

# A Study on Planning Methods for Sustainable Waterfront Residential Estates Project in Germany

- With Focus on the Rummelsburger Bay Waterfront Residential Quarters in Berlin-\*

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## ABSTRACT

This paper is to identify the characteristics of sustainable waterfront residential quarters based on the cases in Germany. The study places the focus on conditions of location, arrangement of buildings, land use, specific plan for each phase, partition of residential districts, and types of residences in accordance with their relations to water. Results of the analysis pointed out that there are the principles which should be complied to construct waterfront residential quarters. First, it is necessary to redefine waterfront from the viewpoint of city and culture. Second, the project should be approached with a long-term vision and detailed plans. Third, cooperation between residents, government, and construction companies is required. Forth, heritage and identity for sustainability should be maintained. Fifth, it should be open to the public. The findings of this study suggest that sustainable waterfront residential quarters is desirable for occupants' comfort and health as well as for conservation of nature, improved views of cities and vitalization of communities.

**KEYWORDS:** Waterfront, Waterfront Residential Estates, Berlin Terrace, waterside terrace, floating home

## 1. INTRODUCTION

### *1. Research Purposes*

Nowadays, creation and reproduction of waterfront is one of the important themes considered in city design. Especially constructing residential district that takes advantage of natural environment, that is, waterfront and green zone, through waterfront redevelopment makes a significant influence not only to physical living environment but also human emotional state; thus, it is establishing its place as a very attractive item in building a new residential environment. This study examines the case of waterfront redevelopment in Germany where research on sustainable waterfront residential estates has been continued and many cases of successful applications are found. Especially it aims to provide the basis data needed to create waterfront residential estates fit to South Korean circumstances by examining the overall process of planning waterfront estates and developing a particular planning method for waterfront estate.

### *2. Research Method and Scope*

This paper is based on studying planning methods for sustainable waterfront estates project in Germany. Basic research method is first to understand the comprehensive notion of sustainable waterfront residential estates in Germany and then to select a case that can represent the notion and analyze them in depth. Of two waterfront redevelopment projects in the city of Berlin, the case with

the Rummelsburger Bucht residential district on the Spree waterfront, which we visited, was selected for this study.<sup>1</sup> Research then proceeded in the order of a review of previous research, theoretical study, literature review, and field visit of the target location. Then, the data will be analyzed by focusing on the conditions of location in waterfront estate, urban conditions, plan of building arrangements, specific plans for each phase, land use and detailed plan, partition of residential districts by spatial characteristics, types of residences according to their relations to water, and unit residential model developed in accordance with the conditions of waterfront estate.

## 2. Theoretical Review

### 2.1. 10 Principles for Development of Sustainable<sup>2</sup> Waterfront<sup>3</sup> Residential Estates

After recognizing the significance of waterfront estate in urban redevelopment, the city of Berlin has begun to realize human and fresh residential estate which also maintains the identity of the city on the basis of the frame of experimental architect program and various cooperative relations. To achieve this goal, especially “The City of Water” Co., Ltd.<sup>4</sup> which has been in charge of the development of sustainable waterfront city in Berlin announced 10 principles<sup>5</sup> for the development of sustainable waterfront estate after a long period of preparation time.

Table1. Principles for Development of Sustainable Waterfront Residential Estates

1	One should understand that waterfronts or river mouths are the origin of city culture and reflect the value and history of water in city.
2	It is more effective to reproduce old ports or waterfront factory estates as contemporary residential or office complexes than to make rural areas into urban areas.
3	Developing waterfront in a sustainable way is to ecologically regenerate land and water through purification of water and waterfront and to eventually reduce energy consumption and discharge of environmentally detrimental materials.
4	Waterfront residential estates should be open to the public so as to satisfy the demands of health and leisure of city residents and should have a network with old city districts.
5	Waterfront space is a significant historical heritage for the city and these historical evidences of the city should be infused with the newly-developed waterfront city to grant an identity to the city.
6	Waterfront residential estates basically emphasize the mixture of social classes and functions. It denies isolation and pursues inclusion.
7	The whole process from planning, revision, and execution should be done through a structure of public – private cooperation on the basis of truly cooperative relationship.
8	In the job of the development of waterfront city, the capability of development companies are emphasized. Especially, development companies should have a long-term vision to control investors and government offices and to enable waterfront cities to achieve sustainable development from economic, social, and ecological perspectives.
9	The work to reproduce waterfront estates should be seen with a long-term eye and flexibly and continuously promoted regardless of economic cycles or terms of administration.
10	Recreation of a vast harbor or factory estate should be developed step by step with sufficient time, which is important to give sustainability and life.

With this, the city of Berlin defined the perspective on waterfront with depth and has been persistently endeavoring to realize the systematic sustainable “waterfront city” development plan by 2015.

<sup>1</sup> The other project location, the Havel Lake Waterfront in the west of Berlin, was excluded in this study to address it in future after collecting more data in the field.

<sup>2</sup> It is to develop domicile by efficiently utilizing the resources within a limit of ecological capacity and preventing adverse effects on environment.

<sup>3</sup> Waterfront is the location where water and land meet covering the range that is used in relation to water. Usually it includes the land within 300m from the water line and the area above the water at a depth of 5 meters.

<sup>4</sup> Wasserstadt GmbH, a proposer of architecture group model as a trust development unit of the city of Berlin. It provides waterfront land in Berlin with infrastructure, on which it is possible to immediately construct buildings.

<sup>5</sup> After 7 workshops between October 1999 and March 2000 and various discussions on the development of sustainable suburban waterfront space, a type of declaration is resolved.

## 2.2 Waterfront Suburban Areas in the City of Berlin

On the basis of the concept of suburb development selected as Berlin housing policy in the early 1990s, the city of Berlin promoted two city development projects in Spree and Havel waterfronts in Berlin, which include the “City of Water,” Overhavel, near Havel River in the west of Berlin and Rummelsburger Bucht area on the waterfront of Spree near inner city. Especially these two areas had factories, storages and military and harbor facilities during World War II. Even though two areas share the large principle<sup>6</sup> for estate development, they have slight differences in the arrangement of main buildings as well as the way in which a unit house faces water.

## 3. An Analysis of Conceptual Characteristics of Rummelsburger Bucht Waterfront Estates

### 3.1 Location Outline



Figure 1. A Overall View of Rummelsburger Bucht

Research location, Rummelsburger Bucht (130ha), is located in an attractive place that has the traits of both city and rural areas. Especially it has scenery like oasis in the middle of dense metropolitan city. It is located at the entry point of the city connected with elssen bridge, surrounded with green zone of Treotow Park, and opened to Spree River. Rummelsburger Bucht is divided largely into two areas. Rummelsburger Bucht has long had a negative image with factories and prisons, and Stralau also has continued to maintain rural atmosphere despite the fact that it is located in the center of a metropolitan city. Therefore, these areas retain rich green zones even inside the large city. Moreover, planners anticipated that beautiful waterfront residential estates should be built after the German reunification due to close location and convenient transportation.<sup>7</sup>

### 3.2 Plans for Each Phase and Detailed Plan

When the characteristics of the master plan are examined, first, one can see the characteristics of design for city planning.<sup>8</sup> Residential estate is planned to be parallel in the north-south direction by reflecting a linear structure of the past city organization, which allows visual connection between Spree River and Rummelsburger Bucht. Also, at right angle to this, the street system that seems to flow toward the

Table 2. Outline of Rummelsburger Bucht

Development District Area	130ha (393,939 pyeong)	
Planned Number of Units	5,700 units	
Planned Service/Commercial Area	412,000 m <sup>2</sup>	
Housing Unit	Total	3,535 units
	Government Assistant	1,419 units
	Individual Finance	2,116 units
Social Infrastructure	Kindergarten/Daycare	6
	Elementary School	2
	Youth Leisure Ship	1
	Meeting Places for Senior Citizens	1
	Sports Facilities	1

<sup>6</sup> Waterfront estates are grounded in basic principles of the mixture of city functions from residence, labor, and leisure on the waterfront and the introduction of such elements as city space, buildings, squares, and pedestrian areas and paths to improve residents' quality of life.

<sup>7</sup> After the German reunification, the city of Berlin made a plan to designate the area surrounding Osktreuz Station that connects suburban express railroad (S-Bahn) and long-distance rail networks as the center of the expansion of the city of Berlin, which made Rummelsburger Bucht the best development area for new residences and workplaces.

<sup>8</sup> In 1992, five architecture offices were selected in “Mutually Cooperative Design Contest” and appointed to create the master plan. Three offices proposed conceptual starting points, and the concept of urban landscape by Klaus Theo Brenner in Berlin was selected. Additionally the ideas from Herman Hertzberger of Amsterdam and MBM/Barcelona were applied to the two development areas.

water in the east-west direction and the continuous public riverside roads on the outskirts strengthen the experience of waterfront estates. While urbanism is granted through this dry method that evokes an image of city streets, it is possible to approach the riverside from any directions and the streets and squares are open toward the water, which are the most notable characteristics of Rummelsburger Bucht waterfront estates.

#### 4. Analysis of the Types of Unit Residences in Waterfront Estates

In Section 4, the types of unit residence in research fields are examined. In terms of three representative types,<sup>9</sup> their conceptual characteristics and the characteristics in planning that has been realized in the actual land are compared and studied.



Figure 2. water-front type

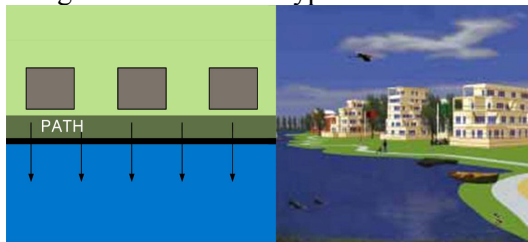


Figure 3. water-side type

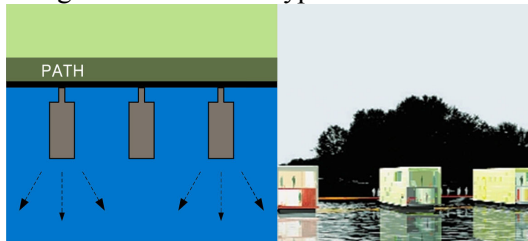


Figure 4. water-on type

##### 4.1. Types of Unit Residences within Estate

Rummelsburger Bucht Waterfront Estates have greatly diverse types of residence, but three types are sorted depending on the method of dealing with the waterside.<sup>10</sup>

##### 4.1.1 Water-Front Type (Berlin Terrace)

It is a type of which residential areas are formed with a certain space from water, such as walks or parks. Main buildings are arranged at right angles to walking paths that follow lakeside, and, through this, it is possible to acquire a sense of openness from the inside of the estate toward waterfront.

##### 4.1.2 Water-Side Type (Waterside Terrace)

It is a type of which residential areas are directly close to water and walking paths. Waterfront space is considered as public property, so the outskirts water line around the whole estate, which meets the waterfront are made into parks or walking paths, excluding the form where they meet the water line naturally.

##### 4.1.3 Water-On Type (Floating Home)

It is so-called floating home, it is a type of a house unit in the form of floating on the water. Its relation with water is excellent and it is a representative model as waterfront residence. However, it is not appropriate to be introduced in South Korea where several rainfalls are experienced in summer.

<sup>9</sup> “The City of Water Co., Ltd.” presented three types of unit residences that are appropriate for waterfront estates in Berlin based on broad research.

<sup>10</sup> The term “Waterfront” is generally used for the area where relatively large water areas, such as seaside, riverside, or lakeside, and adjacent land are organically combined.

## 4.2. Characteristics of the Cases for Each Type of Residence

### 4.2.1 Characteristics of Water-Front Residence Type (Berlin terrace)<sup>11</sup>

Basic characteristics of the residence type includes 3 – 5 stories in height, 4-7 m in width, 120-250 m<sup>2</sup> of residential space and a small front garden. Generally it is equipped with garden, roof terrace, and garage; and, the width of a house, color of elevation, the number of floors, and the story height can be selected. It is notable that it provides space to work within residence so as to enjoy urban life in natural landscape. This can be seen as a solution for a new concept of resident in the city of Berlin which predicts future urban life customs. Also, one building owner or 2-3 households with similar views on residence form a group to exchange their opinions with architects and make their intents reflected in design.<sup>12</sup> Of the proposals by 8 architects<sup>13</sup> who participated in the project, the most typical Bauforsche's "Customized Terrace Residence" shows diverse possibilities for types of terrace residence (See Figure 5).

### 4.2.2 Characteristics of Water-Side Type (Waterside Terrace)

'Waterside Terrace' is a type that, while retaining architectural elements of typical terrace, tries reinterpretation in correspondence with waterfront space. Berlin Terrace began with a collective intention, while waterside terrace aims at appearance design that makes one building itself balanced with waterfront space. The core of design is that wide terrace facing the waterfront is arranged in all units of each floor. Also, a location to have a nice view toward the waterfront is crucial



Figure 6. Conceptual Model of Waterside Terrace

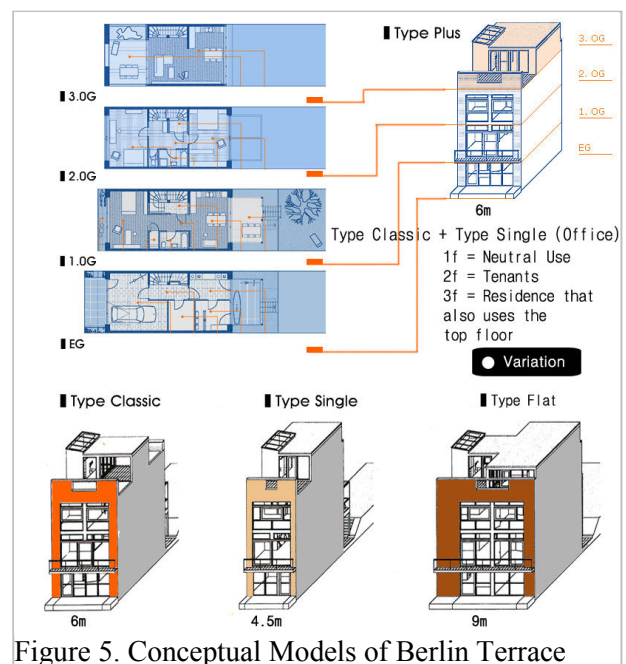


Figure 5. Conceptual Models of Berlin Terrace

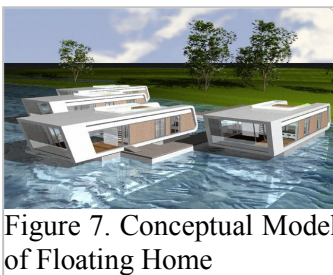


Figure 7. Conceptual Model of Floating Home

### 4.2.3 Characteristics of Water-On Type (Floating Home)

Of three models, it is a residential model that is most positively related to the waterfront. One of the most notable features is so-called 'sky deck' which is wide roof terrace and balcony that is open to water and sky. It is located in a place with the most beautiful view within the waterfront estates, and is an experimental model of which its supplies are extremely limited as places with beautiful views are limited. In the

<sup>11</sup> Berlin Terrace was created through a workshop in 2000 where 8 architecture offices, city planners, and investors attended and opened to the public in March, 2001. Here terrace house is different from housing on slops. It was originated from multi-family housing for middle-class families in the Georgian Era in England, and one household uses 4 – 5 floors, space of unit house is vertically expanded.

<sup>12</sup> The issues including architect format (Linear Residence and Multi-Family Residence), building method (wooden frame structure or metal concrete), architecture materials (woods, clays, and limestone), and architecture costs are discussed with architectures in the beginning.

<sup>13</sup> ① Architektenwerkstatt Freiburg/Amann Burdenski ② Baufrosche/Kassel ③ Klaus Theo Brenner/Berlin ④ Caruso St John Architects/London ⑤ Fink +Jocher, München ⑥ Gussman +Valentien/Berlin ⑦ Martine de Maeseneer Architects/Brüssel and ⑧ Ortner & Baukunst/ Berlin – Total 8 reputed architecture groups from Europe participated.

arrangement plan, it is possible to basically have a single layout, but it is more general to collectively arrange houses by connecting them through floating bridge walks. Through crisscross arrangement, on the one hand, the maximum view toward the sea is secured, and on the other hand, a middle area is created which can be used as water-surface walks or docks. Similar with other unit models, its positional features toward the waterfront is very important, but what makes this model differentiated is its technical aspect distinguished in terms of technology.

## 5. CONCLUSION

In this paper, with focus on Rummelsburger Bucht area, which is the representative case of waterfront redevelopment in the city of Berlin, the whole process from the circumstantial conditions of the city to the characteristics of architectural planning was analyzed based on previous literature review and field visit. Then, the conceptual characteristics and planning method of sustainable waterfront residential estates were summarized, and city planning and architectural factors that should be considered in future waterfront redevelopment were examined. The findings are as follows:

First, the concept of waterfront space was redefined in the context of city. City waterfront is not just a simple point where city and nature meet but a historical place closely related to the formation of city.

Second, development for phase and complex development method are used with long-term vision and detailed plan. Through complex development of the area, efficiency of land use is increased, urban cavitation is challenged through residence-oriented complex development, and efforts are made to increase the quality of waterfront estates through reorganizing infrastructure such as roads.

Third, history and identity of the estate is maintained for sustainability. Especially buildings with urban historicity are fused with waterfront estates through redevelopment. For redevelopment, a method to transform a building itself for other uses and a method to make community space by additionally placing new building to historical buildings are used.

Fourth, residential types of waterfront estates are divided into Water-Front, Water-Side, and Water-On types depending on their relations with water. For these three types, three residential models – ‘Berlin Terrace,’ Waterside Terrace, and Floating Home – were customized and developed in order to satisfy the conditions of locations of waterfront estates and the demands of new city life.

Fifth, it is important to secure habitability of individual unit house, but it is more important to take into consideration of residents and outside visitors who use waterfront space. Residential units are excluded in the area of water-side with high waterfront utility, but by providing public walks, attractive street views are provided to pedestrians.

Additionally, in principle, waterfront estates are open to the public so there are tourist routes. That is, waterfront space is considered as a park for the whole estates and further as public property of the city that all citizens should enjoy.

In conclusion, a plan of sustainable waterfront residential area, which has been carried out by maintaining a balance with natural environment, especially waterfront in the city, and respect for the existing city organization, offer us a lot of suggestions as an alternative for new residential estates that should comprehensively satisfy environmental preservation, improvement of urban landscape, and vitalization of local community for residents’ comfort and health.

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