan

1. Type A
2. Type B
3. Type C
4. Type D
5. Type E
6. Type F
7. Dwelling units for CISF
8. CISF Staff Quarters
9. Anganwadi
10. Shopping complex
11. Guest House
12. Community Hall
13. Club House
14. Auditorium
15. Sports complex
16. Township office
17. Bus Stand
18. Public Toilet
19. Taxi Stand
20. Main Gate House
21. Gate House
22. Watch tower
23. Amphitheater
24. Future Expansion
25. MRS block
26. Overheat tank
27. Sewage treatment
28. Garbage Room
29. Barracks
30. Canteen
31. Gymnasium
32. Sanrakshika store
33. Main Gate for CISF
34. Playground
35. Parade ground
36. Playground with shops
37. Kabbadi Court
38. Cricket field
39. Football ground
40. Volleyball ground
41. Lawn Tennis
42. Badminton Court
43. Swimming Pool

LEGEND
HRRL TOWNSHIP AT BARMER, RAJASTHAN

**Sustainable Features**

- Ecologically sensitive green development which is environment friendly.
- Creation of lakes and water bodies maintains the water balance.
- Natural lighting and ventilation, making the architecture of the township, energy efficient.
- Jaalis and chhajjas, are an essential part of the design.
- Reducing the electrical energy consumption.
Green Design Strategies

Wind Analysis

- There are no wind traps near the buildings, hence wind can flow through the campus.
- Buildings are arranged to allow air movement within township.
- Courtyards allow air movement within buildings.
- Different wind patterns in and winter is carefully studied and block placements has being done accordingly for efficient air movement without obstructions.

Green Cover

Native Plantation
- Helps in maintaining the natural beauty.
- Decreasing the temperature
- Increasing water holding capacity of the soil and in using fewer resources.
- Creates comfortable microclimate within the township.
HRRL TOWNSHIP AT BARMER, RAJASTHAN

Architectural Design Typologies

Nukkads (developing street corners as recreation spaces); Jharokhas (overhanging enclosed balcony); Jaalis (lattices); Aangans (courtyards); Chhatris (canopy)
Category 3: Conservation of Heritage

Cities are dynamic entities that experience expansion, development, renewal and redevelopment. The tasks of the professionals are not limited to integration of the built heritage with the urban planning / development framework but also to exclusively promote and practice conservation, restoration, regeneration and management of valuable built heritage in Indian cities.

A comprehensive approach to heritage management that demonstrates economic efficiency, creative vigour and peoples' participation is the need of the hour for there are many cities in India that abounds in precious built heritage that is either neglected or at the mercy of unplanned urban development.
“The mother art is architecture. Without an architecture of our own we have no soul of our own civilization”

Frank Lloyd Wright
Category: Conservation of Heritage
Project: Conservation of Keneseth Eliyahoo Synagogue, Mumbai, Maharashtra
By Abha Narain Lambah Associates

FIRST PRIZE
CONSERVATION OF KENESETH ELIYAHOO SYNAGOGUE, MUMBAI, MAHARASHTRA

Project Background

The Keneseth Eliyahoo Synagogue is the oldest Baghdadi synagogue in Mumbai, a 19th century classical revival structure and Grade II A heritage building within the Kala Ghoda Art District. Over the years it became vulnerable to structural distress, leakages with damage to its interiors and stained glass. The local Jewish community had also dwindled to less than 100 in Mumbai, unable to bear the expenses for its repair. The conservation was a four way private initiative, with the Jacob Sassoon Charitable Trust, JSW Foundation, World Monuments Fund and Kala Ghoda Association extending their support. Whilst the Sabbath prayers continued, the works of the building were taken up over 12 months and the structure was re opened to both the Jewish community and non Jews, demonstrating the pluralistic character of the city. The intent of this Conservation exercise was guided by a holistic approach and respect for authenticity. From its structural consolidation and interior restoration to removal of layers and layers of oil paint to expose the historic Victorian gilding and stenciling works, the project was a labour of love guided by intelligent conservation. The larger goal was to re-establish this tiny Jewel located in the historic Fort Precinct of Mumbai, giving back to the Jewish Community their prime place of worship, and the city its heritage landmark. Popularly known as the ‘blue Synagogue’ the building is not only a local landmark of the Mumbaikar but an important part of various heritage walks and tours that cater to locals and visitors both domestic and international.
Restoration Works
The project started in the month of February 2018 with restoration and structural repairs of the main roof of the building. The Keneseth Eliyahoo Synagogue was built Classical Revival style with decorative Victorian interiors. The structure boasts of a large pediment crowning the western facade over the large semi-circular fenestration housing three unique stained glass panels flanked by pilasters of fluted Corinthian columns. The facade has been punctured with neo classical semicircular and segmented fenestrations. Both the entrances on the western and northern facade have been marked by smaller pediments supported by decorative brackets. Another special feature is the use of vermiculate plaster to decorate masonry courses on the ground floor.

The primary task for all the façades of the building was that of scraping of paint and from the stone and the plaster.
CONSERVATION OF KENESETH ELIYAHOO SYNAGOGUE, MUMBAI, MAHARASHTRA

On site work on the façade – restoration of the stained glass, stone, and plaster.

Drawing Showing Defect Mapping
Pre – Restoration of Front Façade Elevation
The interiors of the spectacular prayer hall had undergone a series of insensitive alterations ranging from painting over of carved stone friezes and sculpture, to insensitively placed tube lights, switches and electrical conduits over architectural details, greatly detracted from the architectural ambience of the once grand interior.

**Paint:** It was found that the walls, cast iron columns, timber brackets and all other ornamental elements in the main hall were painted over in many layers over the years. On the removal of these layers the original paint scheme with ornate stencils was found on 2 walls of the building. An intensive exercise of matching these colour to bring back the original color scheme was carried out by the Team. The interiors of the main hall now reflect the original pastels.

**Minton Tiles:** The main hall has Minton tile flooring in the form of an intricate pattern. The tiles in one of the corners of the main hall were completely damaged and covered with another flooring. Tiles from the Bharat tile company were ordered for to replace the missing tiles. The team made samples and spent extensive time in making the mould and matching the many colours in the original tile pattern.

**Furniture & Illumination:** The Prayer hall has various old pieces of furniture such as high back ornate chairs and 41 timber benches of various lengths for devotees to sit during their prayers. Some of these benches were damaged and has missing parts and meshwork which has been repaired. All the furniture had been re-polished. It has various types of beautiful brass Chandeliers hung at various levels. Many of the fittings has missing glasses, arms etc and have all been repaired and polished.
CONSERVATION OF KENESETH ELIYAHOO SYNAGOGUE, MUMBAI, MAHARASHTRA

On site interior restoration works in the Prayer Hall.

Pre - Restoration

Post - Restoration
CONSERVATION OF KENESETH ELIYAHOO SYNAGOGUE, MUMBAI, MAHARASHTRA

During the restoration, keeping with the need to maintain material authenticity, the structural repairs employed authentic materials used in the original construction - from like repair of wood in matching sections of Burma teak, repair of lime stucco using lime mortars slaked on site and restoration of damaged lime stone elements in the facade with Dutchman repair of matching limestone sourced from the same quarries. Minton tile floors in the prayer hall were restored in situ and the wooden flooring of the Ladies’ balcony too was carefully polished and restored.

The authenticity of colour and architectural style was maintained by restoring the original Victorian colour palette of sage green gold and white colour palette and peeling off the later multiple layers of paint. The Stained glass which was the highlight of the main hall was restored by a team of Stain glass conservators by dismantling it and conducting an efficient bench repair for the same. The historic chandeliers in the building were restored and the furniture also carefully polished and repaired in case of damage. Even the exterior colour palette respected the oral history of generations that knew and identified the building as the ‘blue synagogue’ adopting a rich indigo shade of breathable blue paint for the exterior that had been painted in sky blue oil paints.
The stained glass of the Synagogue is a very beautiful three-Light Window, 10 feet x 2 feet each, with simple, elegant tracery that holds circular panels or Medallions as well as small insets called “eyes”. The medallion in the center of the tracery has a “sun-burst” that is striking. The vertical Lights below the tracery are ornate and punctuated with medallions again. These medallions carry Renaissance imagery that was a hallmark of the 19th century “Revivalist” style: foliage, white laurel, roses, fruit (lemons, pomegranates, golden apples) – all poised in a formal, yet stylized arrangement. The imagery lends naturally to Jewish religion as well. In fact, it is said that the twelve Medallions represent the Twelve Tribes of Israel.
Category: Conservation of Heritage

Project: Conservation of Mukhya Bhawan, Sampurnanand Sanskrit University, Varanasi, Uttar Pradesh

By INTACH, New Delhi

SECOND PRIZE
CONSERVATION OF MUKHYA BHAWAN, SAMPURNANAND SANSKRIT UNIVERSITY, VARANASI, UTTAR PRADESH

Project Summary
Sampurnanand Sanskrit University is an old institution of higher learning, specialized in the study of Sanskrit and related fields. The initiative to restore the building was taken up by Sampurnanand Sanskrit University in 2014 and the project was sanctioned by UP Government in July 2015. With the release of first instalment of funds, the conservation work commenced on site in March 2016.

Due to serious deterioration and collapsed roofs, the main building was not in use since more than 15 years. The collapsed roofs are now restored in its original form as well as strengthening of structure has been done by addressing the problems of dampness, termites, plaster damages, etc. As part of the work, damaged stained glasses and the decorative terracotta, stone, wooden elements were also restored. The project involved a number of experts in the field of conservation like conservation architects, art conservators, engineers and archaeologists. Other than the regular labours, more than 20 artisans were employed for skilled work in wood, stone and lime. After a gap of 15 years or more, the building has now been revived in its original glory enabling the university to convene the 37th convocation ceremony on 5th December 2019. The ceremony was graced by the Governor of Uttar Pradesh (Chancellor of Sampurnanand Sanskrit University) and attended by other dignitaries.

History and Significance
The main building of Sampurnanand Sanskrit University was established in 1852 AD by Major Markhan Kittoe to serve as Convocation ceremony hall and lecture hall. This is the only University in India which has its widespread affiliation all over the country. More than 1200 Sanskrit medium schools and colleges are affiliated with this University.

❖ 1791 AD
Jonathan Duncan, resident of the East India Company, proposed the establishment of a Sanskrit college for the development and preservation of Sanskrit Vangmaya (grammar) to demonstrate British support for Indian education. The initiative was sanctioned by governor general Lord Cornwallis and the college was then called Government Sanskrit College.

❖ 1852 AD
The Main Building (or Mukhya Bhawan)) was established by Major Markhan Kittoe to serve as Convocation ceremony hall/lecture hall for the University.

❖ 1958 AD
The efforts of Dr. Sampurnanand changed the status of institution from that of a college to a Sanskrit University.

❖ 1974 AD
The name of the institution was formally changed to Sampurnanand Sanskrit University.

❖ 2016 AD
In march 2016, Department of Higher Education, Government of Uttar Pradesh sanctioned an amount of Rs. 11.39 crores for the conservation of Mukhya Bhawan and from April 2016, the work started on site.

❖ 2019 AD
After a gap of 15 years or more, the building has now been revived in its original glory enabling the University to convene the 37th convocation ceremony on 5th December 2019.
Architectural Features

Main building materials used in building includes walls of old bricks in lime mortar, local chunar stone cladding in exteriors, terracotta & stone bands, wooden truss system in roofing covered with mangalore tiles. Similar chunar stone is also used for flooring in chauka pattern. Sandstone jails, ornamental terracotta bands, gargoyle, rose windows and stained glass work were used to enhance the visual character of the building, making it an excellent example of Gothic Revival architectural style in the country. Use of pointed arches, buttresses, gable roof with wooden trusses also highlights the Gothic architectural style of the building. It is a large symmetrical structure with corner towers.

Conservation Works

Key Principles followed in the conservation of building:

- The conservation is aimed, making the building structurally safe and user friendly.
- Modern conservation & restoration materials are applied only where found necessary for long term behaviour in the region & reversibility and colleges are affiliated with this university.
- As much possible, all the traditional methods & techniques were adopted for conservation works.

Important conservation works involved in bringing back building’s glory includes:

Cleaning & Restoration Of Terracotta Work

Building is embellished with various terracotta design in interiors as well as in exteriors. All the reusable terracotta pieces carefully stacked on site. Various samples collected for duplication of missing broken pieces. These terracotta bands are restored using old as well as new terracotta units of similar design.
CONSERVATION OF MUKHYA BHAWAN, SAMPURNANAND SAN SKRIT UNIVERSITY, VARANASI, UTTAR PRADESH

Stained Glass Conservation

The stained glass windows are an integral part of the building’s Gothic style architecture. The windows are composed of individual pieces of colored glass and transparent.

**Condition before conservation work:** With time and renovations in the building, some stained glass windows were damaged and replaced with plain glass panes painted with same design on the glass. The glass and lead deteriorate with changes in temperature and humidity. These changes also lead to planer deformation.

**Conservation:** There were enough evidence to be used as reference to restore the missing and damaged pieces of stained glass windows. All these windows were carefully documented and templates were made. Sample of glasses were taken to order the matching shades. Since the lead frame, already present was not in reusable condition, were replaced with new one.

With the completion of conservation works, aesthetic appeal of all these windows are restored.

Stone Work

Building is embellished with beautifully carved stone elements like: Gargoyles, Sandstone Jalis, Horizontal band at plinth, cornice and parapet level, Carved patterns around door/window openings, Sculptures, Finials, etc. The broken/missing ornamental stone work are restored matching the original design. The whole task involved detailed documentation of elements and several skilled craftsmen.

Left: Carving of stone finials by skilled craftsmen; Right: Installation of broken stone pieces

Before & After- Restored Stained Glass Rose Window (Hall 3) Before & After- Restored Stained Glass Window (Hall 2)
Wood Works

Wood is another extensively used material in the building. Either structural or superficial all are intricately carved. Old doors found in reusable condition were stacked followed by necessary repairs and anti termite treatment. These doors were then re-fixed using old hinges, nut-bolts, etc. The old hinges, nut bolts and other fixtures from unserviceable doors are taken out for fixing old and new doors wherever required. Veneers made for cladding of wall posts matching the original design. Other elements like wooden railings, balcony, post, truss panels are restored matching the original design.
CONSERVATION OF MUKHYA BHAWAN, SAMPURNANAND SANSKRIT UNIVERSITY, VARANASI, UTTAR PRADESH

Roofing System

The building is comprised of two types of roofing system:
All the five halls are covered with pitched roof and terracotta tiles on the top. The corridors and the classrooms are covered with RCC roof. Both of them found in most deteriorating and dilapidated condition before the actual work started.

Repairs to decayed RCC roof

All the decayed/loose plaster were removed and the corroded reinforcement was cleaned. Bars are now provided with a protective layer of anti corrosion. Final repairs are done in form of new plaster or RCC cover and other finishes.

Restoration of Central Hall & Installation of Skylight

There were no evidences of original roofing system in the central Hall when the project started. Only remains were the building malba on ground floor. Nothing was there even in archives. The study of similar buildings of same period enable to make a roofing design for this area. The central part of the roofing is now provided with a skylight for better ventilation and natural lighting.
CONSERVATION OF MUKHYA BHAWAN, SAMPURNANAND SANSKRIT UNIVERSITY, VARANASI, UTTAR PRADESH

Restoration of Pitched Roof

Considering the condition of stacked truss members and material available in market, the new trusses are fabricated in stainless steel. To restore the original design, this will be further cladded with veneers made from original unserviceable materials and new veneers in similar design wherever required. Since most of the wooden trusses were either rotten or eaten by the termites, the roofing system was carefully dismantled and then re-laid using reusable material wherever possible.
CONSERVATION OF MUKHYA BHAWAN, SAMPURNANAND SANSKRIT UNIVERSITY, VARANASI, UTTAR PRADESH

Building exterior with collapsed roof; Building after conservation works

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Mr. A K Singh, Executive Engineer, Provincial Division, PWD, Varanasi

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Mr. Ravindra Kumar, Project Contractor

From INTACH Varanasi Chapter
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Ms. Sugandha Jain, Conservation Architect
Mr. Hirak Borah, Architect
Mr. Kushagra Anand, Architect
Mr. Chandresh Kumar
Rising carbon footprints and consequent climate change is a harsh reality that needs to be resisted and rectified by all concerned and at all levels possible. In a rapidly urbanizing world and increasing built up space, energy efficiency of buildings is believed to play an important role in combatting this menace. Research suggests that consumption of energy and consequent carbon footprints of buildings can be considerably reduced through adoption of efficient and sustainable design specifications, appropriate choice of materials and proficient construction practices. Designing green buildings i.e. a building that is green ‘...through its lifecycle. From planning its design, to construction, operation, maintenance, renovation and demolition' is the need of the hour to combat the climate change challenge and ensure sustainable development.
“Each new situation requires a new architecture”

Jean Nouvel
Category: Green Buildings
Project: Krushi Bhawan, Bhubaneshwar, Odisha
By Studio Lotus

FIRST PRIZE
Krushi Bhawan is located in Bhubaneswar, the state capital of Odisha; home to multiple agrarian communities, the state is the third largest contributor to India’s grain supply. The new campus sits adjacent to the old campus for Krushi Bhawan, with several ancillary structures of power in the vicinity, such as the Police Commissionerate Building and the State Guest House.
Typical closed-off government building morphology, compared with Krushi Bhawan's focus on connection and inclusivity.

The spatial programme allows for the ground floor to function as a free-flowing public space that opens out into a plaza, whereas the terrace houses urban farming exhibits and is used for the demonstration of best agricultural practices.

The offices for the State department and Directorates – which require restricted access – have been placed on the first, second and third floors. This allows the offices to be secured off, making it possible to keep most of the other facilities open to public even on holidays.

The complex consists of a central courtyard that provides optimal air circulation. It opens through a series of colonnades into the Public Plaza, which consists of a garden with native flora, featuring an informal amphitheatre and a pond that cools the forecourt. The primary entrance pathway performs multiple functions — from a common area for employees to congregate, to a place for hosting small gatherings.
KRUSHI BHAWAN, BHUBANESHWAR, ODISHA

Environmental & Ecological Impact

The simple night-purging system pulls cool air into the building through the northern façade when temperatures drop at night; the building’s high thermal mass traps this ‘coolt’ and becomes a ‘coolt’ exchanger with the surrounding air in the day when outside temperatures are higher.

At Krushi Bhawan, 100 percent of rainwater is harvested for recharge and waste water recycling on site.

Rainwater is conveyed via a rooftop rainwater catchment system and supplied to irrigation channels and pools while excess water is collected in a storage tank.
KRUSHI BHAWAN, BHUBANESHWAR, ODISHA

Contextual & Aesthetic Impact

The patterned brick façade draws on the region's famed *ikat* dyeing technique, created using clay in three different colours to represent the geographical diversity of the region.

The Odisha *ikat* is a resist-dyeing technique practised by the region's artisanal communities.

The geographically tagged product inspired the distinctive design of the building's brick facade.
Bas-relief carvings depict agricultural motifs over laterite cladding along the Public Plaza, illustrated in the Odia Pattachitra (cloth-based scroll paintings) style.

The tribal cast metal craft of dhokra is adapted to make light fixtures that wrap around the ground floor columns, as well as metal screens and partitions that line the building’s corridors.

Depiction of local mythologies and agricultural deities, drawn from the ancient temple architecture of the region, are expressed through hand-carved laterite and khondalite lattices.
Krushi Bhawan emerges as a key addition to Bhubaneswar's urban fabric, creating a space that facilitates community engagement and education.

The courtyard morphology, the inclusion of a stilt level, and the staggered building profile enable self-shading.

The complex brings the Odia farmers and the citizens of Bhubaneswar into the fold and facilitates their interaction and collaboration.

The building brings together over 100 highly-skilled local artisans to create a vibrant and contemporary narrative of traditional Odia craft,
At Krushi Bhawan, 100 percent of rainwater is harvested for recharge and waste water recycling on site.

Krushi Bhawan seeks to present a model of frugal innovation that celebrates culture, includes the neighbourhood and is highly sustainable.

The project takes the immediate context into account foremost through its site planning, by retaining all existing trees on the site.

The tribal cast metal craft of dhokra is adapted to make light fixtures that wrap around the ground floor columns, as well as metal screens and partitions that line the building’s corridors.
KRUSI BHAWAN, BHUBANESHWAR, ODISHA
Category: Green Buildings
Project: Atal Akshay Urja Bhawan, New Delhi
By Edifice Consultants Pvt. Ltd.

SECOND PRIZE
Buildings have over time, changed to address the need of the present. The advent of the skyscraper, for instance, came as a result of the scarcity of real estate in American City. Steel framing technology allowed the extension of architecture in the third dimension.

We are at a similar point in history. The overwhelming need of the hour is to address the energy needs of the country, especially the kind that do not impact the environment in a negative manner.

The Ministry for New and Renewable Energy represents the future of energy policy in the country. With global impetus towards alternative energy, this sector will receive unparalleled impetus in the future. Buildings represent 30-40% of total final energy consumption. Today’s energy and environmental needs ask to drastically evaluate this. The building where the Ministry of New and renewable energy will be housed will need to foreground this transition to buildings that minimize the energy, carbon and environmental footprint.
ATAL AKSHAY URJA BHAWAN, NEW DELHI

Atal Akshaya Urja Bhawan is designed on a 2.76 acre plot in CGO complex area, Lodhi Road, New Delhi by the Ministry of New and Renewable Energy (MNRE), Government of India.

The location of the site was a pivotal factor in the design decisions taken. The green oasis of the Lodhi Garden, the historic edifice of Safdarjung’s tomb; the cultural magnet of India Habitat Centre and the symbol of Delhi’s ambition – Jawaharlal Nehru Stadium, along with all the other culturally important buildings peppered along the Lodhi area, all influenced the site.

Being surrounded by public landmarks assured visibility and accessibility to the site. Also located near the metro station ensured proximity to public transport. Overall the site provided an opportunity to build a landmark as a value addition to the surroundings.

- Adequately represent what this ministry stands for, a benchmark development: This benchmark net zero project should set a new precedent in building design, to be replicated and display the evidence of judicious use of renewable energy.
- Integrate the building with public use and perception: Create a public interface, keeping security and safety needs of the building intact, to showcase the strategies to the general public and respond to the urban fabric in which the building is situated, to encourage debate and conversation. Make a larger statement: Use the building to address the urban issues and concerns; for instance pollution, congestion, the lack of public space etc. Ensure a truly Energy efficient structure: Ensure that the building is not a superficial representation of a net zero building, but has performance integrity. This would be done even at the material level, with low embodied energy materials.

Left| Urja Pavillion - The plaza seeks to create a new public entity, where people can mingle.
Site Planning:
The single mass in rectangular form is divided into two parts; North wing and South wing, distributing the functions with a pivotal central spine. It acts as an entry for the building and collaborative spine connecting departments on each floor.
Service cores are placed along west direction for shielding harsh sun with openings covered with jalis and have provision of creeper growth.

Architectural Expression:
Massing:
The building opens up in a triple height atrium housing the main Reception with a stone backdrop behind reception table. The public & semi-public activities are located on the ground floor. These include the Auditorium of capacity around 250 people, Exhibition centre and Visitors’ room in the south wing towards the secondary entry. North wing includes Creche, Kendriya Bhandar, bank & ATM. The Main Reception connects the north and south wing. Common amenities for building located on 1st and 2nd floor like Library, Exhibition area, sitting areas, Canteen, Recreation area, Gym, Yoga room and guest rooms.
The offices are placed on from the third floor upwards for optimum sunlight, views and isolation from the public activities below. Ministers & MOS Room are located on 8th floor. Exclusivity for uppermost floor with almost 360 degree views. Above the terrace floor, houses the solar roof of area around 60,000 sq.ft.

Walls:
East façade of the building is protected for thermal insulation by double walls. The walls are built by ACC which have cavity in between them with glass wool insulation infill 200mm thick.

Façade:
The building is cladded with crème/beige Dholpur sandstone. The East and North façade contains continued strip glazing with DGU system. The west façade has solid masses as the service areas are located on this side. The façade has punctures which are covered with GFRC jalis which enable cross ventilation.
**Look and Feel**

To duly respect the rich architectural heritage character of the city with keeping in the language of modernism is the primary purpose. To adhere to the purpose, the built mass is being wrapped by a portal (an envelope) to attain a strong character as similar to that of Fort architecture. The structure is then cladded with local sandstone. The glass on the East facade reflects the urban development happening in the city.

**Urja Pavilion**

Most government buildings in the city are extremely opaque and closed to the general public. This is mainly due to security concerns. However, for The Atal Akshaya Urja Bhawan, we intend to create a building that not only affords security but also creates a public space. The proximity of the metro station to the site alludes to a ‘public-ness’ to the area. The plaza seeks to create a new public entity, where people can mingle.

**Net-Zero Energy Building**

The benchmark net zero project aims by creating a Net Zero Energy building is twofold:

- **Overall reduction in Energy** - Primarily achieved by reducing heat ingress; by blocking the west sun, orientation, reducing the air-conditioning footprint, providing appropriate building materials as well as using technology like radiant cooling and double glazed units.

- **Providing for optimized Energy needs** - by providing solar panels on the rooftop to ensure enough energy production to attain net zero mark. The solar area provided on the rooftop is around 60,000 sq.ft.
Site Geometry

The North-South orientation of the site governs the building’s profile to a large extent. The design intent was to create a permeable public edge with adhering to the established building footprint with a view of celebrating the available frontage.

Sustainable Design Strategies

To maximize the north light the south wing is tilted with respecting the site geometry and enhancing the entry experience. This massing strategy creates spaces which are housed below the roof which are duly shaded in the south wing. To block the harsh west sun, service cores are introduced along this direction. Also punctures are provided on this facade which are covered with jallis and have provision for creeper growth. This will help to filter the inward flow of polluted air.

As most of the areas inside the building are centrally air conditioned, provision is made to let open the glass windows to harness the air from the jallis, enabling cross ventilation. The south wing of massing strategy creates a facade of solar panels which assists in shielding the building from harsh sun and also helps attaining zero energy mark.
Energy Efficient Structure Goals

Energy efficient structure goals achieved with a designed combination of energy reduction and energy production.

- Strategies like building orientation, placement of openings, jalis, use of appropriate walling strategies, building envelope, shading strategies etc. has been explored to take down passive heat gain.
- Radiant cooling, reduction of air conditioning foot print, use of energy efficient lighting fixtures; strategies to reduce energy consumption.

On other hand 60,000 sq.ft of roof top and southern façade gas been used to inlay solar PVs; adheres energy production to optimize energy needs.

Sustainable approach through water efficiency by recycling waste water and using for flushing, horticulture and cooling tower make up.

Above / All Building Envelopes contribute towards Energy Production or Energy Reduction to result in a Net-Zero Energy Performance
Technological Innovation
The proposed building is designed to be an iconic landmark symbolizing towards the energy efficient renewable energy integrated building, which will set an example of energy and environmental performance. Net zero energy aspects has been strategies by using technologies like radiant and providing solar panels to optimize energy needs.

Solar PV:
ON grid tie Solar PV system complete with AC DBs & AC DB combiner panel, controllers, inverters has been proposed to install at the roof top & South Facade wall. Power generated shall be supplied to grid power at 11 KV.
The estimated solar installation potential is 1100 kWp with a generation potential of 19 lakh units per annum.

Radiant Cooling:
It is proposed to install required capacity Water Cooled Screw chilling machines with VFD for radiant cooling. The radiant cooling is done through ceiling or floor by PEX pipe embedded in floor/false ceiling to achieve uniform lower surface temperature.
The major sensible cooling is done by radiant and convective heat transfer from the chilled radiant false ceiling panels in the room. The chilled water is supplied at around 15 deg C and return at 20 deg C to cool the surface which in turn cools the conditioned area. A very high efficient radiant space heating will be done by same piping system with Hot water boiler.

Showing facade of solar panels
Category:
Green Buildings

Project:
Bhatt Residence, Vadodara, Gujarat
By
Shreya & Kalpesh Dalwadi

SPECIAL MENTION
The basic perception towards any ‘Green Design’ is that, it is the design which uses ‘all resources optimally’. The emphasis here is on being optimal and appropriate. Now, ‘optimal’ designs are the ones which are ‘contextual’ in real sense. Context can be understood and expressed in terms of ‘local architectural grammar, local climate and local lifestyle’. So their manifestation to suit contemporary lifestyle will result in a design which can be nothing but ‘green’ (and that has been attempted by the designers in the mentioned project). It is the key understanding of designers that ‘sustainability is contextual’ and so any design which is ‘contextual’ shall essentially be ‘optimal’ and so forth a ‘green design’.
BHATT RESIDENCE, VADODARA, GUJARAT

The residence deploys rammed earth, stone. RCC filler slabs, compressed earth blocks and bricks as the main building materials.

Passive products & materials including paints & coatings, adhesives & sealants, cement, concrete, composite wood, certified new wood, housekeeping chemicals, false ceiling materials, are the ones which are certified under GPCB programme of IGBC.

The project implemented a comprehensive structural design philosophy to conserve steel & cement, as compared to national practices, for the building type.
It is increasingly believed that green open spaces define the culture and character of a city and makes it vibrant and resilient. A well designed and well maintained green area adds to the social environmental aspect of the city and also improves psychological and physical wellbeing of citizens. However, the rapidly modernising cities are increasingly becoming concrete jungles where the green open places are grossly undervalued and therefore neglected. Understandably, there is a growing awareness about importance of public places in impacting sustainable development and finds mention in the Sustainable Development Goals (SDGs). The challenge before the professionals is to design safe, inclusive and accessible green spaces that enhances the image of a city and contributes to environmental sustainability.
“I don’t divide architecture, landscape and gardening. To me they are one”

Luis Barragan
Category:
Landscape Planning & Design

Project:
Avilala Ecological Park, Tirupati, Andhra Pradesh

By
Ravikumar & Associates

FIRST PRIZE
AVILALA ECOLOGICAL PARK, TIRUPATI, ANDHRA PRADESH

Introduction
The proposal for “Avilala Ecological Park” site is located at the southern fringe of the TIRUPATI TOWN (Andhra Pradesh State) touching the Tirupati bypass road on the southern side.

TIRUMALA, the well known & most visited temple town is situated on a hill range, 24.7 Kms away from the site on the NW direction. The site measuring 150 acres in extent was a part of 500 years old lake, which has been filled up around 20 years ago.

Design Intent
The purpose of this project is to develop an Ecological Park with water conservation as a priority.

This proposal intends to create a park, representing the ecology of the surrounding region, within the following design intents. Catering to the local public as well as the visitors.

- Creation of ecological HABITATS.
- Spreading KNOWLEDGE & awareness about ecology.
- Developing RECREATIONAL activities & spaces within the park.

Site Visuals

View towards East

View towards North

View towards West

View towards South
AVILALA ECOLOGICAL PARK, TIRUPATI, ANDHRA PRADESH

Study & Analysis

The site is almost barren without any features of ecology and hence an elaborate study was done throughout the region (Chittoor district) regarding NATURAL ECOLOGY & CULTURAL ECOLOGY.

NATURAL ECOLOGY comprises of Hills, Forest, Lakes & Rivers and Fauna. CULTURAL ECOLOGY comprises of Agriculture, Arts & crafts and importantly the TIRUMALA TEMPLE, the cultural icon of the region.

Natural Ecology

Cultural Ecology

Synthesis

A Spatial pattern has been arrived at by synthesizing the various entities of the NATURAL & CULTURAL ecosystems of the region, showing the 4 dominant ecologies - Hills, Forests, Fields & Lake...

The regions eco-spatial pattern sits onto the site creating various zones...

1. Habitat zone
Hills, Forests, Fields, Lake...

2. Experience zone
A promenade originating from the Entrance plaza and culminating at the View Tower cutting across all the Ecologies and Features.

3. Knowledge zone
Lotus pavilion comprising cafe, Eco-club, Gallery, Visitors center...

4. Recreation zone
Expo, OAT, Lake Front Promenade, Parks, Crafts bazaar, Food village...
The regional ecosystems of the Hills, Forests & Ponds are recreated at the higher terrain of the site. The cascade does the water balance by circulation from the lake. The Skywalk & Cascade provide the visual appeal for the viewers.

Themed gardens showcasing native species, spiritual plants, local crops, Wild flowers along with bioswales, Field trails recreate the Field ecosystem.
Experience Path:
Apart from the symbolical cultural connect to the Tirumala temple, the EXPERIENCE PATH houses the important features - LOTUS PAVILION, GARUDA PAVILION & the VIEW TOWER. As a Boulevard it connects all the ecologies & features and offers visitors a glimpse of these at a stretch.

LOTUS PAVILION:
Being a visitor’s center of the Ecological park, the Lotus Pavilion symbolically represents the symbol of Goddess Padmavathi and houses Ticket counters, Eco-club, Gallery, Cafe and other visitor’s amenities.

Garuda Pavilion:
Symbolically this pavilion represents GARUDA, the vahana of Lord Venkateshwara and houses a Bird Aviary in 3 acres, with visitor’s gallery, elevated walkways, etc...

View tower:
Positioned at the culmination point of the Experience Path, the view towers is 150’ high, constructed with steel & bamboo, has a 3000 Sq.ft view deck covered with solar panels roof & offers a panoramic view of the park, Tirupati & Tirumala. At the ground level, there is a museum, and the first level has a cafe & the landing point for the Sky walk.
The Lake along with wetlands & nesting island forms the core of the water ecology. It controls the entire surface water management of the park through ponds, bio swales and water channels. Through the wetlands & dewats system, it treats the sewage water for the irrigation of the park.

The 'Sustainable' features of the Lake Zone include constructed wetlands, nesting islands, lake trails, aquaponics garden, structures for energy generation such as wind powered aerators, wind turbines and solar trees.
A range of social, community recreation facilities - Jogway, Yoga pavilion, Bikeways, Public park, Expo grounds, Open Air Theater, Food village, Arts and Crafts Bazaar, Farmers market are offered at the community zone.
Category: Landscape Planning & Design
Project: Java Rain Resort, Chikmagalur, Karnataka
By Ficus Landscape Architects

SECOND PRIZE
JAVA RAIN RESORT, CHIKMAGALUR, KARNATAKA

Key facts:
5 acres. 11280m AMSL
13° 21'42.6"N 75° 43'29.5"E
Mean annual rainfall: 900 mm

Introduction
The resort sits on the crest of the coffee estate, on a relatively flat plateau in the North. The layout comprises of single villas (4 nos), twin villas (3 nos), presidential suite (2nos) and a manager’s villa. The principal building is the arrival centre, set at an upper level to give a prospect of Chikamagalur town in the far distance. Below it is the Restaurant and an adjoining spa block which open into an elliptical swimming pool. The site has a level difference of 16 metres from South west to North. A ridge on the south separates the resort from rest of the coffee estate. The steepest gradient is around this dyke, and progressively flattens towards the North gate.

The landscape design works around a few guiding principles such as conservation, habitat strengthening, erosion control, runoff management, design of outdoor spaces to make users feel at leisure while working with a monochrome planting palette to strengthen the impression of wilderness.

In a Physical sense, Java Rain site lies on topographical prospect which connects the viewer to the intrinsic landscape mosaic of the place i.e. the hill, forest and valley. These view corridors are experienced in serendipitous manner in the landscape interventions. The idea of a forest-pasture, and subtle aromas are expressed in the planting design.
JAVA RAIN RESORT, CHIKMAGALUR, KARNATAKA

Deriving a Sense of Place

The location offering the distant vista of Mullayanaigiri hill was reserved as a linear grassed clearing dotted with existing trees. This sightline visually connects the observer to the region’s most prominent landscape feature. A revised site survey was undertaken focusing on existing grade, identification of remnant indigenous species and the small difference between ground and plinth of the already sited buildings. All trees, including native saplings were mapped to understand the extent of indigenous and introduced species.

The site also gave an impression of having an ad-hoc distribution of coffee plants. The mapping exercise helped re-imagine the site into areas where coffee bushes were growing well, and areas where they had depleted completely. This information was used to steer construction disturbance and start re-planting the slow-growing Coffea robusta shrubs, which would be needed to strengthen the sense of being in a coffee estate.

**Habitat Strengthening**

Interventions included canopy thinning of silver oaks to promote pioneer and slope stabilization vegetation to take root, along with removal of infested trees, remedial grading and soil improvement. The construction disturbance was re-assigned as a buggy drive to the primary linkage to each villa. Another key idea was to a mix of introduce native and compatible trees and shrubs that host pollinators all year round and work under the canopy structure of the remnant native trees. This was felt to help in making the landscape more resilient.

Wherever, the complex natural canopy structure generated abundant leaf litter, it was left in place to arrest soil erosion and enhance percolation of water till the design interventions would come through. The overall planting design primarily avoided human-animal conflict, creating an impression physical distance between cottages, rehabilitating slopes while triggering the sense of being ‘at leisure’.

Integration of key strategies towards revitalization of the site:

01 - Existing Silver Oak trees
02 - Existing Native Forest trees
03 - Introduced Middle Storey (texture / backdrop / screening)
04 - Introduced Lower Storey (texture / transition / fragrance / colour)
05 - Existing Coffee shrubs
06 - Slope stabilisation grasses
07 - Stonewater diversion & Snake deterrent apron
08 - Retained slopes, with toe walls
09 - Artefacts for visual interest and camouflage of service points

**Existing Native Trees**

- Syzygium cumini
- Ficus racemosa
- Gmelina arborea
- Melia dubia
- Dipterocarpus indicus
- Palaquium ellipticum
- Lagerstroemia microcarpa
- Pongamia pinnata

**Some Planted Species**

- Syzygium cumini
- Ficus racemosa
- Michelia champaca
- Mesua ferrea
- Flicum decipens
- Artabotrys hexapetalus
- Plumeria alba
- Plumena alba
- Ficus lyrata

**EXISTING PLANTED TREES**

- Grevillea robusta
- Erythrina indica
- Areca catechu
- Ficus carica
- Bambusa vulgaris

**Planted Shrubs**

- Vetivera zizanoides
- Cymbopogon citratus
- Bacopa monnieri
- Centella asiatica
- Zephyranthes candida
- Hymenocallis littoralis
- Piper nigrum
Retaining and reinforcing the ‘first impression’ of spliced foreground/ background formed a key aspect of the landscape design strategy. Ideas like “as found” and ‘figure ground’ helped locate outdoor activity spaces, small gathering spaces and infrastructure in relation to the figure ground of tree trunks and villas. The idea of site planning was left to examine how to weave the discrete buildings as encountered forms set within a semi-wild, cohesive landscape experience.

The cry of peacocks, the shy snakes, sound of crickets, and the occasional butterfly provided another lens about the nocturnal and dawn quality of the site.
Existing trees splice the field of view even as they provide dappled shade throughout the site. The choice of material (paving/plants) captures the play of sun as an “intrinsic” experience of a coffee estate and natural woods. The landscape quality at eye level is an interplay of textural contrasts, hard and soft outlines, and consistency of “form”.

Design Approach
The landscape design creates a series of transitions and buffers between villas and their immediate adjacencies. Spaces between cottages create a contrast with the existing silver oaks. A woods and glade-like quality, found in the natural landscape around Kaimara, is introduced into the site aided by slope stabilization, runoff management, protecting existing native trees, and ameliorating site disturbance. The attempt was to create a spatial quality in response to the natural quality of the place - a coffee forest, while the valley views and distant vista are weaved into the overall experience. The area around the site was not suitable for water conservation structures although intrinsically water sufficient. Ground water recharge through recharge pits infiltration wells and robust understory planting were identified as methods for improving the water table.
The landscape design also extends the geometric language of the architecture, especially around the clubhouse where a free-curved stepped seating negotiates a 4.0m deep cutting with an amphitheater. The deck space articulates the shape of the infinity pool while allowing outdoor group gatherings. Plant forms mimicking the architectural form and colour of the highly imageable Arrival centre, designed by the architect were chosen as directional, buffer, transition and foreground elements throughout the site.

The Reception area is on the first floor of the Clubhouse. A planting thicket envelopes this area, providing selective glimpses of the site from this vantage.

At the Ground level, a lawn and pool deck function as spillouts for Restaurant and the spa.
Each villa forecourt was given a sense of partial enclosure, through landform grading, alignment of pathways and planting. The rear side of the villas, with their sit outs was opened up into private garden pockets for play, idling, or just gazing at the sky. Between villas, patches of existing Robusta coffee were retained as an allusion to its erstwhile landuse. Beyond the villa perimeter, the planting transitions to grasses and then to borrowed glimpses of the adjoining coffee plantation or the valley.
The presence of seasonal birds and butterflies adds to the occasional delight and slowly turns users to look at the landscape around. Due to protection and careful integration of many mature trees, the points for repose are numerous, un-dictated and therefore ‘organic’. The landscape holds enough visual cues to enable visitors to “read” the fundamental ideas of public and private space, and the ‘idea of wilderness’ set within a coffee estate.
Category: Landscape Planning & Design

Project: Biosynmedica – A Healing Centre, Hyderabad, Telangana

By Anjuna Architects

SECOND PRIZE
Introduction
The site is spread over 24 acres and is located at Himayatsagar Village, Hyderabad, Telangana. With gentle slopes, scattered trees and rock outcrops site provided an opportunity for a design which could be unique to its surrounding. We also noted 408 existing trees of 63 species which would be preserved.

Concept
“Biosynmedica” the name is derived by amalgamating biodiversity and medicinal plants synergizing effect for healing purpose.

The concept evolves from understanding the way roots of the plants and the human nervous system works. We all live through energy transmitted by the electromagnetic waves. These complex living systems form a network of communication to send messages. These are a form of electromagnetic fields, which form junctions from where energy is distributed.
The site is thus seen as a living entity with the central road acting as the spine with 7 chakras placed as junctions on this road. Every chakra is related to different body parts. And the zones in design are defined by this concept.
The journey through the park for any visitor would mean physical, psychological and spiritual healing. Sending a positive and reaffirming message of health is one of the major aims.

Another aspect is to connect the man back to nature and reinforcing the idea of healing through Eco-therapy. The idea to have multiple meanings and associations with park gives an opportunity for the visitor to explore a different understanding of the park. This thus creates a complex and a unique design.

Site Evolution
The site has varying slopes with the highest point being the North. The site slopes towards north-west and south-east.
The lowest point being towards the south east of the site.

The existing road divides the site into two parts and is retained as a spine.

All the seven chakras are arranged on the spine which would act as a plazas for visitors to gather and understand the meaning of the respective chakras.

Central path acts as a transition between plazas.

Radiating pathways are designed on existing contour at the site making sure there is minimal amount intervention on the site.

The two water bodies are located at the lowest points to be used for maintenance of the park.
The park has been divided into different habitats to educate the visitors on how an ecological community undergoes orderly and predictable changes following a disturbance or the initial colonization of a new habitat.

**Aquatic**

The water body would host a variety of aquatic plants and weeds, boosting the biodiversity by attracting avifauna and other species dependent on such an ecology.

**Grassland**

Grasslands are an important habitat which are open and flat. They are known to reduce carbon footprint.

**Shrubland**

Shrub lands with scattered trees form the next step in the succession, these shrubs with their medicinal properties would help a visitor to understand the significance of nature.
Having rocks on the site gives an opportunity to create a rock garden. The plants are hardy and can survive in harsh conditions. This shows the diversification and adaptability of plants.

Through Miyawaki method we are creating a medicinal forest. The forest that is being grown is 10 times faster and 30 times denser as 80,000 tree saplings have been planted in 4 acres.

Evergreen woodland which also are the peak of succession provide an area for visitors to just unwind in nature and play. These also act as a buffer, cutting the site from surrounding areas.

Every habitat attracts and shelters different species. We are increasing the biodiversity of the park. This is done to understand the relation between medicinal plants and species dependent on them. Thus, understanding medicinal and ecological importance of these species.
Multipurpose court a place to relax and unwind surrounded by Miyawaki forests all around it. Located in the center of the park, it becomes easily accessible for every visitor.

Entrance to the park is designed using Terracotta Jali work with vertical garden. The porosity of he wall becomes the first connection to draw visitors in.

A conservatory is being created to showcase the beauty and richness of northeast medicinal plants. Thus, seven mounds are being created to represent the 7 sister states of North East India.
Sahasrara Chakra represents the connection with cosmos. Here we create a labyrinth which is a symbol of wholeness. It is a metaphor for life’s journey. The choice is whether to walk a spiritual path. At its most basic level the labyrinth is a metaphor for the journey to the center of your deepest self and back out into the world with a broadened understanding of who you are.

Ajna Chakra represents self-reflection. A land art called ‘Circle of life’ is made on site, which would consist of 12 Plumeria trees in a circle. In this we would be forming an inverted spiral with 52 medium sized boulders and 365 smaller stones. All these represent 12 months, 52 weeks and 365 days making one year. Plumenas are the only ones which would grow and blossom while everything else would remain static. In similar way when we reflect on our life, we need to realize there are few things which would grow along with us and if we constantly pay attention to smaller things or situations, we would be stuck. And like the inverted spiral we would not be able to turn back time. The idea of this art piece is to make a person think about their life.

An Open-air theater to gather and further deepen the understanding of the park, as this would provide a platform for lectures and educational discussion surrounding, medicinal plants, health and biodiversity.

Yoga and meditation court, a space for physical and mental healing. As yoga does not only concentrate on body but on mind and spirit.
Category: Landscape Planning & Design
Project: Garden of the Unexpected, Auroville, Tamil Nadu
by Studio Naqshbandi

SPECIAL MENTION CERTIFICATE
The Matrimandir gardens are meant to be a place where one can discover and explore the states of consciousness through a beautiful landscape that surrounds the Matrimandir. Matrimandir was completed in 2008. Since then work on the gardens started in earnest. The Garden of the Unexpected is situated within the Oval ring that surrounds the Matrimandir Area. A lake of approximately 90000 cu liter is expected to surround the oval path.
The Design Brief For The Garden of the Unexpected:
1. The garden is an “initiatory place” for children. It is not an ordinary playground, but a place of wonder and discovering the unexpected. A place of reversed reality - for example, a place where one can feel the sky on the ground and the ground in the sky.
2. The existing contours have to be respected.
3. The areas of the Gardens must not be overcrowded.
4. It is suggested that designers work as a team.
5. The designers would study and include indigenous flora & fauna in the design and provide for adequate shade and sitting arrangements.
6. Safety in the garden has to be the primary concern of designer as the garden is meant for children.
7. The garden has to be sustainable in the long run and not require highly labour intensive or costly maintenance.
6. Water usage, for irrigation and water bodies, has to be kept at a minimum.
7. Matrimandir gardens can grow according to the consciousness of people and society. In this regard, hard landscaping has to be kept minimum while giving natural landscaping more emphasis.

Principles Of Sustainability Applied In Our Proposal On The Gardens:
- Use of water resistant plants:
  - 44 TDEF (Tropical Dry Evergreen Forest, Indigenous to the south eastern coast of India) bushes and trees (5-10 m high) were planted as the first step creating the overall major musical scale of the garden.
- Minor scale created by many small interventions like edible curative gardens, small fruit trees, indigenous ground cover, etc.
- Combination of automatic sprinklers & drip irrigation for a judicious use of water.
- Use of illumination with -12v only. Creating indirect lighting by state-of-the-art lamp shades in granite which are locally available and easy to maintain.
- Properly designed site drainage and rainwater harvesting pits where possible.
- Minimum use of hard landscape and RCC.
- Retaining the existing contours of site.
- Natural Bio Ponds which are designed with plants and fish (to keep away mosquitoes) and made child proof by steps inside.
- Paving done using waste materials recycled on site.
- All mature trees on site have been retained.

Site Details
Site Area - 8350 sq. m
Site Budget - 60 lakhs
Cost - 728 rs/sq m. 70 rs /sq ft
Client- Auroville community and visitors to matrimandir.
GARDEN OF THE UNEXPECTED, AUROVILLE, TAMIL NADU

Garden A Pond planting

Garden B pathway arrangement made with waste

Stone bridge construction – big laterite boulders are arranged in a row for children to jump and cross the pebble garden.

Garden B Stone bridge construction

Garden B Planting with children
GARDEN OF THE UNEXPECTED, AUROVILLE, TAMIL NADU
GARDEN OF THE UNEXPECTED, AUROVILLE, TAMIL NADU

Garden B Pebble garden

Garden A Pond
GARDEN OF THE UNEXPECTED, AUROVILLE, TAMIL NADU

Indigenous Plants Used in the Garden

Tecoma Stans
Butea Monosperma
Glycosmis pentaphylla

caesalpinia ferrea
Caesalpinia conana
Pongamia pinnata

Dodonaea viscosa
Evolvus alsinoides
Ixora parviflora
jasminum angustifolium