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SANITARY LANDFILL & NEIGHBOURHOOD DEVELOPMENT

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ABSTRACT

In order to have design a waste management unit that serves the purpose of enhancing the environment and the quality of life, we must understand the current scenario. In order to upgrade urban lifestyle an active participation of society is also required. As this project is solely based on converting garbage area into a garden. Our main objective is to create a recreational area at Bhanpur, Bhopal, we will be focusing on

- Impact on socio-cultural activities of residents near that area.
- Enhancing the quality of life of the residents near that locality.
- Part that society will play to upgrade urban conditions of that area in context with that recreational patch of land.
- Environmental impact due to this urban development.
- Local area business will be affected by this proposal.

An array of sub-methods such as literature study, observations, study visits, site analyses, photography, sketching, etc. were conducted to bring the concept of the park in Bhanpur, Bhopal. The main objective is to provide a clean and beautiful aesthetically sound environment, without creating turmoil in residential facilities near the concerned area.

INTRODUCTION

Developing countries with increasing urbanization the Living standards and sanitation conditions in low-income countries are worsening day by day. The need of land and sanitary landfill that meant for Solid Waste management due to increased urbanization the post closure of site is necessary as with respect to time the site gets into the habitable area so the closure of landfill brings on the picture of contaminated land soil and air pertaining to the landfill sites. Proper sorting and composting solutions are required to handle informal waste and to decrease the environmental burden and to improving overall situation in over populated cities.

The main intention of performing this project is to develop functional decentralized waste management units in the city of Bhopal, Madhya Pradesh. Indian organization center for Environmental Education initiated, Garbage to Garden by collaborating with Swatch and various Municipal corporations of India. It intends to decrease the environmental degradation caused by un-treated waste and give the concerned areas heightened aesthetical, educational and recreational values. In order to gain approval from the residents residing in concerned areas a good architectural design in an essential element.

The proposed ideas are derived from the objectives, in order to produce a final design product that will serve its purpose.

LITERATURE SERVEY

The aim of the literature study was to collect and gain all the necessary knowledge to be able to successfully perform our part as design consultants in the Garbage to Gardens project. Our desire was to examine the following questions: What are the underlying phenomena that cause the garbage crisis in the developing world? Why is sanitation a problematic issue? What are the characteristics of successful waste management? How does a well-functioning waste management unit work? In this chapter we will present the findings of the study.

Developing countries are usually described as low- and middle-income countries where the standard of living is low. However, there is no single internationally recognized definition of a developing or developed country. Usually, the International Monetary Fund list in the annual Economic Outlook Report is regarded as the operative definition of the development status of the countries in the world. India has a gross national income per capita that according to IMF places the country among the developing nations, although the gaps between different income groups are enormous. Economy as the only criteria for development is a debatable subject because income gaps are not recognized, nor other sorts of development such as social development. Many instances have stopped using the vocabulary altogether, as it is impossible to make a clear distinction between developing and developed countries.

INTRODUCTION

TYPES OF SOLID WASTE

Municipal solid waste (MSW) is generated from households, offices, hotels, shops, schools and other institutions. The major components are food waste, paper, plastic, rags, metal and glass, although demolition and construction debris is often included in collected waste, as are small quantities of hazardous waste, such as electric light bulbs, batteries, automotive parts and discarded medicines and chemicals.

Disposal Methods for MSW

- Open Dumping
- Land filling Composting
- Incineration

Sources of waste generation

A waste characterization study for BMC & other ULBs was carried out on 11 to 12 March, 2017. To analyze the physical characteristics of waste samples. The sources of waste generation from BMC& ULBs are as follows-

- Residential/Individual houses
- Slums
- Market yards
- Road/street sweeping
- Hotels& restaurants
- Shops/offices/institutions
- Hospitals/nursing homes/pathological laboratories
- Marriage halls
- Construction waste

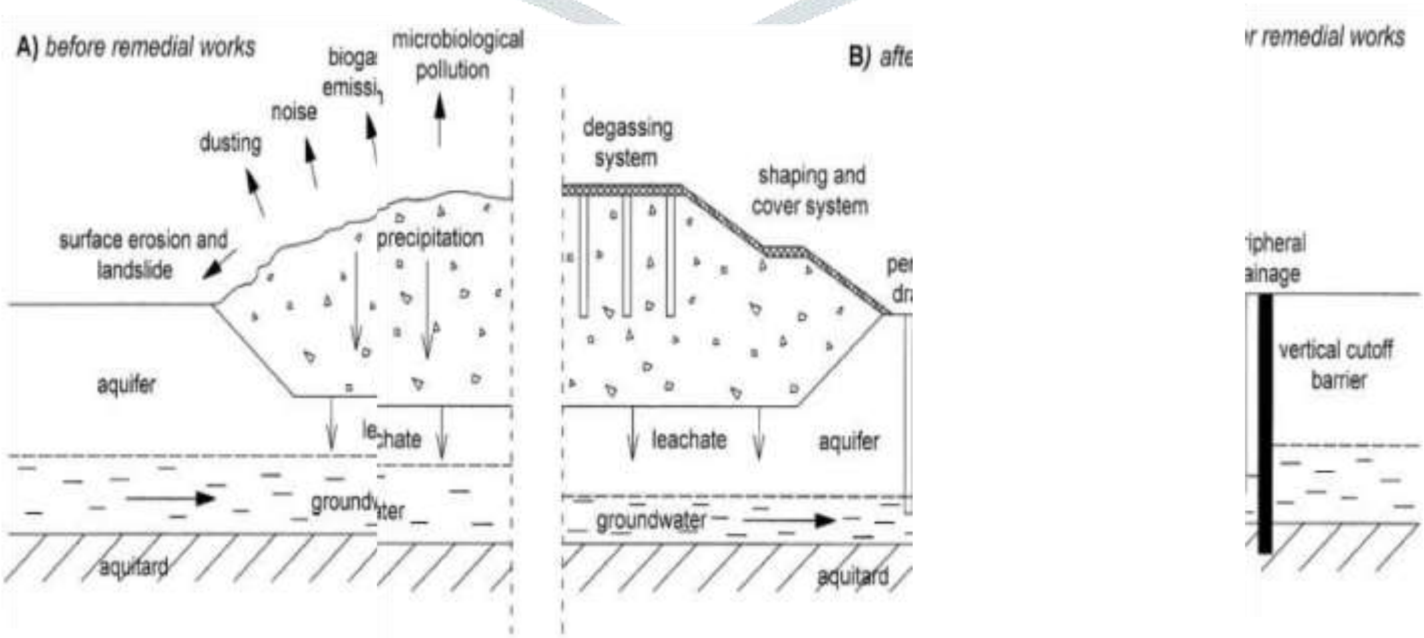

Figure 1. Typical section of sanitary landfill

CASE STUDY

CASE-1

"A CONVERSION IN SANITARY LANDFILL TO A RECREATIONAL AREA"

The Garbage to Gardens project started off in 2009. There was a collaboration between students from the "Global Social Entrepreneurship" course at Yale School of Management and Centre for Environment Education in Pune. CEE was familiar with the work and needs of the SWACH cooperative, and therefore challenged the Yale team to evaluate the feasibility of decentralized composting in Pune. Of particular importance was how to engage the residents to be more involved and informed in neighborhood composting programs that incorporated garden space - thus the project name Garbage to Gardens.

The Yale students produced a report about the financial and administrative aspects of a composting project. In dialogue with SWACH it was later noted that compost facilities are well suited to be placed near the existing sorting points, as the composting is to be performed by the same workers. It was recognized that the sorting points also needed improved facilities. Thus, the Garbage to Gardens project grew to incorporate both the sorting of the waste and the composting.

When we contacted CEE, they saw us as a good opportunity to go forward with the project, more specifically designing the physical outcome. SWACH and CEE decided on two areas in Pune where a scheme like this was needed, and where the prerequisites seemed to be the right ones for it to work.

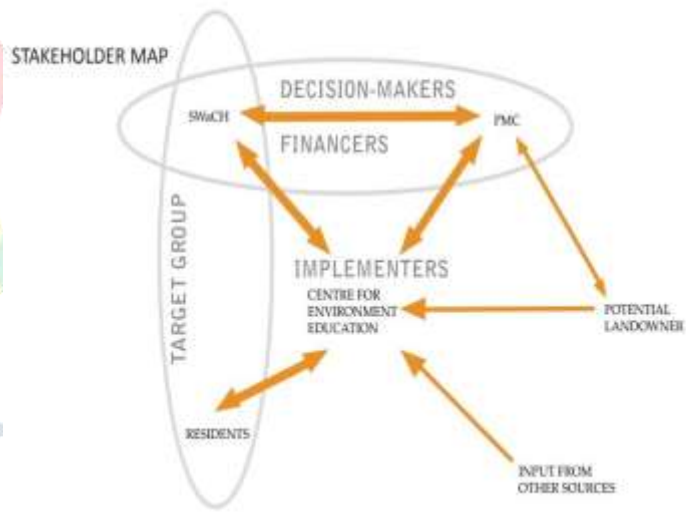

Figure 2. Stakeholders Map

CASE-2

SHANGHAI HOUTAN PARK

Designer	Turenscape
Location	Pudong, Shibo Avenue Shanghai, Shanghai
Size	34.5 Acres

Project Type	Park/Open space Waterfront redevelopment creation/restoration
Budget	$15.7 million
Climate Zone	Humid subtropical
Former Land Use	Brownfield

Table 1. Introduction of Shanghai Houtan Park

As one of the central green spaces of the Shanghai 2010 Expo, Houtan Park was designed not only as a revived ecological waterfront for the exhibition. It was also conceived with the flexibility to be transformed into an open public waterfront space for Shanghai afterwards. The 140,000-squaremetre (or 14-hectare) site is located on the southern boundary of the Expo site between the east bank of the Huangpu River waterfront and Puming Road. A former steel manufacturing factory and boat repair facility remained on site when the design was initiated in early 2007. Construction was completed in October 2009, and the park opened to the public in May 2010.Shanghai Houtan park is an inspiring high performance, but low maintenance design that could be applied to many polluted waterfronts worldwide,

CASE-3
FRESH KILLS—NEW YORK'S NEW PARK
THE CITY'S COMMITMENT TO FRESH KILLS PARK:

Fresh Kills, which operated from 1948 until it closed initially in 2001, is the world's largest landfill. Consisting of more than 2,000 acres on the western edge of Staten Island, it contains within its boundaries intact tidal wetlands and significant wildlife habitats. Because of its size and diverse topography, the site lends itself to both recreational and scenic uses. We hope that Fresh Kills Park, with its unprecedented size, metropolitan context, and challenging but rich opportunities for end-use development, will serve as a model for land reclamation projects around the world.

As we embark on the development of this site, we would like to offer Staten Islanders and all New Yorkers a glimpse of the many ways we can reimagine this extraordinary open space. Fresh Kills Park will be a significant addition to New York City's portfolio of parks, providing waterfront access and innovative recreational uses.

METHODOLOGY WORK

Due to contamination the land is not suitable for any kind of residential and commercial purpose. Until that, land revived to its natural form this land can be used as a park, so that trees and other things will treat that patch of contaminated land. Our topic is proposing that Green Patch that will help the land to heal faster to its natural form.

Figure 3. The Proposal

Since the site is former dumping and it is situated near the landfill, a large amount of leachate will be generated from the landfill. This leachate if not treated properly might contaminate the ground water and further destroying the ecosystem of that patch of land. Apart from leachate the land will also emit a large amount of methane gas. Leachate treatment plant and Bio-Gas Collection Plant are installed to treat leachate and collect the bio- gas.

Natural ways for remediating the contaminated water and soil

PLANT LIST : TREES (T)

SR.NO	SYMBOL	BOTANICAL NAME	COMMON NAME	C/C DISTANCE IN M	TYPE	TEXTURE	SHAPE	COLOR
1	T1	Conocarpus erectus	GREEN BUTTONWOOD	6.0	EVERGREEN	MEDIUM	PYRAMIDAL	
2	T2	Calophyllum inophyllum	BEAUTIFUL LEAF	6.0	EVERGREEN	COARSE	SPREADING	
3	T3	Delonix regia	GULMOHAR	8.0	EVERGREEN	FINE	SPREADING	YELLOW
4	T4	Millingtonia hortensis	CHAMELI	8.0	PERENNIAL	COARSE	SPREADING	WHITE
5	T5	Bauhinia	BAUHINIA PURPUREA		PERENNIAL	MEDIUM	SPREADING	PURPLE
6	T6	Cassia fistula	GOLDEN SHOWER	6.0	PERENNIAL	MEDIUM	ROUND	YELLOW
7	T7	Ficus benjamina	WEEPING FIG	6.0	EVERGREEN	COARSE	SPREADING	
8	T8	Jacaranda mimosifolia	PRIDE OF INDIA	8.0	PERENNIAL	MEDIUM	SPREADING	PURPLE
9	T9	Butea monosperma	PALASH	6.0	PERENNIAL	MEDIUM	SPREADING	ORANGE
10	T10	Callistimon	BOTTLE BRUSH	6.0	EVERGREEN	FINE	SPREADING	RED
11	T11	Casurina	WHISTLING PINE	8.0	EVERGREEN	FINE	SPREADING	
12	T12	Mimosops elengi	SPANISH CHERRY	8.0	EVERGREEN	MEDIUM	SPREADING	

PLANT LIST : SHRUB (S)

SR.NO	SYMBOL	BOTANICAL NAME	COMMON NAME	C/C DISTANCE IN M				
1	S1	Acalypa wilkesiana	COPPER LEAF	0.6	EVERGREEN	MEDIUM	SPREADING	RED
2	S2	Dracana reflexa	SONG OF INDIA	0.6	PERENNIAL	MEDIUM	BUSHY	RED
3	S3	Rosa	ROSE	0.6	PERENNIAL	MEDIUM	SPREADING	RED
4	S4	Duranta erecta	GOLDEN DURANTA	0.6	EVERGREEN	COARSE	SPREADING	YELLOW
5	S5	Hymencallis littoralis	SPIDER LILY	0.5	EVERGREEN	FINE	SPREADING	WHITE
6	S6	Hibiscus	CHINA ROSE		BIENNIAL	MEDIUM	SPREADING	RED
7	S7	Plumeria alba	TEMPLE FLOWER	3.0	EVERGREEN	COARSE	VASE	WHITE
8	S8	Thuja occidentalis	THUJA	0.5	PERENNIAL	COARSE	SPREADING	ORANGE
9	S9	Ixora	CHINESE IXORA	0.5	PERENNIAL	FINE	SPREADING	MULTI
10	S10	Viburnum iburnum opulus	VIOLA	0.8	EVERGREEN	MEDIUM	BUSHY	WHITE
11	S11	Tagetes	MARIGOLD	0.5	BIENNIAL	MEDIUM	SPREADING	ORANGE
12	S12	Anisomeles indicar	CATMINT	0.5	EVERGREEN	MEDIUM	BUSHY	
13	S13	Russelia equisetiformis	FIRECRACKER PLANT	0.5	EVERGREEN	DENSE	BUSHY	RED
14	S14	Tecoma stans	YELLOW ELDER	0.5	EVERGREEN	DENSE	BUSHY	YELLOW

PLANT LIST : LAWN

SR.NO	SYMBOL	BOTANICAL NAME	COMMON NAME	C/C DISTANCE IN M	TYPE	TEXTURE	SHAPE	COLOR
1	L1	Zoysia japonica	BERMUDA GRASS	-	EVERGREEN	COARSE		

Floating Island Plant List (FIP) :			Wetland Plant List : (WP)			
SR.NO	BOTANICAL NAME	COMMON NAME	SR.NO	BOTANICAL NAME	COMMON NAME	PROPERTIES
1	Chrysopogon	VETIVER	1			
2	Canna indica	INDIAN SHOT	2		COMMON DUCKWEED	
3	Typha	CATTAIL	3		COMMON DUCKWEED	
4	Scripus	BULLRUSH	4		WATER CABBAGE	
5	Cymbopogon	CITRONELLA	5	Hydrilla	WATER THYME	
6	Hibiscus	CHINA ROSE	6		TAPE GRASS	

7	Cenchrus setaceus	FOUNTAIN GRASS		7		SCARED LOTUS	
8	Ocimum tenuniflorum	TULSI		8		WHITE WATER LILY	
9	Withania somnifera	ASHWAGANGHA		9		PURPLE SPIKE RUSH	
SWALE PLANT LIST : TREES				10		INDIAN SPIKE RUSH	
1	Spartina alterniflora	CORD GRASS	Bottom layer	11		MARSH HENNA	
	Oemlaria cerasiformis	INDIAN PLUM	Side slope	12		PONDWEED	

Table 2. List of Plants that are In-corporate in this paper based on their Growing Pattern

Plant name	Role in phytoremediation
Alyssum	Nickel accumulator
Amaranthus retroflexus	Accumulator of ^{137}Cs
Armoracia rustica	Hairy-root cultures remove heavy metals
Armeria maritima	Lead accumulator
Atriplex prostrata	Removes salt from soil
Azolla pinnata	Accumulator of lead, copper, cadmium, and iron
Brassica canola	Remediates ^{137}Cs-contaminated soil
B. juncea	Hyperaccumulator of metals
Cannabis sativa	Hyperaccumulator of metals
Cardamonopsis hallerii	Hyperaccumulator of metals
Ceratophyllum demersum	Metal accumulator
Datura innoxia	Barium accumulator
Eucalyptus sp.	Removes sodium and arsenic
Eichhornia crassipes	Accumulator of lead, copper, cadmium, and iron
Helianthus annus	Accumulator of lead and uranium. Removes ^{137}Cs and ^{90}Sr in hydroponic reactors
Hydrocotyle umbellata	Accumulator of lead, copper, cadmium, and iron
Kochia scoparia	Removes ^{137}Cs and other radionuclides
Lemna minor	Accumulator of lead, copper, cadmium, and iron
Phaseolus acutifolius	Accumulator of ^{137}Cs
Pteris vittata	Arsenic hyperaccumulator
Salix sp.	Phytoextraction of heavy metals, waste water, and leachate

Table 3. List of Plants Used in Phytoremediation

WATER CLEANSING MECHANISM MAN MADE WET LAND

Manmade wet land or constructed wetland (CW) is an artificial wetland to treat municipal or industrial wastewater, greywater or storm water runoff. It may also be designed for land reclamation after mining, or as a mitigation step for natural areas lost to land development. Constructed wetlands are engineered systems that use natural functions vegetation, soil, and organisms to treat wastewater. Depending on the type of wastewater the design of the constructed wetland has to be adjusted accordingly.

Constructed wetlands have been used to treat both centralized and on-site wastewater.

CONTAMINANTS REMOVED

- Nitrogen
- Phosphorus
- Metals
- Pathogen
- Rain garden

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