



# Design for All



School of Planning and  
Architecture, Bhopal

## Chairman's Desk:



*Dr. Sunil Bhatia*

**What is wastage? Is it something not required after making use of that element out of the total material provided by nature? We call it generates during the changing of form and it is the integral part of the process to release that is not useful for desired forms or anything that does not require to meet the desire level of objectives or anything that loses its relevance with time. Modern education's biggest achievement is systematic onslaught on our ancient wisdom of 'caring and creativity for the uniform progress' and succeeded in diverting our all efforts on focusing on commercial gains. We educate to young generation 'what is not useful is waste' is wrong education and making them to unaware about real goal of life. 'Everything has purpose.' We site numerous examples in support of our theory and most popular are when electricity is stepped down from higher voltage to the lower it releases heat, vibrations etc. and we do not bother for this wastage of heat since it is not affecting our desired objectives. Is it right education where we never allow our students to explore the possibilities of utilizing what we call wastage? We generally inform self-sustaining or environmental friendly way of designing products but never allow them to think what appear natural wastage is actually suggesting us for unexplored area where we have not travelled so far. There is an important example of James watt where he had used natural process of converting steam into a powerful tool. It is natural when we heat water it changes forms and converts to**

**gaseous state. Steam was considered waste for over centuries since the days of discovery of fire as tools for heating but James Watt had revolutionized the thought and lives of people by using waste of steam into powerful tool of transportation .Industrial revolution had set its pace after design of steam engine. I always say nothing is waste in this cosmos and everything has purpose. It is because of our limited knowledge we fail to identify its purpose and as such we treat that as a waste. Coal was treated as waste for centuries by ancient people and as we acquired more knowledge it became major source of energy in modern time. Davy safety lamp was designed by Sir Humphry Davy for use in flammable atmospheres of coal mines by using the principle of controlling the wastage to that level that cannot ignite fire. Similarly petroleum was lying unutilized in the womb of the earth for centuries but it is the knowledge of modern man who has developed it into one of the major catalyst for energy requirement for driving movement of second level of industrial revolution. He had designed all kinds of equipment for exploration, extraction, purification and transportations. Our present spectrum of human life is revolving around these developments. In simple words, we may say that it is our limited knowledge that does not know how to use all unknown & 'what we call at present a waste' for constructive purposes. 'Nothing is waste in this universe.'**

**Briefly speaking all that we call waste may be useful for someone who has knowledge for its utilization. In certain respects our ancestors were wiser than modern man since they were living with basic wisdom. They were aware about utility of each part of their products. After peeling the banana modern man from urban area treats the skin as a waste and look for bin for its disposal in civilized manner. In rural community they prepare delicious meals out of skin of banana as well as from various skins of vegetables and are treated as delicacy. They have art to convert what urban people treat as waste for the benefit of the society. Excreta or human waste is flowing in the urban area in the form of sewage and managing is great problem for administration. In rural areas they convert it into compost maneuver by using indigenous technology with local resources and use that as food for plants and various extracted materials like mustard cake etc. as supplements foods for animals. 'Nature is self-sustaining and knows how to use every form for the benefit of living beings.' Our imperfect knowledge is the problem. We should be mentally prepared that nothing is waste and 'What we treat as waste is nothing**

but integral part of the system.' It is the call of the time for retrospection of our educational system because it is failing in attracting our mind for exploring toward basic wisdom but it is allowing to think for more and more applications of existing technology .It is absolutely wrong way of teaching. I advocate by giving example of cane sugar, banana, cotton seed where man has acquired knowledge to use every form for benefits of living beings. We extract juice from cane to convert into sugar; jiggery as sweeteners & preservatives and waste of juice i.e. molasses used by liquor industry for making various types of alcohol and extracted waste of cane is now use for power plant for generation of electricity. Another plant is of cotton; its fiber is used for clothing, seeds for extracting edible oil for human consumption and cottonseed meal compressed into nuts or cubes of various sizes for feeding to animals. It is all the human mind of the past centuries that is trying every waste into utility. In these areas human mind had won but there are areas still need our attention for achieving knowledge on utilizing every part of the so called wastage for benefits. Crude oil is another example where every level of extracting oil is used by different industries and nothing is left as waste.

I am not traditionalist. Still I give credit to some of ancestors who were aware of the recycling of certain elements and for their benefits. We have designed electronic items but do not know how to use once it completed designed life. Electronic wastages are piling and disturbing the peace of mankind. 'How to dispose of nuclear wastage is great challenge? 'The present tendency is total indifference to the issue. Ancient people were following & practicing the philosophy of 'What can be consumed by man for maintaining basic needs were used and greed should be under control. They were living with the tendency of minimize wastage and never lose objectives. It is the centuries old practice of peeling or cutting the vegetables or food items for cooking and they do with such precision that unwanted materials should be eliminated and there should be minimum waste of edible items. It is responsible of design of many tools like knives; peelers etc. and for extracting juice from different items various equipment.

New persuasions are to be initiated after thorough research. In certain cases an individual tries & wishes to reduce the wastages but there are some occasions where person deliberately encourage wastage because it becomes symbol of

affordability, demonstrating happiness, and power of wealth. It is the individual's trait to prove before others around that he enjoys power to exhibit. He believes that others are impressed by his wealth & power. Educated people whose number is small are not carried away by his false ego but others take it that he is great man since he can afford to waste resources. 'Wastage is integral part of human living'. It is the commercial gains that controls for optimizing the profits deter them to waste. The concept of wastage has developed pole a part psychology amongst the people. One with generous frame of mind with thinking that it is not kind of wastage if it is going on in order and upholding the human values. A sensible individual would think and act differently. He would checkmate his expenditure & would assure that wastages is minimized. If he is part of the vivacious circle; he would try to enslave others. To achieve profitability man can turn mean to that level which is beyond imagination. A normal person should behave sensibly and we expect such behavior where he tries to achieve his objectives but carries for future generations too. When he goes for sleep he blows out the candle or oil lamp or switches off the light because he does not need light during his sleep and it is waste. If someone experiences fear of darkness he needs minimum light which is provided by low wattage bulb. Wear and tear is another kind of wastages and he accepts this because he knows it is because of frictional forces. To minimize the wastage we have designed various viscosities of lubricants and bearings with ball or without ball. When we ignite our automobiles the unburnt portion of oil is treated as waste and it may harm the humans in long run. To manage this waste designers have designed chimney for managing smokes and mufflers, exhaust for automobiles fumes management.

How does the wastage occur? Ancient people had learnt by keen observations. They needed products that were to be stored for future use these are either available seasonally or scarcity makes in terms of availability. They first designed products for storage and later on developed the technology for controlling further damage because of environmental effects. They designed pot either with mud or animal skin in various size & shape of mouth to control the environmental damaging effects. They had understood stored products had limited life and were damaged because of either air or light or moisture or heat or all and it is unsuitable for human consumption. They designed earthen pot for storage of water and it was natural for them to move to next level of design 'how to keep it cool'. They used sand with mud to create porous

earthen pot and used the philosophy of evaporation for cooling. As technology advanced and with the knowledge of Carnot Cycle we succeeded in designing refrigeration for cooling as well for storage of the products that damage and minimize the wastage.

So called wastage was responsible for progress of civilization and later on we noticed the change in to medical sciences since people questioned 'Why does a man turn to corpse when that becomes waste?' Wastage is then given us packaging industry. Checks & balances are designed to control wastage and it has given us accounting & administrative system. Wind winnowing is an agricultural method developed by ancient cultures for separating grain from chaff. It is also used to remove waste materials.

Whilst the trend is questioning the traditional routes of waste disposal in favor of sustainable waste management strategies. In my opinion this basic question is irrelevant. I am trying to clear the ground for framing the right question. Right question leads to right answer. 'Why do we say no system is hundred percent perfect? It expresses our helplessness that knowledge is yet to achieve perfection and certain level of wastage is acceptable. It is not the system but our knowledge is imperfect. We should focus on adding values to our educational knowledge rather simply developing applications. The basic technology is mobile but we are talking about features that are nothing but applications. This is not right way to onward progress. Problem of disposing the electronic items remain the same and we do not know what to do with this and we call it garbage is piling. It is problem of imperfect knowledge that is the reason we call it wastage. Once we acquire knowledge of that level where we can use so called wastage then this question loses its importance. Our modern thinking takes us one step ahead in wrong direction and we talk about the process of waste minimization through 'Designing out Waste' and that too is in its infancy after so many years. Many opportunities exist in developing waste minimization strategies in design but nothing is perfect till so far. By redirecting our focus of waste minimization to the earliest stages of projects the many opportunities for waste minimization and recycling exist but it is diverting our attention from actual solutions from traditional thinking. The real solution needs two pronged strategies. One designer

should work for minimization of wastage and side by side learn the art 'how to use this waste for betterment of the society'. Our ancestors designed the use of waste in more effective manner than modern man. They used the mud for natural treatment of some ailments and designed earthen pots, toys, baked bricks and many more. In modern time we are using natural products after processing like cement or plaster of Paris. Cement is major chemical composition for construction industry but disposing of its RCC waste is headache. Similarly Plaster of Paris it is used for fixing of broken bone as well as for interior of house. After it is achieved its objective disposing is difficult compared to mud. Is it not modern mantra for 'reducing waste' of the waste hierarchy: reduce, reuse and recycle? Zero waste is a philosophy and a goal is good but it is directed in wrong direction. They are focusing on "closing the loop" in hope to develop a sustainable economy. Achieving Zero Waste depends on designing products and industrial processes so that their components can be dismantled, repaired and/or recycled. Zero Waste means linking communities, businesses and all kind of industries so that one's waste becomes another's feedstock. In rural India people use all the parts of banana tree and they know nothing is waste. They use fruit for human consumption, stem as vegetables, leaf as serving plates for food, and left over along with banana leaf as food for livestock. Is it not design of zero waste concepts that had been in practice since ancient times? This is the reason ancient people were unaware about waste bin and that tradition is still prevailing some parts of rural area of the world. Urban people under the influence of modern education always look for bin to throw the waste. Height of the foolishness is when they have designed different categories of waste and place the many bins for waste management. Rural India even uses human waste as composite fertilizers for enhancing their agricultural yields. Falling of leaves from tree is natural phenomena and they never burn but use as fertilizers or herbal products for treatments of ailing of the plants. What we call organic farming is our tradition and it has been losing ground because of scientifically prepared fertilizers. Is it not our wrong education where whatever everything turns into waste that does not meet objectives? What kind of people are we developed? Are modern people not self-centered, individualistic, selfish, greedy and never wish to share with others? Is modern person not selfish when compared to our ancestors? Society grows with love, sensitivity, care and creativity not with characteristics of modern person namely greed, self-centered, egoism, selfishness etc.

**I am thankful to Prof Rachna Khare of School of Planning & architecture, Bhopal, India for accepting our invitation and her interest to showcase the works of students is clearly reflecting in this issue. The way Ms Deepshikha Sinha and Mr Piysh Verma justified their role of Guest Editor under the supervision of Prof Rachna Khare is admirable and they have touched every possible aspects of what different departments are educating for use of possible architecture & planning.**

*"Never waste a crisis."--Mark Rutte*

*With regards*

*Dr. Sunil Bhatia*

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## 1. Guest Editorial

Despite the age old fallacies and the stigmas, the recent decades have been a testimony to the improvements in the field of accessibility in India. Many institutions and organizations have come forward and have shown sincere efforts in this regard. **‘Universal design’ is no more an unheard term. School of Planning and Architecture, Bhopal through its constant efforts, is one of the leaders of this endeavor in the country.** In last few years, the students have shown immense interest towards universal design and accessibility. The reason behind this continuous participation is driven by the initiatives of the institute in this regard. Introduction of universal design in NSDC (National Student Design Competition), various cultural functions, seminars, workshops and lectures by national and international pioneers had been organized and the institute looks forward to continue these ventures.

The atmosphere of the college has motivated the students, teachers and also the administration to promote an environment of universal design, to let everyone think about designing elements for everyone. It was hardly two months **before we made the ‘call for works’ for this issue of ‘Design for All Newsletter’, and the participation has gone beyond our expectations.** From the quantity of admirable works received it was fairly evident that the students are sincerely concerned about this imperative issue, be it in terms of designing spaces, products, environment or expressing their personal views .

In this issue, we have tried to bring forth things in a specific order, starting from the Competition works for NSDC (National Student Design Competition) which has been an ice breaker for the introduction of Universal Design competitions in India, and happened two times in last three years. It seeks the participation of students from all over the country encouraging them to think about this inevitable subject. Additionally, to stride towards universal design, we have taken this opportunity to include other socially and economically **marginalized sections in the context of ‘design for all’.** In India there are still many places which do not have the basic facilities such as water supply, sanitation, electricity and communication, and we ought to think ‘are we really designing for them all?’ In this respect, students have shown their passion towards working for everyone who are apparently not counted in the ‘mainstream’. They not only the contributed their articles related to disabled and elderly, but also on the design for homeless and isolated tribes. The contents also include students’ essays which talk about providing accessibility in order to create a sense of understanding

amongst the people. Finally, we have incorporated the expressions of the students regarding accessibility and universal design, which have been portrayed by the product designs, sketches, photographs and articles.

**All the works that have been included in this ‘Young Designers’ issue are contributions from undergraduate students of School of Planning and Architecture, Bhopal.** The authors are young design students and not accomplished writers; and we hope that the readers would enjoy their emergent design thinking and nascent style of writing. Retaining the spirit of **the young designers’ issue, we have tried our best** to not tamper with the original works of the students in any way so that it retains its freshness, actuality and conveys their true ideas.

**We have strived to culminate an understanding among the readers that it’s not about providing ‘special’ facilities to ‘special people’ but about giving ‘equal’ and usable facilities to ‘all’.** We hope that our efforts live up to the expectations of everyone and prove to be successful in making ‘design for all’ more widespread and appealing.



Deepshikha Sinha



Piyush Verma



Prof. (Dr.) Rachna Khare

## Brief bio of Editors

**Deepshikha Sinha** is a III<sup>rd</sup> year student pursuing Bachelors of Architecture (B.Arch.) at School of Planning and Architecture, Bhopal. She has been a meritorious student and has received several prizes in various academic and non academic competitions. To her, architecture has the potential to inspire and encourage everyone, to think and work for all sections of the society. She is very good at the team work and has good compositional skills. She has written articles for leading newspapers in the state of M.P. and has worked and attended NASA (National Association of Students of Architecture) in the years 2011 and 2012. She participated and done well in a studio exercise of ‘Universal Design for Exploring World Heritage Site in India’ at School of Planning and Architecture, Bhopal. She can be contacted at [deepshikha.spab@yahoo.com](mailto:deepshikha.spab@yahoo.com).

**Piyush Verma** is a III<sup>rd</sup> year Bachelors of Architecture (B.Arch.) student at School of Planning and Architecture, Bhopal. Along with reading and literature, his enduring fascination is with design and its socio-cultural inferences, specifically concerning the marginalized and vulnerable sections of the society. He believes that architecture can certainly bridge the gap, between the desires and realization, for the stigmatized groups. He likes blogging and has participated in various national and international level writing competitions in school and college including GOI Peace-Foundation International Essay Contest 2012, Japan; and was the semifinalist in the Berkeley prize Essay competition-2012 with a theme of Inclusive Design. He was the former member of Student’s Council, SPA- Bhopal. He is currently a part of ‘Make a difference’, an organization which encourages youth to become change leaders and spread grass root education to the orphans and unprivileged children in India. He was also involved in the studio exercise of ‘Universal Design for Exploring World Heritage Site in India’ at School of Planning and Architecture, Bhopal. He can be contacted at [verma.piyush2@gmail.com](mailto:verma.piyush2@gmail.com).

**Rachna Khare** is a Professor of Architecture and Associate Dean of the Doctoral Programme and faculty Development at School of Planning and Architecture, Bhopal. Prior to this she was the Senior Research Fellow with Jamsetji Tata Universal Design Research Chair at National Institute of Design, Ahmedabad and taught at Birla Institute of Technology, Mesra. Starting her career in early nineties as Exhibition Officer cum Designer in Jawahar Kala Kendra, Jaipur, she practiced for nine years in the field and then taught architecture for almost twelve years.

Rachna is a recipient of the prestigious Fulbright Fellowship and was affiliated with Georgia Institute of Technology, **Atlanta, USA during her PhD. Her research interests in the field of 'Universal Design' and 'Designing for Special Needs'** have earned her grants and awards nationally and internationally. Apart from Fulbright award, she is recipient of IMFAR-2009, Professionals from Developing Country Award, Chicago; Friends of Fulbright India Grant-2008, Lewisburg; Universal Design Award for working professional-2011 by NEPEDP-MPhasiS, India and R&D projects from All India Council of Technical Education and University Grants Commission in India.

She has lectured extensively on Inclusive Design all over the world and has many papers in various National and International journals and conferences to her credit. Her papers appeared in the publications like Taylor and Francis, **Sage, HFES, RESNA and Archnet MIT. Her book 'Designing Inclusive Educational Spaces for Autism' published by Institute of Human Centred Design, Boston, USA was released in 2010, and later the book received 'Certificate of Merit' in ArchiDesign Award-2010. She has also edited special issues of internationally refereed journals called 'SPANDREL' on 'Social sustenance' in 2012 and 'ABACUS' on 'Architecture for All' in 2007. Some major events organized by her are 'Universal Design Workshop' and National Student Design Competition (NSDC-2011) on 'Universal Design/Design for All'-2011 in collaboration with National Institute of Orthopedically Handicapped, Kolkata and NSDC-2012 on 'Universal Design for Exploring World Heritage Sites in India' in collaboration with Archaeological Survey of India and UNESCO.** She is one of the authors of Universal Design India Principles developed at National Institute of design, Ahmedabad in 2011.

Rachna is well known as an activist and is a founder member of MITRA and member secretary of DRONAH Foundation. She also remained convener of Kislaya for several years, a school **for underprivileged children supported by 'Asha'** Stanford. In her current position at SPAB, she is coordinating Centre for Human Centric Research (CHCR) that aims to build a body of knowledge that responds to the design needs of diverse human population otherwise marginalized in the past design practices. She can be contacted at [rachnakhare@spabhupal.ac.in](mailto:rachnakhare@spabhupal.ac.in)



## 2. CENTER FOR HUMAN CENTRIC RESEARCH (CHCR)

### SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL, M.P., INDIA

SPA-Bhopal is an Institute of National Importance and is committed to produce best Architects and Planners to take up the challenges of physical and socio- environmental development of global standards. Located in Bhopal, Madhya Pradesh, the institute is set up by the Ministry of Human Resource Development, Government of India and intended to be an institute of excellence for studies in Planning and Architecture. The charter of the School of Planning and Architecture explicitly support social sustenance through universal design, cultural sustenance through conservation and environmental sustenance through the discipline of Architecture, Planning and Design. Supporting its Charter to be a socially responsible institution, a multidisciplinary **Center for Human Centric Research (CHCR) is formed at SPA-Bhopal** (link: [www.spabhupal.ac.in](http://www.spabhupal.ac.in)).

**Objectives** of this research and design development center are:

- Bring awareness amongst budding architects and planners to respond to the needs of diverse human population otherwise marginalized in the past design practices, for collective socio-economic-cultural development in the country.
- Build a research based body of knowledge with all realms of the ethnographic, qualitative and quantitative experimental paradigms, to support human centered design process.

To attain its objectives, the center functions in **four major areas, 'identification of research priority areas and networking', 'education & training', 'research & design development' and 'dissemination'**.

- I. **Identify the Areas of Research Priority and Network** all stakeholders (SPA-faculty and students, other Institutes of higher learning, NGOs, government agencies, consumers, users and service providers like engineers, planners, designers, architects and builders) to address these priority areas. This has begun with the formation of a resource group that builds awareness with special lectures, workshops and conferences on the subject. The center has organized several *Universal Design Workshops* and National Student Design Competitions on the theme of *Inclusive Design/Design for All/Universal Design*.
- II. Establish a National level resource center for **Education and Training** at School of Architecture and Planning, Bhopal, to facilitate researches addressing people centric studies in the built environment at local, regional and national level. The center offers electives and has plans to offer short-term certificate courses and specialized academic courses in the subject.
- III. Initiate and support faculty and student **Research and Design Development** projects, in the identified priority areas at School of Architecture and Planning, Bhopal. The center is developing low-cost disabled friendly toilets in Anganwadi centers and Schools in association with Arushi and UNICEF. The center also supports undergraduate and postgraduate projects/studios and PhD research on the theme and sponsor faculty projects.
- IV. **Dissemination through Publications** on the subject for information sharing and developing a body of knowledge that would help those architects, engineers, planners, designers and all stakeholders, who would like to work in this area. The center has published SPANDREL, an international refereed journal on 'social equity' to address needs of the vulnerable groups like Persons with Disabilities, Children and Elderly. The center is also developing a booklet with design guidelines on barrier-free schools in Hindi with illustrations, in association with an NGO Arushi. Another upcoming publication of CHCR '*Uniting Differences*' is based on winning entries of a Design Competition on Inclusive Design.
- V.



Activities of CHCR at SPA-Bhopal

### 3. UNIVERSAL DESIGN FOR EXPLORING THE WORLD HERITAGE SITES IN INDIA - NSDC-2012

Center for Human Centric Research in School of Planning and Architecture Bhopal organized two National Student Design Competitions on Universal Design (NSDC) together with Hands-on Workshops in 2011 and 2012. The competitions were organized to explore alternative methods for teaching universal design and accomplish student motivation for the subject. The overall aim of the student competitions was to generate design solutions that optimize the whole living environment so that everyone in the community regardless of his limitations can participate equally. For NSDC 2012 'Universal Design for Exploring the World Heritage Sites in India', students attempted design interventions in one of the twenty two protected world heritage sites in India (cultural). The students were encouraged to think 'out of box' to develop imaginative solutions for universal usability, retaining original fabric of world heritage sites. The workshop was organized in collaboration with Archaeological Survey of India (ASI), UNESCO (United Nations Educational, Scientific and Cultural Organization), DRONAH (Development and Research Organization for Nature, Arts and Heritage) Foundation and National Association of Students of Architecture (NASA). The institute received outstanding response for this competition from architecture and design schools with about 170 registrations and 56 design entries. The upcoming section will describe a few competition entries by SPA students for NSDC 2012, on 'Universal Design for Exploring the World Heritage Sites in India'.



## BHIMBETKA

### CONTEXT:

Bhimbetka is a painted rock shelter of hill rocks, formed of sandstones of Vindhya group, one of the oldest geological formations. Its cultural core is spread over an area of 1892 hectares; it is within a wildlife sanctuary and surrounded by forest. The NSDC **brief talks about** ‘Universal Design for exploring the World Heritage Sites in India’. Thus intervening a large complex site as Bhimbetka, which is spread over a considerable area, necessitates a comprehensive view, a holistic approach and a strategy that relates to its multidimensional character. Therefore, the interventions proposed are as under

- It should benefit the society rather than providing a short term gain.
- It should have clear objectives, use proven methods and materials, so as to preserve the cultural core

Thus after visiting the site a couple of times, the unique character of the site was discovered. One thing which made Bhimbetka very different from the other ‘world heritage sites’ was it being a natural heritage and not manmade, thus puts heritage value and universal accessibility on two opposite sides of the weighing balance.

### DESIGN METHODOLOGY: *(Please refer design sheets along with the text)*

It was only after the discussion with an official of the Archeological Survey of India that our design methodology came **out of the fog**, ‘PRESERVE’, ‘PROTECT’ and ‘PRESENT’.

- The cultural core of Bhimbetka is spread in a Wildlife Sanctuary and surrounded by protected forest and so forms an integral part of the broad component of ecology and environment which has naturally protected the cultural core. **So, that makes up for the “PROTECT” aspect of the chalked out plan.**
- The cultural core for the trees is an essential buffer to the rock shelters and paintings against the weathering effects of strong dust laden winds. **Hence, these are needed to be “PRESERVED”.**
- **“PRESENTING” the site to the “world”.**

### ANALYSIS:

The people of the settlements in the immediate vicinity of the cultural core depend on forest produce. Modernization is inevitable but transformations have been at the cost of heritage of continuing cultural traditions. While exploitation



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for timber directly destroys forests, the depletion of forest covers results in the formation of grasslands and a destruction of an ecosystem that has evolved and survived hitherto undisturbed. This directly affects the cultural core for the trees.

**The second aspect obstructing the “PRESERVE” plan is the entry of visitors using fossil fueled vehicles** inside the cultural core. From off the NH12(Bhopal-Hoshangabad) the cultural core is about 3kms of undulating steep uphill climb to the entrance of the site, this leads to the increase in the torque of these vehicles exerting all of its capacity to enable locomotion. This leads to considerable emission of gases which are a priority threat to the sites heritage.

This can be solved by restricting entry of fossil fueled locomotives inside the cultural core, enabling the use of battery-operated/CNG-operated locomotives. Solving the first issue, the needs of the people of the villages must be met through alternatives so that their demands on the forest are satisfied and the pressure on the forest and sanctuary are considerably lifted.

**This is a long and intensive process and the methodology of our design shouldn't drift away in this direction as it wouldn't lead to anything important if the purpose of this competition is considered. This leads to the final lead of the process which is “PRESENTING” the site to the “world”. After all it's no ordinary heritage site.....it is a “world heritage site”. Thus, the world would want to see “Bhimbetka” the way it was in the BC's. So freezing the site is what is supposed to be done if things were to be put in a cheesy way. The cultural core of Bhimbetka is the fundamental component of the “accessible” site and is invaluable in content and potential.**

**The site exhibit's the symbolic relationship of man and nature. This implies that the in-situ interventions should be minimal and focus should be made on enhancing the site experience through solutions which do not kill the heritage of the place. Therefore, the decision of installing minimal in-situ intervention along with an accessibility enhancing product has been taken.**

### **DESIGN SOLUTION:** *(Please refer design sheets along with the text)*

**1. It is the interpretation of the site's story to visitors where the “heritage” of the site is brought to light. Interpretation makes the site come to life for the visitors, giving the site relevance and importance. It reveals to visitors, in powerful and memorable ways, the difference between “old” and “historic”.**

- Thus, an interpretation/experience center of appropriate size and composition is proposed at a convenient location. **“BHIYANPURA” located at the foot of the NH12 highway has been selected for this purpose.** This

location is selected as it is near to the highway, at a respectable distance from the sensitive zone of the core and has mythological significance with historical remains **of the “Paramaras” of the 11 century.**

**2.** Locomotion intervention:

- Locomotives would be restricted near the experience center itself and transportation to the cultural core of the site would be through battery operated/ CNG dependent locomotives.

**3.** Substitute pathways would be marked out on the site

- Alternate routes have been proposed along the existing routes
- Routes are proposed through the 15 caves of Bhimbetka taking into consideration the topography of the site, so that the specially-abled person need not tediously go uphill or dangerously downhill.

**4.** Signage in the form of bollards

- Proposed so as to navigate visitors efficiently along the site.
- **The signage's are in the form of a bamboo logs with information on it to ensure enhanced navigation around the site.**

**5.** Pathway intervention:

Rubble stone along with cement mortar pathways have been laid out by the ASI twenty two years back. The issue with the use of cement mortar is that it develops major cracks, and with rubble stones they make the pathway an uneven surface to walk at major parts of the access route. These pathways are also majorly hit by algae.

- Thus this issue has been tackled by laying a layer of lime mortar which is mixed with crushed sandstone and fly ash.
- Not only does this solve the issue of uneven pathways but also solves the issue of algae and major crack formation in case of cement mortar.
- The use of lime along with crushed sandstone also complements the essence of the sandstone rock shelters.
- As years pass, lime mortar gains strength so as to finally become a monolith.
- Fly ash acts as a pozzolan which enhances the mortar's compressive strength and protects it from weathering.
- On an event of cracking, the exposed mortar reacts with air to recrystallize reducing the loss of strength.

## 6. Toilets:

Keeping in mind the number of tourists coming up to the site and considering the sensitivity of the invaluable heritage of the cultural core, installation of mobile toilets near the parking at the site along with drinking water facilities has been proposed.

## 7. All-terrain wheelchair:

Installation of ramps to solve the issue of terrain would be a non-innovative/an easy way to enhance accessibility around the site. But such interventions would create a ‘band-aid’ effect on the site, and thus in an action of enhancing the accessibility the heritage would be destroyed. The NSDC brief encourages us to “think out of the box” ..... **simple enough to put it in words. How simple is “simple”? The aim was to create a “simple” accessibility enhancing product using available assistive technology.** Brainstorming for solutions led our eyes to fall upon the wheelchair, thus clearing out our aim-**“To create a wheelchair that is adaptive to the uneven terrain of Bhimbetka”.** Considering the fact that simplicity is not accomplished by reducing complexity, the product was to be based on human needs rather than technical difficulties. The existing wheelchair is an incredible design serving the right purpose, but considering uneven sites like Bhimbetka, it is the wrong context to use the present day wheelchair.

- **Thus the “all terrain wheelchair” is all about reinventing the wheel so as to make it adaptive to the topography of Bhimbetka.**
- **The “all terrain wheelchair is not only about aesthetics** but very much about the function. **It’s** also about the enhancement of self-esteem and self-respect as one would feel confident to move about in most of the terrains outside.
- **Raising the passengers’ eye level** would also enhance potential exchange of verbal communication thus making the **“all terrain wheelchair” not only an innovative accessibility enhancer but also a self-esteem enhancer.**

## REFERENCES:

[1] Information panel at Bhimbetka Site.

[2], [3] Bhimbetka: Archeological Survey of India available at [www.asi.nic.in](http://www.asi.nic.in)

**DESIGN SHEETS:** *(continued in next page)*



**SITE SPECIFIC ISSUES**

THE PRESENT ROUTE THROUGH BHIMBETKA HAS 12 CAVES TO PASS THROUGH COVERING A DISTANCE OF 780M

PASSING THROUGH A VERY UNDOULATING TERRAIN BHIMBETKA POSSESSES THE FOLLOWING ISSUES



**ZONE 1 (CAVES 1-3)**



UNEVEN PATHWAYS



OBSTRUCTION AT CAVE 8



NO PROVISION FOR THE BLIND

**ZONE 2 (CAVES 4-10)**



STAIRS AT CAVE 8 A HINDERANCE TO UNIVERSAL ACCESSIBILITY



NARROW PASSAGE NEAR CAVE 8 TO REACH CAVE 9 A HINDERANCE TO ACCESSIBILITY

**ZONE 3 (CAVES 11-12)**



STEPS OF UNEVEN RISERS A HINDERANCE TO THE BLIND



STEEP GRADIENTS OF PATHWAYS AFTER CAVE 11



STEEP GRADIENT OF PATHWAY AFTER CAVE 11

**PROBLEM IDENTIFICATION & CONCLUSIONS TOWARDS INTERVENTIONS**

**BHIMBETKA**

**PROTECTING THE ECOLOGY & ENVIRONMENT**

PROTECTING THE GEOMORPHOLOGICAL CHARACTER THROUGH THE ASSESSMENT AND MONITORING OF ILLEGAL MINING, QUARRING AND CUTTING

PROTECTING THE FLORA AND FAUNA BY LIMIT THE EXTENT OF GRAZING AND BY KEEPING A RECORD ON ILLEGAL POACHING AND HUNTING

PROTECTING THE FORESTRY AGAINST ILLEGAL FELLING

MAINTAINING THE MICRO-CLIMATE WHICH INCLUDES KEEPING A MONTHLY RECORD OF TEMPERATURE, HUMIDITY, PRECIPITATION AND WIND DIRECTIONS

**BROADER ISSUES APART FORM ACCESSIBILITY**



ZONE WITH A RELATIVELY FLAT TERRAIN

-DAMAGED PATHWAYS

-UNDOULATING TERRAIN



VISIBLE CRACK INDICATIONS



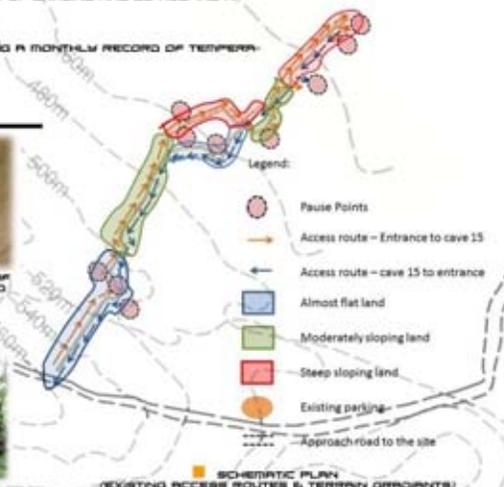
INCREASE IN NUMBER OF BEE-HIVES, INSECTS AND NESTS



ALGAE GROWTH ON CAVES



CHANGE IN COLOR OF THE ROCK SURFACE



**CONCLUSIONS ON THE SITE CONTEXT**

TO CONSERVE A LARGE COMPLEX SITE AS BHIMBETKA NECESSITATES A COMPREHENSIVE AND A HOLISTIC APPROACH THAT SUITABLY RELATES TO ITS MULTILAYERED CHARACTER. THE CULTURAL CORE OF BHIMBETKA IS THE FUNDAMENTAL COMPONENT OF THE 'ACCESSIBLE' SITE AND IS INVALUABLE IN CONTENT AND POTENTIAL. THE SITE EXHIBITS THE SYMBOLIC RELATIONSHIP OF MAN AND NATURE.

THUS THE IN-SITU INTERVENTIONS SHOULD BE MINIMAL AND FOCUS SHOULD BE MADE ON ENHANCING THE SITE EXPERIENCE THROUGH SOLUTIONS WHICH DO NOT HILL THE HERITAGE OF THE PLACE.

THUS THE DESIGN OF INSTALLING MINIMAL IN-SITU INTERVENTION ALONG WITH AN ACCESSIBILITY ENHANCING PRODUCT HAS BEEN TAKEN.



**BHIMBETKA**

### 1# EXPERIENCE CENTER

IT IS IN THE INTERPRETATION OF THE SITE'S STORY TO VISITORS WHERE THE HERITAGE OF THE SITE IS BROUGHT TO LIGHT. INTERPRETATION BRINGS THE SITE CORE TO LIFE FOR THE VISITORS, GIVING THE SITE RELEVANCE AND IMPORTANCE. IT REVEALS TO VISITORS IN POWERFUL AND MEMORABLE WAYS THE DIFFERENCES BETWEEN OLD AND HISTORIC.

THIS AN INTERPRETATION/EXPERIENCE CENTER OF APPROPRIATE SIZE AND COMPOSITION WILL BE PROVIDED AT A CONVENIENT LOCATION. SHIMANPURA, LOCATED AT THE FOOT OF THE NH-18 HIGHWAY HAS BEEN SELECTED FOR THIS PURPOSE.

### ACCESSIBILITY/HERITAGE ENHANCING INTERVENTIONS

### 2# PATH WAY INTERVENTION

**BEFORE**

**AFTER**

ADDING A LAYER OF LIME MORTAR + CRUSHED SANDSTONE + FLY ASH AS POZZOLAN

### 3# ALTERNATE ROUTES FOR THE DISABLED

-ALTERNATE ACCESS ROUTES PROPOSED TAKING IN CONSIDERATION THE TOPOGRAPHY OF THE SITE.  
-IN-SITU SIGNAGES INSTALLED FOR BETTER NAVIGATION ALONG THE SITE.

### 4# SIGNAGES

INFORMATION ON A SANDWOOD BOLLARD

### 5#

KEEPING IN MIND THE NUMBER OF TOURISTS COMING UP TO THE SITE, INSTALLATION OF MOBILE TOILET NEAR THE PARKING AT THE SITE ALONG WITH DRINKING WATER FACILITIES WOULD BE CONSIDERED APT.

### REASONS:

- JUST OFF THE HIGHWAY
- RESPECTIBLE DISTANCE FROM THE SENSITIVE ZONE OF THE CORE.
- HAS MYTHOLOGICAL SIGNIFICANCE AND HISTORICAL REMAINS OF THE PARANARRS OF THE 11TH CENTURY

## NATIONAL STUDENT DESIGN COMPETITION-III

NSDC-III/UD/-049

6#

# ALL-TERRAIN WHEELCHAIR

BHIMBETKA



RAISING THE THE WHEELCHAIR USER'S EYE HEIGHT ENHANCES POTENTIAL EXCHANGE OF VERBAL COMMUNICATION MAKING IT A KEY ASPECT OF ENHANCING THE SELF ESTEEM OF THE USER.

THUS THE 'ATW' BRINGS THE USER 'EYE TO EYE' TO THE WORLD.

ARM REST HAS BEEN EXTENDED SLANTING FORWARD TO MAKE GETTING UP EASIER USING THEM.

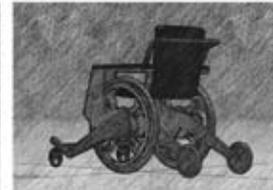
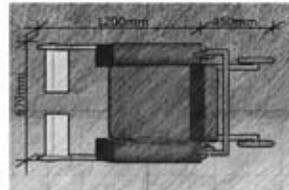
THIS PRODUCT IS BASED ON HUMAN NEEDS RATHER THAN TECHNICAL ABILITIES.

THE PRESENT WHEELCHAIR IS AN INCREDIBLE DESIGN SERVING THE RIGHT PURPOSE, BUT CONSIDERING SITES LIKE BHIMBETKA...IT IS THE WRONG CONTEXT TO USE THE PRESENT DAY WHEEL CHAIR.

THUS 'ATW' IS ALL ABOUT REINVENTING THE WHEEL SO AS TO MAKE IT ADAPTIVE TO THE TOPOGRAPHY OF BHIMBETKA.

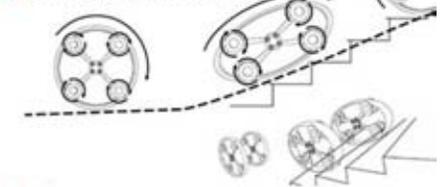
THE 'ATW' IS NOT ONLY ABOUT FORM, AESTHETICS AND VERY MUCH ABOUT FUNCTION, BUT REALLY IMPORTANTLY ITS ABOUT THE ENHANCEMENT OF SELF ESTEEM, SELF RESPECT AS ONE WOULD FEEL CONFIDENT TO MOVE ABOUT IN MOST OF THE TERRAINS OUTSIDE.

## KEY DIMENSIONS



PUSH-ROD PROFILE

## SCHEMATIC CONCEPT OF THE WHEEL



## VISUALS OF THE INTERVENTIONAL TRANSFORMATIONS



CAVE 8 ENTRY (BEFORE INTERVENTION)



CAVE 8 ENTRY (AFTER INTERVENTION)



CAVE 10 (BEFORE INTERVENTION)



CAVE 10 (AFTER INTERVENTION)



PATHWAY TO CAVE 3 (BEFORE INTERVENTION)



PATHWAY TO CAVE 3 (AFTER INTERVENTION)

## VISUALS OF THE DESIGN ELEMENTS



ROBUST DESIGN WITH TWO WRAP WHEELS ENHANCING STABILITY



FORM-FILLED TYRES LAID UNDER TENSION AROUND FOUR ROLLERS WHICH TURN PIVOT TO SHOCK-ABSORBERS FOR ITS ADAPTABILITY TO TERRAIN



SUSPENSION CONNECTED REAR WHEELS EASE THE TASK OF UP-HILL CLIMB



SPECIALLY SHAPED PUSH-ARMS TO ENABLE LARGER GRIP ON THE WHEEL

## QUTUB MINAR COMPLEX

### CONTEXT:

When we initially heard about the NSDC 2012 design competition, and the fact that the topic this time was physical accessibility in the World Heritage Sites, the first thing that came to our mind was wheelchairs and ramps, as I am sure 90% of people would have thought. When our group decided to take up the Qutub Minar complex as our site, a lot of people told us that our selection was not a challenging one, as the complex had already been made accessible to a certain level. And frankly speaking, our decision to choose the complex was also based on the fact that the work could be completed easily. Little did we know that a vast challenge was waiting on the other side of this decision.

We arrived at New Delhi for the site study. The first day, when we reached the complex, all of us were sitting outside the main gate, holding our maps and trying to figure out our course of survey. A foreign tourist walked up to us and **asked us “Do you happen to be students of architecture?”**, we looked up and we saw that the man questioning us was none other than Architect WeilAtres, the famous architect from Netherlands, whose works we were pretty familiar with through our college library. We took his presence as a golden opportunity, thinking he would give us some tips that would make our problem simpler. When we explained our design problem to him, he asked us one simple question-What do you mean by physically disabled? **And that’s when we realized that physically** disabled is something that has to do more than just wheelchairs and ramps. It can mean various things, and we have tried to include solutions for as much universality in our design as we could think of.

### DESIGN METHODOLOGY: *(Please refer design sheets along with the text)*

Pre site visit studies: We referred a few books on the history of Qutub Minar, to find out more about the historical importance of the different structures in the complex, so that no changes that may affect the history of the place are made. And also to figure out the basic layout of the structures of the Qutub Minar complex.

On site studies: We followed a 3 day methodology to cover the entire site.

**DAY 1:** As tourists, we visited the site, to understand the problems from an outsider’s point of view. This approach helped us to figure out the basic problems tourists face when they come to this place. The same day, we interviewed the following categories of people whom we found in the complex are facing difficulties:



Ashwathy A.,  
B.Arch Student



Praseeda M.,  
B.Arch Student



Nimisha K.K.,  
B.Arch. Student



Meghna M.,  
B.Arch. Student

1. A woman in a wheelchair: This lady in a wheelchair was having difficulty in moving, as the surface was quite uneven. As a result of this, she had to wait by herself at the entrance till her family returned after seeing the complex. When asked for suggestions, she said that if the flooring was smoothed out, wheelchair movement could be much easier, as sufficient ramps for movement were already provided.

2. Pregnant woman: We followed a pregnant lady as she went around the site. At the end when we asked her how comfortable her experience was, she told us that the high risers in all the sets of steps were making her movement difficult, as it is difficult to cope with them while carrying.

3: An aged couple: Their problems were similar to those of the pregnant woman. High risers were making it difficult for them to climb to the higher structures.

Other than this, a lack of sufficient number of toilets, wheelchair accessible toilets, drinking water facilities and cloak rooms were some of the problems we discovered on the first day of study.

**DAY 2:** On the second day, we divided the entire site into different zones, and did a zone to zone SWOT analysis of the entire site.

Zone 1: The parking lot, and the entrance area.

Zone 2: The Mughal gardens, and the area up to the Outub Minar

Zone 3: The Outub Minar, Iron pillar, Alai Minar, Alai Darwaza

**Zone 4: Khilji's tomb, Iltutmish's tomb, the Madrasa (college)**

Zone 5: Gardens and open areas on the side

Zone 1: The parking was vast, and there was sufficient space, but it was on the opposite side of the road of the entrance, and vehicles kept passing through the area, so the crossing was proving a little dangerous. The same was the case with the ticket counter, as that was also on the opposite side of the road. The audio guide centre had guides in many foreign languages, but not in local Indian languages, and as we considered linguistic disability as a physical disability, this was a huge drawback of the site. The information board written in Hindi or English may be illegible to an Indian unknown to these two languages

Zone 2: The entrance was accessible by all, and so was the checking counter. The Mughal garden area and the mosque had smooth flooring so wheel movement was not difficult. But there were no tactile surfaces provided for the Blind, nor was there any information board in Braille. The steps on the main plinth were provided with a proper ramp too.

Zone 3:

***The Qutub Minar:***

The area around the minar was not feasible for any wheel movement. The flooring had to be smoothed out. There were no tactile surfaces for movement of the blind, which was a common problem for the entire complex. Not enough information boards and signage. A person looking at the minar could be easily confused as to where to go next.

***The Iron Pillar:***

There was a ramp provided for easy movement to the Iron pillar level from the level below, but there was a small level difference on the level, and the flooring was extremely irregular. The flooring was so problematic that even a perfectly normal person would not be able to walk on it comfortably. There was no exit path for wheelchairs to the other side, i.e., the side of the Alai Minar.

***Alai Darwaza:***

The entrance ramp to the darwaza is not of the proper gradient. The ramp is not constructed of proper materials. Movement of wheelchairs from the darwaza is not feasible as the plinth level is too high, and ramps cannot be provided.

***Alai Minar:***

The approach to the alaiminar is fine, but the area around the minar is not accessible for a wheelchair. The zone has no washrooms, which is very important, as this is the main sightseeing zone.

Zone 4: Level differences, sudden steps, high risers, and lack of washrooms are the main problems in this zone. The rooms of the madrasa can be utilized in various ways. A food kiosk can be provided in the area.

Zone 5: This area has a few abandoned plinths which can be utilized to various extents; one of the smaller plinths can be used to create a small scaled model of the complex. The bigger plinth can be used to create an amphitheater for a light and sound show of the history of the Qutub Minar complex.

*Swot Analysis of the Entire Site:*

Strengths:

- Tactile surface at the entrance
- Special ticket counters for Indians, foreigners and physically disabled
- Information centre (with audio guide)
- Recreational area
- Existing plinths
- Large green cover area, hence apt area for recreation

Weakness:

- Level differences
- High risers
- Uneven flooring
- Lack of signage
- No communication means (Braille inscriptions) for vision impaired
- Lot of dark corners such as graveyards, unidentified tombs
- Inconveniences caused by auto drivers and hawkers

Opportunity:

- No special disabled parking
- No accessible ramps
- No kerb cuts
- Small entrances
- Slopes
- Location of washroom
- Level differences
- No signs or maps
- Uneven path

Threat:

- Vibrations caused by the traffic may harm the structure

- Area prone to lightning and thunder
- Structure prone to vandalism
- Natural erosion of the structure

**DAY 3:** The third day was spent in visiting the ASI (Archaeological Survey of India) office, at Safdarjung Tomb, New Delhi, and also the office of the organization “Svayam” who had been responsible for the current status of accessibility at the Qutub Minar complex, to collect valuable information regarding the site.

**DESIGN SOLUTIONS:** *(Please refer design sheets along with the text)*

- Proper ramps provided in all the necessary areas
- Flooring smoothed out for easy accessibility of wheelchairs and prams
- Extra risers provided in between steps to help climbing motion
- Accessible toilets provided where necessary
- Golf car course provided for movement around the complex
- Seating facilities provided around the complex

Suggestions to improve the quality of experience:

- Amphitheatre
- Scaled down model of the complex
- Pet garden near the tombs
- Food and book store kiosk
- Multi-purpose walking stick
- Multi lingual audio guides

**DESIGN SHEETS:** *(continued in next page)*

LOCATED AT:

-NEW DELHI, INDIA  
-28.5244° N  
-77.1852° E

## The Qutub Minar Complex

NSDC-III/UD/031



### History:

The construction of the Qutub Minar was commenced in 12th century AD by Qutbuddin Aibak of the Mamluk dynasty.

However, the work was completed only in 1230 AD by his successor Iltutmish.

Later on Firuzshah Tughlaq replaced the top storey with the existing two marble faced storeys.

The Qutub minar is the highest stone pillar in India, with a height of 72.5m.



- 1) Area with archeological survey of India.
- 2) 100 metres declared prohibited area from the monument as per government notification.
- 3) 300 metres declared as regulated area from the monument as per government notification.



NSDC-III/UD/031

SITE PLAN, CIRCULATION PLAN, SERVICES PLAN, PROBLEM AREAS

CIRCULATION PLAN



1. PARKING PROBLEMS



PARKING IS ON OPPOSITE SIDE OF THE ROAD. NO PARKING FOR PHYSICALLY HANDICAPPED.

2. UNEVEN FLOORING



THE FLOORING IS NOT SMOOTH FOR WHEELCHAIR MOVEMENT OR EVEN WALKING.

3. DIFFICULT RAMPS



SLOPE OF 1:4 (WRONG SLOPE)  
THE PLANKS MAKE WHEELCHAIR MOVEMENT DIFFICULT.

4. HIGH RISERS



RISE HEIGHT OF 38.5 CM IS

**STRENGTHS:**

- ONE OF INDIA'S FIRST ACCESSIBLE WORLD HERITAGE SITES
- THE SKYLINE OF THE MINAR HAS NOT BEEN DISTURBED
- THE COMPLEX HAS BEEN WELL MAINTAINED
- RED SANDSTONE CONSTRUCTION IS EASY, AS MATERIAL IS AVAILABLE IN PLENTIFUL

**WEAKNESSES:**

- LEVEL DIFFERENCES
- HIGH RISERS
- UNEVEN FLOORING
- LACK OF SIGNAGES
- NO COMMUNICATION MEANS (BRAILLE INSCRIPTIONS) FOR VISION IMPAIRED
- LOT OF DARK CORNERS SUCH AS THE GRAVEYARDS, UNIDENTIFIED TOMBS

**OPPORTUNITIES:**

- SCOPE FOR IMPROVING QUALITY OF EXPERIENCE OF WORLD HERITAGE SITES
- GREEN AREAS CAN BE WELL EXPLOITED
- UNIDENTIFIED STRUCTURES ARE THERE IN THE COMPLEX, WHICH CAN BE USED TO THE MAXIMUM

**THREATS:**

- VIBRATIONS CAUSED BY THE TRAFFIC MAY HARM THE STRUCTURE.
- AREA PRONE TO LIGHTENING AND THUNDER WHICH INTURN HARM THE STRUCTURE.
- STRUCTURE PRONE TO VANDALISM
- NATURAL EROSION OF THE STRUCTURES.

5. STEEP LEVELS



TOO HIGH FOR COMFORTABLE WALKING

6. LEVEL DIFFERENCES



SMALL LEVEL DIFFERENCES MAKE WHEELCHAIR NO BIND NAVIGATION DIFFICULT

7. NARROW WALKWAYS



WALKWAYS AND SPACES BETWEEN COLUMNS ARE LESS THAN 3M

8. INSUFFICIENT TOILETS



NOT ENOUGH TOILETS, BOTH NORMAL AND PHYSICALLY HANDICAPPED PROVIDED IN THE COMPLEX



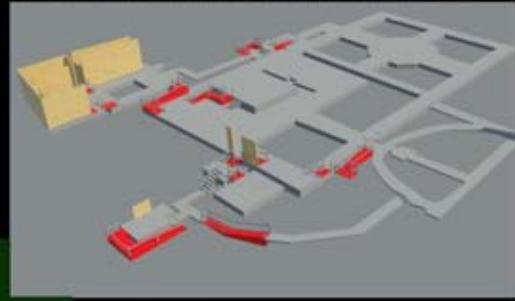
# NSDC - III/UD/031



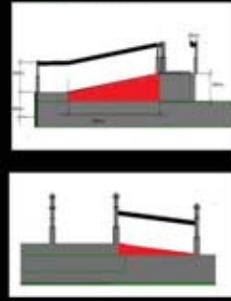
**QUTUB MINAR**

ACCESSIBILITY PROPOSALS

MAP OF COMPLEX SHOWING PLACEMENT OF RAMPS



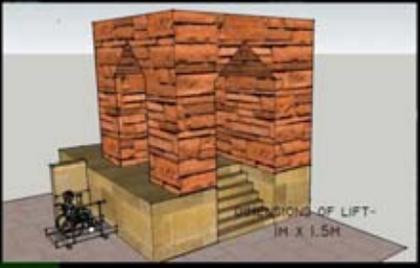
RAMP SECTIONS



CONCEPT

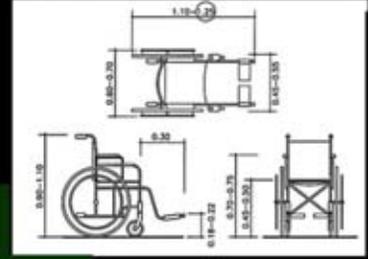
- REACH ALL PLACES
- ENTER ALL PLACES
- USE ALL FACILITIES

HYDRAULIC LIFT EXIT FROM ALAI DARWAZA



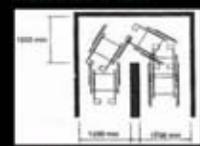
DIMENSIONS OF LIFT - 1M X 1.5M

STANDARDS FOR WHEELCHAIRS

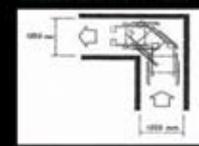


STANDARDS:

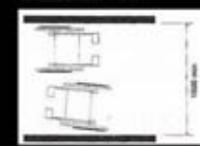
WHEELCHAIR U-TURN



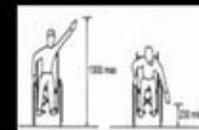
WHEELCHAIR RIGHT TURN



WHEELCHAIR PATH

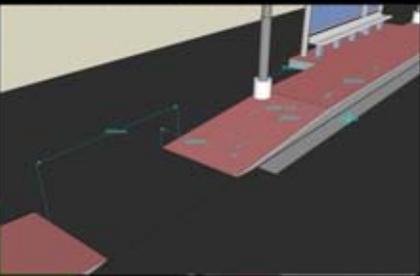




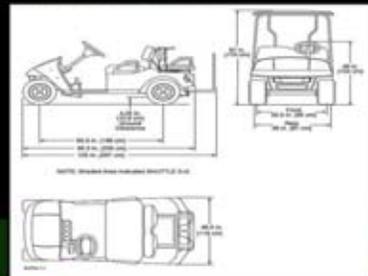




WHEELCHAIR FRIENDLY BUS STOP DESIGN



STANDARDS FOR GOLF CAR

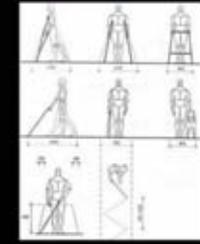


APPROACH RAMP TO COLONNADES



WIDTH BETWEEN COLONNADES-2M  
DIMENSIONS OF RAMP-2M X 3M X 0.45 M  
SLOPE OF RAMP - 1:8

MULTIPLE SUPPORT





**NSDC- III/UD/31**



**OUTLET MINAR**

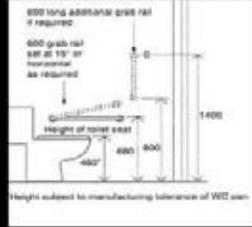
ACCESSIBILITY PROPOSALS



**PARKING ONLY**  
MINIMUM FINE ₹ 100



WHEELCHAIR ACCESSIBLE ROUTE



HEIGHTS SUBJECT TO MANUFACTURING TOLERANCE OF WC UNIT



WHEELCHAIR TOILET STALL



WHEELCHAIR ACCESSIBLE PARKING



1. CURRENT FLOORING



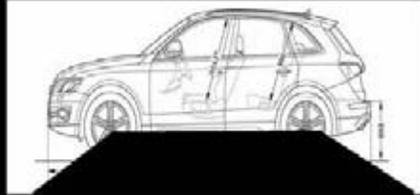
2. CHISELLING THE FLOOR



3. SPREADING THE FLOOR



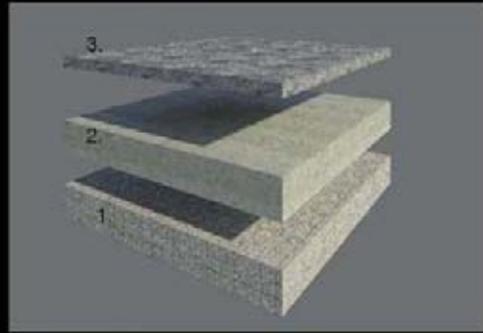
4. FILLING SPACES WITH RED OXIDE



MAXIMUM HEIGHT OF ACCESSIBLE RAMP



MAXIMUM HEIGHT OF ACCESSIBLE RAMP



1. EXISTING FLOORING  
2. LAYER OF MORTAR  
3. NEW FLOOR

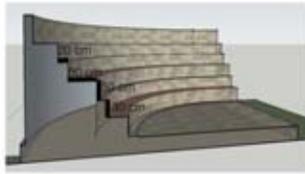


proposals - quality of experience

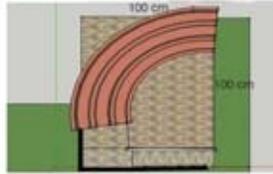
AMPHITHEATRE - view



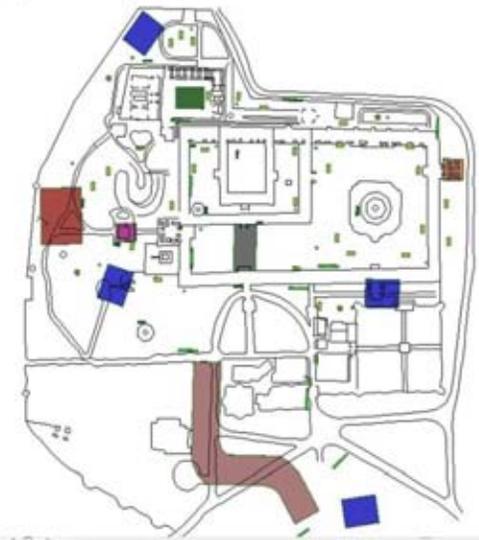
section



plan



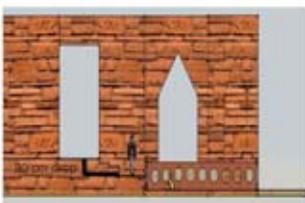
map showing facilities



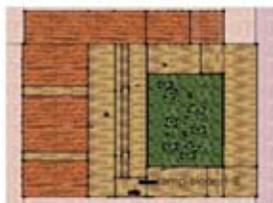
PET GARDEN - view



section



plan



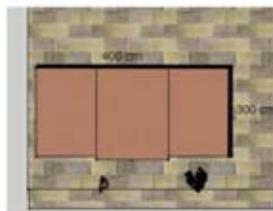
FOOD AND BOOK STORE KIOSK - view



section



plan



key:

- amphitheatre
- scaled down model
- signages
- toilets
- subway
- seating
- pet garden
- kiosk

Electric golf cart



Braille inscriptions



Signages



Scaled down model



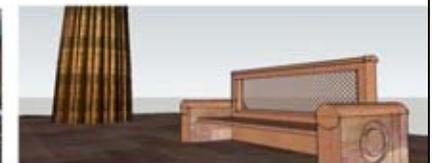
Multipurpose walking stick



Luggage room



Sitting space



## SANCHI

### CONTEXT:

Sanchi known for its "Stupas", is a small village in Raisen District of the state of Madhya Pradesh, India, it is located 46 km north east of Bhopal, and 10 km from Besnagar and Vidisha in the central part of the state of Madhya Pradesh. It is the location of several Buddhist monuments dating from the 3rd century BCE to the 12th CE and is one of the important places of Buddhist pilgrimage. Universal access is about ensuring independence and dignity for all users entering and using places. Our aim was to improve the accessibility of the Sanchi for everyone and enhance the overall experience of the site.

### DESIGN METHODOLOGY: *(Please refer design sheets along with the text)*

Very first step was to access the site and cite the problem areas. We opted for trip chain method and a user-based approach. Trip chain method is apt till Stupa 1. And, then we had to proceed with the user-based approach. We zoned out the site and penned down the problem areas with accessible and inaccessible regions, talked to local people and the authorities to know more about the lacunas and redressals whence forth. The site was segregated, and the problem areas **were tackled one at a time and, simultaneously trying to improve visitor's experience.**

### ANALYSIS:

Various barriers were identified and categorised into following heads:

- Organizational
- Physical
- Intellectual
- Sensory
- Social and cultural
- Financial



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B.Arch. student



Abhinav B.  
B.Arch. student



Nitesh Verma. B.Arch.  
h. student



Navankur S.  
B.Arch. student

Major emphasis has been laid over eradicating the physical barriers.

**DESIGN SOLUTION:** *(Please refer design sheets along with the text)*

The accessibility till stupa 1 is good. It can be accessed by all using the accessible pathway. But after that, accessibility is highly hindered due to contours and change in topography.

Pathway:

We intervened into the site by developing a pathway with an even gradient where shuttle carts could travel. These carts can carry any physically challenged person or pregnant women to travel throughout the accessible path. Shelter stoppages are provided along the route with proper seating and shaded areas. The width of the pathways has been increased to nullify the hindrance caused due to shuttle carts on pathways.

Ramps:

Proper gradient ramps at the entrance and the parking have been provided to ensure easier circulation. The use of ramps at various places within the site has been added to further help in the user friendly approach. A ramp has been introduced with a gradient of 1:12 to deal with the level difference of 7.1 meters when we walk from stupa 1 to the **monastery leading to the Stupa 2. The proper gradient of ramp will not only serve the shuttle carts' easier movement but will also prove beneficiary in the movement of standard user.**

Ropeway:

Another design intervention done at the site is the introduction of an aerial ropeway. It is one of the most efficient and feasible type of system for carrying people at high gradients or slopes. The ropeway has been provided from bottom of the Sanchi complex hill and can be used conveniently by people visiting Sanchi without any vehicle.

Signage:

The main purpose of signage is communication, to convey information such that its receiver can make cognitive decisions based on the information provided. The site lacked signage, so a signage has been designed with particular pictograms and platforms of suitable height(s) for no visual barriers and legibility. Three major types proposed are as under:

(a) Informational: signs giving information *locating* main spots, services and facilities, e.g. maps.

(b) Directional: signs *leading* to services, facilities, functional spaces and key areas, e.g., sign posts, directional arrows for toilets, drinking water etc.

(c) Identificational: signs *indicating* services and facilities, e.g., room names & numbers, toilet signs, etc.

**There's already a provision of audio compasses at the site, we basically have improvised it by adding GPS to it. These** GPS enabled audio compasses can guide the user to the entire site, visually impaired will be benefitted as this will enable them to know the distance too. For better GPS, local transmitters are added to the entire site in a grid pattern to facilitate the precise calculation of the distance.

(d) Toilets and public facilities: Proper considerations have been taken into account for the public facilities like the toilets and water coolers. Extended pathways with tactile flooring and handrails have been designed. A universally designed path has been the main objective which leads to a perfect toilet area designed for physically challenged, keeping in mind the wheelchair circulation within the toilet, washbasin height, WC height, handrail and other supporting rails both vertically and horizontally.

**DESIGN SOLUTION:** *(Please refer design sheets along with the text)*

We made some design interventions to make the Sanchi complex more accessible by feasible techniques and simple mechanisms. We aim to make the complex fully accessible and user friendly by simple approach. We also took into considerations the overall prospect of the heritage site e.g. aerial ropeway would provide an excellent view point of the high stupas and thus acting as an excellent way to improve tourism.

**SHEETS:** *(continued in next page)*



**Sanchi** is an important Buddhist pilgrimage center of India. This site is topped by some of the oldest and most interesting Buddhist shrines in the country. The imposing hilltop site offers commanding views of the surrounding countryside. Sanchi is a peaceful town crowned by a group of stupas and abandoned monasteries that are one of the most important Buddhist sites in India. Sanchi is known for the famous stupa, built by the Emperor Ashoka.

Toranas surround the Stupa and they each represent love, peace, trust, and courage.

**Location : India**  
**Madhya Pradesh**  
**Co-ordinates : N23 28 45.984 E77 44 22.992**  
**Date of Inscription: 1989**  
**Criteria: (i)(ii)(iii)(iv)(vi)**  
**Ref: 524**  
**Selection criteria**

# Sanchi

*- a spiritual symphony in stone*

**Location and Approach**  
Sanchi is in the central part of the state of Madhya Pradesh, just above the Tropic of cancer, 46 km north east of Bhopal, and 10 km from Besnagar and Vidisha . It can be approached through road and rail network, with National highway 86 and railway station of central railways .



**The Great Stupa (No. 1)**  
The world renowned stupa was originally built by the Mauryan emperor Ashoka and is an icon of India's cultural heritage. The present stupa is a superstructure over the original brick stupa and comprises a hemispherical dome. It measures 36.5

**Stupa No.2:**  
The 2nd century BC. stupa lies on the edge of the Sanchi hill.

**Stupa No.3:**  
This stupa was built during 150-140 BC. The relics of Sariputta and Mahamoggallan, two of Buddha's chief disciples were found in the stupa. These relics are at present housed in the Sri Lankan Vihara here.



**SITE PLAN**

**The protected and prohibited area of the Buddhist Stupas at Sanchi, Madhya Pradesh**





**National Student Design Competition**  
**Design for all. Universal Accessibility.**



**NSDC III /UD/ 048**

# Sanchi

## Accessibility

To give every member of our society a chance to have foundation free access in and around the world heritage sites across India regardless of their disabilities is the aim of this year's NATIONAL STUDENT'S DESIGN COMPETITION.

People with vision impairment, movement aiding appendages, old people and pregnant women in general face neglect in these situations.

To cater to their disadvantages and providing barrier free environment is our GOAL.

## Parking

### Present condition parking

- No separate parking spaces for disabled
- No proper well defined parking spaces
- Uneven terrain
- No proper signages

### Proposed parking

- Parking spaces for disabled
- Well defined parking spaces for two wheeler, four wheeler, buses, and for PWD.
- Even terrain with 1:18 slope
- Proper signages

## Zoning

The site has been categorized into two different zones as per circulation of the physical challenged:

1. easy accessible
2. not easily accessible
3. not accessible

### the section of parking

### Existing accessible path

### Total pathway of the complex

The site section shows the various attractions at sanchi with reference to their latitudes.

1. M.P. Tourism resort
2. Ticket booth and A.S.I. Museum
3. Parking and entrance
4. Stupa 1
5. Monastery
6. Stupa 2

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### ENTRANCE & PATHWAYS :

The existing entrance provides little assistance to the disabled. There is no ramp or handrails at the present entrance and stairs have uneven tread and riser. Uneven surface , slippery stone used to lay the path , absence of railings all add to the problems of disabled.



#### PROPOSED ENTRANCE:

By providing proper steps with adequate riser height and tread width and also providing handrails to improve the functionality of stairs

A ramp has been added so as to ease the movement of disabled.

**RAMP : SLOPE OF 1/12**



#### PROPOSED PATHWAYS

Rough granite has been used for the top surface of both ramp and stairs to provide better traction durability.



Proper gradient  
Handrails  
Wider Paths  
Shuttle Kart service  
Tactile blister surface

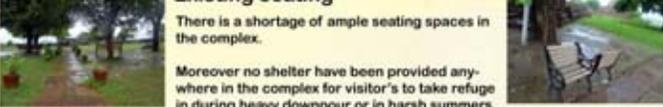
**MINIMUM WIDTH OF PROPOSED PATH IS 3500mm**

### SEATING SPACES:

#### Existing seating

There is a shortage of ample seating spaces in the complex.

Moreover no shelter have been provided anywhere in the complex for visitor's to take refuge in during heavy downpour or in harsh summers.



#### PROPOSED SITTING SPACES:

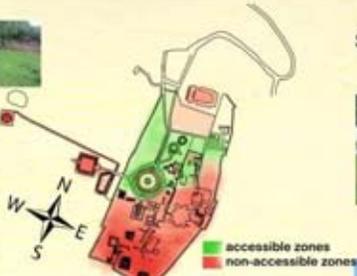
A proper sitting space with ample head-cover which accommodates upto 16 visitors and also serves as a shuttle service pickup point.

The material used is precast exposed rough concrete for the shelter

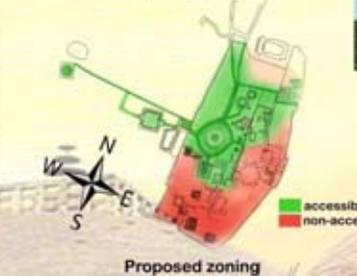
Prefabricated concrete bench

Total length is 8000 mm Gross height of shelter is 2700mm





Existing zoning



Proposed zoning



Accessible layout with seating

### TACTILE FLOORING:

Available in two patterns:  
Warning - with raised disks or domes  
Directional - with raised lines or ridges  
Suitable for indoor and outdoor application  
Quiet when walked on  
Slip resistant in both wet and dry conditions.





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### Toilets



### Drinking water



**KEEP THE AREA CLEAN**



Drinking water

### Signage



# Sanchi



the drinking water facility has no proper drainage. the tap height is high not designed for physically handicapped



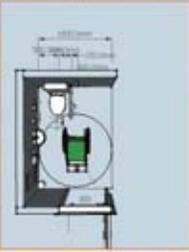
Existing signage are not easily readable  
They are not available in different languages  
the viewing angle is not proper  
lack of signage at various structures



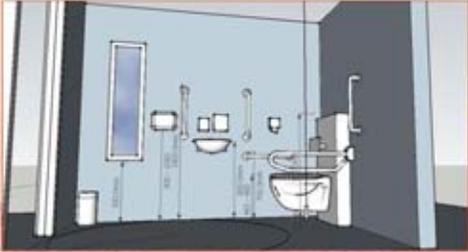
### Proposed signage

The specially designed signage for wheel chair bound people enables them to have a clearer look at the information boards

The existing toilets were not designed for the physically handicapped. it had no separate provisions for urinals, washbasins, and well equipped toilets. the handrails were missing



Sectional plan



Toilet section

### Proposed toilet

- Lower height WC (460-480mm)
- vertical handrail
- wheel chair space
- wide door entrance (>900mm)
- use of handrails (h=700mm)
- washbasin at low height (800mm)
- angled mirror at 500mm
- dustbin in corner



DISABLED TOILETS



RESERVED PARKING

Parking for disabled has been designed separately with proper considerations ramp, curbs, spacings, adjacent to accessible path



Ticket counter

1. Ticket counter placed down the slope
2. No proper signage, or highlighted boards.
3. No guards
4. Path and counters not universally designed



CANTEEN



Canteen must be kept clean and tidy.



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Let's Design for ALL

NSDC III / UD / 048



### AERIAL ROPEWAY

Simple, inexpensive yet powerful technology. One of the most energy-efficient forms of transporting goods and people. Relatively easy and quick to set up, operate and take down again. The most common materials used for constructing ropeways were first wood/fiber and then steel/steel ropes. The introduction of steel ropes and electric motors was a major efficiency boost, so these should probably be the preferred option.

**Advantages of ropeways :**

**Structural efficiency:** Ropeways are tensile structures - structures loaded primarily in tension - which makes them inherently more efficient than structures with significant bending and compressive loads.

**Economy:** Mainly a result of structural efficiency (above), but also the result of having multiple cars propelled by a single power-plant and drive mechanism. This reduces both construction and maintenance costs. The use of a single operator for an entire ropeway is a further saving, in labor cost. On level ground, the cost of ropeways is competitive with narrow-gauge railroads; in the mountains the ropeway is far superior.

**Ability to handle large slopes:** Ropeways and cableways (cable cranes) can handle large slopes, and large differences in elevation. Where a road or railroad needs switchbacks or tunnels, a ropeway travels straight up and down the fall line.

**Low footprint:** The fact that only narrow-based vertical supports are needed at intervals, leaving the rest of the ground free, makes it possible for ropeways to be constructed in built-up areas and in places where there is intense competition for land use.

**Safety:** There is no danger of collision between cars, or between ropeway cars and other modes of transportation - except aircraft of course.

### Shuttle carts

Electric carts provide an ideal way to shuttle employees or guests around any large facility or campus. Battery power lets them travel indoors and out without any emissions that can create hazardous breathing conditions. Carts are always ready to go, quiet and easy to operate.




The wheel chair accessible cart      View showing closed ramp

**proposed shuttle cart**

The proposed shuttle cart features an electric universally designed shuttle cart for easier accessibility for elderly people, wheel chair bound, pregnant women, children, and others.




**passway for carts on ramp**

**cart parking**

The cart parking has been designed adjacent the main parking area. The cart route has been directly connected to the ramp provided in the existing site.



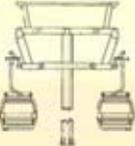


station 1, station 2, station 3

Plan showing 3 stations for the ropeway route

### Why ropeways should be used ?

For people who live in remote, mountainous areas, getting food to market in order to earn enough money to survive is a serious issue. The hills are so steep that travelling down them is dangerous. A porter can't go but they are expensive, and it would still take hours or even a day. The journey can take so long that their goods start to perish and become worth less and less. Practical Action have developed an ingenious solution called an aerial ropeway. It can either operate by gravitational force or with the use of external power.



Elevation of trolley



Side section of ropeway



Ropeway section



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Let's Design for All

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## CHHATRAPATI SHIVAJI TERMINUS, MUMBAI

### CONTEXT:

Built by the East India Company in 19th century, situated in the southern part of Mumbai, Maharashtra, Chhatrapati Shivaji Terminus is one of the busiest railway stations in India, and serves suburban Mumbai commuters as well as the passengers of central railways.



Presently this historic building serves as the headquarters of the central railways, and is supposed to be converted into a museum soon after it has been declared a world heritage site in 2004.

With its cathedral like facade, the train station is a historical landmark of Mumbai and is arguably the finest example of the city's Gothic buildings. Its remarkable stone dome, turrets, pointed arches and eccentric ground plan are close to traditional Indian palace architecture. Italian marble, sandstone and limestone are the materials originally used in the building.



Noopur K.,  
B. Arch. Student



Varsha C.,  
B. Arch. Student



Purna Jindal, B.  
Arch Student



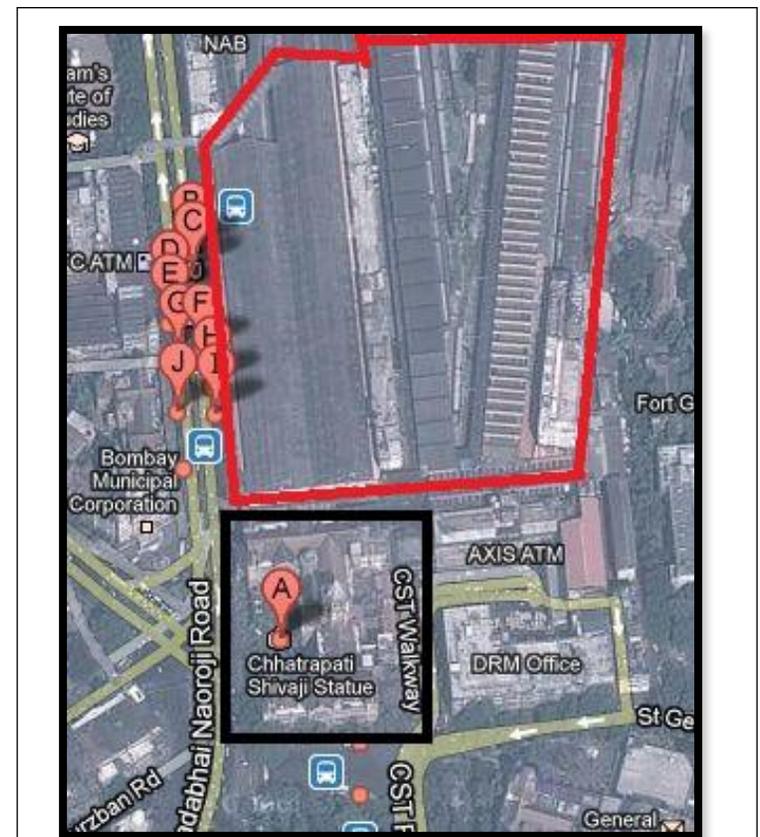
Sushil Kumar, B.  
Arch. Student

**DESIGN METHODOLOGY:** *(Please refer design sheets along with the text)*

There are a number of shortcomings in the accessibility of the area like Parking area, Entrance way, suburban railways platforms. For the analysis of problem areas, we searched for the information about the site from the internet, from local public etc.

With the help of marked spaces on the map, we analyzed each area for its shortcomings and prepared a list. Our survey was done in two parts: The survey was conducted with few points on focus:

- Studying the connectivity of the site.
- Check if the entrances to the site are universally accessible or not.
- Study the circulation pattern inside the heritage building, for all types of users.
- Classifying the users: the able bodied people, the especially abled, the pregnant, the elderly and the kids.
- Studying the toilets and water facilities with respect to its location and accessibility by different categories of users.



The platform and the main heritage building  
*(The area enclosed in red boundary is the platform.)*

## ANALYSIS:

- 1) Entrances: not universally accessible, since all entries are through staircases, from platforms as well as through main entrance.
- 2) Circulation: not smooth for all types of users, because of many abrupt level differences.
- 3) Toilets: not universally designed.
- 4) Stairs: improper railings and handrails, as well as insufficient lighting.
- 5) Information boards: not at all installed.

## DESIGN SOLUTION: *(Please refer design sheets along with the text)*

### A) ENTRANCES

- Entrances to the site:
  - 1) Main entrance into the museum (entry 1)
  - 2) Entrance through the railway platform (entry 2)
- Entrances to the building:
  - 1) Ramps on the 1<sup>st</sup> and the last entrances (ramp 1 and 2) of the railway platform: These ramps are of slope 1: 15, hence making the span of the ramp 13.5 meters for 0.9 meter of the platform height.
  - 2) Ramp at the main porch (ramp 3): **This is 'I' shaped ramp again with a complete length of 13.5 meters.**
  - 3) Ramp at the side porch (ramp 4): Again a ramp of 13.5 meters length.
  - 4) Providing railings of height of 0.80 meters to the ramps.
- Entrances to the halls:
  - 1) Connecting halls into a large one and providing only one entry to it.
  - 2) Providing slope of 1:20 to the entrance.

### B) STAIRS

- Railings and handrails:
  - 1) Providing hand rails on both the sides of the staircase with extra gripping devices.
  - 2) Providing extra handrail at a lower height for kids.
  - 3) Providing extra movable clutch for the elderly on the railings.

- Lighting:  
Provide cove lighting on the bottom side of the handrails to lighten up the staircase. LEDs will be used inside the coves of stainless steel railing that will be encased in a wooden covering to match the environment of the heritage building. Manufactured by many companies, like micro star railings and prestige railings etc., these led lights are available in 12v. Being completely waterproof and encased in a type 316 stainless steel housing, these led lights are able to stand up to the most demanding environments. This railing light is both a functional and creative lighting alternative.
- Flooring with Tactile mapping:
  - 1) Making pathways throughout the heritage building to provide free circulation of the vision impaired.
- Installation:  
Rubber sheet roll of 0.5 mm thickness will be used for the proposed tactile mapping throughout the building, which can be installed by two ways:
  - 1) By using a double sided tape made especially for this purpose, with extra strong gum.
  - 2) By gluing it to the sub flooring i.e. the existing flooring.

**DESIGN SHEETS:** *(continued in next page)*

# CHHATRAPATI SHIVAJI TERMINUS, MUMBAI

## INTRODUCTION

Built by the East India company in 19th century, situated in the southern part of Mumbai, Maharashtra, CHHATRAPATI SHIVAJI TERMINUS is one of the busiest railway stations in India, and serves suburban Mumbai commuters as well as the passengers of central railways.

Presently this historic building serves as the headquarters of the central railways, and is supposed to be converted into a museum soon after it has been declared a world heritage site in 2004. With its cathedral like facade, the train station is a historical landmark of Mumbai and is arguably the finest example of the city's Gothic buildings. Its remarkable stone dome, turrets, pointed arches and eccentric ground plan are close to traditional Indian palace architecture. Italian marble, sandstone and limestone are the materials originally used in the building.

It is an outstanding example of the meeting of two cultures, as British architects worked with Indian craftsmen to include Indian architectural tradition and idioms thus forging a new style unique to Bombay.

The centrally domed office structure has a 330 feet long platform connected to a 1,200 feet long train shed, and its outline provides the skeleton plan for building. VT's dome of dovetailed ribs, built without centering, was considered as a novel achievement of the era. The interior of the building was conceived as a series of large rooms with high ceilings.

It has a C-shaped plan which is symmetrical on an east-west axis. All the sides of the building are given equal value in the design.

## LOCATION

## HISTORY

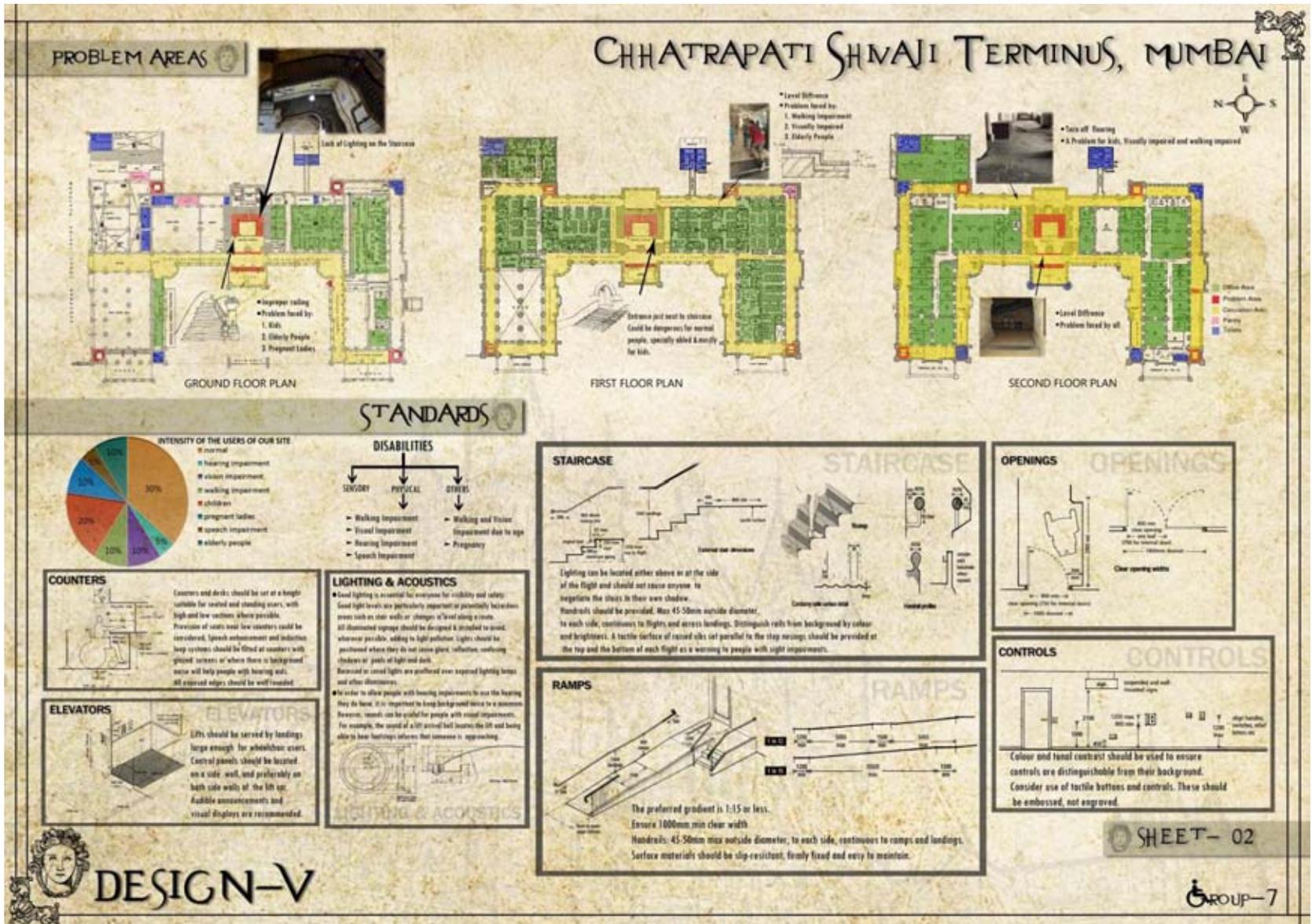
The Chhatrapati Shivaji Terminus was designed by Frederick William Stevens from 1887 to 1888. The building took ten years to complete, and was named "Victoria Terminus" in honor of the Queen Victoria and was opened on the date of her Golden Jubilee in 1887. The station was fondly referred to as VT Station. In 1996, in keeping with the trend of renaming cities and important locations with Indian names, and in response to demands of Shiv Sena, a political organization, the station was renamed after a famed 17th century Maratha King. Interestingly Victoria Terminus was the 1st railway station of India and the very 1st train ran from Victoria Terminus to Thane. Originally intended only to house the main station and the administrative offices of the Great Indian Peninsula Railway, a number of ancillary buildings have been added subsequently, all designed so as to harmonise with the main structure. A new station to handle main line traffic was erected in 1929. The original building is still in use to handle suburban traffic and is used by over three million commuters daily. It is also the administrative headquarters of the Central Railway. Recently after its declaration as world heritage site, in 2008 it went through a terrorist attack after which its security has been improved and also the efforts to convert it into a museum, to provide it a recognition of being a world heritage site that it should get being India's 1st railway station.

<span style="color: red;">—</span>	Present Boundary
<span style="color: green;">—</span>	Open Spaces / Green Areas
<span style="color: red;">—</span>	Chhatrapati Shivaji Terminus
<span style="color: yellow;">—</span>	Mixing
<span style="color: orange;">—</span>	Roads
<span style="color: grey;">—</span>	Subways

## DESIGN-V

## SHEET- 01

## GROUP-7





# CHHATRAPATI SHIVAJI TERMINUS, MUMBAI

**PROPOSALS**

ROAD  
FIRST FLOOR PLAN  
SCALE- 1:500

**TACTILE MAPPING**  
Rubber sheet roll of 0.5 mm thickness will be used for the proposed tactile mapping throughout the building, which can be installed by two ways:  
1) by using a double sided tape made especially for this purpose, with extra strong gum.  
2) by glueing it to the sub flooring i.e., the existing flooring.

ROAD  
SECOND FLOOR PLAN  
SCALE- 1:500

**TACTILE MAPPING**

X- It depicts change of direction  
Y- It depicts straight path

**STAIRCASES**

- Tactile mapping through out the staircases
- Railing: providing hand rails on both the sides of the staircase with extra gripping devices. Providing cove lighting on the bottom side of the handrails to lighten up the staircase. LEDs will be used inside the coves of stainless steel railing that will be encased in a wooden covering to match the environment of the heritage building.

Section      Elevation

**AUDIBLE DEVICE**

Audible device installed at turning points which transmit signal detecting the touch of walking stick of the visually impaired person with the help of detector installed on the tactile mapping tiles.

AUDIBLE DEVICE

**3D MODEL**

3D model installed for visually impaired to create a vision in their mind by means of touch.

**BRAIL MAP** ★

Brail map and audio Video device installed for visually and hearing impaired respectively at the both entrances of the site.

BRAIL MAP

**LIFTS**

- Lift car of dimension (1500x2000) mm Sq. installed .
- Display boards and handrails at a height of 800 mm installed.
- Brail boards also installed.

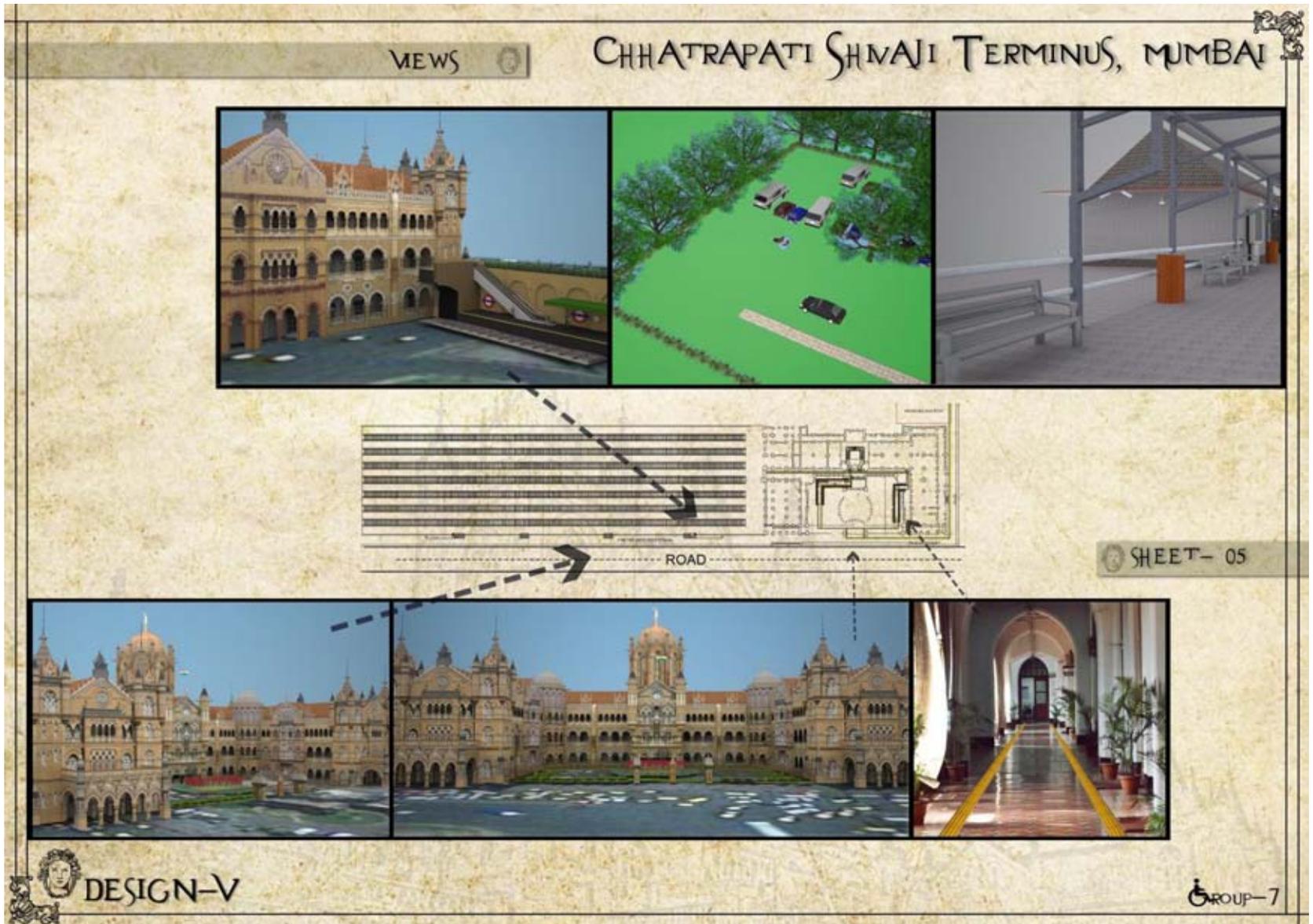
LIFTS

**DESIGN-V**

SHEET- 04

GROUP-7

41



## HUMAYUN'S TOMB

### CONTEXT:

Exemplifying the formative stage of the Mughal structural style, Humayun's Tomb stands as a landmark in the development of Mughal architecture, and also represents the earliest extant specimen of the Mughal scheme of the garden tomb, with causeways and channels. It is well developed specimen of the double domed elevation with kiosks on grand scale. This building is the precursor of Taj Mahal. Humayun's tomb is the architectural achievement of the highest order.

Humayun's tomb is the tomb of the Mughal Emperor Humayun. The tomb was commissioned by Humayun's wife Hamida Banu Begum in 1562 AD, and designed by Mirak Mirza Ghiyath, a Persian architect in 1569-70 at a cost of 1.5 million rupees. It was later used for the burial of various members of the ruling family and contains some 150 graves. It has been aptly described as the necropolis of the Mughal dynasty. It was the first garden-tomb on the Indian subcontinent, and is located in Nizamuddin East, Delhi, India.

The tomb was declared a UNESCO World Heritage Site in 1993 and since then has undergone extensive restoration work, which is still underway. Besides the main tomb enclosure of Humayun, several smaller monuments dot the pathway leading up to it. The tomb complex of Isa Khan pre-dates the main tomb more than 20 years, constructed in 1547 AD. Within the enceinte to the south-east of **Humayun's Tomb** there is a **fine square tomb of 1590-91**, known as the **Barber's Tomb**.

### OBJECTIVE:

How many disabled users and elderly are able to go where they want to go? Are their special needs met in the places they visit? Are they treated with dignity and equality like others? To answer these questions with our sensibility of design we made an attempt to make a world heritage site accessible for all; design it universally.

The objective was to attempt design intervention in one of the twenty two protected world heritage sites in India (cultural) in our respective zones. We were to develop imaginative design solutions for universal usability, retaining the original fabric of the world heritage sites. Our design intervention may range from a product to a whole site experience, with an intention to meet different levels of challenges for diverse users in the site.



Pritam Roy,  
B. Arch. Student



Tiyas Mandal, B.  
Arch. Student



Abhishek Pal, B.  
Arch. Student



SoumitDey,  
B. Arch. Student

**DESIGN METHODOLOGY:** *(Please refer design sheets along with the text)*

- To make the entire complex universally accessible, and not only concentrating on the accessibility of certain premeditated path that the tourist is expected to take.
- Placing ourselves in the shoes of the disabled person to experience the surroundings and understand the problems faced by them.
- Examining the present amenities provided to aid a disabled person and to check if there is any scope of improvement.

**DESIGN SOLUTION:** *(Please refer design sheets along with the text)*

To help the visitors visiting this monument, we did some interventions. These interventions are as follows:

- **Since this area serves as an entrance point of the Humayun's Tomb complex** and is centrally located within the project area it is proposed to locate a new interpretation center in the area partially occupied by the parking lot.
- A counter or service center to be built near the parking area to avail the wheelchairs for the movement-impaired persons, along with which a volunteer or an attendant, if needed.
- We propose that the parking area ramps are such that they have enough gradient for the smooth movement of the wheelchairs.
- We also propose that a tactile surface is laid in the site thoroughly such that the vision impaired people do not find it difficult to move. The tactile surfaces which are readily available could be used for the path from the parking to the ticket counter.
- For the path up to the gate prior to the west gate of the **Humayun's Tomb, we propose the** tactile surface to be custom built of concrete and brick structures such that it blends with the pathway which is made of concrete. On this pathway, **on the right side stands the Isa Khan's Tomb** and on the left stands the Bu-Halima Garden and Tomb. For the Char Bagh the tactile surfaces would be sandstone laid to make it blend with the natural surroundings of the **Humayun's Tomb. The textures should** be clear enough to make it usable for the needed and to blend with the natural surroundings.
- After entering the west gate, one would find it difficult to climb the stairs with riser height of 300mm. This makes the locomotion of the movement impaired people difficult here. Thus they remain deprived of the visit to the exhibition hall. We suggest that a ramp along with a platform in the middle to be built at this place. This

particular type of ramp would rise up to the platform with a gradual slope and then it would be bifurcated, with one slope entering the exhibition room. The slope again with a smooth gradient makes a person to enter directly to the Char Bagh.

- The kind of ramp stated above would have tactile surface for the easy locomotion of the visually impaired persons.
- As one enters the Char Bagh, both the visually impaired person and the movement impaired person would find **it difficult to reach the Humayun's Tomb. The slab** which covers the drains for the easy movement of the persons, are actually small to carry out the wheel chairs. Moreover there are no tactile surfaces in the whole char bagh for the flow of the visually impaired people. We suggest that the causeway slabs should be made wider enough for the wheelchair to travel on it and an even tactile surface discussed above to be laid in the char bagh for the flow of the visually impaired people.
- **The plinth level of the Humayun's Tomb is high enough. The movement** impaired people cannot climb this up, neither can they go to the first floor height. We suggest a ramp with a rubber plating on both the sides for the grip of the wheelchair. The ramps are to be fixed in the chamfered corner of the plinth and the ramps should be made of glass so that the immediate surroundings of the tomb are intact and the original surface view is not blocked by the intervention.
- To make the possibility of the locomotion of the movement impaired people to the first floor, we propose a stair wall handrail lift. The wheel chair can stand on the platform of this inclined lift. The platform is foldable and thus covers a minimum area and blending with the environment.

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**DESIGN SHEETS:** *(continued in next page)*

### SITE PLAN AND MOVEMENT PATTERN

**CONCEPT**  
Universal design is an inclusive philosophy that says all spaces should be inherently accessible for all users. Rather than focusing on users with specific disabilities, universal design creates solutions that will work for everyone, regardless of age, mobility, visual, auditory or mental ability. Universal design is "roads to grace" design, in other words, design that addresses the needs of every stage of human life.

### CASE STUDY

#### ISA KHAN TOMB

Excavation work going on

➤ Closed due to archaeological restoration and excavation.  
➤ On 7 August 2011 the restoration work on this tomb in New Delhi led to the discovery of the India's oldest sunken garden. Isa Khan's garden tomb in the enclosed area of Humayun's Tomb World Heritage Site.

#### TICKET COUNTER

➤ Accessibility problem for Visually and Physically impaired people because of the barriers.

#### GATE ONE : Prior to HUMAYUN'S TOMB WEST GATE

➤ Uneven surface makes accessibility a problem for wheelchair movement.  
➤ No special pathway for visually impaired.

#### CHARBAGH

➤ No texture difference making it risky for visually impaired.  
➤ Width of the slab is 60 cm whereas minimum 75 cm is required for wheelchair movement.

#### BU HALIMA'S TOMB & GARDEN

➤ The tomb or the raised platform where it once stood is not at the centre, it appears to be a later addition.  
➤ Closed for archaeological excavations and restoration.

#### HUMAYUN'S TOMB

➤ The slope is steep. Angle of the slope is 20 degree.  
➤ Uneven slopes and surfaces.  
➤ Stairs with high treads (>200mm).

#### OTHER LACUNAS OF THE SITE

➤ No drinking water facility.  
➤ No toilets near the tomb area, there is one outside the tomb.  
➤ The site is bereft of direction.  
➤ The site lacks audio visual components.  
➤ No proper sign boards are provided on the site showing ramps, toilets, drinking water facility.

#### FOREWORD

Embodying the formative stages of the Mughal structural style, Humayun's Tomb stands as a landmark in the development of Mughal architecture, and also represents the earliest extant specimen of the Mughal scheme of the garden tomb, with colonnades and charobas. It is well developed specimen of the double domed elevation with kiosks on the grand scale. This building is the precursor of Taj Mahal. Humayun's Tomb is the architectural achievement of the highest order.

#### EXCERPT from UNESCO INSCRIPTION 17COM XI

Criterion ii: Humayun's Tomb is of outstanding cultural significance as the first example of garden tomb on the India sub-continent and one which introduced important architectural innovation, and as such it led to the unrivalled series of similar monuments that culminated in the construction of the Taj Mahal.

Criterion iv: The garden tomb, of which Humayun's Tomb is the first important example in India, is above all else the symbol of the powerful Mughal dynasty which unified most of the sub-continent.

The importance of Humayun's Tomb in the evolution of Mughal architecture is great. It is the first of a long series of dynamic tombs and innovative in a number of ways, notably by virtue of the fact that it introduced the garden tomb to the subcontinent.



Universal Design Competition  
Architecture for all

Humayun Tomb, Delhi  
NSDC-III/UD/032



INTERVENTIONS AND SOLUTIONS

WESTGATE AND EXHIBITION CENTER

A slope has been provided to the West Gate entrance for the better movement of wheelchair at 1:18.

Tactile Pathway provided through the West Gate for the better movement of visually impaired.

Ramps

Exhibition Gallery

Plan

View of the Ramp

Conceptual Section of the Ramp through the West Gate

PARKING

Existing Ramp

Counter for Wheelchair

Tactile Surface

Existing Ramp

Way to ticket counter

Counter for Wheelchair

Plan showing the tactile pathway for the vision impaired, existing slope for the movement impaired and counters for wheelchairs to be needed.

Audio compasses will be available from counter in parking.

Parking for disabled people

View of the pathway from the parking

TICKET COUNTER

Wheel Chair

View of the Ticket Counter

Existing Ticket Counter

View showing single operable gate for wheelchair movement

Tactile Pathway For the vision impaired person

Single operable Gate helps in the movement of the wheelchair

Audio compasses will be available from the ticket counter

Intervened Pathway through the ticket Counter

Existing Pathway through Ticket Counter

CHARBAGH : WATER CHANNEL

Present Condition  
Wheelchairs can't pass through the state.

Tactile Pathway for the better movement of visually impaired.

Addition of surface area to enable movement of wheelchair over the water channel

The width of the surface was increased to 120 cm from 60 cm.

Wheelchair Dimensions

SCALE DOWN MODEL OF HUMAYUN TOMB

Scale down model of Humayun Tomb will be introduced in the exhibition hall for the visually impaired people, such that they can touch and feel the model.

HUMAYUN TOMB

View of the ramp

Ramp provided on the North West Direction of the main tomb's plinth

Wheelchair podium takes wheelchair from plinth to first floor

View of the ramp

Conceptual section of the ramp

Circumferatory drains on the first floor will be covered with steel jali.

Section of the wheelchair podium

Views



Universal Design Competition  
Architecture for all

Humayun Tomb, Delhi  
NSDC-III/UD/032







## CRC- I: DHRAMA-KARMA-ARTHA-MOKSHA

### CONTEXT:

The purpose of our design is to create a built environment which is friendly to all users, with or without functional disabilities. Our priority was to initiate equality in our design process. A very prolonged approach has been made to design a model example of universal design in which, with the aid of technology, we have tried to create a balance between the natural and modern built environment. The major challenge was to uproot the wrong notions about universal design which is generally observed in people and to create awareness amongst them.

### DESIGN METHODOLOGY:

The entire design process was carried out through a series of objectives; a case study of CRC Bhopal was done. Drawing inferences from the case study, the study of the prevailing climatic conditions of the provided site, becoming familiar with the different types of disabilities, designing aids to counter them, and finally designing a building which is universally accessible were major steps in the design methodology.



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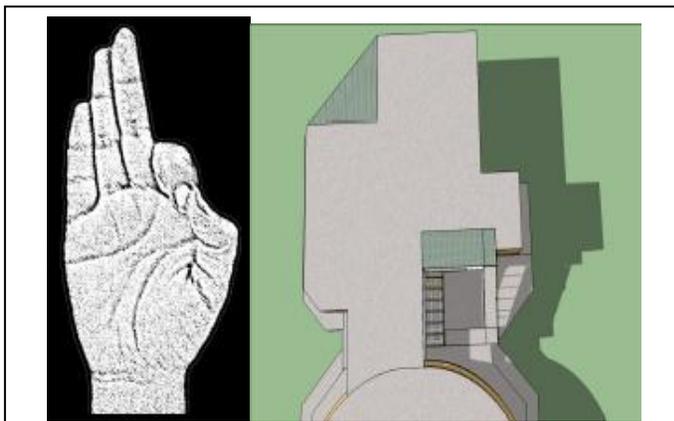
*Fig 1.1: case study Composite Regional  
Centre Bhopal*



*Fig 1.2: case study Composite Regional Centre  
Bhopal*

### DESIGN SOLUTION:

Every individual experiences a fair life span irrespective of his disability. According to the Gita, the life of any human being is divided into four parts: Dharma (acceptance of religion), Artha (preservation of possessions, Karma (duty towards the world) and Moksha (salvation). Our design very well reflects the journey of a man from his formation to his salvation and captures the four stages in any human's life. It is as much philosophical as it is technical. The very deep philosophy of human life thus suggests that we shift our perspective to one which is equal to all.



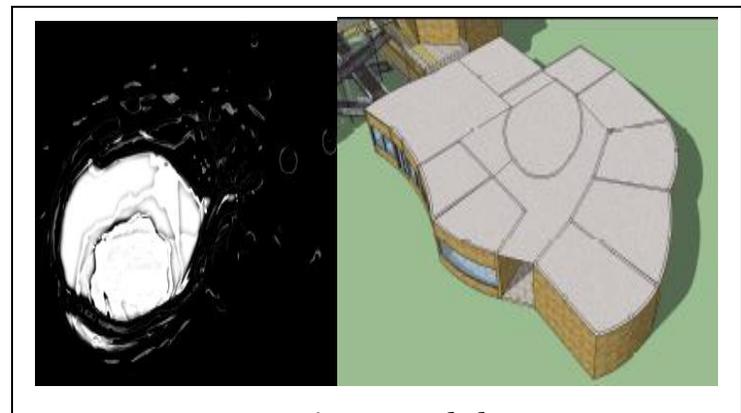
*Fig 2.1 Dharma*



*Fig 2.2 Karma*

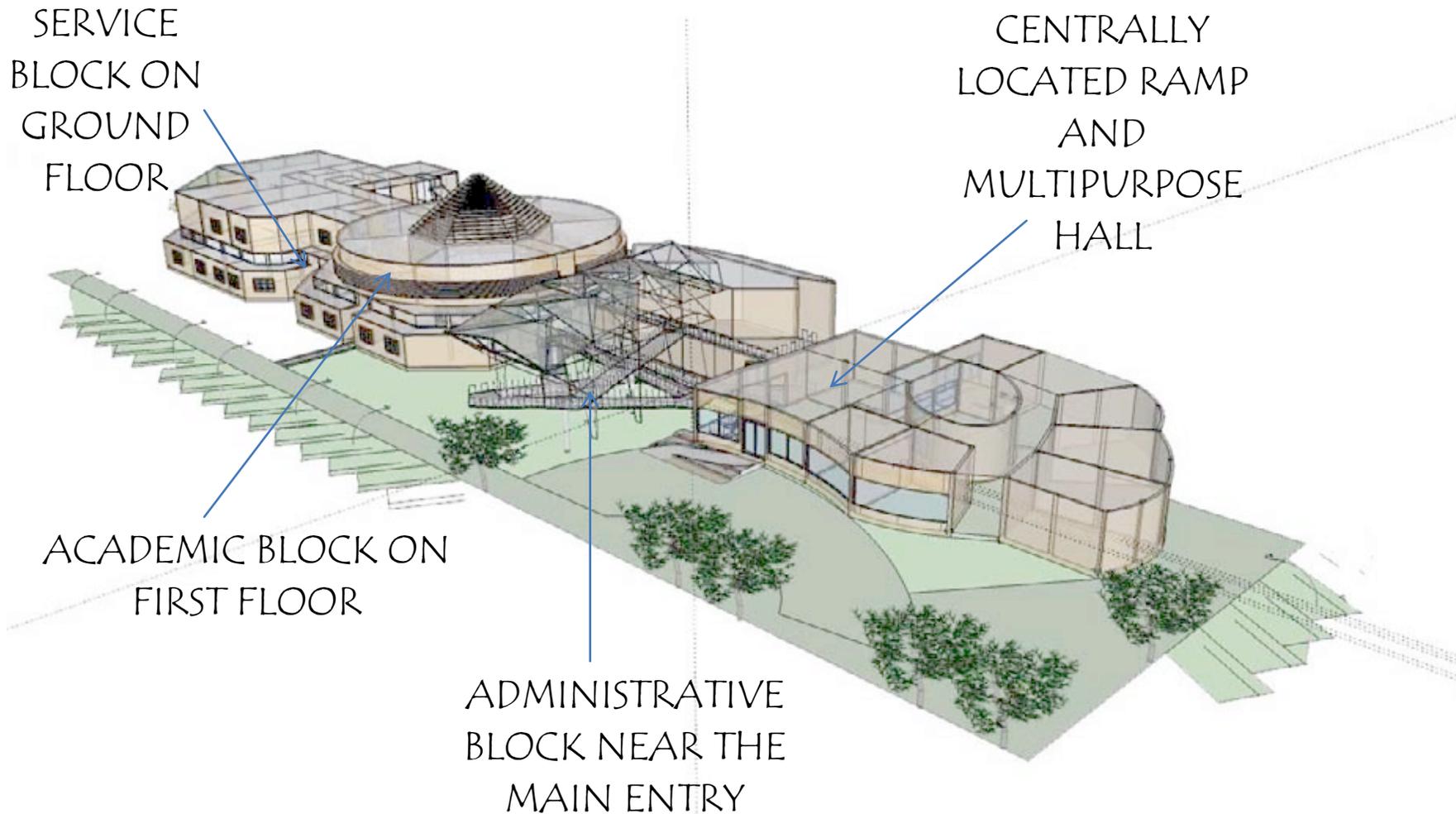


*Fig 2.3 Artha*

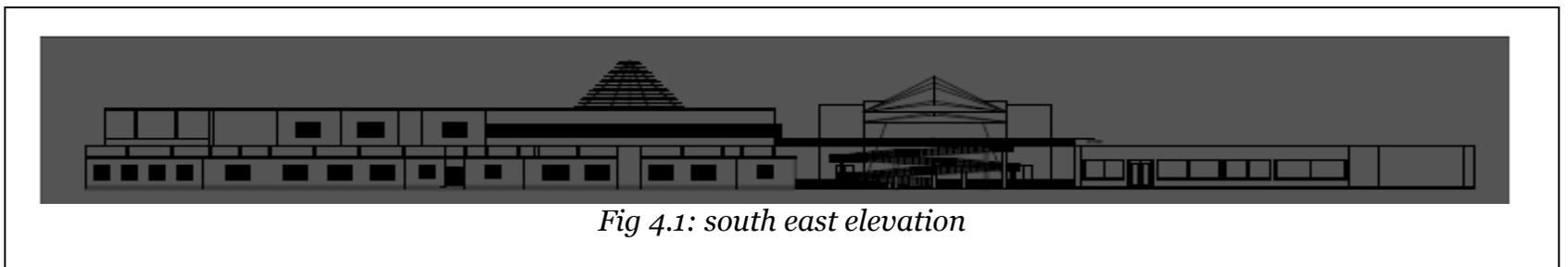
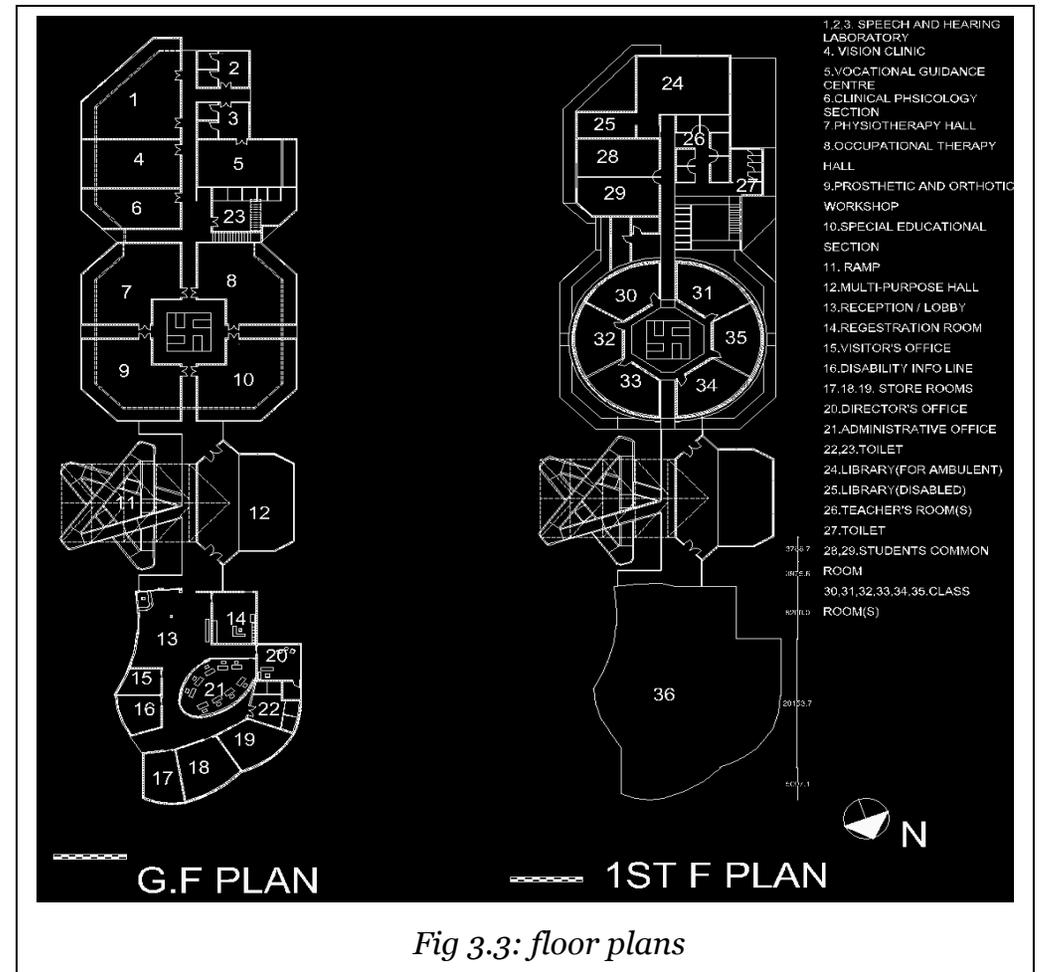
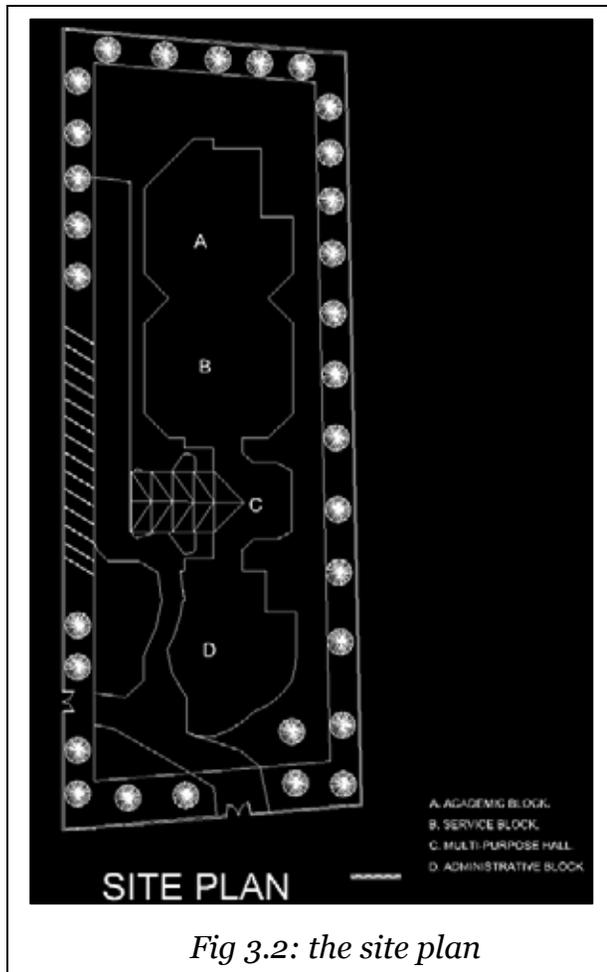


*Fig 2.4 Moksha*

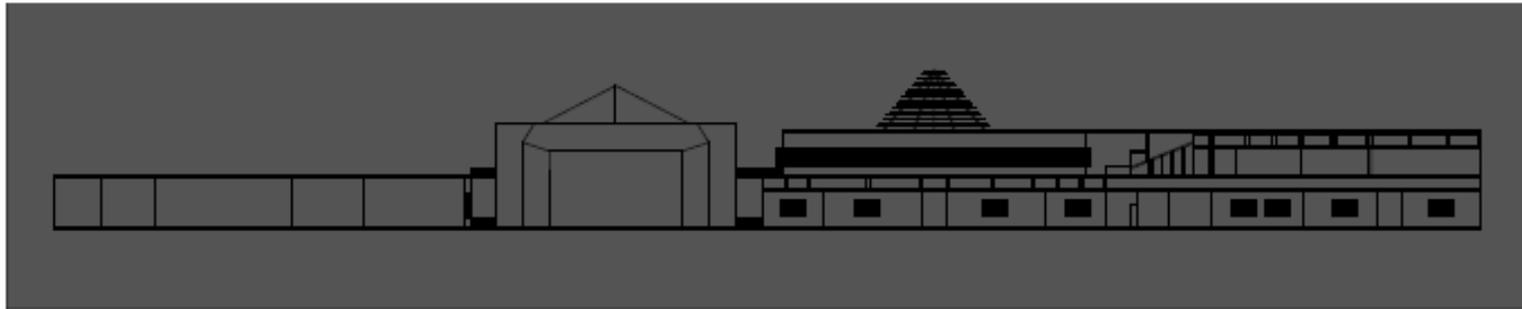
The building is a composition of four blocks – the service, the academic, the ramp & multipurpose hall, and the administrative.



*Fig 3.1: 3-D view of the Building*



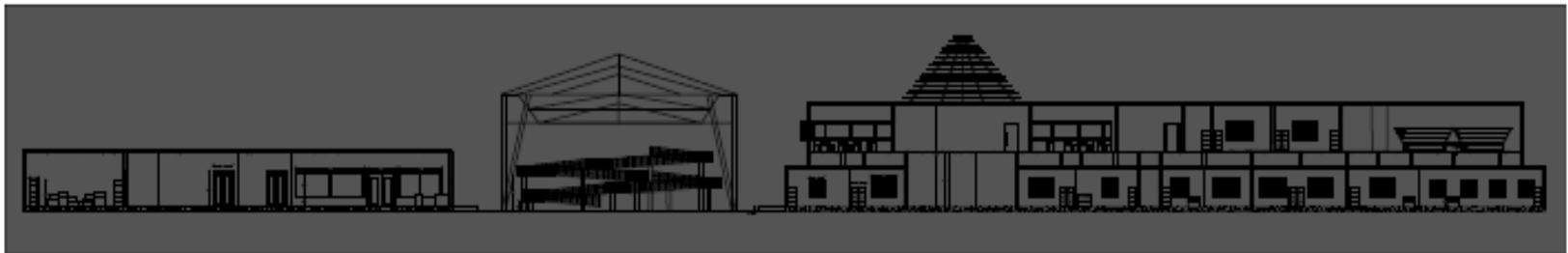
The elevations of the building are seen in figures 4.1, 4.2 and 4.3. A section is shown in fig4.4.



*Fig 4.2: North West elevation*



*Fig 4.3: south west elevation*

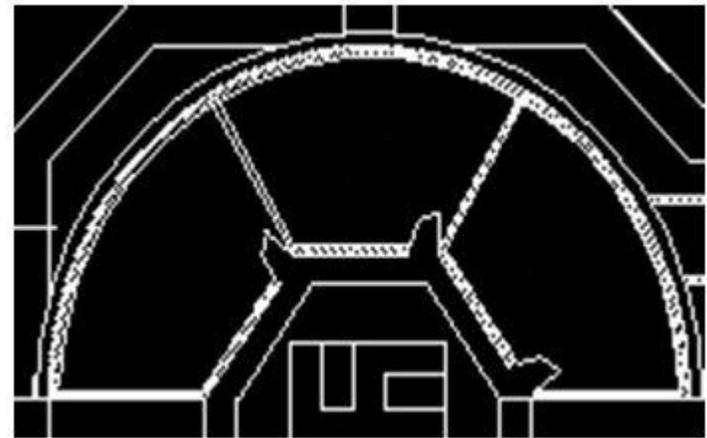


*Fig 4.4: a section through the building*

In the process, a lot of innovations in terms of aesthetics and technicalities have been included for the differently abled people. A straight pathway has been provided through the entire building as seen in the plans (fig 3.3). A ramp of slope 1:12 with a landing after every 6000 mm and a stair lift are the means of vertical circulation (fig 5.1).



*Fig 5.1 the pentagram shaped ramp*



*Fig 5.2: fan shaped classroom*

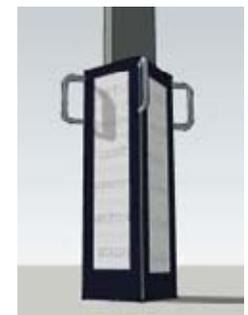
Window sill level, height of handrails and the width of doors have been decided as an average for a person sitting on a wheelchair and an ambulant person. Fan shaped classrooms have been provided (fig 5.2). The provision of a separate section for the blind has been made. The reception desk in the administrative block has been designed in two levels for the ease of people (fig 5.3).



*Fig 5.3: reception desk*



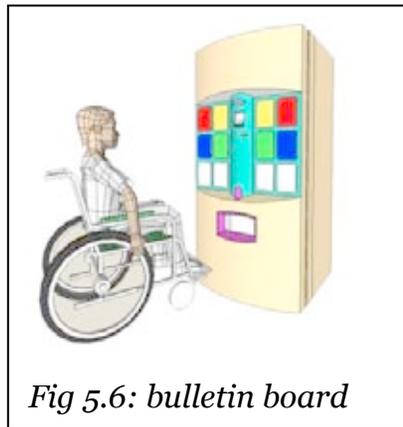
*Fig 5.4: universally designed toilet*



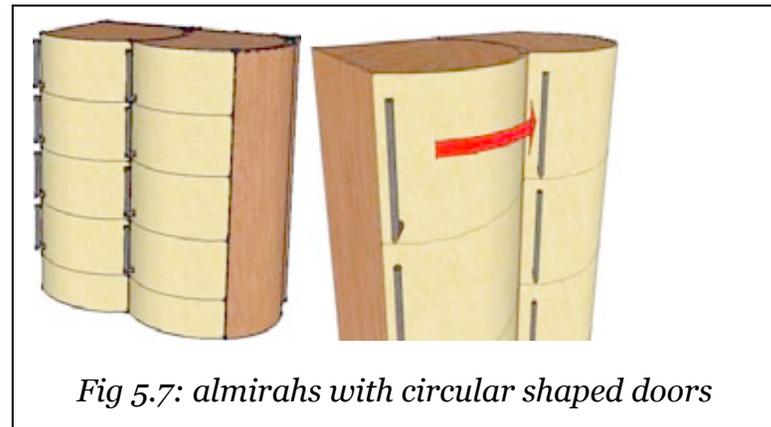
*Fig 5.5: water cooler*

With the help of technology, we have come up with a toilet which is universally accessible, with special equipment like a rotating lever arm and an adjustable mirror (fig 5.4).

The height of the bulletin boards (fig 5.6) and water coolers have been decided keeping in mind the comfort of the users. The water coolers have colored buttons with Braille pads on them (fig5.5). Almirahs with circular sliding doors have been installed, where doors slide inside the almirah to minimise the movement while opening it (fig5.7). Windows having tables in front of them have been provided with levers which project outwards for opening the louvers.



*Fig 5.6: bulletin board*



*Fig 5.7: almirahs with circular shaped doors*

The pathfinder which is an easy- to-operate locating system has been provided at several nodes to serve as an auditory and visual aid for people (fig 5.8). The machine has a display unit and works with a tape recorder, has keys with Braille pads and is coded with complimentary colours. The relative distances of one place to another are stored in the machine and the keys contain the names of the places.



*Fig 5.8: the pathfinder*



*Fig 6.1: use of recycled rubber on the ramp*

Innovation in terms of material applicability lies in the use of recycled rubber on the ramp to increase the rolling friction between the tracks of the ramp and the tyres of a wheelchair, providing traction while turning it (fig 6.1).

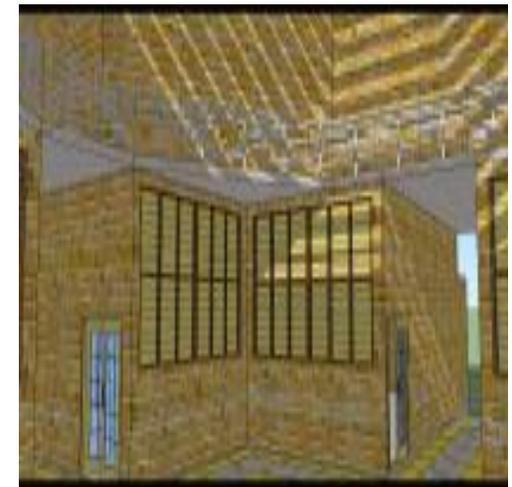
Also tactile tiles laid along the pathway change their orientation after every 1000 mm distance for helping a visually impaired person to calculate the distance he has covered (fig 6.2). The tiles have a different color and surface texture at the junctions (fig 6.3).



*Fig 6.2: tactile tiles as the flooring material*



*Fig 6.3: tiles at junctions*



*Fig 7.1: diffused light in the central courtyard through the louvered roof*

For ventilation and natural lighting, wooden as well as synthetic louvers have been used. Glass has been used in slant angles to radiate heat for controlling the indoor temperature. A tetrahedron-shaped roof over the central courtyard with louvered openings provides a central courtyard style of air circulation (fig7.1).

A total schematic diagram of the entry and escape of air is shown in fig 7.2.

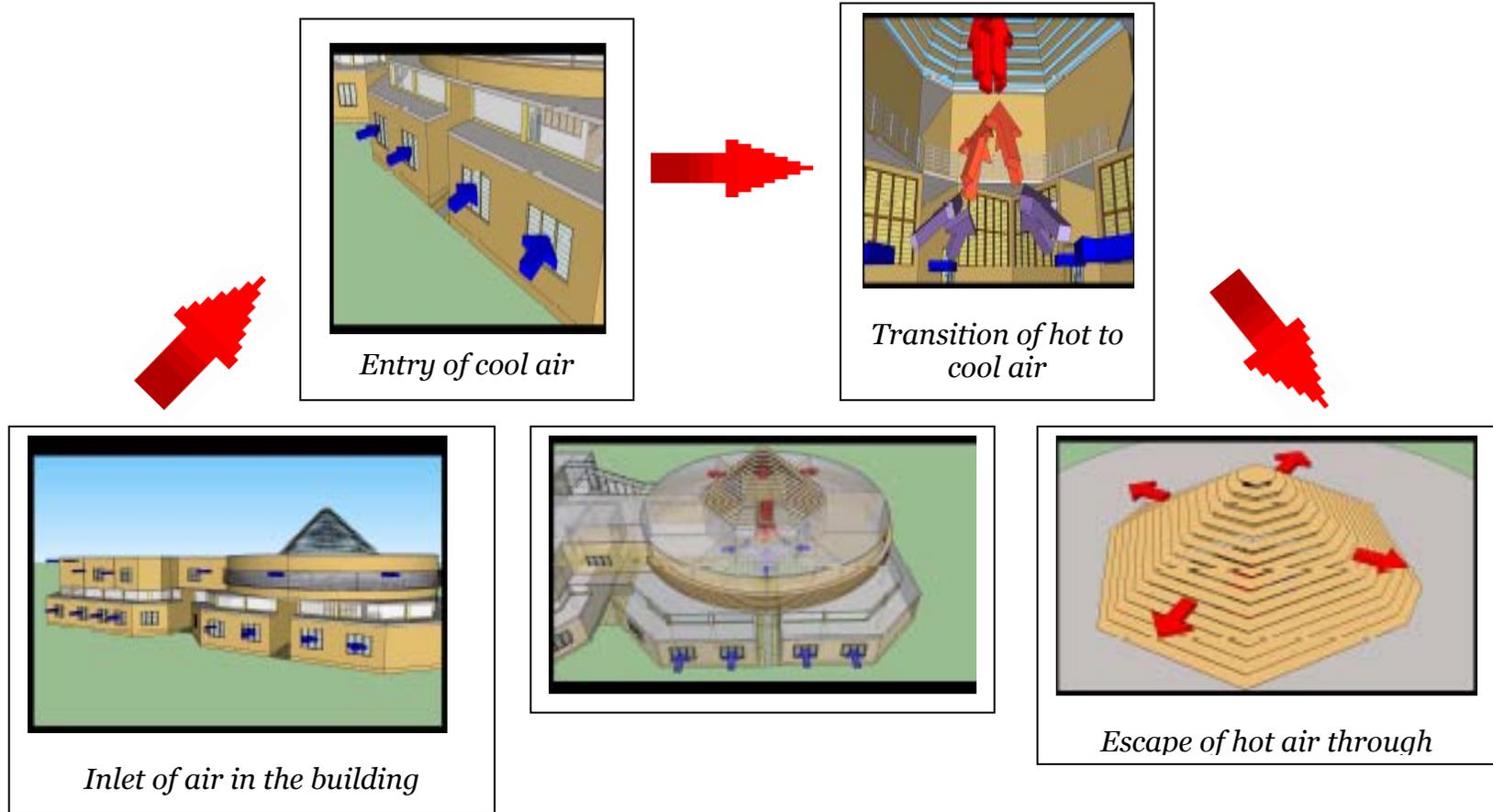


Fig 7.2: total schematic diagram of the inlet and outlet of air

The transition in the building from the geometrical forms to the organic style in the administrative block represents the transition of one's restrained life to salvation.

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## CRC II: ACHIEVING 'UNIVERSALITY' IN DESIGN

### CONTEXT:

Universal design means that the products which are universally accommodating; they conveniently cater requirements of all their users. On the route towards this goal, the product that are designed primarily for the mass market of able-bodied people, could be refined and modified, so that it would suit all its other potential users including people with disabilities. Good design is for everyone, it is good for especially/differently abled people too.

Universal Design in Architecture serves all levels of the eight-level pyramid (Goldmith, 2000). With regards to public buildings, if usable by all kinds of people, it is the route to universal design.

- In row 1 at the foot of the eight-level pyramid are fit and agile people, those who can run and jump, leap up stairs, climb perpendicular ladders, dance exuberantly and carry loads of heavy baggage.
- In row 2 are the generality of normal adult able-bodied people, those who, while not being athletic, can walk wherever needs or wishes may take them, with flights of stairs not troubling them.
- In row 3 are the main, also, normal able-bodied people, and in the public realm the architect frequently fails them.
- In row 4 are elderly people who, although perhaps going around with a walking stick, do not regard themselves as being 'disabled'.
- In row 5 are ambulant people who have disabilities
- The people in row 6 are independent wheelchair users.

### CASE STUDIES:

Case study in SOS village at Bhopal and in CRC Bhopal was done. This gave an overall idea about universal design. Following is an account of the special features in the case-studies:

Parking & Walk-Way:

- Parking for general public was as per basic standards.
- Parking for the disabled was very close to the entrance of the building.



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- Dedicated spaces were allotted for the disabled and they were inviting for them.
- The access for visually impaired people was not up to the standards.
- The access path had lots of hindrances.
- There was one way entrance and the parking was on both the sides of the road.
- The footpath dedicated to the visually impaired people had markers on only one side.
- Good thing was that topographic map was available with Braille patterns for persons with visual disability.

#### Entry:

- The entrance was a metal gate with a guard room towards the right.
- The parking shed was visible.
- The entrance path was demarcated with green surroundings so it was inviting.
- There was only one way entrance.
- Accessibility aspects were not effectively considered.
- Especially visually impaired persons cannot access the building without assistance.

#### The administrative wing:

- There was a registration office for the new recruits, trainers and the patients.
- Disability Information Line was available, which contained the database of:
  - Available facilities to the disabled people.
  - All the registered patients and their profile updates.
  - It was mainly providing awareness to the new patients who were ignorant about the available facilities that they can avail provided by the Government of India.

The office had the managers, accountants and multi skill experts. It also had Lecture halls, Library and Common training hall for the recruits and the trainers.

#### Waiting and Reception:

- There was one main reception cum waiting area just after the porch entrance.
- There was a dedicated administrative block with a conference hall and a room dedicated for disability information line which was their database management system
- All the different wings dedicated to different activities had their own dedicated offices.
- The interrelationship and circulation outside and inside was very effective.

- Use of contrasting colours was done to highlight the paths for the visually challenged people.
- Before every entrance there was a Braille imprint.
- Guide rails were installed in to the walls all around the building.
- There was a difference in the texture of material at all junctions and turnings to let the visually impaired people know that they have to turn in some direction.

### **CRC-PATNA:**

Patna is the capital of the state of Bihar, and the second largest city of Eastern India just after Kolkata. Patna is also one of the oldest inhabited places of the world. Ancient Patliputra was the capital of the Magadha Empire. The city blessed by rivers Ganga, Son, and Gandak is approximately 25 km long and 9 to 10 km wide. Buddhist, Sikhs, Hindu and Jain pilgrim centre of Bodhgaya, Nalanda, Rajgir and Vaishali are situated in Patna.

The Composite Regional Centre would be an all in one Centre for specially-abled people; the given site is situated near the Indira Gandhi Institute of Medical Science, Patna. The plot is divided into two parts by link road. The challenge was to create a building, specially made for differently-abled people with an education centre, hospital and multipurpose auditorium. To make such a multipurpose building according to universal design theory, we have to get a look on the concept of universal design.

The universal design precept is that the accommodation parameters of normal provision should be extended as far as possible, thereby minimizing the need for special provision for people with disabilities. The query here is what is **meant by 'normal' and what by 'special'**. **Three tests may be applied to assess the reasonableness of such special provision** as is proposed in the course of designing of a building. The first is that it will be of *genuine value* to the disabled people it is intended to benefit. The second is that it **is not inconvenient to other users** of the building; this applies other than where the advantages for its intended beneficiaries outweigh the disadvantages caused to others.

### **DESIGN SOLUTION:** *(Please refer design sheets along with the text)*

Proposed design focuses on many aspects related to the universal design theory.

- The planning of the building has been given utmost importance. Different areas have been demarcated and all related things kept together to ease the users.
- Several access points have been given in the building to minimize the travelling distances for the persons with disabilities and provide them with extra comfort of travelling less in the premises.

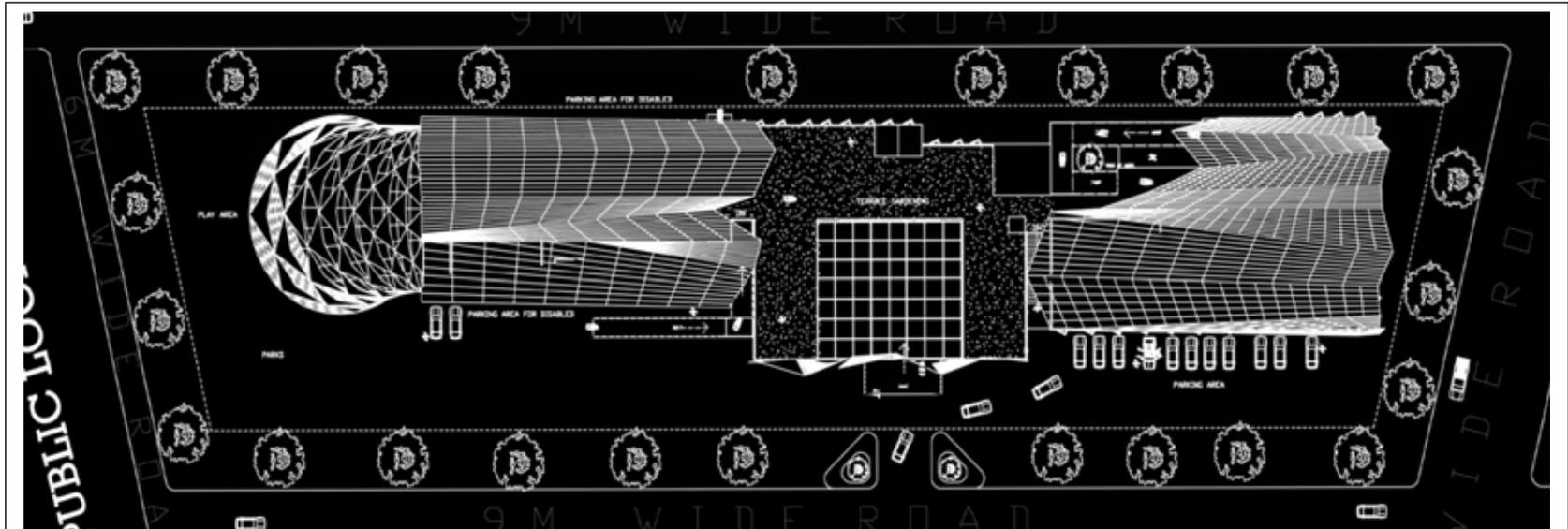
- A long continuous corridor has been provided for easy horizontal motion, which is acting like a central spine.
- The multipurpose hall is evolved from a fruit basket which has number of vertical and horizontal sticks making it a nest kind of a structure.
- Bay windows have been provided which give access to north and glazing light, thus providing a cooler sun in the hot and temperate zone of Patna.
- Different materials are used in different sections of the building-Academic, Administrative, Hospital, to help the user identify each block distinctively.
- An open library is provided on first floor. The main concept of ‘open library’ is based on its functionality that the themes written on the books are clearly visible, which helps to attract people towards them.
- The concept behind the design is based on spirituality and hope. A ‘TREE OF HOPE’ has been placed inside the building to make people believe that they are no less important and that there is always a better world for them.

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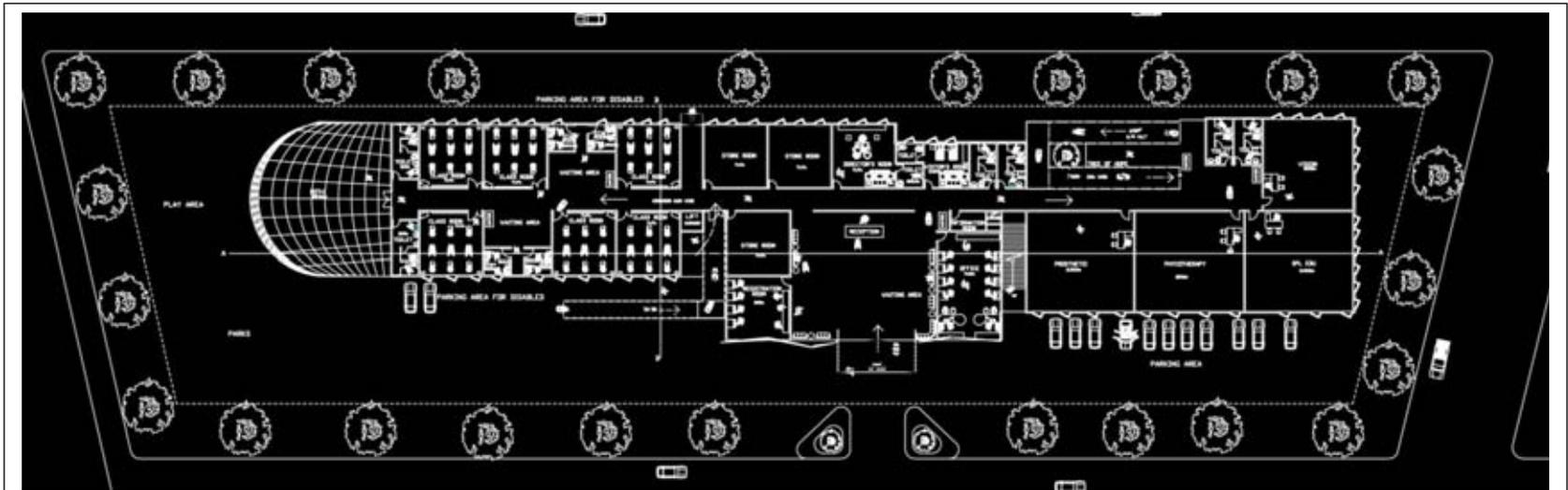
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**DESIGN SHEETS:** (continued in next page)

**PLANS, ELEVATIONS, SECTIONS AND VIEWS:**



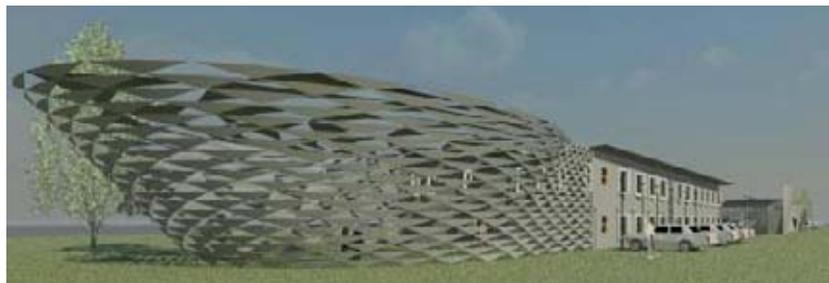
*Site Plan*



*First Floor Plan*



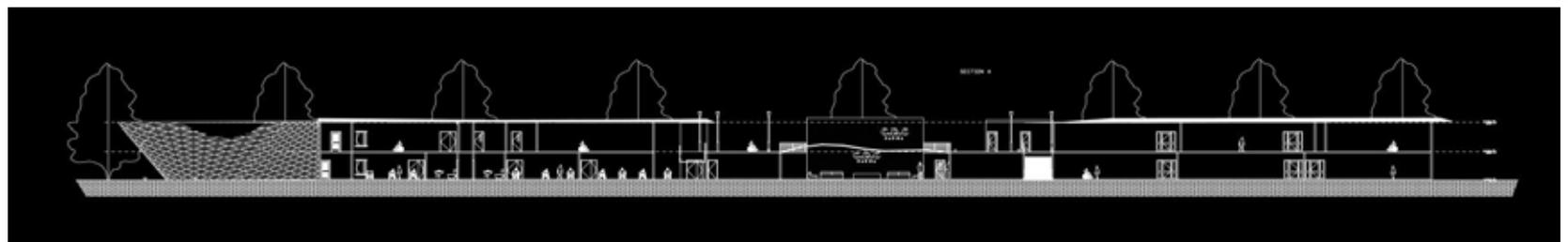
*View 1*



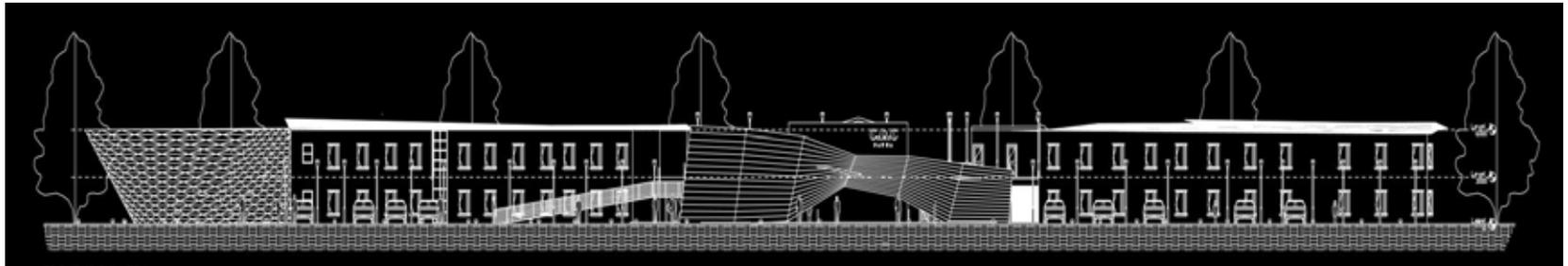
*View 2*



*View 3*



*Section*



*South-East Elevation*



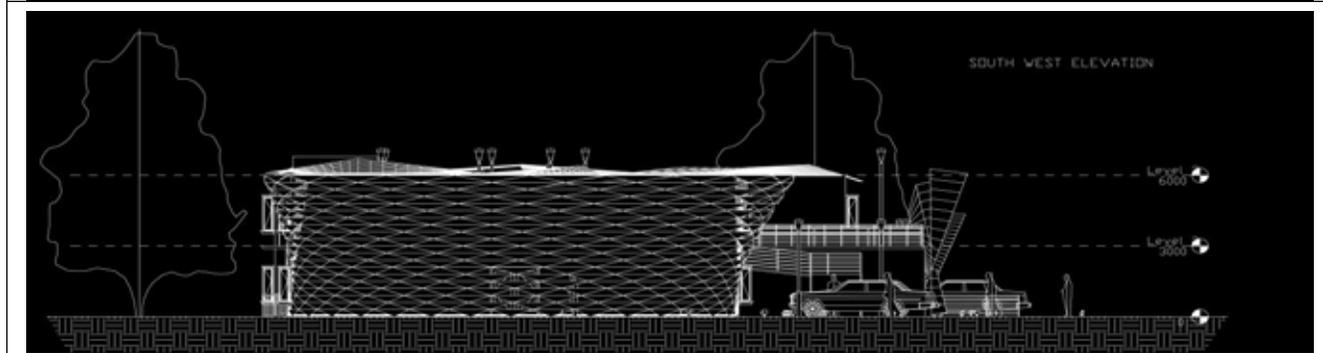
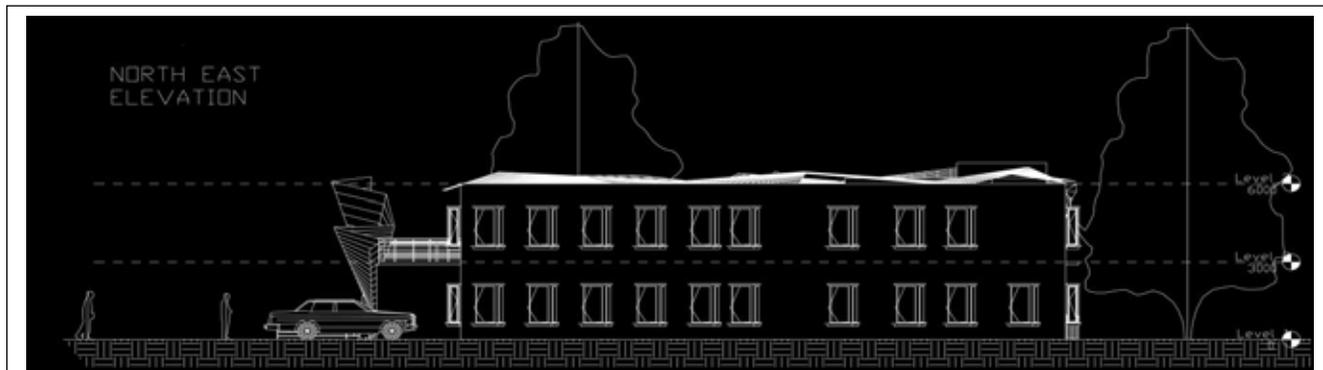
*View 4*



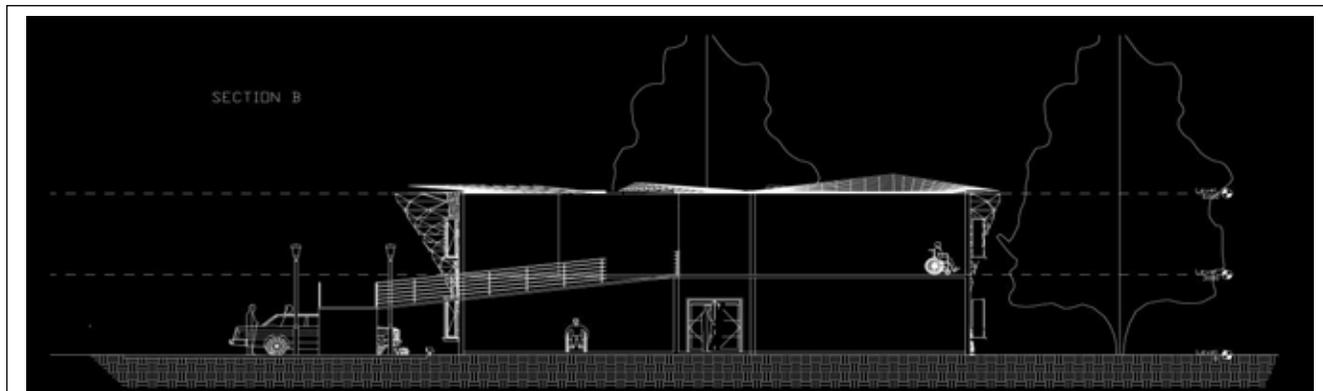
*View 5*



*View 6*



*South-West Elevation*



*Section*



*View 7*

## CRC III: HUMANOLIC

### CONTEXT:

The concept of the building is “HUMANOLIC” which has been inculcated in design through the theme of “FORM FOLLOWS FEELING”.

### *Humanolic:*

This term represents the state of human being when one starts feeling human. If we are designing a ‘building for all’ that simply mean that the building belongs to all. There is a human sense, which is with everyone in this universe, if he is alive, and that is “Feeling”. The design that makes everyone feel that the building is not for a special group of people but for all. A building that fulfills the “needs of all” physically and aesthetically, and create an environment which is live and energetic. For example, entering in the lobby, when we look on the sculpture and the strings/cables holding ramp, it unknowingly develop a feeling of support for life and the power of life. The main principle of concept is “to serve the users in the best possible way” because building is not only the walls and the roof but the environment inside. How many times we feel patriotic in our regular life, but when we go to India Gate or Rajghat, a sense of being an Indian springs in. This is the *Humanolic* behavior of the structure which makes you to believe so.

### *Form follows feelings:*

The design not only fulfills the functional requirements but also the feelings, and the functions which are derived from the feelings like care, strength, hard work, happiness, etc. The orientation of the entire interior space is such that one can easily find out his/her department of interest from the entry of the lobby, at the same time he is free to move and help himself in the building. The use of design elements adds value in aesthetics, low cost and functionality.

### CASE STUDIES:

Following are the important observation gathered from the case studies of CRC Bhopal and SOS Village Bhopal



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We tried to make the built environment as helpful as possible, so one can easily communicate with the outer world. Flooring pattern of the plan are in different colors. Hand rails have been provided with the walls to guide the user. The energy used in the entire building is as less as possible. Option for lift has been provided for if building is made taller in future. The lawn or the courtyard provided inside the building brings nature inside it.

The ramp is hanging on the string and wires from the roof. Fiber glass translucent dome allows daylight and ventilation in the lobby area. The courtyard in the building is to balance the internal temperature and air movement; sun breakers at tilted angle in south west are designed to break the direct noon and evening sun. The plates in the front increase the pressure of air and cool it down. The front green terrace garden increases the value in aesthetics.

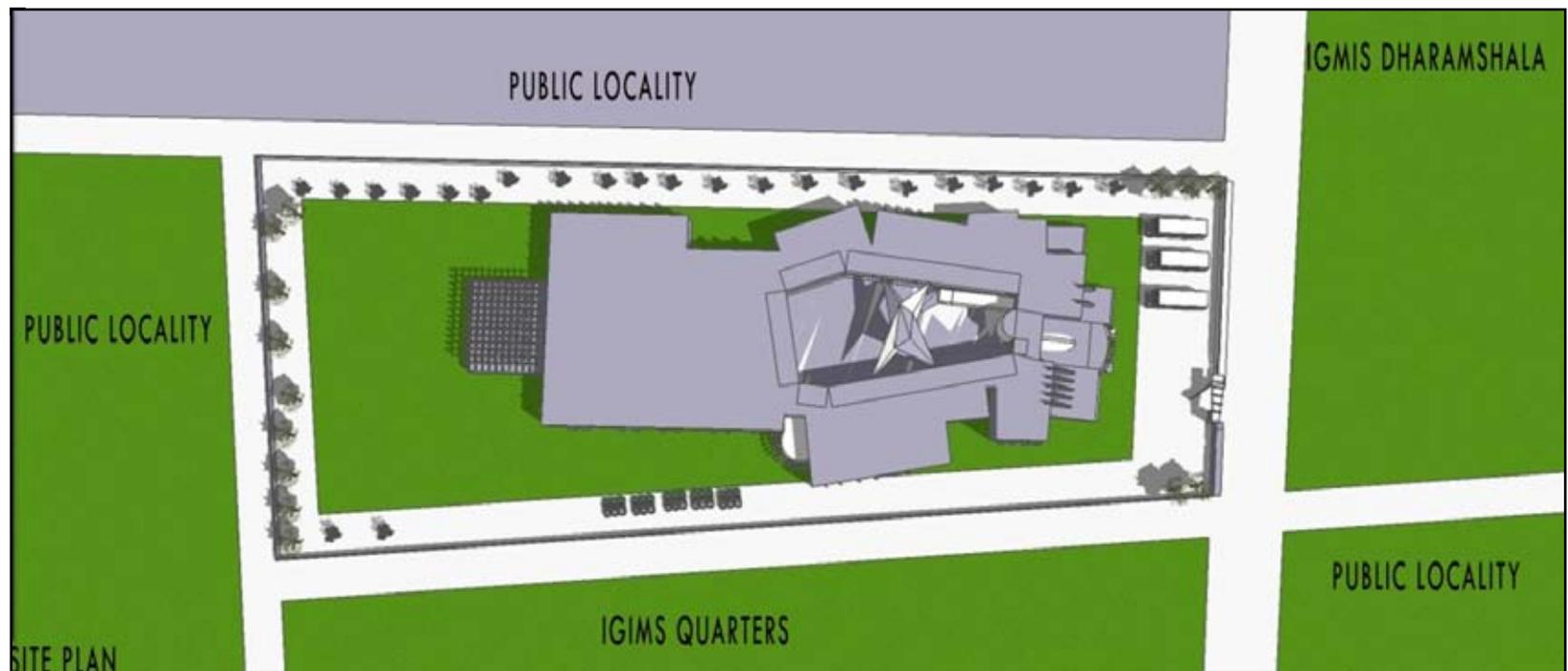


Figure 5: SITE PLAN

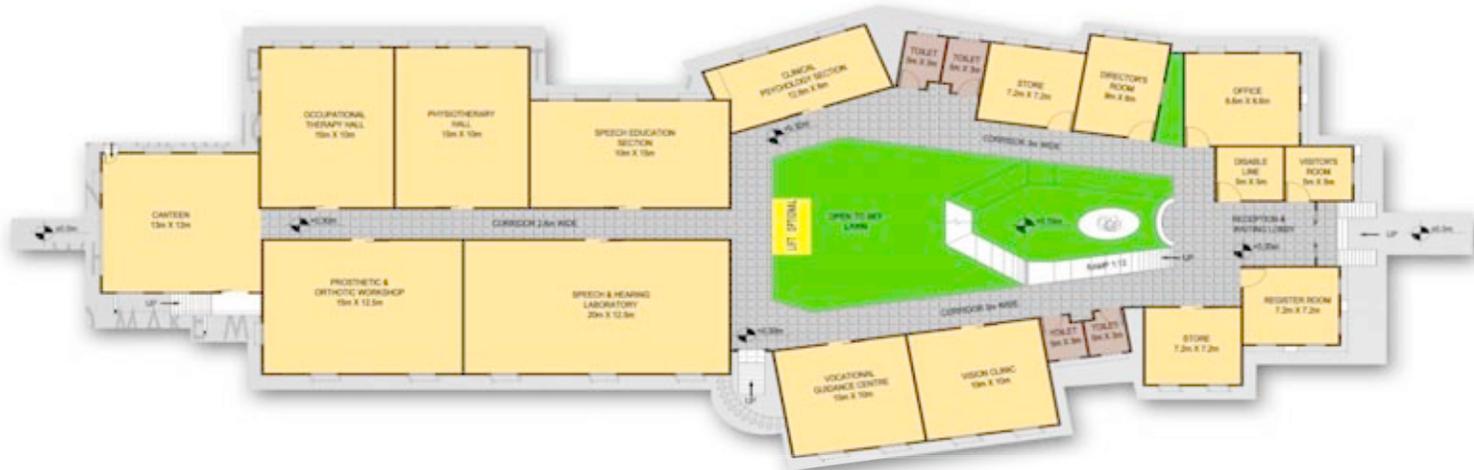


Figure 6: GROUND FLOOR PLAN

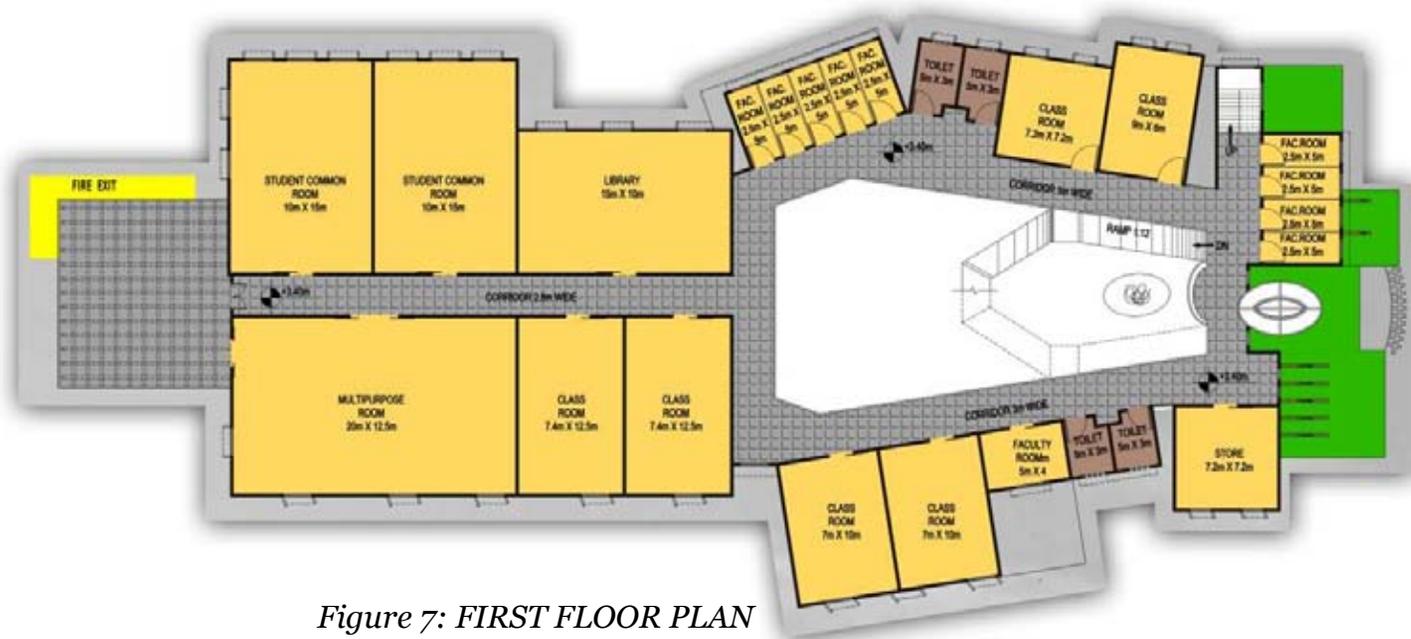


Figure 7: FIRST FLOOR PLAN

The multipurpose room is placed in the first floor adjoining to the open terrace which accommodates the open air activities too. The function performed in the multipurpose room is related to all the students and staff, so the orientation of the room is not bothering the visitors.

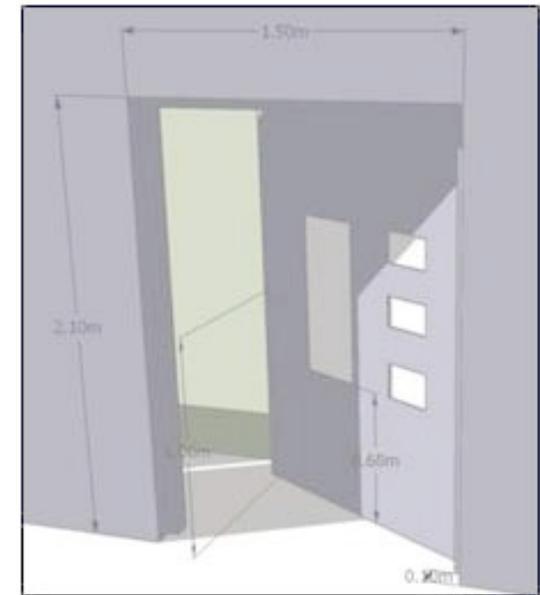


*Figure 8: Open area or terrace adjoining to the multipurpose room*

Material- Exposed brick work is used in the facade of building. Sun breakers and chajjas are provided at an angle to break the direct sun in the building. Car parking allows wheel chair user to park the car and move in the area which is totally accessible. Use of glass is limited only for visibility and light. Over exposure through glass is ignored to make spaces clearer to all.

### 1. DOOR

Sliding Door- The door slides and gives comfort to the user. The long handle allows holding it from different heights and the glass manages the visibility.



*Figure 9*

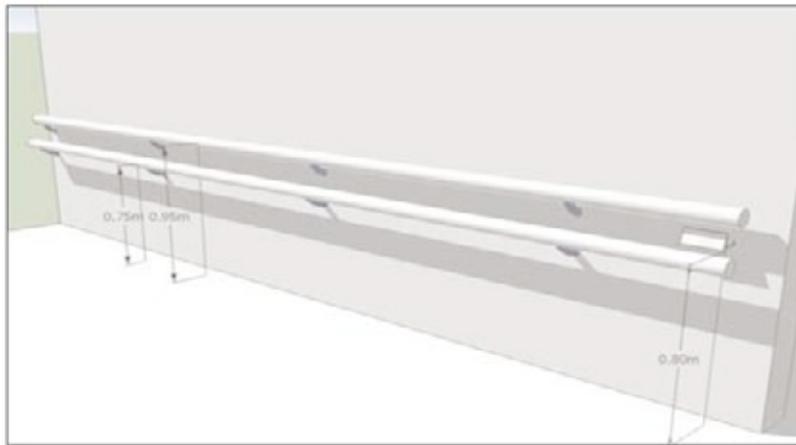


Figure 10

**2. RAMP & HANDRAIL DETAILS**  
Handrail is provided at different heights which allows the user to use it and the direction board is attached along with it in braille script, useful for those who are visually impaired.

### 3. RAMP

The material used in the ramp is non-slippery and the ratio of the ramp is 1:12 which allows easy accessibility. Handrail at different heights makes it more comfortable.

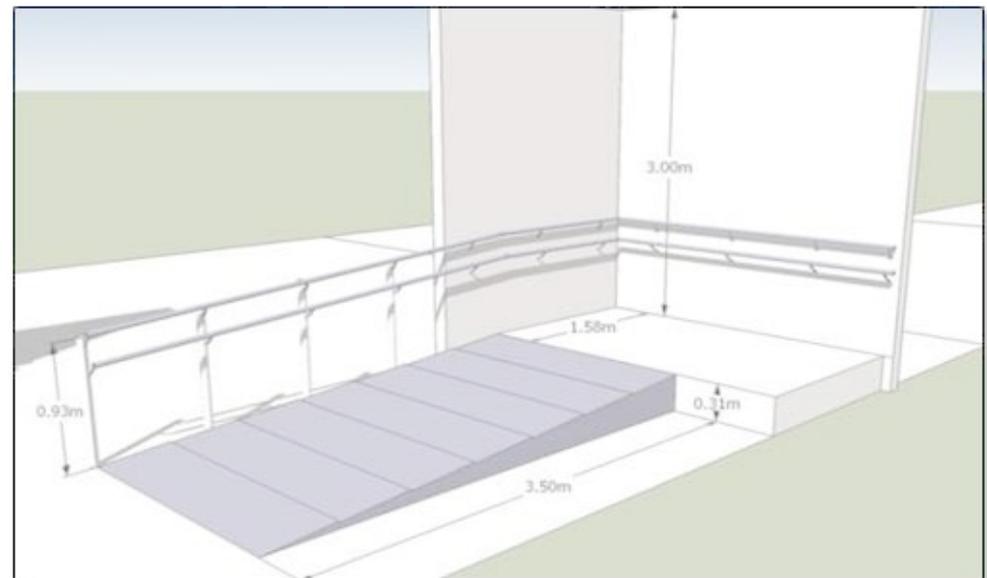


Figure 11

## TOILET FIXTURES

Water Closet - The handles at different heights enhances the usability. Similarly, a long grab-bar increases the efficiency of the urinals for the people with disability.

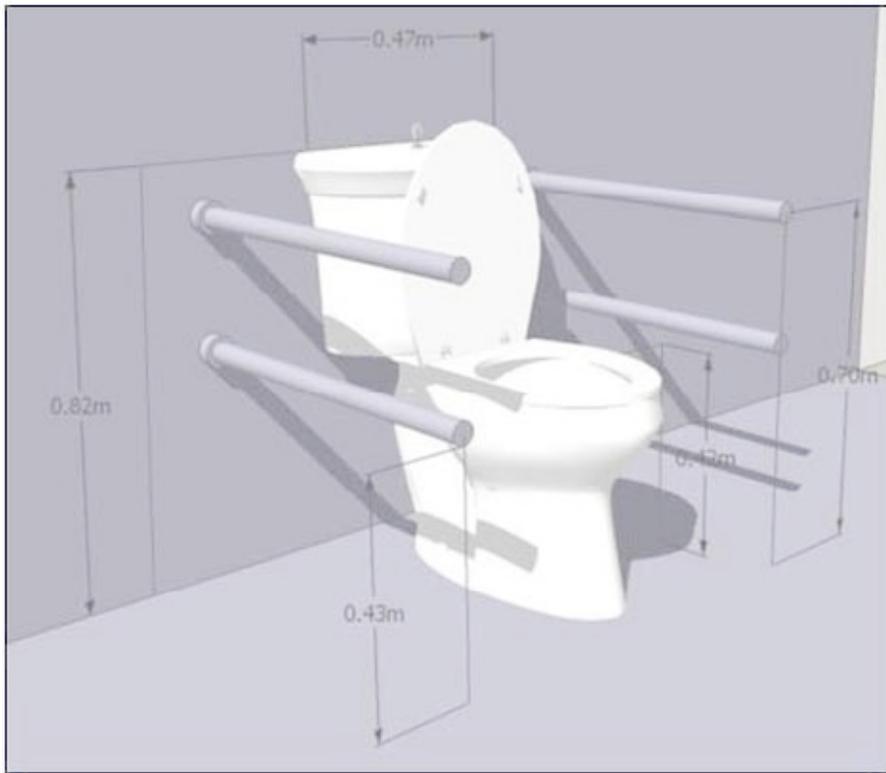


Figure 12

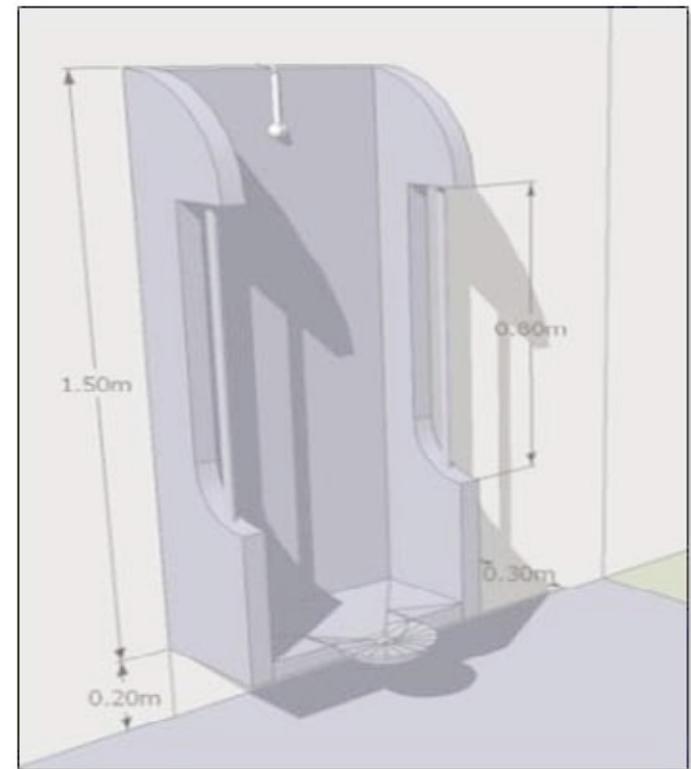
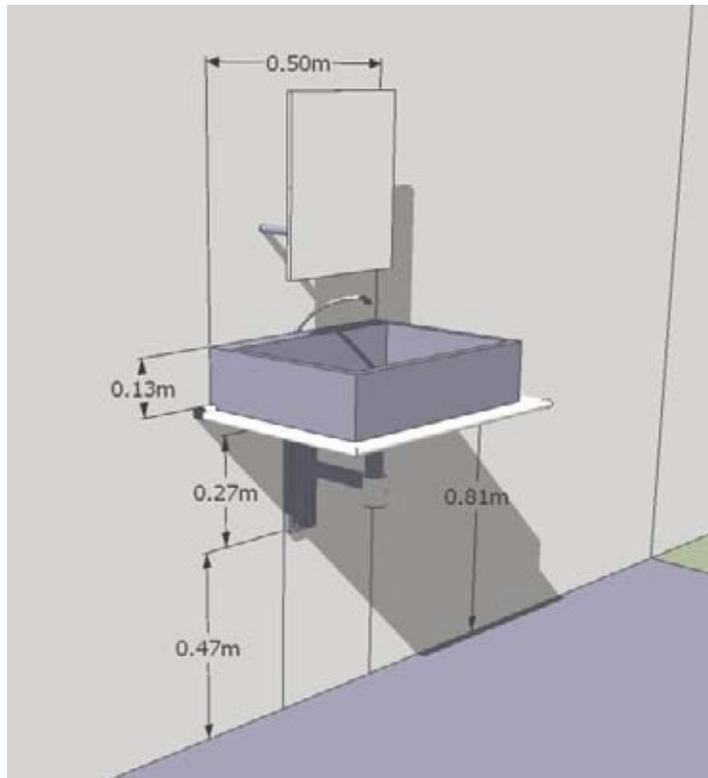


Figure 13



*Figure 14*

#### OTHER DESIGN ELEMENT

Mural: Wall mural is used as path direction for those who can identify this, simultaneously, enhances the interior value without any special treatment.

#### WASH BASIN

The wash basin is designed in such a way that it can be moved upwards and downwards, helping users of different height and mirror too can be rotated as per the requirement.

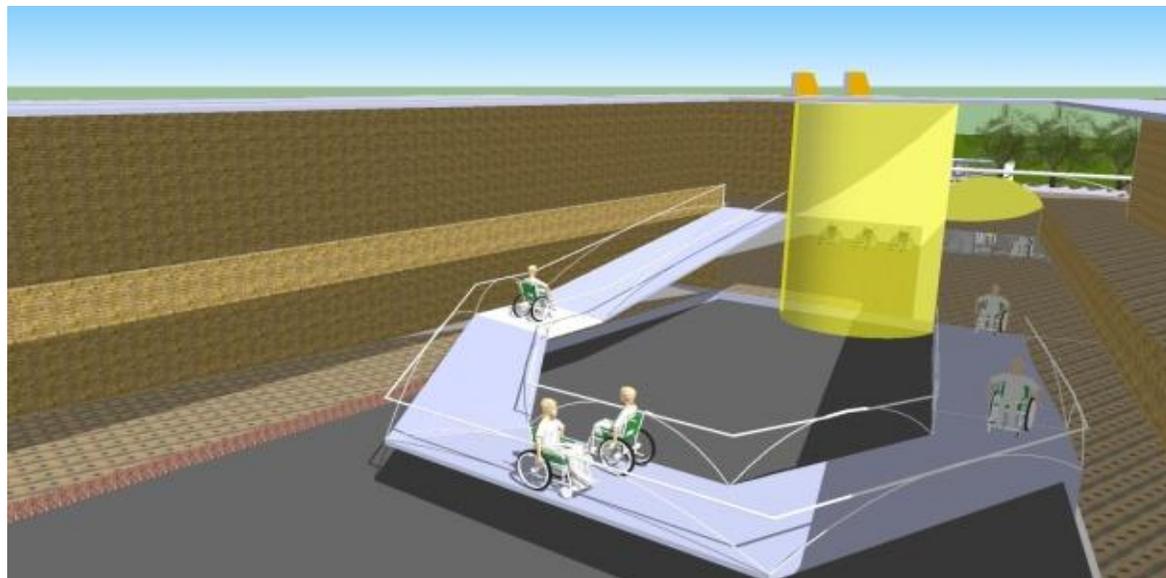


*Figure 15*

## VIEWS



*Figure 17*



*Figure 18*



*Figure 19*



*Figure 21*



*Figure 21*

## REFERENCES:

- Universal Design, A Manual of Practical Guidance for Architects by Selwyn Goldsmith
- Time Saver Standards for Interior Design and Space Planning, by Joseph De Chiara, Julius Panero, Martin Zelnik
- **Architects' Data**, 3<sup>rd</sup> edition, Ernst and Peter Neufert, edited by Bousmaha Baiche & Nicholas Williman
- [www.designforall.in](http://www.designforall.in) as is accessed on January 2011
- [www.architecture.about.com](http://www.architecture.about.com) as is accessed on January 2011
- The Principles of Universal Design, Center for Universal Design, NCSU by Connell, B.R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M. And Vanderheiden, G. North Carolina State University, Raleigh, NC.

## 5. RESEARCH, DOCUMENTATION AND DESIGN INITIATIVES ON SOCIAL-ECONOMIC-CULTURAL EQUITY

*...“The problem is not how to wipe out all differences, but how to unite with all differences intact.” - Rabindranath Tagore...* Universal Design in India needs to address diversity as well as socio economic disparity that will define its width and depth in Indian context. The upcoming section has included some students’ research, documentation and design works to address Social Equity by Design.

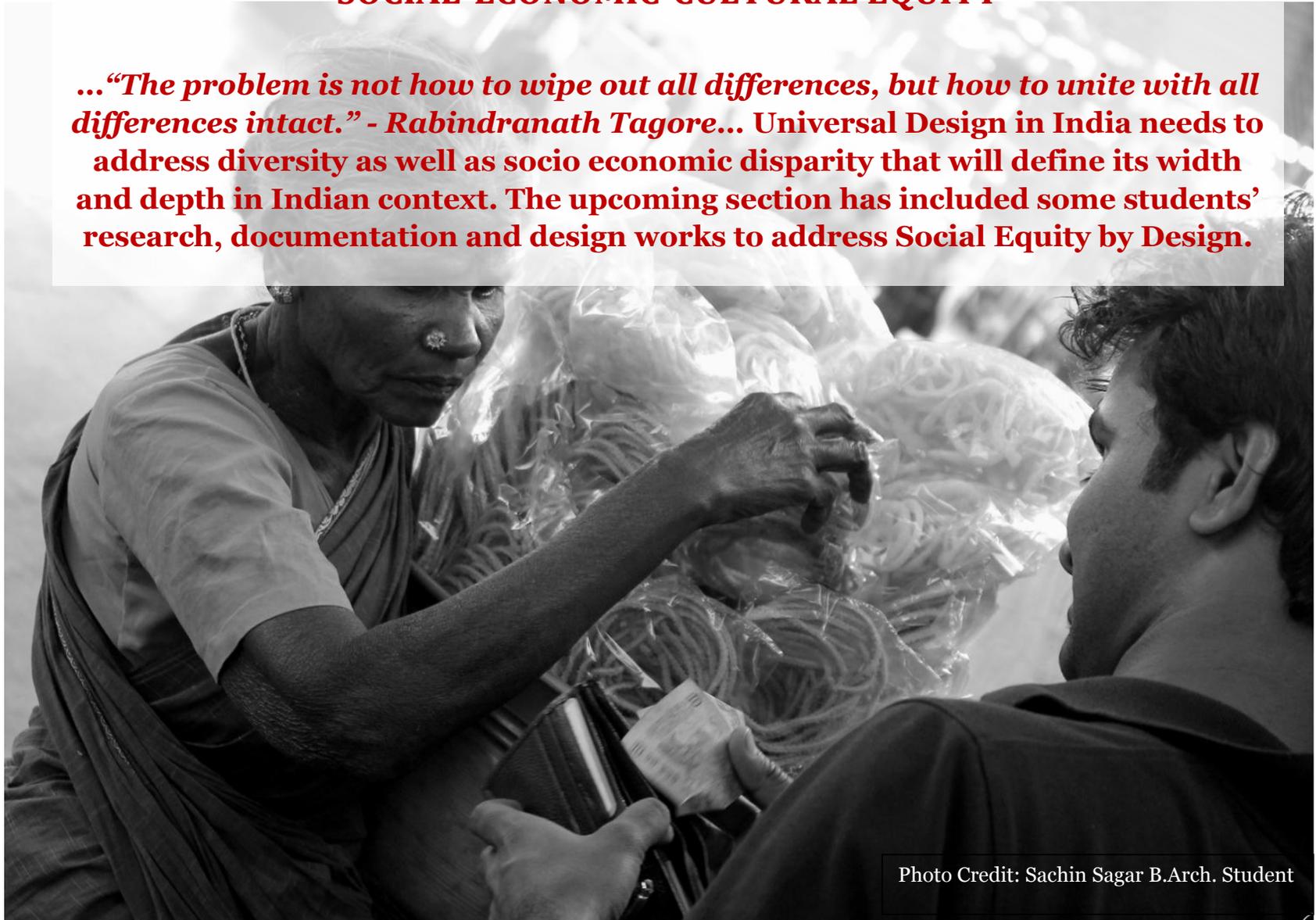


Photo Credit: Sachin Sagar B.Arch. Student

## HUDCO TROPHY FOR URBAN POOR

### CONTEXT:

Ever since the commencement of human civilisation, vulnerability has been a part and parcel to the weaker sections of the communities who have spent their entire lives in suffering and agony due to some reason or other. Even after 5000 years of existence it has been difficult to get rid of the concept and after effects of susceptibility. As for India with over 500 class-1 cities that account for the second largest population in the world which is supposed to surpass China by year 2025 has been steadily growing in urban context, has given rise to homelessness to less blessed people of our society. Homelessness, caused as a series of unconditional factor occurring algorithmically within an unsolicited flowchart can be termed as strategically planned phenomenon rather than being a perceived state of life. As per urban context, in the recent 10 years, Indian cities have encountered with an all-time high rate of migration from rural areas where people come in search of employment and becoming economically resilient. On the other hand such has not been the case.

Though New Delhi, the national capital of India accounts for more than 55000 people that are susceptible to homelessness even after the fact that these people in some or the other way constitute the powerhouse of our country, yet these people do not have the privilege of living in a night shelter. India being a developing nation has a great majority of people under the line of poverty. These people are deprived of the adequate access in basic needs of life such as health, education, housing food, security, employment, justice and inequity. Moreover these are unidentified people in the urban context as they do not account for the net gross population in the urban context of the country. Homeless people mainly are skilled and unskilled workers, rickshaw pullers, hawkers, beggars who were not as providential in their skill for being employed. As a matter of fact it is sad to notice that 20% of this population has spent at least 7 years of their life in such inhumane conditions.

### AIM AND PURPOSE:

The design aimed at creating a homeless shelter within a class 1 city of India which could cater to the needs of at least 100 homeless people. The design brought in the sense of belongingness for it was equally challenging to design for homeless and help and sustain them in the society.



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Ritika Saraf  
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## WHY DELHI?

Homelessness as a problem is a nationwide disgrace to the largest democracy in the world. New Delhi, a class 1 city was chosen to confront this issue so as to send out a clear message to other cities who could not cater the needs of these less privileged people. In initial study it was also concluded that the city has far been neglecting the population of homeless people which forms a major chunk of the society.

### **METHODOLOGY:** *(Please refer design sheets along with the text)*

The identification of homeless people was the foremost obstacles as no one really knew as to where they lived. It was later concluded that their places included footpaths, under-bridge passes, down-town areas, railway stations and bus stops where they did their daily jobs during days while spent their nights nearby. Since Delhi is a tactically planned city, neither it was possible to cut out areas in the middle of the city and assign them plots nor it was feasible to take such a mass population outside city. Finally after thorough brainstorming it was realised that Delhi accounts for more than 1500 flyovers within its vicinity which never utilized the spaces below it. Every flyover had a sufficient space that could serve the purpose of at least 50 people in a well-planned approach. The final site chosen to create a prototype was one such flyover at ISBT, Kashmere Gate which had enough space for 100 people.

### **DESIGN CONCEPT:** *(Please refer design sheets along with the text)*

Since the design was below the flyover, natural shade was but obvious, but there was an urgent need to minimize the noise from the road traffic and tackling the water logging as Delhi faces heavy rainfall every year. Basic design intervention solved our structural problem when the prototype for 100 was elevated on numerous stilts with ramps running on its periphery. As for noise, they were tackled using perforated bill boards which minimized the noise levels on the inside of the module. While the design was more about functionality, all the aspects were kept in mind while evolving it as the design should bring out belongingness and not discrimination of any sorts.

### **DESIGN SHEETS:** (Continued in next page)



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Siddhartha Yadav



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B.Arch student

## THE PROPOSED PROTOTYPES



## OVERVIEW



THE PROBLEM OF HOMELESSNESS IS NOT PECULIAR TO INDIA, RATHER, IT IS A WORLDWIDE PHENOMENON

### CHALLENGE:

TO DESIGN A 24 HOURS HOMELESS SHELTER WITH A CAPACITY OF 50-100 PEOPLE IN ANY CLASS 1 CITY OF INDIA.

### HOMELESS:

THE TERM 'HOMELESS' MEANS SUCH PERSONS (INCLUDING MEN, WOMEN, EUNUCHS, AND CHILDREN) WHO DON'T HAVE A HOME OR SETTLED PLACE OR ABOVE, THEY LIVE ON PAVEMENTS OR AT THEIR WORKPLACES.



### PRESENT SITUATION:

- 13 MILLION PEOPLE HOMELESS IN INDIA.
- THEY LIVE IN A CONDITION OF DEBARMENT AND MARGINALIZATION.
- REASONS FOR NON-OCCUPANCY OF SHELTERS ARE POOR AMENITIES, LOCATION OF SHELTERS IN INACCESSIBLE AREAS, MISBEHAVIOR OF CARETAKERS ETC.
- IN SOME SHELTERS MONEY IS CHARGED FROM THE HOMELESS



### WHY DELHI?

- NATIONS CAPITAL, IT SHOULD SET A GOOD EXAMPLE
- EXTREME CLIMATIC CONDITIONS: CHALLENGE
- HOMELESS DENSITY MORE AS DELHI IS THE SECOND MOST POPULATED CITY AFTER MUMBAI
- JOB OPPORTUNITIES FOR UNSKILLED PEOPLE
- EDUCATIONAL INSTITUTIONS ATTRACT STUDENTS FROM VILLAGES WHO DON'T HAVE A PERMANENT PLACE TO LIVE
- LANGUAGE IS NOT A BARRIER AS DELHI IS DOMINATED BY HINDI SPEAKING PEOPLE



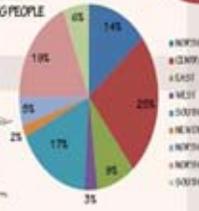
MAP SHOWING DENSITY OF HOMELESS INDEPENDENT ZONES IN DELHI



MAP SHOWING LOCATIONS PROVIDING JOB OPPORTUNITIES AND EDUCATIONAL FACILITIES FOR THE INHABITANTS WITHIN A 5KM DISTANCE

### WHY DEAD SPACES?

- AWAY FROM GENERAL POPULATION
- EMPTY PLOTS NOT AVAILABLE IN HIGH POPULATION OF HOMELESS AREAS
- SUCH SPACES ARE NOT BEING USED FOR ANYTHING
- CHOOSING A SPACE WHERE THE COMMON MAN DOESN'T WANT TO GO TO LIVE



### SHORTLISTING OF FLYOVERS

- PROXIMITY TO HOMELESS INHABITANTS
- FEASIBILITY OF CONSTRUCTION
- JOB OPPORTUNITIES NEAR THE AREA

### WHY UNDER FLYOVER?

- ADEQUATE SPACE UNDER AND SUFFICIENT HEIGHT ACHIEVED USUALLY AFTER 100M
- THE SPACE IS FREQUENTLY USED BY THE HOMELESS
- 24HR SHELTER POSSIBLE
- SHADE BY THE FLYOVER CAN BE UTILISED
- THERE IS A SENSE OF SECURITY AS THERE IS A CONSTANT MOVEMENT



SPACE ANALYSIS	PLACE	ROAD LEVEL	PUBLIC INTERFERENCE	SHADE LEVEL	REMARKS
OPEN SPACE	LOW	HIGH	24	WITHOUT INTERRUPTING ANY SMALL ACTIVITY HAPPENING, A SMALL CORNER CAN BE USED	
FREE SPACE UNDER FLYOVER	HIGH	LOW	24	SPACE OPTIMALLY UNDER LOW HEIGHT CONSTRUCTION IS POSSIBLE	
SPACE UNDER METRO FLYOVER	VERY HIGH	LOW	17	SPACE VERY NARROW - DIFFICULT TO CONSTRUCT	

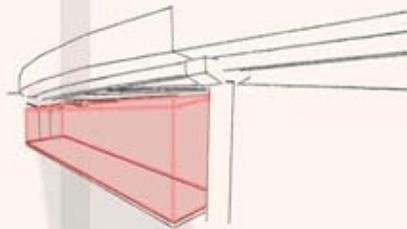
### WHY ISBT KASHMERE GATE?

- CONVENIENT FOR IMMIGRANTS AS IT IS NEAR NEW DELHI RAILWAY STATION AND ISBT.
- HIGHEST DENSITY i.e. 25% OF THE TOTAL HOMELESS POPULATION INHABIT HERE.
- PROXIMITY TO HEALTH CARE CENTRES WITHIN 3KMS.
- PROXIMITY TO EDUCATIONAL INSTITUTIONS.
- EMPLOYMENT OPPORTUNITIES ARE AVAILABLE IN THE NEARBY AREA (PORTERS, SWEEPING BUS STOPS, VENDORS, RICKSHAW PULLERS ETC.)



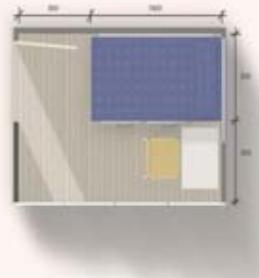
ISBT KASHMERE GATE

## FORM DEVELOPMENT

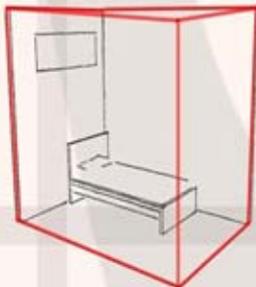


A LONGITUDINAL SPACE IDENTIFIED UNDER FLYOVER

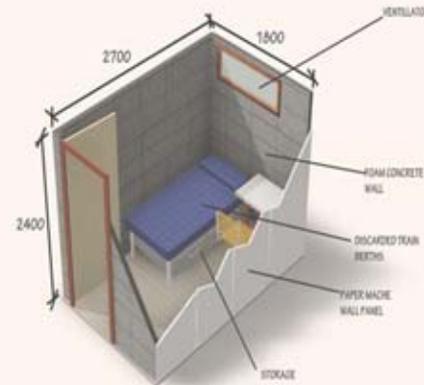
- THE MODULE IS DESIGNED BY TAKING THE MINIMUM AREA REQUIRE FOR ONE PERSON AS PER REQUIREMENT
- FACILITIES LIKE STORAGE, STUDY, SUFFICIENT NATURAL LIGHTING IS PROVIDED
- USE OF LOW COST MATERIALS LIKE FOAM CONCRETE, PAPER MACHE WALL PANELS AND DISCARDED TRAIN BERTHS
- AREA PROVIDED PER PERSON : 4.86 sq.m.



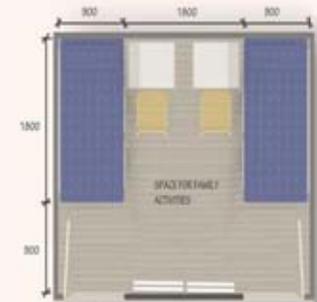
SINGLE MODULE PLAN



A MODULE DESIGNED TO COMFORTABLY ACCOMMODATE A SINGLE PERSON

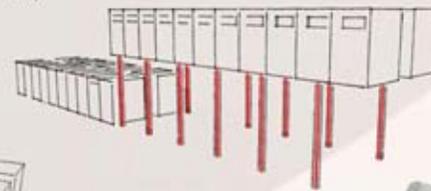


ISOMETRIC VIEW OF SINGLE MODULE



TWO SINGLE MODULES COMBINED TOGETHER TO FORM A DOUBLE BEDROOM

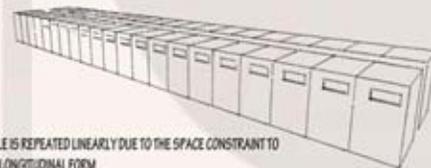
A PORTION OF THE SHELTER RAISED ON COLUMNS TO CREATE SPACE BELOW FOR ACTIVITIES TO TAKE PLACE (LIKE PLACE FOR VENDORS, PARKING SPACE ETC.)



THE PORTION LEFT ON THE GROUND RAISED UP ANOTHER FLOOR TO ACCOMMODATE MORE PEOPLE

THE STRUCTURE LOAD IS NOT TRANSFERRED TO THE FLYOVER SUPPORTS

THE MODULE IS REPEATED LINEARLY DUE TO THE SPACE CONSTRAINT TO ACHIEVE A LONGITUDINAL FORM

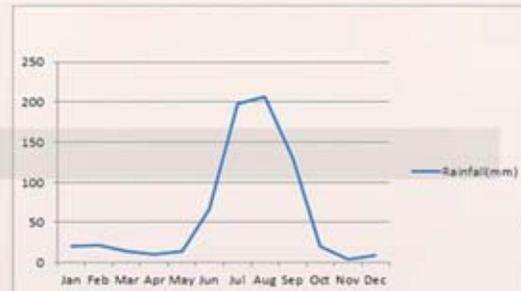


BILLBOARDS ADDED ON THE EXTER GENERATE REVENUE FOR THE MAINTENANCE OF THE STRUCTURE AND CLIMBERS A GIVE A VISUAL APPEAL TO THE SITE

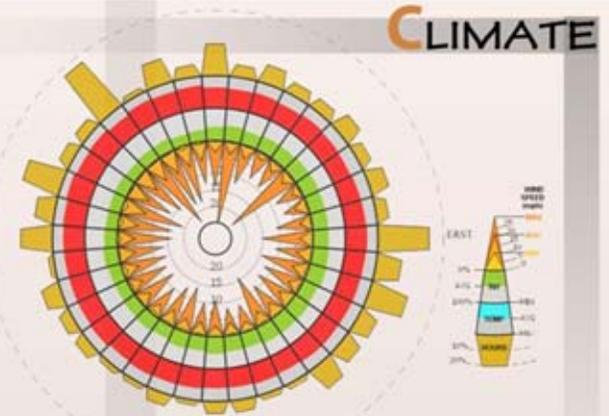




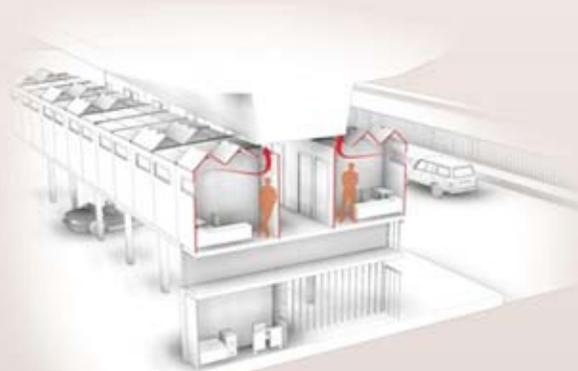
ANNUAL TEMPERATURE GRAPH



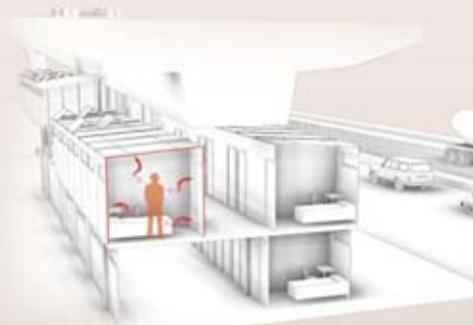
ANNUAL PRECIPITATION GRAPH



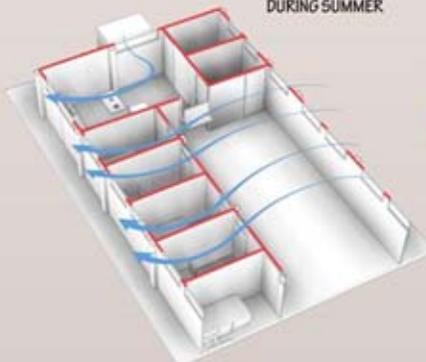
WIND WHEEL DISPLAYING PREVAILING WIND DIRECTION DURING SUMMER MONTHS



COLLAPSIBLE ROOF PANELS TO HELP IN HEAT VENTILATION DURING SUMMER



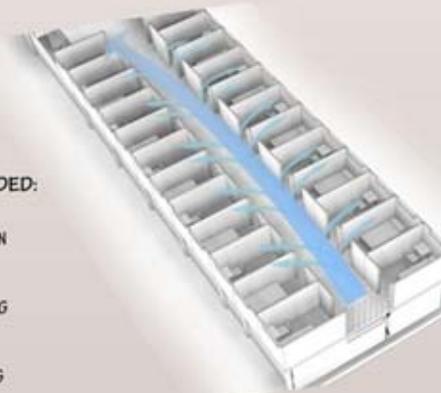
ROOF CAN BE CLOSED DURING WINTER AND RAINY SEASON



GROUND FLOOR VENTILATION

**CLIMATIC CONSIDERATIONS NEEDED:**

- CONSIDERATION FOR HEAT VENTILATION DURING HOT DRY SUMMER DAYS
- CONSIDERATIONS FOR HEATING DURING COLD WINTER DAYS
- PROPER DRAINAGE TO AVOID FLOODING DURING RAINY SEASON

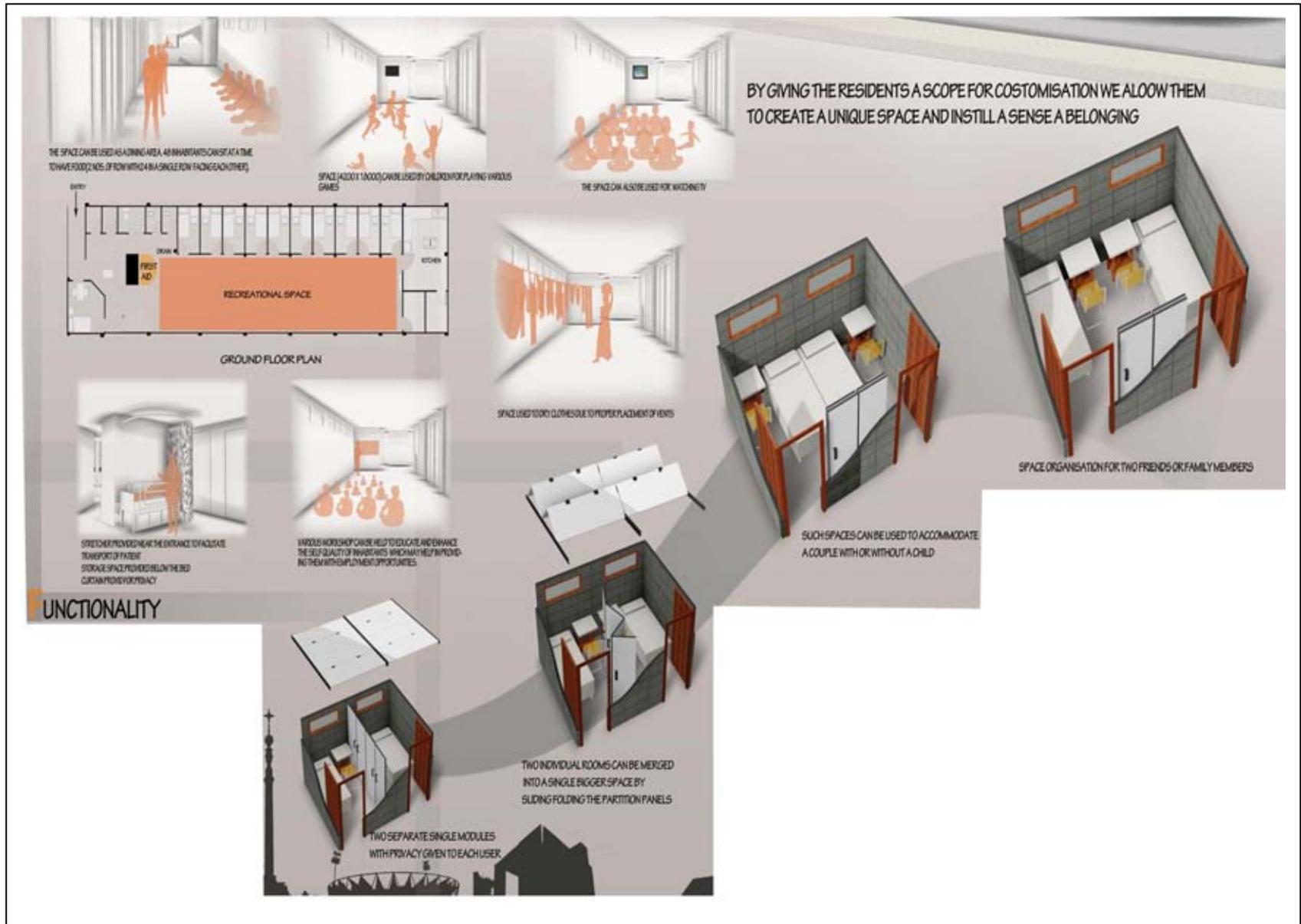


OPEN PASSAGEWAY PROVIDES GOOD AIR CIRCULATION TO ALL ROOMS

Month	Daily Min.	Daily Max.	Rainfall(mm)
Jan	7.8	20.8	20.9
Feb	10.3	23.7	21
Mar	15.4	29.6	14.5
Apr	21.5	36	10.7
May	26.2	39.8	14.1
Jun	28.3	39.4	66.3
Jul	27	35.2	198.4
Aug	26.2	33.6	206.5
Sep	24.7	34	130.3
Oct	19.4	32.9	20.8
Nov	12.8	28	3.9
Dec	8.4	22.7	8.8

**CLIMATIC CONSIDERATIONS TAKEN:**

- COLLAPSABLE ROOF TO BE OPENED FOR HEAT VENTILATION DURING SUMMER
- AND TO BE CLOSED DURING WINTER AND RAINY MONTHS
- FOAMED CONCRETE USED ON EXTERIOR WALLS FOR BETTER THERMAL INSULATION
- SHADING IS ALSO PROVIDED BY THE FLYOVER
- CLOSE PROXIMITY TO THE YAMUNA RIVER (150M) - WIND COMING FROM THE EAST DIRECTION (YAMUNA SIDE) WILL CARRY SMALL AMOUNT HUMIDITY AND AIR WILL BE COOLER



## INDIGENOUS ARCHITECTURE OF TODA TRIBE



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Praseeda M.,  
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### THE TODAS

This paper presents documentation study of a vulnerable isolated ethnic tribe in India. During this study we found out various amazing facts about the people of this unique tribe, who are believed to be the descendants of the early Dravidians. The undulating plateau of The Nilgiris, in the Western Ghats, in Tamil Nadu, a southern state of India, is where the Todas and other smaller tribal groups like the Badagas and the Kotas survive. Their population was around 900 to 1100 during the last century. Toda people live in loose settlements called “**mund**”, merged in the natural Rolling Meadows and shola forests of the Nilgiris. They are a purely pastoral community, but nowadays they have turned to agriculture and other means of livelihood. Their traditional mode of life required an annual migration to established hot weather hamlets to provide their buffalo with new pasture. (A striking point, the women dress their hair in long ringlets on either side of their face and both sexes wear a white cotton robe crossed by broad red bands surrounded by dense black geometric embroidery. Today such clothes are mostly ceremonial only.

### THE TODA WOMEN

In toda society, women are not treated equally. They do not enjoy the freedom as the men do. When a girl is very young, the male elders of the family decide who she is to marry. The Buffalos are exchanged between the families to mark the wedding according to their tradition. So when she grows enough, she is sent off to the boy's house. They also have children at a very early age.



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Abhinav A.  
B.Arch student

*Toda once practiced the relatively rare, although widespread (in Asia, Africa and Oceania), marriage custom whereby a woman has a plurality of husbands. According to traditional Toda practice, a woman in a polyandrous union was the shared spouse of a set of brothers, lived in a common home. But today, as with female infanticide, polyandry the practice no longer exists among the Toda. Social paternity, on the other hand, was and still remains, of crucial importance, for without it an individual has no social, economic or religious status in Toda society. Such paternity is bestowed, through ritual: the offering by a male (man or boy) of a symbolic bow-and-arrow to the pregnant woman, representing his acceptance of the fruit of her womb. The status of women in Toda tribe is quite poor. They are not given any consideration in the decision making body. The Toda tribal council is a group of elderly Toda Males selected by common consent for a particular dispute. They don't have any right of inheritance. It is restricted to the sons only. Also they are not allowed near the tribe's tall temples.*

The women struggle because the flow of money is only **between men**. **Most of the women's** demands are never taken seriously within Toda areas. They do not have the consent for education even when they want to, even in present scenario. They are not able to find right man or an able husband in the tribe, because most of the times men go for agriculture. They are generally at a loss as they lease out their land to outsiders. And, when they need money, they take out even larger loans until they can't cope. When they can't cope with that, they start drinking; this ultimately leads to the deterioration of the families.

Nowadays, the Toda women are breaking the tradition and are marrying outside of their community, rejecting the older beliefs. They have started studying. Many families are converting to Christianity and this is slowly resulting in the breaking up of this small community. Though it has resulted in the up-gradation of women's status, but Toda women are still far from achieving socio-political and ritual parity with their men folk.

All these findings lead us to conclude that these people also deserve an opportunity to live their life as per their whims and wishes. Proper steps need to be taken for the education and the upliftment of the Toda women. Also, for the development of this tribe we need to provide equal social employment opportunities and accessibility.

**DOCUMENTATION SHEETS:** (Continued in next page)

# INTRODUCTION

OUR ARCHITECTURAL DOCUMENTATION IS OF TODA TRIBE AS EXHIBITED IN THE TRIBAL HABITAT OF MANUV SANGRAHALAYA, BHOPAL.

TRIBES OF TAMIL NADU ARE MAINLY CONCENTRATED IN THE DISTRICT OF NILGIRI OF ALL THE DISTRICT TRIBES, THE KOTAS, THE TODAS, THE IULAS, THE KURUMBAS AND THE MADAGAS FROM THE LARISEK GROUP.

OF THESE TRIBES, THE TODA PEOPLE DESIGNATES A SMALL PASTORAL COMMUNITY THAT LIVE ON THE ISOLATED NILGIRI PLATEAU. THE TODA POPULATION WAS HOWERED IN THE RANGE OF 100 TO 400 DURING THE LAST CENTURY.

ORIGIN - THE ORIGIN OF THE TODAS REMAIN UNCLEAR. ONE OF THE ORIGINAL TRIBES, THEY HAVE REMAINED SECLUDED FOR A VERY LONG TIME. ACCORDING TO VARIOUS VERSIONS, THEY ARE CONSIDERED TO BE THE DESCENDANTS OF KAVANA OR HANUVA OR SURVIVING PALLAVA KACE OR MIGRANTS OF ROME OR SUMERA.

A TYPICAL TODA SETTLEMENT COMPRISES OF ONE TO FIVE DWELLING HUTS, ONE TO THREE BARK BUILDING, ATLEAST ONE BUFFALO PEN AND ONE OR MORE CALF SHEDS.

THE TODA PEOPLE WEAR OF A SINGLE PIECE OF CLOTH, WHICH IS WORN LIKE THE PLAIN OF A SCOTISH HIGHLANDER OVER A WAIST FOR MEN AND SKIRT FOR WOMEN.

ACCORDING TO THE TODAS, THE GODDESS TERKISHY AND HER BROTHER FIRST CREATED BUFFALO AND THEN FIRST TODA MAN. THE FIRST TODA WOMAN WAS FOR CREATED FROM THE RIGHT KIB OF THE FIRST TODA MAN.

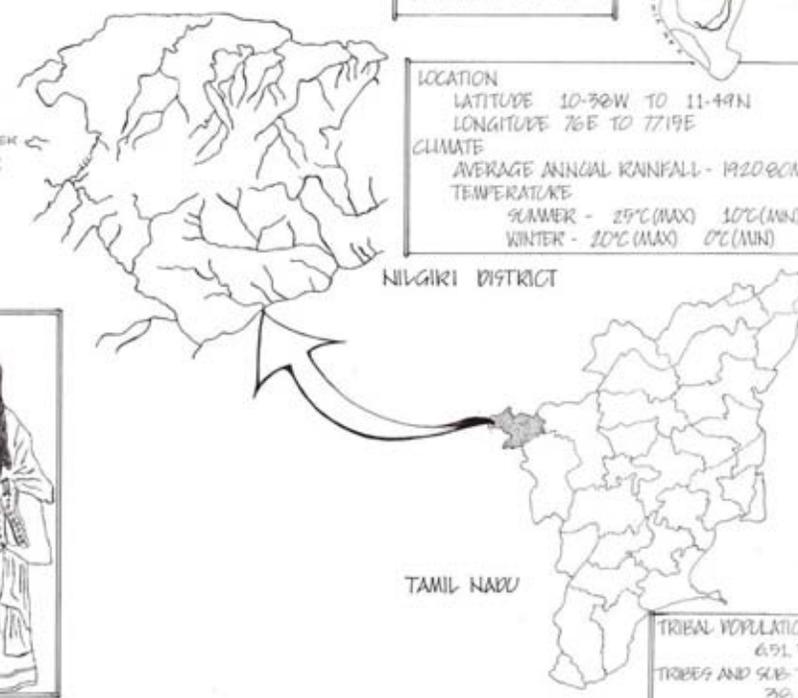
IN TODA TRIBE, MEN TO WOMEN RATIO IS 3 TO 5.

INDIRA GANDHI KASHTRIYA  
MANUV SANGRAHALAYA

- ★ - TODA
- A - AVRITTI BHAWAN
- B - VEETHI SANKAL
- C - TRIBAL HABITAT
- D - CENTRAL RECEPTION & INFORMATION CENTRE.



LOCATION  
LATITUDE 10-30W TO 11-49N  
LONGITUDE 76E TO 7719E  
CLIMATE  
AVERAGE ANNUAL RAINFALL - 1920MM  
TEMPERATURE  
SUMMER - 25°C (MAX) 10°C (MIN)  
WINTER - 20°C (MAX) 0°C (MIN)



TRIBAL POPULATION  
691 321  
TRIBES AND SUB-TRIBES  
70  
LITERACY RATE - 27.4%



TODA MEN  
• OVER 5 FEET IN HEIGHT  
• WELL-SHAPED, BUSHY  
• BROWNEY AND BLUE EYES  
• HAZEL HAIR/TEEN



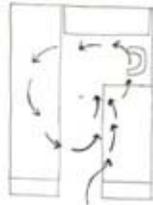
TODA WOMEN  
• SMALL IN STATURE  
• WEAR LONG-SLEEVED  
• SAREES AS A WAY OF  
• HAIR ARRANGEMENT.

TODA

GROUP-10

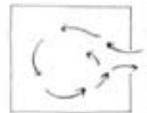
# CLIMATIC ANALYSIS

CLIMATE PLAYS AN IMPORTANT ROLE AND REFLECTS ON THE NATURE OF THE DWELLING.

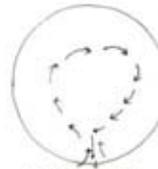


**DAIRY**  
THE HEIGHT OF THE DOOR IS CONSIDERABLY DECKAGED AND WINDOWS OR OPENINGS ARE AVOIDED TO TRAP THE HEAT PRODUCED INSIDE THE STRUCTURE. IT ALSO KEEPS THE DWELLING PROTECTED FROM COLD WEATHER AND HUMIDITY, CAUSED BY HEAVY RAINFALL. AS A RESULT MILK PRODUCTS REMAINS UNAFFECTED BY HIGH HUMIDITY RATE.

AS PER OBSERVATION, NO SHADING DEVICES ARE FOUND AS THE TEMPERATURE RANGES BETWEEN 0°C TO 25°C, THE SUN RAYS MAY BE DIFFUSED. SO, AS A RESULT, NO SHADING DEVICE IS FOUND.

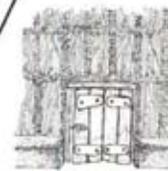


**DWELLING HOT**  
THE STRUCTURE HAS A CONSIDERABLY LONG ENTRANCE, WITH NO DOOR. SMALL OPENINGS ARE PROVIDED FOR AIR CIRCULATION. STILL VENTILATION IS NOT GIVEN MUCH CONSIDERATION IN ALL THE THREE STRUCTURES. LETHING ARRANGEMENTS IS ALSO NOT MUCH TAKEN INTO ACCOUNT, AS MOST OF THEIR ACTIVITIES TOOK PLACE OUTSIDE IN THE OPEN.



**SHRINE**  
ENTRANCE IS VERY SMALL AND ALSO THE ONLY OPENING IN THE STRUCTURE. HENCE, IT VENTILATES THE WHOLE STRUCTURE AND IS ALSO THE SOURCE OF LIGHT INSIDE THE SHRINE.

**OCCUPATION**  
AS THE CLIMATE FAVORS THE GROWTH OF VEGETATION, SO BUFFALO REARING IS THE COMMON OCCUPATION.

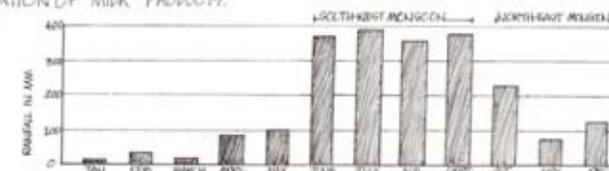


## SLANTING ROOF

HIGH PRECIPITATION OF AROUND 1000MM. RAINWATER FLOWS ALONG THE SUCCESSIVE LEVELS OF THATCH AND FLOWS DOWN. THICK THATCHES ARE PLACED CLOSE TO EACH OTHER AS A MEASURE AGAINST HEAVY RAINFALL. THE HUT REMAINS DRY AS A RESULT.



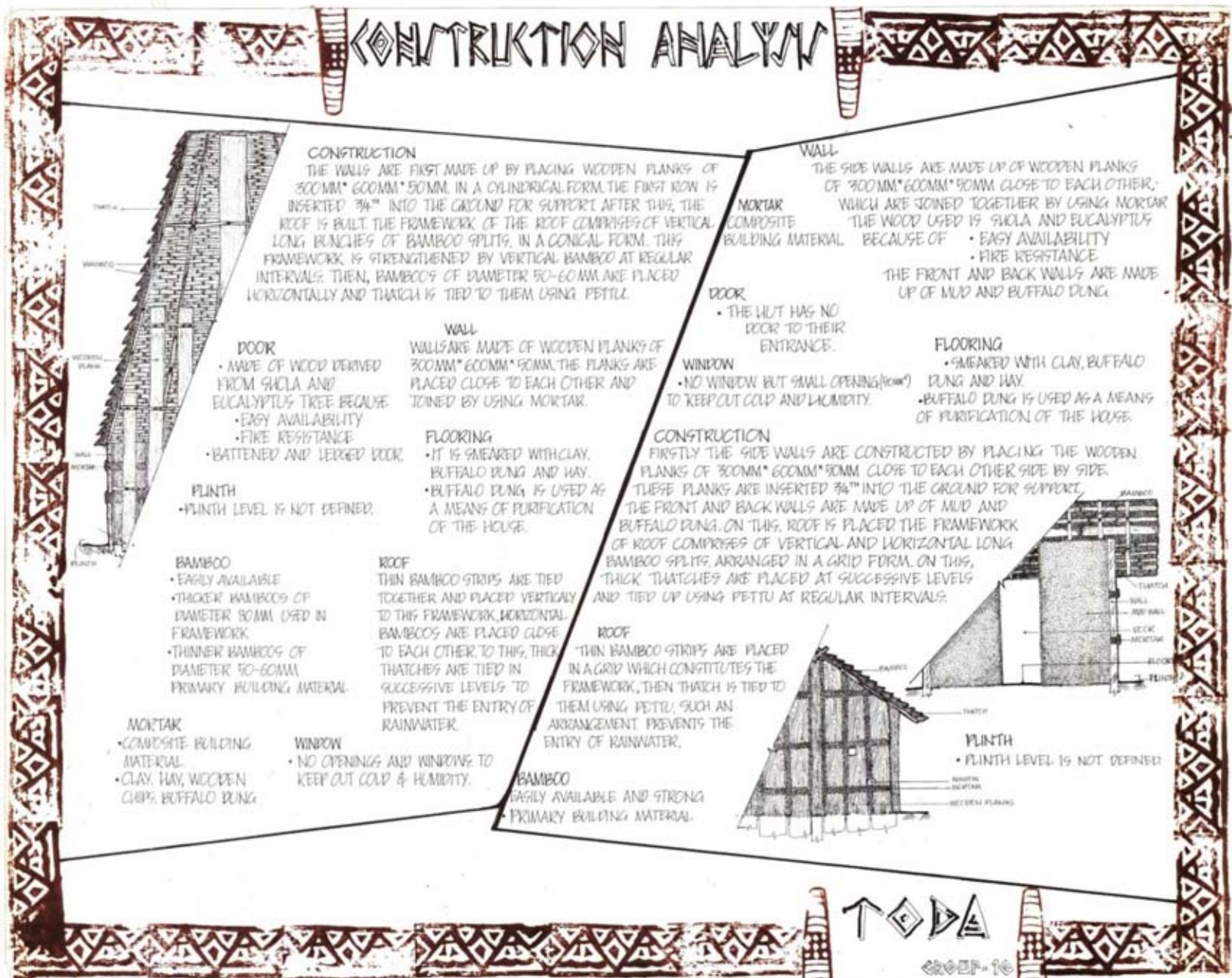
DAIRY AND SHRINE HAS SMALL DOORS/ OPENINGS TO KEEP OUT COLD AND HUMIDITY. WINDOWS AND OPENINGS ARE OMITTED TO KEEP OUT HUMIDITY AND COLD WHICH HELPS IN PRESERVATION OF MILK PRODUCTS.

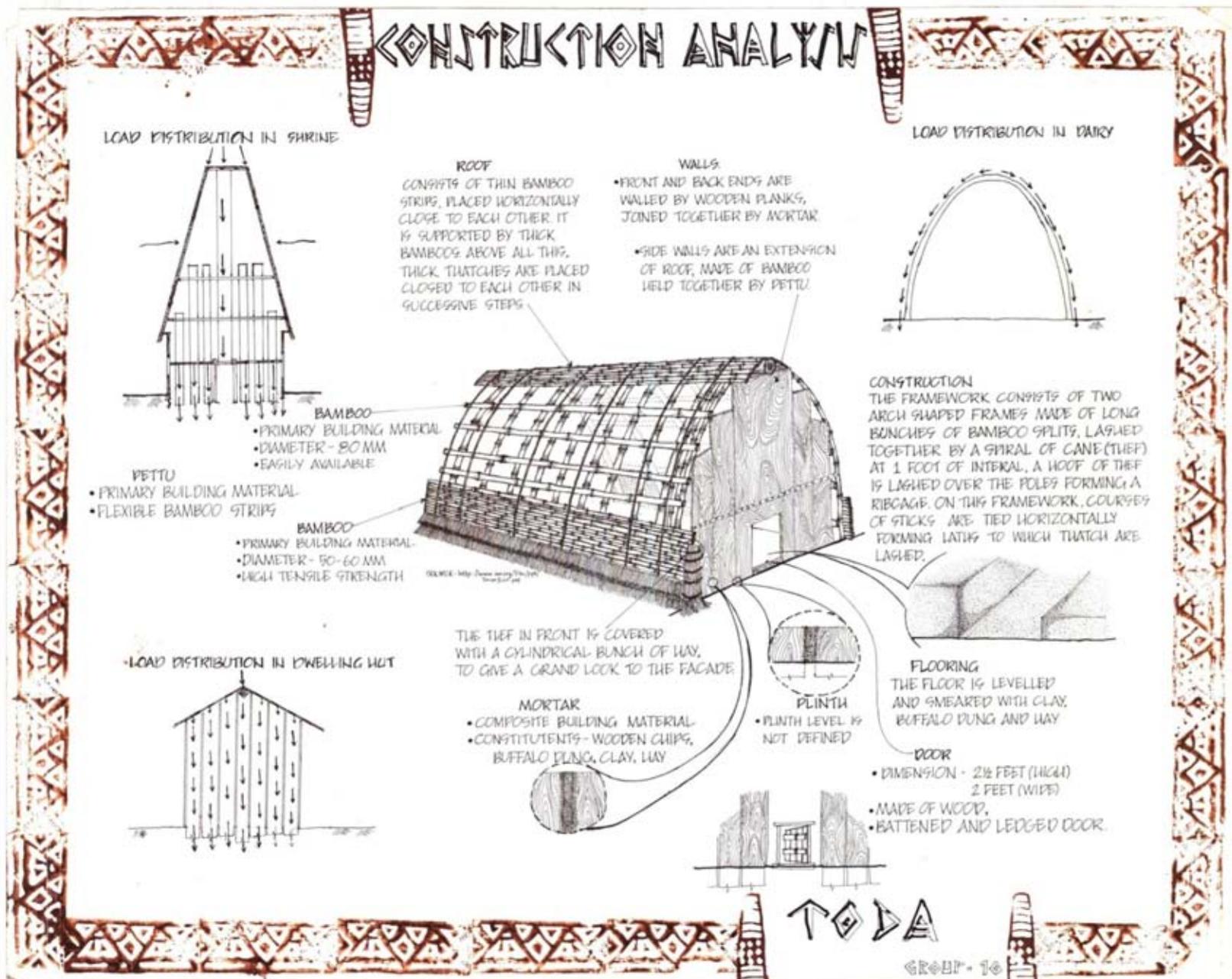


NILGIRI DISTRICT HAS AN AREA OF 2,425.50 KM<sup>2</sup>. THE DISTRICT IS A HILLY REGION, SITUATED AT AN ELEVATION OF 2000 TO 2,600 METRES ABOVE SEA LEVEL. THE ALTITUDE OF THE NILGIRIS RESULT IN A MUCH COOLER CLIMATE AND ALSO WETTER. DURING SUMMER, THE TEMPERATURE REMAINS TO A MAXIMUM OF 25°C. DURING WINTER, THE TEMPERATURE REACHES A MAXIMUM OF 20°C AND A MINIMUM OF 0°C. THE DISTRICT USUALLY RECEIVES RAIN BOTH DURING SOUTH WEST MONSOON AND NORTH EAST MONSOON. AVERAGE ANNUAL RAINFALL OF THE DISTRICT IS 1,920.80 MM. ITS LATITUDINAL AND LONGITUDINAL DIMENSIONS BEING 130 KM (LATITUDE - 11-41N) BY 185 KM (LONGITUDE - 76 E TO 77.19 E).

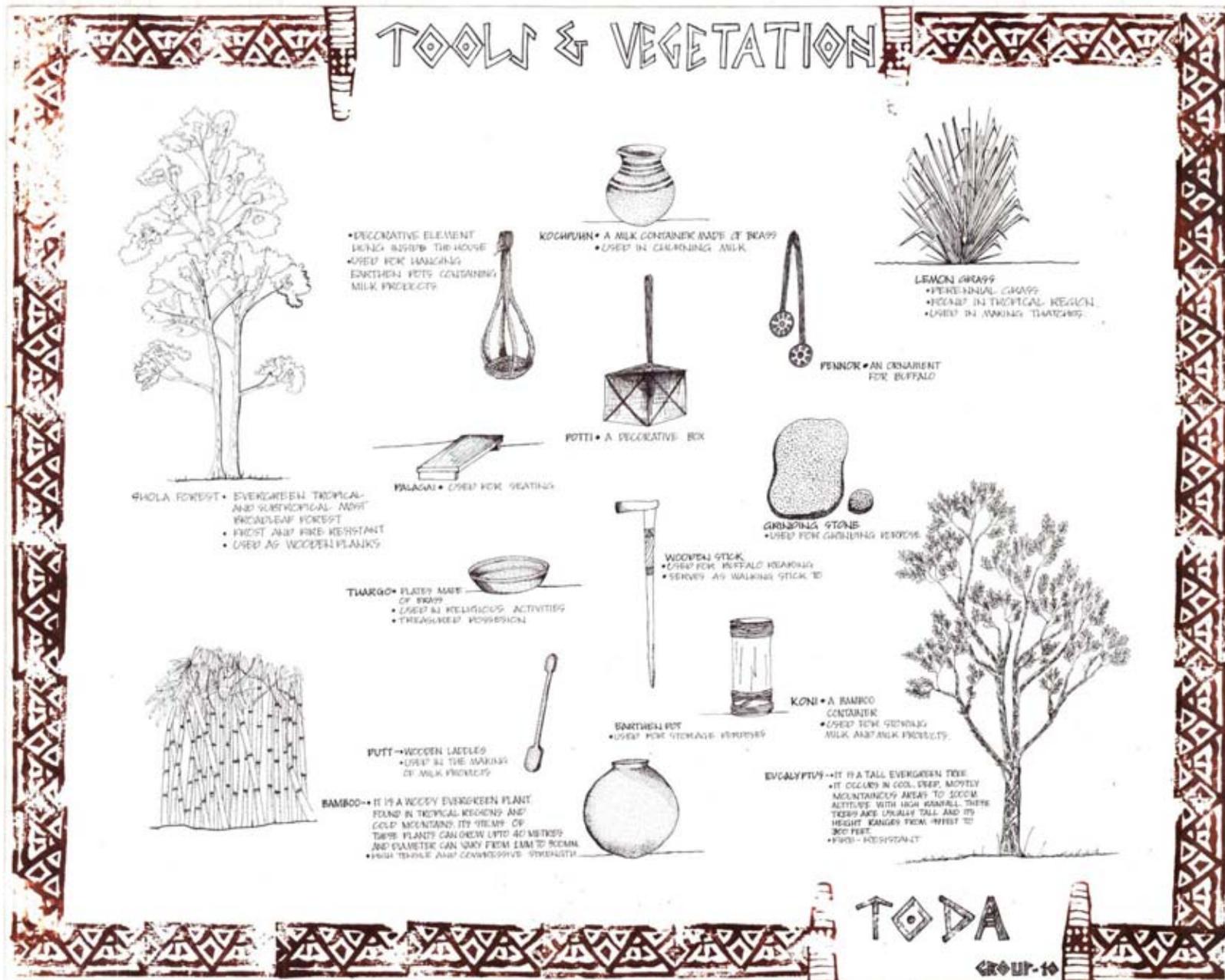
# TODA

GROUP - 10



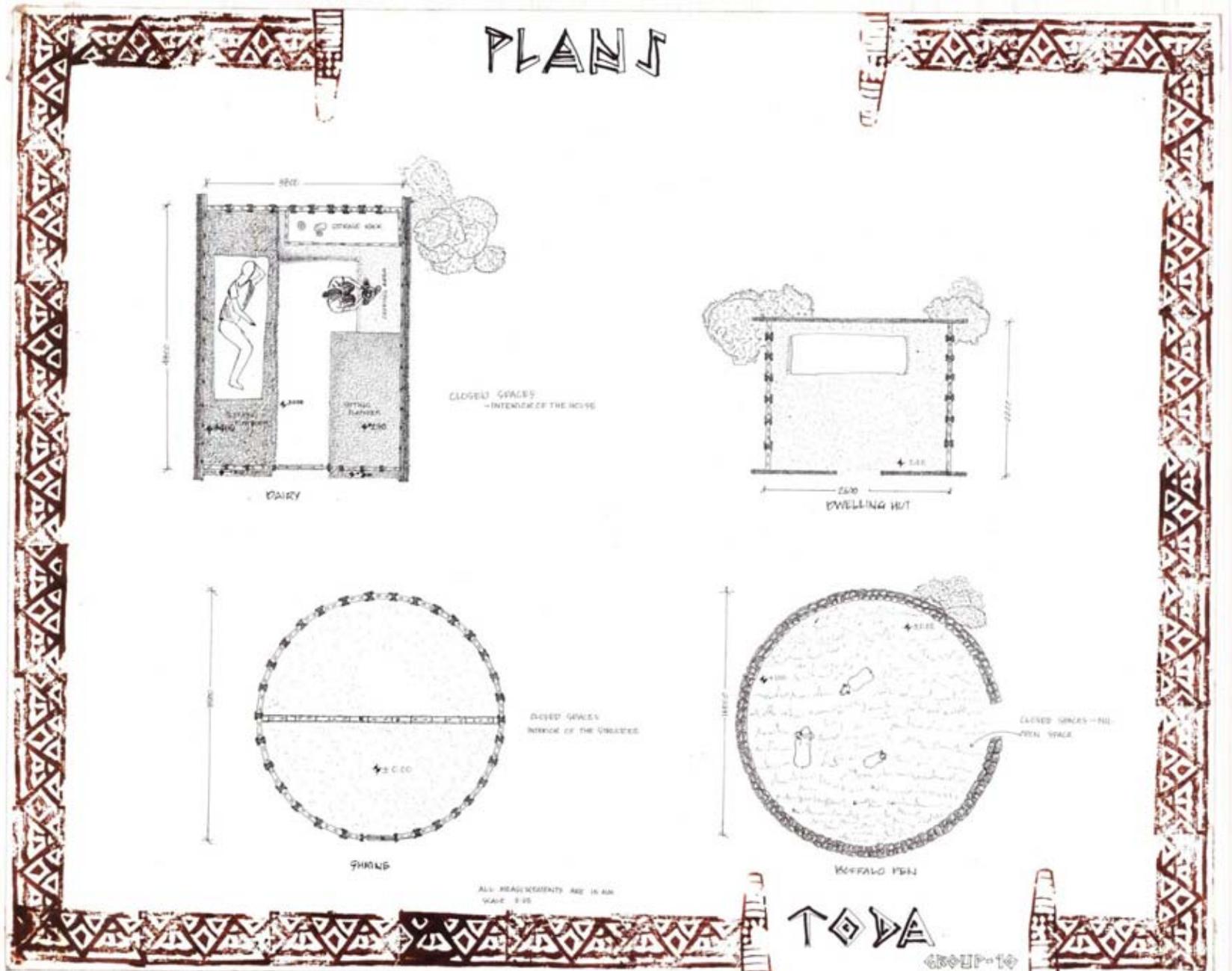


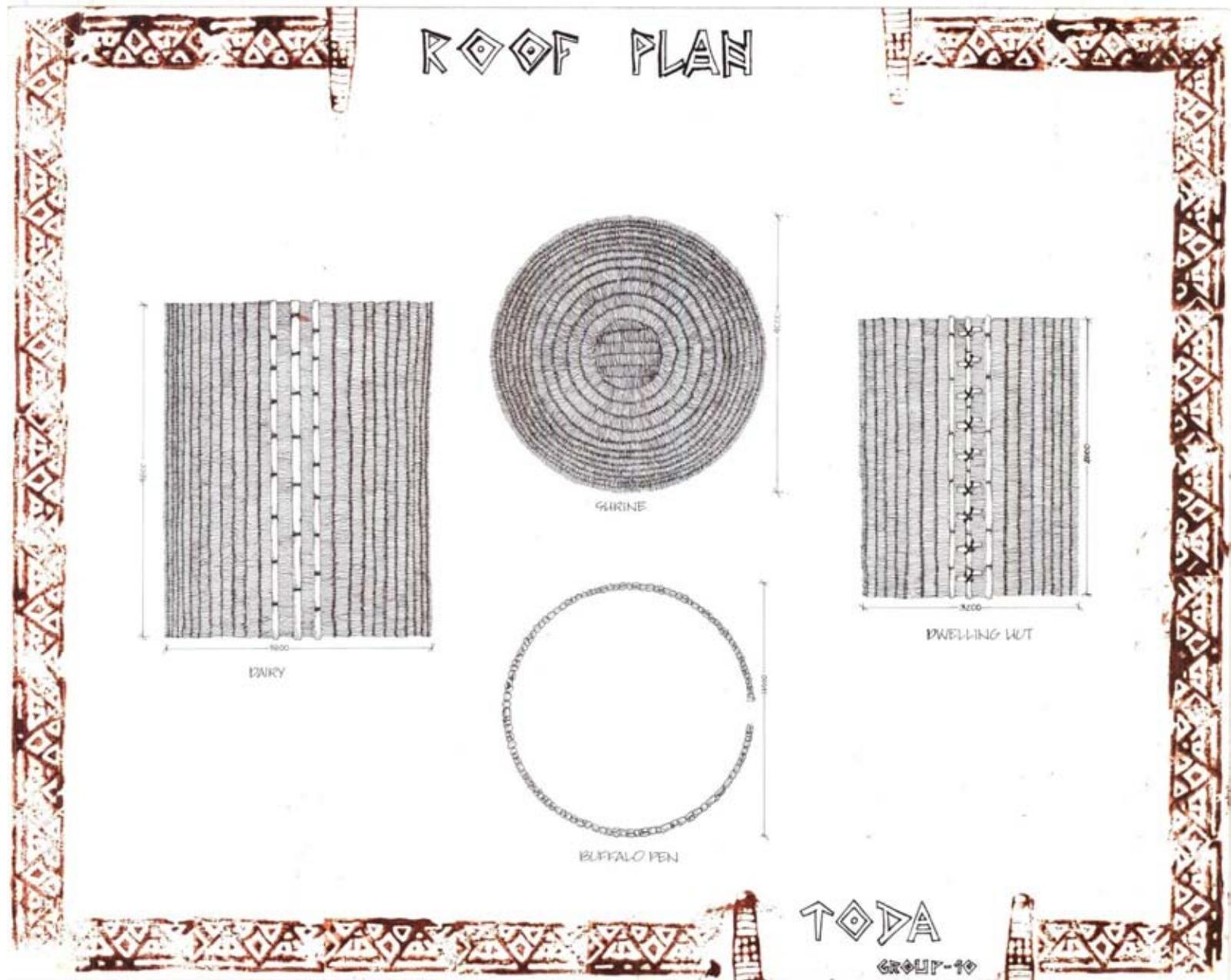


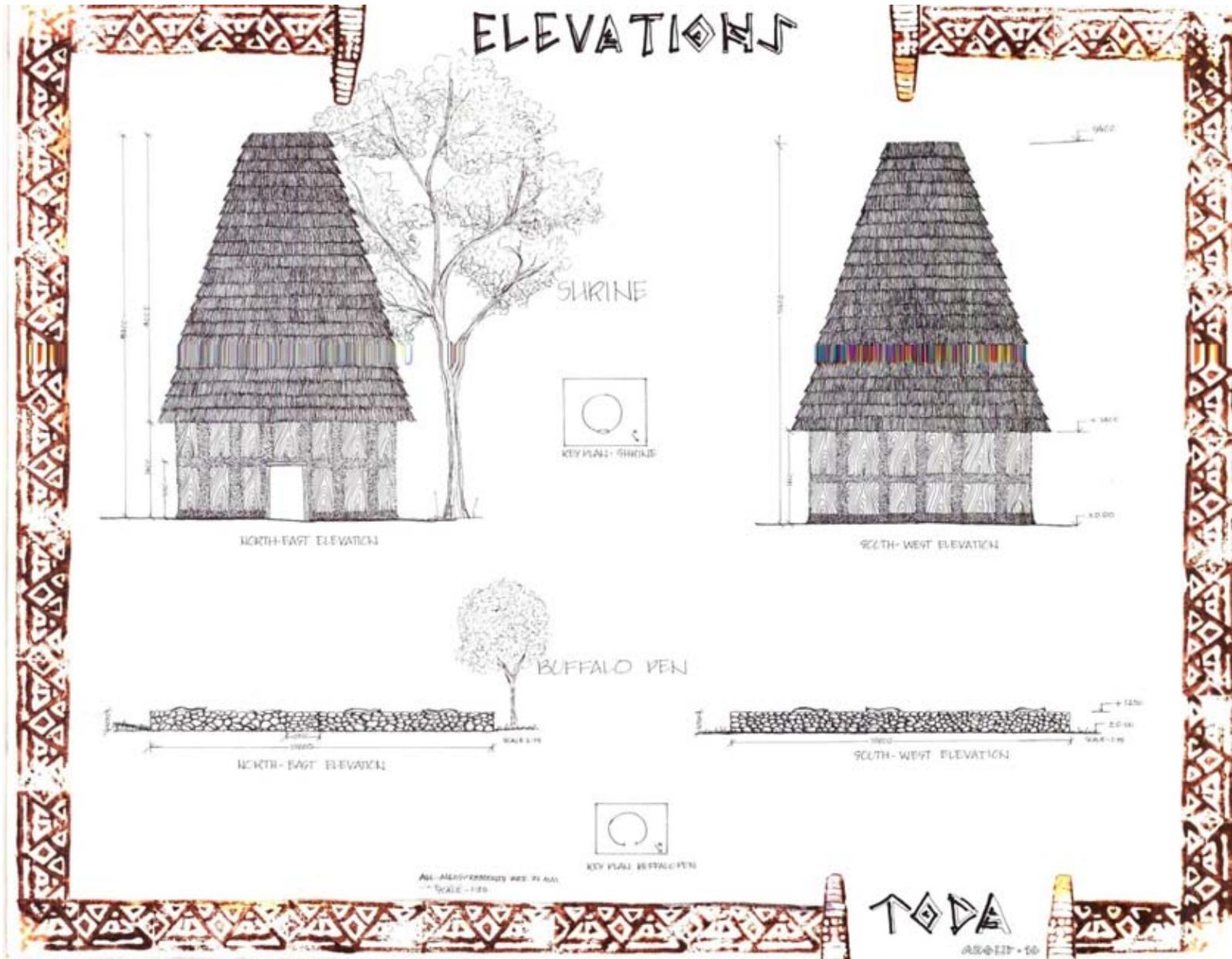


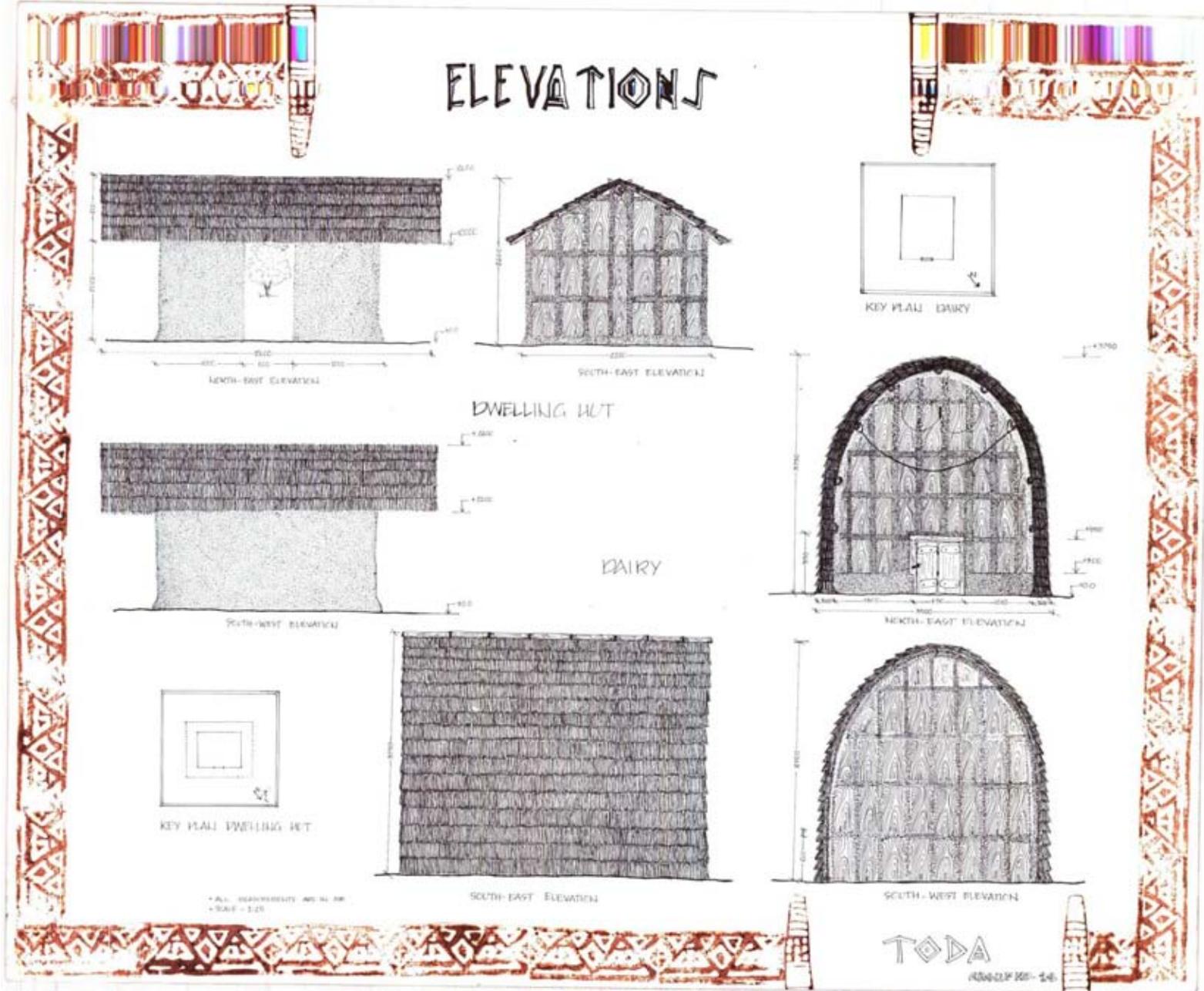


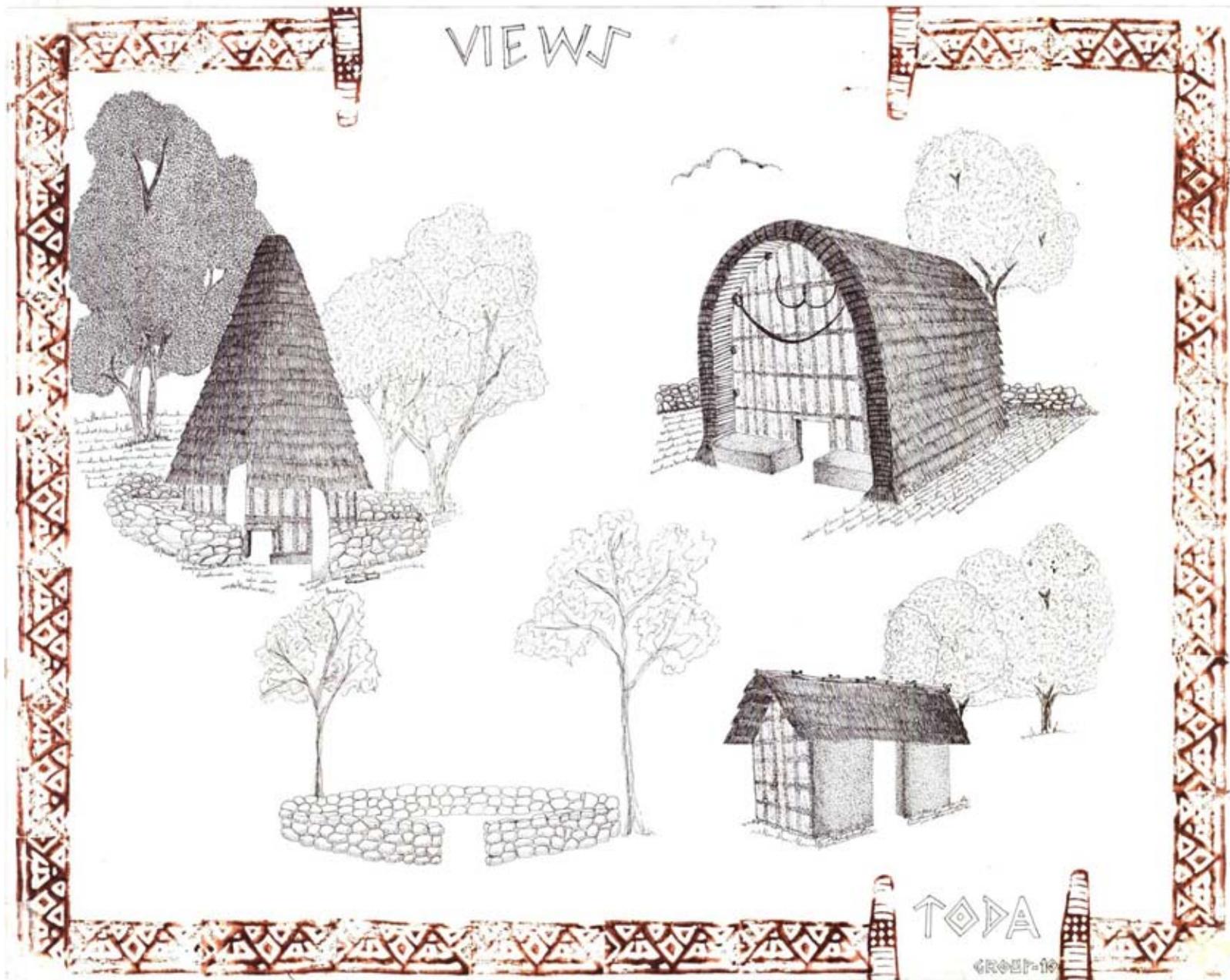






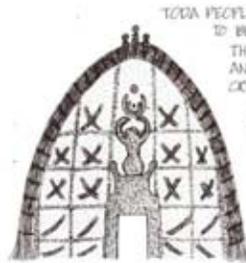








# AESTHETICS ANALYSIS



TODA PEOPLE ARE VERY RELIGIOUS AND WORSHIP LAMP. THEY ARE CONSIDERED TO BE THE DESCENDENTS OF HINDAVAS. THEY BELIEVE THAT THEY WERE CREATED BY GODDESS TERKISHY AND HER BROTHER. BEFORE THEM, A SACRED BUFFALO WAS WORSHIPPED.

HENCE, BUFFALO IS CONSIDERED AS SACRED ANIMAL AND WORSHIPPED.

THE TRIBE CONTAINS DAIRIES AND SHRINES. THE HIGHER THE GRADE OF A DAIRY, THE GREATER THE SANCTITY OF ITS BUFFALO HERDS. AND THE DAIRY MAN PRIEST WHO OPERATES IT AND SACRE SACRED A DAIRY, THE MORE ELABORATE ARE THE RITUALS THAT ACCOMPANY THE MILKING, CHEESEING AND OTHER DAIRY ACTIVITIES OF THE DAIRYMEN PEOPLE, AND

GREATER MUST BE THE CONDITION OF RITUALITY IN WHICH HE KEEPS THE DAIRY, ITS APPOINTMENTS AND HOUSES.

THE KEY CONCEPT UNDERLYING THE ENTIRE DAIRY COMPLEX ARE ALSO THOSE THAT INFORM MUCH OF THIS RELIGIOUS CULTURE.

THEIR CULTURE AND RELIGIOUS BELIEFS ARE REFLECTED IN THE ORNAMENTATION. THE DAIRY HAS CARVINGS OF BUFFALO HEADS AND HORNS.

EVEN BUFFALO SYMBOLS ARE USED IN AND OUTSIDE HOUSES ON THE FRONT FACADE. BULL HORNS ARE USED.

ONE OF THE STRIKING FEATURES OF THE WAY MATERIAL IS USED IS THAT NATURAL COLOR AND TEXTURE OF THE MATERIAL IS RETAINED.

NO ARTIFICIAL COLORING IS USED.



SYMBOL FOR BUFFALO HORNS



PUTT-ROODU LAMP



POTTI - A DECORATIVE BOX

SOURCE-VEEN SANKU, BHANI SHARMA. ORNAMENT FOR BUFFALO

ALL STRUCTURES HAVE A WELL DEFINED FORM AND SHAPE.

THE SPACES ARE WELL DEFINED IN AND AROUND THE STRUCTURES.

OPEN AND CLOSE SPACES CAN BE EASILY IDENTIFIED.

OPEN SPACES - SPACES AROUND SHRINE AND DAIRY, BUFFALO PEN

CLOSED SPACES - DAIRY, SHRINE AND DWELLING HUT.

DAIRY HAS AN BARREL VAULTED STRUCTURE. SHRINE HAS AN CONICAL SHAPE WHICH A RESEMBLANCE OF ITS ENERGY CENTERED AND POINTING UPWARDS. DWELLING HUT IS A SLOPED ROOFED STRUCTURE.

IN ALL THESE STRUCTURES, THEIR ENTRANCE IS QUITE SMALL IN SUCH A WAY THAT A PERSON HAS TO CRAWL TO REACH INSIDE. CONTRASTING TO THIS, DWELLING HUTS' ENTRANCE IS LONG AND WIDE.

AS ASSUMED, SMALL ENTRANCE MAY BE KEPT TO PREVENT THE ENTRY OF WILD ANIMALS. ALSO TO KEEP THE HUT AS THE HEAT PRODUCED BY CHULHA WILL NOT BE LOST TO THE ATMOSPHERE.

BUFFALO PEN IS A CIRCULAR LARGE OPEN SPACE, OFTEN KEPT ALONG THE SLOPE WHERE THE STEEP EDGES ARE CLEVERLY LANDSCAPED TO MAKE IT LOCK SECURE.



SOURCE - A VERY TOP OF SHRINE BY PULLI HOUSE, BHANI SHARMA



# TODA

GROUP-10

## REDESIGN OF 'GAURIGAT' FOR UNIVERSAL ACCESS

### DESIGN CONTEXT:

This paper presents a redevelopment/ redesign project of Gaurighat, riverfront of holy river Narmada at Jabalpur, Madhya Pradesh, India. The aim of this redesign project was to provide the solution to various prevailing problems related to accessibility, drainage, cleanliness, circulation during the festive months.

### METHODOLOGY:

The 10 hour competition started with a site visit to Gaurighat in the morning at 6, these 10 hours were divided into different sections as follows.

Introduction to the design problem 30 minutes

Site visit for 2 hours.

Design sections each of 2 hours.

Last design section of 1:30 hours.

### DESIGN SOLUTION: *(Please Refer design sheets along with the text)*

Our solutions focused on the most important circulation and movement areas. So in order to make the whole area accessible, we started off with the stairs which were the only way to descend to the Ghat, and were completely out of proportion with huge risers, which made the main circulation to the ghat completely inaccessible, not only for the old age population but also for the handicapped. So to improve upon this, we suggested a staircase that inculcated the basic anthropometry required along with integrated ramp which could be used by the disabled to access the ghat. Moreover, the path was provided with tactile pavings throughout, which could make it easier for the blind or visually impaired.

The next problem was to improve the drainage system and maintain a standard hygiene on the ghats. So we used the natural terrain difference to drain the waste water from the Ghats to a nearby sewage line.

This proposal also included the relocation of the pandits and providing them a specific space to sit, so as to maintain a proper flow of the people who came for the Ghat Darshan. On the Ghat, there was no provision for changing rooms or private areas for the females, who visit for taking the sacred bath in the Gaurighat. So we provided with a series of changing rooms. The basic structure of these changing rooms was proposed to be made up of modular steel, which can



Siddharth M.  
B.Arch student



Harsh P. Singh  
B.Arch student



Ankita Thodemala  
B.Arch student



Adrish Naskar  
B.Arch student

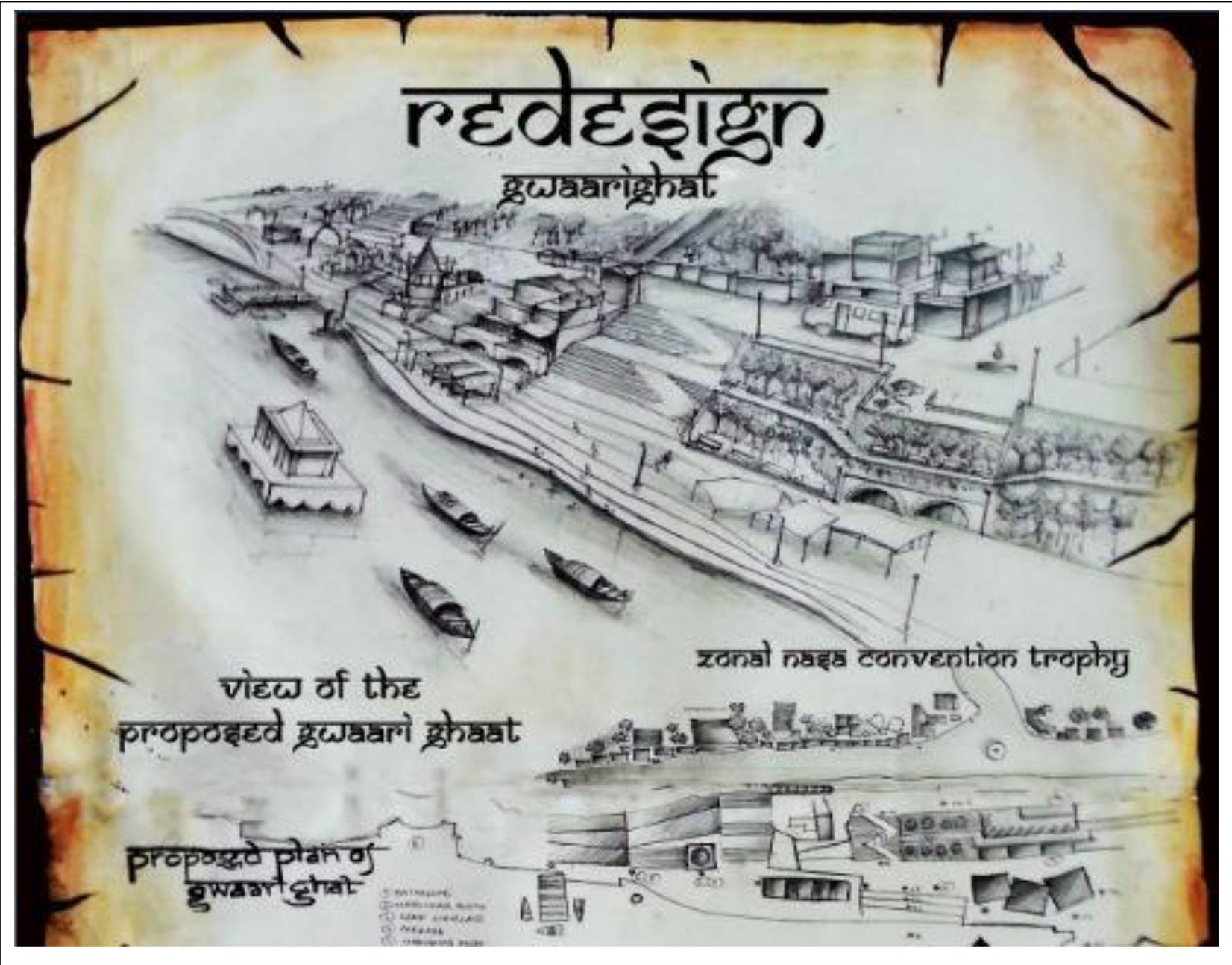
be assembled anywhere on the ghat as per their requirements and can be dismantled in case of flooding of the ghat during monsoon. The roof of these changing rooms was made with Polytetraethylene (PTFE). Also long span structures were also designed to serve the bhandaras and obituary ceremonies which are held on the Ghats.

Initially, these ghats were deprived of any kind of green space. So plantation throughout the ghat was also proposed, keeping in mind the landscape of the ghat. Provisions of lamps, which run on the electricity stored by harnessing the solar power were deployed on the ghat to facilitate the visitors during the night.

This site never had any defined parking space which resulted in a lot of commotion during peak hours. So we extended the area above the toilets and defined a parking space and a circulation pattern for 40, 2-wheelers and 20, 4-wheelers.

Ghats in India have a general scenario of polluted water due to the practices which are carried out over there. So in order to facilitate the cleaning and maintenance of the river water, we proposed to create a catchment area near the ghat, where the municipal corp. can easily carry out the cleaning of the water without disturbing the activities of the ghat. This Ghat had a small temple in the middle of the river. So to transport the visitors from the ghat to the temple, there was a provision of 5 hand rowed boats. But the problem was there was no defined circulation pattern of them which created a lot of problem to the visitors who were there for the sacred bath. So we designed a small dock made of concrete and wood for these boats, hence reducing the traffic on the ghat.

**DESIGN SHEETES:** Continued in next Page





## SURVIVAL JACKET FOR HOMELESS



Achyut Siddhu  
B.Arch student

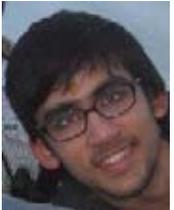
Our current population is 1.2 billion and is expected to settle at 1.8 billion. Let us call that 2 billion. To house a population of 2 billion, India needs 6% of its land area. This may not be difficult, considering we have 15% uncultivable land.



Aayush Jindal  
B.Arch Student

Mr. M.K.Gandhi said that for the poor, God **comes in the form of food. Thanks to the three S's from Tamil Nadu-** C.Subramaniam, B.Sivaraman and M.S.Swaminathan-people are better fed these days than when Mr. Gandhi was alive. However, shelter-particularly in the cities-has definably deteriorated. For the poor now God will probably appear in the form of shelter.

**Political parties have put to good use this shortage of shelter. “Get the poor into appalling slums and offer them** protection from eviction if the slum flies the party flag and promises to vote for the party when the election comes. That is a shame. It is cheating the poor of what should be theirs as a right. However, the poor are too weak to protest and too ignorant to understand that they are being cheated.



Tarun Bhasin  
B.Arch student

Soon after independence, the government **gave up the idea of “slum clearance” and replaced it with “slum improvement”.** That meant the government gave one water tap for several hundred families, gave or let people grab electrical power and, at times, even paved the narrow lanes. But land for building a house of their own was an absolute no-no. Rather with rising land prices, it was not even affordable. Politicians argue that India is a crowded country and the poor have to do as best as they can. But countries like Netherlands, England and, even Mauritius is more crowded than India and yet has no slums.

Unfortunately, we cannot find that kind of space in any of our large cities. On the other hand, when we fly across the country, we notice how empty it is. So, the correct solution is to build houses where there is space-and not inside or close to our already overcrowded cities-along with jobs and a full range of services. That is quite possible but there is one difficulty, in-fact, an insurmountable problem. If we do not overcrowd our cities further, our politicians cannot make money by grabbing land, they would not be able to then fill their apparatus with bureaucracy.

## CONTOUR LINING THE HOMELESS:

The homeless mass just does not include those migrated masses it also includes people who have been abandoned from the society either culturally, financially or socially.

The homeless mass consists of:

- Woman with children abandoned by their provider.
- Alcohol Abused.
- Drug Abused.
- People with mental health issues.
- Most importantly people with paid work which is not enough to sustain/afford/build a shelter in the present system.

More than the realization of the domain of diversity, it should be understood that: Homelessness is a strategically planned phenomenon rather than a perceived state of life.

### So what's the plan?

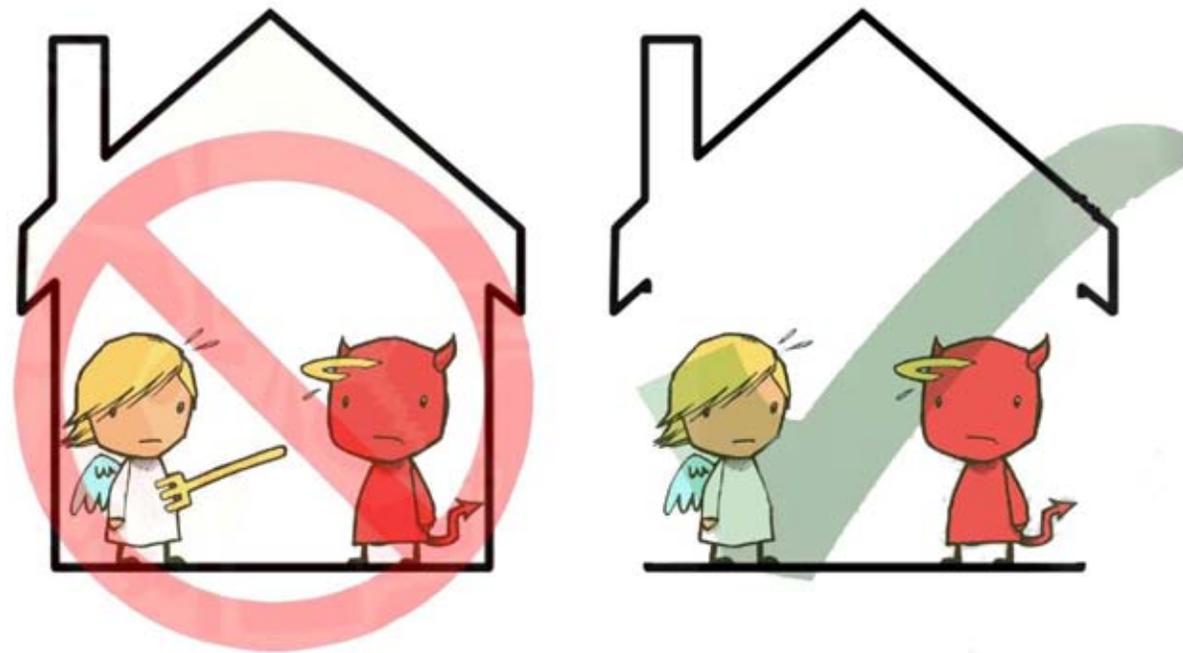
In such a country like ours where working against this deeply rooted system would increase the chances of one getting **murdered. Strategically working with this system to slowly purify it's impurities in a "holistic approach" is the necessary to be done.**

The idea was to **work "with" the system** to finally beat it.

To do this the approach had to be open-minded and solution finding with a brick and mortar kind of mindset would be a complete failure. It is to be understood that there is a difference between homelessness and people without a house. Equating the both would only lead to a creation of low cost temporary housing which would eventually convert itself into a permanent slum as in case of Haiti after the earthquake in 2010.

Thus solving this issue is more about creating an environment where the homeless feel "**secured not exploited**". **It is** because the homeless mass not only houses the clean ones involving people with inadequate life skills, but also the dirty ones abandoned by the society due to their friendship with drugs, crime or alcohol.

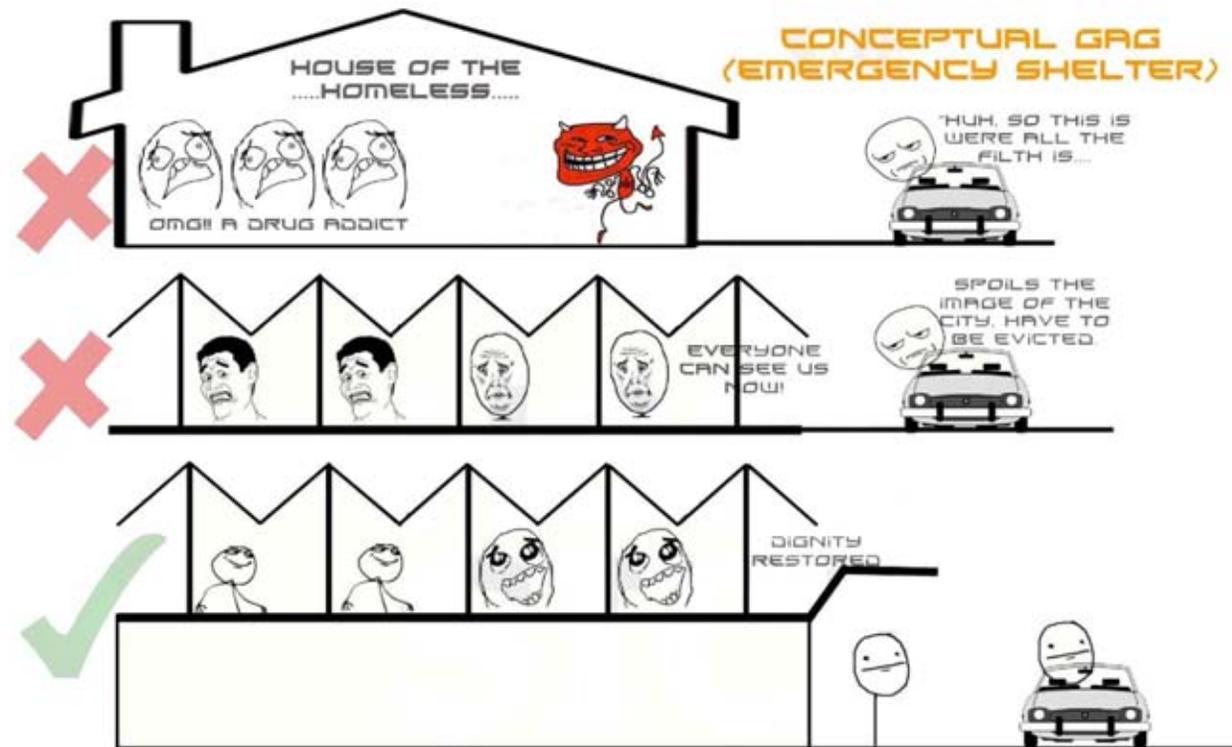
Allotting a building as a night shelter, housing this homeless mass thus would lead to an attachment of security/policing which doesn't solve the problem because **policing does not reduce crime/exploitation, it restricts it**. Thus an enclosed space would grow sprouts of exploitation.



#### THE IDEA:

Thus the idea was to have a space, housing the homeless at night having psychologically no physical barriers. It would be a system which would provide it's users with a survival enhancing product.

**DESIGN PROPOSAL:** (Please refer Design Sheets along with the text)



One consequence of the effectiveness of this emergency shelter is that it reduces the visibility of the problem to the community overall. People of the community are naturally blinded by their existence in the first place; thus lessening the risk of eviction. People who were homeless and who were fearful of being seen by their own community negatively were now able to conceal their condition at best. The lack of visibility reduced pressure on the community as well as the homeless as they were able to reinforce both their invisibility and their dignity. These people could now live in an open space which was secure both mentally and physically from being evicted, yet being invisible from the surrounding context.

Eliminating/reducing homelessness

**PROPOSED SYSTEM:** *(Please refer Design Sheets along with the text)*



## BACKGROUND NOTE

OUR CURRENT POPULATION IS 1.2 BILLION AND IS EXPECTED TO SETTLE AT 1.8 BILLION. LET US CALL THAT **2 BILLION**.

TO HOUSE A POPULATION OF 2 BILLION, INDIA NEEDS **6%** OF ITS LAND AREA. THIS MAY NOT BE DIFFICULT, CONSIDERING WE HAVE **15% UNCULTIVABLE LAND**.

GANDHIJI SAID THAT FOR THE POOR, GOD COMES IN THE FORM OF FOOD. THANKS TO THREE S'S FROM TAMIL NADU - C. SUBRAMANIAM, B. SIVARAMAN AND M. S. SWAMINATHAN - PEOPLE ARE BETTER FED THESE DAYS THAN WHEN GANDHIJI WAS ALIVE.

HOWEVER, SHELTER - PARTICULARLY IN THE CITIES - HAS DEFINITELY DETERIORATED.

FOR THE POOR NOW, GOD WILL PROBABLY APPEAR IN THE FORM OF SHELTER.

OFTEN LEADING TO SETTLING IN UNORGANIZED SLUMS OR CHRONIC HOMELESSNES

**UNFORTUNATELY**, WE CANNOT FIND THAT KIND OF SPACE IN ANY OF OUR LARGE CITIES. ON THE OTHER HAND, WHEN WE FLY ACROSS THE COUNTRY, WE NOTICE HOW EMPTY IT IS.

SO, THE CORRECT SOLUTION IS TO BUILD HOUSES WHERE THERE IS SPACE - AND NOT INSIDE OR CLOSE TO OUR ALREADY OVERCROWDED CITIES - ALONG WITH JOBS AND A FULL RANGE OF SERVICES.

THAT IS QUITE POSSIBLE BUT THERE IS ONE DIFFICULTY, IN FACT, AN INSURMOUNTABLE PROBLEM. IF WE DO NOT OVERCROWD OUR CITIES FURTHER, OUR POLITICIANS CANNOT MAKE MONEY BY GRABBING LAND.

THEY WOULD NOT BE ABLE TO THEN FILL THEIR APPARATUS WITH BUREAUCRACY.

### POLITICAL PARTIES

HAVE PUT TO GOOD USE THIS SHORTAGE OF SHELTER. 'GET THE POOR INTO APPALLING SLUMS AND OFFER THEM PROTECTION FROM EVICTION, IF THE SLUM FLIES THE PARTY FLAG AND PROMISES TO VOTE FOR THE PARTY WHEN ELECTION COMES.'

THAT IS A SHAME.

IT IS CHEATING THE POOR OF WHAT SHOULD BE THEIRS AS A RIGHT.

HOWEVER, THE POOR ARE TOO WEAK TO PROTEST AND TOO IGNORANT TO UNDERSTAND THEY ARE BEING CHEATED.

SOON AFTER INDEPENDENCE, THE GOVERNMENTS GAVE UP THE IDEA OF

**"SLUM CLEARANCE"** AND REPLACED IT WITH **"SLUM IMPROVEMENT"**.

THAT MEANT THE GOVERNMENT GAVE ONE WATER TAP FOR SEVERAL HUNDRED FAMILIES, GAVE OR LET THE PEOPLE GRAB ELECTRICAL POWER AND, AT TIMES, EVEN PAVED THE NARROW LANES.

**BUT...**

LAND FOR BUILDING A HOUSE OF THEIR OWN WAS AN ABSOLUTE NO-NO.

RATHER WITH RISING LAND PRICES, IT WAS NOT EVEN AFFORDABLE.

A SHAMEFUL POLITICAL STRATEGY OF OUR FOUNDING FATHERS

POLITICIANS ARGUE THAT INDIA IS A CROWDED COUNTRY AND THE POOR HAVE TO DO AS BEST AS THEY CAN.

**BUT...**

COUNTRIES LIKE NETHERLANDS, ENGLAND AND, EVEN MAURITIUS ARE MORE CROWDED THAN INDIA AND YET HAVE NO SLUMS.



RURAL



URBAN



POLITICIANS



EMPLOYMENTAL  
MIGRATION

01

## DESIGN PROCESS

THE HOMELESS MASS DOES NOT INCLUDE THOSE MIGRATED MASSES.

IT ALSO INCLUDES PEOPLE WHO HAVE BEEN **ABANDONED** FROM THE SOCIETY EITHER **CULTURALLY, FINANCIALLY OR SOCIALLY.**

THE HOMELESS MASS CONSISTS OF :

- WOMAN WITH CHILDREN ABANDONED BY THEIR PROVIDER
- ALCOHOL ABUSED
- DRUG ABUSED
- PEOPLE WITH MENTAL HEALTH ISSUES
- MOST IMPORTANTLY **PEOPLE WITH PAID WORK WHICH ISNT ENOUGH TO SUSTAIN/AFFORD/BUILD A SHELTER IN THE PRESENT SYSTEM.**



TO DO THIS THE APPROACH HAD TO BE OPEN-MINDED AND SOLUTION FINDING WITH A

**BRICK AND MORTAR** KIND OF MINDSET WOULD BE A COMPLETE FAILURE.



IT IS TO BE UNDERSTOOD THAT THERE IS A DIFFERENCE BETWEEN

### HOMELESSNESS & HOUSELESSNESS

EQUATING THE BOTH WOULD ONLY LEAD TO A CREATION OF **LOW-COST TEMPORARY HOUSING,** WHICH WOULD EVENTUALLY CONVERT ITSELF INTO A **PERMANENT SLUM,** AS IN CASE OF HAITI AFTER THE EARTHQUAKE.

THUS SOLVING THIS ISSUE IS MORE ABOUT CREATING AN ENVIRONMENT WHERE THE HOMELESS FEEL **"SECURED NOT EXPLOITED".**

MORE THAN THE REALIZATION OF THE DOMAIN OF DIVERSITY, IT SHOULD BE UNDERSTOOD THAT.

**HOMELESSNESS IS A STRATEGICALLY PLANNED PHENOMENON RATHER THAN A PERCEIVED STATE OF LIFE**

### SO WHATS THE PLAN???

IN SUCH A COUNTRY LIKE OURS WHERE WORKING AGAINST THIS DEEPLY ROOTED SYSTEM WOULD INCREASE THE CHANCES OF ONE GETTING MURDERED.

STRATEGICALLY WORKING WITH THIS SYSTEM TO SLOWLY PURIFY ITS IMPURITIES IN A 'HOLISTIC APPROACH' IS THE NECESSARY TO BE DONE.

THE IDEA WAS TO **WORK "WITH" THE SYSTEM** TO FINALLY **BEAT** IT.

IT IS BECAUSE THE HOMELESS MASS NOT ONLY HOUSES THE **CLEAN** ONES INVOLVING PEOPLE WITH INADEQUATE LIFE SKILLS, BUT ALSO THE **DIRTY** ONES ABANDONED BY THE SOCIETY DUE TO THEIR FRIENDSHIP WITH DRUGS, CRIME OR ALCOHOL.

ALLOTING A BUILDING AS A NIGHT SHELTER HOUSING THIS HOMELESS MASS THUS WOULD LEAD TO AN ATTACHMENT OF **SECURITY/POLICING** WHICH DOESNT SOLVE THE PROBLEM BECAUSE.....

**POLICING DOES NOT REDUCE CRIME/EXPLOITATION.....IT RESTRICTS IT.**

THUS AN ENCLOSED SPACE WOULD GROW SPROUTS OF EXPLOITATION



THUS THE IDEA WAS TO HAVE A SPACE HOUSING THE HOMELESS AT NIGHT HAVING **PSYCHOLOGICALLY NO PHYSICAL BARRIERS.**

IT WOULD BE A **SYSTEM** WHICH WOULD PROVIDE ITS USERS WITH A **SURVIVAL ENHANCING PRODUCT**

**INDUSTRIAL DESIGN TROPHY 2012** NASA:ADJ:Z224:01



02

## DESIGN PROPOSAL

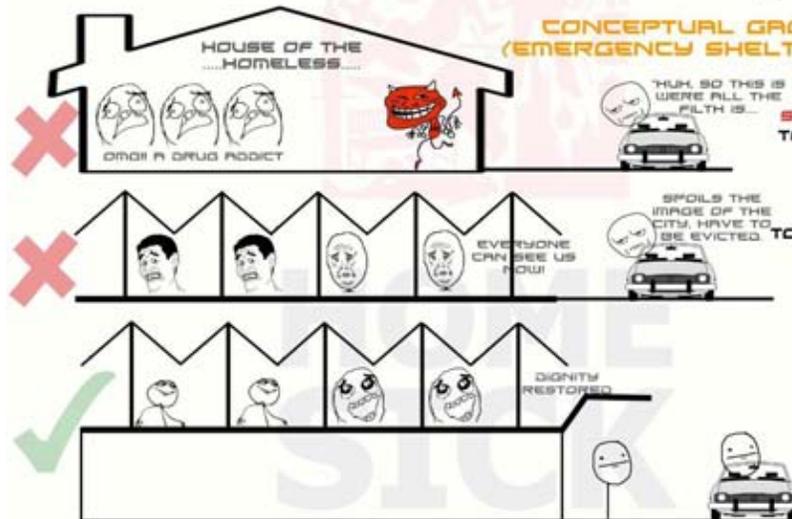
ONE CONSEQUENCE OF THE EFFECTIVENESS OF THE EMERGENCY SHELTER DESIGN IS THAT IT REDUCES THE VISIBILITY OF THE PROBLEM TO THE COMMUNITY OVERALL. PEOPLE OF THE COMMUNITY ARE NATURALLY BLINDED BY THEIR EXISTENCE IN THE FIRST PLACE, THUS LESSENING THE RISK OF EVICTION. PEOPLE WHO WERE HOMELESS AND WHO WERE FEARFUL OF BEING SEEN BY THEIR OWN COMMUNITY NEGATIVELY WERE NOW ABLE TO CONCEAL THEIR CONDITION AT BEST.

THE LACK OF VISIBILITY REDUCED PRESSURE ON THE COMMUNITY AS WELL AS THE HOMELESS AS THEY WERE ABLE TO REINFORCE BOTH THEIR "INVISIBILITY" AND THEIR "DIGNITY"

PEOPLE COULD NOW LIVE IN AN OPEN SPACE WHICH WAS SECURE BOTH MENTALLY AND PHYSICALLY FROM BEING EVICTED.

YET BEING INVISIBLE FROM THE SURROUNDING CONTEXT.

HOW GOOD WOULD THAT BE TO REINFORCE ONES DIGNITY???



## PROPOSED SYSTEM:



## DESIGN PROPOSAL

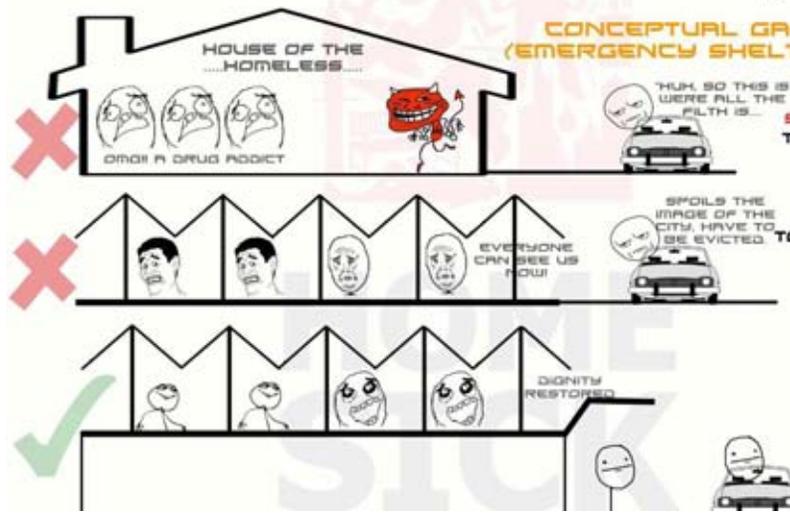
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PEOPLE COULD NOW LIVE IN AN OPEN SPACE WHICH WAS SECURE BOTH MENTALLY AND PHYSICALLY FROM BEING EVICTED.

BUT BEING INVISIBLE FROM THE SURROUNDING CONTEXT.

HOW GOOD WOULD THAT BE TO REINFORCE ONE'S DIGNITY???



### CONCEPTUAL GAG (EMERGENCY SHELTER)



CONCEPT VISUALIZATIONS

THE T<sub>R</sub>ENT<sub>CH</sub> COAT

A SURVIVAL ENHANCING COAT WHEN THE HOMELESS IS OUT FROM THE NIGHT SHELTER



MATERIALS USED



TWO 1000MM X 600MM X 600MM FOLDING LAUNDRY BASKETS ARE ZIPPED IN POCKETS NEAR THE SHOULDER AND THE THIGH AREA OF THE COAT.

THESE BASKETS ARE STITCHED IN COMBINATION OF 'NYLON' AND 'PLASTIC MESH'

T.ENT<sub>CH</sub> COAT (AS A SLEEPING BAG)

04



T.ENT<sub>CH</sub> COAT (IN SUMMERS)



VELCRO



T.ENT<sub>CH</sub> COAT (AS A BAGPACK)

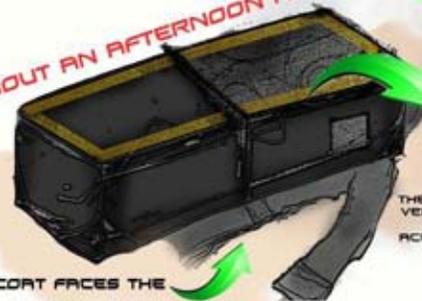


T.ENT<sub>CH</sub> COAT (IN MONSOONS)

REVERSING THE COAT WOULD EXPOSE THE WATER PROOF NYLON WHICH ACTS AS A RAINCOAT.



HOW ABOUT AN AFTERNOON NAP??



THE SLEEPING BAG OPENS VIA A VELCRO WITH ITS UPPER LAYER BEING PROTRUDING TO ACCENTUATE THE PRESENCE OF THE PERSON AT NIGHT.



INDUSTRIAL DESIGN TROPHY 2012

NASA.ADI:Z224:01



## UNIVERSAL DESIGN OF INFORMATION KIOSK

### CONTEXT:

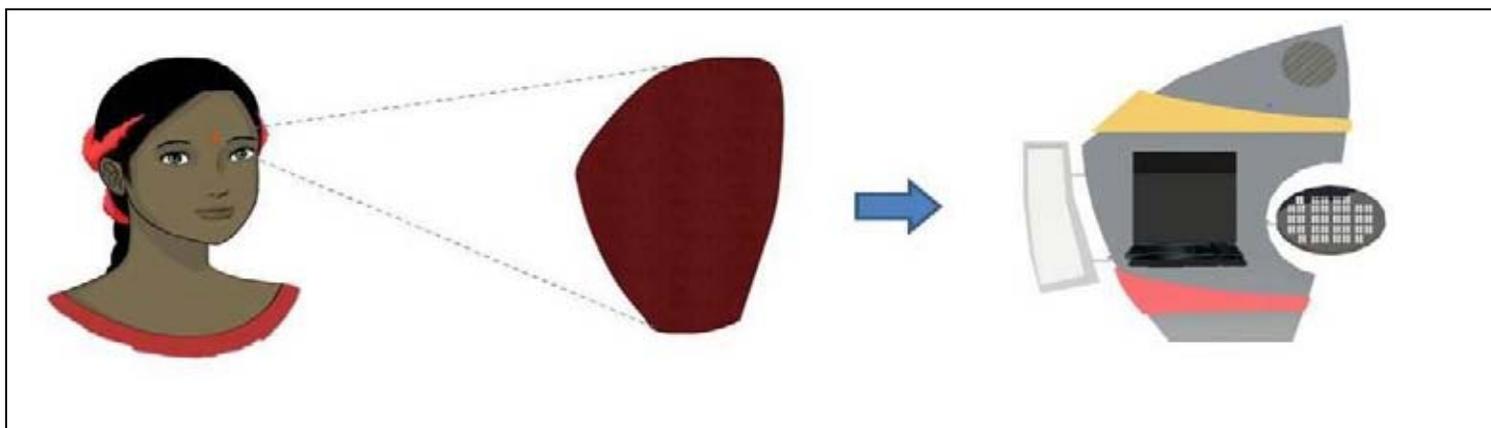
We humans constantly grow, with respect to our surroundings, with respect to our needs. Between the maze of our needs and requirements, what plays an inevitable role is the requisite to constantly learn and be aware of our surroundings. **The disabled empathetically are no exception. 'Being aware or gaining information is synonymous to being empowered'.**

One such thought emerged into our minds, and the thought formed the basic idea of our product that intends to serve a wide **spectrum of people in every domain. Not just the so called 'mainstream'.**

### REACHING TO THE FORM:

In India we greet, we acknowledge people with our special ways to welcome, one such way is to **put 'tilak'** (a cultural gesture) on the foreheads, considered pious and highly respectable. It not just serves its purpose to welcome but also creates a warm beckon for our visitors.

The following figure **shows the transformation of the basic shape of the traditional 'tilak' which will serve the purpose** to provide information to the people with special needs and at the same time help in improving their participation in the society at large. Similar to a tilak in Indian context, our product symbolizes dignity and pride to the user as it brings social equity and equality. Providing quick access to any sort of information of the area to anyone it gives an opportunity for the differently abled people to be more visible and equal in the public realm.



Mr. Gaurav Sinha  
B.Arch student



Mr. Abhishek S.  
B.Arch student



Mr. Piyush Verma  
B.Arch student

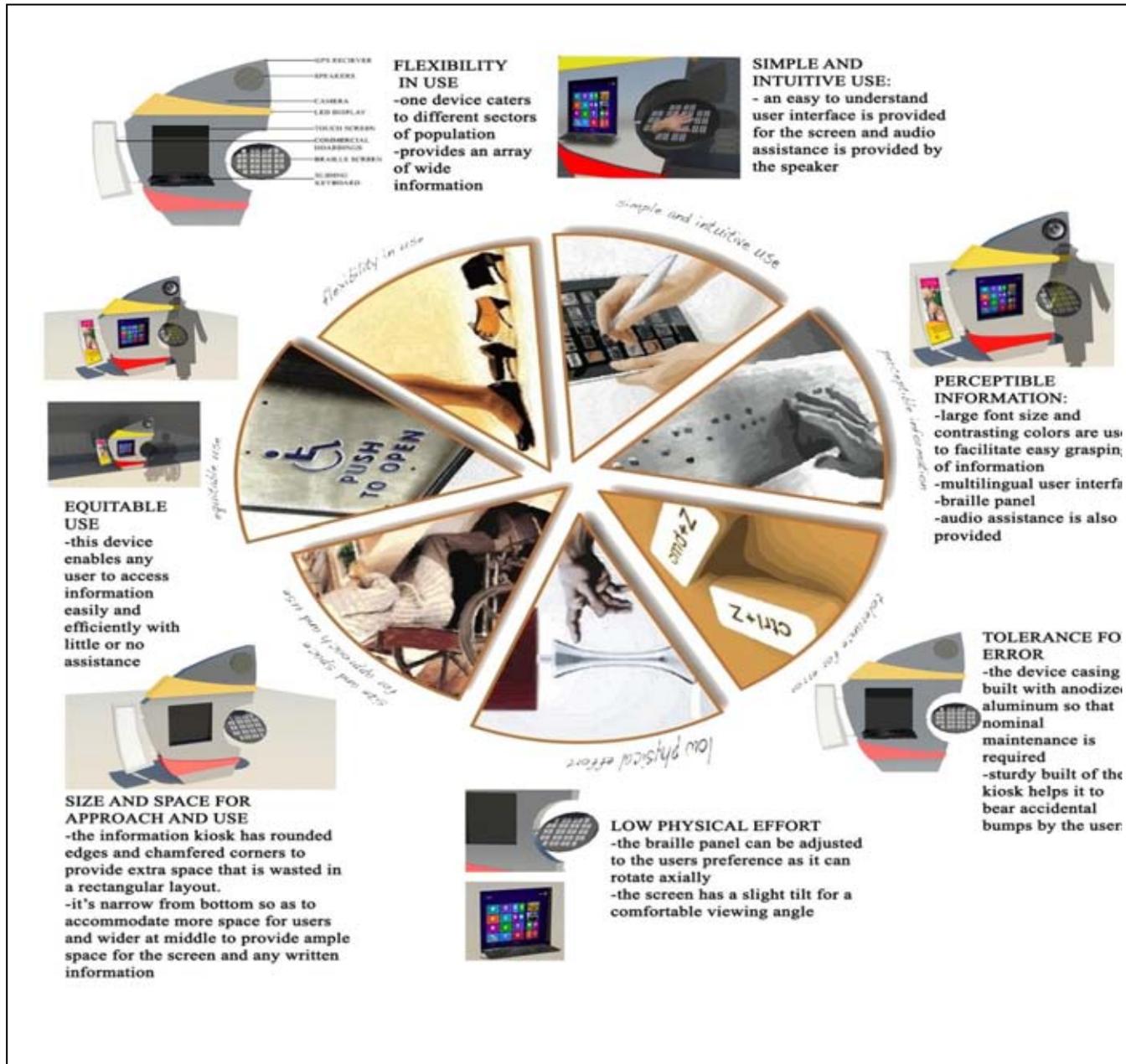
**FUNCTIONING AND METHODOLOGY:** *(Please refer Design Sheets along with the text)*

To cater the needs of all sorts of people in the society we have proceeded from the very core of universal design. Seven Principles of Universal Design (The Principles of Universal Design published by Center for Universal Design, North Carolina State University, Raleigh, NC, authored by Connell, B.R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M. And Vanderheiden, G.)

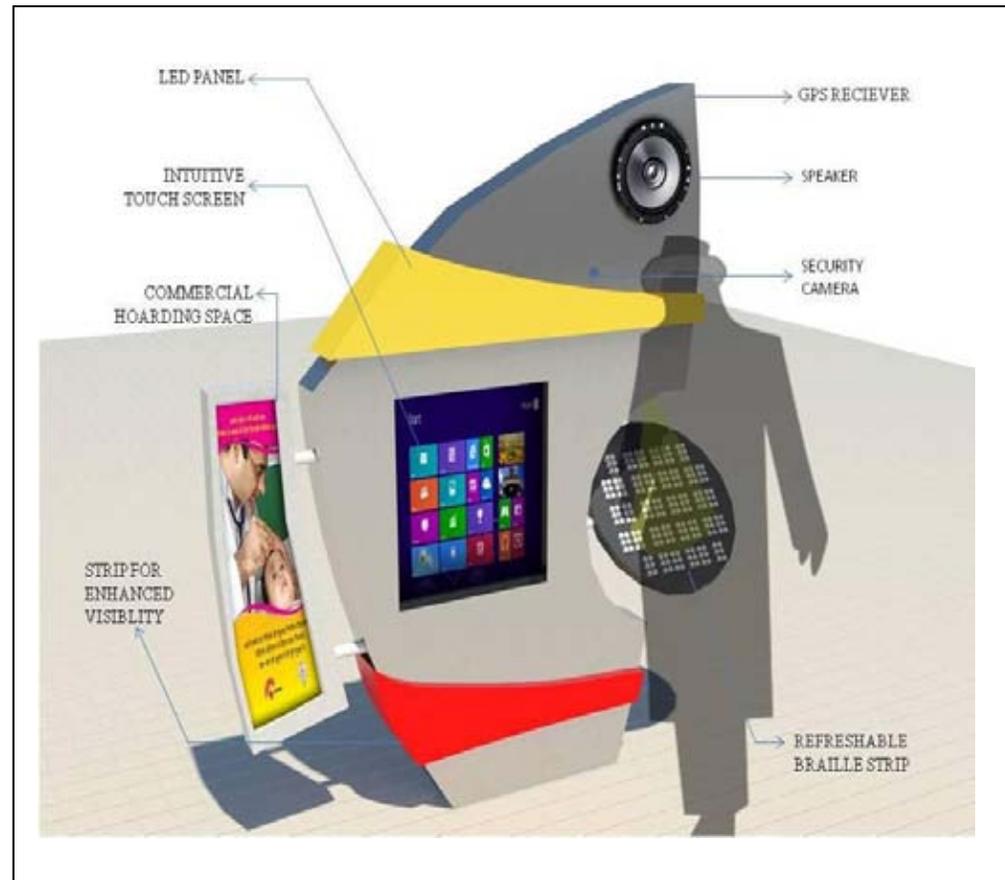
- Principle One: *Equitable Use*
- Principle Two: *Flexibility In Use*
- Principle Three: *Simple and Intuitive*
- Principle Four: *Perceptible Information*
- Principle Five: *Tolerance for Error*
- Principle Six: *Low Physical Effort*
- Principle Seven: *Size and Space for Approach and Use*

These seven principles lay the basic foundation of our product, which have been incorporated in almost all aspects of the product. The following figure shows the terminology and parts of the whole product-

**DESIGN SHEETS:** Continued in next page



The figure shows all the important parts of the kiosk.



#### LED PANEL:

The purpose of the LED panel on the top is to continuously flash the location, time, directions towards the exits and entry and also the important announcements.

#### INTUITIVE TOUCH SCREEN:

The screen placed at the centre of the kiosk is a multipurpose capacitive touch screen, provided with a keyboard which serves various purposes including all sorts of information in multiple languages with an easy interface.

The most important purposes of the screen are-

- 1) Navigating the people in all the areas which includes the important public areas including toilets, drinking water facility, ticketing counters (in case of stations), floor wise plans and important zones with a interactive map showing the current location and the ways to reach the desired places.
- 2) Ticket booking facility and schedules of trains or buses (in case of respective stations).

#### REFRESHABLE BRAILLE PANEL:

The electro-mechanical Braille display panel works by the means of raising dots through holes in a flat surface. Blind users, who are unable to use a normal computer monitor, can use it to read text output. These panels are adjustable and can be rotated in a plane through 180 degrees which can be used by the visually impaired users according their ease.

#### GPS RECIEVER:

The pointed edge at the top of the kiosk has been provided with the GPS receivers, which provides the current location and respective distances of all the important areas. Also facilitates the users with GPS receptive transmitters to locate the kiosk.

#### SPEAKERS:

For audio assistance and announcements these speakers have been provided which can also act as beacon at the time of emergency.

#### SECURITY CAMERA:

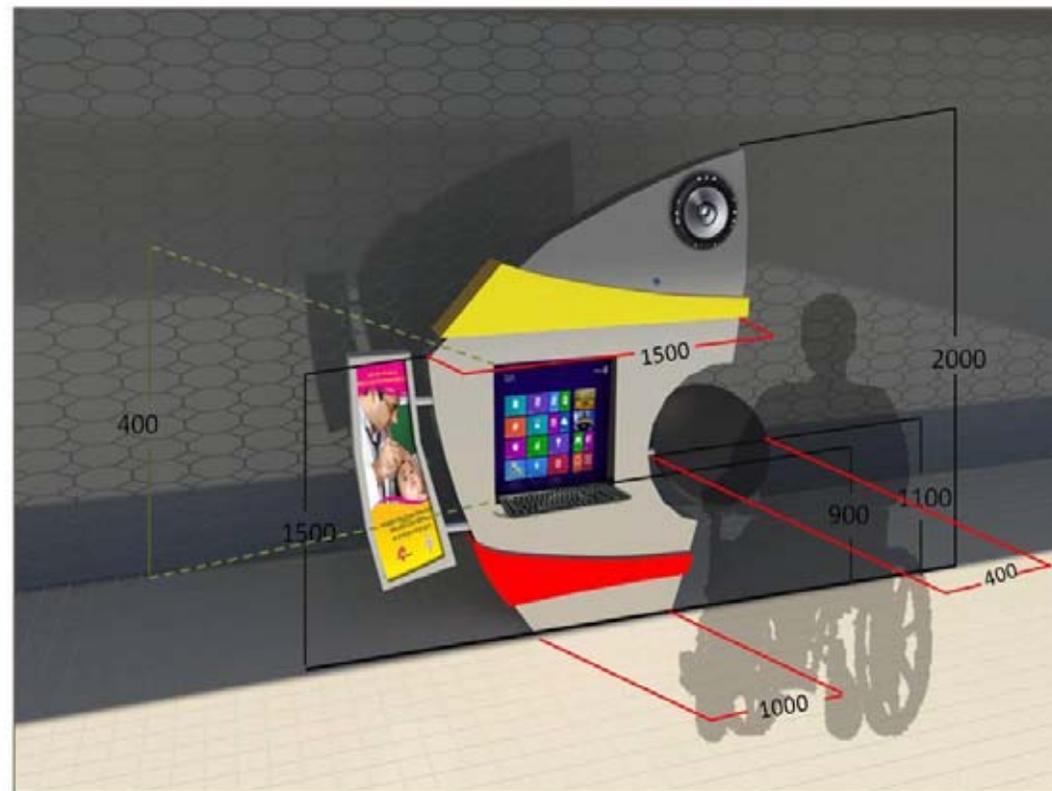
The camera provided at the top right corner of the kiosk facilitates continuous monitoring and surveillance. Also check if the nearby people are in case of any urgent difficulty which can be taken care of through audio messages.

#### CONTRASTING COLOURED STRIPS:

This strip painted with contrasting colors facilitates everyone including the people with partial blindness to easily locate the kiosk and also displays the associated user instructions.

In addition to these, commercial hoarding spaces have also been provided for display of advertisements which can generate revenue and help to reduce the economic inconveniences to a certain extent. The product is a prototype which can be implemented in various public and private or commercial places, and can be used in any number.

The following figure shows all the dimensions of the kiosk which have been set according the basic anthropometric requirements.



All Dimensions are in mm



Abhishek Pal  
B.Arch student

## BATH TUB FOR PEOPLE WITH PHYSICAL DISABILITIES

### CONTEXT:

In order for a disabled person to take bath, he or she must receive the assistance of someone else. Many disabled people, who experience the preconception of others, may be reluctant to receive assistance performing routine daily tasks: like bathing.

### CONCEPT:

This bathtub, which was designed using the principle of seesaw, has a point of entry which is used so that it is easy for a person to move his or her body from a wheelchair to the bathtub. Also, upon entry, a feeling reminiscent of riding a slide is experienced which may cause everyone to want to try the use of the bathtub.



### INSPIRATION:

Its design was inspired by the common slide found at the playgrounds and swimming pools.

### PRINCIPLE: *(Please refer figures along with the text)*

The design came from an idea obtained from the principle of the seesaw. The bathtub lies tilted towards the seat of the bathtub where the center of gravity is. This allows for a disabled person to easily climb into the bathtub. After a disabled person climbs into the bathtub and fills it with water using the faucet on the right side of the bathtub, the bathtub begins to center itself gradually due to the weight of the water, the center of gravity of the bathtub slowly causes it to tilt backwards in proportion to the amount of water remaining in the bathtub. The user is now able to easily exit the bathtub.

### STEPS:

1. Place both Feet in the Bathtub

2. Grab the handle and slide into the seat of the Bathtub
3. As water fills the Bathtub it begins to tilt to the other side
4. When it is filled with water, the Bathtub becomes centered

### **SPECIAL FEATURES:**

1. The drain is located near the bottom of the seat so that water can be removed regardless of the amount of tilt of the Bathtub
2. Steel Grips on either side of the Bathtub provides ease in moving from the wheelchair to the Bathtub.
3. The Bathtub was designed organically in order to ensure the safety when the user moves around inside the Bathtub
4. It is convenient for anyone to use.
5. Comfortably enjoy your bath while sitting down

### **DERIVATION OF THE FORM:**

Like us every generation used to go to the parks and try the See-Saw and the Slides for playing. This bathtub is designed using the principle of seesaw. Also, upon entry, a feeling reminiscent of riding a slide is experienced which results the physically challenged person to slide onto the seat of the bathtub.

### **INDIVIDUAL THOUGHTS:**

One problem I come across often when I work with people with disabilities is how possibly they could take a shower or bath? Many are unable to enter and exit a bathtub or have extreme difficulty doing so. Solutions have come in the forms of walk-in bathtubs. Each has their own advantages and disadvantages. This accessible bathtub involves simple physics similar to a seesaw or balance scale. The Accessible Bathtub will create a line of solution for physically challenged people that will be truly futuristic both in design as well as function.

### **BENEFIT TO THE TARGET PEOPLE:**

The bathtub is an intriguing one for those physically challenged people who still want to soak and bathe. This bathtub has been designed with tilted mechanism to help wheelchair-bound people easily move their body from the wheelchair into the bathtub. This design enables wheelchair-bound people to get into bathtub independently without the need assistance from others.

User can tilt down this tub to a level at which he or she can take hold of the attached handles and transfer him or **herself into the tub. There's a seat built-in** at the point of entry. As water fills the tub, it automatically balances out

itself because the weight will be distributed evenly. As user drains the water, he or she can slowly tilt the *bathtub* again to return to the wheelchair. My only concern is that, the user has to have strong hands to lift him/her self from and into the bathtub.

STEP1- Place both Feet in the Bathtub



STEP 2- Grab the handle and slide into the seat of the Bathtub



STEP 3- As water fills the Bathtub it begins to tilt to the other side



STEP 4- When it is filled with water, the Bathtub becomes centered



## 6. STUDENTS' EXPRESSIONS

**The following section highlights the perspective of the students towards the persons with disability and universal design. There are diverse ideas in the minds of students and they have used their creativity to translate them into essays and articles, covering various issues associated with accessibility.**



Photo credit: Sushil Chaudhary (B. Arch. student)

## DESIGN FOR ALL.. AS IT OUGHT TO BE SEEN

“Where the mind is without fear  
And the head is held high,”

Rabindra Nath Tagore

Most of us owe this person a lot for what he has done as a father figure to the Indian society. As for me, it must have been my other side of luck that I was not born in his era. But, through what I have read and heard about him in books and other literature, there is one thing which was clear in mind- though he was not an architect or a designer but he surely did envision and dreamt of a world where all its elements were accessible to all.

**To my mind, design is similar to literature in some context or the other. If one can't read the literature works, one can hear them and vice-versa; if one can't write, one can speak them** and accordingly anything like that. But, above all, you can always feel it, express it just like your design no matter how weird they may be.

It was my trip to Massachusetts in the early February this year when I stumbled upon one of the premium samples of design mediation which shook me down the spine. While whole of the colossal Statesman House was concealed in snow, there was this diminutive symbol of a man on the wheel chair which coped with the thick and thin, still unperturbed in its tranquillity by the catastrophe of nature. Within my short instinct of architecture I never came across something as stunning as this perception. The pint-sized symbol portrayed much more supremacy than the power surrounding the House and it modestly conveyed its memorandum through its aura round the globe. But, was this the sole place that conveyed such illustrations? Where was this aspect of design enveloping such might with so tiny palms? Conclusively, it is yet to practised at such an extensive scale to be brought to notice. But what one does not understand is that the fundamentals of frailty based design cannot be accomplished because one has to, they are adapted because one wants to.

Just like literary denotation of building is to build something, Design for all needs to be perceived in the same custom, context **and hierarchy. One needs to understand that it is 'Design for "all"' and not only for inversely consecrated people and thereby,** cease unsubstantiated discrimination on such pity basis. We as designers and architects possess the authority to alter to how the masses apprehend design in innumerable systems. It should be customary for one to always retain that urge to bring about designs inclusive of all the facets in its entirety without generating the discrimination, both at somatic and cerebral levels. We owe it to our dearth of suitable innovations that has left the less blessed slice of our community a long way back in the social



Kartikeya Sonkar  
B.Arch student

participation. The sensitivity surrounding this aspect of the design is detached by minute membrane which goes down the line to bring out essence of exquisiteness being engulfed over a period of time and presenting the same in an obnoxious manner. It should be learnt that Design for all is that character of the edifice which gives a feeling of belongingness to the operator without actually making one apprehend that the structure is made for oneself. After all it is Design for All and not Discriminate for All.



To my mind, if ever God was an architect, then nature was his most perfect design, as its user never ever felt the sense of discrimination while it has been serving us.

## DESIGN FOR ALL - DESIGN FOR LIFE

"How does built space contribute to human oppression? Can it contribute to human liberation? If we could build anew our cities, neighborhoods, workplaces and dwellings in ways that fostered relationships of equality and environmental wholeness, what would they be like?" Weisman (1992, p. 2); the above quote certainly ponders over the need for a universal design. The idea that a diverse population needs a diverse environment to succeed seems easy enough to grasp. Certainly, it is easier to comprehend than a one-size-fits-all design philosophy. Why then, in the name of universal design and equality, do we continue to design uniform one-size-fits-all environments?

To this I have a memory to share.

I still remember the day when I first entered my high school. The very thought of being with new classmates made my adrenaline rush. It was completely different place, a new step in the journey of my life. Like me everybody else was too excited to be in a new classroom. Amidst all this, I saw a boy sitting at an extreme corner isolated from others, quiet and just watching others. I realised there was something in him, something so different from others. He was not a normal child, he was having polio. A sense of pity overpowered me, I observed him everyday struggling to cope up with the surroundings. He dealt with great problems each day. Not because he was a physically disabled child but because of the inadequate facilities available for people like him in my school. And today in our country and all around the globe this is a major crisis.

Why are physically disabled or elderly people so ignored? Why not try making structures that are universally designed for mankind?

Today there is a need for making designs that are accessible by everybody, be it physically disabled, an elderly or a pregnant woman. This is a time of revolution; we want everybody's contribution in making a stronger and sustainable country. For everybody's contribution there is need to bring each human on the same platform so that they can raise their voices and contribute equally. For this universal designs are the only solution. Equality doesn't come in a single day. We need to develop it from a preliminary stage (when a boy or a girl enters school).

Advancements in medical sciences have increased the population of the disabled several times over the years. Small children, pregnant women and elderly are also an integral segment of the society. Are these segments only for government funds? And are to be always taken for granted? When they contribute to a **total of 30% of our country's population, why a design only for the rest 70%? Why being so partial? Can't we design keeping in mind the 100% population of the country. For this we need to sensitize**



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Niharika Singh  
B.Arch Student

design according to their needs. They need specially designed products and buildings because of their inability to use normally designed products comfortably.

There are two ways of fulfilling their requirements –providing accessible design and universal design. Accessible design has separate arrangements made for the disabled whereas universal design includes products designed in such a way that normal as well as disabled people can use it with the same comfort and ease. Universal design means giving attention to the needs of 'real life diverse users' including elderly ,children, pregnant women ,people with disability, and people with socio-cultural differences . An important allegation of universal design is that it has mass appeal. Accessible design often has a medical or institutional appearance. The lack of good aesthetics often leads to "technology abandonment" on the part of the consumer or negative attitudes towards accessibility on the part of building owners or designers. To assure that universal design will be accepted, it must have a high standard of aesthetics.

Individual minds hugely vary in skills, needs, and interests of learning. Neurosciences reveal that these differences are as diverse and unique as our DNA or fingerprints. These minds just need an equal platform to showcase their talent. To ensure equality at the school level the academic premises and curricula should be designed with flexibility. An adaptable curriculum and learning environment will help students with varying disabilities and opportunity to adjust and compete with their fellow mates. Besides that presentations should include various means of instruction like audio, visual, textual, motionless images etc and students be allowed to respond through writing, speaking, drawing, video recording etc. Universal design means designing materials and activities such that it allows the learning goals be achieved by people with wide differences in their abilities to speak, see, hear, move, read, write, understand and remember. It provides a blueprint for creating instructional goals, methods, materials, and assessments that do not follow one-size-fits-all methodology but rather provides flexible approaches that can be adjusted and adapted according to the individual needs.

Taking architecture into consideration, ramped entrances and corridors and automated doors are a necessity or an institution who deals with children suffering from disability. Suggesting ramps instead of stairs sounds impractical keeping space efficiency in mind. Instead introduction of lifts at certain distances can fulfil both the requirements. Inside classrooms furniture and walking spaces should have enough area for a wheelchair or walking aid to function with ease.

Transport facilities available for the disabled on the way to their institutions should include barrier free pedestrian routes from their respective residences to nearest accessible transport facility area, buses having stairs that can be unfolded into ramps etc.

This levelling commonly reduces environmental diversity that in turn threatens accessibility and enriching experiences to both those with and without disabilities. This one-size-fits-all mentality consolidates variation instead of celebrating it. Sandy Speicher—an expert in educational design at IDEO—says, **“Too often, equality in education is treated as sameness. The truth is that everyone is starting from a different place and going to a different place.”** Speicher advocates for mass customization, both in the system and the classroom. Remember **“Equality doesn’t mean we require the same environment, but an equal opportunity to address our individual needs”**. A Universal design accessible for all is similar to a Universal language (English) for all. Imagine me writing this article in my mother tongue (Non English).



Tarun Bhasin  
B.Arch student

## ACCESSIBLE DELHI

"At the stroke of the midnight hour, when the world sleeps, India will awaken to life and freedom. A moment comes, which comes but rarely in history, when we step out from the old to the new, when an age ends, and when the soul of a nation, long suppressed, finds utterance. It is fitting that at this solemn moment we take the pledge of dedication to the service of India and her people and to the still larger cause of humanity..."

With an overwhelming speech by Pandit Jawaharlal Nehru, India embarked on a new journey - to revive its lost glory. An independent nation, whose future was paved on the ideals by Mahatama Gandhi; a country dedicated to service humanity, to give life and freedom to every suppressed soul with a motto of Sarvodaya for all. " Nevertheless, the past is over and it is the future that beckons to us now..." With these lines by Nehru, the construction and composition of India as a post-modern country was commenced and various architects from around the world were beckoned to help India in its unending quest, even from the countries that once ruled us; thereby proclaiming that India had moved on over its brutal past.

In this restoration process, where freedom of movement, of life was being gifted to everyone in every nook and corner of the country, there was a particular section of our big Indian family that was left neglected. The world saw India as an emerging economic superpower, evident from its rapid growth in infrastructure. But this growth wasn't shared by all. The perception of collective growth at that time was limited to the sphere of common people only; the physically disabled were left out. The purpose of servicing humanity was incomplete.

In the next 30 years, the country came up with the world's largest and densest railway network, the biggest employer in the world, but again to disappoint a section of Indian masses. At the stroke of the midnight hour, 30 years hence independence, a man on a wheelchair sought to board a train from the New Delhi Railway Station. As he approached the station, he found it difficult to enter the very premises of the platform, stairs surely were not an option for him. Somehow the people with him around managed to lift the wheelchair to the platform level and continued to the desired platform. Crossing the platforms came as an equally formidable challenge. The steep ramps that linked to the overwalks were too heavy to climb upon and too fast to get down from; often resulting in skidding of the wheelchair. The train did not bestow any mercy either. The high rise of the train bed made it a rough task to lift the wheelchair onto the bed, but before the task could be accomplished the wheelchair gave away to the stress and the man collapsed on the floor causing him a severe head injury.

It was just one incident in many where many blind, hearing impaired, wounded or people suffering from any physical complication were injured and found the system humiliating. Children or adults, physically impaired could not use government buildings, parks or other public domains. Improper guiding infrastructure was a huge disadvantage for them. The international

outcry for the need of accessible and universal design soon found ears in India. A support for the then called "handicapped" arose from the streets and soon Indian legislature was awakened to yet another reform. But was it too late?

"At the dawn of history India started on her unending quest, and trackless centuries are filled with her striving and the grandeur of her success and her failures. Through good and ill fortune alike she has never lost sight of that quest or forgotten the ideals which gave her strength. We end today a period of ill fortune and India discovers herself again."

Again the speech of Pandit Nehru reverberated in the hearts and minds of every Indian alike.

It was an unending quest after all, and with success we had faced this failure but hadn't lost our way. It was a moment of impact, a moment of realization, a moment of self-introspection, self-discovery - the PWD Act 1995 - better late than never!

This act brought a major change in the Indian society. The central and state departments for persons with disabilities were set up. Education and employment was made easier for them by protecting them against any discrimination by providing affirmative systems and actions. Special schools and institutions for man-power development were started. The architecture also underwent change. Government buildings had to incorporate some degree of universal design and accessibility options.

18years hence.. Fifty feet underground, grey concrete flooring, levels over levels stacked, the mellow roar of trains arriving and leaving, the usual bustle of a metropolitan – all heard and felt at the same time – **deafening one's ears, blinding one's eyes and numbing one's sensations. The sight is the heart of the baby project of India's capital** – Rajiv Chowk Metro Station. Amidst the chaotic crowd, easily forgotten sight of a blind man finding his way easily to Café Coffee Day at one of the corners and then to his usual yellow line, a level below; or that of a man on wheelchair being helped to his line without any bumps. Yes, easily **forgotten for one doesn't see them both struggling, confused or scared** – but see them as a part of the crowd. Cutting to the architecture, the tactile plates follow an intelligent system of reading, and have been installed in such a language that not only helps in the direction decision but makes the user understand the aspects of his surroundings too. Use of ramps and lifts with stairs and elevators has obliged the old and people with disabilities. The same level of the train flooring and platform has made a huge difference, making Delhi Metro a path changer. IS THIS THE ULTIMATE ACHIEVEMENT?

No, it is but a small step in the Indian transit; a lot needs to be done still. Framing the bigger picture, the Indian Railways - the world's **densest railway system and also the largest employer** – provides a poor access to the disabled. Steep and ill maintained ramps, no lifts, poor access to various parts of stations; and the very basic but the biggest problem of the high rise of trains – it is a shameful way to cater to the population but also shows the ample opportunity that can make believe one that universal design is not after all, just a myth. What if these small yet effective methods could be inculcated in every other railway station of India with the new found proposals like automated ramps joining the train bed to the platform – a game changer indeed! What if these changes are not limited to just the railways but every other mode of transit in the country; smoothed and automated ramps at every bus stop or this new found intelligent system of tactile plates on pedestrian walks or travelators for road

crossing? The image we get is of a city that is virtually accessible by anyone and everyone, an image that can make any architect smile – the core of universal design achieved.

**We do not need to build anything new or grand, just observe and understand what's around us and exploit it as far as we can.** These many small things if inculcated in every other design (the process has been commenced already) will prove to be revolutionary, and make us realize the statement – **“take care of the small things...”**



Dheeraj Reddy  
B.Arch student

## DOES 'DESIGN FOR ALL' EQUATE 'DIGNITY FOR ALL'?

You have to mean it when you design it.

**I am not concerned about what 'universal design' actually means, but I do ponder- why have we got into a situation where we have to think about them 'specially' while designing something? It could be a 'normal' designing process where the universal design should be an integral factor not a 'special factor'. I believe, it's not the ability or the so called 'disability' that decides what kind of person you really are. It's the real you (where the heart is the dominant organ of all, which makes you special, not your abilities) that makes you what you are ought to be, yes ought to be, because it's not karma or fate that decides, the environment the person lives in... and when you strive to make it a better place for all (all kinds and classes) that's what universal design speaks about, doesn't it?**

Narayanan Krishnan (founder of Akshaya trust), **who comes from the so called 'privileged life' (he 'was' a Brahmin). He** shuns the cultural belief of some in India that says the men and women who are homeless, destitute, struggling in the streets or suffering from mental illness are untouchables and unworthy of compassion. He sees them as equal, in the streets of Madurai he saw an old man eating his own human waste out of hunger, that was the day when he realised the purpose of his life, since then he serves them by providing them food year-round, giving them bath daily, giving them haircut in weekends. As he says food would just give them the physical nutrition, but love and compassion we show them gives mental nutrition. **So, what's the whole point of me speaking about a person who has nothing to do with universal design.. Narayanan Krishnan hasn't designed anything, but what he did is being truly committed to serve the old and mentally destitute because he has gone through a life changing incident where he had 'totally' understood the situation and had immediately sought for a 'solution'. so as designers do we 'really', 'totally' understand a problem (of any level) like he did, we do namesake case studies where we look at the issue as a complex thing and try to solve it though some complex process, what we need to do is to literally walk in the streets(yes the streets, 21<sup>st</sup> century India has got almost everything into the street) like narayanan did, where you see the real world, where you would be introduced to those striving forces that which will lead you to solutions that are simple and perfectly satisfying every criteria which anyone can think of, because here you would really mean it because you have gone through what we call real (not an imagination where we 'assume' 'real' things).**

Treating all equally with dignity through design is not just meeting the goal of their physical convenience. Places like government buildings, amusement parks, hotels etc are used by all classes and should be designed in a way that they pose no

kind of discrimination, for instance if a blind person and a normal guy enter a building, there are stairs for the normal guy and ramp for the person with disability, this is exactly where the ugly face of discrimination creeps in.

**Dr. Megha Phansalkar an Indian started an initiative called “prajwal”. They strive to give the differently enabled the smallest joys of life like riding on a roller coaster, being able to paint and soak in the immense beauty of mother nature. Initiatives like these provoke us the “fraternity of future designers” to be able to create something universal in its true sense.** Also taking inspiration from prominent personalities like Baba Amte and Narayan Krishnan to help them in any way we can to succeed in their initiatives to create a place for all in this racist world. All these initiatives are a result of a devastating experience which acted as an eye opener and prompted these people to do something. Their initiatives are social which can be manifested as architectural to make an even bigger difference.

As a designer and hopefully the future of this developing country, I would like to see a world where design knows no inequality and thus preserving the dignity of all.



-a work by  
Deepshikha Sinha

*No external help is required, when we feel the bliss in ourselves...*