# Re-treat;

# creating a regional framework for the future of Semarang

strengthening sustainability with strategies balancing
urban development, population increase, climate change and ecology

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*ABSTRACT*

KEY WORDS | Ecopolis, Ecocity, Casco-Concept, regional framework, heritage, nature conservation

Historic city of Semarang is called the 'Sleeping Beauty' of South-East Asia. It is located on the North coast of Central Java, it is the largest city in the Central Java province and the fifth largest city in Indonesia. There is great economic and cultural potential in Semarang, especially taking into consideration Kota Lama- Semarang old town. Heritage buildings and the surrounding nature preserve areas are in danger of deterioration and damage by haphazard development and lack of urban planning by the central government.

The objective of this project is to create a regional framework for the future of Semarang while providing a sustainable method of water resource usage, as well as keeping biodiversity intact and also offering a good living environment.

The Ecopolis strategy framework by Tjallingii (1995) will be utilized as the overarching framework used in the design methodology. For the structural framework, the Layers Model by Ian McHarg (1995) and the Casco-Concept (Hull Concept) by Kerkstra and Vrijlandt (1988) will be used together. After studying the underlying structures of the landscape and strategically forming a framework for the future, the Ecocity Principle by Richard Register (1987) is utilized to create the strategical approach for the design. The method works in double because the design involves community design, which requires administrative and strategical approaches on top of the structural design.

The design masterplan and details aim to build a framework for the future of Semarang, in the scenario which the coastal and mountainous areas are not suitable for residence due to flooding, subsidence and landslides. The chosen site area is a suburban Semarang region, in which residents from the dangerous coastal areas; the migration of residents can already be seen. Thus, measures have to be taken to not only encompass the new influx of residents, but also keeping the natural qualities of the area intact, and the aquifers and watersheds clean.

I would like to thank my tutors;
Nico and Fransje for helping me through all the way.
Thank you to my family and friends
who had supported and trusted me,
I couldn't have dont it without you.

# PART 1
# Introduction

1. Background / Fascination
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# *1. Background / Fascination*

## *1.1 Introduction to Semarang, Central Java, Java Island, Indonesia*

Historic city of Semarang is called the 'Sleeping Beauty' of South-East Asia. It is located on the North coast of Central Java, it is the largest city in the Central Java province and the fifth largest city in Indonesia. The deep, rich history of Semarang city is still 'sleeping' and waiting to be awakened. There is great economic and cultural potential in Semarang, especially taking into consideration Kota Lama-Semarang old town. Heritage buildings and the surrounding nature preserve areas are in danger of deterioration and damage by haphazard development and lack of urban planning by the central government. The historical city center and the profound nature in Central Java is in continuous decline, and therefore in need of a structured development plan in order to preserve its values.

Semarang was-and still is-known as the gateway to the world, with its extensive ports acting as a hub and connecting point to the world beyond the Java Sea. Thanks to its history as a trading hub and port city, Semarang has a mix of Asian, European and Western culture and architectural depth. The social heritage is very rich thanks to its mixed ethnic and religious groups, making the city even more prominent than other international port cities. Other port cities such as Penang, Vigan, and Batavia also have a similar international architectural and cultural identities. But what makes Semarang unique is that Semarang possesses a stronger connection to the development of locomotive and transportation. Further railway development through High Speed Trains is planned, thus making this identity even stronger and making Semarang even more unique.

However, Semarang is in danger. Semarang is sinking at an alarming rate of about 6 to 7 cm per year, with maximum rates up to 14 to 19 cm per year in some areas. With the future development plans in hand, solutions for the challenges need to be found and new frameworks for development need to be created.

### SEMARANG

**area:** 373.7 km2

**population:** 1,454,594 (1.41% annual increase)

**precipitation:** 2183mm - 2215mm (December to January)

**temperature:** 25 C - 30 C

**humidity:** 60% - 80%

### Kota Lama

**area: 0.31 km2**
- UNESCO World Heritage listed
- 'old town' of Semarang
- historical / cultural significance
- tourist attraction

(fig.1-1 general map of Semarang)


Karimunjawa
N
Jepara
Mount Muria
Kudus
Tegal
Pemalang
Pekalongan
Batang
Demak
SEMARANG
CENTRAL JAVA
Mount Ungaran
Mount Sundoro
Purwokerto
Banjarnegara
Mount Sumbing
Magelang
Mount Merbabu
Surakarta
Mount Merapi
Java
Kebumen
Klaten
Yogyakarta

S

E

R

A

## historic center
# Kota Lama

The Old Town area of Semarang is also called Outstadt. The area is around 31 hectares. Judging from the geographical conditions, it appears that this region is separate from the surrounding area, so it looks like a separate city with the nickname "Little Netherland". The Semarang Old Town area is a silent witness of the history of Indonesia during the Dutch colonial periodmore than 2 centuries, and its location adjacent to the economic area. In this place there are about 50 ancient buildings that still stand firm and have a history of Colonialism in Semarang. In general, the character of buildings in this region follows buildings in the European continent around the 1700s. This can be seen from the specific building details and ornaments that are identical to the European style. Such as the size of doors and windows that are extraordinarily large, the use of colored glass, the unique shape of the roof, to the existence of a cellar

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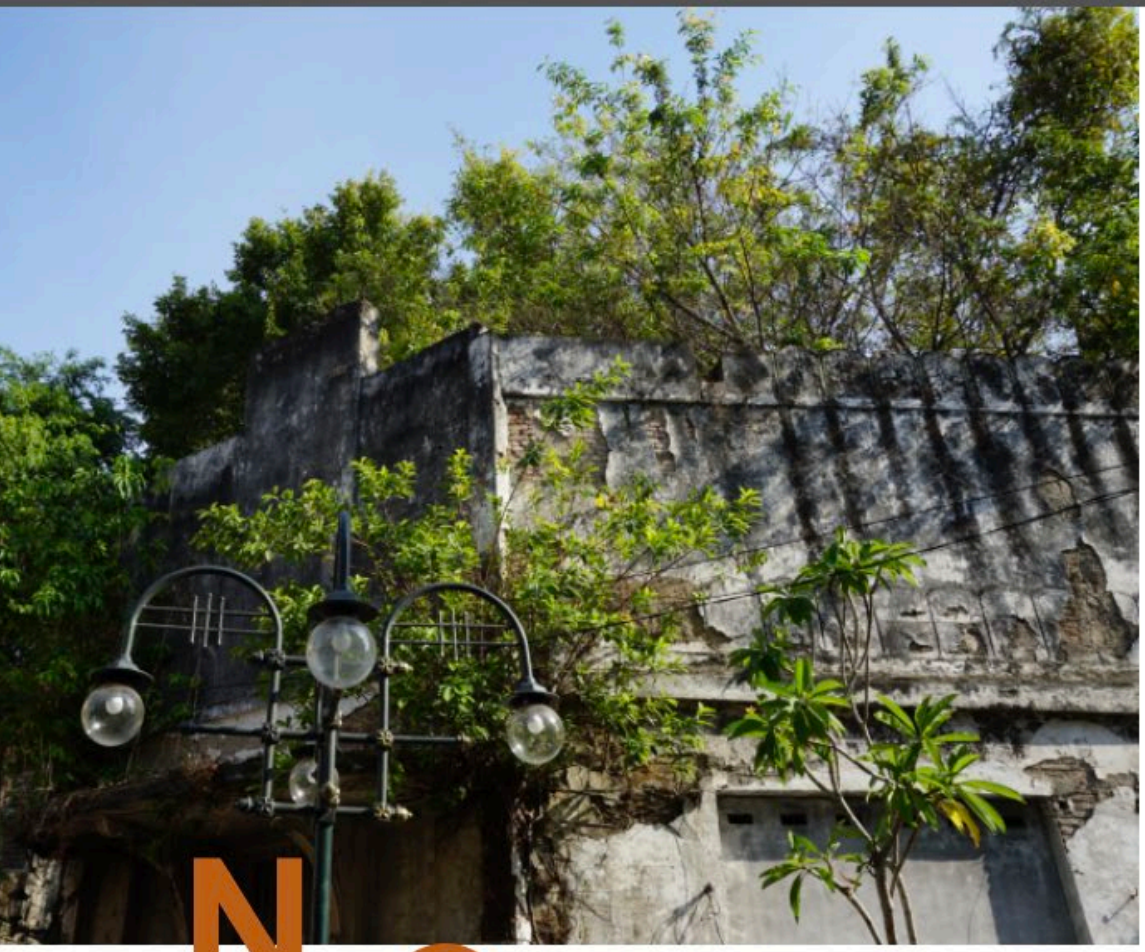


N G

(fig.1-2 characteristic images of Semarang)

## *1.2 Motivation*

I believe everything around us is multi-faceted. This is why I have studied find arts and photography in my high school years, Industrial Design and Global Environment Management in my bachelors, then Landscape Architecture in my masters. I realized that ability to mix different disciplines to create bigger synergy is important in the world today, where nothing is single sided. Everything needs to be seen in different perspectives to fabricate new and innovative ideas or solutions. This means we increasingly need to become aware of multiple fields and not be afraid to merge them to make something even greater.

The reason why I enrolled in the Landscape Architecture track is because my biggest passion is to make the world more sustainable, but also increase the quality of life for people at the same time. The environmental problems and sustainability challenges need to be tackled from different angles for they are becoming more complex as time passes by. I believe landscape architecture will help me see the world in diverse scales and phases through time. It is a discipline which involves ecology, biology, architecture, urban planning and so much more. This will help me to become the bridge between different professions in the future.

The argument as to why I joined the Shared Heritage Lab is also related to my passion to make change in the world for the better. Since during my bachelors program, I've been continuously going to third world countries in South East Asia, to help enhance the quality of life for the local people. I've also worked with engineers, designers and environmental specialists when working on these projects, which helped me realize the importance of cooperation of different fields of study. These activities triggered my deeper interest in working to create more sustainable and livable environment for people in third world countries, and the project concerning the City of Semarang, Indonesia was perfect to let my interests bloom to its fullest.

(fig.1-3 street in Kota Lama)

## *2. Research question*

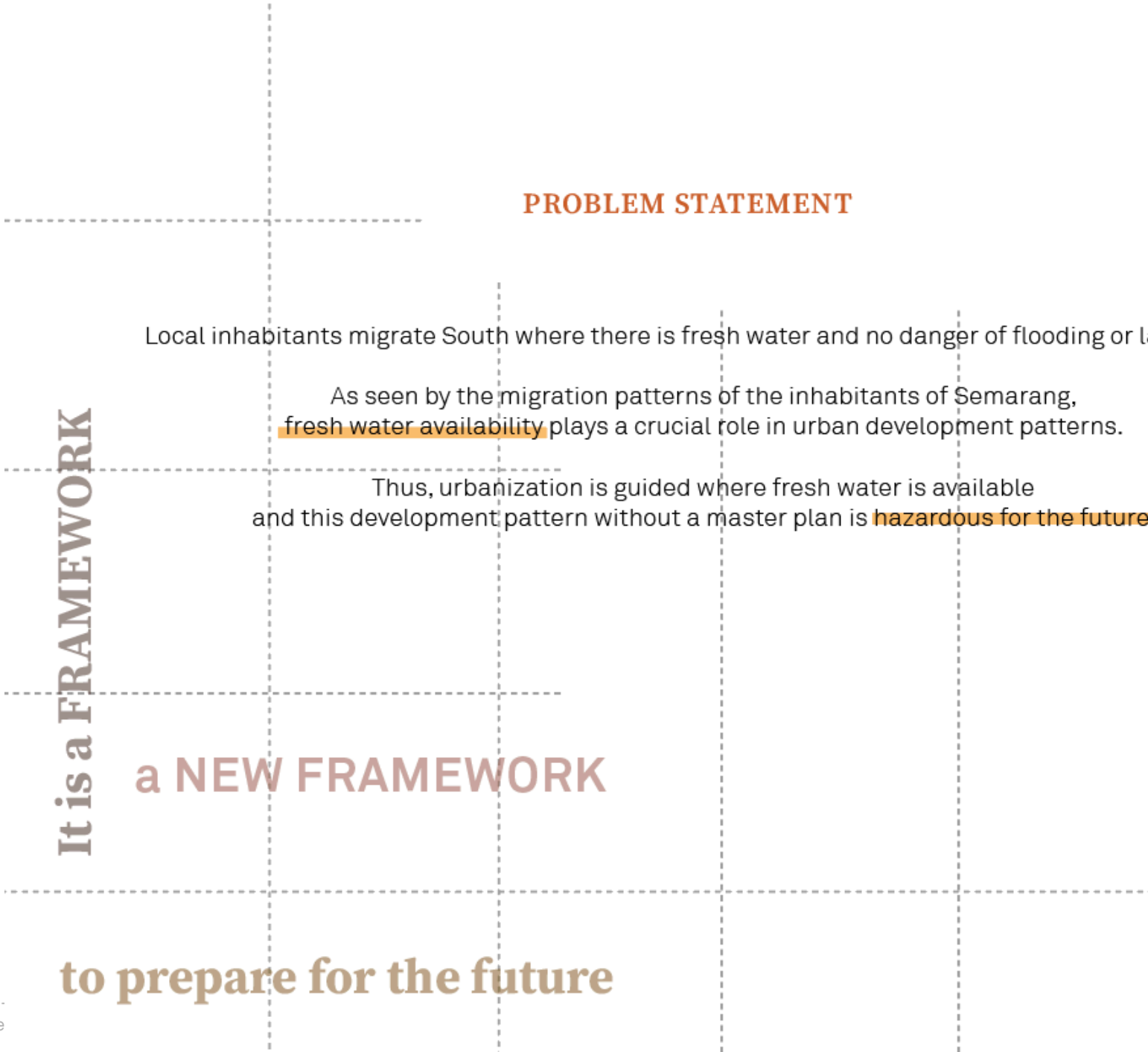
### *2.1 Problem Statement*

Local inhabitants migrate South where there is fresh water and no danger of flooding or landslides. As seen by the migration patterns of the inhabitants of Semarang, fresh water availability plays a crucial role in urban development patterns. Thus, urbanization is guided where fresh water is available and this development pattern without a master plan is hazardous for the future.

To elaborate further on the problem statement above, the problem with this search and usage of fresh water is that fresh water resources are limited and overused. This random development pattern near water resources only deepens the problem in the short term and also long term in several different aspects:

a. Lowering of aquifers / land subsidence rate increase
b. Decreasing biodiversity and damage of nature reserves
c. Triggering suboptimal housing and living conditions

Slowly but surely the natural and historical qualities of the area will be lost due to haphazard urban development or even to nature by flooding and land subsidence.



(fig.1-4,5 Indonesia landslide and flood image / source: mlaplus)

WASTE

WATER

WATER POLLUTION

andslides.

EDUCATION

HEALTH ISSUES

FUTURE

We are not running away,
we are creating a new framework
that works WITH nature nor AGAINST it

## *2.3 Research question*

The main research question for this project is as follows:
How can guidelines for natural disasters and nature preservation be useful for sustainable urban sprawl / urbanization?

From this branches 3 sub questions based on the three scopes presented in the question itself. The three scopes are natural disasters, nature preservation and urban development. The natural disasters implies to water related issues such as flooding and excessive rainfall but also soil related ones such as land subsidence and landslides. Nature preservation is related to protecting the already existing nature in the rural areas but also increasing the quality of nature in urban areas. Lastly, urban development is the issue of haphazard rural development.

### Problem Statement:

Local inhabitants migrate South where there is fresh water and no danger of flooding or landslides.

As seen by the migration patterns of the inhabitants of Semarang,
fresh water availability plays a crucial role in urban development patterns.

Thus, urbanization is guided where fresh water is available and tthis development pattern without a master plan is hazardous for the future.

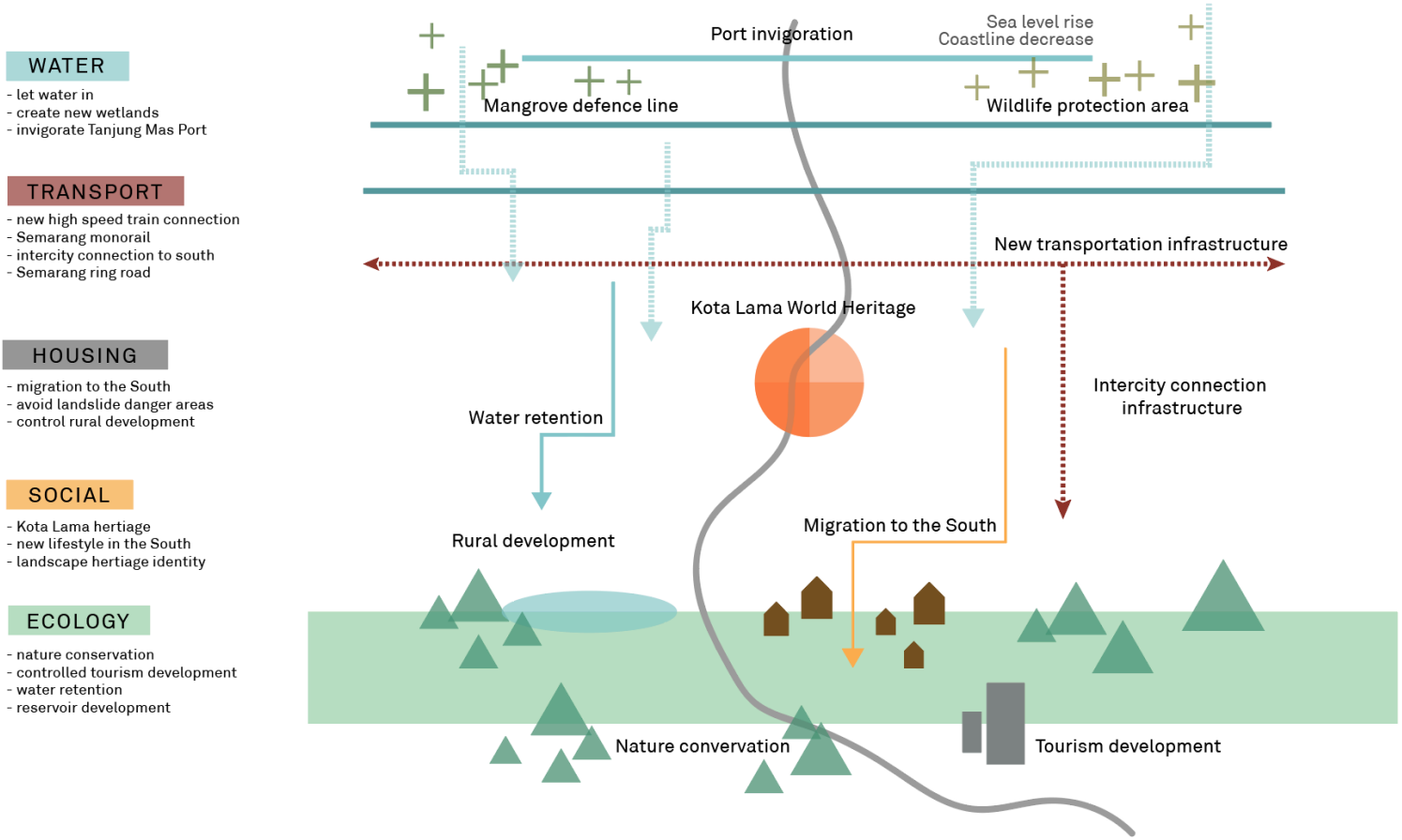
### Research Question

What is a spatial **framework** to **guide urbanization Southwards**

- while providing a sustainable method of water resource usage,
- as well as keeping biodiversity intact
- and also offering a good living environment?

## 2.2 Objectives / Aim of Research

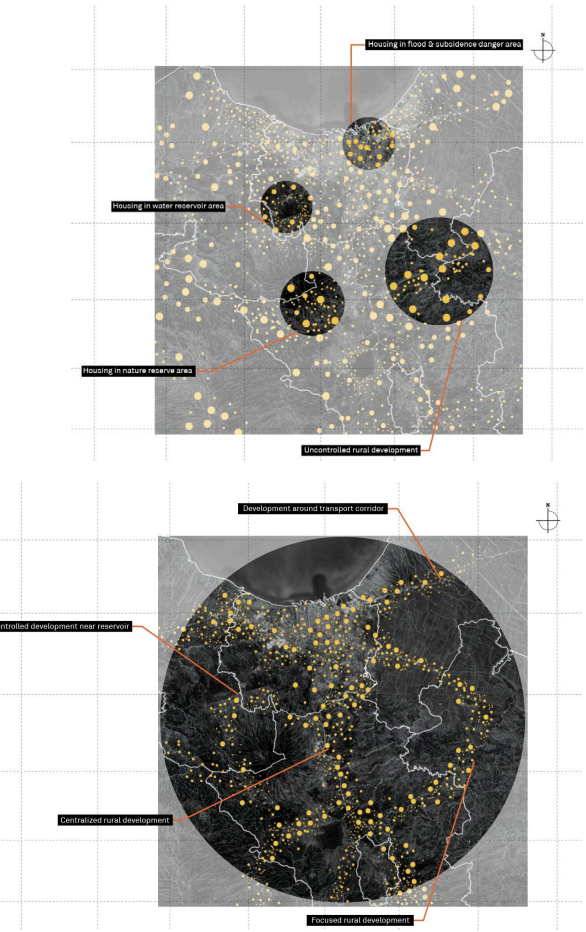
(fig.1-6 challenges and opportunities of Semarang)




The objective of this project is to create a regional framework for the future of Semarang while providing a sustainable method of water resource usage, as well as keeping biodiversity intact and also offering a good living environment.

In the end, the project will work as a threefold- in the regional, local, and communal scale. First, the macro regional scale is for the spatial framework for the regency of Semarang. This will incorporate the water network, aquifers and reservoir with the transportation infrastructure to naturally guide rural development to these areas. Then the meso scale will zoom into a potential migration site to propose a potential safe and sustainable settlement zone. Last, the detail on-site solution will deal with the maintenance of natural resources and water on a communal scale. The details will comprise of 'aquaponics' a sustainable method of agriculture and water filtration already in application in Semarang and 'permaculture' for the integration of nature preservation and also food production.

For this project, the heritage is the cultivation of the land and the cultural identity of the people. Heritage is not just architectural nodes, but the landscape itself with its rich history of transformation and development over time. As a Landscape Architecture Student, the cultivation and transformation of the land is my heritage. However, in these landscape heritage zones, architectural buildings are used as interest 'nodes'. This is important because vernacular architecture as heritage is important in the case where the residents have to re-settle in new rural development areas. The project in end will present a new framework and typology of living.




(fig.1-7,8 simulation scenario of Semarang without intervention)

## 2.4 *Sub-research questions*

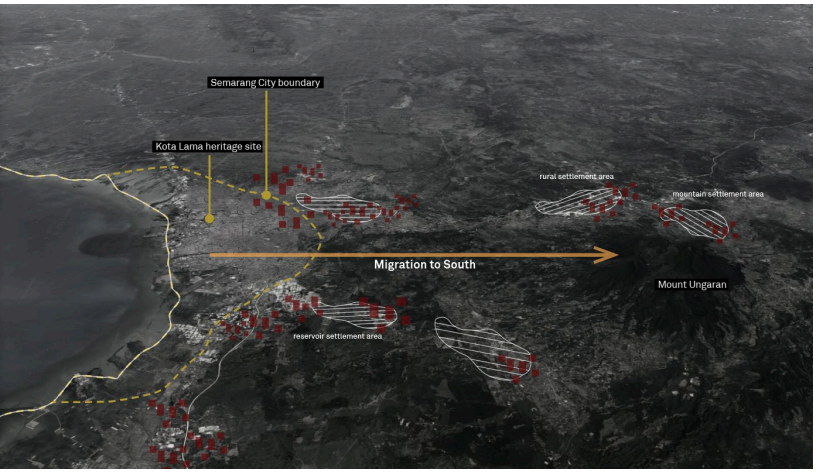
In order to formulate the sub research question, preliminary research of the current situation needs to be made. To perform this, the following questions were formed:

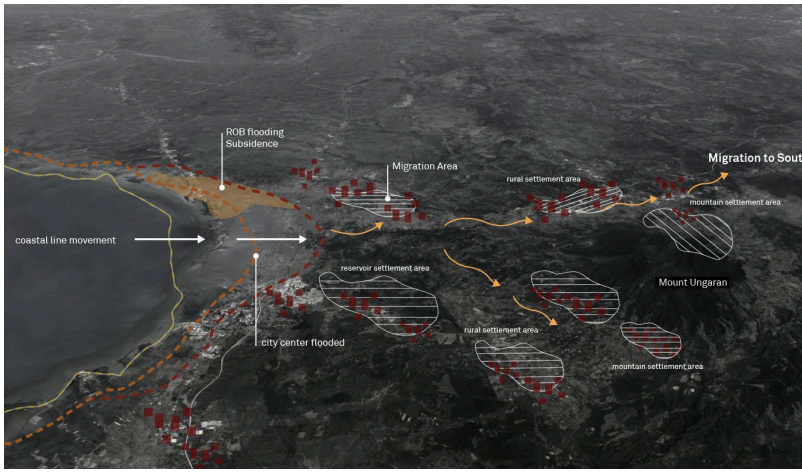
a. What are the local water challenges and opportunities?
b. What is the current biodiversity in the area, and what are the threats and opportunities?
c. What is considered 'good quality of living' and what needs to be done to improve it?

With this preliminary research conducted, the sub questions were formed. It is based on the equation in the research question and the inventory of the preliminary research. The three sub questions are the following:

1. Danger + Nature | How can we build with nature to prevent natural disasters in urban areas
2. Nature + Urban | How can urbanization occur within the carrying capacity of nature
   | How can the quality of nature in urban areas be improved
3. Danger + Urban | How can disaster resistant urban development occur

The design will be proceeded based on the overall research question and also the sub questions above. The sub questions will be solved with solutions based on the methodology framework used in this project. The theories utilized in the project will be elaborated further in the coming chapters.



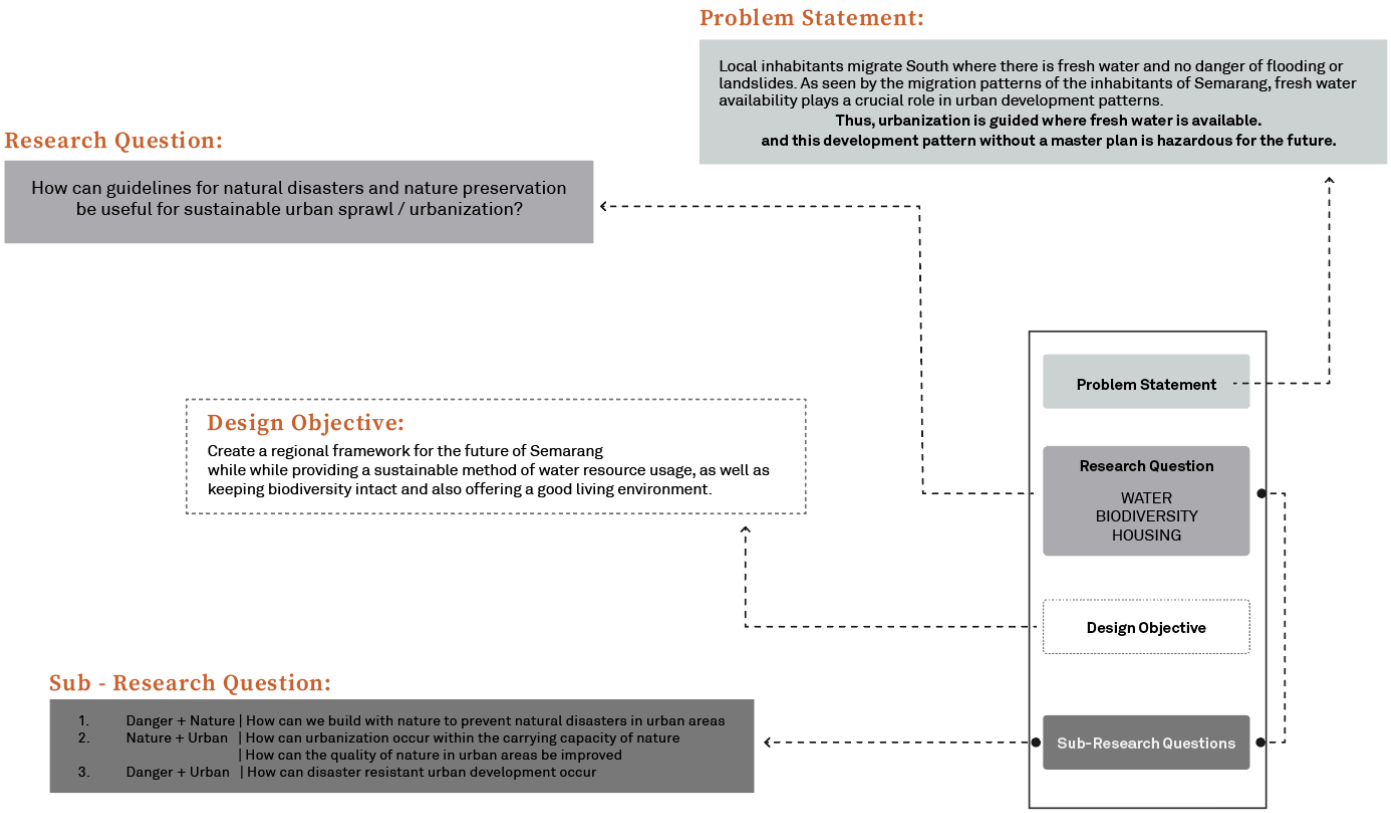




(fig.1-9,10 future scenario of rural Semarang development with / without interventions)

## 2.5 *Methods: Combining research and design*

The following steps below were taken as steps for the method of research. Field research on-site, literary studies and further development with research by design were conducted.

- ➢ Literature study
- How Semarang historically evolved
- Relation of the City of Semarang to Semarang Regency
- Current status of the mountainous area (Mount Ungaran)
- Water management history and developments of Semarang
- History of transportation infrastructure development in Java Island and Semarang
- Water reservoir and dam situation of Semarang
- ➢ Field research
- Interviews with local residents of Semarang
- Gauge the current living situations in Semarang
- Map potential areas for development
- Map around Semarang Tawang Station and the adjacent road infrastructure
- ➢ Case studies
- Find examples of regional development plans involving water
- Find heritage movement projects
- Find water and infrastructure development projects
- ➢ Research by design
- Study the relationship between culture, heritage and the landscape identity
- Study the merging of water systems and infrastructure in rural mountainous areas

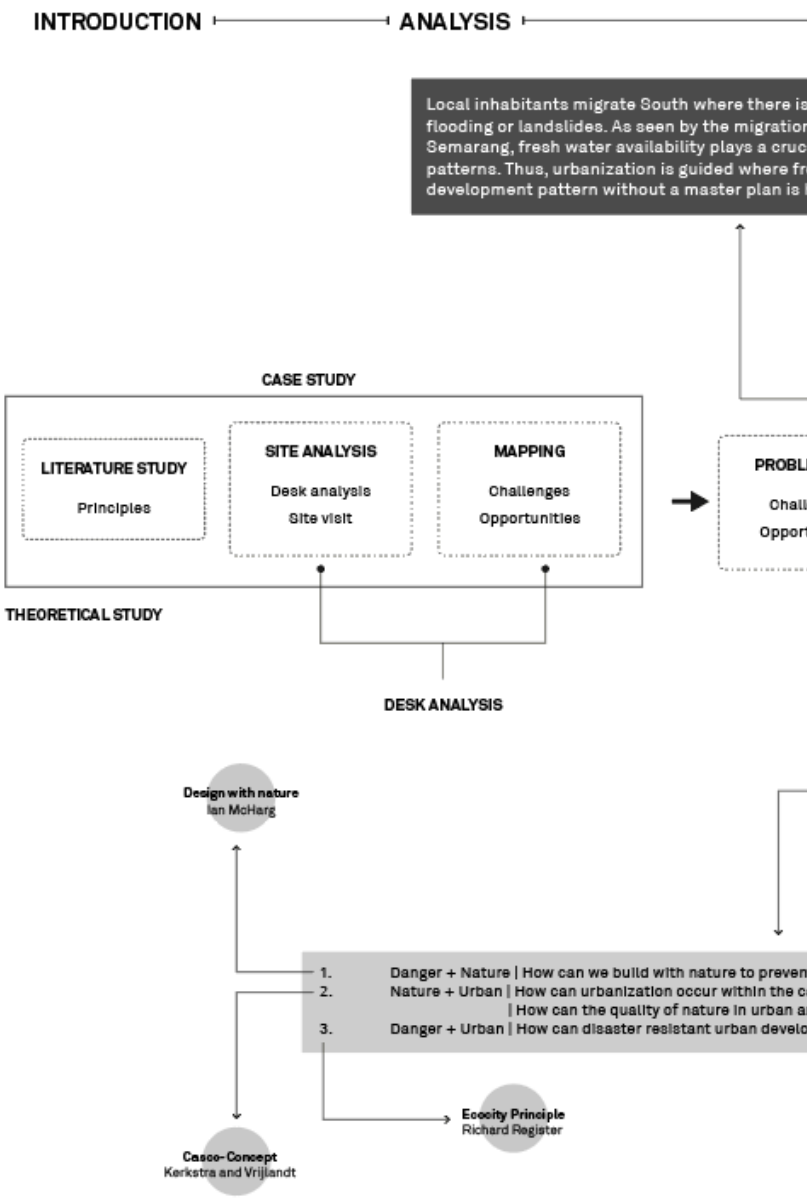



(fig.1-11 Theorhetical flow)

# PART 2
# Theoretical Framework

## 3.1.1 Methodology flow

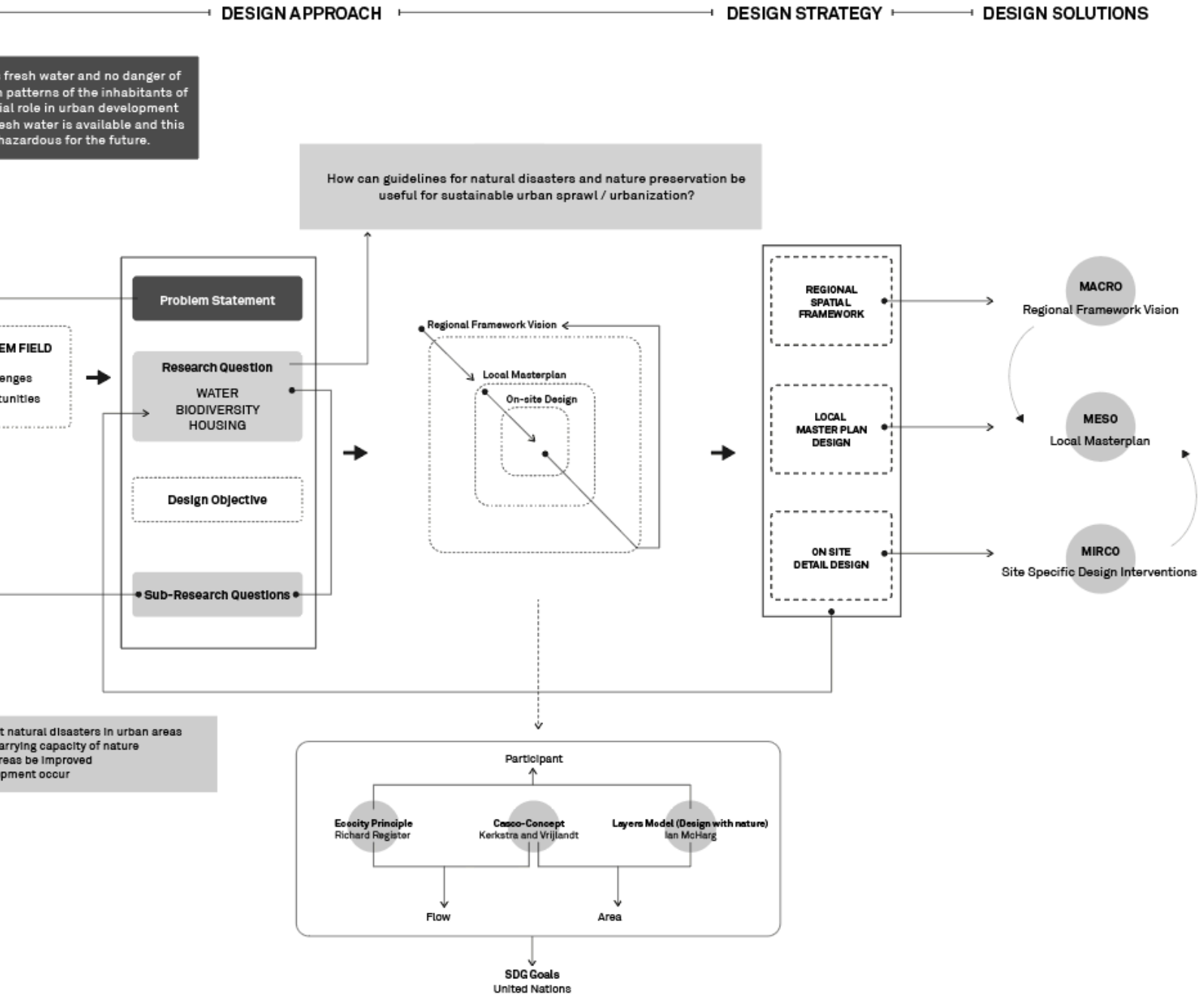
Each of the theories used in




The Ecopolis strategy framework by Tjallingii (1995) will be utilized as the overarching framework used in the design methodology. In order to create a city that is ecologically sound and sustainable, the goal of using the Ecocity Principle (Richard Register, 1987,2006) is to achieve a city with significance as an Ecocity. In order to become an Ecocity, different methods and principles of urban planning are organized in accordance to the categorization given by the Ecopolis framework suggested by Tjallingii (1995).
For the structural framework, the Layers Model by Ian McHarg (1995) and the Casco-Concept (Hull Concept) by Kerkstra and Vrijlandt (1988) will be used together. After studying the underlying structures of the landscape and strategically forming a framework for the future, the Ecocity Principle by Richard Register (1987) is utilized to create the strategical approach for the design. The method works in double because the design involves community design, which requires administrative and strategical approaches on top of the structural design.

(fig.2-1 Methodology flow)

the above methodology flow will be explained in further detail in section 3.4 to 3.7.



## *3.2 Why do we need to conduct Sustainable Development?*

### *3.2.1 Need for Sustainability*

Industrial and systems development are crucial for economic as well as societal development. The speed of change in current days is increasingly becoming more rapid thanks to advancement in technology. Although for some the living environment may seem like it is increasing, the downsides of uncontrolled development and environmental damage is alarmingly becoming bigger. It is becoming pivotal for societies and people to switch their perspective on development centered goals and focus more on the unbalance between economic development and environmental responsibility.

### *3.2.2 Definition of Sustainable Development*

According to "Our Common Future" report by Brundtland Commission (1987), sustainable development in one line would be to "meet the needs of the present, without compromising the ability of future generations to meet their own needs." However, we, the human kind, cannot continue in the current lifestyle without harming the environment and resources that should be left for the future generations. The key aspects of sustainable development are recycling and reusing materials and built structures, stabilizing and reducing carbon emissions, and lessening environmental impact.

The best case scenario for sustainable development would be to increase the quality and affordability of life, make education affordable, enable freedom of speech without violence and help our economies grow exponentially. Overall, we have to aim to develop in a positive way while keeping the environment safe. There are three components to sustainable development:

1. Economic growth
2. Environmental stewardship
3. Social inclusion

To achieve these three components, three primary goals of sustainable development is also proposed:

1. To minimize the depletion of natural resources when creating new developments.
2. To create development that can be maintained and sustained without causing further harm to the environment.
3. To provide methods or retrofitting existing developments to make them into environmentally friendly facilities and projects.

Governments around the world, and also global organization such as the United Nations and NGOs are getting more involved in promoting these key goals so that they can be recognized by all development governments and stakeholders.


(fig.2-2 local using water in Semarang)
(fig.2-3 waterfront situation in Semarang)

### *3.2.3 Why we need sustainable development*

The key terms and goals for sustainable development were best summarized in the list above. However, the term still covers a wide range of topics and makes it hard to grasp. But one thing is for sure; it is important and need to be acknowledged. Thus, the need for sustainable development should be thought of as a holistic approach, with the following perspectives taken into consideration:

a) Provide essential human needs
b) Agricultural requirement
c) Manage climate change
d) Financial stability
e) Sustain biodiversity

(fig.2-4 Waterfront pollution situation in Semarang)

## *3.3 Sustainable development Goals (SDGs)*

The United Nations proposes 17 interconnected goals which addresses global issues we all face. These goals act as a blueprint in which all human kind can follow. By achieving these goals one by one, we will be able to create a better and more sustainable future for all. The 17 goals are as follows:


(fig.2-5 UN sustainable development goals/ source: UN)

The design will not be attempt to fulfill all 17 categories suggested by the United Nations. Rather, 9 big categories were chosen out of the 17. Then, the 9 categories were again sorted according to the three objectives of Ecopolis suggested by Tjallingii. Here are the 9 categories that were chosen:

1. No poverty
3. Good health and well-being
4. Quality education
6. Clean water and sanitation
8. Decent work and economic growth
9. Industry, innovation and infrastructure
11. Sustainable cities and communities
13. Climate action
15. Life on land

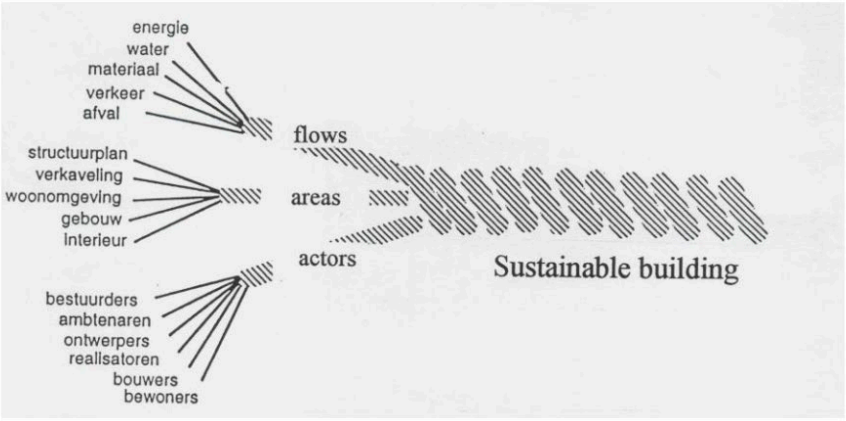
## *3.4 Ecopolis*

### *3.4.1 Ecopolis definition*

The term 'Ecopolis' is a compound word consisting of 'eco' (a Greek oikos word for house, but more widely used in the term of 'ecological') and 'polis'(a city 'where people come together, not just by birth and habit, but consciously, in pursuit of a better life'(Mumford, 1991). The term Ecopolis includes not only the biotic features of the landscape but also the abiotic factors which influence human and nature life in the area. This is why Ecopolis is used as the overarching term to thread the different theories in this project.

Also, compared to Ecocity, Ecopolis is more dynamic and well-integrated. It nurtures not only recycling and reusing resources, but controlling it on a cradle to cradle basis. To promote ecological services in various scales, Ecopolis proactively nurtures bioregional functions from the basis of what ecocity protects.

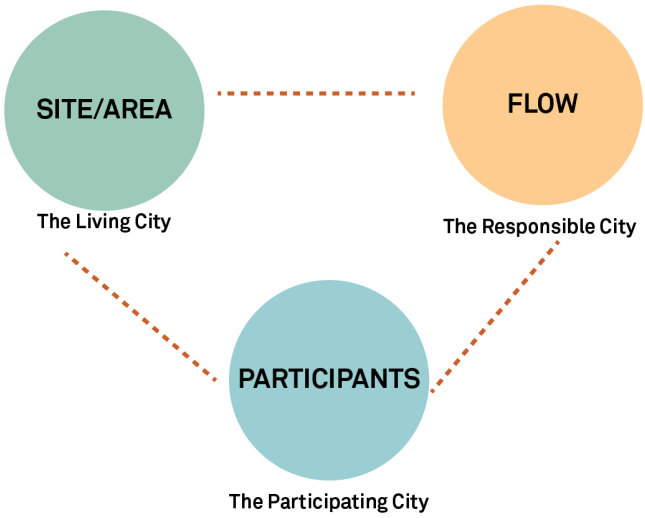
Ecopolis strives to achieve ecological sustainability through a balance of input and output in the city system. However, through this process, environmental problems such as depletion, pollution and disturbance may occur. To prevent these problems from occurring and practice environmentally sound urban development, a threefold strategy framework has been devised by Tjallingii (1995).




(fig.2-6 The relationship between flows, area and actors in Ecopolis/source:Dutvestein, 1996)

### *3.4.2 Ecopolis strategy framework*

Ecopolis can be achieved when the input and output from humans and nature form a sound balance. To achieve this, a threefold strategy involving flows, sites/areas/ and participants is designed. Each factor in the threefold correspond with 'the responsible city, the living city, and the participating city'. When all these three come together and balance is found, an 'ecocity' is formed.




(fig.2-7 When all three components come together, an Ecopolis is formed)

The Responsible City- Flow

The 'responsible city' is designed from 'flows'. It strives to achieve balance in the flow of energy, water, waste and transportation. Thus, it focuses on the re-use of materials to make the city more economical and ecologically sustainable. Water, energy, and waste flows need to be used together to reinforce each other (Tjallingii, 1995).

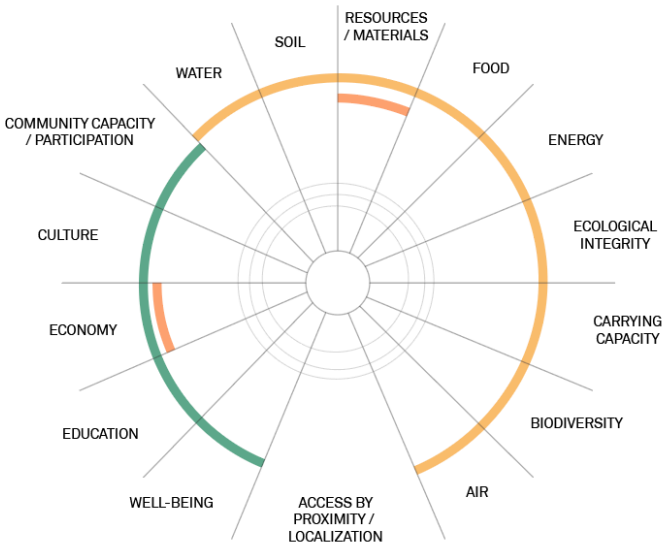
The Participating City- Participants

The 'participating city' involves the participants of the area. This means that the stakeholders of the area need to show the appropriate behavior and awareness in order to form a participating city. In order to help the stakeholders be involved, it is important that economically, socially and ecologically sound areas need to be formed. This will help to boost awareness from the participants. Furthermore, visual and physical devices will help the participants to be involved in forming Ecopolis (Tjallingii, 1995).

The Living City – Site/Area

The 'living city' is the format which can be applied to different areas of intervention. This helps this module be one of the most flexible modules in Ecopolis. Because the living city is mainly site specific, the local natural and cultural environment needs to be reflected to solve the problems of the site. Natural structures need to be formed and integrated with different flows so the landscape can create more opportunities (Tjallingii, 1995).

## 3.5 Ecocity Principles




**Definition:**

*An ecocity is an urban space planned to promote ecological sustainability*

(fig.2-8 Definition of Ecocity)

An Ecocity is, as stated by Ecocity Builders (2010):
•An ecologically healthy human settlement modeled on the self-sustaining resilient structure and function of natural ecosystems and living organisms.
•An entity that includes its inhabitants and their ecological impacts.
•A subsystem of the ecosystems of which it is part — of its watershed, bioregion, and ultimately, of the planet.
•A subsystem of the regional, national and world economic system.

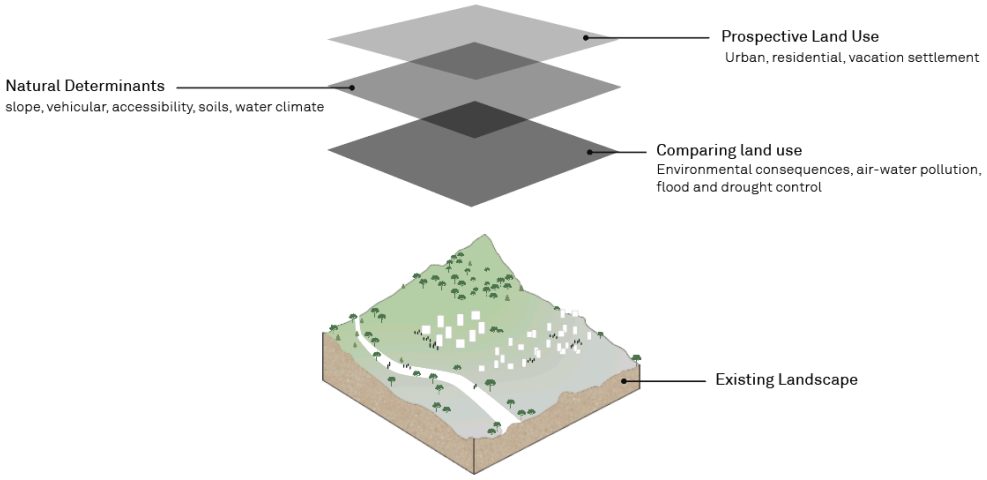
Ecocity was a term first used by Richard Register in his book "Ecocity Berkley: Building Cities for a Healthy Future (1987)". Then, it was coined by Register at the 1st International Ecocity Conference in 1990. Now the concept of Ecocity is hosted by Ecocity Builders, founded by Richard Register in 1992. The definition of Ecocity proposed by Ecocity Builders is an "ecologically healthy human settlement modeled on the self-sustaining resilient structure and function of natural ecosystems and living organisms." Thus, it is designed to minimize the energy, water and food needs in the city itself. It also aims to reduce the total emission of pollution. Although the term Ecocity is referring to the city scale, an Ecocity can be of any scale; from neighborhoods to metropolis. It does not matter how small or big the scope is, unless it functions together with the greater ecosystems. The ecosystem in relation to Ecocities may include watersheds, bioregions, and also human social systems. In short, a healthy Ecocity should have similar characteristics of healthy ecosystems and living organisms.

Ecocities as Ecosystems means that it should involve all living and non-living organisms in the intervention area. This also puts importance on the urban qualities, for they are a part of the bigger urban ecosystems which provide essential services.

Ecocities as living organisms means that the city as a whole should be treated like a living organism which needs to move, eat, and breath. This means the physical and non-living qualities of the city has to be well integrated with the living entities of the city in order to function as a whole.

The timeline of building an Ecocity is a longer process. Ecocities cannot be built overnight. It takes 5 to 15 years for basic survey and design, 15 to 50 years for construction and over 50 years for the cost and benefit analysis of the processes. Although it may take a long time, the benefits of an ecocity can be passed on from generation to generation, making this long process more rewarding.

## *3.6 Layer Model (Design With Nature)*




**Definition:**

*Layered maps presents the opportunities and constraints of the site, and result in potential development maps for decision making and urban patterns.*

(fig.2-9 Definition of the Layer Model)

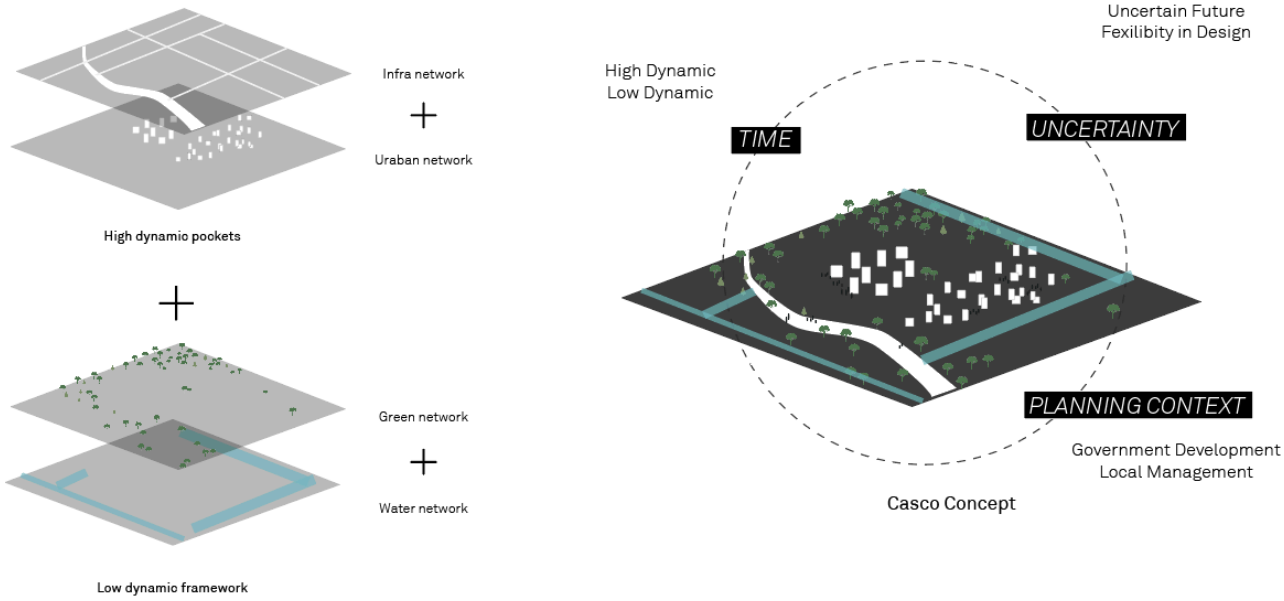
The layer model is an approach by Ian McHarg (1969). It is an approach actively utilized in analyzing the landscape, and also policy making in the Netherlands (Van Schaick and Klaasen, 2011). The layer model is a multidisciplinary approach, where it distinguishes the biotic and abiotic and the anthropogenic layers in the landscape. By separating the different qualities in the landscape, it also separates the different dynamics of the landscape. From this approach the Casco Concept was developed, which will be explained further below.

The method McHarg took to draw the layer model is as follows: first, the ecological information of the landscape is mapped out. Then, transparent maps of social and environmental values are added. To make the layer model matrix more specific, these three matrix are in it: the prospective land use, natural determinants, and environmental consequences. The prospective land use would be the man made built environment; natural determinants are the qualities of the landscape that already exists such as water, soil, slope, climate and accessibility; the environmental consequences are the environmental effects that occur because of human interventions such as air and water pollution, flooding, landslides and droughts.

By overlaying the natural qualities of the landscape and the consequences of the interventions, the opportunities and consequences of human intervention in the landscape can be easily seen. The opportunities and consequences can provide future developments, maps for policy decision making, and guide urban pattern developments.

McHarg also states in "Plan for the Valleys" that "development is inevitable and must be accommodated". Furthermore, uncontrolled growth is harmful for the landscape and thus development should be planned to the bigger regional goals to prevent unplanned growth. He also stresses the multi-disciplinary qualities of the layers model, and encourages collaborative work between different fields for sustainable development.

## *3.7 Casco-Concept*




**Definition:**

*Casco concept is a strategy to describe and design development processes in the landscape. The approach is mainly focused on analyzing landscape problems that can get a place in the landscape next to each other.*

(fig.2-10 Definition of the Casco-Concept)

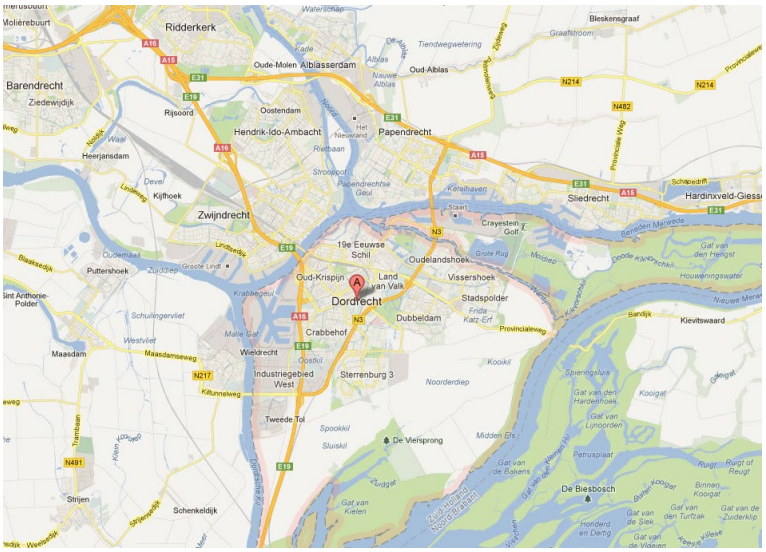
The Casco Concept is a spatial strategy concept in the Netherlands. It was developed by Kerkstra, Vrijlandt and Sijmonds (1990). It is called the Framework concept in English but Casco in the Netherlands. 'Casco' in Spanish means a protective structure. The term has the dictionary meaning of a structure, but it refers to the Spanish architecture practice where only the structural framework of the building is build and the users are allowed to modify the interior design to their needs. The casco concept is a spatial strategy rather than a specific design proposal. It is an ecological framework for planning and designing sustainable landscape (Buuren van and Kerkstra 1993, Smith and Hellmund 1993).

This strategy aims to design development processes in the landscape. It attempts to analyze landscape problems and study if certain landscape qualities can be placed next to each other. The qualities which are analyzed in the landscape are; the high dynamic (infrastructure and the built environment), low dynamic (nature and environment). These two qualities need to be in one framework because nature has to be developed spontaneously in urban spaces. By doing this, the complexity of the landscape can be preserved as a whole. The landscape can also be organized more efficiently in the rural development areas.

## *4. Case studies*

Three case studies were conducted to see how the Ecopolis framework strategy can be implemented to enhance the natural environmental qualities and also the living qualities for the local people. One is Dordrecht in the Netherlands, which was chosen from one of the three examples given by Tjallingii. The second is EVA lanxmeer in Culemborg, NL. The third is Vancouver, which introduced the concept of Ecodensity Planning strategy in 2007.


(fig.2-11 Map of the Netherlands/source:Google)




(fig.2-12 Map of Dordrecht/source:Google)

(fig.2-13 Photo of Biesbosch/source:Olaf van Kooten)

## *4.1 Ecopolis Dordrecht planning*

Tjallingii himself suggests three examples in the Netherlands which utilized the Ecopolis strategy framework. The three are: Zwolle, Dordrecht, and Breda. The example of Dordrecht was chosen out of the three examples because the step towards ecologically sound urban development was taken the most proactively in Dordrecht. The city strives to create a city with favorable daily living conditions while conducting ecologically sound urban development.

Furthermore, the city of Dordrecht has a mix of the old and the new metropolitan area; the old city of Dordrecht was founded over a thousand years ago. In 1421, the city was severely damaged by the St. Elisabets flood, where the 'Grote Waard' was sunk under water, later becoming the 'Biesbosch' which borders Dordrecht in the South. Historically, Dordrecht was one of the most important harbor and trading city in the Netherlands.

## *4.2 EVA lanxmeer Culemborg, NL – environmentally friendly housing*

(fig.2-14 Houses in EVA lanxmeer/source:Madeleine d'Ersu)

(fig.2-15 Activities in EVA lanxmeer/source:Marleen Kaptein)

EVA lanxmeer is a neighborhood formed between 1994 to 2009, consisting of 240 houses in Culemborg, Netherlands. It became known for its environmentally friendly housing development, and also large scale common ownership. The development of EVA lanxmeer was led by Marleen Kaptein in 1990, who wanted to create a neighborhood with high environmental quality. The masterplan was made by the intellectuals who were involved in the project.

However, much of the creative process was carried out by the current and future residents of the area. This can be seen as the pinnacle of residents taking initiative to create an environmentally friendly neighborhood with the cooperation between the inhabitants, consultants and government officials. It mean that the residents had input when the site was being designed, and they also take part in the maintenance of the village. This helps the neighborhood to become a more shared open area, making it safer for its residents and children. The creative and maintenance process in EVA lanxmeer is a bottom up process, which has to be reflected more in the Semarang projects. Because community relationship and the RT-RW structure is important in Indonesia, this process of residents cooperating and communicating effectively with the government is something to be learned from this case.

The site was designed on a water extraction area, thus the identity of water in the area is prominent. The water is widely channeled into 2 routes; for clean water and grey water. The clean water-mostly rain water runoff from the roofs-are collected in retention ponds, and kept running with the help of pumps flushing rinse water topping the retention ponds. This also helps the waterbed vegetation to flourish throughout the year. The total amount of water runoff into the retention ponds is calculated to ensure it is the same from when the Rhine river flushed water out to this area.

Water on the street is filtered along the gutters and parking spaces. Because it is semi-paved, water can also infiltrate in the area, and the excess water is put into the larger infiltration pool. Grey water (such as water from showers and kitchens) is also treated with helophyte filters then drained into the near waterway. Black water(water from the toilet that cannot be reused) is to be processed separately, in order to produce energy by mixing with green waste.


(fig.2-16 EVA lanxmeer water collection system/source:Groenblauw)


(fig.2-17 EVA lanxmeer grey water system/source:Groenblauw)


(fig.2-18 EVA lanxmeer rainwater pavement infiltration system/source:Groenblauw)


(fig.2-19 Map of Culemborg/source:Google)


(fig.2-19 Map of Eva lanxmeer/source:Justine Leleu)

# PART 3
# UNDERSTANDING AND EXPLORING

5. Context Research
   - *5.1 Java Island Context*
   - *5.2 Semarang Context*

6. Site Analysis
   - *6.1 Landscape analysis*
     - *- water/drainage*
     - *- soil*
     - *- biodiversity/nature*
     - *- urban infrastructure / development*
   - *6.2 Social analysis*
     - *-settlements/culture (occupation, heritage, etc.)*
     - *- Population and occupation*
     - *-community structure: RT-RW*
   - *6.3 Challenges of Semarang*
     - *a. Water issues*
     - *b. Soil issues*
       - *- Subsidence*
       - *- Sedimentation*
       - *- Landslide*
     - *c.Urban development*
       - *- No master plan to guide large-scale settlement and public facilities development*
       - *- Environmental damage due to development*
   - *6.4 Opportunities of Semarang; The Future of Semarang*
     - *a. UNESCO World Heritage*
     - *b. High speed train & Semarang ring road development*
     - *c. Tourism development*
     - *d. City population still young, potential for development*

*5. Context Research*
*5.1 Java Island Context*

(fig.3-1 Map of Java Island)

The geological condition of Indonesia is ver much a consequence of the tectonic plate move- ments. Java Island is located at the boundary of Eurasian Plate and Indo Australian Plate, as well as the ring of fire. The subduction plate movement has been causing the active volcanic movement on the Sunda arc. There are constant earthquakes and vol canic eruption on Java Island. Mount Merapi locate in between Semarang and Jogjakarta is one of the most active volcanoes in Indonesia, with frequent eruptions recorded.

Java is an island of Indonesia. It is bordered by the Indian Ocean on the south and the Java Sea on the north. It has a total population of 141 million (up to 145 million including the surrounding islands standing as the world's most populated island. The capital city of Indonesia-Jakarta-is on the North Western coast of Java island. Java was the center of the Hindu-Buddhist empires, Islamic sultanates and was the core of the Dutch East Indies during th

colonial times. This makes Java island a very historically rich island.

Semarang is the capital city of Central Java province. On the North is the Indian Ocean, East Java in the East, west is West Java, and in the South is the Special Region of Yogyakarta. Central Java is 33,548 km², with a population of 33 million. This makes it the third most populated province in Indonesia. Although it is densely populated, Central Java also has much historic, natural and cultural diversity. This is why many new tourism development plans are being centered around Java Island. Tourism development will definitely be beneficial to economic growth, but ecological and environmental damage must also be thought about when further development plans are made.

Because Central Java is dominated by many volcanic mountains, many earthquakes and volcanic eruptions occur in Indonesia, but also is the reason how the unique mountainous landscape of Java was formed. The main mountain that is closest to Semarang is Ungaran mountain. Mount Ungaran is a deeply eroded stratovolcano. There are no historical records of the volcano's activities. Two active fumarole fields are found on the southern flanks of the mountain.

(fig.3-2 Map of Central Java)

## 5.2 *Semarang Context*

(fig.3-3 Kota Lama night views)

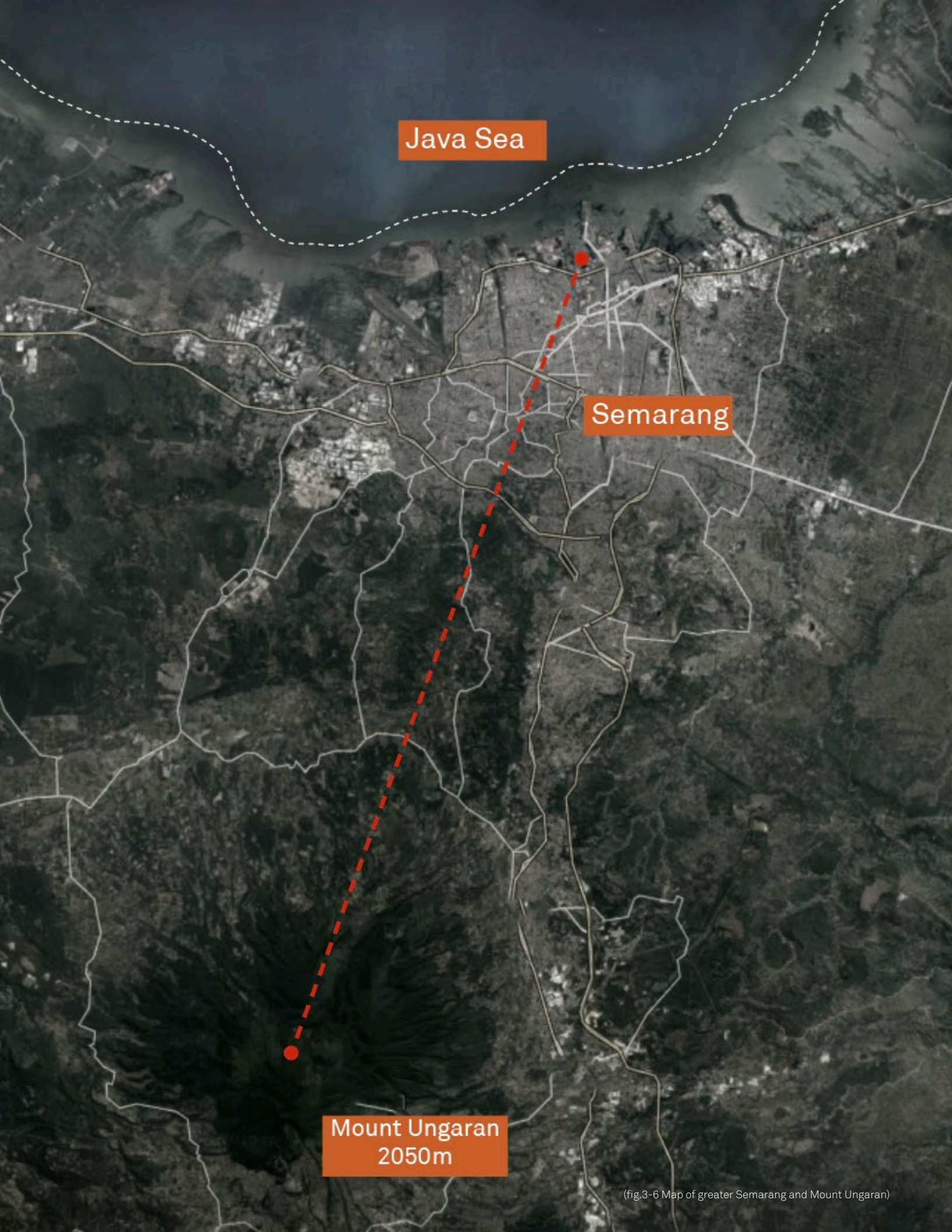
(fig.3-4 Kota Lama in the daylight)

Semarang is located almost in the center of Java Island. Semarang is the capital and largest city of Central Java province in Indonesia. Semarang is 450km East from the capital city Jakarta, and 314km West from Surabaya, the vibrant metropolitan city of East Java. Semarang is also 100km North of the special region of Yogjakarta; known for its traditional arts and cultural heritage. With its central location, the Achmad Yani International Airport and the Tanjung Mas harbor in its center, Semarang still acts today as the heart of Java Island.

From the colonial Dutch East Indies era, Semarang was, and still is an important port city. Semarang city has a total area of 373.78km², and a population of 1,832,670 people in 2019. It is the seventh most populated city in Indonesia. The urban area of the district of Semarang has 3,183,516 people spread over 2 cities and 26 districts.

One of the reason why nearly half of the population lives in the urban area is because 66% of the total area of the city is in the uplands, consisting of heights varying from 5m to 345m in elevation. These areas are mostly situated in steep hills of Mount Ungaran. 33% of the rest of the area is in the lowlands, with elevations of 0.75m to 5m. The remaining 1% is the coastal plain area, consisting of areas with elevations from 0 to 0.75m above sea level.

(fig.3-5 Resident in Semarang)




(fig.3-6 Map of greater Semarang and Mount Ungaran)

## *6. Site Analysis*
## *6.1 Landscape analysis*

(fig.3-7 Water usage in commercial area in Semarang)

(fig.3-8 Water usage of a local in Semarnag Kampung)

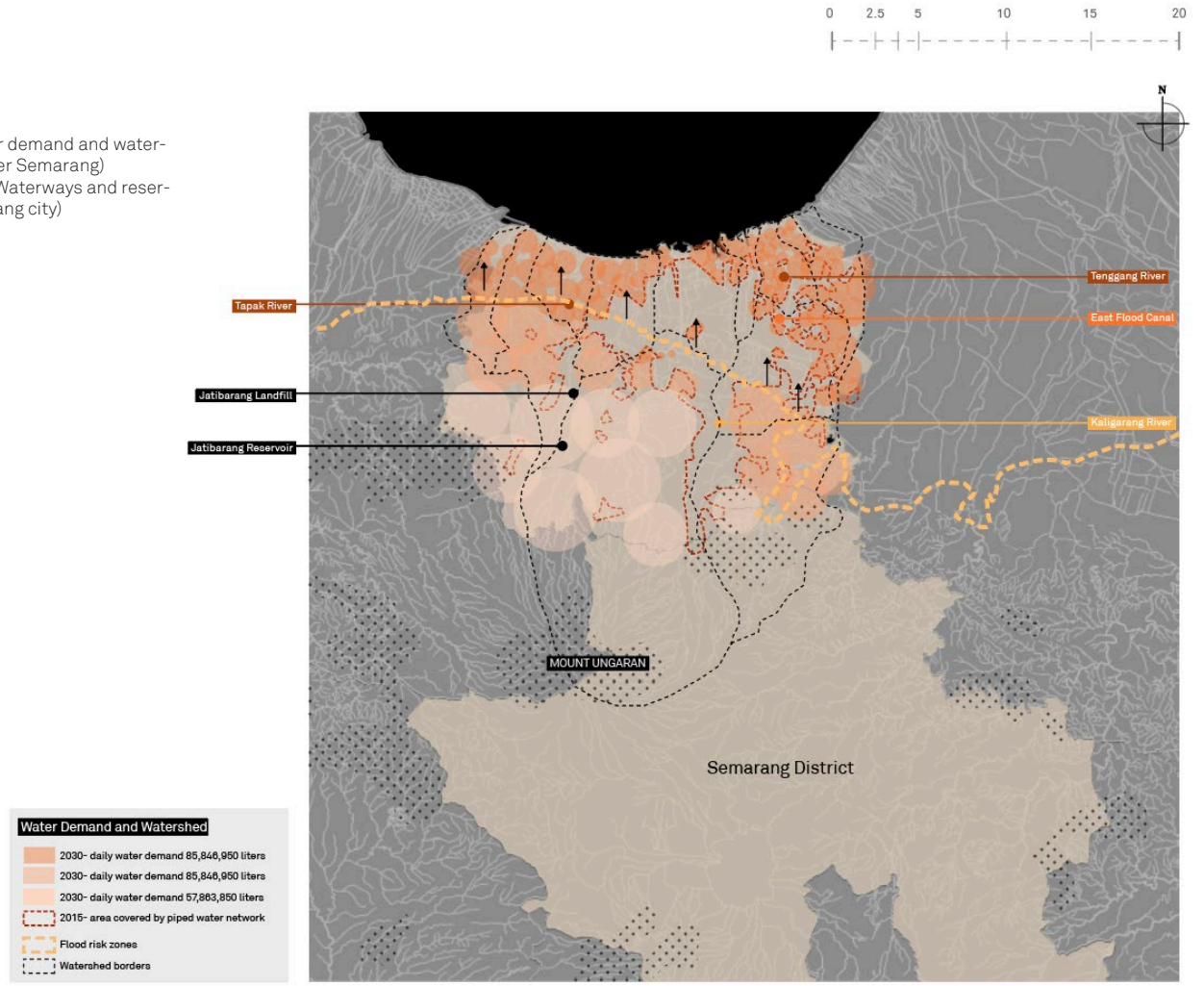
### *a) Water*

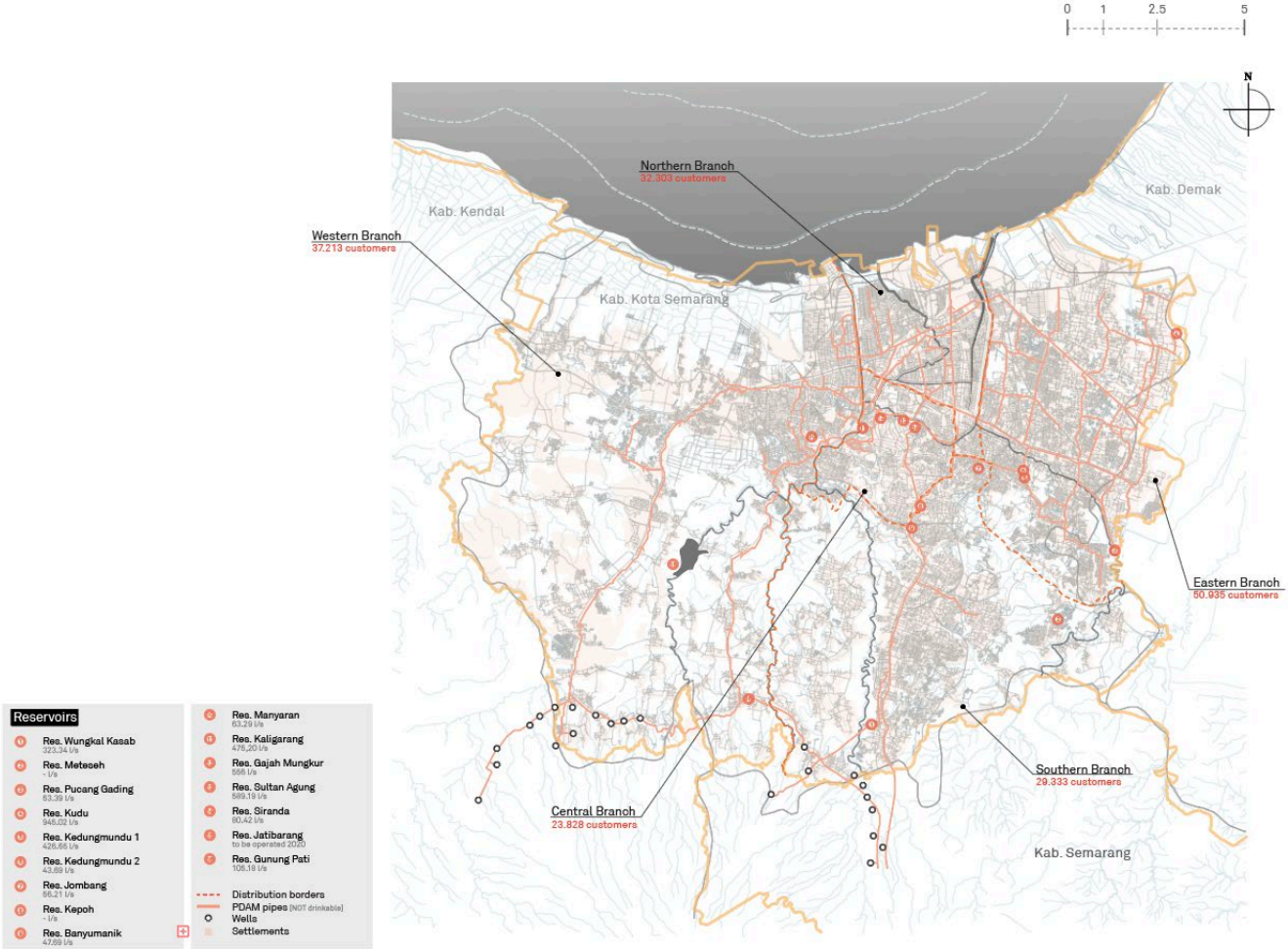
The urban landscape of Semarang is largely characterized by its water bodies. The Java Sea borders the city in the North. The coastal area used to be bordered and protected by mangrove forests, but much of the natural mangrove forests are now lost, causing even more flooding, erosion and sedimentation issues in the coastal area. From the Java Sea up to Mount Ungaran, Semarang River runs through the heart of the city in center of the cityscape. The Semarang River plays a crucial role in battling flash floods-caused by sudden increase in rainfall and water flow from the mountainous areas-in the city.

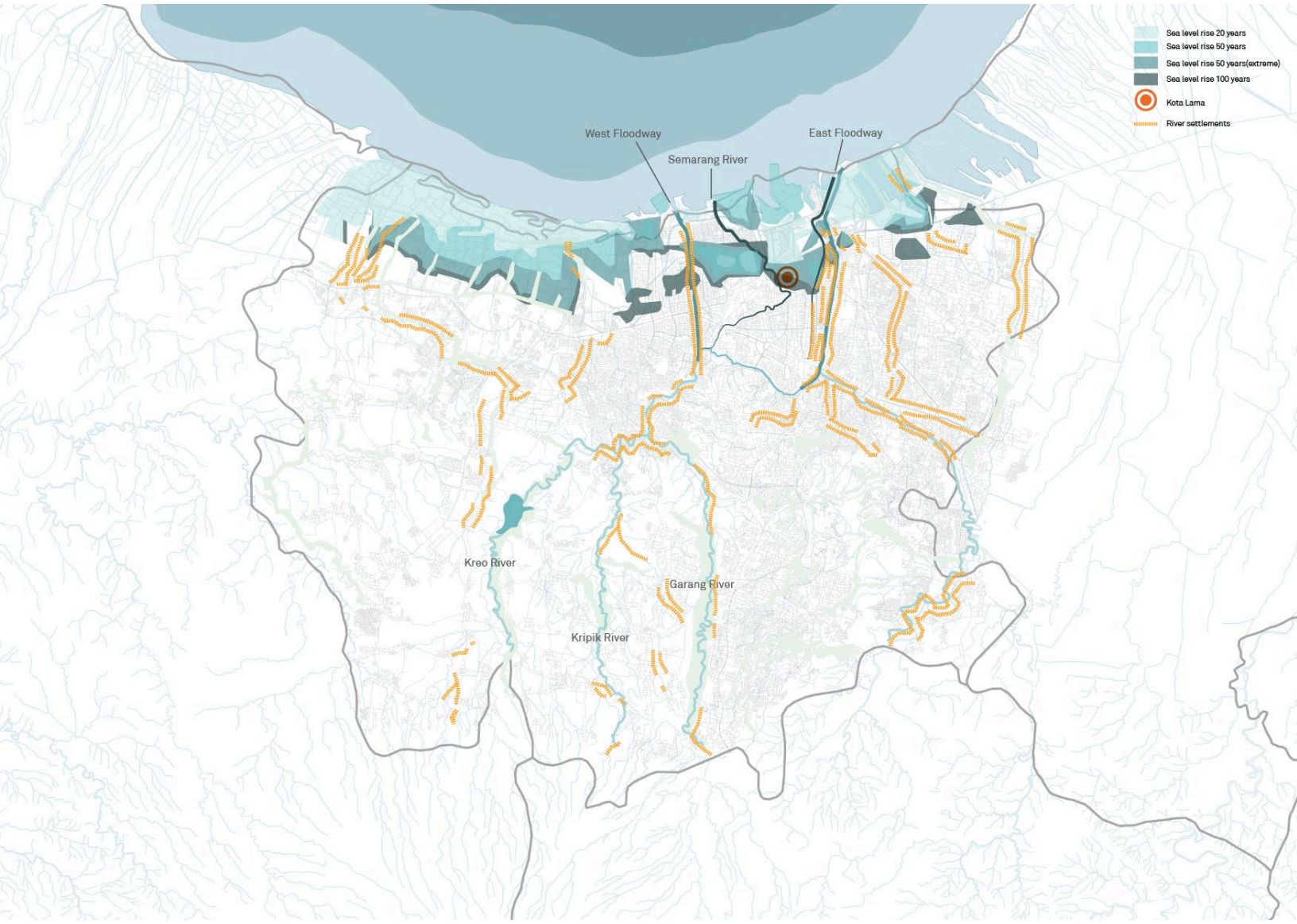
However, hardening of the river edges and improper maintenance of the river is only contributing to increased flooding and inability to discharge water in cases of flash floods. To assist with the water discharge to battle flooding issues in the city, two canals each in the East and the West of the Semarang River were later added.

(fig.3-9 Household chores in residential area in Semarang)

TOP (fig.3-10 Water demand and watershed map of Greater Semarang)
BOTTOM (fig.3-11 Waterways and reservoir map of Semarang city)



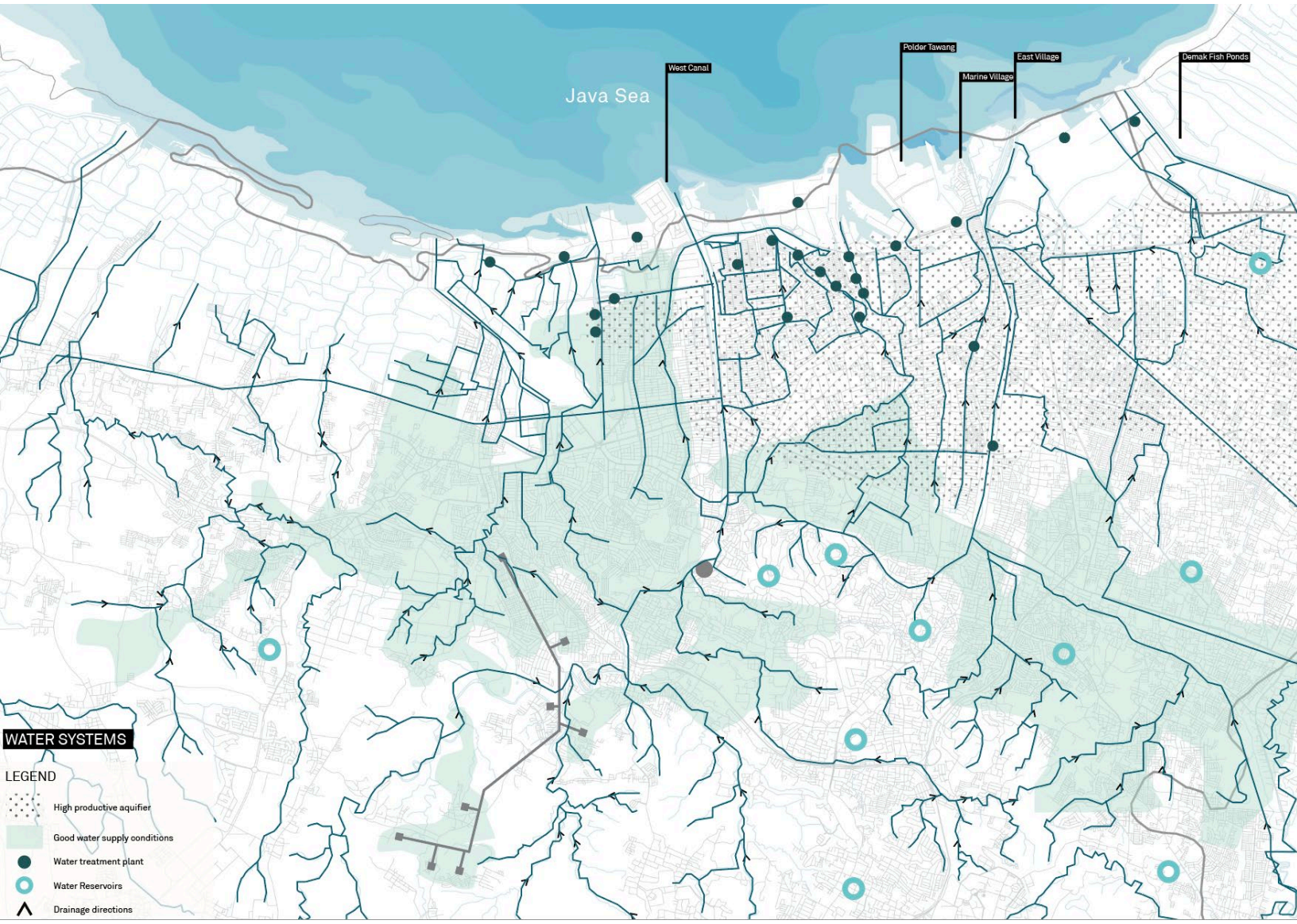






Semarang is currently transformed into an actual polder system that, for a clear understanding, has nothing to do with the public ponds that are locally named 'polders' as well. The coastal defense master plan that is in the making consists of a large dyke structure circumscribing the urbanized region of Semarang as well as its shoreline and mangrove areas. This seawall will also serve as a highway, being an important connector for Semarang and the regional traffic between the East and West of Java. A series of pumps and water basins will drain the new polder system, although the weakest links within this vulnerable approach of coastal defense need to be examined still.

196,346,592 liters per day produced. But it is still not enough to quench the needs of all the inhabitants of Semarang. An extra of 53,142,188 liters per day is needed to fully satiate the hydrology needs of the city.

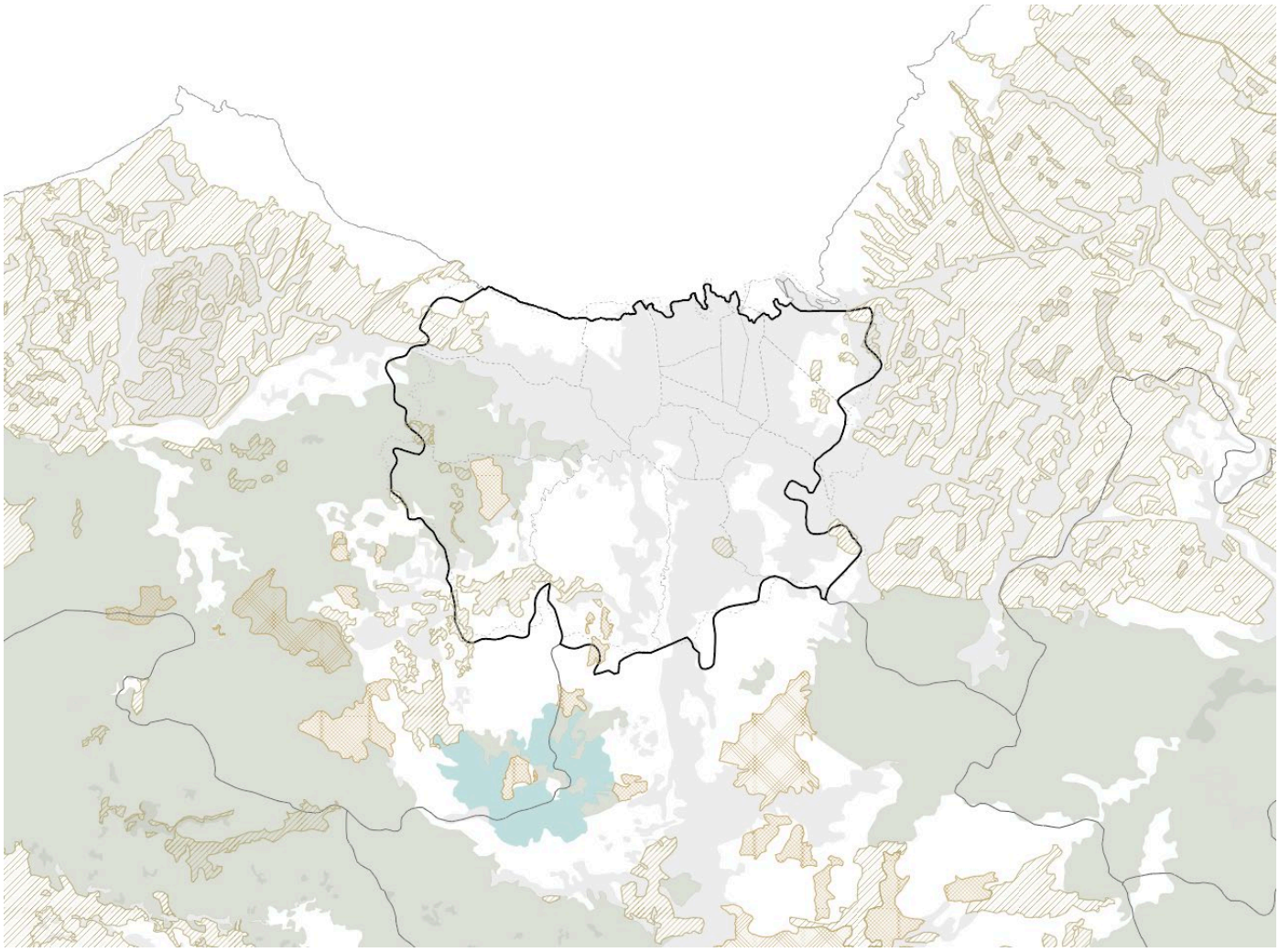
Most of the waste is put into Tapak river. There is no clear sanitation system. This lowers the surface water quality in the city even more. Dirty running water-mostly stagnant during dry seasons-makes the hygiene status of the city even worse.




LEFT (fig.3-12 Sea level rise and riverside settlement in Semarang)
RIGHT (fig.3-13 Watersystem of Semarang city)

## *b) Landuse*

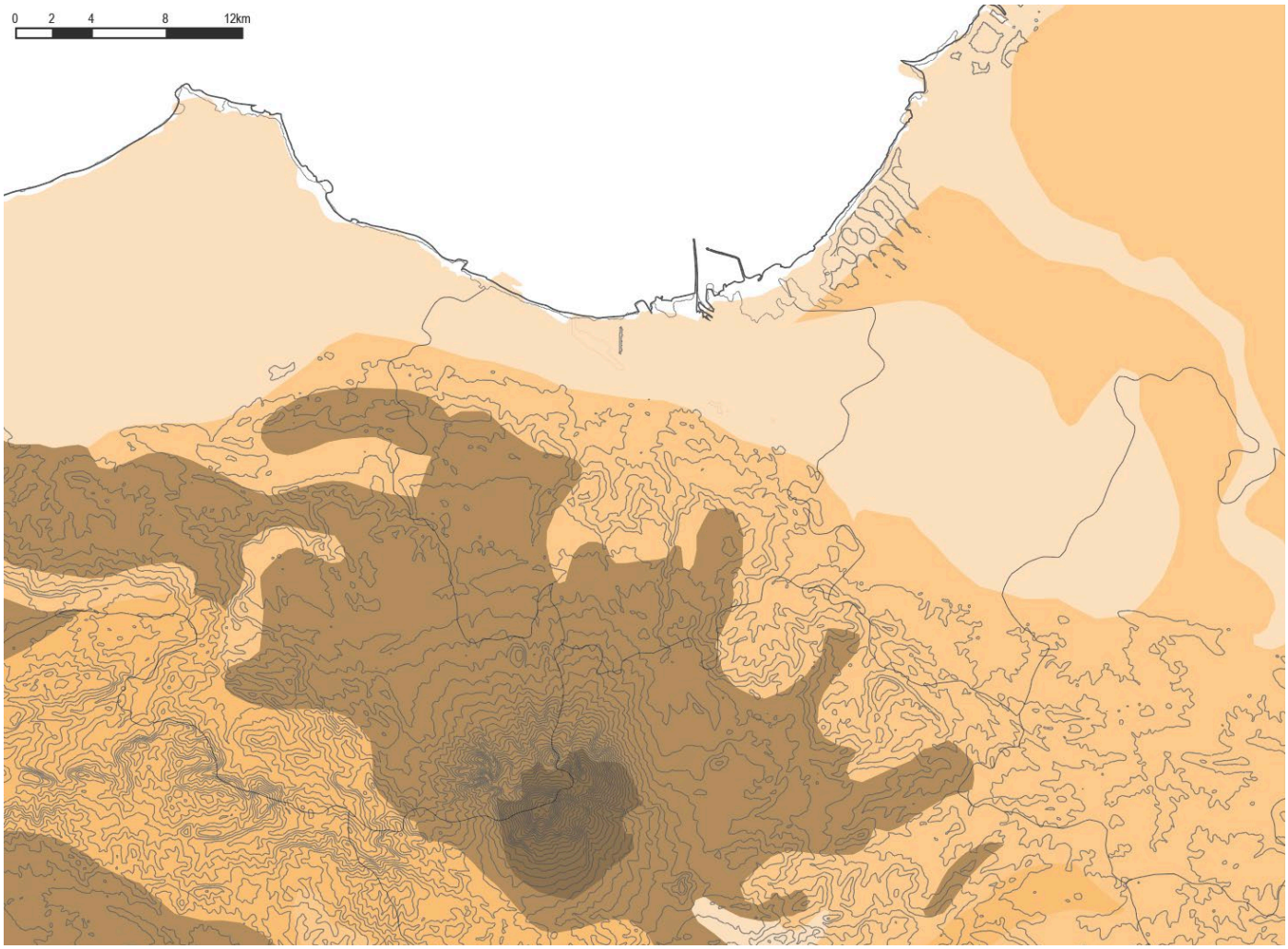
(fig.3-14 Landuse of Greater Semarang)




The land use in Semarang is mixed. Most of the land is used for agriculture, production forests (such as tobacco, coffee, tea, and sugar cane plantations), nature conservation areas and coastal ponds. One third (33.12%) of Semarang city's total area of 373.7 km2 is built (urban) areas. Although only one third of the city is characterized as urban areas, 48.4%-almost half of the population- live in urban areas. Thus, it can be seen that the city center of Semarang is the most densely developed urban areas, while the outskirts of the city is relatively less developed and has more natural qualities to it.

## *c) Soil*

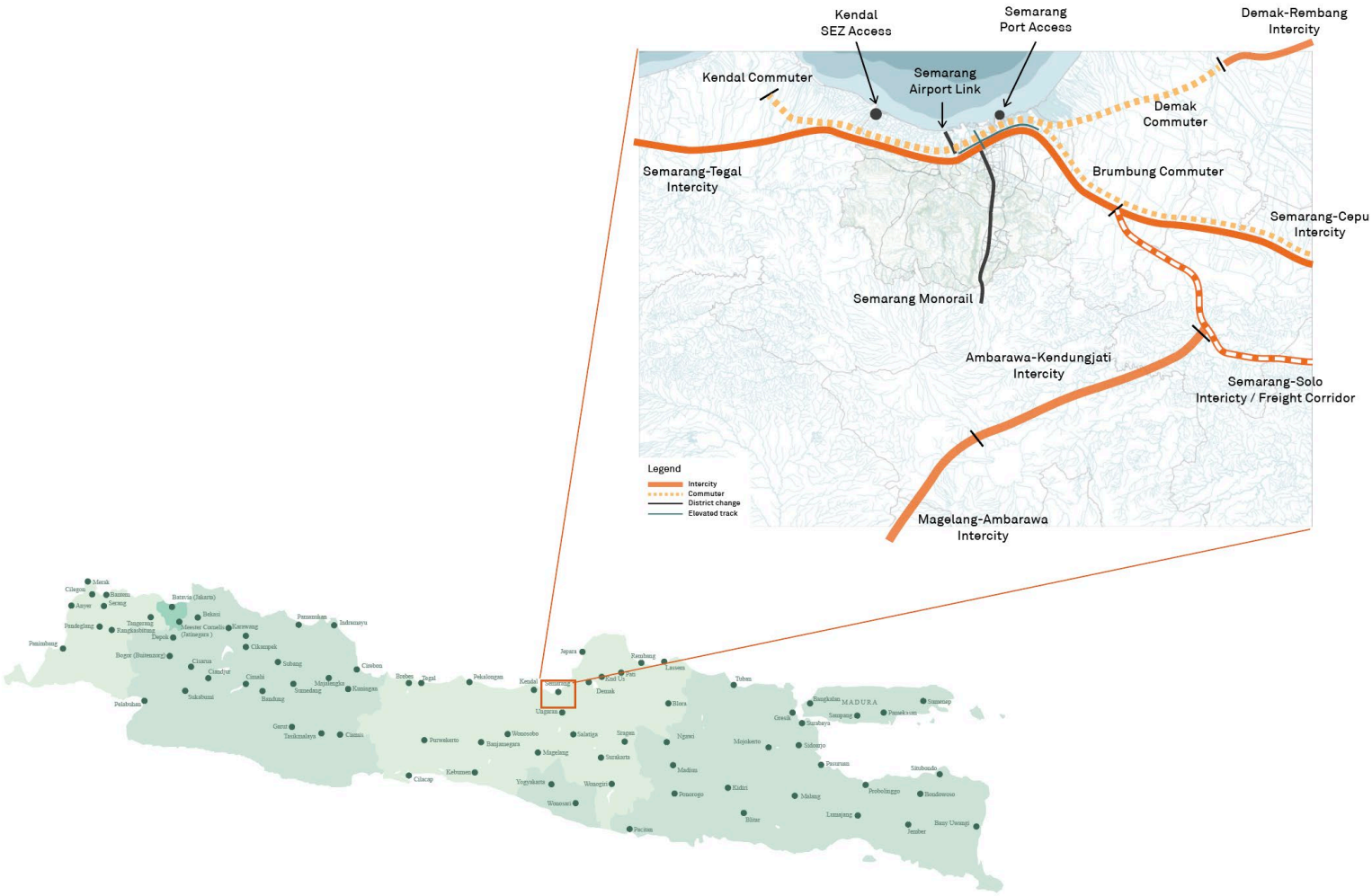
(fig.3-15 Soilmap of Greater Semarang)




Soil in the Semarang city is largely affected by the fact that many volanic mountains are around it. The land was formed over time through volcanic activity, and thus the soil is largely volcanic soil.

This means that the soil is very nutrient rich and good for crop cultivation; why so many plantations existed in colonial times and even today. Nowadays, however, most of the crops are rice fields.

## *d) Transportation*

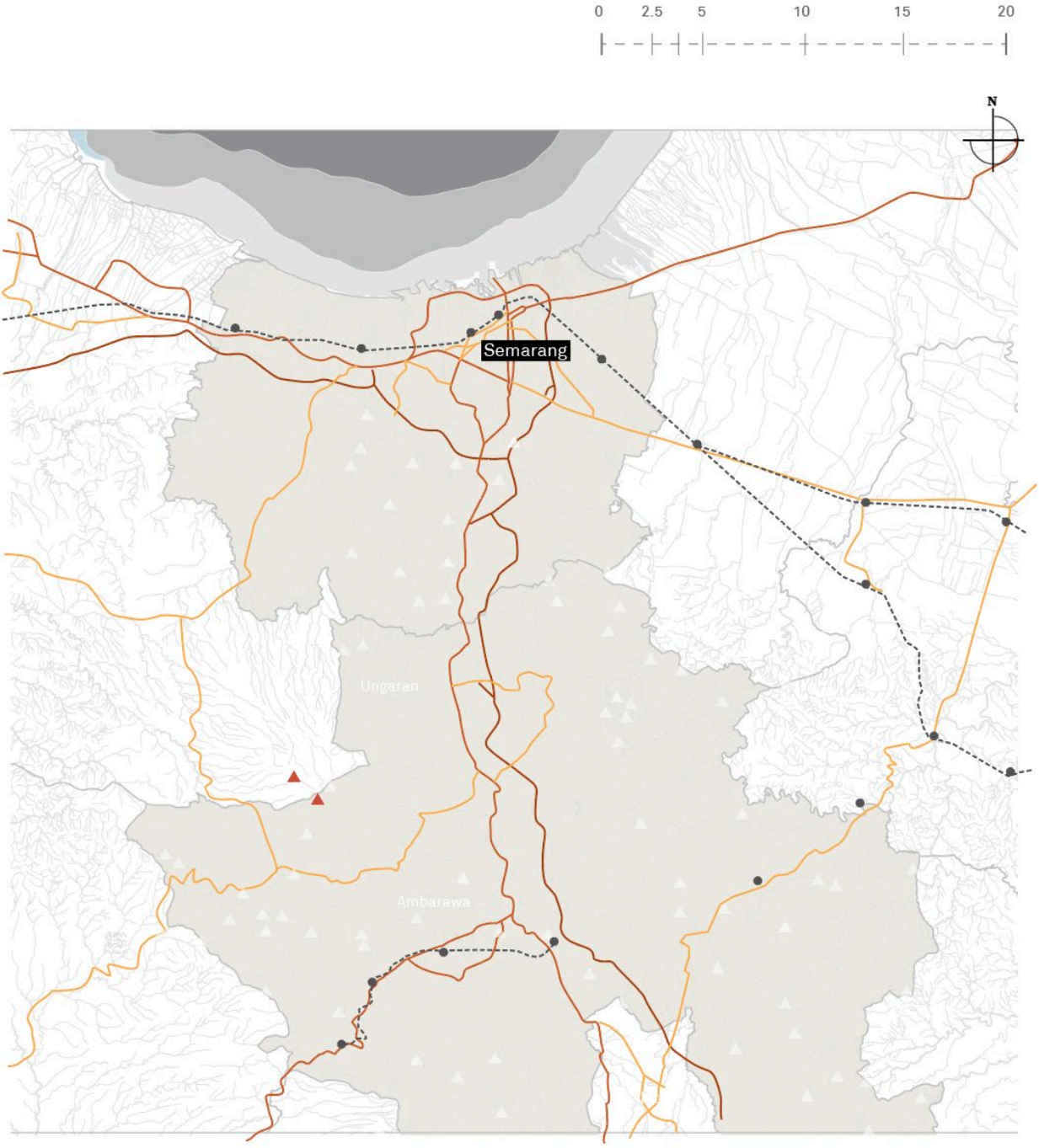



(fig.3-16 Railway map of Central Java)

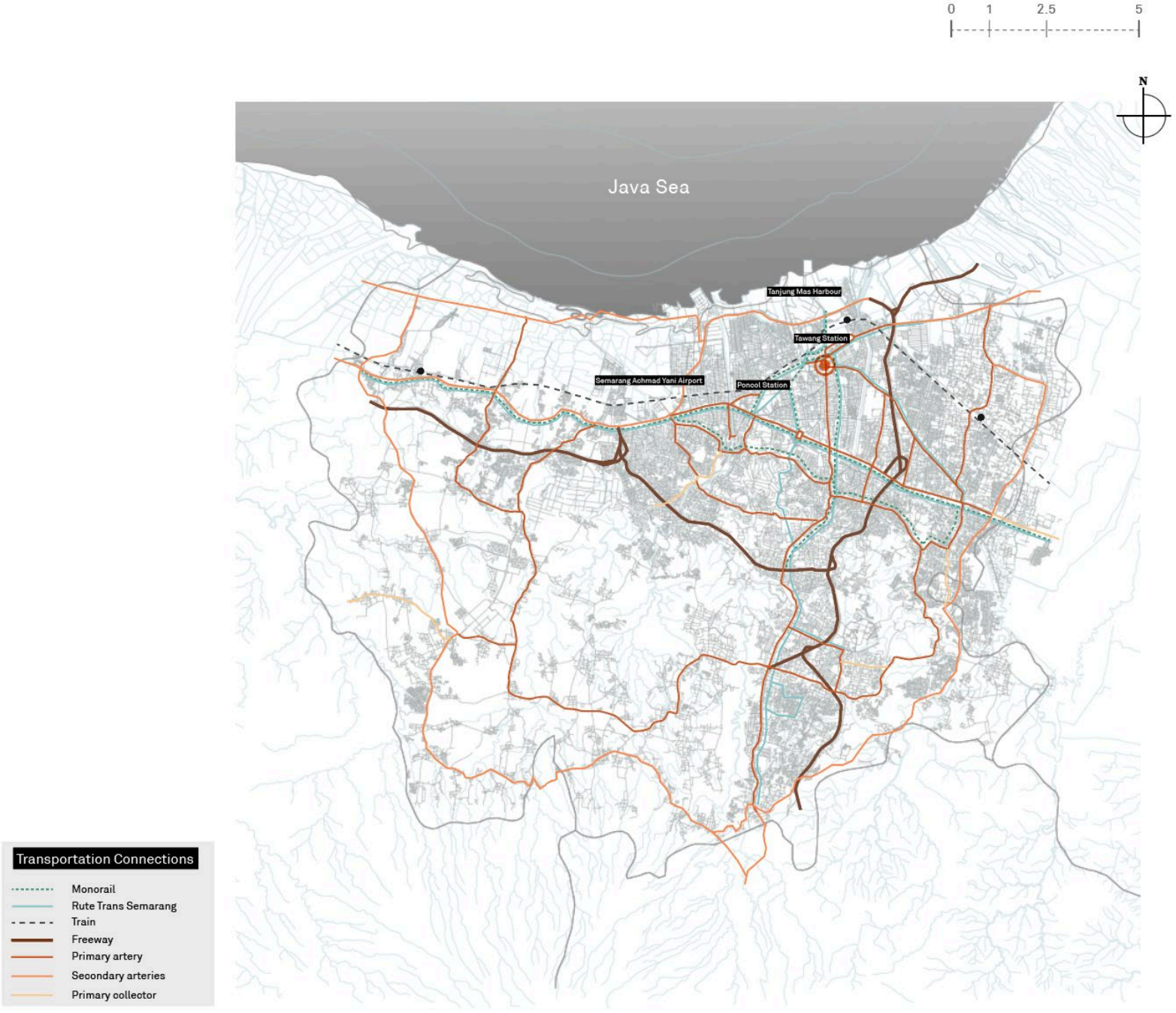
Semarang was and is still known for its deep history in port activities, and it's role as the stepping stone into Java Island from the western water worlds.

However, currently there is much congestion on a daily basis in the main city areas, There is no train connection down to Yogjakarta, and there is no clear method of transportation for the locals of the area. These are just a few of the issues the area faces at the current moment. To fix the problems of constant congestion in the city areas, Semarang city is planning many more intercity connectors, ring roads and even monorails for the city. These are just the plans that are layout out for the city, but much of it will not be plausible if the local residents do not agree to it, or if the funding cannot be put together on time.

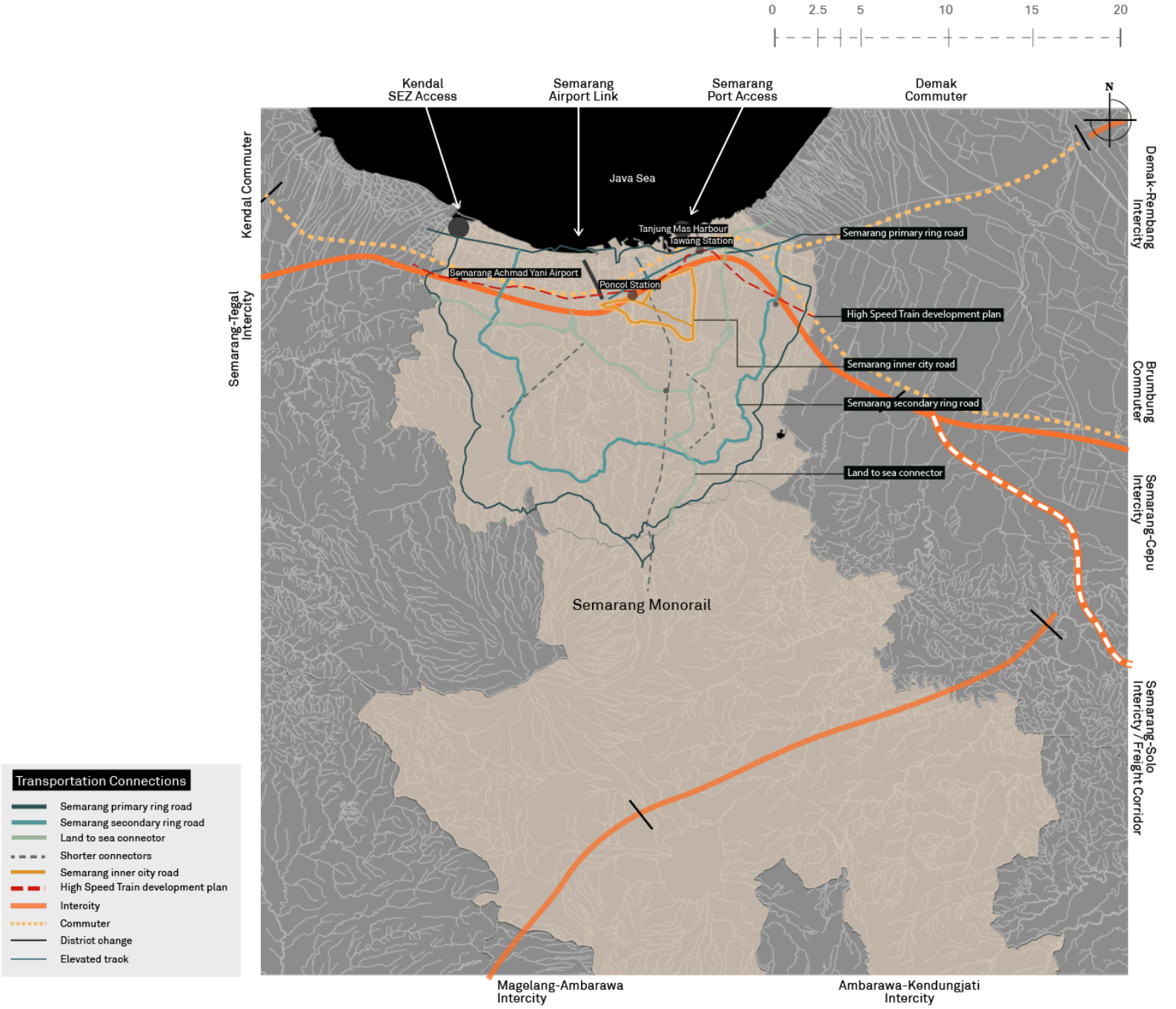
To fix the problems of constant congestion in the city areas, Semarang city is planning many more intercity connectors, ring roads and even monorails for the city. These are just the plans that are layout out for the city, but much of it will not be plausible if the local residents do not agree to it, or if the funding cannot be put together on time. The intercity connection horizontally will become stronger thanks to the High Speed Trains. Ring roads will further improve the traffic conditions in the city, but there seems to be no vertical connection connecting the city into the South.




(fig.3-17 Transportation map of Greater Semarang)

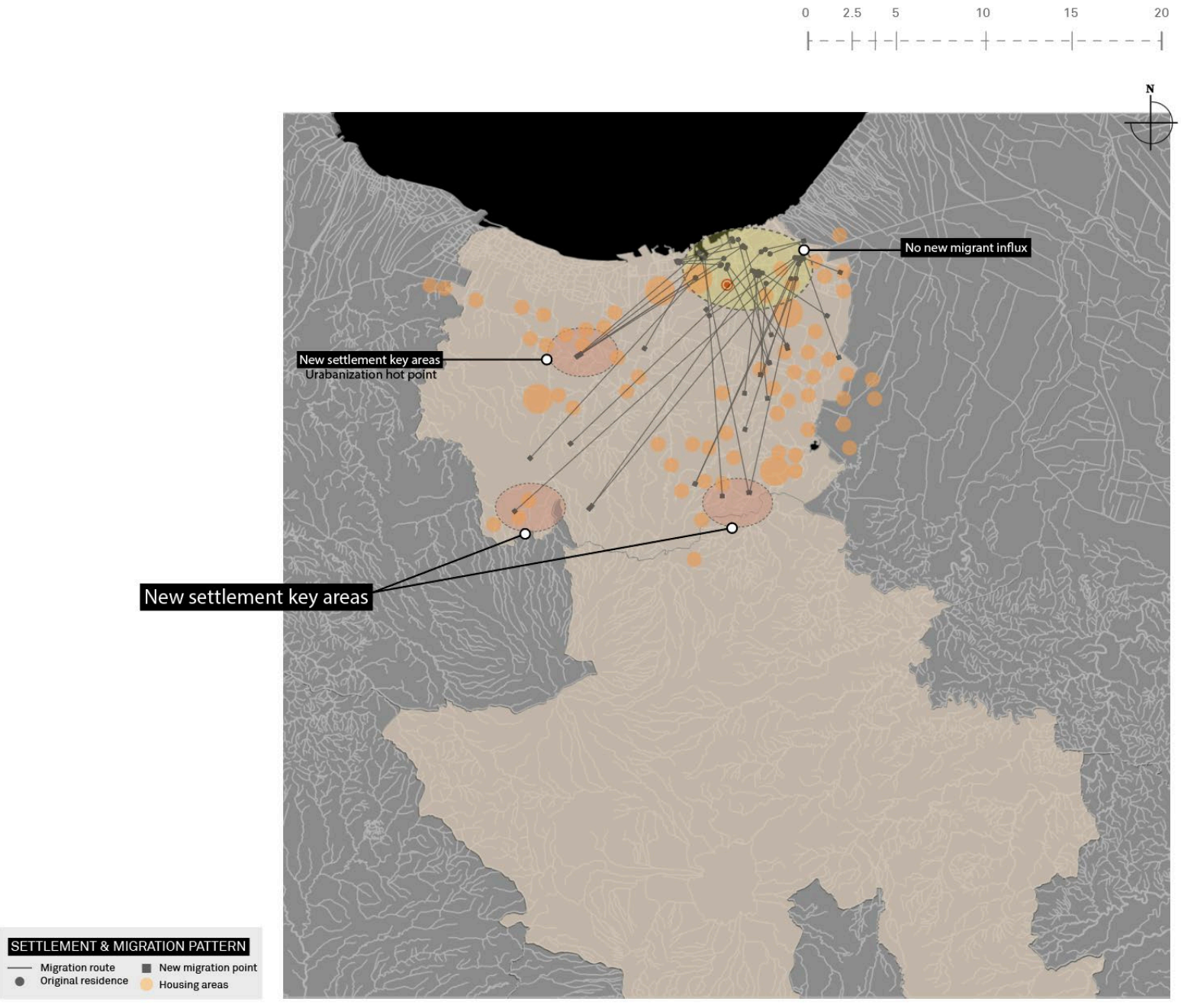



(fig.3-18 Transportation map of Semarang City)




(fig.3-19 Future transportation development of Greater Semarang)

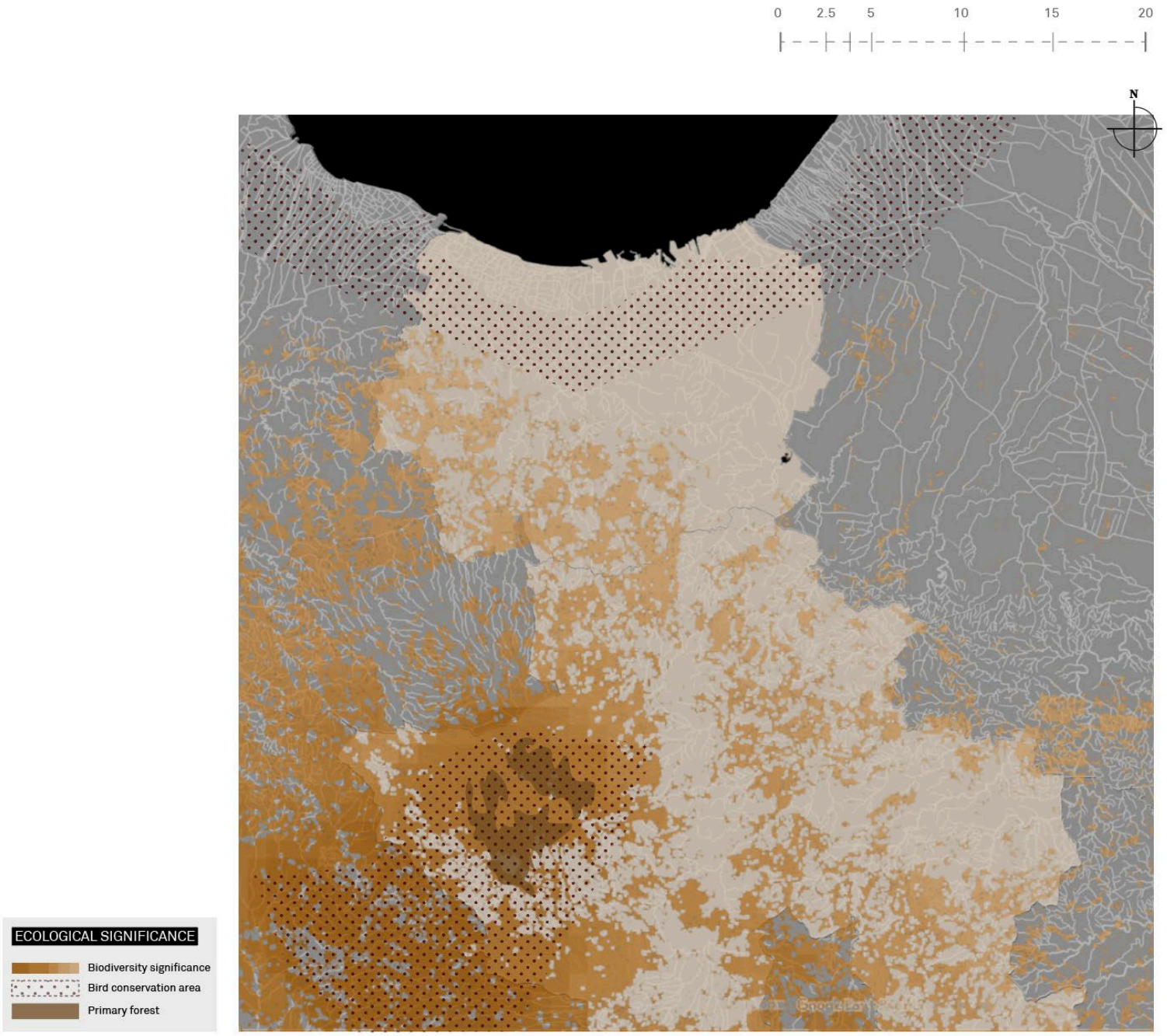
## *e) Housing*




(fig.3-20 Migration patter in Semarang City)

It can be clearly seen that people are moving out of the dangerous areas. They are mostly moving to the areas that have higher elevation, fresh water supplies, and more greenery. This could indicate what kind of living environment the people deem as 'good living environment'.

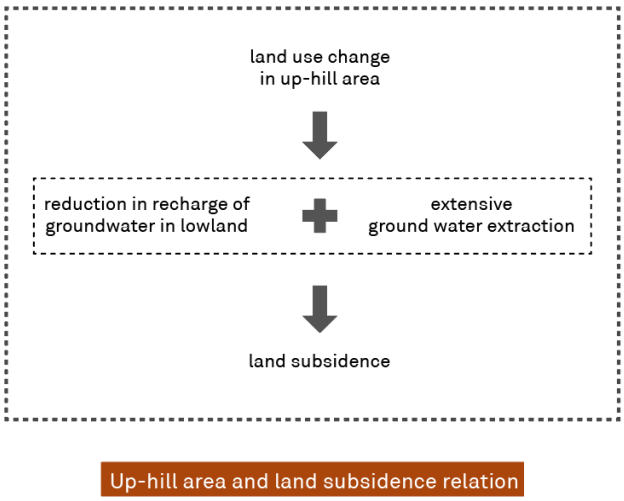
## *f) Ecology*




(fig.3-21 Ecological significance in Greater Semarang)

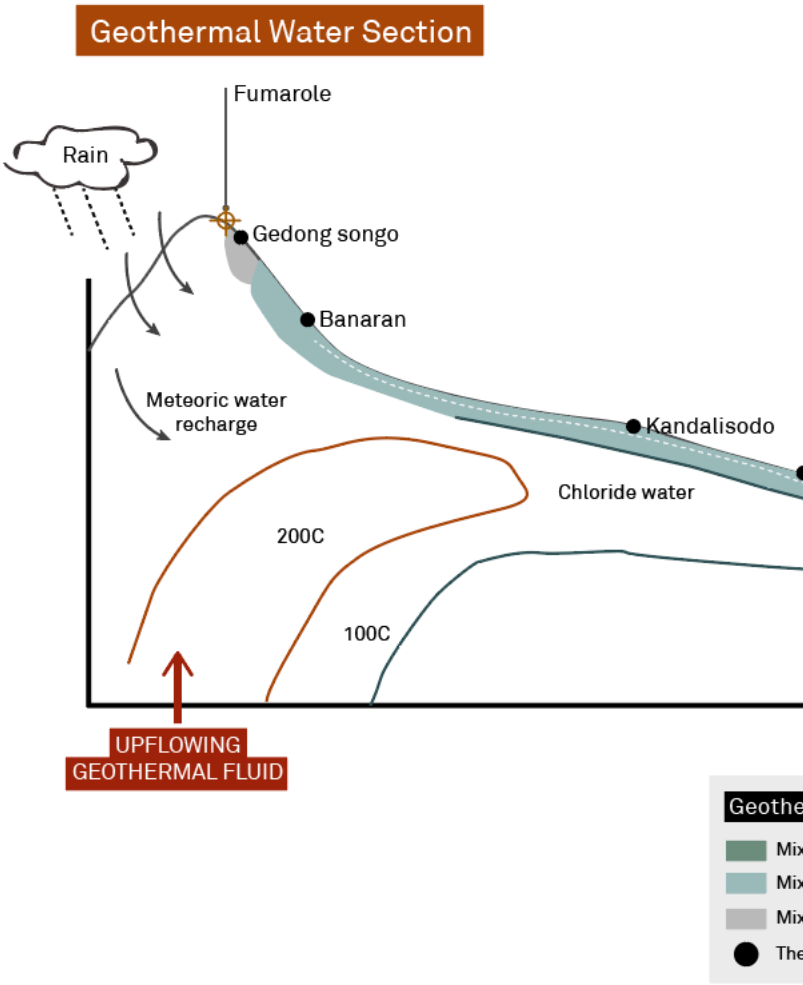
There is much to be considered regarding the ecology in the area. Mount Ungaran encompasses primary forests and biodiversity conservation areas, which are home to many exotic species of animals. Most of the mountainous areas around Semarang have high ecological significance. This is why the mountain areas should be preserved as much as possible.

## *g) Hinterlands*




Up-hill area and land subsidence relation

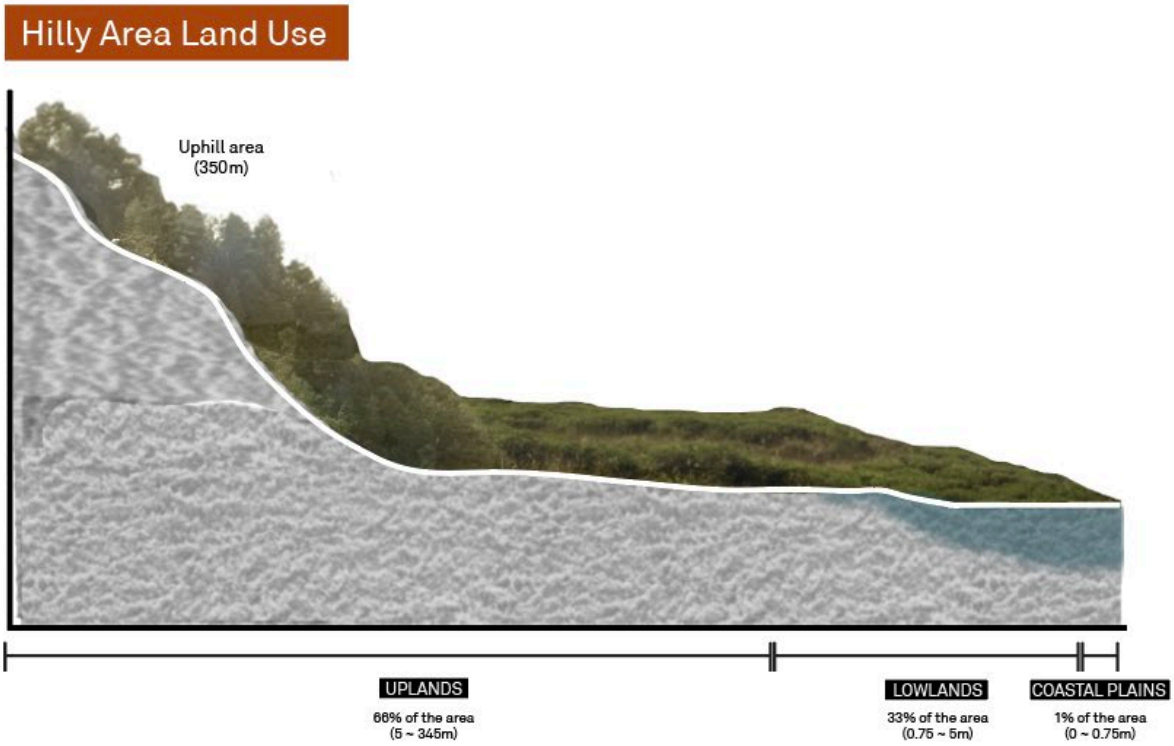
(fig.3-22 Uphill area and land subsidence relation diagram)



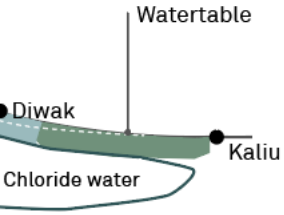

(fig.3-23 Geothermal water sysem in Mount Ungaran)

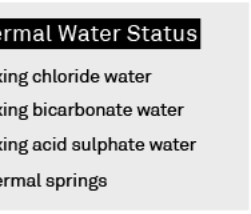
The analysis about the hinterlands volcanic activities were crucial, because it is in relation with the new settlements that will be made in the up-hill areas. Geothermal activities affects settlements because it creates tectonic movements and hot spring activities which is harmful for people living in the area. Also, up-hill activities affects the land subsidence in the low hill areas; the whole landscape is connected to each other.

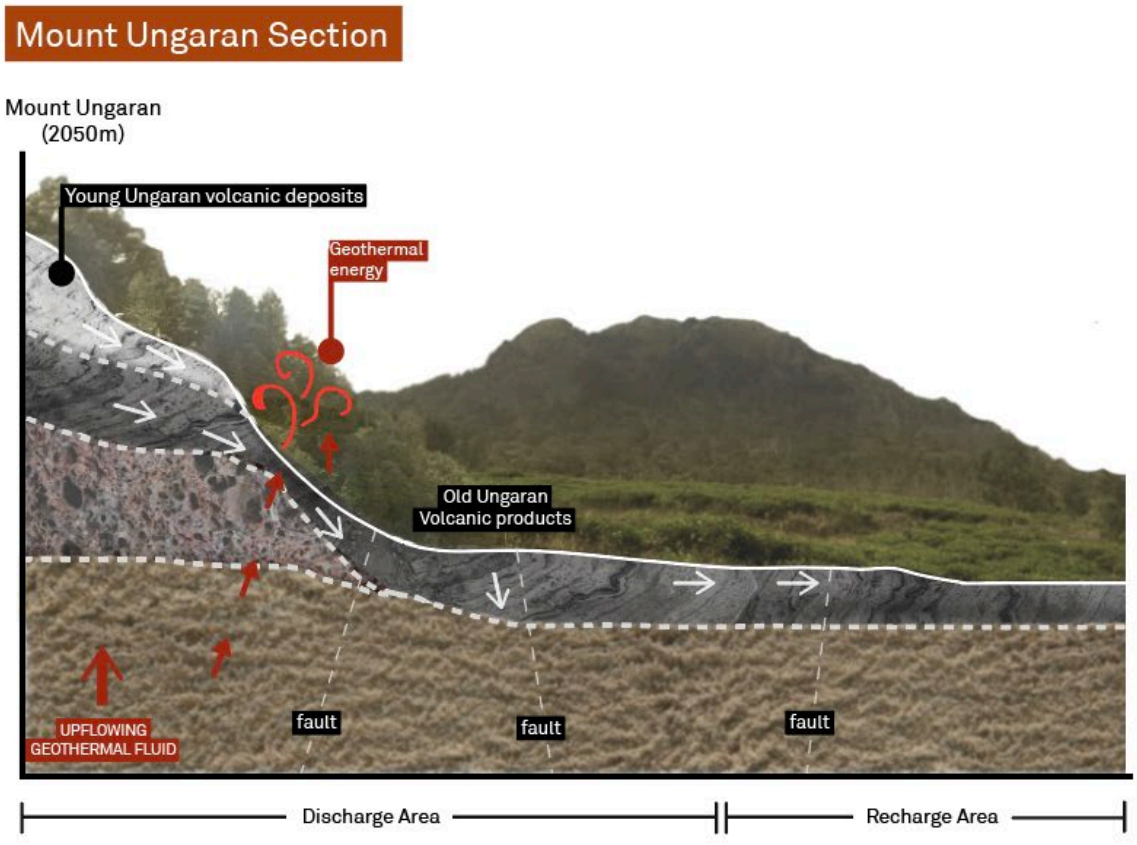
The water relation between Mount Ungaran and the water landscape was carried out. This was also overplayed with the urban status of the area to see which areas were the most urbanized and in need of alterations. The mountain landscape-so far- seems like it is full of potential for development in the future.



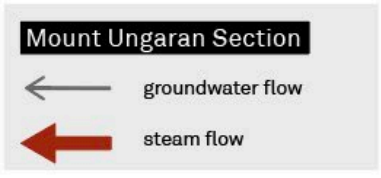

(fig.3-24 Hilly area land use in Mount Ungarran)




(fig.3-25 Moung Ungaran section)



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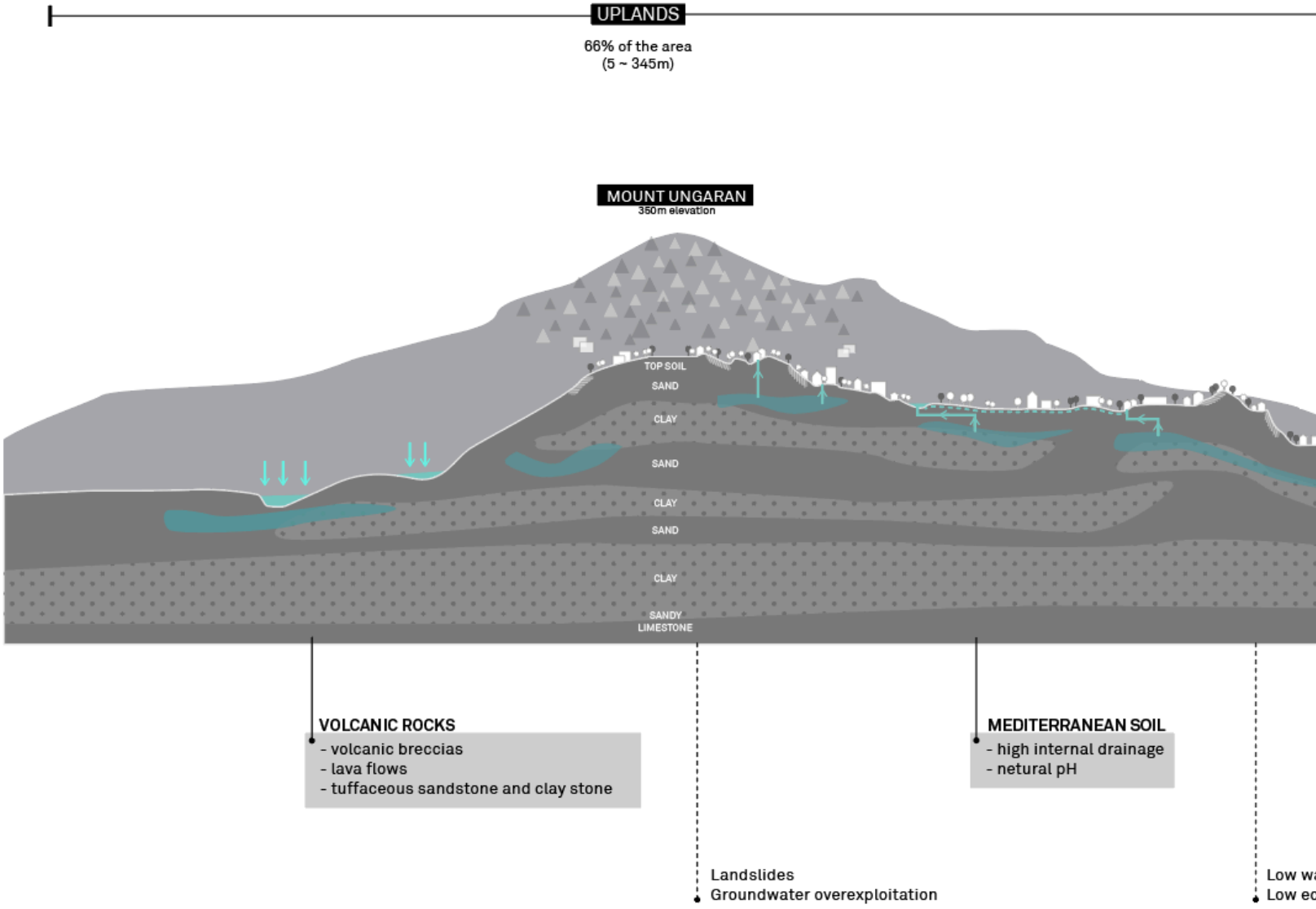
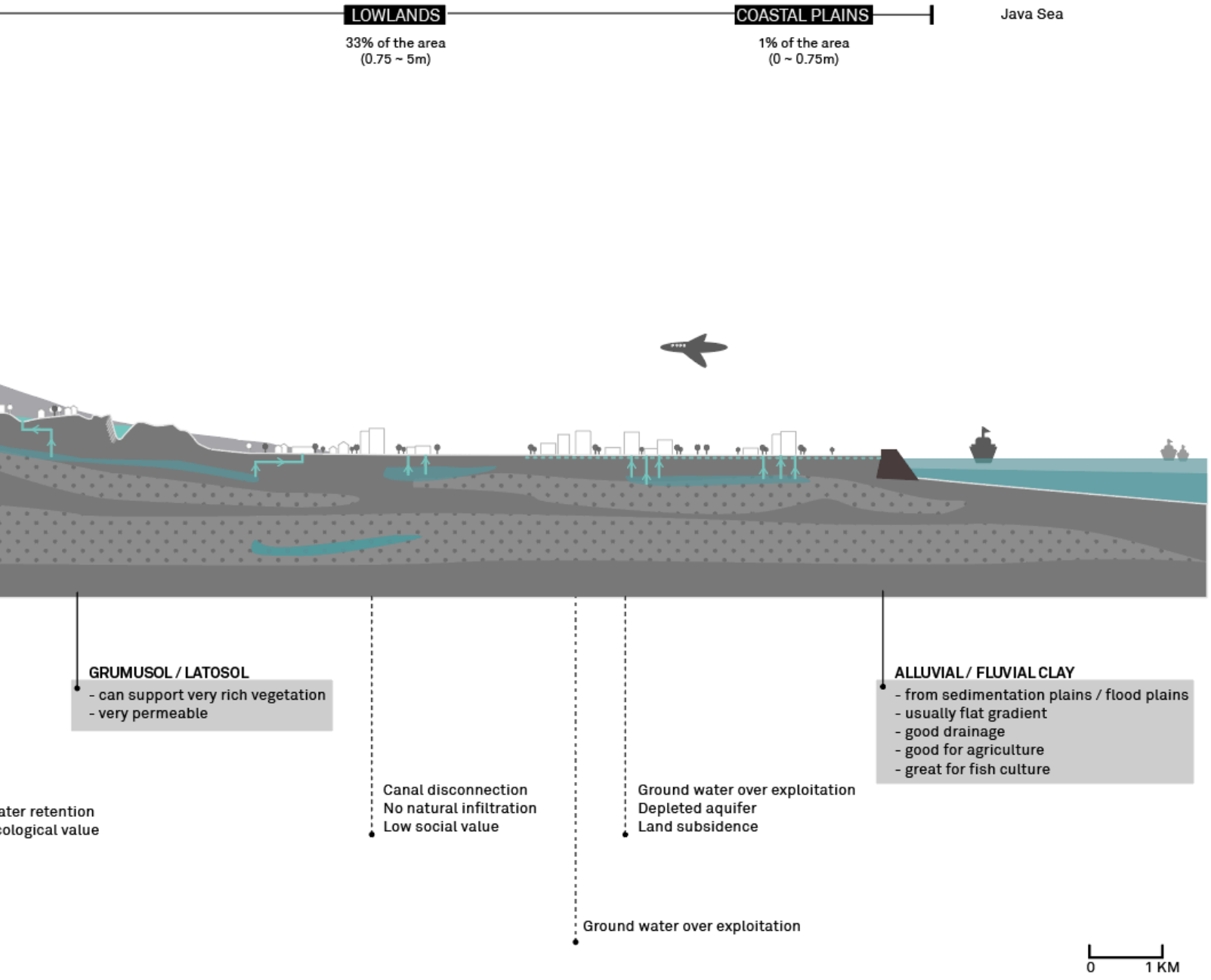


(fig.3-26 Mount Ungaran, Semarang City and Java Sea section)



# Housing Development and Economic Status go hand in hand


## a) Population and occupation

Out of the total population of Semarang, 77,800 inhabitants are considered impoverished. A large part of the economic activities in Semarang are considered 'informal', and the unemployment rates of 7.76% is still higher than the average of 5.86% of Central Java province (100 Resilient Cities, 2016). Still with the poverty rate, the city's population is increasing at 1.41% annually.

Furthermore, greater Semarang (a.k.a. Kedungsapur) has a population of close to 6 million. Population of the city is predominantly Javanese with significant Chinese population. The Chinese population is from the Chinese colonization past, with its descendants still living in Semarang.
Semarang has an annual economic growth of 4.6%. 30.38% of the total economic activities consist of trade, restaurants and hotels. The second biggest economic sector is the processing industry, consisting of 27.37% of the total economic action.

(fig.3-27 Collage of activities in Semarang City)

**1.41%**
annual population increase

**4.6%**
annual ecoomic growth

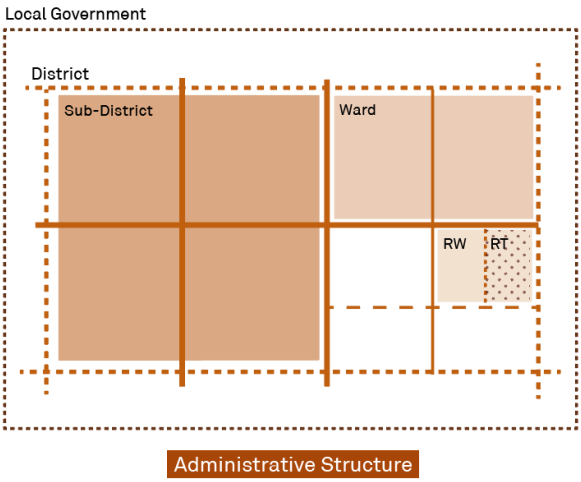
mpoverished

**7.76%**
unemployment rate

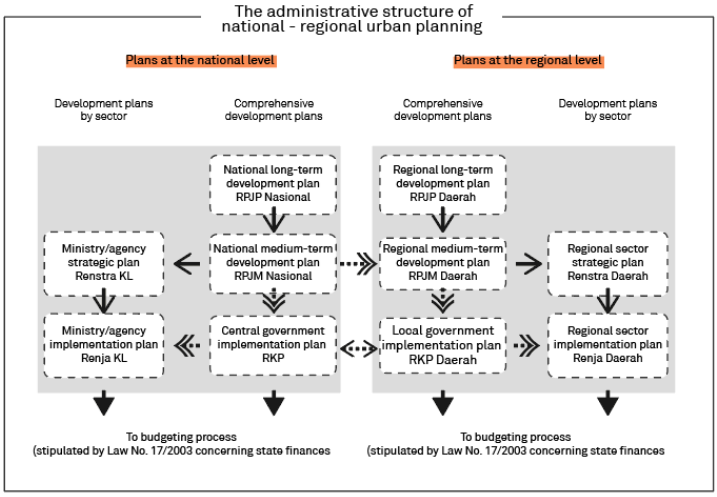
8%
staurants hotels

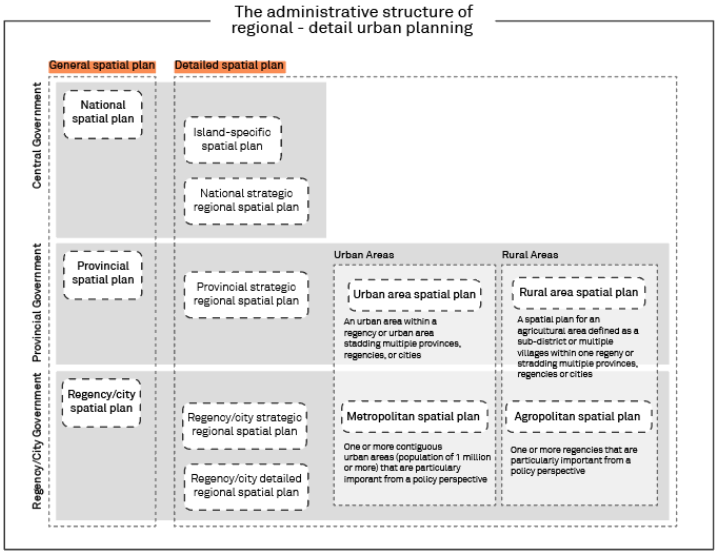
**27.37%**
processing industry

## *b) Community structure: RT-RW*




(fig.3-28 Administrative structure of Indonesia)




(fig.3-29 Administrative structure of Indonesia in urban planning)

Community level of organization in Indonesia is very tightly knit compared to other countries. Community based disaster early warning and response system is well organized in self-governing systems called RT and RW. Not every household can be reached through the top-down system by the government; thus the RT RW system is efficiently used in people's daily lives.

Rukun Tetannga (RT) is a group of 18 to 20 households. Monthly meetings of the RT leaders are held in order to discuss everyday life issues in the community scale. Rukun Warga (RW) consists of 7 to 15 RTs. The heads of each RT gathers every 2 to 3 months to gather the opinions and suggestions of administrative issues to be delivered to the higher administrative level. Then, 10 to 15 RWs are considered one sub-district in an area.

Community level of coordination is very well organized in Semarang. However, there is a big segregation between the government level of urban planning and local development. Large areas of the city-urban and rural areas in common- are unregulated and much of the local development and reform is conducted on a community level.

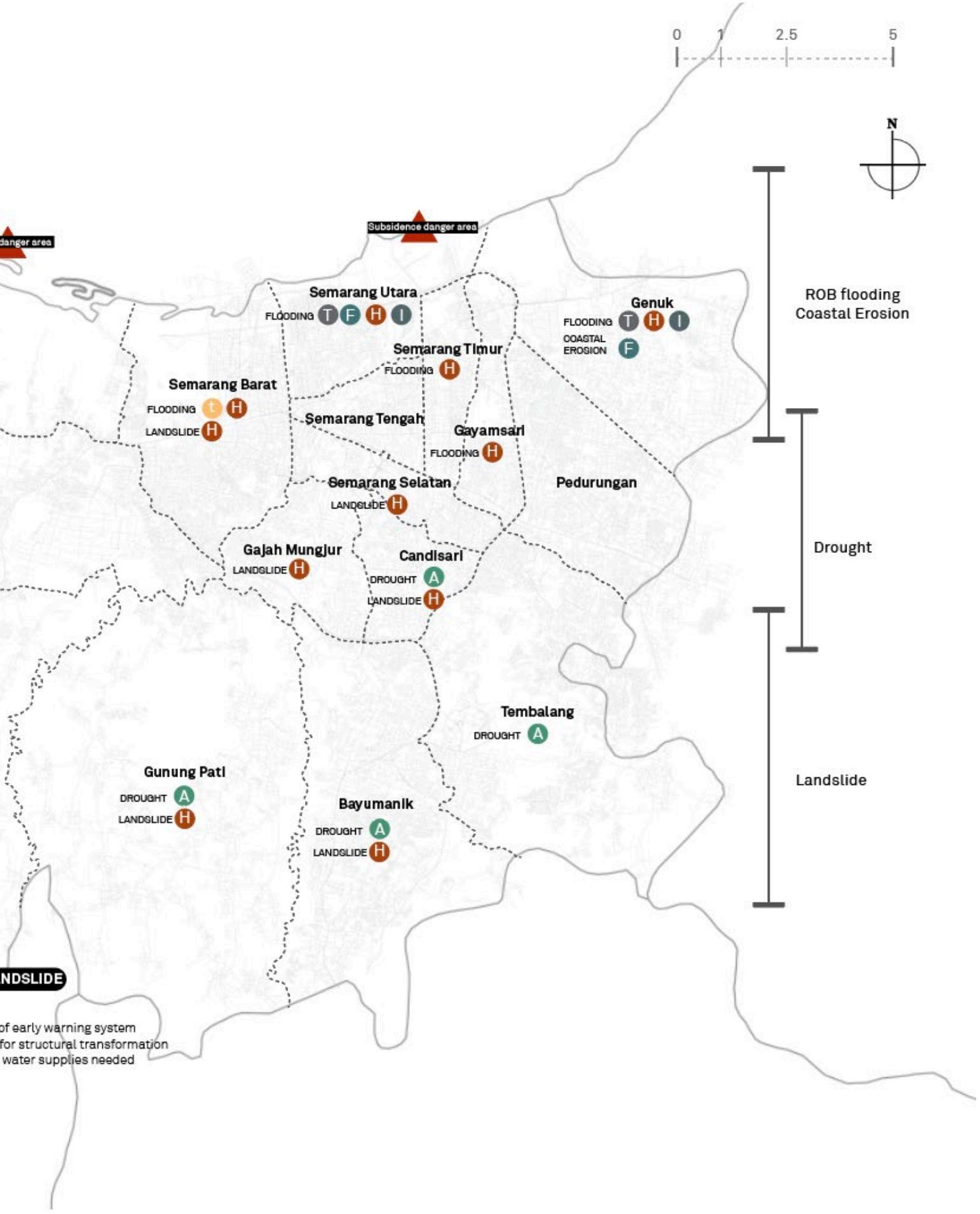
However, this problem also makes the community organization and gathering even stronger. The government is now striving to make the Bottom-Up structure more closely connected to the Top-Down structure, forming a link between uncontrolled development and policy regulations.


(fig.3-30 collage of residents of Semarang City)

## *6.3 Challenges of Semarang*

The city of Semarang faces many challenges from water, soil, to urban development issues. Looking at the city and municipality as a whole, the hazard index can be seen at a glance in the following map above. The dependency ratio of an individual and the hazard rate of each district is compared, then categorized according to the level of danger each individual faces. The danger rates are the highest in flood and landslide danger areas. Below, the main challenges that are faced by Semarang are studied closer to further comprehend the current state of the city.

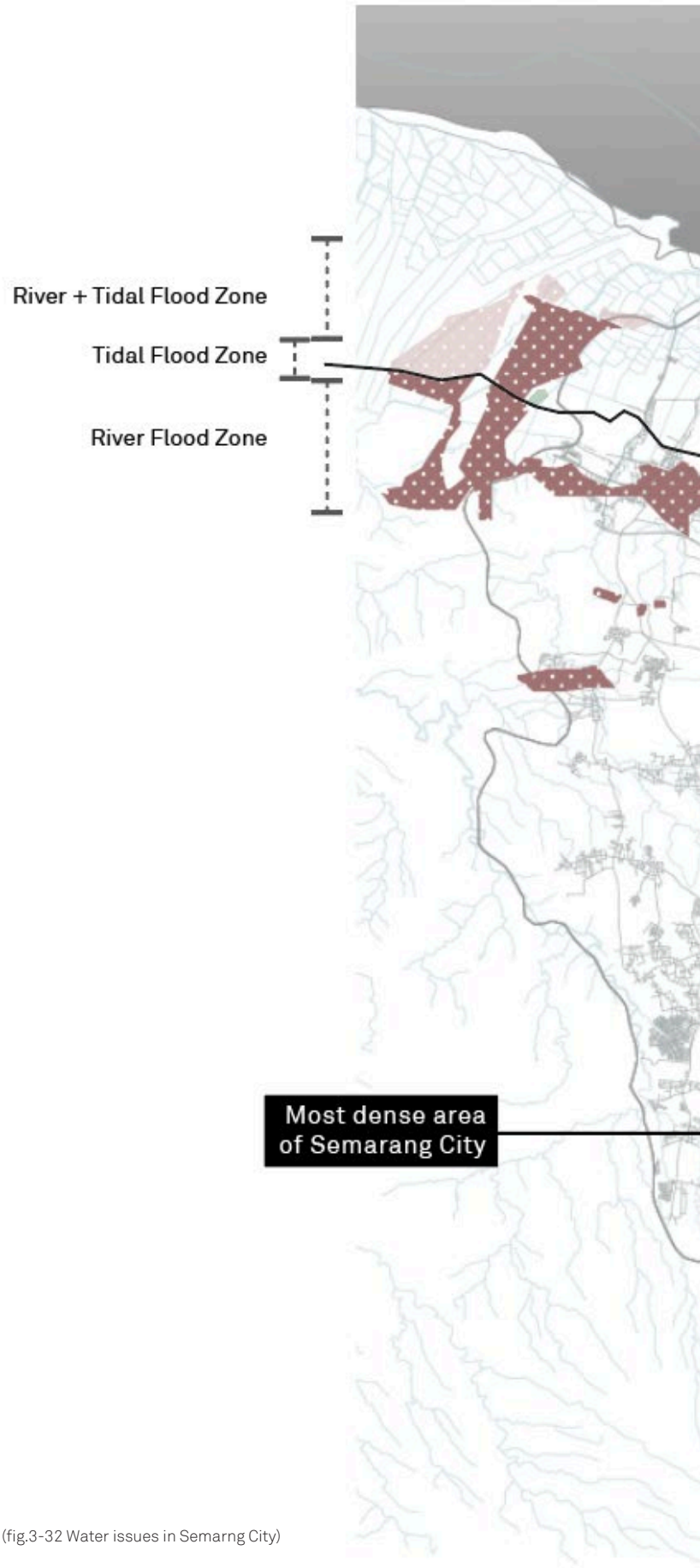

(fig.3-31 Issues per district in Semarang City)


0
1
2.5
5
N
danger area
Subsidence danger area
Semarang Utara
FLOODING T F H I
Genuk
FLOODING T H I
COASTAL EROSION F
Semarang Timur
FLOODING H
Semarang Barat
FLOODING t H
LANDSLIDE H
Semarang Tengah
Gayamsari
FLOODING H
Pedurungan
Semarang Selatan
LANDSLIDE H
Gajah Mungjur
LANDSLIDE H
Candisari
DROUGHT A
LANDSLIDE H
Tembalang
DROUGHT A
Gunung Pati
DROUGHT A
LANDSLIDE H
Bayumanik
DROUGHT A
LANDSLIDE H
ROB flooding
Coastal Erosion
Drought
Landslide
NDSLIDE
of early warning system
for structural transformation
water supplies needed

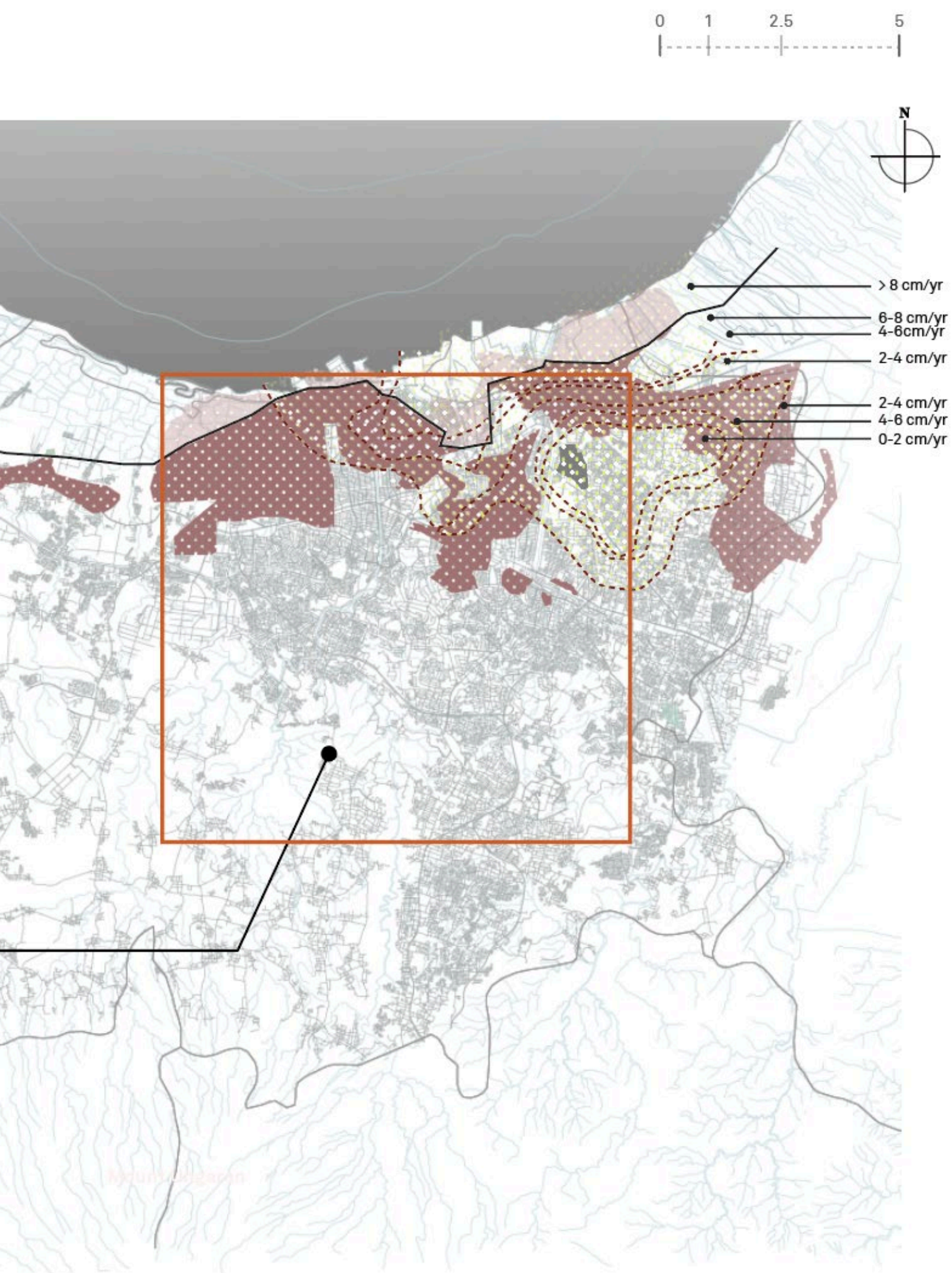
*a) Water issues*
*- General Overview*

The urban landscape of Semarang is largely characterized by its water bodies. The Java Sea borders the city in the North. The coastal area used to be bordered and protected by mangrove forests, but much of the natural mangrove forests are now lost, causing even more flooding, erosion and sedimentation issues in the coastal area. From the Java Sea up to Mount Ungaran, Semarang River runs through the heart of the city in center of the cityscape. The Semarang River plays a crucial role in battling flash floods-caused by sudden increase in rainfall and water flow from the mountainous areas-in the city. However, hardening of the river edges and improper maintenance of the river is only contributing to increased flooding and inability to discharge water in cases of flash floods. To assist with the water discharge to battle flooding issues in the city, two canals each in the East and the West of the Semarang River were later added.

Semarang is currently transformed into an actual polder system that, for a clear understanding, has nothing to do with the public ponds that are locally named 'polders' as well. The coastal defense master plan that is in the making consists of a large dyke structure circumscribing the urbanized region of Semarang as well as its shoreline and mangrove areas. This seawall will also serve as a highway, being an important connector for Semarang and the regional traffic between the East and West of Java. A series of pumps and water basins will drain the new polder system, although the weakest links within this vulnerable approach of coastal defense need to be examined still.

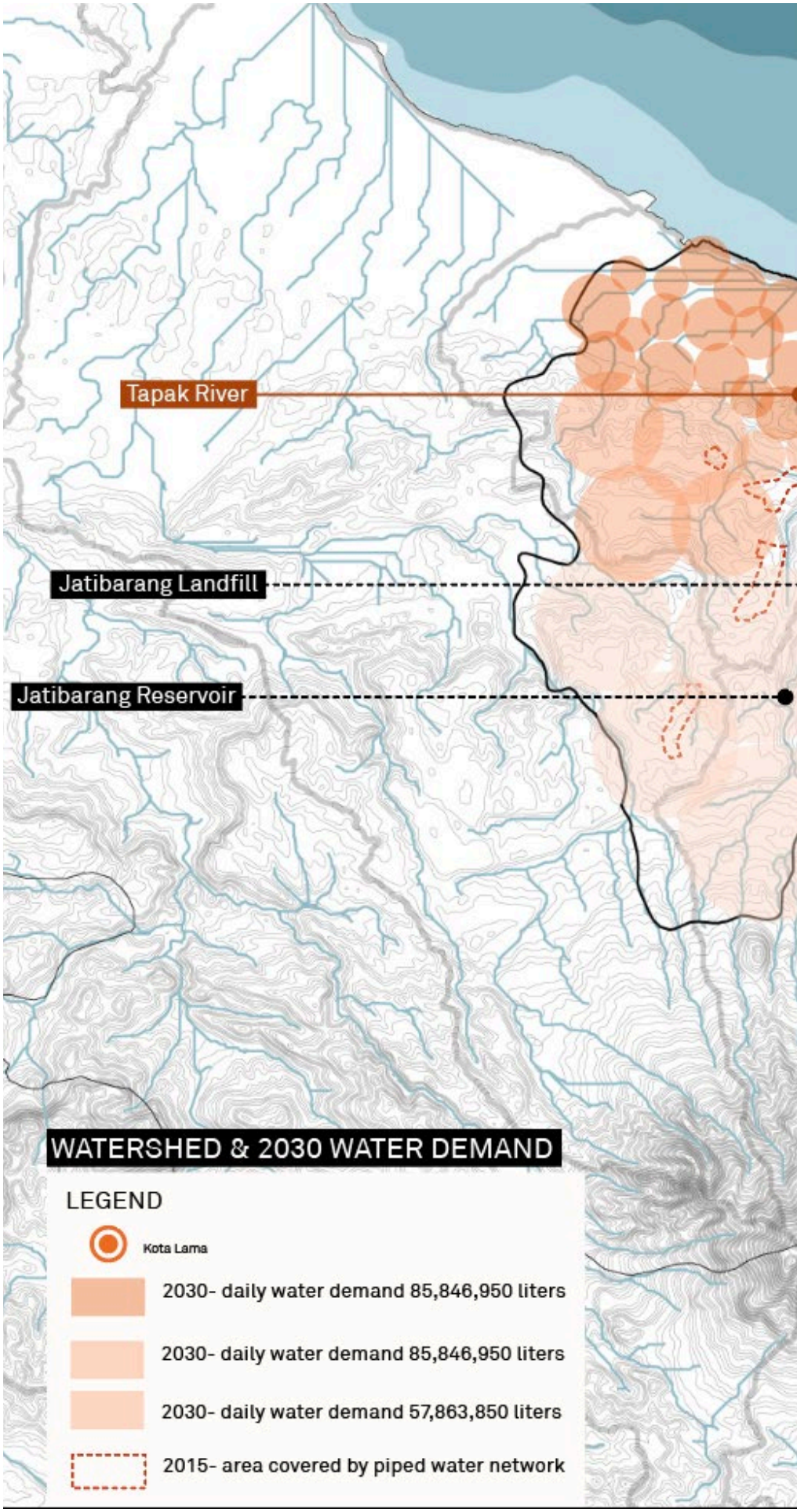



(fig.3-32 Water issues in Semarng City)

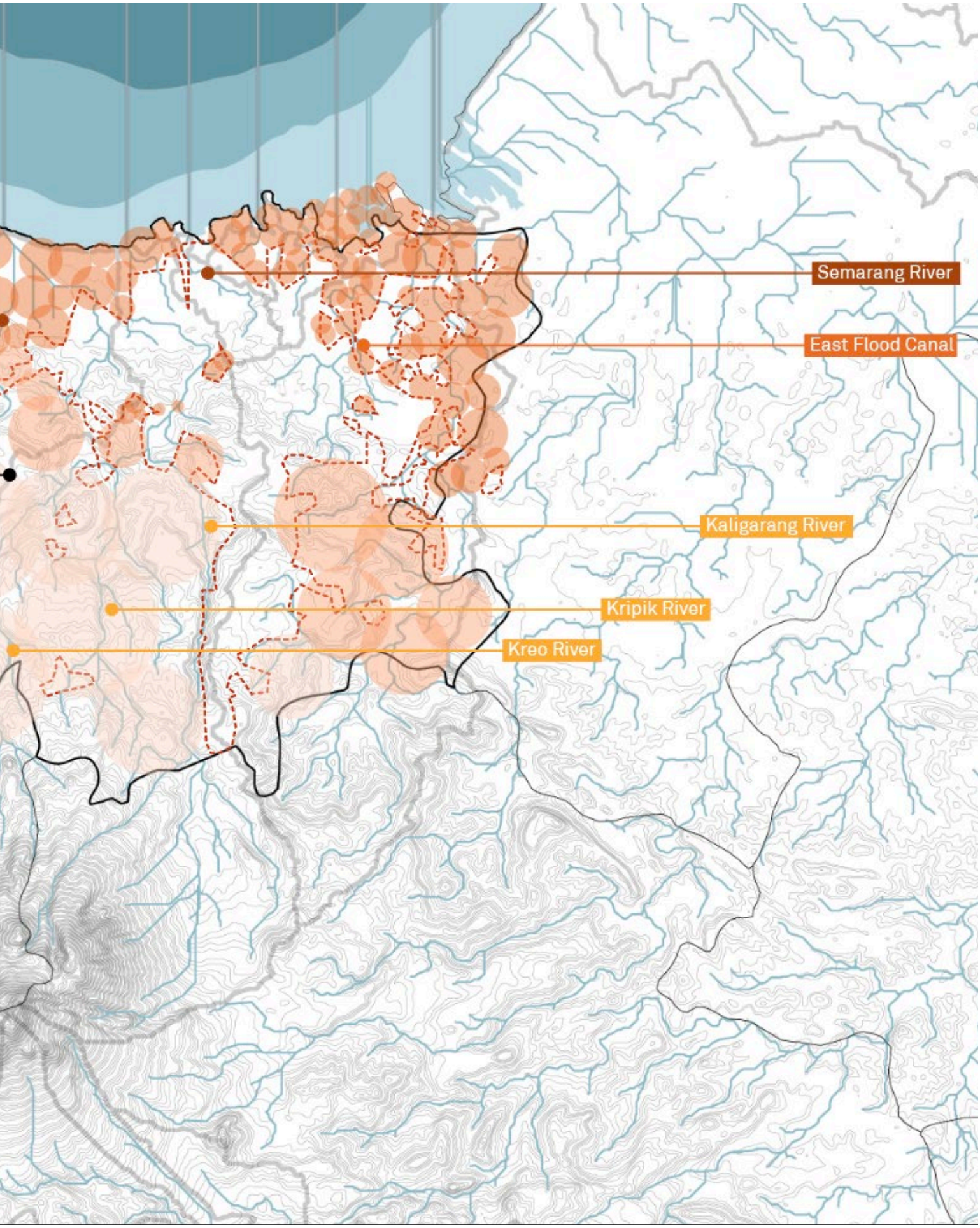

0
1
2.5
5
N
> 8 cm/yr
6-8 cm/yr
4-6cm/yr
2-4 cm/yr
2-4 cm/yr
4-6 cm/yr
0-2 cm/yr

*a) Water issues*
*- Fresh water supply*

Fresh water demand to increase up to 200% in the next 15 years. It is difficult for the city to keep up with such high demands of fresh water, thus pushing the local residents to the edge and forcing them to forage fresh water supplies on their own. This is making the residents extract water from deep wells for drinking and cooking, because the water on the surface is too polluted.




(fig.3-33 Watershed & 2030 water demand of Semarang City)


Semarang River
East Flood Canal
Kaligarang River
Kripik River
Kreo River

## *b) Soil issues*
## *- Subsidence*

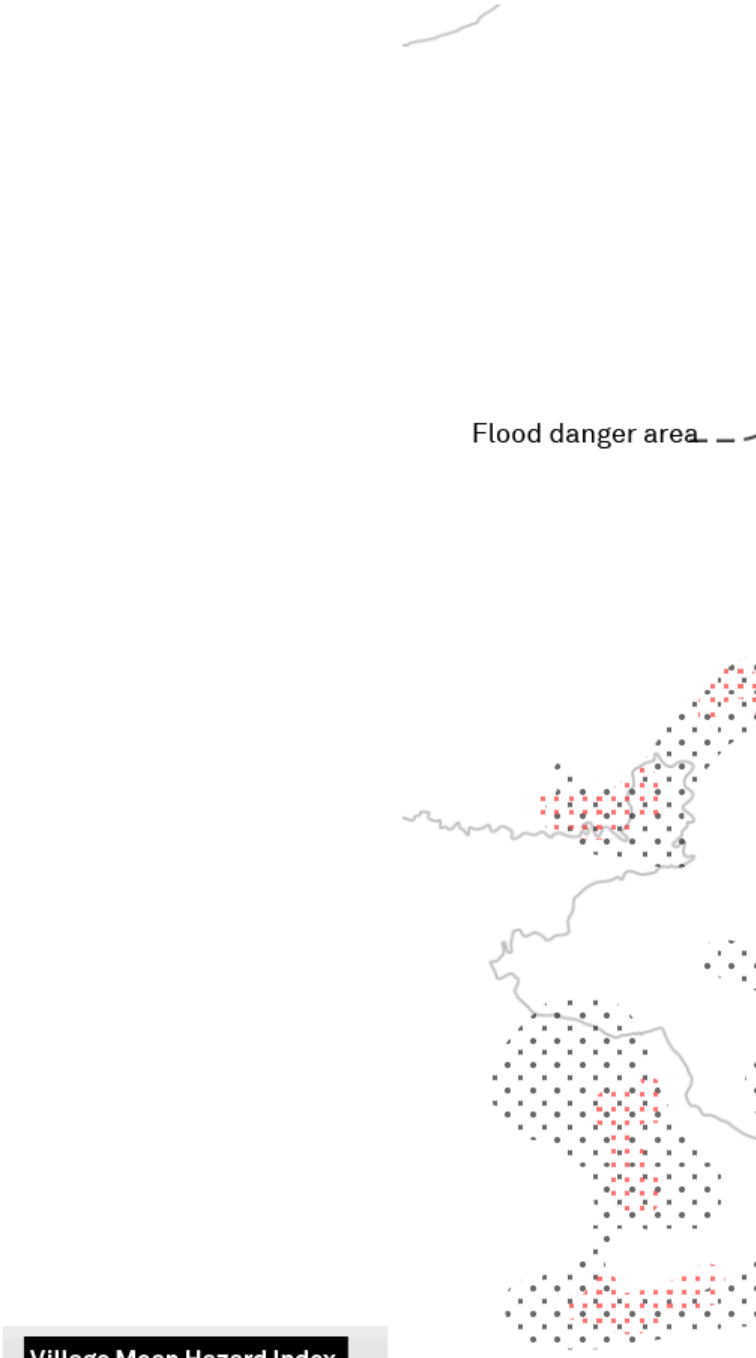
The North East Java Sea coastal area of Semarang city is in danger of extreme soil subsidence. Together with sea level rise, the subsidence rate in the area varies from 0 to 2 cm per year to over 8 cm per year in some areas. Subsidence together with water level rise brings about the rate of Semarang sinking about 6 to 7 cm per year, with maximum rates up to 14 to 19 cm per year in some areas.

## *- Sedimentation*

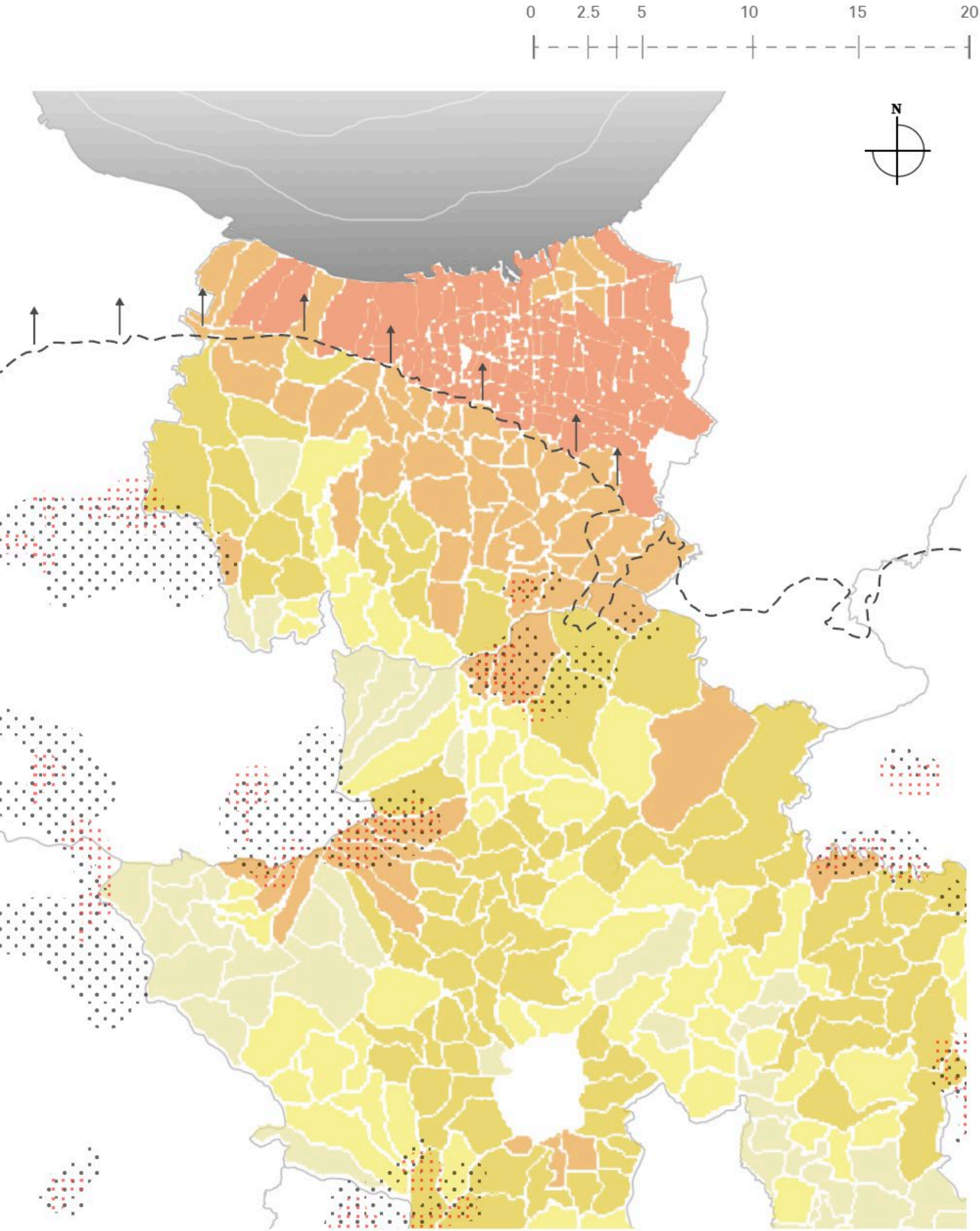
Sedimentation issues are occurring because the sedimentation is not gathering at preferable locations on the coastal areas of Semarang. Where the soil needs to stay, the soil is shaven away by coastal erosion.

## *- Landslide*

Development in mountainous areas triggers landslides, and development along volcanic faults on Mount Ungaran can even also cause bigger troubles in case of tectonic or volcanic activities. When water seeps into the volcanic faults – which are all around Mount Ungaran (especially around the South and South East part of the mountain) – it can cause plate movement which can cause landslides and even volcanic activities at its worst.




(fig.3-34 Village mean hazard index of Greater Semarang)


0
2.5
5
10
15
20
N

### *c) Urban development*

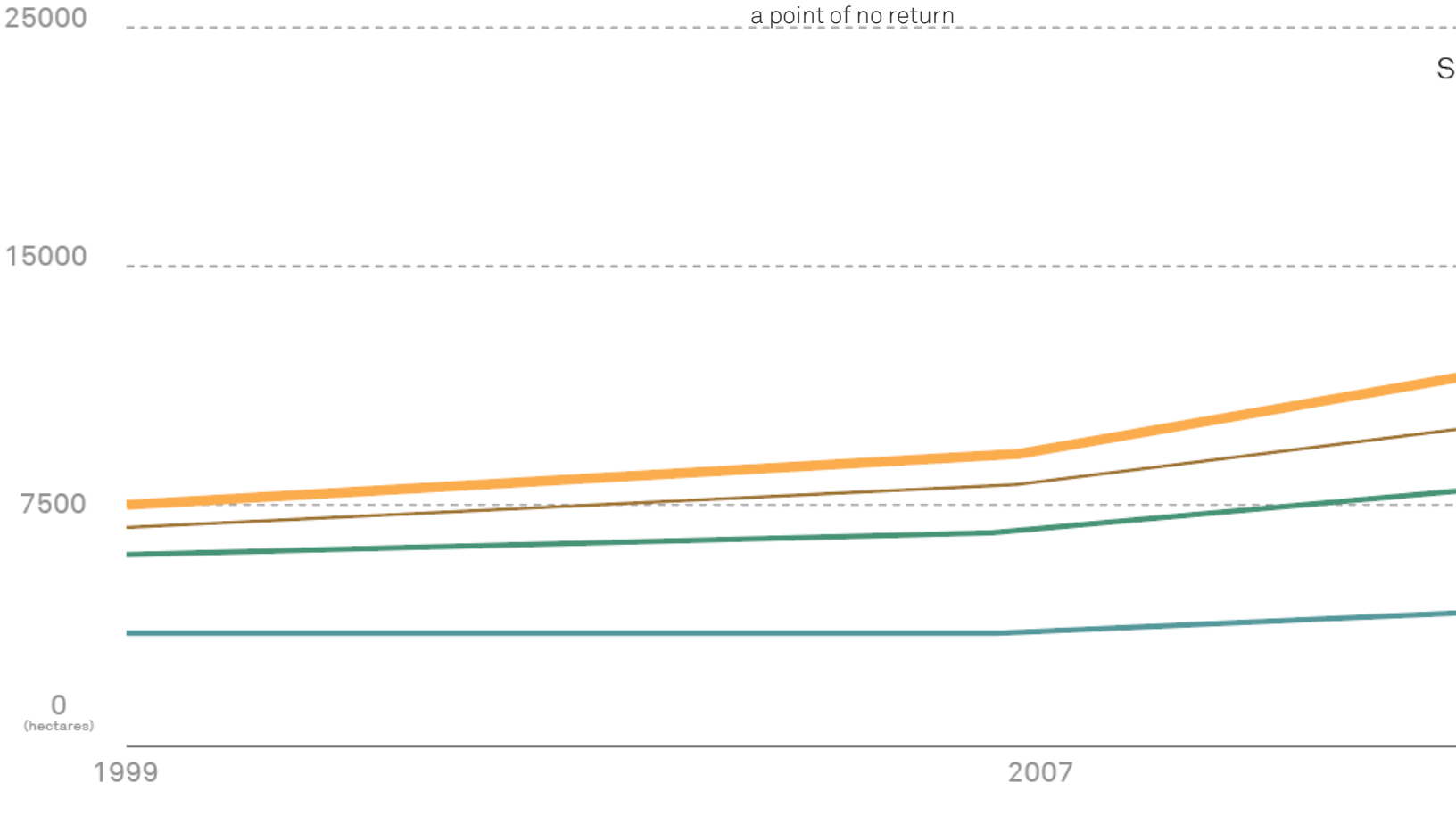
Semarang is going through rapid regional transformation, from the past and to the present day. However, the rapid urban sprawl and commercial activity developments is still parallel to its spatial organization. There are two main issues with indiscriminate development:

### *-No master plan to guide large-scale settlement and public facilities development*

Much of the economic development came from the switch from manufacturing to business, and local people's housing replaced by luxury hotels and shopping malls in the city center. The long term residents of the area are slowly being pushed out of the city and into the outskirts of Semarang. Due to this, old villages such as Basahan, Basahan, Jayenggaten, Morojayan, Petroos, Mijen, Sekayu, and others on Pandanaran Road at the center of Semarang City disappeared.

Furthermore, real estate developers construct infrastructure such as new roads, water pipes, electricity cables and phone towers and healthy and education facilities in the new areas they develop. These facilities are usually accessible by people in adjacent communities, thus making these development areas preferable zones for migrant destinations. For instance, small and large scale housing development and the equivalent facilities development carried out in Pedurungan and Genuk districts (Giyarsih and Fauzi, 2016) "triggered collateral development in the surrounding regions" (Sriartha et al., 2015). Thus, large scale developers play a crucial role in triggering regional transformation (Sriartha et al., 2015). However, these areas are usually the less urbanized and natural areas where people prefer to live in the peripheries of the city's urban areas. Therefore, without a clear strategy and master plan to guide the further expanding cityscape, it will be only a matter of time until the damages done to the environment and the natural context are at a point of no return

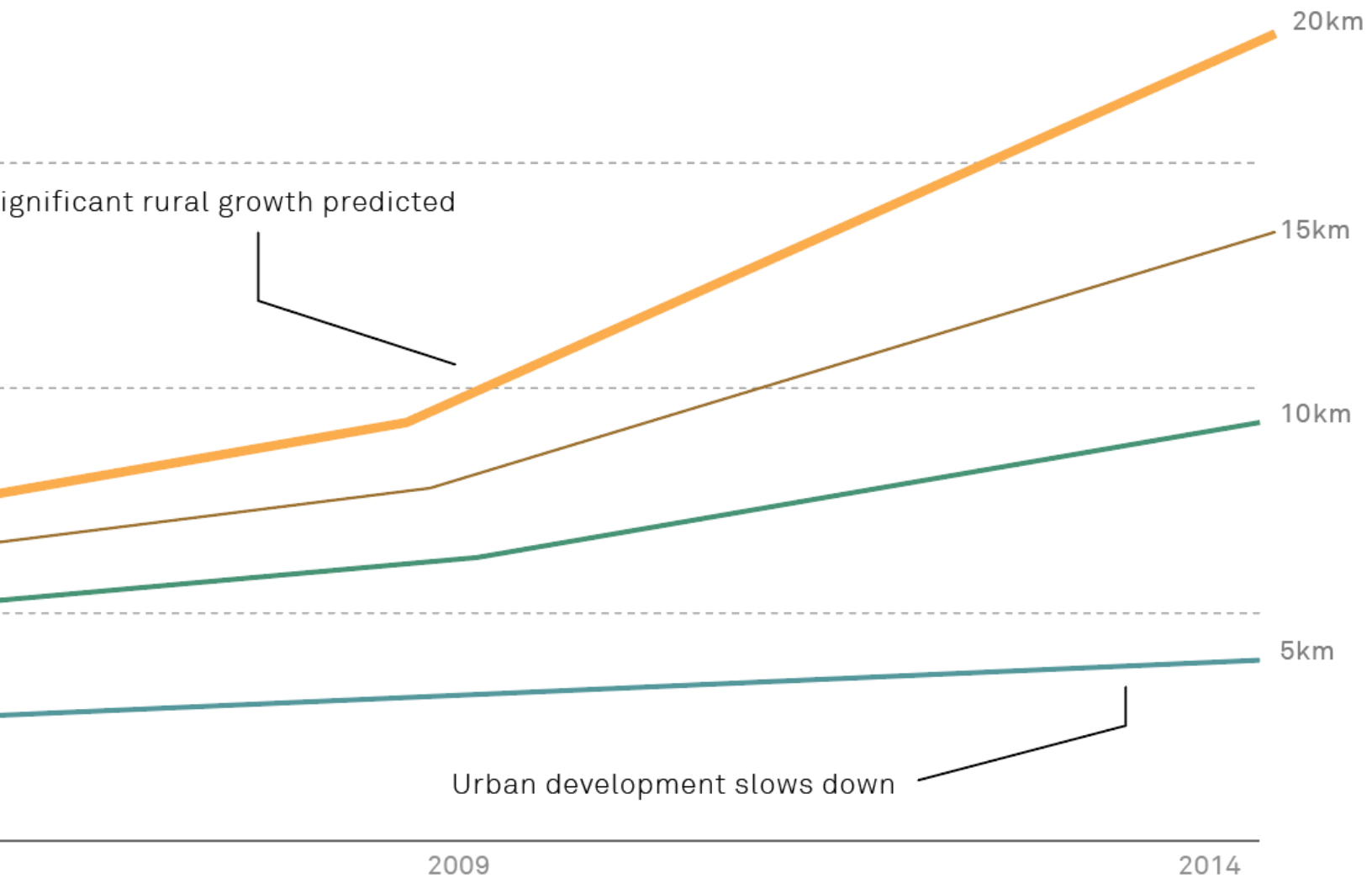
(fig.3-35 Semarang population growth predictions/source:UN)

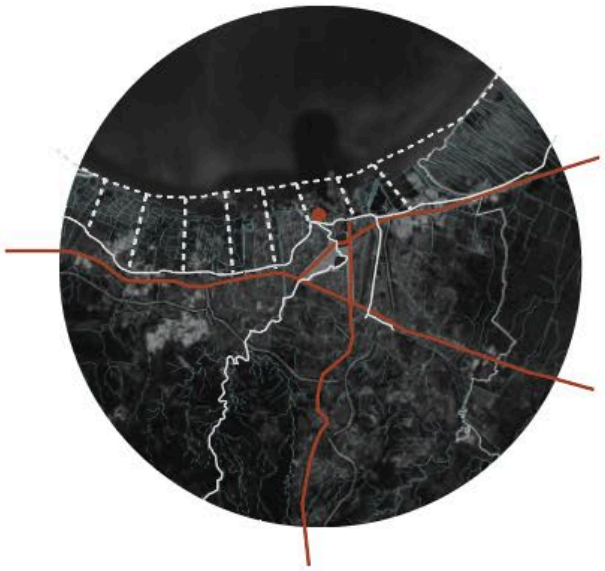


## - *Environmental damage due to development*

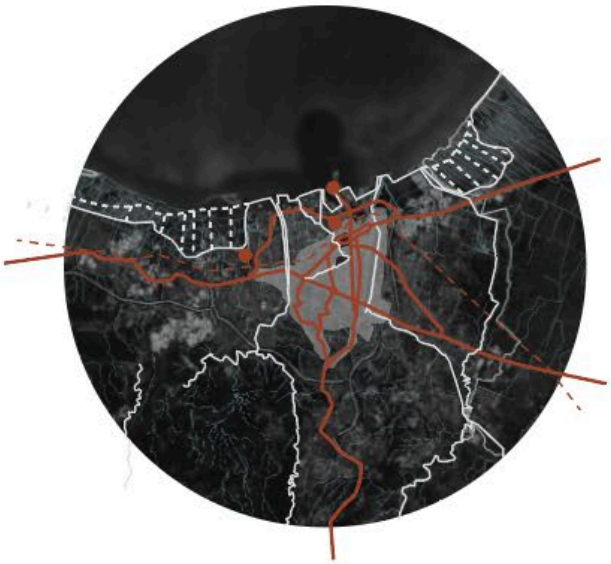
The issue of housing and facilities development in the suburban areas naturally leads us to the next issue of indiscriminate development; damage of natural resources and the environment. While much of the large scale development is done by real estate developers, a large portion of the smaller scale interventions are carried out in a community based consensus. Community based urban planning is becoming a bigger issue because the local settlements are beginning to form in nature preserve areas, causing damage to the priceless environmental assets of the area. Mount Ungaran to the South of the city of Semarang is home to countless numbers of endangered species, natural life and primary forests which cannot be recovered after it is harmed.

This issue of unconstrained development and environmental damage also goes hand in hand with waste and energy problems. Most households rely on LPG generators for energy, causing considerable contributions to increased CO2 emissions.

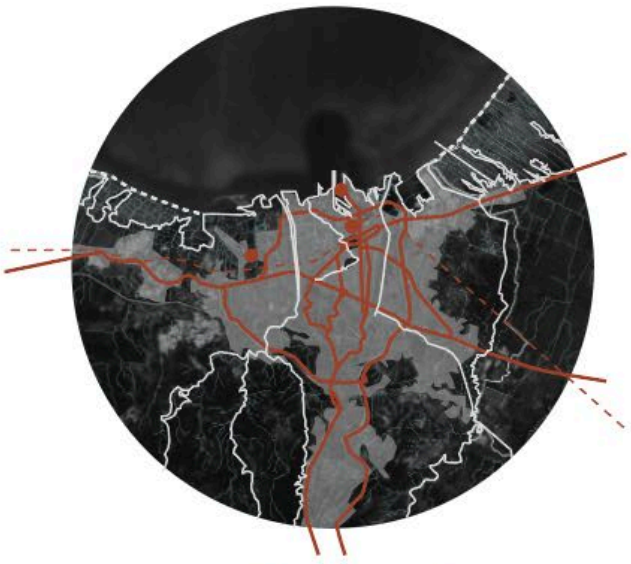




1880



1970



Current

(fig.3-36 Semarang Urbanization process)

*"In Semarang City, only two districts are still able to be developed.*
*They are Mijen and Gunungpati Districts because their population densities are categorized as low.*
*However, the development has to be conducted very carefully".*

*- Satya Hadi*
*(Head of Physical Infrastructure Sector,*
*the Regional Development Planning Agency of Semarang City)*

## *6.4 Opportunities of Semarang; The Future of Semarang*

Although the city of Semarang faces many natural and built infrastructural problems currently and in the future in the Business as Usual circumstances, there are many more opportunities than dangers that can be harness for further development. The future of Semarang is greatly anticipated by the locals as well as the citizens of Indonesia. The following four factors are the reasons why the future of Semarang is still shining bright, and why we should revive the city at all cost:

### *a) UNESCO World Heritage*

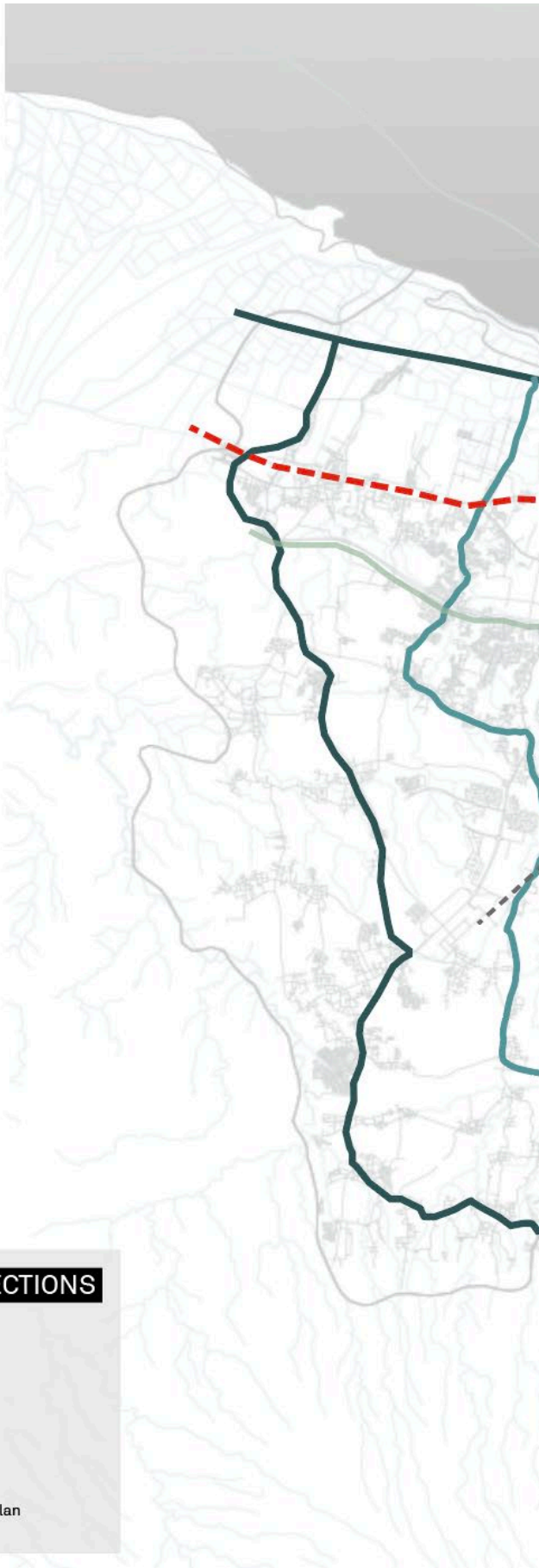
More attention is put into the city of Semarang, for it is aiming to become a UNESCO World Heritage City. The Delegation of Republic of Indonesia submitted its documents for Kota Lama, Semarang, to become UNESCO World Heritage site listed on January 30th, 2015. Kota Lama is the carrier of political, social and economic representation of the historical phases of human civilization; from its deep history in diverse architecture styles, the development of a fortified city to the growth into the international cosmopolitan city it is today. Although Kota Lama is still on the tentative list by UNESCO World Heritage, Kota Lama is in the heart of Semarang, helping to enrich the deep cultural identity and history of Semarang. In the coming future, the city of Semarang will relentlessly strive to become UNESCO World Heritage enlisted to preserve and protect the historical city center of Kota Lama, Semarang.

(fig.3-37 Street in Kota Lama)

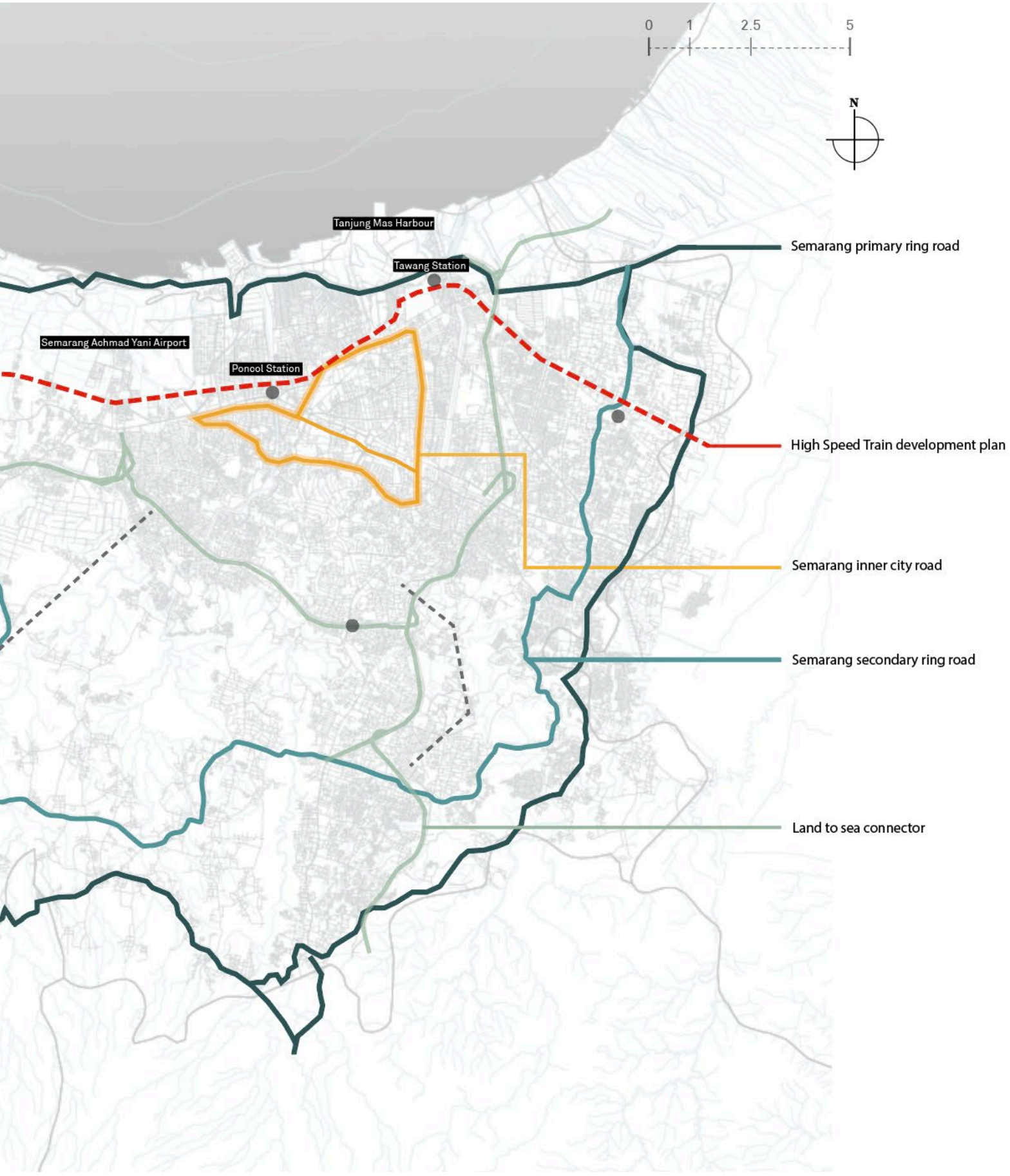
### *b) High speed train & Semarang ring road development*

The development of Semarang shows a deep connection with the development of locomotives and transportation throughout history. Semarang was a port city in charge of much of the trading activities in Central Java. Since the early 20th century, trading activities and also international cruise lines had also been developed in this historic port city. The influx of cargo and people in the harbor was further spread throughout Indonesia with the help of vehicles and trains. The train track running through Semarang is still today highly responsible for people transporting across Java Island. This horizontal connection will further be enhanced with the development of High Speed Trains on the Northern coast of Java Island, from Jakarta to Surabaya.

In order to solve the problems of traffic congestion in the city center, the city of Semarang is planning to develop a ring road system around the city. This would mean the heavy, fast traffic will be diverted to the outskirts of the city and only the slow everyday vehicle movement will be in the city center. The development of this ring road would mean the city is slowly preparing for the increase of traffic and population for the future, as well as the influx of tourists by the High Speed Train and harbor invigoration.



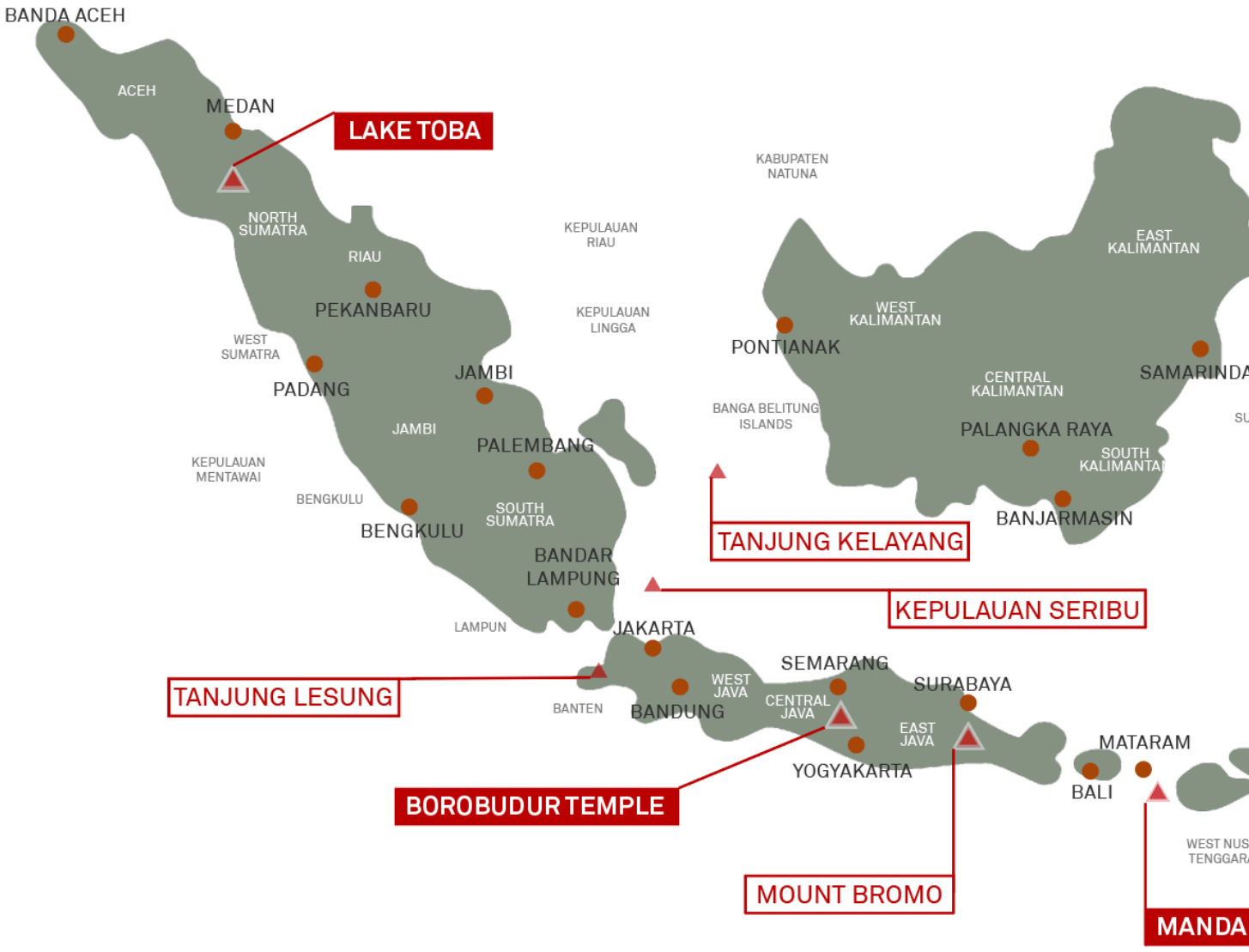

(fig.3-38 Future transportation development in Semarang city)


0
1
2.5
5
N
Tanjung Mas Harbour
Tawang Station
Semarang Aohmad Yani Airport
Poncol Station
Semarang primary ring road
High Speed Train development plan
Semarang inner city road
Semarang secondary ring road
Land to sea connector

## c) *Tourism development*

Together with the development of the High Speed Train and port invigoration planned by the city of Semarang, the government of Indonesia is also striving to create 10 new nodes of tourism hotspots. The most closely related development from Semarang is Borobudur Temple, about 100km (3 to 3.5 hours' drive) from the city center of Semarang. Tourists from all over Indonesia will gather via the High Speed Trains, and also through the port of Semarang.

Furthermore, tourists coming to Semarang to go to the South coast of Java Island will naturally pass through the h
rang. This will grac
increase in the city
efforts to become
enlisted will go ha
increase, creating
all.

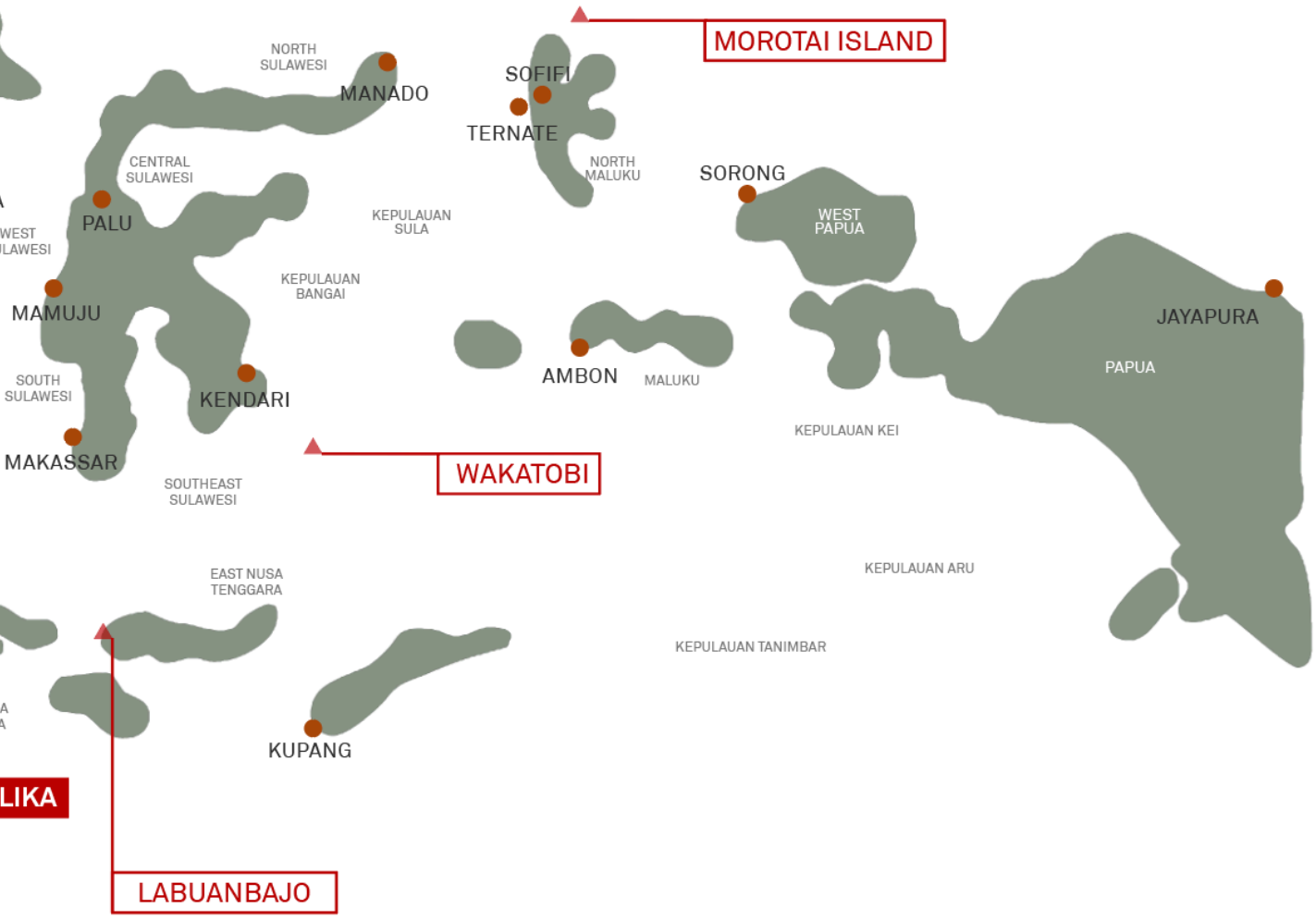



**10 NEW INDONESIAN TOURISM HUBS**

LEGEND

- Main cities
- Priority locations

historic old town of Sema-
dually expedite tourism
y of Semarang. Kota Lama's
UNESCO World Heritage
nd in hand with the tourism
an even bigger synergy for

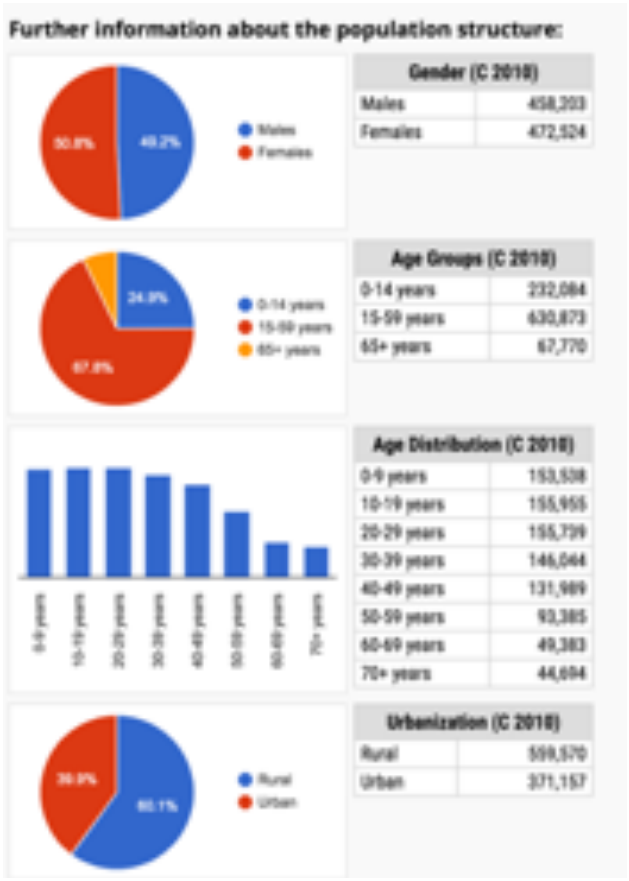



(fig.3-39 Future tourism development in Indonesia)

## *d) City population still young, potential for development*

The population of Semarang in 2019 was estimated at 1,832,670. However, in 1950, the population was merely at 371,000. The population was grown by 126,478 since 2015, making the annual growth at 1.80%. The population projections and estimates were made by the UN World Urbanization Prospects. These numbers are important in showing the urban situation of Semarang, for it represents the urban agglomeration of Semarang. This means that the numbers show the urban population in Semarang city and its adjacent suburban areas.

The age of the inhabitants of Semarang city is also very important. 71.55% of the population in Semarang is at a productive age. This means that over half of the population is still capable of engaging in economic activities. Even if tourism development is further made, the city is able to withstand the increased labor demands. This gives the city more potential for future developments and further economic growth.




(fig.3-40 Semarang population structure/source:UN)

(fig.3-41 Waterway in Semarang City)

# PART 4
# DESIGN

# *7. Design Strategy*
## *7.1 Design Strategies*

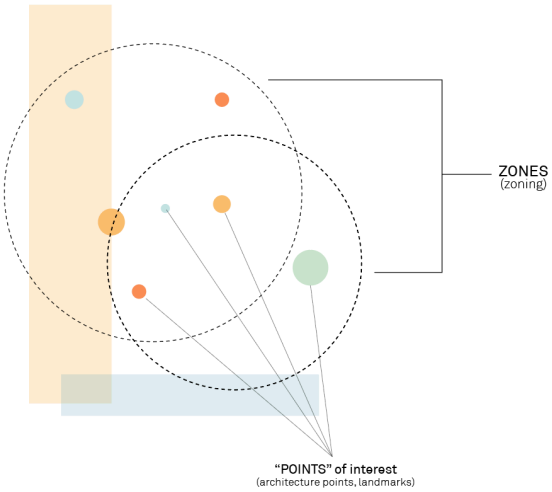
The design involves three design method strategies. The three strategies were chosen based on the theoretical research and methodology formation in the above section (4.1.1 Methodology flow). The three are:

### *a) Zone*

First, the zoning strategy is extracted from the mixture of Casco-Concept by Kerkstra and Vrijlandt (1988) and Layer Model by McHarg (1969). The two theories are combined to form the theoretical basis of the structural framework in the regional design. In order to form the framework, the first step is to sort the landscape by its characteristics and functions and categorize it again by its relevance to Heritage zoning and Restriction zoning.

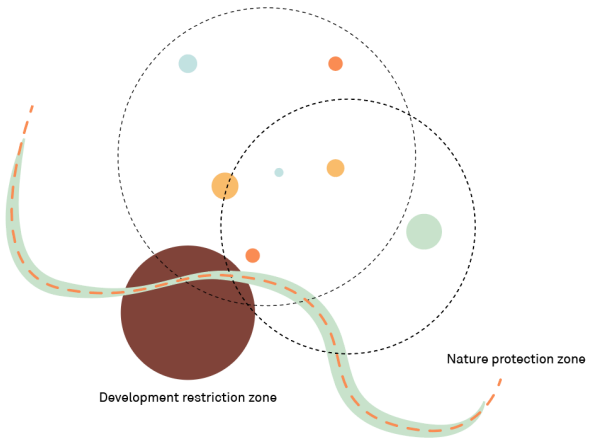
Here, the Heritage zoning refers to the landscape cultivation and transformation of the land throughout history. This cultivation in the end forms the landscape identity and thus the landscape heritage of the site. Within these landscape heritage zones are the architectural heritage points of interest; which are the architecture heritage buildings in the area.

The Restriction zoning is an extension from categorizing the landscape according to its characteristics and functions. The areas in need of protection or limited development will be sorted as the Restriction zones, which literally means development in these areas will be constrained.




**Heritage Zoning**

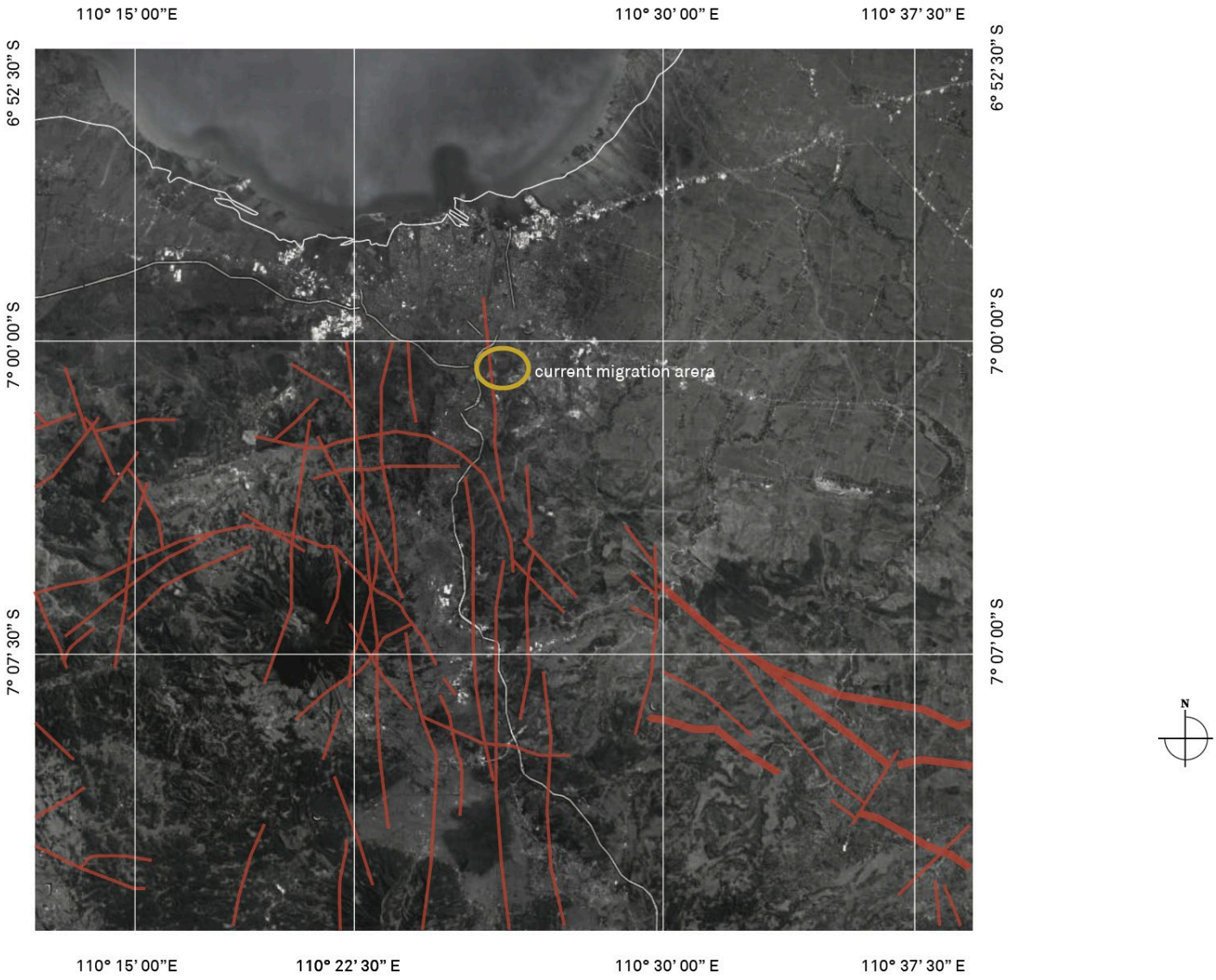
*- landscape*
*- architectural heritage*




**Restriction Zoning**

*- nature protection zone*
*- development restriction zone*
*- aquifer protection zone*

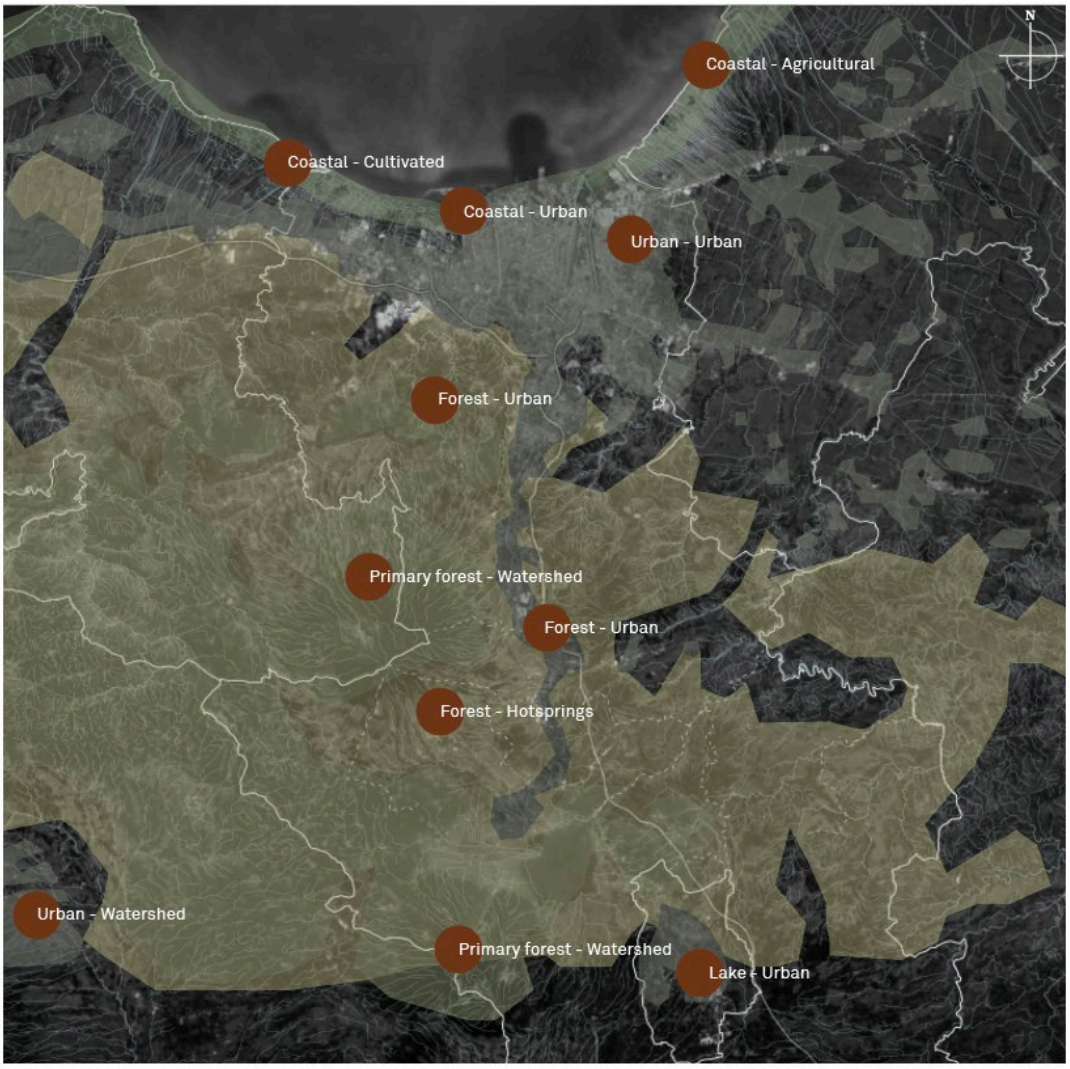
(fig.4-1 shcematic digram of zoning strategy)



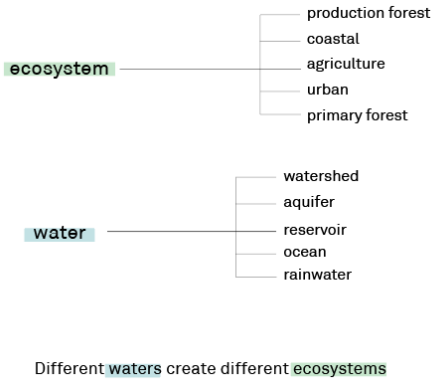

(fig.4-2 tectonic activity safety zone configuration using zoning strategy)

**Lubrication of pre-existing faults can cause earthquakes / damage. In this case, the suggested migration pattern is as follows:**

(fig.4-3 suggested migration route according to tectonic activity zones)




(fig.4-4 Ecological identity zoning study)



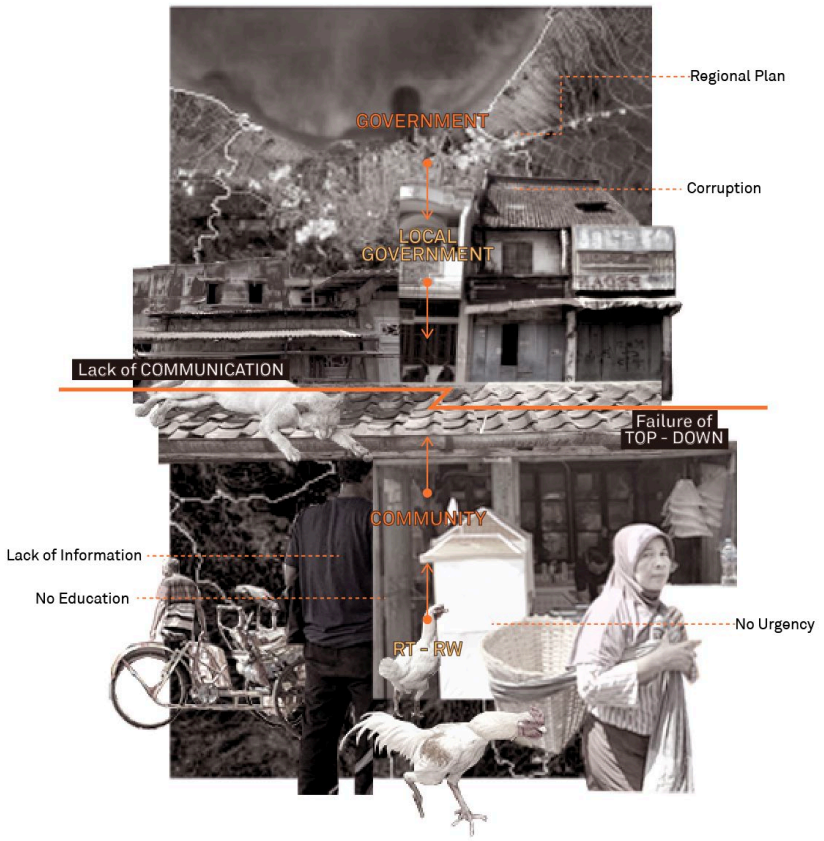

The relationship between water identity and land use was mapped. The different cultural and geographical identity of the land had to be analyzed in order to categorize the different urban and environmental zones in the site area.

Especially for the regional framework, the identity of the area has to be analyzed in order to faciliate movement south while also keeping the heritage.

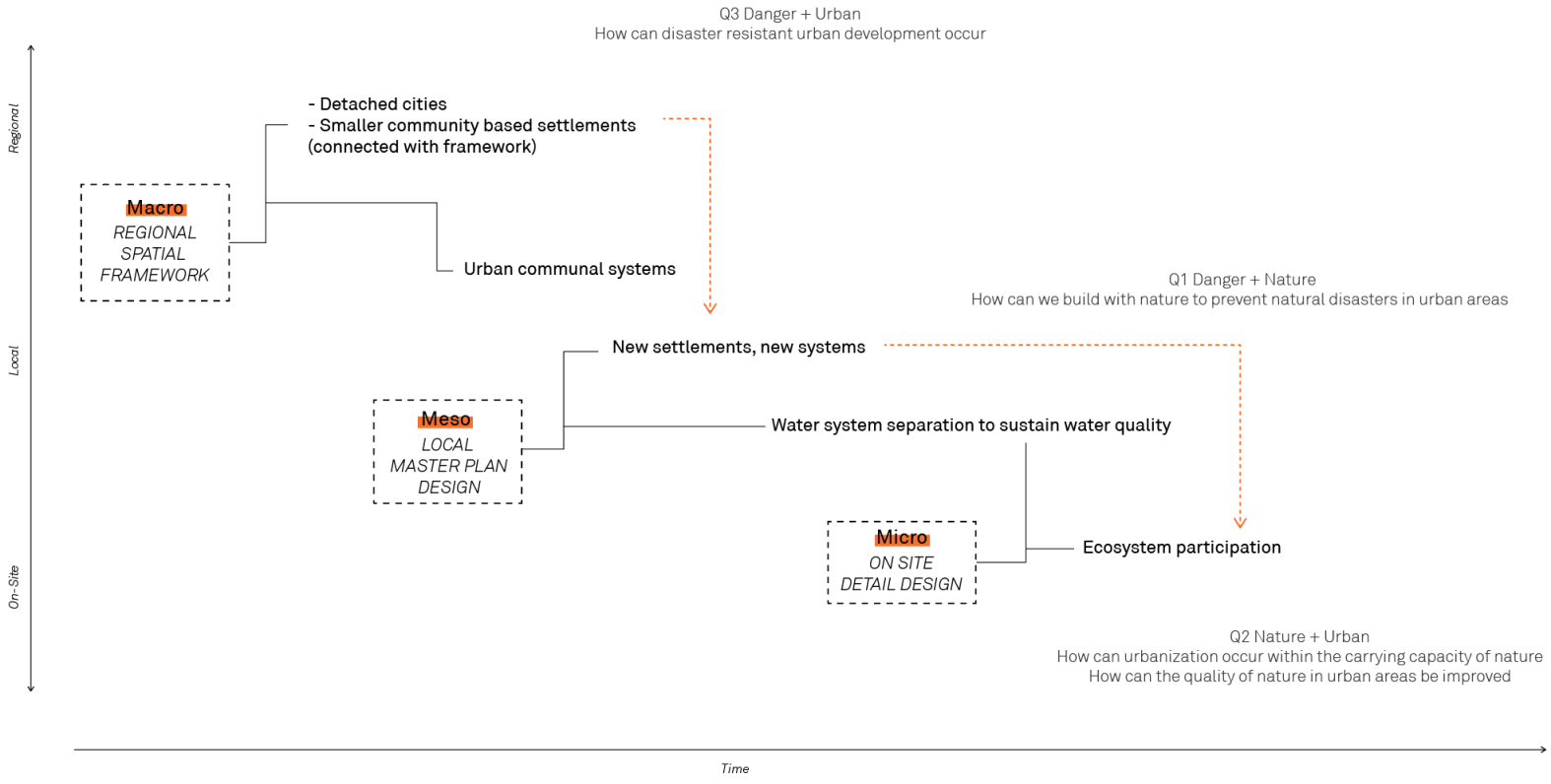
## *b) scale*

Then, the scale perspective is drawn from Ecopolis strategy by Tjallingii (1995). Tjallingii formed the strategy in a threefold system, which are flows, site/areas, and participants; listed from the largest to the smallest scale. Each scope has different object, problem and objective but in the end has to configure a balanced structure in the end to form an Ecocity.

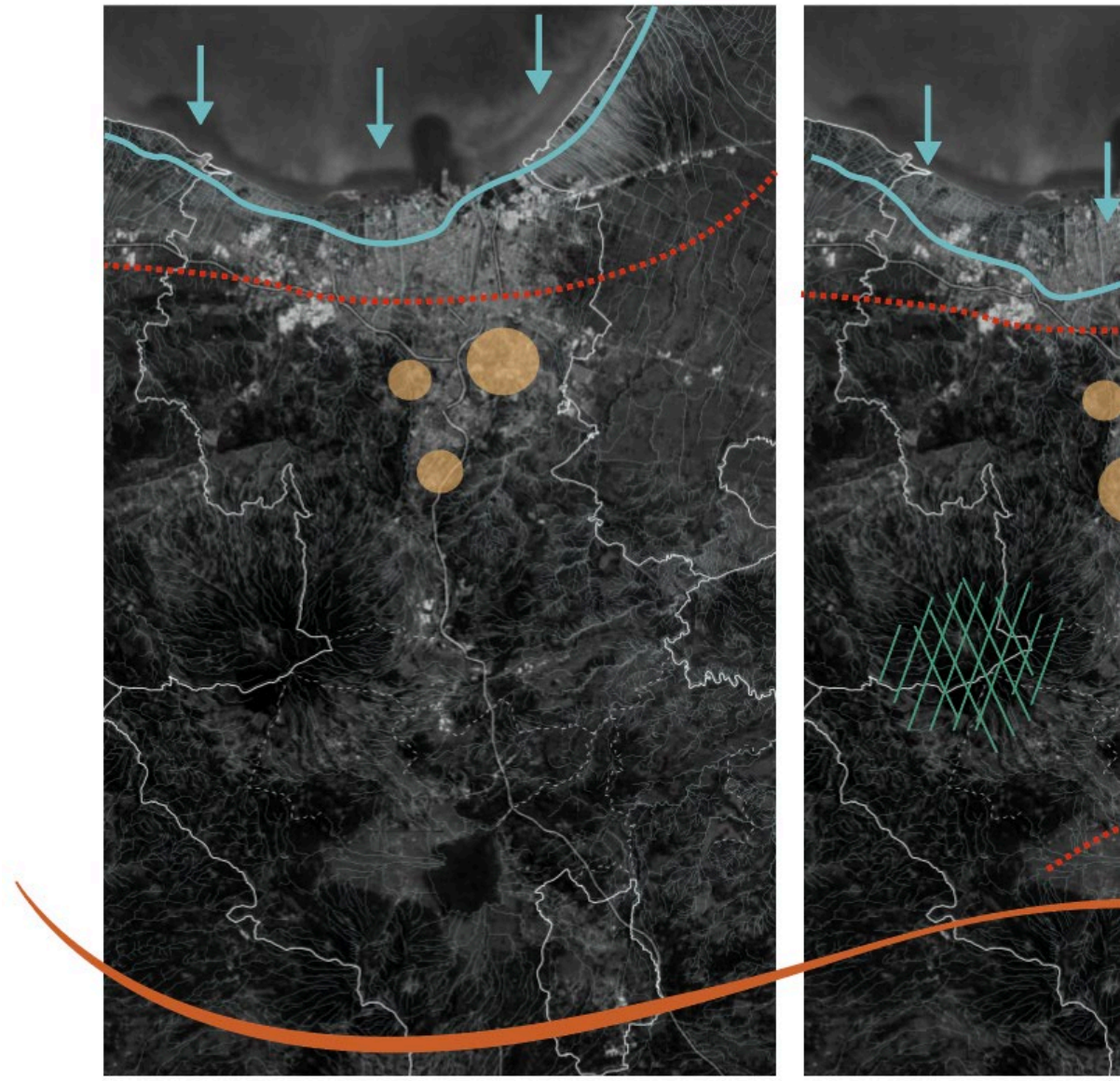
From the threefold system, the flows are related with the macro scale of the design. This scale deals with the regional spatial framework for the whole city. The framework will be formed based on the zoning strategy mentioned above. The site/areas is the meso scale. This is for the local master planning of the site area, and will include more details of the specific neighborhood. The last is the participants which is the micro scale. The micro scale is for the on-site detail design, with test areas chosen from the meso local master plan design. The on-site details will involve site specific design interventions, where the residents and local people can interact with the design interventions.




(fig.4-5 Diagram of social structure of Indonesia through different scales)




(fig.4-6 Relationship between scale and sub-research questions)



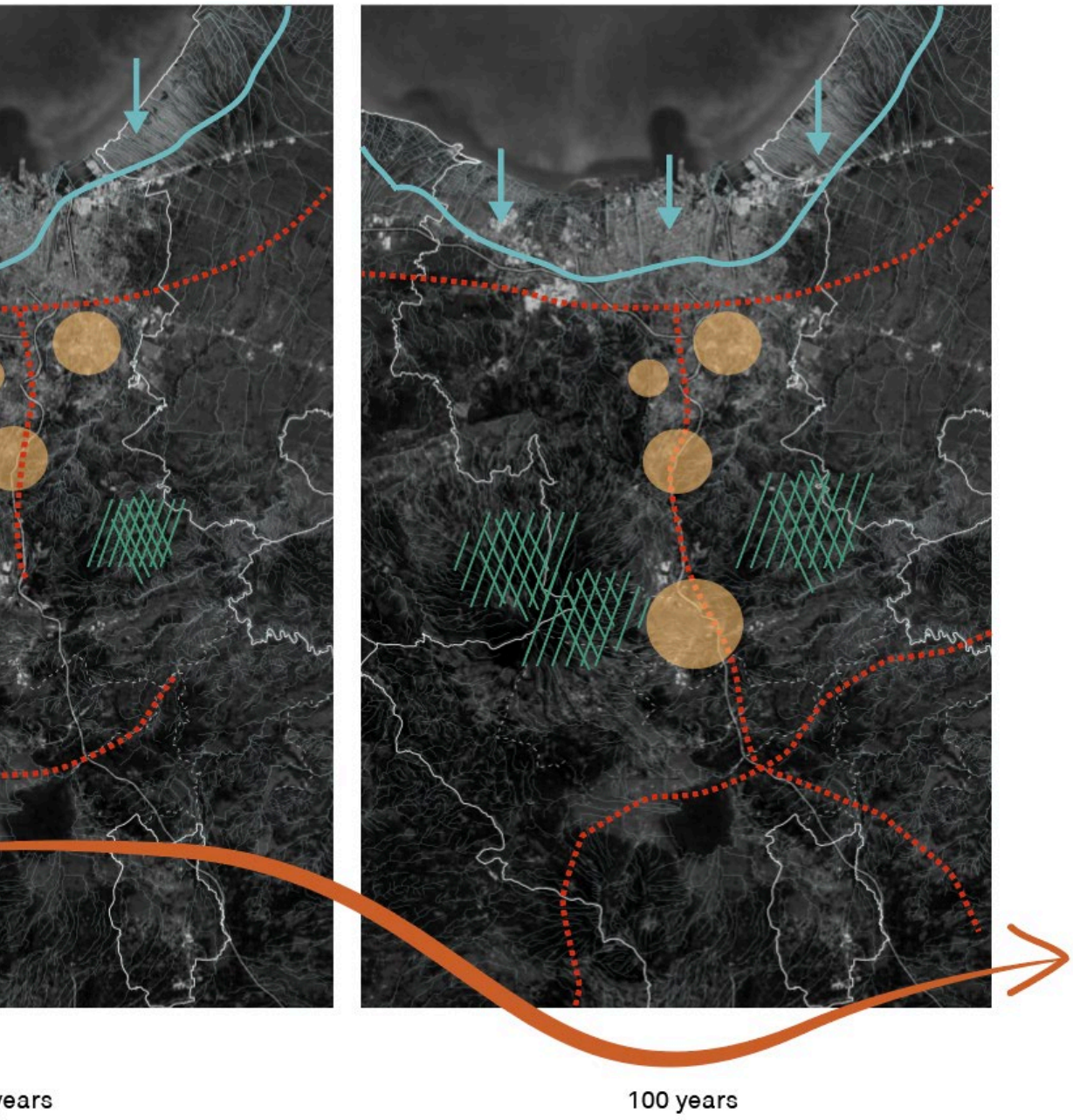
30 years

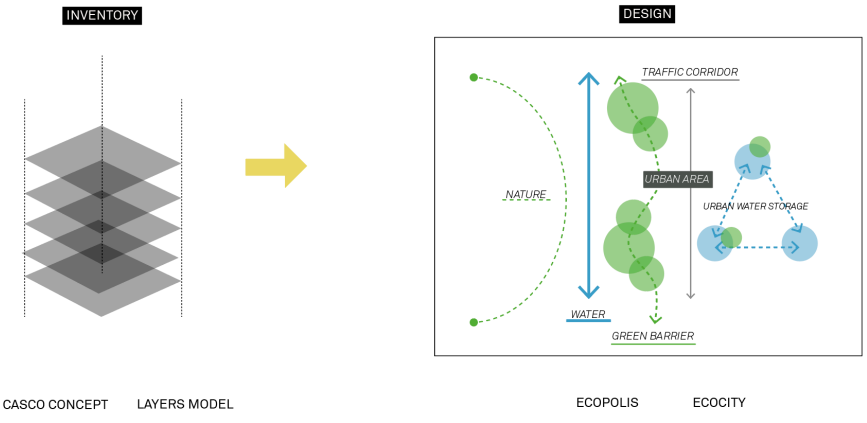
50 y

*c) Phase*

Lastly, the phase strategy shows step by step how the landscape design will evolve over time. This strategy has two parts, the time factor and the nature-infrastructure phases. Time will depict the changes of the design in future scenarios. The predictions will be made based on the statistical data and mapping inventory from the spatial analysis. Then, the nature-infrastructure phases will be made to show what steps will be taken to achieve the final design framework. This will mainly be the succession or cultivation of nature, and the step by step development of infrastructure in urban development.

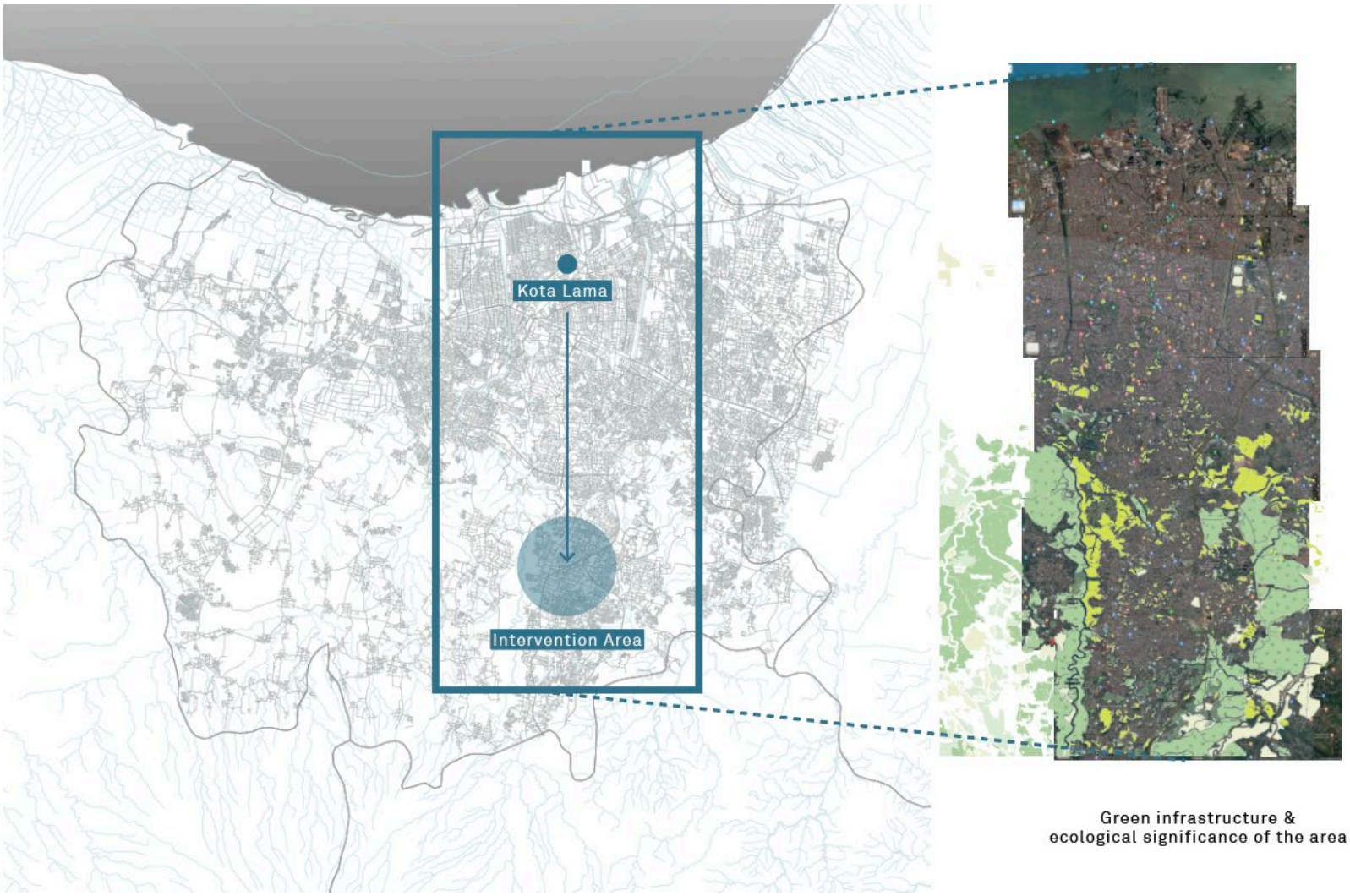
(fig.4-7 Schematic regional design phase diagram)




(fig.4-8 Relation between theoretical study and regional planning)

## *7.2 Intervention site*




(fig.4-9 Intervention area and its green infrastructure)

The chosen intervention site is in the South of Semarang City, bordered by Mount Ungaran on the East. The area is in the administrative boundary of Banyumaik, while covering the RT areas of Srondol Wetan, Srondol Kulon, and Pedalangan. There is mountain peak Gunung Selekor in the East of the design intervention area. The natural qualities of this area is relatively well preserved, for little development has yet been made in this area. The Kaligarang river runs vertically on the border of Administrative boundaries of Banyumanik and Sekaran. This river is part of the biggest water supply routes in this area, and thus must be more vigorously protected.

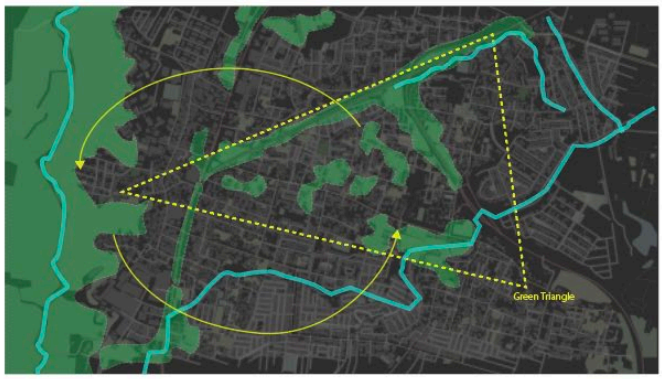
*Overall function study*

*Educational facilities*


*Religious activity range + void area mapping*

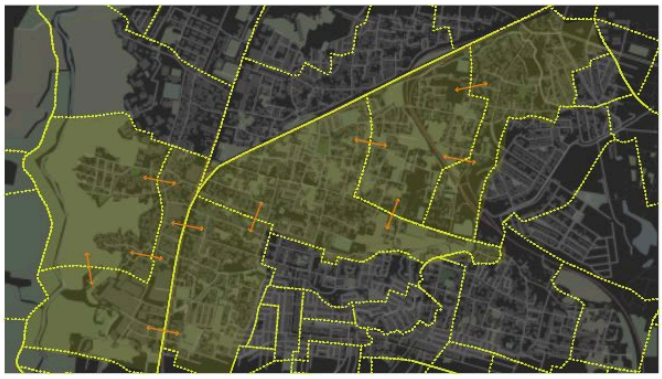

*Recreational area mapping*


(fig.4-10 Intervention area functtion mapping)




Green and blue structure

Traffic flow



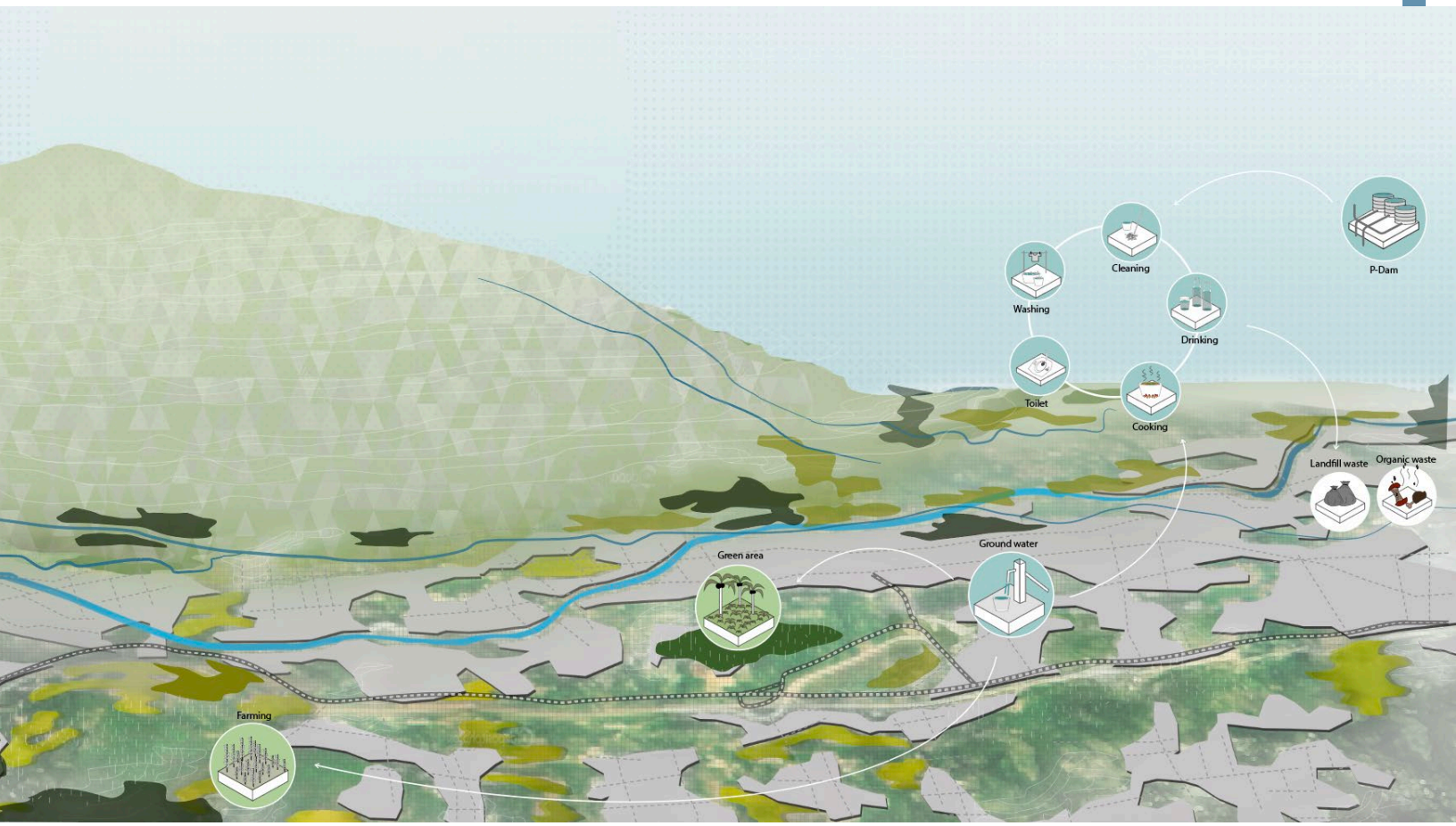
District Boundary Relations


Ecology Flow

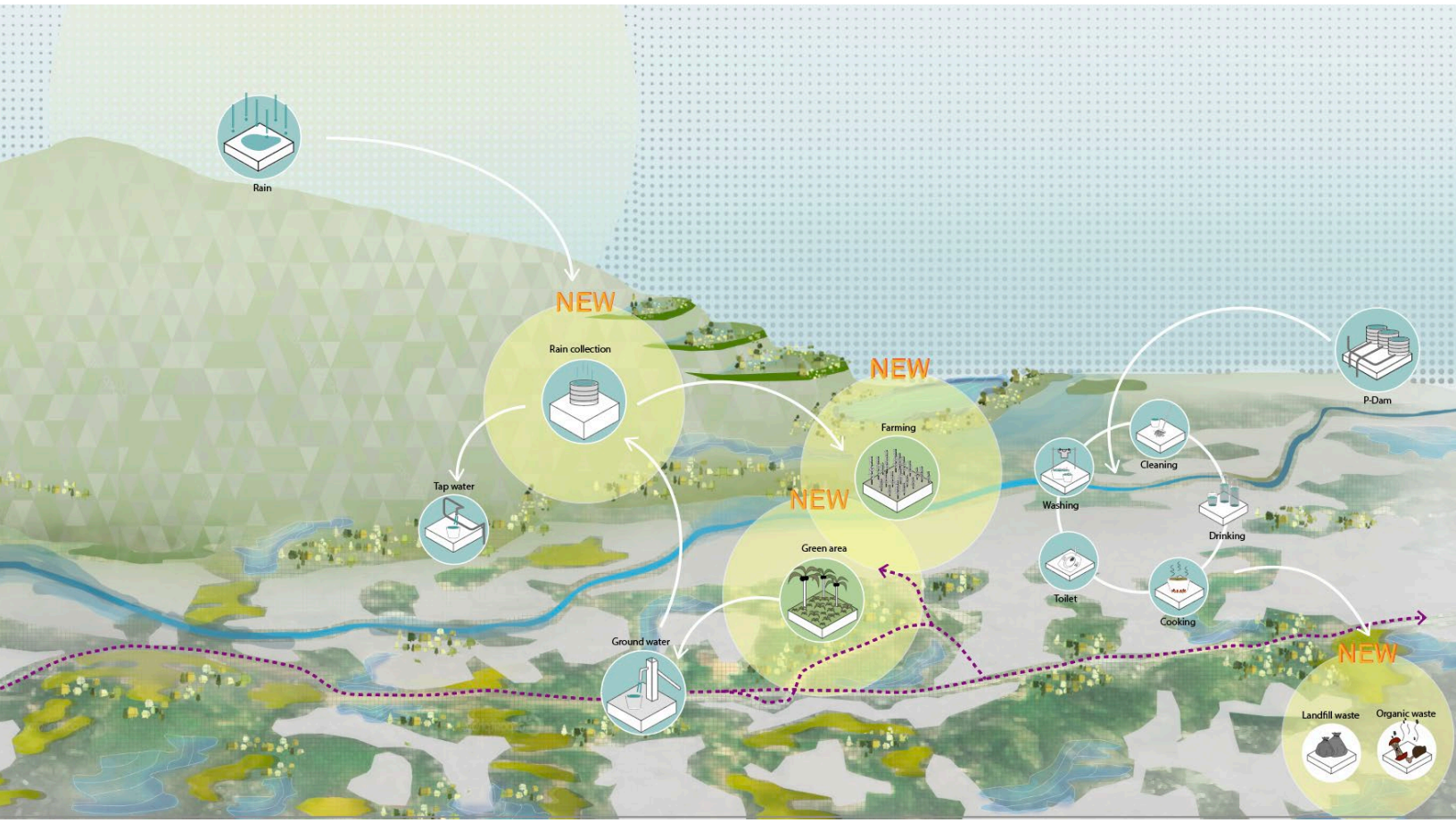
(fig.4-11 Intervention area metabolism mapping)


(fig.4-12 Intervention area elevation mapping)

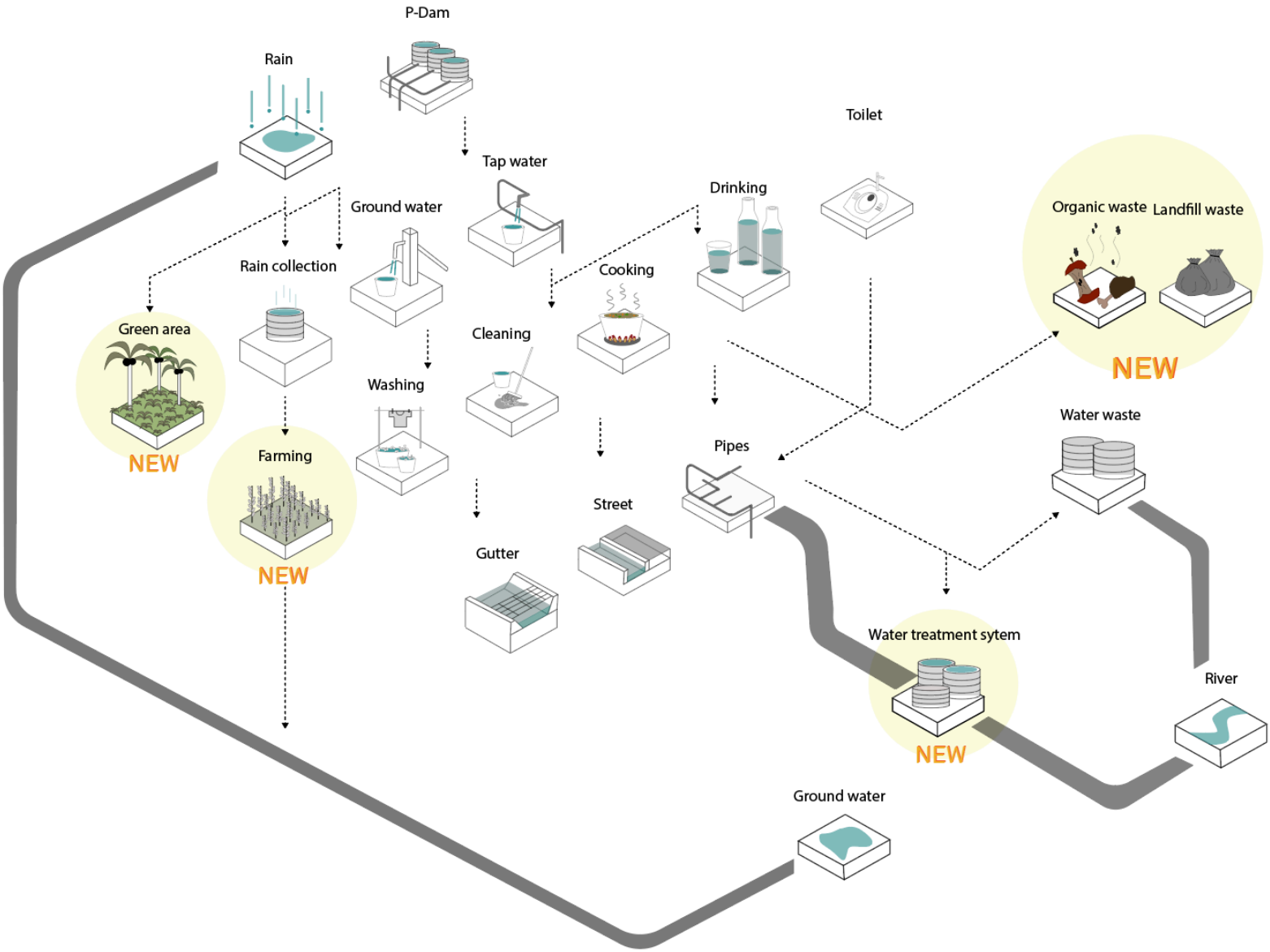
The area here is in the highlands, thus development is centered around the area which are relatively less steep, and have less dangers of landslides. The landslide danger areas, and tectonic movement of the mountainous areas had to be mapped in order to figure out the preferable areas for development in this project. The analysis about the hinterlands volcanic activities were crucial, because it is in relation with the new settlements that will be made in the up-hill areas. Geothermal activities affect settlements because it creates tectonic movements and hot spring activities which is harmful for people living in the area. Also, up-hill activities affects the land subsidence in the low hill areas; the whole landscape is connected to each other.




(fig.4-13 Water and green cycle in the intervention area-before)



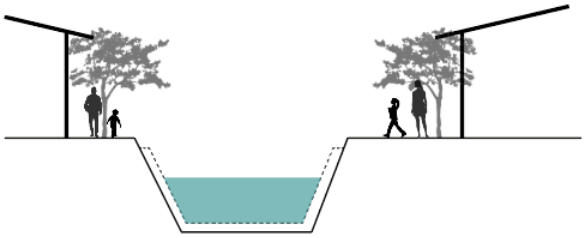

(fig.4-14 Water and green cycle in the intervention area-after)



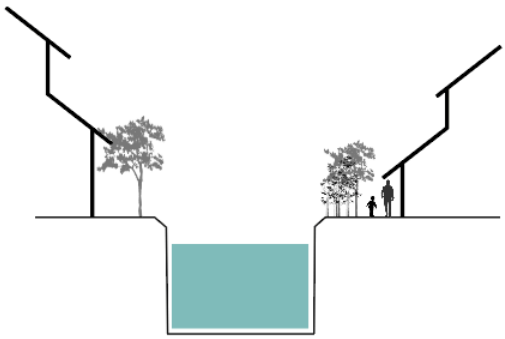

(fig.4-15 Water metabolism study in the site area)

There is much to be considered regarding the ecology in the area. Mount Ungaran encompasses primary forests and biodiversity conservation areas, which are home to many exotic species of animals. Most of the mountainous areas around Semarang have high ecological significance. This is why the mountain areas should be preserved as much as possible.

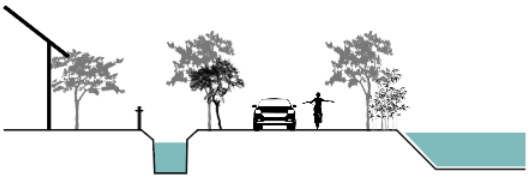
The migratory patterns of residents from Semarang city to the suburban areas were studied to see which areas were the most preferable areas to move into. It can be clearly seen that people are moving out of the areas prone to flooding and subsidence. They are mostly moving to the areas that have higher elevation, fresh water supplies, and more greenery. This could indicate what kind of living environment the people deem as 'good living environment'. But because of this migratory pattern of residents moving into environmentally preferable areas, the nature in Mount Ungaran areas is in danger of losing its ecological values.



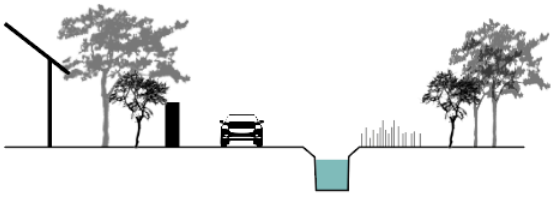
1. inaccessible waterfront



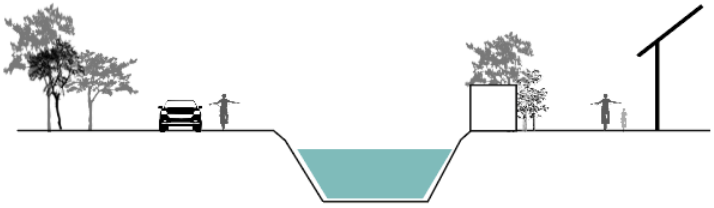
4. Deep + inaccessible water front



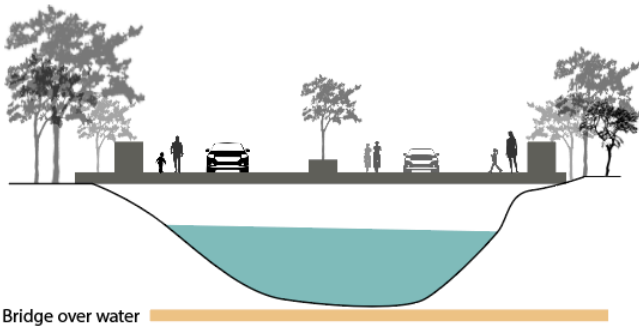
2. Gutter + inaccessible water front



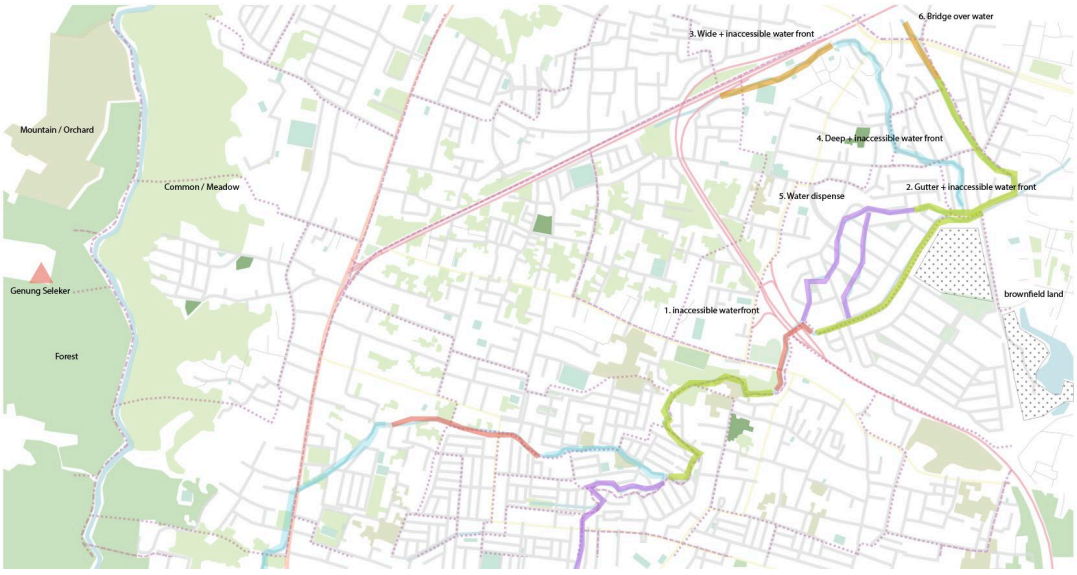
5. Water dispense



3. Wide + inaccessible water front



6. Bridge over water



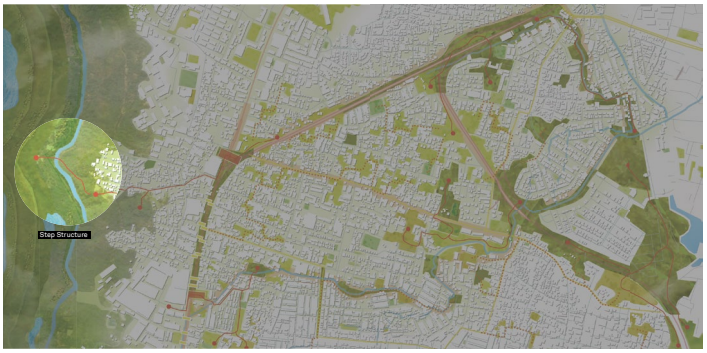

TOP (fig.4-16 Waterfront typologies in the intervention area)

BOTTOM (fig.4-17 Waterfront typologies in the intervention area)

## *7.3 Design Interventions*

(fig.4-18 Masterplan of the intervention area)

## *Site 1- Valley step structure*

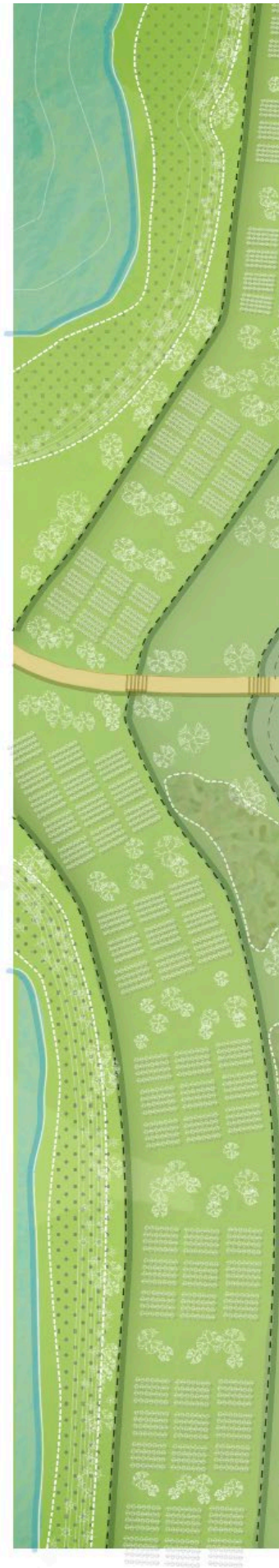



(fig.4-19 Site 1 in the intervention area)

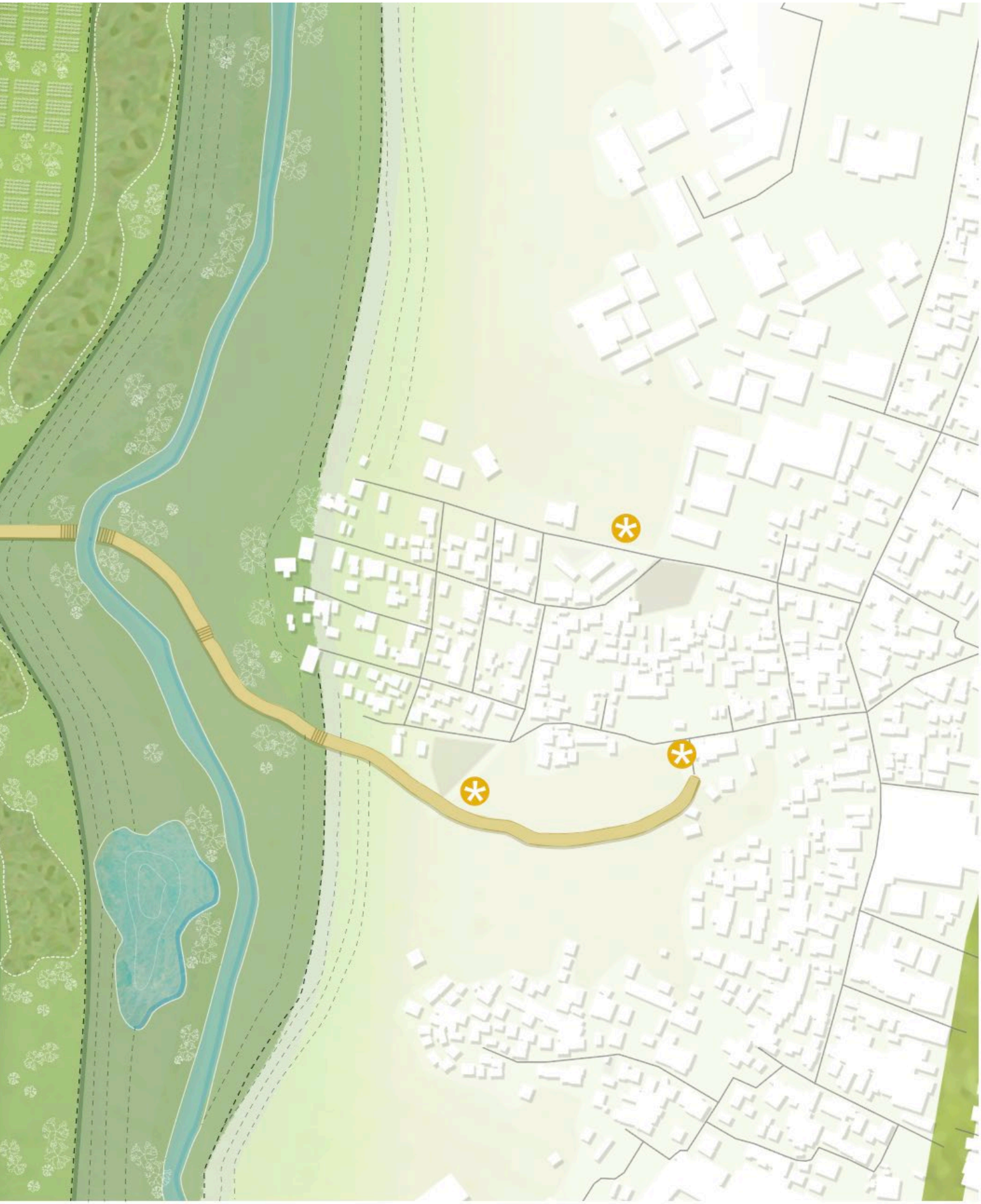
This site focuses on stabilizing the landslide prone area and protecting the ecosystem in Mount Ungaran. By creating a step structure on the side of Mount Ungaran and creating areas with specific functions, it will be possible to prevent future haphazard development in the ecology preservation areas. There are four steps in the structure; water storage reservoir, agriculture, ecological tourism center, and green buffer zone around the Kalisemarang.

Trees on the hillside will be planted in order to hold the soil together with the tree's roots. Other than this, trees are planted according to their growth time spans. Common bamboos (Bambusoideae) and palm tree (Arecaceae) will be the first to take over the hills, for their growth span is 10 years. Trees such as Canarium indicum, Tamarin-dus indica and Khaya senegalensis will be planted as well for they are the most common species of trees in Central Java. Then, after the 10 year life span trees whither, Gonystylys bancanus will slowly take over through a span of 30 years.

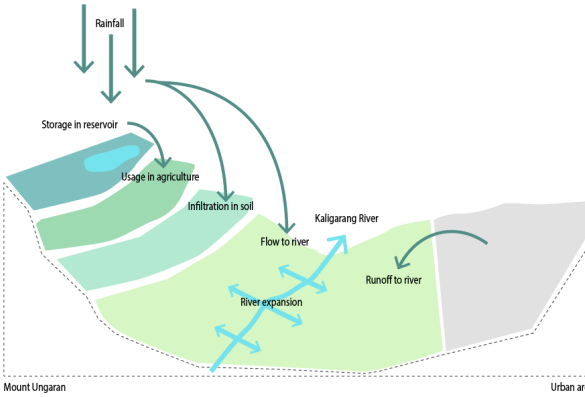
The valley step structure focuses on treating the landscape the way it should be treated in the long term; interventions taken will be minimal ones made to prevent further disruption of nature. Nature will be able to recover itself over time. Ecologically friendly interventions will also help to improve the landscape and solve already existing problems such as landslides and water retention.

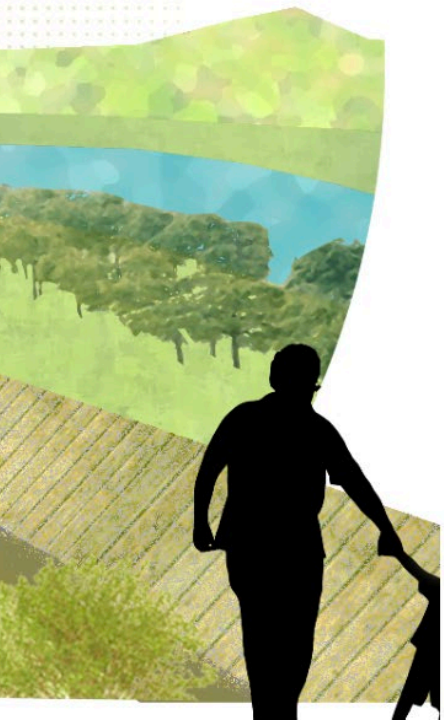


(fig.4-20 Site 1 detail plan)



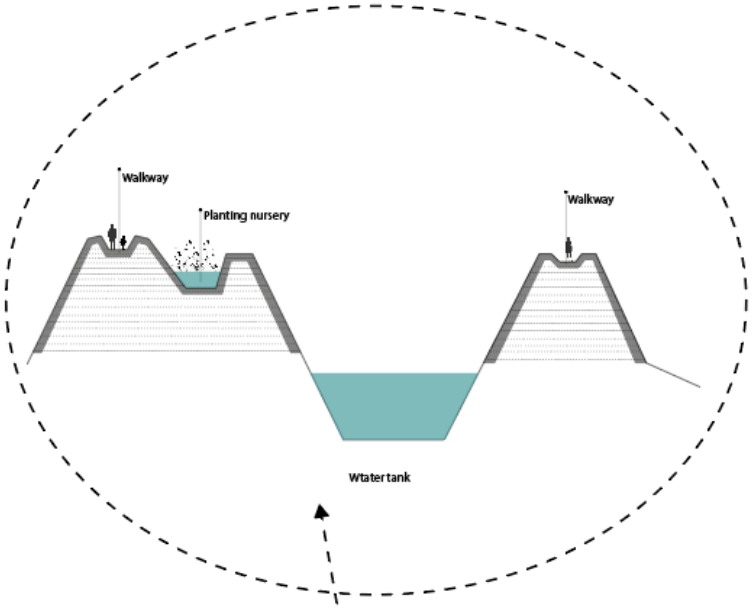
200m

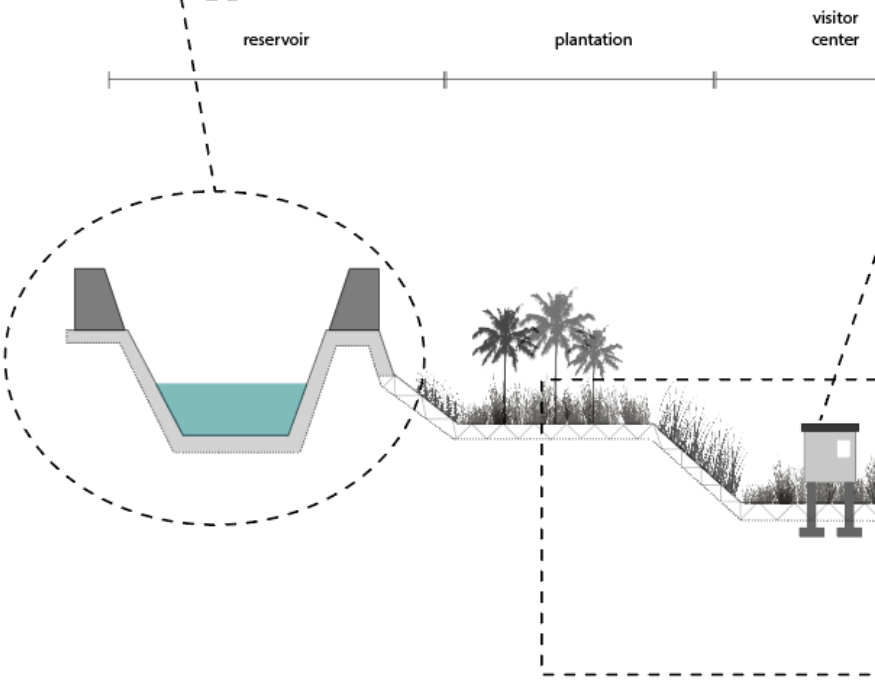


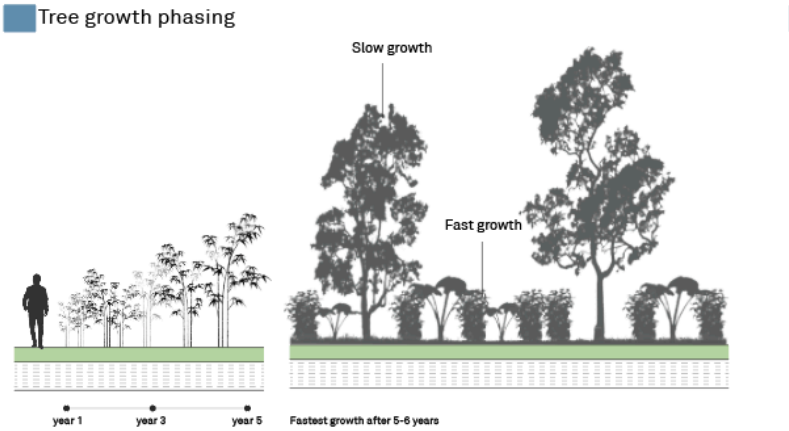



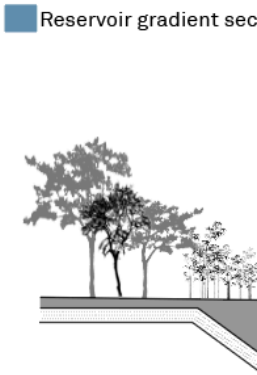
TOP RIGHT (fig.4-21Site 1 detail perspective section)

BOTTOM LEFT (fig.4-22Site 1 schematic collage)



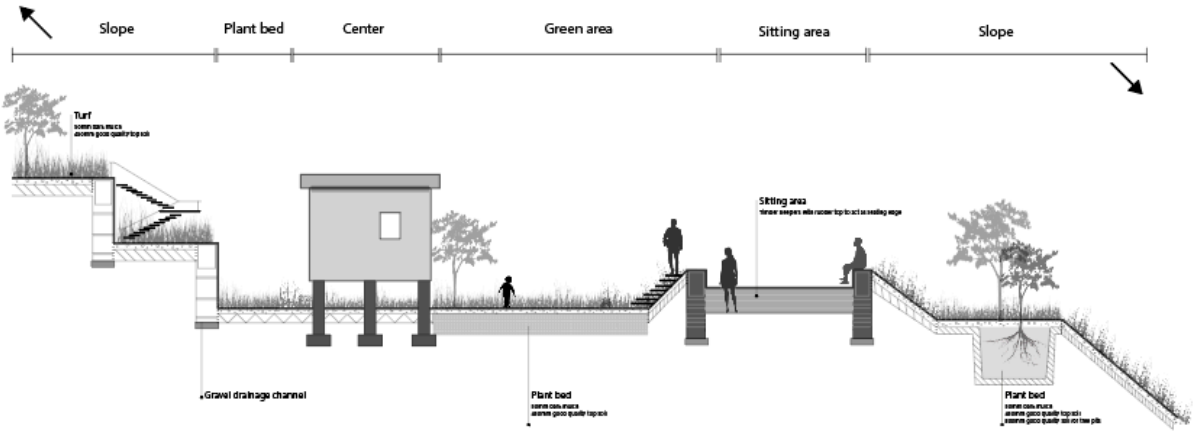

10 years

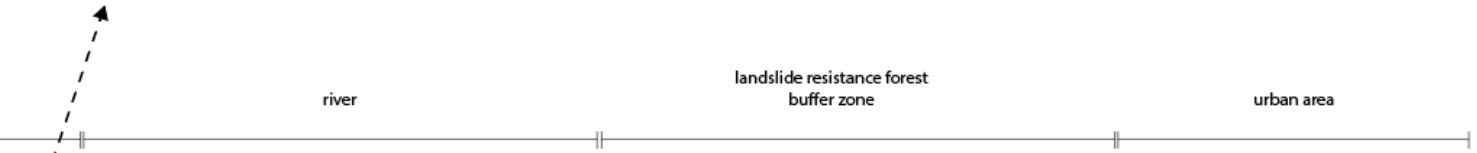
Fast growing plants
(ex. bamboo, palm trees,)

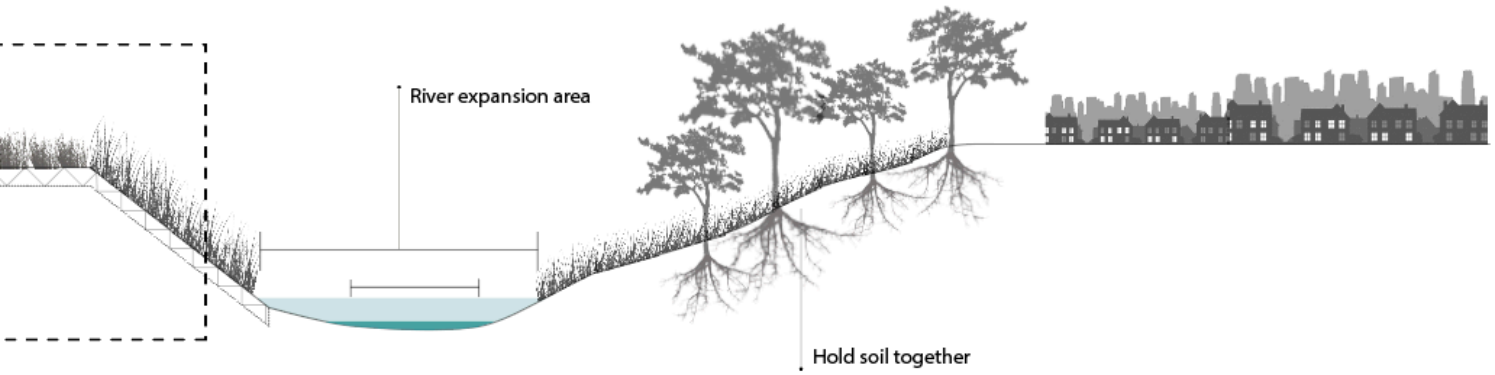
30 years

Slower growth time
(ex. vv, )

(fig.4-23 details of the step structure)

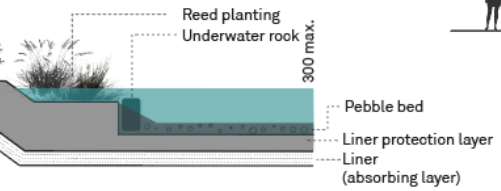


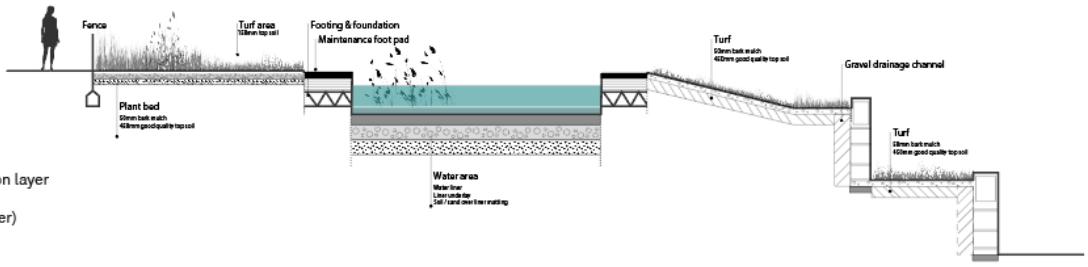




tion

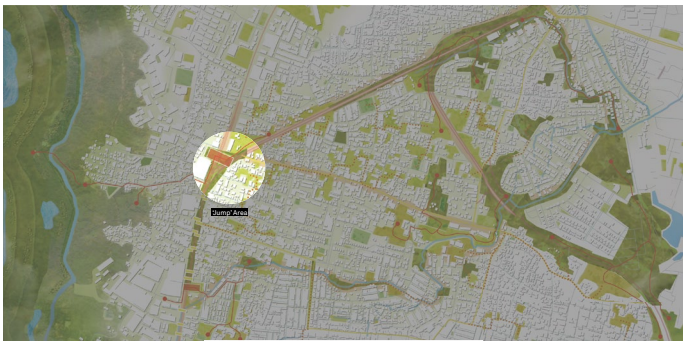
Pond gradient section




Alternative



## *Site 2- Jump area*




(fig.4-24 Site 2 in the intervention area)

The jump area is called 'jump' because it jumps over two districts; Srondol Kulon and Srondol Wetan. Under the bridge is Sumerboto. The existing road now is 2 dimensional, and has no diversity vertically in the landscape. Also, because the road dividing the two district is Jalan Setia Budi-a regional high speed road- it is difficult for pedestrians to cross the road. By connecting the districts with a green overpass where vehicles and pedestrians can use, it will increase the connection between neighborhoods and natural areas. It is also beneficial for users of the high speed vehicle road, for the traffic will not be hindered by pedestrians and slow traffic.

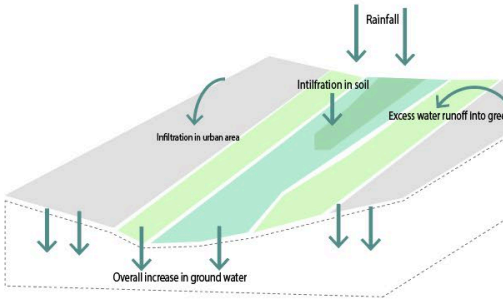
The bridge is also designed so it can withstand the weight of small vehicles and people walking. Also, the sides of the overpass will have planting soil areas where greenery can be planted give the passers a pleasant user experience.

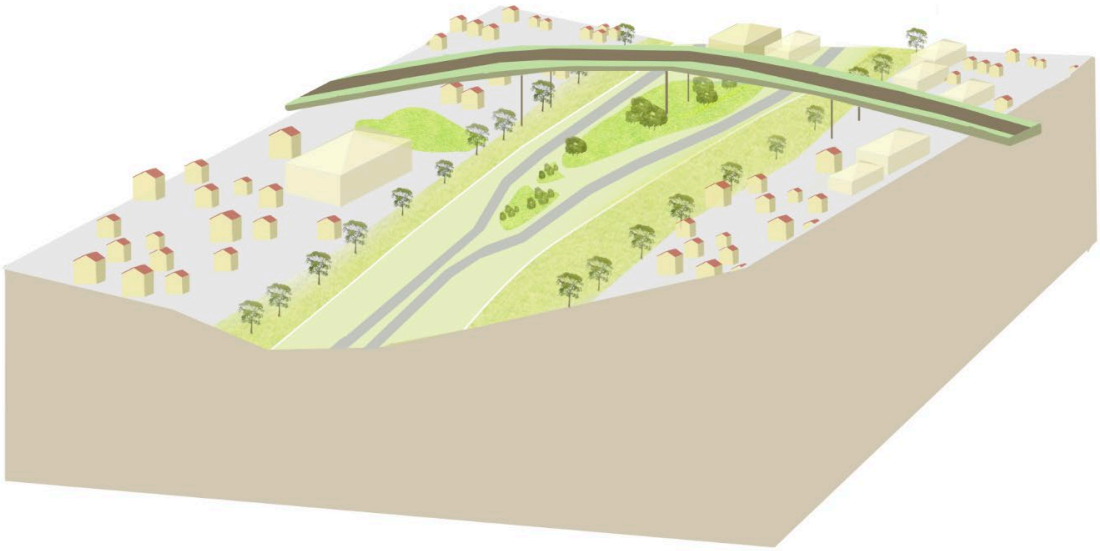
Below the green overpass are areas with green buffers. This will help to collect excess water during seasons of heavy rainfall and strengthen the soil with the tree roots. The middle of the overpass is a large green open area around bank buildings. This will be transformed to an open green ground, which the users can freely use. The green area will also help to reduce heat island effects and collect excess water during rainfall season.

(fig.4-25 Site 2 detail p


lan)

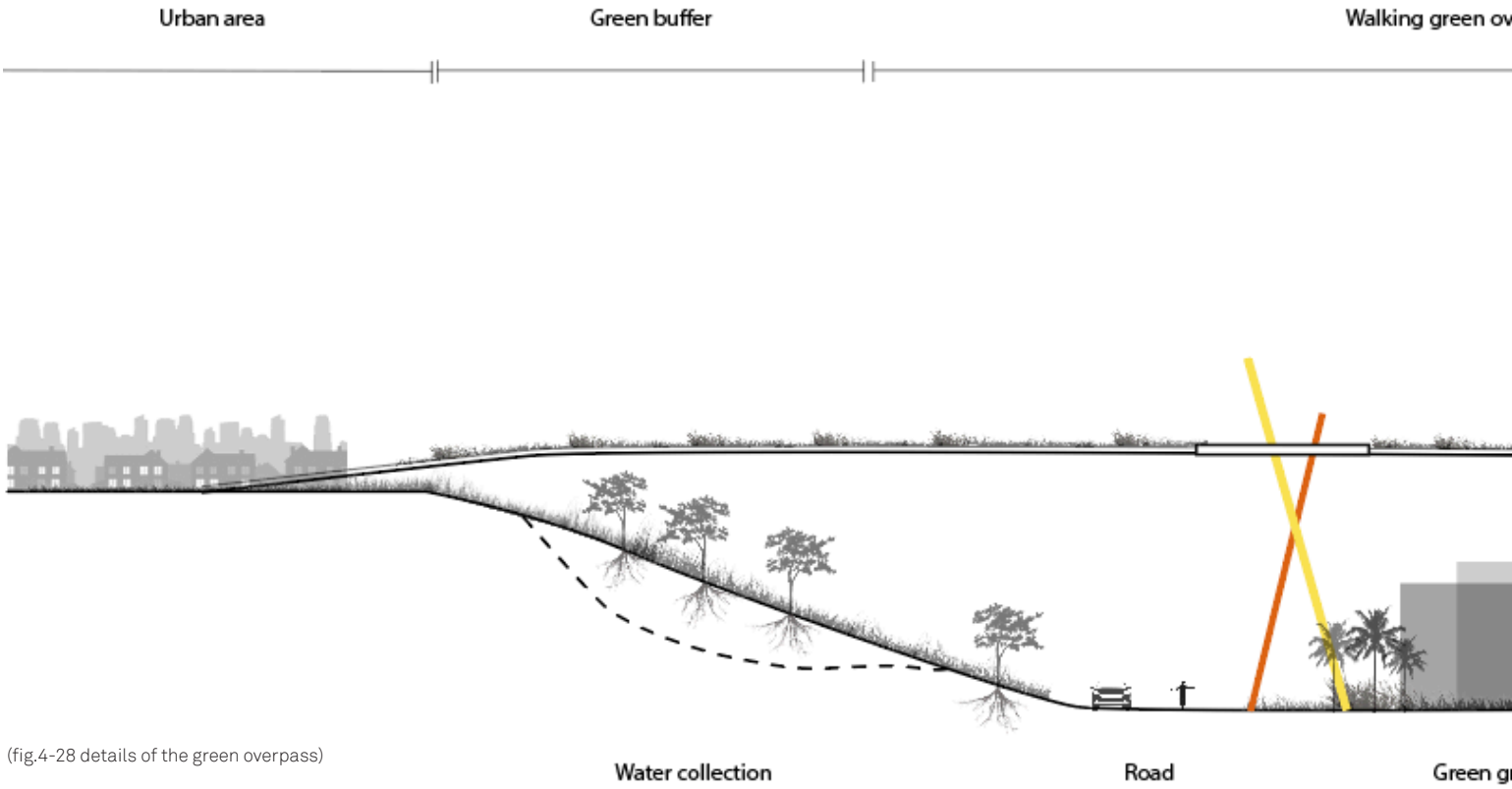
0m 200m


Rainfall
Intilfration in soil
Infiltration in urban area
Overall increase in ground water

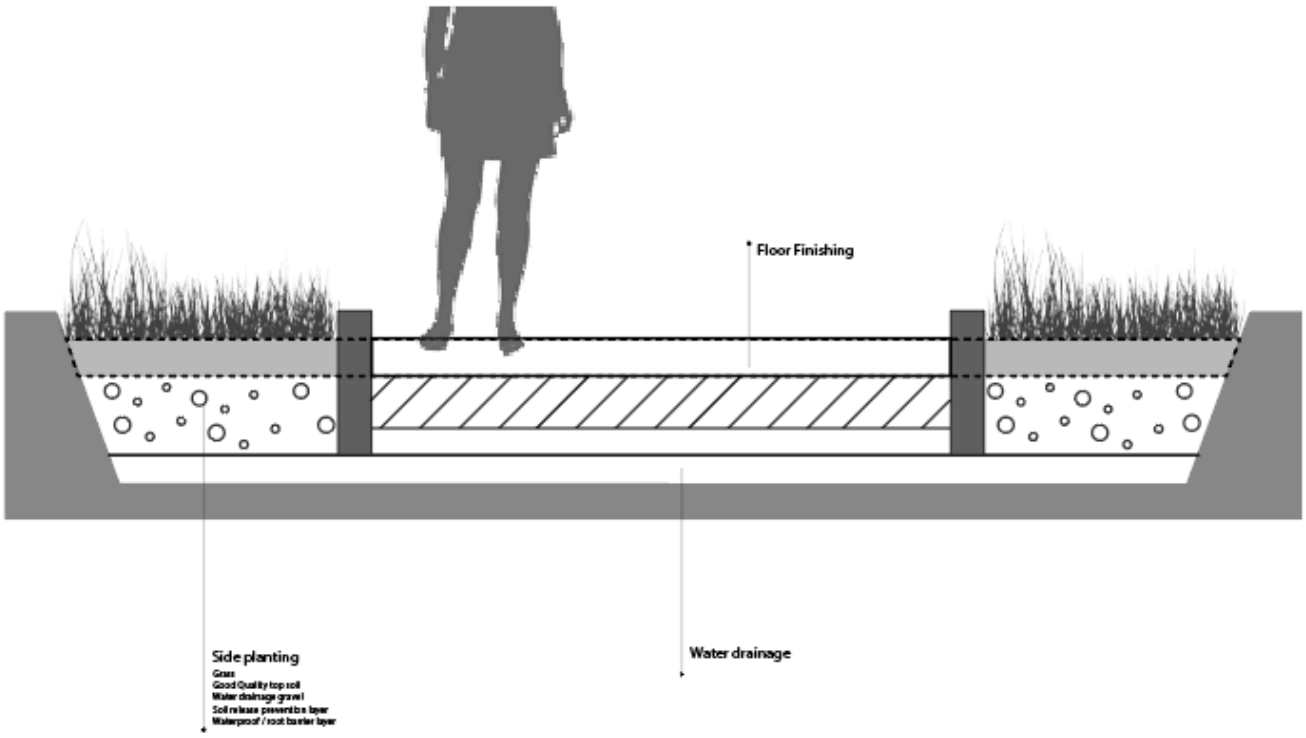


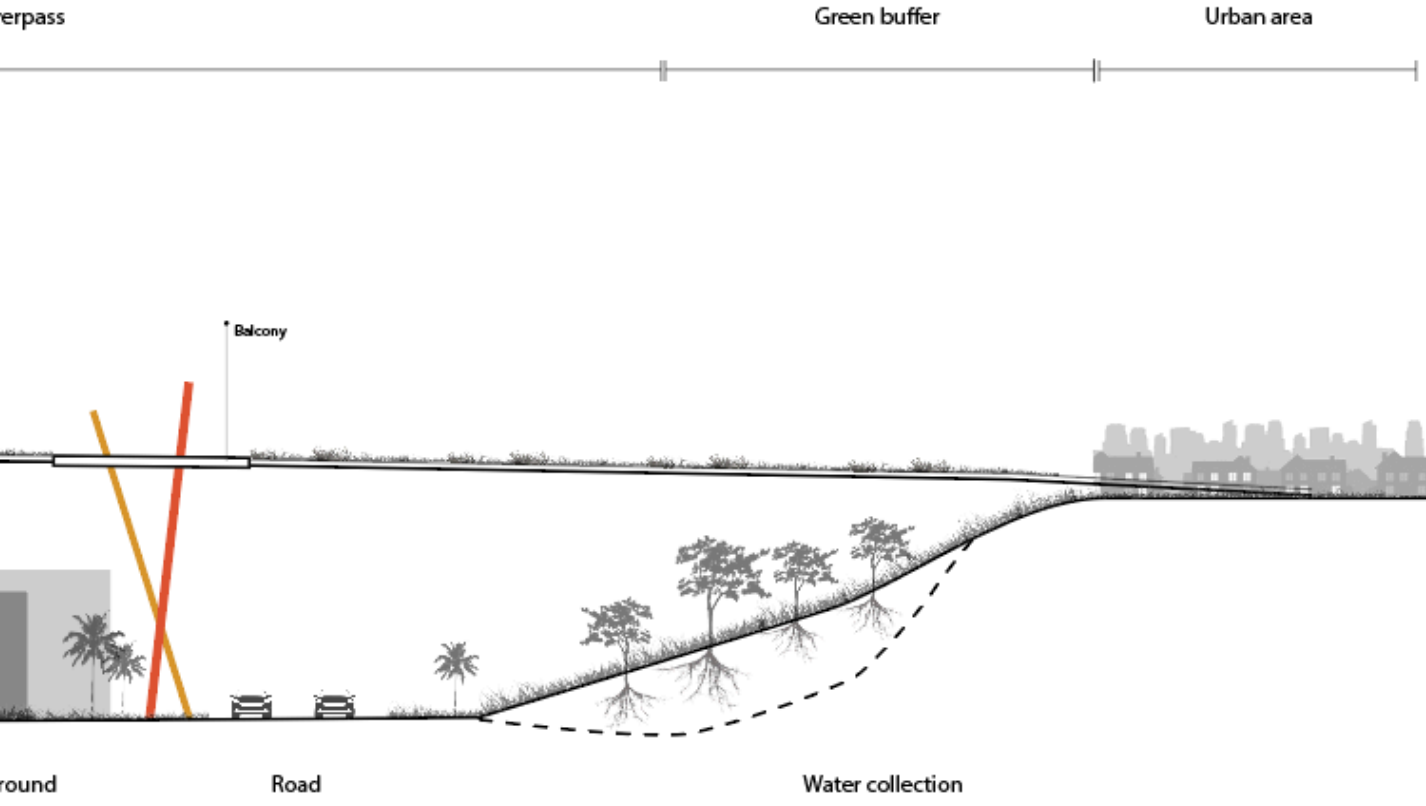
TOP RIGHT (fig.4-26 Site 2 schematic collage)

BOTTOM LEFT (fig.4-27 Site 2 detail perspective section)

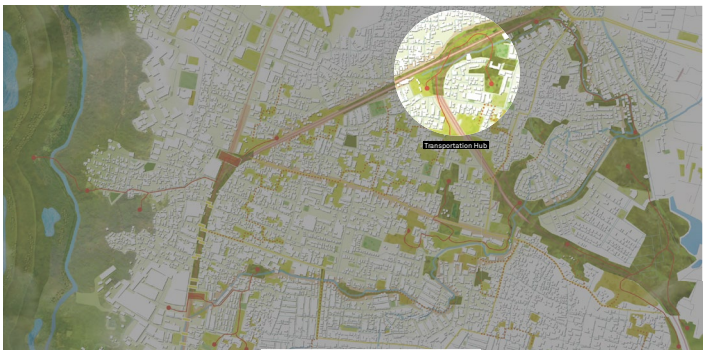



(fig.4-28 details of the green overpass)


Floor Finishing
Side planting
Grass
Good Quality top soil
Water drainage gravel
Soil release prevention layer
Waterproof / root barrier layer
Water drainage


erpass
Green buffer
Urban area
Balcony
round
Road
Water collection

## *Site 3- Transportation hub*




(fig.4-29 Site 3 in the intervention area)

This site focuses on the current state of infrastructure and future transportation developments. High speed vehicles pass by horizontally through the site, with a small stream running parallel to it. Then, regional roads stem from the high speed roads into the neighborhood. On this junction point are many schools and Diponegoro University. Already existing here is a walking overpass over the highway, called Jembatan Layang Jalan Tol Pedalangan. However, it is very worn down and difficult to feel the surrounding environment. Thus, the walking bridge will help to enhance the experience of walking over the highway into the transportation hub.

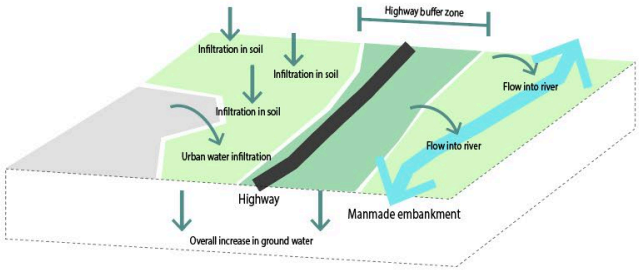
Furthermore, the transportation hub is located near residential buildings and highways. It will be convenient for the residents of the area to take public transportation. Because his makes this station the perfect location for high speed buses to stop by. slowly helping the population to switch from using personal vehicles to public transportation. If highspeed trains will be developed in the future, this will be an ideal location for the train station. People will have easy access to it, and the existing highway networks provide good tracks for future route development.

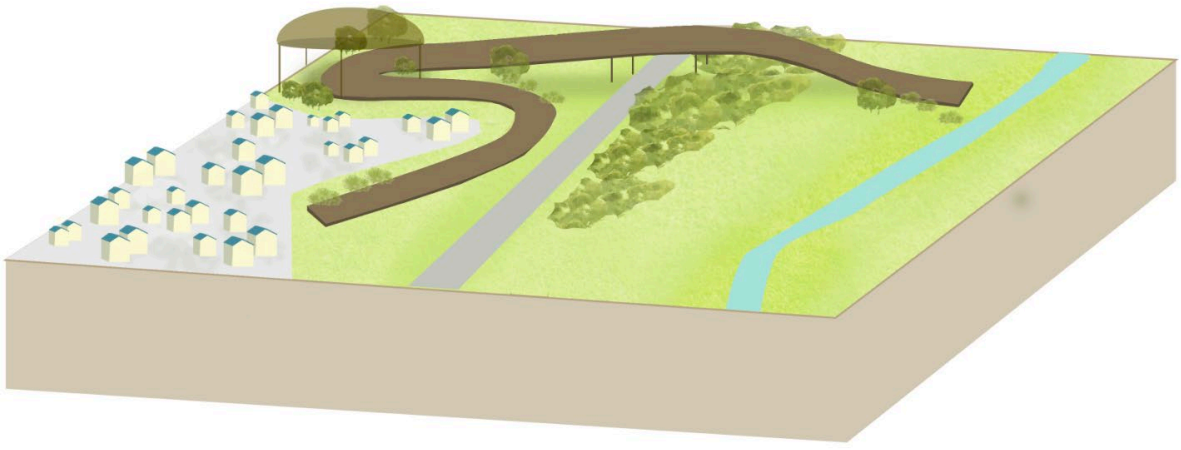
(fig.4-30 Site 3 detail plan)

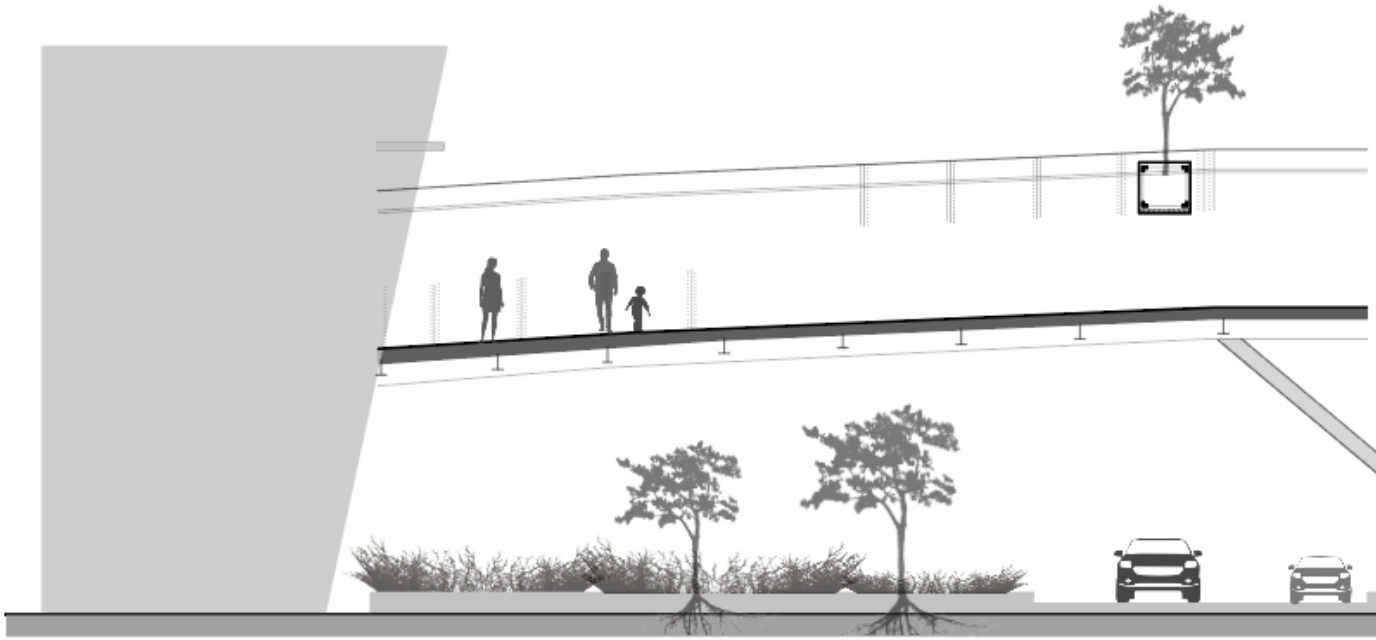

University
Parking
School
School
School
200m

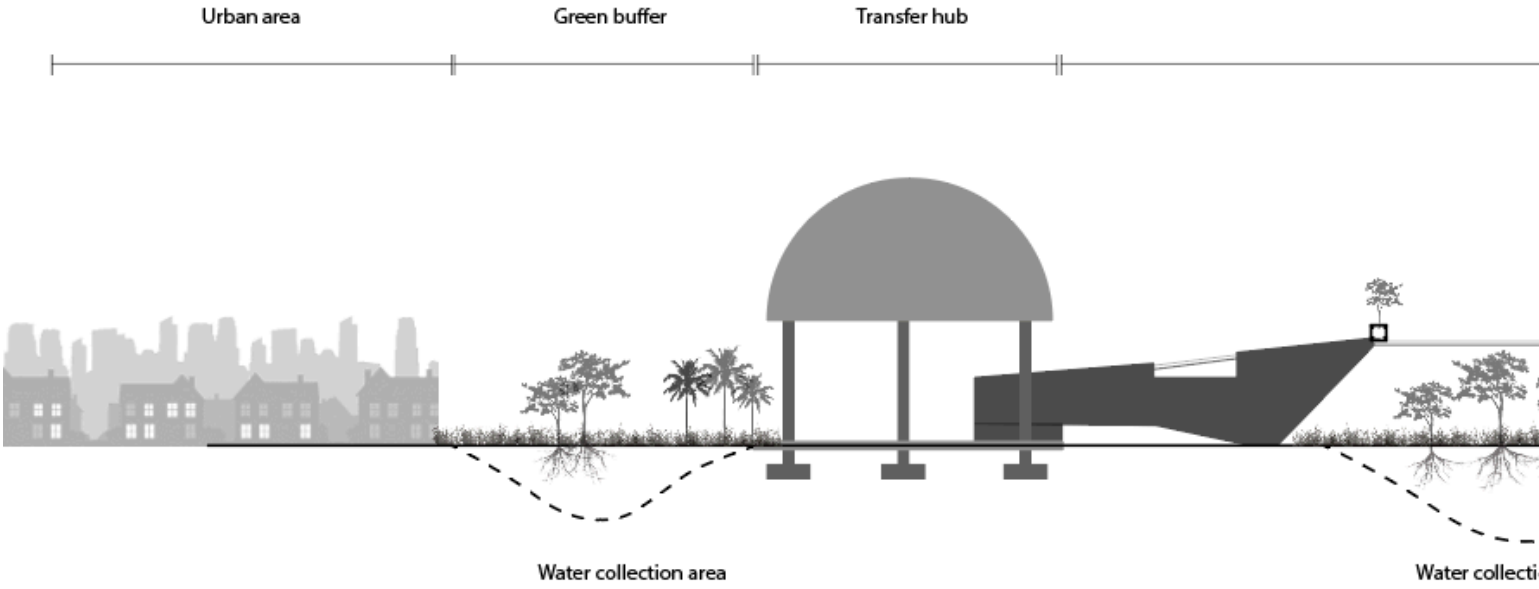
TOP LEFT (fig.4-31 Site 3 detail schematic collage)

BOTTOM RIGHT (fig.4-32 Site 3 perspective section)

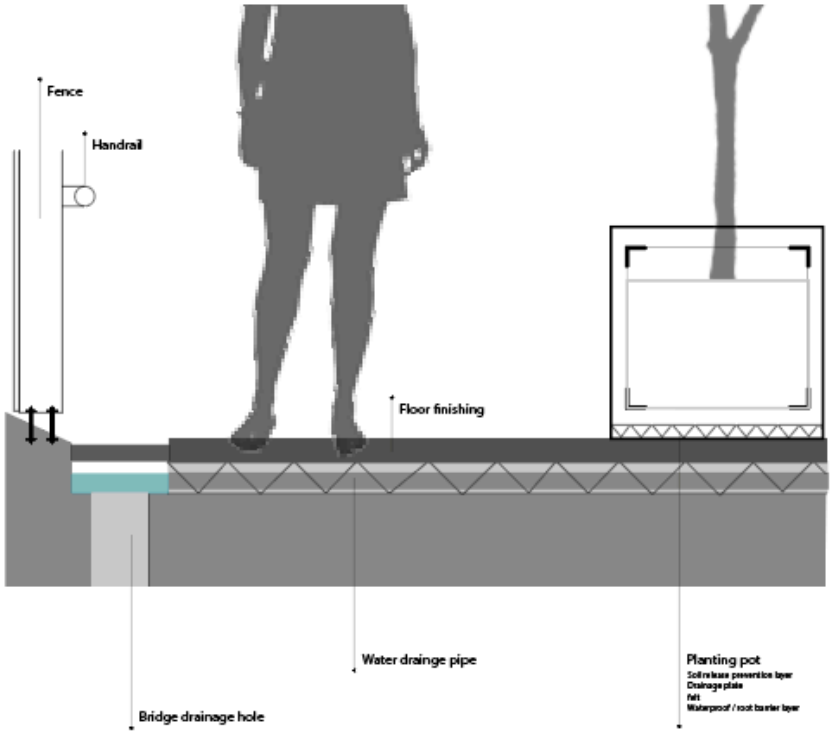

Highway buffer zone
Infiltration in soil
Infiltration in soil
Infiltration in soil
Flow into river
Urban water infiltration
Flow into river
Highway
Manmade embankment
Overall increase in ground water

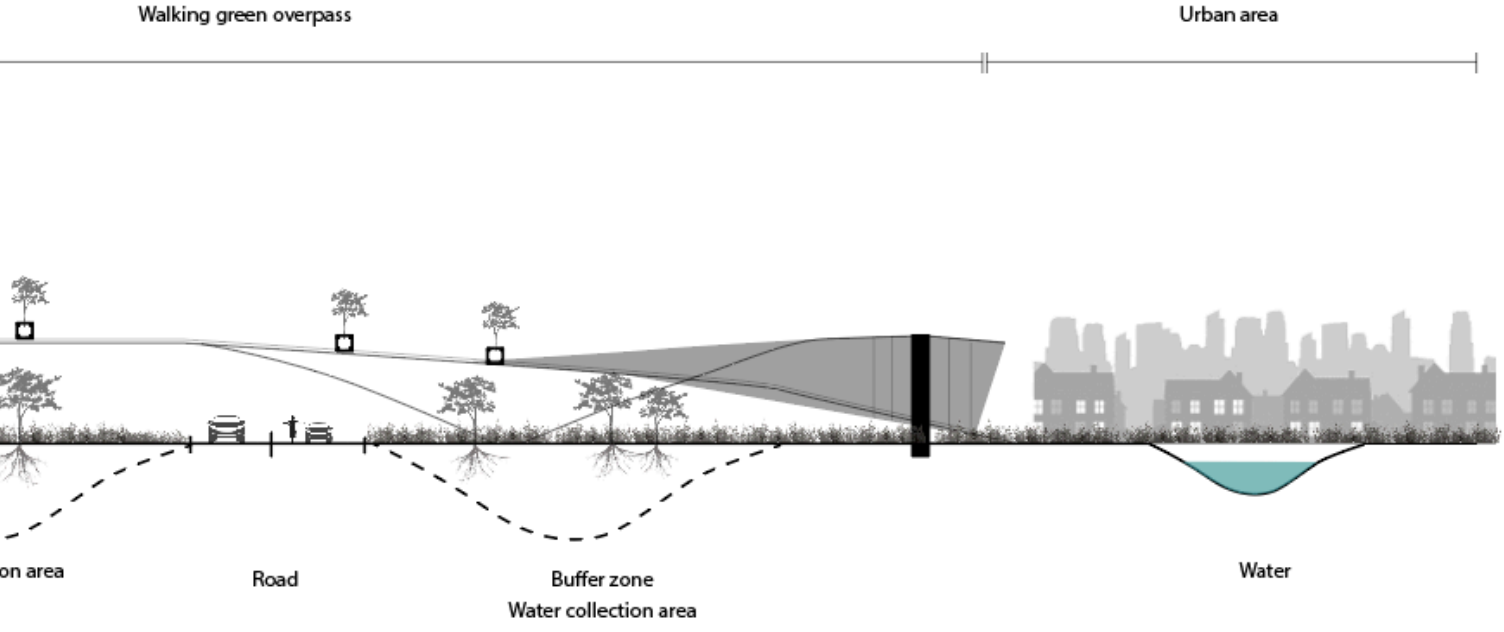







(fig.4-33 details of the transportation hub)


Fence
Handrail
Floor finishing
Water drainge pipe
Bridge drainage hole
Planting pot
Soil release prevention layer
Drainage plate
Felt
Waterproof / root barrier layer


Walking green overpass
Urban area
on area
Road
Buffer zone
Water collection area
Water

## *Site 4- Densification area*

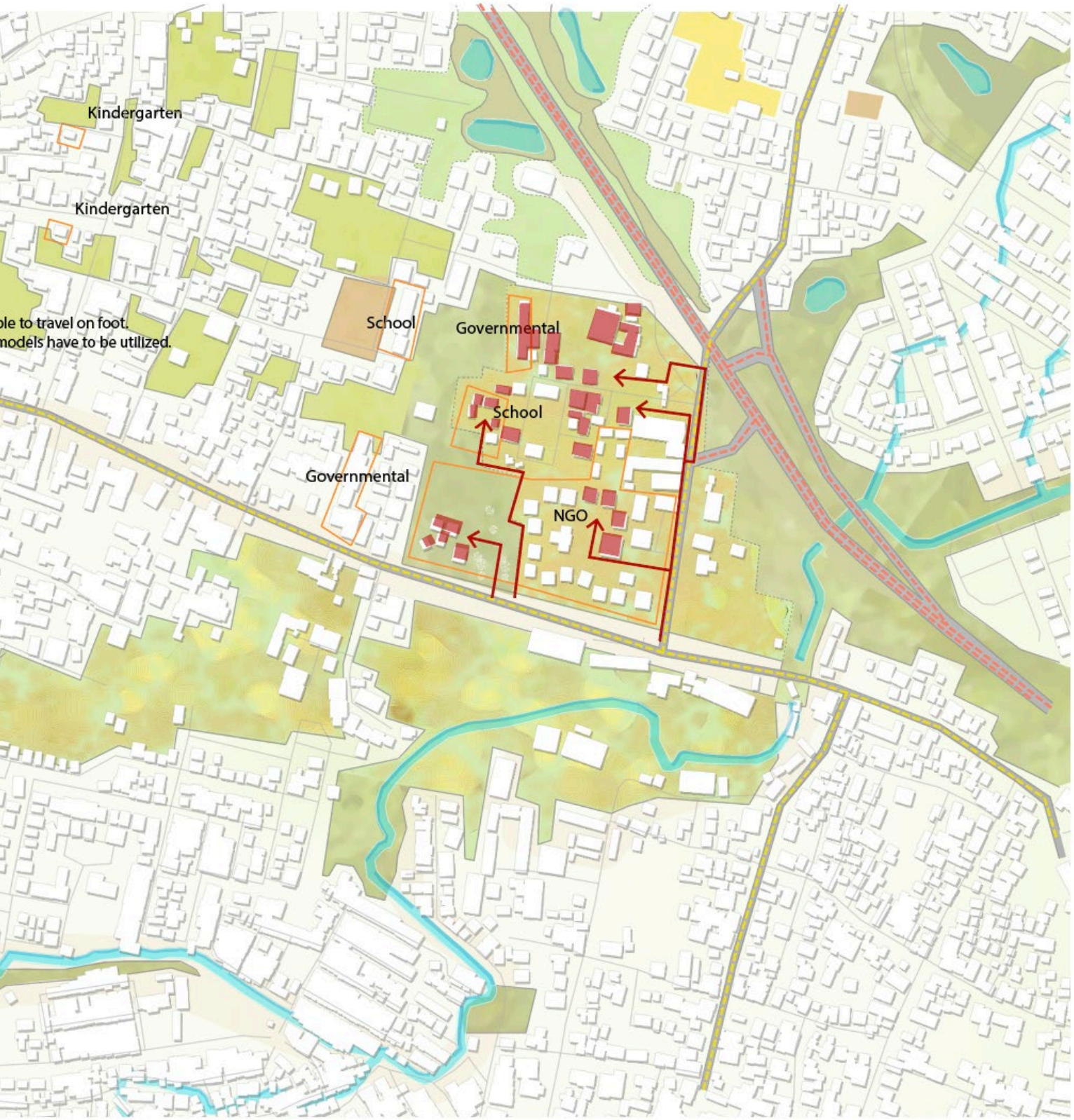

(fig.4-34 Site 4 in the intervention area)


(fig.4-35 Si

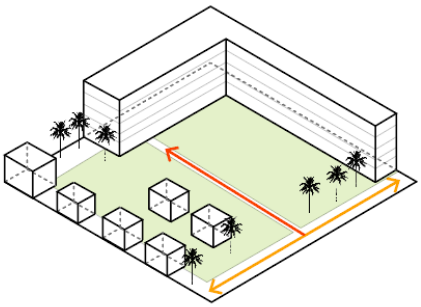
The last is the urban densification area. This is where large open green space exists, and will be transformed into higher-density residential complexes. There are many educational institutions, governmental buildings, and NGO's in the area. These qualities make this area an ideal place for working residents to live in. While creating more living spaces to maximize density, the green spaces between the buildings will be sustained to make the living quality better. Also, a large water body flows through the site, and this will be used to its fullest by creating a waterfront play area around it. Decks will be added to help the users go closer to the water, and existing flat bodies of green areas will be transformed into organic land formations to increase diversity in the urban landscape.

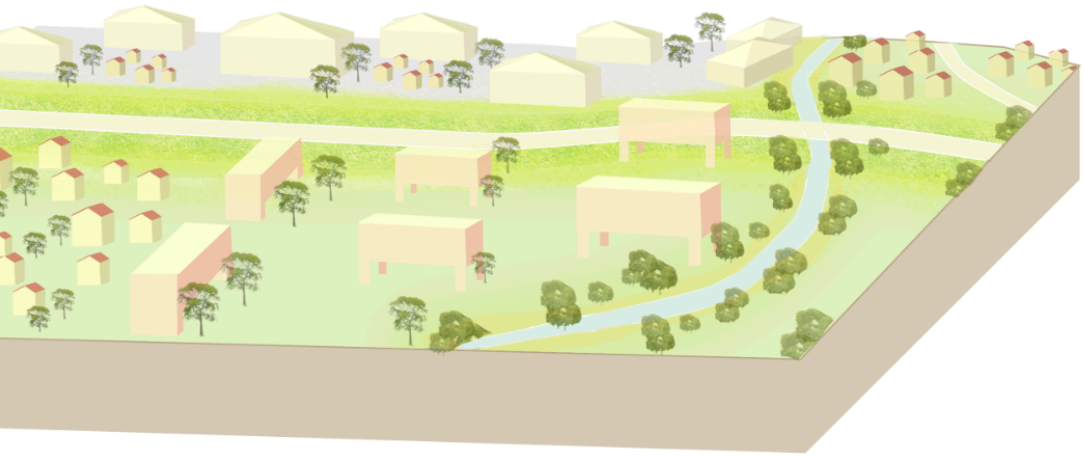
The building formations currently are in tree like clusters, which makes it hard for people to travel the area on foot. Instead in the new densification area, a web like form will be utilized to make it convenient for the users and maximize land usage. Web like formations make the streets much more inter-connected, and give the users the chance to move and connect around the area.

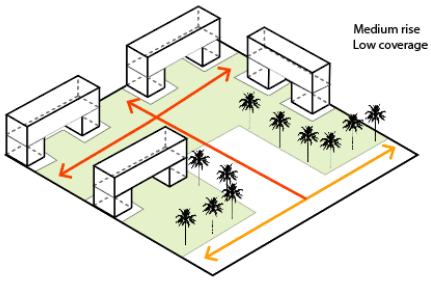
There are three densification methods that can be used; high rise-low coverage, medium rise-low coverage, and low rise-high coverage. High rise-low coverage would mean smaller individual housing buildings are taken down and re-built into a high rise apartment complex. This will be able to accommodate much more people vertically, but would not be the most preferable method for the Indonesian culture. Second is Medium rise-low coverage, which is the mix between smaller town-house structure villas. This would be one of the best ways to maximize green space in between the buildings. Buildings will be rebuilt in villa complex structures, but freedom of using green spaces as yards will be guaranteed for there is enough green space for every house hold. The last is low rise-high coverage buildings. This is the current building structure, consisting of individual houses. However, when a new neighborhood is formed, most green space between the buildings will be secured to increase green spaces in urban areas. This would also mean treading on foot will become easier, for traffic will not hinder pedestrian walkways. Heavy traffic will be diverted to the outsides of the neighborhood and only slow traffic will be permitted in the complexes in all situations.

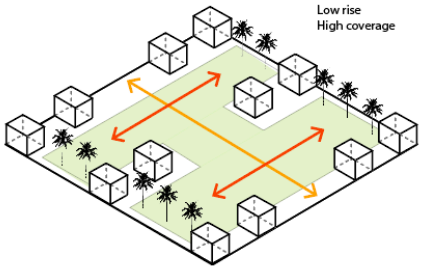



te 4 detail plan)



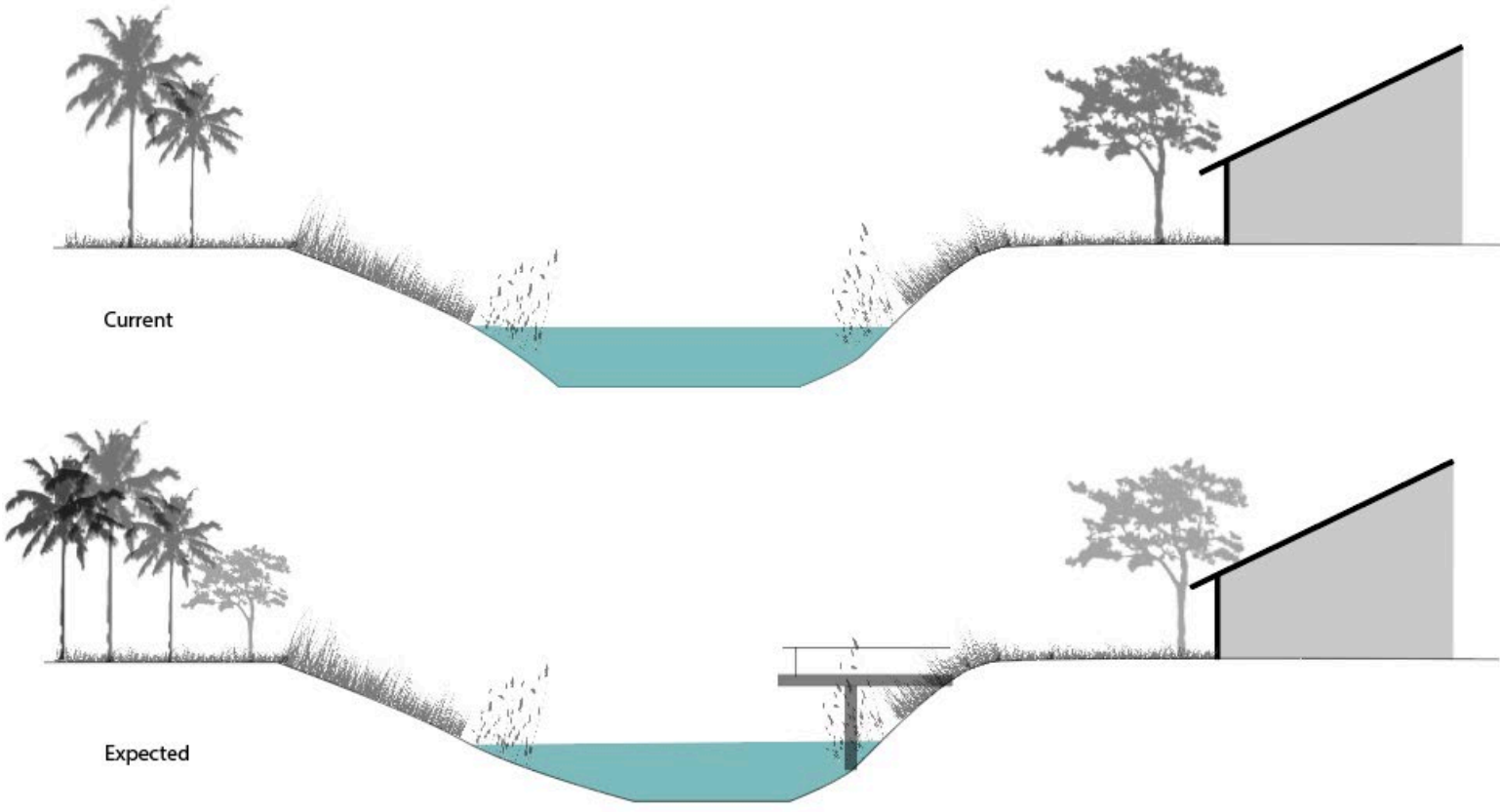



**Densification module potentials for the area**

TOP RIGHT (fig.4-36 Site 4 detail schematic collage and densification module)

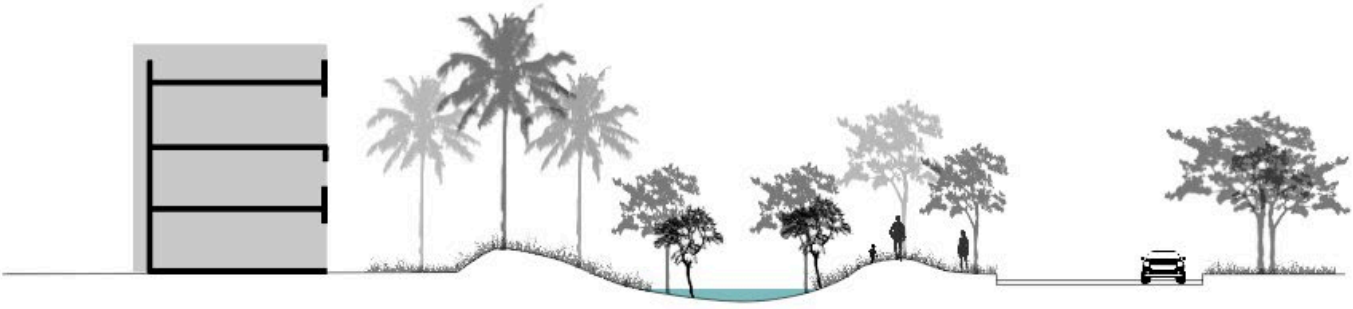
BOTTOM LEFT (fig.4-37 Site 4 perspective section)




(fig.4-38 details of the waterfront in the densification neighborhood)

LEFT (fig.4-39 photos of aquaponics in Semarang Kampung)
RIGHT (fig.4-40 photos of aquaponics in Semarang Kampung)

Current



Expected

(fig.4-41 details of the waterfront in the densification neighborhood)

# PART 5
# CONLCUSIONS

## *8. Research Findings*
### *8.1 Overall*

The theories used in the theoretical part of the project were mainly Ecocity Principle, Ecopolis, Casco-Concept and Layer Model. These theories were mainly used for the structural background, as well as the basis for research. The information gathered about the site was sorted using the above theories in the methodology. The possibilities and constraints of the site were also processed the same way. Then, the current situation and the possibilities were layered together to draw out the zones possible for development and preservation. From this, design was carried on by doing research by design and design by research. In this process the theoretical principles were applied to provide a strong reasoning for the design strategies. This process worked well throughout the design development, because it helped to organize the information gathered during research, and moving on to the designing part. Furthermore, the theories were reflected efficiently in the design masterplan outcome.

The design masterplan and details aim to build a framework for the future of Semarang, in the scenario which the coastal and mountainous areas are not suitable for residence due to flooding, subsidence and landslides. The chosen site area is a suburban Semarang region, in which residents from the dangerous coastal areas; the migration of residents can already be seen. Thus, measures have to be taken to not only encompass the new influx of residents, but also keeping the natural qualities of the area intact, and the aquifers and watersheds clean. This is why detail design areas were chosen to explore the possibilities of increasing green and blue areas in urban context, preserving natural qualities in mountainous areas, and creating new areas for the residents' convenience.

However, the design itself could bring controversy, for the tight-knit RT-RW structure of communities and the top-down system of the government would be the biggest obstacles in making radical changes like this. Furthermore, for a country with rapidly growing population and economy, reserving land for nature preservation my rouse repulsion. However, this masterplan is a utilitarian choice in which we have to make to keep the environment intact for future generations.

## *8.2 Conclusion; Ecocity Principle*

The Ecocity Principle is applied throughout different scales in this project. It focuses on neighborhood scale interventions to city scale, which fits into the Ecocity scope of thinking. The design also breaths together with the greater ecosystem; mainly Mount Ungaran and the Java Sea, and the human social system. In all, the design aims to help the city function like an autonomous living organism. In this sense, the manmade infrastructure and natural water and green systems in the design act as skeletal and vein structures which help the organism function. The physical and non-physical entities had been merged into one system to function as a whole.

## *8.3 Conclusion; Ecopolis Strategy*

Stemming from Ecocity Principle, Ecopolis Strategy is more dynamic and integrates the system of the ecosystem more. It involves the abiotic features in the urban ecosystem. Ecopolis cradles the bioregional functions that is formed through Ecocity Principles. In this process, the  flow, area, participants of the site needs to be studied. The design focuses mainly on the water flow of the site, and also the green and traffic flow is added to accentuate one another. As for the area, the cultural and local natural aspects were highlighted in the design to make the design more site specific and integrated. Finally, the participants are naturally introduced into the design with the consideration of the unique RT-RW structures in Indonesian communities, and also interactive green and infrastructure structures.

(fig.5-1 Stray cat in the street of Semarang)

## 8.4 Reflection

### Q 1&2

The main focus of the Flowscape studio was to think of 'landscape as infrastructure' and 'infrastructure as landscape'. By doing this, we as landscape architects had to explore spatial, societal and environmental issues through various scales and timeframes. My graduation project is titled "Retreat; creating a regional framework for the future of Semarang". The project focuses on tackling environmental, spatial and societal issues by creating urban landscape framework for the future. The framework is reflected from the current issues in the landscape, and strives to guide the future development in a more sustainable way.
The Shared Heritage Lab was centered around how we can preserve the complexity of the heritage and invigorate the livelihood of the residents of the area. The Shared Heritage perspective believes that maintenance of heritage will help to drive sustainable development. As landscape architects, we also had to consider the importance of environmental protection and the integration of the blue and green structures with the urban fabric. Thus, the project also had to take into account the cultural background of the study area and the tendencies of the residents. The cultural aspect was crucial in developing the regional framework, because the community structure in Indonesia is a unique structure which only exists there. It was very important to learn the RT-RW structure in how the neighborhood functions. Although the project is titled creating a 'regional' framework for the future, the details of the project also focused on the neighborhood and small scale interventions as guidelines for future developments.

My graduation project is to build a regional framework for the future city of Semarang, taking into consideration not only the current constraints, but also the future development plans and the environmental state of the area. The current state of development is not sustainable for the future. At this speed of development and deterioration of nature, the ecological values of suburban Semarang will be broken in the next few generations. Because the population is always increasing, new methods to encompass the residents and keeping nature intact needs to be thought of. The framework in general aims to preserve certain areas of the landscape as ecological areas but make the urban areas more densified to embrace population growth in the future. Thus, the project involves the ecological aspects of the landscape, infrastructure in the urban and suburban areas, and the residents in the site.

Societal relevance is answering questions the society has and solving the problems it has. It usually focuses on the cultural and economic value of the project. The project itself is centered around looking at the problems the site and residents face, thus the beginning of the project began at the societal level. Furthermore, the interventions that are taken in the project does not only look at the environmental or spatial functions of the landscape, but also strives to help strengthen the livelihood of the residents by invigorating tourism in the area by establishing stronger infrastructural connections and ecological values in the area. If the societal relevance of the project is to be strengthened, more investigation about the residents has to be taken through interviews, and extensive review of the RT – RW structure in the neighborhood needs to be executed to directly influence the lives of the residents.

### Q 3&4&5

The theories used in the theoretical part of the project were mainly Ecocity Principle, Ecopolis, Casco-Concept and Layer Model. These theories were mainly used for the structural background, as well as the basis for research. The information gathered about the site was sorted using the above theories in the methodology. The possibilities and constraints of the site were also processed the same way. Then, the current situation and the possibilities were layered together to draw out the zones possible for development and preservation. From this, design was carried on by doing research by design and design by research. In this process the theoretical principles were applied to provide a strong reasoning for the design strategies. This process worked well throughout the design development, because it helped to organize the information gathered during research, and moving on to the designing part. Furthermore, the theories were reflected efficiently in the design masterplan outcome.

However, the shortcomings of the chosen methodology is that the theories chosen were focused mainly on the larger scale interventions and not the small scale interventions. Thus, it was convenient to use the theories for regional design, but difficult to use them for detail designs.

### Q 6

The biggest moral issue involved with my graduation project is the fact that whole neighbourhoods need to be moved. Because the project deals with altering the current lifestyle of the local residents, the moral issues always had to be a part of the consideration. I have made radical the decision to alter the lives of people, which in the end is beneficial for them. In the future, the current level of urbanization and destruction

of nature will come back at the residents with bigger consequences; the current method is just a means of pushing the consequences away and not dealing with it properly. However, this could only be my point of view, for many of the people who reside in the danger prone areas are happy with their houses and do not want to move away. The values they have and what I have of what a good living environment is radically different. This means that the choices I make will never be able to reflect the residents' opinions a hundred percent.

Also, for a country which is rapidly growing, all methods of economic income is crucial in helping the livelihood of the people. However, in my design concept, certain areas need to be reserved for nature, not for development. This would mean that less financial rewards from the land. The solution I had chosen would be the method to choose when thinking about passing on the environment to the next generation. However, this is only in the case of developed countries, and for developing countries like Indonesia, all means of economic activity is important. The design masterplan may seem like a utilitarian choice-in which the solution which has the most benefits for the greatest number of people- but in the current state of the living condition of the locals, I am not completely sure if this is the right choice to make.

However, we cannot continue to ruin and take advantage of nature in the means of development; it has to stop eventually, and this method of slowly changing the landscape will help the people to slowly adjust to the different lifestyle. In the end, words will turn into action, and action will turn into thoughts. Endless vicious cycle of pointing fingers and NIMBY needs to be stopped, and this is the first step to take to ease the thought of environmental awareness into the people's lives.

(fig.5-2 Sunset in the street of Kota Lama)

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## Precedent Research:

- Water as Leverage City Report Semarang
- Cascading Semarang
- Semarang Resilience Strategy
- Resilient Cities Report
- One Resilient Semarang Program
- TML Kissing Sleeping Beauty Alive

(fig.5-3 Stray cat in the street of Kota Lama)