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Studying the Effect of Mashhad Chehel Bazeh Watercourse on Determining Neighboring Land Uses (Setting: Areas 10 & 11, Mashhad Municipal)

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ABSTRACT

Background: When watercourses pass through cities and residential centers and(or) their suburbs to reach their destinations, they bring about new issues. And, it is at the same place of encountering cities that they would be taken as lost and pending spaces in cities, in case of being overlooked. This is because they mostly depict a dry area passing through cities due to the seasonal and periodical passage of water flows in them.**Objective:** Recent studies on urbanization indicated that it is not possible to achieve the optimum pattern of living without "land use planning" in cities. Due to its special geographical position, Mashhad is a semi-highland city and has accepted many watercourses in its context. **Results** Among the watercourses inside Mashhad, Chehel Bazeh Watercourse is considered to be one of the main northwest branches for directing ground waters. Due to being located in residential texture and due to its size and dimensions increased the extent of contact with its surrounding, its location toward the main setting of Mashhad and the main development direction of the city (toward northwest), it can have significant influence on the city and surrounding area. **Conclusion:** The present study is a "practical-applied" research. Data collection is done by library and field studies. The research question is: To what extent have the potentials of the watercourse affected its neighboring uses in areas 10 and 11 of Mashhad municipal?

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INTRODUCTION

"There is highly diverse close relationship between city and water: rivers and streams, beaches capable of being equipped, floods and underground water tables, water piping network, wastewater discharge, and the like are respective examples." Generally, civilizations have been formed in the rivers' banks. And, many big cities of the world have originated from their flowing rivers. Cities like Rome, Paris, Isfahan, and … are among them (Bastieh, 1998).

As an abandoned open space, Chehel Bazeh Watercourse and its limit in Mashhad urban texture have such quality. The area can play a major role in Mashhad regarding its suitable urban situation, dimension, and scale. The issue became more important when the future development of Mashhad happened in the same direction created a big challenge in the city texture. Since Mashhad metropolis hosts many national and international pilgrims and tourists due to Imam Reza's shrine and requires extensive facilities to respond a variety of service-recreational demands, and regarding the lack of spaces for recreational, entertainment, purchase, etc, the low per capita of green space as well as the lack of suitable urban spaces (urban squares) in the main setting of Mashhad all draw attention to such "urban opportunities" which can respond the shortages mentioned as well as modifying concentration on urban centers and the equal distribution of urban facilities, if they are equipped.

As well as having the potential to play an appealing and active role in urban body and being an urban identification in Mashhad scale, Chehel Bazeh Watercourse can be transformed into an "equipped urban corridor" by organizing various urban services and uses.

In this article, we aim to examine the effect of Chehel Bazeh Watercourse on its neighboring uses with respect to sustainable urban development.

2. Results and Contents of the Study:
2-1- Research Questions, Objectives, and Methodology:

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Recent studies on urbanization indicated that it is not possible to achieve the optimum pattern of living without "land use planning" in cities. Urban land use planning discusses how to employ, distribute, and protect lands as well as to organize activities and performances locally and spatially based on the needs and demands of urban society and determines a variety of land use. The planning should not solve the problems and issues of cities and not set the type of land use in city concerning the spatial-structural organization and construction of the city. In general, the urban land use system and planning acts like a pattern for exploiting lands in city (Ziari, 2002).

Now, the main question here is whether the watercourses flowing in the context and limit of the city can affect the determination of their neighboring uses in urban texture? How?

2-2- Importance and Significance of Studying Chehel Bazeh Watercourse:

Mashhad is also among the cities which can be claimed to have inefficiencies in many areas including the poor quality of urban structure and spaces and inconsistent setting.

Lack of open urban spaces, low green space per capita and service uses, lack or shortage of suitable services for tourists and pilgrims, lack of a place for recreation and leisure for the visitors and several others all draw our attention toward establishing spaces which can satisfy the needs.

Among the watercourses inside Mashhad, Chehel Bazeh Watercourse is considered to be one of the main northwest branches for directing ground waters.

The significance of carrying out this study indicates that it is possible to turn the potentials of Chehel Bazeh Watercourse into an active dynamic urban axis with respect to sustainable development principle, compliance with the least urban planning standards, and finally urban environment and the relationship between nature and human in city.

2-3- Research Method:

This study was conducted using data and information from reviewing library resources and respective documents. Data collection and analysis were done by means of analytical-descriptive method. In the end, conclusion and suggestions were presented for determining the special parking uses in Mashhad development plans. These documents and evidences were reviewed in the following respect:

2-3-1- Studying the growth and development of Mashhad in contemporary period and factors affecting the increase of parking demand in this city

2-3-2- The status of parking use in Mashhad development plans

2-3-3- Inefficiencies and problems resulted from lack of adequate parking space and destruction of urban sustenance factors (air pollution, noise pollution, urban landscape visual pollution, destruction of nonrenewable resources, disappearance of citizens' peace and comfort) in contemporary period

2-3-4- Suggestions and strategies

2-3-4-1- The Growth and Development of Mashhad in Contemporary Period

Due to sacred Imam Reza's shrine, Mashhad (population=2.4million) is one of the most important shrines of Shiite and annually hosts 20million pilgrims across Iran and the world today. In the last thirty years, Mashhad has transformed to a metropolis with inharmonious and imbalanced growth. Between 1976 and 2006, the population of the city increased %8; that is, from 240,000 to 2,427,000 in 2006(Mashhad Wikipedia site,).

Factors affecting the development and population growth of Mashhad (what are factors affecting the increasing demand of parking in Mashhad during recent years?)

Natural status of area: being located in an open wide area and lack of spatial limits.

Communication, political and religious status: being located in the communication path with Middle Asian and West countries, the historical background and religious and pilgrimage role of Imam Reza (a) shrine and establishment of security.

Immigration: extensive immigrations to Mashhad including Afghans' immigration, the financial poverty of the area, lack of water and farmland, seeking for better job and acts of God like drought.

The advance of transportation devices:

Integration of surrounding villages and cities with the consistent texture of the city: From 1965 to 1976, city expanded toward east and northeast. And, about nine villages and brick factories were combined with the city texture. Yet, from 1976 to 1986, over two cities and thirty one villages were combined with (Husseini, 2008)

2-3-4-2- The Status of Parking Use in Mashhad Development Plans (Where did parking use stand in Mashhad development plans?): To answer this question, we must examine the location of parking uses in the maps of Mashhad master and detailed plans.

Studying the Status of Parking in Mashhad Master Development Plans: The summary of results from the previous development plans of Mashhad and the status of parking in them are implied below:

Capacitive Master Plan of Mashhad (the first master plan of Mashhad) (FARNAHAD, 2010)

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The plan was notified to the Technical Office of Consulting Engineers Cooperation in August 1967. The first stage includes the identification of the general characteristics of city in May 1970 and the second stage regarding anticipations and providences in a 25-year period was approved in 1971. Among three alternatives proposed, this one was approved: the future development of city toward west and southwest around Vakilabad axis. General principles proposed by the plan are as follow:

City limit will reach from 3344hectare (1966) to about 17000hectare (1991).

General development toward west and southwest, in north to northern highway and in south to the heights will reach a slope about %15.

In this plan, Chehel Bazeh Watercourse is not located in urban texture.

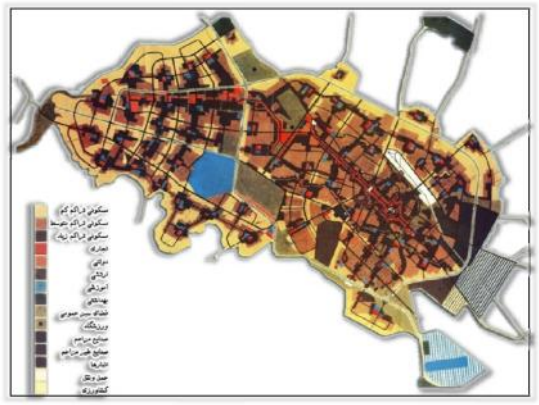

Photo. 1: Capacitive Master Plan of Mashhad

Source: FARNAHAD, Architect, and Urban Planning Consulting Engineers, (Master) Development and Construction Plan of Mashhad Metropolis – 2010

The Second Master Plan of Mashhad (Mehrazan Plan) (FARNAHAD,2010) : was formulated in 1993 for a 25-year period (1991-2016) and approved by the Supreme Council of Iran Architecture and Urbanization (Photo 8). Based on plan anticipation, the population of the city will reach 3million in 2001 from 1.9million in 1991, and will be 5.4million in the horizon year of the plan (i.e. 2006). Hence, the main objective of the plan is to settle the future extra population of the city. Accordingly, three different arenas were taken to settle the extra 3.5million people in future including: the present area of the city, lands attached to the area, and inconsistent development.

In this plan, the average gross density of population at city level is suggested about 142 individuals in a hectare and the average pure density as 335 individuals in a hectare. Population density distribution at city level is divided into three groups based on the social and economic characteristics of target groups.

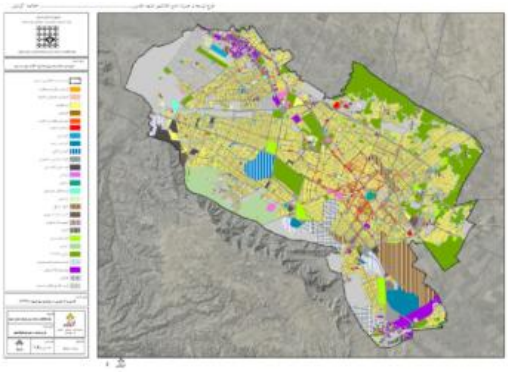

Photo. 2: Mehrazan Master Plan Map **Photo. 3:** Farnahad Master Plan Map

Source: FARNAHAD, Architect, and Urban Planning Consulting Engineers, (Comprehensive) Development and Construction Plan of Mashhad Metropolis – 2010

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The Third Master Plan of Mashhad (Farnahad Plan) (FARNAHAD,2010): The third master (construction and development) plan of sacred Mashhad metropolis is formulated with a strategic trend and in contractual terms and the same title by Khorasan-e Razavi Housing and Urbanization Organization. After conducting studies integrated with sacred Mashhad urban set plan and the advancement of the plan between 2005 and 2007 (in mid 2007), Housing and Urbanization Organization delegated the representativeness of receiving the master plan to the Construction and Development Studies and Planning Department of sacred Mashhad metropolis (Photo 9).

The plan – as the third master plan of the city – is developed by the serious participation of experts, elites, and managers from many organization and respective organs regarding the development and construction of the city. We dare say that it is the result of the participants' collective understanding.

Conclusion: Studying the Status of Parking in Mashhad Master Development Plans:

After reviewing the maps of master plan, it was determined that no parking spot is seen on them. And, parking issue is implied as a critical problem in these studies.

Photo. 4: Land uses suggested in Mashhad master plan (Source: Mashhad master plan)

Table 1: Setting land uses in Mashhad master plan (Source)

Use in detailed plan	Square	
	Hectare	Percent
Residential -Commercial	142,2	33,3
Channel and green space	161,8	37,9
Urban services and equipments	5,7	1,3
Passage and green space network	117,7	27,5
Total square	427,4	100,0

Studying the Status of Chehel Bazeh Watercourse in Mashhad Detailed Plan

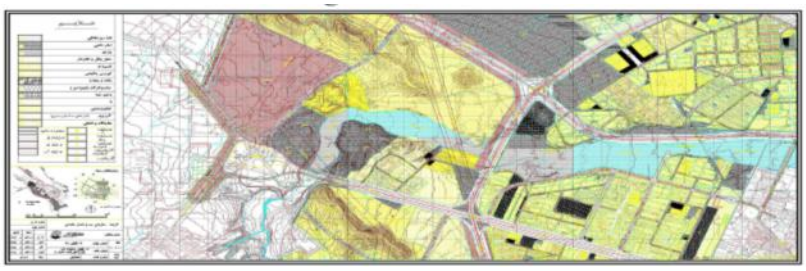

Photo. 5: Land uses suggested in Mashhad detailed plan

Table 2: Setting land uses in Mashhad detailed plan

Use in detailed plan	Square	
	Hectare	Percent
Residential	128,4	22,4
Commercial	32,9	7,7
Channel and green space	110,7	25,9
Urban services and equipments	9,8	2,3
Passage and green space network	135,6	31,7
Total square	427,4	100,0

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2-3-3- The effect of Chehel Bazeh Watercourse as a potential to resolve inefficiencies and problems resulted from population growth and lack of per capita in Mashhad

Based on population as well as existing and proposed per capita, lack of uses area in Mashhad scale is as follow:

Table 3: Lack of area for uses in urban scale

Use in Mashhad scale	Lack square
Commercial/urban	873774
Cultural	1362266,5
*Urban green space	12279400
Sport	677130,34

Use	Existing per capita	Proposed per capita
Commercial/urban	0.27	0.38
Cultural	0	0.39
Urban green space	0.39	1.61
Sport	0.09	0.24

Lack of area for uses in area 1 and 2: Based on the population of area and per capita proposed by master plan, lack of per capita was gained in the following table.

Table 4: Lack of Chehel Bazeh Watercourse lands uses

Lack of use	Area 1	Area 2
Commercial/urban	306460.65	283513.4
Cultural	40134.5	36107.11
Sport	66388.9	42613.82
Green space	469265	14289.8

Table 4-1: Evaluating the effects of Chehel Bazeh Watercourse on neighboring environment

Analyzing internal and external factors						Proposed strategies							
						Promoting environmental sustainability by prioritizing the structural-spatial effects of Chehel Bazeh Watercourse on urban management		Promoting environmental sustainability by prioritizing the economic effects of Chehel Bazeh Watercourse on urban management		Promoting environmental sustainability by prioritizing the environmental effects of Chehel Bazeh Watercourse on urban management		Promoting environmental sustainability by prioritizing the socail effects of Chehel Bazeh Watercourse on urban management	
Row	Factors	Description	Sig. coefficient	Score	Total factor score	Attraction score	Attraction score	Total attraction score	Attraction score	Total attraction score	Attraction score	Attraction score	*Total attraction score*
1	Strengths	Role of watercourse as the natural context of water flow in city texture	0.16	4	0.64	1	0.16	1	0.16	4	0.64	1	0.16
2		Role of watercourse as the context of ground waters direction in city texture	0.07	4	0.28	2	0.14	1	0.07	3	0.21	1	0.07
3		Wide watercourse domain square and the creation of urban open space	0.125	4	0.5	3	0.375	3	0.375	2	0.25	2	0. 25
4		Seasonal water	0.07	3	0.21	1	0.07	1	0.07	2	0.14	1	0.07

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		flows											
5		The effect of watercourse on the per capita of neighboring uses	0.11	4	0.44	3	0.33	3	0.33	3	0.33	3	0.33
6		Extensive length of watercourse bed and mo flowing in various urban areas	0.055	3	0.165	1	0.055	2	0.11	2	0.11	2	0.11
7	Opportunities	Lack of suitable vegetable coverage in watercourse bed	0.05	2	0.1	1	0.05	1	0.05	3	0.15	1	0.05
8		Having just one performance (directing water	0.04	2	0.08	1	0.04	1	0.04	1	0.04	1	0.04
9		Lack of foot access to watercourse	0.08	1	0.08	1	0.08	2	0.16	1	0.08	1	0.08
10		Lack of light in watercourse surrounding	0.05	1	0.05	2	0.1	3	0.15	1	0.05	2	0.1
11		Unhealthy environment of watercourse	0.09	1	0.9	2	0.18	3	0.27	3	0.27	3	0.27
12		Lack of suitable design	0.1	1	0.1	3	0.3	4	0.4	3	0.3	4	0.4
13		Total	1		2.735								
14	Opportunities	Passage of water through watercourse about 2 to 3 months in a year	0.09	4	0.36	2	0.18	1	0.09	1	0.09	1	0.09
15		Suitable conditions for creating touristic spaces Being adjacent to international fair in west	0.13	4	0.52	4	0.52	4	0.52	3	0.39	13	0.39
16		Adjacency to the main urban streams	0.07	3	0.21	2	0.14	3	0.21	1	0.07	3	0.21
17		The existence of different investors in tourism in Mashhad	0.1	3	0.3	3	0.3	4	0.4	1	0.1	3	0.3
18		Lack of facilities for realizing improvement plan	0.17	4	0.68	4	0.63	4	0.68	4	0.68	4	0.68
19	Threats	Creation of Environmental	0.07	1	0.07	2	0.14	2	0.14	1	0.07	2	0.14

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		pollution											
20		Reduction of land price and safe construction	0.08	1	0.08	1	0.08	2	0.16	4	0.32	2	0.16
21		Population growth and housing demand	0.09	2	0.18	3	0.27	2	0.18	2	0.18	2	0.18
22		Multiplicity of owners in neighboring uses and its legal problems	0.15	1	0.15	4	0.6	3	0.45	2	0.3	4	0.6
23			0.05	2	0.1	2	0.1	2	0.1	2	0.1	1	0.05
24			1		2.65		2.65		5.511		4.87		4.37

Conclusion:

Reviewing the effects of Chehel Bazeh Watercourse on its surrounding environment:

Based on reviews done and with respect to the present situation of Chehel Bazeh Watercourse and its surrounding environment (Areas 10 and 11), we can identify the effect of the watercourse passage on the surrounding environment and vice versa.

Table 5: Evaluating the significance degree of different land uses in Berkal Watercourse limit

Row	Use			Intensity
1	Agricultural	Wet land farming	Traditional	High
			Modern	Medium
		Dry farming		Little
2	Residential and commercial	Urban		High
		Rural		Medium
3	Industrial	(light) industrial group		Little
		(heavy) industrial group		Medium to high
4	Infrastructural installations	Group 1 (other installations)		Medium
		Group 2 (transferring water, power, telecommunications, bridges, port installations)		Little
5	Recreational and pastime	Extensive		Little
		Centralized		Medium

Source: Local Water Organization, Razavi Khorasan Province, 2006

Extensive Recreational Uses:

Pastimes needing no or little expansion like hiking, hunting, fishing, horse riding, sighting animals in nature

Concentrated Recreational Uses:

Pastimes needing expansion like swimming, skiing, picnic, camping

Regarding the intensity of the effect of uses and sensitivity of qualitative limit areas, the establishment of uses is set as listed in the following table:

Table 6: Uses fitting the watercourse limit (Local Water Organization,)

Limit	Fitting uses
First	Non-flooding farming – infrastructural installations [Group 2] (transferring water, power, telecommunications, bridges, and port installations) – extensive recreational (without creating centralized installations)
Second	Non-traditional farming – rural residential – light industrial group - infrastructural installations [Group 1] (other installations) – centralized recreational – marine breeding and animal husbandry
Third	Traditional farming – urban residential and commercial – heavy industrial group

Based on the table and target uses tables in Chapter 2, final target uses in each domain are proposed as below:

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Table 7: Final target uses proposed

Texture	Limit	Neighboring domain
Open space Green space Passage Watercourse	Open space Green space Passage Bicycle path and pavement Equipped parks and camps Sport and recreational use Temporary commercial use Infrastructural installation (water and power and bridges and …) Breeding marine	Green space Passage Bicycle path and pavement Equipped parks and camps Sport and recreational use Commercial and trade use Residential use Commercial and residential use Light industrial use Infrastructural installation (water and power and bridges and …)

Reviewing Different Strategies based on SWOT Model:

Table 4-1- Evaluating the effects of Chehel Bazeh Watercourse on neighboring environment Conclusion of Reviewing and Analyzing SWOT Model:

a) Reviewing Internal and External Factors:

Based on Tables 4-10, total score is 2.735 for internal factors and 2.65 for external factors. That is to be settled in offensive strategy (maximum-maximum).

b) Reviewing proposed Strategies:

Although – beside having especial significance - all strategies proposed have close relationship with each other, results from Tables 4-10 indicate that strategy attraction score is more than other strategies for "promoting sustainable development by prioritizing the economic effects of watercourse in urban management" and should be given priority.

Conclusion:

Upon detecting and studying the status of Chehel Bazeh Watercourse in Mashhad urban environment and the urban texture of areas 10 and 11, this thesis examined and evaluated its effect on determining its neighboring uses. Accordingly, based on data analysis in chapter four, it is concluded that the potentials of this watercourse in its neighboring domain has had significant effect on setting its neighboring uses in the urban development plans of Mashhad such as master plan, detailed plan, tourism plan, and the like. We hope that, like past, urban planning officials and managers can exploit the endowments of these urban natural environments to accomplish the objectives of urban sustainable development.

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