Global Research Review

ISSN: 2737-8551

Review homepage: http://www.grrjournal.org

ROADSIDE LANDSCAPE OF BAGHDAD –BABYLON- KARBALA ROAD AS A CASE STUDY

Haider Naser Hussain[1]

Sada Nacif Jasim[2.]

University of Baghdad & College of Engin & Agricultural sci-Dept of Horticulture & Landscape Design·Baghdad.10011.Iraq.

Corresponding Author.Email.sada.jasim@coagri.uobaghdad.edu.iq

Abstract

Natural roadside landscape is an important strategy to achieve aesthetic and functional roads represented by collaborative work among road engineers, architects, landscape designers, and road workers.. This study is aimed to design, and afforestation of 10 km roadsides connects Baghdad-Babylon-Karbala to achieve the strategy of aesthetic roads. The landscape design methodology included the separation of road into sections, in order to prepare a design diagram for each section through field survey, and create preliminary design proposals for the project that achieves aesthetic and functional purposes of the road , The study concluded that the design of the natural landscape for road sections depends on the appropriate choice of vegetation , environment, soil and road neighbors.

Key words: Landscape design, Roadsides, Roads vegetation

INTRODUCTION

Roads environment is considered as general landscape that creates tangible identities for local communities, also Natural landscape is the main element that creates the scene. The impact of the road environment on landscape aesthetics is tangible by road users as they transport all along the road scenes and landscapes (Stamps ، 2001 و Forment و Domon ، 2006). Roadside landscape is an important strategy to achieve aesthetic roads represented by collaborative work among road engineers, architects, landscape designers, and road workers. This strategy requires a knowledge in roads projects, general and detailed plans preparation among the engineers. In order to improve the landscape of existing roads, more considerations are required in terms of plant species, irrigation requirements, soil, and the rest of the landscape components, as well as the relationship among the road to the various surroundings; whether its industrial, commercial, residential, car parks, rest areas or what termed as "Road Architecture" (Egebjerg et al, 2002). Many urban communities seek to achieve positive values associated with landscape design on roadsides such as environmental, aesthetic, visual quality, and traffic safety, which confirms the need for transport specialists to work alongside with afforestation specialists to determine the design strategies of the main roads systematically with the city's streets. Also roads that devoid of design standards require a new structure to preserve the environment and aesthetics of the road, which ultimately improve the traffic safety and reduce accidents (Wolf and Dixon, 2007). The American association of highway and transportation officials (AASHTO) has emphasized the importance to create an aesthetic and tangible identity in road environments alongside with traffic safety and noise reduction (AASHTO, 2002), Visual quality means how visual values are incorporated into highway planning, and road users evaluate visual quality on roadsides as beautiful and magnificent, instead of dense buildings, commercial signs, electricity wires and column, which degrades the perceived visual quality (Nasar, 1998). Recent studies on landscape design has shown the side effects of highways afforestation and revealed that the road users prefer a simple and attractive landscape that provides aesthetic scenery and clear vision along the streets and highways. Studies also revealed that vegetation improves temperament and reduces visual stress, which is a common phenomenon among drivers. Trees and shrubs contribute to the vertical levels demarcation of road space and enhance the relationship between the artificial vertical elements "road furniture" and the ground-level of greenery and ground cover plants that helps to provide more desirable scenery along the road (Smardon, 1998 and Fukahori et al, 2003). Since the 1960s, studies have focused on the importance of afforestation in natural resource management and the clarification of general concepts and associated values; furthermore, People from all cultural backgrounds prefer the nature in built

environments and the presence of trees generally enhances the overall evaluation of visual quality in the cities. A study was conducted to improve the landscape quality of roadsides in California, residential compounds where drivers described the roadside scene as "crowded" and "unattractive", while Roadsides were described as "attractive" and "beautiful" for planted highway (Wood and Evans, 1980). Road users have also become more attracted to landscape views of urban Minnesota roads and the highest values have been given to road segments that have natural features, well-designed plants and structural elements (Nassauer and Larson, 2004). Burley (1997) also found in his study that the presence of vegetation and flowering is an important classification indicator of natural aesthetic on urban roadsides. Wolf (2006) also found that the drivers had taken the Parkway road, which has attractive scenery to reach the shopping malls, even though it has many stops and takes a lot of time to arrive; the drivers confirmed their feeling of relaxation and comfort as they traveled along this road. The study by Younis et al. (2002) aimed to develop a design plan for the sides of the "Sumandari" road which is an important gate that connect Faisalabad, one of the largest cities of Pakistan to several important cities in the country, and the possibility of community participation in the development of green spaces and landscapes and overcome the obstacles of development, In addition to the future planning for implementation in collaboration with the municipality of Faisalabad; results of the study showed that 99.2% of the study sample desired to see green areas along Sumandari Road, The Approbation of green areas along the way can be attributed to many benefits related to plants such as reducing pollution, creating comfort zones, and improving microclimate, Besides aesthetic interest; Attractive, strong and environmentally adaptable plants have been chosen on the roadsides, The plant's selection is important for the success of any horizontal design; species must be suitable for a specific function, whether for aesthetic or environmental function, considering the maintenance costs and efforts. Naderi (2002) presents a collaborative work strategy among landscape designers, road engineers and planners who attempt to identify environmental variables that have a positive impact on driver's safety and encourage pedestrian's activity, The study was conducted on five major arterial roads in Toronto city, where improvements to the green infrastructure of streets were carried out between 1992 and 1995, the speed limits on the road sections ranged from 50 to 70 km h^{-1}, landscape elements has increased all along the street and the circular sidewalks, including shrubs, colored stone paves , flowers, signs, green areas, and trees; results revealed that the landscape and afforestation alongside the road has significantly decreased the traffic accidents by 5-20%. Iftikhar et al. (2016) studied the landscape evaluation alongside the 11 km Canal Road in Faisalabad, Pakistan which is one of the most traffic-intensive roads that connect the eastern side of Faisalabad to the rest of the city, in order to identify general preferences of plant selection for green spaces Along the way and their suitability to the natural landscape environment, considering the problems that faced by the surrounding

environment along the way, The results showed that 94.5% of the sample confirmed the improvement of the microclimate along the site, and 68% indicated the landscape scenery all along the road has reflected on pollution, winds intensity through dense vegetation, and residential properties value has increased in the surrounding areas, 91.5% expected these improvements to has a positive impact on human health; Furthermore, the public awareness of plants species cultivated along the green areas on roadsides, the study concluded that 16.5% of the sample was familiar with the cultivated plants, also It was noted that 65% of the research sample referred that most problems were related to continuous maintenance and management, While the road development workers reported a defect in the irrigation system, a shortage of workers, materials, machinery, transport specialists, architects and landscape engineers. This study is aimed to design, and afforestation of 10 km roadsides connects Baghdad-Babylon-Karbala that important in religious tourism, in addition to many features of the local environment surrounding the road sections

Materials and methods

- **Study location**

The road of Baghdad - Babylon - Hilla center towards Karbala is an important road that connects Baghdad to the central and southern governorates, in addition to religious tourism to Karbala and Najaf, and the commercial importance for the frequent use by owners of heavy and medium load vehicles to transport goods among the governorates, in addition to the industrial companies adjacent beside the road such as the automobile industry in Alexandria, the mechanical company for agricultural products, and thermal power stations which increased the intensive use of the road.

Materials and Methods

In spite of the urgent necessary to construct an attractive landscaped roads, however; there is no particular formula for the construction yet, Usually road design depends on the site's nature, specialists experience and skill available in the planning, design and implementation of the road project, and the methodology used in the landscape design of the road; it means a set of stages through which decisions can be made on the road (Egebjerg et al, 2002).

- **Information gathering**

At this stage, the masterplan for the municipality of Alexandria (study area) was obtained, and GIS plan (see figure 1), the cross-sections on the main roads, and roadsides inside and outside Alexandria

city were obtained from the design section – municipality institution, the cross dimensions of the roads within the city is 40m including paved street, median, pavements, and the roadsides, while the cross dimensions of paved roads outside the city is 150m including the median, pavements, and the roadsides.

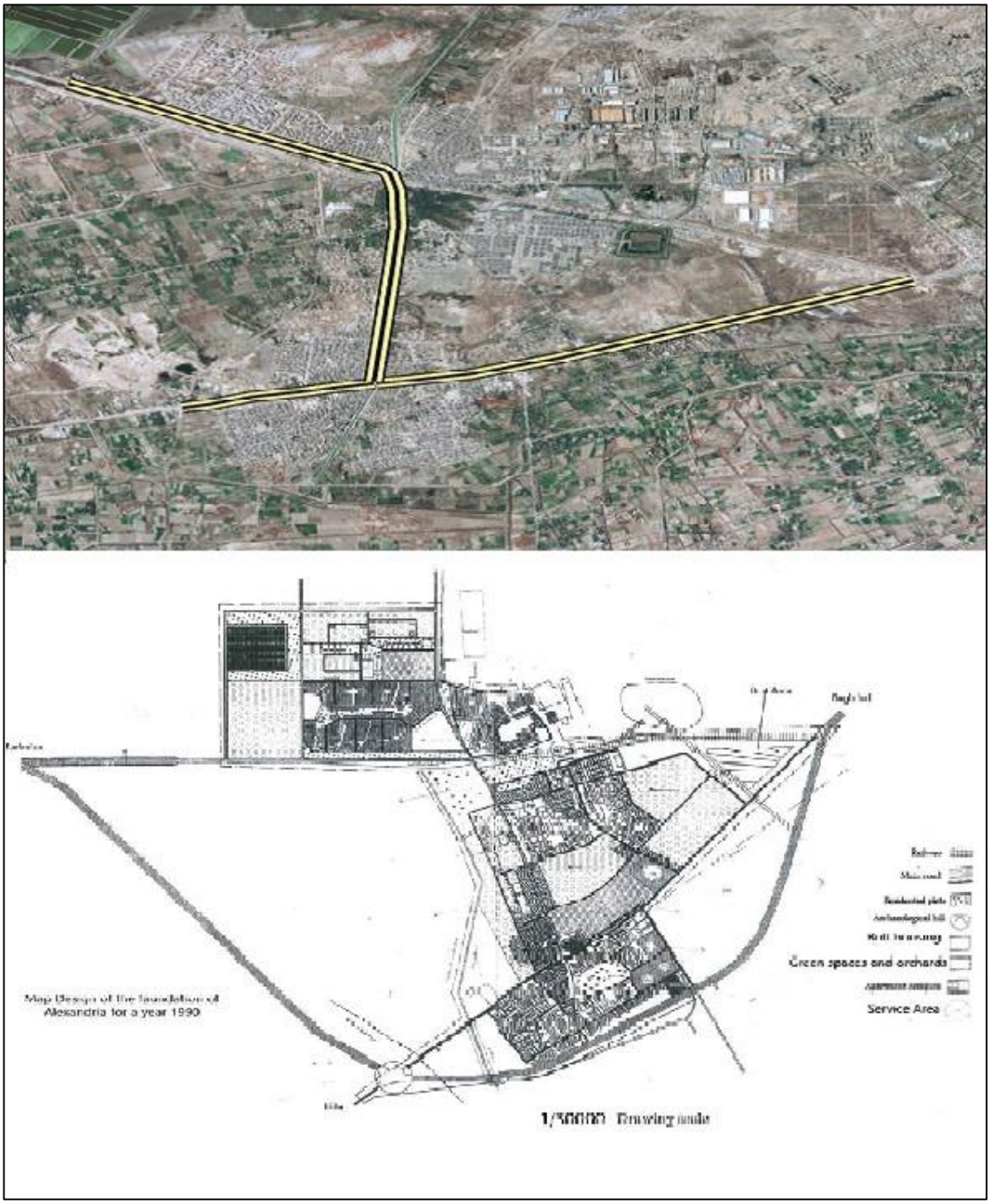

Figure 1. Master plan and GIS map of Alexandria city.

- **Analysis of road sections**

Frequently, Changes in the road or street are based on the analysis of the sections according to their different functions and the adjacent features contents that may affect the road structure and utilized as a main plot for the rest of design steps; then, The details of the road section are represented after the field survey for drawing and evaluation, The road section is usually taken with the surrounding environment.

- **Description of the road sections**

First section

This 2 km road is categorized as a main arterial road; the beginning is represented by the entrance checkpoint of Babylon governorate and part of a sorted area as a residential area on the roadside with an irregular spread of kiosks and restaurants, a secondary road linking the neighboring residential areas to the main roads. The main road includes two turnings, median, and roadsides planted with *Conocarpus erecta*. The most important characteristic of this section is the aesthetic features represented by palm orchards illustrated the local natural environment and the archaeological hill area, in addition to commercial and industrial shops.

Second section

This 1 km road is categorized as a main road includes several landmarks, represented by the industrial district on the right towards Baghdad and the left roadside towards Babylon with a roundabout heading to high population residential area away in less than 1 km. this section contains a totally paved roadside for the narrow width of the median as it represents the entrance to Alexandria city; roadsides along this section are characterized by palm and eucalyptus trees scenery which optimized as windbreaks, Followed by a gas station which is headed to an irregular roundabout towards the international road, known as the Circle Road; a rural road surrounded by private orchards planted with palm trees and vegetable crops, and the industrial district of Alexandria city.

Third section

This section is about 4 km, it is one of the longest, and considered as urban class; furthermore, it is a transportation link among Baghdad (in the north), Karbala (in the west), and Babylon (in the south), also considered as a main road to transport construction materials among these governorates; which makes it continuously crowded by heavy and medium load vehicles, in addition to public and private vehicles to transport visitors to the holy shrines during the year. It also includes a bridge and concrete

sidewalks, which is distributed by lighting poles, sidewalks and a cross bridge for pedestrians; besides, the kiosks and shops, the most important natural attractions of this section is Alexandria River alongside the Karbala road towards Alexandria and Baghdad road, in addition to 3 km median planted with *conocarpus erecta*, *Dodonaea* and palm trees.

Fourth section

This 2 km section consists of two parts; the first is considered as urban part represented by Alexandria entrance passing by Dallah crossroads, gardens, green areas, the Municipality of Alexandria, residential areas, industrial shops, and Alexandria gas station including two standard roundabouts. The second part represents the natural scenery such the fish lakes that surrounded by *Arundo donaxi* and *Cyperus papyrus* plants, drainages, and medians that planted with palm and conocarpus plants.

Results and Discussion

-Design proposal of road sections

This step aims to interact the results of road analysis and its surrounding environment in order to determine a preliminary design proposal for landscape design on roadsides that is suitable for its importance and functions.

The first section

On-site observation during the field survey of the road under study

(figure 2).

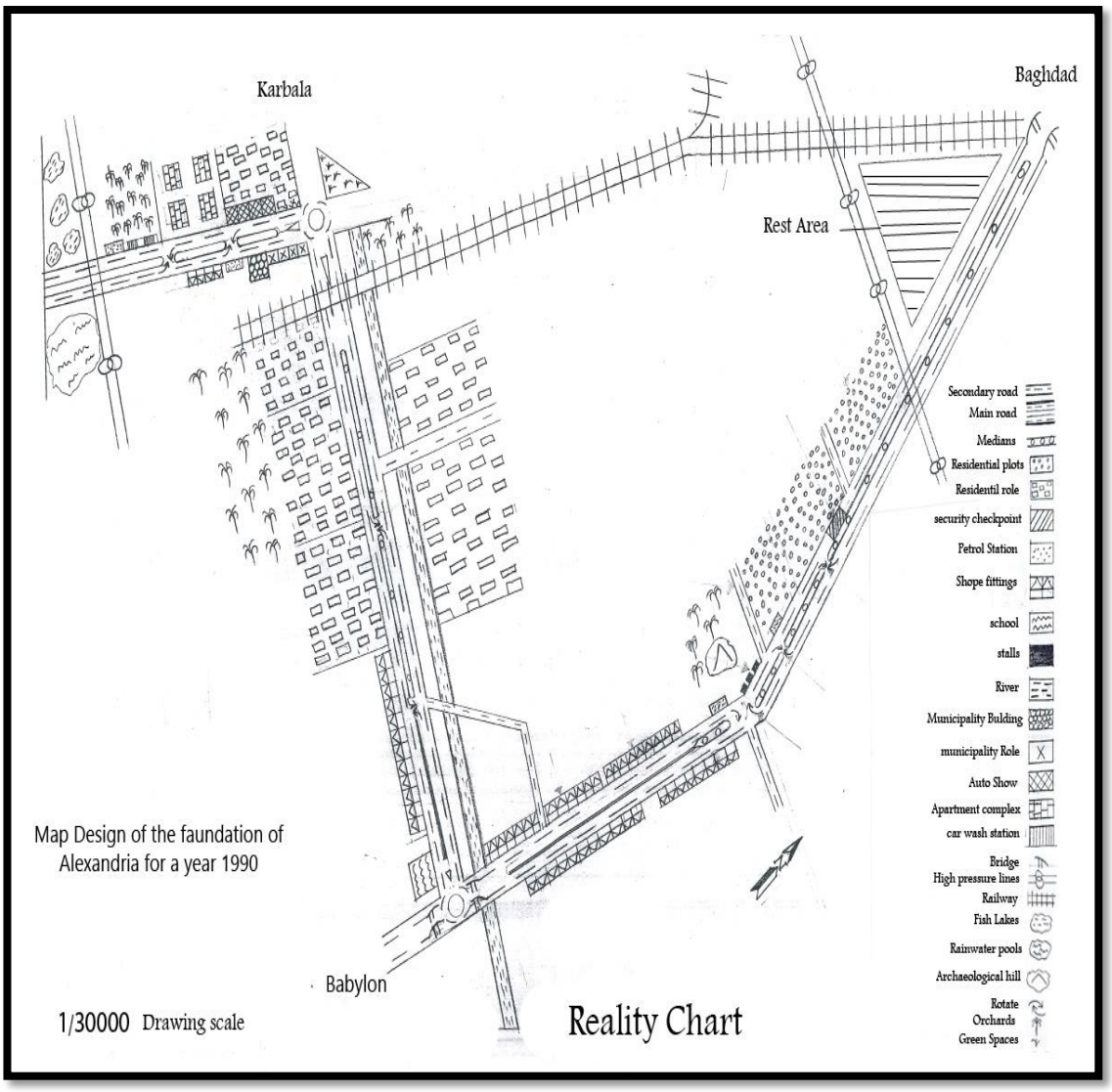

Figure 2. Plan of the reality based on master plan

It is clear that all roadsides needs a paving stone "Curbstone" in order to guideline the road edges, which contributes to improve the traffic safety; on the other hand, it separates the road from the pedestrian pavement, which also provides better traffic safety for pedestrians (Urban Road Planning and Transportation Guide 2013). concerning the landscape design of roadsides, plants selection must be suitable for local climate, local diseases, as well as the functional and aesthetic purposes; in case of height (2m at least), shading functions in the final growth spread, and maintenance requirements especially on the medians (Melham et al, 2013, Kim et al, 2007, Stakes et al, 2006). the alternately planting system of two different plants was applied considering their suitability in terms of height, shape, color of flowering and duration, environmental and maintenance requirements. The first plant is *Cassia glauca*; an evergreen shrub, flowering duration in summer, fall, and winter seasons with golden flowers, plant's height reaches 4m and almost 5m of spread, with 5-7 m of planting distance.

The second plant is *Lagerstroemia indica*; a deciduous shrub that cultivated in 5-7 planting distance, 6m in height, and 6m of spread, with attractive dense and various coloring flowers such as purple, white and pink, flowering duration in the end of fall and spring seasons. The cultivation of flowering plants is one of the most important classification indicators of natural beauty on the roadside highway sections, especially those involving commercial uses "section under study". Recent studies have confirmed that vegetation affects the visual quality of commercial uses of road scenes consisting of trees and shrubs generated a clear vision for buildings, shops and different landmarks; studies on the roadsides landscape design have confirmed that vegetation affects the balance between the visual quality of the different uses of the land adjacent to the road and the rest of the road (Wolf, 2008 and Wolf, 2005). Concerning the use of herbaceous plants around the tree trunks to obtain aesthetic flowering, multiple colors, shapes, different dates and length of the flowering periods; in addition to, the aromatic smell of flowers; preferably, width should not be less than plant's height to indicate the aesthetic benefits (Abu-Dahab et al 1998). Median landscape design depends on its dimensions; for large medians, two species of trees are preferred with almost the same irrigation requirements in order to ease maintenance, *Washingtonia* and *Phoenix dactylifera* trees were chosen in the road section median for its symbolic and national importance, which imparts tangible identity to the local environment that surrounding by palm orchards, as well as the aesthetic values, comfortable for pedestrians, and provide clear vision for drivers .

The roadsides areas that dedicated for road furniture must be provided with simple and attractive designed furniture, made of durable materials considering different weather conditions, and suitable colors for the general character of the region and appropriate the users; The furnishing elements of the section under study include lighting that appropriate illumination levels along the road, also lighting directed to pedestrians along the sidewalks in the furniture area or the median and at intersections as well as traffic signs that must be coordinated in such a way to avoid overlapping with underground facilities or with Pedestrian walk or at the crossroads.

Second section

In terms of landscape design, *Cacia glauca* shrubs was proposed, which is suitable for the local environment conditions of the study area; easy to plant, maintenance requirements, adopted to various environmental conditions, and suitable for roadside planting, plant's height reaches 4m and 5m in spread, and flowering period extends from late spring to early fall season, it also recommended to be planted at close distances by the road sections facing the industrial district and a planting distance range

approximately 3.5-4m to completely block the undesirable views of the opposite side where the industrial district, while the rest of the road section to the shops is incompletely blocked with 5-7 m of planting distance 5-7 m.

Third section

According to the field survey, this section is passing through the city and represents the urban section of the road under study, it is important to propose plant that is less in maintenance requirements, and prefer flowering trees that provides an attractive scenery and clear vision; in this case, *Bombax ceiba* is proposed; a deciduous tree, with height ranges from 8 to 20 m and spread up to 20m, it is suitable for various environmental conditions in terms of high temperature, drought, wind and low tolerance to salinity, it appropriate for decoration uses and shades, flowers are Individual, large, bright red, and star-shaped that spread over leafless branches, and flowering period is in the middle of spring. The perennial herbaceous planting ponds under the Bombax trees should not occupy much of the pavement while avoiding occupancy of the entire pavement in the ponds, which impedes the pedestrians, considering the distribution of plants and commercial panels on the sidewalks to avoid overlap among them. Since the road section is adjacent to the intersection of Al-Salam Bridge and proximity to residential properties, this road acquired the use nature by pedestrians to move from one area to another. Therefore, the sides of the section were furnished with benches where do not impede the pedestrians, under the trees shade and at the same time away from the danger of vehicles, considering that they are made of easy maintenance materials that undertake various weather conditions. As for the section alignment to the Alexandria River, the section acquired a natural aesthetic value; In this case, it is suitable to choose such trees that do not obscure the water scenery such as Albizia, Cassia, and Bauhinia that resists the local environmental conditions.

Fourth section

According to the field survey, this section includes the road that passes through the city and mainly the intersection of Dallah, which represents the largest areas on the highway which is used to facilitate the change of traffic flow direction. Many plants that provide different colors and shapes can be grown at different times of the year for the regular passengers. Small and medium trees can provide a vertical dimension to the intersection that can expand them a human scale, the landscape proposition of this section aimed to restructure and design the surroundings of "Dallah" and plant it with herbaceous plants, *Lagerstroemia indica* and *cacia glauca*, which are suitable for the environment conditions of the study area (see figure 4). As for the part that passes through the residential properties, it is proposed

to roadside with curbstone and to provide lighting poles, traffic signs, and road signs to the intersection approaches. As for the aesthetic part of the natural environment, such as fish lakes, which cover the edges of papyrus, Arundo, and drainages it must be considered to use plants that do not obscure water scenery and provide shades for pedestrians, such as Albizia and cassia and Bauhinia.

Conclusion

The study concluded that the design of the natural landscape for the aspects of highways connecting the Iraqi governorates requires a joint work strategy for road , architecture , landscape designers and road workers. This strategy requires an insight into aspects of work on road projects and the preparation of general and detailed design plans shared between them,to improve the natural landscape of existing roads requires more considerations regarding the types of cultivated plants, requirements for irrigation, type of soil and the relationship of the road to the various uses of the land on its aspects

Figure3. Design proposition of Road sides and medians.

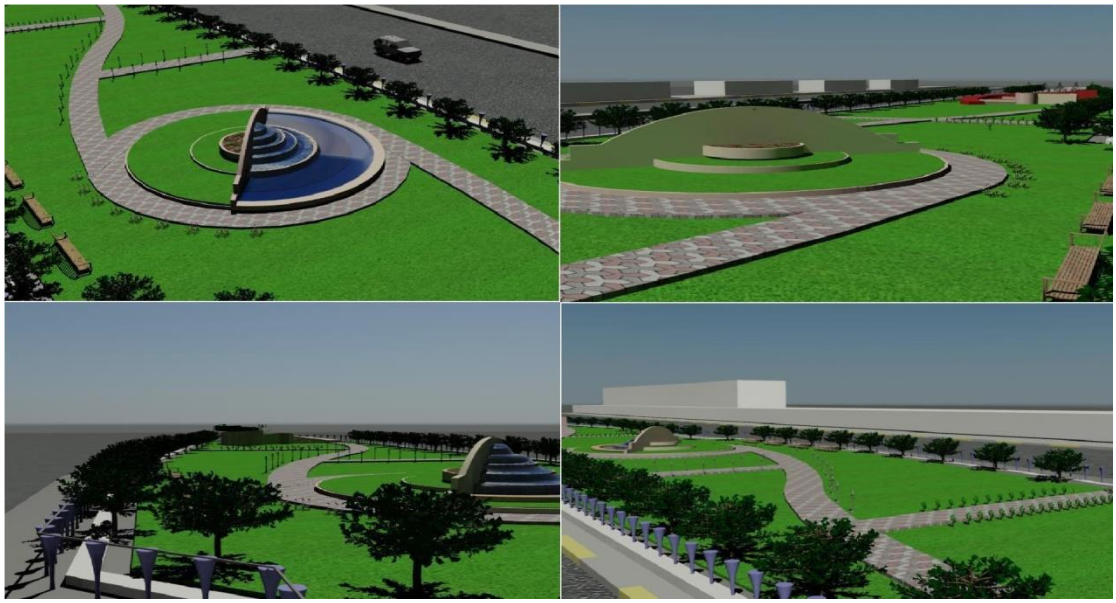

Figure4. Design proposition of Dallah crossroad

References:

- Abu Dahab, M.A.and T. M.Abu Dahab. (1998). Landscape and garden design. First edition, Arab Publishing House, Cairo, Egypt, PP.498.

- American Association of State Highway Transportation Officials (AASHTO). 2002. Roadside Design Guide, 3rd Edition. Washington D.C.: AASHTO.

- Burley, J. A. (1997). Visual and Ecological Environmental Quality Model for Transportation Planning and Design. Transportation Research Record: Journal of the Transportation Research Board, No. 1549, TRB, National Research Council, Washington, D.C., pp. 54-60.

- Dixon, K. K., and K. L. Wolf. (2007). Benefits and Risks of Urban Roadside Landscape: Finding a Livable, Balanced Response. Proceedings of the 3rd Urban Street Symposium (June 24-27, 2007; Seattle, WA). Washington D.C.: the National Academies of Science.

- Egebjerg, U.Friis, P and N.Lutzen.2002.Beautiful Roads. A Handbook of Road Architecture, 1st Edition, Published by Danish Road Directorate .pp64.

- Evans, G. W., and K. W. Wood. (1980). Assessment of Environmental Aesthetics in Scenic Highway Corridors. Environment and Behavior, 12, 2, pp. 255-273.

- Forment, J. and Domon, G. (2006). Viewer appreciation of highway landscapes: The contribution of ecologically managed embankments in Quebec, Canada. Landscape and Urban Planning, **78 (1-2)**, 14-32.

-Fukahori, K. and Kubota, Y. (2003). The role of design elements on the cost-effectiveness of streetscape improvement, Landscape and Urban Planning, **63**, 75–91.
-Stamps, A. E. (2001). Evaluating enclosure in urban sites Landscape and Urban Planning. **57**, 25–42.

- Iftikhar ,J,A,Iftikhar,M,Asif,M,Qasim,A,Riaz and T,Ali.(2016). Assessment of Roadside Landscape up-Gradation: A Case Study of Canal Road, Faisalabad, Pak. J. Agri. Sci., Vol. 53(4), 885-891.

- Kim, D.J., B.Storey, D.Jasek and J.Sai (2007).Synthesis of New Method for Sustainable Roadside Landscapes. South Texas Environment Institute. Texas Dept of Transportation.

- Melham, J.T, Zahniser and Zimmerman. (2003).Roadside Planting Guidebook. Pennsylvania Department of Transportation Bureau of Maintenance and Operations Commonwealth Keystone Building.pp 461.

- Naderi.R,G, G, G. (2002). Landscape Design in the Clear Zone: The Effect of Landscape Variables on Pedestrian Health and Driver Safety Transportation Research Paper 1851.p119-130. Publication of this paper sponsored by Committee on Landscape and Environmental Design.

- Nasar, J. L. (1988). The effect of sign complexity and coherence on the perceived quality of retail scenes. In Environmental aesthetics: Theory, research and applications (pp. 300-320). Cambridge, MA: Cambridge University Press.

- Nassauer, J. I., and D. Larson.(., 2004). Aesthetic Initiative Measurement System: A Means to achieve Context-Sensitive Design. Transportation Research Record: Journal of the Transportation Research Board, No. 1890, TRB, National Research Council, Washington, D.C, pp. 88-96.

- Smardon, R. (1988). Perception and aesthetics of the urban environment: review of the role of vegetation. Landscape and Urban Planning, **15**, 85–106.

- Stakes, A.L.L.M.B., Heard, S.Comuters and T.Reynolds. (2006).Guide to Roadside Vegetation Survey Methodology in South Australia. Department for Environment Heritage, Adeldie.

- Wolf, K. L. (2005). Business District Streetscapes, Trees and Consumer Response. *Journal of Forestry,* Vol. 103, No. 8, pp. 396–400.

- Wolf, K. L.2006. Assessing Public Response to Freeway Roadsides: Urban Forestry and Context-Sensitive Solutions. J of Transportation Research Board, No. *1984,* pp.102-111.

- Wolf, K.L. (2008). Community Context and Strip Mall Retail - Public Response to the Roadside Landscape, J of the Transportation Research Board, N 2060, PP, 95-103.

- Urban Road Planning and Transportation Guide.2013.General Administration for urban planning, first Edition, Ramallah, Palestine.

- Younis, A.Riza, A.Qasim, M and A.Shahzad (2002). Development and management of Green Spaces on Sumundri Road , Faisalabad: A case Study . *Pak.* J. *Agri. Sci., Vol.* 39(4).

.