

A Descriptive Preference Analysis on Waterfront Parks Neighboring Lake Shihwa

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II. THEORETICAL BACKGROUND

A. Waterfront

Waterfront is defined by various studies and researches. According to Shim [1], there are various urban activities and communications going on around waterfront area. Therefore types of waterfront can be categorized into various characteristics such as locations, spatial functions, structures, and urban scales. Kim [2] remarks that waterfront is a combined area of lands and waters which interact on each other. Water Quality and Ecosystem Conservation Act [3] in Korea designates waterfront ecological zone within 1km from river stream in order to preserve water quality and aquatic ecosystem.

B. Literature Review

Kim [2] derives five urban design elements for waterfront area and investigates the difference between experts and users. Lim [4] researches on landscape elements of waterfront area in Han River and focuses on satisfaction and preference of waterfront users. Shim [1] analyses how waterfront park users recognize design elements different and presents suggestive points on design elements on users' perspectives. Lee [5] compares design elements on waterfront eco-parks on users' perspectives with experts' perspectives.

Previous studies have been conducted primarily for river areas. But this study focuses on areas neighboring Lake Shihwa and researches actual user preferences on waterfront parks with in-depth interview method.

TABLE I
PREVIOUS STUDIES ON WATERFRONT DESIGN

Study	Contents
Kim (2009) [2]	Ranking the hierarchical order among 5 design elements for waterfront driven from literature reviews and demonstrating differences in cognition between experts and users.
Lim (2009) [4]	Analyzing satisfaction and preference of landscape elements in waterfronts of Han River and providing suggestions for waterfront plan and design.
Shim (2011) [1]	Assessing users' satisfaction of waterfront parks in Han River and analyzing differences in cognition of users' perspectives among urban design elements
Lee (2011) [5]	Analyzing differences in attribute importance of design elements among experts and users of waterfront parks.

III. METHODOLOGY

A. Study Area

This study is based on three typical waterfront parks neighboring Lake Shihwa. Ansan Waterfront Park, Shihwa Reed Wetland Park, and T-Light Park are analysis target areas represented on this study. All three waterfront park are created

Abstract—As the ecology of Lake Shihwa has been restored significantly nowadays, the urban development is in progress around Lake Shihwa areas. Each development project includes a plan on utilizing waterfront areas, but there exist a difference on waterfront design criteria between experts and users. Therefore, it is significant to analyze preferences in design elements of existing waterfront parks around Lake Shihwa (Ansan Waterfront Park, Shihwa Reed Wetland Park, and T-Light Park) based on users' perspectives and to reflect the result on upcoming waterfront developments. This study derives design elements on waterfront parks from literature reviews. The survey questionnaires are created based on these classified elements and the surveys are conducted to experts and users with in-depth interviews. For all three parks, several park facilities appear to be not recognized by users. Therefore the circulation path should be introduced in guide maps and information activities and furthermore in disposition of park facilities.

Keywords—Design Elements, Lake Shihwa, Preference, Waterfront Park.

I. INTRODUCTION

THE waterfront area is an attractive place and it functions as an open space as well. According to rapid urbanization and industrialization in Korea, the waterfront area began to be destroyed and unprotected.

The region neighboring Lake Shihwa was a typical example for environmental aggravation in waterfront area. But nowadays water quality of Lake Shihwa has been improved better and several of urban planning developments are under construction with design elements of the waterfront area.

This study focuses on preferences of design elements on waterfront parks from relevant previous studies and on how these elements differ between expert and user groups especially in three waterfront parks neighboring Lake Shihwa.

The research questions are made to progress as follows. How the facility elements for waterfront parks can be classified? Is there any difference in facility preferences between experts and users of waterfront parks? If there is a difference in facility preferences between experts and users, what would be the specific reason? And lastly, are there any of common advantages or improvements for disadvantages in waterfront parks?

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and managed under K-Water (The Korea Water Resources Corporation). These parks provide leisure opportunities and reflect a variety of facility elements to park users.

TABLE II
FACILITY ELEMENTS FOR WATERFRONT PARKS

	Ansan Waterfront Park	Shihwa Reed Wetland Park	T-Light Park
Area	62,000 m ²	1,037,500 m ²	64,800 m ²
Character	An ecological park providing environmental preservation and waterfront area	An artificial wetland park providing wildlife habitat and eco-learning	An ecological park built on silt from tidal power plant construction
Facility	<ul style="list-style-type: none"> - walk and bicycle path - sports facilities - observatories - reeds observation trail - pergola and bench - landscape facilities - parking lots - public restroom - park management office - field of reeds - viewing deck 	<ul style="list-style-type: none"> - exhibition hall - flower garden - observatory trail - artificial island - bird observatory - ecological pond - greenhouse - pergola and bench 	<ul style="list-style-type: none"> - waterfront facilities - landscape facilities - resting places and shelters - environmental sculpture - plaza - flower garden - parking lots - pergola and bench - exhibition hall - viewing deck

B. Waterfront Park Components

This study draws various design elements from previous studies on waterfront parks [1], [2], [4]–[9]. Those design elements can be classified into 14 categories as following: access facilities, access complementary facilities, waterfront sports facilities, water sports facilities, landscape facilities, waterfront landscape, open space, cultural facilities, waterfront observation facilities, waterfront experiencing facilities, natural recovery and maintenance, guidelines, and the others.

TABLE III
FACILITY ELEMENTS FOR WATERFRONT PARKS

Main Categories	Sub-Categories
access facilities	bicycle, walk, public transportation, automobile, water transportation, access facilities between urban and waterfront areas
access complementary facilities	parking lots
waterfront sports facilities	Walk, bicycle path, sports facilities
water sports facilities	marina, cruise
landscape facilities	green space, planting, lawn, tree
waterfront landscape	skyline, night-time landscape, structural aesthetics, landmark, color
open space	plaza
cultural facilities	museum, sculptures, auditorium
waterfront observation facilities	waterfront walking path, esplanade, waterfront staircase
waterfront experiencing facilities	nature observation site, cruise
natural recovery and maintenance guidelines	shore design regarding to the ecology, reeds wetland, clean water quality guidelines
convenient facilities	restaurants, convenient store, commercial facilities, cafe, resting place and shelter, information facilities
the others	event, historical site, educational program

IV. ANALYSIS

A. Survey Design

Based on literature review and field study, a total of 14 main categories for waterfront park facilities are derived out and a number of sub-categories among them. According to these

categories, the descriptive survey with 5-likert scale is conducted to experts and users during the period between June 14th and 17th, 2013. The survey is carried out of experts who have been participated in waterfront park constructions and managements. In-depth interviews are conducted with e-mail and telephone for experts. In the other part of survey, it is carried out of actual park users with questionnaires and face-to-face interviews.

B. Characteristics of Survey Subjects

The survey is carried out to a total of 42 people composed of expert group (21) and user group (21). The expert group is composed of workers in K-Water who have been experienced waterfront park construction and management. The user group is composed of actual visitors of each waterfront park. Characteristics of survey subjects are as shown in Fig. 1.

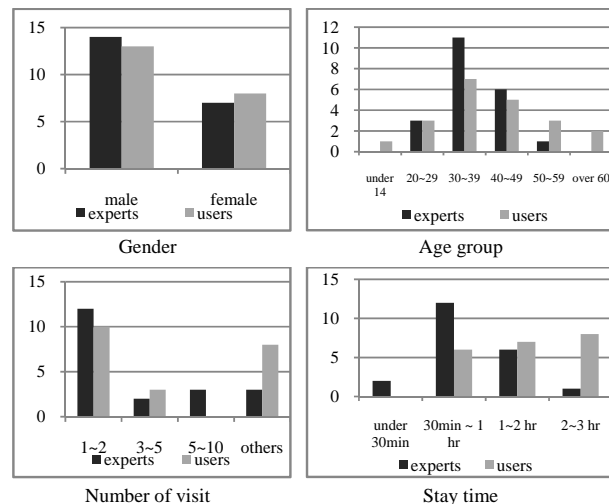


Fig. 1 Characteristics of Survey Subjects

V. RESULTS

A. Preferences for Waterfront Park Use

The preferences for waterfront park use of experts and users

are as following. The expert group shows their preferences on waterfront sports facilities (bicycle path and walk) and convenient facilities in Ansan Waterfront Park, on cultural facilities (exhibition hall) and waterfront experiencing facilities in Shihwa Reed Wetland Park, and on cultural facilities, waterfront observation facilities, and convenient facilities in T-Light Park.

The user group shows their preferences on natural recovery and maintenance and convenient facilities in Ansan Waterfront Park, on waterfront experiencing facilities and natural recovery and maintenance in Shihwa Reed Wetland Park, and on open space and convenient facilities in T-Light Park.

The design element of convenient facilities comes out to be a common preference from both expert and user groups. But the expert group puts more weight on value of waterfront sports and cultural facilities while user group does on value of natural recovery and maintenance.

TABLE IV
RESULT ON PREFERENCES AMONG EXPERT GROUP

Ansan Waterfront Park		Shihwa Reed Wetland Park		T-Light Park	
bicycle path, walk	4.14	observatory trail	4.29	viewing deck	3.86
viewing deck	4.00	exhibition hall	3.86	environmental sculpture, resting place, plaza, Smart garden	3.57
Noeul observatory, pergola bench	3.86	bird observatory, pergola and bench	3.71	Noeul garden, Grassy garden	3.43
landscape facilities	3.71	artificial island, ecological pond	3.29	shelter, pergola and bench, exhibition hall	3.29
field of reeds	3.57	flower garden	3.14	landscape facilities, parking lots	3.14
reeds observatory trail	3.43	greenhouse	2.33	Storytelling	3.00
sports facilities, night lighting	3.33			waterfront facilities	2.86
foreshore	3.29				
observatory, park management office					
parking lots	2.57				

TABLE V
SUMMARY OF RESULTS ON PREFERENCE AMONG EXPERT GROUP

	Ansan Waterfront Park	Shihwa Reed Wetland Park	T-Light Park
Preferring Facilities	bicycle path and walk	observatory trail	waterfront viewing deck
Undesirable Facilities	parking lots	greenhouse	waterfront facilities

TABLE VI
RESULT ON PREFERENCES AMONG USER GROUP

Ansan Waterfront Park		Shihwa Reed Wetland Park		T-Light Park	
pergola and bench, field of reeds	4.86	observatory trail	4.43	resting place, Grassy garden, plaza	3.86
bicycle path and walk	4.71	ecological pond	4.17	viewing deck, landscape facilities, ecological sculpture	3.71
reed observation trail	4.57	pergola and bench	4.14	shelter, Smart garden, parking lots, Storytelling	3.57
night lighting	4.00	flower garden	3.86	waterfront facilities	3.43
landscape facilities	3.86	bird observatory	3.50	exhibition hall	3.33
Noeul observatory	3.83	artificial island	3.00	Noeul garden	3.29
viewing deck, sports facilities	3.71	greenhouse	2.33	pergola and bench	3.14
parking lots	3.57				
public restrooms	3.29				
park management office	3.17				

TABLE VII
SUMMARY OF RESULTS ON PREFERENCE AMONG USER GROUP

	Ansan Waterfront Park	Shihwa Reed Wetland Park	T-Light Park
Preferring Facilities	pergola and bench, field of reeds	observation trail	resting places, Grass garden, plaza
Undesirable Facilities	park management office	greenhouse	pergola and bench

B.Descriptive Analysis of Waterfront Park Use

According to in-depth interviews with experts and users among three waterfront parks introduced in this study, there exist some differences in preference between expert and user groups. The preferences for Ansan Waterfront Park among experts are due to high utilization of facilities and landscape, but the users are due to the safety and they are not satisfied with utilization due to the lack of park facilities. However, expert and user groups of Shihwa Reed Wetland show similar perspectives in preferences (Table X and XI).

In case of Ansan Waterfront Park, there is an implication that park users do not recognize design elements which experts put significant values in. Also users, in contrast with experts, are concerned about scenery damages according to on-going development projects near Lake Shihwa. Both experts and users show their preferences relatively high in waterfront sports facilities, especially in bicycle path and walk. The reason why the expert group selects waterfront sports facilities is that they are convenient for use and landscape view. And for the user group, they show their preferences in waterfront sports facilities for safety and completeness (Tables VIII and IX).

TABLE VIII
RESULT OF IN-DEPTH INTERVIEW AMONG EXPERTS (ANSAN WATERFRONT PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(bicycle path and walk)	nature view, convenient exercise facilities	intervention between bicycles and pedestrians	safety of pedestrians
Undesirable Facilities(parking lots)	convenient parking system	lack of parking space, inconvenient location	additional space for parking lots

TABLE IX
RESULT OF IN-DEPTH INTERVIEW AMONG USERS (ANSAN WATERFRONT PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(pergola and bench, field of reeds)	nature view	unclean surroundings	No more of development for the area in the other side of Lake Shihwa
Undesirable Facilities(park management office)	park maintenance	unknown	public relation

In case of Shihwa Reed Wetland Park, both expert and user groups show similar perspectives on waterfront experiencing facilities and waterfront observation facilities. For waterfront experiencing facilities, experts and users express positive opinions because those facilities satisfy actual users. But experts and users express negative opinions on waterfront observation facilities because the observation does not work as much as expected. Also for the greenhouse, users respond that many of them do not visit there since it is located outside the main pedestrian circulation path. This refers to use pattern of actual park users that they do not use all facilities in park, but facilities located on the main pedestrian path (Tables X and XI).

TABLE X
RESULT OF IN-DEPTH INTERVIEW AMONG EXPERTS (SHIHWA REED WETLAND PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(observation trail)	observation of reed wetland	safety accidents	prevention of accidents, management
Undesirable Facilities(greenhouse)	a variety of flowers and plants	lack of public relation	alternation of use

TABLE XI
RESULT OF IN-DEPTH INTERVIEW AMONG USERS (SHIHWA REED WETLAND PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(observation trail)	observation of reed wetland	overgrown reeds, lack of management	pergola and bench
Undesirable Facilities(greenhouse)	-	insufficient use	facility activation

Various facilities are well positioned in T-Light Park even though the park size is relatively smaller than other two parks.

T-Light Park appears to have similar use pattern with Shihwa Reed Wetland Park. The users show positive opinions on gardens and plaza which are located on the main pedestrian circulation path. But most of users do not recognize waterfront experiencing facilities and sculptures, cultural facilities, and landscape facilities which are all outside of the main circulation path (Tables XII and XIII).

TABLE XII
RESULT OF IN-DEPTH INTERVIEW AMONG EXPERTS (T-LIGHT PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(waterfront viewing deck)	nature view	indistinctive space	distinctive area
Undesirable Facilities(waterfront facilities)	nature view	unclean and inharmonious surroundings,	Harmonious surroundings

TABLE XIII
RESULT OF IN-DEPTH INTERVIEW AMONG USERS (T-LIGHT PARK)

	Advantages	Disadvantages	Improvements Required
Preferring Facilities(resting places, Grass garden, plaza)	appropriate use of facility	indistinctive space	distinctive characteristics
Undesirable Facilities(pergola and bench)	appropriate use of facility	lack of facility, indistinctive space	additional facilities

VI. CONCLUSION

This study makes an attempt to find out design element preferences for users and recognition differences between experts and users of waterfront parks especially in the area neighboring Lake Shihwa to come up with suggestive ways for waterfront park design.

For Ansan Waterfront Park and T-Light Park, differences in design elements (facility elements) preferences appear to be distinctive. According to interviews with experts and users of those two parks, their opinions on each facility elements also vary from each group. Users of Shihwa Reed Wetland Park and T-Light Park appear to have similar circulation path and do not recognize design elements which planners attempt to reflect on waterfront parks.

A number of existing park facilities as design elements appear to be whether not recognized nor utilized in all three waterfront parks near Lake Shihwa. Therefore the pedestrian circulation path should be introduced in guide maps and information activities like public relation, and furthermore in disposition of park facilities.

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