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CONFERENCE PROCEEDINGS

3rd International Conference on Sustainable Built Environment (ICSBE)
“Resilience and Risk Reduction Towards Well Being Society”

4th International Seminar on Tropical Eco-Settlements (ISTECs)
**“Bringing Coastal Cities Into The Future: Challenges,
Adaptation, and Mitigation”**



Editors:

Mochamad Teguh - Islamic University of Indonesia, Indonesia
Anita Firmanti - Ministry of Public Works, Indonesia
Thomas Boving - University of Rhode Island, USA
Akihisha Kitamori - Kyoto University, Japan
Thanongsak Imjai - Rajamangala University of Technology, Thailand

CONFERENCE PROCEEDINGS



The 3rd International Conference on Sustainable Built Environment (ICSBE) **RESILIENCE AND RISK REDUCTION TOWARDS WELL-BEING SOCIETY**

In collaboration with:



The 4th International Seminar on Tropical Eco-Settlements (ISTEcS) **BRINGING COASTAL CITIES INTO THE FUTURE: CHALLENGES, ADAPTATION, AND MITIGATION**

Inna Garuda Hotel, Yogyakarta, Indonesia
October 21-22, 2014



International University Partners:



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EDITORS:

Mochamad Teguh – Universitas Islam Indonesia
Anita Firmanti – Ministry of Public Works, Indonesia
Thomas Boving – University of Rhode Island, USA
Akihisa Kitamori – Kyoto University, Japan
Thanongsak Imjai – Rajamangala University of Technology, Thailand

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Welcome Speech

The Chairman of Organizing Committee

Assalamu'alaikum warrahmatullahi wabarakatuh,

The honorable;

- Rector of UII, Ir. Harsoyo, M.Sc., Ph.D.,
- Director General of Spatial Planning, Ministry of Public Works, Indonesia, Dr. M. Basoeki Hadimoeljono,
- Director General of Agency for Research and Development, Ministry of Public Works, Indonesia, Ir. Waskito Pandu, MSc.,
- The Head of Research Institute for Human Settlement, Ministry of Public Works Indonesia, Prof. Dr. Ir. Anita Firmanti, MT.,
- Dean of Faculty of Civil Engineering and Planning, Islamic University of Indonesia,
- Conference's Partners: University of Hawai'i at Manoa – USA, Univesity of Rhode Island – USA, Fatih Sultan Mehmet University – Turkey, Disaster Research Center Gadjah Mada University – Indonesia, Kyoto University – Japan, Rajamangala University of Technology – Thailand,
- Keynote speakers: Prof Thomas Boving, Ph.D., Prof. Farhad Atash, Ph.D., Prof. Mochamad Teguh, Ph.D., Dr. Dadang Rukmana, Prof. Dr. Ir. Anita Firmanti, MT., Prof. Aris Marfa'i, Thanongsak Imjai, Ph.D.
- Participants of the 3rd ICSBE 2014 and the 4th ISTECs.
- Distinguished Guest, ladies and gentlemen,

Welcome to Yogyakarta!

The International Conference on Sustainable Built Environment (ICSBE) was first launched in 2010 with the theme “Enhancing Disaster Prevention and Mitigation”. The second conference was launched in 2012 with the theme “Livable Cities in the Fast-Growing Countries”. This year, the third ICSBE 2014 presents the theme “Resilience and Risk Reduction Towards Well-Being Society”, which is a fine match with the position of Yogyakarta as the one of resilient cities in Indonesia due to its prone disaster location. A resilient city is able to survive a traumatic blow to its physical infrastructure, its economy, or its social fabric.

A resilient city bends but does not break; it absorbs impacts without shattering. Even if the bridges and roads are ruined and the buildings toppled, the resilient city's core institutions survive; its social fabric holds; and in time, its economy rebounds. Resilience can be difficult or even impossible to gauge a city's true rebound capacity until an actual disaster is at hand. A city's degree of resilience can also change over time; the same kind of event can yield very different outcomes depending on prevailing socioeconomic conditions. The conference aims to better understand how resilient is perceived in the societies. What problems need to be tackled in the planning and design of the built environment in order to achieve such resilient? The conference presents five sub themes comprising urban/rural environments and settlements, building and constructions, infrastructures, policies and management, and coastal cities.

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The Organizing Committee received 140 abstracts coming from 9 different countries and covering in 5 specified sub-topics. The scientific committee members blindly reviewed to all submitted abstracts and have provided technical comments to the author/s with regard to ensure that the submitted full paper is qualified. After reviewing process to overall submitted papers, the scientific committee has decided to receive 69 papers only and the authors were invited to present his/her paper in the conference. It should be noted that papers not presented in the conference session are excluded in the conference proceedings. Finally, there are 54 presented papers included in the conference proceedings covering the sub-topics as follows:

1. Urban/rural Environments and Settlements: 16 papers
2. Building and Constructions: 19 papers
3. Infrastructures: 8 papers
4. Policies and Management: 6 papers
5. Coastal Cities: 5 papers

This program will not take place without the generous support from our partners. Therefore, I would like to extend my gratitude to Bank Mandiri, Bank Syariah Mandiri, Bank Muamalat for co-sponsoring this event.

My gratitude also goes to our international invited speakers: Prof. Thomas Boving, Ph.D. and Prof. Farhad Atash, Ph.D. – University of Rhode Island (URI), USA, Prof. Mochamad Teguh, Ph.D. – Universitas Islam Indonesia (UII), Prof. Aris Marfa'i – Gadjah Mada University, Prof. Dr. Ir. Anita Firmanti, MT. – Ministry of Public Works (PUSKIM), Indonesia, Dr. Dadang Rukmana – Director of Urban Planning and Development, Directorate General of Spatial Planning and Development, Ministry of Public Works. Thanongsak Imjai, Ph.D. – Rajamangala University of Technology, Thailand. Finally, I must thank all members of the organizing committee for making this event possible.

Wassalamu'alaikum warrahmatullahi wabarakatuh

Yogyakarta, October 21, 2014

ICSBE General Chair of Organizing Committee

Suparwoko, Ph.D.

Welcome Speech

Director of Research Institute for Human Settlements

4th. International Seminar on Tropical Eco-Settlements

“Bringing Coastal Cities into the Future: Challenges, Adaptation, and Mitigation”

It is a great pleasure to welcome you at the 4th. International Seminar on Tropical Eco-settlements (ISTEcS), which is held in the beautiful city, Yogyakarta. To our overseas participants, let me welcome you once again to our country, Indonesia.

The ISTEcS is a bi-annual event since 2006 with the only exception of 2008, hosted by Research Institute for Human Settlements (RIHS) Ministry of Public Works Indonesia. As previous seminars in the series that each had emphasis on specific issues related to tropical settlements, this year's ISTEcS will also focus on the sustainability challenges of coastal cities in tropical zones arising from sea level rise, climate change, and land subsidence. These phenomena have become a global concern as they could put populations of these cities at greater risk of flooding and other climatic disasters. Adaptation and mitigation are thus two fundamental terms within this context.

Efforts must be taken to bring coastal cities to the future. We believe all adaptative and mitigating measures require every stakeholder to hold hand together in collaboration. With this seminar, we therefore seek to establish a forum for government officials, researchers, academicians, industry practitioners, non-governmental and multinational organization staff members to share their views and experiences on managing sustainable coastal cities. No less important is an opportunity to build collaborative partnerships with experts of different scientific areas and country of origins.

The 2014's ISTEcS is also special in the way that this event is organized in collaboration with the 3rd. International Conference on Sustainable Built Environment (ICSBE), hosted by Islamic University of Indonesia (UII), following a previous cooperative agreement signed not long ago between UII and RIHS. Such a collaboration, rather than rivaling one another, would have benefited both institutions as well as prospective participants. Not only could we share our resources for mutual goal, we could also take advantage on enhanced networks for our future works.

Our secretariats have received about 60 technical papers covering different aspects of urban/rural settlements, including coastal cities as a special issue of the joint seminars. To ensure the quality of papers to be published in the conference proceedings, all accepted papers have undergone a blind review process by our scientific committee members and professionally been edited in accordance with the given template. These papers will be presented in parallel sessions for two consecutive days.

We sincerely hope that these joint seminars will prove beneficial and valuable for you, all the seminar participants. Besides attending the seminars, you may also find time to visit many local attractions of Yogyakarta.

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Finally, as the RIHS Director, I wish you productive discussions during paper presentations and a very pleasant stay in Yogyakarta.

Yogyakarta, October 21, 2014

Director of Research Institute for Human Settlements

Prof. Dr. Ir. Anita Firmanti, MT.

Welcome Speech

The Dean, Faculty of Civil Engineering and Planning, Universitas Islam Indonesia

Assalamu'alaikum warrahmatullahi wabarakatuh

The honorable:

- Rector of UII, Ir. Harsoyo, M.Sc., Ph.D.,
- Director General of Spatial Planning, Ministry of Public Works, Indonesia, Dr. M. Basoeki Hadimoeljono,
- Director General of Agency for Research and Development, Ministry of Public Works, Indonesia, Ir. Waskito Pandu, MSc.,
- The Head of Research Institute for Human Settlement, Ministry of Public Works Indonesia, Prof. Dr. Ir. Anita Firmanti, MT.,
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- Keynote speakers: Prof. Thomas Boving, Ph.D., Prof. Farhad Atash, Ph.D., Prof. Mochamad Teguh, Ph.D., Dr. Dadang Rukmana, Prof. Dr. Ir. Anita Firmanti, MT., Prof. Aris Marfa'i, Thanongsak Imjai, Ph.D.
- Participants of the 3rd ICSBE 2014 and the 4th ISTECs.
- Distinguished Guest, ladies and gentlemen,

First of all, praise is to Allah, the Cherisher and Sustainer of the world, for His blessing for all of us. He who has provided us a chance so that we could be here to share knowledge, ideas, solutions and experiences in the Third International Conference on Sustainable Built Environment (ICSBE) 2014. To the academic, our colleagues from the overseas universities, guests, participants, students and so on, please accept our gratitude, warm welcome and appreciation.

In the last decade, there were several disasters occurred in Indonesia. Yogyakarta, as one of big cities in Indonesia, had been facing two great disasters in 2006 and 2010. The first disaster was an enormous M 5,9 earthquake, the victims was very devastating, more than 5.700 deaths and 37.000 injuries. The total financial losses was USD 3,1 billions. The second disaster was Merapi Volcano Eruption, which killed hundreds of people in 2010. These disasters have given us extra experiences how to protect our communities and the environment.

Resilience and risk reduction has been a really important part in order to overcome the disasters in future, and then societies have the key role to play that. The disasters were causing many casualties, injuries, and financial losses because the societies do not know the proper action. Many parties take involve in activities of resilience and risk reduction, they teach the resilience and risk reduction to societies living in the prone disaster areas. A city with a robust, diversified economy, for example, will rebound much more quickly than a city with a narrowly specialized or weak economy. Planning, too, can dramatically bolster a city's resilience. Well-rehearsed evacuation and emergency management plans can enable a city to endure a crisis with minimal loss of life. Cities that invest in hazard mitigation planning and action can also reduce their vulnerability.

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The Third International Conference on Sustainable Built Environment (ICSBE) 2014 takes issues in this urgent agenda of “resilience and risk reduction towards well-being society”. The conference takes role as the media to share wisdom and experiences, and develop knowledge as well as skill and recent technologies on applied built environment sciences and technologies. This conference conducted with participants from different background study is expected to have integrated solution of resilience and risk reduction towards well-being society. We will discuss five sub themes comprising urban/rural environments and settlements, building and constructions, infrastructures, policies and management, and coastal cities.

Let me deeply state a special appreciation to the Research Institute for Human Settlement, Ministry of Public Works (PUSKIM) who has fully support this conference so that joint host of this conference between FCEP UII and PUSKIM is well managed. It is a great pleasure to acknowledge the invited speakers; Prof. Thomas Boving, Ph.D. and Prof. Farhad Atash, Ph.D. – University of Rhode Island (URI), USA, Prof. Mochamad Teguh, Ph.D. – Universitas Islam Indonesia (UII), Prof. Aris Marfa'i – Gadjah Mada University, Prof. Dr. Ir. Anita Firmanti, MT. – Ministry of Public Works (PUSKIM), Indonesia, Dr. Dadang Rukmana – Director of Urban Planning and Development, Directorate General of Spatial Planning and Development, Ministry of Public Works, Thanongsak Imjai, Ph.D. – Rajamangala University of Technology, Thailand. I also would like to extend my special thanks and high appreciation to our sponsors: Bank Mandiri, Bank Syariah Mandiri, Bank Muamalat for their generous support to take place this conference. Our appreciation is also for all participants who have actively written excellent research papers.

Finally, my special thanks go to Rector of UII, all the steering and organizing committees for making this conference possible. It is desired to have a sustainable conference to be held continually in future times, as we are challenged by daily minor and major disasters to make a well-being society.

Wassalamu'alaikum warrahmatullahi wabarakatuh

Yogyakarta, October 21, 2014

Faculty of Civil Engineering and Planning (FCEP)

Universitas Islam Indonesia

The Dean

Dr.-Ing. Widodo Brontowiyono.

Welcome Speech

The Rector of Islamic University of Indonesia

Assalamu'alaikum Warahmatulahi Wabarakatuh

- The Honorable, Dean of Faculty of Civil Engineering and Planning Universitas Islam Indonesia, Dr.Ing. Widodo Brontowiyono,
- Director General of Spatial Planning, Ministry of Public Works, Indonesia, Dr. M. Basoeki Hadimoeljono,
- Director General of Agency for Research and Development, Ministry of Public Works, Indonesia, Ir. Waskito Pandu, MSc.,
- The Head of Research Institute for Human Settlement, Ministry of Public Works Indonesia, Prof. Dr. Ir. Anita Firmanti, MT.,
- Respectable all of the keynote speakers and participants,

Distinguished guests, ladies, and gentlemen,

On this special occasion, let us offer our praise and gratitude to Allah SWT for it is with His mercy and grace that we are able to attend the 3rd International Conference on Sustainable Built Environment (ICSBE) today.

On behalf of the university, we are honored and very pleased to have your visit today especially to the keynote speakers and all participants. It is also a pleasure for me to extend everyone a warm welcome to Universitas Islam Indonesia (UII), the oldest national university in the country.

Distinguished speakers, ladies, and gentlemen,

We are also honored to inform you that this program is jointly hosted by Faculty of Civil Engineering and Planning, UII and The Research Institute for Human Settlements, Agency of Research and Development Ministry of Public Work, Republic of Indonesia (PUSLITBANGKIM KEMEN PU RI). We hope that this activity will establish closer ties and cooperation between the two institutions in the future.

This 3rd International Conference on Sustainable Built Environment (ICSBE) is conducted under the topic 'Resilience and Risk Reduction towards Well-Being Society' in association with the 4th International Seminar on Tropical Eco-Settlement (ISTEcS) under the theme 'Bringing Coastal Cities into the Future: Challenges, Adaptation and Mitigation.

Distinguished guests, ladies, and gentlemen,

We are fully aware that the population growth in the last centuries grows rapidly. A growing population leads to several environmental issues as well as social problems. This means that a better setting of the settlement is very important to make a city become livable. Inspired by that notion, this conference in one hand is aimed to better understand how livability is perceived in the fast-growing cities.

In the other hand, this conference will provide the opportunity to government officials, researchers, academicians, industry practitioners, non-governmental and multinational organization staffs and other stakeholders to share their views and experiences to build

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international collaborative networks on managing sustainable coastal cities. Some important issues that will be presented on this seminar are about how to handle all the problem of the urban/rural environment, how to assess the risk of building and construction, infrastructure, politics management, and coastal cities. All that issues are intended to build a well-being society with a good reduction of risk and reliance.

Distinguished speakers, ladies, and gentlemen,

To conclude, once again I extend everyone my warm welcome to this conference. I hope that this conference will inspire us to enhance our awareness to explore any possibilities in building resilient society. Also, I look forward to fruitful discussions and hope we can be inspired by the best practices we will hear from our distinguished speakers.

I thank you.

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Yogyakarta, October 21, 2014

Rector

Dr. Ir. Harsoyo, M.Sc.

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THE OPEN SPACES ADDED VALUE OF THE EAST COAST OF SURABAYA RESIDENTIAL DEVELOPMENT

Timoticin KWANDA¹

ABSTRACT: Surabaya is the second largest city in Indonesia, and half of the city at the eastern part has a coastline that extended from the north to the south. In 1990's, three developers have been granted to develop the area of 3,200 hectares, the so-called the East Coast of Surabaya. The East Coast of Surabaya is inherently vulnerable to climate change impacts such as rising sea level, changes in rainfall. These impacts would put this coastal area at greater risk of flooding, land subsidence, and sinking land. Therefore, before the area can be developed for residential area, some studies have to be done, namely environmental study, transportation study, hidrology study, and soil investigation to cope with issues, such as accessibility, flooding, soil settlement, and land reclamation. This article aims to show that these environmental issues of the East Coast of Surabaya is not a constraint for development, and it argues that coping these environmental issues with open space namely retention ponds, canals, green open space such as mangrove coastline zone and parks are indeed added value for residential development namely economic benefits. The economic benefit of the residential area is the increasing of land price.

KEYWORDS: East Coast, Surabaya, Residential, Open Space, Added Value

1. INTRODUCTION

Surabaya is the capital of East Java that most of the municipal territory at the north-south corridor has already urbanized, and new residential development can only be done at the open land areas at the western, and the eastern part of the city with a long coastline, the so-called the East Coast of Surabaya. The situation of the East Coast of Surabaya is though highly potential as it is very close from the city centre that can be enhanced to develop a new residential area. In 1990s, the East Coast of Surabaya with 3,190 hectares was granted to three developers for residential development.² This coastal area is a lowland area occupied by fish and shrimp pond activities with the presence of seven rivers flowing toward the sea that is inherently vulnerable to climate change impacts such as rising sea level, extreme weather events, and changes in rainfall. These impacts would put this coastal area at greater risk of flooding, land subsidence, and sinking land.

As a lowland coastal area, to develop the East Coast of Surabaya as a livable residential area, some studies have to be conducted, namely a district spatial planning, an environmental study, a transportation study, a hydrology study, and a soil investigation to cope with issues such as accessibility, flooding, soil settlement, the impact of land reclamation. Based on these studies of environmental issue, the area can only be developed with 31 per cent of the land for open space, and only 47 per cent for housing, public facilities (6%), industries (3%), and roads (13%). For the developers, this land composition with large open space is not worth to be quantified, as the revenue (return) on investment of open spaces is often not paid back to the developers, but to other parties namely communities benefiting from the green-space. The subdivided lots only are worth to be quantified as revenue for return on investment allocated for land filling, facilities provision and roads construction.

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² The three developers were Dharmala group, Sac Nusantara group, and Pakuwon group.

Current reality reveals that the environment is often sacrificed in order to benefit residential development, mainly because in the East Coast of Surabaya open space such as retention ponds, canals, and green-spaces are seen as a luxury, a visual attribute of the area, and not a necessity. Open spaces on the other hand are believed to be more valuable, due to their direct benefit which can be determined in monetary value, thus the financial value of green-spaces needs to be quantified. In short, this article aims to show that environmental issues are not a constraint in residential development, and instead it has economic benefits.

2. OPEN SPACES AS ADDED VALUE

The literature study will explain the environmental issues as added value that affects the context of planning, they be used as a base for innovative approaches and processes. Environment is no longer approached as a constraint but as an added value that will have a transversal impact on all future residential developments. Some studies show that environmental issues such as green open spaces have direct and indirect benefits. These indirect benefits of green-spaces are hard to quantify in monetary terms (Harnik, 2009:6), and therefore classified as an indirect benefit of green-spaces.

These indirect benefits include social benefit that is the aesthetic value it offers, creating a qualitative living environment for all residents. Ahmed & Hassan (2003:9) concluded that the lack of green-space and the exponential increase of the population enhance physical, social, psychological and environmental hazards. Community cohesion is built through the use of green-spaces, as users are bound by location and common interest. Alongside the social benefits, open space especially green-spaces also have direct economic benefits such as increase of house or land prices (Perman et al., 2003). Direct benefits of green-spaces can be measured in monetary terms, but it is this value that is neglected within current planning procedures. Green-spaces needs to be expressed in monetary terms in order to become comparable to economic factors and consequently have more weight in the decision-making processes (Luttik, 2000:161-162). Numerous studies have also shown that housing and land value, which are adjacent to green spaces, may increase by 8% to 20% (Circea & Pîrlogea, 2011). It is known that most people are willing to pay more if they close a park, a school, a police station and any other facility of its kind. Therefore, urban green space can help increase revenue in real estate as a result of high property prices.

In this environmental issues, the East Coast of Surabaya has a map of constraints, such as flooding, and therefore the concept of a large portion of open space of residential development is selected with 31 per cent of the land for green open space, and only 47 per cent for housing. The 31 per cent of open space comprises mangrove coastline zone, green open space such as parks, canals and retention ponds. This study will focus how this land use composition is applied to the residential development and its economic benefits such as increase of property prices.

3. METHODOLOGY

It is important to note that this study was done within a specific reference framework, from a green planning perspective, evaluating green space planning concepts and the added value and benefits thereof. Other impacting forces also contribute to the green planning concept, but were not the main focus of this study. The case study of the East Coast of Surabaya is evaluated and described accordingly. Most of the data are collected from available documents, such as drawings (district plan, master plan, site plan), brochures, transportation study by the experts of Bandung Institute of Technology, the hydrology study by Prof. Lee Seng Lip, an expert from National University of Singapore, the Environmental Impact study (AMDAL), and the District Spatial Plan of the East Coast of Surabaya (Rencana Detil Tata

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Ruang Kota Pantai Timur Surabaya). Analysis and interpretation are based on the author personal experiences as part of the residential development team during the process of development from 1990 to 1996.

4. COPING WITH ENVIRONMENTAL ISSUES

Planning guides and ensures the orderly development of settlements. In the planning stage, in 1990 the East Coast of Surabaya as a lowland coastal area was planned to deal with the environmental issues through some studies as follows:

4.1 HYDROLOGY AND GEOTECHNICAL STUDIES

As a lowland coastal area that used for fish and shrimp ponds, it is inherently vulnerable to greater risk of flooding due to tidal seas and rains. In addition, there are seven rivers, also function as the rain water system, flowing from the eastern part of the city to the sea or the strait of Madura. Aware of this condition, the developers agreed to do various studies to develop the area as a livable residential area, such as hydrology and geotechnical studies.

The hydrology studies was carried out aim to set an efficient flood control and drainage systems, and the geotechnical studies was done to look for the most efficient land reclamation methods, such as whether to use the maximum level of land reclamation, the polder system, or the combination of the both systems. As a result of the studies, it is decided to use the combination system as the most efficient system, which is the area has to be filled at a level of 4 meter above the sea level (+1 meter of the existing level)) and equipped with some retention ponds that equals to 7 per cent of the total area, and barrages along the coast and rivers at a level of 5 meter above the sea level (+2 meter of the existing level) to block flooding due to high tides and heavy rains.

For the land filling, a conventional way of land filling through the city's roads was not possible due to its huge volume, for it will destroy the roads and disturb the nearby community with noise and dusts. Hence, the existing fishponds were filled with sands that obtained by dredging sand from the bottom of the sea and pumped them to the site for at least 20,000 m³ per day.

4.2 THE ENVIRONMENTAL IMPACT STUDY

According to the Master Plan of Surabaya Year 2000, the area was planned for open space with mangrove forests, and limited used for fish and shrimp ponds. In order to sustain this condition, the municipal government asked the developers to do the Environmental Impact Study (AMDAL). As a result, the recommendation is 100 to 200 meter of coastal setback line to conserve the mangrove plant, 50-meter river setback line for Wonokromo river and 25-meter for the other smaller rivers (Figure 1). Another study such as transportation study was also carried out. This study tries to look for some access to the area from the western part of the city in order to connect the main road system of the two areas, and to accommodate the eastern outer ring road that passes from the north to the south in the area.

4.3 THE DISTRICT SPATIAL PLAN OF THE EAST COAST OF SURABAYA

Based on these previous studies, a district spatial plan of the East Coast of Surabaya or Rencana Detil Tata Ruang Kota (RDTRK) Pantai Timur Surabaya was done as the legal document that guide developers to develop the area. The area was permitted to be developed for residential uses with some restrictions, namely (Figure 1):

- Coastal setback line from 100 to 200 meter, and 50-meter river setback line for Wonokromo river and 25-meter for the other smaller rivers,
- Providing a flood control system with north-south canal to hold flood from the west side of the area, and 7 percent of the area for retention pond
- 31 percent of the land for green open space, land use composition for the rest are housing (47%), public facilities (6%), industries (3%), and roads (13%).

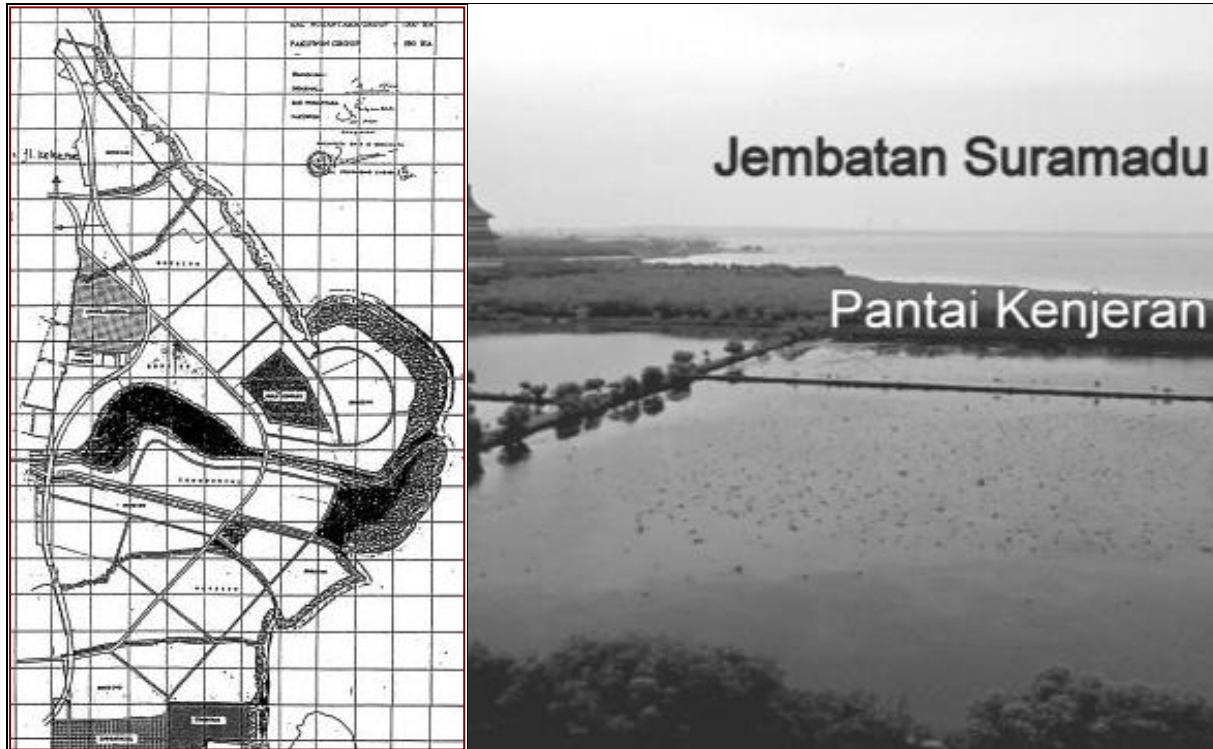


Figure 1. The co-production between the Municipal government and the developers for the District Spatial Plan of the East coast of Surabaya (left), and the mangrove of the East coast of Surabaya (right). Source: The Municipality Government of Surabaya (left), and author (right)

4.4 THE MASTER PLAN: THE ELEMENT OF OPEN SPACE

Based on the recommendation of the District Plan (Figure 1), a conceptual master plan of the residential area was developed by a well-known American architect, Paul Rudolph (figure 2). In the master plan, open space in the residential area is the main element as seen in the Conceptual Plan and the Master Plan. The open space is namely retention ponds located in between the residential blocks (the round shape or the irregular shape), rivers, and green open space such as mangrove (coastal line zone) and parks (Figure 2). In the two master plans, the main roads system is also appeared, especially the main accessed roads to area and the Eastern Outer Ring Road in the area, the collector and local roads pattern is also shown especially in the master plan (Figure 2).



Figure 2. The conceptual Master Plan of the East Coast of Surabaya designed by Paul M. Rudolph (1918-1997) in 1990 (left), and the final Master Plan designed in 1991 (right). Sources: author.

5. THE BENEFITS OF OPEN SPACE

After six year of development through various stages such as land acquisition, planning, and marketing, in 1996, Pakuwon group developed the first zone of the area at the northern part with an area of 590 hectares. The rest of the area belongs to the two developers can not be fully acquired by them before 2009, consequently they cannot develop it as according to the Surabaya Spatial Plan 2009–2029, the area was planned for natural retention pond. The residential area was developed based a site plan designed by an American consultant that was totally different with the Rudolph's master plan due to the market demands. In the Rudolph's master plan, inefficient curved and circular road pattern will create irregular shape of lots, and it is difficult to sell irregular shape of lots, as most consumers of high-income groups and Chinese ethnics are unwilling to buy this kind of lots for geomancy reasons (Figure 3). The site plan still has to be confirmed with the District Spatial Plan such as the land use composition, the main streets pattern, and the most important elements of the area the open spaces (31 per cent of open space), such as mangrove coastline of 100 meter wide, parks, the retention ponds and the canals.

Today, the residential area, the so-called Pakuwon City is livable residential area with various developed residential clusters (Westwood, Virginia Regency, Palm Beach), a shopping mall, some schools, one campus, and two complexes of 19 tower apartments, and Town Square of a 9,2 hectare commercial center that is conveniently accessed by two main

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boulevards and an outer ring road (Figure 3). The commercial center consists of East Coast Center, an 8-storey retail mall with area of 23,372 square meters with anchored shops, specialty shops and alfresco dining and Soho (shop and home office). The mall was opened in October 22, 2010 (Figure 4).

As mentioned previously, direct benefits of green-space increases property value as many empirical studies have shown that parks have a positive impact (8% to 20%) on nearby residential property values (Harnik, 2009; Circea & Pirlogea, 2011). Most people are willing to pay more for a home close to a green-area, this being reason for an increase in the market value. This was proven in Windsor, Canada where homes of 30 feet from a green-space were valued \$6,995 more than those at a mean distance of 1,035 feet (Environment Canada, 1991). In four British Columbia urban communities it was found that a 10% to 15% increase in property value could be attributed to the land's proximity to a riparian greenway system (Evergreen, 2009:1).

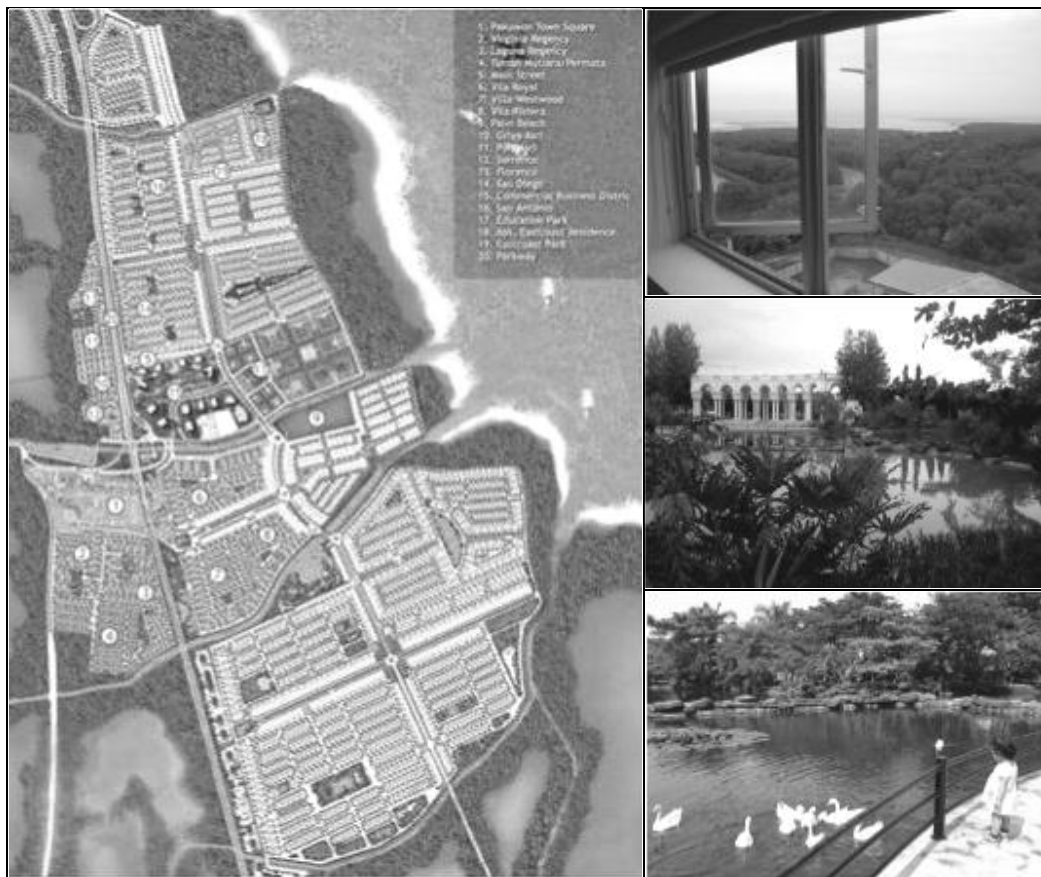


Figure 3. The current site plan showing the developed area coded with numbers (left), and one of the park with retention pond, the Goose Park (top and middle right), and the mangrove along the coastal line as seen from the window of the East Coast apartment (bottom left). Sources: PT. Pakuwon Jati.

In the case of the Pakuwon City of the East Coast of Surabaya, as the area develop the land price of the area has been increased drastically, since its first launching in 1994, the land price of a lot was only Rp. 400,000 per m², and today the price of land has increased to Rp. 12,500,000 per m², thus it has increased more than 3,000 percent for 20 years or 150

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percent per year.³ This current land price is not only influenced by the open space, but also the provision of amenities in the residential complex, however as shown in the price list of lots, a certain lot close to a park is valued 10 to 20 percent higher than those far from the parks. One popular park with retention pond is Taman Angsa or Goose Park (Figure 3). In 2014, a new residential area has been developed related to the 'open space as added value' such as the Grand Island cluster is developed as a canal resort, a residential complex with water recreation and sports, and the land price of a lot is 21,500,000 per m2 (Figure 4).⁴



Figure 4. The livable residential areas with public facilities at the Pakuwon City. Source: PT. Pakuwon Jati

³ The land price of the first cluster, Westwood, launched in 1994, and in 2014 the land price of the Palm Beach Cluster at Pakuwon City as offered by broker, <http://rumahdijual.com/surabaya/128227-dijual-tanah-di-palm-beach-malibu-pakuwon-city-surabaya> (downloaded on September 14, 2014).

⁴ See <http://rumahdijual.com/surabaya/487158-grand-island-pakuwon-city> ((downloaded on September 14, 2014).

6. CONCLUSION

Residential planning is constantly faced with conflicts between pro-development approaches and pro-environment approaches. In the case of the East Coast of Surabaya, especially the Pakuwon City, it can be concluded that the development of the residential area has been developed in line with the environment approach. Following the environment approach, the master plan of the East Coast area was designed based on the various studies such as a hydrology study, a geotechnical study, and an Environmental Impact Study. Subsequently, the residential area was planned with a large open space or 31 percent of the land area for open space namely retention ponds, and green open space (parks and mangrove).

This environment approach is no longer as a constraint but as added value as in this residential area, the green-spaces have economic benefits that increase house or lots prices when green space is present. It is proven that the land price has been increased for more than 30 times since its first launching of the residential area in 1994. Thus, open space has been seen as added value for residential development. Unfortunately, this green space of the high-end residential development in Surabaya is used only for the people who live in the residential complex, except for the Goose Park that located outside the residential cluster.

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