

Smart Dharavi: A City in Many Grounds

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Smart Dharavi proposed the idea of three grounds: existing ground, flyover ground and a high-rise ground, the last of which would provide a sale component to finance the improvement of Dharavi. It also identified three actors – people, politicians and builders – proposing the developer and government as primary decision makers with a community consent assumed. The jury found the proposed densities and living conditions to be unworkable.



PREMISE

A unique characteristic of Dharavi is its very close live-work relationship. Productive activity takes place in nearly every home. As a result, Dharavi's economic activity is decentralised, human scale, home-based, low-tech and labour-intensive. This has created an organic and incrementally developing urban form that is pedestrianised, community-centric, and network-based, with mixed use, high-density, low-rise streetscapes. This is a model many planners have been trying to recreate in cities across the world. A simplistic re-zoning and segregation of these activities - common in the United States - would certainly hurt this very unique urban form [Extracted from the team's proposal, quote from *Dharavi: India's Model Slum*, Prakash M Apte (2008)].

This live-work relationship has developed social and urban connections which are representative of community-based successes, establishing desired urban parameters for most cities.

The type of urbanism in Dharavi, supported by the integration of functions and people, uses urban elements as living parts of a distinct organism and not like pieces of a puzzle. The street is perceived as the primary space for social activities and experiences, not just as physical connections. Dharavi offers the opportunity to tighten the house-work relationship, reconciling densities with human scale, culture and social organisation along with amenities and infrastructure, to become a sustainable urban neighbourhood.

GUIDING PRINCIPLES

High Density

To create surplus real estate property to triple-finance the scheme project-construction-maintenance.

Eco-Sustainability

The scheme pursues high levels of self-sufficiency in management and production of resources supported by state of the art systems and controls.

Physical/ Social Integration

The need is to build recognition of Dharavi as a unique place within the city. Strengthen existing communities, traditions, historic values and livelihoods in the process by fostering participation of existing and new communities both in planning and social startups.

Flexibility

It has to leave ways to introduce changes within each stage which will be clearer with deepening of projects and the development of city wide plans.

Synergy

With the project, the actors, working together, will become partners. To achieve long term partnership of participants beyond the start-up period to long term maintenance of infrastructure for all levels of income.

GOVERNANCE

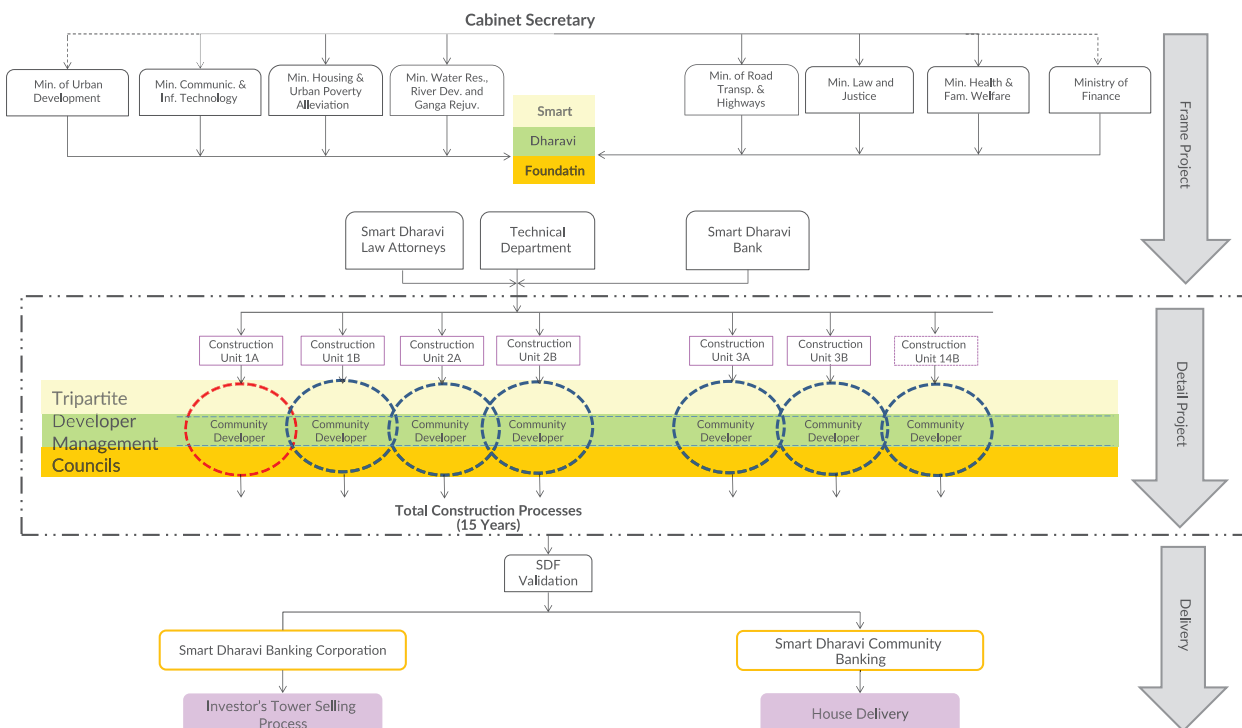
Smart Dharavi Foundation is proposed as a non-profit organisation created exclusively for the purpose of :

- Executing and planning the project,
- Assigning responsibilities for the final design,
- Coordinating responsibilities for implementation, and
- Monitoring compliance with the standards established and creating the legal framework for delivering infrastructure to local governments, investors and residents of Dharavi.

The Technical Department will be the agency responsible for overall project completion, but the Functional Descriptive Report will serve as a guideline for specific designers of different "stages", by establishing delivery requirements:

- Compile results and do errands for all proposals in the project matrix;

- Once consolidated the various developments of the 14 stages must call for tender;
- Ensure the implementation of the project and through its project department, inspect if the work executed meets the stated parameters;
- Give the final approval for Developers to begin marketing the towers;
- Aggressive advertising campaigns (at regional, national and international levels) for the promotion and dissemination of the project;
- Coordinate the work of the Smart Dharavi Law Attorneys and Smart Dharavi Bank;
- Create a team with local governments of Maharashtra and Mumbai to enable transformation into Smart Dharavi County for creating mayoral agencies for the collection and allocation of funds for them.



PLANNING

Areas to be Preserved

- Mangroves, the Mahim Park and *nalas*
- *Koliwad*s and *Kumbharwad*s have legal land tenure and should be integrated with the project
- Buildings and spaces with historic, religious, architectural or symbolic value, such as Riwa Fort or mosques
- Well maintained amenities
- Newly constructed private buildings.

NEW AREAS PROPOSED

New Dharavi Ground

A system of square blocks to reinterpret the cluster and increase the efficacy of spatial use, the ground accommodates residential and workplace units. Plots are readjusted to existing areas that are preserved and maintains the relationships of original organisation.

Flyover Connection Ground

This level above the new Dharavi ground, is arranged in a criss-cross of large diagonals to provide a system of streets, public spaces and elevated transport lanes.

High Rise Ground

Supported by the flyover connection ground, it contains taller buildings to provide office space and upscale residential units.

Industrial Zone

Industrial areas are proposed to be developed near train stations and industrial zones are proposed within Dharavi.



New Dharavi Ground



Flyover Connection Ground



High Rise Ground

FINANCE



New Dharavi Ground

Area 17.73%

Cost 6.46%

USD 70,146,902.29

Construction 18.91%



Flyover Connection Ground

Area 12.20%

Cost 12.33%

USD 124,209,528.84

Construction 12%



High Rise Ground

Area 68.90%

Cost 80.71%

USD 813,007,621.90

Construction 68.9%

Smart Dharavi was conceived to work as all three grounds together. The financing for each ground are as below.

The estimates of construction cost in Mumbai show that there is a value of INR 1,700 per sq ft as the minimum cost of construction and INR 2,300 per sq ft as the average cost of construction. Similarly it seems reasonable to estimate the selling price on financial towers at INR 12,500 per sq ft. Minimum construction cost multiplied by an index estimates the cost of construction for each ground.

As a validation of the financial scheme, the relative weight of construction on the total was estimated as indicated in the chart above. The amount of construction on High Rise Ground are higher considering the profit to be obtained from sale of units here.

Other costs should be estimated such as the value of acquiring private land from their owners which is estimated at USD 1,130,438,216.

Total Dharavi	2,394,923 m ²	
Total Private Land	372,190 m ²	
Land to remain private	102,282 m ²	
Land to be purchased	269,908 m ²	11.27%

Cost of land 1,130,438,216 US\$

HOUSING

High Rise Ground will sell real estate to an open market in order to finance technology to sustain a high standard of life for them. The financial business crowd can be detached from the street using elevators to travel within their work space. Height is an asset as towers become their identity symbol.

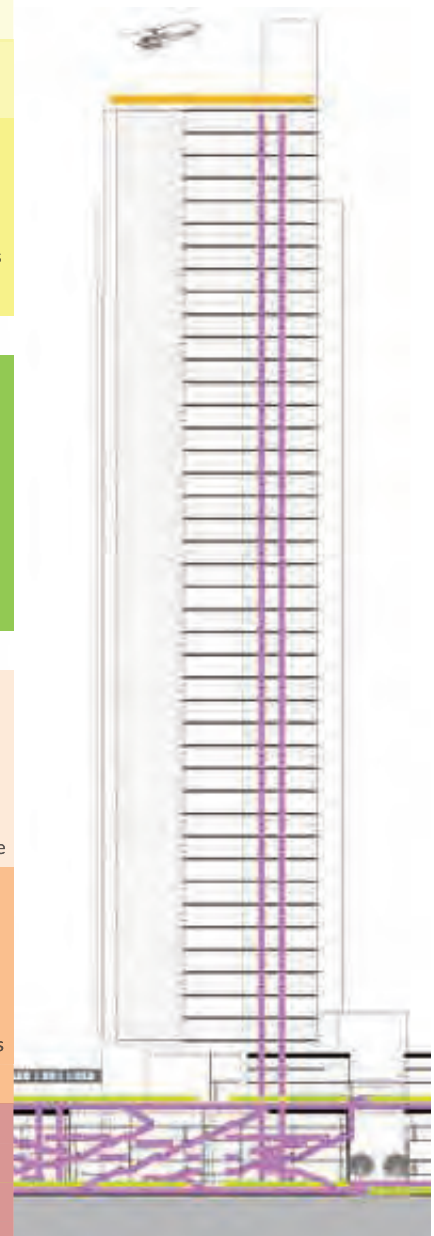
Flyover Connection Ground will be above these houses, matching the level of elevated main roads in Mumbai. This ground is a road network, a public open space and hub where schools, theatres, mosques and squares with shaded areas shape the new downtown area. The people of Dharavi will meet and pursue activities but without need to travel.

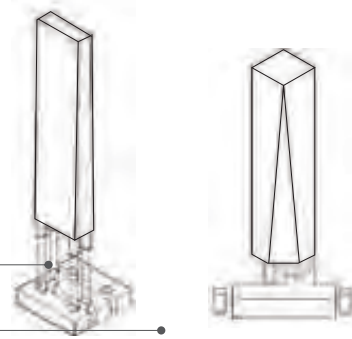
New houses will be built in the **New Dharavi Ground**, close to the current street. This ground will maintain the traditional form of social organisation. New Dharavi will contain the local uses and flavour with structures, across maximum four levels and the traditional narrow alleys. Organising the 85 communities into a participative scheme will allow location of each community near the original place they occupy, along with the facilities related to their traditional work.

- Apartments
- Private Terraces
- Office
- Private Amenities
- Access Atrium
- Parking
- Commons
- Semi-public Terraces
- Vertical Shafts

- Historic Icons
- Look Outs
- Eco-parks
- Cultural Space
- Boulevards
- Education
- Health

- Family Home
- Rental Residence
- Tool House/Terrace
- Toilets
- Outdoor Work Space
- Temples
- Sport Grounds
- Access Paths
- Local Streets
- Commercial Avenues
- Vertical Shafts
- Squares
- Local Parks
- Central Spaces



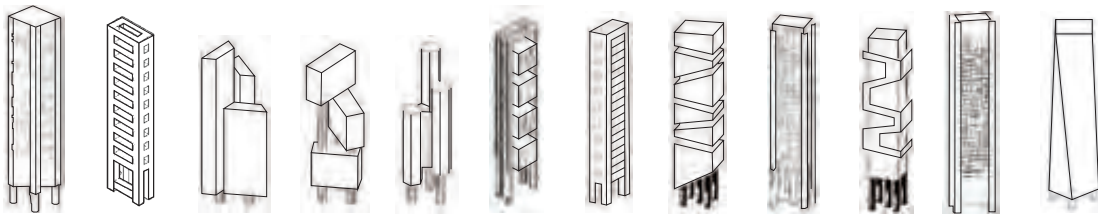


The "Long Tower" is supported in four pillars, one in each corner. Match with one type of Street Block, and can also be located as a bridge between two blocks.

Finally, the Diagonal Square nests the "Continuous Tower", without any structural restriction, as it could go solid to the ground.

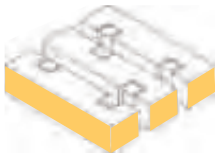
The basic types can be used for building and infinite set of variations, not only in image but also in height and construction area. These last number, however, it is fundamental to check the financial feasibility, so here there is an example of possible conditions :

	Shaft x Tower	Floor Area (m ²)	Number of Floors	Total Area (m ²)	% Rental	Rental Area (m ²)
Triangular	3	1,370.53	55	75,378.88		60,303.10
Void	4	1,827.44	40	73,097.60		58,478.08
Central 1	5	3,406.28	75	255,470.84	80.00%	204,376.67
Central 2	5	2,485.79	75	186,433.99		149,147.19
Central 3	5	3,027.36	75	227,052.18		181,641.74
Long	4	1,573.80	60	94,427.86		75,542.28



High Rise Ground: Towers

	Residential Units	Number of flats	Construction area (m ²)	% flat area	Open common area (m ²)
Street Block	3 long	468	24,862.86	50.82%	2,016.00
Courtyard Block	2 long + 2 short	444	24,862.86	48.22%	1,485.98
Square Block	1 long + 3 short	442	20,825.24	57.31%	2,300.74
Diagonal Block	1 long+ 2 short	312	16,575.24	49.57%	3,161.88



Courtyard block



Square block



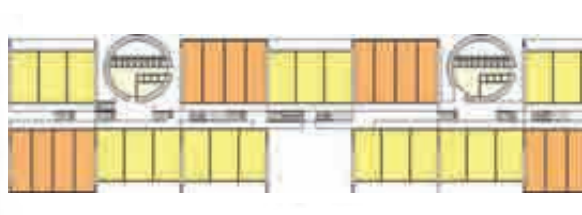
Diagonal Block



Flat Units



Shafts



Housing Unit

New Dharavi Ground: Blocks

SOCIAL AMENITIES

Commercial activity, squares, amenities, green areas, will be attached to secondary roads implementing a new high ground supplying the amenities needed to reach acceptable standards. The flexibility of this grid allows building amenities as they are required with easy connections to New Dharavi and High Rise Grounds.

In addition, the building typologies leave a broad margin for designing for health, educational and recreational facilities as shared resources. Amenity buildings in New Dharavi ground will be above the blocks and connected by streets.

The proposed industrial spaces will be covered by elevated parks apt for collective gatherings, fairs, weekend markets and festivals to introduce the cultural elements not present so far. A construction presenting two faces inside industrial activities, outside recreation and cultural.

PHASING

Two lots have been identified to start the construction process without disrupting existing activities and to initiate the grid plan. The north plot, currently used as a Bus Depot must be moved to its new location at Sion Train Station grounds. The other plot located north of Mahim Station (2.4 ha) has no important use and the land is the property of Maharashtra Railroad.

The first phases will initiate the process of community participation. After houses are allotted, the next phase will implement a new construction site on vacated land in order to replicate the process six more times on both fronts while enlarging the size of next stage as much as possible. The whole scheme will be complete, in approximately 15 years.



Phase 1



Phase 2



Phase 3



Phase 4



Phase 5



Phase 6



Phase 7



Phase 8



Phase 9

Legend

- Proposed
- Existing
- New Built

TRANSPORTATION

Elevated Streets

New bus stations are proposed on Flyover Ground with levels for train and bus passengers, vehicle maintenance and parking. Transport facilities will be combined with a complete Commercial Mall and Light Industrial area, to facilitate the exchange of goods and the financial sustainability of the transport system. Over the industrial space will be space for the Bus Depot, that can accommodate 230 bus units with facilities on two levels, maybe one for public connections and other for maintenance and repairs.

Parking

The level immediately below the streets in the Flyover Ground will be a parking facility with capacity for 26,000 cars connected to all three levels. A system of ramp modules will allow picking the route either on New Dharavi roads or by Flyover Connection Ground.



Proposed waste disposal network



Proposed nala network

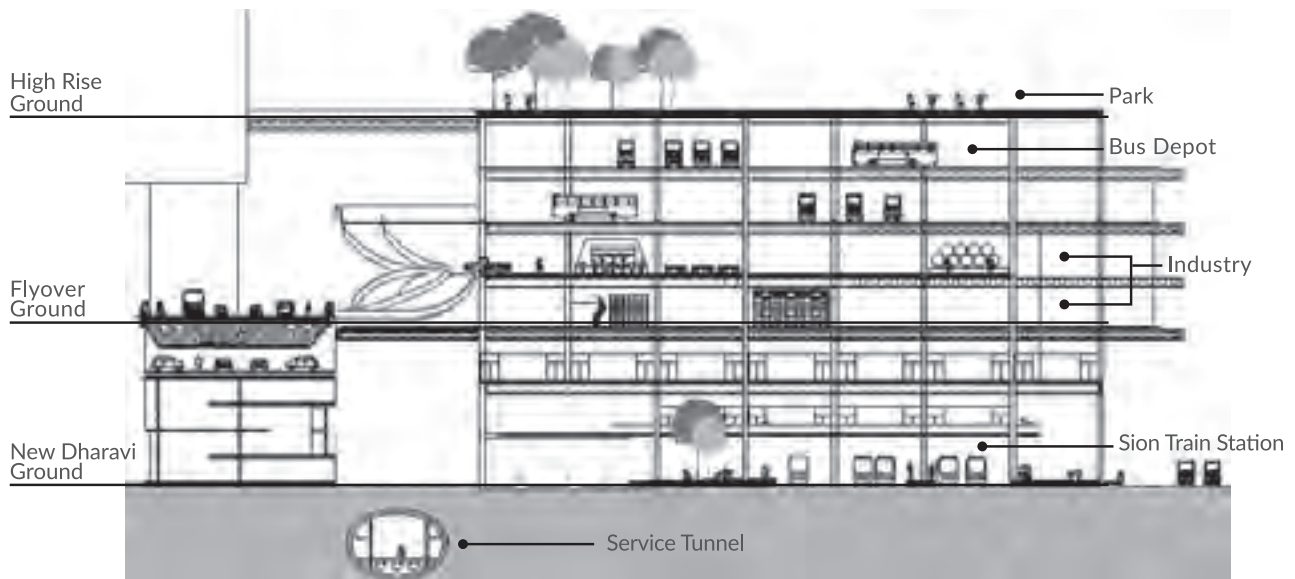
SERVICE INFRASTRUCTURE

Waste Disposal

The proposal suggests use of an automated vacuum waste collection system, which transports waste at high speeds through underground pneumatic tubes to a collection station where it is compacted and sealed in containers. This system helps facilitate separation and recycling of waste.

Nala Network

The proposal includes expanding and building additional channels. This will improve storm water drains, shorten spans of surface runoff to final deposition and assist in remediation of floods affected areas. The nala network will have multiple connections to Mithi.



Proposed system of transport and industry



Proposed system of public and green spaces

ENVIRONMENT

This project proposes an articulate system of public spaces and green areas along with the Mahim Creek landscape with its mangrove ecosystem. This includes walkways, bike paths, plazas, amphitheatres, gazebos and observation towers. The Green Boulevard with its extended central nala will bring the water feature to link both Koliwada and Kumbharwada to create a

green T with two axes structuring the open public space system. A Centre for Study of Mangroves Habitat is proposed alongside a reforestation program which will run mangrove nurseries to help restore the previous forest extension and use as special bio-filtering fields which will aid in diminishing industrial contamination.



