

# “Universal Design”- Public Toilet for all.

PR08AR18

## Description of Design

The proposed Public toilet is located at the “Dabali” of “Kathmandu Durbar Square”. The site forces, have a very strong character, hence the design responds to the site and tries to bring an architectural harmony to the square. The Design is based to bring comfort, safety, and user friendliness. The generous layout, adequate lighting and ventilation, appropriate anthropometrics and selection of materials are ways we have tried to bring comfort safety and user friendliness in the interiors. Ramp is provided for disabled people, marker tiles for the visually impaired, lower basins are provided for the children. The slope roof is used for rain water collection with gutter provided at the roof. Water from the roof is directly collected in water duct running around the periphery of the wall at 9 feet height with approximate capacity of 25,000 litres. This water from the ducts runs down pipes into the toilet flushes while the cavities of the Rat Trap Bond act as piping ducts. We have attempted to use rat trap bond for its cost effectiveness and integrate with the idea of the duct. For normal drinking water there are two overhead tanks of capacity of 10,000 litres each. Grey water from basins and showers goes to the wetland treatment areas and finally treated water collects in an underground storage which then is pumped back to the duct for re-use. 1000 litres of water can be treated with the use of wetland treatment area. Overflow water from treatment plant is led to the sewage line. For natural ventilation, we have small openings located six inches above plinth level and dormer windows located opposite them for cross ventilation. Our design is a hybrid model, partially self sustained. Using the existing city sources as well as trying to self sustain.

## Description of the Design Process

The Design process began with Site analysis and site selection. We selected five possible sites for the public toilet primarily keeping in mind the available space, density and flow of people and the macro context. Then we conducted case studies of toilets at Bishal Bazaar, New Road and Nepal Telecom building located at Tripureswor. The case study showed us that the toilets at New Road were well maintained and managed, while the one at Tripureswor was dark, smelly and not well maintained, there were also exhaust fans which had stopped working. As lessons we learnt about natural ventilation, and compelled us to look into operation and maintenance. Before we got started with drawing works, we laid out a conceptual framework for developing the design broadly dividing into categories considered below:

- architectural design,
- interior design,
- services and system design,
- constructional approach

The framework considered, comfort, quality of space, air circulation, water re-use, water harvesting, grey water treatment, self cleaning methods, promotion of craftsmanship, low maintenance and cost effectiveness. The design then moved into area analysis, calculation of water required, spatial layout and architectural planning. We tried to explore and study separately each category and develop appropriate ideas simultaneously and connect to the planning phase. The design framework was constantly referred while making design decisions and developing the design. The design motivation finally was the integration process of the system design, construction method and architectural statement. As a result the architectural product tries to make a connection to the past through its form while the construction technique and system design is tending to connect to the future by improving the present. The concept generated here could be seen as a combination of “Change and Continuity”, change as in the building systems and technology while architecturally continuing and allowing the past to evolve.

## Description of ways the proposal meets the four criteria

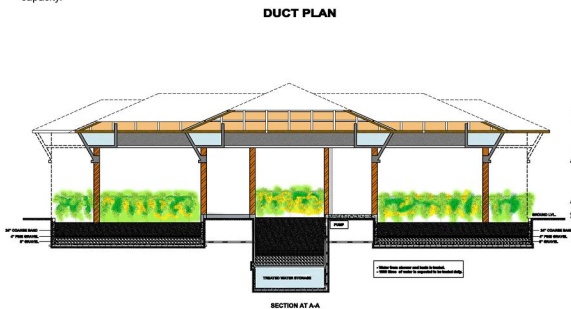
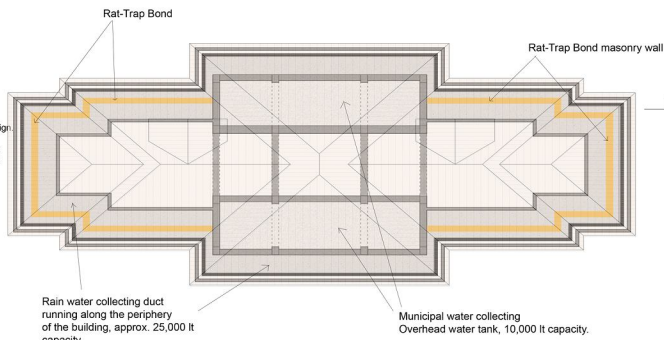
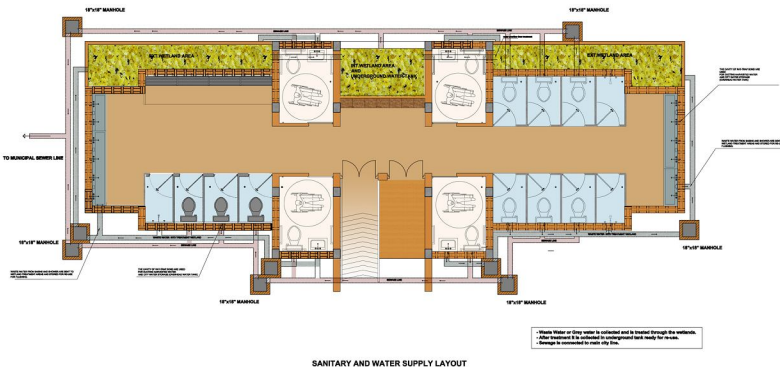
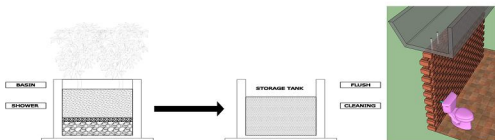
As we are given four- different criteria for design i.e. universal design, sustainable design, appropriate and low cost and design excellence. We tried our best to meet the above mentioned criteria in our design project in the following way:

1. Universal design: Provision of ramps for disabled persons and also separate cubicles with special type of w/c, sliding doors, enough space for turning of wheel chair within the room is made. Also special provisions are made for children. That includes low height, wash basin and water taps. Marked floor tiles for visually impaired.

2. Sustainable design: Use of slope roof and rain water harvesting can minimize the dependence of municipal water. Use of grey water treatment from basins and shower water through wet land and re-using in flush is provided addressing a continuous cleaning process. Grey water is naturally treated using filtration through various layers and plants. Plants also create green environment. Use of natural ventilation saves extra energy. Natural movement of air is utilized and use of natural light through various openings provided in the wall.

3. Appropriate and low cost: Flag stone is used for paving inside toilet which is non-slippery as well as cheaper than tile. Use of rat trap bond saves about 25% of brick than English bond. Cavity of rat trap bond is used for plumbing and electrical purposes. Minimum use of concrete is done in the masonry work. Strength is gained providing reinforcement bars at corners. Avoiding Plastered surface in the interiors. Rat trap bond gives aesthetic appearance than English bond.

4. Design Excellence: As site chosen is enlisted in UNESCO list of world heritage site, visual aspect of building is essential. In order to make contextual design, traditional Malla architectural style was adopted with use of modern materials and technology. Exposed brick works with sloping roof, lattice windows, and struts is matched with surrounding; also linear form of building is fitted in the existing site.



AREA ANALYSIS

Area analysis was done according to the international size of fixtures and space needed

Area of the cubical (w/c)	: 15.50 sq. ft.
Area of the cubical (shower)	: 45.90 sq. ft.
Area for circulation	: 490.30 sq. ft.
Area of Urinal	: 25.00 sq. ft.
Area of basin	: 36.00 sq. ft.
Area of waiting space	: 36.70 sq. ft.
Wetland area (internal)	: 45.00 sq. ft.
Wetland area (external)	: 123.00 sq. ft.
Wall area	: 422.80 sq. ft.
TOTAL AREA	: 1230.80 sq. ft.

Water use calculation

1. Flush	6-8 ltr/use
2. Urinal	0.5ltr/use
3. Wash Basin	2-4ltr/use
4. Shower	30-40 ltr/use

Total estimated approximately 8100 lt per day.

Water Storage Capacity

1. Overhead tank	20000lrs
2. Duct canal	27000 ltr

