

## Different Roles of the Green Cover Elements of the Park as a Reference in Design Process Criteria

Abdul Kader Hariri      Lamis Herbly      Aisha Reem Shaabani

*Department of City Planning and Environment, Faculty of Architecture,  
Aleppo University, Syria  
reem-shaabani@hotmail.com*

(Received 11/1/2015; accepted for publication 12/5/2015.)

**Abstract:** Parks are among the most important affordable possibilities that can be used to face the pollution and the deterioration of the urban environment; as they can achieve balance in the spiritual, psychological, cultural and aesthetical as well as the ecological and environmental aspects of people's daily life.

The research maps out a comprehensive selection strategy of the green cover elements of the park to maximize their benefits. It is hoped that the findings contribute to a deep understanding of the green cover design process criteria; and indicate that the landscape Architect is responsible for selecting suitable green cover elements that perform as much as possible vital roles, while at the same time meet the needs of park's users, which is key factor for success. Examples of the way that green cover elements can be chosen according to their different roles were listed in tables and applied in the case study of Al-Mashtal Park at Aleppo city in Syria. The field study findings aim to contribute to the wise selection of the green cover elements, and point out the necessity of listing and ordering the various roles of the green cover elements at different zones of the new park in order to face the possible conflict of choices throughout the suggested matrix of selection set out in the research.

**Keywords:** Design Criteria, Green Cover Elements (GCE), Landscape Architect, Park.

### 1. Introduction

Green cover is the major elements of the physical natural components of any park, which are earth and rock, water, and green cover (Encarta Encyclopedia, 2006). It represents more than fifty percent of the area of any park and it contributes not only to the visual quality of park's environment but also to its physical quality; and has relevant design features such as form, color, and texture that can be used by designers to generate the character of the park. It also has functional characteristics which can be used to affect the environment. Green cover elements classification depends mainly on their properties and visual qualities. They can be classified according to their height, form and shape, structure and texture, color, fragrance, rate of growth,

seasonal effect; and environmental requirements (Britannica Encyclopedia, 2006).

- Classifying (GCE) according to their height: they can be sorted out as trees, shrubs, small plants and grass (figure 1). Trees and shrubs represent the ceiling of the green space; small plants form its edges, while grass is its floor.

- Classifying (GCE) according to their form and shape: they can be sorted out by their shape to vertical, horizontal, round and irregular trees and shrubs (figure 2). On the other hand, green elements form is a combination of overall plant shape and habit of growth. Each shape has its own unique characteristics and design potentials (figure 3).

- Classifying (GCE) according to their structure and texture: structure of the green elements refers to the visual grain coarseness of a perceived

surface. It differs for the same shape according to the differences of the foliage and trunks (figure 4). Texture of the green elements is influenced by leaf size and edge character, twig and branch size; bark articulation, growth habit and viewing distance (figure 5).

- Classifying (GCE) according to their color: green elements color is supplied by their flowers, fruits, foliage, bark, twigs and branches.

- Classifying (GCE) according to their fragrance: plants differ according to the fragrance of their foliage, flowers, and fruits.

- Classifying (GCE) according to their rate of growth: due to the time required to reach

their final shape and dimensions, green elements can be divided into slow growing, medium growing, and fast growing plants that are usually pruned and trimmed to form sculptures or entrances.

- Classifying (GCE) according to their seasonal effect: green elements can be divided according to the impact of seasons on their foliage into evergreen or deciduous plants on their flowers to blooming or non-blooming plants; according to their fruits into fructuous and non-fructuous plants.

- Classifying (GCE) according to their environmental requirements: green elements differ in their need for soil, drainage, temperature range, sun shade, pruning and pest protection.

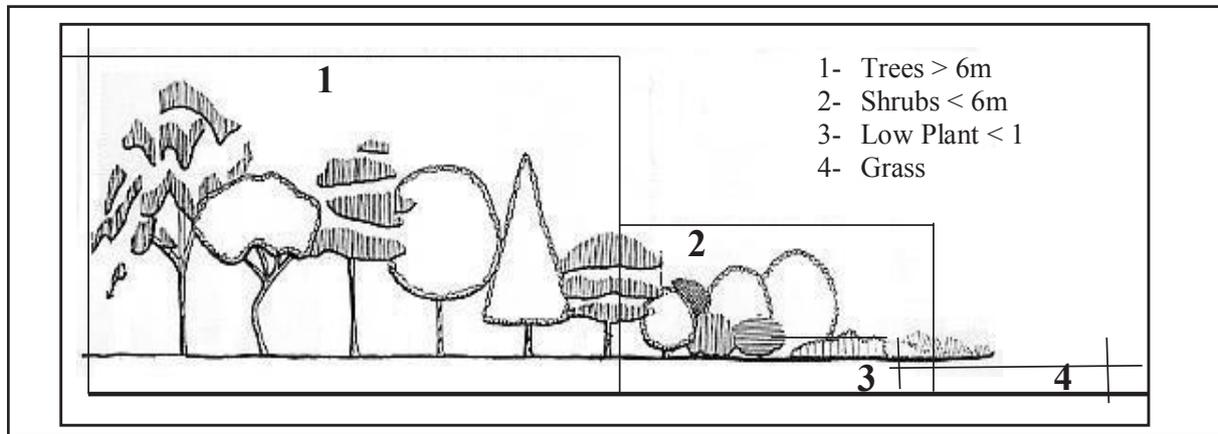


Figure 1: Classifying (GCE) according to their height (Clouston, 1996).

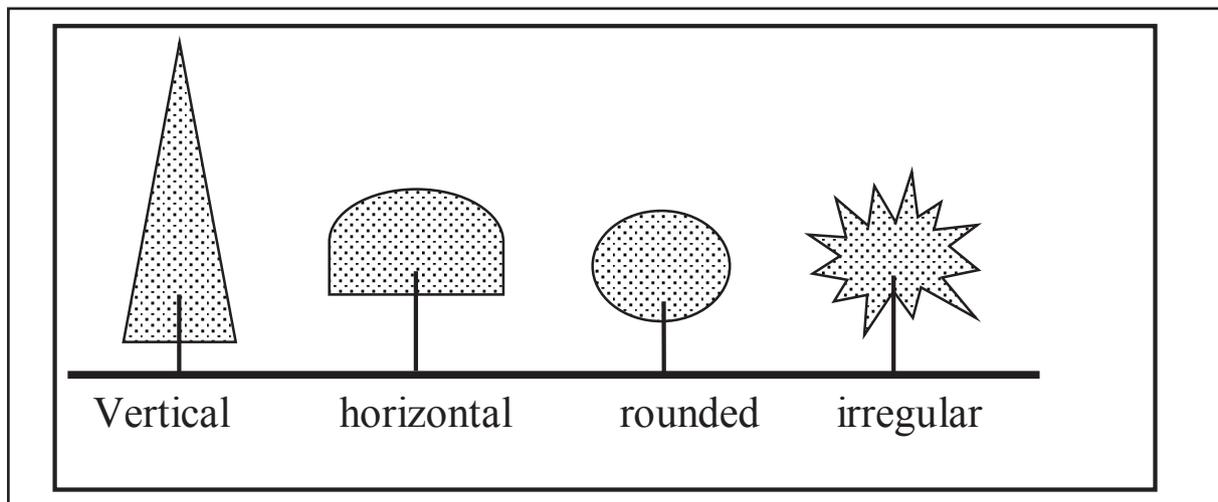


Figure 2: Classifying (GCE) according to their shape (The Researchers).

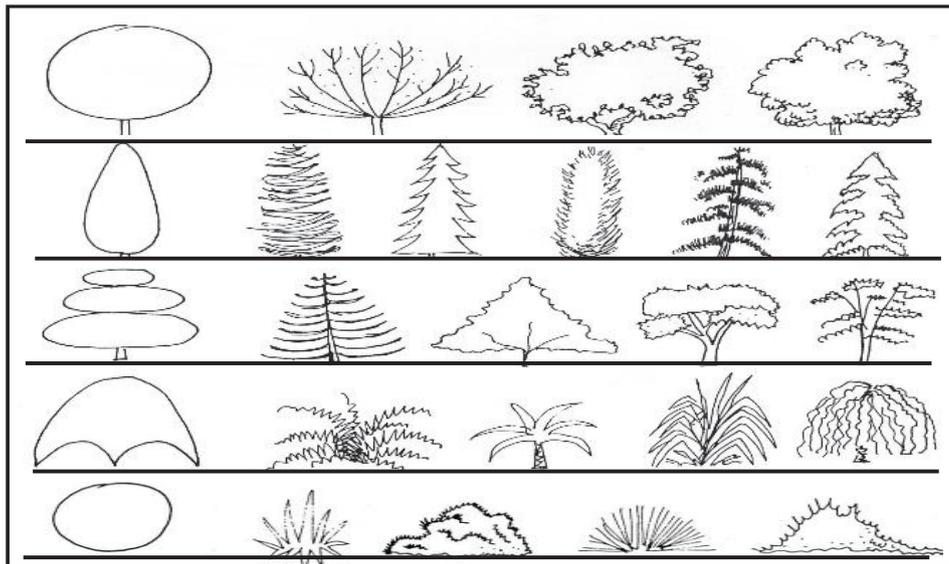
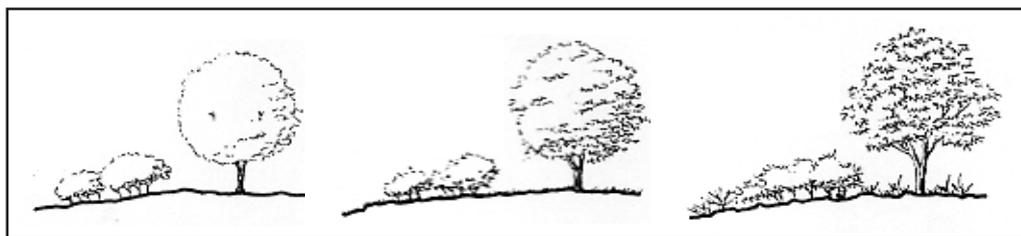


Figure 3: Classifying (GCE) according to their structure. (Alexander, 1994).



Soft texture

Middle texture

Coarse texture

Figure 4: Classifying (GCE) according to their texture (L. Motloch, J. 2001).

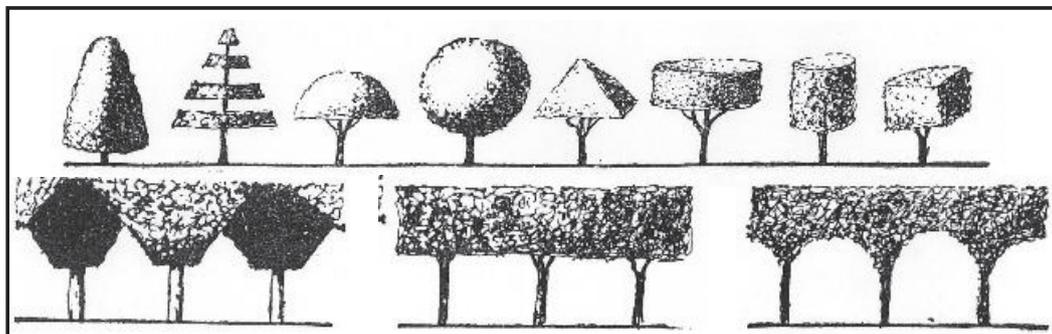


Figure 5: Trimming and pruning fast growing plants (Hammad, et al. 1971).

## 2. Materials and Methods

The research is based on two main parallel axes:

1-The Theoretical Axes: includes summarizing, joining and scheduling the most important related information taken from different kinds of Arabic and English references.

2-The Practical Axes: includes applying the theoretical study findings and schedules on a recent selected park.

This is followed by the process of comparing, concluding and suggesting that takes place in order to find a practical way of choosing suitable (GCE) for every single zone of the park by the suggested matrix of selection that the research proposes.

## 3. Discussion

As green elements grow and change through time, choosing (GCE) is not an easy job. Decision on selection when planning the green cover of the park depends on two main aspects (Britannica Encyclopedia, 2006):

First: adaptability of the green element to site's physical conditions (climatic conditions, topography and soil type, water requirements, etc.) This is directly related to agronomist and other specialists who are responsible for the environmental requirements of the plants.

Second: adaptability to the expected role of the (GCE) in each part of the park, which is the subject of this research.

When designing a park, the landscape architect studies carefully the functions of the (GCE) in each part of his project and determines suitable size, form, structure, texture, color, rate of growth, seasonal affect, and places of the green elements that are required; then agronomists and other specialists suggest kinds of plants suitable to site conditions according to the landscape architect plan of the green cover (Hassanein, Samer, 1998). The research aims to find a method to ensure the harmony between the selected (GCE) of the park and its different functions in

order to fulfill various visitor's needs as much as possible.

Design criteria are the set of roles that define and express the objectives of site and landscape planning process (Hassanein, Samer, 1998). They differ in their relative importance from one park to another, even of the same type, depending on the dominant purpose that is to be achieved and the people for whom the park is planned and designed (different needs according to their age, gender, culture, etc.).

Therefore, creating a more comfortable environment is usually achieved mostly by controlling the local climate, which can be a common design criterion that has to be taken in consideration at park design process (Hassanein, Samer, 1998).

There is no formal checklist of park design criteria since they evolve from the purpose of the planning process that differs from one park to another and from one zone of the park to another. However, such checklist could be formulated due to the common objectives that are usually required to be accomplished.

Each part of the green cover of a park plays several different vital roles at the same time, according to its location and expected function. These roles can be divided into three main categories as follows (Shaabani, Aisha Reem, 2007):

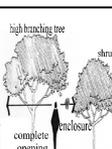
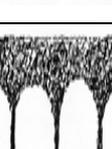
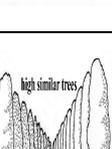
1. Space articulation role: (GCE) articulate space by forming walls, screens and frames; and by implying and dividing space. They also can direct movement and draw attention to direction change (table 1).

2. Aesthetic and coordinating role: The most noticeable role of the (GCE) is the aesthetic role that gives the shape, color and scale to the park as different plants can join, frame, provide background, hide or present elements and break repetition (table 2).

3. Environmental role: It is highly obvious that (GCE) provide shade and oxygen, control temperature and wind as well as reduce pollution and noise (table 3).

Each role is a goal by itself that can be achieved by right selection, as those roles are directly influenced by the properties of the (GCE) as summarized in tables 1, 2, 3.

Table 1: Examples of Space Articulating Role of the (GCE).

Expected Role	Properties and Visual Qualities of the Green Element						Example
	Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect	
Walling and Surrounding	Trees or Shrubs	Vertical	Dense and Tight	Optional	Fast growing	Evergreen	
Screening	Trees or Shrubs	Vertical	According to Privacy needed	Optional	Fast growing	Evergreen	
Dividing Space with Complete Opening	High Branching Trees	Horizontal	Medium Density	Optional	Fast growing	Evergreen	
Dividing Space with Sub-Enclosure	Trees and Shrubs	Horizontal or rounded	Medium Density	Optional	Fast growing	Evergreen	
Dividing Space with Full-Enclosure	Trees and Shrubs	Horizontal or Rounded	High Density	Optional	Fast growing	Evergreen	
Forming Entrances	High Trees	Vertical	High or Medium Density	Optional	Fast or Medium growing	Evergreen	
Directing Movement	High Trees	Vertical	High or Medium Density	Optional	Fast or Medium growing	Evergreen	

Completion of Table 1

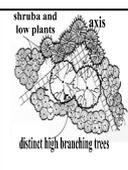
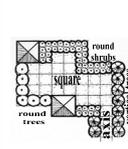
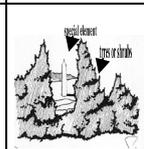
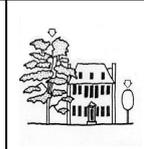
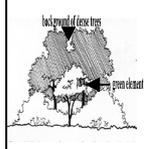
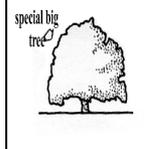
Expected Role	Properties and Visual Qualities of the Green Element						Example
	Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect	
Drawing Attention to Direction change	Trees or Shrubs	Optional	High or Medium Density	Optional and Distinct	Fast growing	Evergreen	
Framing Squares	Trees or Shrubs	Optional	High or Medium Density	Optional Homogeneous	Fast or Medium growing	Evergreen	

Table 2: Examples of Aesthetic and Coordinating of the (GCE).

Expected Role	Properties and Visual Qualities of the Green Element						Example
	Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect	
Framing Special Element	Trees or Shrubs	Vertical	High or Medium Density	Contrast with the Element	Fast or Medium growing	Evergreen	
Inspiring Scale	Trees or Shrubs	Vertical	optional	Contrast with the Building	Fast or Medium growing	Evergreen	
Background of a Green Element	Trees or Shrubs	Horizontal	Dense and Tight	Harmony with the Element	Fast growing	Evergreen	
Background of a Special Element	Trees or Shrubs	Vertical	Dense and Tight	Harmony with the Element	Fast growing	Evergreen	
Confirmation & Strengthening	Special Big Trees	optional	optional	optional	Fast growing	Evergreen	

Completion of Table 2.

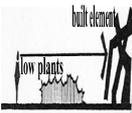
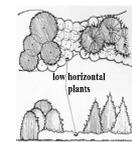
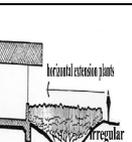
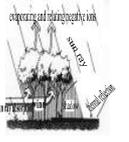
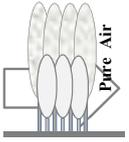
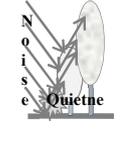
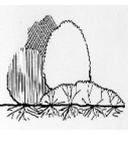
Expected Role	Properties and Visual Qualities of the Green Element						Example
	Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect	
Presenting Built Element	Low Plants	Horizontal	optional	optional	Fast or Medium growing	Evergreen	
Hiding Built Element	Shrubs	Horizontal	Dense and Tight	optional	Fast growing	Evergreen	
Joining Green Elements	Small shrubs or Low plants	Horizontal	optional	Harmony with the Elements	Optional	Optional	
Forming Sculptures	Trees or Shrubs	Vertical or Horizontal	Optional	Optional	Fast growing	Evergreen	
Breaking Repetition	Trees, Shrubs, Low Plants	optional	optional	Contrast with Building	Optional	Optional	
Hiding Land Topography	Shrubs or Low Plants	Horizontal	Dense and Tight	Optional Homogeneous	Fast Growing	Evergreen	

Table 3: Examples of Environmental Role of the (GCE).

Expected Role	Properties and Visual Qualities of the Green Element						Example
	Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect	
Controlling Wind	Trees	Rounded or Horizontal	Dense High Branching	Optional	Fast or Medium Growing	Evergreen	
Controlling Temperature	Trees or Shrubs	Rounded or Horizontal	High or Medium Density	Optional	Fast or Medium Growing	Deciduous	
Reducing Air Pollution	Trees and Shrubs	Optional	High Density	Optional	Fast or Medium Growing	Evergreen	
Reducing Noise	Trees Shrubs Low Plants	Optional	High or Medium Density	Optional	Fast or Medium Growing	Evergreen	
Reducing Glare	Grass	-----	High or Medium Density	Optional	Fast Growing	Evergreen	
Fixing Surface Soil	Grass and Low Plants	Horizontal Extension roots	Optional	Optional	Fast Growing	Evergreen	

4. Case Study:

In order to understand the importance of choosing suitable (GCE) that play various vital roles in the park, we are going to analyze and study ‘Al-Mashtal Park’ at Aleppo City. The analysis will follow the following steps:

- Describing the park and specifying the reasons for choosing it as a case study: (location, neighborhood, area, style and kind).
- Detailing and drawing the status quo

scheme of its (GCE).

- Analyzing various roles of the (GCE) in five different zones of the park to determine the possibility of working better and performing more roles.

Al-Mamashtal Park is a small neighborhood park (28916 m2) in Al-Hamdaniyah District at the south west corner of Aleppo City in Syria (figure 6). It is located at the middle of the upper part of Al-Hamdaniyah District right by the main road that connects the residential units of the district and its

main service center. It is surrounded by roads which attach the park to villas at North and West, and residential buildings at South and East (figure 7).

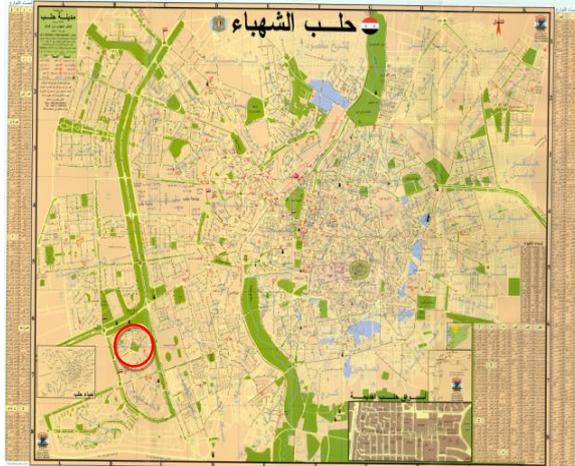


Figure 6: Location of Al-Mashtal Park at Aleppo City (Official Map of Aleppo City, Ministry of Information).



Figure 7: Location of Al-Mashtal Park at Al-Hamdaniyah District. (Google Earth 2010)

The park takes the (L) shape with two main entrances at North and South, and one minor entrance at West. The style of the park is 'Mixed Style' which gathers the geometric axis (circle and straight inclined line) with the free curved axis. The park is a quiet calm park that serves the inhabitants of the district with its playing zones, simple promenade zones, and relaxation axis. It has been chosen because of its reasonable area and function, suitable location and radius effectiveness, simple style and components; and most of all for its adequate (GCE) kinds (figure 8).

The park is popular amongst the people of the neighborhood in spite of some functional inadequacy of particular green zones. Like any park, it consists

of axes (main, minor and collective axes) and green cover. The area of the green cover of the park is about (17252 m<sup>2</sup>) which represents (59.7 %) of the whole area of the park. It consists of different kinds of all the types of the green elements (fourteen kinds of trees, ten kinds of shrubs, four kinds of small plants, three kinds of hedges plants, one kind of pergola plants, and grass). Green zones of the park can be divided, according to their role, into three main types: walling and enclosing zones, promenade zones and aesthetic inner zones. The park also includes three sanded zones for children to play in, seats at sides of relaxation and promenade axes, one W.C. block, and four small service buildings near entrances (figure9).



Figure 8: Aerial Photo of Al-Mashtal Park (Google Earth 2010).



Figure 9: Site Plan of Al-Mashtal Park.

Detailing and drawing the status quo scheme of the (GCE) of Al-Mashtal Park was done successfully through intensive on-site work. The field study included taking photos for each individual green element, classifying and describing properties and visual qualities of these green elements in tables (tables 4, 5 and 6). Trees are given the symbol of a big green circle with a letter inside, shrubs are given the symbol of a smaller green circle with a number inside, and small plants are given the symbol of a green oval with an abbreviation inside, while hedges plants are given different green symbols. Through specifying locations and kinds of the defined green elements at each individual zone of the park according to the prepared tables, the whole green cover plan is completed (figure 10).

Table 4: Types of the (GCE) of Al-Mashtal Park –Trees-

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	A	Tree	Vertical	High Branching Medium Density Medium Texture	Light Green Medium Brown	Slow growing	Evergreen
A Widespread Vertical Evergreen Tree							
	B	Tree	Round	High Branching High Density Coarse Texture	Light Green Medium Brown	Slow growing	Evergreen
A Widespread Round Evergreen Young Tree							
	C	Tree	Oval	Low Branching High Density Coarse Texture	Light Green Dark Brown	Slow growing	Evergreen
A Widespread Round Evergreen Young Pine Tree							

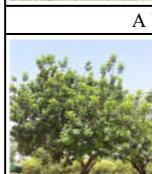
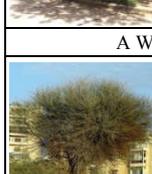
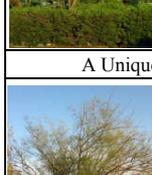
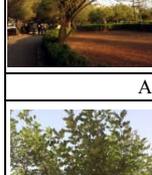
Completion of Table 4.

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	D	High Tree	Vertical	Low Branching Medium Density Coarse Texture	Dark Green Dark Brown	Slow growing	Evergreen
A Widespread Vertical Evergreen Pine Tree							
	E	High Tree	Irregular	High Branching Medium Density Soft Texture	Light Green Light Brown	Slow growing	Deciduous
An Irregular Deciduous High Tree							
	F	Huge Shade Tree	Horizontal	High Branching Medium Density Soft Texture	Light Green Dark Brown	Slow growing	Deciduous
A Horizontal Deciduous Huge Shade Tree							
	G	Tree	Irregular	High Branching Low Density Medium Texture	Light Green Medium Brown Striped Brown	Medium growing	Evergreen
An Irregular Evergreen Tree							
	H	Tree	Irregular	High Branching Low Density Soft Texture	Light Green Medium Brown	Medium growing	Deciduous
An Irregular Deciduous Tree							
	I	Tree	Irregular	High Branching Low Density Soft Texture	Dark Green Dark Brown	Medium growing	Evergreen
An Irregular Evergreen Tree							

Completion of Table 4.

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	J	High Tree	Vertical	High Branching Low Density Soft Texture	Medium Green Light Brown	Medium growing	Evergreen
A Vertical Evergreen High Tree							
	K	High Palm Tree	Vertical	High Branching Medium Density Coarse Texture	Medium Green Medium Coarse Brown	Medium growing	Evergreen
A Unique Vertical Palm Tree							
	L	Tree	Horizontal	Low Branching Medium Density Soft Texture	Medium Green Dark Brown	Slow growing	Deciduous
A Horizontal Deciduous Low Branching young Tree							
	M	Tree	Horizontal	Medium Branching High Density Coarse Texture	Medium Green Light Brown	Fast growing	Deciduous
A Widespread Horizontal Deciduous Shade Tree							
	N	Tree	Horizontal	High Branching Medium Density Medium Texture	Medium Green Medium Brown	Medium growing	Evergreen fructuous
A Horizontal Evergreen fructuous young Tree							

Table 5: -Shrubs and Low Plant-).

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	1	Shrub	Round	High Branching Medium Density Medium Texture	Light Green Medium Brown	Medium growing	Evergreen
A Widespread Round Evergreen Shrub							
	2	Shrub	Horizontal	Medium Branching High Density Soft Texture	Light Green Medium Brown	Medium growing	Evergreen
A Widespread Horizontal Evergreen Shrub							
	3	Shrub	Round	High Branching Medium Density Coarse Texture	Dark Green Medium Brown	Medium growing	Evergreen
A Unique Round Needled Leaves Evergreen Shrub							
	4	Shrub	Irregular	High Branching Low Density Medium Texture	Light Green Medium Brown	Medium growing	Deciduous
A Unique Irregular Deciduous Shrub							
	5	Shrub	Irregular	High Branching Medium Density Medium Texture	Medium Green Medium Brown	Medium growing	Evergreen
A Widespread Irregular Evergreen Shrub							

Completion of Table 5.

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	6	Shrub	Round	Low Branching High Density Coarse Texture	Medium Green Med. Coarse Brown	Medium growing	Evergreen
A Unique Dwarf Evergreen Palm Shrub							
	7	Shrub	Round	High Branching High Density Medium Texture	Dark Green Dark Brown	Fast growing	Evergreen Fructuous
A Widespread Round Evergreen Fructuous Shrub							
	8	Shrub	Round	High Branching Medium Density Medium Texture	Dark Green Dark Brown Pink Flowers	Fast growing	Evergreen Blooming
A Widespread Round Evergreen Fructuous Shrub							
	9	Shrub	Horizontal	Low Branching High Density Soft Texture	Middle Green Middle Brown	Fast growing	Evergreen
A Widespread Trimable Evergreen Shrub							
	10	Shrub	Horizontal	Low Branching Low Density Medium Texture	Medium Green Medium Coarse Brown	Medium growing	Evergreen
A Unique Decorative Evergreen Palm Shrub							

Completion of Table 5.

Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
	R	Low Plant	Vertical	Medium Density Medium Texture	Dark Green Dark Brown Colored Roses	Fast growing	Evergreen Blooming
A Widespread Vertical Evergreen Roses							
	FL	Low Plant	Horizontal	High Density Medium Texture	Dark Green Dark Brown Orange Flowers	Fast growing	Evergreen Blooming
A Widespread Horizontal Evergreen Flowers							
	SP	Low Plant	Oval	High Density Coarse Texture	Medium Green Dark Brown	Fast growing	Evergreen
A Unique Oval Evergreen Decorative Low Plant							
	CO	Low Plant	Vertical	Medium Density Coarse Texture	Medium Green Light Brown Yellow Fruits	Fast growing	Evergreen Fructuous
A Widespread Vertical Evergreen Corn							

Table 6: -Hedges and Pergolas.

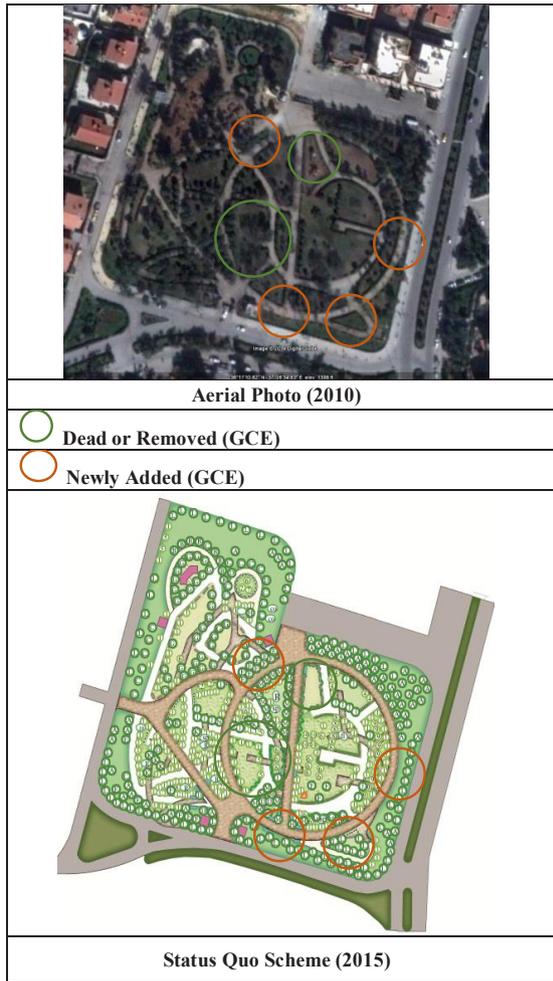
Photo of the Green Element	Symbol	Properties and Visual Qualities of the Green Element					
		Type	Shape	Structure	Color	Rate of Growth	Seasonal Affect
		Hedges Plant Type 1	Horizontal	High Density Coarse Texture	Middle Green	Fast growing	Evergreen Blooming
A Widespread Trimable Evergreen Hedges Plant							
		Hedges Plant Type 2	Horizontal	Medium Density Soft Texture	Middle Green	Fast growing	Evergreen
A Widespread Horizontal Evergreen Hedges Plant							
		Hedges Plant Type 3	Horizontal	High Density Medium Texture	Middle Green	Fast growing	Evergreen
A Widespread Trimable Evergreen Hedges Plant							
		Pergola Plant	Vertical	High Density Medium Texture	Dark Green Medium Brown	Fast growing	Deciduous
A Widespread Deciduous Pergola Plant							



Figure 10: The Status Quo Scheme of the (GCE) of Al-Mashtal Park.

The green cover of Al-Mashtal Park is relatively at medium density. Inner green zones are highly dense, walling zones are planned mainly with trees type A or L with a different density, while promenade zones are just surrounded by trees or shrubs and planned with some separate low plants at middle with a grass floor. Playground zones are surrounded by shade trees and floored by sand. The same kind of trees or shrubs is used around each zone, with a little dissimilarity sometimes.

What attract attention in the (GCE) of Al-Mashtal Park are the different ages of the plants. Most of the trees and shrubs were planted from the early beginning, while some are relatively newly added as they are of the same kind but noticeably of a different size. Furthermore, by comparing the aerial photo of the park (since year 2010) with its recent situation we notice that some trees and shrubs were dead (there stocks are obtainable), or were rooted up (with no trace); and we can also observe the newly added (GCE) that were not noticeable in the aerial photo (figure 11).



**Figure 11: Examples of the Changes in the (GCE) of Al-Mashtal Park.**

This leads us to think about two important points. First, how important it is to study and understand the final dimensions that each green element will reach when it matures, in order not to be forced in future to remove some of them. Second, how necessary it is to plant the green elements in synchronization mode, with a possibility of a future assessment and addition.

To analyze various roles of the (GCE) in the park and determine the possibility of working better and performing more roles, five different areas were chosen randomly to be detailed and discussed. The chosen areas were of different zones, kinds, styles, components and roles (figure 13). Each one was studied in a separate table according to an analysis model that was used for this purpose (tables 7, 8, 9, 10, 11).



**Figure 12: Chosen Areas of the (GCE) of Al-Mashtal Park.**

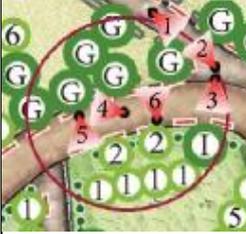
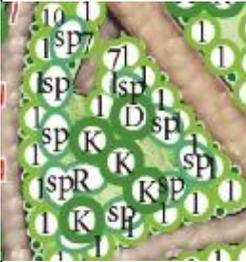
The disparity of the five studied areas of Al-Mashtal Park in fulfilling their different exposed roles was clear. Grading of areas was based on the expected fulfillment of the roles. Area two and three achieved first rank, area four and five come second, while area one ranks last. Such a disparity shows that those roles were not all in mind when setting the (GCE) plan, or they were not given priority although they are important. As a reassessment process to add more green elements in order to achieve better performance for an existing green cover in a park, little additions and tricks can be done only in the vacant spaces and with similar elements.

As it is noticeable from the study of the five samples, the fulfillment of different exposed roles of the (GCE) at area one is highly improved due to the vacancy left by dead plants; while area three is full of green elements that only few little interventions can be done. Area two was semi-full, so acceptable additions were suggested. Area four was typical as it was originally at a good grade and it has empty spaces to work with. Areas two and five were at a moderate fulfillment and a medium vacancy.

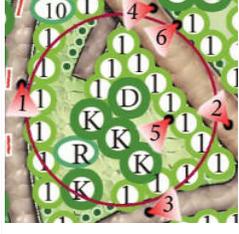
The previous discussion proves the importance of listing and ordering different exposed roles of the (GCE) at different zones of the new park when designing the (GCE) plan. However, even in a recent park, the vital roles of the (GCE) could be discussed again to make some possible changes that make the (GCE) fulfill as much as possible its visitors' needs.



**Table 9: Examples of the Roles of the (GCE) at AL- Mashtal Park -Area 3-**

Description		Scheme of the Chosen Area	
<p>Area 3 consists of a main axis running beside a promenade zone with a minor axis leading to its entrance.</p> <p>The (GCE) at area 3 are:                      Trees type K and D at the middle of the promenade zone.                      Shrubs type 1, one shrub type 10 and hedges plants type 1 surrounding the promenade zone.                      Low plants type R inside.                      Grass flooring few parts of the zone.</p>			
<b>Some of the Aimed Roles Here</b>		<b>Photos of the Area</b>	
Fulfilled ≡	Semi =	Not ≠	
≡	Framing square		
≠	Direction change		
≠	Forming entrance		
=	Screening		
≡	Dividing with opening		
≡	Confirming		
=	Joining green elements		
≡	Presenting green element		
≡	Giving pleasant smell		
=	Controlling Temperature		
=	Reducing air pollution		
=	Reducing Noise		
≡	Reducing glare		
=	Fixing surface soil		
<b>Suggestions</b>		<b>Scheme of the (GCE)</b>	
<p>Adding shrubs type 7 to confirm and strengthen entrance and to draw attention to direction change.</p> <p>Adding one shrubs type 1 to complete surrounding the zone.</p> <p>Adding low plants type SP as a second row to frame, join and screen.</p> <p>Flooring all dusty parts with grass.</p> <p>Note: there are only little spaces to work with because the area is full of existing plants.</p> <p>All the green elements enhance environment.</p>			

**Table 10: Examples of the Roles of the (GCE) at AL- Mashtal Park -Area 4-**

Description		Scheme of the Chosen Area	
<p>Area 4 is the point where the straight inclined axis is branching of the circled main axis. It consists of a walling zone at south and two inner green zones at North.</p> <p>The (GCE) at area 4 are:                      Trees type M and H at the North zones and type L at South.                      Shrubs type 1 and 6 above.                      Hedges plants type 2 surrounding the inner green zones.                      Three pergola plant at the T cross.</p>			
<b>Some of the Aimed Roles Here</b>		<b>Photos of the Area</b>	
Fulfilled ≡	Semi =	Not ≠	
≠	Walling & Surrounding		
≠	Screening (South)		
≡	Dividing with opening		
≡	Forming entrance(North)		
≡	Directing movement		
≡	Direction change		
≠	Hiding built element.		
≠	Joining green elements		
≠	Controlling wind		
=	Controlling temperature		
=	Reducing air pollution		
≠	Reducing noise		
=	Reducing glare		
≠	Fixing surface soil		
<b>Suggestions</b>		<b>Scheme of the (GCE)</b>	
<p>Adding trees type A as a second row to frame, screen, join, and to hide the fence.</p> <p>Adding row of shrubs type 8 at the front of the walling zone to frame, join and direct movement.</p> <p>Adding hedges plant type 2 at the outer edge of the walling zone to frame and join green elements.</p> <p>Flooring all dusty parts with grass.</p> <p>Note: most of the supposed roles of the (GCE) are fulfilled in area number 4.</p> <p>All the green elements enhance environment.</p>			

**Table 11: Examples of the Roles of the (GCE) at AL- Mashtal Park -Area 5-**

Description		Scheme of the Chosen Area																																										
<p>Area 5 consists of a short collective axis running from the round main axis at North East corner and passing between two inner green zones at both sides.</p> <p>The (GCE) at area 5 are:</p> <p>Trees type A surrounding East walling zone, type J at the corner of the right inner zone.</p> <p>Shrubs, type 4 at the corner of the right zone, type 1 surrounding the inner zone at left, and type 9 as sculptures at middle.</p> <p>Hedges plants type 3 a t right andl at left.</p> <p>Grass flooring the left green area.</p>																																												
<p><b>Some of the Aimed Roles Here</b></p> <table border="1"> <tr> <td>Fulfilled ≡≡≡</td> <td>Semi ≡</td> <td>Not ≡≡≡</td> </tr> <tr> <td>≡≡≡</td> <td colspan="2">Walling &amp; Surrounding</td> </tr> <tr> <td>≡</td> <td colspan="2">Framing square</td> </tr> <tr> <td>≡≡≡</td> <td colspan="2">Direction change</td> </tr> <tr> <td>≡</td> <td colspan="2">Directing movement</td> </tr> <tr> <td>≡≡≡</td> <td colspan="2">Confirming</td> </tr> <tr> <td>≡≡≡</td> <td colspan="2">Forming sculptures</td> </tr> <tr> <td>≡</td> <td colspan="2">Joining green elements</td> </tr> <tr> <td>≡</td> <td colspan="2">Controlling wind</td> </tr> <tr> <td>≡</td> <td colspan="2">Controlling temperature</td> </tr> <tr> <td>≡</td> <td colspan="2">Reducing air pollution</td> </tr> <tr> <td>≡</td> <td colspan="2">Reducing noise</td> </tr> <tr> <td>≡</td> <td colspan="2">Reducing glare</td> </tr> <tr> <td>≡</td> <td colspan="2">Fixing surface soil</td> </tr> </table>		Fulfilled ≡≡≡	Semi ≡	Not ≡≡≡	≡≡≡	Walling & Surrounding		≡	Framing square		≡≡≡	Direction change		≡	Directing movement		≡≡≡	Confirming		≡≡≡	Forming sculptures		≡	Joining green elements		≡	Controlling wind		≡	Controlling temperature		≡	Reducing air pollution		≡	Reducing noise		≡	Reducing glare		≡	Fixing surface soil		<p><b>Photos of the Area</b></p>
Fulfilled ≡≡≡	Semi ≡	Not ≡≡≡																																										
≡≡≡	Walling & Surrounding																																											
≡	Framing square																																											
≡≡≡	Direction change																																											
≡	Directing movement																																											
≡≡≡	Confirming																																											
≡≡≡	Forming sculptures																																											
≡	Joining green elements																																											
≡	Controlling wind																																											
≡	Controlling temperature																																											
≡	Reducing air pollution																																											
≡	Reducing noise																																											
≡	Reducing glare																																											
≡	Fixing surface soil																																											
<p><b>Suggestions</b></p> <p>Adding trees type D and pergola plant to confirm and strengthen entrance and to draw attention to direction change.</p> <p>Adding shrubs type 8 as a second row to screen and join.</p> <p>Adding shrubs type 1 to complete framing the inner right zone.</p> <p>Adding shrubs type 9 to form sculptures as in the near zone, strengthen, and complete the axes rhythm.</p> <p>Adding hedges plant type 3 to join green elements and frame the walling zone.</p> <p>Flooring all dusty zones with grass.</p> <p>All the green elements enhance environment.</p>		<p><b>Scheme of the (GCE)</b></p>																																										

**5. Results**

Each role requires a different approach in the choice of the (GCE), although two or more roles are often fulfilled by the same selection. When designing the (GCE) plan, the landscape architect should study carefully different roles of each zone of his park and decide wisely which roles should be given priority. Several possible alternative plans of the (GCE) could be planned and evaluated according to specific standards and relative units in order to decide which plan can cover most of other roles in addition to its main role, as will be explained in the suggested matrix of selection that this research concludes to (table 12).

Matrix of Selection can be explained by four simple steps:

**First:** dividing the roles of the (GCE) into three main axes (space articulation, aesthetic and coordinating, and environmental roles) and several minor axes.

**Second:** rating each axis of each alternative plan in four degrees (excellent to poor) by giving relative units to each role according to its importance.

**Third:** counting the final scores of each alternative plan.

**Fourth:** adopting the (GCE) plan of high score. In order to explain how this works, we are going to apply the matrix of selection on three alternative suggested (GCE) plans to explain the reason for adopting the (GCE) plan that was suggested for area-1- in table 7 (tables 13,14, 15).

This matrix of selection can be applied to different zones of the park, then the adopted plans can be put together to form an excellent green cover of a successful park.

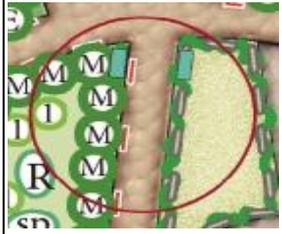
**6. Conclusion:**

(GCE) are the main physical natural components of a park that can be classified due to their visual qualities. The selection of the (GCE) according to their adaptability to their function is the responsibility of the landscape architect who sets the general green cover plan. In each zone of the park (GCE) articulate space, coordinate, and improve environment. Those roles are the main factors that form design criteria and affect (GCE) selection. When designing the green cover of a park, landscape architect has to study carefully different roles of the green cover at each zone and determine which roles will be given the priority. Choosing (GCE) that play as much as possible different roles in the park is the key to its success.

**Table 12: Suggested Matrix of Selection of the (GCE) of the Park.**

Main Axes	Minor Axes	Main Axes	Minor Axes	First Alternative				Second Alternative				Third Alternative					
				excellent	good	acceptable	poor	excellent	good	acceptable	poor	excellent	good	acceptable	poor		
Space Articulation Role		X1	X11														
			X12														
			X13														
			X14														
			X15														
			X16														
			X17														
			X18														
			X19														
			X20														
		Aesthetic & Coordinating Role		X2	X21												
					X22												
					X23												
					X24												
					X25												
					X26												
					X27												
					X28												
					X29												
					X30												
Environmental Role		X3	X31														
			X32														
			X33														
			X34														
			X35														
			X36														
			X37														
			X38														
			X39														
			X40														
SUM	X1= X2= X3=	1 <sup>st</sup> =	2 <sup>nd</sup> =	3 <sup>rd</sup> =													
	X1= X11+ X12+X13... .....+X20	X1 < X2 + X3															
	X2= X21+ X22+X23... .....+X30	X2 < X1 + X3															
	X3= X31+ X32+X33... .....+X40	X3 < X1 + X2															

**Table 13: Suggesting Three Alternative (GCE) Plans to Fulfill Visitors Needs in Area-1-**

Recent (GCE) Plan	
<p>Area 1 consists of a main axis passing between playground area at left (zone 1) and inner green area at right (zone 2).</p> <p>Trees Type M surrounding zone 2 with Shrubs type 1 behind.</p> <p>Hedges plants 2 around both.</p> <p>Pergola plant at the beginning of the axis.</p> <p>Sand flooring zone 1 with steel hedges around.</p> <p>Grass flooring zone 2 with</p>	
<b>Suggestions</b>	<b>Scheme of the (GCE)</b>
First Suggested Alternative (GCE) Plan	
<p>Removing the steel hedges and completing hedges plants type 2 around zone 1.</p> <p>Surrounding the North and West Sides of zone 1 by trees type G with a tree space letting to form an entrance.</p> <p>Surrounding the East and South Sides of zone 1 by shrub type 4.</p> <p>Adding an extra shrub type 4 as a second row to divide playground space.</p>	
Second Suggested Alternative (GCE) Plan	
<p>Removing the steel hedges and completing hedges plants type 2 around zone 1.</p> <p>Surrounding the North, West and South Sides of zone1 by trees type M with a tree space letting to form an entrance.</p> <p>Surrounding the East Side of zone 1 by shrubs type 4.</p> <p>Adding an extra shrub type 9 as a second row to be cut as a children sculpture and to divide playground space.</p>	
Third Suggested Alternative (GCE) Plan	
<p>Removing the steel hedges and completing hedges plants type 2 around zone 1.</p> <p>Surrounding the North and West Sides of zone1 by trees type M with a tree space letting to form an entrance that is confirmed by shrubs type9 as a second row children sculptures.</p> <p>Adding two separate shrubs type2 at the East Side of zone 1 with hedges2 to divide the playground area into three, flooring ground by grass.</p> <p>Adding shrubs type1 as a second row in zone 2.</p> <p>Adding two trees type K at the beginning of the axis.</p>	

**Table 14: Applying Suggested Matrix of Selection on the First Alternative (GCE) Plan of Area-1-**

Main Axes	Minor Axes	Main Axes	First Alternative				
			Minor Axes	excellent	good	acceptable	poor
Space Articulation Role	Framing Playground Square	X1	X <sub>11</sub>	√			
	Dividing Playground Area with complete opening		X <sub>12</sub>		√		
	Draw Attention to Direction Change		X <sub>13</sub>			√	
	Screening the Playground Area		X <sub>14</sub>		√		
	Forming Entrance to the Playground Area		X <sub>15</sub>			√	
	Forming Entrance to the Inner Green Zone		X <sub>16</sub>				√
	Directing Movement		X <sub>17</sub>			√	
	X1= x11+x12+x13+x14+x15+x16+x17						
X1= 4+3+2+3+2+1+2 = 17							
Aesthetic Role	Forming Sculptures	X2	X <sub>21</sub>				√
	Joining Green Elements		X <sub>22</sub>			√	
	Confirming and Strengthening		X <sub>23</sub>				√
	Breaking Repetition		X <sub>24</sub>				√
	Presenting Play Furnishings		X <sub>25</sub>	√			
	X2= x21+x22+x23+x24+x25						
X2= 1+2+1+1+3 = 8							
Environmental Role	Controlling Wind	X3	X <sub>31</sub>			√	
	Controlling Temperature		X <sub>32</sub>			√	
	Reducing Air Pollution		X <sub>33</sub>		√		
	Reducing Noise		X <sub>34</sub>		√		
	Reducing Glare		X <sub>35</sub>		√		
	Fixing Surface Soil		X <sub>36</sub>				√
	X3= x31+x32+x33+x34+x35=x36						
X3= 2+2+3+3+3+2 = 15							
Note: all Axes here are of the same importance and priority							
<b>Discussion</b>							
<p>Both zones are excellent framed, but only good screened as trees M and G are high branching trees.</p> <p>The Pergola plant helps to draw attention to direction change, but directing movement is only acceptable due to the differences between trees M and G at both sides of the axis.</p> <p>No special plants to confirm and strengthen, to join green elements, to form sculptures, or to break repetition.</p> <p>Trees M and shrubs 4 are deciduous, while trees G are evergreen but high branching so they allow the winter sun to get in the playground. They reduce pollution, noise, and glare in a good way, but control wind and temperature with less efficiency.</p>							
SUM.1 = X1+X2+X3 = 17+8+15 = <b>40</b>							

**Table 15: Applying Suggested Matrix of Selection on the Second Alternative (GCE) Plan of Area-1-**

Main Axes	Minor Axes	Main Axes	First Alternative				
			Minor Axes	excellent	good	acceptable	poor
Space Articulation Role	Framing Playground Square	X1	X <sub>11</sub>	√			
	Dividing Playground Area with complete opening		X <sub>12</sub>			√	
	Draw Attention to Direction Change		X <sub>13</sub>			√	
	Screening the Playground Area		X <sub>14</sub>		√		
	Forming Entrance to the Playground Area		X <sub>15</sub>			√	
	Forming Entrance to the Inner Green Zone		X <sub>16</sub>				√
	Directing Movement		X <sub>17</sub>		√		
	X1= x11+x12+x13+x14+x15+x16+x17						
X1= 4+2+2+3+2+1+3 = 17							
Aesthetic Role	Forming Sculptures	X2	X <sub>21</sub>				√
	Joining Green Elements		X <sub>22</sub>		√		
	Confirming and Strengthening		X <sub>23</sub>				√
	Breaking Repetition		X <sub>24</sub>				√
	Presenting Play Furnishings		X <sub>25</sub>	√			
	X2= x21+x22+x23+x24+x25						
X2= 2+3+2+2+3 = 12							
Environmental Role	Controlling Wind	X3	X <sub>31</sub>		√		
	Controlling Temperature		X <sub>32</sub>		√		
	Reducing Air Pollution		X <sub>33</sub>			√	
	Reducing Noise		X <sub>34</sub>			√	
	Reducing Glare		X <sub>35</sub>			√	
	Fixing Surface Soil		X <sub>36</sub>				√
	X3= x31+x32+x33+x34+x35=x36						
X3= 3+ 3+ 2+2+2+2 = 14							
Note: all Axes here are of the same importance and priority							
<b>Discussion</b>							
<p>Both zones are excellent framed, but only good screened as trees M are high branching trees.</p> <p>The Pergola plant helps to draw attention to direction change, and directing movement becomes good due to the similarity of trees at both sides of the axis.</p> <p>Using shrub 9 helps to divide the playground area and it also, as a children sculpture, helps to confirm and strengthen, to join green elements, and to break repetition.</p> <p>Trees M and shrubs 4 are deciduous so they allow the winter sun to get in the playground and provide shade in summer. They reduce pollution and glare, and control noise with less efficiency in winter.</p>							
SUM.2 = X1+X2+X3 = 17+12+14 = <b>43</b>							

**Table 16: Applying Suggested Matrix of Selection on the Third Alternative (GCE) Plan of Area-1-**

Main Axes	Minor Axes	Main Axes	First Alternative				
			Minor Axes	excellent	good	acceptable	poor
Space Articulation Role	Framing Playground Square	X1	X <sub>11</sub>	√			
	Dividing Playground Area with complete opening		X <sub>12</sub>	√			
	Draw Attention to Direction Change		X <sub>13</sub>	√			
	Screening the Playground Area		X <sub>14</sub>	√			
	Forming Entrance to the Playground Area		X <sub>15</sub>	√			
	Forming Entrance to the Inner Green Zone		X <sub>16</sub>	√			
	Directing Movement		X <sub>17</sub>	√			
	$X1 = x11+x12+x13+x14+x15+x16+x17$ $X1 = 3+4+4+3+4+4+4 = 26$						
Aesthetic Role	Forming Sculptures	X2	X <sub>21</sub>	√			
	Joining Green Elements		X <sub>22</sub>	√			
	Confirming and Strengthening		X <sub>23</sub>	√			
	Breaking Repetition		X <sub>24</sub>	√			
	Presenting Play Furnishings		X <sub>25</sub>	√			
	$X2 = x21+x22+x23+x24+x25$ $X2 = 4+4+4+4+3 = 19$						
Environmental Role	Controlling Wind	X3	X <sub>31</sub>	√			
	Controlling Temperature		X <sub>32</sub>	√			
	Reducing Air Pollution		X <sub>33</sub>	√			
	Reducing Noise		X <sub>34</sub>		√		
	Reducing Glare		X <sub>35</sub>	√			
	Fixing Surface Soil		X <sub>36</sub>	√			
	$X3 = x31+x32+x33+x34+x35+x36$ $X3 = 3+4+3+ 2+ 4+4 =20$						
Note: all Axes here are of the same importance and priority							
<b>Discussion</b>							
<p>Adding shrubs 9 as a second row (after high branching trees M) at the West side of the playground zone helps to join, frame and screen in an excellent way. As they can be trimmed as different children sculptures they are useful to confirm and strengthen and to break repetition.</p> <p>Adding shrubs 1 as a second row (after high branching trees M) at the East side of the inner green zone helps to join, frame and screen in an excellent way. The vacant tree area forms an entrance to the zone at sides of tree G.</p> <p>Palm trees K draw attention to direction change; and with the similarity of trees M and the second row shrubs at sides of the axis, directing movement becomes excellent.</p> <p>Adding two parallel rows of hedges plants 2 with the two shrubs2 helps to divide the space with complete opening and good shade at East, but</p> <p>Surrounding the south side with hedges plants 2 only helps the winter sun to get in the playground, but makes screening and controlling pollution and noise less effective.</p> <p>Flooring the playground zone with grass reduces glare.</p>							
SUM.3 = X1+X2+X3 = 26+19+20 = <b>65</b>							

**7. References**

**Abu Saadah, Hisham Jalal, Bader, Abdul Aziez Bader.** Vocation of Environmental Architecture. Cairo:ArabicWorldCenterPress,2002.(inArabic).

**Alexander, R.** A Handbook for Garden Designers. London, 1994.

**Al-Hussein, Zeiad Jalal.** Design and Arrangement of Gardens. Aleppo: Department of Academic Books and Prints at Aleppo University. 2001. (in Arabic).

**Al-Kiey, Tarerk Mahmoud.** Trees, Shrubs, Palms, and their role in the Environmental Balance. Kingdom of Saudi Arabia: Mars Press center. 1993. (in Arabic).

**Al-Zught, Muein, Al-Manieh, Fahad, Saad-awi, Faisal.** Green Planes. Riyadh: King Saud University Press. 1990. (in Arabic).

**Britannica Encyclopedia,** 2006.

**Clouston, B., Stansfield, K.** Trees in Towns. London: The Architectural Press Ltd., 1981.

**Clouston, B.** Landscape Design with Plants. London: BAS Printers Ltd.,1996

**C. Marlowe, O.** Outdoor Design (A Handbook for the Architect & Planner). London: Crosby Lockwood Staples, 1977.

**De Chiara, J., Koppelman, L.** Urban Planning & Design Criteria Spain: Litton Educational Publishing Inc., 1975.

**Eckbo, G.** Urban Landscape Design. U.S.A.: 1964.

**Edries, Rasheed Saleem.** Gardens: Design and Arrangement. Beirut: Academic Center Press, 1986. (in Arabic).

**Encarta Encyclopedia,** 2006.

**Hammad, Muhammed, Salem, Muhammed, Fathi.** The Architectural Afforestation. Egypt: Egyptian Universities Publication Press. 1971. (in Arabic).

**Hammad, Muhammed, Salem, Muhammed, Fathi.** Trees of Parks and City Streets in the Arabic Homeland. Kingdom of Saudi Arabia: Golden Papers Company. 1983. (in Arabic).

**Hassanein, Samer.** Site and Landscape Planning with Special Emphasis on Environmental Factors, Harmony and Contradiction of Design Criteria, Master Thesis. Cairo: Cairo University, 1998.

**L. Motloch, J.** Introduction to Landscape Design, U.S.A.: John Wiley & Sons, Inc.2001.

**Mohammed Basant,** Rehabilitation of Residential Areas through Successful Employment of Landscape in Urban Open Spaces Master Thesis. Cairo: Cairo University, 2006.

**Shaabani, Aisha Reem.** The Green Areas and the Enhancing of Neighborhoods’ Urban

Environment (Neighborhoods of Aleppo City),  
Master Thesis. Aleppo: Aleppo University, 2007.

**Vanderzanden, A., Rodie, S.** Landscape Design  
(Theory and Application). Canada:  
Thomson Delmar Learning, 2008.

**Winter, C., Lockwood M.** “A Model for  
Measuring Natural Area Values and Park  
Preferences”, *Journal of Environmental  
Conservation*. Vol. 32, (No. 3), (2005).

## الأدوار المختلفة لعناصر الغطاء النباتي كمرجع في معايير عملية تصميم الحديقة

عبد القادر حريري      لميس حربلي      عائشة ريم شعباني

قسم التخطيط والبيئة، كلية العمارة، جامعة حلب، سوريا

*reem-shaabani@hotmail.com*

قدم للنشر في ٢٠/٣/١٤٣٦هـ؛ وقبل للنشر في ٢٣/٧/١٤٣٦هـ

ملخص البحث. تعتبر الحدائق واحدة من أهم الإمكانيات المتاحة التي يمكن استعمالها لمواجهة التلوث وتدهور البيئة العمرانية كونها تحقق توازن الحياة اليومية في الجوانب الروحانية والنفسية والثقافية والجمالية على التوازي مع الجوانب البيئية والإيكولوجية.

يحاول هذا البحث أن يرسم استراتيجية اختيار شاملة في معايير العملية التصميمية للغطاء النباتي لتحقيق الاستفادة القصوى من الحديقة وتفعيل أدوارها المختلفة. إن النتائج المنشودة للبحث تسهم في تعميق فهم معايير عملية تصميم الغطاء الأخضر وتشير إلى مسؤولية مهندس تصميم الحدائق عن اختيار الغطاء النباتي المناسب الذي يؤدي أكبر عدد ممكن من الأدوار الأساسية في نفس الوقت حتى تلبي الحديقة احتياجات مرتاديها بشكل أفضل مما يشكل مفتاحاً لنجاحها.

تم إعداد جداول تلخص أمثلة لمعايير اختيار عناصر الغطاء النباتي وفقاً لأدوارها المختلفة وطُبقت في الدراسة العملية لحديقة المشتل في مدينة حلب في سوريا. أثبتت الدراسة العملية مدى أهمية اختيار مهندس تصميم الحدائق لعناصر الغطاء النباتي اختياراً حقيقياً، كما لفتت النظر إلى ضرورة إعداد قائمة أولويات للأدوار المختلفة المتوقعة من عناصر الغطاء النباتي في مناطق الحديقة الجديدة المختلفة لمواجهة الخيارات المتضاربة المحتملة وذلك من خلال مصفوفة الاختيار التي يخلص إليها البحث.

الكلمات المفتاحية: حديقة، عناصر الغطاء النباتي، معايير التصميم، مهندس تنسيق الحدائق.