

# Sensible High DenCity 2015

Megacity Design Studio  
Indonesia-Japan 2015

Research Institute of Humanity and Nature(RIHN)  
+Universitas Indonesia(UI)  
+Chiba University(CU)



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Megacity Design Studio Indonesia-Japan 2015

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## Contents

### 04 Challenges to Improve Water and Wastewater Issues in Slums

Satou Hiroyasu

### 05 Biopori in Kampung -An Intervention of "Open Public Space"

Rini Suryantini

### 06 Jakarta : Chaotic City Design Principles: Small and Effective

Kenya Endo

### 07 Kampung Cikini Revisit: A Retrospection Towards Kampung

Denny Husin

### 08 Water Flow and Informal Settlements

Norihisa Shima

### 09 Upgrading The Quality of Urban Kampung by Water Management System

Olga Nauli Komala

### 10 Background "Before Water Flow Project"

- JKTWS 2012 "Alternative Helicopter"
- MCK RT11 Project

### 26 Joint Studio JKTWS 2015

- Introduction
- Site Survey and Proposal
- Comments of WS Leader

### 53 Water Urbanism -MCK Renovation Project-

Tomohiko Amemiya

### 54 Exploring the Mutual Relation Between Water and Kampung Culture

Evawani Ellisa

### 55 Integrated Approach to Climate Change and Poverty

Akiko Okabe

### 56 Soccer Project 2015

### 62 Credit



# Challenges to improve water and wastewater issues in slums

**Hiroyasu SATOU**  
Professer, University of Tokyo

It is very difficult to solve water and wastewater issues in slums, because of the complexity of the causes. The local people living in slums are often not authorized to live there. On the other hand, water supply and sanitation especially through sewerage works require construction of infrastructure supported by the local government. There are technologies, which enables infrastructure-independent water supply or wastewater treatment. But they usually require large area and costs. In slum areas, because of the high population density, it is difficult to find places to construct water/wastewater treatment facilities. The cost is also a big hurdle. Maybe initial cost could be exempted by aid from outside, but the maintenance cost cannot be met. In addition, because of the lack of understanding on the necessity of maintenance, thought-to-be useful technologies from developed countries are often found abandoned.

In Cikini, Jakarta, both water supply and sanitation require significant improvement. Currently, people are using water from wells. Because the quantity of water available is limited, people are making efforts to effectively use water. Yet, water level in wells are decreasing, most probably because of the urban development which covers ground surfaces and sometimes intercepts underground water flow, and local people are concerned about it. Water supply could be improved if they introduce water supply from Jakarta City. Yet, they once introduced water supply, and abandoned it, because of the cost and quality of water. Toilets are shared by plural households. Human excreta is contained in septic tanks, or immediately flown away by what they call “helicopter”. Thus, water borne disease is anyhow controlled. But seepage from septic tanks and gray wastewater contaminates drains and the stream that flows through Cikini.

Significant part of Jakarta’s vitality should be coming from places like Cikini, as these slums hold such big population in central part of Jakarta City. It would be needed to anyhow improve water and wastewater issues in slum areas in Cikini.

Water supply could be anyhow introduced, because local people would pay money to purchase water for its value. It is rather an issue of how to balance money and the level of service.

How about wastewater? Now, Jakarta City is planning to construct sewer network, but even if Cikini is connected to the sewer network, what would be the merit for the local people in Cikini? Will each household have a private toilet? In Cikini, having a private toilet is an issue not only of connection to sewer/septic tank but also of land-ownership in the extremely densely populated conditions. Water quality in streams would be improved, but for more complete improvements, sewerage works not only in Cikini but also in upper streams should be improved. Johkasoh, or small wastewater treatment systems are also effective solutions to solve problems related with wastewater, but again, citywide implementation is needed to return the benefit to local people in Cikini.

Apart from above fundamental problems in water supply and sanitation, it is important to raise awareness of local people on water environment. There are ways to reduce discharge of pollutants to water environment without adversely affecting the life of local people in terms of labor load and cost. It can start from recovery of cooking oil instead of discharging it to sewer systems and avoiding putting solids such as plastic bags to sewer systems, then to manage solid waste collection stations in better conditions, and then little by little, strengthening underground sewer pipes. In sewer pipe in which flow is thought to be small, it is possible to have microorganisms which eat organic matters in wastewater when there is flow of wastewater and oxidize it when wastewater flow is stopped. If such mechanisms are effectively introduced with locally affordable technologies, water environment would be very much improved. Stimulating local technologies to step-by-step improvement is another, and if successful more important, option to cope with water and wastewater problems in slums.

# Biopori in Kampung -an intervension of “public open space”-

**Rini SURYANTINI**  
Universitas Indonesia, Indonesia

Flood and puddle are no strangers in Jakarta, especially during the rainy season. In the 1970’s flood was mainly caused by natural reason, but in the past decade, flood is more due to human activities, such as exploiting water reserves, land sink, covering the green open space and waterways with impervious materials, changing natural water catchment area into a covered built environment, bad habits of disposing waste into river, and so on. Water is becoming more delicate issue in Jakarta and intervention is crucial.

A neighborhood group in Jakarta is being taken as case study for this intervention. They suffer flood at the rainy season, but almost drought in dry season. A small part of Kalibata, RT 11/08, is being observed and mapped. It is composed mostly from dense and populated housing, along with small part of housing complex. Almost 90% is categorized as grey area, which is very obvious compared to green or blue area. This grey area indicates covered earth by building or other hardscape, minimum permeability, closed and “invisible” drainage network. Meanwhile private green open space is only in larger lot in the housing complex, while in the dense area, no yard are to be seen, only by-pot plantation aside along alley. Since it is located in a basin-like area, flood and puddle happen during rain with immense rainfall covering almost the whole neighborhood with maximum 150 cm of depth at the lowest spot. This is worsened especially due to the frequently interrupted gutter and drainage system, unavailable or covered by new building, and the idea to discard the water quickly, instead of retain it for owns benefit.

Since this project deals with small neighborhood and domestic related, micro intervention is presented to the community, in order to have as much participation from households. In 2012, biopori project is already introduced by the district office, but it did not solve the flood problem. Through series of discussion and field observation, a scenario of utilizing their open space is arranged. Since there is very limited household’s green open space, their “public open space”, such as roads, alley, parking lot, inactive area, alongside the gutter network is being intervened by biopori and sumur resapan.

Biopori or Lubang Biopori Resapan (Bahasa Indonesia) is a large pore on ground surface, in form of hole, which allows the soil absorb water faster by having more

surface area vertically in the soil ground and hence more absorption (Brata, 2008). This idea is introduced by Kamir R Brata since 1976, an IPB researcher in field of soil ecology, to retain more storm water (1), as well to improve the soil condition (2) by composing organic waste in the hole and activity of organism, and lessen puddle and along with disease, such as malaria or dengue (3). By having a ca. 10 cm diameter and 100 cm deep hole, a 3,000 cm<sup>2</sup> absorption surface will be achieved and more water excess is being taken and kept as water reserves (biopori.com, 2015). This innovation can be considered as low technology and thus easy application and accepted by public, especially since it can be applied on every surface and by everyone. Another technique is Sumur Resapan or retention well also introduced. It has bigger dimension (ca. 40cm x 160 cm x 200 cm) to retain water, but different mechanism, which excludes composting process. The well is filled with rocks, silts and gravel and unsealed bricks as walls, which still allows the water to fill the well and filter the water, before the water is being absorbed by the soil. From sustainable urbanist’s point of view, both are considered as retention basin, a micro environmental intervention project, which catches the storm water/ grey water and regulate it into drainage system and retain it (Graham, 2011). After 2007, when the great flood in Jakarta occurred, biopori are broadly disseminated. After evaluating the prior biopori project, it turned out that it was lacked of maintenance know-how and eventually biopori is less effective in area with bigger volume of water, such as RT 11/08 Kalibata (as well as in Kompas, 8 March 2012). Therefore, in this project around 80 holes of biopori are being reactivate, 12 units of sumur resapan distributed in several low spots, and equipped with of maintenance technique, which is refined by the community themselves. The positive aspect from the community, that it has good community bounding as well positive mindset, and therefore contributes greatly to the success of the project. It is not always solving the water problem by discarding the flood and storm water, but also keeping it some for near future’s sake.

# Jakarta: Chaotic City

## Design Principles: Small and Effective

Kenya ENDO

Jakarta: Chaotic City

What we often see in most of Asian mega-cities are the obvious shortage of basic physical infrastructures and housing supply. The pace of rapid population growth exceeds the speed of building proper foundation for all city dwellers to enjoy their healthy urban lives. As a result, the impression of cities like Jakarta, is well-represented by horrible traffic jam, informal settlements and tons of daily waste discharged into nearby waterways.

Witnessing the chaotic cityscape and having the opportunity to attend the WS among university students and local residents in Cikini, I started to think the importance of understanding the broader context of city planning in Jakarta. We should figure out where we “creative thinkers” position ourselves within that framework, otherwise the issues we are tackling is too massive and diverse to handle. Hence, Cikini served well as a suitable study site to start with which has the outlook of typical informal community, lack of proper sewage infrastructure as well as its proximity to waterway that heavily interplays with resident’s lifestyle. Here in this essay, I intend to raise some key standpoints that we planners should take into account for a better contribution to this complex urban issue.

Design Principles: Small and Effective

According to the interview session conducted by Chiba University team, JICA (Japan International Cooperation Agency) is now in the process of planning city-wide sewage masterplan that targets its completion date in 2050. Although, considering the fact that infrastructural works require long period to plan and build, Cikini asks for actions to be taken right away. We heard some pressing concerns from local residents about daily ground water resource, both in terms of quantity and quality. Needless to say, they also face hygienic and flooding risk at all moments. If we challenge to take a parallel yet alternative approach to complement overarching governmental target, the key concept for our design intervention will automatically be “small” and “effective”. These keywords refer to local scale interventions that can be duplicated to similar informal communities along the waterway. Collections of dispersed design interventions can be combined with other functions that respond to community’s social need; e.g. providing more openspaces, raising awareness of clean water etc.

Just like some proposals by students were pointing out, small but effective intervention schemes, especially with the mindset of flexibility in its operation and siting, must be the guiding principles for an immediate improvement. In addition, targeted goals for each small intervention need not to be overwhelming, but must be aligned with the long term plans undertaken by governmental agencies.

Strategies: Encouraging Global and Local Conversations  
Once we understand the guiding principles for the first action, now what are the tools we have in our hands? Here briefly describing what I think useful.

Firstly, I see the potential of advanced information technologies. Strange enough, Jakarta is far less developed compared to Tokyo, for example, but the amount of information people have access must be almost the same. Smart usage of IT can easily facilitate sharing innovative ideas among multi-professionals throughout the world. There are a number of challengers (so-called social entrepreneurs) in the world testing out their “small” and “effective” design interventions in similar conditions as in Cikini. Unlike the previous century, information can travel quickly and easy to gain collective feedbacks. Thus, IT can accelerate the process of coming up with new solutions, testing out and eventually creating successful models for cities to upgrade their living environment.

Secondly, when it comes to small scale design interventions, needless to say, community engagement will become crucial. Collaborative efforts among planners and local stake-holders must be well-organized with mutual trust, and the skill to build such relationship is extremely important. It was my pleasure to receive friendly smiles and greetings from local residents here and there during my visit to Cikini. In order to carry out long-term urban planning projects, community members must be heavily involved for a sustainable operation and maintenance. In short, listening to voices from all over the world via IT as well as local community members will turn into strong weapons to overcome the struggles many neighbourhoods like Cikini are facing. I hope any challenges taken in Cikini will become one of the successful prototypes that can be shared and well-evaluated within global discourse regarding issues in developing cities.

# KAMPONG CIKINI REVISIT

## : A RETROSPECTION

## TOWARDS KAMPONG

Denny HUSIN

Academic Staff, Universitas Tarumanegara, Jakarta.

The successful KIP project has shown a low-cost, creative and sustainable method of transforming high-density urban informal settlements into healthier and greener condition which has gained international recognition by activating inhabitant’s resources and by increasing attentiveness of the importance of a clean and hygiene living environment. This comprehensive project promotes better circumstance for low-income families, involving the local community in the development, encouraging long-term sustainability and continous improvement. Although critiques and debates have been giving credits yet suggestion for applying scaling up strategy for kampung, kampung shall not neglect all the greatness and richness of its own as contains the genuine embryo of Indonesian characteristic. Kampung grows together as part of the genius loci of the city and still striving in the competition of this commercialized world (Turner, 1977).

Erratic involment and arbitrary development of Kampung often lead to miss-perception of kampung, resulting miss-conception and erosion of its true meaning (Kusumawijaya, 2006). Kampung-Kota represents the informality of the city, a city’s void and footprint where the city’s spirit shall be proliferated in this ‘informal landscape’( Purnomo, 2005). The revisit is intended to retrospect its complexity, and by presenting the fundamental meaning of Kampung in the city ,an architectural strategy is required for urbanizing kampung.

According to Indonesian Dictionary, Kampung is interpreted as a group of houses, grown as part of a city by housing various ethnicities; a village; the smallest administration in an area; a place of born yet less positive ones is a compound of less intellectual; primordial and less mannered inhabitant. ‘To kampung’ means making group or to gather more power where the reciprocity is believed as one of the fundamental spirit and characteristic of Kampung yet National proudness (Pangarsa, 2008). House as the smallest unit of Kampung is gathered, to shelter a family or more, participating as a member of Kampung community; yet a part of society in the bigger term. The true meaning of house in Kampung is differenciated in architectural perspective and may be unique in comparison with the contemporary definition of a modern house.

The term : house in the tropical manner is defined as a shelter rather than a building or a permanent structure, as tropical climate is acceptable for a delicate and less

clothed body in comparison with harsh and various climates at other countries which may need more protection (Priyotomo, 1988). The term ‘Griya’ and ‘Omah’ etimologycally in Javanese word explains the possible meaning as a tree; a metaphorical yet literal shelter for human habitation, represeting mutual symbiosis between human, house and their tropical environment (Priyotomo, 1999). Vernacular house in Indonesia is interpreted as organic, growing, non-permanent yet dynamic and continuously changing material and programmatic, and believed as the gen of Kampung.

With a greater ideas and inspiration of improving Kampung condition, often we as architect and planner often easily judge kampung situation in less-positive attitude, with parametric calculation concluding the condition as poor and less-manner, resulting proposal which may be perfect from modern point of view although less fitted within existing circumstances. More acknowledgement shall be given to Kampung’s own creativity, tradition and survival kits as some may have proven as protection of Kampung pure spirits; reflected on materials, techtonic and the communal space, showing the openness and hospitality, echoing the richness and more complex local structure of Kampung to the global world.

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# Water Flow and Informal Settlements

**Norihisa SHIMA**

(Associate Professor, Department of Regional Development Studies, Toyo University)

Polluted water, scattered and piled garbage … rivers and drainage, or water flow, inside informal settlements of a city is often seen in the negative way. Yet, looking around the world, we can find interesting cases of upgrading informal settlements through water flow.

The pioneering case is Orangi Pilot Project (OPP) initiated in Karachi, Pakistan, around the 1980s. The project was implemented at communities of slums and squatters called katchi abadis, where the residents’ groups were organized to fund and construct the drainage for themselves, technically supported by OPP. Then, the drainage constructed by the residents was then connected to the sewage network that the City Government had developed. Naturally, building drainage inside the community itself helped them improve their living environment. Furthermore, this connection of the drainage and the sewage network, together with the construction of the drainage itself had led to the empowerment of the residents. Thus, OPP and this way of empowerment was highly appreciated to be awarded World Habitat Award 2000, introduced not only to other Pakistan cities but also to cities around the world.

Another case worth highlighting is Slum Networking Project (SNP) implemented in Ahmedabad, India. After the pilot project in Indore, Ahmedabad Municipal Corporation started SNP in 1996. The project, intended to improve the physical condition and to promote the community development of slums, was launched by the government, the business sector, NGOs and the slum residents to construct the sewage network as well as to upgrade the slum housing. Indeed, this project had a merit for the government. Building the sewage network by connecting through slums usually located at the lowland part of the city was the effective way to improve the environmental condition of the slums themselves and whole the city. For the business sector, as the slum residents are often their workers, the improvement of the environmental condition of the slums would lead to activating economy. Through

residents of 32 slums were improved, and Ahmedabad Municipal Corporation has tried to scale it up. Ahmedabad Slum Networking Project was also awarded Dubai International Award and also selected as one of the best practice by UN-HABITAT.

Look at Jakarta then. The city is full of water flow. The rivers from Bogor is utilized for water supply, the east and west channels prevent the city from flooding, a number of small rivers flow across the city… Like many other cities, the water flow of Jakarta, naturally including kampongs, the informal settlement, seems be seen in the negative way. Yet, we must keep it in mind that water flow would become somewhat key to improve informal settlements.

Reference: cSUR-SSD, The University of Tokyo (2008) “SSD 100” Tokyo: Shokokusha Publishing (in Japanese)

# Upgrading the Quality of Urban Kampong by Water Management System

**Olga Nauli Komala**

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Urban kampong in Jakarta is usually assumed as slum, abandoned, high density area which has high rate of criminality and bad conditions of housing and infrastructures. Kampong inhabitants are also seen as low educated and poor people who work in informal sectors and have unhealthy habits. The assumptions are not absolutely true. Not all of kampongs can be seen as squatters or slum areas. When we look back at its history, the existence of urban kampong cannot be separated in shaping the characteristics and memory of a city. Some kampongs in Jakarta also take part as economic support for the city and space for local communities and culture, where we can easily find liveliness, togetherness and intimacy in its communal spaces that we cannot find at any other places in a city.

Kampong Cikini Ampiun, as case study area of this workshop, is an urban kampong which has many layers that form its complex organic forms. The layers, which shape the kampong, grow spontaneously following the basic necessities of the people, without holistic approach and long term planning. Sometimes, one layer can contradict with other layers in the context of kampong itself as “micro-system” or the city as the “macro-system”. As we set apart the layers, we will find that some aspects will contradict with other aspects, for example: the issue of privacy contradicts with its limited space; the needs of healthy standard of living contradicts with the habit of its inhabitants; the real conditions of kampong contradict with some technical approaches to solve the problems of kampong; even the characteristics of urban kampong itself contradict with the characteristics of the city around them. Regarding to the topic of this workshop, the issue of water in Kampung Cikini Ampiun becomes complicated since the problems do not only relate to the limited amount of clean water, but also relate to some aspects such as: limited space to plug standardized sanitary system in kampong; unhealthy habits of the inhabitants in managing wastewater; financial capabilities of low income people to build water infrastructure; and the problems of flooding and polluted river.

One of the existing solutions to the water issue in Kampong Cikini is MCK (Mand, Cuci, Kakus). In this case, MCK is not only functioned to facilitate public for bathing, washing and urinating, but also functioned as public space for local people to chit chat, for children to play around and for any

other public activities. Actually, MCK cannot be the only solution in responding water issue in Kampong Cikini. How the water management system can be sustainable enough in this kampong becomes the main question. Knowing how the inhabitants use the water in their different daily activities and in different needs of life cycle must be known in searching which systems appropriate to be applied in Kampung Cikini.

Furthermore, water management system in urban kampong cannot depend only on technology (technical approach) but also on a holistic water management system. It must be based on daily activities of the inhabitants, so that the system will be sustainable enough for the kampong. The system should be easily prepared, operated, maintained by the inhabitants. If water management system becomes a part of their daily activities, it will be easier for the inhabitants to take their responsibilities and make sure to control the system. This participatory approach is needed to choose which technology appropriate to be applied in kampong.

As the architects, the main idea is creating better space with the chosen system. Without ignoring the true meaning of urban kampong, technology can be inserted to the system, as long as it is familiar to the inhabitants. Some design proposals from this workshop have shown the possibilities and potential concepts to involve the inhabitants in water management system as well as to create better communal space with the systems, such as: the concept of stacking and modular system as self build architecture and water management system; the concept of “kerasering” which uses local material to filter water and trash besides creating new communal space; the concept of free – play related to split systems for water treatments which is based on the daily activities; the concept of inserting water management system related to the changing of space, etc.

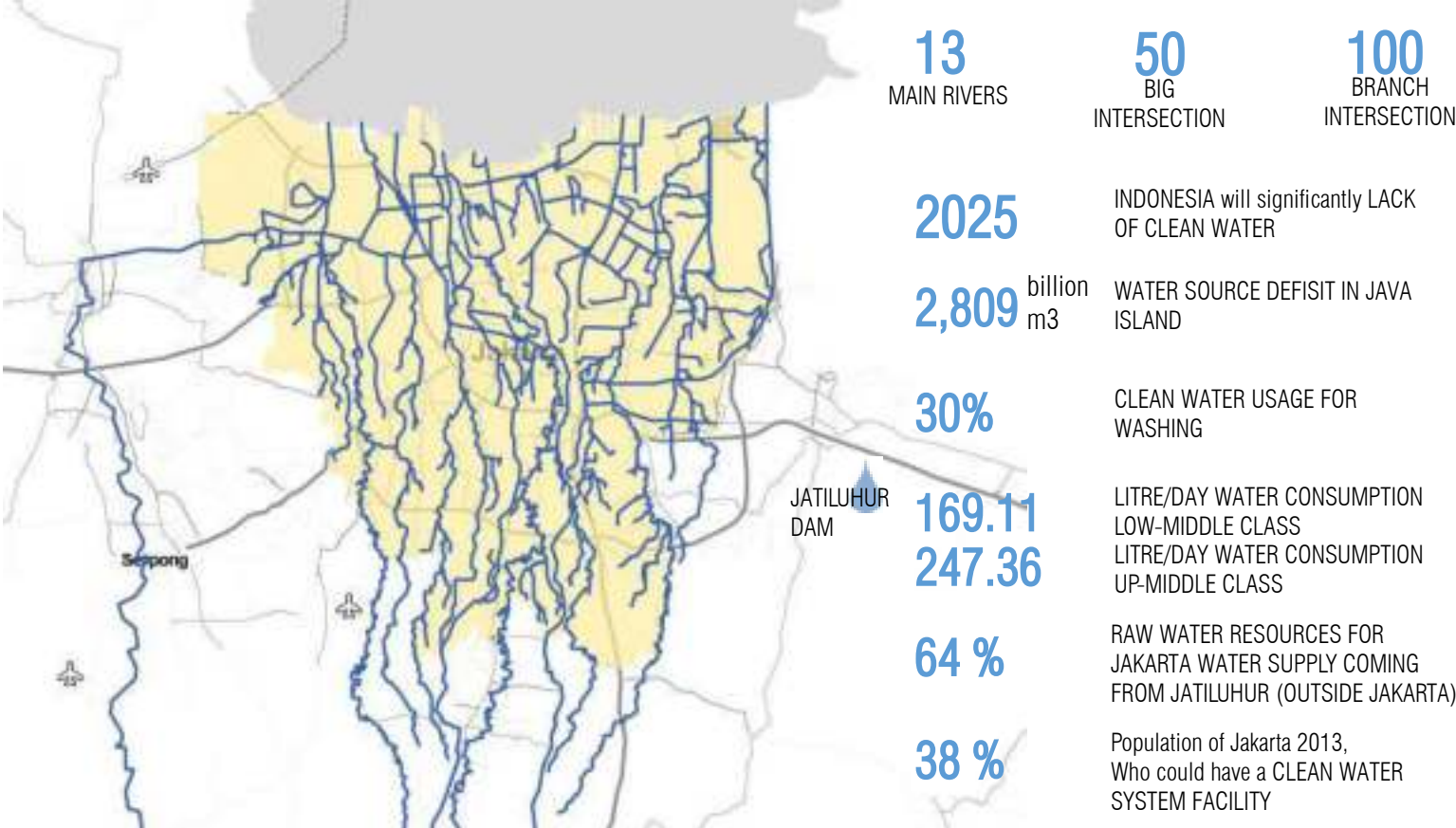
The synergy between the system and the inhabitants will not only create sustainable water management system but also create urban kampong as better place to live.



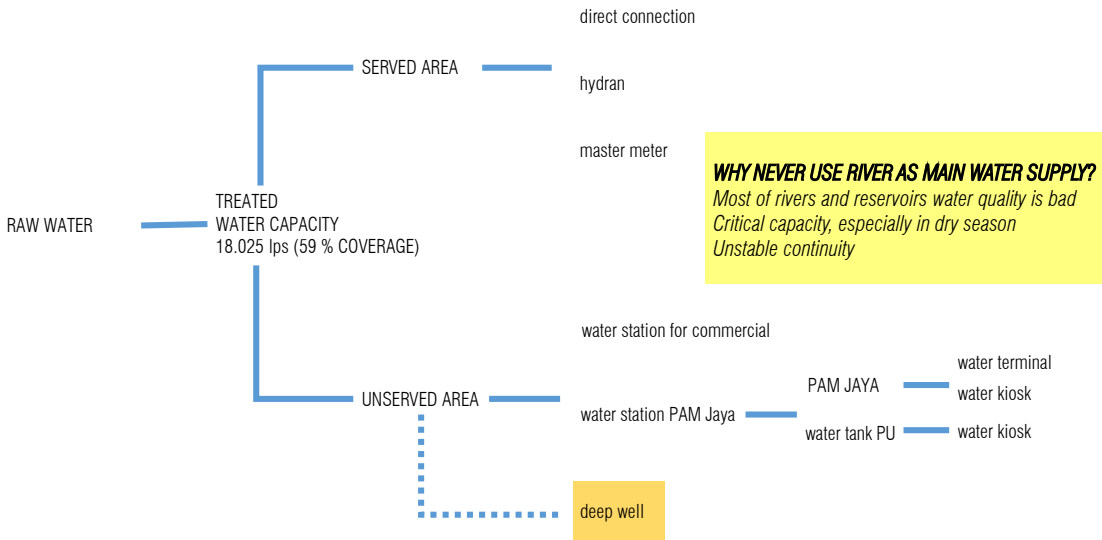
Field: Cikini, Jakarta, Indonesia

In Cikini, around 3,200 people are staying on 4 hectare land. Including temporary residents, 5,000 people have their life here. Many small houses from one to three stories are gathering and making super high density built environment. A shopping street, which was railway track in Dutch colonial age, is now making a strong axis of this area. Because of the low living cost, good access to the city center, and rich community of neighborhood, many people are thinking of keep staying here. But, many problems such as polluted ground water, illegally-disposed garbage on a street, or high risk of disaster are necessary to be solved.

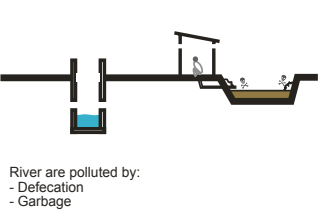
- Area: 40,000 m<sup>2</sup>
- Population: 3,200 people
- Number of unit: 800 units
- Residential floor area: 32,000 m<sup>2</sup>
- Density: 800 people/ha



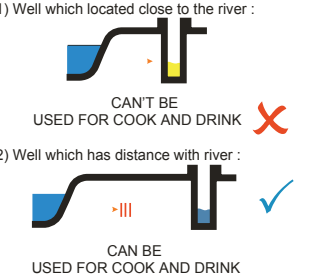
DISTRIBUTION OF WATER SUPPLY SYSTEM



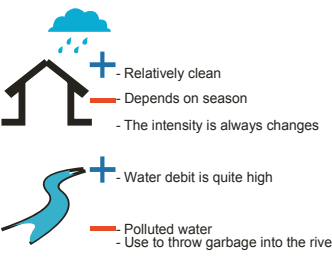
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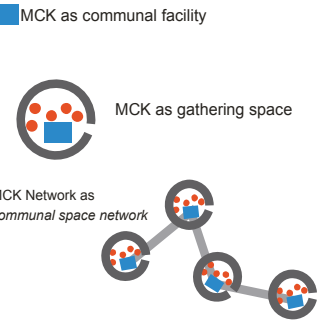
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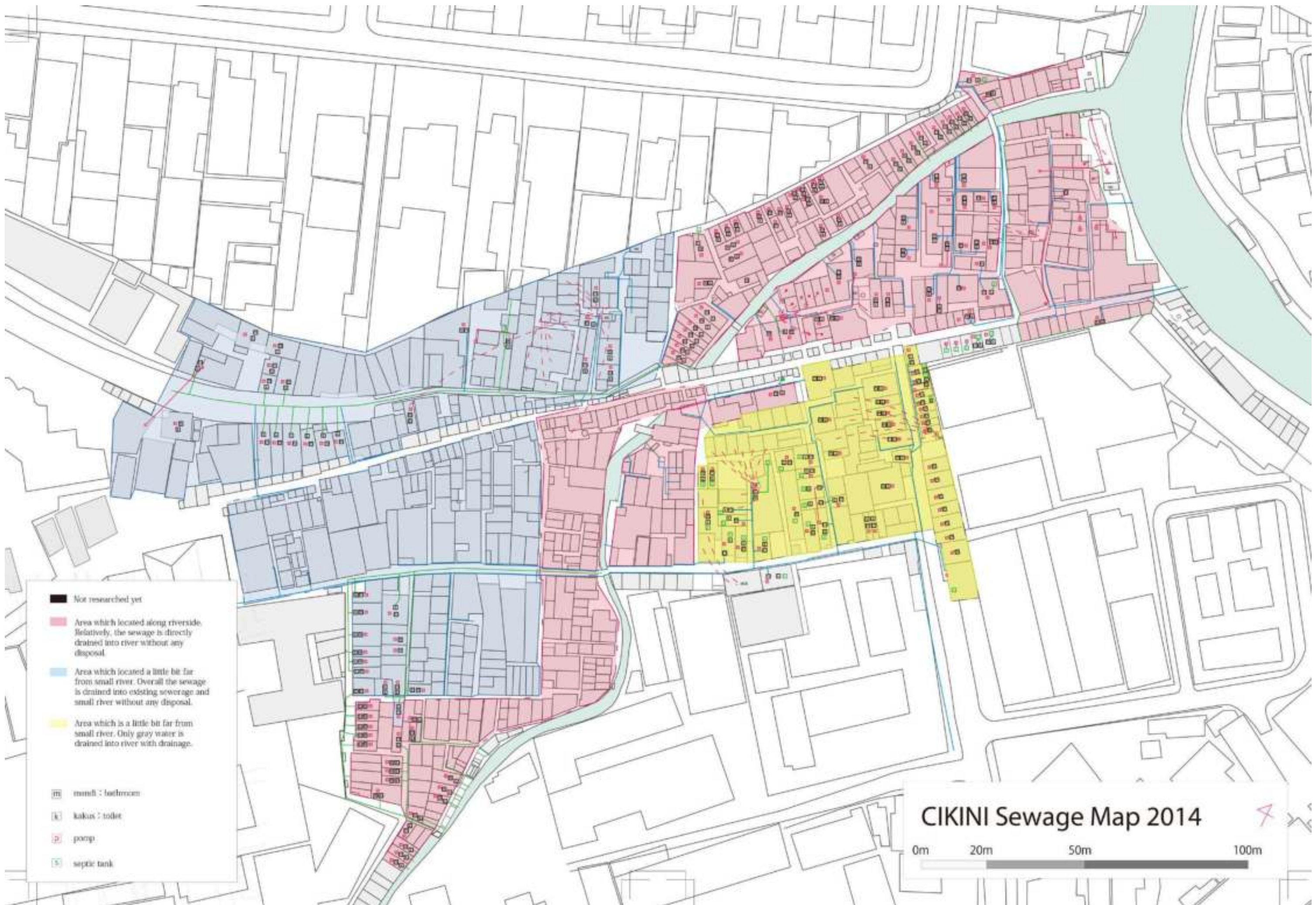
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CK Building Process











# Background Before Water Flow Project





# Joint Studio Workshop in CIKINI 2012

## Alternative HeliCopter



### Date

September 8th-15th 2012

### Participants

8 students (Indonesian)  
4 students (Japanese)

### Universities

Universitas Indonesia  
Chiba University  
Tokyo Metropolitan University

### Place

the small river

Urban neighbourhoods of high density like Cikini-Ampun in Asian Megacities have various problems as a living environment. At the same time, there are many things to learn from community such as intimate community, human-scale built environment, or spontaneous and local infrastructure. We, as urban planner, should develop the alternative way of strategic intervention and propose the future vision which is not only about slum demolition or redevelopment by modern city planning method. Based on this concept which is shared in the workshop in 2011, 2012's workshop tried to do one real physical construction on site. The main aim was to let local people aware about the value of the small river which is used as sewage now and feel

the different experience about river.

A small river is running through high density area in Cikini-Ampun. Some river points are full of garbages. Sometimes we could clearly see that the sanitary conditions are not going well. It is better to find more value of the river. There were more than ten bridges over this river which called "Helicopter". Most helicopters were abolished and only two of them remain until today. The workshop explored "Alternative Helicopter", which gives local people a chance to reevaluate the river. In order to turn the river into a place for relaxation or a playground for children, an architectural installation was designed with local people.





Survey

We found many lively activities of children in Cikini. Though children have the talent to find their space anywhere such as narrow alleys, parking ot, etc, basically they need more space to be their playground. Then we started to consider the possibility of making some playground on the river for children. Finally we reached the idea of big SWING which becomes the symbol of the district and the place where everybody wants to gather.



Sketh



Proposal



Construction Process with Local People



**Choose Material**  
Bamboo was chosen as the structural material since we could get recycled bamboo easily in Cikini. Local carpenter also recommended bamboo because it would be easier for both students and local people to construct the installation with bamboo.

**Structure**  
After setting up bamboo scaffolding, we built main column structure to support the beam of the swing.

**Paint**  
After constructing structure, all the swing parts were painted in yellow so that it could be more attractive and could become attention.

**Local People**  
Local people joined the construction every day in three days. Mr. Duding became the supervisor and children enjoyed bamboo painting.

**Swing!**  
Everybody was looking forward to the unveiling day. It was impressive that many children made a line to ride on the swing

Ayun-Ayun Kaliku as Education Media



**Step 1 Bringing Garbage as Ticket**  
We ask children to bring garbage which was thrown to the river until that time as a ticket for trying Ayun-Ayun Kaliku (swing).

**Step 2 Promise**  
Children make a promise that they will never throw garbage into the river and keep the river clean. After they promise, they get a sticker as an evidence of the promise.

**Step 3 Separating Garbage**  
There are 3 trash boxes at the gate of the swing, paper, organic and non-organic. Children classify their garbage into 3 boxes. After that, the gate open.

**Step 4 Playing Swing**  
Finally they can play the yellow big swing. The swing is very thrilling! Their screams and cheers could be heard around the swing all the day.



# MCK RT 11 PROJECT

Alternative HeliCopter



Date

September 2014

Participants

4 students (Japanese)

Universities

Universitas Indonesia  
Chiba University

Place

RT11

In After Fire Project last year, we proposed and built "Housing Model" in high density residential area Cikini, Jakarta. In the MCK project this year, we are planning to enforce and develop the idea of After Fire Project.

The site is also in Cikini. There are toilets, an office, and a garbage disposal in this site. But 3 of 4 toilet booths are not working while local people really need toilets for their everyday life. Because of such situation and offer from leader of that area, it is decided to renovate existing function and to design new structure in this site.

As After Fire Project is intended to improve housing environment by making void behind the building, we also adopt the "Void" idea for MCK project this year to improve the environment of toilet space

In addition to the idea, we propose management system by incorporating the idea of "Core Housing". Now the toilets are left broken because of the difficulty in providing budget. In our design, we let the 2nd floor area to be open so that local people could make additional construction freely by themselves. The community can get income by proposing some additional functions for 2nd floor, such as rental offices or rental houses, and part of the income could be used for the management of MCK facility. Through such a management system by producing management funds, we would like to make this project as a sustainable engagement, not only to give temporary repairing cost.





Design Concept

Typical house in kampung Cikini is extending each floor as wide as possible, and the interior space doesn't get enough sunlight or wind in the result. To solve such environmental problems, Jakarta government have started to renovate existing houses by reducing 1 meter of front side to get the narrow alley wider (fig.1). This kind of remodel method is typically used in modern city, but it has the problem that the existing local atmosphere might be lost.

Our new method used in 'After Fire Project' proposes to reduce back side of houses, as same volume as government's method (fig.2). It is environmentally effective because of two direction openings, and showing that narrow void could works effectively in near-equatorial area like Jakarta where sunlight enters from straight above.

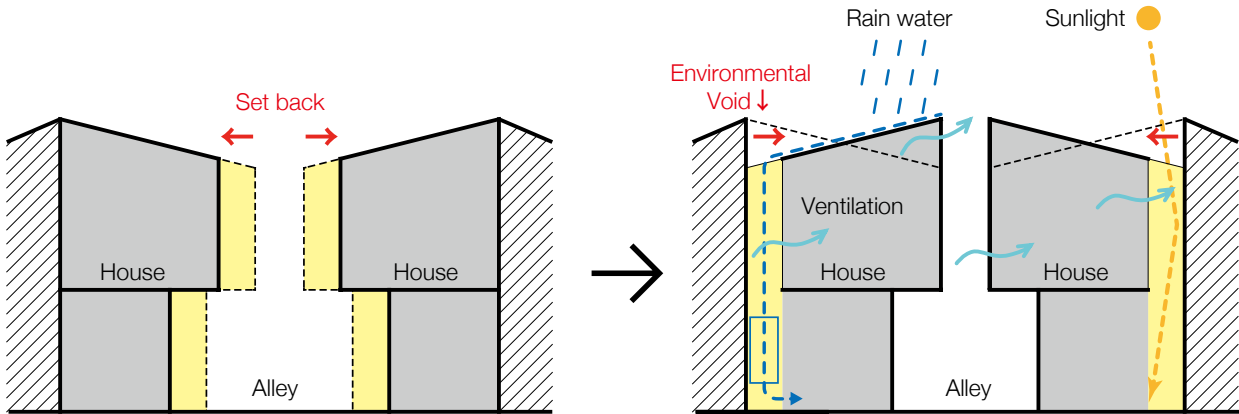


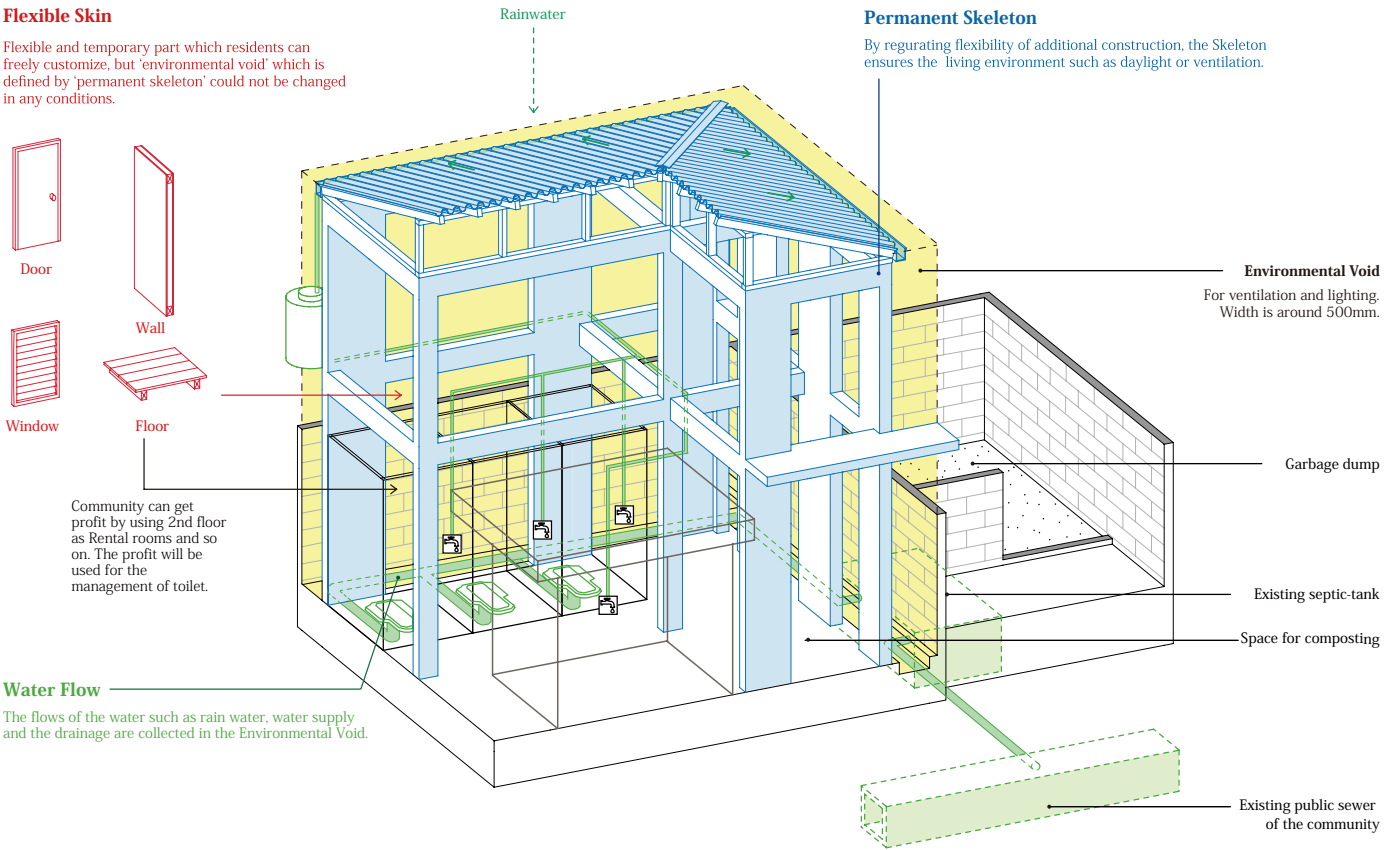
fig.1 Government's Policy

fig.2 After Fire Project

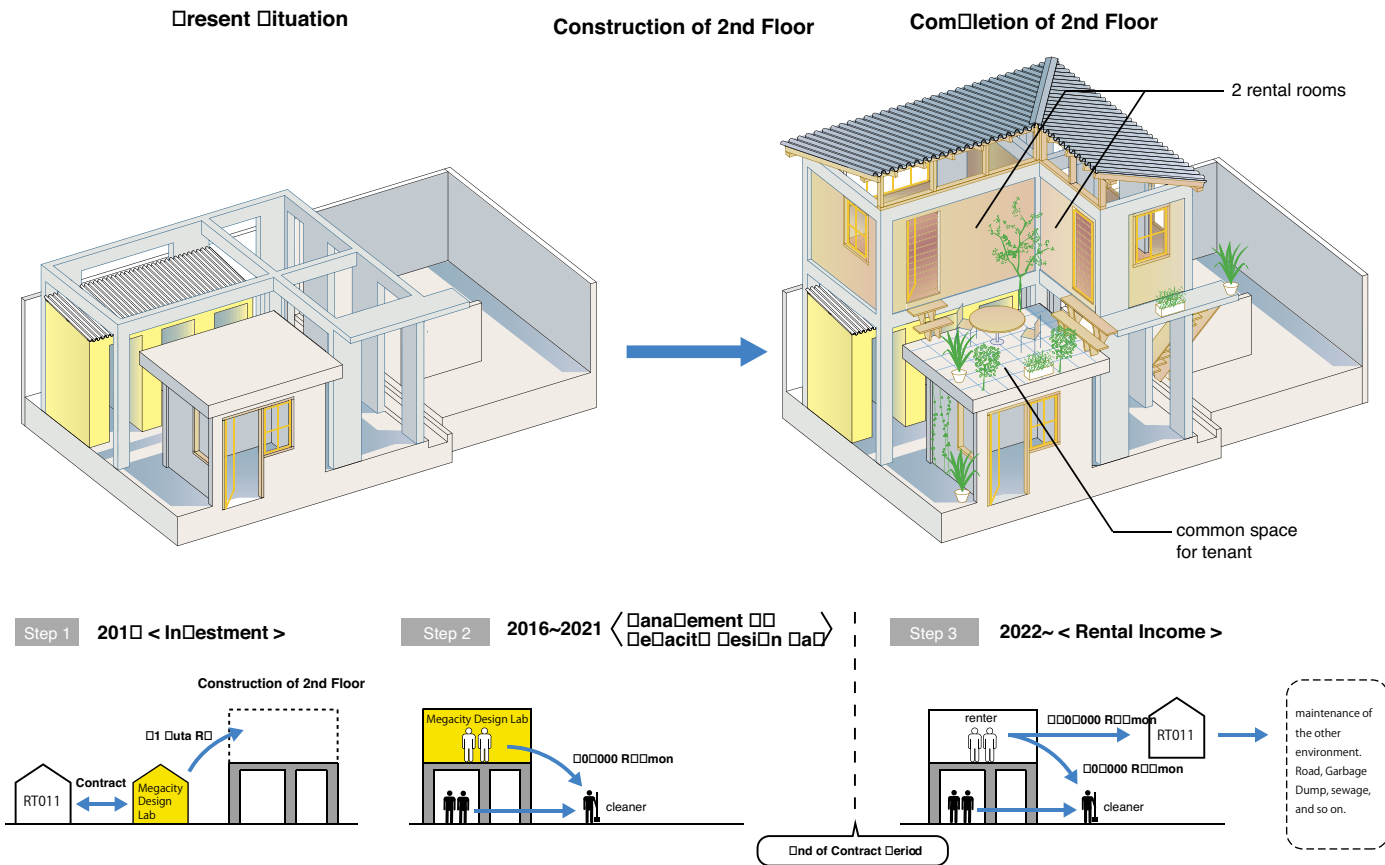
After Fire Project



MCK RT11

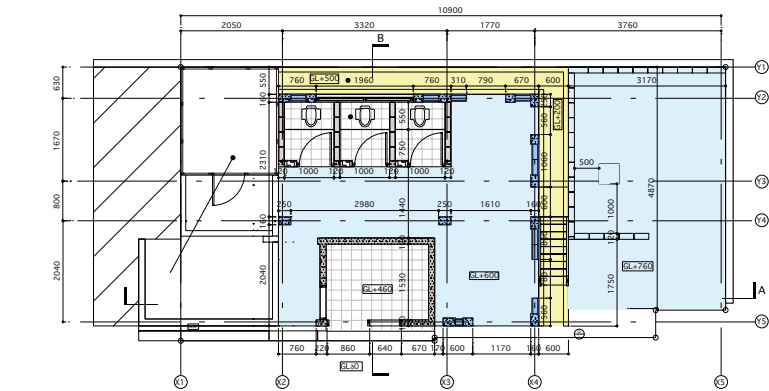


MCK Budget Plan 2015

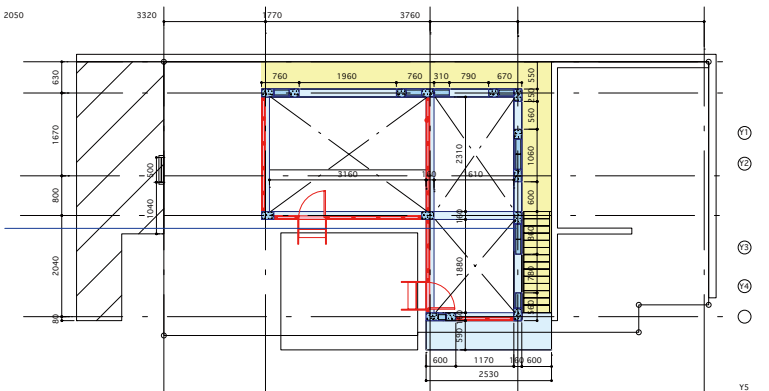




MCK RT11



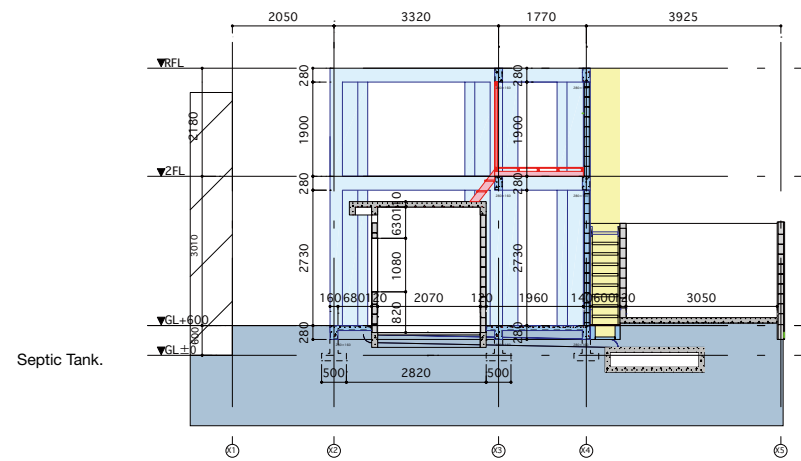
1st Floor Plan (S=1/150)



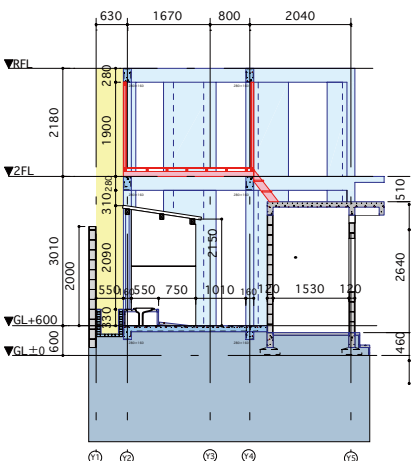
Second Floor Plan (S=1/150)

User of this building makes this space by themselves. 2nd floor is covered by user.

Skeleton built with concrete. This skeleton keeps both the boundary of void and the room inside. The walls permanently keep the size of



A Section (S=1/150)



B Section (S=1/150)

Septic Tank.

creat bright space in front of toilet.







SITE1 RT7



SITE2 RT4



SITE3 RT13

# JOINT STUDIO WORKSHOP IN CIKINI 2015



Introduction

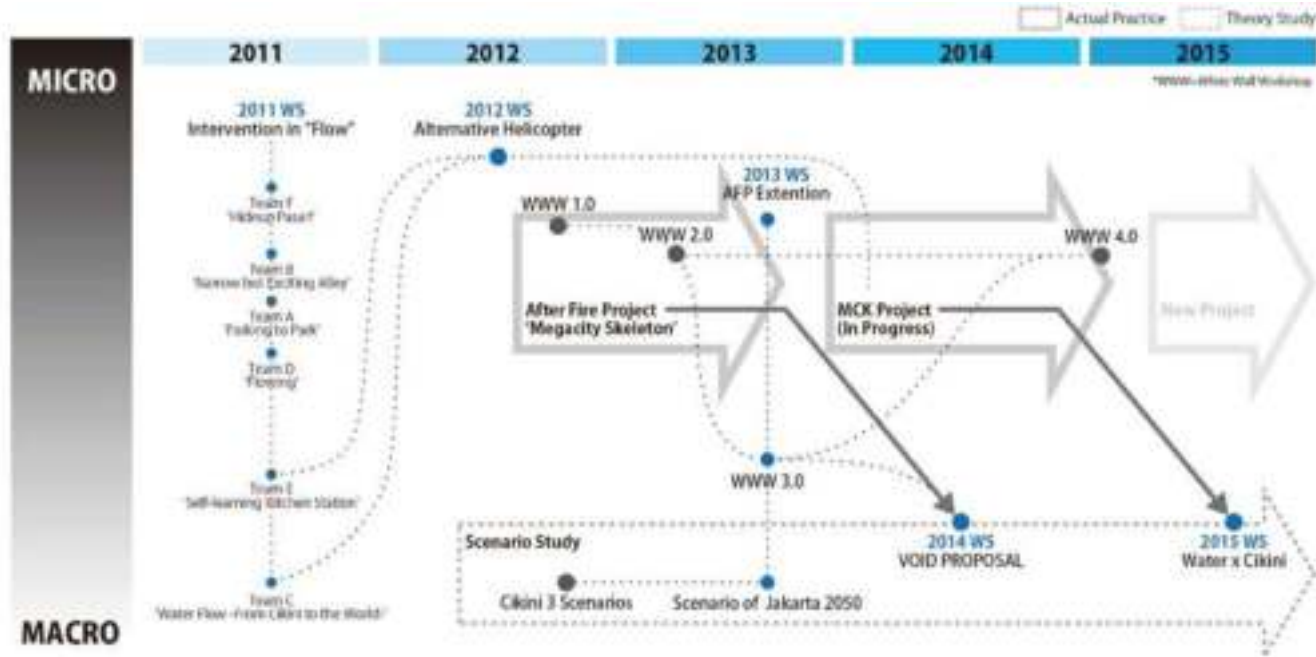


WATER PRESSURE & CHALLENGE

The dynamic survivability of the inhabitants of kampung expose how the crowded contiguous spaces are used and negotiated into a place to live for the majority of urban dwellers living in informal high dense urban area. Yet, there are numerous facts shown that living in overcrowding settlement is more tolerable if there is good provision for daily life supports such as piped water, electricity and functioning, safe toilets and waste water disposal.

There is not much point in expecting the virtues of dense informal settlements if these virtues depend on a competence, capacity and accountability of city and municipal governments. So, what can be done for thousands of urban dwellers facing the scarcity of domestic water for daily life as well as lack of appropriate sewage? What can we do, to avoid the deteriorating quality of well water?

From 2011 to 2014, We (Universitas Indonesia and Chiba University) have been proposed some ideas and proposals to improve the living environment in high-density area through interventions to Kampung Cikini. However as those are still partial interventions, our project has not been able to be linked to urban planning yet.



Schedule

| Day    | Date         | WS Phase         | Program  |
|--------|--------------|------------------|--|
| day 0  | 22.Aug (Sat) | Kick off meeting | •Kick off meeting  |
| day 1  | 23.Aug (Sun) | Survey           | • Walking around Cikini<br>• Discussion by each team   |
| day 2  | 24.Aug (Mon) |                  | • Surveying and Measuring water flow of each team's district.<br>• Drawing present technical drawing.          |
| day 3  | 25.Aug (Tue) |                  | • Drawing present technical drawing.<br>• Presenting drawing and sharing condition of water flow in WS members |
| day 4  | 26.Aug (Wed) | Making proposal  | •Making Concept<br>•Esqiees check by tutors  |
| day 5  | 27.Aug (Thu) |                  | •Development of architecture proposal<br>•Esqiees check by tutors  |
| day 6  | 28.Aug (Fri) |                  | •Development of architecture proposal<br>•Esquisse check by tutors   |
| day 7  | 29.Aug (Sat) |                  | •Modifying the proposal.<br>• Preparation for the final presentation   |
| day 8  | 30.Aug (Sun) | Proposal         | • Presenting proposal to community   |
| day 9  | 31.Aug (Mon) |                  | • Preparation for the final presentation   |
| day 10 | 1.Sep (Tue)  |                  | • Presenting proposal to Professors  |



Kick off meeting



Survey

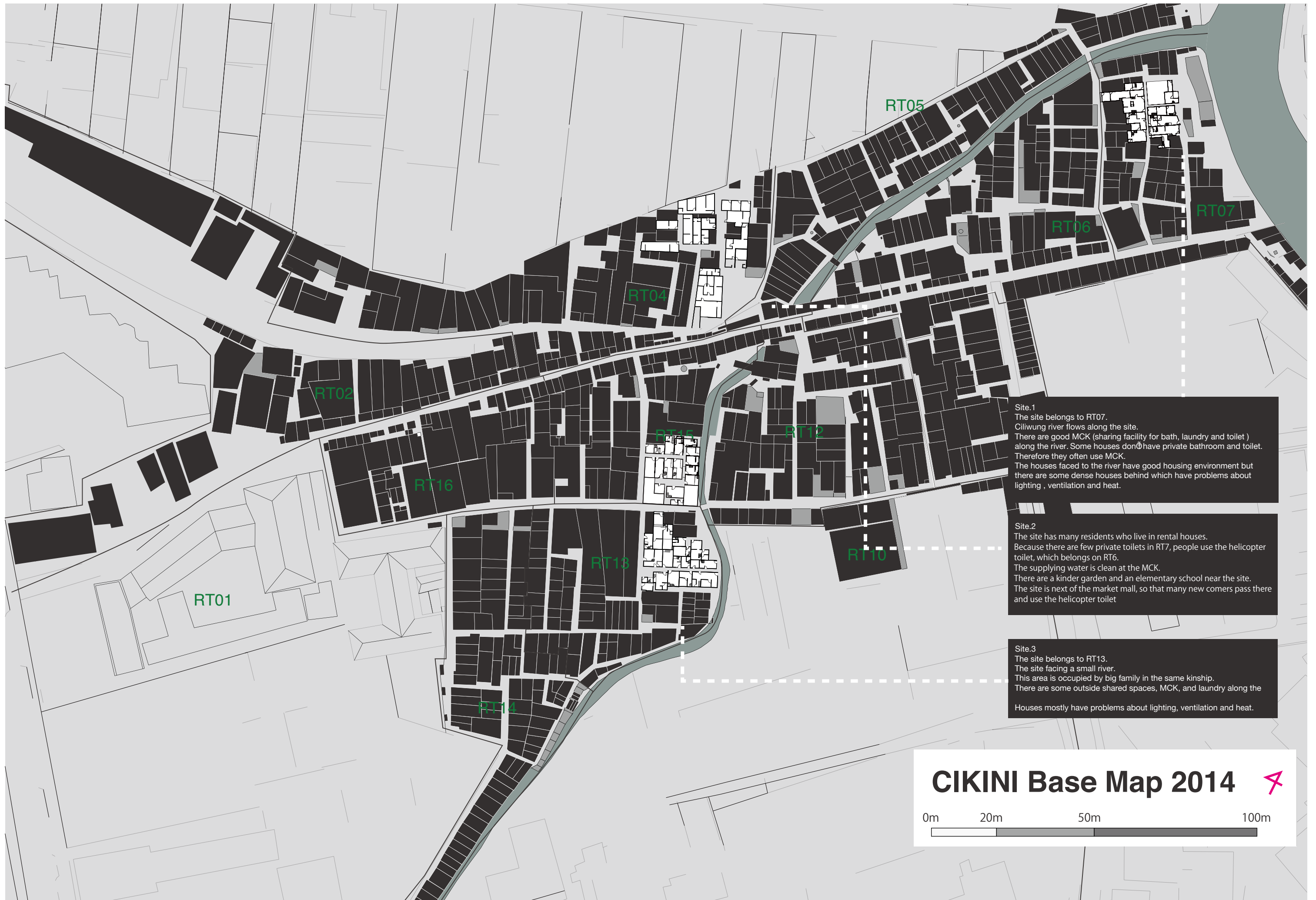


Making proposal



Proposal





Site.1  
The site belongs to RT07.  
Ciliwung river flows along the site.  
There are good MCK (sharing facility for bath, laundry and toilet) along the river. Some houses don't have private bathroom and toilet. Therefore they often use MCK.  
The houses faced to the river have good housing environment but there are some dense houses behind which have problems about lighting, ventilation and heat.

Site.2  
The site has many residents who live in rental houses.  
Because there are few private toilets in RT7, people use the helicopter toilet, which belongs on RT6.  
The supplying water is clean at the MCK.  
There are a kinder garden and an elementary school near the site.  
The site is next of the market mall, so that many new comers pass there and use the helicopter toilet

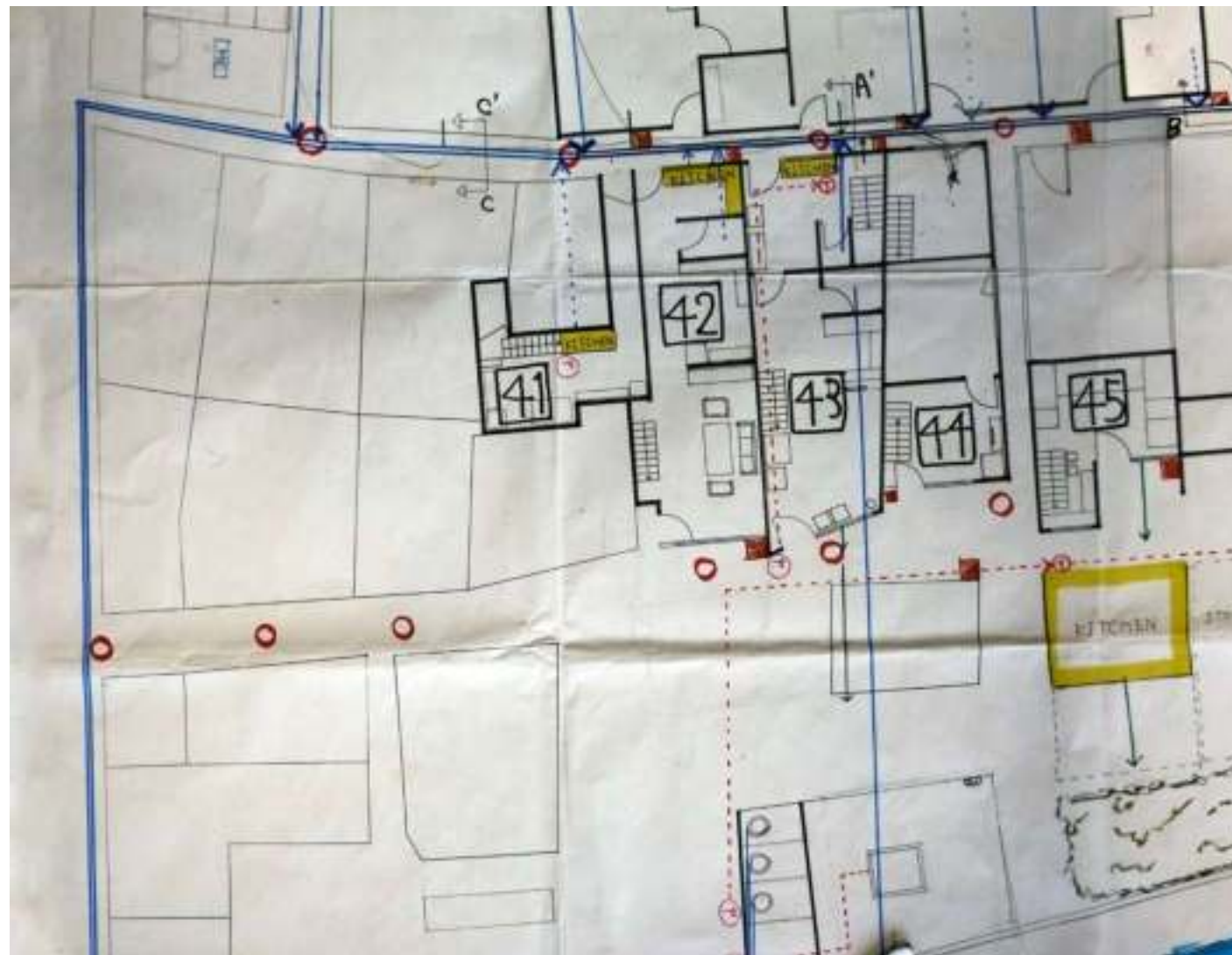
Site.3  
The site belongs to RT13.  
The site facing a small river.  
This area is occupied by big family in the same kinship.  
There are some outside shared spaces, MCK, and laundry along the  
Houses mostly have problems about lighting, ventilation and heat.

# CIKINI Base Map 2014

0m 20m 50m 100m







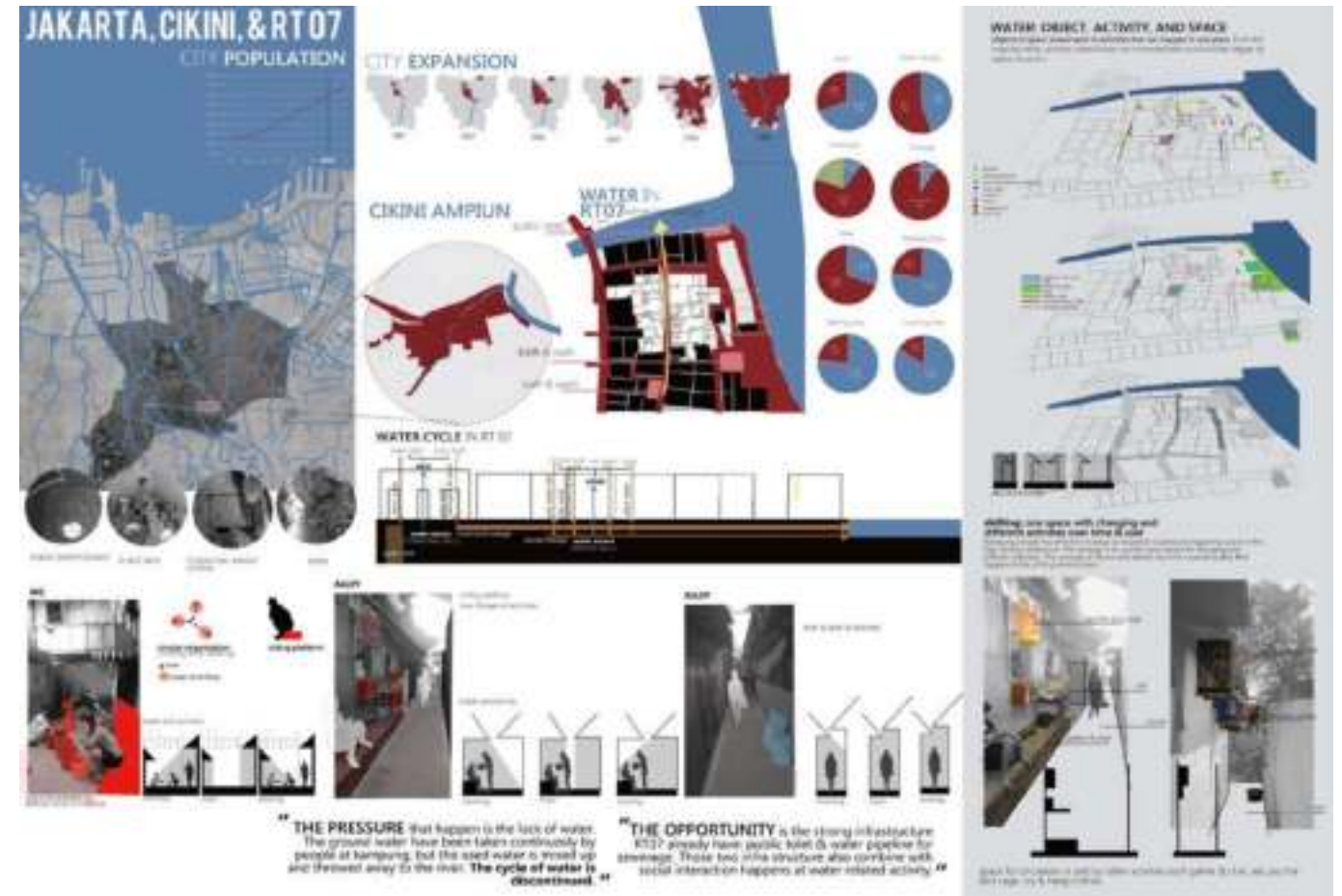
# SITE 1-RT 7

TEAM 1 : Maulitta Cinintya Iasha, Tia Aprotasari, Eka Pradnyanida, Akira Hirano

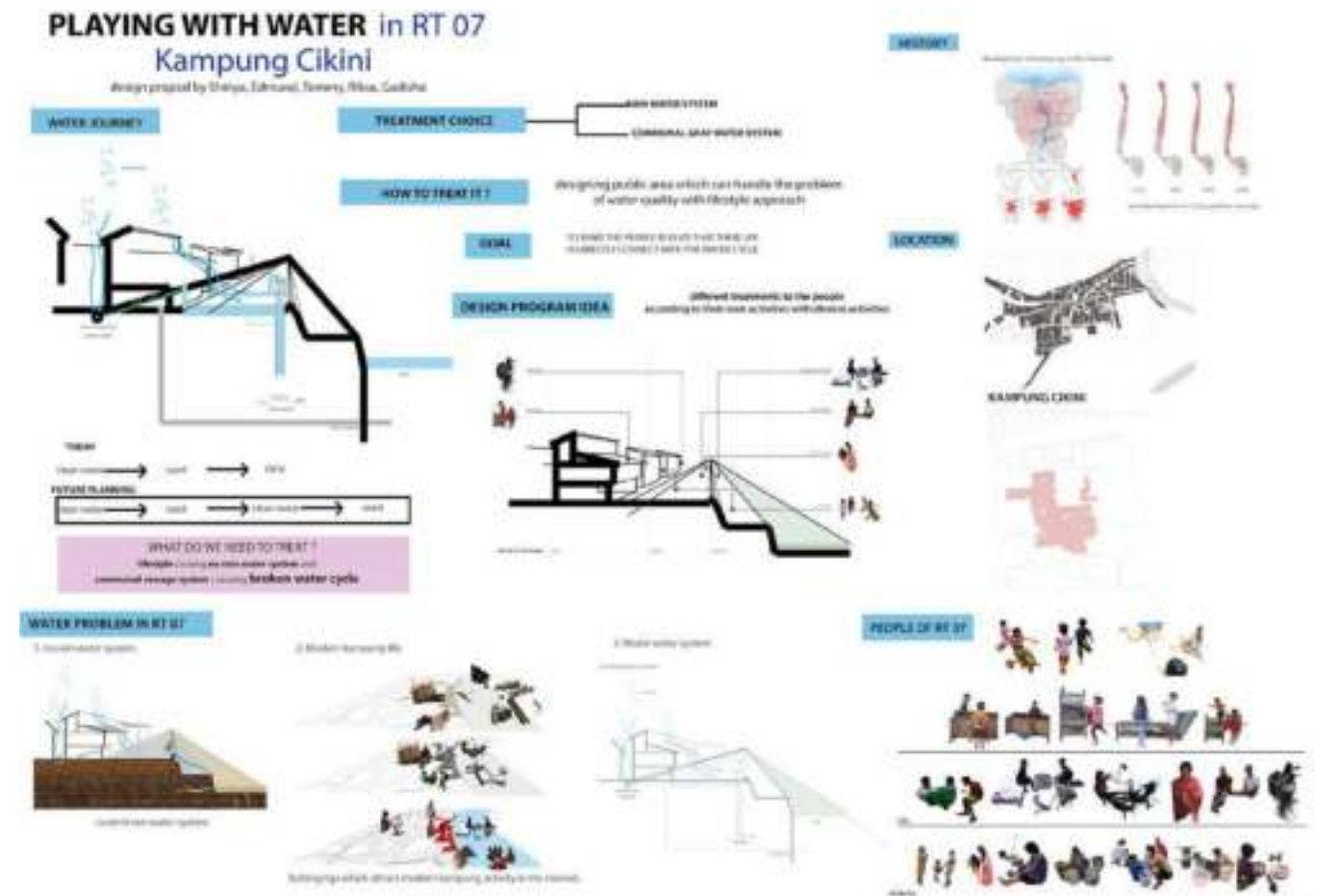
TEAM 4 : Gadisha Amelia, Tommy Tanedy, Edmund Santos, Shinya Tateishi



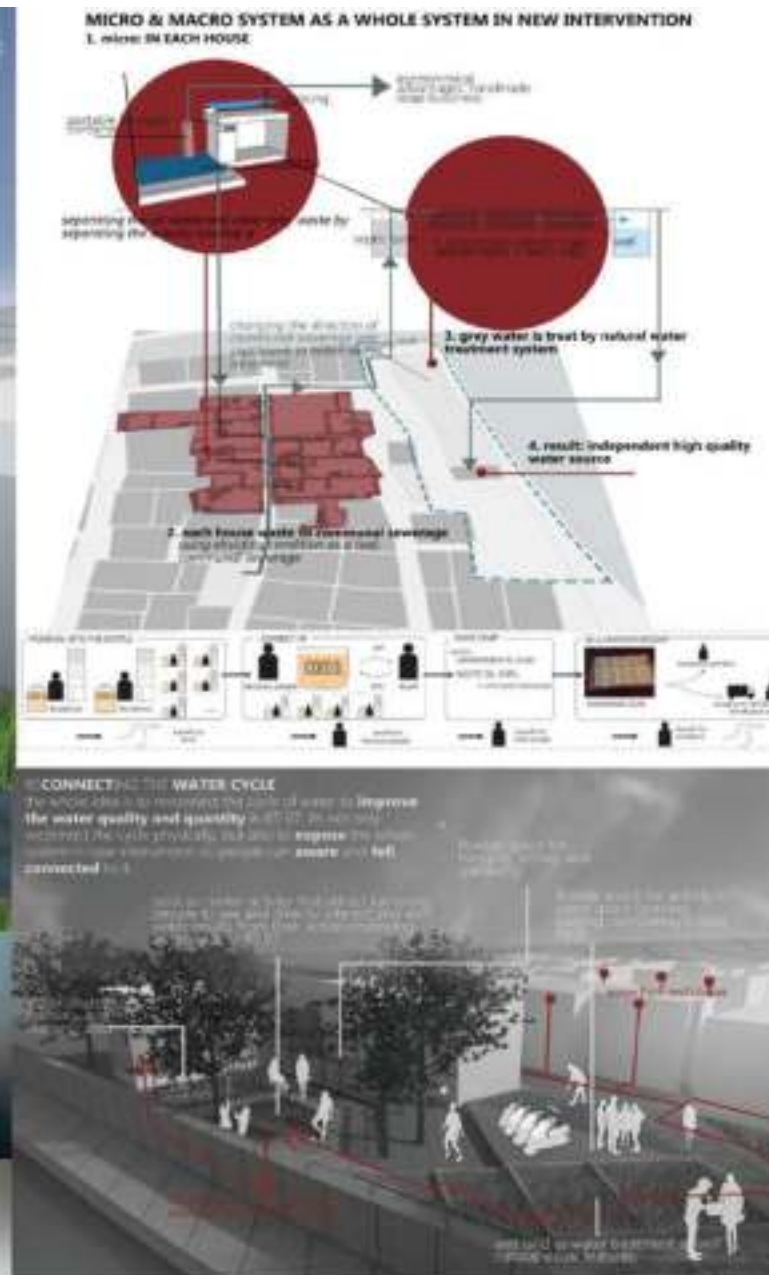
## SURVEY TEAM 1



## SURVEY TEAM 4







## LOCAL PEOPLE'S COMMENTS



TEAM 1

Q : What about the water source ? if we build building or something in this place, then the water source will decrease.

A : We will build this area with the water storage system, so the water will be collected and can be used by people. Don't worry about the water source.

Q : Is the pond save ?

A : The water level is low and the water quality is good enough for people to interact with. So it will be save for the children to play here.

Q : Where will the project be build ?

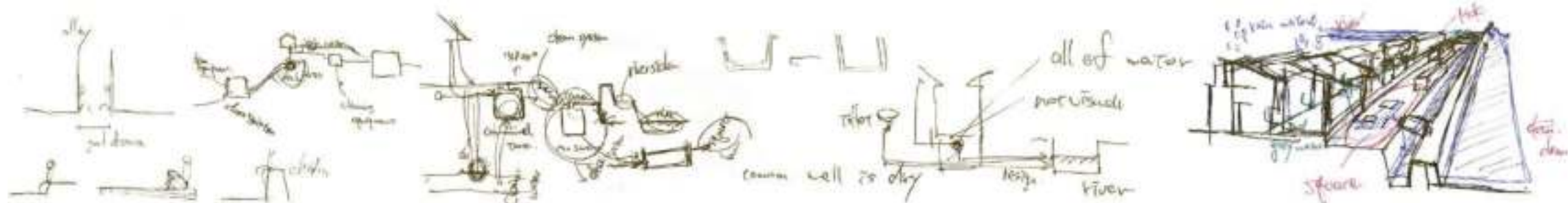
A : At riverside between the public toilet and public bath at RT 7

Q : How about the parking lot ? Can we still park our motorcycle?

A : We will make the space for parking which function can be changed over time depend on need of users

Q : How about the water storage system ?

A : The overflow from the water treatment system goes to storage then absorbed by the ground





# PROPOSAL TEAM 4

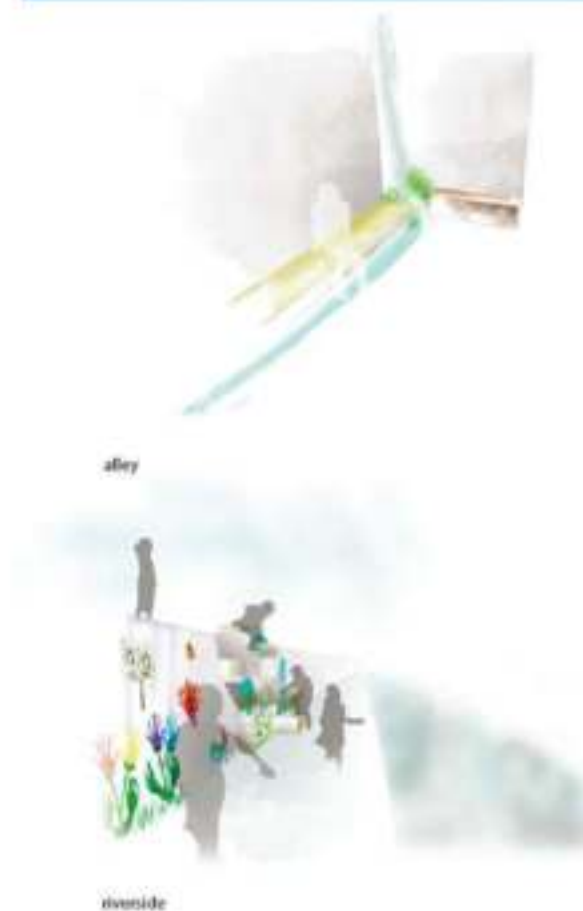
## DESIGN PROPOSAL

DESIGN PROGRAM IS 'PLAYING' WITH WATER WHICH IS CONNECTER TO WATER JOURNEY. BY SEEING THE JOURNEY OF THE WATER, WE HOPE THAT THE PEOPLE OF RT 07 WOULD REALIZE THE IMPORTANCE OF KEEPING THE WATER QUALITY.

## WATER JOURNEY



## MAIN AREA WHERE THE WATER JOURNEY SYSTEM HAPPEN



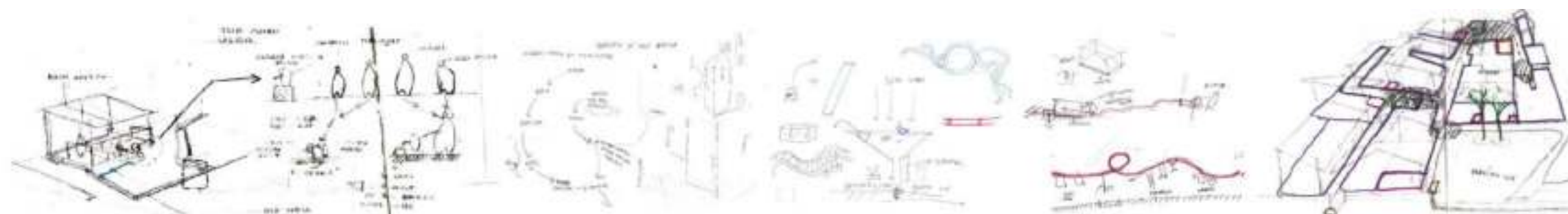
## DESIGN PROPOSAL IN RT AREAS



## WATER JOURNEY SYSTEM PLANNING



# SKECTH TEAM 4



## LOCAL PEOPLE'S COMMENTS



## TEAM4

Q : How about the system of the pond ?  
A : the system of the pond is that it's the center of the clean water tank from the rain water collection and the filtrated grey water. Under the pond, underground, there is one big clean water tank, the combination of rain water and filtrated grey water. The tank would have other pipes, one pipe for filling the pond for the people (mostly adults) to use as informal gathering space and to have a relaxed foot bathing in the evening when the water got warmer by the sunlight. The other pipe from the clean water tank is used to distribute the clean water back to each people houses and public MCK so the quantity of the clean water will increase.

Q : Is it save for children ?  
A : the big system has three different systems. The systems that would allow the children to interact with the water would be in the riverside and in the square. In the riverside, the stacking box's size would be the same as the elements that the children use to play in the existing site for climbing, and its proven to be safe for them. In the riverside, the size of the pond is only 20 cm so the children could jump safely above it. And then there will also be a closing plate for the cycle track so it would be safe for the children.





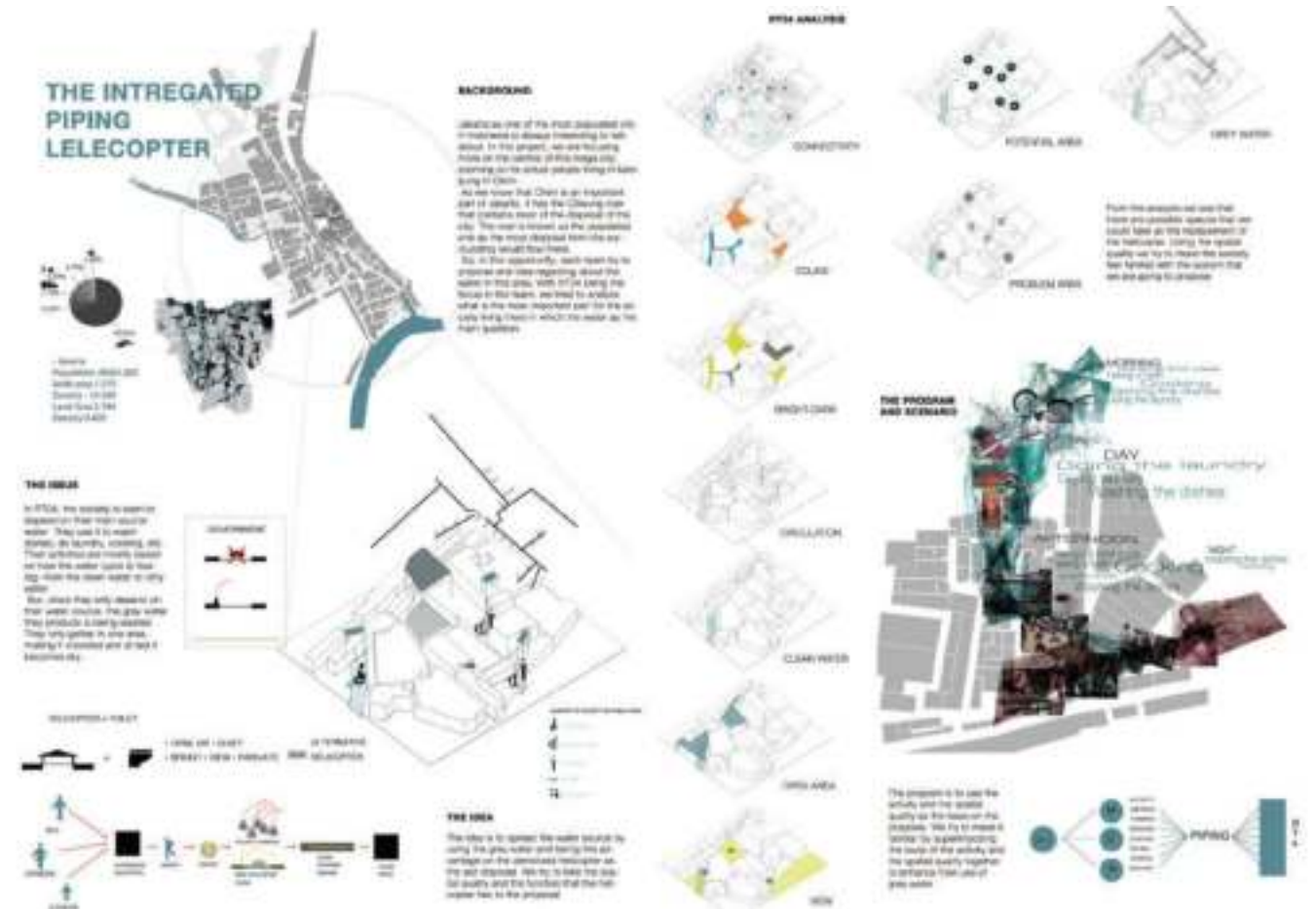
# SITE 2-RT 4

TEAM 2 : Nadia Oktarsy, Nisrina Muthi Meidiani, Inesa Purnama Sari, Nonny Idah Wulansari, Kaitaro Hirai

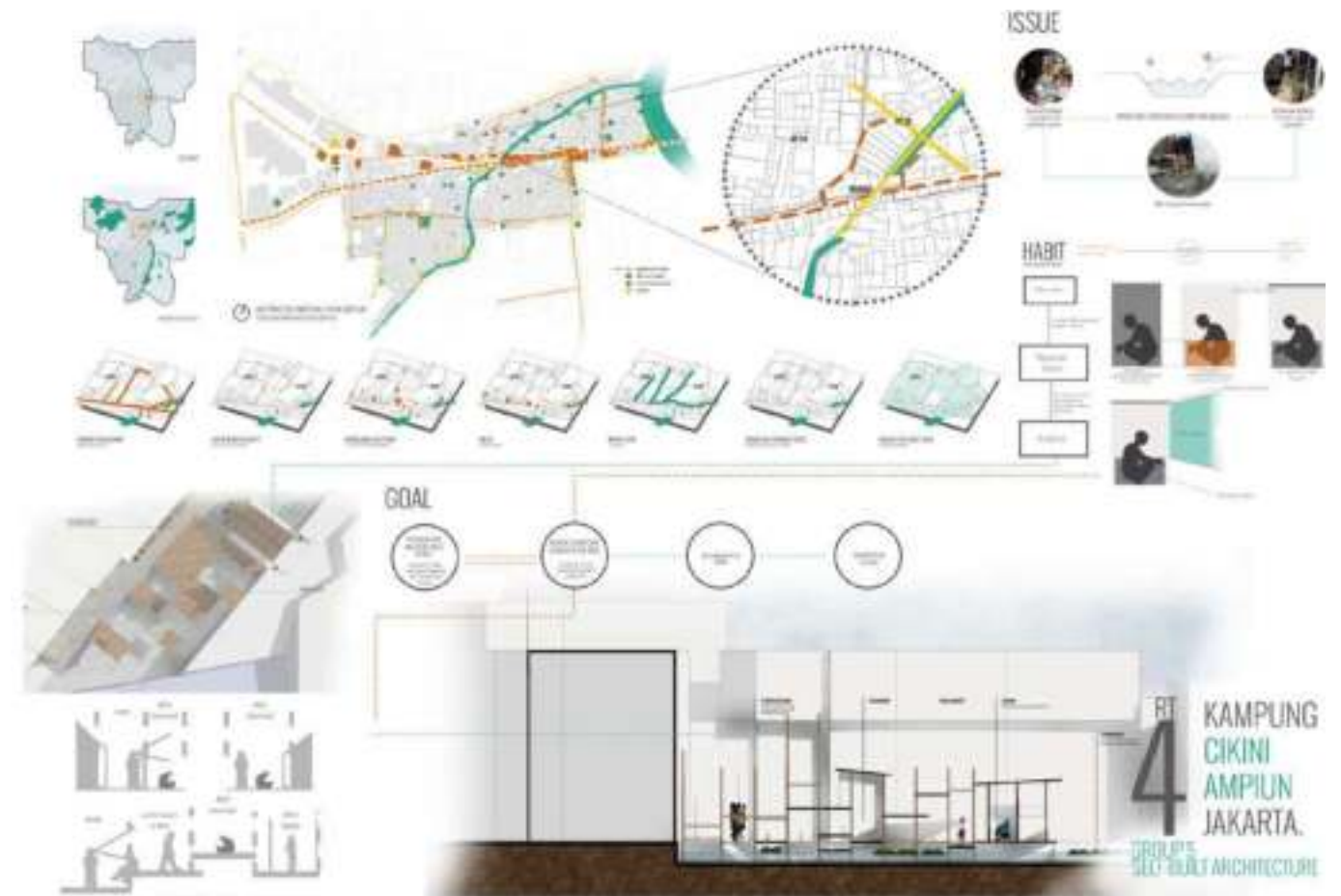
TEAM 5 : Ni putu Dani Ekayanti, Angela Agnes, Dinada Nadira, Tri Damayanti, Akihiro Osada



## SURVEY TEAM 2



## SURVEY TEAM 5





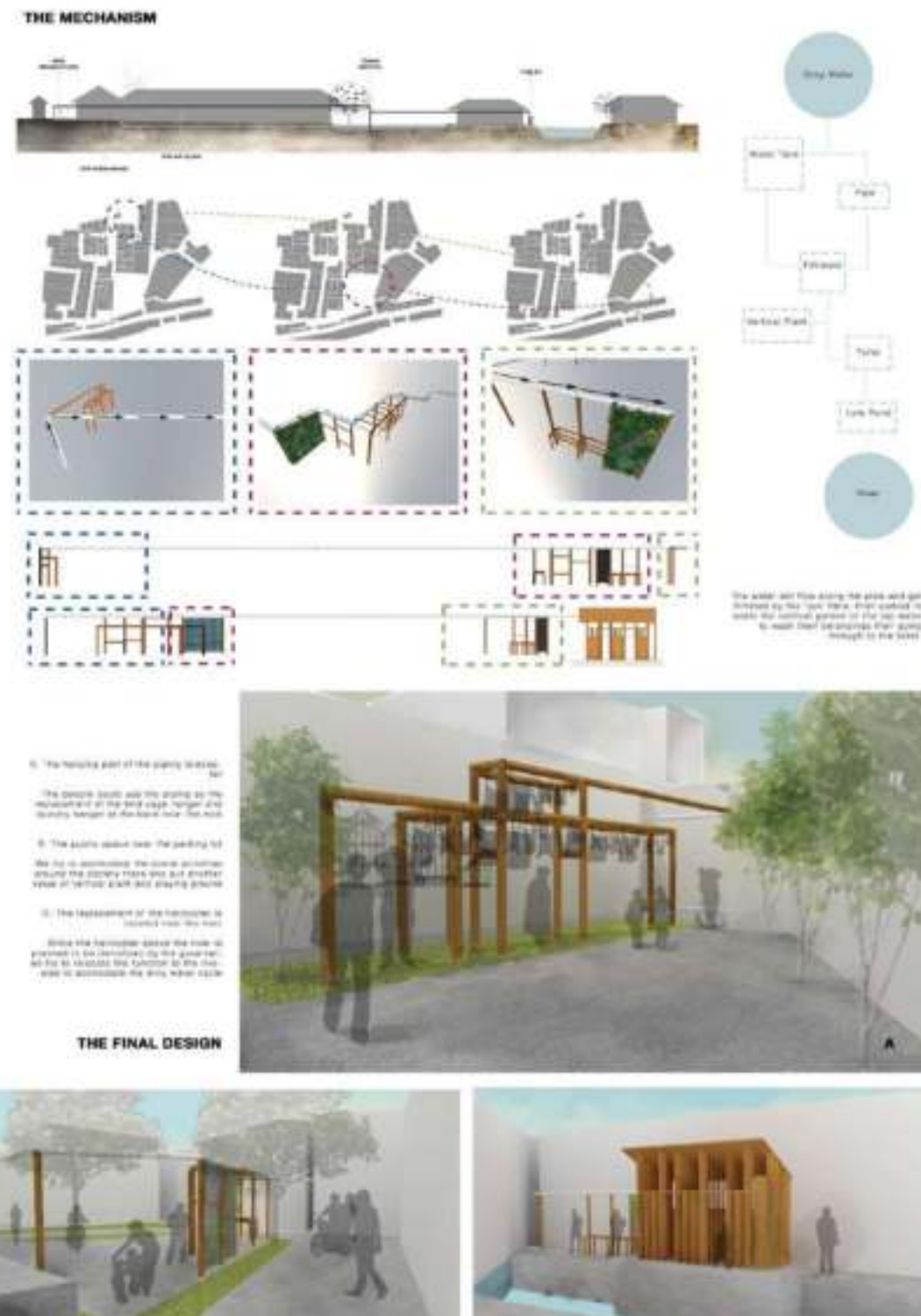


PHOTO MASK

PHOTO RESIST

SUBSTRATE

REPLICATED MASTER



Q : There is just one public space ( near the helicopter toilet), how can you get the permission about the property ?

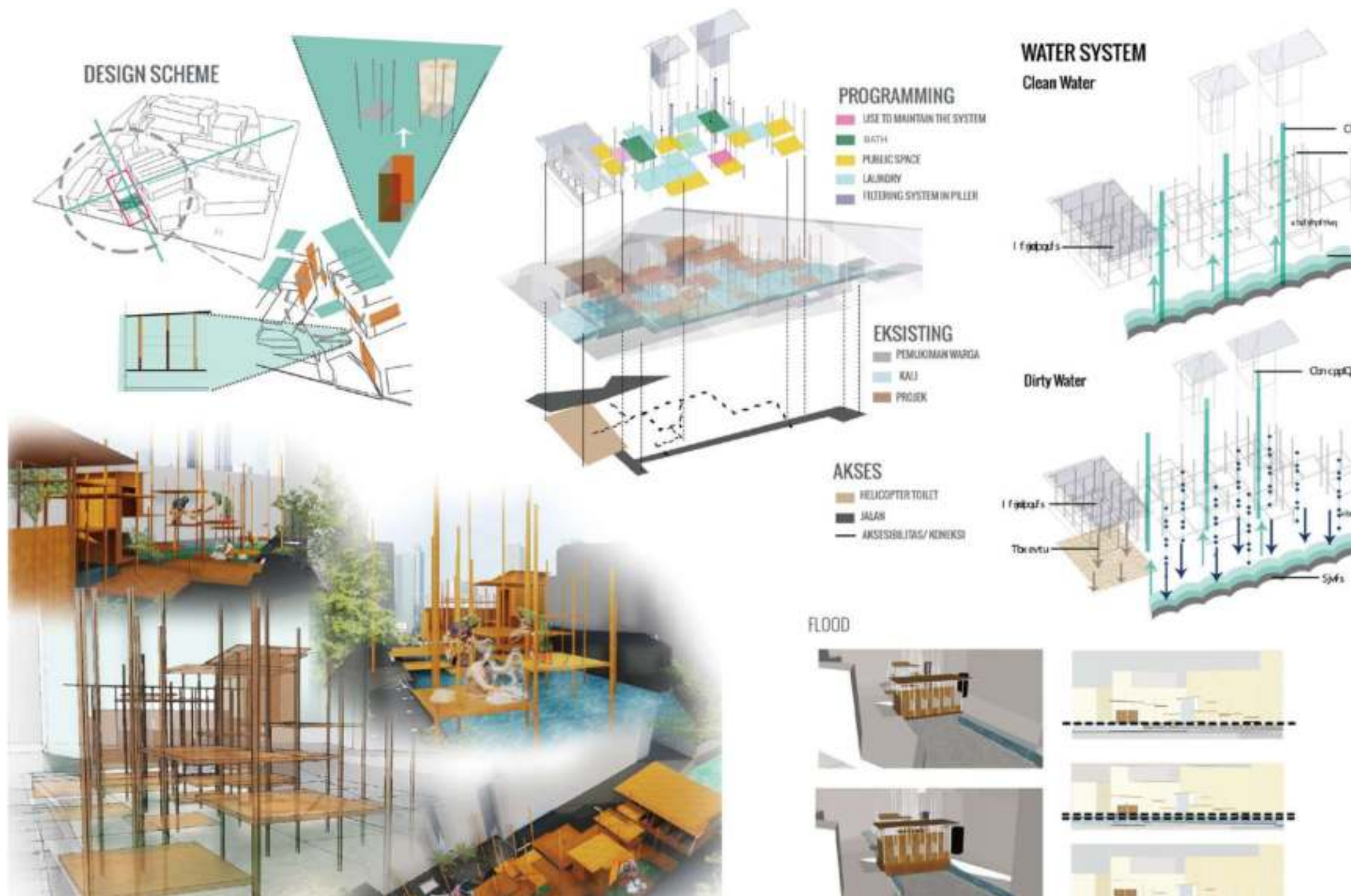
A : I will thinking about it

Q : his place (the river in RT 4) is downstream, and the upstream is in another place which is non organic garbage come. How do you solve this problem?

Limitation of this area the intervention can be a non-permanent or semi-permanent intervention. Although the intervention will be the semi-permanent or portable architecture we hope that it will give long-term benefit to the people in Cikini.

I actually agree to change and move the helicopter toilet to the riverside. It will be better.





## LOCAL PEOPLE'S COMMENTS



TEAM 5

Q : How about the flood come ? it will make some area flooded ? how about the helicopter and the intervention in that time ?

A : ( we will think about it ) maybe the filtration system will absorb the the water too and flow it to the top of the column.

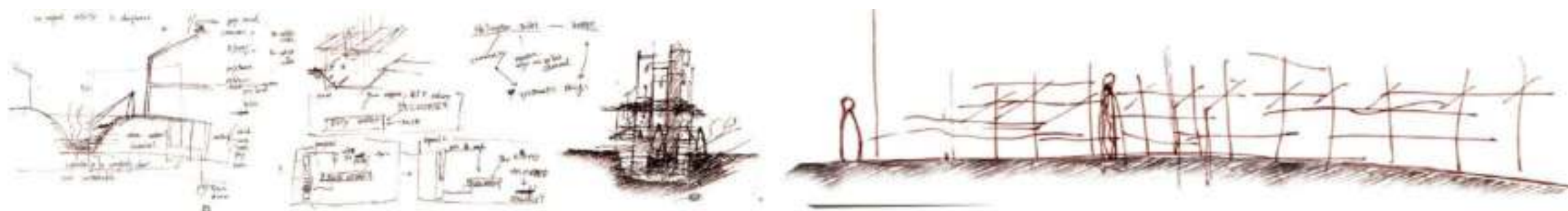
Q : How about the filtration system and disposal ?

A : the function of the column will be the filtration system too. The disposal system of helicopter toilet will be in the ground (riverside), and the grey s=water from the kampong sewerage system will filter the garbage from river (upstream ) and clean the grey water to reuse.

Q : The river side is very narrow, did you consider about that ?

A : Actually we have thought about the space, there is no public space in this RT, so we make the system suitable for the narrow riverside.

## SKECTH TEAM 5









# PROPOSAL TEAM 3



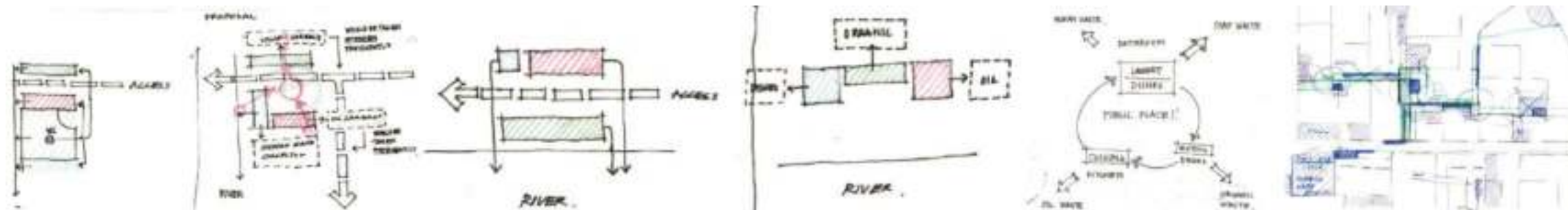
## LANGKAH 2



## LANGKAH 1



# SKECTH TEAM 3



## LOCAL PEOPLE'S COMMENTS



### TEAM 3

Q : I think cooking is the private activity, we not used to cook together in public place ?

A : we make a public kitchen because of we want to make a compact system in this rt. We just saw about the "individual system" (every house has a disposal system ) maybe it is the one which give impact to the main disposal system .

Except that, it becomes an educational facility, people will learn about the recycle and get the benefit from it. There will be a change to do something together to make a better life.

Q : What is the relation about this intervention and the water ?

A : We think that kitchen ( which produce waste ) is near from the MCK ( water). Both of that different activity can be combining to make the compact system. It becomes the public space too, so people can socialize while they do daily activity. In that system, at the same time we will get two goals (to solve the waste problem and get benefits)



# PROPOSAL TEAM 6



## LOCAL PEOPLE'S COMMENTS



### TEAM6

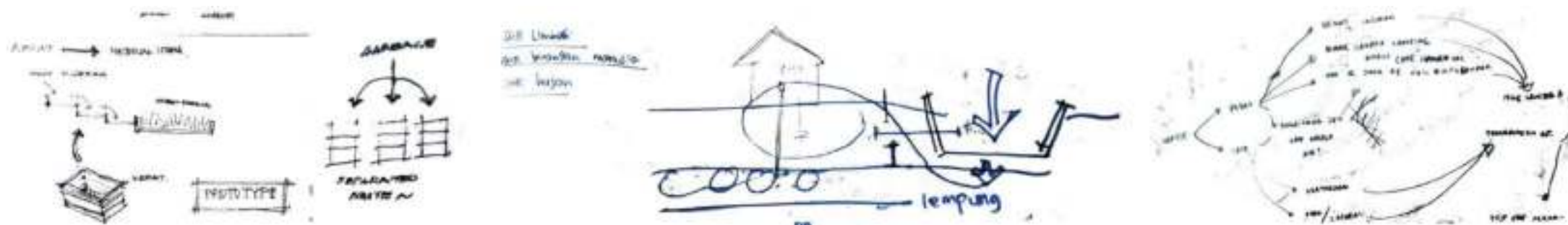
Q : Then what is another function of this intervention ( the filtration system ) because I don't see the benefit except that ( function of the filtration to push the garbage on the river ) .

A : Beside of the filtration, we want to make people enjoy the riverside because of the garbage pushed by the river flow.

Q : There are a lot of people that dispose the garbage on the river, not only (sometimes) the people near from the river that throw out but also people from another area. But people in the riverside push and clean the garbage everyday. Do you think your intervention (the filtration system) can filter all of those garbage?

A : Yes, I think the amount of garbage will not reduced, but with this system, we can make the garbage flow smoothly

## SKECTH TEAM 6









**Anwar Bahir Saifullah**  
**WS Leader From Universitas Indonesia**

Actually this is not my first time in Cikini, i have joined the after fire project (rumah pintar) construction , did my undergraduate thesis about MCK and culture in kampung Cikini, and currently doing the renovation of MCK Kobak at RT 14, So, i can say that I’m already familiar with this neighborhood.

But still, this workshop is a new thing for me. It gave me new perspective of kampung issues, especially about water, which is the main topic of the workshop. From this workshop, i knew that In kampung Cikini, issues regarding water are not only environmental issue but also social issue. So, in this workshop beside dealt with the water infrastructure such as water channel and saniation system, we also dealt with social activity related to water usage.

Working together with students from Chiba University and Tarumanegara University was also a new experience for me. Sharing ideas and discussing solution with people from different background with different design approach made me open my mind that there are so many way of thinking in architecture and urban design. In the short, I had really good time during the workshop I got new experiences, new things, and also new friends.

**Akira Hirano**  
**WS Leader From Chiba University**

The actual situations at Cikini and daily life in Kampung were interesting and impressed for me, and maybe the other workshop members from Japan also thought so. Almost everything such as ways to use spaces differs from our daily life in Japan. Of cause there are a lot of problems which had better be improved, but many things like strong relationships between people and buildings and attitudes of solving matters with local people should be protected. Through communicating with local people and Indonesian students and experience in Kampung, I considered more about what I had though ever.

The term of this workshop was “ Water Pressure and Challenge “. We should have several points of view, which are not only architectural, but also environmental one and water systems. And our proposals would be systematically, physically and architectural solutions. That was not easy. One of the most difficult things was how to integrate system proposal and architectural one. We discussed a lot and consider suitable ideas for the site and people. At final presentation for local people, they were interested in our proposal and had their opinions and conversation about the proposal with us.

As we consider “city”, the experiences at the workshop would provide innovative views to us.



# Water Urbanism -MCK Renovation Project-

**Tomohiko Amemiya**  
**UNITY DESIGN/ University**

Our project team has been challenged to make housing prototype model in informal settlements. The first prototype “Megacity Skeleton I”, which was built at Cikini in 2013, adopted “environmental void” to improve the lighting and ventilation in living environment, and is now demonstrating the effect as expected.

As a housing prototype which optimizes natural resources as much as possible, it has been a big issue how to deal with “water” as natural element. Around that time, Renovation of MCK in RT011 was requested by the community, and we decided to tackle the issue.

We designed new MCK building with “environmental void” in the same way as “Megacity Skeleton I”, and utilized the void as drainage route from toilet. The drainage water is kept in the septic tank under the garbage damp, and released to the local small river through the community sewer line. Though it is not ideal that dirty water is directly released to the river, we could hardly adopt this basic system respecting the local customs at this time.

After a great deal of study, it turned out that it is difficult to utilize void space as a part of community sewer line. Actually, the character of “environmental void” installed in each house is that effective for daylight or ventilation even if it is not connected to the other void. But in case of water flow, all the sewer line should be physically connected as one line and it does not work if any of houses are not installed of voids. Though partial water flow such as rainwater recycle could be utilized in void space, it seems impossible to take individual void space as a part of wider sewage system. After all, we could not escape from top-down way of planning for water system even in micro scale like Cikini. Instead, it would be more important to divide the top-down process into different scale precisely corresponding to the existing conditions, and it might lead to the evolution of Water Urbanism in informal settlements. Then, we decided to regard MCK project as a connection hub of local sewer system and wider urban sewer system. It means that the connection process of whole sewer system is the design target. The process would be as below. 1; Replacing the septic tank with combined sewage treatment tank, 2; Drainage water from community houses are collected to the combined sewage treatment tank through community sewer system, and 3; Community sewer system is connected to the wider urban sewer system planned by Jakarta government.

MCK become intake point and enrich the shared space for Cikini community. On the other hand, local people are lack of responsibility for sewage water, garbage, or dirty river. Then, the sanitary condition has become worse. In modernized lifestyle, we don’t need to care about the world beyond the drain output, but in pre-modernized space as Cikini, community people should care more about discharged water or garbage. It’s not negative but positive issue if it leads to more sustainable lifestyle which has close relationship with water.

For such a purpose, a new symbolic public space to produce compost is combined to MCK project. Local people will not only learn water or garbage system in Cikini but also make money from compost for the maintenance of underground drainage system. We hope the new MCK as public space in outlet side of water has some impact to their sense of responsibility to their own water, and step by step process of water system rearrangement would open the new possibility of Water Urbanism.



# Exploring the Mutual Relation Between Water and Kampung

**Evawani Ellisa**

**Researcher and Lecturer, Universitas Indonesia**

As a basic element for metabolism, water is essential not only for our human bodies, but also for the wider public sphere. Borrowing Levebre, water is a critical dimension to the social production of space. It symbolizes the relationship between the body and environment, between social and bio-physical systems and between the visible and invisible dimensions to urban environment space. However, lack of legal standing, as informal settlement, Kampung Cikini falls outside the formal planning framework that the government rarely plan the provision of water supply and sanitation. Sanitary conditions at Kampung Cikini are permanently endanger, as it coexist without planning, or it only applied at the minimum investments and in ad-hoc coordination.

Drainage is also insufficient. Drainage and storm water ditches bring liquid and solid waste, but not in an environmentally friendly or hygienic way. Rain water sometimes flows into latrine structures, forming water pools and running without any treatment into footpaths and nearby rivers, i.e. Kroncong River and Ciliwung River. These appalling conditions lead to acute water and diseases such as diarrhea and dengue with greater frequency and impact. Indeed, the community of Kampung Cikini often prioritizes to get access to drinking water and neglect sanitation facilities. Utilize the pumping wells to supply drinking water that locates in short distance with pit latrine had led to greater risk of contamination from fecal human material.

With all those pressures on water, in JKTWS 2015 we challenged 6 (six) groups of students to deal with the issue on the water ecosystem at Kampung Cikini, focusing at 3 (three) specific areas. The proposed idea and design should be based on a set of guiding principles and should be specific, but should be practical and general enough to validate for modification according to the conditions of each area. To improve the environment and circumstances of water and space we expect the students to be challenged by the idea that would demonstrate the ingenuity, capacities and capability of the local community. Water will be the medium to shows how even basic infrastructure and limited space can provide the stimulus for much wider community daily activism.

As we had been expected, most of the ideas were resulted from the issue of density and informality - a condition where the concerns are not about grand design but grand adjustment. Students considered seriously various interesting scenarios, among others, are: what we can learn from the elasticity of kampung as physical plant and urban system? How we expand the margins of kampung space and its infrastructure to accommodate unimagined uses? How to create a highly innovative water delivery system that's efficient and make more optimum the existing bare-minimum water infrastructure? As water related design architecture is not only 'hard' technical aspect, we challenged the students to create 'soft' program such as negotiation, social mediation, and management to make their designs worked. Education and knowledge about sanitation practices and the relationships with polluted water also embedded in their proposed designs.

I really enjoy the moment when students performed presentation through informal dialogs in front of the inhabitants. We were dealing with infrastructure, but we realized that big plans that the communities don't understand was not necessary. For that reason, students tried hard to avoid conversation around planning that is commonly known as "arcane". They realized that inhabitants already lived exactly where they want to live and had made their own spatial arrangement that they can live with. Lesson learned from this workshop is that for high dense settlement like Kampung Cikini, the dialectical of mutual relations between water and local culture is very important.

# Integrated approach to climate change and poverty

**Akiko Okabe**

**Professor, University of Tokyo**

I visited Jakarta for the first time five years ago. Our project mission was to explore integrated approach to both climate change and poverty. The importance to address poverty and climate change at the same time has been already declared many times, recently such as Pope Francisco's Encyclical and SDGs of UN.

A professor of UI, Hery Fuad, took me to Cikini, his project field. It is urban kampung with density of 1000/ha, very high density, in front of Cikini station and along Ciliwung river. I was impressed with the disparity between poor and rich area. I could easily imagine the difficulty of social inclusion in this city.

Once inside kampung, I got aware that the living condition in kampung settlements, naturally emerged from a rural village of more than 100 years ago, are getting worse by densification especially in the well-located central areas. We have to say that it is in slum state because of its bad physical environment and sanitation but we have to distinguish with squatter settlements.

People who live in a small minimal rental rooms in kampung, especially the poor, are very lucky obtaining low cost life in privileged central area of the megacity of Jakarta. And the people can benefit with well organized deep community of kampung which has a role of safety net. Amazingly, they have the ideal lifestyle with low environmental impact thanks to the knowledge of share cultivated in kampung tradition. I have to confess that there is certain nostalgia towards warm communities we have lost in Japan. Of course, we have to take seriously that their actual lifestyle is not desired but forced mainly because of low and unstable income.

On the basis of this observation, we developed our project with the hypothesis that;

If we can find an integrated solution for both climate change and poverty, it should be in overcrowded slum-kampungs with rich community. Our project is quite small but an ambitious challenge to explore it.

Getting clean water from wells and discharging human waste into rivers have been common habit under Asian monsoon climate. In the past as well as now, in upper mountain villages as well as in Jakarta riverside kampungs, people have discharged feces and waste into rivers. The habit of disposal has not changed at all. However, the water risk is much higher in urban kampung. It is a mere

consequence of density.

The kampung knowledge has developed to survive the high density by sharing space. Alleys are common living room, kitchen and dining room for neighbors. A variety of informal works has emerged to respond reciprocal needs of community. Shared water facilities, toilet and bath, are quite common.

On the other hand, local people demand strongly more privacy and private toilet and bath. Naturally, they are completely against sharing. They have desires for granted for better life style which can be found there just on the other side of the wall, between the rich and the poor. But, individualizing spaces leads to the more consumption oriented lifestyle. Is really richer individualizing spaces than sharing spaces? We may need a radical change in what is quality of living.

Amina Mohammed, UN Secretary-General's Special Advisor, says, "People in developed countries must reconsider their lifestyles". This is what SDGs adopted by UN summit in September require to Japan. Now, I should admit that who must change the lifestyle are people with the habit of consumption prevailed in developed countries. We have to shift towards more responsible lifestyle with less environmental impact and "sharing" can be an important key.

In our 5th joint studio, taking shared water facilities as a precondition, we explored creative solutions for water management, hoping to be an integrated approach to poverty and climate change.





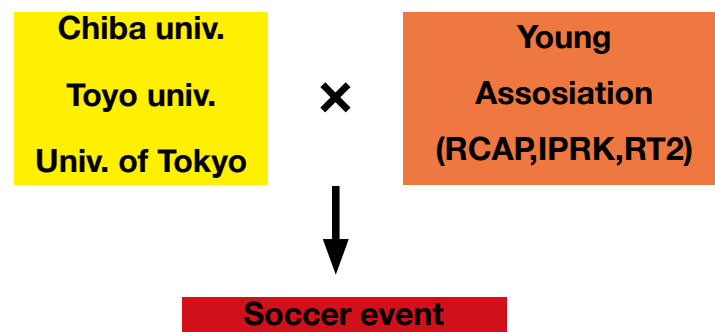
# Soccer Project 2015







## Concept of the event



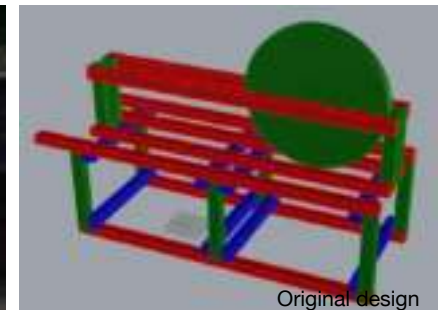
The concept of this event is making event with local people. And we try to connect soccer match and social activity at the same time. By making furniture to use this both activity with local people, we can make good relationship and find new possibility of creation by cooperating with local people. Not only us but also for them, they have satisfaction that we created this event by themselves. And furthermore, the furnitures remain in Kampung Cikini and are used by neighbors. We hope when they use this furnitures, it reminds them of the event that created with us for making this event better.

## Schedule

|      |  |
|------|--|
| Day1 | Explanation about this event                       |
| Day2 | Buying material, Making prototype(RCAP)            |
| Day3 | Making prototype(RCAP)                             |
| Day4 | Making 2nd furniture(IPRK), Meeting with RT leader |
| Day5 | Making furniture(RT2), Drawing soccer line         |
| Day6 | Cleaning kampung & Soccer match                    |

| Time table of day 6          |
|------------------------------|
| 10:30 Opening ceremony       |
| 11:00 Cleaning Kampung       |
| 12:00 Lunch break            |
| 13:30 Soccer match (5 games) |
| Japan VS Cikini1             |
| UI VS Cikini2                |
| Japan VS Cikini3             |
| UI VS Cikini 4               |
| Friendly mix match           |
| 16:00 Ending ceremony        |

## Making furniture



Original design



Kaki lima (mobile shop)

### Cart for trash

×

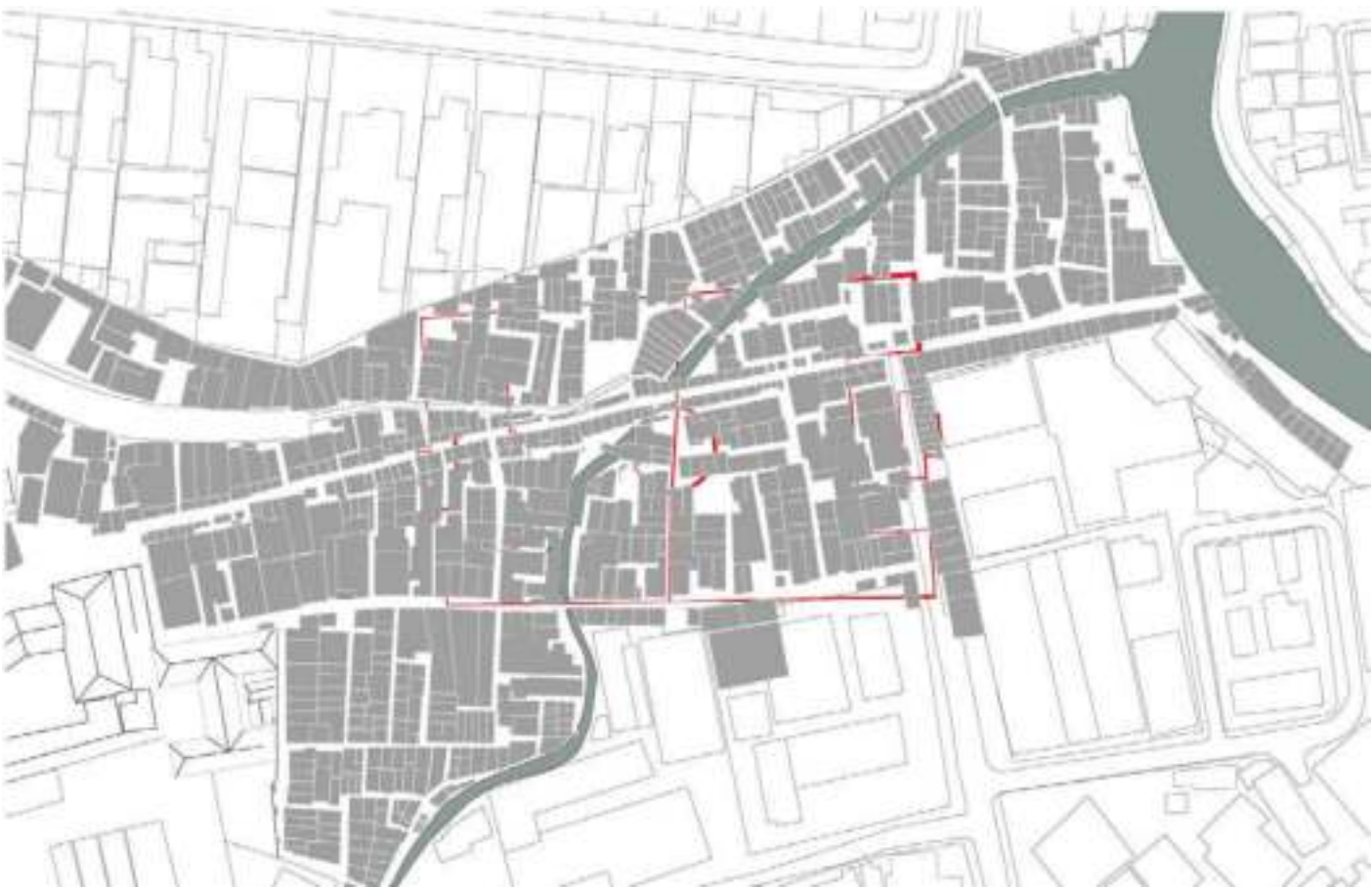
### Bench for soccer

When we decided to make furniture with local people, we thought it should be used for both activity in this event. Finally the uses decided Bench for soccer match and cart for cleaning event. To making the solution for product that we can use it as multi purpose furniture, we made the furniture be able to turn upside down by putting the wheel at the center of this furniture. In Indonesia there is popular product called "Kaki lima". It means that it has five legs by human and product and it is used as mobile shop in Indonesia. But this furniture has three legs, so we can call it "Kaki tiga". By using this idea we could create the furniture that one way is for sitting, another way is for car to collect trash.





Soccer line WS



Soccer cort  
×  
Alley of Cikini

This football line WS was held in order to have a look from a different perspective of the public space of CIKINI. We are by pulling the football ground of the same size as that of the road in the school in the Kampong, I thought trying to compare the size. Drawn Soccer coat is 1.2 times the size of the real thing. we are made aware to the small and the height of the density of Cikinikamong. When we drew the line, local people frequently said, “What is this line? ”. So we explained. And then every person was surprised at the size of the soccer coat. Everything peeled off 2 days later, but I think the line is stayed at a lot of people’s intention.



Cleaning kampung & Soccer Match





Credit

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Universities

Universitas Indonesia  
Chiba University  
University of Tokyo  
Universitas Tarumanegara

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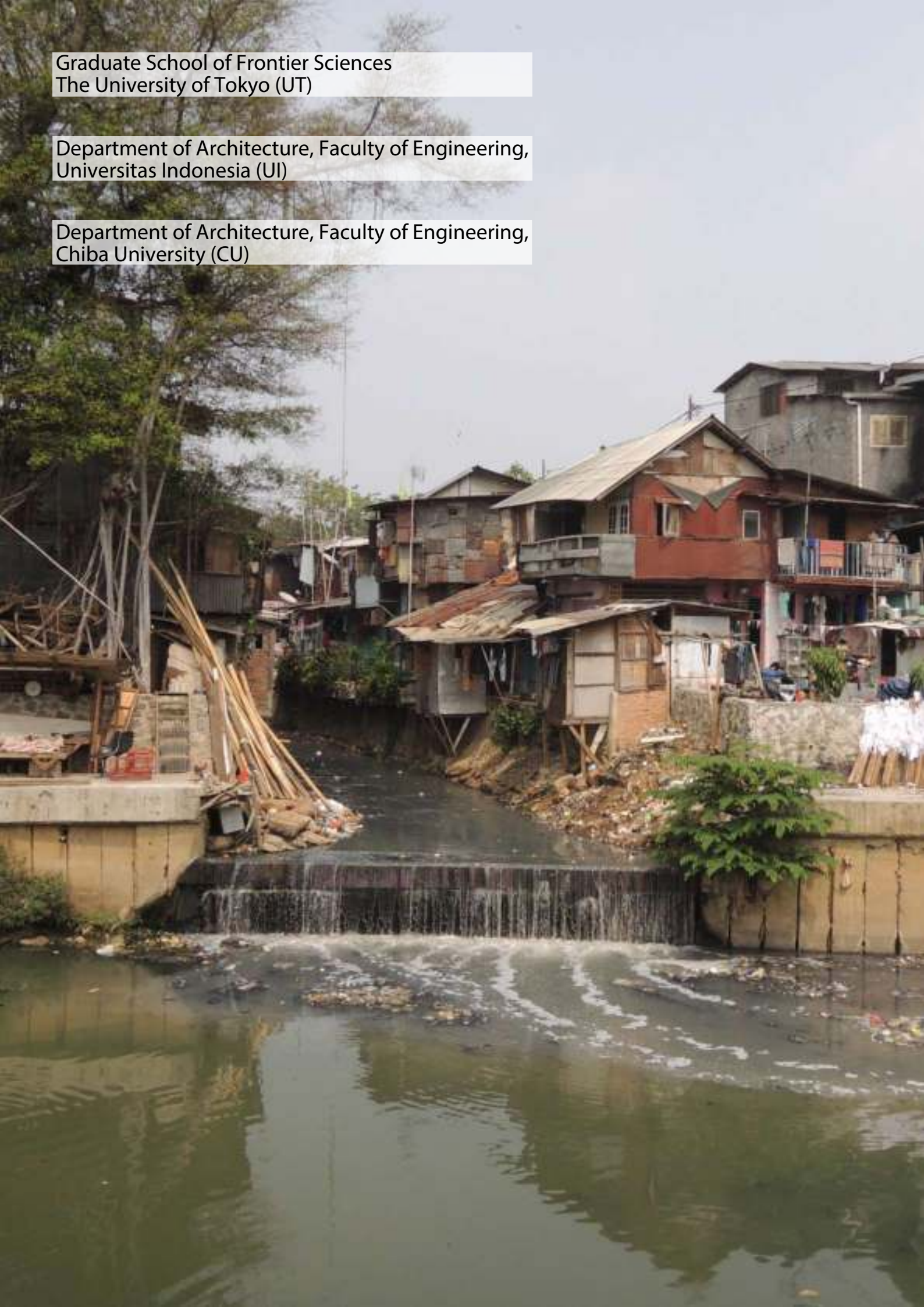
<https://www.facebook.com/Megacity.Design.Labratory/?ref=bookmarks>



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# JKTWS 2015

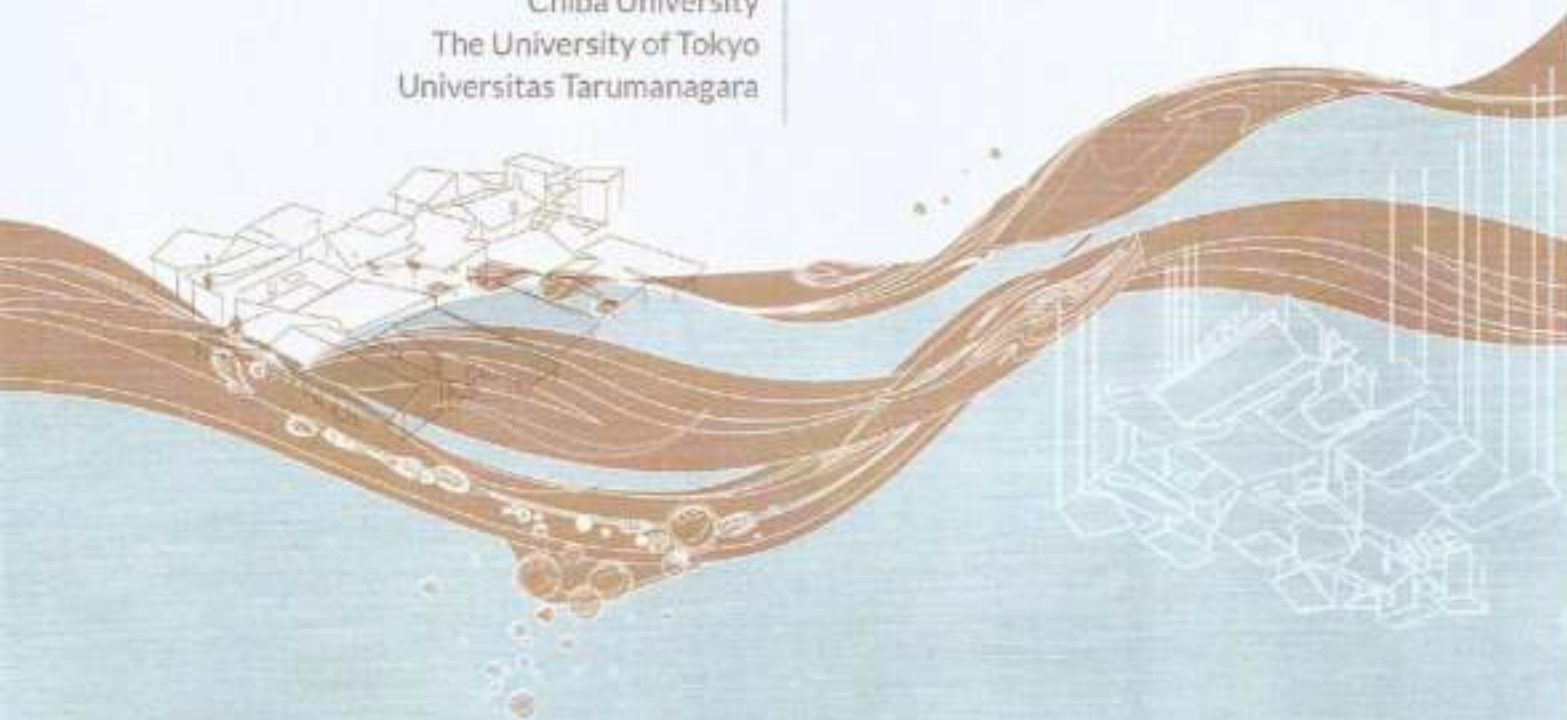
## INTERNATIONAL JOINT STUDIO WORKSHOP

### WATER: PRESSURE AND CHALLENGE

Department of Architecture Universitas Indonesia  
Chiba University  
The University of Tokyo  
Universitas Tarumanagara

### THE ALTERNATIVE VISION FOR SUSTAINABLE URBAN ENVIRONMENT

KAMPUNG CIKINI, JAKARTA, INDONESIA



## CERTIFICATE

Has awarded this certificate of appreciation to:

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TUTOR

Head of Department Architecture  
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**SURAT - TUGAS**

Nomor: 2852-DK/FT-Untar/IX/2015

Dekan Fakultas Teknik Universitas Tarumanagara, dengan ini menugaskan kepada Saudara:

1. Olga Nauli Komala, S.T., M.Ars.
2. Denny Husin, S.T., M.A., H.U.

Untuk melaksanakan Kegiatan sebagai berikut :

Nama Kegiatan : Indonesia – Japan Joint Studio Workshop 2015  
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Peran : Mentor  
Penyelenggara : Universitas Indonesia-Chiba University (Jepang)-Universitas  
Tarumanagara  
Waktu  
Kegiatan : 13 Agustus 2015 s/d 2 September 2015

Demikian Surat Tugas ini dibuat, untuk dilaksanakan dengan sebaik-baiknya dan melaporkan hasil penugasan tersebut kepada Dekan Fakultas Teknik Universitas Tarumanagara.

22 September 2015

Dekan

Prof. Dr. Agustinus Purna Irawan

Tembusan :

1. Kajur Arsitektur
  2. Kabag. Tata Usaha
  3. Kasubag. Personalia
- /es