

Redesigning the garbage collection area system (Zrayeb 15th may)

Menna Allah Hussein ahmed Mohamed

Cairo university, faculty of urban and regional planning, Egypt, e-mail: mennaahassan@gmail.com

Supervisor: Dr. hesham el-barmelgy

Professor of Sustainable Development and Urban Design and the Dean of the faculty of Regional and Urban Planning

Supervisor: Dr-maha ezz el din

Doctor at faculty of urban and regional planning

Abstract– Urban communities bear images of coexistence, each of which includes energies and capabilities, and this appears especially in the urban communities that were called garbage collectors. It includes an ecological coexistence whereby man fits his job with the natural and social environment to create a state of ecological coexistence that can be monitored through manifestations of that coexistence.

In addition, the disposal of urban waste is one of the most important contemporary environmental problems and attention to the system that manages solid waste in all its stages and disposes it safely is one of the most important steps to solve the problem and turn it into a resource that can be exploited for the development of the Egyptian economy

THE RESEARCH STUDY INCLUDED 3 MAIN COMPONENTS:

- 1. A study of the environmental coexistence of garbage collectors, their characteristics, and the impact of the prevailing chanting on them**
- 2. How to design an appropriate environment that meets their needs within a sound environmental framework**
- 3. Studying how to establish a complete system for the recycling of urban solid waste**

Keywords: Garbage collection systems - garbage collectors community - solid waste management - solid waste recycling

I. INTRODUCTION

Waste is considered one of the biggest problems that Muslar faces, and the disposal of urban waste is one of the most important environmental issues. Therefore, attention to the systems that collect, exploit and recycle garbage is one of the most important steps to solve the problem and turn it into a resource.

The communities of garbage collectors in Egypt carry a different form of environmental coexistence as a result of the influence of the prevailing activity on them, so that these communities became an indispensable part of the life cycle of Egyptian societies and created a place for themselves within the system of Egyptian societies through their ability to coexist with their reality and circumstances surrounding their different methods and These communities suffer from many manifestations of environmental degradation, which poses a threat to them and to the Egyptian society as a whole

A. Problem definition:

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Societies of garbage collectors bear images of coexistence, each of which carries energies and capabilities. These societies were established on the basis of a main function, which is garbage collection, sorting and recycling, which turned it into a functional and productive society that increases its value. However, despite that, the state is during a classification process And the development of informal societies does not address those societies and the careful monitoring of the features and manifestations of coexistence and its impact on the urban pattern, housing, living and its constructive products to highlight its value and solve all manifestations of deterioration in it and benefit from it in the economic system of the state and solve the problem of solid waste.

B. Objective:

The research aims to study garbage collection systems in Egypt at the level of urban spaces, services, housing, roads, urban fabric and all social aspects, in order to

- Shedding light on the values held by those societies that can be benefited from by the state and the exploitation of these systems in solving the problem of solid waste and its best exploitation
- The ability to find an ideal design for these systems that takes into account the prevailing activity and the characteristics of the population and solves the beautiful manifestations of deterioration within these societies, which increases the efficiency of these systems and their ability to produce

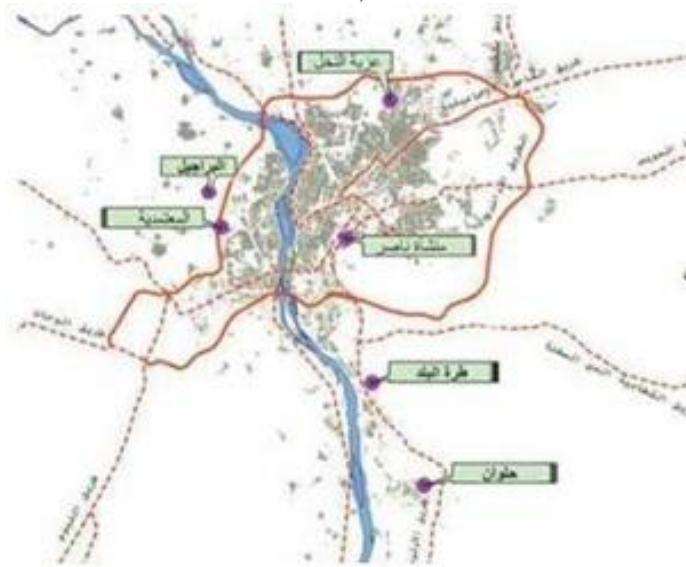
C. Methodology:

THE RESEARCH FOLLOWS TWO APPROACHES

- THE THEORETICAL APPROACH OF GARBAGE COLLECTION SYSTEMS AND THEIR CHARACTERISTICS AND A SUMMARY OF EXPERIMENTS TO DESIGN DEVELOPMENT PROJECTS FOR AREAS WITHIN LOCAL AND GLOBAL GARBAGE COLLECTION SYSTEMS
- IT EXPLAINS A CASE STUDY OF (ZRAYB 15 MAY) AND HOW TO REACH THE DESIGN OF A COMMUNITY THAT FITS THE SYSTEM AND MEETS THE NEEDS OF THE PARTIES TO THE SYSTEM.

II. GARBAGE COLLECTOR SYSTEMS in cairo

A. Study of the locations of the main systems in Cairo: Greater Cairo includes major garbage collection gatherings (Ezbet Al-Nakhl - Al-Motamiya - Al-Barajeel – Manshiet Nasser - Tora Al-Balad - Helwan)



Source: Mansheyet Nasser Urban Development Project

Garbage collector area	Garbage collection areas	The amount of garbage collected per day	Population	Founding date
Mansheyet Nasser	Central, East and West Cairo	3000 ton	40000	1970
Ezbet Al Nakhl	North of Cairo and south of Qalyubia	2000 ton	25000	1970
Almuetami dia	Central and north of Giza and west of Cairo	1200 ton	12000	1972
Barajeel	Central and North Giza	400 ton	8000	1972
Tora	South of Cairo and North of Helwan	600 ton	10000	1986
Helwan	Middle and North Helwan	200 ton	3000	1995

Source: Mansheyet Nasser Urban Development Project

B. Stages of work for the garbage collectors system: The stages of work of garbage collectors are divided into 4 main steps:

1. Collection stage: The collection process represents the first stage of the system’s work, where men and children collect garbage by passing through several neighborhoods in Greater Cairo.



Source: Spirit of Youth Association in Manshiet Nasser

2. Sorting stage: represents the second stage of the system’s work and is carried out by the women in partnership with the children, where they sort the garbage inside the housing and classify it into organic and inorganic



Source: Spirit of Youth Association in Manshiet Nasser

3. The stage of retrieval and recycling: the process of recycling the sorting product begins as a third stage within the system of work of garbage collectors and is carried out by men and begins after the arrival of the sorting product



4. Garbage dealers: The garbage dealer represents the last stage in the system, which is after recycling, and it is carried out by men, which is the sale of the recycling product.



Source: Spirit of Youth Association in Manshiet Nasser

C. Manifestations of deterioration within the garbage collection system:

These areas suffer from many manifestations of deterioration, including:

1. Environmental pollution as a result of garbage sorting inside housing
2. General deterioration in the condition of buildings
3. These areas lack facilities, services and infrastructure
4. The presence of some of them in environmentally dangerous areas that threaten human life



Source: Spirit of Youth Association in Manshiet Nasser

III URBAN SOLID WASTE

Waste is the residue of materials that can be recovered or left behind as a result of a production or consumption process

A. Classification of urban solid waste:

Sold waste type
household waste
harassment waste
commercial waste
market waste
Road cleaning waste
Waste from water treatment

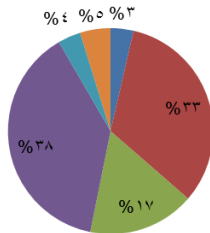
Source: Egyptian Ministry of Environment

B. Egypt's production of urban solid waste:

Egypt produces 75 million tons of solid waste annually

■ Waste disinfection of water bodies ■ Construction and demolition waste

■ municipal solid waste ■ agricultural waste
■ industrial waste ■ medical waste



Source: Egypt Environmental Situation Report

C. Methods of disposal of urban solid waste:

Methods of disposal of urban solid waste	Advantages	Defects
Sanitary landfill	Reduce unpleasant odors and burn risk	lead to air pollution
Burn	random burning	Consumption of a large amount of fuel and environmental pollution
	Hermetic burning	
Throwing waste into the sea	It is used to create artificial islands	It is used to create artificial islands
Take back and recycle	Contributes to reducing pollution	high cost
organic fertilization	It is used to feed animals and birds and to produce manure	It is limited in some seasons due to its need for warmth

Source: Egypt Environmental Situation Report

D. State efforts to manage solid waste:

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The state has recently begun to intensify its efforts in solid waste management through:

1. Incorporating the informal sector from supporting the recycling industries.
2. Establishment of many sanitary burials.
3. Establishment of recycling plants.
4. Remove random dumps.



Source: Spirit of Youth Association in Manshiet Nasser

IV An analytical study of several areas of the garbage collection system:

A. Comparison between two areas of garbage collectors:

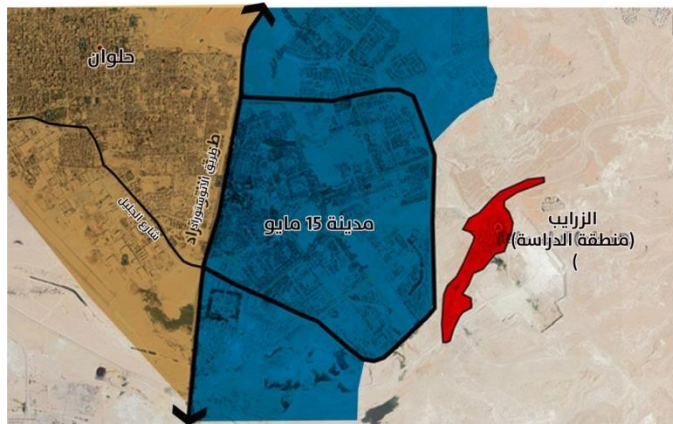
Case study	the program	the design
Manshiet Nasser	<p>1-Housing design</p> <ul style="list-style-type: none"> • Moving the garbage sorting process outside the residential block • Transfer of pig farming outside the residential block <p>2- Services</p> <ul style="list-style-type: none"> • primary education school • Shopping center • Health Unit • Nursery <p>3- Industry</p> <ul style="list-style-type: none"> • Combined garbage sorting areas • organic fertilizer factory 	<p>1-Remove all dilapidated buildings</p> <p>2- Opening new routes for easy access</p> <p>3- Increase the area with services and green spaces</p>
Nanjing city in china	<p>1- Industry</p> <ul style="list-style-type: none"> • sanitary landfills • Recycling products stores • Recycling products stores • solid waste recycling plant <p>2- The main elements of the work system</p>	<p>1- Distribution of system components throughout the city</p> <p>2- Providing green spaces</p> <p>3- Distribution of work system areas on the main roads of the city</p>

Source: favia Conrad.mokattam worlds largest recycling hub

V. CASE STUDY: (zrayeb 15 may)

A. Introduction to the study area:

- ZARAYEB 15 MAY IS THE LAST GARBAGE SYSTEM IN CAIRO
- IT HAS AN AREA OF 120 ACRES
- ITS CURRENT POPULATION IS 7000



Source: menna hussein, Google earth.

B. Reasons for choosing this study area:

- THE AREA WAS SUBJECTED TO DROWNING DURING THE TORRENTIAL RAINS OF MARCH 2020, WHICH LED TO THE DEATH OF 24 OF ITS RESIDENTS
- THE AREA LACKS SERVICES AND INFRASTRUCTURE
- ENVIRONMENTAL POLLUTION RESULTING FROM SORTING WASTE AND RAISING PIGS INSIDE THE RESIDENCE

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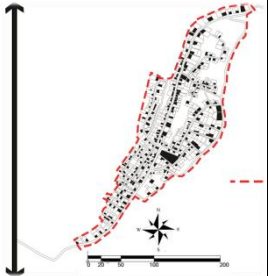


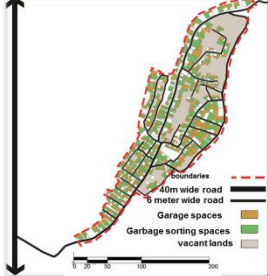
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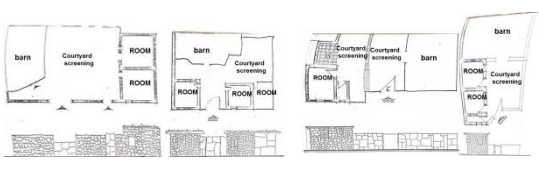
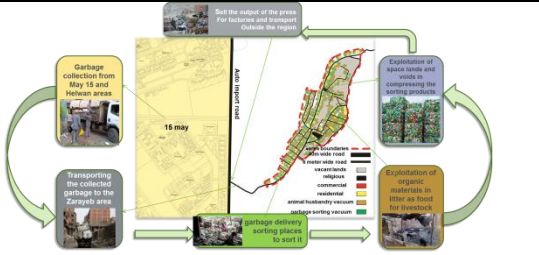

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LAND USE	<p>1. REPRESENTS THE LAND USES IN THE AREA (RESIDENTIAL USE - ANIMAL PENS - SORTING AREAS - RELIGIOUS)</p> <p>2. SPACE LANDS AND SORTING FLATS ARE THE LARGEST IN THE REGION</p>  	
ROAD NETWORK	<p>1. THE WIDTH OF THE OCCUPIED AREA OF THE ROAD IS 3 METERS TO ACCOMMODATE MOVEMENT IN ONE DIRECTION</p> <p>2. A DISTANCE OF 1 METER IN FRONT OF THE HOUSING FOR THE ABILITY TO LOAD AND UNLOAD</p>  	
URBAN FABRIC	<p>1. THE PERCENTAGE OF VOIDS IN THE GARBAGE COLLECTORS AREA IS 5.8% AS A RESULT OF THEIR NEEDS</p>  	
URBAN SPACES	<p>1. THE AREA OF THE SORTING SPACE IS ABOUT 150 SQUARE METERS</p> <p>2. THE SPACE OF THE CORRAL SPACE IS 100 SQUARE METRES</p>  	

C. Study the current situation:

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AT THE LEVEL OF A SINGLE BUILDING	ARCHITECTURAL MODEL	 <p>1. THE DWELLING CONSISTS OF A MAIN VOID, WHICH IS THE GARBAGE YARD SPACE 2. IT CONSISTS OF A BACK SPACE, WHICH IS THE BARN SPACE 3-THERE IS ONE OR TWO BEDROOMS 4. VACUUM SCREENING HEIGHT 3M 5. ENTRANCE WIDTH 3M</p>
	PRODUCTION CYCLE LOCATIONS	
	INPUT AND OUTPUT	<p>1. INPUT: COLLECTED GARBAGE BAGS 2. OUTPUT: THE PRODUCT OF SEPARATING THE COMPONENTS OF THE GARBAGE FROM ORGANIC AND INORGANIC</p> 

Source:mennahussien




C. Dealing with the study area:

- 1- DEVELOPING THE AREA BY MOVING IT TO AN ENVIRONMENTALLY SAFE PLACE AWAY FROM THE EXIT OF THE TORRENT, TAKING INTO ACCOUNT THE REQUIREMENTS AND CHARACTERISTICS OF THE POPULATION
- 2- MOVING THE SOLID WASTE SORTING PROCESS OUTSIDE THE RESIDENTIAL BLOCK TO PROVIDE A HEALTHY ENVIRONMENT
- 3- ESTABLISHING A WASTE RECYCLING SYSTEM TO ACHIEVE ECONOMIC DEVELOPMENT

D. Choosing a suitable location for moving the area:

GIVEN THE SPECIAL NATURE AND THE PREVAILING ACTIVITY OF THE SYSTEM OF GARBAGE COLLECTION AREAS, WHICH MUST BE TAKEN INTO ACCOUNT WHEN CHOOSING A SITE FOR THEM, SEVERAL CRITERIA (ENVIRONMENTAL = SOCIAL = URBAN) MUST BE DEVELOPED TO DETERMINE THE PROPOSED SITES AND EVALUATE SITES THROUGH WHICH TO CHOOSE THE APPROPRIATE SITE

SITE SELECTION CRITERIA	ENVIRONMENTAL		URBAN		SOCIAL	
	NOT BEING LOCATED IN A HIGHLY ERODED OR SLOPING AREA	IT IS NOT FOUND IN AREAS WITH HIGH WATER LEVELS	THE SITE IS NOT LOCATED NORTH OF THE RESIDENTIAL	THERE IS GOOD CONNECTIVITY BETWEEN THE AREA AND THE RECYCLING AREAS	YOU NEED AN ENTRANCE THAT IS 250 METERS AWAY FROM THE MAIN STREET - 2 KM MAX	THE DISTANCE OF THE SITE FROM THE RESIDENTIAL AREA IS NOT LESS THAN 200 METERS

FIRST SITE (LIKELY)	SECOND SITE	THIRD SITE
		

E. Community participation:

COMMUNITY PARTICIPATION IS ONE OF THE MOST IMPORTANT STEPS WHEN CONDUCTING ANY DESIGN FOR ANY EXISTING AREA, BECAUSE:

- 1- THE POPULATION HAS THE FIRST RIGHT TO CHOOSE WHAT SUITS THEM AND SUITS THEIR NEEDS
- 2- THE SUCCESS OF ANY DESIGN DEPENDS ON THE EXTENT TO WHICH IT MEETS AND TAKES INTO ACCOUNT THE NEEDS OF THE POPULATION

THE GOAL OF COMMUNITY PARTICIPATION

- 1- VIEW THE PROPOSED SITES TO CHOOSE THE APPROPRIATE SITE
- 2- KNOWING THE NEEDS OF THE POPULATION FROM THE ELEMENTS OF THE PROGRAM AND THE NECESSARY SURFACES



The result of community participation

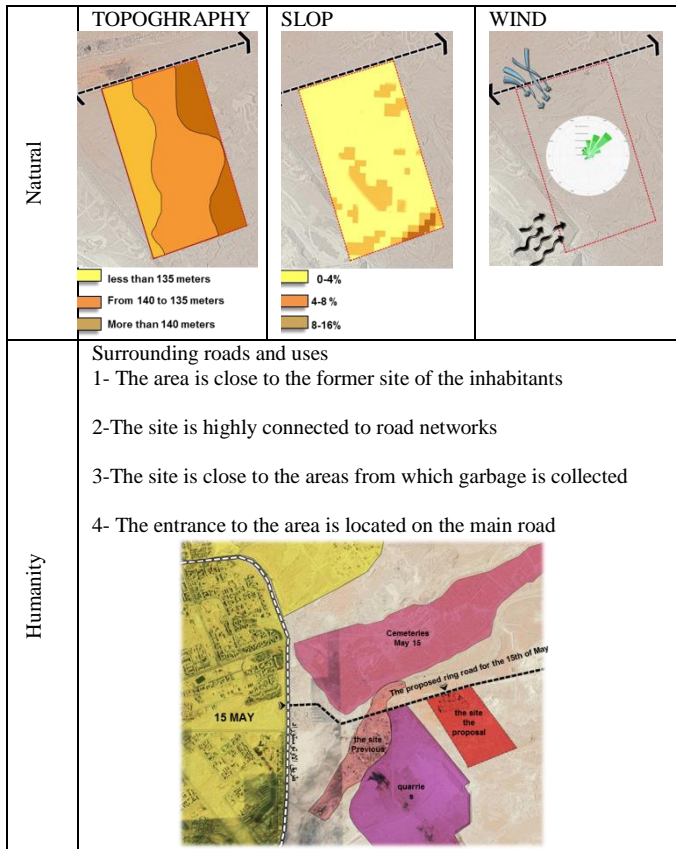
- 1- Residents agree to the first proposed site
- 2- Determining the population of the elements and areas of the proposed program for the project

F. The proposed program for the design of the area:

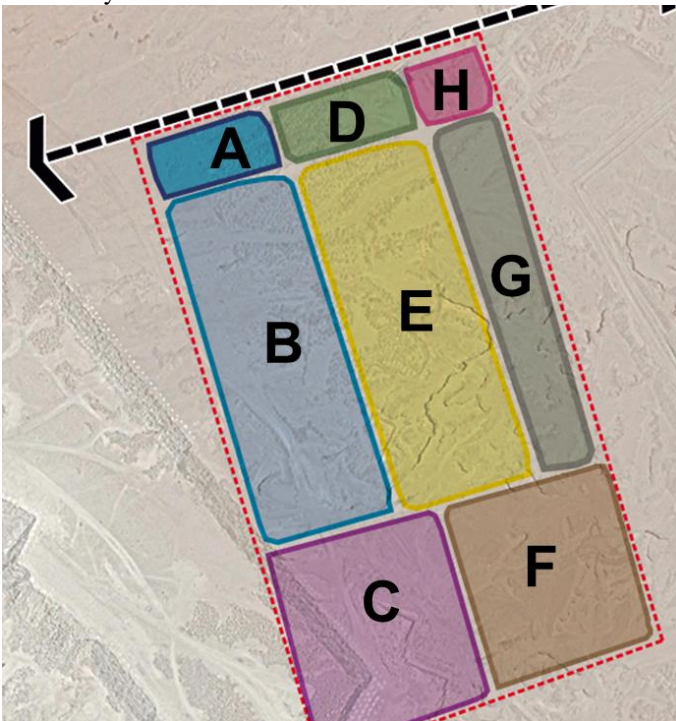
USAGE		BUILT-UP AREA (M2)	BUILT-UP AREA (ACRES)	TOTAL AREA (M2)	TOTAL AREA (ACRES)	% OF TOTAL
RESIDENTIAL		75600	18	83160	19.8	21 %
SERVICES	PRIMARY SCHOOL	2400	.57	4200	1	8%
	HEALTH UNIT	300	.07	600	.14	
	COMMERCIAL	500	.12	1500	.36	
	VETERINARY CENTER	100	.02	300	.07	
	SOCIAL CENTER	250	.06	500	.12	
	MOSQUE	350	.08	700	.17	
	CHURCH	3200	.76	5000	1.2	
	EXHIBITION AREA	2000	.48	10000	2.4	
TOTAL		7100	1.7	22800	5.4	
WAYS AND PARKING		-	-	58800	14	15 %
SPACES AND OPEN AREA		-	-	50400	12	13 %
TOTAL		285600	68	399160	95	100 %

G. Study and analysis of the proposed site:

In this part, the natural characteristics (topography - tendencies - wind) and human (roads - surrounding uses) are studied to determine the suitability of the site for use.



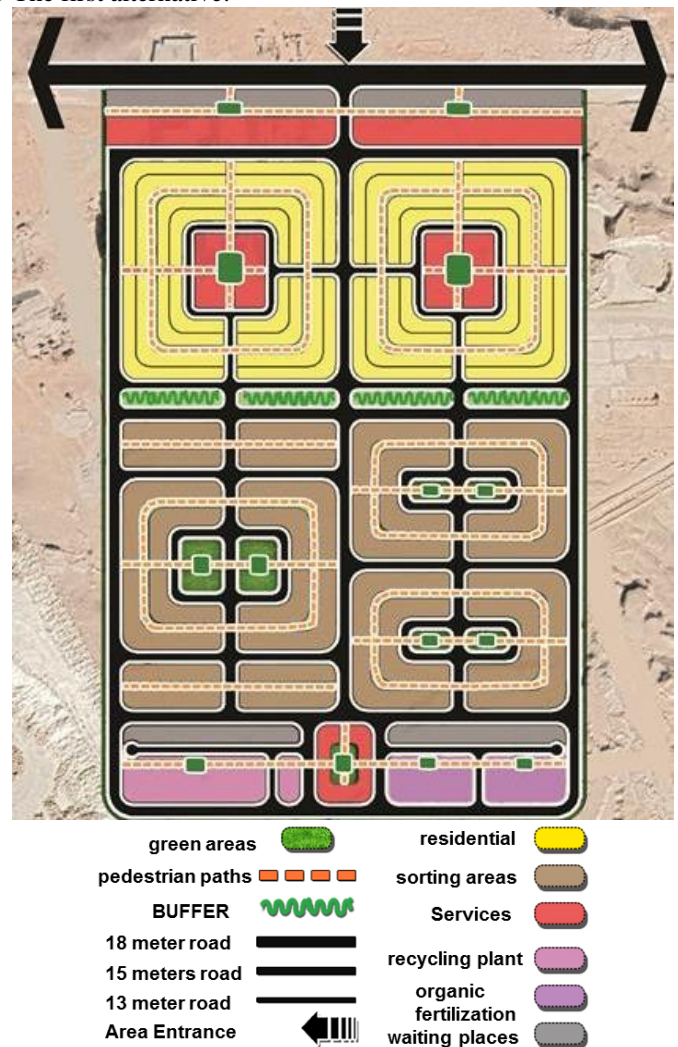
-Validity of the site for use:



ZONE	LAND USE AND ACCESABILITY	TOPOGRAPHY	SLOPE	WIND	DECISION
A	HIGH	LOW	LOW	GOOD WIND	SERVICES-
B	MEDIAM	LOW	MEDIAM	GOOD WIND	RESIDENTAIL-WASTE SORTING
C	LOW	MEDIAM	LOW	BAD WIND	INDUSTRIAL
D	HIGH	MEDIAM	MEDIAM	GOOD WIND	SERVICES-INDUSTRIAL
E	MEDIAM	MEDIAM	MEDIAM	GOODWINF	SERVICES-RESIDENTIALL
F	LOW	HIGH	HIGH	BAD WIND	INDUSTRIAL
G	MEDIAM	HIGH	LOW	BAD WIND	WASTE SORTING
H	HIGH	HIGH	LOW	GOOD WIND	SERVICES

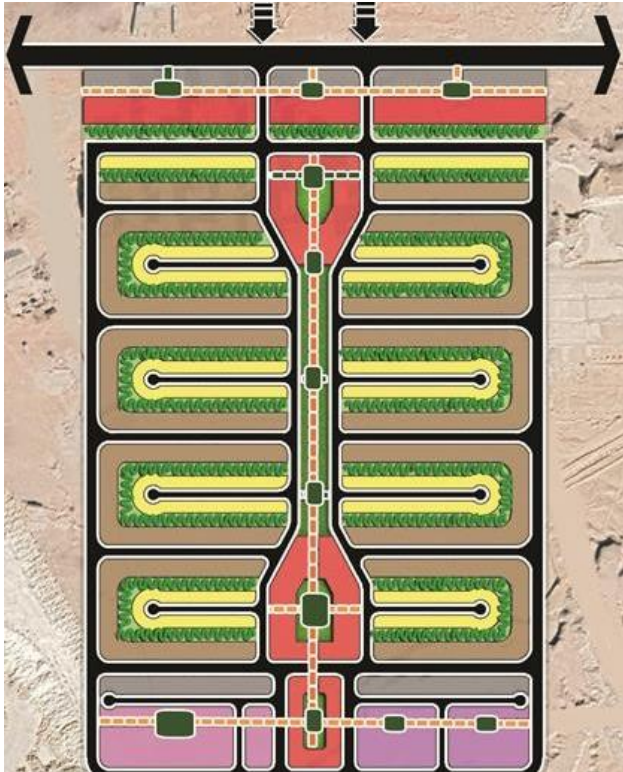
H. Suggested alternatives for optimal design:

1-The first alternative:



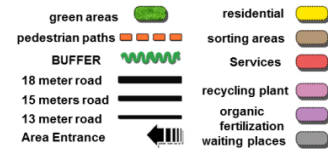
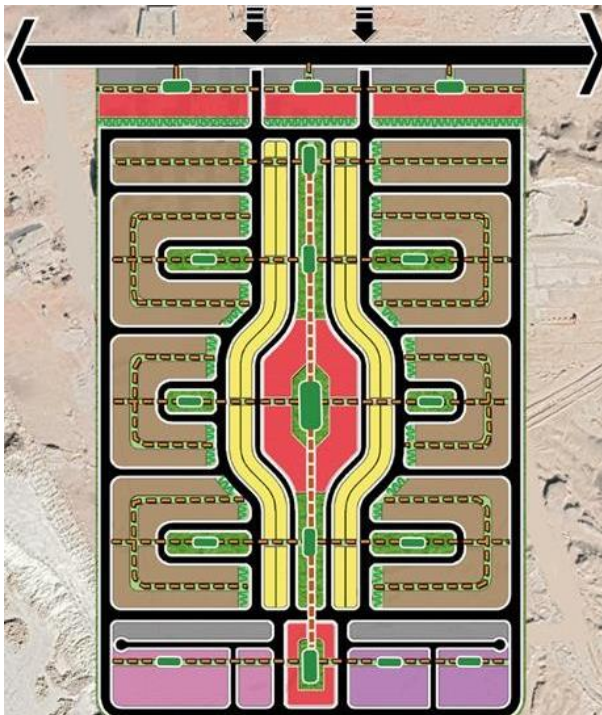
first alternative takes into account the environmental aspect of the design in separating housing from the work system

2- The second alternative



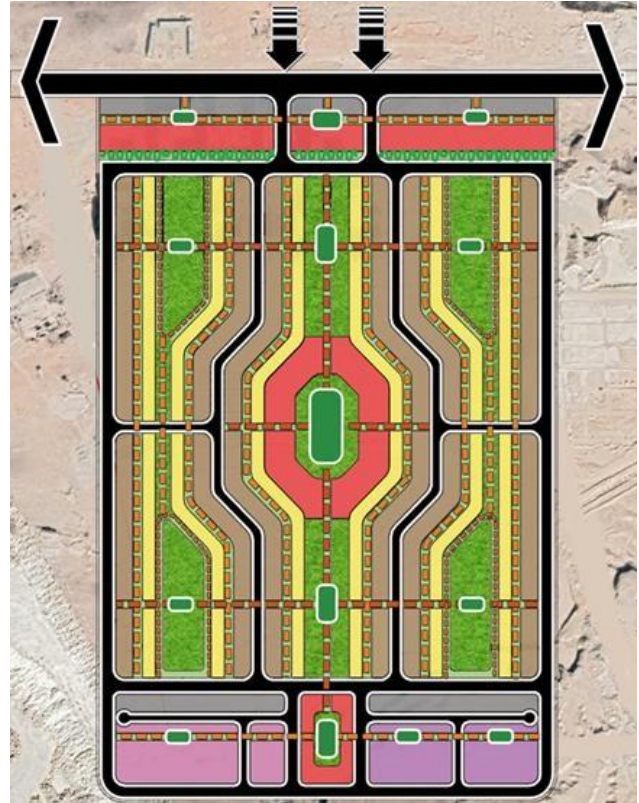
The second alternative takes into account the social aspect of the design by integrating housing with the work system.

3-The third alternative



The third alternative takes into account the balance between the opinion of the residents and the environmental impact by separating housing and placing it between work.

4- Fourth alternative:



The fourth alternative resulted from merging the second and third alternatives to achieve evaluation criteria and attention to the social aspect.

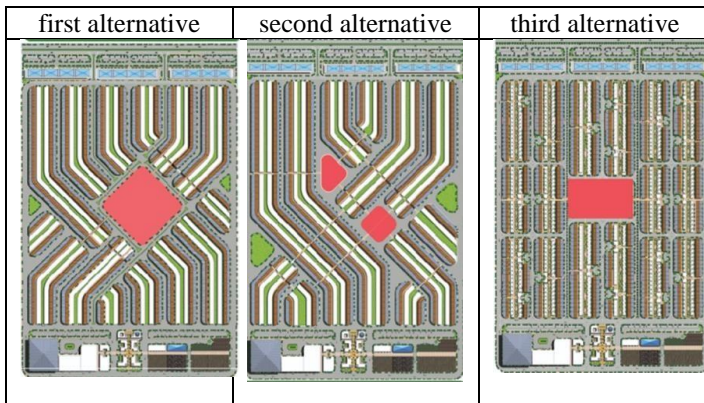
5- Evaluate design alternatives:

- The main idea of the alternatives depends on separating the architectural model of housing from the work system
- When evaluating the four alternatives, we find that the superiority of the fourth alternative, which balances the environmental and social aspects

Evaluation Criteria	population opinion	Availability of the needs of the population	Optimization of the value of the land	Economic efficiency	Connecting project needs	Reducing environmental pollution	Movement efficiency	functional relationships
The first alternative								
second alternative								
The third alternative								
Fourth alternative								

I. Design alternatives for the proposed master plan for the study area:

-By studying the alternatives to the solution and choosing the likely alternative, a number of different alternatives were proposed for the general plan for the region, and by studying and evaluating the proposals from all aspects of urban, environmental, economic and social aspects, the best alternative to the general plan was reached.



-Evaluation of alternatives to the master plan:

Evaluation Criteria	Functional efficiency	environmental side	Community participation	urban formation	Economic efficiency
The first alternative					
second alternative					
The third alternative					

J. The proposed final scheme of the system:

The design resulted from:

- 1- Studies of the current situation in the region
- 2- The needs and requirements of the population
- 3- Considering the environmental aspect



K. Detailed design of the recycling area:

Design an integrated system of recycling containing:

- 1- Factory for recycling inorganic waste (plastic - glass - textiles)
- 2- An area of organic composting for the organic matter resulting from the sorting.
- 3- Recycling area special service area.



L. Exhibition area:

Designing an exhibition area at the destination of the region to sell the products of recycling organic and inorganic waste



M. Comparison of the area before and after development:

1- before development



2- after development:



VI. MAIN OBJECTIVES OF THE PROPOSAL:

- 1- Separation of housing from sorting areas and barns
- 2- Providing green areas in residential homes
- 3- Providing a service area for the residents of the system
- 4- Provide a complete system for recycling
- 5- Designing an exhibition area at the front of the project to sell recycling products.

VII. CONCLUSION:

- 1- The need for the state to exploit the capabilities and capabilities of functional societies as a society of garbage collectors because it contributes to the economic system of the state
- 2- The necessity of not ignoring the goals of the garbage collectors' communities in development by the state, as conscious understanding is one of the ways to choose the most appropriate means of achieving development to benefit from its capabilities and contribution within the urban system
- 3- The importance of studying and scrutinizing these societies, as they bear many aspects that suit their livelihood and follow their needs in coexistence with the environment, which must be taken into account when establishing any development project for these areas.

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