SPACE OF MAINTENANCE

A Situated Understanding of Maintenance Practices
in Jakarta Contested Neighbourhoods

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Abstract

This PhD by Design thesis investigates the spatiality of maintenance in the contested urban neighbourhoods of Jakarta, Indonesia; and how it informs design. Discussion of maintenance has been largely neglected in the current urban and architectural discourse due to perception of maintenance as backstage activity. Yet, driven by the 2015-2016 massive evictions happening in Jakarta, the thesis argues that maintenance research is increasingly urgent in a disputed context where access to spaces and resources are limited.

Current maintenance discourse highlights the importance of a situated understanding of maintenance. The thesis employs practice theory to explore the spatality of maintenance, arguing that such framework enables investigation of actors' complex in doing maintenance across spatial settings. The thesis objective is to creatively make this experience more visible and by doing so construct the spatiality of maintenance.

The thesis investigates two case studies with different conditions of maintenance and different context of contestation. The first case study explores waste practices in Kampung Pulo, a riverbank neighbourhood without access to waste collection services. The second case study explores clearing out practices in Pesing Koneng temporary market, a locally organised space outside the Pesing Koneng neighbourhood. The fieldwork employs a combination of qualitative methodologies for data collection; conducting observations, visual documentations, and semi-structured interviews that build the maintenance narratives. Based on these data, this PhD by Design research conducts creative explorations as a form of analysis that situates maintenance in space. Titled as PLATES, these explorations become a form of design portfolio that are integrated with the text.

Based on these narratives and creative analysis, the research conceptualises the spatiality of maintenance. The thesis points out the actors' territoriality of maintenance; and the mixed, subjective, and partial ways the maintenance process is performed. It addresses connections between waste types to its potential space of disposal, highlighting traces that creates challenges of maintenance in space. This thesis then discusses how the knowledge of maintenance spatiality expands design methodologies for contested context, proposing a practice based spatial inventory and situated research creative methodologies.

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This thesis is dedicated in loving memory of my grandparents. My grandmother died shortly before I started this PhD, while my grandfather died shortly before this thesis is finished. May Allah give them the best place in the hereafter.

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Glossary

Maintenance

A process of keeping the built environment in working order, which particularly concerns the act of repairing, cleaning, and securing within a specific context.

Attributes of maintenance

Aspects that are significant in the thesis' discussion of maintenance, consisting of the social order of maintenance, space of maintenance, and resources of maintenance.

Social order of maintenance

Actor relations that organise and differentiate between actors who do different phases of maintenance work (detecting problems, accessing resources, and doing the process maintenance) and the users who use the material artefact or the space that are being maintained.

Space/spatiality of maintenance

Space that unfolds from the experience of doing maintenance which differ from how the space is normally used. Space of maintenance can consist of the connections between different spaces that is required to do the maintenance process across spatial scales, and does not only consist of service spaces (e.g. kitchen, bathroom).

Resources of maintenance

Resources needed to perform the maintenance process within a space. In this thesis, such resources consist of the body, the know-how (knowledge/skill), and the infrastructural systems.

Complexity of maintenance

Maintenance in a context in which space and resources are limited, bringing challenges to the overall process of maintenance.

Improvisations of maintenance

Maintenance conducted not as a repetitive or a routine process, but instead tailored based on the needs and availability of resources, which can be a transformative process.

Shifting relationship of actors

Arrangements between actors in the process of accessing resources of maintenance, in addition to the expansion of spatial use by actors of maintenance for another actors. This shift is influenced by the contingent and collective relationships between actors. This thesis considers the contingent relationship as a relationship which demonstrates connection between different actors without shared responsibilities, while collective relationship demonstrates connection between similar actors with shared responsibilities.

Flexible space

Space that evolve from a fleeting/temporary occupation of the space, or from an expansion between one space to another (e.g. claiming the street as a temporary part of the dwelling).

Infrastructure as a process

Infrastructures that evolve from the process of acquiring resources, which emerge through a negotiation between actors to generate, share, or extend access to infrastructure.

Systems of maintenance

Systems of performing maintenance, which consists of the connections between actors, procedures and resources needed to do maintenance.

Household waste

Waste accumulated from the process of inhabiting spaces in the dwellers' living spaces and other spaces they regularly occupy.

Consumption waste

Waste produced from single consumption activities by the actors, such as product packaging, or food debris.

Litter waste

Waste displaced away in the public domain, which can consist of consumption waste.

Dry waste

Household/consumption waste that does not contain perishable components.

Smelly/Wet waste

Household/consumption waste that are perishable, or a form of waste that has been in contact with perishable parts (example: plastic bag containing perishable food). This thesis considers food debris within the grey water that is produced in washing dishes in this category.

Waste disposal

The act of positioning waste in a space where it will be removed or treated.

Waste displacement

The act of positioning waste in a space without any consideration of further treatment of such matter.

Riverbank neighbourhood

Neighbourhood that occupy spaces on the river embankment.

River basin

An area of land which contains the river's body of water.

River terrain

Horizontal and vertical surfaces of land around the edge of the river's body of water.

Ancillary river

A smaller river that is located within a municipality.

Temporary occupation

Short lived occupation of space, usually within a specific period of time.

Public domain

Areas that consist of public spaces and urban networks such as the street, in addition to other commercial areas that are accessible to the public.

Public space

A space that is open and generally accessible for all kinds of people.

Interstitial space

Intermediate areas between spaces or buildings, or smaller spaces between streets that are often unused.

Sanitation amenities

Facilities in the neighbourhood used for sanitation activities, from toileting, bathing, which can be equipped with or without access to water. At some areas, such amenities may also be used for dishwashing purposes.

Practice

A routine activity that is performed based on certain movements, skills, and materials that is appropriate within the context.

Situated practice

A perspective of seeing a practice with an emphasis on how such practice is placed and shaped by a specific social and environmental context.

Carrier of practice

The practice theory term for actors that perform a particular role of practice defined in some practice theories. An actor can perform different practices in a period of time.

Elements of practice

Aspects of practices that are used in the practice analysis that vary across practice theory discourses. Some simplified version of such elements of practice are the competence, material, and meaning of practice. Situated practice discourse often do not employ such elements within its analysis.

Design research

A form of research that emphasises the process of creating as the means of investigation. It does not necessarily start by posing a research question, but is often carried out by developing works throughout the research stages.

Design knowledge

Knowledge accumulated, referred, or generated within the design process.

Design method

Creative approaches and techniques performed by designers to generate works based on a certain knowledge or brief.

Contested neighbourhood

A neighbourhood with limitations in space and in infrastructural resources, and also neighbourhood that faces environmental challenges or is at risk of eviction.

Regional government

An administration that governs a province in Indonesia. Indonesia consists of 43 provinces, with Jakarta as its capital province.

***Kotamadya* / Municipal government**

The administrative level under a provincial government. Jakarta consists of five different municipalities. The municipal government consists of different agencies that manage and develop areas under their jurisdiction, in addition to be the ones who perform the evictions in an area.

***Rukun Tetangga* (RT) / Village**

The lowest administrative level of government in Indonesia that manages a collection of 80 to 160 households.

***Rukun Warga* (RW)/ Neighbourhood district**

The administrative level above Rukun Tetangga. One RW manages 8 to 16 Rukun Tetangga. Together with Rukun Tetangga, Rukun Warga manages neighbourhood services such as waste collection services.

1. Introduction

This chapter starts by problematising the concept of urban maintenance and its relevance in a setting where access to space and infrastructural resources are limited. The chapter addresses the design research's importance for the maintenance study in such setting, outlining the research objectives that become the basis of this thesis investigation. The last section of this chapter reviews the organisation of this thesis, identifying the subject matter of each chapter. This chapter also discusses the use of PLATES, a creative portfolio integrated with the text, providing a manifestation of the thesis as a design-based research.

1.1 Problematisation of research

1.1.1 Maintenance and space

Urban geographers Stephen Graham and Nigel Thrift initially raise the importance of 'maintenance' discussion in urban discourses, defining it as the ongoing process that keeps things to work, ready to hand, and in order.[1] They define urban maintenance as a repetitive and routine activity of care and repair to restore the disconnected and disassembled material setting in an urban fabric.[2] Geographer, Ignaz Strebel, asserted the importance of maintenance for the built environment, stating that maintenance activities are "often invisible…but in a very fundamental sense they are central to the ways in which all buildings hold together."[3]

Despite such importance, urban theories have largely neglected the discussion of maintenance, particularly how it occurs in space.[4] Such neglect is attributed by the perception of maintenance as a backstage activity, which differs from the dominant user-centred perspective in

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[1] Stephen Graham and Nigel Thrift, 'Out of Order Understanding Repair and Maintenance', *Theory, Culture & Society* 24, no. 3 (1 May 2007): 1–25.

[2] Graham and Thrift.

[3] Ignaz Strebel, 'The living building: towards a geography of maintenance work', *Social & Cultural Geography* 12, no. 3 (1 May 2011): 243–262.

[4] Jane M. Jacobs and Stephen Cairns, 'Ecologies of Dwelling: Maintaining High-Rise Housing in Singapore', in *The New Blackwell Companion to the City*, ed. Gary Bridge and Sophie Watson (Malden, MA: Wiley-Blackwell, 2013).

most urban theories.[5] Some references argue that understanding backstage activities such as maintenance provide a more thorough understanding of space, as it allows learning[6] on the hidden connections and assembly between objects, systems, and people.[7] The potential of maintenance discourse towards a more thorough understanding of space validates the importance of this research to the field of architecture.

Maintenance has been seen more broadly as a transformative process that deals with the order and change that shape our relationship with the built environment.[8] Graham and Thrift argue that despite initial perception of maintenance as a process of exact restoration, imitating and repetitive, it can actually be categorised as a form of improvisation.[9] Different conditions of the environment and available resources of maintenance create unexpected and new needs that require adjustments of conducting maintenance.[10] Graham and Thrift stated that instead of exact restoration, maintenance could lead to various transformations, in the forms of "bodge job", "upgrade", "recycling", and "rebuild".[11] This thesis argues that this broad understanding of maintenance demonstrates the potential of such research to expand design methodologies.

With this broader understanding of maintenance, often the objective of it is not limited only to a specific problem in an environmental setting. For example, some references also highlight more complex conditions of breakdowns, such as maintenance in the context of recurrent

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[5] Jérôme Denis and David Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions: The Case of Paris Subway Signs', *Environment and Planning D: Society and Space* 32, no. 3 (2014): 404–416.

[6] Stewart Brand, *How Buildings Learn: What Happens After They're Built*, Reprint edition (New York, NY: Penguin, 1995).

[7] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'. This emphasis on the connections between different things is driven by the maintenance discourse's connection with urban assemblage, which is elaborated further in Chapter 3.

[8] Christopher R. Henke, 'Situation Normal? Repairing a Risky Ecology', *Social Studies of Science* 37, no. 1 (2007): 135–42.

[9] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[10] Jérôme Denis and David Pontille, 'The Dance of Maintenance and the Dynamics of Urban Assemblages', *CSI Interdisciplinary Institute on Innovation*, I3 Working Papers series, 15 (2015), I3WP_15-CSI-03.pdf.

[11] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'. P.6

disaster,[12] or maintenance in the scarce access to infrastructural resources.[13] The following section discusses contested neighbourhood as one of such complex conditions as this thesis' contextual focus.

1.1.2 Maintenance in contested urban neighbourhoods

This thesis is triggered by the 2015-2016 large-scale evictions in Jakarta - a capital city of Indonesia; in city areas where access to space and infrastructural resources are limited, and land ownership and tenure are disputed. Initiated largely by the national and regional government agencies, the evicted areas include the slum neighbourhoods around the river, seafronts, water dams and flyovers, to temporal occupations of public domain such as concentration areas of street vendors in the city.[14]

Objectives of these evictions vary, from mitigation in the event of prolonged disasters to narratives of new development.[15] A distinct argument from these evictions, however, is the Jakarta regional government's claim that these evicted spaces were poorly maintained and thus contributed to wider environmental degradations in the city.[16] In this sense, challenges of maintenance have led to removal of the 'problematic' entities (be it people or space). It has been argued that such acts of removal have led to social segregation,[17] as people are being relocated away from their living spaces. Yet, despite such

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[12] Henke, 'Situation Normal?'

[13] Vanesa Castán Broto and Harriet Bulkeley, 'Maintaining Climate Change Experiments: Urban Political Ecology and the Everyday Reconfiguration of Urban Infrastructure', *International Journal of Urban and Regional Research* 37, no. 6 (1 November 2013): 1934–48.

[14] LBH Jakarta, 'Atas Nama Pembangunan: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2015 (In the Name of Development: 2015 Forced Relocation Report in Jakarta)' (Jakarta: Lembaga Bantuan Hukum Jakarta, 22 February 2016); LBH Jakarta, 'Seperti Puing: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2016 (Like a Debris: 2016 Forced Relocation Report in Jakarta)' (Jakarta: Lembaga Bantuan Hukum Jakarta, 3 April 2017). Chapter 2 discusses a more elaborated number and background of these evictions, while a list of some of this eviction is enclosed in the APPENDIX.

[15] LBH Jakarta, 'Atas Nama Pembangunan: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2015 (In the Name of Development: 2015 Forced Relocation Report in Jakarta)'; LBH Jakarta, 'Seperti Puing: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2016 (Like a Debris: 2016 Forced Relocation Report in Jakarta)'.

[16] Ian Wilson, 'The Politics of Flood Alleviation in Jakarta', The Jakarta Post, 2015, http://www.thejakartapost.com/news/2015/09/05/the-politics-flood-alleviation-jakarta.html.

[17] Sandyawan Sumardi, 'Stigmatisasi, Justifikasi, Hancurkan! Pola Sistematik Peminggiran Warga Miskin Kota Jakarta 2015–2016 (Stigmatise, Justify, Destroy! The Systematic Pattern of Marginalisation of the Urban Poor in Jakarta 2015-2016)', *Forum Kampung Kota* (blog), 25 October 2016, https://medium.com/@forumkampungkota/stigmatisasi-justifikasi-hancurkan-f8b956bc6f9c.

removal, often environmental problems would still persist in the area.[18] It can be argued that the current process of maintenance in Jakarta have led to fragmented and unsustainable development, highlighting the urgency of maintenance research in such context.

The Jakarta evictions, happening in slum neighbourhoods and temporary economic spaces, point out the significant sites of study. To provide a more integrated scope of research, this thesis defines the research sites as contested neighbourhood spaces. The research defines contested neighbourhood spaces as areas at risk of eviction in *and* around a low-income and high-density settlement, where space is limited, and access to essential infrastructural services such as electricity, water or sanitation are scarce. Chapter 2 presents a more thorough account of the background of Jakarta contested neighbourhood and its significance as the study context.

As discussed earlier, maintenance is increasingly complex in a context where there is scarce access to space and infrastructural resources, or in areas facing environmental perils such as recurrent flood or difficult weather. In his study on infrastructural breakdown of the informal settlements of the Global South, Geographer, Colin McFarlane, argues that the prolonged absence and limitation of services has led to continuous improvisation[19] as part of the locals' process of maintenance. As also noted in the previous section, Graham and Thrift argued that in such context the "continual repair and adaptation of buildings" make visible the issues that are "actually completely ignored in the original design process."[20]   In this sense, researching maintenance in contested neighbourhoods presents the opportunity to bring valuable knowledge for an alternative design practice.

1.1.3 The need for design research to study maintenance

In understanding design research, the thesis follows the argument of feminist architectural design educator Jane Rendell's, which states that design research occurs through "generating modes, producing works at

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[18] Nathania Riris Michico, 'Tak Ada Lagi Banjir Di Kampung Pulo, Melainkan Selokan Penuh Sampah (There Is No Flood Anymore in Kampung Pulo, Just a Gutter Full of Waste)', detiknews, 8 March 2016.

[19] Colin McFarlane, 'Infrastructure, Interruption, and Inequality: Urban Life in the Global South', in *Disrupted Cities: When Infrastructure Fails* (Routledge, 2010).

[20] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'. P.6

the outset" for further reflection.[21] This form of research differs from traditional modes of research which start by posing "research questions and then finding answers".[22] Design research emphasises the process of making and generating as its process of investigation.

Such a creative approach arguably brings particular value in exploring urban maintenance, which was neglected as a discourse due to perception of maintenance as backstage activity that tends to be invisible. This thesis argues that design research exhibit potential to reveal such hidden process, finding the space of maintenance through the creative process of making the experience of its actors in performing maintenance in space visible. In addition, design research "creates a place to braid theory and practice",[23] which potentially contributes to knowledge for contested neighbourhood development. Following these significances of design research, Chapter 4 presents a more in-depth exploration of the different objectives and methodologies of architectural design research in studying maintenance.

1.2 Research questions

Informed by the problematisation of urban maintenance, two research questions are outlined:

1. How can we understand the spatiality of maintenance process happening in the contested neighbourhoods through making the experience of maintenance more visible?
2. How can the knowledge of maintenance spatiality inform design for a contested neighbourhood?

The first research question raises the need to expose the hidden maintenance process, understanding precisely how maintenance influences space in and around a contested neighbourhood. The second research question considers the potential of maintenance spatiality knowledge to inform design for future contested context development. The research question is detailed further in Chapter 4.

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[21] Jane Rendell, 'A Way with Words: Feminist Writing Architectural Design Research', in *Design Research in Architecture: An Overview*, ed. Murray Fraser, 1 edition (Burlington: Routledge, 2013).

[22] Ibid. P.117

[23] Peter Lunenfield, 'The Design Cluster', in *Design Research: Methods and Perspectives*, ed. Brenda Laurel (Cambridge, Mass: MIT Press, 2004).

1.3 Organisation of the thesis

1.3.1 Structures and contents of the thesis

Chapter 1

This chapter introduces the issues of maintenance in an urban context and its potential in providing an alternative understanding of space. It highlights the urgency of studying maintenance where space and infrastructural resources are limited. Subsequently, this chapter briefly articulates the importance of design research to study maintenance, and the need for design knowledge that can inform a more inclusive development practice. This chapter then states the corresponding research questions of this study and organisation of the overall thesis.

Chapter 2

This chapter explores the global and regional significance of Jakarta as the context of studying maintenance, highlighting the scope of economic and environmental challenges in the city. It draws attention to the fragmented development in Jakarta, contextualising the governance structures in Jakarta and how they bring challenges to maintenance in contested neighbourhoods. The chapter then highlights two particular conditions of maintenance as the context of each case study in this research.

Chapter 2 follows by creating a preliminary mapping study that explores potential study areas based on the size, physical features and social and economic diversity within seven different sites through drawings. Based on these drawings, the chapter then focuses on Kampung Pulo and Pesing Koneng as the thesis' case studies areas.

Chapter 3

Chapter 3 investigate the meaning, processes, and significance of maintenance discussion in the field of architecture. The chapter explores the different attributes of maintenance, highlighting the complexities of such attributes in contested neighbourhoods and how they potentially bring challenges to perform maintenance. Addressing the growing references that develop a situated understanding of maintenance and employ practice theory to examine maintenance in a situated way, this chapter investigates the significance of such theoretical framework for architectural research. Chapter 3 finishes by providing an initial inquiry of design research methodologies based on such theoretical framework.

Chapter 4

This chapter investigates the methodologies performed within this PhD by Design research. The chapter states the meaning and significance of design research for the maintenance study. Informed by the previous chapters, this chapter details the focus of maintenance for each case study, research objectives and the overall methodological framework of research.

The chapter then investigates creative ways of experiencing and representing maintenance. The chapter then describes the chronological progression of the study, outlining the data collection and analysis process performed in the study. Three main stages of analysis were elaborated, consisting of the coding process of maintenance narratives, the creative studies performed to situate the practice's spatiality, and the process of assembling maintenance spatial inventory as a form of design knowledge.

Chapter 5

Chapter 5 begins by providing spatial and political contestation overview of Kampung Pulo neighbourhood as the site of study, outlining the research participants' profiles and their dwelling locations within the neighbourhood. This chapter focuses on waste practices in the neighbourhood without consistent access to waste collection services. The case study focuses on developing an overview of the dwellers' space of waste practices and the detailed experience of dwellers' waste disposal in and around the neighbourhood.

Chapter 6

Similar with Chapter 5, Chapter 6 starts by outlining the spatial and political contestation overview of Pesing Koneng neighbourhood market as the site of study. This chapter focuses on the clearing out practices in temporal market occupation inside and outside Pesing Koneng neighbourhood. The case study investigates the local organisation of space that allows diverse and dynamic ways of appropriating space and infrastructural resources; annotating challenging experience of the market's clear out practices.

Chapter 7

Chapter 7 discusses findings from maintenance explorations in Chapter 5 and 6. In accordance with the research questions, this chapter summarises the spatiality of maintenance in contested neighbourhoods, and annotates how it potentially informs design knowledge. The chapter assembles spatial inventory based on

maintenance and summarises creative methodologies that have been performed to reveal the spatiality of maintenance. The chapter ends by describing some design exercises explored in this research.

Chapter 8

Chapter 8 summarises the overall findings of this PhD by Design research. The chapter discusses the theoretical implications of this research to architecture and urban theories in contested context, in addition to contribution towards practice theories. This chapter outlines implications towards policy and practice, annotating how the research has brought an alternative understanding of maintenance. Finally, this chapter discusses the limitations of the research and potentials for further studies.

Appendix

This part compiles the research's supporting documents. These documents span from the maintenance practice spatial inventory, lists of situated narratives, coded narratives of case studies' interviews and field notes, transcription of interviews with government and non-government agencies, the list of eviction incidents, and ethics documents of this research. The Appendix also contains a variety of drawings as a form of design thinking created in the process of the research, which was substantial in the shaping of the main work presented in the PLATES page of this thesis.

1.3.2 PLATES roles and contents

Integrated with this thesis text are the PLATES pages, which is the title of the design portfolio in this thesis that holds documentation of research, spatial explorations analysis, and proposals of design tools and design exercises. The overall PLATES pages within the thesis can be seen in the List of Figures.

2. Situating Jakarta as the place of study: Background context

2.1 Introduction

This research focuses on the process of maintenance happening in Jakarta contested neighbourhoods. Many urban references that concentrate on Jakarta define such context as an urban *kampung* or an informal settlement, yet this thesis does not use such terms due to a couple of reasons. Despite focusing on a neighbourhood context, this thesis does not limit its scope of exploration only to a domestic setting of the kampung (e.g. inside the house) or neighbourhood areas (path or shared spaces inside the kampung/the neighbourhood). The thesis' case studies also investigate spaces around such neighbourhood that is not necessarily a part of the settlement itself but within an immediate distance, pedestrians, public streets, or outside market. Moreover, this thesis argues that employing the term 'informal' creates limitations and generalisations of the space and the actors occupying such space, and therefore may inhibit any potential for further discussion.

This chapter is structured in three main parts. First, it discusses the scope of economic and environmental challenges in Jakarta, and the fragmentation of development in the city that builds the urgency of situating Jakarta as the place of study. It also highlights the differences between the actors' spatial needs and the government's development objectives. Informed by the current literatures and the interview narratives with five government and one non-government agencies[24] the second part contextualises governance structures in Jakarta that creates challenges of maintenance in contested neighbourhoods. Based on the conditions of maintenance highlighted in the previous parts, the third part of this chapter highlights the different context of contested

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[24] The government agencies consist of national level government agencies such as Ciliwung-Cisadane River Agency / Balai Besar Wilayah Sungai Ciliwung Cisadane (BBWSCC), and Accelerated Development of Sanitation of Settlements Program[24] / Program Percepatan Pembangunan Sanitasi Permukiman (PPSP). In addition, there are also regional level government agencies, such as Jakarta Regional Development Agency / Badan Perencanaan Pembangunan Daerah (BAPPEDA), Sanitary Agency / Dinas Kebersihan Jakarta, Jakarta Regional Environmental Agency / Badan Pengendalian Lingkungan Hidup Daerah. The non-government agency interviewed in this thesis is Ciliwung Merdeka, briefly mentioned in the previous section. (Reasons of choosing these agencies are elaborated further in the methodology chapter).

neighbourhood areas in Jakarta, positioning the potential sites of study within the city.

2.2 Examining the significance of Jakarta as a place of study

2.2.1 Scope of economic and environmental challenges

The significance of Jakarta as the place of studying contested neighbourhoods is driven by the scale of low-income neighbourhoods or slum areas that exist within the city, and in Indonesia as a whole. As the capital city, Jakarta covers an area of 662, 2 km2, and is occupied by over 10 million residents[25]. Around 20-25 per cent of its residents are inhabitants of low-income urban neighbourhoods commonly identified as *kampung* in Indonesia.[26] Furthermore, as the largest country in Southeast Asia with a population of 237 million,[27] Indonesia has the largest population of contested urban settlers within the Southeast Asia region, with more than 28 million people living in slum areas.[28] The densities of these neighbourhoods are similar to places such as the cities of Calcutta, India[29] and Sao Paulo, Brazil.[30]

In addition to the percentage of low-income neighbourhoods, Jakarta becomes an important context to study maintenance, due to its environmental challenges. Jakarta is the centre of the metropolitan area of Jabodetabek (an acronym of Jakarta and the surrounding regions of Bogor, Depok, Tangerang and Bekasi). The conurbation area of Jabodetabek (See Fig.1) is inhabited by 28 million people that move throughout 6300 km2 of land, with 5.5 million daily trips circulating in and out of Jakarta. As the centre of its conurbation area, Jakarta

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[25] Badan Pusat Statistik Jakarta, 'Jakarta in Figures' (Jakarta: Badan Pusat Statistik Jakarta, 2016).

[26] United Nations Human Settlement Programme, 'The Challenge of Slums: Global Report on Human Settlements 2003' (London: United Nations, 2003).

[27] Badan Pusat Statistik, 'Penduduk Indonesia Menurut Provinsi 1971, 1980, 1990, 1995, 2000 Dan 2010 (Indonesian Demography Based on Provinces 1971, 1980, 1990, 1995, 2000 and 2010)' (Indonesia: Badan Pusat Statisik Nasional), accessed 19 November 2010, http://www.bps.go.id/tab_sub/view.php?kat=1&tabel=1&daftar=1&id_subyek=12&notab=1.

[28] UN-Habitat, 'Urbanization and Development: Emerging Futures World Cities Report 2016' (Nairobi, 2016).

[29] Rukmini Shrinivasan et al., "17% of Urban India Lives in Slums: Census," *The Times of India*, accessed November 19, 2014, http://timesofindia.indiatimes.com/india/17-of-urban-India-lives-in-slums-Census/articleshow/19118219.cms.

[30] CITISCOPE.ORG, 'Improving Slums: Stories from Sao Paulo', Text, Sustainable Cities, 29 June 2011, http://blogs.worldbank.org/sustainablecities/no-excuses-slum-upgrading.

becomes both a mega and a migratory city, attracting a significant influx of people living and working in and around it.[31] Architect Sumita Sinha argues that Jakarta's high dynamic density contributes to the
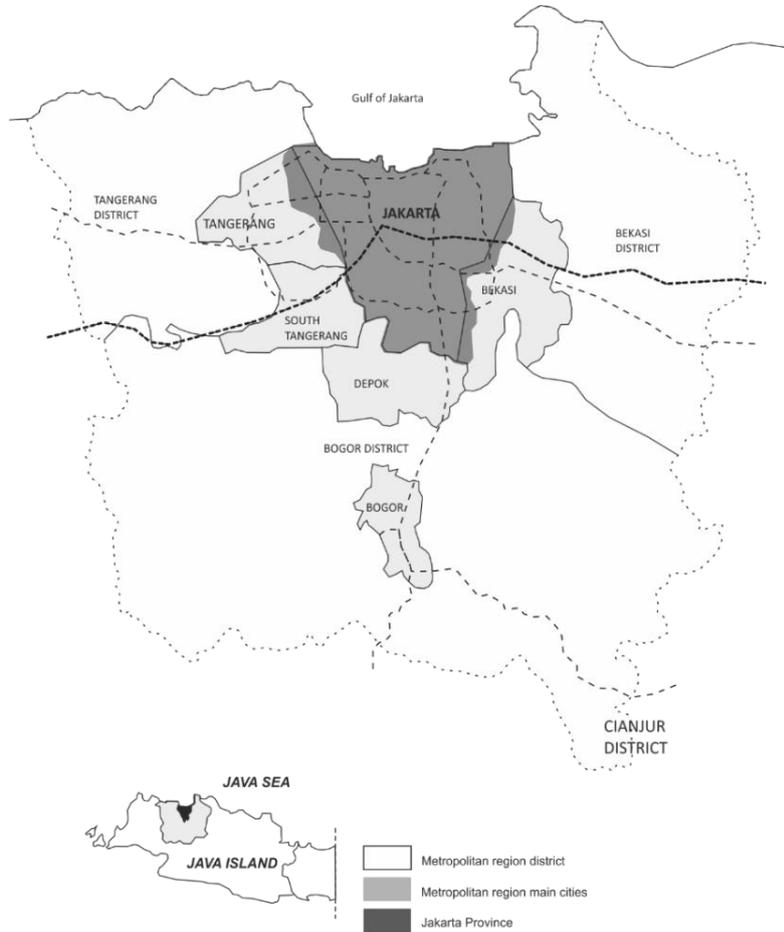
Figure 1. Jakarta and Greater Metropolitan Area of Jabodetabek (Source: Map drawn by the author)

city's infrastructural and environmental challenges, stating that Jakarta has now "reached its limits" due to the traffic congestion, overcrowded settlements, unreliable electricity and yearly floods.[32]   With thirteen different rivers flowing through the city, other than floods, Jakarta is also prone to landslides, low levels of sanitation provisions and lack of adequate sewerage systems.[33] For example, at the time of research, the

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[31] Sumita Sinha, *Architecture for Rapid Change and Scarce Resources* (Abingdon, Oxon ; New York, NY: Routledge, 2012).

[32] Ibid. P.59

[33] United Nations Human Settlement Programme, 'the Challenge of Slums: Global Report on Human Settlements 2003'.

incidences of flood in Jakarta had worsened over the past ten years.[34] Flooding has not only become more frequent but also lasts longer, for as long as three weeks, forcing up to 95,997 people to evacuate their houses in 2014 alone.[35]

Despite such magnitude of slum population and severity of environmental challenges, Jakarta is still currently under-researched in comparison to its regional neighbours and other world cities equally struggling with contestation in the city, such as Karachi, Mumbai, and Sao Paulo. However, there has been a significant increase in researches around Jakarta in the past couple of years that shows the growing awareness of its global importance. The following section focuses on the current developments of contested neighbourhoods in Jakarta and how they demonstrate the urgency of maintenance research in contested context.

2.2.2 Fragmented development of Jakarta: the urgency of maintenance research

As briefly mentioned in Chapter 1, the extent of fragmented development[36] in Jakarta becomes one of its significances as the site of maintenance study. In the past five years, there is an increase in large-scale development projects happening in Jakarta. A prominent example of these projects was the Ciliwung river regeneration projects, in addition to other projects such as toll road development and water dam restoration (an inventory of some of these large-scale projects is listed in Appendix 7).

Between 2015-2016, these projects triggered a high number of evictions.[37] Over this two year period, *Lembaga Bantuan Hukum* Jakarta

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[34] World Bank, 'Jakarta Urgent Flood Mitigation Project/Jakarta Emergency Dredging Initiative Project', 10 July 2014, http://www.worldbank.org/en/results/2014/09/10/jakarta-emergency-dredging-initiative-project.

[35] Kompas, 'Sudah Lelah Mengungsi Dari Banjir, Tapi Belum Ada Solusi Segera...' KOMPAS.com, 2014, http://megapolitan.kompas.com/read/2014/02/07/0813181/Sudah.Lelah.Mengungsi.dari.Banjir.tapi.Belum.Ada.Solusi.Segera. + BNPB, 'Statistik Data Dan Informasi Bencana Indonesia (Indonesia Disaster Data and Information Statistics)' (Indonesia: Badan Nasional Penanggulangan Bencana, 2015), http://dibi.bnpb.go.id/data-bencana/statistik.

[36] This research uses the term fragmented development to explain how some development brings disconnection between actors, spaces and access to resources within an area in the city.

[37] AbdouMaliq Simone, 'Cities of Uncertainty: Jakarta, the Urban Majority, and Inventive Political Technologies', *Theory, Culture & Society* 30, no. 7–8 (1 December 2013): 243–63,; Abidin Kusno, 'Housing the Margin: Perumahan Rakyat and the Future Urban Form of

(the Jakarta Legal Aid Agency) reported 316 different cases of evictions happening in Jakarta, displacing a total of 13,871 households and 11,662 commercial units.[38] Among these 316 cases, 183 were done to enforce public order,[39] 124 were influenced by large scale development of public facilities (mainly dominated by Ciliwung river regeneration projects),[40] while the other 39 were related to the restoration or development of private spaces owned by government institutions.[41] This high rate of evictions has been thought to break the record of evictions in Jakarta by previous administrations.[42]

Other than the objective of increasing the quality of the urban environment and providing city services, another objective of some of the large-scale project developments that trigger eviction is also to provide a modernised image of Jakarta[43], clear from informal occupations, such as squatters, slums and street vendors. The planning and execution of these large-scale projects have been largely under critique for being unsustainable, contributing to the city's segregation and being insensitive to local people's livelihoods.[44]

Jakarta', *Indonesia*, no. 94 (2012): 23–56,; Abdoumaliq Simone, '"We Are Here Alone": The Ironic Potentials and Vulnerabilities of Mixed (Up) Districts in Central Jakarta', *International Journal of Urban and Regional Research* 38, no. 4 (1 July 2014): 1509–24.

[38] LBH Jakarta, 'Atas Nama Pembangunan: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2015 (In the Name of Development: 2015 Forced Relocation Report in Jakarta)'; LBH Jakarta, 'Seperti Puing: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2016 (Like a Debris: 2016 Forced Relocation Report in Jakarta)'.

[39] Eviction based on public order is enforced based on Perda DKI Jakarta No.8 Tahun 2007 (Jakarta Regional Regulation No.8 2007) that the regional government can evict building units or activities that are considered obstructing public order and civic stability. However, this regulation is quite vague, and in reality, the enactment of this regulation is based more on political interest, and often in risk of violating human rights (LBH Jakarta, 2017).

[40] The large-scale development that causes eviction was dominated by national and regional driven projects, from city river regeneration and water facilities (88 cases), flyover and street development (15 cases), green space and urban parks (11 cases), and subway development (2 cases). (LBH Jakarta, 2016; LBH Jakarta, 2017)

[41] Ibid.

[42] Nursita Sari, 'LBH Jakarta: Ahok Mungkin Pecahkan Rekor Penggusuran Oleh Pemprov DKI (Jakarta Legal Aid Agency: Perhaps Ahok Has Broke the Eviction Record Ever Done by Jakarta Regional Government)', KOMPAS.com, 13 April 2017, http://megapolitan.kompas.com/read/2017/04/13/13405181/lbh.jakarta.ahok.mungkin.pecahkan.rekor.penggusuran.oleh.pemprov.dki.

[43] Emma Colven, 'Understanding the Allure of Big Infrastructure: Jakarta's Great Garuda Sea Wall Project', *Water Alternatives* 10, no. 2 (2017): 250–264.

[44] Rita Padawangi, 'In Search of the "kampung" Spirit in Jakarta', The Jakarta Post, 2016, http://www.thejakartapost.com/news/2016/01/23/in-search-kampung-spirit-jakarta.html.

Sandyawan Sumardi, leader of Ciliwung Merdeka,[45] argued that these high numbers of evictions demonstrate the government's systematic agenda to eradicate marginal occupation in the city.[46] Sumardi further argued that the government has enforced this agenda by placing stigma to the occupation of poor and vulnerable communities, and by doing so justifying their ongoing eviction.[47] The evictee is often relocated further away in the urban periphery contributing to the fragmentation of urban space and isolation of such marginal communities.[48]

Evictions were justified based on the assumption of contested neighbourhood spaces as being unmaintained, dirty, and a centre of disease; contributing to the wider environmental degradation such as haphazard dumping or river contamination. For example, the local dwellers occupying the Ciliwung river bank have been accused as "the primary source of pollution",[49] despite studies on river pollution stating otherwise.[50] Nevertheless, reports have shown that the removal of these dwellers does not necessarily lead to better environmental quality, both in the neighbourhood and in the wider urban environment.[51] The thesis argues that the emergence of fragmented development in Jakarta provides a sense of urgency for maintenance research.

2.2.3 Discrepancies between the needs and development of Jakarta contested neighbourhoods: limitations of current research

There are discrepancies between the local actors' occupation and the government understanding of liveable spaces in contested

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[45] Ciliwung Merdeka is a local NGO that advocates for evicted riverbank dwellers that were affected by the Ciliwung river regeneration projects.

[46] Sumardi, 'Stigmatisasi, Justifikasi, Hancurkan! Pola Sistematik Peminggiran Warga Miskin Kota Jakarta 2015–2016 (Stigmatise, Justify, Destroy! The Systematic Pattern of Marginalisation of the Urban Poor in Jakarta 2015-2016)'.

[47] Ibid.

[48] Ibid.

[49] Derek Vollmer and Adrienne Grêt-Regamey, 'Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River', *Global Environmental Change* 23, no. 6 (December 2013): 1542–55. P.1552.

[50] Wilson, 'The Politics of Flood Alleviation in Jakarta'.

[51] Michico, 'Tak Ada Lagi Banjir Di Kampung Pulo, Melainkan Selokan Penuh Sampah (There Is No Flood Anymore in Kampung Pulo, Just a Gutter Full of Waste)'; Robertus Belarminus, 'Mengapa Kampung Pulo Dan Bukit Duri Masih Dilanda Banjir?', KOMPAS.com, 17 February 2017,
http://megapolitan.kompas.com/read/2017/02/17/06353651/mengapa.kampung.pulo.dan.bukit.duri.masih.dilanda.banjir.

neighbourhoods. The contested neighbourhood is arranged based on a variety of coping strategies of appropriating space and resources, that higher authorities may not always agree with. *Besar Wilayah Sungai Ciliwung Cisadane* / BBWSCC (one of the national river agencies) outlines such disagreement through illustrating how the government plans to develop the Ciliwung river terrain in response to the riverbank neighbourhood occupation:

> "We hope that by normalising the river we could obtain the water volume as planned, we would have access for inspection road, and we could have borders between community and river management areas. We hope that if previously there is a barn and a kitchen in there (the river bank) then now we could have house facades facing the river. It becomes a river view. The kampung (neighbourhood) facing the river."[52]

The above passage discusses the appropriation of river embankment parts as either 'barn' or 'kitchen' by riverbank dwellers. Through river regeneration, the government aims to inhibit the community's encroachment to the river, eliminating the presence of such barn and kitchen. Other than these barn and kitchen, the river regeneration also eliminates a large number of shared bathrooms in the affected river terrain.[53] Without these bathrooms, around 400 households from the remaining Kampung Pulo neighbourhood dwellers were left without access to sanitation.[54] These dwellers have no choice than to go to the nearest public spaces to defecate or share bathrooms with neighbours who have private toilets.[55]

Elimination of these bathrooms and kitchen demonstrates the government's assumption that an ideal individual dwelling that should already contain a complete access to an individual toilet and kitchen. This assumption led to the belief that dwellers ways of occupying space will automatically change when they relocate to the ideal dwelling with complete access to space and amenities. Yet, the development of contested neighbourhood initiated by the government often produces

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[52] BBWSCC, Current and future agenda of Ciliwung RIver Development, 2015.

[53] Ibid.

[54] Junianto Hamanongan, 'WC Umum Digusur, 400 Warga Kampung Pulo Sulit Buang Hajat - Wartakota', 25 September 2015, http://wartakota.tribunnews.com/2015/09/25/wc-umum-digusur-400-warga-kampung-pulo-sulit-buang-hajat.

[55] Ibid.

spaces that are less flexible and productive. For example, working or selling at home has been prohibited within the housing unit provided by government for the evictees. This rule creates settlements that are unfit for the livelihood of its dwellers, despite having complete access to amenities. The NGO explained about such inflexibility in a conversation about the resettlement housing unit below:

> "The housing itself is what the housing has always looked like, like a pigeon cage. It is remarkable what the provincial government have done in developing housing for the river bank dwellers. But it is only a place to sleep, not a place to work. If their land is converted to there (the housing unit) it is very luxurious, yes, but it is a place to sleep. It is for living, not for working. That has not been understood. Now you can ask for all people (other relocated dwellers) who now lives in this housing. They have all stopped working, because their land has been substituted into housing units. But if you have five kids it is not enough. Many of them went out from the housing. Not because they don't want to live there, but (simply) because they have to work…" [56]

The above passage shows the regional government's lack of understanding towards the spatial needs of dwellers in contested neighbourhoods. This lack of understanding leads to an enforced oversimplification of the ideal living spaces for the low-income community within regional government-initiated projects in Jakarta. Little value is placed in understanding that such way of occupation "enable micro-flows of information, goods, materials and practices that produce income and make life sustainable under conditions of poverty."[57]

The story of evictions and the lack of understanding regarding dwellers spatial needs demonstrate the needs for a research that highlights the different ways of occupying space around the neighbourhood, but also links how such ways influences the wider environmental quality. Current research in contested neighbourhoods is often more interested in individual or collective coping strategies of its dwellers, without necessarily highlighting the impact of such strategies to the wider environment.[58]

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[56] Ciliwung Merdeka, Current and Future Development of Ciliwung River, 2015.

[57] Kim Dovey, 'Informalising Architecture: The Challenge of Informal Settlements', *Architectural Design* 83, no. 6 (1 November 2013): 82–89.

[58] Evawani Ellisa, 'COPING WITH CROWDING IN HIGH-DENSITY KAMPUNG HOUSING OF JAKARTA', *Archnet-IJAR* 10, no. 1 (1 April 2016): 195–212.

When a research does highlight the environmental quality around contested neighbourhoods, it rarely links to the complex ways dwellers occupy spaces across the neighbourhood. An example is the river design project developed by ETH researchers (see Fig.2) that explores a riverbank community[59] in Jakarta. The project aims to rehabilitate narrowing and polluted urban rivers due to waste disposal and sanitation activities in the river[60] and restores them as multi-functional landscapes.[61] Yet, the ETH proposal is limited to the regeneration of the river terrain to inhibit haphazard dumping. In this sense, the proposal tends to generalise river contamination instead of paying attention to the various organisation of waste disposal and sanitation activities across the neighbourhood.

Image copyrighted
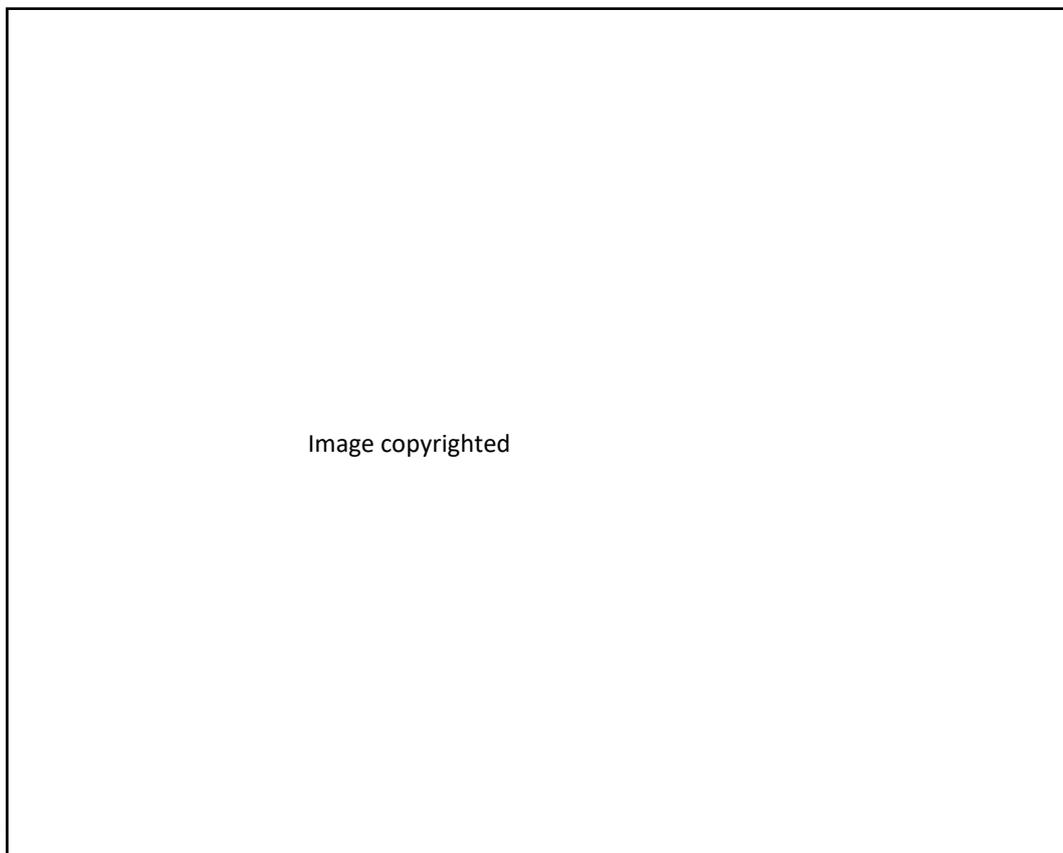
Figure 2. Ecological river rehabilitation scenarios proposed by Future Cities Laboratory, Singapore (Source: Sustainable Cities and Society, 2016)

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[59] Adrienne Grêt-Regamey et al., 'River Rehabilitation as an Opportunity for Ecological Landscape Design', *Sustainable Cities and Society* 20 (2016): 142–146.

[60] Derek Vollmer and Adrienne Grêt-Regamey, 'Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River', *Global Environmental Change* 23, no. 6 (2013): 1542–1555.

[61] FTUI, 'International Design Workshop, Designing The Ciliwung River', 2013, http://newft.eng.ui.ac.id/index.php/id/beritaftui/100.

This section has outlined the significance of Jakarta as a place of studying contested neighbourhoods based on the scope of economic and environmental challenges in such context. Through exploring the extent of fragmented development in the city, and the lack of understanding of complex living arrangements of spaces in such context, this section also begins to introduce the urgency of maintenance research. The subsequent section follows on investigating the structure of governance that creates challenges of maintenance in contested neighbourhoods.

2.3 Contextualising Jakarta: the global and local discourse

2.3.1 Administrative structures in governing the city

Indonesia consists of 34 different provinces,[62] with each province governed under the autonomic authority of a regional government, which is decentralised from the national government.[63] As the capital city, Jakarta is under the authority of the Jakarta provincial government, headed by a governor that oversees the rest of administrative hierarchies within the city.[64] The Jakarta region consists of five municipalities/*kotamadya* (Central, East, West, North and South Jakarta) [65] and a regency/*kabupaten* (Thousand Islands regency, a collection of 105 islands in north Jakarta). A mayor/*walikota* heads the municipality while a regent/*bupati* heads a regency.[66] These municipalities and regency in Jakarta are further divided into smaller administrative areas called sub-districts/*kecamatan*, with each sub-district consists of a collection of villages/*kelurahan*.[67] In Jakarta there are a total of 40 sub-districts and 267 villages (each sub-district can

[62] MLIT, 'An Overview of Spatial Policy in Asian and European Countries' (Japan: Ministry pf Land, Infrastructure, Transport and Tourism, 2014), http://www.mlit.go.jp/kokudokeikaku/international/spw/general/indonesia/index_e.html.

[63] OECD, 'Indonesia Unitary Country Profile' (OECD, 2015), https://www.oecd.org/regional/regional-policy/profile-Indonesia.pdf.

[64] Willem Johan Waworoentoe, 'Jakarta | History, Map, Population, & Facts', Encyclopedia Britannica, 2018, https://www.britannica.com/place/Jakarta.

[65] Ibid.

[66] Budiarti Prasetiamartati, 'Policy and Participatory Local Government in Indonesia' (Islamabad: UNDP Indonesia, 26 September 2013), http://www.undp.org/content/dam/pakistan/docs/Democratic%20Governance/Federalism/International%20Conference%20Sept13/presentations/Day2/3rd%20Ms.%20Budiati%20pdf.pdf.

[67] Ibid.

have between two to ten villages). Sub-districts and villages are each headed by a civil servant called *camat* and *lurah*.[68]

There are two more administrative levels under the above hierarchies, which are *Rukun Warga*/RW (neighbourhood district), and *Rukun Tetangga*/RT (variously translated as just neighbourhood or hamlet). Different from the administrative hierarchies from the level of municipalities to villages that are officially appointed by the provincial government, leaders of Rukun Warga and Rukun Tetangga are locally chosen by members of the households within their neighbourhood.[69]

These administrative hierarchies shape the distribution of tasks in maintaining the city. Each hierarchy has specific and limited roles and territories. The regional government consists of an array of agencies with their regular tasks. Each of these agencies has its branch in the municipal level that will carry their specific tasks in every respective area. For example, one of the agencies involved in the maintenance of Jakarta is the *Dinas Kebersihan Jakarta* (Jakarta Sanitary Agency). This agency has its branches that deliver services to each municipality, in addition to a particular division for specific types of maintenance needs.[70] For example, other than providing household waste collection services at the municipal level, it is also responsible for excavating waste from the regional areas of urban rivers, and together with the household waste, distributing them to the nearest regional landfill every day.

These regional and municipal agencies have strict diversification of tasks. *Badan Perencanaan Pembangunan Daerah* (The Jakarta Planning Agency), another regional agency interviewed in this research, notes that regional agencies focus solely on maintaining and developing the physical amenities of the environment, such as creating

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[68] Pemda DKI Jakarta, 'Organisasi Pemerintahan', Jakarta.go.id, 29 May 2009, https://web.archive.org/web/20090529222650/http://www.jakarta.go.id:80/en/pemerintahan/struktur_pemprop_dki/default.asp#. Rukun Warga can consist of 8 to 16 Rukun Tetangga, while Rukun Tetangga consists of 80 to 160 households in maximum.[68] Based on these terms, the thesis concludes that the term neighbourhood explored in this research can be defined as a RW, with the size of an area that can be occupied by people between 640 to 2,560 households.

[69] Ibid.

[70] In 2016, a year after the fieldwork was conducted, The Jakarta Sanitary Agency and Environmental Agency were merged into one agency called the Environmental and Sanitary Agency.

additional waste disposal space with better boundaries and enforcement:

> "The Jakarta province itself, the Sanitary Agency is only responsible for taking the waste from the waste disposal areas. Other than that, they might organise the waste disposal area, for instance, if there was illegal waste disposal area in the embankment they might either close it down or conversely make it more permanent using waste pushcarts so that it is tidier and does not fall off the river…"[71]

This strict diversification of tasks between government agencies creates a limited and unsustainable focus in maintaining the contested neighbourhood. The process of maintenance is only seen as a passive response towards environmental problems (such as haphazard disposal) instead of an integrated approach of dealing with the environmental condition. For example, Ciliwung Merdeka stated that the river cleaning is performed infrequently by the government:

> "Cleaning the river is not a one- or two-day process. It has to become a pattern. Like in the Netherlands, Germany, and Switzerland, I saw that the rivers there are also dirty. I saw with my own eyes, in front of a market, there was somebody throwing his bicycle into the river. But in there, there was a system, at least once or twice a month the river is cleaned. That thing (the bicycle) has already gone the next day. It's not like that here. Perhaps after decades the river might be cleaned, when there is a ceremony, then the soldiers would come and clean the river banks….''[72]

The strict jurisdiction of their task and the lack of integrated approach also inhibit the engagement of local actors. While there are programs targeted for low-income neighbourhoods for better environmental behaviour carried out by some agencies such as the Regional Environmental Agencies,[73] it can be argued that in reality these programs tend to be generic and ceremonial. This lack of local engagements leads to a partial approach in addressing maintenance problems in the neighbourhood.

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[71] Ibid.

[72] Ciliwung Merdeka, Current and Future Development of Ciliwung River.

[73] Based on interview with BPLHD, one of the examples of the agencies' program that focuses on low-income neighbourhood related program is the 'Green Kampung Movement' that emphasises on community empowerment, (introducing waste recycling and composting, vegetable planting and craft making).[73] Another example is the provision of waste bank and counselling on haphazard waste dumping. Nevertheless, there are no further details on how these programs are tailored appropriately for each neighbourhood needs and challenges.

The above section discusses the impact of strict diversification of tasks between the national, regional agencies and their municipal branch, that lead to a limited and unsustainable focus of handling maintenance in the city. The following section expands more on this limitation of maintenance in the context of a contested neighbourhood.

2.3.2 Limitation of the local authority in contested neighbourhoods

This section argues that there is a limitation of the local authority in a contested neighbourhood that leads to vulnerability in handling the daily maintenance. Some infrastructural services for neighbourhood level are organised by the local authority, such as the household waste collection services. The local neighbourhood district (RW) arranges such services and transports the collected waste to the municipal waste disposal area organised by the municipal government.[74] However, some references highlight that the lack of economic, spatial and human resources in such context,[75] inhibit the local authority to arrange such services. For example, in contested neighbourhoods, there might be a lack of space to organise collective waste disposal, due to the neighbourhood density.[76] The absence of proper waste collection within the neighbourhood disconnects the flow of waste from the neighbourhood level to the waste disposal area at the regional level, leading to the risk of haphazard disposal.

Limitation of authority may evolve in a lack of continuous enforcement from local authorities, which challenges a thorough maintenance of the neighbourhood spaces. This challenge is seen in the conversation with BBWSCC regarding the evicted dwellers of the riverbank neighbourhood. They argue that these dwellers do not have any sense of ownership towards the Ciliwung River and therefore would haphazardly dispose their waste in the river, except when continuous surveillance is present:

> "We do not have to use any theories. It all comes back to the community's sense of belonging towards a clean river. The second thing is law enforcement. (Even) if an angel guards the area, if the angel left it will still be dirty. How if it happens in their garden. No one

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[74] Pemda DKI Jakarta, 'Peraturan Daerah Tentang Pengelolaan Sampah', 03 § (2013).

[75] Vollmer and Grêt-Regamey, 'Rivers as Municipal Infrastructure', 2013.

[76] Ibid.

disposes of waste. If there is rain coming, just stand by in some place (near the river). Then there will be spring beds (mattress) and sofas flowing by."

Disconnection with higher authority also creates limitation of local authority, reflected in the municipal agencies' lack of engagement with local dwellers in organising and maintaining the neighbourhood. For example, Ciliwung Merdeka NGO has suggested that maintenance of areas around the contested neighbourhood should be established as a system that engage with the dwellers as the occupants who inhabit the area. However, the NGO notes that the regional government do not trust the dwellers; as stated in the following paragraph:

> "The community has been accustomed to cleaning the river. But nobody believed them. It is extraordinary how the urban poor are disbelieved in the city. Until the officials who manage the housing do not want to give the housing unit to be owned by the community[77]. Even if they pay nobody would give them because they afraid that it will be dirty, and the community does not have sense of responsibility to clean them. Why don't they make a system for the community to be responsible to clean for themselves?...The absence of such belief destroy their potential to participate actively…" [78]

Apart from limitation of local authority, disconnection with the higher authorities also led to a local organisation of space conducted by local administratives to "brokers, and land Mafiosi".[79] Abidin Kusno, an urban studies educator who focuses on informal housing in Jakarta, stated that often these actors expand the use of space subversively, selling "the rights for persons to settle on any unregistered land".[80] In the event of subversive use of space, these local authorities (be it local administration or the Mafiosi) do not necessarily control the occupants, but simply become those that "watch each other without the

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[77] The housing unit of which the Kampung Pulo residents are relocated into is not owned by them, but by the provincial government. They are objected to pay a subsidised maintenance fee monthly. Such arrangement is actually prompted over earlier experience of dwellers in other relocated housing that sell their unit to other people that in the end become the landlord of several units within the housing compound and rent the unit out with high price.

[78] Ciliwung Merdeka, Current and future agenda of Ciliwung RIver Development, 2015.

[79] Abidin Kusno, 'Housing the Margin: Perumahan Rakyat and the Future Urban Form of Jakarta', *Indonesia*, no. 94 (2012): 23–56, p.33.

[80] Ibid.

connotation of mutual surveillance."[81]

Sociologist AbdouMaliq Simone argues that securing the operation of such subversive space employs a form of "elastic security",[82] which is not about "maintenance of tight boundaries",[83] but instead development of

> "…the capacity of residents to imagine various circuitries for reaching each other…Residents fold in other residents – as labour, as actual and potential beneficiaries of each other's output, as extensions of opportunity that are part of efforts to scale-up economic activity, and as mutual sources of contacts and favours."[84]

In securing and utilising these imagined circuitries of occupants, the local authorities play an important role to be the "switchboards of information and impressions…to keep various constituencies informed."[85] This condition highlights another form of maintenance that evolves in the subversive use of space. In this condition, maintenance does not only consist of the activity of restoring the quality of the environment but also managing the connections between occupants.

This section contextualises the problem of maintenance in Jakarta, highlighting the structure of governance and its limitations that affect maintenance in contested neighbourhoods. In addition, this section reveals two particular conditions of maintenance that becomes the research's case studies. The first condition highlights maintenance in the absence of consistent and reliable access to domestic infrastructural services. The second condition addresses maintenance in the subversive occupation of spaces in and around neighbourhood, detached from higher authorities. The following section explores potential sites of studying maintenance in Jakarta's contested neighbourhoods based on these conditions.

2.4 Positioning sites of study in Jakarta: preliminary mapping studies

This section searches for potential sites of studying maintenance among the high number of low-income neighbourhoods in Jakarta. The

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[81] AbdouMaliq Simone, 'Cities of Uncertainty: Jakarta, the Urban Majority, and Inventive Political Technologies', *Theory, Culture & Society* 30, no. 7–8 (1 December 2013): 243–63. P.249

[82] Simone. P.251

[83] Ibid. P.252

[84] Ibid.

[85] Ibid.

The study starts by creating a map (See Fig.3) that layers the distribution of slum neighbourhood areas in Jakarta with the eviction location from 2015 to 2016.

LIST OF GOVERNMENT PROJECTS THAT CAUSES EVICTIONS

#	Project	#	Project
1	Toll road Bekasi-Cawang development	23	Spaces under highway regeneration
2	Pluit reservoir restoration	24	River path development
3	Pluit reservoir restoration	25	River water channel regeneration
4	Sports facilities development	26	Krukut river regeneration
5	Toll road Bekasi-Cawang development	27	Food center development
6	Toll road Bekasi-Cawang development	28	Ciliwung river regeneration
7	Pluit reservoir road widening	29	Ciliwung river regeneration
8	Pluit reservoir restoration	30	Railways space regeneration
9	Kalimalang road widening	31	Toll road Bekasi Cawang development
10	River widening development	32	River regeneration
11	Gendong river widening	33	RPTRA development (child's space)
12	City water chanel restoration	34	RPTRA / under highway development
13	Duri river regeneration	35	RPTRA / under highway development
14	Ciliwung ancillary river regeneration	36	Kali Baru river regeneration
15	Ciliwung ancillary river regeneration	37	Kota Tua and Pasar Ikan revitalisation
16	Ciliwung ancillary river regeneration	38	Asian Games venue development
17	Kelapa Gading reservoir development	39	Asian Games venue development
18	Toll road Bekasi-Cawang development	40	Menceng raya road widening
19	Asian games athlete accommodation	41	BMW football stadion development
20	Under highway restoration	42	Under highway development
21	Rawa Badung river development	43	Railways spaces regeneration
22	Ciliwung river regeneration	44	River regeneration

Figure 3.Map that overlays position of slum neighbourhood in Jakarta with locations of large-scale evictions carried by the regional authorities (Complete information of these locations are attached in the APPENDIX) (Source: drawn by the author based on slum neighbourhood data from BPS and evictions locations from Jakarta Legal Aid)

While the locations of government projects were obtained from the Jakarta Legal Aid's report[86], the location of the slum neighbourhood uses the data provided by *Badan Pusat Statistik* (BPS) Jakarta (Jakarta Regional Statistic Agency).[87] The BPS data uses the lack of tenure ownership as one of the primary reasons of slum conditions, in addition to low education and economic level, and some space quality parameters shown in Figs 4 and 5. These parameters consist of the density of people and the building residing in the neighbourhood, the state of the building and its environmental quality (current conditions, layout, sufficiency of ventilation), access to infrastructure and quality of environment within the building and the neighbourhood (water pipe,
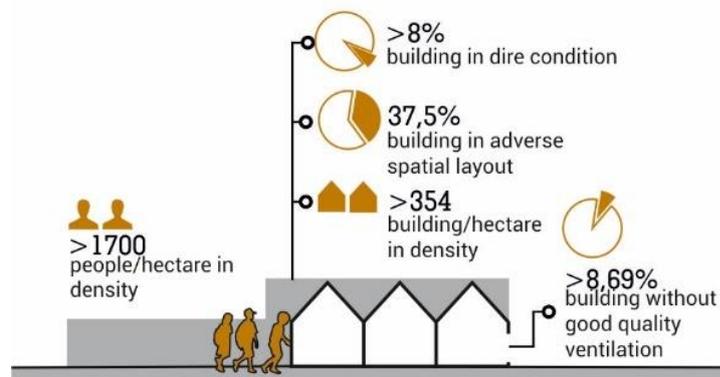
Figure 4. Parameters of slum neighbourhood based on their physical conditions on BPS data (Source: drawn by the author from Badan Pusat Statistik Jakarta (Jakarta Statistic Agency))
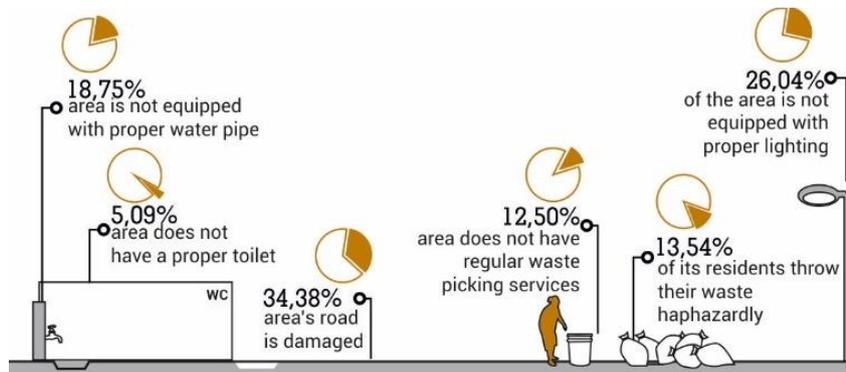
Figure 5. Indicators of slum neighbourhood based on infrastructural conditions (Source: drawn by the author from Jakarta Slum Neighbourhood Evaluation by BPS, 2011)

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[86] LBH Jakarta, 'Atas Nama Pembangunan: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2015 (In the Name of Development: 2015 Forced Relocation Report in Jakarta)'; LBH Jakarta, 'Seperti Puing: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2016 (Like a Debris: 2016 Forced Relocation Report in Jakarta)'.

[87] Badan Pusat Statistik Jakarta, 'Evaluasi RW Kumuh Jakarta 2011 (Jakarta Slum Neighbourhood Evaluation)' (Jakarta, 2011).

toilet, accessible path, waste management, lighting), to people's behaviour in space (haphazard waste disposal). [88]

Following the map in Figure 3, two other maps were then created (See Figure 6-7). The map in Figure 6 layers the location of slum neighbourhoods in Jakarta, with areas with environmental concerns in the city; from flood-prone areas, water pollution levels and quality of groundwaters across the city. This map shows that flood incidences dominate the north-west and east area of Jakarta, and demonstrates pollution spots across the city. The map also highlights the gradation of the ground water's salinity across the city, where salt traces were detected in almost half of it. The map in Figure 7 layers the locations of slum neighbourhoods with the locations of prominent social and economic spaces in Jakarta. The map highlights neighbourhoods with high density, annotating their vicinity with important economic spaces in the city.

The map exploration demonstrates potential study areas in West, East and South Jakarta. The map in Figure 3 shows a particularly high number of evictions in West and East Jakarta. In addition, while Figure 6 demonstrates significant environmental concerns spread across the city, Figure 7 shows that locations around West, East, and South Jakarta provide more diverse economic activities. North Jakarta is argued to be less economically diverse. Some parts of the northern peripheral area are occupied by industrial factories making the neighbourhood predominantly occupied by factory migrant workers, while other settlements in the northern peripheries often have a similar source of livelihoods, such as the fisheries and other sea-front focused economies.

Informed by this mapping study, this research conducted a more detailed preliminary study among the West, East, and South areas in Jakarta. The locations of preliminary studies are selected based on the two conditions of maintenance outlined in Section 2.3.2. The preliminary study in the neighbourhoods with vulnerable access to maintenance services focuses in three riverbank neighbourhoods in East and South Jakarta. These neighbourhoods consist of Kampung Pulo, Manggarai, and Kalibata neighbourhoods which were the primary target of eviction within the Ciliwung river regeneration project. These neighbourhoods

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[88] Ibid.
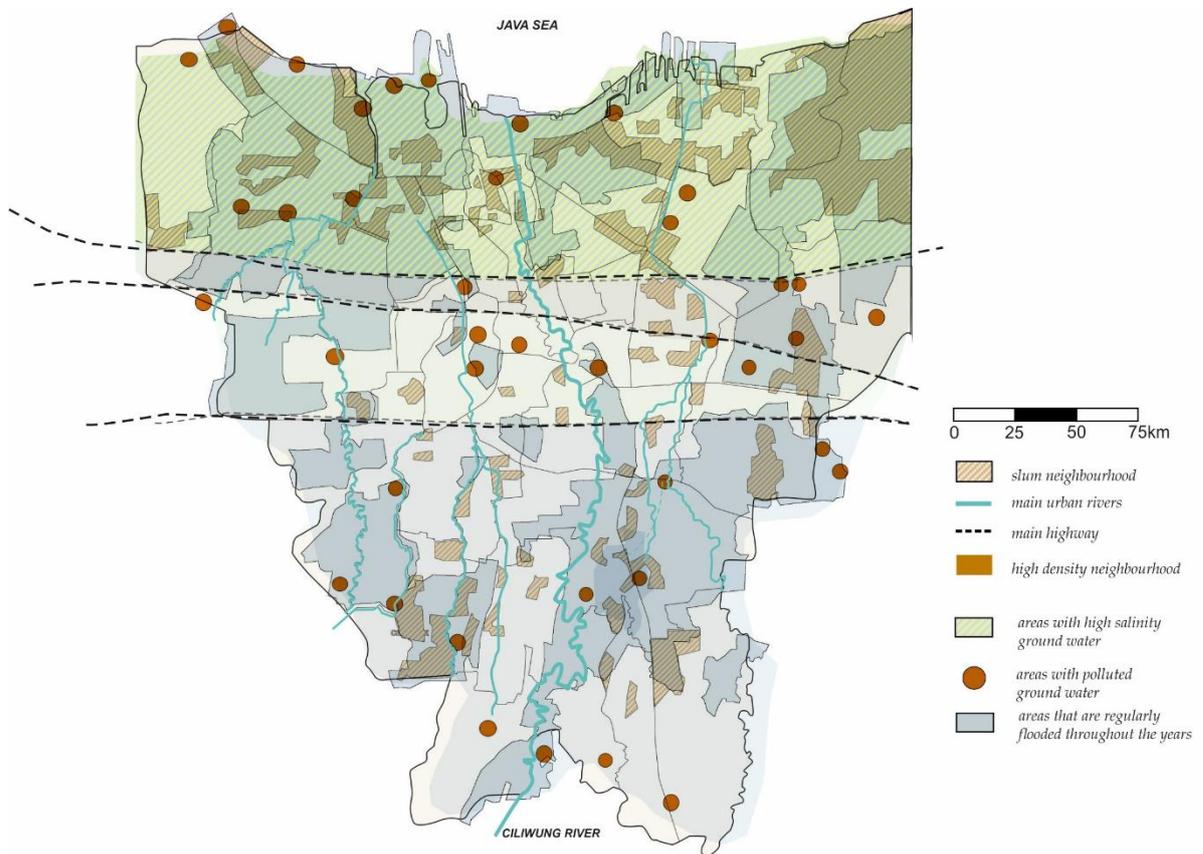
Figure 6. Mapping locations of important economic activities in Jakarta in relation with positions of the contested neighbourhood (Source: drawn by the author based on data of slum neighbourhood density and preliminary observations)
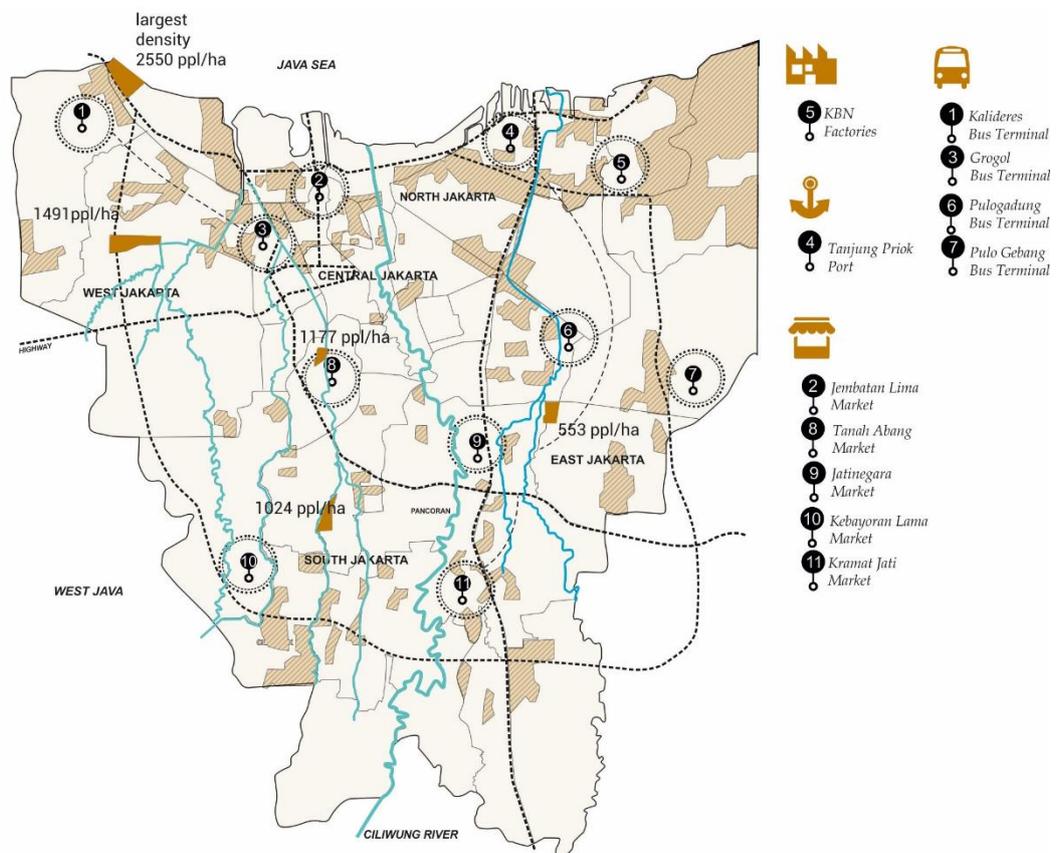
Figure 7. Mapping locations of environmental concerns in Jakarta in accordance with positions of the contested neighbourhood (Source: drawn by the author based on the flood, salinity, and water pollution level in Jakarta)

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were subject to regeneration due to their alleged haphazard disposal, demonstrating their lack of access to waste collection services.

On the other hand, the preliminary study that investigates maintenance within a subversive occupation of space explores four locations of street vendors concentration in East, West and South Jakarta. Street vendors concentrations allow observation of spaces that are temporarily occupied and locally organised, detached from the higher authorities. The study also focuses its investigation on the concentration areas that have some connection with a low-income neighbourhood. The overall locations of these preliminary studies are enclosed in Figure 8.

1. Pesing Koneng
2. Manggarai
3. Kampung Pulo
4. Kalibata
5. Kebayoran Lama
6. Kramat Jati
7. Pesanggrahan
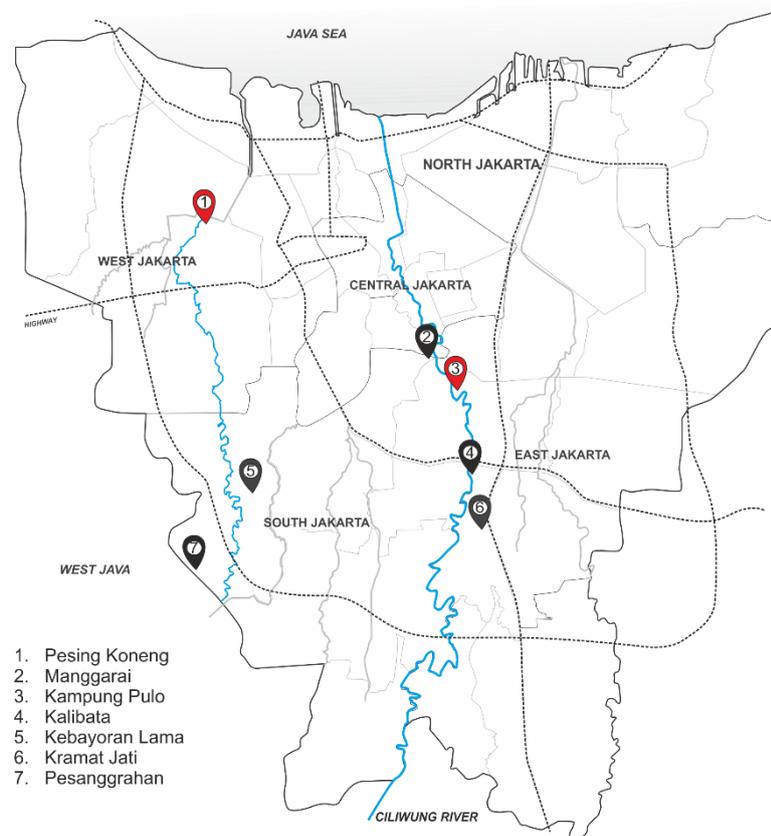
Figure 8.Initial observation areas, and the focused area of study in Pesing Koneng and Kampung Pulo (Source: Drawn by the author)

The subsequent section elaborates the observation conducted on these seven contested sites, divided into a riverbank neighbourhood study and a temporal economy spaces study. Each study outlines the fragmented development and environmental challenges happening within its sites, to find the areas that have the most urgency of studying maintenance.

In addition, each study also compares the social diversity between sites that may add further complexity to the areas' maintenance needs.

2.4.1 Jakarta's contested riverbank neighbourhoods' study

As mentioned earlier, the contestation driven by the Ciliwung river regeneration project - a 3-year project carried out by Indonesia's National River Region Agency for Ciliwung-Cisadane River[89] - becomes an important background for the maintenance study. The river regeneration project (formally referred as 'river normalisation' by government agencies) aims to widen and restructure the river embankment, creating a demarcated border between the river and the riverbank neighbourhood (See Fig.9 bottom photo).[90]

Figure 9. (Top photo) Construction process of concrete pile sheet installation on site (Bottom photo) Finished concrete embankment in Kampung Pulo, East Jakarta (Source: Documentation provided by National River Agency (BBWSCC))

In addition, the project organises the river basin corridor excavation, dyke construction, and the building of inspection paths (See Fig.9 top

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[89] Ciliwung River is a multi-region river, spanning around 120 km length and flowing through three different cities of Bogor, Depok, and finally Jakarta. Due to this crossing territories, the development of this river is managed by a national river agency in coordination with the corresponding provincial government called Balai Besar Wilayah Sungai Ciliwung-Cisadane (BBWSCC).

[90] Ibid.

photo).[91] In sum, the regeneration works' objectives were to increase the Cilliwung's water capacity from 200 m3/second to 570 m3/second and by doing so reducing the risk of flooding.[92] However, as around 273,300 people occupy the overall Ciliwung riverbank,[93] the measures to be implemented have led to a high number of evictions.

Figure 10 illustrates the 120 km-span of Ciliwung river through three cities, namely Jakarta, Depok, and Bogor. [94] Among this span, the regeneration project mainly focuses on 11.5 km areas between Manggarai to Kalibata, as shown in the map. Among this 11.5 km area, the preliminary study investigates three different riverbank neighbourhoods, which consist of Kampung Pulo in East Jakarta, and Manggarai and Kalibata in South Jakarta. The map also shows the areas that have been developed by the government, as of May 2018. The map shows that apart from Kampung Pulo, the Manggarai and Kalibata neighbourhoods have not yet been developed. At the time of data collection, Manggarai and Kalibata neighbourhoods have been measured but the dwellers have yet to be evicted.

The preliminary study observes all three neighbourhoods and redraws the neighbourhood site plans, the arrangement of houses and its main street. These plans and the collaged photos of each neighbourhood can be seen in Figure 11-13 on the following page. Comparison between these plans and collages determines their suitability for the maintenance study. One of the critical points of this assessment is the social context and physical conditions of the neighbourhood. The social context of the neighbourhood concerns with the dwellers' occupations and livelihood, in addition to cultural diversity of dwellers in each neighbourhood. On the other hand, the physical conditions of the neighbourhood demonstrate the area's environmental quality or vulnerability in the time of disaster.

Each of these neighbourhoods is situated in a relatively busy area. As can be seen in the neighbourhood plans in Figure 12, the Manggarai neighbourhood is located near the busy Manggarai train station,

[91] Ibid.

[92] Ibid.

[93] BPLHD, 'Pekerjaan Penyusunan Rencana Aksi Peningkatan Kualitas DAS Ciliwung (Ciliwung River Area Improvement Action Plan Report)' (Jakarta: BPLHD, 2011).

[94] BBWSCC, Current and Future Development of Ciliwung River.
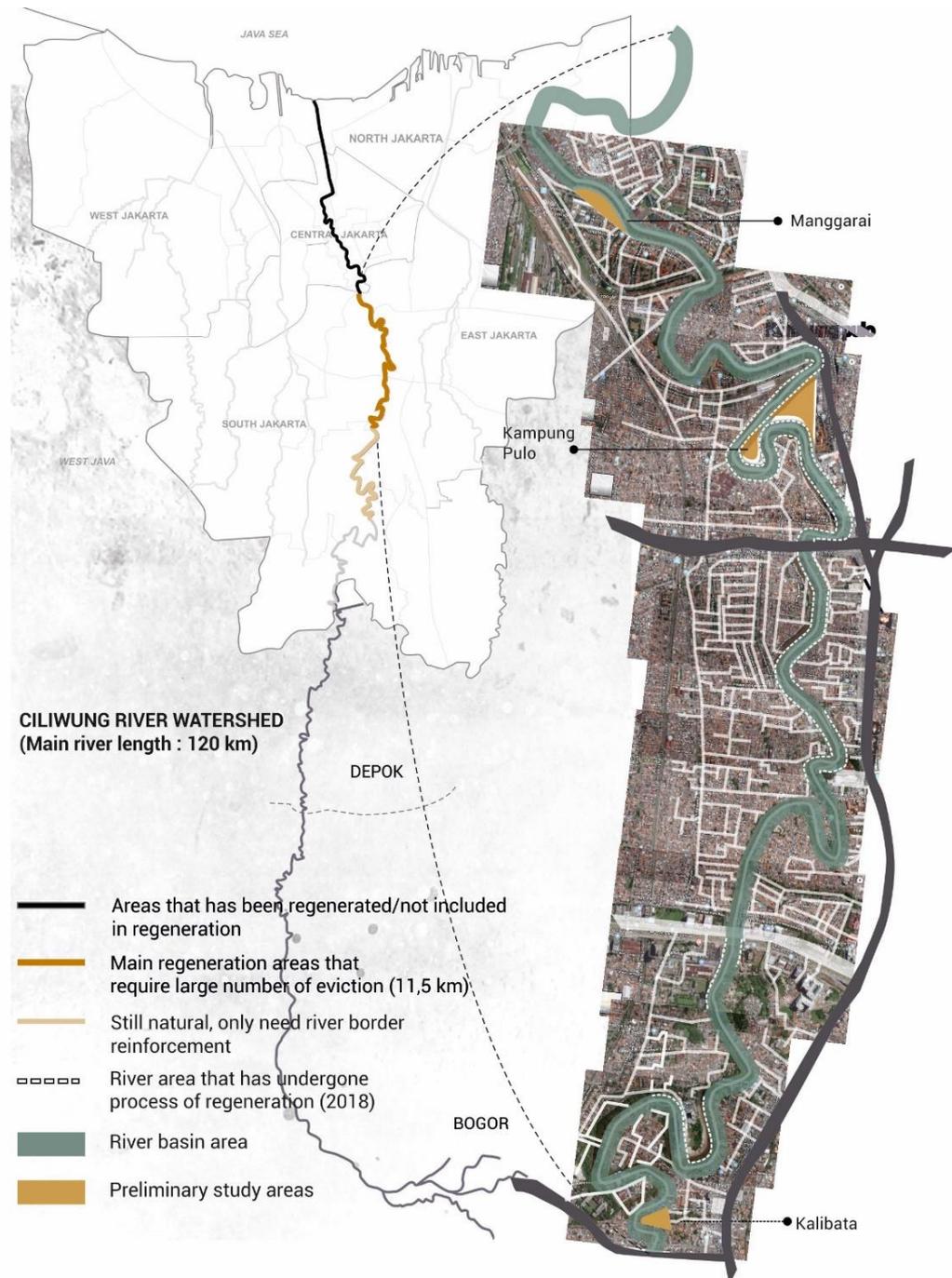
Figure 10. Map of Ciliwung river regeneration project areas, and the focused areas of riverbank preliminary study (Source: redrawn by the author in accordance with data from BBWSCC)

surrounded by some shops and stalls along its main street. On the other hand, the Kalibata neighbourhood is located around a higher-income neighbourhood, situated near the local hospital, mosque and schools, with some small shops nearby (See Figure 13 bottom drawings). Kampung Pulo is surrounded by economic shops and located adjacent to a crowded traditional market called Jatinegara market (See Figure 11 top drawings).

From the observations, the Jatinegara market significantly influences the livelihood of Kampung Pulo, arguably more so than commercial spaces around the other two neighbourhoods. Most dwellers shop and work within the market, creating constant streams of people going in and around Kampung Pulo neighbourhood throughout the day. When parts of the neighbourhood in the river periphery that included the shared toilets were demolished, some remaining dwellers went to the market to access its public toilet. The market also becomes a leisure space for Kampung Pulo dwellers.

In terms of environmental challenges, all three neighbourhoods are prone to yearly flooding. Nevertheless, the occurrence of flooding in Kampung Pulo is much more severe in comparison with the other two neighbourhoods. Manggarai and Kalibata neighbourhoods are located higher than the river itself, with both having roughly similar altitudes throughout the neighbourhoods (See river terrain diagram in Figure 12-13). In contrast, parts of the Kampung Pulo neighbourhood have different altitudes; the difference between the lowest point of the neighbourhood to its highest can be up to 6 m. In the rainy season, some parts of the neighbourhood can be completely submerged while other parts are safe.

There are varied configurations between the river basin and the terrain in these three neighbourhoods. Some terrains in these neighbourhood are curved, surrounded by the river on both edges, creating a faster water stream during flooding, leading to a higher impact of destruction to the neighbourhood. In Kampung Pulo, such curved area is more extensive (See Kampung Pulo neighbourhood plans in Figure 11), creating more damage and casualties to the dwellings within that particular area. These damages can be seen in the existence of abandoned lots and damp structures in dwellings throughout Kampung Pulo neighbourhood, making the neighbourhood look drearier than others. These abandoned building lots also often become the area for haphazard waste disposal in the neighbourhood. The other two
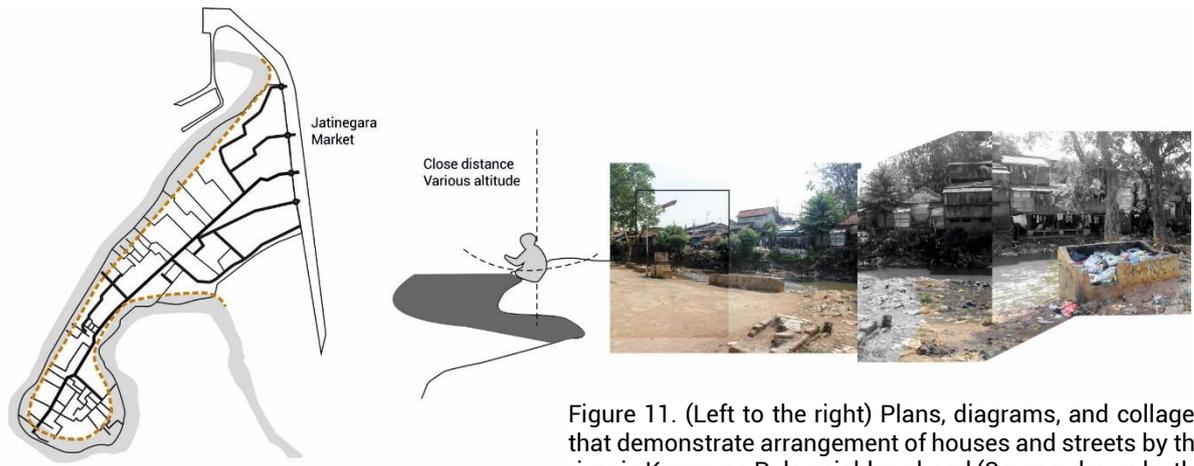
Figure 11. (Left to the right) Plans, diagrams, and collages that demonstrate arrangement of houses and streets by the river in Kampung Pulo neighbourhood (Source: drawn by the author based on preliminary observations)
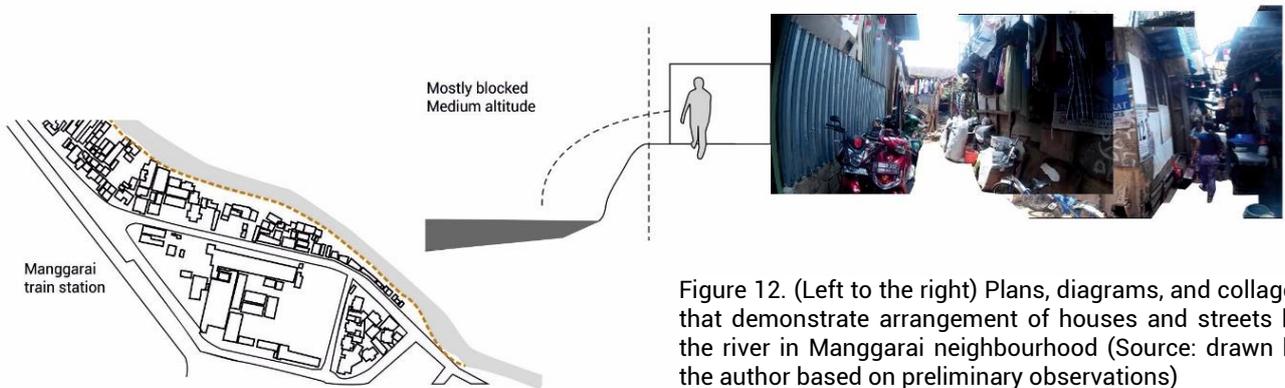
Figure 12. (Left to the right) Plans, diagrams, and collages that demonstrate arrangement of houses and streets by the river in Manggarai neighbourhood (Source: drawn by the author based on preliminary observations)
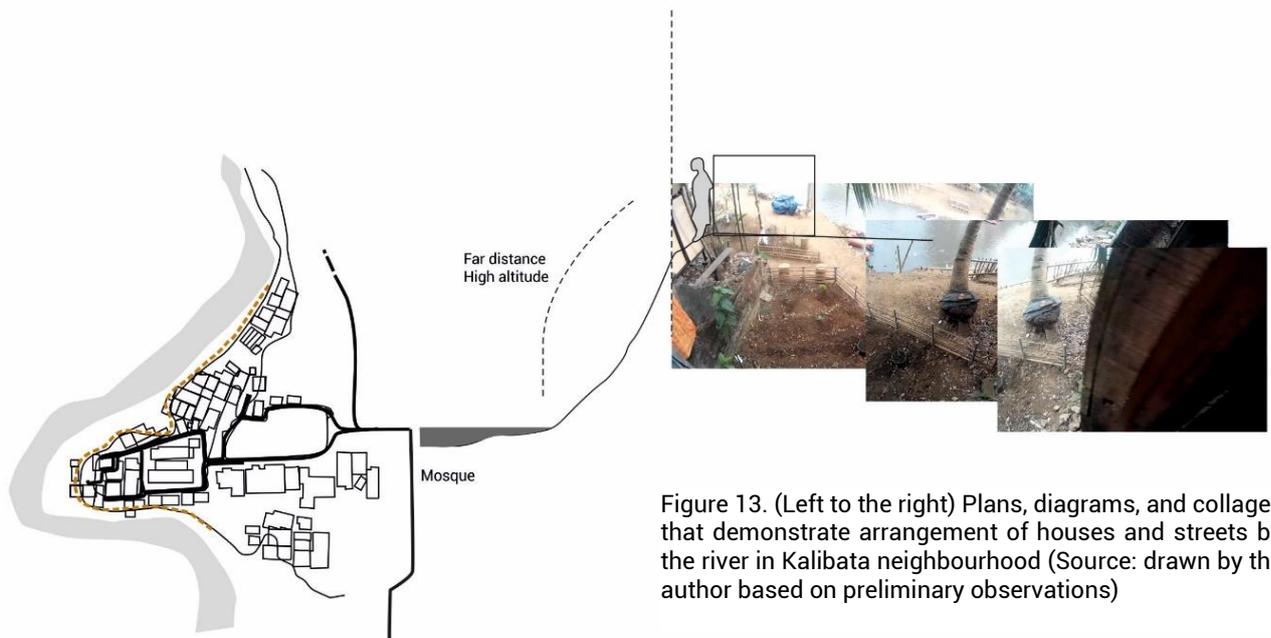
Figure 13. (Left to the right) Plans, diagrams, and collages that demonstrate arrangement of houses and streets by the river in Kalibata neighbourhood (Source: drawn by the author based on preliminary observations)

neighbourhoods are much smaller and denser, with less haphazard disposal found inside the neighbourhood itself.

A variety of cultural tribes with different economic status occupy these three neighbourhoods. Many neighbourhood dwellers have been residing in these neighbourhoods for generations, particularly the Betawi tribe as the original cultural tribe of Jakarta. Kampung Pulo, however, also has a significant proportion of single dwellers or families of *newcomers*, which can be seen in the significant presence of multi-room rental houses. This condition brings higher diversity to the neighbourhood's social context in comparison to the other neighbourhoods.

Based on the initial observation of these three neighbourhoods, the Kampung Pulo neighbourhood presents more potential as the first case study site. It faces pressing environmental challenges driven by its size and physicality, in addition to its status as the first evicted neighbourhood within the government's river regeneration project. Problems of waste are also much more apparent in the Kampung Pulo neighbourhood due to the size and physical conditions of it. In addition, the observations also demonstrate particular social and economic diversity in Kampung Pulo, influenced by the proportions of cultural tribes, length of tenure, and adjacency with commercial spaces that influence the neighbourhood's livelihood.

2.4.2 Jakarta's contested temporal economy spaces study
This preliminary study explores four concentrations of street vendors that appropriate different spaces in an urban context temporarily; from Pesanggrahan and Kebayoran Lama in South Jakarta, Kramat Jati in East Jakarta, and Pesing Koneng in West Jakarta. Most of these spaces have undergone almost yearly eviction (apart from Pesanggrahan), carried out by the Jakarta regional government, municipal government (for example: West Jakarta municipality), or a private authority (such as in the Kramat Jati market).[95]   I argue that these repetitive evictions demonstrate similar assumptions of riverbank neighbourhood dwellers,

[95] Bintang Pradewo, 'Kawasan Pasar Kebayoran Lama Kembali Semrawut (Kebayoran Lama Market Area is Cluttered Again)', Wartakota, 2015,
http://wartakota.tribunnews.com/2015/08/20/kawasan-pasar-kebayoran-lama-kembali-semrawut; KontrasNews, 'Dalam Waktu Dekat PKL Pesing Koneng Jakarta Barat Akan Di Tertibkan', *Kontrasnews.Com* (blog), 2016,
http://kontrasnews.com/index.php/2016/08/13/dalam-waktu-dekat-pkl-pesing-koneng-jakarta-barat-akan-di-tertibkan/; Dwi Rizki, 'PKL Sekitar Pasar Induk Kramat Jati akan segera Direlokasi karena Picu Kemacetan', Warta Kota, 13 March 2018,
http://wartakota.tribunnews.com/2018/03/13/pkl-sekitar-pasar-induk-kramatjati-akan-segera-direlokasi-karena-picu-kemacetan.

which view the presence of concentration of street vendors that occupy the space as obtrusive, creating a slum appearance.

The city authorities have not always been able to follow up the eviction with further action, be it by protecting the space, formally relocating the vendors or other plans of regeneration. For example, some relocation plans in Kebayoran Lama have been hindered by a prolonged land acquisition process[96] and confusion of traders' allocation due to limited space available and escalating numbers of traders.[97] These prolonged processes of waiting without resolution and stagnancy of space development led to the return of the street vendors to their original trading area.[98]

The drawings in Figure 14-17 explore vendors' position in relation to other spaces (such as dwelling, shops, streets) through drawing the plans and sections of the area. In addition, the study annotates the vendors' overall temporality and the vendors' trading space structure using layered collages of photographs and drawings. The plans in Figure 14 demonstrate how Kebayoran Lama street vendors occupy pedestrian spaces around the main street around the Kebayoran Lama public market, while the Kramat Jati street vendors occupy private spaces inside the Kramat Jati market building area instead (Figure 15). Pesing Koneng street vendors are located in the periphery of Pesing Koneng mainly (Figure 16). Pesanggrahan market, on the other hand, is located inside a quieter high-density neighbourhood (Figure 17).

Trading spaces in Pesing Koneng and Kebayoran Lama demonstrate significant connections with the local neighbourhood people. There is an assumption that the local neighbourhood leaders actually coordinate Pesing Koneng market,[99] while Kebayoran Lama vendors were reported

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[96] Laila Rahmawati, 'Relokasi PKL Kebayoran Lama Masih Tunggu Pembebasan Lahan (Kebayoran Lama Street Vendors Relocation Still Waiting for Land Acquisition)', 2014, https://travel.kompas.com/read/2014/08/06/09393571/Relokasi.PKL.Kebayoran.Lama.Masih. Tunggu.Pembebasan.Lahan.

[97] Bintang Pradewo, 'Lahan 8.000 M2 Disiapkan untuk Relokasi PKL (8,000 m2 land are being prepared for street vendors relocation)', Wartakota, 2016, http://wartakota.tribunnews.com/2016/01/23/lahan-8000-m2-disiapkan-untuk-relokasi-pkl.

[98] Pradewo, 'Kawasan Pasar Kebayoran Lama Kembali Semrawut (Kebayoran Lama Market Area is Cluttered Again)'.

[99] KontrasNews, 'Dalam Waktu Dekat PKL Pesing Koneng Jakarta Barat Akan Di Tertibkan'.

Figure 14. Site plan, collage and sections of temporal market around Kebayoran Lama market, which takes place along the neighbourhood street and the public street. (Source: drawn by the author)
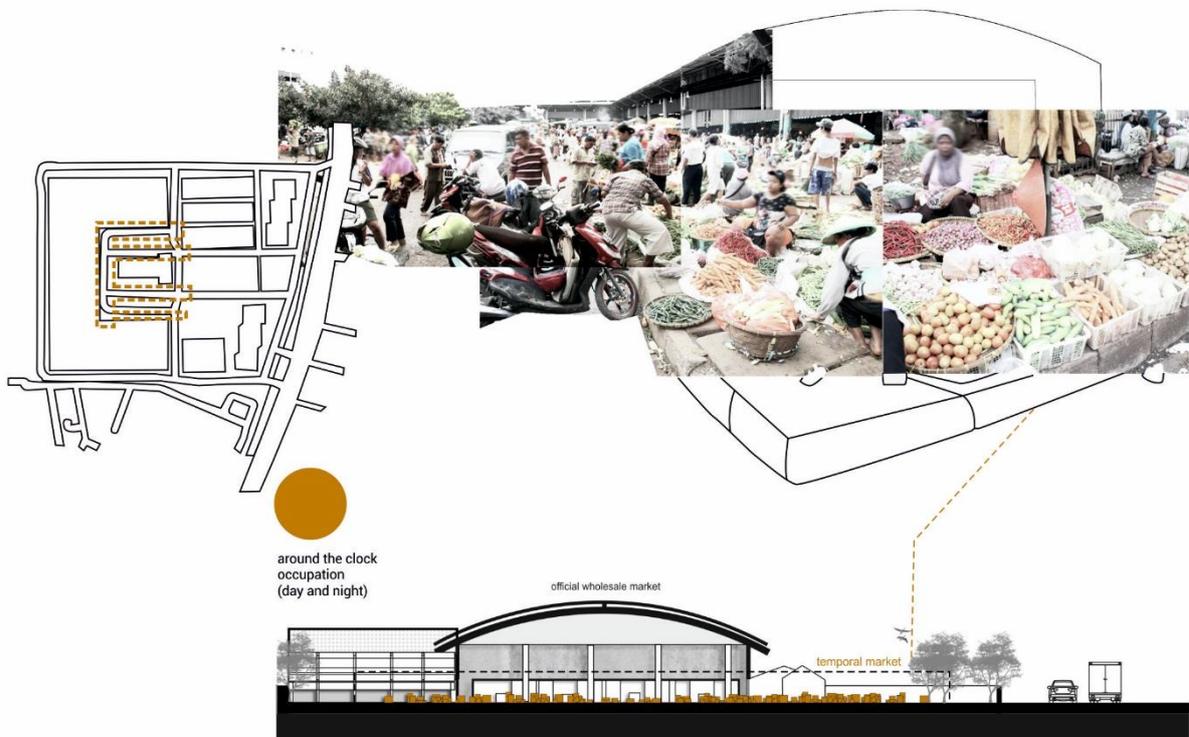
Figure 15.Site plan, collage and sections of street vendors around Kramat Jati wholesale market (Source: drawn by the author)

to be coordinated by a local sub-district officer,[100] in coordination with the local dwellers. However, spatially, this connection is more apparent in Pesing Koneng market, as street vendors largely use Pesing Koneng neighbourhood spaces and local dwellers' spaces for their needs.

Kebayoran Lama street vendors employ some parts of the smaller streets in the periphery of a local neighbourhood, in addition to some of the pedestrian spaces (see plans in Figure 14 (left drawing)). Pesanggrahan market is located inside a neighbourhood, but has no physical connection with the neighbourhood itself, as it only occupies a large vacant field inside the neighbourhood. Kramat Jati market does not intersect with any neighbourhood, as the vendors reside on private land inside the Kramat Jati wholesale market owned by the regional government (See the section in Figure 15 (bottom right drawing)).

The street vendors in these four areas exist at different times of the day, selling a variety of things with different structures. Kebayoran Lama street vendors trade throughout the day and night, mixed between different goods. Trading times in Pesing Koneng are roughly divided based on their goods' type, with the grocery vendors trading in the early morning and clothing vendors in the late afternoon until the evening. In comparison with other areas, street vendors in Pesanggrahan have a much more limited trading time. They only trade once a week on Thursday night for three hours.

In terms of structures, a large number of street vendors in Kebayoran Lama occupy a local neighbourhood alley next to the Kebayoran Market building, covered with a canopy structure. (See the section in Figure 14, bottom right drawing). Kebayoran Lama vendors offer different goods depending on their position. The vendors in the neighbourhood alley sell a larger volume of goods, which varies from vegetables, meat, and fish; or other items such as kitchen utensils. Outside the alley, there are smaller ambulatory vendors with their carts or smaller stalls who sell multiple objects, such as cigarettes and snacks. Kramat Jati and Pesanggrahan vendors do not have any elaborate structures and usually consist of street vendors selling their goods by placing them on the

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[100] Dwi Rizki, 'Sudah Bayar Uang Jago, PKL Kebayoran Lama Tak Mau Pindah (Already Pay Money, Kebayoran Lama Street Vendors Refused to Move)', Wartakota, 2013, http://wartakota.tribunnews.com/2013/12/09/sudah-bayar-uang-jago-pkl-kebayoran-lama-tak-mau-pindah.

Figure 16. Site plan, collage and sections of the temporal market around Pesing Koneng market, which takes place in spaces in and around Pesing Koneng neighbourhood. (Source: drawn by the author)
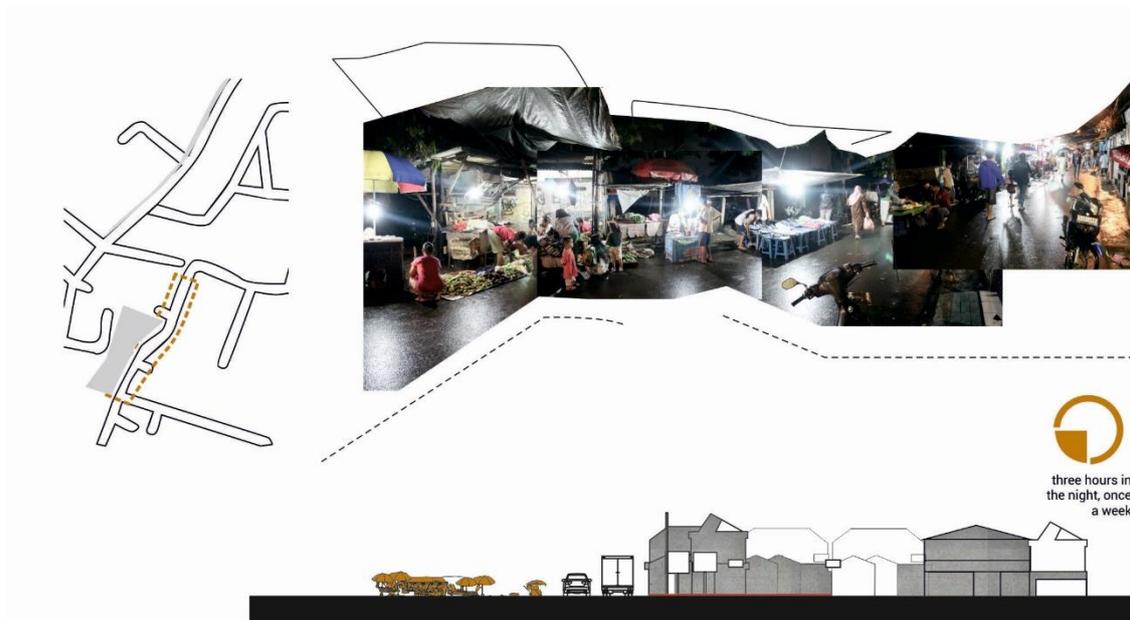
Figure 17. Site plan, collage and sections of the temporal market around Pesanggrahan market, which takes place next to an empty field inside Pesanggrahan neighbourhood   (Source: drawn by the author)

ground. In comparison, Pesing Koneng street vendors are much more varied in terms of their trading structures. Some of them construct large temporary stall structures above the pedestrians, while others occupy local dwelling terraces and shopfronts in simpler structures and arrangements of objects (See collage in Figure 16).

Based on the above exploration, the Pesing Koneng street vendors area presents potential as the second case study site. The position and structures of the street vendors demonstrate a deeper connection with the neighbourhood in comparison with other areas. The street vendors in Pesing Koneng also trade for a sufficient length of time with more temporal dynamic in comparison with other areas. In addition, Pesing Koneng vendors demonstrate more variety of spatial structures, creating a richer context to study maintenance in the context of a subversive occupation of space.

3. Theoretical overview

3.1 Introduction

Currently, there are limited discourses that offer a thorough conceptualisation of maintenance. This chapter provides a structured overview on the definition, processes, and significance of maintenance. The chapter follows by articulating the actors, spaces, and resources of maintenance, and the complexity of such attributes in a context where access to space and infrastructural resources are scarce. In accordance with such context, this chapter addresses the growing need to investigate maintenance in a more situated way, proposing to employ a lens of practice theory to do so. The chapter ends by providing an initial inquiry of practice-based maintenance research.

3.2 Maintenance: meanings, processes, and significance

3.2.1 Understanding maintenance discourse in an urban context

There is a growing discourse of urban maintenance, emerging notably from the fields of urban geography and sociology.[101] Urban geographers such as Stephen Graham, Nigel Thrift, and Vanesa Castan Broto[102] define maintenance as the ongoing process within "broad circuits and systems"[103] which keeps things working, ready to hand, and in order.[104] As "the city is a knot of maintenance and repair activities", maintenance

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[101] Among the growing references, maintenance practice in space has been particularly discussed in: Stephen Graham and Nigel Thrift, 'Out of Order Understanding Repair and Maintenance', *Theory, Culture & Society* 24, no. 3 (1 May 2007): 1–25; J. Allen and M. Pryke, 'The Production of Service Space', *Environment And Planning D-Society & Space* 12, no. 4 (1994): 453–475; Christopher R. Henke, 'The Mechanics of Workplace Order: Toward a Sociology of Repair', *Berkeley Journal of Sociology* 44 (1999): 55–81; Elizabeth Shove, Mika Pantzar, and Matt Watson, *The Dynamics of Social Practice: Everyday Life and How It Changes* (Los Angeles: SAGE Publications Ltd, 2012).

[102] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'; Vanesa Castán Broto and Harriet Bulkeley, 'Maintaining Climate Change Experiments: Urban Political Ecology and the Everyday Reconfiguration of Urban Infrastructure', *International Journal of Urban and Regional Research* 37, no. 6 (1 November 2013): 1934–48.

[103] Broto and Bulkeley, 'Maintaining Climate Change Experiments'.

[104] Stephen Graham and Nigel Thrift, 'Out of Order Understanding Repair and Maintenance', *Theory, Culture & Society* 24, no. 3 (1 May 2007): 1–25.

URBAN MAINTENANCE

PROCESSES

Maintain

General care
and cleaning

Deals with an array
of material elements

Repair

Tweaking elements
within a system

Deals with specific
material elements

Vigilance and surveillance

Checking and assessing
space and systems

Deals with the context of
material elements

May generate order
for repair and cleaning work

SIGNIFICANCE FOR ARCHITECTURE

Understanding space
as resulted from
performing activities
and inhabitation

Linked to urban
assemblage theory
(Deleuze and Guattari,
1987)

Relevant to understand
the neglected space of
backstage activities in
urban context
(Graham and Thrift, 2007)

Space as unfixed
and unstable as a
result of inhabitation
and existence in time

Shift from perspective
that celebrates
architecture as
durable and eternal
(Till, 2013)

Highlight transactions
between different urban
entities instead of fixed
division between them
(Dovey, 2013)

Maintenance as a tool
to transform and adapt
spaces in the city

Design for passage
territories and incomplete
development
(Sennett, 2006)

Design for infrastructure
of disorder: surfaces,
sections, and process
(Sendra, 2016)

Figure 18. (Upper diagram) Processes of urban maintenance and (bottom diagram) the theoretical significance of such discourse for architecture (Source: drawn by the author in reference to the literature review)

becomes an important process that shapes the urban everyday experience.[105] Yet, such a process tends to be invisible, hidden underneath the illusion of an ordered environment.[106]

Maintenance can be defined as a process that responds to failures, absences, or problems among material artefacts or systems (from broken machines, water leaks, to electricity failure).[107] Apart from responding to failure, it is also important to counter material settings of the built environment which produce discomfort and decay (i.e: being dirty or polluted),[108] particularly through cleaning and general upkeep.[109] Based on these definitions, maintenance can consist of a "whole host of activities"[110] taking place within a context (See Fig.18, upper diagram).

Graham and Thrift categorise maintenance into two activities, which are the repairing and maintaining activities.[111] Repair is concerned with a more incidental and specific problems within a setting. Sociologist Christopher Henke states that "(r)epair as maintenance is an attempt to solve problems by 'tweaking' elements within the structure of a system, keeping as much of the system intact while remedying the trouble".[112] On the other hand, maintaining process refers more to the routine processes of general care and cleaning up. In comparison with the repairing process, maintaining process often deals with an array of elements in the built environment. For example, referring to the street cleaners, sociologists Tom Hall and Robin Smith, demonstrate how the act of maintaining deals with a variety of things,

> "…making myriad small adjustments to the urban fabric in ways which, taken together, contribute significantly to keeping the whole

[105] Nigel Thrift, 'But Malice Aforethought: Cities and the Natural History of Hatred', *Transactions of the Institute of British Geographers* 30, no. 2 (2005): 133–50. P.136

[106] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[107] Ibid.

[108] Henke, 'The Mechanics of Workplace Order', 1999.

[109] Tom Hall and Robin James Smith, 'Care and Repair and the Politics of Urban Kindness', *Sociology* 49, no. 1 (1 February 2015): 3–18.

[110] Thrift, 'But Malice Aforethought'.

[111] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[112] Henke, 'Situation Normal?' P.138

place going: walkways tidied, leftover food and drink removed, bins emptied, gutters and drains swept clean…"[113]

Cleaning responds to the accumulated conditions of the material properties in a space after a period of time (e.g. accumulated waste, dust, dirty dishes, dirty laundry or clutter). Anthropologist Mary Douglas, for example, points out that cleaning is initiated based on the need to preserve "hygiene" and also a "respect for conventions".[114]

The process of cleaning differs between permanent and temporary spaces. In temporal space, cleaning takes place within the sequence of "finishing up"[115] the main activities in place. These finishing up activities may consist of repacking any objects or space, clearing the by-products, and finally vacating the space. These activities differ from the process of keeping a permanent space clean, as one does not necessarily have to finish up activities happening in that particular space (for example: there is no need to stop eating when dishes are being washed in a house).

Other than repair and maintain, there is another maintenance process which focuses on the act of checking or securing. Sociologist, John Law, defines such process as maintenance of "(v)igilance and surveillance".[116] He argues that without such a form of maintenance, "the elements will fall out of line and the network will start to crumble."[117] In a housing maintenance study in Singapore, Jacobs and Cairns summarise that the works of vigilance and surveillance maintenance are "to determine what repairs are needed, to generate the

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[113] Hall and Smith, 'Care and Repair and the Politics of Urban Kindness'. P.10

[114] Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*, 1 edition (London ; New York: Routledge, 2002). P.7 An example of both of these objectives is explored in Shove's note on people's laundry habits, which shows that most people feel the need to change underwear every day while some believe that their children can wear the same t-shirt for a week. In this case, the underwear may not be dirty, yet it is still changed daily in respect of convention. On the other hand, in this narrative a t-shirt was simply washed when it felt dirty after a week of use, implying a lesser need to conform to similarly rigid conventions (Elizabeth Shove, *Comfort, Cleanliness and Convenience: The Social Organization of Normality* (Oxford, England; New York: Berg Publishers, 2003).

[115] M. Perry, O. Juhlin, and D. Normark, 'Laying Waste Together: The Shared Creation and Disposal of Refuse in a Social Context', *Space And Culture* 13, no. 1 (2010): 75–94. P.83

[116] John Law, 'Technology and Heterogeneous Engineering: The Case of Portuguese Expansion', in *The Social Construction of Technological Systems [Electronic Resource]: New Directions in the Sociology and History of Technology*, Anniversary ed. (Cambridge, Mass. ; London: MIT Press, 2012). P.108

[117] Ibid.

work order for repairs, and to assess if the work is completed and to a standard considered appropriate." [118]

The process of vigilance and surveillance can be intertwined with the repairing and cleaning processes. As an example, through exploring the routine block check practice of concierges in residential buildings, architectural geographer, Ignaz Strebel, notes that the concierges

"control doors, patrol landings and stairs, close windows left open, check rubbish chutes, remove rubbish, carry out smaller cleaning tasks and sometimes get rid of objects that are obstructing passages."[119]

Strebel explains that the concierges will often deal with and mend faulty window and door problems during their checks. These acts show that the process of vigilance and surveillance may include some form of repair, albeit potentially more predictable problems of repair that require less skills.

3.2.2 Theoretical significance of studying maintenance in architecture

This section discusses the theoretical significance of urban maintenance discourses to the field of architecture (See Fig.18, bottom diagram). The limited discussion of maintenance in urban theories brings question on its relevance for architectural discourse. The use of assemblage discourse as the basis of some maintenance discourse demonstrates an understanding of space as evolves through performance. [120] For example, through exploring signage repair within the Paris subway wayfinding system as an urban assemblage, sociologists Jérôme Denis and David Pontille demonstrate that "maintenance lies in the capacity of workers to become attentive to wear and tear, to perceive the minute traces of a missing sign, and to realize

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[118] Jacobs and Cairns, 'Ecologies of Dwelling: Maintaining High-Rise Housing in Singapore'. P.88

[119] Ignaz Strebel, 'The living building: towards a geography of maintenance work', *Social & Cultural Geography* 12, no. 3 (1 May 2011): 243–262.P.243

[120] Colin McFarlane, 'The City as Assemblage: Dwelling and Urban Space', *Environment and Planning D: Society and Space* 29, no. 4 (1 August 2011): 649–71; Jérôme Denis and David Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions: The Case of Paris Subway Signs', *Environment and Planning D: Society and Space* 32, no. 3 (2014): 404–416; Ignacio Farías and Thomas Bender, eds., *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*, 1 edition (London: Routledge, 2011).

The notion of assemblage is coined by theorists Giles Deleuze and Felix Guattari during their discussion on the connection between heterogenous elements which are not hierarchical (Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi, 1st edition (Minneapolis: University of Minnesota Press, 1987)

that a corridor is no longer a corridor if one of its signs is absent…"[121] In the case of the Paris subway repair, the space of maintenance does not only consist of the maintenance shop where the signs are being repaired, but also includes the corridor that is experienced based on the conditions of its signs.

Apart from the understanding of space as performed, the significance of maintenance relies on the way such discourse shift the initial understanding architecture as inherently fixed and stable, or - as pointed out by architectural educator Jeremy Till - as "fully fledged durable items with enduring value".[122]   Instead, discussion of maintenance enables understanding of space as changing - a result of the process of inhabitation.

Another potential significant aspect of maintenance discourse based on urban assemblages, is the ability for such discourse to address the city in a more thorough way.[123] Denis and Pontille note that understanding public space needs to not only take into account the activities of its user, but also backstage activities, including maintenance.[124]

Emphasis on this thoroughness also arguably demonstrates the significance of maintenance study for contested neighbourhood's discourses. Dovey argues that in such context it is important for architecture to "move from object-oriented formalist thinking towards new understandings of complex integrations of formal/informal and order/disorder."[125] Influenced by the work of Deleuze and Guattari, he points out that such integration evolves through contingent connections between formal and informal actors in the city which creates "a split condition".[126] I argue that studying maintenance provide an opportunity

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[121] Jérôme Denis and David Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions: The Case of Paris Subway Signs', *Environment and Planning D: Society and Space* 32, no. 3 (2014): 404–416, p.412.

[122] Jeremy Till, *Architecture Depends* (MIT Press, 2013). P.71

[123] McFarlane, 'The City as Assemblage'; AbdouMaliq Simone, 'Cities of Uncertainty: Jakarta, the Urban Majority, and Inventive Political Technologies', *Theory, Culture & Society* 30, no. 7–8 (1 December 2013): 243–63; Kim Dovey, 'Informalising Architecture: The Challenge of Informal Settlements', *Architectural Design* 83, no. 6 (1 November 2013): 82–89.

[124] Denis and Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions'.

[125] Ibid.
[126] Dovey.P.88
Dovey states that split condition is not hybrid, meaning that informal and formal actors do not take turns occupying the space nor simply coexist without influencing each other (as hybrid spaces) but instead coexist and simultaneously influence each other. This split condition may reflect contingent integration between the wasp and the orchid discussed by Deleuze and Guattari, which only provisional instead of a fixed condition.

to address this contingent relationship, as maintenance is inherently a "highly contingent affair".[127]

Some other references highlight the importance of maintenance as a tool to transform the city.[128] An example of such transformation is the proposition of the 'infrastructure of disorder' by planning educator Pablo Sendra. He proposes to design public space as incomplete and indeterminate,[129] to ensure that the public realm operates as a continuous state of maintenance.[130] In this sense, designers and planners must shift from creating fixed elements and instead propose "a process with multiple possibilities, where the outcomes are influenced by the way people use the public realm, rather than just an end result."[131] Sendra's proposition demonstrates the potential of maintenance research to generate alternative architectural and urban design methods.

This section demonstrates the significance of maintenance study for architecture. The following section further discusses the different attributes of maintenance; consisting of the connections between the actors and users, the spaces of maintenance, and the resources required to support the maintenance process.

3.3 Actors, spaces, and resources of maintenance

3.3.1 The social order of maintenance

Despite the growing mechanisations of maintenance, humans are still crucial in the process, [132] as the problems and ways of maintenance often vary and cannot always be automated. There are different

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[127] Ignaz Strebel, Alain Bovet, and Philippe Sormani, eds., *Repair Work Ethnographies: Revisiting Breakdown, Relocating Materiality*, 1st ed. 2019 edition (New York, NY: Palgrave Macmillan, 2019).

[128] Pablo Sendra, 'Infrastructures for Disorder. Applying Sennett's Notion of Disorder to the Public Space of Social Housing Neighbourhoods', *Journal of Urban Design* 0, no. 0 (6 February 2016): 1–18; Yannis Kallianos, 'Infrastructural Disorder: The Politics of Disruption, Contingency, and Normalcy in Waste Infrastructures in Athens', *Environment and Planning D: Society and Space* 36, no. 4 (1 August 2018): 758–75.

[129] Sendra employed some terms from Richard Sennet's essay on the Open City to aid his proposition of the infrastructure of disorder, including notions of incompletion, passage territories, and open systems.

[130] Sendra, 'Infrastructures for Disorder. Applying Sennett's Notion of Disorder to the Public Space of Social Housing Neighbourhoods'.

[131] Ibid.

[132] Jacobs and Cairns, 'Ecologies of Dwelling: Maintaining High-Rise Housing in Singapore'.

organisations of humans within a maintenance process (See Fig.19 - upper diagram), assembled in the hierarchies of "the social order".[133] The social order of maintenance organises and differentiates between actors who perform the maintenance work in accordance with the user.

Sociologists, Tim Dant and David Bowles, investigate such social order through examining the work of car servicemen. In the case of car repair services, they note that there is a "hierarchy with the customer at the top with owners, managers, foremen, senior technicians, technicians, trainees and cleaners following on."[134] The customer is the car user, while the rest can be considered as maintenance actors. In some maintenance processes, both actor and user can be a similar person; such as in a more domestic setting or in a DIY approach of maintenance (such as self-reparation of the car).

Dant and Bowles' study highlights that a maintenance process can be collectively carried out by multiple actors. The actors' roles vary based on the sequence of maintenance, from experiencing and detecting the problem, accessing spatial and infrastructural access to resources to do the maintenance, and performing the actual care or repair. Another example of such sequence of maintenance can be seen in the Strebel study, where the concierges that routinely inspect the space are the ones who detect the problems in the building that require repair, such as water leaks reported by tenants. The concierges then determine the next step needed, which may require other services to mend such problems. Without the concierge, the technicians would not be able to have access to conduct the maintenance process.

Another social order may include multiple actors in multiple spatial settings. This happens especially when the material that is being repaired is more complicated, creating maintenance requirements that cannot always be fulfilled in one setting. An example is the process of doing laundry that is managed by multiple actors in multiple spaces:

> "…they might go for a partial service, doing the washing at a laundrette but drying and ironing clothes at home, or they might do everything themselves, or do it with the aid of a domestic washing machine and/or a tumble dryer."[135]

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[133] Henke, 'The Mechanics of Workplace Order', 1999. P.55

[134] Tim Dant and David Bowles, 'Dealing with Dirt: Servicing and Repairing Cars', *Sociological Research Online* 8, no. 2 (2003): 1–17.

[135] Shove, *Comfort, Cleanliness and Convenience*. P.120

ATTRIBUTES OF MAINTENANCE

● ACTORS

Social orders
(Henke, 1999)

Hierarchy of actors
with different roles
of maintenance
(detecting problems,
doing maintenance,
providing resources)
(Dant and Bowles, 2003)

Multiple actors
(Shove, 2012)

Actors doing
similar roles, but with
different skills and resources
to do maintenance
(Shove, 2012)

● SPACES

Spaces of
maintenance as
'other space'
resulted from
maintenance
activities
(Strebel, 2011)

Spaces of maintenance
can evolve differently
depending on relationship
between users and actors
of maintenance
(absence, co-existence,
parallel)
(Allen and Pryke, 1994)

'Concealed space'
is space of maintenance
manipulated by actors
to do things other than
maintenance
(Allen and Pryke, 1994)

● RESOURCES

The body as a
resource to detect
and guard
the maintenance
process
(Henke, 1999;
Strebel, 2011)

Technique and
know-how of
doing maintenance
in a particular
context
(Bucciarelli, 1994;
Strebel, 2011)

Infrastructural
resources allow
for the circulations of
provisions, people,
vehicles, etc that
shape maintenance
temporalities
(Kallianos, 2018)

Figure 19. Attributes of maintenance, consist of (top-bottom diagram) actors, spaces and resources of maintenance. (Source: drawn by the author)

The above passages demonstrate the process of doing laundry across different spatial setting, which take place in the dwelling and in the laundrette, which can be influenced by either the lack of skills (limited knowledge of washing) or limited infrastructure (unavailability of machine, space and water to wash), or the lack of time required to do the washing.

The studies discussed in this section demonstrate a variety of social orders which may govern a maintenance process. They point out how maintenance process is increasingly complex in modern spaces and objects, which require the need for specific tools and skills not always owned by laypeople.[136] The social order of maintenance organises different actors with different roles, skills, access to space and resources to maintain the built environment. This order shapes spatiality of maintenance, explored further in the following section.

3.3.2 Space of maintenance

Discussion of space is especially limited within the maintenance discourse. The space where maintenance processes take place is often deemed invisible,[137] and where they are evident, the focus is solely on the problematic material artefact[138] instead of the overall setting where maintenance is being carried out. Geographers John Allen and Michael Pryke employ Henri Lefebvre's frame of spatial production in their study of a finance office space in London,[139] providing a useful basis on what a space of maintenance might mean.

In their study on the space of cleaning, catering, and securing a finance office, Allen and Pryke define space of maintenance as the "other' spaces".[140] They points out that space of maintenance might share the same space with the user, but it is *lived* differently by the actors of maintenance.[141] For example, Allen and Pryke argue that both office workers and cleaners "occupy the same place, yet live their everyday

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[136] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[137] Christopher R. Henke, 'The Mechanics of Workplace Order: Toward a Sociology of Repair', *Berkeley Journal of Sociology* 44 (1999): 55–81.

[138] Thrift, 'But Malice Aforethought'.

[139] Allen and Pryke, 'The Production of Service Space'.

[140] Ibid. P.458

[141] Ibid.

lives within different spaces."[142] To the finance office workers, the space represents certain values, such as market globalisation. Nevertheless, to the cleaners, the same office is lived as a collection of surfaces, composed from

> "a variety of desk tops, terminals, chrome panels, and floor coverings— whether marble, wood, tile, nonslip, or a particular type of carpet. Each surface requires a technique of cleaning… Cleaning space, in this sense, is lived as *sections* and *surfaces,* unaffected by the global networks which give formal meaning to the floors and buildings."[143].

In Allen and Pryke's study, space of cleaning only fully emerges when it is being cleaned by the cleaners when the office worker as the users are not present. The space of cleaning, whereby "stems from the absence of the dominant users of that space".[144]

In the catering activities, Allen and Pryke focus on the process of clearing and addressing problems generated by the eating process such as removal of "a dirty glass, a chipped plate, poorly presented food."[145] Here, Allen and Pryke argue that different than the space of cleaning, there is a co-presence between the maintenance actors and users in the space of maintenance, but with anonymity of the maintenance actors and "considerable distance".[146] In comparison with cleaning, space of clearing out the catering is also much more dynamic and responsive, countering the problem as soon as it emerges instead of accumulated as in the cleaning process.

Different than the space of cleaning and clearing, the activity of securing the office, on the other hand, requires the full presence of its maintenance actors (namely the security officers) alongside the user.[147] The act of securing the building is part of the maintenance of vigilance and surveillance, and in doing so, they create "a straightforward *extension* of dominated space."[148] The actors guard the space in

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[142] Ibid. P.453

[143] Ibid. P.467

[144] Ibid.

[145] Ibid. P.468

[146] Ibid.

[147] Ibid.

[148] Ibid.

accordance with the users' routines and events, such as the time when workers would go in and out of the office.[149]

During the night, similar with the cleaning actors, the security guards secure the empty space of the office. Securing the office is done through the act of a controlled night walk, that creates a secure environment:

> "In a twelve or thirteen-hour shift, it is the regularity of the 'walks' through a building, the isolation, and the near silence that define the spatial practice of the guards."[150]

The guards determine the frequency and routes of such walk, based on the knowledge of the context and the needs of maintenance. The concierges in Strebel's study demonstrate a similar form of such knowledge, through their ways of planning the check routes based on the anticipation of the residents' habits. For example, the concierges understand from CCTV observation that some areas around the building become areas of drug use. This knowledge then influences the choice of the concierge's block check routes, either to avoid the space for his safety or to intervene in such activity.[151] The way the guards do their checks differently demonstrates that space of maintenance is not necessarily fixed and repetitive.

Apart from 'other' space, Allen and Pryke note another space of maintenance which they call "concealed spaces".[152] Concealed spaces are spaces produced by the maintenance actors for the purpose other than maintenance activities. The concealed space can be located in the interstices of a built environment, such as the nook space for the cleaners to read a newspaper or listen to the radio. On the other hand, the concealed space for cleaner, can also be superimposed to the space, which can be seen in the way the security guards play cards in their station.[153]

Explorations in this section provide useful pointers regarding the concept of space of maintenance (See also Fig.19, middle diagram). First, space of maintenance does not only consist of a fixed service

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[149] Ibid. P.469

[150] Ibid.

[151] Strebel, 'The living building'.

[152] Allen and Pryke, 'The Production of Service Space'. P.471

[153] Ibid.

space (storage rooms, kitchens, CCTV rooms). They consist of spaces that have been reworked and experienced by the actors of maintenance as the 'other space'. This space changes based on the actors' knowledge and needs. Spaces of maintenance can also consist of appropriated spaces taken over by the maintenance actors during their time of maintaining which are concealed and not always being used for maintenance processes.[154]

Secondly, this section points out that there are different relationships between users of space and actors of maintenance; which shape the space of maintenance's temporality. Spaces of cleaning require time when the user is not around. Spaces of clearing out blurred within the eating event, where actors of maintenance co-exist with the users. In addition, spaces for the maintenance of vigilance evolves in parallel with the users' space, creating an extended space.[155]

3.3.3 Resources of maintenance

This section elaborates the different means of resources that shape and support the maintenance process (See Fig. 19. bottom diagram). To begin with, body is an important resource for the maintenance process:

> "When watching mechanics fix things, it is difficult to ignore the importance of their bodies—they are constantly using them to diagnose and effect repairs."[156]

Body is still a crucial component of maintenance process despite access to technologies and mechanisation mentioned earlier. In the Strebel study, the concierges can inspect and look at the building through CCTV, yet they insist that they need to actually see what they are looking at:

> "Seeing what you are looking at (scanning for damage, determining if something is out of place, assessing if a window that is open should not be) as Steve puts it, is a central part of the work that is done on the block check."[157]

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[154] The concealed space especially applies when the users and actors of maintenance are different, particularly within a non-domestic setting.

[155] These relationships may develop differently in a more domestic setting, whereby maintenance becomes home chores and the user and the actor are the same.

[156] Henke, 'The Mechanics of Workplace Order', 1999. P.63

[157] Strebel, 'The living building'. P.251

The security guards in Allen and Pryke's study also use their bodies to support their maintenance process. During their night inspection routine, anything that breaks the silence requires further investigation, demonstrating the use of their senses.[158]

Other than body senses, body movements are also essential for the maintenance process, not only as a tool to detect problems but also as an active instrument to trigger, build knowledge, and manage the maintenance process itself. For the concierges, "while on the move",[159] a stream of events happens; from tenants' requests to access for elderly people in need of assistance. For the guards, the regularity of inspection movements across the building ensures the security of the space.

Apart from the body, resources of maintenance also consist of the technique and the know-how of conducting such processes.[160] The know-how of maintenance deals with the specific methods, procedures and rituals to do the maintenance in a specific setting, in addition to its corresponding materiality. Allen and Pryke's study of the cleaners' space explains these techniques:

> "…computer screens and their casings can be dusted down but keyboards require an intricate clean using small wipes; computer rooms may require high quality buffing or burnishing; whereas kitchens require 'deep cleaning' with specialist equipment and acid preparations…"[161]

Such know-how is not a universal knowledge, it is a "learned"[162] process from doing maintenance in a context. Bucciarelli, on understanding how things works, explains such process of knowing as understanding "how to act on it and react to it, how to engage and appropriate the technology according to one's need and responsibilities."[163]

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[158] Allen and Pryke, 'The Production of Service Space'.

[159] Strebel, 'The living building'. P.250

[160] Susan Leigh Star, 'The Ethnography of Infrastructure', *American Behavioral Scientist* 43, no. 3 (1 November 1999): 377–91.

[161] Allen and Pryke, 'The Production of Service Space'.P.467

[162] Star, 'The Ethnography of Infrastructure'.P.381

[163] Louis L. Bucciarelli, *Designing Engineers* (MIT Press, 1994). P.4

The know-how of maintenance influences the social order. For example, in Strebel's block check study, concierges are divided between the ones that are on the move and the ones who stay in the station. The concierge who are on the move carry out surveillance and cleaning tasks, while the ones who stay in the station respond to reports and calls, as well as operating systems and other administrative tasks.[164] These procedures of labour and tasks division are understood by all concierges as part of their maintenance know-how.

Maintenance is widely discussed within the field of urban infrastructure, demonstrating the importance of infrastructure as a resource of maintenance.[165] Infrastructure organises "the circulation of provisions and services"[166] needed to do the maintenance process. Consistent flows of a working infrastructure create reliable urban rhythms,[167] mobility of people, vehicles, and information, [168] which influence the spatial and temporal patterns of maintenance.

Graham and Thrift use sociologist Susan Leigh Star's articulation of the properties of infrastructure to highlight how infrastructure shapes the process of maintenance.[169] Among these properties are how infrastructure links with the way people do things in a particular way, as well as how infrastructure spans across spatial scales.[170] Unfortunately, failure of infrastructures create complexities of maintenance, particularly in contested neighbourhood, something which will be discussed in the following sections.

3.4 The complexity of maintenance in contested contexts

Context with limited space and resources, as this thesis' focus of contested neighbourhoods in Jakarta, bring complexity to the maintenance process. McFarlane argues that the contested settlements

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[164] Strebel, 'The living building'.

[165] Broto and Bulkeley, 'Maintaining Climate Change Experiments'.

[166] Kallianos, 'Infrastructural Disorder'. P.761

[167] Kallianos.

[168] Alex Wall, 'Flow and Interchange - Mobility as a Quality of Urbanity', in *84th ACSA Annual Meeting and Technology Conference Proceedings*, 1996.

[169] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[170] Star, 'The Ethnography of Infrastructure'.

of the Global South demonstrate changes in the process of maintenance as continuous acts of improvisation.[171] Understanding maintenance as a form of improvisation redefines maintenance beyond the process of exact restoration;[172] and instead framing it as a transformative process.[173]

References that explore such transformative processes of maintenance have more complex and abstract objectives, which potentially led to changes of the process and attributes of maintenance. However, such changes have yet to be discussed in current discourses. For example, Thrift argues that maintenance in the context of limited space and resources requires a form of "social repair" to mobilise support more evenly between social networks.[174] Another example can be seen in Broto and Bulkeley's study on housing in India, whereby they argue that maintenance exists as a form of "metabolic adjustment".[175] Despite defining maintenance beyond singular activities of repair, maintain, or vigilance, these studies have not yet offered a comprehensive understanding of how process of maintenance can be more complex. The following sections discuss more on how such complexity applies in the maintenance attributes, pointing out on the challenge of maintenance in contested context.

3.4.1 Shifting relationships of actors

Limitations of spaces and resources change the social order of maintenance (See Fig.20, upper diagram). One of the reasons of this change is the need to include more actors to gain access of resources.

Thrift elaborates more on this wide involvement of other actors in acquiring infrastructural support:

"...these cities, through general lack of resources, are likely to have less maintenance and repair infrastructure and that they are forced to make up this deficit through even more acts of inspired improvisation and

[171] McFarlane, 'Infrastructure, Interruption, and Inequality: Urban Life in the Global South'.

[172] Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'.

[173] Henke, 'Situation Normal?'

[174] Thrift, 'But Malice Aforethought'. P.138

[175] Broto and Bulkeley, 'Maintaining Climate Change Experiments'.P.1936

COMPLEXITY OF MAINTENANCE

●

SHIFTING ACTORS RELATIONSHIPS

Expansive networks
of actors

More people are
needed to access
space and resources
of maintenance
(Thrift, 2005)

Enable new user in space

Actors of maintenance
extends use of space
subversively for others
(Dovey and Polakit, 2009)

●

FLEXIBLE TERRITORIES

Space tends to be
fleeting, can consist of
loose objects or just
a simple nook
(Sinuraibhan, 2011,
Dovey and Polakit, 2009)

Space of maintenance
may expands across
spatial hierarchies
(Yatmo and Atmodiwirjo,
2013)

●

INFRASTRUCTURE AS PROCESS

Space without
infrastructure:
Managing supply
(McFarlane, 2010)

Infrastructure
without space:
Appropriating
others' space
(Yatmo and Atmodiwirjo,
2013)

Absence of space
and infrastructure:
Improvising
systems
(Brown, 2014; Iossifova,
2015; Vollmer and
Regamey, 2013)

Figure 20. Complexity of maintenance in contested context (top-bottom diagram)
Shifting relationship of actors, flexible territories, and infrastructure as a process.
(Source: drawn by the author in reference to the literature review)

the widespread use of informal networks of help like family and friends."[176]

An example of such engagement of actors can be seen in a study of urban *kampung*'s communal toilets by Yatmo and Atmodiwirjo. The toilet is owned by a local dweller who expands it for the use of all neighbourhood residents.

"Maintenance is an important issue in the management of the communal toilet…The communal toilet is owned by the owner of the rental dwelling units, but used by anybody regardless of whether they rent the units from him or not. This may raise a question of how the maintenance system should take place, and who should take the roles and responsibilities…"[177]

In such toilet, the process of managing water and toilet access are considered as the process of maintenance, other than the process of keeping the toilets clean:

"In everyday practice, the owner delegates the maintenance responsibility to one of his female tenants occupying a dwelling unit located close to the communal toilet. She takes responsibility in managing the collection and payment of the clean water …She is also responsible for cleaning the toilet cubicles and the surrounding areas, including the drainage ditch. For all these chores she receives a small amount of weekly incentives from the owner."[178]

The above passage demonstrates the way connections between multiple actors in managing the process of accessing the water as a form of maintenance, transforming the areas that previously face a limited supply of infrastructure.

Change of social order is also contributed by the expansion of the use of the space by actors of maintenance, defined as concealed space in section 3.3.2. An example of such expansion of use can be seen in Dovey and Kasama Polakit's study of a night dining place situated within a Bangkok sidewalk:

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[176] Thrift, 'But Malice Aforethought'. P.138

[177] Yandi Andri Yatmo and Paramita Atmodiwirjo, 'Communal Toilet as a Collective Spatial System in High Density Urban Kampung', *Procedia - Social and Behavioral Sciences*, ASEAN Conference on Environment-Behaviour Studies (AcE-Bs), Savoy Homann Bidakara Hotel, 15-17 June 2011, Bandung, Indonesia, 36, no. Supplement C (1 January 2012): 677–87.

[178] Yatmo and Atmodiwirjo. P.684

"This evening dining strip is technically illegal and is sustained by regular 'fines' paid by vendors to the local authorities. Some of this payment is creamed off as graft and the remainder operates as a form of rent. Despite its illegality, this is a sustainable system where the 'fines' are matched to the food market, the vendors' profits and the regulators' salaries." [179]

The above paragraph demonstrates how the local authorities become an illicit land proprietor on the other, creating a concealed space to be used by street vendors. In such concealed space, the users instead see the maintenance actors no longer as the backstage actors, but as the ones who provide access to space. The expansion of actors and the subversive use of space create complexities of the social order, as it shifts the relationships between the users of space and the maintenance actors.

3.4.2 Flexible territories

Contested spaces often retain some form of flexibility, [180] which may apply in different ways (See Fig.3, middle drawing). Dovey and Polakit argue that such flexibility may apply through temporary occupation of space for different uses, defined as a "looseness of form".[181] An example of such temporary occupation can be seen in architectural educator Soranart Sinuraibhan's study on Thailand's Rom-Hoob traditional market, a temporary market which subversively occupies railway tracks.[182] The market consists of "(t)he stalls and temporary structures designed by locals" that "are essentially affected and formed by the movement of trains".[183] Every time the train comes, the stalls and structures will be folded aside to give way to the train, before being re-extended again after the train has passed. By doing so, the vendors

[179] Kim Dovey and Kasama Polakit, 'Chapter 11: Urban Slippage Smooth and Striated Streetscapes in Bangkok', in *Becoming Places: Urbanism / Architecture / Identity / Power*, 1 edition (London ; New York: Routledge, 2009). P.176

[180] Dovey, 'Informalising Architecture'.

[181] Dovey and Polakit, 'Chapter 11: Urban Slippage Smooth and Striated Streetscapes in Bangkok'. P.167

[182] Sinuraibhan Soranart, 'Local Flows: Rom Hoob's Phenomena of Transition', in *Architecture in the Space of Flows*, ed. Andrew Ballantyne and Christopher Smith (Abingdon, Oxon, England ; New York, NY: Routledge, 2011).

[183] Ibid. P.139

"exist in dynamic relationship with the local environment and construct their shelter in creative ways that retain a sense of local ownership by subverting local materials for novel purposes."[184]

Other than through temporary occupation, expansion of space also contributes to flexibility. Yatmo and Atmodiwirjo explore an example of such expansion in a study of dwelling configuration in North Jakarta contested neighbourhood. They note that limitation of space creates multiple strategies to expand the spatial use beyond the dwelling itself. These appropriation strategies create arrangements of living spaces that can defy common assumptions of domestic spaces. Some domestic activities can occupy spaces in front of dwellings, even for activities which are more private and often positioned to be the back area activities such as bathing and washing.[185] Some dwellers perform domestic activities by occupying multiple dwelling units together, particularly between extended family:

"…service activities could be organized beyond individual house spaces. It is possible to share the use of space among different house units…The use of shared space could be conducted at different times through the alternate use of space, either for the same kind of activity or for different kinds of activities."[186]

The flexible space discussion demonstrates two different conditions of space in contested neighbourhood. First, flexible space can be more fleeting, consisting of loose objects or spatial elements arranged to create multiple uses of space in different times. Secondly, flexible space can expand across spatial scales, and one actor can occupy multiple spaces in and around the neighbourhood. Flexibility of space creates a more open sense of territory that is not bounded by territorial ownership; but by temporality and social relationships. It can be argued that such openness may potentially lead to challenges in applying a consistent and thorough maintenance.

3.4.3 Infrastructure as a process

There has been a growing discourse that explores infrastructure no

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[184] Ibid. P.141

[185] Yandi Andri Yatmo and Paramita Atmodiwirjo, 'Spatial Strategies for Domestic Service Activities in Urban Kampung Houses', *International Journal of Technology* 4, no. 1 (2013): 24–33.

[186] Ibid. P.31

longer as a fixed system, but as a process.[187] This shift emphasises how infrastructure is managed locally, particularly in the context of the Global South.[188] This section explores a variety of infrastructural conditions in contested context that create maintenance challenges (See Fig.3, bottom diagram).

The first condition happens in the context with space availability to do the activities, but without sufficient flows of infrastructure. This condition may happen in areas that are not equipped with reliable and adequate supplies of services, leading to improvisations in order to manage the flow of supply. McFarlane discusses such improvisations through investigation of water accumulation in contested settlements of Sao Paulo, stating that:

> "Beyond the lack of water connections and the quality of the water, a key problem for the urban poor is regularity of access to clean water, of which there is enormous variability over time… In an effort to cope with a highly erratic supply, the urban poor often store water in drums and tanks."[189]

The second condition points out the state whereby there is availability of infrastructure, but there is insufficient space to do the activities individually. This condition is particularly apparent in high density settlements, which inhibit individual access to infrastructure, leading to collective appropriation. An example of such collective appropriation can be seen in the study on *kampung's* communal toilets by Yatmo and Atmodiwirjo, mentioned earlier. The project demonstrates the lack of a bathroom in the neighbourhood's individual dwelling unit, leading to the creation of a shared bathroom which uses a local water unit.[190]

[187] McFarlane, 'Infrastructure, Interruption, and Inequality: Urban Life in the Global South'; Stephen Graham, ed., *Infrastructural Lives: Urban Infrastructure in Context* (Abingdon, Oxon ; New York, NY: Routledge, 2014); Graham and Thrift, 'Out of Order Understanding Repair and Maintenance'; Stephen Graham, *Disrupted Cities: When Infrastructure Fails* (Routledge, 2010); Matthew Gandy, 'Rethinking Urban Metabolism: Water, Space and the Modern City', *City* 8, no. 3 (1 December 2004): 363–79.

[188] Graham, *Infrastructural Lives*.

[189] McFarlane, 'Infrastructure, Interruption, and Inequality: Urban Life in the Global South'. P.137

[190] Yandi Andri Yatmo and Paramita Atmodiwirjo, 'Communal Toilet as a Collective Spatial System in High Density Urban Kampung', *Procedia - Social and Behavioral Sciences*, ASEAN Conference on Environment-Behaviour Studies (AcE-Bs), Savoy Homann Bidakara Hotel, 15-17 June 2011, Bandung, Indonesia, 36, no. Supplement C (1 January 2012): 677–87.

The third condition is the context where both infrastructure and spaces to do the activities are unavailable. A prevalent example of such a condition in contested neighbourhood is the lack of space and infrastructure to accommodate toilet activities. A study of the "flying toilet" as sanitation practice in Kampala demonstrates such condition, whereby a bucket is used for toileting and is emptied regularly by throwing it in the nearby swamps.[191] Architectural educator, Deljana Lossifova, explores a similar condition in the study of community sanitation in Shanghai, where a "night pot" is used to substitute a flush toilet in low income areas.[192] This night pot will then need to be emptied regularly in local neighbourhood excrement collection stations.[193]

Another reference also highlights similar condition in Kampung Pulo neighbourhood, Jakarta; outlining the use of the "bamboo platforms known as getek"[194] for sanitary purposes. Such a platform is placed on the river basin near the terrain, with small partitions in one end so that the toilet can dispose the human excrement straight into the river. Through the use of such platform, dwellers improvise the river stream to remove their excrements and by-products.

Despite dealing with similar limitations, these three examples demonstrate significant differences of infrastructural improvisations. Improvisation of space to do the sanitation activities uses either tools or temporary structures, leading to differences where the sanitation activities can be conducted, inside or outside the dwelling, in private or in public. Ways of improvising sewerage infrastructure in these examples also vary, happening through bucket displacement in Kampala, the creation of a collective excrement collection in Shanghai, and the use of the river stream in Kampung Pulo. It can be argued that cultural differences shape these infrastructural improvisations, determining whether it is important to use water to clean impurities.

[191] Stephani Terreni Brown, 'Kampala's Sanitary Regime: Whose Toilet Is It Anyway?', in *Infrastructural Lives: Urban Infrastructure in Context*, ed. Stephen Graham (Abingdon, Oxon ; New York, NY: Routledge, 2014). P.158

[192] Deljana Iossifova, 'Everyday Practices of Sanitation under Uneven Urban Development in Contemporary Shanghai', *Environment and Urbanization* 27, no. 2 (1 October 2015): 541–54. P.543

[193] Ibid.

[194] Derek Vollmer and Adrienne Grêt-Regamey, 'Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River', *Global Environmental Change* 23, no. 6 (2013): 1542–1555.

3.5 Framing maintenance as practices: developing a situated knowledge

There are growing references that highlight the need to understand the process of maintenance in a more situated way.[195] Such discourse argues that maintenance is performed in a situated inquiry,[196] closely related to a specific environmental and social context. In maintenance discussion, it has been argued that such increase is contributed by the need to expand the shortcomings of Actors-Network-Theory. Such approach is widely used in urban assemblage, but it is argued that it has not yet been able to explore maintenance in its "local contingency". [197]

The emphasis on situatedness is initially based on feminist theorist Donna Haraway's proposition of situated knowledges.[198] She claims that knowledge is neither universal nor relative, and instead, specifically situated as a product of the actors' historical, political or situational circumstances.[199] Viewing maintenance in a situated way views each maintenance process as entirely unique. In this sense, maintenance is seen as a situated action,[200] which is an action performed based on the experience of a problematic material setting instead of a planned thing. How a maintenance task is performed often evolves from how it is initially planned, as there are things happening in a context that requires improvisations.[201]

The actors of maintenance create "a representation of the problematic situation"[202] based on their experience of maintenance problems in space. This representation determines the subsequent act of

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[195] Strebel, 'The living building'; Denis and Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions'; Sarah Pink, *Situating Everyday Life* (Los Angeles: Sage Publications Ltd, 2012); Henke, 'Situation Normal?'

[196] Strebel, Bovet, and Sormani, *Repair Work Ethnographies*.

[197] Ignaz Strebel, Alain Bovet, and Philippe Sormani, 'Introduction: When Things Break Down', in *Repair Work Ethnographies: Revisiting Breakdown, Relocating Materiality* (Springer, 2018). P.3

[198] Donna Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', *Feminist Studies* 14, no. 3 (1988): 575–99.

[199] Jesper Simonsen et al., *Situated Design Methods* (MIT Press, 2014).

[200] Lucy A. Suchman, *Human-Machine Reconfigurations*, 2nd edition (Cambridge ; New York: Cambridge University Press, 2006).

[201] Strebel, Bovet, and Sormani, 'Introduction: When Things Break Down'; Jérôme Denis and David Pontille, 'The Dance of Maintenance and the Dynamics of Urban Assemblages: The Daily (Re)Assemblage of Paris Subway Signs', in *Repair Work Ethnographies: Revisiting Breakdown, Relocating Materiality*, ed. Ignaz Strebel, Alain Bovet, and Philippe Sormani (Springer, 2018).
[202] Julian E. Orr, *Talking about Machines: An Ethnography of a Modern Job* (Ithaca, N.Y: ILR Press, 1996). P.114-115.

maintenance, and it evolves together with the performance of maintenance until the space is restored. The thesis argued that addressing such representation is key in the exploration of space of maintenance. The thesis focuses on ways of researching and representing the actors' experience as part of a more situated maintenance research.

3.5.1 Appropriating practice theory for a situated understanding of maintenance

Some maintenance references employed practice theory to explore such situatedness (See Fig. 21, top drawing), emphasising actors' practices as a vehicle of understanding space. For example, Strebel claims that "the building has to be found in the situated practices of those who live and work with buildings."[203]

Strebel further argues that employing a practice perspective allows for a better understanding of how people navigate the built environment in real time, demonstrating a "living" (instead of lived) experience of space.[204] In another study of maintenance in a high-rise building by Jacobs, Cairns, and Strebel; a similar argument is stated, that the "practice turn in social sciences" provides different ways of approaching architecture as "eventful, vital, and performative".[205] It can be concluded that practice theory provides the potential to be the basis of studying space maintenance in a more situated way.

Situated maintenance researches that employ practice theory refer to the body of work of theorists such as Judith Butler, Bruno Latour, and Theodore Schatzki.[206] Such theorists define a practice beyond simply a singular human act, as elaborated by Reckwitz:

> "'Practice' (*Praxis*) in the singular represents merely an emphatic term to describe the whole of human action… 'Practices' in the sense of the theory of social practices, however, is something else. A 'practice'

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[203] Strebel, 'The living building'.

[204] Strebel. P.248

[205] Jane M. Jacobs, Stephen Cairns, and Ignaz Strebel, 'Doing Building Work: Methods at the Interface of Geography and Architecture', *Geographical Research* 50, no. 2 (2012): 126–140. P.128

[206] Andreas Reckwitz, 'Towards a Theory of Social Practices a Development in Cultural Theorizing', *European Journal of Social Theory* 5, no. 2 (2002): 243–264.

SITUATING MAINTENANCE

⦿

UNDERSTANDING MAINTENANCE AS SITUATED

Maintenance as situated inquiry: performed in response to local contingency (Strebel, et al, 2019)

Maintenance as situated action: action performed in response to experience of a problem instead of a planned thing (Suchman, 2006)

Space of maintenance as unfolding from actors' representation of the problematic setting (Orr, 1996)

⦿

UNDERSTANDING MAINTENANCE AS PRACTICES

Understanding 'living experience' of practice in space (not lived) (Strebel, 2011)

Understanding space as eventful and performative (Jacobs et al, 2012)

Acknowledge the distribution of agencies (Jacobs et al, 2012) which can relate with one another across spatial scales (Pink, 2012)

Allow reading of backstage practices by backstage actors (Jacobs et al, 2012)

Allow reading of infrastructure as a process driven by transactions between actors (Shaw, 2015)

⦿

RESEARCHING MAINTENANCE PRACTICES IN SPACE

Following actors' experience while performing practices (Pink, 2012)

Guided tours
Live re-enactment

Creative methods to reconstruct space of maintenance (Pink, 2012; Strebel 2011; Jacobs et al, 2012)

Visual diagram
Collages and montages
Performative show

Figure 21. Situating maintenance in space as practices (Top drawing) significance and (Bottom drawing) research approaches (Source: drawn by the author based on literature review)

(*Praktik*) is a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge."[207]

The practice theory carried by these scholars differs from the work of Michel de Certeau[208] and Pierre Bordieu[209], which are the earlier theorists more recognised in architectural discourse through their thinking on everyday life practice. Pink explores such differences by comparing both discourses, annotating that de Certeau and Bordieu discourses lead to debate on the the singular nature of a practice:

"Bordieu rejects the binary of resistance and submission through a notion of relationality...In contrast de Certeau's approach depends on a problematic binary....By viewing the arguments of de Certeau and Bordieu, it emerges that in common they have become part of a debate over whether we should characterise practices as resistant or normative."[210]

Pink suggests that instead of trying to define the nature of a practice, practice theory should be considered as "a more open analytical concept that stands for human actions that may have multiple potentials." [211] In this argument Pink refers to the notion of practice developed by Schatzki, arguing that they are more open and situational in comparison with the likes of de Certeau and Bordieu.

This thesis points out that practice theory is also a relevant framework for researching maintenance with its complex attributes. Practice-based maintenance research demonstrates understanding of the different actors exist within an environment with their own purposes, even subversive ones. For example, Jacobs et al argue that practice theory allows for understanding on the distribution of agencies,[212] highlighting the different actors who occupy and change space beyond

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[207] Ibid. P.249

[208] Michel De Certeau, *The Practice of Everyday Life*, 3rd Revised edition (University of California Press, 2011).

[209] Pierre Bourdieu, *Outline of a Theory of Practice*, trans. Richard Nice, 1st English Ed edition (Cambridge: Cambridge University Press, 1977).

[210] Pink, *Situating Everyday Life*. P.19

[211] Ibid.

[212] Jacobs, Cairns, and Strebel, 'Doing Building Work'.

the user. This may range from "maintenance workers, do-it yourself (DIY)-ers, homemakers, cleaners, artists, and vandals".[213] In Shatzki's line of practice theory, a practice can be performed differently by a different person, and an actor can perform multiple practices without being limited to a certain binary.

Employing practice theory also allows for the exploration of space of maintenance across spatial scales. For example, Pink, informed by geographer Doreen Massey's argument of space as open and plural, notes that a gardening practice connects different spaces beyond the garden:

> "...practice of gardening creates trajectories, movements, constellations and entanglements. For example, elsewhere I have discussed how plants are donated, and moved from other mapped gardens into a community garden site..."[214]

Practice theory is also relevant in researching a context where infrastructure is a process. In his study on street cleaners, geographer Rob Shaw argues that practice-based approaches allow for understandings on the process of making infrastructure, a process built by

> "the range of actants and moments which have not been traditionally been considered infrastructural, which nonetheless form part of the process of making infrastructure."[215]

This section demonstrates the relevance of practice theory to be the theoretical basis of researching maintenance in the contested neighbourhood. Yet, despite this theoretical advantage of practice, initially there are still difficulties in outlining a systematic way of researching a practice. Schatzki states that there hasn't been "a unified practice approach",[216] an argument supported by Reckwitz, who further states that there is still a lack of systematic ways to analyse a

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[213] Ibid. P.129

[214] Ibid. P.96

[215] Rob Shaw, 'Cleaning up the Street: Newcastle-upon-Tyne', in *Infrastructural Lives: Urban Infrastructure in Context*, ed. Stephen Graham (Abingdon, Oxon ; New York, NY: Routledge, 2014). P.175

[216] Theodore R. Schatzki, Karin Knorr Cetina, and Eike von Savigny, *The Practice Turn in Contemporary Theory* (Routledge, 2005). P.11

practice.[217]

Specific to researching the space of practice, sociologist Elizabeth Shove argues that there are challenges in determining the particular "spatial needs of any one practice" as "spaces that practices require and occupy are often overlain and interwoven, creating only vague boundaries".[218] There is still a need to examine potential methodologies of researching experience of maintenance and its spatiality based on practices, initiated in the following section.

3.5.2 Researching maintenance practices in space

This section serves as an initial inquiry into methodologies of practice-based maintenance research, which will be further explored in the methodology chapter (See Fig.21, bottom drawing). Research that is based on practice theory has demonstrated different ways of researching practices. It is important to understand these different approaches and their potential.

Some practice researches investigate the practice by exploring its elements, outlined by Reckwitz in the definition of practice earlier. These elements, such as the things and know-how of practice have derived from various practice discourses, particularly from Schatzki's writing.[219] The know-how of practice, for example, may be driven from Schatzki's argument that "practice is a set of doings and sayings organized by a pool of understandings, a set of rules, and a teleoaffective structure."[220] Furthermore, Schatzki outlines the material element of practice, by arguing that "understanding specific practices always involves apprehending material configurations",[221] where material may denote the things (objects, infrastructures) used in a practice.[222]

Shove et al follow by creating a simpler adaptation of these elements (particularly by redefining Schatzki's teleoaffective element as

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[217] Reckwitz, 'Towards a Theory of Social Practices a Development in Cultural Theorizing'.

[218] Shove, Pantzar, and Watson, *The Dynamics of Social Practice*. P.131

[219] Schatzki, Cetina, and von Savigny, *The Practice Turn in Contemporary Theory*.

[220] Theodore R. Schatzki, 'Practice Mind-Ed Orders', in *The Practice Turn in Contemporary Theory*, ed. Theodore R. Schatzki, Karin Knorr Cetina, and Eike von Savigny (Routledge, 2005).

[221] Theodore R. Schatzki, 'Introduction: Practice Theory', in *The Practice Turn in Contemporary Theory*, ed. Theodore R. Schatzki, Karin Knorr Cetina, and Eike von Savigny (Routledge, 2005). P.11

[222] Shove, Pantzar, and Watson, *The Dynamics of Social Practice*.

meaning), concluding that practice is the product of the interrelation between competence, materials, and its embodied meaning.[223] They detail each element further, stating that competence is the "understanding and practical knowledgeability"[224] of performing the practice, while materials are things which are required to do the practice, from "objects, infrastructures, tools, hardware and the body".[225] Furthermore, meaning is "the social and symbolic significance"[226] of doing the practice. These elements have been named differently in various practice references, varying from skill, material, and image; or competence, image, and equipment.[227]

Practice research that uses this practice element framework develops thematic analysis of practice for each element, using data from observations and interviews with actors of practices. Nevertheless, it can be argued that such division limits a thorough reading on how the overall practice unfolds in space.

Scholarship which aims to situate practice in space does not necessarily divide the practice based on its elements, but rather translates and extends them based on the experience of practice in space. For example, Pink translates the element of competence as "sensory embodied ways of knowing",[228] highlighting how some people wash dishes by feeling the water coming out from the tap and rubbing it and placing it on the shelf to ensure cleanliness.

The concept of material as an element of practice is viewed not as general tools or means of practice but instead focuses on how such material is situated within the setting. For instance, Denis and Pontille highlight the visibility and invisibility of material in a Paris subway,

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[223] Reckwitz, 'Towards a Theory of Social Practices a Development in Cultural Theorizing'; Shove, Pantzar, and Watson, *The Dynamics of Social Practice*; Pink, *Situating Everyday Life*.

[224] Shove, Pantzar, and Watson, *The Dynamics of Social Practice*. P.23

[225] Ibid.

[226] Ibid.

[227] Elizabeth Shove and Mika Pantzar, 'Consumers, Producers and Practices: Understanding the Invention and Reinvention of Nordic Walking', *Journal of Consumer Culture* 5, no. 1 (1 March 2005): 43–64.

[228] Pink, *Situating Everyday Life*. P.52

noting how some signage becomes visible upon breakdown.[229] By highlighting visibility, Denis and Pontille address the material's position in space in relation with the actors and users.

In a situated understanding of meaning, Strebel and Jacob et al propose to move away from understanding meaning as a universally symbolic and predetermined thing, suggesting instead the need to understand meaning as being made and unmade.[230] Meaning can change in accordance to the context of practice. This change can be seen in the discussion of sanitation infrastructure appropriation in Section 3.4.3, whereby ways of doing sanitation activities in contested neighbourhoods in Kampala, Shanghai, and Jakarta are all different depending on bodily and cultural preferences.

Practice-based maintenance researches often develop an array of research methodologies. This section outlines two important methodological approaches in situating the practice in space (See Fig.4, bottom diagram). The following paragraph briefly discusses the importance of these approaches, which will be elaborated further in the methodology chapter.

The first approach emphasises the need for the researcher to first experience the practice through following the actors and making sense of the space he or she is in.[231] It is important "to seek routes to access[ing] practices as they are performed".[232] Urban educator Yonn Dierwechter highlights such a need of understanding the experience in his study of the informal cities, stating that only while following the actor can "different urban geographies" emerge.[233] Similarly, Strebel argues that following an experience of practice enables the researcher to move away "from solely studying what people say about buildings", to "what people do with objects, tools and technologies and what they do with their buildings".[234] This thesis argues that such approach has

[229] Denis and Pontille, 'Maintenance Work and the Performativity of Urban Inscriptions'.

[230] Strebel, 'The living building'; Jacobs, Cairns, and Strebel, 'Doing Building Work'.

[231] Yonn Dierwechter, 'Six Cities of the Informal Sector—and Beyond', *International Development Planning Review* 24, no. 1 (1 March 2002): 21–40.

[232] Pink, *Situating Everyday Life*.P.40

[233] Ibid. P.37

[234] Strebel, 'The living building'. P.249

more to do with ways of capturing the practice as part of the data collection.

The other approach uses creative methodologies to reconstruct the practice in space, and by doing so, arguably demonstrate how a practice is situated in relation to its context. This thesis argues that this approach can be applied in both data collection and analysis process. Some interesting examples of this approach can be seen in Jacob et al's study of maintenance practices on high-rise housing in Singapore, which employ an array of creative visual methodologies. Some examples are the use of diagrams to visualise the variety of practitioners inside a building, development of a show titled "Show Me Your Home" to enable the users to demonstrate their ways of living, and the creation of a fold-out montage of images of a space's surface that has just been vacated by humans, as a way of representing traces of inhabitation.

Jacob et al's use of visual diagrams, show events, and photo montage demonstrate ways of researching practices and its corresponding space in a more creative way. Different from previous practice-based research, their works demonstrate the importance of creating different ways of situating the practice in space creatively. This creative process is important for this thesis as design-based research. A more elaborate discussion on the importance of design research for studying maintenance, along with the different approaches of studying maintenance as practices, are elaborated further in the subsequent methodological chapter of this research.

4. Researching Maintenance: Methods and Methodologies

4.1 Introduction

The chapter investigates the methods and methodologies performed in this PhD by Design research, addressing the meaning and importance of a design-based maintenance research. The chapter details the main enquiries of this research as well as the research structure in accordance with this discussion.

This chapter follows by exploring maintenance practice research methodologies. It then outlines the chronology of the fieldwork and the data collection and analysis process conducted in this research. Based on the analysis, this chapter then discusses the process of assembling the spatial inventory to inform design based on the knowledge of maintenance.

4.2 Design research for maintenance practices: an enquiry

4.2.1 The meanings, objectives, and creative methods in architectural design research

The discussion on architectural design research is still limited in comparison to other creative fields. Architectural design research often "appears to be unsystematic, dependent on individual whim[s], and reliant on processes that are largely invisible",[235] making it difficult to draw a structured definition of such research and its methodologies.

Architectural educator, Murray Fraser, describes architectural design research as "the processes and outcomes of inquiries and investigations in which architects use the creation of projects, or broader contributions towards design thinking…"[236] It is "a method of invention that sides with finding out rather than finding the already found."[237] Design research values the processes of making, creating and

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[235] Shane Murray, 'Design Research: Translating Theory into Practice', in *Design Research in Architecture: An Overview*, ed. Murray Fraser, 1 edition (Burlington: Routledge, 2013).P.96

[236] Murray Fraser, *Design Research in Architecture: An Overview*, 1 edition (Burlington: Routledge, 2013).

[237] Lunenfield, 'The Design Cluster'.

inventing as parts of the process of finding out; using an array of means for different design intentions.[238]

Design research provides connections between theory and practice, aiming for different intentions and outputs. Design research can lead to a "positivistic production" that aims for "beautiful, useful, and better" outputs.[239] On the other hand, design research can also "build in an inherent criticality that produces provoking, tactical and oppositional results".[240] On a similar note, Rendell annotates that design research can seek to produce artefacts that are functionally useful, but can also "raise questions" and "pose critiques of architecture's position and role."[241] In this sense, a design research can have various intentions that lead to different kinds of output; either a physical output with a particular quality, or a critical perspective which allows things to be seen differently.

Architectural educator, Shane Murray, provides another useful reference in defining the knowledge contribution of a design-based research. Murray points out that knowledge existing within a design process is often only understood by the designers themselves, and therefore it is necessary to give "a much clearer account"[242] of the contribution to knowledge in design research.[243] He argues that there are three distinct forms of knowledge produced by architectural design researches.[244] These forms of knowledge consist of the method and structure of the design process, the accumulated knowledge that the process of designing draws upon, and the knowledge which is revealed from the design outcomes.[245]

Murray demonstrates an example of an accumulated design knowledge through the creation of program formulations diagram in his research

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[238] Ibid.

[239] Ibid.

[240] Ibid.

[241] Rendell, 'A Way with Words: Feminist Writing Architectural Design Research'. P.118

[242] Ibid.

[243] Ibid.

[244] Murray. 'Design Research in Architecture: An Overview'.

[245] Ibid.

on housing redevelopment. He then develops drawings of housing program reconfigurations as a new proposition,[246] which demonstrate knowledge on the design outcomes.

Rendell discusses the design process of design with objective of creating critiques, drawing from the work of Muf, an architecture/art practice. Muf uses the design process as "the location of the work itself",[247] creating a critique of the brief, in addition to developing dialogues and collaborations between stakeholders.[248] By focusing on such design intentions, Rendell argues that Muf "challenges a linear conception"[249] of design, through challenging and redefining the design process instead of solely aiming for a singular output.

4.2.2 The importance of design research: situating maintenance practices

Design research presents a creative opportunity to make hidden process of maintenance visible, and by doing so reveal the spatiality of it. Jacobs et al's creative investigation explored in Chapter 3 points out such design research potential for maintenance exploration.

Design based research is also deemed important for research in contested context. There has been a need to better understand the complexity of space in such context by visualising it, as argued by Dierwechter:

> "We *can* understand the spatialities of informal sector urbanism. But I believe that we need quite new maps showing fantastically new cities. The way to draw these maps, as suggested by Latour, is to follow the actors around; to watch them very closely as they transgress our segmented specialities. As we do this, we will see very different kinds of urban geographies emerge..."

Design research based on maintenance is also valuable in generating design knowledge that inform future development in Jakarta's contested neighbourhoods. Dovey notes that there is a need of a "spatial thinking that link an understanding of incremental change and existing

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[246] Ibid.

[247] Ibid. P.123

[248] Ibid.

[249] Rendell. P.125

morphologies to a larger-scale strategy of transformational change."[250]

This thesis argues that employing design research in investigating maintenance practices potentially allow such forms of spatial thinking to emerge. Based on these significances, the following section provides details on the underlying research questions and methodological framework of this thesis.

4.3 Detailed research questions and the structure of the study

This section details the research objectives and outlines the study's methodological structure. The research questions outlined in the beginning of this study, consist of 1) How can we understand the spatiality of maintenance process happening in contested neighbourhoods through making the experience of maintenance more visible? and 2) How can such knowledge of maintenance spatiality inform design for contested neighbourhoods?

Chapter 2 highlights two central maintenance conditions happening in contested neighbourhoods in Jakarta, which brings a narrower focus to researching the spatiality of maintenance. The first condition is the vulnerability of access to infrastructural services. The empirical study that explores maintenance in such a condition focuses on dwellers' waste practices in Kampung Pulo, where there is lack of access to waste collection services. The other condition is the local organisation of authority which subversively creates temporal occupation of spaces around the neighbourhood. The empirical study of maintenance in such a condition focuses on the practice of clearing out the temporal market space in Pesing Koneng neighbourhood.

The second research question focuses on how knowledge of maintenance obtained from the first research question can inform design in contested neighbourhoods. Based on the discussion of different kinds of design knowledges, it is argued that maintenance research in this thesis can inform design by assembling 1) an accumulated knowledge of maintenance and 2) maintenance creative research methods. This thesis generates accumulated knowledge by creating an inventory of spatiality of maintenance practices based on the case studies, which can potentially be the basis of future design guidelines of contested neighbourhoods. Outlining maintenance research methods potentially expands architectural design methods by

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[250] Kim Dovey, 'Informalising Architecture: The Challenge of Informal Settlements', *Architectural Design* 83, no. 6 (1 November 2013): 82–89.

providing alternative means of understanding and representing space in a more situated way.

Based on the above arguments, the PhD by Design research questions can be detailed further as follows:

1. How can we understand the spatiality of maintenance practices happening in contested neighbourhood spaces in a situated way through making it more visible, particularly within the following two focuses of maintenance:

> a. How are waste practices conducted in neighbourhoods with limited and/or vulnerable access to household or collective waste collection services?

> b. How are clear out practices conducted in subversively organised temporary neighbourhood spaces by local actors?

2. How can understanding of the above maintenance practices inform design for contested neighbourhoods within the following forms of knowledge:

> a. Knowledge in the form of a spatial inventory that values the complexity of maintenance

> b. Knowledge in the form of maintenance research methodologies, which elaborates on how space is being researched and represented in a more situated way.

Based on the above discussion, the diagram in Figure 22 explains the overall research methodological framework. This research starts by creating the preliminary studies to map and position the research within a variety of contested neighbourhoods in Jakarta. The research follows by conducting the fieldwork studies in two different contexts of maintenance. The data collected from the fieldwork is then coded and creatively analysed, which produces situated narratives of maintenance. Based on these situated narratives from both case studies, the thesis conceptualises the overall knowledge of the maintenance spatiality. This study then investigates how such knowledge can inform design; by assembling a spatial inventory and compiling the situated practice methodologies based on the maintenance practice research.

4.4 Exploration of maintenance research methodologies

In continuation with the initial discussions of practice research explored in the literature review, the discussion of research methodologies is

RESEARCH FRAMEWORK

PRELIMINARY STUDY

DATA COLLECTION PROCESS

**KAMPUNG PULO
NEIGHBOURHOOD**

**PESING KONENG
NEIGHBOURHOOD MARKET**

**ANALYSIS PROCESS
OF EACH CASE STUDIES**

CODING NARRATIVES OF PRACTICE

**CREATIVE STUDIES TO
SITUATE THE PRACTICE**

**SITUATED NARRATIVES
OF PRACTICE:
ANALYSED THEMES**

SPATIALITY OF MAINTENANCE PRACTICES
(Research Question 1)

INFORMING DESIGN
Spatial inventory
Situated practice creative methodologies
(Research Question 2)

Figure 22. Structure of the research (Source: drawn by the author)

divided into methods of experiencing spaces of maintenance practices and methods of spatial representations, particularly in contested contexts. Both discussions highlight the different aspects and instruments of researching maintenance.

4.4.1 Experiencing and capturing spaces of maintenance practices

Chapter 3 has discussed the act of following actors' movements in practice (either natural movements or re-enactment) in order to enable the researcher to understand the practice.[251] This act of following is particularly useful for individual-led practices that are easily visible as it allows for the observation of a precise and distinct movement of a person. The way people do things gives them assurance that they are conducting the practice correctly. For example, in researching the practice of washing dishes, Pink notes how "cleanliness was not necessarily assessed though the visible evidence of the clean glass, but rather in the embodied knowing of the skilled practice of cleaning it."[252]

The act of following also ensures that the researcher is exposed to the actors' whole maintenance route across spaces, instead of simply observing actors in one particular space. Informed by Tim Ingold's notion of place as 'meshwork', Pink argues on the "laundry route", or the route by which the laundry washing process evolves, that:

"Laundry does not necessarily begin in the laundry basket, but is an ongoing process. Participants described to me how and where they 'found' the laundry items distributed by different family members, in bedrooms, on the floor. They also discussed the measures that had to be taken to procure dirty items of clothing that other family members still wanted to wear, and strategies for returning items to the places where they would be found if clean, if they disagreed with the dirty classification allocated to them by other family members."[253]

In this sense, the space for doing laundry is not simply limited to the laundry basket or the washing room. Doing laundry involves going through the house and finding objects to be laundered in different spaces in the house.[254] Following the extensive routes of actors

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[251] Yonn Dierwechter, 'Six Cities of the Informal Sector—and Beyond', *International Development Planning Review* 24, no. 1 (1 March 2002): 21–40.

[252] Pink, *Situating Everyday Life*. P.57

[253] Ibid. P.76

[254] Ibid.

potentially uncovers this whole process and the spaces connected by these routes.

Aside from following the actors, an alternative way of researching practices involves wandering around in space. This way of researching is useful in capturing practices that are either subversive, uncoordinated or inconsistent. These forms of practice cannot be researched by following the actors as it is a much more concealed process, they are instead 'found' by wandering. This act of wandering follows the act of drifting, coined by theorist, Guy Debord, as the act of walking in the city and actively making new meanings of occupation through their encounters with city spaces.[255] Different to the act of following the actors, such act of wandering may not always be precise, instead, concepts of "spontaneity and chance" are valued.[256] The movement of the researcher becomes a tool to discover and experience such forms of practice.

The process of wandering can lead to another approach of researching maintenance which is through the act of finding traces of practice in space. Below, Pink discusses how traces inform a specific way of doing a practice:

"Particularly interesting was a stained area of the wall. This had happened through a shared practice of throwing teabags at the target of the bin, which either missed and hit the wall or splashed onto it on their way…This left material and memory traces of a series of practices as well as a way of understanding the kitchen through these practices." [257]

Traces can be the trigger of the maintenance practice itself. In his concierge study, Strebel annotates how some traces of water leaks have led to the act of repairing a window position:

"Jim sees a small pool of water on the floor… He approaches the puddle, and briefly smears the liquid with his shoe to see what substance he is faced with…When he determines from the liquid's behaviour and colour that it is water, he immediately looks up at the ceiling, he then checks the nearby

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[255] Guy Debord, 'Separation Perfected', in *The City Cultures Reader*, ed. Malcolm Miles, Tim Hall, and Iain Borden (Psychology Press, 2004).

[256] Simon Sadler, *The Situationist City*, New Ed edition (Cambridge, Mass.: MIT Press, 1999). P.77-78

[257] Pink, *Situating Everyday Life*. P.59

window. It can quickly be discerned that one of the window frames is not tight."[258]

As an impact and trigger of practice, traces can reflect ownership of a space. Pink notes that the removal of traces is necessary when new occupants start to inhabit a space, stating that the kitchen mentioned earlier "would need to be 'gutted' and re-done".[259] Without such removal, the new owner cannot identify the space as their space.

Another way of exploring practices can be done by engaging with collective events, particularly when researching a collection of practices in shared spaces. Pink researches a local event whereby local community members gather together, while Jacob et al explore political meetings in order to understand the social order of maintaining a building. Researchers can attend and record collective events and reflect on the connection between personal and collective practices in space.[260]

Aside from the methods of following, wandering, finding traces, and engaging in collective activities, another way of researching the experience of practice is by examining the narratives of practice itself. Pink adds that other than the re-enactment of practice, narratives can help in understanding how people verbally represent and clarify their sensorial experiences in a setting, adding depth to the overall spatial experience.[261] Narratives also fill the gaps of practice observations that are difficult to be directly observed, such as practices that are done illegally or unpredictably.

There are different forms of data that can build narratives of practices. Some references employ detailed interviews or self-reflections of actors in forms such as domestic diaries.[262] There are also other supporting documents, such as advertisement posters, media reports, and policy

[258] Ignaz Strebel, 'The living building: towards a geography of maintenance work', *Social & Cultural Geography* 12, no. 3 (1 May 2011): 243–262.

[259] Pink, *Situating Everyday Life*.

[260] Ibid.

[261] Ibid.

[262] Elizabeth Shove, Mika Pantzar, and Matt Watson, *The Dynamics of Social Practice: Everyday Life and How It Changes* (Los Angeles: SAGE Publications Ltd, 2012); Pink, *Situating Everyday Life*; Jane M. Jacobs, Stephen Cairns, and Ignaz Strebel, 'Doing Building Work: Methods at the Interface of Geography and Architecture', *Geographical Research* 50, no. 2 (2012): 126–140.

documents.[263] Narratives provide information on things which give meaning to practice, from social order to memory and culture.[264] These narratives are important information for the data analysis of the practice; as they help to make sense of the visual data.[265]

Having distinct methods of experiencing and capturing the practice enables the researcher to understand the full experience of the maintenance actors. The variety of methods and data articulated in this section is useful as an actor may perform a practice in a variety of ways at different times and therefore require different research strategies.

4.4.2 Making spaces of practice visible: situating practices in space

As discussed in both the literature review and discussion of design research in the beginning of this thesis, creative research methods are important as the means of investigating and constructing spaces of practice through representations. Pink argues that representation of practice research should evolve "as emergent *from* rather than simply as standing for".[266] In this sense, photographs, collages, videos, diagrams, drawings and other forms of representation should go beyond a matter of visualisation, but also become a way of making sense of the practice in space. Nevertheless, current methods of producing architectural representation often cannot fully signify the actual experience of practice in space.[267] This section discusses how this limitation can be expanded.

Drawing routes of practice

As mentioned in sections 4.2 and 4.4.1, practice routes are an important aspect of revealing the space of practice. In architectural discourse, route drawing often consists of simplified lines that connect the starting points and the destinations. Architect and educator Doina Petrescu, argued that route drawing in the discourse of contemporary urban planning (such as in the likes of Space Syntax) tends to emphasise "the most connected routes, the diagonals, the shortcuts, the most secure

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[263] Ibid.

[264] Pink, *Situating Everyday Life*.

[265] Pink; Strebel, 'The living building'.

[266] Ibid. P.45 (emphasis is original).

[267] Henri Lefebvre, *The Production of Space*, 1 edition (Oxford, OX, UK; Cambridge, Mass., USA: Wiley-Blackwell, 1991).

routes; they are not interested in the hidden gestures and 'delinquent' routes..."[268] Such route drawing tends to disregard the journey within that route. Approaches to route drawing needs to be less reductive, and reflect the full experience in doing the practice.

Petrescu investigates a different approach to a route drawing, through investigating drawings by child psychiatrist Fernard Deligny, (as shown in Fig. 23).[269] She notes that Deligny

> "mapped the lines that the children traced on their walks and throughout their everyday life activities, discovering that there were fixed points where their movements concentrated, where they stopped and lingered, where the lines they followed intersected. According to Deligny, these were often sites with magnetic fields and underground waterways, and autistic children appeared to be especially sensitive to them."[270]

Image copyrighted
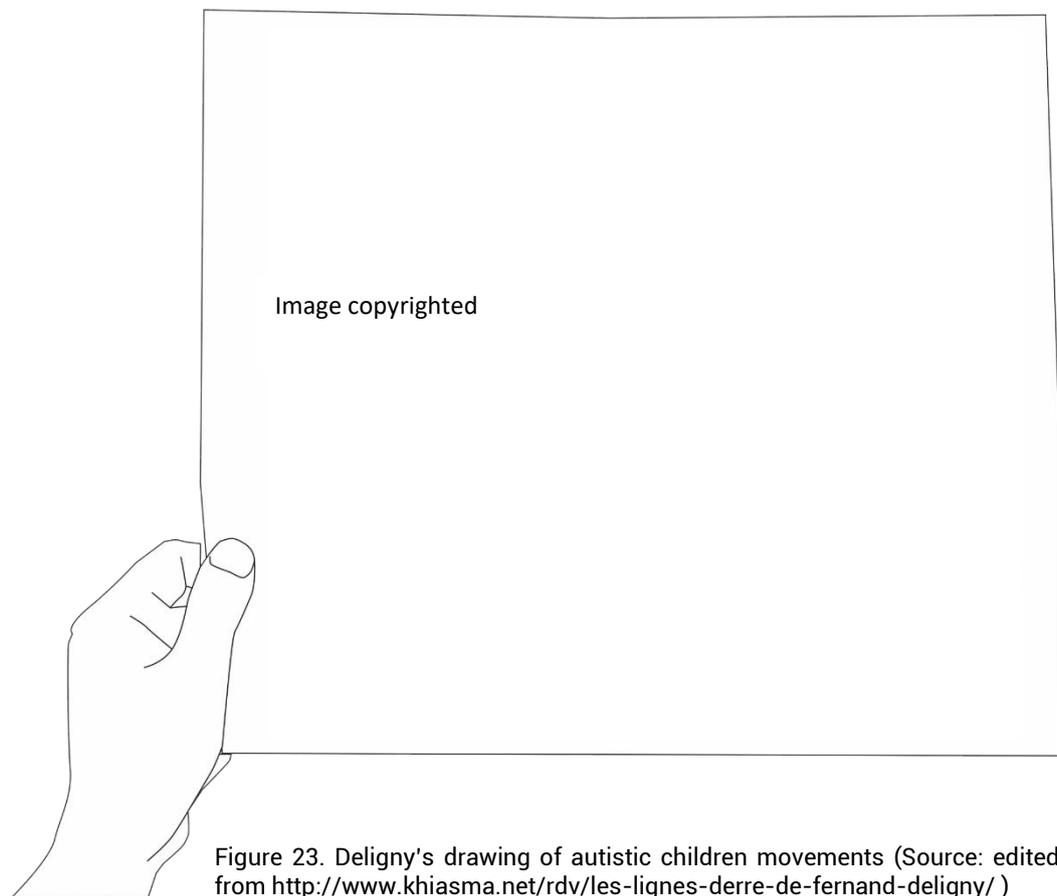
Figure 23. Deligny's drawing of autistic children movements (Source: edited from http://www.khiasma.net/rdv/les-lignes-derre-de-fernand-deligny/)

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[268] Ibid. P.94

[269] Petrescu.

[270] Ibid. P.90

Petrescu argues that Deligny's routes drawing emphasises the experience of individuals, demonstrating no desire to control the output, eager to find the "custom" instead of the "approximations" of a route.[271] This form of drawing demonstrates the walking routes of autistic individuals whereby they experience different things along the walk, that influences their body, such as the magnetic fields and underground waterways.

Another method of route drawing can be seen in the landscape architect Lawrence Halprin's work of "Motation" (Fig.24). Motation is "a notational system focused on movement for the purposes of environmental design".[272] Halprin developed Motation in collaboration with his dancer wife Anna, and the drawing serves as a score which demonstrates the sequential routes of human movement across spaces.[273] Motation serves as both a tool of observation and design, as it can be used to record the movements as they happen or to present them as proposition.[274]

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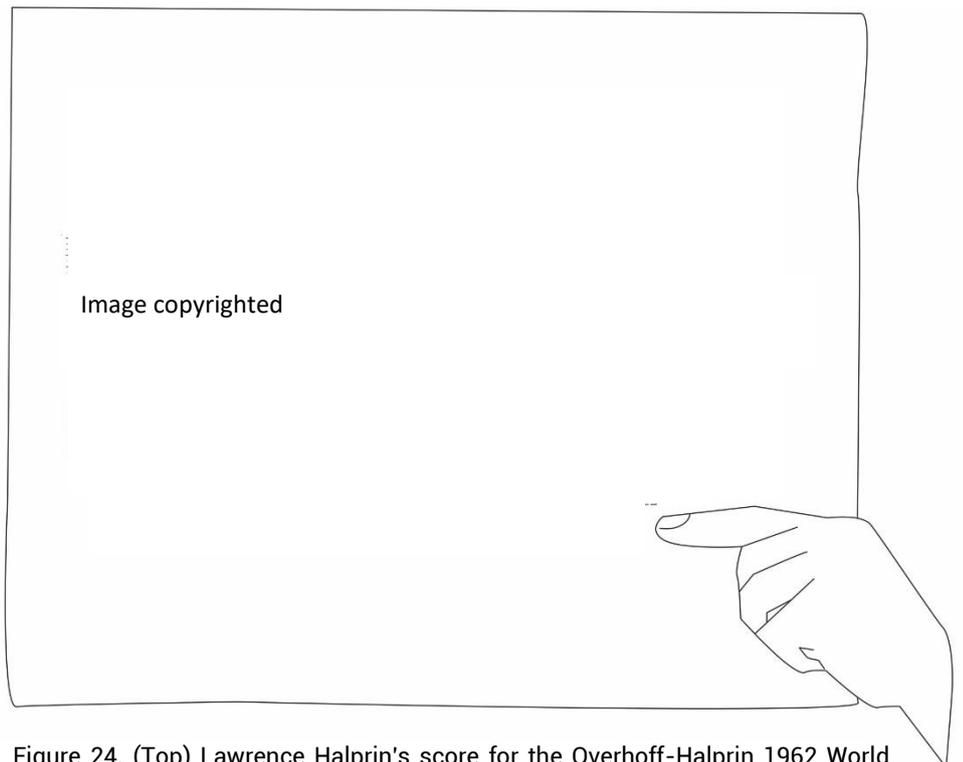
Figure 24. (Top) Lawrence Halprin's score for the Overhoff-Halprin 1962 World Fair. (Source: drawing edited from the original drawing taken from A World in Motion: The Creative Synergy of Lawrence and Anna Halprin by Judith Wasserman (2012) P. 42)

[271] Ibid.

[272] Judith Wasserman, 'A World in Motion: The Creative Synergy of Lawrence and Anna Halprin', *Landscape Journal* 31, no. 1/2 (January 2012): 33–52. P.35

[273] Ibid.

[274] Ibid.

Different to Deligny's drawing that represents the unstructured and changing movement of actors, Motation represents a more precise sequence of movement based on the predetermined knowledge of the researcher. Both drawings celebrate the journey, either by revealing hidden information or highlighting the sequences of the movement. For example, reflecting on the concentration of movement within the routes in Deligny's drawing, it is found that autistic children have sensitivity to some qualities of the environment.[275] Emphasising the journey within these routes reveal the experience of practice taking place in spaces as performed by the actors.

Drawing detailed experiences of the actors

Representations are "not only to 'represent' or to 'conceive', but also to enhance experience"[276] of self and others. Examples of this experience can be seen in Strebel's concierge study, where the sensorial experience of the concierge as they moved through the space became their tools to conduct the maintenance process. Yet, there are concerns that current architectural representations, such as plans and elevations, are unable to capture such complex experience. For example, architectural educator, Katie Lloyd Thomas, points out the limitation of architectural representations, stating that "the architecture drawing… [It] cannot represent the porous, the fluid, the almost immaterial…."[277] Quoting Christine Hawley's work on drawing,[278] Thomas follows this by stating that architectural lines cannot deal with immaterial things such as shadow, nor can they project anything in movement that "hovers, threatens, glides or melts."[279]

Through her work of "Kotti (revisited),", a representation of the Zentrum Kreuzberg (ZK) housing estate and its surroundings in Berlin, Germany, artist Larissa Fassler expands the architectural drawing limitation. As

[275] Petrescu, 'The Indeterminate Mapping of the Common'.

[276] Doina Petrescu, 'Relationscapes: Mapping Agencies of Relational Practice in Architecture', *City, Culture and Society* 3, no. 2 (2012): 135–140. P.137

[277] Katie Lloyd Thomas, 'Building While Being in It: Notes on Drawing "Otherhow"', in *Altering Practices: Feminist Politics and Poetics of Space*, ed. Doina Petrescu, New Ed edition (London ; New York: Routledge, 2007). P.102

[278] Christine Hawley, 'Invisible Lines', in *The Architect: Reconstructing Her Practice*, ed. Francesca Hughes (Massachusets Institute of Technology, 1996).

[279] Hawley quoted by Thomas, 'Building While Being in It: Notes on Drawing "Otherhow"'. P.169

seen in Fig.25, Fassler layers visual images and texts above normal plans or city view drawings, creating a perceptive space above the conceived space.
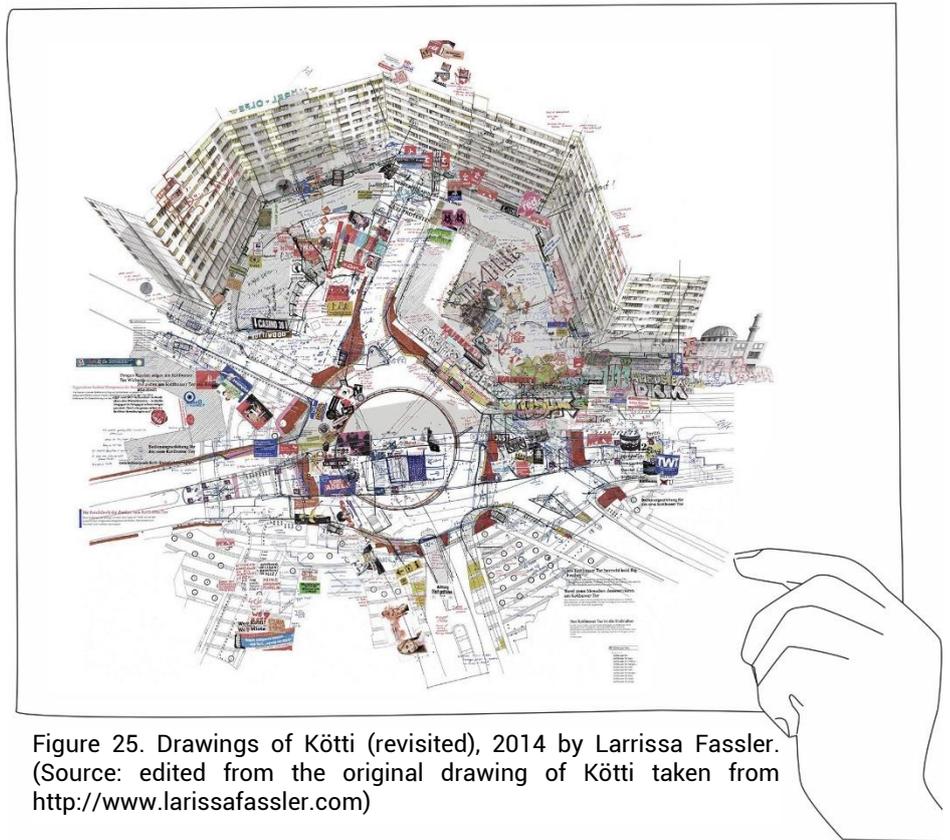
Figure 25. Drawings of Kötti (revisited), 2014 by Larrissa Fassler. (Source: edited from the original drawing of Kötti taken from http://www.larissafassler.com)

The text within Fassler's drawing contains a wide variety of information, from the number of people crossing, to the places where people urinate, to the current weather and the location of the food stall. The visual images collaged into the drawing consists of photographs and drawing of the signage and graffiti in the vicinity of the area. This drawing is assembled based on Fassler's act of walking, wandering and seeing "the actions and perceptions of the users within the architecture they inhabit."[280] Fassler uses her body measurements (arms and steps) to measure some of the information on this perceived layer, such as the distance between areas using her arm's length or footsteps. In Fassler's drawing, the researcher's body becomes "an instrument" to experience the space, a way of grasping local practices which contribute to "the complexity of public space".[281]

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[280] Mark Minkjan, 'An Artist's Impression: Larissa Fassler on Berlin's Kottbusser Tor', *Failed Architecture* (blog), 1 November 2012, https://www.failedarchitecture.com/an-artists-impression-larissa-fassler-on-berlins-kottbusser-tor/.

[281] Ibid.

Elsewhere, I have explored other ways of drawing the details of actors' experience in space. The drawing shown in Fig.26 shows an autistic child's movement in a sensory integration therapy space.[282] The sequences of movements are initially driven by the therapeutic needs of the child, but it is also shaped by the child's dynamic responses, interests and moods.[283] The drawing details these dynamic responses by highlighting how the body engages with objects, walls, and other spatial properties.

Figure 26. Drawing of autistic children's movements that engage in the same space but in different way (Source: edited from Topological Reading of Movement Connectivity by Yatmo, Atmodiwirjo and Paramita (2017))

The richness of Fassler's drawing lies in her ability to capture the multiple experiences that can happen in a space, while the autistic child's drawing emphasises more on the dynamic experience of space.

Drawing practice across time

Shove argues that "experiences of time are part and parcel of the experience of practice".[284] Some practices happens in particular

[282] Yandi Andri Yatmo, Paramita Atmodiwirjo, and Kristanti Dewi Paramita, 'Topological Reading of Movement Connectivity in Sensory Integration Space for Autistic Children', *Space and Culture* 20, no. 1 (2017): 24–41.

[283] Ibid.

[284] Shove, Pantzar, and Watson, *The Dynamics of Social Practice*. P.129

frequencies, organised across the rhythms of daily life.[285] On the other hand, certain times and events dictate the particular types of practice to happen.

An example of representations of practice in an event can be seen through a collection of drawings by Jörg Rekittke, depicting a flood (Fig.27) in Kampung Melayu, Jakarta.[286] Together, these drawings show the precipitation of rain within a certain month, the effect of river water flow levels and how at some level this influences people's activities, from moving things, going outside the neighbourhood, and cleaning up after the water has receded. The drawing shows the different uses of dwelling during the increasing and receding water level, demonstrating different practices of living in response to the environment changes in a period of time.

Representation of practice across time can also be done through exploration of traces. Jacobs et al's study of housing, developed a photo montage of some vacated spaces (Fig.28), which showed traces of inhabitation and signify whether the occupier and authorities have maintained or instead neglected the environment:

> "…interested in the material unfolding that was evident in, and would continue on from, the moment of human vacating….the photo-montage foldouts communicate a materialised atmosphere that is the consequence of years of disinvestment…" [287]

While Rekittke's drawing addresses the movement of people initiated by flooding events, Jacobs et al's drawing, through traces, focuses more on the material condition of space when inhabited for a period of time. Both representations demonstrate investigation of practice dynamic and link it to the changes in the built environment.

4.5 The data collection process

4.5.1 The chronological progression of the fieldwork

This research's fieldwork was conducted between 2014 and 2015, informing both the preliminary study and the case studies within this

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[285] Ibid.

[286] Jörg Rekittke, 'Being in Deep Urban Water: Finding the Horizontal Urban Trim Line, Jakarta, Indonesia', in *Water Urbanisms 2 - East*, ed. Kelly Shannon and Bruno De Meulder (Zürich: Park Books, 2013).

[287] Jacobs, Cairns, and Strebel, 'Doing Building Work'. P.137

thesis. As discussed in Chapter 2, preliminary studies were conducted in seven sites consisting of riverbank neighbourhoods (Kampung Pulo,

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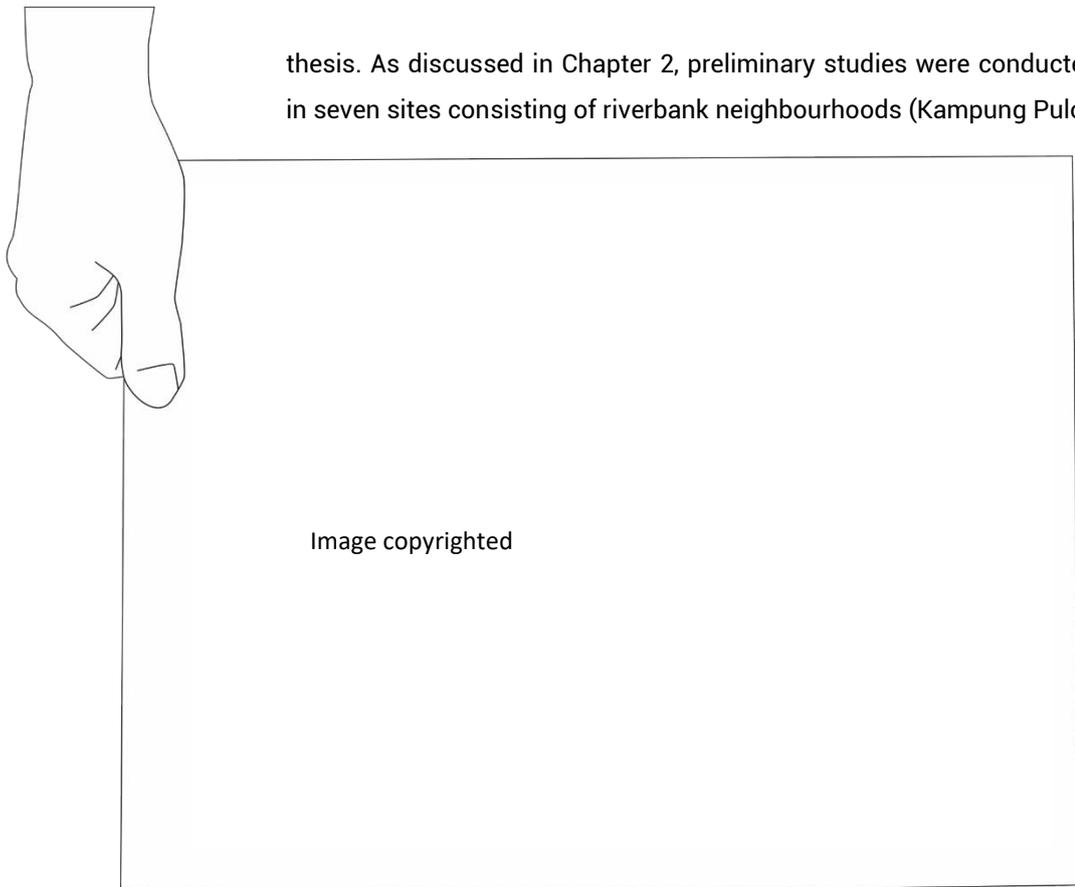
Figure 27. A collection of drawings of a flooded kampung neighbourhood in Kampung Pulo, Jakarta. It shows the progression of the water which inundated the neighbourhood before receding, shaping the activity and use of space within the neighbourhood as shown in the sections. (Source: edited from Being in Deep Urban Water by Jörg Rekittke (2013) P.85)

Image copyrighted
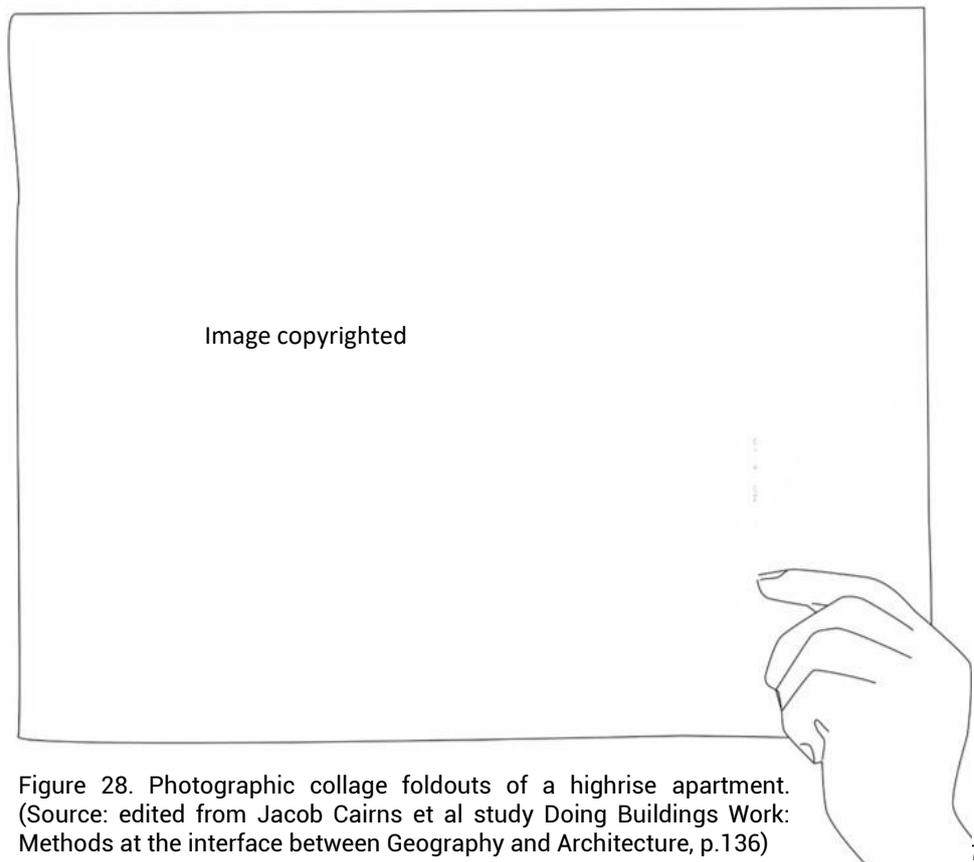
Figure 28. Photographic collage foldouts of a highrise apartment. (Source: edited from Jacob Cairns et al study Doing Buildings Work: Methods at the interface between Geography and Architecture, p.136)

Manggarai, Kalibata) and temporal economic spaces (Kebayoran Lama, Pesing Koneng, Kramat Jati, and Pesanggrahan). Initial observations, and the compilation of secondary data (such as newspaper information) were done within these sites, which led the study to focus on two areas (Kampung Pulo and Pesing Koneng) as its case studies areas.

This process of data collection for both case studies started in mid-2014, collecting data from 33 participants in Pesing Koneng and 29 participants in Kampung Pulo. As Kampung Pulo is a larger area of study, a year later in 2015 more fieldwork was conducted there, collecting additional data from 33 participants. A more detailed account of the process of approaching the participants and collecting data will be discussed separately in Section 4.5.2-4.5.3.

In parallel with the neighbourhood data collection, semi-structured interviews were done with six different national and regional agencies, in addition to a local non-government organisation (NGO) in 2015, as mentioned in Chapter 2. Two of these agencies, Ciliwung-Cisadane River Agency / Balai Besar Ciliwung Cisadane (BBWSCC), and the local NGO, Ciliwung Merdeka were interviewed regarding the overall controversies of river development. One agency (Jakarta Regional Development Agency / Badan Perencanaan Pembangunan Daerah (BAPPEDA)) was interviewed in order to understand the overall development process of the Jakarta city government.

Three other agencies were interviewed specifically in order to understand the challenges and processes of maintenance happening in Jakarta, focusing on the issues of infrastructural services and environmental monitoring. These agencies are the Jakarta Regional Sanitary Agency / Dinas Kebersihan Jakarta, Jakarta Regional Environmental Agency / Badan Pengendalian Lingkungan Hidup Daerah, and the Accelerated Development of Sanitation of Settlements Program[288] / Program Percepatan Pembangunan Sanitasi Permukiman (PPSP). Together, conversations with these six agencies shed light on the organisation of maintenance in Jakarta and its relation to the planning and development of contested neighbourhoods in the city. This understanding informs the contextualisation of Jakarta as the place of study, presented in Chapter 2.

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[288] This is a nation-wide program, carried out by a division under Indonesian Ministry of National Development / Badan Perencanaan Pembangunan Nasional.

4.5.2 Kampung Pulo data collection

The fieldwork in Kampung Pulo was focused on collecting data of the neighbourhood dwellers' waste practices through observations and open-ended interviews. With consent from the local neighbourhood group leaders, potential participants were approached in the course of the researcher's initial walk around the neighbourhood. These interviews were conducted in a two-year period from 2014 to 2015. Field notes were taken in the first year in order to collect information from the interviews while the second-year interviews were recorded using a digital recording device. A change in method occurred due to a lack of safety and participants' inconvenience during the beginning of research, which then shifted in the second year.

The Kampung Pulo neighbourhood dwellers who participated within this study have a variety of dwelling positions. To ensure the cross distribution of the neighbourhood, this study has engaged with a total of 62 riverbank *kampung* dwellers who lived within different distances from the main street outside the neighbourhood, from 10 m to over 600 m. Their dwellings were located within various proximity to the river, from 0 m to approximately 200 m. Another criterion of participant distribution was their period of occupation in the neighbourhood, focusing on Kampung Pulo dwellers who have occupied the river terrain for at least five years.

The interviews began by gathering a basic participant profile, asking the participant's identification, address, occupation, and family background. The interview then collected data on the dwellers' daily routines and places that they visit during the day. The dwellers were further asked about their household waste practices, particularly how waste is produced at home and disposed in relation to their occupation and daily routines. Dwellers approached in the neighbourhood shared space, such as alleys, sides of the streets and empty fields, were asked about their collective activities within such spaces.

The study collected photographs, videos, and sketches of the homes and shared spaces where waste is accumulated, disposed, and treated. Observations at home were focused on the arrangement of spaces and infrastructure available in the house. Observations at shared spaces around the neighbourhood were focused on the arrangement of the spaces in relation to the street and dwellings around it.

Informed by the interviews, the data collection process continued by observing and documenting waste practices using primarily photograph

and video recording. The study collected data regarding the routes taken by dwellers in disposing their household waste without waste collection services. Within these routes, the study also annotates traces of waste found in various neighbourhood spaces, from scattered litter to piles of household waste found in some corners of the neighbourhood.

As the household waste disposal process varies in ways, timing, and frequency, it was difficult to safely capture the household waste disposal in real time. The research opted to use a combination of methods to capture the disposal process, from asking the dwellers to guide the researcher to their disposal area, tracing the journey of the dwellers based on their interview narratives, to creating an individual observation by walking around or staying in multiple spots of the neighbourhood area to either spot an act of disposal or to note any traces of disposal.

The last method was used particularly to observe haphazard disposal, such as displacing waste into the river or to the gutter. The neighbourhood spots that were observed in the data collection study were found during the initial activity of walking around the neighbourhood to record environmental conditions. These spots were then observed and documented in detail, an act which generated an understanding of how the space was used by dwellers for waste practices.

4.5.3 Pesing Koneng data collection

As the Pesing Koneng fieldwork was focused on the clearing out practices of a temporary market space, it was necessary to first understand how the market space operates. In 2014, the data collection started by first observing (with consent from the local neighbourhood group leaders) how the market stall structures are installed, used, and then repacked to clear it out over a certain time. The observation and documentation of the market employed video recording, photographs, and on-site drawings of particular parts of the market; such as the railway crossing, trading spaces in front of the houses and areas in the river embankment. These areas became the initial places of observation as they were the spaces that were most crowded throughout the market trading time.

Based on the data collected from this initial observation, some of the local actors were subsequently approached and asked for consent for further interviews. Pesing Koneng fieldwork engaged with 33 participants through semi-structured interviews, collecting narratives of

their market activities written as field notes instead of recorded due to safety issues in the area. Of this number, five were local authorities (security officer, neighbourhood leaders, storage keepers, and railroad gatekeeper) while the remaining 28 were all market-related actors (vendors, buyers, visitors, and builders).

The interviews explored the local organisation of the market space by highlighting who coordinates the daily market and organises access to trading spaces and resources. The interviews also explore how such organisation was connected to the Pesing Koneng neighbourhood dwellers and their neighbourhood spaces. In addition, the data collection process aimed to understand the different ways vendors clear their stall structures, goods, and waste to allow for the normal use of the street by pedestrians. When consent had been granted, video recordings were taken to understand the individual actors' movement in coordinating, cleaning, and repacking their trading spaces.

4.6 Data analysis within the research

4.6.1 Coding narratives of the practice

Narratives provide details of actors' experience in doing the practice. The narratives collected from the interviews and the fieldwork notes were coded to "select, separate, and sort the data to begin analytic[ly] accounting to them."[289] The coding process of maintenance narratives in this thesis employed a form of open coding, elaborated in the following paragraph.

An open coding system creates categories of information, by looking at the text for "instances that represent the category and to continue looking (and interviewing) until the new information obtained does not further provide insight into the category."[290] The coding process for each case study began by examining all interview transcripts and field notes and highlighting the connections between the text with similarity of information (See Fig.29). The texts with similar information were then further grouped to create categories which may inform particular aspects of maintenance practice in each case study.

[289] Kathy Charmaz, *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*, 1 edition (London ; Thousand Oaks, Calif: SAGE Publications Ltd, 2006).

[290] John W. Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, Second Edition edition (Thousand Oaks: SAGE Publications, Inc, 2007).

Mr. MAR lives in District 2 Neighborhood 9 with his wife and two children, aged 13 and 8. He is part of the security team that is responsible to secure the Pesing market area that resides in District 2. His work shift ran into 24 hours with one day off the next day. He explained that Pesing market consist of two kinds of market, the food market from 02 AM to 11 AM, and clothing market from 4 PM to 11 PM. Usually people who buys from the food market comes owns their own shop at home, or they may own a small stall or restaurant. The vegetable sellers' supplies are from Main Market Tangerang and Kramat Jati. They usually use pick-ups that can be shared by 2 to 3 sellers at once. These pick-ups are parked in a nearby local field that has been transformed into a parking lot. Many sellers also store their commodity here and only take them out when they went back to their village after Ramadhan.

Mr. MAR said that this area is prone to flooding, and many of houses in the area have been elevated to reduce water coming to the house. He explained that this is also caused by the rise of the river's water level, and 50 cm flooding is considered normal. The water is also heavily polluted, as it is situated near the soy sauce factory, as well as car cleaner and battery factory that dispose their waste to the river. So filthy that most local citizen could not use ground water pumping for their home, most of them use national water pipeline system. This is because the water still smells even after they dig the soil to about 200 m depth. However, in the adjacent district there are private water pump that is operated by locals to be bought by local water seller. The water seller will collect the water from a water tank in jerry cans and sell it to coffee or beverage seller by using cartwheel. Every cartwheel can load into 4 jerry cans. The water seller usually sells it in 'pikul' or every 2 cans of water. The water seller starts selling from 2 AM in the morning to cater the morning market as well as the afternoon ones.

We asked Mr. MAR how every stall can be supplied by electricity. He explains that any stall that spans to about 50m in the left side of the security post is supplied by connecting electricity cable to the post, with the fee of 4000 rupiahs per lamp (about 0,2 pounds). He said that it is a bit pricey because of the huge size of lamp and its wattage. For stall that is located in the right side of the security post, their electricity supplies is provided by a diesel machine operated by local people that used to live in District 2.

To deal with garbage issues, the district employs garbage men that works in a daily basis. There are three routes that is used by these men, from traffic light to the kindergarten, from kindergarten to post office, and from post office to the railway. The district gets several garbage trucks that they bought from the local authorities. The garbage men will be paid directly by the street vendor when they collect their garbage. The security also collect money from street vendors, however the money is uses to pay for the garbage that has been collected by the garbage men to be taken away by truck to the Regional Garbage Dumping area at Bantar Gebang for the cost of 300,000 rupiahs (about 15 pounds) every month. Before it was taken, the garbage is stored in the district's garbage dumping area. However, sometimes it does not get stored and loaded into the truck directly. Mr. MAR also stated that Mr. UN has his own cartwheel, and he owns two cartwheels. Garbage men are a very important role in Pesing market. Mr. MAR said he

Handwritten annotations: "sharing resources ①", "transformed space due to needs ③", "transgression", "contamination ?", "top down hard economy", "form of ① space sharing for different events", "events that change the flow of resources ①", "transformed space ③", "sharing resources (open) distribute resources ④", "sharing resources ②", "distribute resources ④"

Figure 29. Examples of the highlighting process of the field notes (Source: the author's documentation)

The following paragraphs explain some of the coding processes employed within each case featured in the thesis. One of the waste narratives in Kampung Pulo highlights dwellers' disposal while going to other spaces. The dwellers dispose within the spaces they regularly go to daily, as highlighted in these examples:

"There is no (waste collection service), I throw in the market Jatinegara, I throw in (the space) across. Every morning (when) I go to shop I will bring that waste. Because if it is late (morning) the waste (at the market) has been taken away, at 8 the waste has been collected."[291]

Night (is better) as I go outside, my child can also be brought outside…It is not much (as) I throw (waste) everyday…(Sometimes) It's me, (sometimes) its (my) child…anybody, this is just when somebody go out, (ah) just bring it together, just whoever can…"[292]

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[291] S1, Kampung Pulo maintenance practices interview, 2015.

[292] M2, Kampung Pulo maintenance practices interview, 2015.

"(We could go to) gate 5, but it is quite further away, it is not that far, the neighbourhood post is even further. But <u>it is more for people from around gate 5</u>."[293]

The underlined narratives in the above quotes demonstrate the dwellers' practice to dispose while going somewhere, such as going shopping or just having a walk. In addition, the last passage indicates that dwellers only dispose within spaces they regularly go, and not to other spaces that are less familiar. The thesis then simplified the narratives into a statement (such as: disposal while going to the market) and organised these narratives together with other related narratives. For example, some of the narratives note that sometimes dwellers may go to shop in different spaces and they would then adjust their waste disposal space accordingly. The following table demonstrates how the narratives are listed together and then coded. The underlined words are the words that influenced the coding process.

Reorganised narratives	Coded narratives
Family <u>take turns managing</u> the stall Family <u>help close</u> the stall Family <u>inherit</u> the stall Family <u>help buy</u> the goods	Family ties can help acquire, manage and care for the stall and trading process

Table 1. Sample of the coded narratives of Kampung Pulo (Source: Sorted by the author from interviews and field notes)

In Pesing Koneng narratives, the coding process can be seen in the field notes that focused on the way traders organise their trading activities together with the help of their families. The field notes highlight that a clothing trader's wife helps him every day, when the stall is especially crowded or when closing up the stall and repacking the structures away.[294] Other notes illustrate how a grocery seller takes turns attending the stall - doing different shifts with her daughter.[295] These notes are then simplified into a sentence as stated in Table 2.

The narratives in the left column illustrate how the traders work together with their families, occupying a variety of roles required to trade in a temporary market. Some notes also annotate how some vendors

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[293] S7, Kampung Pulo maintenance practices interview, 2015.

[294] E1, Pesing Koneng maintenance practices field notes, 2014.

[295] D2, Pesing Koneng maintenance practices field notes, 2014.

Reorganised narratives	Coded narratives
Disposing <u>while going</u> to shop at the market Disposing <u>while going</u> for a leisure walk Disposing <u>while going</u> to the workplace Not going to dispose <u>in other neighbourhood group spaces</u>	<u>Dwellers dispose within the routes they move through daily</u>

Table 2. Sample of the coded narratives of Pesing Koneng (Source: Sorted by the author from field notes)

inherited their stall from their families. These narratives are coded by concluding that vendors with family ties provide many potential benefits for some traders to acquire, manage and care for their trading stall and trading process. The complete lists of these coded narratives for each case study based on interviews and field notes are attached in the Appendices 4 and 5.

4.6.2 Creative studies: situating practice in space

As a PhD by Design research, this thesis developed an array of creative studies as forms of analysis that situate the coded narratives. This research experiments with different ways of visual representation, be it through drawing or video-editing; informed by different representations explored in section 3.4.2. These creative studies are included as PLATES or as the portfolio part of this thesis (as introduced in Chapter 1).

The creative process in Kampung Pulo started by mapping the routes taken by dwellers to dispose their waste. These routes drawings became a starting point for Kampung Pulo analysis, noting the variety of movements by dwellers to dispose the waste, which involve a range of distances and types of spaces used for disposal. Some dwellers may have multiple routes of disposal, while others stick to one route every time. Examples of such route drawings are presented in Fig.30.

Important qualities from the map were further explored through the detailed drawings of spaces in and outside the neighbourhood (See Fig.31). These drawings were done using collaged sections, plans, or spatial axonometry of the disposal that were layered with drawings of people, objects and their patterns of movements. Figure 31 demonstrates a sample of a detailed drawing of maintenance experience, illustrating the location of the waste disposal area in the market and in the neighbourhood gates. The drawing shows the distance, size and orientation of the disposal areas in accordance to the neighbourhood and the street.
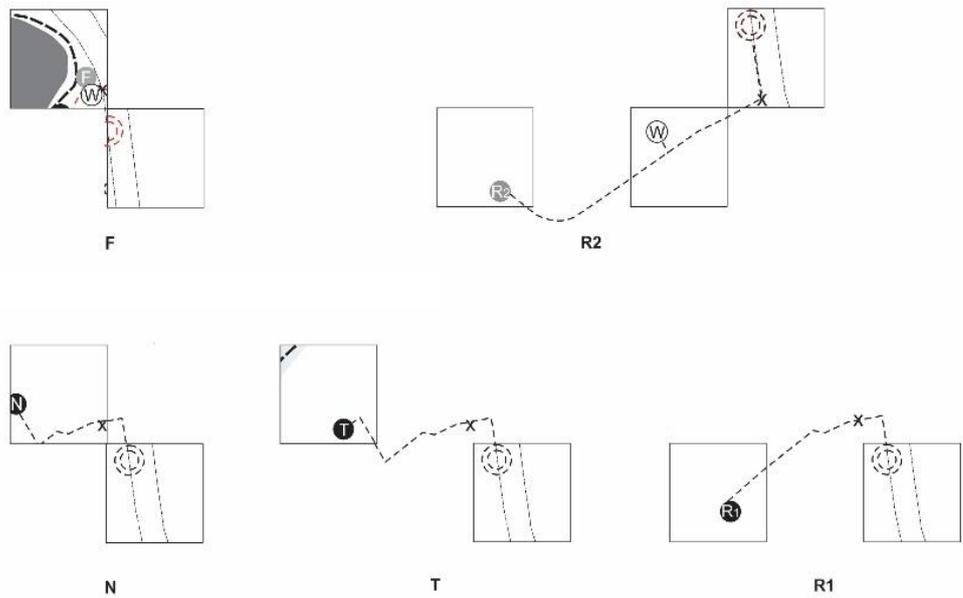
Figure 30. Dwellers' disposal routes between their dwelling to their disposal space (Source: drawn by the author based on data observation)
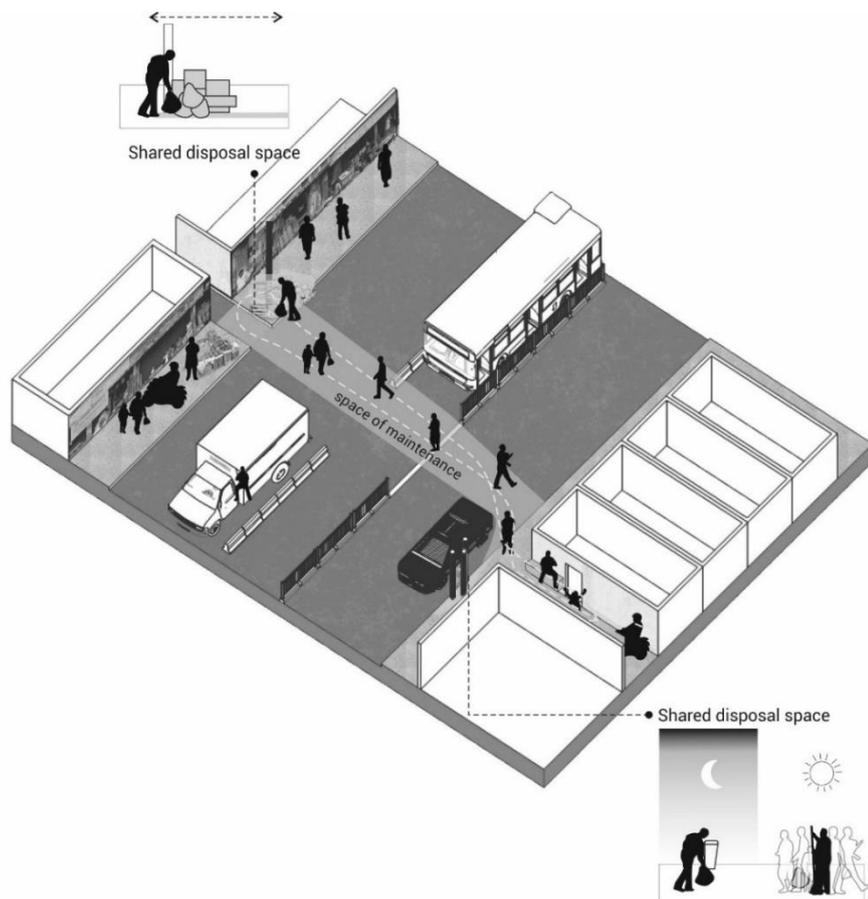
Figure 31. Samples of disposal routes drawings outside the neighbourhood - details created using axonometry drawing (Source: drawn by the author)

These maps and drawings strengthen and inform the coded narrative from the interviews and the field notes. Insights from the maps and drawings are added to the narratives table, making it much more situated, as highlighted below:

Added narratives	Situated narratives
Disposing while going to shop at the market	The overall options of routes where dweller regularly move in and outside the neighbourhood creates territories of disposal
Disposing while going for a leisure walk	
Disposing while going to the workplace	
Not going to dispose in other neighbourhood group spaces	
Options of disposal space dependent on shopping needs and times of walking	

Table 3. Sample of the Kampung Pulo added narratives from the creative studies explorations (Source: compiled by the author)

In Pesing Koneng study, the creative process started by creating a video experiment and diagrams (See Fig.32 for example). This drawing reveals which actors manage the operation of the market and also clarifies the multiple positions of the actors who provide the access to space and resources which are needed to trade.
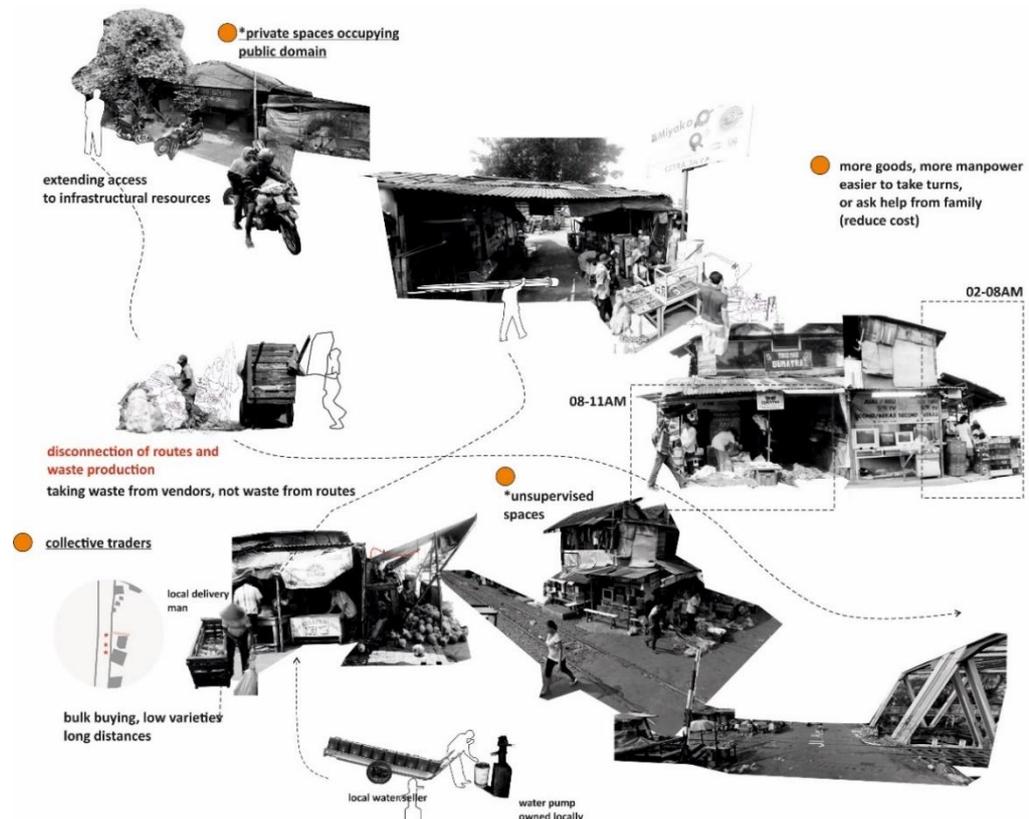
Figure 32. Sample diagram of the connections between actors in Pesing Koneng (Source: drawn by the author)

The other drawings explored the impact of such actors organisation for the clearing out practice in the area. For example, Figure 33 demonstrates different trading times within the shift depending on their goods, which shape the market's temporality.
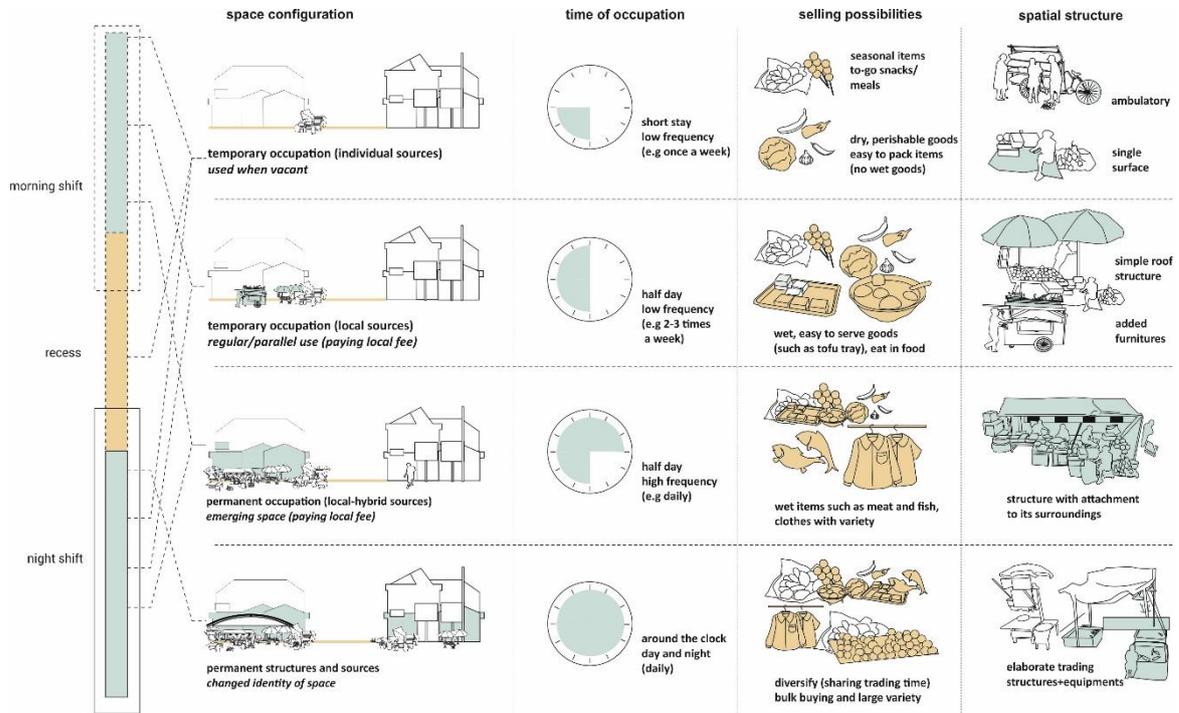
Figure 33. Example of the drawing of the vendors' dynamic temporality of (Source: drawn by the author)

These drawings inform the coded narratives, creating a more detailed view of the spatial and temporal aspects of the market. For example, the drawing of the accumulated trading time demonstrated that dwellers who have help from families were able to remain in the space longer, which therefore created difficulties in clearing out the area. These drawings create additional information to the previous narratives as presented in Table 4 through the underlined sentences:

Reorganised narratives	Situated narratives
Family taking turns managing the stall	Family ties can help acquire, manage and care for the stall and trading process, allowing for a longer occupation of the market
Family help close the stall	
Family inherit the stall	
Family help buy the goods	
Vendors with family help are able to stay in the market longer beyond the market shift	

Table 4. Sample of the added narratives from Pesing Koneng taken from the creative studies explorations (Source: compiled by the author)

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The situated narratives in the table were later arranged together to develop the themes of the case study analysis. For example, the narrative of the vendors occupying the market longer is tied to other related narratives, such as their ways of working and mismatches of trading times as seen in Table 5. The creative study in this phase creates a deeper form of analysis; drawing connections between the representations and narratives which allows for maintenance practice to be understood in relation to the space. The case study chapters are then structured on these themes. The complete lists of situated narratives and its corresponding theme can be seen in Appendix 3.

Connected narratives	Theme
Families help enable longer times of occupation Working with other actors inside and outside the neighbourhood (sharing supplies, using storage) enables a larger volume and variety of goods with longer trading times Some sellers do not follow the times set by the local authority	Dynamic temporality of the market

Table 5. Sample of connected narratives and the theme generated (Source: compiled by the author)

4.6.3 Spatiality of maintenance and the spatial inventory: towards maintenance design knowledge

This section demonstrates the process of organising the case studies findings as knowledge of spatiality of maintenance; and highlight the process of translating such knowledge into a spatial inventory. In assembling the spatiality of maintenance, findings from both case studies were mapped together based on similar relationships between the themes (See Fig.34). The map provides a clearer view of which narratives have the most connections with each other, creating a distinct feature of maintenance spatiality.

An example of one of the categories of maintenance spatiality is the traces from failure of maintenance. This category draws from the relationship between different narratives, from difficulties of disposal in Kampung Pulo to mismatches of trading times and cleaning times in Pesing Koneng. This category is concerned with the traces found on site that demonstrate challenges of maintenance in restoring the space; be it waste, objects, people or structures that are not supposed to be there.
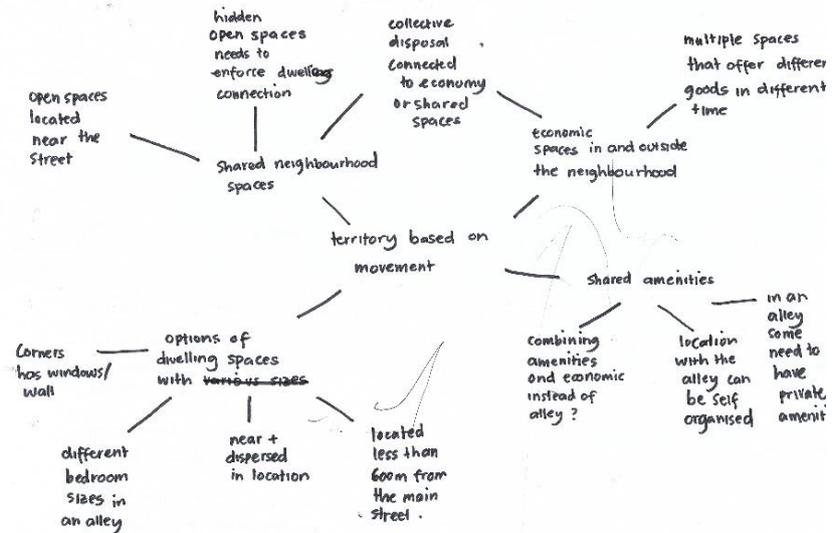
Figure 34. Sample of one of the mapping processes of the relationship between findings of both case studies (Source: drawn by the author)

To translate this knowledge into an inventory, this thesis lists the overall social order, space, and resource of maintenance spatial qualities from each category and then highlights the spatial mechanism important for that category. An example of such a list is presented in Table 6. The mechanisms on this list are then sorted together to create a form of design proposition which can then serve to structure the overall inventory. Figure 35 illustrates some sketches of the thinking process performed in generating such propositions.

Category	Spatial mechanism	Social order	Space	Resources
Territory of maintenance is built by actors' movement	Positions of space of disposal within the course of movement	Family or neighbour's connection is important	Occupying multiple spaces widens the territory	Using other people's cleaning services

Table 6. List of attributes of maintenance based on the category of maintenance spatiality (Source: compiled by the author)
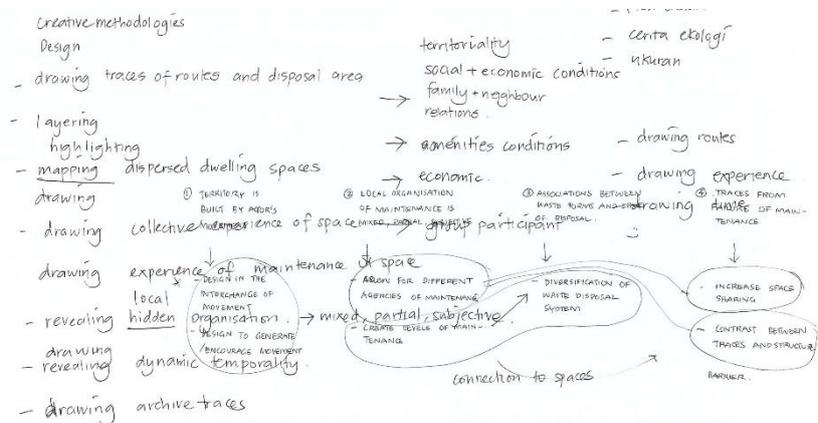
Figure 35. Sample of sketches that generate propositions for the inventory based on relationship of maintenance mechanism (Source: drawn by the author)

Based on the relationship outlined between the maintenance mechanism, this thesis generates the corresponding inventory of propositions. An example of some of these propositions can be seen in Table 7.

Design propositions	Mechanism based on findings narratives	Spatial/temporal inventory
Design around pattern of movement Regularity, orientation and course of movement build an actors' territory, which is important in determining the potential disposal space	Identify spaces in the interchange of movement to position the space of disposal (instead of being cornered and hidden)	Disposal in the intersection of movement (junction) Disposal along the movement (periphery) Disposal at the end of movement Disposal along and in the end of movement particularly in areas that have a lack of visibility and ownership leads to displacement

Table 7. Sample of propositions in the maintenance practice spatial inventory (Source: compiled by the author from the data analysis)

Design based on the inventory can employ each proposition as a focus of development in practice, using the spatial and temporal qualities within the inventory as a starting point. It is argued that this inventory may potentially become the basis of future design guidelines as it provides criteria of performance needed in a guideline.[296]

In accordance with the spatial inventory, this thesis develops a variety of design exercises which are included in the discussion chapter. Certainly, there are limitations in such exercises as they are not exhaustive and have not been initiated within the context, nor have they undergone user consultation. These exercises simply serve as starting point towards further development of architectural design methods based on maintenance.

The inventory of maintenance practices enables a more focused view of the spatial conditions that challenge maintenance. Knowing these conditions provides design opportunities that do not solely aim for removal but emphasise the interrelationships between actors, space and infrastructure; potentially leading to more inclusive architectural design methodologies for contested contexts.

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[296] John Zeisel and John P. Eberhard, *Inquiry by Design: Environment/Behavior/Neuroscience in Architecture, Interiors, Landscape, and Planning*, Rev. Ed edition (New York: W. W. Norton & Company, 2006).

5. Kampung Pulo Riverbank Neighbourhood Maintenance Practices Study

5.1 Introduction

This chapter explores waste practices in Kampung Pulo riverbank neighbourhood in East Jakarta. It begins by providing overviews on the spatial and political context of Kampung Pulo as a contested neighbourhood, outlining the respondent data and structure of analysis. The waste practice analysis in this chapter examines waste disposal routes, investigating the dwellers' different journey. The chapter then details the experience of disposal on spaces in and around the neighbourhood further.

5.2 Spatial and political overview of Kampung Pulo neighbourhood

5.2.1 Spatial overview

Kampung Pulo is an urban *kampung* neighbourhood located in Jatinegara, East Jakarta, situated in a pocket-shaped land (See Fig.36a). In the time of the fieldwork in 2015, the neighbourhood was inhabited by around 3,809 households, occupying 8.5 hectares land around the river terrain. The neighbourhood has different topographical levels, with up to 5 m difference between some parts of it and the street (See Fig. 36b). It is accessible through five neighbourhood gates as the point of entry, marking the boundary between the neighbourhood and the Jatinegara Barat road next to it. The map also annotates other important places in and around the neighbourhood, such as communal toilets, and public economy spaces. Kampung Pulo is located opposite the Jatinegara Market, a large traditional market managed by city-owned agency PD Pasar Jaya. With such adjacency, many Kampung Pulo dwellers work in the market as store employees, street vendors, parking attendants and cleaners.

Apart from working in the market, a large proportion of the dwellers (90%) also open home-based businesses, from selling groceries to producing food such as tofu, meals, and snacks (see Fig.37).[297] Some

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[297] Ciliwung Merdeka, 'Alternative Proposal of Kampung Pulo' (2015).
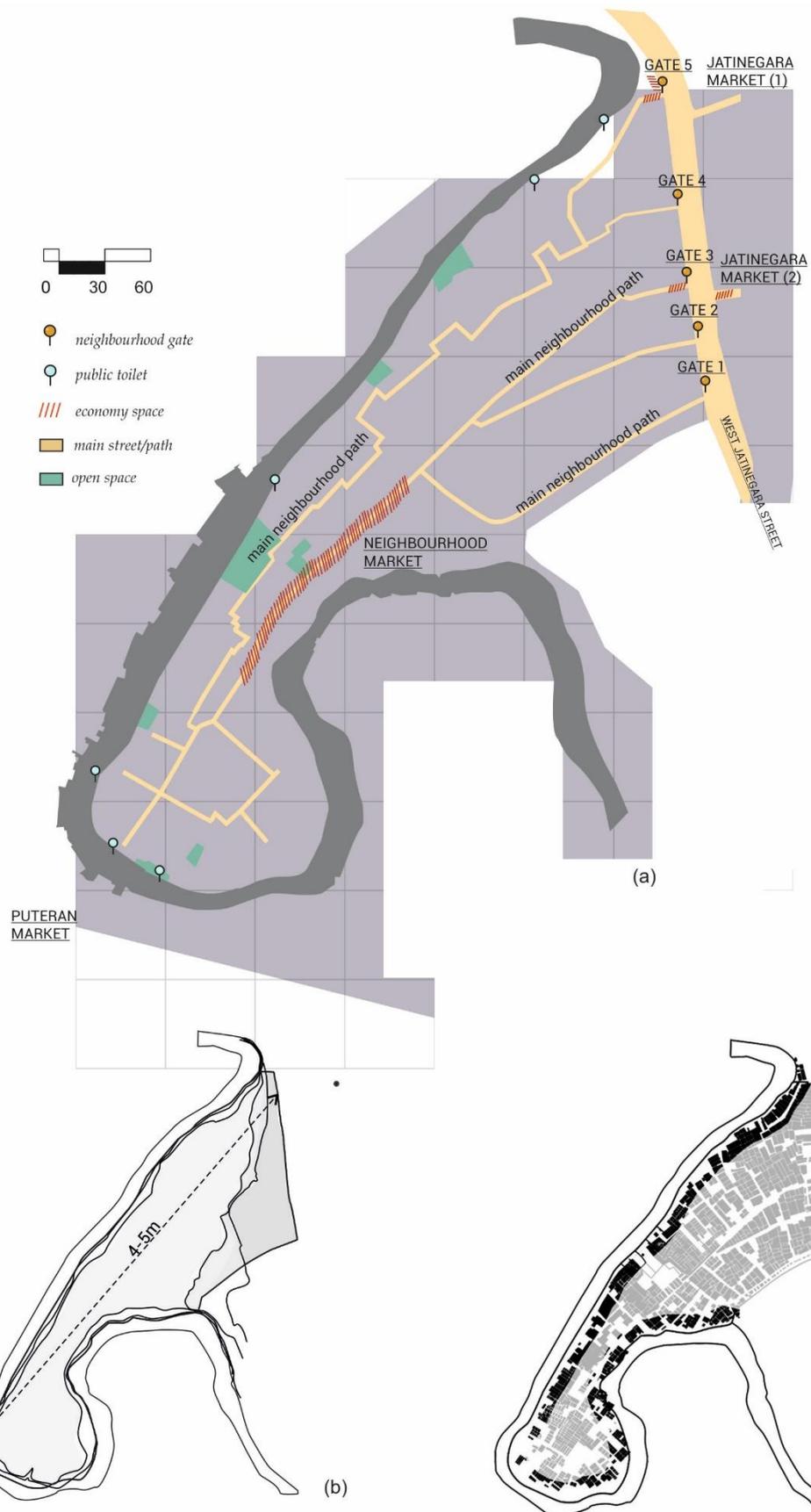
Figure 36. (a) Kampung Pulo neighbourhood site plan and key spaces, (b) different topographies of the neighbourhood, (c) areas of the neighbourhood that are affected by eviction (Source: drawn by the author)

products of these businesses are being sold in the Jatinegara market,[298] and conversely, some of the businesses are also being supplied by the market (usually commodities).[299] Apart from the Jatinegara market, there is also a small, temporary groceries market created from of a collection of home-based businesses and street vendors in the middle of the neighbourhood (See Fig.38). In addition to these businesses, other variations of home-based businesses in the neighbourhood include motorcycle repair shops[300] and motorcycle trading.

Figure 37. An example of dwellers' home businesses in the neighbourhood: dwellers selling groceries, food and toys in front of and on the side of their dwellings. (Source: the author's documentation)

Figure 38. Market area in the middle of the neighbourhood, made from an array of portable stalls and stalls at home (See Fig.1 for location). (Source: the author's documentation)

[298] S11, Kampung Pulo maintenance practices field notes, 2015.

[299] A1, Kampung Pulo maintenance practices field notes, 2014.

[300] Ciliwung Merdeka, 'Alternative Proposal of Kampung Pulo'.

Kampung Pulo is dominated by two storey houses (see Fig.39). A dwelling is commonly occupied by extended families, such as elderly parents and their married children and their families. In parts of the neighbourhood where houses are smaller, and space is more limited (usually in areas away from the main neighbourhood path), some extended families may occupy two adjacent houses together, creating a close-knit neighbourhood.[301] As this neighbourhood has faced recurrent flood for years, [302] the upper part of the house has been used as a safe refuge during flood.[303].

Figure 39. Neighbourhood main path with two storey houses. Some were cladded with tiles as facades (houses on the right) to protect against a recurrent flood. (Source: the author's documentation)

Due to the worsening occurrence of flood, Kampung Pulo does not have consistent collection service nor reliable waste disposal areas inside the neighbourhood, forcing dwellers to manage their own waste. Apart from the lack of human resources that can consistently collect waste to be disposed outside the neighbourhood for a waste truck to pick up,[304]

[301] S9, Kampung Pulo maintenance practices field notes, 2015.

[302] Tito Sianipar, 'Mereka Yang "bersahabat" Dengan Banjir Di Tepi Ciliwung Sejak "Zaman Nenek Moyang" (They Who Make Friends with Flood around Ciliwung since 'the Olden Days')', *BBC Indonesia*, 8 February 2018, sec. Majalah, http://www.bbc.com/indonesia/majalah-42971731.

[303] J1, Kampung Pulo maintenance practices interview, 2015.

[304] E4, Kampung Pulo maintenance practices field notes, 2015.

the flood takes away most of the neighbourhood communal garbage bins, so there is no place to dispose of waste collectively. [305]

Attempts to create a form of collection services also lead to illegal waste dumping to the river or to an unofficial disposal space around the riverbank.[306] To combat such illegal disposal, a local NGO funded recycle initiative in one of the neighbourhood groups (RW) was formed, but it was not sustainable and only lasted temporarily.[307]

The observation also showed that in Kampung Pulo neighbourhood it is common for a dwelling to be built without a bathroom, particularly in neighbourhood areas adjacent to the river. Such lack of individual amenity leads to an array of public toilets in the neighbourhood, in addition to the use of *getek,* a makeshift toilet using bamboo platforms that float onto the river basin itself.

5.2.2 Political contestation overview

Kampung Pulo was the first neighbourhood that faced relocation within the three-year regeneration project of Ciliwung River spanning from 2014-2017. Before the river regeneration, the regional government mapped out all of the affected dwellings (See Fig.36c for the affected area of eviction and Fig.40 for a complete timeline of the relocation). The Jakarta regional government relocated a total of 530 households in Kampung Pulo to the Jatinegara Barat affordable housing, located around 700 metres away from the *kampung* neighbourhood gates.[308]

The above numbers only reflect the units that were going to be demolished by the government, and in reality, there were more households affected by the project. Actual numbers of affected households differ across different sources. In August 2015 the Regional Housing Agency reported that the evicted households reached 916 [309], while an official report from Jakarta Legal Aid Agency published in

[305] S1, Kampung Pulo maintenance practices field notes, 2014.

[306] Derek Vollmer and Adrienne Grêt-Regamey, 'Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River', *Global Environmental Change* 23, no. 6 (2013): 1542–1555.

[307] E4, Kampung Pulo maintenance practices field notes.

[308] BBWSCC, Current and Future Development of Ciliwung River.

[309] Andri Donnal Putera, 'Soal Rusun, Penertiban Warga Daerah Terlarang Dan Ego Wilayah', KOMPAS.com, Agustus 2015, http://megapolitan.kompas.com/read/2015/08/30/09574601/index.

>>timeline of Kampung Pulo relocation

2012 — plans of Ciliwung River normalisation project announced by BBWSCC (National River Agency)

2013 — Ciliwung River normalisation project commenced, construction of embankment by Public Works Agency

2014 — Kampung Pulo initial survey mapping and measurement by National River Agency + Jakarta Housing Agency

2015

July
Jakarta Governor met NGO Ciliwung Merdeka for alternative proposal of Kampung Pulo relocation

July
Deadlock in compensation negotiation between Jakarta provincial government and Kampung Pulo residents

August
Forced relocation of Kampung Pulo residents

2016 — April
530 houses demolished
1041 households evicted, 516 relocated
7.4 ha riverbank area normalised

Figure 40. Timeline of Kampung Pulo eviction. Source: author's drawing. Picture left: Banner inside the neighbourhood to ask the current governor at that time for fair relocation compensation (timeline drawn by the author and photo from author's documentation)

February 2016 determined it to be 920.[310] However, a more recent newspaper report in April 2016 concluded that the total number of evicted families had actually reached 1,041 households.[311]

The scheme of dwellers relocation contributes to these differing numbers. The government used the "property to property" system[312], and only prepared one resettlement unit for every demolished house,[313] despite the fact that many dwellings were occupied by two or more families. This scheme of relocation leads to overcrowded units[314] and disjointed families.[315] In addition, the families who do not have a legal ownership to the property (such as the renter) were not entitled any resettlement by the government[316], and were required to move without compensation.

The dwellers' relocation process was complicated, not only due to the limitation of units but also due to the changing scheme of compensation for the relocated dwellers. Initially, in 2012, the residents of Kampung Pulo were promised to acquire compensation for both their land and house.[317] Nevertheless, such compensation scheme kept diminishing, from partial compensation in 2013 until complete refusal for any compensation in mid-2015, leaving the resettlement rental units as their only option.[318] The affected dwellers were considered squatters

[310] LBH Jakarta, 'Atas Nama Pembangunan: Laporan Penggusuran Paksa Di Wilayah DKI Jakarta Tahun 2015 (In the Name of Development: 2015 Forced Relocation Report in Jakarta)'.

[311] The Jakarta Post, 'Dozens of Kampung Pulo Evictees at Risk of Losing New Homes', The Jakarta Post, 12 April 2016, http://www.thejakartapost.com/news/2016/04/12/dozens-of-kampung-pulo-evictees-at-risk-of-losing-new-homes.html.

[312] Diah Harni Saputri, 'Penggusuran Kampung Pulo, Pengamat: Ini Yang Membuat Warga Resah', Tempo, 23 August 2015, https://metro.tempo.co/read/694209/penggusuran-kampung-pulo-pengamat-ini-yang-membuat-warga-resah.

[313] BAPPEDA (the planning agency) explained that the regulation stated that communities that have been impacted by the normalisation deserve to be relocated to the nearest affordable housing. However, due to the massive relocation caused by the multiple watershed projects in Jakarta, the number of evicted people would often exceed the amount of units available nearby. This condition often prolonged the relocation process itself. (BAPPEDA, Current and future agenda of Ciliwung River Development, 2015.

[314] Gangsa Parikesit and Ninis Chairunisa, 'Ini Kesulitan Warga Kampung Pulo Tinggal Di Rumah Susun', Tempo, 28 August 2015, https://metro.tempo.co/read/695735/ini-kesulitan-warga-kampung-pulo-tinggal-di-rumah-susun.

[315] Saputri, 'Penggusuran Kampung Pulo, Pengamat'.

[316] BAPPEDA, Current and future agenda of Ciliwung River Development.

[317] Ciliwung Merdeka, Current and Future Development of Ciliwung River.

[318] Ciliwung Merdeka.

in the river embankment areas, and therefore do not considered entitled to any compensation on housing ownership.[319] Such an act of refusal had ended the negotiation and left the dwellers in a deadlocked situation.

On 20 August 2015, the city government forced demolition of 530 houses in Kampung Pulo despite the dwellers' refusal leading to riots exploding within the areas.[320] Four people were injured in the process, and a further twenty-seven were incarcerated for participating in the attack and destroying regional government-owned construction vehicles.[321] The Jakarta Public Works Agency, who was responsible for construction works in the area continued to demolish the houses in the following weeks, restructured the river edge and created a concrete embankment with 7.5 m wide inspection paths as river demarcation on each side.

Since then, some of the evicted families have been relocated to the 516 units available at the nearest affordable housing.[322] The dwellers would have to pay a subsidised monthly rent and electrical bills, deemed too costly for some dwellers and ended leaving them in debt months after relocation.[323]

The last updates from newspaper reports on Kampung Pulo in 2017 informed that the remaining neighbourhood is still flooded from time to time, but in much less frequency and severity before the regeneration.[324] As some parts of Kampung Pulo are significantly lower than the river,

[319] The Jakarta Post, 'Events behind Kampung Pulo Clash', The Jakarta Post, 2015, http://www.thejakartapost.com/news/2015/08/20/events-behind-kampung-pulo-clash.html.

[320] The Jakarta Post, 'Violent Eviction of Poor in Kampung Pulo', The Jakarta Post, 2015, http://www.thejakartapost.com/news/2015/08/20/violent-eviction-poor-kampung-pulo.html.

[321] Audrey Santoso, '27 Warga Kampung Pulo Diperiksa karena Diduga Terlibat Bentrok (27 Kampung Pulo Dwellers Arrested To Participate in Riot)', liputan6.com, 2015, http://www.liputan6.com/news/read/2298118/27-warga-kampung-pulo-diperiksa-karena-diduga-terlibat-bentrok; Wanda Indana, 'Metro | Bentrok Warga vs Satpol PP Di Kampung Pulo Telan 4 K (Clash Between Dwellers and City Security in Kampung Pulo Left Four Injured)', 2015, http://news.metrotvnews.com/read/2015/08/20/422820/bentrok-warga-vs-satpol-pp-di-kampung-pulo-telan-4-korban-luka.

[322] BBWSCC, Current and future agenda of Ciliwung River Development, 2015. This number is smaller than the overall unit affected that were still waiting for relocation in the time of data collection of this study.

[323] Ramadhan Rizki Saputra, 'Warga Gusuran Tercekik Biaya Rusun Sepeninggal Ahok (The Evictee Unable to Afford the Housing Cost After Ahok)', CNN Indonesia, 2017, https://www.cnnindonesia.com/nasional/20171101083735-20-252612/warga-gusuran-tercekik-biaya-rusun-sepeninggal-ahok.

[324] Kristianto Purnomo, 'Mengapa Kampung Pulo Dan Bukit Duri Masih Dilanda Banjir? (Why Kampung Pulo and Bukit Duri Is Stil Flooded?)', KOMPAS.com, 17 February 2017,

Figure 41. The Public Works Agency-employed contractor developing a concrete river terrain with inspection pathways in the right side at the end of 2015. (Source: the author's documentation)

the water often rises from their gutter during high water level.[325] With this bordered riverbank, the neighbourhood now significantly relies on pumping machines to relieve any inundation and pump it back into the river.[326]

Despite the construction of river border and eviction of the riverbank dwellers (See Fig.41 for the construction process of such edge), traces of waste are still found throughout the river and the areas around the neighbourhood. For example, a year after the relocation in 2016, the neighbourhood gutters were still blocked with waste that inhibits water flow.[327] It is argued that traces of waste and continuous inundation demonstrate connections between *kampung* neighbourhoods, the river and the wider city spaces; despite significant attempts to demarcate them. Understanding maintenance practices, particularly waste practices create an opportunity to understand these connections in a more integrated way.

5.3 Dwellers waste practices data and analysis structure

This research explores waste practices of 60 different dwellers in the Kampung Pulo neighbourhood (See Table 8), as a sample study among 3,809 households within the neighbourhood. Between 2014-2015, these dwellers were approached based on their dwelling proximity with the river basin and the disputed status of their dwelling. As can be seen in Fig.42, their dwellings locations were also distributed in a variety of positions within the neighbourhood, to ensure cross coverage of the neighbourhood's different geographies.

The data presented in Table 8 organises dwellers backgrounds by listing their occupations, and the location of their home workplace (if located away from home); and toilet availability (as also specified in Fig.42). The table also informs locations of dwellers household waste disposal area in the neighbourhood.

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[325] Robertus Belarminus, 'Warga Kampung Pulo: Saya Keluar Rumah, Tahu-Tahu Sudah Banjir Selutut - (Kampung Pulo Dweller: When I Go out, the Water Has Reached My Knee)', KOMPAS.com, 16 February 2017, http://megapolitan.kompas.com/read/2017/02/16/12153061/warga.kampung.pulo.saya.keluar.rumah.tahu-tahu.sudah.banjir.selutut.

[326] Sumardi, 'Stigmatisasi, Justifikasi, Hancurkan! Pola Sistematik Peminggiran Warga Miskin Kota Jakarta 2015–2016 (Stigmatise, Justify, Destroy! The Systematic Pattern of Marginalisation of the Urban Poor in Jakarta 2015-2016)'.

[327] Michico, 'Tak Ada Lagi Banjir Di Kampung Pulo, Melainkan Selokan Penuh Sampah (There Is No Flood Anymore in Kampung Pulo, Just a Gutter Full of Waste)'.

No.	Resp.	Occupation	Economic Space	Waste Location	Toilet
2014					
1	F	Soto babat seller	Neighbourhood gate 5	Neighbourhood gate 5	In mother's house
2	U	Grocery seller	Home	**River**	**No**
3	I1	Employee/Neighbourhood security	Outside neighbourhood	Neighbourhood gate 5	Yes
4	A1	Grocery seller	Home	**River**	Yes
5	S1	Warteg seller	Home/Jatinegara market	Jatinegara market	**No**
6	M1	Kolak seller	Daughter's house (unknown)	Neighbourhood gate 4	Daughter's house (unknown)
7	R1	Housewife	-	**River**	**No**
8	S2	Housewife	-	River	Yes
9	S3	Pensionary/ Soto seller	Neighbourhood gate 3	Neighbourhood gate 3	Yes
10	S4	Pensionary	-	**Neighbourhood gate 4 / river**	**No**
11	E1	Housewife	-	**River**	**No**
12	I2	Meat soup seller	Home	Neighbourhood gate 3	Yes
13	N1	Housewife	-	Neighbourhood gate 3	Yes
14	Y1	Employee/grocery seller	Outside neighbourhood	Neighbourhood gate 3	Yes
15	T1	Employee/Grocery seller	Outside neighbourhood / home	Neighbourhood gate 3	Yes
16	E2	Housewife	-	**River**	**No**
17	R2	Lupis seller	Home	Neighbourhood gate 2	Yes
18	A2	Ready made snack seller	Home	**River**	**No**
19	R3	Cleaning maid	Neighbour's house	Neighbourhood gate 3	**No**
20	D1	Traditional sweets seller	Home	**River**	**No**
21	D2	Housewife	-	**River**	**No**
22	E3	Housewife		Neighbourhood gate (number not specified)	Yes
23	M2	Instant noodle and ice seller	Home	**River**	Yes
24	M3	(sell meals with daughter)	Daughter's house	**River**	Yes
25	S4a	Housewife	-	**River**	Yes
26	S5	Housewife	-	E6 (trash bin)	**No**
27	S6	Snack and beverage seller	Home	E9	Yes
28	Y2	Grocery seller	Home	Concrete trash bin	Yes
29	I3	Grocery seller	Home	Concrete trash bin	Yes
2015					
30	J1	Washing maid/food seller	Neighbour's house / home	Neighbourhood gate 5	**No**
31	M4	Housewife	-	**Neighbourhood gate 4 / river /grass field**	Yes
32	S7	Housewife	-	**Neighbourhood gate 4 / river /grass field**	**No**
33	S8	Housewife	-	**Neighbourhood gate 4 / river /grass field**	**No**
34	S9	Fritters maker	Home	**Neighbourhood gate 4 / grass field**	**No**
35	H1	Rice seller (fritter during Ramadhan)/washing maid	Home	Neighbourhood gate (number not specified)	**No**
36	H2	Motor service	Outside neighbourhood	**River**	Yes
37	N2	Washing maid	Home	Neighbourhood gate (number not specified)	**No**
38	Y3	Beverage seller	Home	**River**	**No (with her sibling)**
39	E4	Unemployed	-	Grass field	Yes
40	I4	Tubun clothes seller	Jatinegara market	Neighbourhood gate 4	Yes
41	N3	Fritters seller	Home	Neighbourhood gate 4	Yes

Table 8. Respondents detailed data: occupation, the location of dwelling, working, waste disposal area, and toilet availability (Source: compiled by the author from respondent data)

This chapter is focused on the production, accumulation, and movement of household and litter waste in the neighbourhood spaces; which may lead to waste disposal or displacement. This thesis defines disposal as the act of placing waste in the space where it will be removed or treated, while displacement of waste abandons the waste without any consideration of further treatment. In this sense, disposal does not strictly mean placing the waste to a bin, but merely a way of situating waste that ensures further treatment of the matter.

The case study exploration starts by drawing dwellers overall routes in situating their household waste in accordance with their daily movement. Informed by coded narratives of dwellers, this chapter highlights the different types of waste disposal routes and investigates the detailed experience of dwellers in spaces where they perform their waste practices.

5.4 Tracing neighbourhood's waste practice routes

The observation highlights 12 different spaces used for household waste and litter disposal in and out of the neighbourhood (See Fig.43). Some disposal spaces are located outside the neighbourhood, from the peripheral sidewalk outside the neighbourhood gates, to the waste container and along the sidewalks around the adjacent public market.

RIVER

River next to dwelling

River next to open space

VACANT SPACE

Grassy fields

Site of ruins

OUTSIDE NEIGHBOURHOOD

Sidewalk around market outside the neighbourhood

Sidewalk outside the neighbourhood gate

GUTTER

Gutter next to dwelling

Gutter next to open space

Gutter next to neighbourhood market

SIDEWALK

Sidewalk next to houses

Sidewalk next to a vacant space

Sidewalk next to a stall occupying the main path

Figure 42.12 waste disposal spaces found in and out of the neighbourhood (Source: drawn by the author)

Figure 43. Locations of respondents' dwellings in Kampung Pulo as approached in 2015-2016 (Source: drawn by the author based on fieldwork data)

Some disposal spaces were identified inside the neighbourhood, which consist of vacant neighbourhood spaces, from grass fields to abandoned dwelling sites due to flooding. Some of these spaces have been used to compile and burn waste. Displaced waste around the neighbourhood was also found in some parts of the river periphery, and the gutters and sidewalks in some areas of it.

Discussion in Chapter 2 has claimed that the riverbank neighbourhood dwellers in Jakarta who live in proximity with the river will displace their waste to the river. While some participants' interviews show that this claim possesses some validity, [328] the map of dwellers waste disposal routes in Figure 43 demonstrates that dwellers disposal pattern aremuch more complicated. There were a number of dwellers disposing of waste in spaces further away (Fig.44c), despite living next to the river. In reverse, there were also dwellers disposing of waste in the river despite living further away from it (Fig.44a). There were also dwellers disposing both to the river and other places in and outside the neighbourhood (Fig.44b). This conflicting occurrence of disposal shows the need for a thorough understanding on the overall dwellers' movement, instead of merely relying on proximity between dwelling and disposal points. The following section will explore more on such complexities.

5.4.1 Regular routes of movement in and outside the neighbourhood and potential space of disposal

Some of the dwellers' routines while working, shopping, playing, and hanging out create movement across the neighbourhood. Some dwellers dispose of waste along these movements, particularly for disposal to spaces outside of the neighbourhood (See Fig.45). For example, some dwellers stated that they dispose of their waste in the neighbourhood gates, while going outside to the Jatinegara market for a daily shopping trip:

> "….just wait (to dispose of) until tomorrow while buying fish (in the market)."[329]

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[328] N3, Kampung Pulo maintenance practices field notes, 2015. N3 states that she disposes of waste to the river as it is near her house.

[329] S7, Kampung Pulo maintenance practices interview.
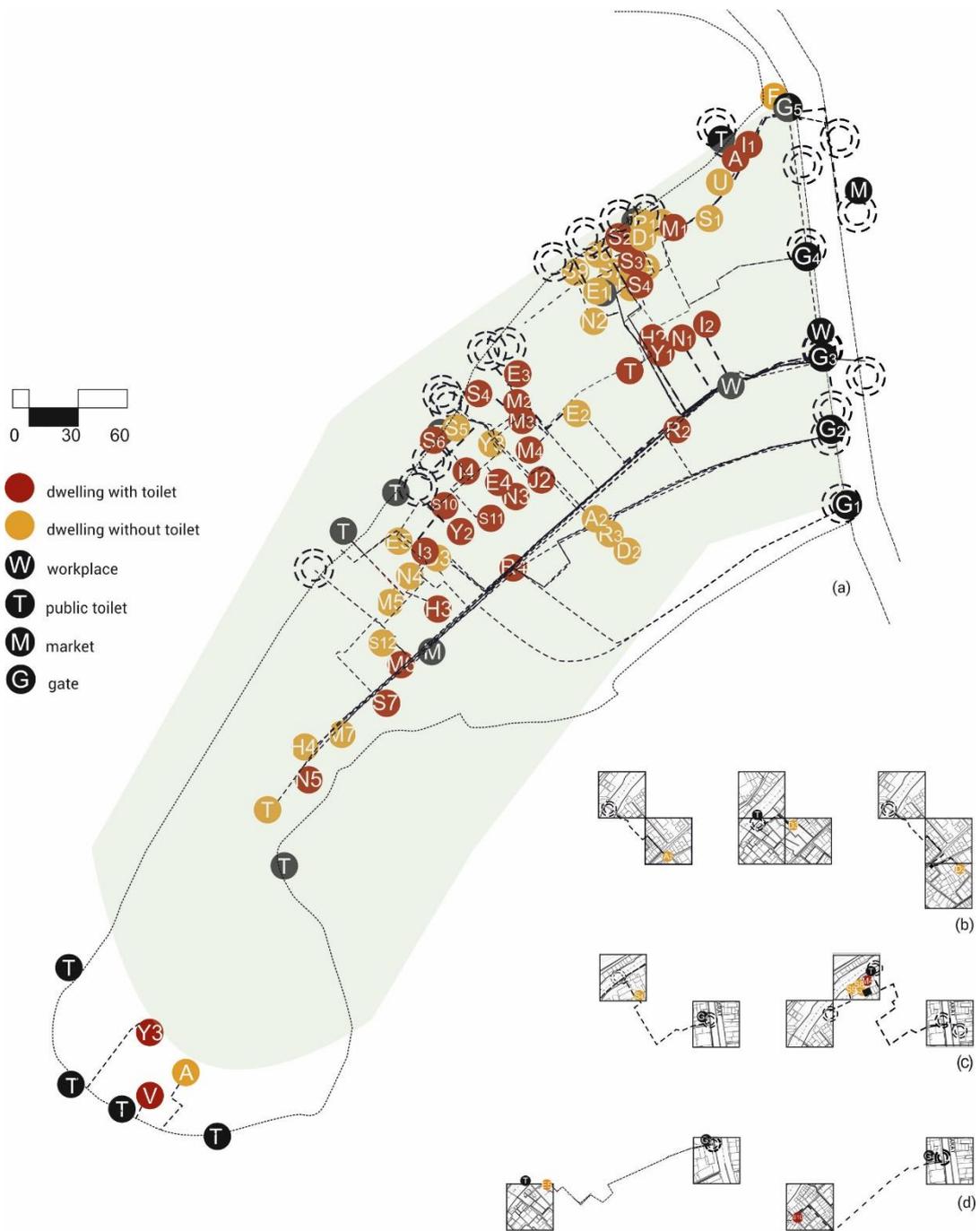
Figure 44. (a) Overall waste disposal routes of Kampung Pulo respondents, (b) routes of some dwellers who dispose waste to the river even from 200 m distance, (c) routes of some dwellers who dispose to the river and the street, and (d) routes of some dwellers who dispose to the street further away despite their dwelling located in the vicinity of the river (A more complete drawing of routes can be found in the Appendix) (Source: drawn by the author)
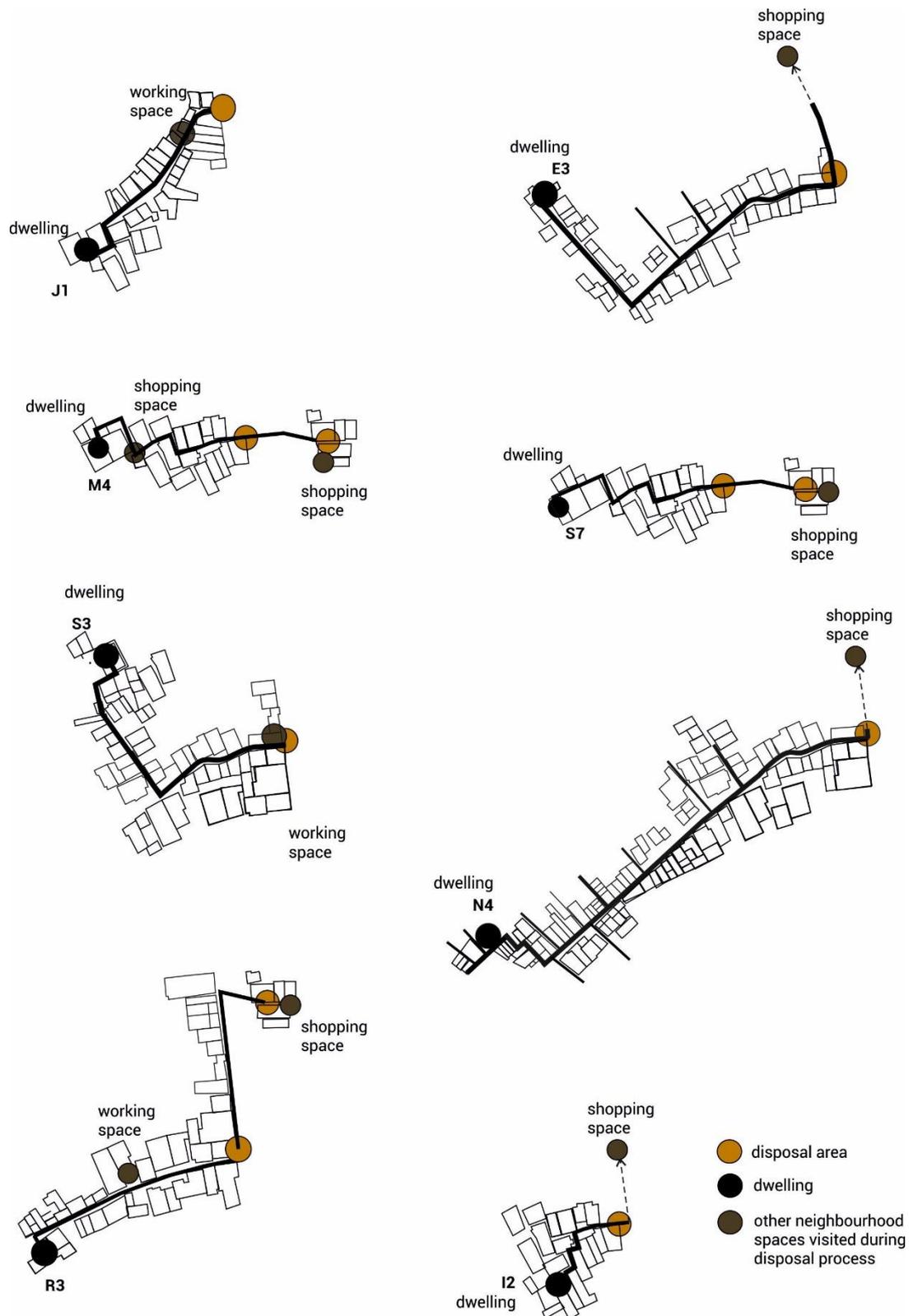
Figure 45. Some examples of the dwellers' routes who dispose of their waste while going elsewhere, from shopping place, leisure space, or working space in and outside of the neighbourhood (Source: drawn by the author)

Some other dwellers stated that they often dispose of waste outside the neighbourhood while going to their workplace as a laundry maid or as a cleaning lady in their neighbour's house[330]:

> "Yes, there isn't anyone (who collects waste)….So (I) use a plastic bag to throw (waste) near the front (of the neighbourhood gate) when I was going to take (people's) laundry…" [331]

Some dwellers also dispose of their waste while going around outside the neighbourhood for a leisure time with family, as illustrated by a dweller who disposes of waste while taking an afternoon stroll with her grandchild:

> "Night or afternoon (is better for disposal) as (when) I go around outside, my (grand)child can also be brought outside (to play)…(The waste) is not much (as) I throw (waste regularly) everyday…(Sometimes) it's me (who dispose of the waste), (sometimes) its (my grown) child…or anybody (who can). When somebody is going out of the neighbourhood, (then) they just take (the waste) with them, just whoever has (the opportunity)…"[332]

It is argued that the regularity of this movement creates the potential territory where they can perform their waste practice. Disposal to other areas that they do not live in or do not regularly pass through (such as other neighbourhood groups space) are considered wrong for the dwellers.[333] S7, a local dweller states that she only disposes waste to the neighbourhood gate that she usually crosses daily:

> "(We could go to) gate 5, but it is quite further away, it is not that far, the neighbourhood post (in gate 5) is even further. But it is more for people from around gate 5 only."[334]

The map indicates that some dwellers walk to relatively far distances to dispose of their waste, indicating that regularity shapes the territories more than proximity between dwellers' dwelling to the disposal location. An example is H1, who lives quite far away (See Fig. 42a) but

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[330] R3, Kampung Pulo maintenance practices field notes, 2014.

[331] J1, Kampung Pulo maintenance practices interview.

[332] M4, Kampung Pulo maintenance practices interview, 2015.

[333] H2, Kampung Pulo maintenance practices field notes, 2015.

[334] S7, Kampung Pulo maintenance practices interview.

disposes of his household waste in the neighbourhood gate every night.[335]

Dwellers who have less regular movement are more vulnerable to waste displacement. Some food sellers and grocery sellers do not stock regularly and rarely go outside the neighbourhood. An example is D1, a local sweet snack producer who only goes to the market once a week, and usually disposes of her daily waste straight to the river located next to her house.[336] Another example of the absence of regular movement can be seen in Y3's case. She lives in the furthest part of the neighbourhood (radius 600 m from the main street outside it). She is an older participant who lives alone with her husband and rarely goes outside the neighbourhood (for shopping or other needs). She complained that it is hard for her to bring the waste outside the neighbourhood and therefore she chooses to displace in the river:

> "(I) still throw waste in the river, (at) night. Nobody collects them, (it is) hard. (But it is) also hard to bring it to the (neighbourhood gate in the) front." [337]

D1 and Y3 experience show that the dwellers regularity of movement is influenced by dwellers backgrounds and habits, and the nature of their occupations; shaping the production and disposal process of their waste. As indicated in M4's narrative, dwellers who care for younger children, or dwellers who regularly cook tend to move more frequently around the neighbourhood. In contrast, dwellers who are not working, living on their own or who have older children have less regularity of movement,[338] and are more likely to displace their waste. Y3's experience also demonstrates the importance of the dwellers' accessibility to other spaces in and outside the neighbourhood for more options of disposal. The map in Fig.122 demonstrates that waste is increasingly being displaced in dwellers occupying areas far away or less accessible from the neighbourhood gates.

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[335] H1, Kampung Pulo maintenance practices field notes, 2015.

[336] D1, Kampung Pulo maintenance practices field notes, 2014.

[337] Y3, Kampung Pulo maintenance practices interview, 2015.

[338] N3, Kampung Pulo maintenance practices field notes.

5.4.2 Dispersal of dwellers' living spaces and options of space of disposal

While the previous section primarily discussed waste disposal performed during movement, this section highlights disposal during occupation of a space. Some dwellers occupy multiple spaces beyond their dwelling, creating dispersal of their living spaces and expansion of the territory of potential disposal waste. Figure 46 demonstrates the different pattern of living spaces dispersal.

One of the dispersal demonstrated in the drawing is a family's occupation of multiple dwelling spaces across the neighbourhood (See Fig.46 on F and M5-N4 dwelling spaces). Due to limitation of spaces, some extended families may occupy multiple dwellings together. Some of these dwellings are located close to each other,[339] however, some interviews note that some dwellers also occupy multiple dwellings located relatively far away from each other. The families may split household and childcare roles within such dwellings. [340] Some families even share economic roles, for example, cooking food in the parents' family dwelling and selling it in the daughter's dwelling.[341]

Occupying multiple dwellings in different areas has some benefit, as the other dwellings might have better facilities, such as a better bathroom or better quality of water. It is also possible that the other house is located in an area that is more profitable for the home business. For example, F, a meat soup seller, lives in a dwelling with his mother, but rents a dwelling space 200 m away to be used as a kitchen to sell the soup in the alley near the neighbourhood gate (See diagrams in Fig.47). Other than being more profitable, this area is also safer to be used during the flood, as demonstrated in the following passage:

> "(The one who sells meat soup in the neighbourhood gate) lives in front of the small mosque. (But he) cook in the (house) in the corner (of the gate). His house is over here in the area below. His kitchen is up there (in the gate)…So if it is flooding he can still cook in the upper part (of the neighbourhood). (Because) if it is flooded (down here) the upper part is not flooded yet. So, the house in the above area is better used for cooking. " [342]

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[339] S9, Kampung Pulo maintenance practices field notes, 2015.

[340] N4, Kampung Pulo maintenance practices field notes, 2015.

[341] M1, Kampung Pulo maintenance practices field notes, 2014.

[342] S3, Kampung Pulo maintenance practices field notes, 2014.
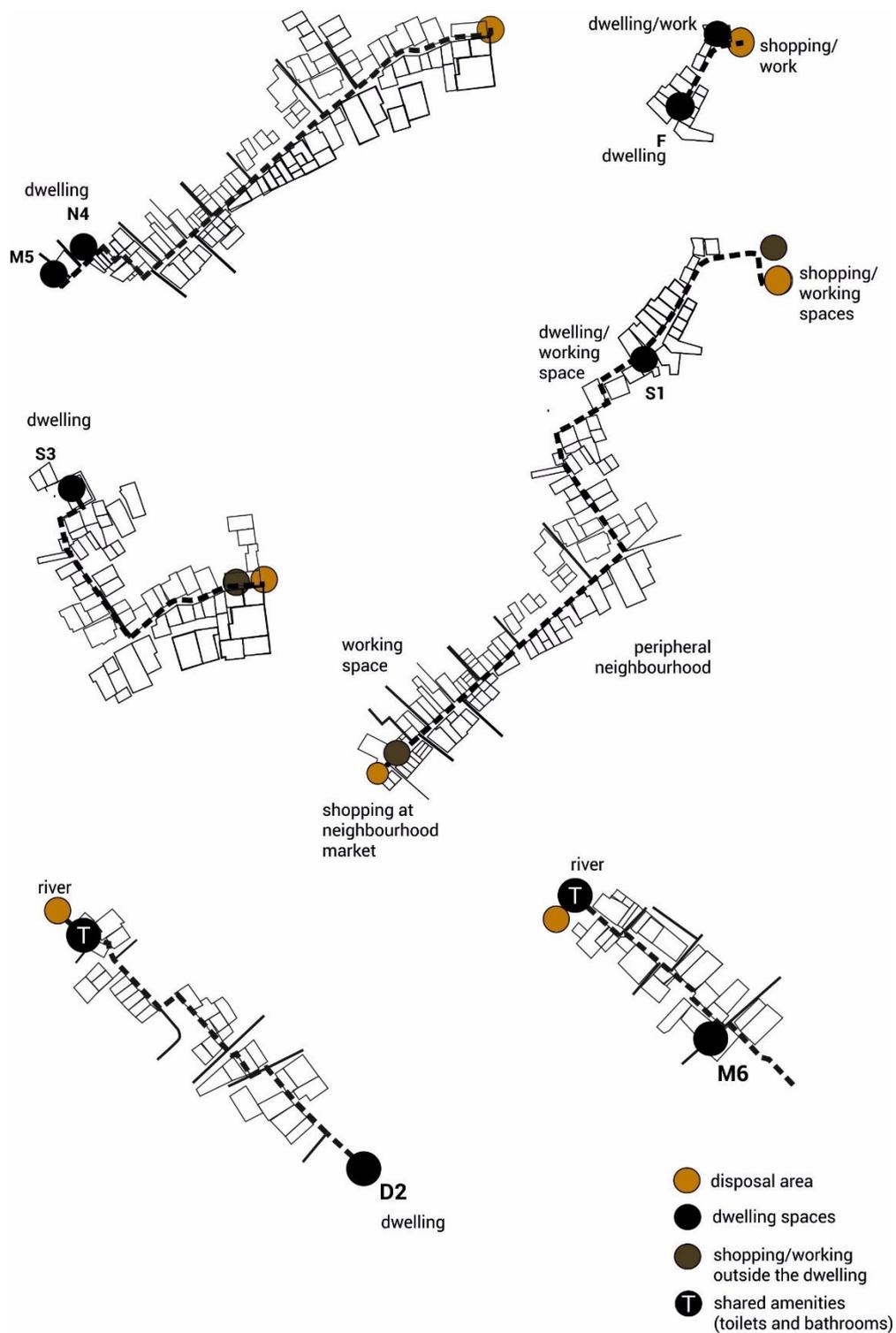
Figure 46. Examples of some dwellers dispersed dwelling space due to movements of working and shopping (e.g S1 who go to different shopping place or S3 who works outside), occupation of multiple dwelling spaces (F, M5, and N4) or the use of shared amenities (D2 and M6) (Source: drawn by the author)
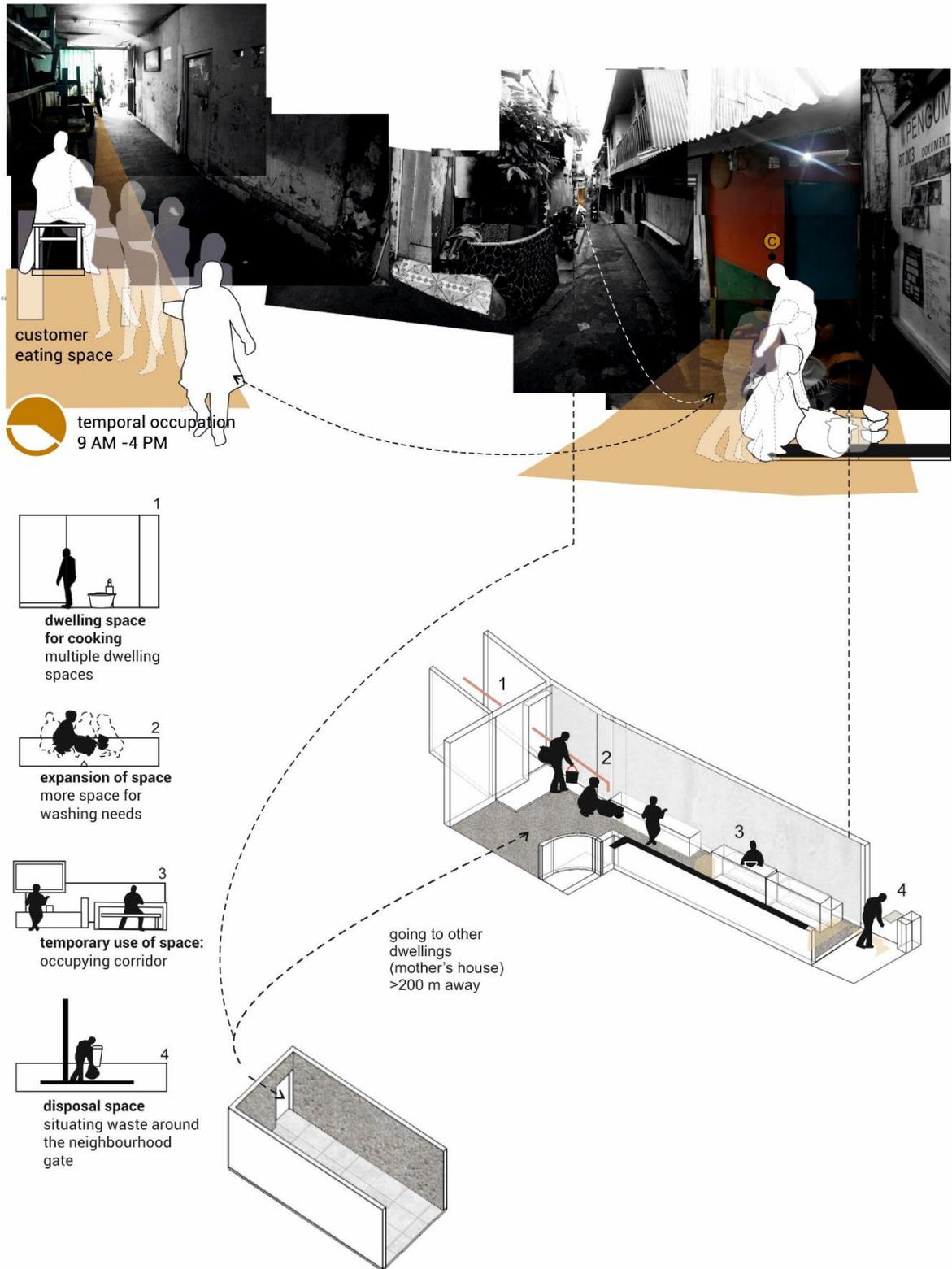
Figure 47. Dispersal diagram of F's living spaces. F occupied multiple dwellings for different needs. One dwelling was used as a kitchen for his trading space, while the other dwelling was used for other domestic activities with his extended families (Source: drawn by the author)

Multiple occupations of spaces in the neighbourhood change accumulation of waste beyond their own dwelling space, widening territory of disposal space. For example, F and S3 who both own a dwelling near the river dispose household waste in the neighbourhood gate. Their home businesses are located around the neighbourhood gate, making it more practical to bring their household waste and dispose of in the neighbourhood gate.

Dispersal of living spaces drawing in Fig.46 also highlights that other than occupation of multiple dwelling, occupation of shared amenities also influences territorial dispersal (e.g. M6 and D2 routes). Table 8 shows that 20 out of 28 dwellers who displace waste in the river do not have access to a toilet and therefore tend to use a public toilet located from 0-200 m around the dwelling.

The interviews highlight areas around the public toilet as a prominent spot to displace waste, as the toilet creates access to the river.[343] Based on the observation, dwellers do not necessarily dispose of waste while going to or occupying the toilet, however, such regular use of shared amenities creates familiarity and regularity of movement that enables them to potentially dispose in such area.

Figure 46 highlights that dispersal of living spaces can also be contributed by the different way dwellers do their daily activity in different spaces of the neighbourhood. S1 stated that she alternates her shopping spaces, between two markets around the neighbourhood, and disposes between the two options as follows:

> "Sometimes (my husband) likes to dispose of waste in the late afternoon to evening when he goes to the Kramat neighbourhood market. If (he) only has time at night he will do it at night. Around 8 or 7.30 PM or after Maghrib (around 7), it is not fixed, it depends on what he prefers. If he wants to do it at night, it will be at night, if it is in the morning, then it will be in the morning. Morning is the time to shop for fish (in Jatinegara market), but for vegetables, it is bought at night time (in neighbourhood market)."[344]

This section annotates the living spaces dispersal contributed by occupation of multiple dwelling spaces, shared amenities, and other spaces visited by dwellers; expanding potential waste disposal territory.

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[343] D3, Kampung Pulo maintenance practices field notes, 2015; E5, Kampung Pulo maintenance practices field notes, 2015.

[344] S1, Kampung Pulo maintenance practices interview.

This expansion demonstrates that dwellers may dispose their waste in different ways instead of in one generic way.

5.5 Drawing experience of disposal in space

While Section 5.4.1 and 5.4.2 emphasise more on the dwellers' overall routes of movement in spaces across the neighbourhood, this section investigates more on the detailed experience of dwellers disposal. Instead of thinking of waste disposal as a generic and one-off process, the thesis argues that Kampung Pulo dwellers tailor their ways of doing waste disposal in accordance with their experience of the neighbourhood spaces.

5.5.1 Relations between accumulated waste forms and potential space of disposal outside the neighbourhood

This section draws the link between forms of household waste accumulated by different kinds of dwellers and their corresponding space of disposal around the neighbourhood (See Figure 48). Based on this drawing, the following passages further explore how dwellers assess the appropriateness in situating different types and quantity of waste in a space with certain spatial qualities.

For example, participants who dispose waste in the Jatinegara market usually work as vegetable or food sellers with dominantly organic waste. There is a similarity between the type of their waste and the types of waste produced from the market, making the market an appropriate space of disposal. One of the market seller participants commented that his goods are "bought in the market, thrown in the market".[345]

Some dwellers perform different ways of disposal for each type of waste. As an example, S7 said that she only disposes of dry waste in the neighbourhood gate, but displace her wet waste in the river.[346] She explained that wet waste is inappropriate to be situated in the street due to its smells, as the street is also a space that is shared by others.

> "It is smelly if (we) keep it or if we put it in the neighbourhood gate, it is (located) straight to the street, the fish insides (is not appropriate to be there)…"[347]

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[345] M8, Kampung Pulo maintenance practices field notes, 2015.

[346] S7, Kampung Pulo maintenance practices interview.

[347] S7.

Non-working dwellers with kids · non-working dwellers · vegetable/tofu sellers · meat/spices seller · food seller with multiple menu · snack/coffee sellers

displaced to the river

forms of waste

small quantity

large quantity

smelly waste

dry waste

vegetable debris

open disposal space in the market · contained disposal space in the market · neighbourhood gates
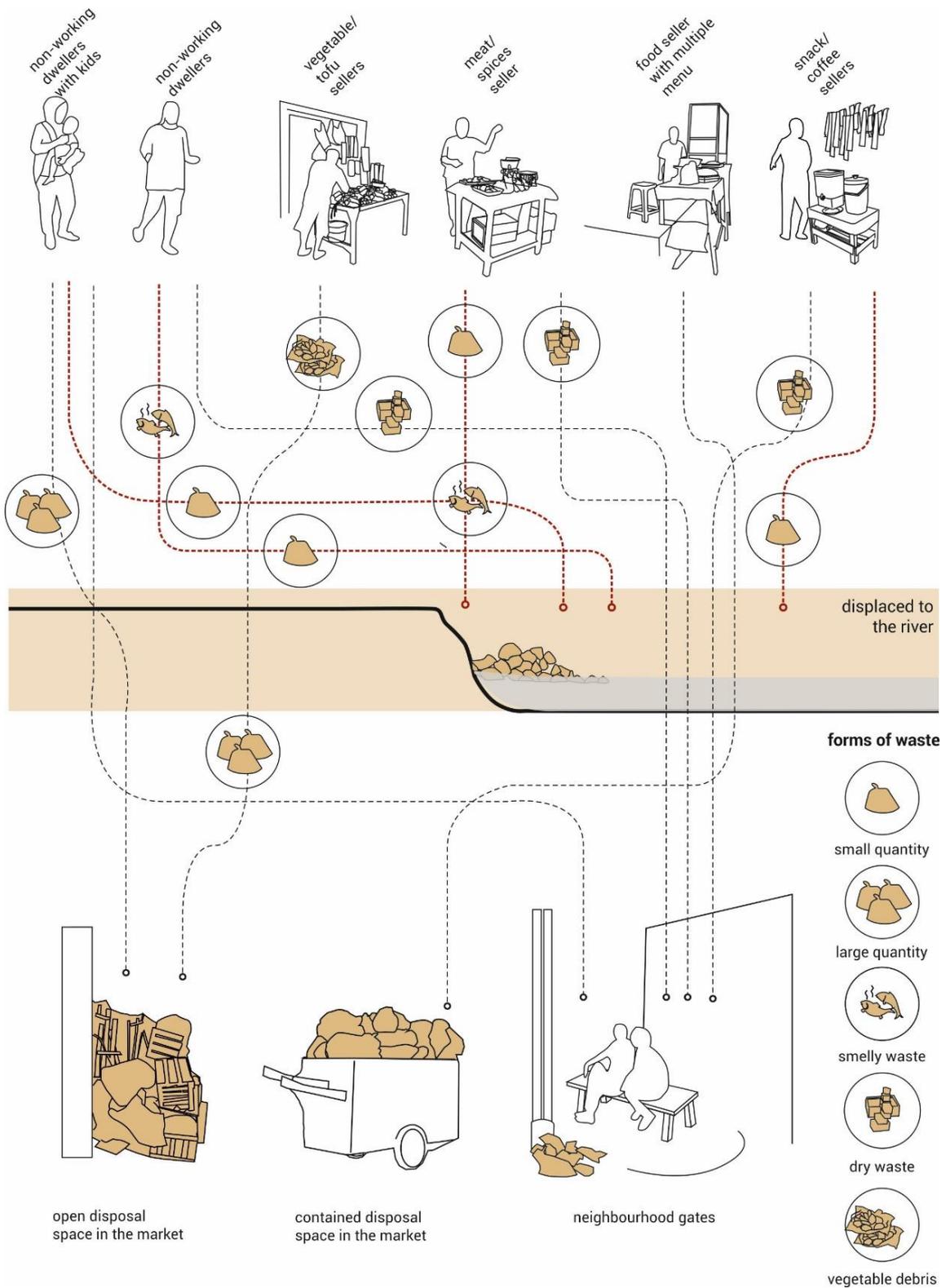
Figure 48. Diagram of dwellers' different forms of accumulated waste and their corresponding space of disposal outside the neighbourhood (Source: drawn by the author)

A similar concern of disposing wet waste is also stated by another dweller, who explained that the area around the neighbourhood gate is often used for selling food, and therefore it is inappropriate to dispose of waste around eating areas:

> "It is not prohibited (to throw waste in the neighbourhood gate), but (when) there is (already) somebody selling food there, it is not okay if (for example) there is a smell around a meat soup stall."[348]

Other than the type of waste, the quantity of waste that can be disposed of in a particular space also influences disposal decision. Vegetable/food sellers with large quantity of waste dispose in the Jatinegara market as the disposal area in the market can contain such size of waste. For example, S1, a food seller, prefers to dispose of her waste in the market as there is sufficient space:

> "There used to be a big garbage bin in front of local St. Maria School, but it has been moved. So S1 compiles all of her garbage daily and disposes of it in Jatinegara market where she usually shops in the morning. There are two cartwheels at the market that can be used to dispose of the garbage from the market."[349]

The quantity of waste that can be disposed in the neighbourhood gate is rather limited. A local snack seller stated that she had been prohibited from disposing of waste in the gate,[350] while other dwellers note the street cleaner refusal to take large quantity of waste:

> "(I don't put waste in the neighbourhood gate, because) I am afraid that it will not be collected, sometimes the cleaning men are lazy. If it is not being collected, it will accumulate and becomes smelly…Sometimes the cleaning men dislike sweeping the area, particularly when everyone is putting their waste over there…"[351]

With such refusal, dwellers adapt their disposal practice, disposing smaller quantity and dominantly unorganic waste in the neighbourhood gate. The dwellers also tailor their time of disposal, by secretly disposing in the gate before the street cleaner arrives to reduce the risk of refusal. Disposal in the gate usually takes place during the night or early morning:

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[348] S1, Kampung Pulo maintenance practices interview.

[349] S1.

[350] D1, Kampung Pulo maintenance practices field notes.

[351] S1, Kampung Pulo maintenance practices interview.

"But usually at night, if the kids are asleep, I went outside to throw waste. It is often me who throw to the street."[352]

"We like to see first, the stack in gate 4. If when we go out (in the morning) there is a lot (of waste), (we can) just put it there to be taken away by the cleaning men. If it is already empty, (it means) we are late."[353]

However, when they are late and the street cleaners have arrived, the dwellers will adjust and dispose of their waste elsewhere.

"(If we are late) then we (would just) cross to the market, as (their waste) has not been picked up. We cross, just a little bit further, put the waste, and (it is) done. (This is) around 9 AM…"[354]

Figure 48 demonstrates that conflicts between waste forms and disposal space also influence displacement to the river. As mentioned earlier, S7 said that she would dispose of her wet waste (such as wet plastic from buying fish) in the river. Dwellers with small quantity of waste are also more reluctant to walk to other disposal space, leading to disposal to the river, as discussed below:

"(But as we are) human, there are still some (dwellers) who throw waste to the river…If it is wet, it goes to the river, if it is not much it goes to the river…" [355]

The above passage points out that the experience of space of disposal is not only limited to the actual space where waste is situated, but also the journey of accessing such space. The experience of waste practices considers both potential disposal space and the journey taken by dwellers to situate their household waste.

5.5.2 Collective waste disposal inside the neighbourhood based on the connection with neighbours

This section addresses how some waste is collectively situated and treated in neighbourhood spaces. Some dwellers collectively accumulate household waste, taking turns burning it when it has reached a certain quantity. Figure 49 draws the different positions of such collective waste spaces in the neighbourhood.

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[352] S7, Kampung Pulo maintenance practices interview.

[353] S7.

[354] S7.

[355] M4, Kampung Pulo maintenance practices interview.

Some of these waste spaces are open and directly accessible from the main neighbourhood street, such as concrete waste containment found near the playing field located by the river (See Fig.49a and Fig.50). Y2, a local groceries seller describes that this concrete bin was constructed as part of local university charity work for the Kampung Pulo dwellers.[356] Local dwellers living adjacent to this particular waste bin compile their waste in the bin and take turns burning it. The concrete bin creates a clear and contained space to accumulate waste, located in a space some distance from another dwelling so that the burning process can be done safely.

Some collective disposal spaces are somewhat hidden and located in secrecy. Secrecy of burning waste is achieved by disposing in spaces away from the main path or locating it in a hidden corner of the neighbourhood. These hidden spaces are found in the grass fields and sites of ruins across the neighbourhood, where waste will be compiled, either in the middle or in the corner of the space for burning (See Fig.49 b and d, and Fig.51). The hidden location of these spaces means that dwellers can only appropriately dispose of accumulated waste to such space when it is part of their territorial routes as discussed in Section 5.4.2.

Secrecy is needed as the act of burning is not always agreed by everyone, mainly when it is located in a space in close distance to the dwellings around it. A dweller thought that burning waste would still make the neighbourhood dirty[357] as it still left traces in the burning sites. Secrecy of collective disposal space is also essential to prevent people other than local dwellers around it to dispose of litter or accumulated household waste in that space, particularly where there is no clear border of the waste containment space itself such as the concrete bin.

The observation found individual waste accumulation space in the neighbourhood. An example is J1, who disposes and burns waste in a small nook of the alley next to her house (See Fig.49 c and Fig.52). While this area is not used collectively, waste from children playing in the path in front of her house often leads to disposal in J1's stack of waste.

The collective accumulation and treatment of waste in Kampung Pulo indicates the relations with other people and their space in situating

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[356] Y2, Kampung Pulo maintenance practices field notes, 2014.

[357] E2, Kampung Pulo maintenance practices field notes, 2015.
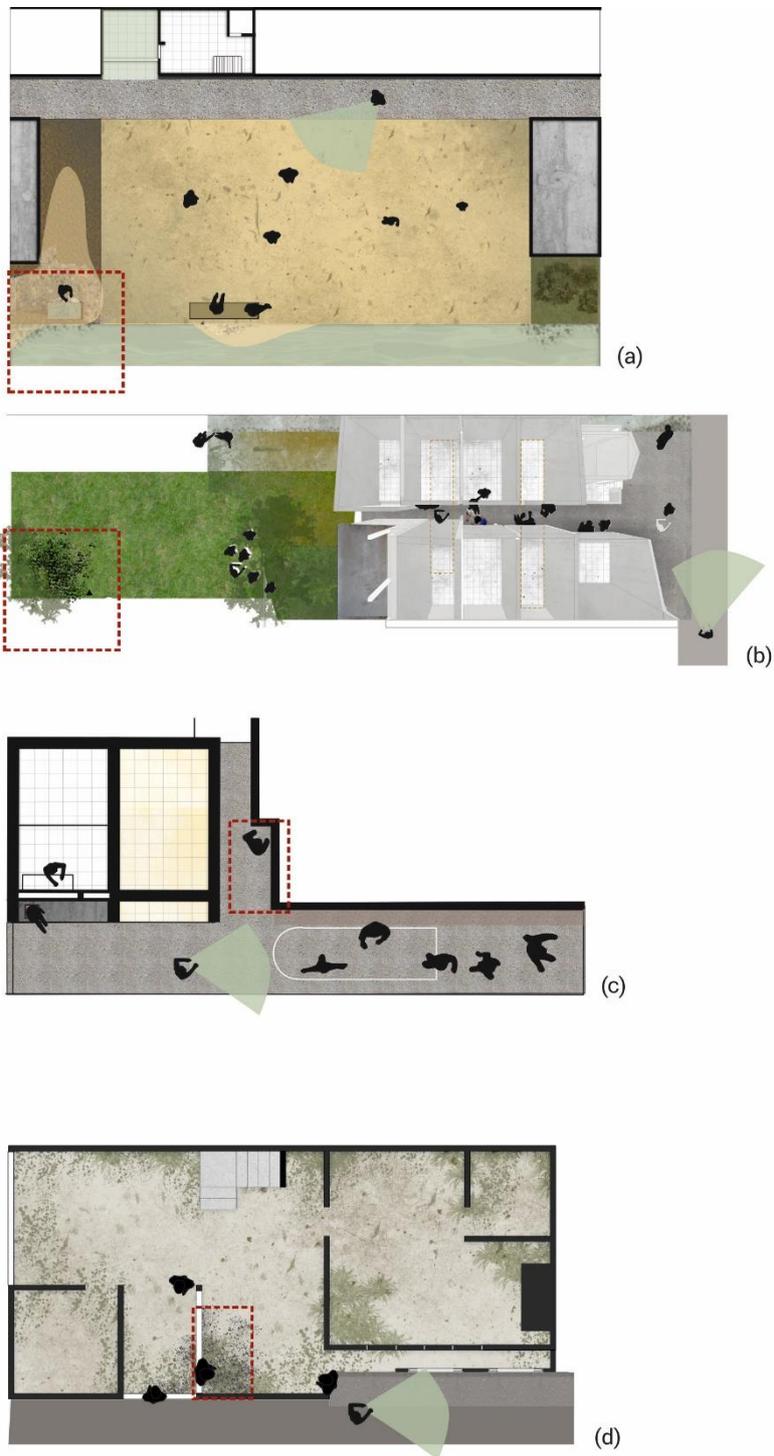
Figure 49. Examples of sites of collective waste burning in Kampung Pulo neighbourhood, from (a) open collective disposal near the playing field (b) hidden collective disposal in the middle of the grass field (c)small disposal area in the alley's corner (d) collective disposal area in the abandoned dwelling lot (Source: drawn by the author)

Figure 50. Concrete garbage bin where Y2 dispose of waste regularly. (Source: the author's documentation)

Figure 51. The privately-owned grass field used to compile and burn waste (top right) (Source: the author's documentation)

Figure 52. J1 is moving through the alley with nook where she occasionally burns her waste. (Source: the author's documentation)

one's waste. It is essential to have a proper neighbour relation for some dwellers to dispose and treat waste collectively. This practice, however, is limited to neighbouring dwellers with tight knit connection with each other. Without such connection, waste may accumulate without anybody treating it, and this may lead to displacement. For example, a participant complained that waste often emerges and is stacked in front of his dwelling alley (without him knowing), leaving him treating it on his own reluctantly. To avoid having to deal with this waste and burn it, he then resorts to displace this waste to the river.[358]

This occurrence shows how the connection between neighbours influences disposal and can be uneven across the neighbourhood. The uneven connection between dwellers can also be influenced by dwellers' differences, influenced by their tribe backgrounds (coming from different tribes), home ownership (renting or inheriting), or length of stay in the neighbourhood (new dwellers or old dwellers (at least more than ten years). [359] In this sense, areas dominated by newer dwellers or certain dwelling types (such as boarded house or rental dwellings) potentially limit collective waste initiatives, leading to more risk of waste displacement.

Availability of shared spaces (open or hidden) in the neighbourhood is also essential as burning waste requires sizeable space to compile and burn with a significant distance from other dwellings.[360] The scarcity of open spaces in the densely populated neighbourhood also limits collective waste disposal,[361] and contribute to waste displacement.[362] The following section explores further on the connections between waste displacement and neighbourhood shared spaces.

5.5.3 Vulnerability of disposal for waste produced in shared neighbourhood spaces

While Section 5.5.1 and 5.5.2 focus more on household waste disposal, this section emphasises waste that is produced and accumulated in shared spaces, such as neighbourhood alleys, neighbourhood market, neighbourhood field space, and so on. With lack of space, during the day,

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[358] S11, Kampung Pulo maintenance practices field notes.

[359] Y3, Kampung Pulo maintenance practices interview.

[360] Y2, Kampung Pulo maintenance practices field notes.

[361] Y3, Kampung Pulo maintenance practices interview.

[362] Y2, Kampung Pulo maintenance practices field notes.

dwellers use these spaces for hanging out, playing, or doing economic activities. The thesis argues that the waste produced in shared spaces is more vulnerable to displacement. This section explores the experience of waste practices in these shared spaces.

Displacement of waste produced in hidden shared spaces

As demonstrated in previous sections, there are a variety of shared spaces in the neighbourhood. This section focuses on understanding displacement in the neighbourhood shared spaces. An example of such space is open spaces and dwelling alleys around M4's dwelling (See Fig.53). Fieldwork observation demonstrates that M4 displaced waste collected from her dwelling alley to the river nearby.

The waste disposed in the alley includes traces of food and beverage packaging consumed by the children and adults during playing and hanging out in such space. There is a significant quantity of bottled beverages, as access to portable water is scarce. For example, S7 stated that her children refuse to drink boiled water due to the smells of the groundwater pipe, and always ask to buy a beverage from nearby groceries seller:

> "…the kids rarely drink (boiled water), (they) drink bottled water…A (her oldest son) always buys bottled water. These kids do not want to (drink boiled water), particularly J (her youngest child). She (also) does not want boiled water. Sometimes it is not smelly, (but she would say) no mum, just buy bottled water, there is a grocery stall here (nearby)…"[363]

Figure 53. Displacement of waste found in grass field which was being used as laundry hanging space, where children also play around. (Source: the author's documentation)

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[363] S7, Kampung Pulo maintenance practices interview.

displacement around child's play space

displacement around neighbourhood path

A-A'

B

B'

A

A'

B-B'
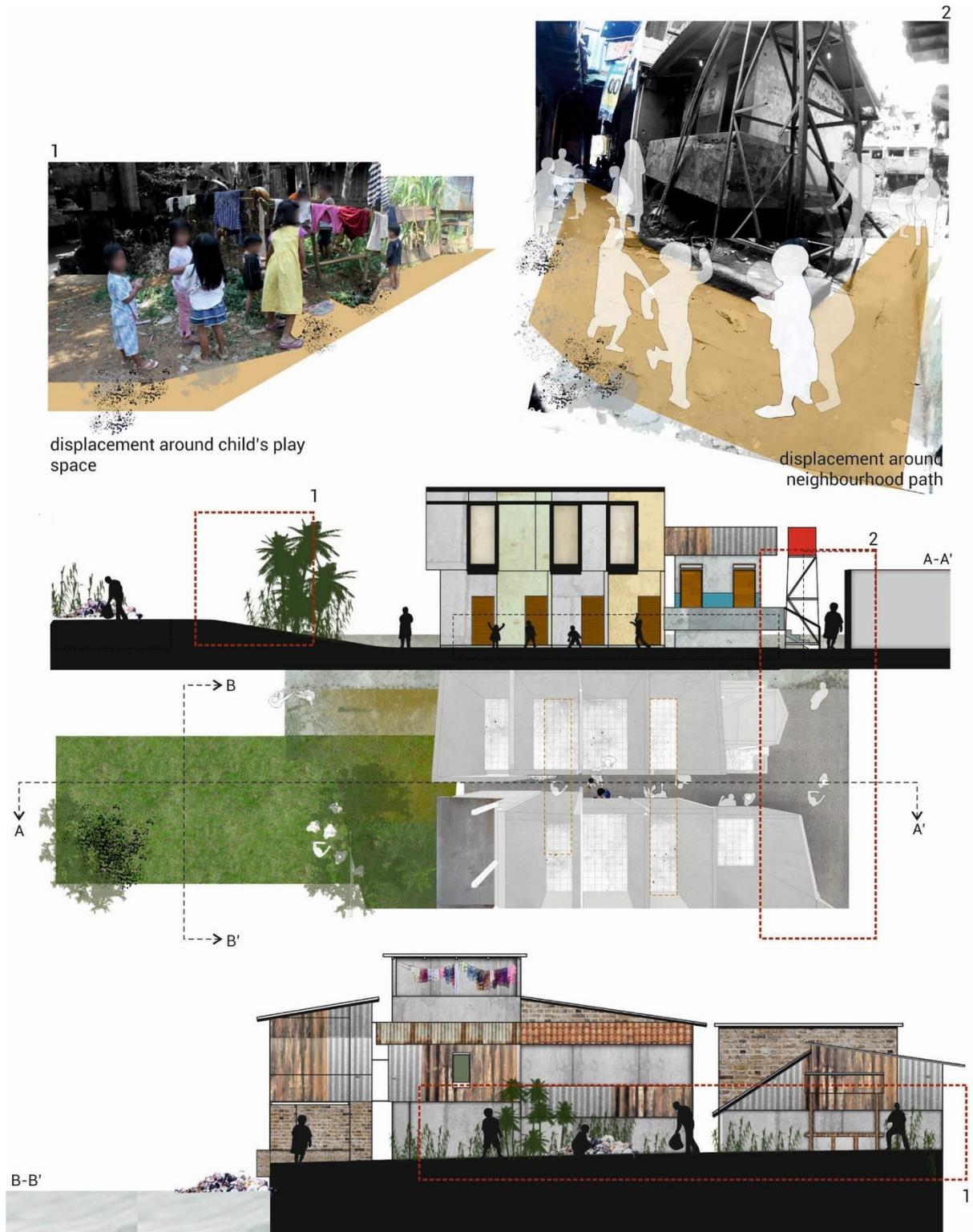
Figure 54. Examples of displacement in hidden shared space in Kampung Pulo neighbourhood (1) displacement around child's play space and (2) displacement around neighbourhood alley (Source: drawn by the author)

Waste produced from the collective activities in shared spaces such as the alley is vulnerable to displacement as it cannot be returned to the dwellers' dwelling as part of the dwellers' household waste. A similar trace of displaced waste in shared space is found alongside the grass field that has been used for play space, laundry hanging area and the shared resting area (see Fig.53 and Fig.54 (area 1)).

I argue that the position and orientation of these shared spaces in relation to the neighbourhood street significantly influence the displacement. The displacement of waste takes place near the river basin which is accessible through a small river opening instead of a big river embankment (see Fig.54 and Fig.55). This opening is mainly hidden from the main neighbourhood path, creating a concealed space to displace in the river. Traces of waste in shared spaces also increasingly worsen when these spaces are located in areas with less visibility to the main neighbourhood street.

Figure 55. One of the neighbourhood alleys with stacks of waste in the river opening at the end of the alley (Source: the author's documentation)

Displacement of waste spilt to the areas around the neighbourhood street

Other than in the concealed alleys and grass fields, displacement of waste is also found in some spaces along the main neighbourhood street, such as neighbourhood gutters, sidewalks, and abandoned sites along the street. The observation notes that waste that is being disposed around the neighbourhood street evolves from activities around the street. The neighbourhood gutters and sidewalks conditions in many parts of the neighbourhood were relatively clean, but they were increasingly dirty around areas with spaces for hanging out activities and areas around dwellings that sell groceries.

The observation shows that dwellers hang out primarily around businesses that sell quick, ready-made food, such as instant noodles, coffee, and beverages, creating consumption waste displaced around the sellers' dwellings. Some of these sellers also have longer opening times and located near crowded neighbourhood space such as the playing field, leading to increased hang out time and an increased production of consumption waste that is vulnerable for displacement.[364]

Another example of hanging out activities around the neighbourhood path can be seen in the presence of a phone credit stall that was built above the sidewalk nearer the neighbourhood gates (See Fig.56). The stall is attached to the dwelling wall, creating a nook which then allows dwellers to hang out during the day. This nook also creates a pocket of space that accumulates a significant volume of waste from the phone credit stall and dwellers consumption activities in the area.

Figure 56. A phone credit stall (yellow shed) occupying the sidewalk of a neighbourhood street (Source: the author's documentation)

Another example of hanging out activities around the gutter can be seen in the children hanging out around the neighbourhood street (See Fig.57). The children employ spaces above the gutter as sitting space while parking their bicycles nearby, sometimes buying drinks and snacks from the vendors around the street. The waste produced from this consumption activities is often displaced to the gutter, creating piles of waste that fill the open gutter along the street.

[364] I3, Kampung Pulo maintenance practices field notes, 2014.

Figure 57. Consumption waste being displaced in the gutter around a busy neighbourhood market occupying the sidewalk (Source: the author's documentation)

Other than the consumption activities, food and groceries preparation activities can also lead to displacement to the gutter and the sidewalk. A food seller shows how she prepares her food in her terrace before serving, which potentially leaves some waste such as the banana leaves and some food debris to the neighbourhood path along the movement of the sellers and the buyers (See Fig.58 top drawing).[365] The quantity of waste increases with more complexity of the food preparation process:

> "Normally I don't even throw anything, maybe just a little bag I bring it to the front. But, if I sell food, my waste does increases…"[366]

Some dwellers also perform preparation activities above the gutter itself, such as the neighbourhood market sellers, who prepare vegetables or meat through the activity of peeling and repacking.[367] Drawing in Figure 58 (bottom drawing) demonstrates that market sellers have separate spaces for preparation of vegetables and meat, that covers the neighbourhood gutter. The vegetable sellers with a portable cart will move elsewhere after they finish trading, and he waste produced on the table will be cleared away and disposed outside the neighbourhood as discussed. However, waste spilt from this table is often displaced away in the gutter and in the neighbourhood path.

Apart from the waste displacement to the gutter and the sidewalks, observation shows there is also displacement from the neighbourhood

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[365] S1, Kampung Pulo maintenance practices interview.

[366] J1, Kampung Pulo maintenance practices interview..

[367] N5, Kampung Pulo maintenance practices field notes, 2015.
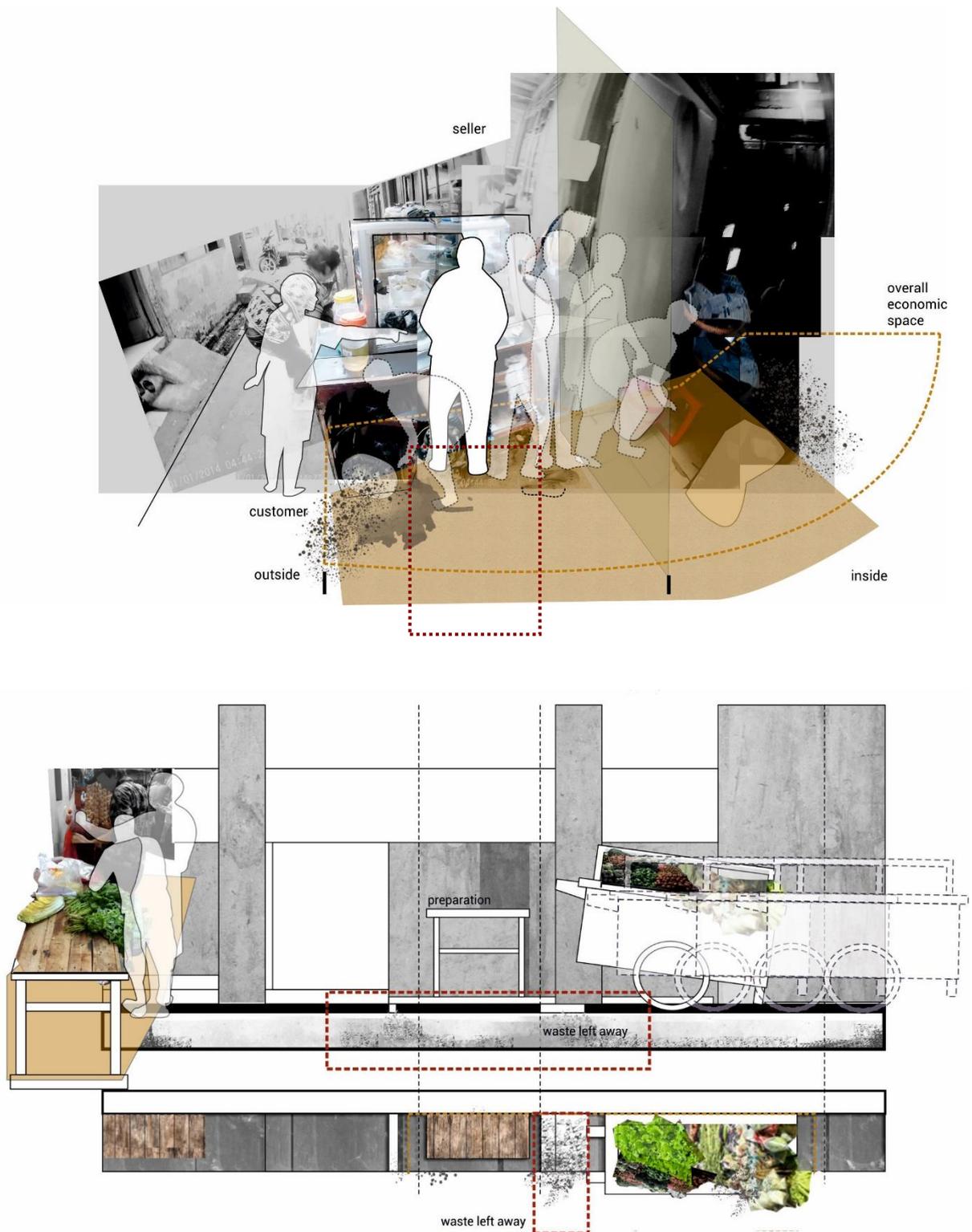
Figure 58. Displacement in the gutter left by food preparation activities at home (Top drawing) and displacement in the gutter left by grocery preparation activities (Bottom drawing) (Source: drawn by the author)

street to neighbourhood spaces around it. Some dwellers displaced some litter waste to spaces along the street, such as waste disposed into the sites of ruins located next to the neighbourhood path as seen in Figure 59.

Figure 59. Waste disposed around one of the sites of ruins in the neighbourhood (Source: the author's documentation)

The waste displaced to these spaces may consist of waste from both consumption and preparation activities. Although Section 5.5.2 has also annotated household waste disposal in the sites of ruins, such waste usually takes place in the sites' hidden corner. In comparison, the litter waste displaced in these sites is located only in the parts of the space that are most accessible from the street. These different waste positions show how one space can be used by different dwellers for their various waste practices.

6. Pesing Koneng Neighbourhood Market Maintenance Practices Study

6.1 Introduction

This chapter presents the second case study taking place in Pesing Koneng temporary market, West Jakarta; starting with the spatial and political overview of the market. It outlines the data collection and analysis process of the case study, focusing on the clear out practices in subversively occupied space. The Pesing Koneng case study analysis starts by exploring the connections of local actors of maintenance and other market actors that allow the market to evolve and operate. This thesis then explores the clear out process in Pesing Koneng neighbourhood market, detailing the ways vendors repack structures and goods and remove waste individually and collectively.

6.2 Spatial and political overview of Pesing Koneng neighbourhood market

6.2.1 Spatial overview

Pesing Koneng market is a local neighbourhood temporary market taking place in the span of a 500 m modest two-way Pesing Koneng street, Kedoya, West Jakarta (Fig.60). The market spans between Pesing Koneng Neighourhood District 1 and District 2, both are two densely populated neighbourhood districts or Rukun Warga (RW) in Kedoya, which are separated by a train crossing (Fig.61). A large part of the market is mostly located within the District 2 neighbourhood territory, as the dimension of the street and pedestrian spaces in it are much broader. The market is situated next to the Sekretaris river, an ancillary river of Ciliwung river. The Sekretaris river is severely contaminated and has become shallow due to the large volume of waste in it, creating an unpleasant smell along the market.

The buildings existing alongside Pesing Koneng street comprise of mixed types, such as a school, shops, houses, rental houses, and public amenities such as a mosque and a security post (See Fig.60 for locations of mosque and security post). There is also an empty field inside the neighbourhood used by vendors for parking and storage (See Fig.60 for locations of the gates).

DISTRICT 5

DISTRICT 2

DISTRICT 2
LEADER'S
HOUSE

SECURITY
POST

MOSQUE

SEKERTARIS
RIVER

MARKET'S
STORAGE/
PARKING LOT

GATE KEEPER
OFFICE

LOCAL THUGS'
COFFEE SHOP

DISTRICT 1

DISTRICT 1

0   30   60

🟠 market's amenities
🔵 split condition
//// economy space
▭ main street/path
▭ open space
▭ pedestrian space
⋯⋯ railways
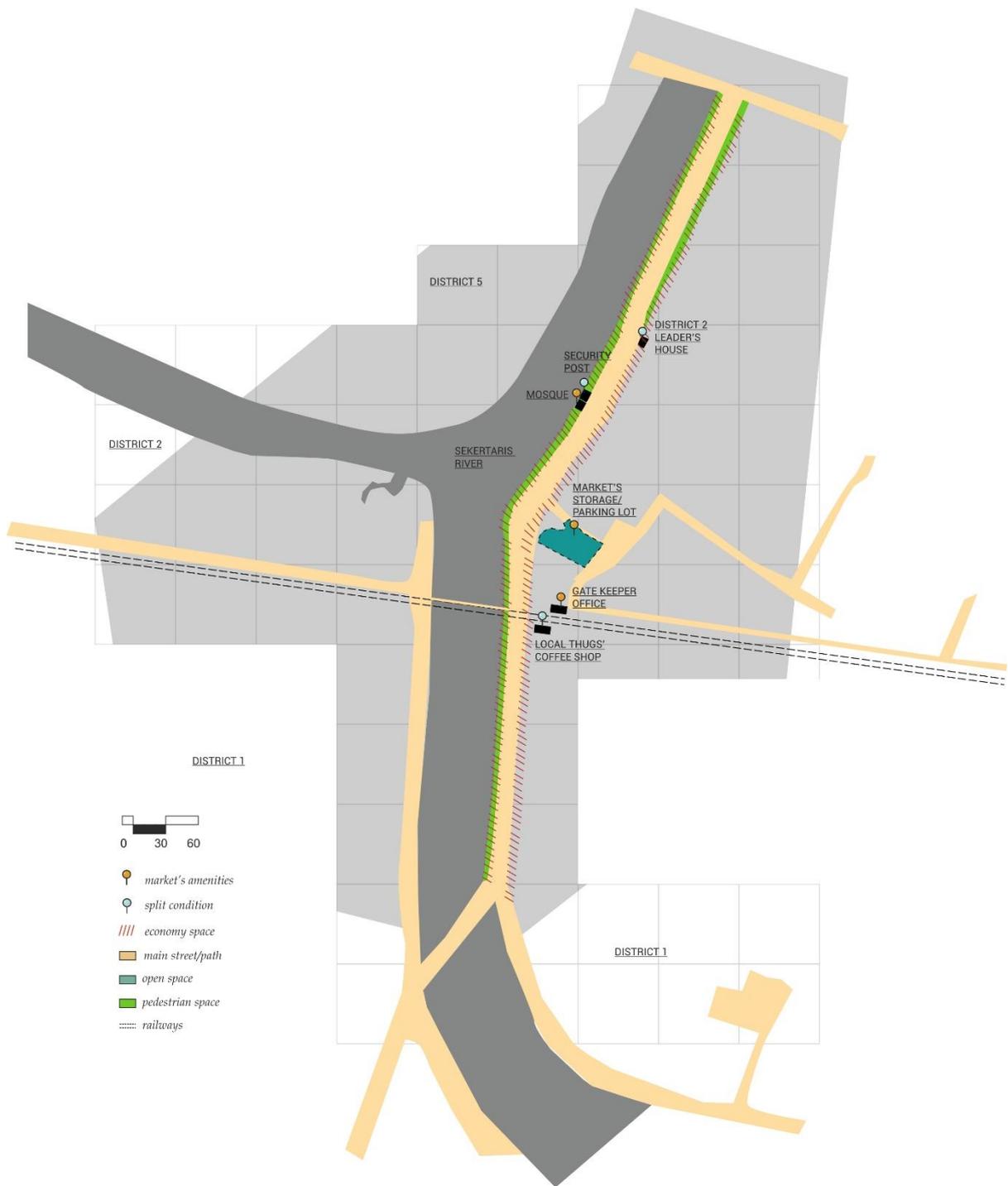
Figure 60. Pesing Koneng neighbourhood market site map (Source: drawn by the author)

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Figure 61. Train crossing area in the middle of the market looking towards District 1. (Source: the author's documentation)

By 2016, Pesing Koneng neighbourhood market accommodates up to 316 sellers[368], creating an array of makeshift stalls and tents on the neighbourhood peripheries and at the pedestrian of the river terrain. These sellers take turns operating on two different shifts, which is early morning (2 AM to 11 AM), and afternoon to around midnight (4 PM to 11 PM).[369] The early morning market vendors mainly sell food and other perishable items, while the afternoon market sells mainly clothes and accessories, with a few food and groceries sellers as well.

6.2.2 Political contestation overview

Figure 62 draws the contestation timeline of Pesing Koneng neighbourhood market. In early 2015, the Jakarta Deputy Governor ordered relocation of overflowing vendors to a nearby official market building called Pasar Kedoya to restore the obstructed traffic. Pasar Kedoya was deemed suitable for relocation as in that year the market accommodated around 688 units, with 300 of them currently empty.[370] Despite the initial refusal of the vendors, the regional

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[368] KontrasNews, 'Dalam Waktu Dekat PKL Pesing Koneng Jakarta Barat Akan Di Tertibkan'.

[369] These different time shifts are the official market time from the local authority, despite the fact that some sellers were still trading beyond 11 AM to the afternoon based on the narratives.

[370] Yuanita, 'Pemprov DKI Segera Relokasi PKL Pasar Pesing Koneng (Jakarta Regional Government Will Relocate Pesing Koneng Informal Traders Soon)', SINDOnews.com, 17 April 2015, https://metro.sindonews.com/read/990779/170/pemprov-dki-segera-relokasi-pkl-pasar-pesing-koneng-1429282021.

fully occupied pedestrian

2015

January
Deputy governor inspecting the market space, planning for relocation to nearby official Kedoya Market

May
forced relocation of street vendors

June
vendors returning to Pesing Koneng market space

Local police's remarks:
'We already put a flower pot so the traders can't occupy the pedestrian. But instead they have moved it.'

'When it is already troublesome (full), we will not tolerate it. We will evict (again).'

idle pedestrian with remains of vendors structure

2016

August
Plans to inhibit trading by banning trading times and cutting electrical resources

November
Proposal to buy 500 sqm land nearby Pesing Koneng to relocate all the vendors

pedestrian demolished and moved towards the river

December
Google map examination shows that the pedestrian area has been moved towards the river (see figure in the left), demolishing existing pedestrian and leaving the mosque.

Figure 62. Timeline of Pesing Koneng neighbourhood contestation between 2015-2016. (Source: drawn by the author)

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currently empty.[371] Despite the initial refusal of the vendors, the regional government continued to deploy the municipal security officer to evict the street vendors in May 2015. Yet, shortly after, in June 2015, the vendors had gone back to their original trading place. It was reported that the lack of visitors in the Kedoya market and higher operational costs for renting the market space have caused the vendors to return.[372]

The disconnection between regional/municipal and local authority discussed in Chapter 2 inhibited daily supervision of the area, leading to tendency for a repetitive eviction.[373] The newspaper report in August 2016 stated that the vendors were again evicted but later returned again to their original area.[374] In this sense, instead of securing the area daily, the municipal security officers are often only able to perform actions when the vendors have been a significant challenge to public life.

While the local neighbourhood district authorities are the ones that can detect the amassing vendors sooner, they have actually been supporting the vendors' existence in Pesing Koneng. For example, responding to the government's plan of eviction, the neighbourhood District 2 leader stated that the government should not relocate the vendors all at once as they had been trading in the area for an extensive period,[375] demonstrating their support. Despite warning by the regional government to enforce stricter trading times to avoid traffic jams (only until 7 AM) and cutting the power supply,[376] I argue that the persisting presence of market vendors signifies the support for street vendors operation despite such threats from the government.

The latest condition of Pesing Koneng neighbourhood through the Google Street View in March 2018 shows that the area is still heavily used by the street vendors, however, some part of the street in Pesing

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[371] Yuanita.

[372] Intan Fauzi, 'Pasar \'Liar\' Pesing Buat Pedagang Pasar Jaya Kedoya Merugi', metrotvnews.com, March 2015, http://news.metrotvnews.com/read/2015/03/28/377854/pasar-liar-pesing-buat-pedagang-pasar-jaya-kedoya-merugi.

[373] TP Moan Simanjuntak, 'PKL Kuasai Jl Pesing Koneng - Beritajakarta.Com', http://www.beritajakarta.com/, 2016, http://www.beritajakarta.com/read/34780/pkl-kuasai-jl-pesing-koneng.

[374] Simanjuntak.

[375] KontrasNews, 'Dalam Waktu Dekat PKL Pesing Koneng Jakarta Barat Akan Di Tertibkan'.

[376] KontrasNews.

Koneng has been widened, taking up the river space (See Fig.62 in the timeline).

6.3 Neighbourhood market vendor data and framework of analysis

Pesing Koneng neighbourhood market observations collected visual information using sketches, photographs, and video recordings in area spans from the security post to the train crossing area. The study conducted interviews with 33 participants, to understand the actual operation and clear out practices of the market. The table organises the market study participants' data, listing their occupations, the location of their home, the source of their goods, and their working hours. This table is to be seen in accordance with the Pesing Koneng neighbourhood respondent location map in Figure 63.

The analysis of Pesing Koneng neighbourhood market study starts by understanding how the market evolves as subversive occupations, using diagrams and videos. The analysis explores ways of occupying spaces for trading and other market related activities, in addition to the appropriation of infrastructural resources such as water source and electricity. The analysis follows by outlining how these appropriations apply for different street vendors and influence the market's temporality.

This chapter then investigates the practice of clearing out the market as a temporary space. The explorations explore the different ways various street vendors repack and remove their goods and stall structures throughout the day, examining the individual waste disposal and organised cleaning process of the market as a whole.

6.4 Constructing the spatial and temporal territories of Pesing Koneng market

6.4.1 Territories created from mixed access to space and infrastructural resources

The overview of Pesing Koneng political contestation in Section 5.2.2 highlighted the support of the local neighbourhood district leader to the market's existence. The interviews stated that the neighbourhood district leaders coordinate the neighbourhood market[377] with the help of the security team of the neighbourhood district 2, an eight-person team

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[377] B1, Pesing Koneng maintenance practices field notes, 2014.

No.	Resp.	Living Area	Occupation	Source of supply/tools	Work time
2014					
1	E1	District 2	Clothing seller	Cipulir market/ bought with motorcycle every 2-3 days	14.00-23.00
2	U1	District 2	Market waste cleaner	Have 2 waste carts	06.00-12.00
3	M1	District 2	Local security	None	07.00-07.00 (24 hours shift)
4	B1	District 2	Neighbourhood authority/Material store owner	None	
5	S1	District 2	Housewife	None	Undefined Undefined
6	D1	District 5	Clothing seller	Tanah Abang/Mangga Dua market/ self bought	16.00-22.00 (also work in Kodam)
7	S2	District 2	DVD seller	Not disclosed	10.00- until finished
8	M2	District 2	Vegetables seller	Kramat Jati and Tanah Tinggi market	17.00-07.00
9	N1	Tangerang	Vegetables seller	Tangerang /delivered using pick up truck	01.00-11.00
10	D2	District 2	Vegetables seller	Induk market/delivered using truck (go to the market) with motorcycle	16.00-12.00 (afternoon the next day)
11	N2	District 2	Salted fish seller	Muara Angke market/ self bought using motorcycle/three wheeled scooter	02.00-12.00
12	I2	District 2	Vegetables seller (permanent shop)	Induk market/Kramat Jati market	12.00-11.00 (24 hours)
13	W1	District 2	Vegetables seller	Jembatan Lima market/shop every 2 PM using three wheeled scooter	03.00-05.00 and 17.00-22.00
14	S3	District 2	Grocery shop owner	Inpres market/shop every month	06.00-24.00
15	A1	District 2	Chicken porridge owner	self-made, ingredients from Pesing market	06.00-12.00 and 16.30-24.00
16	A2	District 2	Banana and coconut seller	Lampung and Pandeglang/delivered by truck to all coconut seller	03.00-12.00 and 14.00-16.00
17	A3	District 1	Coconut milk seller	Lampung/delivered by truck to all coconut seller	03.00-10.00
18	R1	District 1	Coconut milk, snack, syrup	Lampung and Tangerang/ delivered by truck to all coconut seller	03.00-12.00
19	S4	District 2	Coconut milk	Lampung/delivered by truck to all coconut seller	02.00-07.00 and 15.00-21.00
20	A4	E6	Coconut delivery man	None	Undefined
21	S5	District 5	Chicken noodle seller	Pesing Market and outside/delivered y motorcycle	11.00-22.00
22	I3	District 2	Jelly beverage seller	Local jelly producers	09.00-21.00
23	N3	District 2	Fruits seller	Angke market/self bought using three wheeled scooter	05.00-10.00 or 00.00 to 12.00
24	P1	E6 (next to her daughter's house	Yam, cassava, and banana seller	Jembatan Lima market/self bought using motorcycle or public transport	20.00-06.00 (the next day)
25	S6	Not disclosed	River cleaner	None	08.00-16.00
26	I4	5 km away	Tofu and tempeh seller	Pondok Gede, Srengseng, Tangerang/delivered using truck	02.00-08.00
27	J1	District 2	Secondhand TV seller and fruits seller	Kapuk/self-bought using pick-up	05.00-08.00 (for fruits) and TV seller all day
28	H1	Tangerang	Vegetables seller	Cengkareng/self bought using pick-up	00.00-12.00
29	S7	3 km away	Vegetables seller	Kampung Gusti/self-bought	05.00-12.00
30	N4	North Jakarta	Vegetables seller	Kenari market/self bought using motorcycle	05.00-11.00
31	S8	District 8	Railway gatekeeper	None	undefined
32	S9	District 2	Toilet guard	None	05.00-09.30
33	M3	District 8	Local security	None	06.00-06.00

Table 9. Pesing Koneng participant data (Source: compiled by the author from fieldwork in 2014)
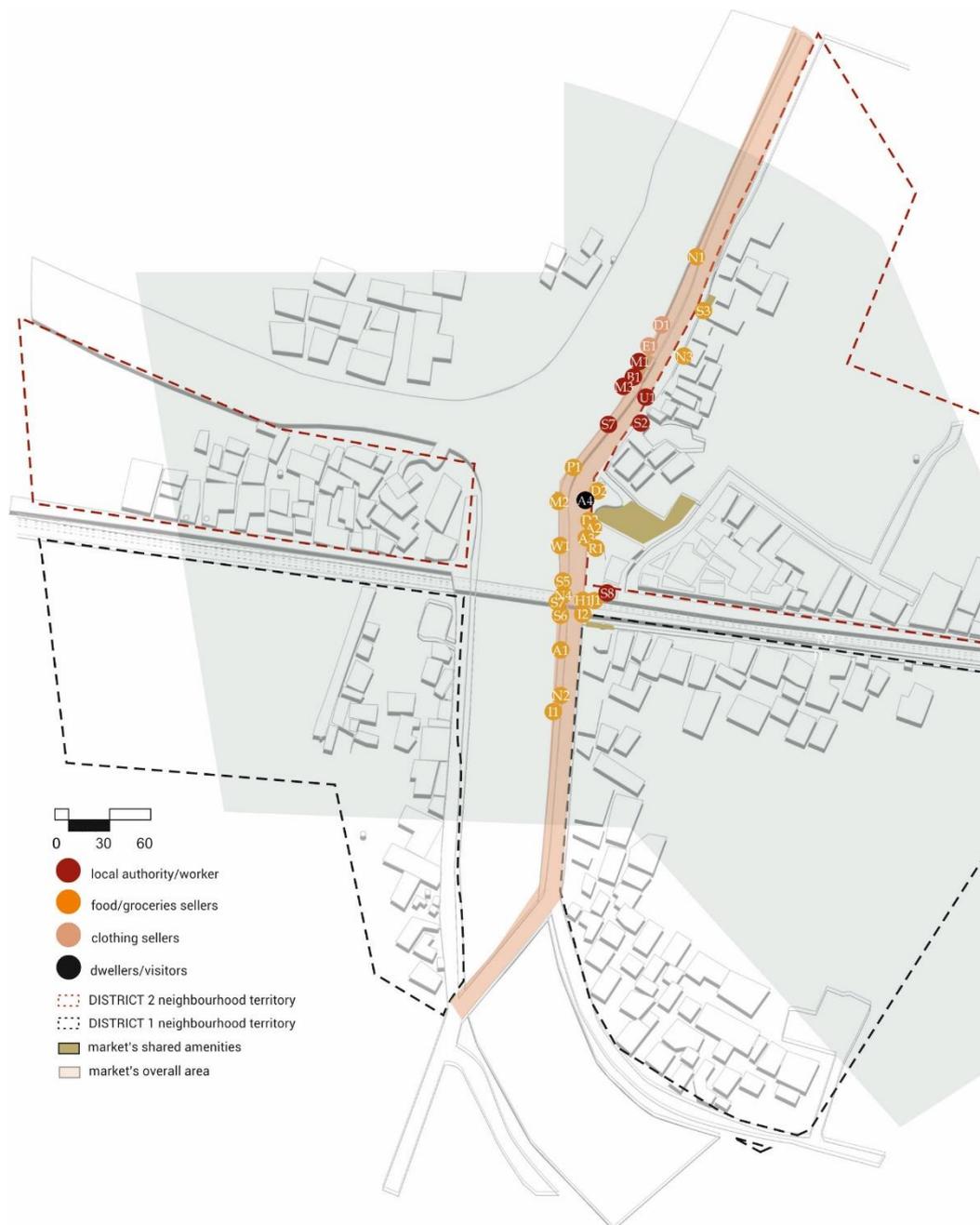
Figure 63. Pesing Koneng respondents' locations map and important spaces in the neighbourhood market (Source: drawn by the author)

taking turns in a 24-hour shift securing the neighbourhood and managing the market. [378] The security team resides in the security post that occupies the pedestrian spaces (See Fig.63 for location and Fig.64 for the security post image).

Figure 64. District 2's security team's post and mosque on the left side (Source: Google Street View, January 2017)

Despite such claims of coordination, the neighbourhood district leaders do not actually control everyone within the market and their actions. The act of security in Pesing Koneng neighbourhood market is what Kusno proposes in Chapter 2 as an 'elastic' form of security. Elastic security is the act of security that does not refer to the act of securing boundaries and provides an overarching sense of surveillance; instead focusing on connecting others and coordinating access to space and resources as an "imagined circuitries".[379] The diagram in Fig.65 aims to capture how such circuitries of connections enable access to space and resources.

Fig. 65 demonstrates a mix of appropriations of spaces in and around the neighbourhood, which are not entirely controlled by the security team. This thesis argues that some of these appropriations reflect contingent relationship as discussed in Chapter 3, demonstrating connections between different actors (e.g. vendors and security team) that happened without controlled hierarchies. An example is the relationship between vendors and the security team where vendors employ spaces and resources in coordination with the security team,

[378] M1, Pesing Koneng maintenance practices field notes, 2014.

[379] Simone, 'Cities of Uncertainty'.

+electricity for stall outside 50 m radius
+cost 0.4 pound per day
+ideal location for stall with low electricity needs

local generator
owner and operator

local people coordinating
traffic in train crossing

+grey water excess

local security officer
split condition actor

local installation
worker

local cleaner

temporary city waste storage

local scavenger/
waste removal

+food debris
+food packaging
+dirt

+complex structure for cloth
stall with elaborate structure
for lighting

+less complex structure for food
commodities and less lighting

local landowner for storage

local storage
coordinator

+additional furniture for added activities
(longer trading time)

local water seller
privately owned water pump

+food debris/packaging
from temporary seller

local home owner

local delivery man

private owners

local worker

split conditions
actor

vendors

+electricity for small business
in front of their homes
+sometimes also provide water supply
(for fish seller)
+cheaper at 2,5 pounds per month

Figure 65. Mixed access to space and
resources created from circuitries of
actors' connection in Pesing Koneng.
(Source: drawn by the author)

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such as the occupation of the large pedestrian areas around the security post. Another occupation example demonstrates coordination between vendors and locals, such as the occupation of privately-owned dwelling terraces[380] or shop fronts[381] (Fig.66), or occupation of neighbourhood empty field that is used as collective parking lots (Fig.67).[382]

Figure 66. Occupation of a local neighbourhood space as the vendors' parking lot (Source: the author's documentation)

Figure 67. Temporary stalls occupying shopfronts area (Source: the author's documentation)

While the security team only provide a reference of potential spaces,[383]they do not regulate the operation of all vendors who occupy the terraces or the parking lots. The vendors would negotiate directly

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[380] S5, Pesing Koneng maintenance practices field notes, 2014.

[381] D2, Pesing Koneng maintenance practices field notes.

[382] E1, Pesing Koneng maintenance practices field notes.

[383] E1.

with the local dwellers regarding the timing of use or any daily fee required.

Other than this contingent relationship, there are other relationships between vendors themselves, that allow them to share resources and responsibility collectively, such as taking turns occupying a space[384] or sourcing goods together.[385] Maintenance in space occupied based on such contingent relationship often becomes partial, as the whole maintenance process is not organised centrally, but instead distributed between security team, owners, or vendors themselves.

In some areas without official local authority, the maintenance role is assumed by a collection of local actors. Such an area can be seen in the train crossing area that divides District 2 and District 1.[386] The observation shows that this area is maintained by a collection of local people (See Fig.68), who manage the traffic and operation of the street vendors.

Figure 68. A local dweller was organising vendors in the train crossing area as the train is coming (man with the white shirt in the right) (Source: the author's documentation)

The people managing the train crossing area were initially hidden and unclear in the observation. A continuous re-run and editing of the digital recording of the area shows that a combination between the local thugs, vendors and local dwellers helps manage the market among incoming trains (See Appendix PLATES 4, video of the train crossing area attached

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[384] I4, Pesing Koneng maintenance practices field notes, 2014.

[385] M1, Pesing Koneng maintenance practices field notes.

[386] S8, Pesing Koneng maintenance practices field notes, 2014.

with the thesis). Interview with the railway's gatekeeper also confirmed the local people's help in managing the traffic.[387] Every time the train comes (roughly every half an hour at its peak time), the local people will help manage traffic and ensure nobody moves towards the railway, in addition to removal of any waste from the crossing afterwards to allow for vehicle and people movement to resume. Other than managing the traffic, these people also occasionally operate the railway gates in the absence of the gatekeeper, as they are fully accustomed to the railway gate procedures.[388]

Other than the traffic management, the local dwellers also provide support for occupation of the area in the middle of the railway as trading space. The observation of the train crossing area demonstrates that houses next to the railway were used to store for chairs, tables, and goods for trading in the railway area. One of the houses next to the railway was also used by the local people to hang around and drink coffee while observing the traffic around the crossing (See Fig.69 for the house location). This occupation creates subjectivity for the maintenance process in the railway area. For example, all vendors trading around the railway were asked for security fee money by the local thugs except J1, as he lives in the house next to the railways and therefore is considered one of them.[389]

Figure 69. J1's house is situated next to the railways where local people often gather while drinking coffee (Source: the author's documentation)

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[387] S8.

[388] S8, Kampung Pulo maintenance practices field notes, 2015.

[389] J1, Pesing Koneng maintenance practices field notes, 2014.

Other than appropriation of spaces, the relationship between actors also enables a mix of accesses to infrastructural services. An example of such accesses is the electricity access extended from the security post to light up some of the vendors' stalls in the 50m distance at night and early dawn (See Fig.70).[390] Another example of extended access to electricity demonstrates vendors and dwellers relationship, where vendors are provided with a private source of electricity from dwellers' houses.[391]

Figure 70.(Left) Electricity extension from the security post, (middle) bringing bulbs, (right) installing bulbs on site (Source: the author's documentation)

Some areas in the market are beyond any electricity reach, leading to the production of electrical resources using a diesel-powered generator owned by a local dweller [392] in coordination with the security team. [393] In addition, sometimes access to electricity does not require physical extension. Some salt fish vendors stated that they acquire lights indirectly from nearby shops around them.[394]

A similar mix of appropriation of services is found in ways vendors acquire access to water, for trading, cleaning or for toilet purposes. Some vendors obtain water from public amenities such as the local mosque. [395] Another food vendor mentioned the use of the toilet in dwellers' houses to get water to wash plates,[396] signifying the connection between vendors and local dwellers (See Fig.71). Some vendors also buy

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[390] M1, Pesing Koneng maintenance practices field notes.

[391] J1, Pesing Koneng maintenance practices field notes.

[392] M1, Pesing Koneng maintenance practices field notes.

[393] B1, Pesing Koneng maintenance practices field notes.

[394] N2, Pesing Koneng maintenance practices field notes, 2014.

[395] M3, Pesing Koneng maintenance practices field notes, 2014.

[396] A1, Kampung Pulo maintenance practices field notes, 2014.

water from local dwellers to be distributed further to other vendors (such as coffee or other beverages stall vendors),[397] reflecting the connection between vendors (See Fig.72).

Figure 72. Private water pump used by dwellers and vendors. (Source: the author's documentation)

Figure 71. Water seller distributes pumped water using jerrycans in a cart and selling them to beverage vendors. (Source: the author's documentation)

The mixed accesses to spaces and resources based on connections between different actors demonstrate the expansion of maintenance actors as discussed in the literature review, creating a distribution of space appropriation across spatial scales. Some of the spaces used for market needs are part of the neighbourhood area, while some market spaces are located in the public domain. Different ways of extending and producing infrastructure also create a wider distribution of services, even in areas that are initially out of the urban network's reach. The mixed ways of appropriating spaces and resources also minimise fixed cost, as multiple people can share one space at different times of the day, with infrastructure available only when needed. In the event of eviction, this wide distribution of space and infrastructural resources make the market less vulnerable, as they can easily return without much adjustment. This thesis argued that the

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[397] M1, Pesing Koneng maintenance practices field notes.

maintenance process in such mixed appropriation of spaces and infrastructural resources is partial and subjective, as the process is distributed to multiple actors beyond the local authority, leading to challenges of a consistent and thorough process of maintenance.

6.4.2 Dynamic temporality of the Pesing Koneng neighbourhood market

The previous section has discussed the appropriation of spaces and resources in Pesing Koneng neighbourhood market under coordination but not unified control of the neighbourhood leaders. This section argues that one of the impacts of the absence of control is the dynamic temporality of the market, as some vendors do not conform to the operation schedule of the market. Figure 73 draws the dynamic temporality of vendors' trading times, highlighting the exceeding trading time beyond the agreed market shifts informed by the security team as the early morning and night shift.

This research did not initially see such dynamic, as the fieldwork observation shows that the market shift division does exist. However, the drawing of participants trading times in Figure 73 demonstrates that such division of trading shift does not apply evenly for all vendors. The drawing shows that some vendors strictly trade in one shift (morning only or night only), some trade across both shifts (morning and night only), and some only trade for half a shift (dawn to morning). Interestingly, there are also plenty of vendors who extend the shift itself (morning to afternoon) despite the period of market recess time defined by the neighbourhood security team. Therefore, not all vendors conform to the market opening hours as described by the security team.

The dynamic particularly applies to street vendors with more perishable goods such as groceries and food vendors. While most clothing and accessories sellers consistently sell within their allocated shift, the groceries vendors sell at various work hours. Vendors with highly perishable items, such as tofu, meat, and leafy vegetables only trade for shorter work hours, which are 6 hours and less. For example, I4, a tofu seller only sells from 2 AM to 8 AM, before packing up and going home.[398] This short work shift then leaves opportunity for other vendors to fill up the space of trading, from 8 AM to 11 AM. This shift is often not enough and may lead to a slight extension of trading times. For example,

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[398] I4, Pesing Koneng maintenance practices field notes.
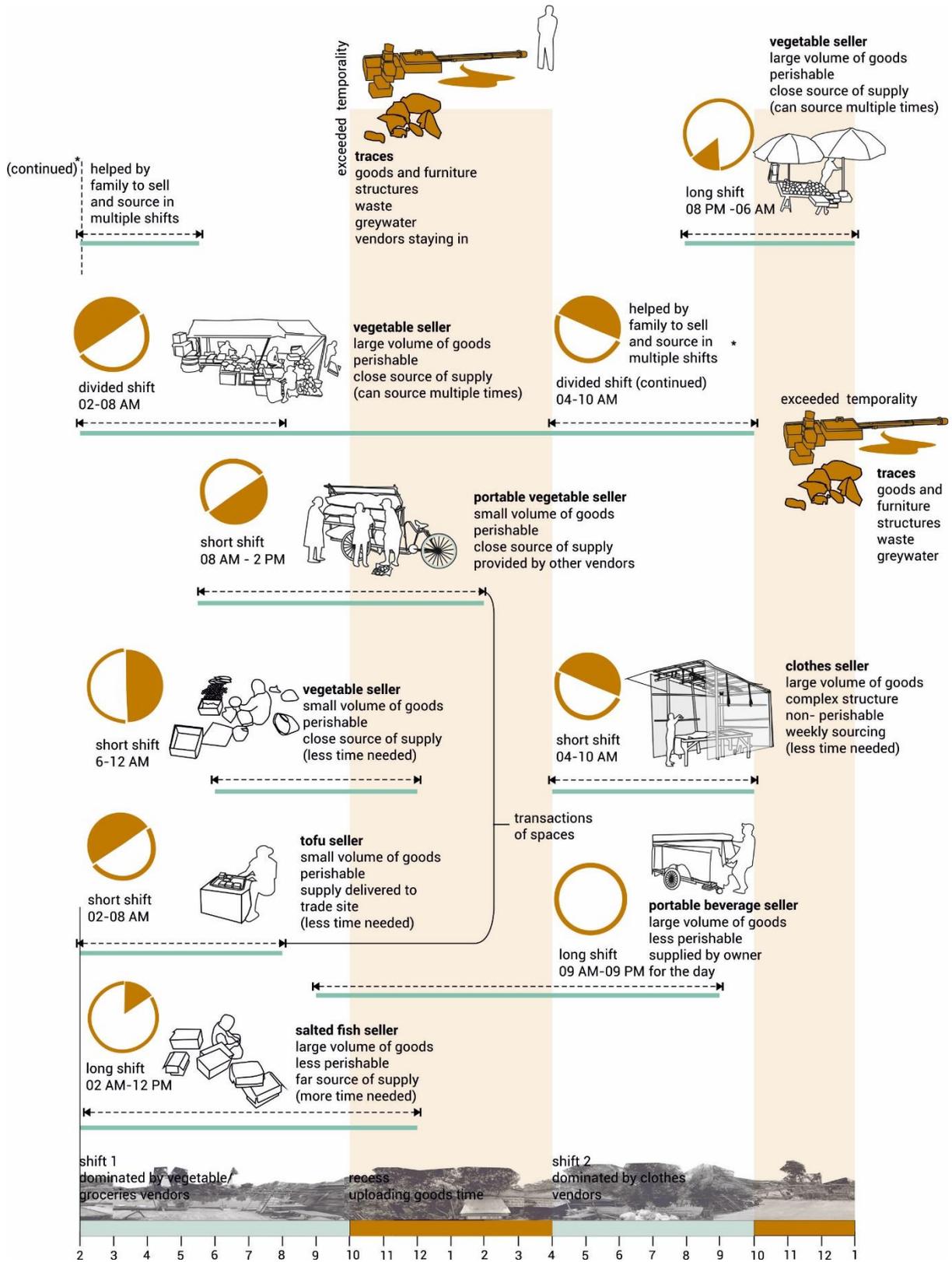
Figure 73. Dynamic temporality of the different street vendors in Pesing Koneng temporary market which spans beyond the assigned trading space (Source: drawn by author)

the vegetable vendors who replace the tofu seller usually trade from 8 AM to 12 PM.[399]

On the other hand, groceries vendors who are less vulnerable (such as root vegetables, coconut, or salted fish vendors) trade beyond the allocated market time. It is argued that for these vendors, their dynamic temporality is influenced by the distance travelled by them to reach the market. For instance, it can be argued that vendors travelling a long distance to reach the trading site or to acquire their supply often perform a more extended trading shift. An example is N2, the salt fish seller, who lives nearby but sources his goods in places further away from the neighbourhood. N2 trades from early dawn to the afternoon, from 2 AM to 12 PM slightly exceeding the morning shift.[400] To save time and cost, vegetable sellers with highly perishable goods often collectively source their goods from the wholesale market in Tangerang and Kramat Jati, sharing a pick-up vehicle to be shared by 2 to 3 sellers at once (See Fig.74).[401]

Figure 74.Collective vegetable bulk buying using pick-up truck by vendors. (Source: the author's documentation)

In relation to distance, another factor that also determines the dynamic temporality is the vendors' process of supply (See Fig.75). Some vendors may live nearby, but trade for a more extended shift as they have a larger volume of goods to sell, due to the process of sourcing which requires them to buy in bulk. An example of the vendors with large volumes of goods are the coconut vendors, who collectively acquire

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[399] I4.

[400] N2, Pesing Koneng maintenance practices field notes.

[401] M1, Pesing Koneng maintenance practices field notes.
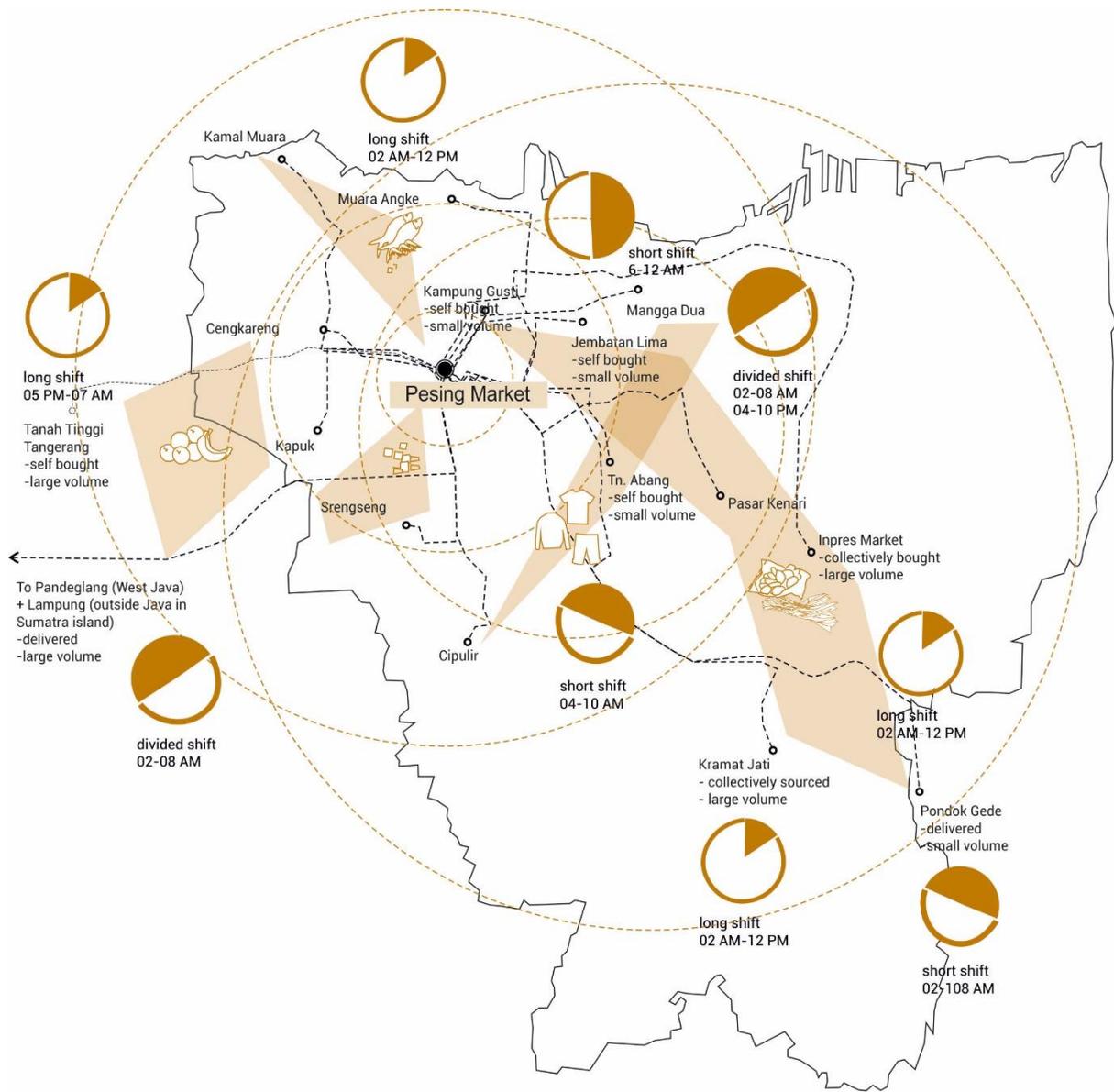
Figure 75. Diagram of vendors' trading times in relation to the distance of the supply source (Source: drawn by the author)

their large volume of goods through regular delivery from areas outside the city.[402] One of them trades from 3 AM to 12 PM[403], while another vendor starts early before the night shift, which is from 3 PM to 9 PM.[404] Figure 75 demonstrate these relations between vendors trading times, goods volumes, the process of supply and the distance of source supply.

In Figure 75, some vendors have a more limited supply and source their goods on their own, such as seasonal fruits[405] or leafy vegetables.[406] This limited supply leads to a shorter trading time, as often one-of-a-kind products need to be sourced in a particular place far away from the neighbourhood. Such limited supply may also be influenced by the vendors' lack of capital to stock a larger volume of goods, leading them to source their supply in a more affordable location.

Vendors with limited supply often perform a divided shift, which combines both morning and night shift together, using the time in between trading times to restock their supply directly. Figure 75 demonstrates that adjacency between the market and their source of supply is essential for vendors with divided shift, as it enables them to source their goods in a limited time within the day. An example is W1, a vegetable vendor who sells from 4 PM until 11 PM the next day and goes to the wholesale market nearby to source their goods in the afternoon.[407]

Some vendors with nearby homes also use the help from families and friends to take turns between sourcing and tending their stall, which enables them to trade longer. An example of this help is D2, a vegetable seller who enlists the help of her daughter for selling vegetables[408] and together perform a more extended shift from 4 PM until 11 PM for the next day. Another example is J1, who sells fruit from early dawn to early morning, and asks his friend to sell for him until midday as he is working

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[402] The vendors source their coconut from Lampung, which is another city based on the island of Sumatra. The coconut is delivered using truck, crossing the sea until it arrives in Jakarta.

[403] R1, Pesing Koneng maintenance practices field notes, 2014.

[404] S4, Pesing Koneng maintenance practices field notes, 2014.

[405] J1, Pesing Koneng maintenance practices field notes.

[406] H1, Pesing Koneng maintenance practices field notes, 2014.

[407] W1, Pesing Koneng maintenance practices field notes, 2014.

[408] D2, Pesing Koneng maintenance practices field notes.

nearby as a used TV seller (see Fig.76). A kitchen utensils seller later uses J1's space in the midday.

Figure 76. Fruit vendor who sells in the dawn works as a TV seller in the late morning, moving his goods along. (Source: the author's documentation)

Other than the types of goods and process of supply, some vendors have dynamic trading times as they occupy spaces that are more fleeting, such as vendors who occupy the rail space in the train crossing area for trading. The vendors, particularly the vegetable sellers or sellers with highly perishable items, will use such space to trade from 2 AM, until the train schedule commences at 6 AM. These sellers would pack up their goods shortly before the trains start to operate (see Fig.77-78). The train schedule is also rather scarce, with trains averagely coming every hour, providing the dwellers with enough opportunity to occupy such space.

Figure 77. Some vendors use railways spaces to trade at early dawn. (Source: the author's documentation)

Figure 78. Railways cleared up from vendors when train schedule starts. (Source: the author's documentation)

Figure 74 earlier points out that the food/beverage sellers are part of the vendors who exceeded the allocated trading hours. These sellers, with their portability and types of goods, seem not to be considered as part of the temporary market and therefore may remain outside the trading hours. They exist in the area beyond market trading hours, serving both market vendors and visitors. For example, a grass jelly beverage seller who sells from 9 AM to 9 PM in the area, states that many local dwellers and shop owners in the market are his loyal customers.[409] These

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[409] I3, Pesing Koneng maintenance practices field notes, 2014.

vendors often bring supply for all day, such as the beverage sellers, [410] although some restock in the afternoon, such as the porridge seller.[411]

Dynamic temporality of the vendors demonstrates the limitation of maintenance in a subversive occupation of space, as without unitary control the security team cannot enforce the same trading times for all vendors. This section points out that trading times may evolve based on the goods perishability, distance taken in reaching the neighbourhood, goods supply process, and portability of the vendors. These aspects influence options of occupying the space other than the agreed shifts, ranging from performing a short shift (less than 6 hours), a long shift (12 hours or more), a divided shift (up to 12 hours but with break) or a combined shift (up to 18 hours). These options enable more people to occupy the space longer, selling more goods for less cost. The vendors' dynamic temporality arguably creates challenges of clearing out the market, discussed in the subsequent section.

6.4.3 Traces within the process of closing and repacking stalls structures

This section explores the processes of closing and repacking the trading area as part of the clearing out practices, pointing out the traces evolving from these activities. These activities may apply differently for each vendor, as they have different types of goods and structures.

Some vendors with complicated structure, often require help on repacking their structures, such as the clothing vendors stall structures (See Fig.79). The observation shows the existence of installation and repacking services for traders, particularly the ones with bigger stall

Figure 79. Some locals are hired to build a clothing stall and repack the stall later on. (Source: the author's documentation)

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[410] I3; S5, Pesing Koneng maintenance practices field notes.

[411] A1, Kampung Pulo maintenance practices field notes, 2014.

structure (see Fig.80). Many vendors use this service, although there are some who opt to do it themselves so they can save more money.[412] After disassembling, clothing vendors' repacked structures and goods will be put to a storage cart and then stored in the collective parking site. The installation and repacking services also include removal of the structures to the storage space.

Figure 80. Clothing vendors' stall structure with an elaborate roof structure for cloth hanging and extensive lighting. (Source: the author's documentation)

Some vendors often hire help just for returning the structures to the parking site as it is quite a hard task to do.[413] They also have to do it quite quickly, as most of the clothing vendors' structure has to be removed completely, usually before midnight. [414] To speed up the process and save some money, some vendors who live nearby often ask their families to help out repacking the stall. For example, E1, a clothing vendor, often asks his wife to help closing at night.[415]

The elaborate structures and limited repacking times lead to some vendors leaving some structures on site to make future installation easier. The observations show that some clothing vendors left some part of the structures in the area outside the vendors' trading time, such as the long bamboo/iron pipes fastened upon the pedestrian wall where the stall is situated (See Fig.81). Apart from such structures, there is

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[412] E1, Pesing Koneng maintenance practices field notes.

[413] D1, Pesing Koneng maintenance practices field notes, 2014.

[414] Ibid.

[415] E1, Pesing Koneng maintenance practices field notes.

Figure 81. Parts of the structures attached on the pedestrian wall, in addition to some crates and furniture left away (left). (Source: the author's documentation)

also some furniture from the stalls (such as tables and chairs) left in the trading space due to the objects' size that makes it harder to be moved around (See Fig.82). There are also some crates left from the goods repacking process, that cannot be stored in the cart and then left away in the trading site. These structures, furniture, and crates create traces in the clothing vendors trading space.

Figure 82. Train crossing area in the afternoon showing J1's crates and furniture which were still present in the area. (Source: the author's documentation)

Different from the clothing seller, most of the grocery sellers have less elaborate stall structures. Some groceries vendors can have less to no structure at all, such as the vendors who only uses a tarpaulin sheet, simply folded and packed after trading. Some vendors only use chairs and simple crates boxes and tarpaulin attached to the wall nearby which is re-assembled and then stored around nearby dwellings. Repacking activities for grocery sellers have more to do with managing their unsold goods, as they deal with perishable items that often cannot be stored; and this is arguably related with their trading times as discussed in Section 6.4.2.

The connection between trading times and repacking activities is explored in the Figure 83 diagram, which shows closing activities of vendors around the railway. In such area, vendors with short trading times often sell their remaining goods to other vendors or ask them to sell the goods for them. For example, as shown in the diagram in the right part, I3, a tofu vendor (who only sells from 2 AM to 8 AM) would sell her remaining tofu to a local vegetable seller after trading. The vegetable seller would take over her space and trade from 8 AM-12 PM.

The diagram demonstrates that in the middle of the railway, J1 would leave all of his cucumbers and his property with his fellow street vendor after trading, asking him to continue selling by telling price points and packaging information. J1's crates, boards and goods will be packed and stored in the house next to the railway before midday, but sometimes it may also be left around (See again Fig.82).[416] The middle area will then be used by other vendors who sell kitchen utensils in the afternoon (See Fig.83, bottom drawing).

Other vendors with short shift, particularly the ones who live far away from the area, often opt to carry their unsold goods back home, such as the leafy vegetable vendors. [417] This option of bringing back everything also applied to vendors who work for one long shift. They prefer to remove their structure and goods away entirely from the market site, as they will be leaving the market space for a more extended period of time. For example, the salted fish seller, who sells from 2 AM to 12 PM completely removes away all of her goods from the trading site, storing some of them in the parking site, and bringing the other goods to be stored in the freezer at home. [418]

Some vegetable vendors with divided shift only leave the area for a short while before returning. These vendors would leave their structure when closing in between their shifts during the market's recess, creating traces of goods and structures that occupy the pedestrian, house terrace and shopfronts extensively. There were lots of vendors who merely stacked the goods' baskets and furniture together on the side

[416] J1, Pesing Koneng maintenance practices field notes.

[417] H1, Pesing Koneng maintenance practices field notes.

[418] N2, Pesing Koneng maintenance practices field notes.

First shift
02-08 AM

Scene 1

extended space

asking fellow
seller to sell
his goods

selling tofu
for local
business

storing furniture
outside local
vendor's own
space

storing
stock on
railway office
terrace

selling
unsold tofu to
other seller

Second shift
08 AM - 2 PM

Scene 2

changing to
other jobs
locally
(jobs flexibility)
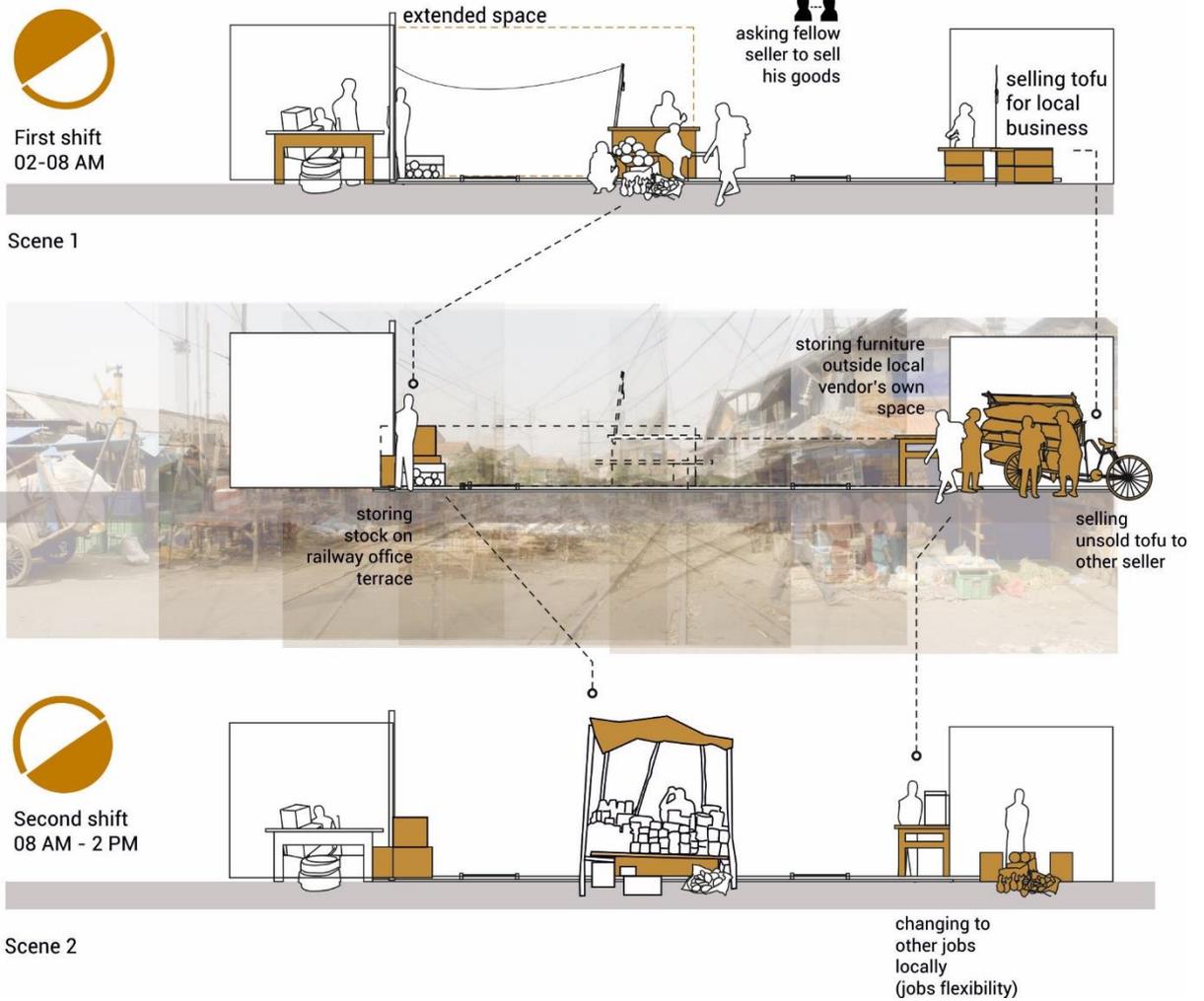
Figure 83.The repacking activities of vendors occupying areas around the railways (Source: drawn by the author)

Figure 84. Closing the stalls and storing goods inside using a large tarp. (Source: the author's documentation)

and covered them using a tarpaulin (See Fig.84), such as vegetable vendors[419] or coconut vendors.[420]

Apart from traces of structures, furniture, and goods, observation during the market allocated recess times (11 AM-4PM) also shows that not all vendors leave the premises. Many vendors stayed in the area for various reasons. Some vendors keep trading throughout the recess times, such as the food and beverage sellers. Some groceries vendors use the time to wait for goods to be delivered to the site and unload the goods right away to the site, such as the coconut sellers who buy the coconut to be delivered to the market (See Fig.85).

Figure 85. Coconut bulk buying sourced from Sumatera (Source: the author's documentation)

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[419] D1, Pesing Koneng maintenance practices field notes.

[420] S4, Pesing Koneng maintenance practices field notes.

Some vendors stay to prepare their goods before trading, as the goods are often still dirty when they are bought from wholesale seller, and need to be repacked to meet customers' needs. For example, a cassava seller rubs cassava using newspaper to rub the mud and soil from the cassava skin, before opening her stall at 6 PM. In addition, some vendors use this time to have a rest, hang out with one another, or take a nap within their stalls (See Fig.86). Some clothing vendors also use this time for cleaning or start installing their elaborate structures.

Figure 86. Some of the vendors' activities during recess hours: unload goods, prepare goods, and have a rest. (Source: the author's documentation)

The presence of structures, objects, goods and people outside market operating hours are not considered as traces of temporary occupation, instead, they have been blurred and considered as a regular part of the local neighbourhood. The drawing in Figure 88 creates an archive of these traces to make it more visible and highlight how some of these traces are connected. For example, the drawing annotates different carts that are placed around the street, and draws a connection between the carts and the people who distribute goods to different stalls around the market. The drawing enables understanding between different traces that produced before and after the trading process.

Figure 87 drawing shows the overall traces that evolve from the failure of entirely clearing out the market space. Some structures and furniture were left in the area because they are elaborate and sizeable, making it bothersome to remove. Some structures and goods are packed but stay unremoved due to vendors' longer time of trading.

Some street vendors and local people remain in the area due to the supply process and other preparation activities that have to be done before trading. In addition, there are still some vendors who trade in the area, such as the portable food vendors discussed in Section 6.4.2, or
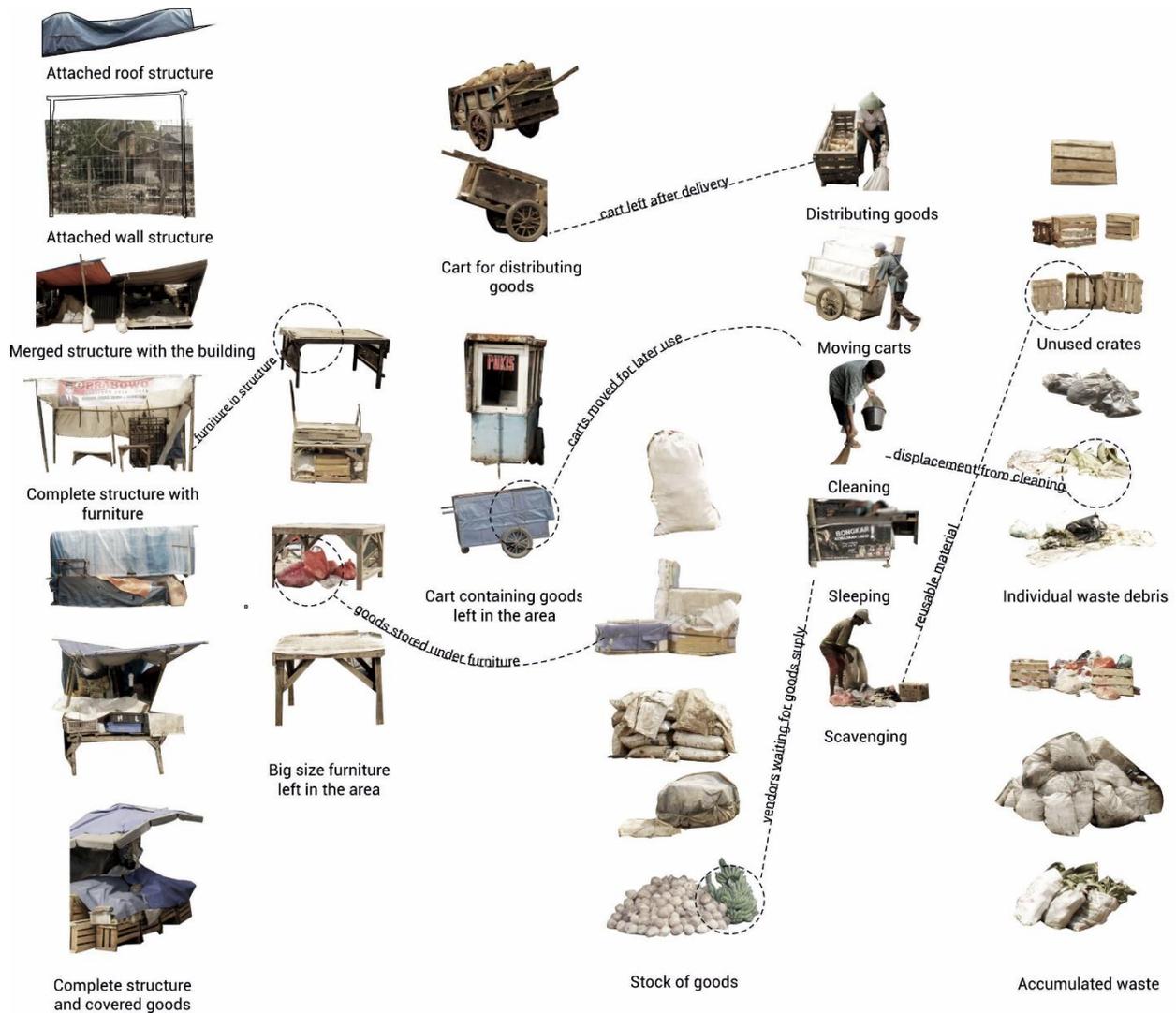
Figure 87. Archive diagram of all the traces of structures, objects, goods, people, and waste in Pesing Koneng market outside the trading hours (Source: drawn by the author)

the local owners of shops around the neighbourhood. Together with traces of structures and goods; these continuous activities made the area never entirely cease to emerge as a market.

6.4.4 Relations between vendors trading process and their waste practices

This section focuses on waste produced before, during and after trading, understanding the disposal or displacement of such waste as part of vendors clearing out practices. Figure 88 draws the various trading activities that produces different kinds of waste in Pesing Koneng, from dish washing, goods preparation, stall sweeping and removal of food debris. Figure 89 demonstrate that there are relations between temporality of vendors occupation and where a vendor potentially situates their waste. For example, Fig.88 shows that some vegetable vendors—who occupy the space in a divided shift—usually leave their waste in front of their trading space. Vendors who perform a long or divided trading shift often leave parts of their stalls structure in the area, and correspondingly, their waste is situated around these structures (See Fig. 88).

Figure 88. Waste stacked in front of the closed stall structure. (Source: the author's documentation)

Other than vendors with a long shift, vendors who are local dwellers (such as the chicken noodle seller (S5)) also leave their waste in front of their home (See Fig.89). As she lives in there, her trading waste is considered part of the house's waste and become part of the

portable seller

seller with furniture

seller with no structure

seller with simple structure

seller with elaborate structure

cleaning goods

washing dishes

sweeping dust

tidying up

sweeping waste

tidying up

forms of waste

small quantity

large quantity

vegetable debris

wet waste

tidying up

displacing in the street/river

market cleaner

collective disposal space

disposing in one's own stall

Figure 89. The cleaning process of different street vendors in Pesing Koneng, which lead to different ways they situate their waste. The top part illustrates different kinds of vendors with their different temporality, while the bottom part illustrates their designated disposal space in the market (Source: drawn by the author)

neighbourhood waste instead of market waste. [421] It can be concluded that disposal around the stall or around private spaces demonstrates permanent occupations in such space, which evolves due to the length of occupation or actual ownership of that space.

Figure 90. Waste disposed of in an area in front of dwelling or shops (Source: the author's documentation)

In contrast, diagram in Figure 89 highlight that vendors with shorter trading hours prefer to dispose of their accumulated waste separately in a collective waste area around their trading space. An example of such collective waste area can be seen in a waste pile near the railway (See Fig.91). The tofu seller who trades near the railways explains that she compiles all of her waste and disposes it to the collective haphazard dumping next to the railway in front of her, before the vendors who takes turns sharing space with her arrive. [422] In this sense, vendors that perform shorter trading hours and occupy highly shared spaces do not consider their trading space to be their permanent space, and tend to dispose of their waste elsewhere.

Other than the vendors temporality, Figure 89 also demonstrates that selection of disposal space is related with the different waste forms (e.g quantity and types of waste) produced in the process. For example, the vendors who produce a larger quantity of waste (such as the vegetable

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[421] S5, Pesing Koneng maintenance practices field notes.

[422] I4, Pesing Koneng maintenance practices field notes.

Figure 91. Collective waste piled around the railway. (Source: the author's documentation)

vendors) usually dispose of their waste in their stall, in collective disposal area, or give them directly to the cleaners.

However, other vendors (such as the salted fish seller or the clothing seller) may not dispose as much waste, and are arguably more likely to displace their waste. For example, the clothing vendors regularly sweep their stall area before building the stall structures (See Fig.92). As clothing vendors often do not dispose much of other waste than this, they often displace the dust and small plastic waste by sweeping them directly to the pedestrian to the street. Another example of small quantity waste can be seen in the salted fish seller who often sieves the fish from sand or pebbles (See Fig.93), leaving it away in the sidewalk.

The diagram in Figure 89 further annotates that some waste can be displaced due to the confusion of disposing a specific form of waste, particularly wet waste from food and beverage vendors. The process of cleaning eating utensils produces greywater and food debris that cannot be accumulated for a more extended period, leading to displacement. For example, a beverage seller stated that he often disposes his waste directly to the street or to the sidewalk of the street.[423] Another example is demonstrated by a food vendor, who disposes greywater from washing activities directly to the nearby river at the end of his shift.[424]

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[423] I3, Pesing Koneng maintenance practices field notes.

[424] A1, Kampung Pulo maintenance practices field notes, 2014.

Figure 92. A vendor sweeping the stall area from dust and small debris (that will be disposed to the street). (Source: the author's documentation)

Figure 93. A vendor sieving salted fish, leaving dust, pebbles, and fish debris to the street. (Source: edited from the author's documentation)

This section has annotated a variety of vendors' waste practices. It highlights the length of occupation and forms of waste that influence the vendors' disposal or displacement in the area. The subsequent section explores further on the organised removal process of waste in the Pesing Koneng market space as a whole.

6.4.4 Vulnerability of cleaning services in a subversive occupation of space

While the previous sections discuss clearing out practices done individually by each vendor, this section discusses cleaning services managed in the market to clean the market as a whole, including collecting waste that has been accumulated and disposed of by vendors.

To clean the market, the security team employs five cleaners who work in shifts, with three men working together to clean the market in each shift.[425] The security team in Neighbourhood District 2 organise routes and tasks of cleaning for these cleaners, divide them into three routes, with each cleaner cleaning around 100 m length of the Pesing Koneng neighbourhood street. The cleaners start collecting the garbage when the morning market starts to close, about 10-12 AM. The cleaners' tasks are to collect all the garbage that is compiled in the sides and the middle

Figure 94. Market cleaner sweeping pedestrian spaces within his routes and load the waste to his cart. (Source: author's documentation)

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[425] B1, Pesing Koneng maintenance practices field notes.

of the streets (See Fig.94). They also sweep the street and put the garbage in their garbage cart and transport it to the adjacent district.[426]

Despite this organisation, the market cleaners are not paid directly by the security team. They are paid directly by the market vendors that use their service in taking out the vendors' waste and cleaning up their space. The cleaning man interviewed stated that he has to ask directly to the street vendors for their share in waste cleaning, each obtaining about 50,000 rupiahs daily (about 2,5 pounds) from about 20 street vendors.[427] The market cleaning men would also need to bring their own waste cart to transport and contain the waste. The waste collection truck often came late for two and three days and therefore the cleaning men could not make money during the day as their cart cannot be emptied.[428]

This scheme of payment is peculiar as the neighbourhood district also inform that it separately asks all vendors for a monthly waste removal fee of about 300,000 rupiahs (about £15). The security team revealed that the removal fee is only used to pay the municipal Sanitary Agency who provide the waste collection services for Neighbourhood District 2. They usually send the truck in the early morning at 6 AM, emptying the cleaners' carts from the previous day,[429] stored in the District 1 collective waste disposal area.[430] The truck would later bring the garbage to regional landfill in Bantar Gebang.[431]

It can be argued that the market cleaner is positioned as a casual worker by the neighbourhood district leader, as the market is not considered part of the neighbourhood official territory and its leaders are not in full control. This casual employment is in contrast with the river cleaner employment (See Fig.95). The river is acknowledged as an official part of neighbourhood territory, making the river cleaners to be formally paid and included within the fixed structure of the neighbourhood organisations. The neighbourhood provides them with tools to collect

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[426] U1, Pesing Koneng maintenance practices field notes, 2014.

[427] U1.

[428] B1, Pesing Koneng maintenance practices field notes.

[429] U1, Pesing Koneng maintenance practices field notes.

[430] B1, Pesing Koneng maintenance practices field notes.

[431] U1, Pesing Koneng maintenance practices field notes.

and compile the river waste before the municipal Public Works Agency trucks pick up the waste. [432]

Figure 95. River cleaner employed by the river scouring the river and taking out waste manually. (Source: author's documentation)

This casual employment arguably presents potential vulnerability of cleaning the market as it lead to disconnections between the routes of cleaning, vendors, and waste. The drawing in Figure 98 demonstrate some of these vulnerabilities by highlighting the cleaning routes that are happening in Pesing Koneng market, detailing different connections and disconnections happening between cleaners and other related actors (e.g. vendors and municipal collection actors).

The first detail highlights how some vendors trading times coincide with the cleaners' timing, making them available during the cleaning routines. These vendors (particularly the long trading shift vendors) reported that they regularly pass their waste to the market cleaner. [433] The second detail highlights how some vendors trading times do not coincide with the cleaning times, making some waste being left out as the vendors are not present to pay or have handed the waste to the market cleaners.[434] In addition, some vendors still trade during the

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[432] M1, Pesing Koneng maintenance practices field notes.

[433] D2, Pesing Koneng maintenance practices field notes.

[434] E1, Pesing Koneng maintenance practices field notes.

vulnerability of
waste collection
routes

waste routes

cleaning shift
10-12 AM

SEKERTARIS RIVER

District 2

1

2

3

District 1

collection services
06-09 AM

continue
to regional
network

4

1. Some waste is transacted
directly by vendors to the cleaning man.

disconnection

2. Some waste is disconnected from
waste collection routes.

disconnection

3. Waste evolves in the middle of
train crossing is not part of the cleaners
routes

4. Collection services are inconsistent, and
therefore the cart cannot be emptied,
inhibiting market clearout practices

Figure 96.Cleaning market routes (left drawing) and details of connections between vendors, cleaners, and municipal services within the routes (right four drawings) (Sources: drawn by the author)

cleaners' shift, producing waste that remains in the area beyond the cleaners' shift.

The third detail addressed disconnections that happen when some parts of the market are omitted from the cleaning routes, such as the railway crossing that is not part of any neighbourhood district's territory. This gap of territory creates difficulties, particularly as some waste from collective waste piling around the crossing often expands to the crossing area, either due to trains or people movements. Local people often help to clear such waste after the train has left (see Fig.97), however high level of crowds passing by also creates difficulties in the complete removal of such displaced waste completely, leading to traces of waste in the middle of the street.

Figure 97. A local people cleaning up some plastic waste that flew to the street when the train passed (Source: author's documentation)

The fourth detail highlights the unreliability of municipal waste collection that creates disconnection of the cleaning routes. As mentioned earlier, there were frequent occasions where the municipal collection cannot take waste collected and stored in the cleaners' cart collection. This unreliability can leave the waste uncollected in the market for days, leading to challenge in consistently keeping the pedestrian space's cleanliness.

Section 6.5 provides an understanding of clearing out practice in Pesing Koneng neighbourhood, drawing attention to the traces of structures, objects, goods, people and waste that exist in the market. The section explains the different ways waste evolved and accumulated to be disposed or displaced, by drawing the link between vendors' temporality and waste forms to their disposal space. The section then illustrates the vulnerable spaces within the cleaners' routes in cleaning the market area as a whole, inhibiting a complete and consistent clear out of the Pesing Koneng temporary market.

7. Architecture informed by maintenance: a discussion

The research was started with two main objectives: (1) to understand the spatiality of maintenance practices through making them more visible and (2) to understand how such knowledge of maintenance can inform design for contested neighbourhoods. This chapter discusses how these objectives can be obtained based on the case studies findings, divided into three main parts.

The first part conceptualises spatiality of maintenance in response to the first research objective. This part organises and compiles findings from the case studies, and categorises them into knowledge of maintenance spatiality. Four knowledges are outlined; consisting of territoriality of maintenance practice, local organisation of maintenance, associations between waste types and spaces, and traces from failure of maintenance.

The second part responds to the second research question, discussing how the above knowledge may inform design for contested neighbourhoods, assembling the spatial inventory as the basis of future contested neighbourhood development. In addition, the second part highlights the creative methodologies performed in the research and summarises how they enable the understanding of space of maintenance in a more situated way. The last part of this chapter briefly discusses the design inventory's potential applications through a series of design exercises, aiming to expand contested neighbourhood design strategies based on the knowledge of maintenance.

7.2 Outlining the spatiality of maintenance practices in Jakarta's contested neighbourhoods

The thesis' first research question considers how maintenance practice takes place in space and influences the quality of the space itself. This section outlines four particular knowledges of maintenance synthesised from the case studies, annotating how they challenge and extend previous research and assumptions outlined in the background context, literature review and methodology chapter.

7.2.1 Actors' movements build territoriality of potential disposal space

The case studies demonstrate that the actors' regular movement builds the territory where an actor may or may not perform their maintenance practice beyond the location of their dwelling space. This perspective is in contrast with previous researches, which suggest that waste displacement into the river is contributed by the proximity of a dwelling space to the river.[435] This research challenges such a proposition, and instead argues that dwellers' regular movements in and outside the neighbourhood (beyond the dwelling space itself) creates potential territory of disposal. Dwellers tend to dispose only in spaces that are familiar and regularly passed through every day to do their living and working activities. Figure 98 demonstrates how this regular movement leads to two ways of disposal, which are disposal while moving to other space, and disposal while occupying a space temporarily.

The research also revealed that the lack of regularity of the actors' movement routes across the neighbourhood, increases risk of displacement. Actors' regularity of movement is significantly influenced by the dispersal of living spaces that widen the coverage of maintenance practice territory. The dispersal is contributed by the use of multiple dwellings by extended families, the use of shared amenities, and the availability of options of economic and shared spaces where dwellers can go. This dispersal demonstrates the flexible arrangement of living spaces in the neighbourhood that support their needs of living and working, which differ from the government assumptions.[436] In such form of living spaces dispersal, compactness - or situating all uses (bathroom, bedroom, working space) to be in spaces adjacent to each other is also not always necessary. Instead, the living space arrangements that are more flexible are important not only to meet dwellers living needs, but also to reduce risk of waste displacement.

Regularity of movement builds not only the coverage of territory, but also the permanence of territory, particularly for temporary occupation of space. For example, in Pesing Koneng, vendors who stay longer in a

435 Derek Vollmer and Adrienne Grêt-Regamey, 'Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River', *Global Environmental Change* 23, no. 6 (2013): 1542–1555; Ian Wilson, 'The Politics of Flood Alleviation in Jakarta', The Jakarta Post, 2015, http://www.thejakartapost.com/news/2015/09/05/the-politics-flood-alleviation-jakarta.html.
436 The context chapter highlights that the of the riverbank neighbourhood by the regional government agencies does not cater for the dwellers' needs and tends to provide generic spaces that does not allow for work and living flexibility. Dispersal of living spaces found in Kampung Pulo demonstrate the need to rethink such development.

ACTORS MOVEMENT BUILD TERRITORIALITY OF POTENTIAL DISPOSAL SPACE
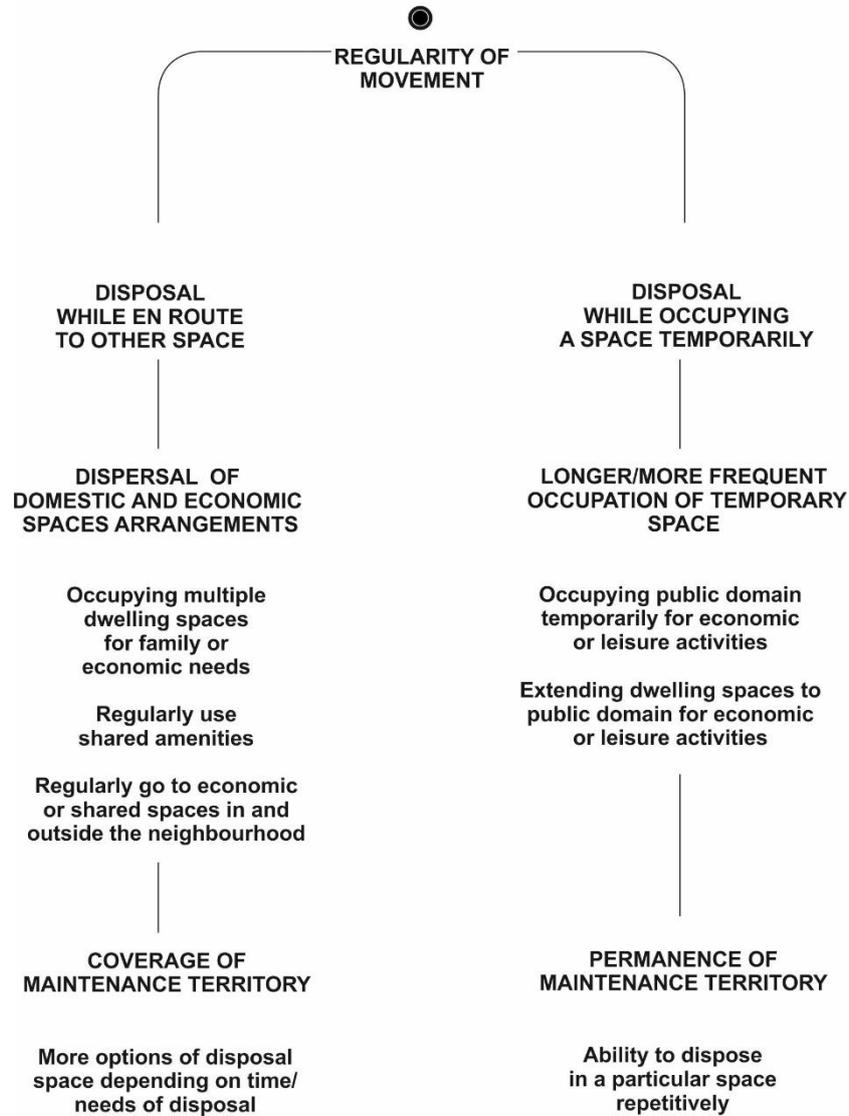
Figure 98. Findings on the territoriality of maintenance created by regularity of movement (Source: drawn by the author)

space dispose differently than vendors who only stay for a short while. Vendors who occupy the space longer may situate their waste in their own trading area. In contrast, vendors who move a lot or who share their space with others tend to dispose waste in the collective disposal area beyond their trading space. In this sense, the frequency and occupation period of space also influence possibility of disposal in a space. It can be concluded that instead of simply addressing proximity between spaces, the regularity of movement across spaces around neighbourhood, and the length of occupation of working and living in certain spaces, build the spatial and temporal territory whereby an actor can perform their maintenance practices.

7.2.2 Local organisation of maintenance: mixed, partial and subjective maintenance

This section outlines how locally organised spaces brings an expansive coverage of access to space and resources, yet it also brings challenges for a thorough implementation of maintenance across neighbourhood spaces. The case studies demonstrate how the control of space and infrastructural resources in locally organised space is distributed between diverse types of actors (See Fig.99).

Distribution of control is driven by the mixed appropriation of public and private spaces and infrastructural resources across spatial scales, engaging different actors within these spaces. This distribution expands assumptions from government and newspaper reports discussed in Section 2.4.2; which are often polarised between seeing the street vendors as standalone actors occupying public domain or instead viewing them as centrally controlled by the local neighbourhood authority. In addition, these mixed appropriations of spaces and infrastructural resources also expands government understanding of space and infrastructure in contested context.[437]

In spaces made of such mixed appropriations, the local actors who secure the area simply become the ones who have the overall know-how to the resources of maintenance in the area. Without unitary control,

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[437] Chapter 2 highlights the discrepancies of the regional agencies understanding of the dwellers' spatial needs, leading to development of relocation settlement for the evicted dwellers that are inflexible. Furthermore, Kampung Pulo observation notes that the current mechanism of infrastructural provision is not fit for contested neighbourhood. For example, some dwellers struggled to gain access to the national water pipeline, as the nearest pump is out of reach, and each new installation requires a minimum of 10 dwellings to participate. Unable to resolve this complexity, the dwellers resorted to either installing a groundwater pump or sharing water access with his/her neighbours.

**LOCAL ORGANISATION OF MAINTENANCE
MIXED, SUBJECTIVE, AND PARTIAL MAINTENANCE**

◉

**MIXED APPROPRIATION
OF SPACES AND INFRASTRUCTURAL
RESOURCES**

**LACK OF
UNITARY CONTROL**

**MAINTENANCE
BASED ON
CONNECTIONS OF
ACTORS**

**COLLECTIVE
CONNECTION**

Similar actors doing
maintenance practice
n a context

Shared responsibilities
of maintenance

**CONTINGENT
CONNECTION**

Different actors doing
maintenance practice
in a context

Appropriating or
generating networks

challenge of maintenance

**PARTIAL COVERAGE
OF MAINTENANCE**

Uneven collective
connection

Spatial and temporal limitation
of services

**SUBJECTIVE PROCESS
OF MAINTENANCE**

Only apply to particular
actors that are familiar

Only apply to specific
type of actors and not
others (e.g ambulatory
vendors not included

**MAINTENANCE IN
ABSENCE OF ANY
CONNECTIONS**

Neglect of
maintenance in
some spaces
(e.g spaces used
collectively, or
interstitial spaces)

Figure 99. Findings on the local organisation of maintenance and how it leads to subjective, partial, or absence of maintenance (Source: drawn by the author)

maintenance practices rely on connections between actors. The case studies annotate the contingent and collective relationship between mix of actors. Different than the collective relationship which requires tightness between actors and shared responsibilities, the contingent relationships allow actors from different backgrounds to connect without hierarchical control nor shared responsibilities. By annotating these relationships, the thesis expands current contested neighbourhood discussion which tends to focus on individual or collective coping strategies.[438] In addition, such connections also inform how the social orders of maintenance change in contested neighbourhood, expanding the maintenance discourse.

Maintenance practices based on such relationships can be subjective, partial, or even absent. Subjectivity of maintenance is usually seen in maintenance performed with certain selective bias from the actors. For example, the local security team in Pesing Koneng demonstrate the subjectivity of maintenance by asking for a fee from some vendors but not from others who are more known and familiar. This subjectivity is also demonstrated by the casual employment of Pesing Koneng market cleaners, who are paid by the vendors instead of the security team who employs them.

The partial process of maintenance is performed due to the limited capability of the actors, either due to safety reasons or limited resources. An example is demonstrated in Kampung Pulo, where dwellers can only dispose small quantities of waste, mostly non-organic, to neighbourhood gates that are regularly cleaned by street cleaning network, such as street cleaners. This process of maintenance leaves the organic waste to be at risk to displacement. Another occurrence of partial process of maintenance can be seen in the spatial and temporal limitations of market cleaners in Pesing Koneng which leads to traces and delays in clearing out the market.

The absence of any relationships in an area, be it collective or contingent, leads to neglect of maintenance. While in some parts of the neighbourhood, the area is cleaned collectively by local dwellers with tight connections with each other, there is still lack of care in some shared spaces in Kampung Pulo, such as the playing field, dwelling alley, the neighbourhood street, and sidewalk. The study demonstrated that such collective connections are uneven across the neighbourhood, and therefore neglected in some areas.

[438] Yandi Andri Yatmo and Paramita Atmodiwirjo, 'Spatial Strategies for Domestic Service Activities in Urban Kampung Houses', *International Journal of Technology* 4, no. 1 (2013): 24–33; Evawani Ellisa, 'COPING WITH CROWDING IN HIGH-DENSITY KAMPUNG HOUSING OF JAKARTA', *Archnet-IJAR* 10, no. 1 (1 April 2016): 195–212.

7.2.3 Associations between waste and disposal spaces

The case studies have revealed that the actors' disposal practices vary in different spaces. This variety of disposal practices is in contrast with the regional authorities' assumptions which generalise the overall disposal process as simply a community's bad habits, as reflected in the interviews investigated in Chapter 2. The thesis argues that this variation demonstrates the actors' subjective associations based on connecting certain waste types to an appropriate space of disposal. The following passage explores associations that connect between spaces and waste disposal practices (Fig.100).

The types of waste, particularly the form and quantity of waste influence the dwellers' method of disposal. In Kampung Pulo, dwellers tend to organise organic waste together, and are more apprehensive to situate organic waste in public areas such as the street as the smell may trouble others. In addition, dwellers also were more likely to dispose regularly when they produce a significant quantity of regular waste. Some case study participants displaced only a small quantity of waste, particularly ones who do not have a home business or those that no longer have young children living with them. The Pesing Koneng case study demonstrates similar association. This consideration of waste forms is also reflected in Pesing Koneng, where vendors tended to displace small or wet kinds of waste, from trading activities. In this sense, the case studies demonstrate that organic, smelly, and small quantity waste are more vulnerable to displacement, due to associations of where such forms of waste should or should not be.

Other than the types of waste, the space where waste is produced also influences the disposal process. Waste produced from collective activities in a shared space, such as waste produced in the street, in neighbourhood alleys or in playgrounds are more prone to displacement. There is often confusion as to how such waste should be disposed, as it is unclear as to who takes the responsibility of clearing it. In Kampung Pulo, waste produced by children playing in the neighbourhood alley is often swept away by the local dwellers to the river nearby. This waste is considered collective waste, which cannot be mixed with household waste and thus tends to be displaced, particularly when there is no collective disposal area available nearby.

Certain practice of maintenance such as waste burning also project particular association that shapes the spatial needs of the practice. Such practice is often frowned upon by dwellers, and therefore requires certain size and orientation of space that influence the possibility of accumulating and burning waste secretly. For example, in Kampung Pulo collective waste burning requires hidden and sizeable open space; oriented away from any

ASSOCIATIONS BETWEEN SPACES AND WASTE DISPOSAL

TYPES OF WASTE

ORGANIC WASTE

Organic waste tends
to not be disposed
in public domain

Organic waste that
smells often being
displaced immediately

SMALL QUANTITY WASTE

Some disposal space
have limitation of
quantities

Actors with limited
or irregular production
of waste often displace
their waste

LOCATION OF WASTE PRODUCTION

WASTE PRODUCED IN SHARED SPACES

Waste produced in
or around shared space
(e.g neighbourhood alley,
playing field) often
leads to displacement

MAINTENANCE PRACTICE REQUIREMENTS

SPACE FOR WASTE TREATMENT

Collective accumulation
of waste require sizeable
and hidden space near
actors' dwelling

Collective treatment of
waste (e.g burning)
requires areas with
particular size, position,
and orientation in relation
with

Figure 100. Findings on the associations between waste and space of disposal (Source: drawn by the author)

doors or windows. Without such kinds of space, the actors cannot conduct the waste burning practice.

7.2.4 Traces from the failure of maintenance

The case studies highlight the presence of traces of structures, people and objects in an area which demonstrates the continuous production of spaces overlooked by the actors of maintenance (See Fig.101). The discrepancies between what is considered traces potentially brings conflict between municipal and local authorities. While the municipal authorities might perceive temporary spaces like the Pesing Koneng market to be continuously in use by street vendors, for the local actors the remaining people, structures, and objects are invisible, immersed as the existing structures of the space.

The case studies demonstrate that traces emerge particularly out of extensive occupation of space, individually or collectively. This extensive occupation of space is contributed by prolonged occupation and overlapping activities in space. An example of the prolonged occupation of space is reflected in the vendors of Pesing Koneng case study who performed a divided shift, or in the vendors that share spaces together. These vendors can occupy the market space for up to 12-18 hours, and tend to leave all or some of their belongings in the market, including the structures and the goods. In Kampung Pulo, this prolonged occupation is influenced by longer opening hours in some home businesses, attracting visitors to hangout extensively around the dwelling and create more traces of waste around it.

Overlapping activities create extensive occupation of space, employing additional tools and objects, and therefore potentially produce more waste. An example is the overlap between goods preparation activity and trading activity found in both Kampung Pulo and Pesing Koneng. In both neighbourhoods, some parts of the tools, and objects from these overlapping activities are often left in the area for an extensive period of time, while some of the waste produced got displaced away around it.

Apart from the prolonged occupation and overlapping activities in a space, the case studies highlight that traces also evolve from the vulnerability of cleaning, particularly traces of waste. The disconnections between actors who use the space and the actors who clean it largely contribute to such vulnerability. An example of such disconnections can be found in the Pesing Koneng night vendors who leave their waste waiting throughout the night for the next collection time as their trading times

TRACES FROM FAILURE OF MAINTENANCE

⦿

CONTINUOUS PRODUCTION OF SPACE

PROLONGED OCCUPATION OF SPACE

Expanding frequency or period of a temporary occupation create traces of structures, objects and goods

Different types of actors with different types of goods occupy space longer

WASTE SITUATED IN SPACE WITH LONGER USE

Waste is disposed in space that is used more frequent in comparison with highly shared space

OVERLAPPING ACTIVITIES IN SPACE

Multiple activities happening in space outside designated time of use creates traces of people, structures, objects, and goods

MORE TYPES OF WASTE BEING DISPOSED

More quantity of waste and types of waste are being disposed some can be displaced

VULNERABILITY OF CLEANING

Casual employment of cleaning actors and unreliable waste pick up services potentially create traces of waste

Some areas cannot be accessed by cleaners, creating gaps of cleaning

DELAY ON WASTE COLLECTION

Spatial and temporal mismatches between cleaning and waste production

Figure 101. Findings on the traces from failure of maintenance (Source: drawn by the author)

do not coincide with the cleaning times. Another example of such disconnection can be seen in the street cleaner's refusal to clean the accumulated waste in the street junction near the gate of Kampung Pulo neighbourhood, particularly when the quantity is excessive. The waste left from these disconnections creates traces that remain in the area for an extended period of time, contributing to the failure of maintenance.

7.3 Design for contested neighbourhoods based on knowledge of maintenance

The thesis' second research question investigates how the knowledge of maintenance outlined in the previous section can inform design. In response to such question, this thesis develops a spatial inventory that demonstrate design knowledge for contested neighbourhoods based on maintenance practices. In addition, this thesis annotates how the creative methodologies employed in this research have constructed a more situated understanding of practice in space, expanding practice research methodologies.

7.3.1 A spatial inventory of maintenance practices: towards design based on maintenance

The inventory presents alternative design knowledge for contested neighbourhoods, going beyond the removal of actors and the generalised assumptions of living spaces in such neighbourhood. This thesis argues that knowledge of maintenance provides a more situated and dynamic design potential for contested neighbourhoods, highlighting specific arrangements of space, connections between actors, and the dynamics of their occupation.

This inventory offers three main propositions based on such knowledge (See Fig.102). Each proposition consists of mechanisms informed by the case studies' findings (See Appendix 1 for a more complete list of the findings). This inventory then lists the spatial and temporal attributes of each mechanism. The following passages discuss each of the inventory's propositions and potential design implications based on the findings from case studies.

Design based on the pattern of movement

This proposition underlines that in contested neighbourhoods, there is a territory of potential disposal space determined by regularity, orientation and actors' course of movement. There are two mechanisms in such proposition (See Fig.103). The first mechanism emphasises that for disposal during movement, the disposal space position is

		a	b	c
I. DESIGN BASED ON PATTERN OF MOVEMENT	**1** The position of waste disposed while moving is related to the course of movement	Accumulated household waste is placed in the interchange of movement or in centred orientation	Litter from consumption waste is displaced alongside the path of movement	Displaced household waste is placed in the hidden corner in the end of movement path
	2 The position of waste disposed while occupying space is related to arrangement of actor's living	Different sizes of dwelling that cater to different actors' needs and capabilities and encourage socio-economic diversity	Options of shared amenities and shared spaces across the neighbourhood	Variety of economic spaces in and outside neighbourhood, and access to the main road with less than 700 m distance
II. DESIGN FOR THE DIVERSIFI-CATION OF ACTORS AND SYSTEMS	**1** Mixed appropriation of space and resources across neighbourhood	Occupation of public domain for private or neighbourhood purposes	Occupation of private or neighbourhood spaces for public uses	Sharing, extending, and generating infrastructural resources in relation to position of users
	2 Maintenance activities managed by multiple actors and systems	Resettlement should not be done individually but acknowledge social diversity between neighbours	Options of shared spaces and arrangement of dwelling types (board houses/rental houses)	Integrated development with spaces outside neighbourhood that enable intersection with other systems
III. DESIGN FOR CONTRAST OF PROGRAMS IN RELATION TO TIME	**1** Contrast of spatial boundary during occupation	Certain occupation of space inhibit household waste disposal due to associations of space	Visibility of shared space from path of movement influence displacement of household waste and litter	Protection of waste containment and vulnerable areas such as interstitial and unsupervised space
	2 Contrast of spatial changes and dynamic temporality	Understand different times of occupation by different actors in one space to understand the dynamic temporality	Increase space sharing between vendors particularly with entirely different goods	Annotate and separate areas with overlapping activities across period of time by similar actor in one space
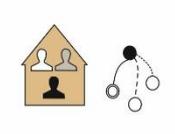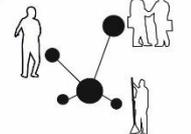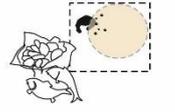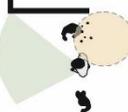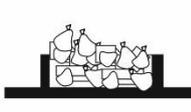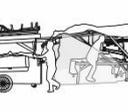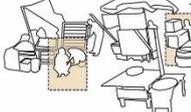
Figure 102. The overall spatial inventory with propositions, mechanisms, and spatial qualities in contested neighbourhood based on knowledge of maintenance (Source: drawn by the author)

DESIGN BASED ON PATTERN OF MOVEMENT

MECHANISM	SPATIAL INVENTORY		
1 The position of waste disposed while moving is related to the course of movement	**a** Accumulated household waste is placed in the interchange of movement or in centred orientation	**b** Litter from consumption waste is displaced alongside the path of movement	**c** Displaced household waste is placed in the hidden corner in the end of movement path
FINDINGS NARRATIVES	Disposal of waste to the gate junction while going outside the neighbourhood	Disposal to the side of the street while going to the workplace or leisure space	Displacement of wet or small quantity household waste to hidden neighbourhood spaces
2 The position of waste disposed while occupying space is related to arrangement of actor's living	**a** Different sizes of dwelling that cater to different actors' needs and capabilities and encourage socio-economic diversity	**b** Options of shared amenities and shared spaces across the neighbourhood	**c** Variety of economic spaces in and outside neighbourhood, and access to the main road with less than 700 m distance
FINDINGS NARRATIVES	Extended family share multiple dwelling space for domestic activities	Some neighbours have bad connection to water and then share with nearby neighbours	Waste is increasingly displaced in areas located far away from the main street
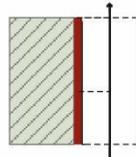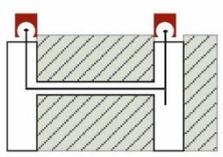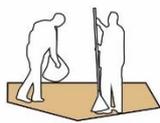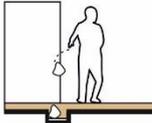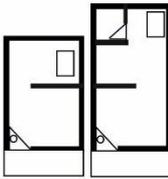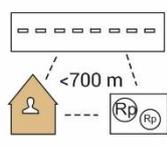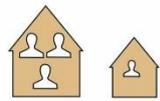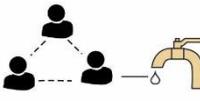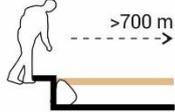
Figure 103. The proposition of design based on pattern of movement, inventory and correlated narratives (Source: drawn by the author)

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determined by the path of movement (main roads, neighbourhood streets, paths, alleys) around it. For example, the spatial inventory highlights that some collective household disposal spaces are found around the *interchange* of the street or paths in a shared space (Fig.103, 1a), while displaced household waste is usually positioned at *the end* of the path itself (Fig.103, top row, 1c). On the other hand, litter waste displaced in collective spaces or in the sidewalk is positioned *along* the path of movement (Fig.103, top row, 1b).

Knowledge about the position and orientation of disposal spaces in the neighbourhood demonstrates how some arrangements of neighbourhood streets and the positions of dwellings and shared spaces are more vulnerable to displacement. This knowledge can further inform the focus of development to avoid waste displacement. For example, development can be focused on abandoned spaces found along paths of movement in the neighbourhood as they are more vulnerable to litter. In addition, dwelling alleys in the riverbank neighbourhood should be designed to avoid dead ends which are currently influencing the accumulation of displaced waste.

The second mechanism addresses arrangements of the actors' living spaces in the neighbourhood that influence waste disposal performed while occupying a space. Certain arrangements of living space trigger the actors' movement around the neighbourhood, and widen the territory of disposal spaces. The findings suggest the importance of creating multiple scenarios of dwelling plans that can cater to the different needs of dwellers (Fig. 103, third row, 2a). For example, it is argued that a variety of living space arrangements, such as different sizes of dwellings in the neighbourhood within a neighbourhood alley, enable dwellers to pick the space that they can afford. Different sizes of dwelling in an alley also fosters a diversity of socio-economic levels in the area, which can encourage dwellers to support each other amidst infrastructural breakdown or simply when distributing jobs. Such arrangements provide an alternative perspective on dwelling design and street configurations for future regeneration strategies beyond the generic space of relocation settlement discussed in Chapter 2.

Other than the form of the dwelling itself, the provision of shared amenities (public toilets and bathrooms) which is affordable and accessible for dwellers is important (Fig.103, third row, 2b). Some shared amenities are only shared within a Rukun Tetangga (an administrative village under a neighbourhood group which consists of 80-160 households), but findings from the mapping routes show that

dwellers can walk up to 200 m to find a toilet. The findings suggest that a variety of amenities options with different levels of accessibility (open for all or limited to a certain group or location of dwellers), provide a more efficient infrastructural provision with less cost for dwellers' different needs, so dwellers can choose based on their different needs.

Apart from dwelling form and amenities, the variety of economic spaces inside and outside the neighbourhood is also important to widen dwellers territory of disposal. Findings from the mapping routes demonstrate that to be visited regularly, the distance between dwelling spaces, economic spaces or the main road should be less than 700 m (Fig.103, third row, 2c). In this sense, while proximity is not essential, the findings demonstrate some knowledge of the distance limit ensure the regularity of movement.

Design for the diversification of actors and maintenance systems

This proposition highlights that in contested neighbourhoods some occupation of space and infrastructural resources are locally organised in diverse ways, employing a mix of people in the process. In contrast with current contested neighbourhoods discourses, the findings suggest that this local organisation is not always done collectively, but they consist of different systems and actors. The variation of actors and systems that provide maintenance services are important and arguably more feasible and sustainable for further development. This proposition focuses on two mechanisms of such diversification (See Fig.104).

The first mechanism underlines the mixed appropriation of spaces and resources which span across public and private domains, demonstrating fluid hierarchies of space and more open infrastructural systems (See Fig.104, top row, 1a-1b). The occupation of the public domain as a permanent private space, or in reverse, the occupation of private neighbourhood spaces for public needs demonstrate this mechanism (as can be seen in the security post and parking lot in Pesing Koneng market).

A more open infrastructural system is suggested in the inventory. Examples are the act of sharing infrastructure when the actors co-exist in space, distributing infrastructure when there is distance between resources and occupied space, and even generating infrastructure in areas outside of any infrastructural network's reach (See Fig. 104, top row, 1c). Pesing Koneng case study findings demonstrates how these open systems evolve, highlighting the expansion of water and electricity

DESIGN FOR THE DIVERSIFICATION OF ACTORS AND SYSTEMS

MECHANISM **SPATIAL INVENTORY**

	a	b	c
1 Mixed appropriation of space and resources across neighbourhood	Occupation of public domain for private or neighbourhood purposes	Occupation of private or neighbourhood spaces for public uses	Sharing, extending, and generating infrastructural resources in relation to position of users
FINDINGS NARRATIVES	Occupying pedestrian space for neighbourhood security post and parking space	Using a private field inside the neighbourhood for storage purposes	Electricity is provided by security post, while some areas uses diesel based electricity
2 Maintenance activities managed by multiple actors and systems	Resettlement should not be done individually but acknowledge social diversity between neighbours	Options of shared spaces and arrangement of dwelling types (board houses/rental houses)	Integrated development with spaces outside neighbourhood that enable intersection with other systems
FINDINGS NARRATIVES	Family and cultural ties of dwellers influence connection between them	Some dwellers collectively accumulate and burn their waste in the shared space	Actors appropriate other space's cleaning network to perform maintenance practices
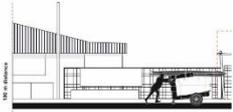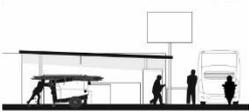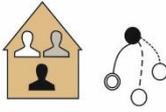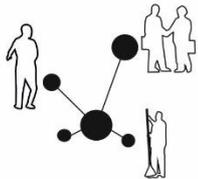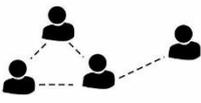
Figure 104. The proposition of design for the diversification of actors and systems, spatial inventory, and the correlated narratives (Source: drawn by the author)

access from private buildings, to the use of generators in some market areas that fit the need for such temporary space.

The second mechanism emphasises management of maintenance practices by multiple actors, in a collective or contingent relationship. Collective initiatives of maintenance require tightness between actors. In Kampung Pulo, collective waste disposal and treatment by some neighbouring dwellers are more apparent between dwellers with similar social backgrounds, such as similar origins or length of stay. By relocating Kampung Pulo dwellers into the housing spaces randomly, the government has not acknowledged such dweller connections within the development process. Arguably, development of contested neighbourhoods must shift from individual based relocation to resettlement that celebrates the diversity of dwellers' relations (Fig.104, third row, 2a).

Apart from social backgrounds, the lack of collective initiatives can also be influenced by the types of dwellings, and the availability of any shared spaces in the location. Board houses or rental accommodation often does not relate well to its surrounding neighbours. On the other hand, areas with a higher density often do not have any shared space that allows collective uses of dwellers. Future development of contested neighbourhoods should pay attention to the arrangements between individual dwellings, rented dwellings, and board houses with rented rooms; in addition to the presence of shared spaces to generate potential collective initiatives (Fig.104, third row, 2b).

Maintenance based on contingent relationship highlights potential intersections with multiple infrastructural networks outside the neighbourhood, such as appropriation of street cleaning network and market facilities for household waste disposal. Future development may encourage such intersections by creating strategies that better integrate the neighbourhood, public streets and public economy spaces around it (See Fig.104, third row, 2c). It is argued that an integrated development brings better efficiency and reduces vulnerability of maintenance in spaces in and around contested neighbourhoods.

Design for the contrast of occupation in accordance with time

This proposition emphasises that in contested neighbourhoods some occupations of space change dynamically over time, and that maintenance often fails to respond adequately to these changes. Based on the findings from the case studies, it is noted that this limited response is influenced by the inability of local maintenance actors to see

different boundaries of spatial occupation and its temporal changes. This proposition mechanism suggests the need to create contrast of spatial boundary and contrast of change between different occupations to reduce traces of people, objects, structures, and waste (See Fig.105).

The first mechanism of this proposition focuses on how associations of space and visibility create the contrast of spatial boundary and shape maintenance practices. The inventory highlights that there is an association that limits spaces for certain activities to be used as disposal space, creating boundary of that space for maintenance activities (Fig.105, top row, 1a). For example, in Kampung Pulo, the neighbourhood gate that is occupied by food stalls is only used for dry waste and not organic household waste disposal.

Visibility of a space also brings contrast of boundaries. The inventory highlights that the neighbourhood gate and shared spaces that are located near to or visible from the neighbourhood street, have less litter (Fig.105, top row, 1b). Other shared spaces that are more hidden have lots of litter, even when there is an accumulation of household waste present in the area. River displacement in Kampung Pulo is more frequent in the terrains near shared spaces that are less visible from the neighbourhood street. In this sense, reducing the risk of displacement requires better visibility of neighbourhood shared spaces.

Other than visibility, creating a boundary contrast can also be done by emphasising protection of vulnerable areas. For example, some findings note that a contained waste disposal area led to less litter around the shared space (Fig.105, top row, 1c). Protection is also important for other vulnerable spaces such as the gutter. An open and exposed gutter often leads to an excessive amount of litter, especially around domestic business or shared spaces used for dwellers hanging out activity.

The second mechanism concentrates on the exchange and overlap of actors' occupations and its relations to traces of people, structures, and goods. The proposition argues that exchange of occupation between actors, particularly with entirely different uses leads to less traces (Figure 105, third row, 2b). For example, when the fruit stall in the train crossing changes into a kitchen utensils stall, this complete change of use entirely removes the fruit seller's goods and structures from the area.

The inventory highlights that the types of spaces that are highly shared by vendors include spaces that are more limited in terms of size or in

DESIGN FOR CONTRAST OF PROGRAMS IN RELATION TO TIME

MECHANISM   **SPATIAL INVENTORY**

	a	b	c
1 Contrast of spatial boundary during occupation	Certain occupation of space inhibit household waste disposal due to associations of space	Visibility of shared space from path of movement influence displacement of household waste and litter	Protection of waste containment and vulnerable areas such as interstitial and unsupervised space
FINDINGS NARRATIVES	Some actors do not dispose smelly household waste in the gate in conflict with a food stall	Disposal in the sides of the shared spaces, or in the river nearby	Excessive displacement of consumption waste along the gutter or unused corners
2 Contrast of spatial changes and dynamic temporality	Understand different times of occupation by different actors in one space to understand the dynamic temporality	Increase space sharing between vendors particularly with entirely different goods	Annotate and separate areas with overlapping activities across period of time by similar actor in one space
FINDINGS NARRATIVES	Street vendors starts and finish their time differently depending on type of goods	Vendors who shares space remove their space and waste completely during clear out	Some vendors prepare, rest, and unpack their goods in the trading space within the day
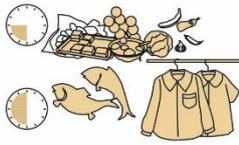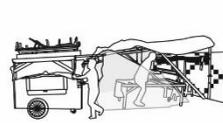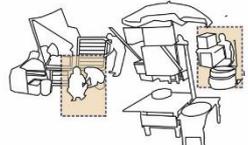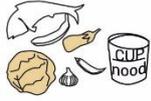
Figure 105. The proposition of design for the contrast of occupation in accordance to time, spatial inventory, and the correlated narratives (Source: drawn by the author)

the potential temporality of use. Space sharing is also more prominent for street vendors with limited goods and less elaborate structures. In Pesing Koneng, an example is seen in the dwelling terraces that are extended around a public domain or areas with dynamic temporality such as spaces in or around the railway crossing.

While exchange of spaces between different actors brings higher contrast, the inventory notes that overlapping occupations by similar actors instead blurred the boundary and creates less contrast between these occupatiosn. In Pesing Koneng, the unloading and preparation activities are not included as part of the market's operational hours as they are considered backstage activities; although it clearly adds to the presence of people, goods and structures outside the trading hours. In this sense, there is a lack of contrast between trading occupations and its supporting activities as they are overlapped into one whole process in space; creating traces of people, structures, and objects outside trading hours. The proposition suggests separating these overlapping activities to reduce such traces (Fig.105, third row, 2c).

7.3.2 Expanding design methodologies: researching and representing maintenance in a situated way

This section addresses how the creative methodologies employed in the research expand methodologies of researching space in a situated way. The Kampung Pulo and Pesing Koneng case studies have provided different lessons in researching space through such creative process. The exploration in Kampung Pulo emphasises the process of following and tracking, while the Pesing Koneng study focuses on the process of observing and exposing layers of information. Both lessons provided insights into researching space of practice by making the maintenance experience more visible, potentially contributing to the expansion of design research methodologies.

This section discusses four main creative forms of researching through representations, consisting of the processes of drawing territory based on movements, drawing connections between actors, drawing experiences of space in practice, and drawing space in practice across time. Beyond the drawings and videos already presented, this section includes other outputs from the thesis' creative exploration processes.

Drawing territory based on movements

Previous routes discussions in urban discourse have been reductive and disregard the full experience of practice, leading to an oversimplification of the actors' maintenance practices. This research attempted to

overcome this tendency through its creative process in drawing the routes employed for disposal practice in Kampung Pulo, informed by the narratives from participant interviews and direct observations.
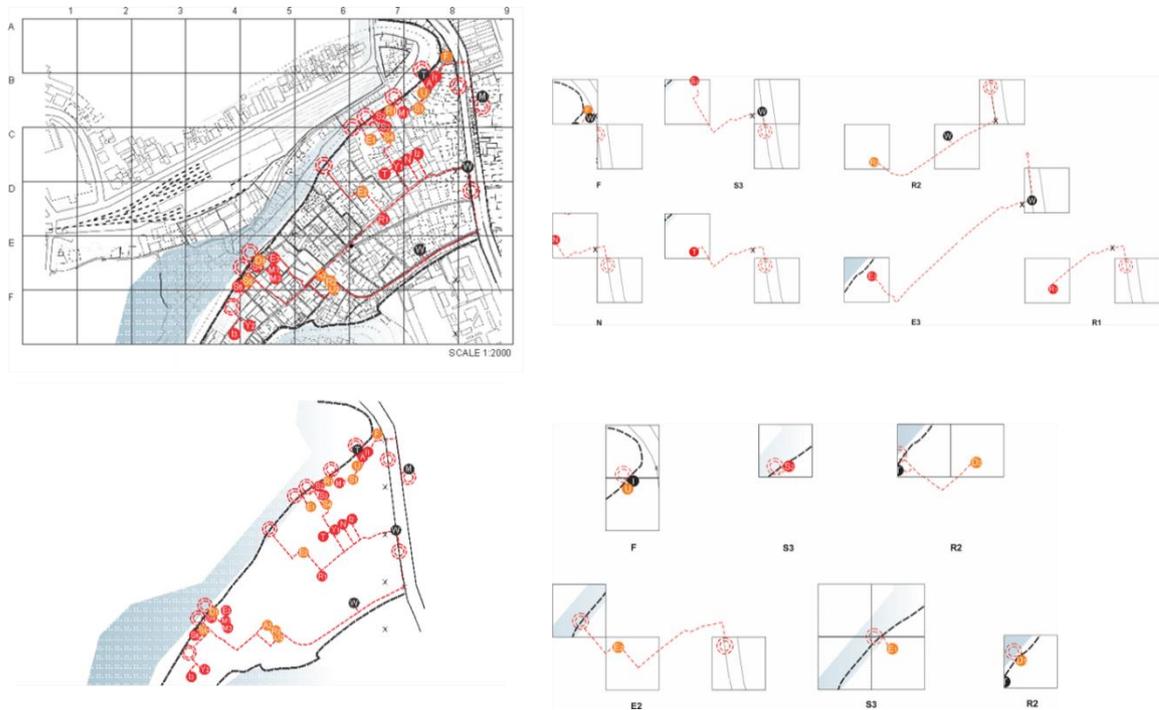
Figure 106. Sample of some isolated dwellers routes in Kampung Pulo
(Source: drawn by the author)

In the thesis, these routes are drawn by connecting dwellers' living spaces, their disposal and displacement spaces, the spaces that they routinely go during the day; annotating different spaces used for disposal and displacement by using dots placed within dwellers route lines (See Fig.106). Drawing these routes allowed for an understanding of the larger picture beyond simply locating the point of disposal, and instead seeing how spaces of disposal are part of the dwellers' overall living territory beyond their dwelling spaces. Reflecting on these movements, the thesis creates a schematic drawing demonstrating the distinct patterns of routes (See Fig.107).

After seeing the larger picture, these routes were then singled out based on the grids, and studied in comparison to each other, revealing that disposal by dwellers is not always done in spaces near their dwellings. This act of isolating and comparing allowed for findings on dwellers' regularity of movement based on their family backgrounds, occupations, and habits, which clarify the overall disposal spaces in and outside the neighbourhood. The drawing suggests that the routes dwellers take to perform their maintenance practices are customised, and that they are not always approximated by dwellers to be the shortest in distance. This
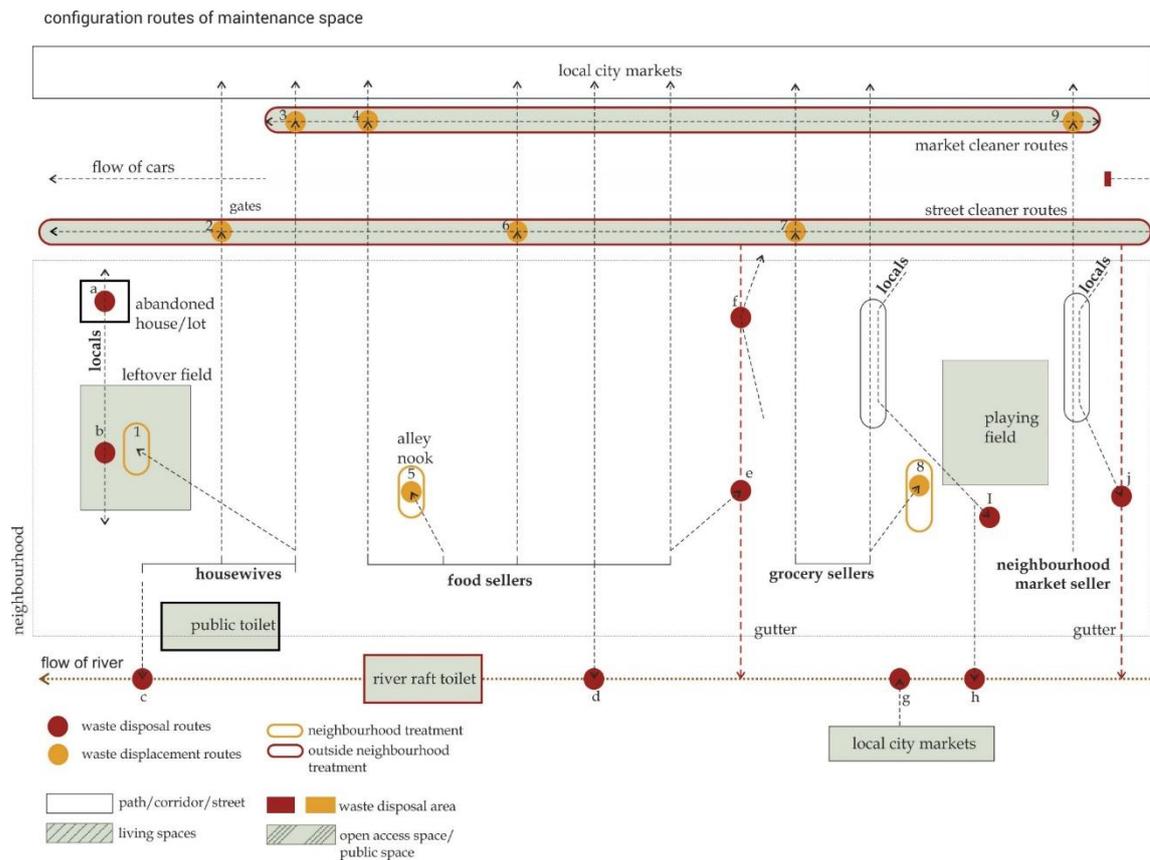
Figure 107. Schematic exploration drawing of different patterns of disposal in Kampung Pulo (Source: drawn by the author)

act of drawing allowed the researcher to read the territorial dispersal of some dwellers influenced by their changing needs and preferences, creating a specific and rich understanding of dynamic living space arrangements in contested neighbourhoods.

Drawing connections between actors

Discussions about the connection of actors in contested neighbourhood discourses have been concentrated to the collective strategies between neighbourhood actors, or similarly on the assumption that local actors enforce a unitary control within a subversive occupation of space. Beyond such limited assumption, this research employs an array of strategies to explore diverse actors' connections which emerge collectively and contingently.

This study employs a diagram to creatively reveal this connection, as particularly seen in Figure 65 on the Pesing Koneng case study. The drawing demonstrates different types of actors who simultaneously transform the pedestrian spaces and streets through building stalls, creating electricity connections, parking the carts and cleaning and

picking waste. Another example of such drawing can also be seen in Fig.108.
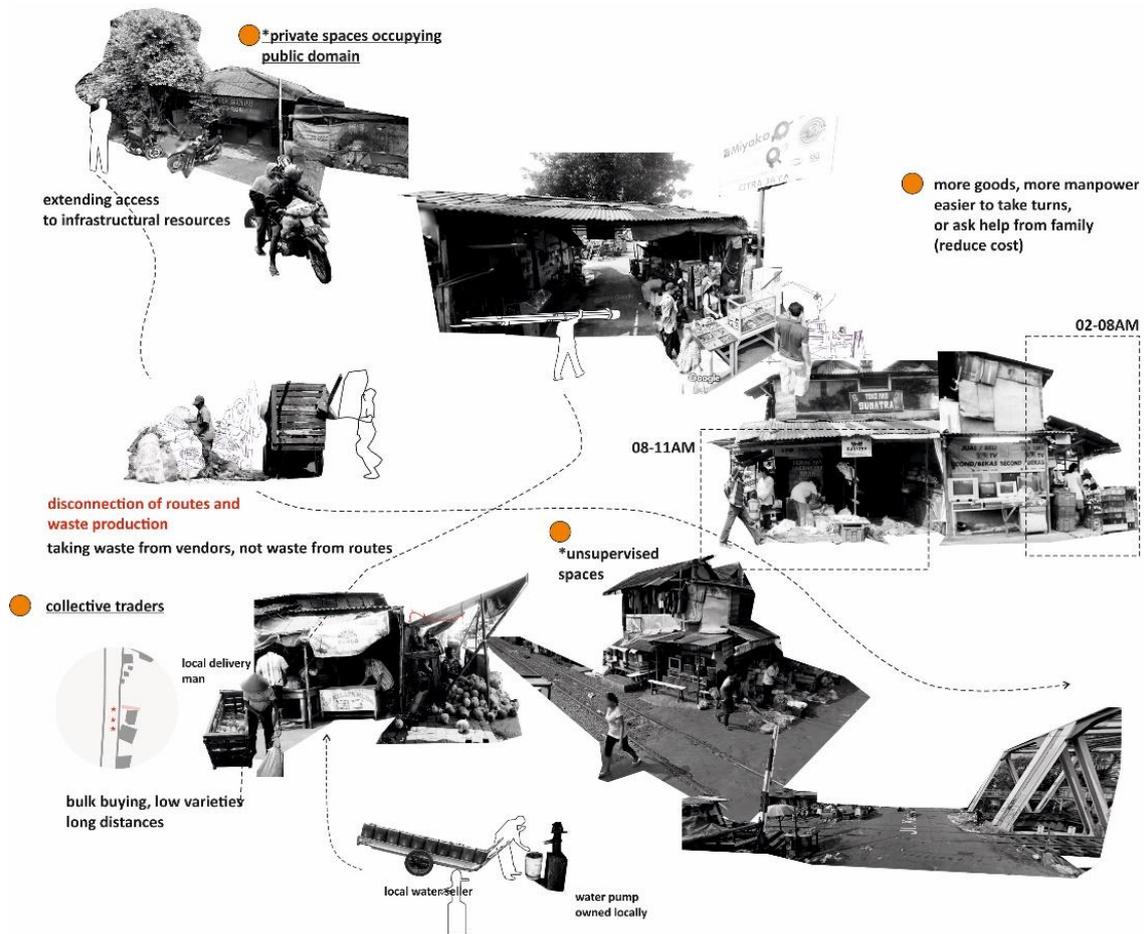
Figure 109. Photo and drawing collage demonstrating connections between actors across spaces inside and outside neighbourhood in Pesing Koneng (Source: drawn by the author)

Figure 108. Highlighting and freezing the actors in the video to reveal the hidden actors that organises the train crossing areas as trading space, (Source: video documented and edited by the author)

Pesing Koneng study also explores actors' connection through an edited video which reveals actors that are more hidden from direct observation and only present in a specific event. (See Fig.109 and Appendix 4 Video 1 of Pesing Koneng train crossing area attached with this thesis). The use of video editing which freezes the movement of specific actors in space allowed for an understanding of actors that perform a maintenance process in an otherwise chaotic and fast-paced space. The video is also useful to reveal information that is typically hidden from the interview, such as the understanding that security practices in Pesing Koneng neighbourhoods can be done by a collection of local dwellers other than the local administration.

Drawing experiences of space in practice

The case studies have developed various representations of experiences of practice in space; employing collaged plans and sections of the dwellers living spaces and annotate courses of body movement in orientation with arrangements of objects and spaces. Collaging the drawing brings contrast to appropriated spaces and structures that are not easily seen. Figure 110 demonstrates how this appropriation of space, structures, and infrastructures is highlighted through collaging sketches and cut-out photographs.

Drawing the actual movement in space also demonstrates understanding of space and objects arrangements based on experience of the body. Examples are the collaged plans and sections on the Kampung Pulo case study (See again Fig.47, 54, and 58). These drawings show how dwellers move around arrangements of objects (tables, chairs) creating an appropriation of space that expands across spatial scales.

The drawing in Figure 111 demonstrates how disposal and displacement happens in different orientations and position of disposal space in relation to the body course of movement. This drawing is a continuation of the drawing scheme of routes in the previous section (See again Fig.108), and provides a more detailed understanding of how body experiences such routes (See also Appendix 4 Video 2 that demonstrates positions of these disposal spaces in accordance with the street).

Apart from the collaged plans and body movements, another method in capturing dwellers' experiences that has been conducted in this research consists of a collective practice mapping workshop performed
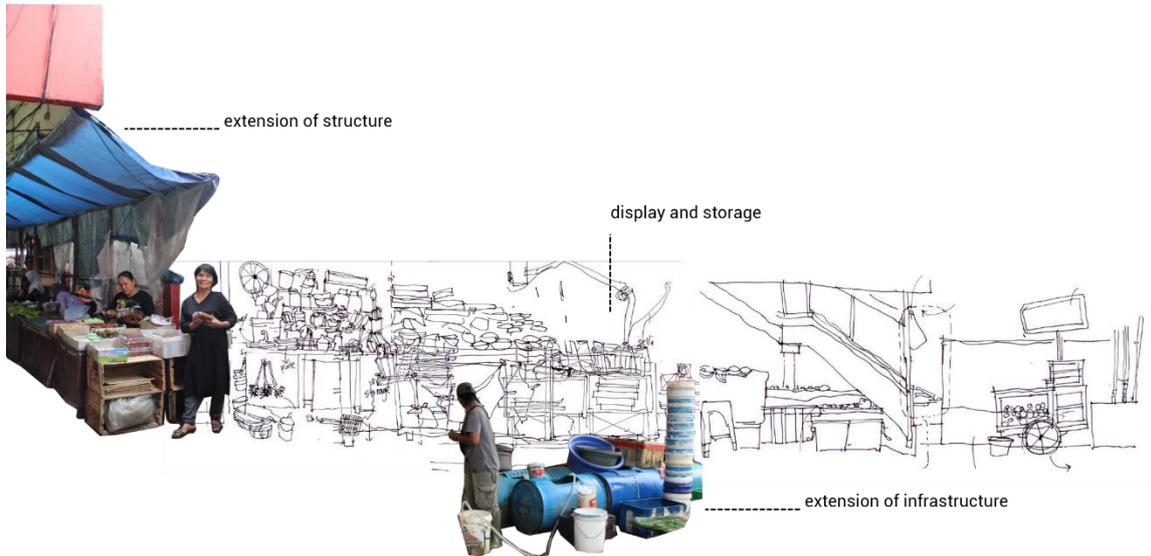
Figure 110. Collage of cut out photographs and sketches which reveal parts of space, structures and infrastructures that are appropriated by actors (Source: drawn by the author based on observation in Kebayoran Lama market)
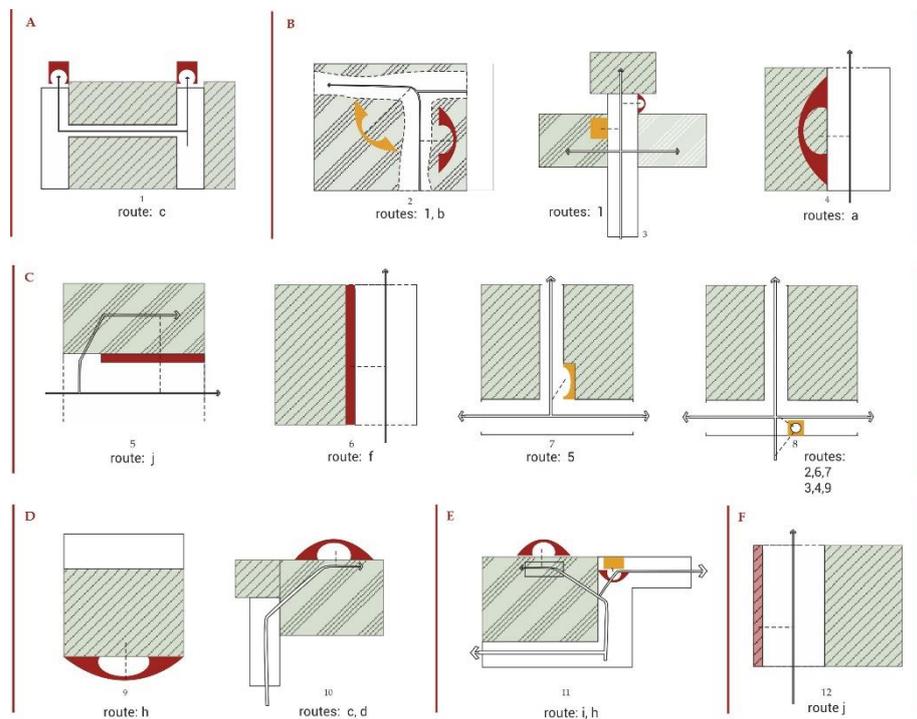
Figure 111. Pattern of orientation and position of space of disposal along dwellers' routes in relation to the body movement (Source: drawn by the author in relation to the dwellers routes map in Fig.107)

in Manggarai. This workshop was initially planned to be carried out within Kampung Pulo, however the sudden eviction made this unfeasible. The workshop was then conducted in Manggarai and serves as an additional study that explores the different methods of studying practices (See Fig.112).

This workshop focuses primarily on revealing the locals' shared knowledge which aids their maintenance practices. The study is done by creating a model of the neighbourhood spaces, and the dwellers were asked to annotate spaces where they wash, perform sanitary activities, and dispose their waste regularly using dots and paper strips. The dwellers stuck post-its containing stories related to these spaces in a paper next to the model.

The findings from this study challenges current assumption on the use of private and public amenities in a contested neighbourhood. For instance, despite the availability of public amenities, the mapping activity showed that there is a large number of dwellers who prefer to use a neighbour's bathroom to do their maintenance practices. Some dwellers said that the public toilet often has no access to water and that they need to bring their own water if they want to use it. Some said that one of the public toilets was once swept away by the flood while one reported that one of her children fell from a hole in the toilet's wood floor. In fear of such occurrence, some dwellers resorted to using their neighbour's toilet despite the rebuilding of a new public toilet. The neighbour's toilet space is also bigger, as it was also in use by the renters of a nearby dwelling; so that the dwellers can also use it for multiple activities such as washing and hanging their clothes. These activities cannot be done in the public toilet, as it is less open than the neighbour's bathroom.

The explorative drawings in Kampung Pulo and the collective mapping workshop in Manggarai (albeit not being used in the case studies) reveal the actors' current spatial and infrastructural arrangement based on the real needs and actual conditions of infrastructure in the neighbourhood that might not be immediately seen. In this sense, these creative representations reveal situated information that changes how practice is performed in a context, such as infrastructural breakdown, changing needs of spaces, and any incidents that brings fear of practice in certain condition.

Figure 112.Collective maintenance mapping process in Manggarai showing (top photo) dwellers discussing their space, (bottom left) the annotated model of the neighbourhood, (bottom right) a dwellers bathroom that has been collectively used by neighbours instead of public toilet (Source: author's documentation)

Drawing space in practice across time

Drawing space in practice across time has been useful in studying contested neighbourhoods, as the temporal appropriation of spaces in such context is prevalent. This form of representation is particularly explored in the Pesing Koneng case study, as the study is situated in a temporary context.

The drawing of the vendors' temporality in Figure 73 addresses variations of vendors' trading hours based on the interviews, revealing that market vendors do not start and finish at the same time. These variations are initially invisible from the interview with local authorities and are only revealed through the drawing of the vendors' temporality.

Another example of drawing practices across times can be seen in the drawing of the transactions of goods and resources in Figure 83. The drawing layers plans and sections of vendors across two different trading shifts. This drawing demonstrates how the vendors' stall structures move in different spaces, how goods are stored away, and where waste disposed moved across time. The drawing demonstrates that in contested neighbourhoods, repacking practice does not only mean simply the entire removal of an individual space, showing that such act is performed in coordination with other practices. Another exploration of drawing the dynamic of practice in relation to other practices is seen in the drawing of the train crossing area in Pesing Koneng across time, presented in Figure 113. This drawing demonstrates that some vendors' repacking activity is also influenced by the flow of vehicles in the area.

The drawing of traces of the Pesing Koneng case study (See Figure 87) is inspired by the presentation of artefacts in the field of archaeology, using cut out pictures of structures, goods, people, and waste that are compiled in rows and linked with lines based on types. Cutting out the pictures is important to highlight that these structures, goods, people, and waste do not currently belong to the space as they were present beyond trading hours. The drawing enhances the visibility of these traces which otherwise blend in with their context and are not initially considered as a challenge of maintenance.

Apart from these drawings, this research previously explored forms of time drawing in Kampung Pulo which is not included in the case study (See Fig.114 and Appendix PLATES 2). The study explores how flood
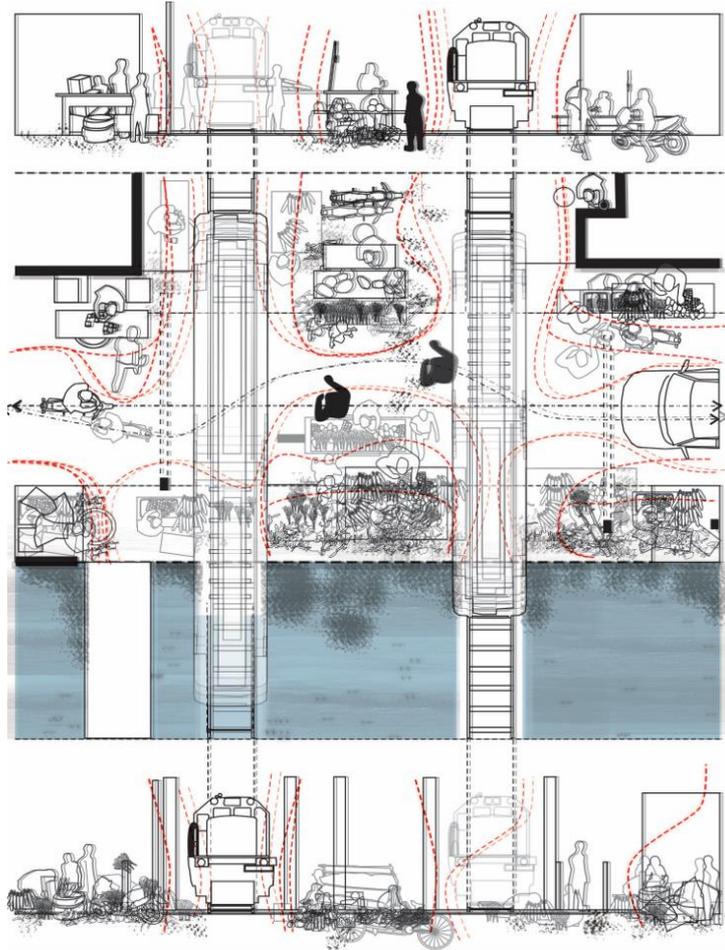
Figure 113. Exploration of drawing space across time in accordance with train movement in Pesing Koneng (Source: drawn by the author)
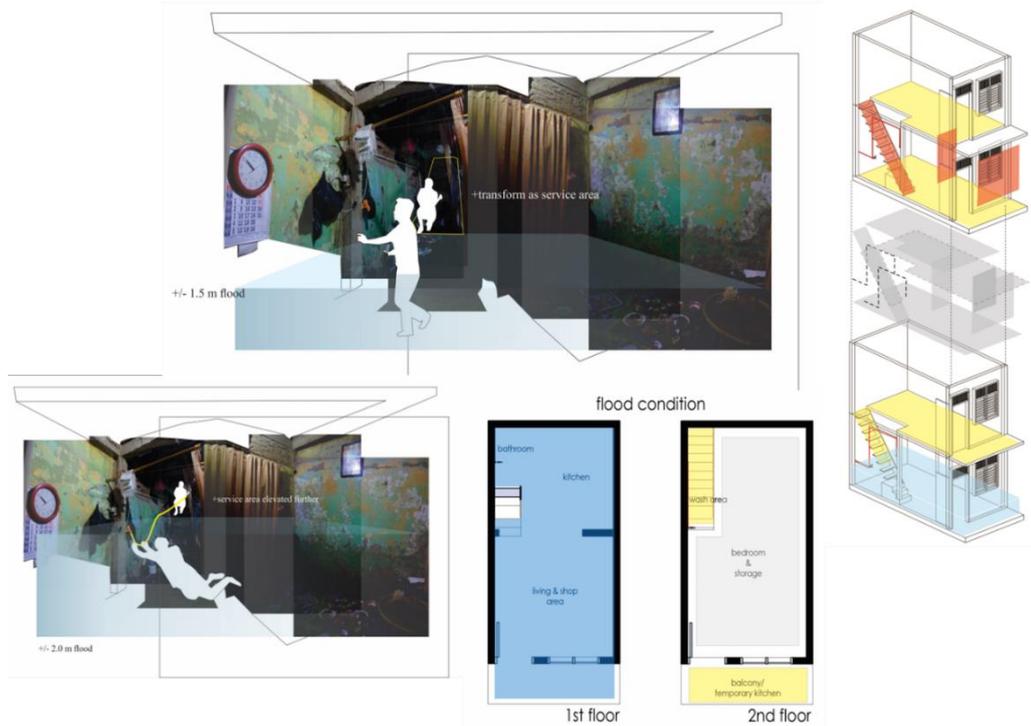
Figure 114. Drawing of changes of arrangements of dwelling spaces with the rise of flood water level from 1.5 m to 2 m (Source: drawn by the author)

incidents influence the use of space over time in Kampung Pulo through a series of sequential drawings in three different dwellings. The drawings consist of a collage of dwellers occupying dwellings with different level of water inundation, highlighting appropriations of their dwelling space and access to infrastructure during prolonged incident of flood. An example of such appropriation is the improvisation of a water tap by dwellers to be positioned near the stair at the height of 1.5 m (See Fig.114, bottom drawing). With such a tap, in the event of a flood the stair area becomes the area to wash and shower while the dwellers take refuge on the second floor, ensuring access to clean water.

Figure 114 demonstrates a situated understanding of how arrangements of space and infrastructure are dynamically transformed by dwellers in the face of severe and prolonged disaster. While in the end these sequential drawings were not included in the maintenance case studies, they were one of the first drawings that signify the importance of a more situated and creative exploration of maintenance practice.

7.4 Design based on knowledge of maintenance: some exercises

This section discusses further on the potential design application of propositions in the spatial inventory; towards the development of design methodologies informed by maintenance. It outlines some design exercises that have been conducted in the course of the research, based on the mechanisms outlined in the inventory. These exercises are not comprehensive, aiming simply to initiate further discussions of potential applications of the spatial inventory propositions for future development of contested neighbourhoods by designers and planners.

The inventory serves more as a tool to specify the starting point of design that values the maintenance process, instead of a tool to detect "the problem" which should be eliminated. While the inventory demonstrates important spatial qualities that shape a practice, these qualities do not serve as absolute determinants of the practice in space. For example, the inventory suggests that there is an appropriation of space within the public domain that was used for the neighbourhood such as the security post, which leads to an extension of electricity to vendors. Removal of the security post in response to this inventory, for instance, does not necessarily guarantee that the vendors will not be able to access electricity for trading.

To begin with, the exercise of a design based on patterns of movement is shown through proposing the position of the public toilet and shared spaces (See Fig. 115) that can change the overall pattern of movement
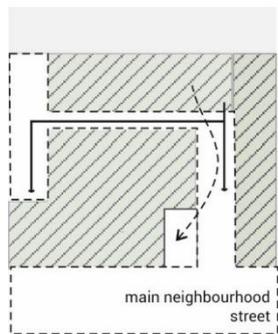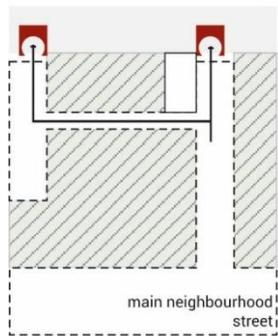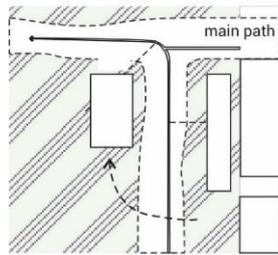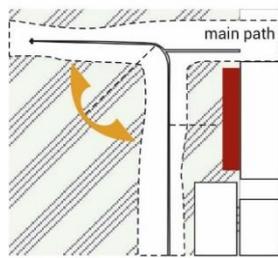
Figure 115. Some strategies of design based on pattern of movement: changing arrangements of shared space and position of shared toilet to reduce potential displacement of waste (Source: drawn by author)

around such space (Fig.115). For instance, the design exercise proposes to move the Kampung Pulo neighbourhood toilet to the middle of the neighbourhood, around the neighbourhood main street (See Fig.115, bottom two drawings). This proposition creates changes of the movement pattern in accessing the amenities, potentially reducing displacement which usually takes place at the back of the public toilet highlighted in the inventory.

Another exercise employed a similar approach by moving the resting space to the middle of a neighbourhood field in Kampung Pulo, from its current position at the side of the field (See Fig.115 top two drawings). Occupying the middle area of the field encourages any collective disposal of waste to the side or to the corner of the space, while also discouraging litter disposal around the resting space. The inventory provides knowledge on which neighbourhood space can be the focus of the reorientation to change vulnerable patterns of movement that are at risk of displacement.

The exercise on design for the diversification of actors, proposes maintenance hubs in Kampung Pulo, as an integrated strategy for actors to connect with each other and better manage production and treatment of waste. This proposition created a series of connected hubs that appropriates some spaces inside and outside the neighbourhood that were abandoned from flood and eviction incidences (See Fig.116, top drawing). The hubs provide a contained waste disposal area to reduce displacement. In addition, it also contains spaces for other neighbourhood needs depending on their position and local district's needs.

The hub inside the neighbourhood primarily responds to difficulties of individual waste collection as some dwellings are not accessible for collection due to the neighbourhood density (See Fig. 117). This density also makes it challenging for collective disposal due to the scarcity of sizeable shared spaces as annotated in the inventory, and even more in the areas dominated by board houses and rental dwellings. Developing the hub encourages collective disposals in multiple spaces that are easily accessible for collection but also accessible from different dwelling positions.

The hub outside of the neighbourhood aims to foster intersection between neighbourhood household waste disposal and other maintenance networks, such as the street cleaners (See Fig. 116, bottom drawing). In
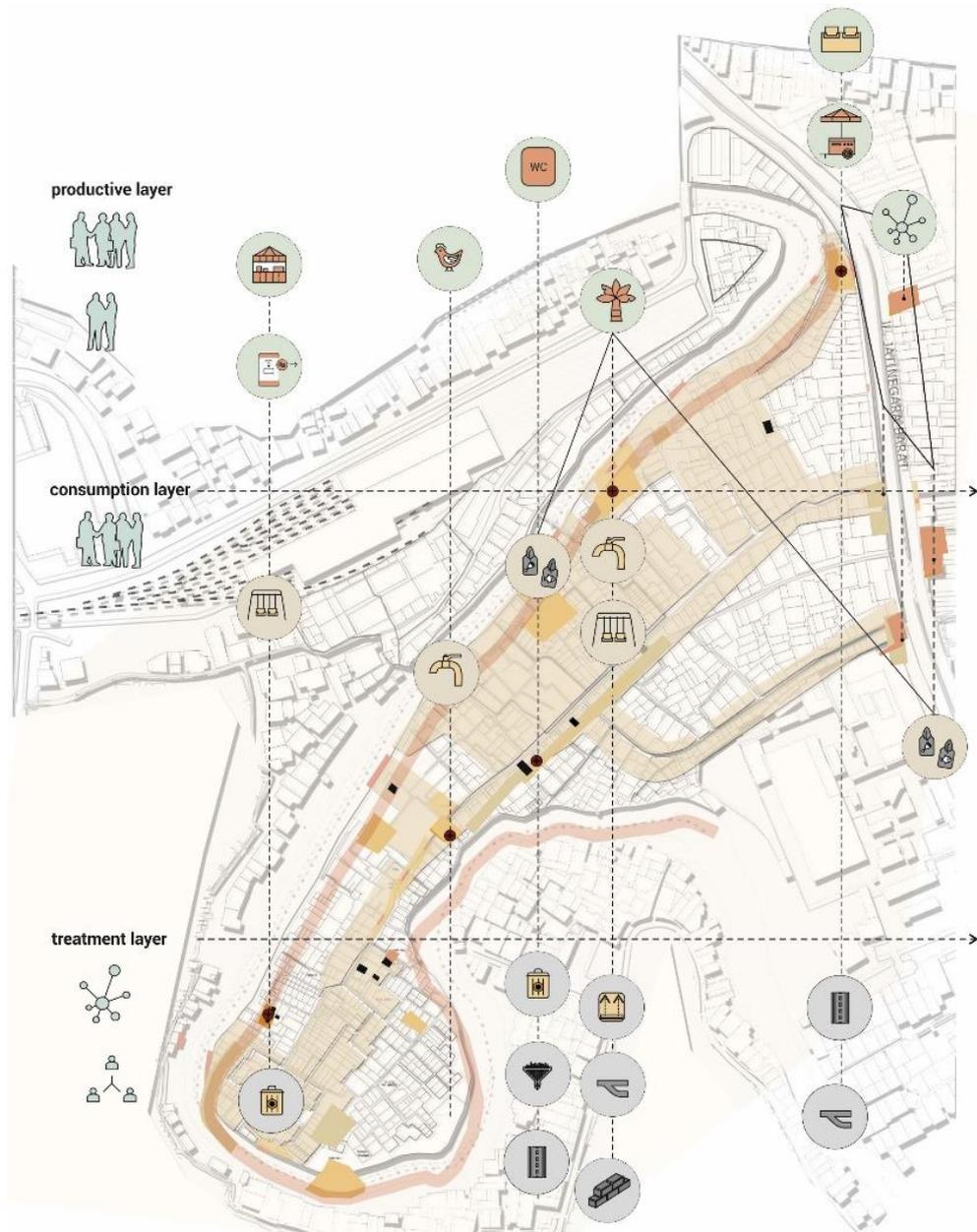
Figure 116. (Top drawing) The maintenance hub programs and targeted location in and outside the neighbourhood (Bottom drawing) Maintenance hub outside the neighbourhood that can be used to accumulate waste and park dwellers' carts (Source: drawn by the author)

Figure 117. A hub inside the neighbourhood that appropriates an abandoned lot as play space (Source: drawn by the author)

the exercise, the hub employs left over areas from the eviction process located near the neighbourhood gate. Apart from being used as collective waste areas, the hub proposes to use this space for cart parking areas. The carts were usually parked near the neighbourhood gate, creating a hidden space under the carts that is often used to displace litter. It can be seen that these hubs acknowledge and emphasise the connections between actors and their spaces across spatial scales, employing these connections to support maintenance activities.

Lastly, the exercise performed in accordance with the need for contrast of programs proposes to create a distribution and preparation centre for goods in the Pesing Koneng neighbourhood spaces (See Fig.118 and 119). The distribution centre occupies the space previously used serving as an integrated place of trading activities, such as spaces to wait for delivery and to unpack and prepare goods for trading. Creating a distribution centre inside the neighbourhood space aims to reduce overlapping activities in the pedestrian spaces, potentially avoiding traces of structures, goods, and waste in the area. This proposition acknowledges the connection between the market and the neighbourhood spaces, and employs such connections to bring more contrast to the program in the pedestrian spaces.

These exercises initiate further discussion on design for contested neighbourhoods based on the knowledge of maintenance that aims to
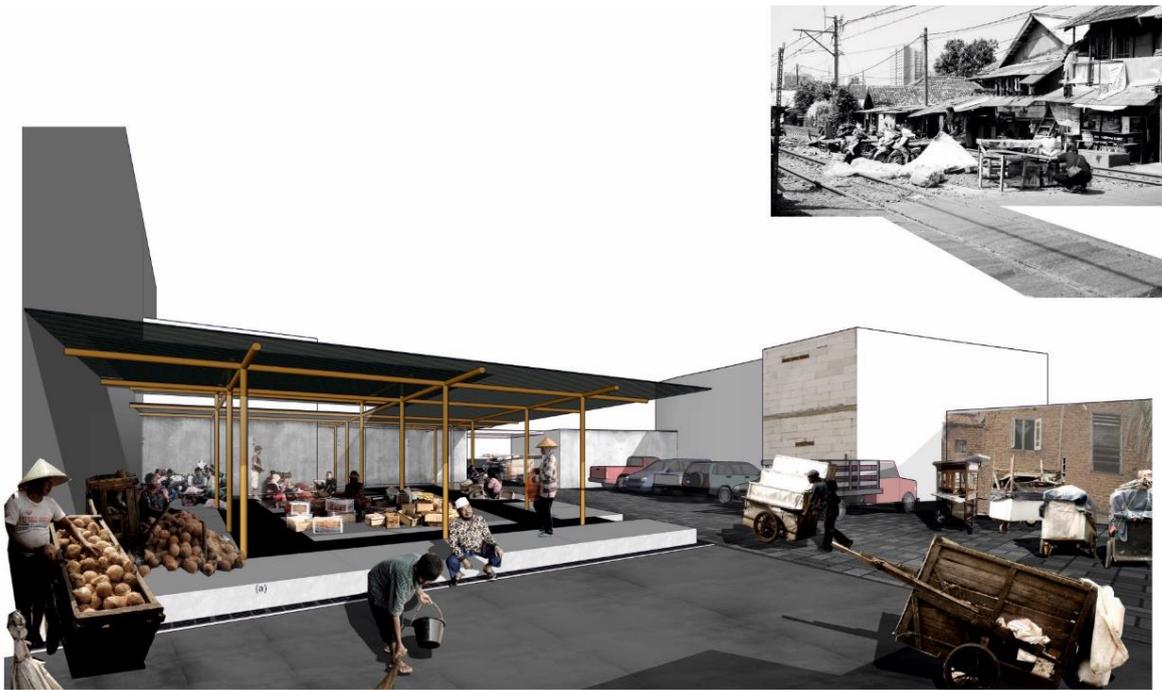
Figure 118. Distribution center design inside Pesing Koneng neighbourhood for temporary market needs (Source: drawn by the author) (Onset photo: vendors preparing their goods outside (Source: author's documentation)
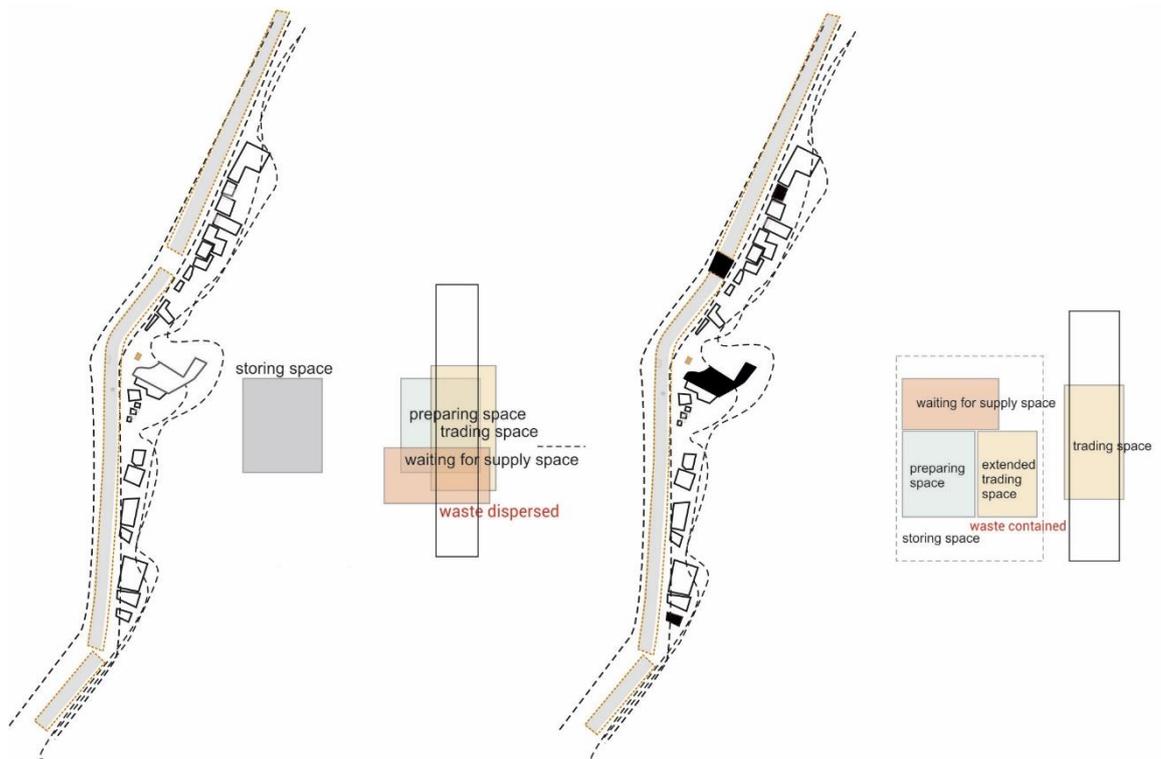
Figure 119. Inserting distribution centre to reduce traces of people, objects, and structures outside trading hours (Source: drawn by the author)

increase the quality of the neighbourhood and its wider city environment. Going beyond removal of contested actors, the exercises outline the importance of creating various interventions that are not limited on particular spatial scales. Future development should alternate between small, micro interventions in some neighbourhood nooks, to larger schemes of collaboration development across spaces inside and outside the neighbourhood. While further thought on the overall design process for such intervention is necessary; the exercises demonstrate the contribution of the spatial inventory in developing more inclusive design methodologies for contested neighbourhoods that acknowledge the actors' complex living practices.

8. Conclusion

8.1 Introduction

This PhD by Design research investigated the spatiality of maintenance in a contested neighbourhood and explored how such knowledge potentially informs design for such context. This concluding chapter summarises the thesis contributions over the course of it. The chapter draws the theoretical and practical implications of research based on these findings and evaluates the limitations of this research and outlines potentials of further studies.

8.2 Research findings summary

8.2.1 The importance of maintenance research in contested neighbourhood for architecture

This thesis builds the urgency of maintenance research in Jakarta, particularly in the background context and the literature review chapters. Reviewing the Indonesian national and regional structures of authorities and interview narratives with Jakarta government agencies, the thesis addresses a limited focus of government authorities on seeing maintenance simply as a passive response towards a problem in the environment instead of an integrated approach. The thesis further highlights disconnection between the local context and the higher authorities in the city, arguing how such disconnection brings challenges on maintenance. The thesis demonstrates how such limitation and challenges have led to social segregation and oversimplified developments, validating the importance of maintenance research.

In its empirical studies, this thesis focuses on investigating how maintenance takes place in the contested neighbourhood, arguing that maintenance brings an alternative understanding of space. Through researching maintenance, the thesis contributes in providing a more thorough understanding of space, particularly from the backstage perspectives. It elaborates further on complexity of maintenance in a contested context, highlighting the changing a social order of maintenance, creating indeterminate spaces, and more open system of infrastructure.

Such structured investigation of maintenance complexity significantly expands urban maintenance discourse. It is argued that these complexities enable maintenance to be seen as a transformative

process, creating an understanding of adaptation and change of space and its impact to the wider environment in contested context. By investigating maintenance in the field of architecture, the thesis creates shift from understanding architecture as inherently fixed and stable to dynamically changing.

8.2.2 A situated understanding of maintenance through the lens of practice

Literature reviews have demonstrated the limitation of current urban maintenance discourses, which has not clearly stated the extent of activities involved in the process of urban maintenance. The literature review provides an overview of activities that are part of the maintenance process, comprising of repair, cleaning, and securing (vigilance and surveillance). The literature review also provides an overview of attributes of maintenance, looking at actors, space and resources of maintenance.

Current urban maintenance pieces of literature arguably tend to concentrate on the problematic material in an environment, leading to a lack of discussion regarding the overall spatiality of maintenance. The literature review extends the discourse by providing a theoretical understanding of spaces of maintenance. As 'other space', space of maintenance does not only simply mean service space but instead space that is experienced through conducting the process of maintenance. The thesis highlights that space of maintenance evolves differently depending on the relations between the actors of maintenance and the users, with some spaces of maintenance requiring absence and others require co-presence between actors and the users. This relationship arguably influences spatiality and temporality of maintenance.

The literature review also annotates another form of space within space of maintenance, which is the 'concealed space' or a space appropriated by maintenance actors during their time of maintaining and not used for maintenance process. With this understanding, the thesis demonstrates how maintenance becomes a transformative process.

Another critical point raised by the literature review is the understanding of maintenance as a situated inquiry. The chapter highlights the growing discourses that aim to employ the lens of practice theory to explore maintenance in a situated way. It is argued that a situated understanding of maintenance brings a consideration of space navigated in real time, creating a living experience of space. Employing

practice theory allows the practice itself to be the one that constructs the space of maintenance, instead of directly researching a certain space that is only assumed as the space where maintenance takes place.

The literature review compares between situated practice research and previous practice-based research, highlighting how their differences influence research methodologies. Previous practice-based research, dominated by sociological and anthropological research employs practice elements as the basis of data analysis, and divides the data based on the elements of competence, material and meanings. In comparison, the situated practice research was dominated by geographers and sociologists that tends to employ visual research methodologies, creatively position how such elements are embedded within the context. The following chapter discusses more on the importance of such creative methodologies for maintenance research.

8.2.3 Creative methodologies in exploring maintenance in a situated way

This research contribution as a PhD by Design research takes place in the development of creative methodologies as its means of research. Through representations, the research exposes the hidden experience of maintenance practices in the contested neighbourhood; enabling a situated understanding of how such practice occurs in space. The thesis explores such methodologies within the literature review, methodology and discussion chapter.

The thesis discussed the twofold importance of using such methodologies. First, researching space of maintenance requires creative method to make the experience of practice visible as it unfolds in space. Creative methods are also important for research in contested neighbourhood as there is a need to better understand such space with all its dynamics. Secondly, as design research, such methods enable this thesis to develop its inquiry through the process of making, expanding ways of understanding space.

Despite the growing references of situated practice researches, the literature review annotates that there has not been a clear overview of the overall methodology of such research. The literature review and methodology chapter expand such limitation by providing a structured explanation of the methods, dividing them into the methods of capturing the experience of practice and the methods of making maintenance practice to be more visible.

Depending on the nature of a practice, methods of experiencing research can consist of the act of following the actors to capture their specific movement practice, or instead of wandering around, to capture a more hidden practice. Researching a practice can also employ other forms of data which are more indirect such as traces of practice in space and actors' narratives itself.

The creative methods of making the practice experience visible are discussed in the methodology and discussion chapters. Currently, the thesis has explored the use of the schematic diagram, edited videos, photograph collages, to community engagement as a method of researching maintenance through representations, but discussing them under the notion of 'drawing' approaches. This thesis argues that employing the word drawing (instead of mapping or diagramming) emphasises more on the process of making, more than simply annotating things.

The methodology chapter discussed three particular approaches to make the practice visible, which is by drawing the dynamic routes of practice, drawing detailed experience of actors in space, and drawing how practices evolve over time. The chapter examines current application of such drawing in urban and architectural discourse, expanding limitations and gaps. The chapter highlights that the routes drawing in current urban theories tends to be reductive and disregard the full experience of the journey. Drawing of waste disposal routes in this thesis traces dwellers' overall movement across the neighbourhood, creating understanding of the overall territory of disposal instead of simply highlighting the points of disposal.

The empirical chapters developed drawings of connections between actors and drawings of their spatial experience in doing maintenance. The actors' connections drawing focuses on drawing diverse relationship, highlighting contingent connections between them that are often hidden. The experience of space drawing focuses on the dynamic qualities of space that are limited in previous architectural representations, such as things happening in movements, e.g. spill over of waste or movements of objects.

Drawing space in practice across time is of particular importance for a maintenance research as the process deals with condition of space that changes over time. Such drawing is also particularly relevant in studying contested neighbourhood, with prevalent temporal appropriation happening in such a context. The drawings developed by

this approach focus on the actors' occupation that transforms space and infrastructural arrangements in different times, employing timeline drawing, sequential drawing, to archaeological drawings to visualise such transformations and how it brings challenges to the maintenance.

8.2.4 Spatiality of maintenance in contested neighbourhood

As part of its main research inquiries, conceptualisation of space of maintenance is one of the key findings of this thesis. The thesis produced such conceptualisations from exploration of waste practices in Kampung Pulo and clearing out practices in Pesing Koneng. The discussion chapter outlined four different aspects of space of maintenance based on these case studies findings.

The first aspect highlighted how actors' movement builds spatial and temporal territoriality of potential disposal space. The knowledge challenges the generalised assumption of neighbourhood dwellers disposal practice, which assumes that dwellers will dispose of their waste solely based on proximity with their dwelling space. The findings investigate dwellers who dispose and displace in considerable distance from their dwelling, pointing out that the regular movement across the neighbourhood creates territory of potential disposal spaces.

Territories can also be widened based on dwellers dispersal of living spaces, contributed by occupation of multiple dwelling by extended families, the use of shared amenities, and options of economic or shared spaces. The findings indicate that the lack of regular movement which potentially increases the risk of waste displacement.

The second aspect argues that maintenance in locally organised spaces is mixed, subjective, and partial. The terms locally organised spaces deal with how occupation and maintenance of space are organised locally in the neighbourhood without or with limited knowledge and support from higher authorities. The findings challenge the current assumption of contested spaces discourse that is polarised between understanding temporary occupation as standalone action or instead seeing it as unitarily controlled.

The findings suggest that there are mixed ways space and infrastructures are simultaneously appropriated across the neighbourhood's spatial scales with reliance on contingent and collective relationship between actors. The contingent relationship demonstrates connection between different actors without shared responsibilities, while collective relationship demonstrates connection between similar actors with shared responsibilities. The case studies

suggested that these relationships may be uneven across the neighbourhood, which potentially leads to a subjective, partial, or even neglected process of maintenance.

The third aspect outlines that the associations that connect waste types and potential space of disposal. This knowledge challenges assumptions that actors in the contested neighbourhood would always dispose of their household waste in one standard, generic way. Instead, case studies demonstrated that the actors could tailor their disposal practice depending on the waste types and options of disposal space around them. Associations of forms and quantity of waste can influence actors to dispose differently, with the findings suggesting that small and organic waste is often being displaced to inhibit disruption to other space.

The findings highlighted that the associations could also be influenced by the maintenance practice itself. Waste disposed in neighbourhood shared spaces has more potential to be displaced. The associations also determine the position, size and orientation of space for the practice of burning waste, as such practice requires hidden space to accumulate and burn waste collectively to avoid conflicts with other neighbours.

The fourth aspect addresses the presence of traces that creates challenges of maintenance in space, particularly in temporary occupation. Traces can evolve in the form of waste, objects, structures, and people remaining in the area outside the assigned time. Extensive occupation of spaces and vulnerability of cleaning significantly influence the presence of traces.

Extensive occupation of space can be influenced by prolonged occupation and overlapping activities in space which allow objects, structures, waste and people to occupy the space longer. Prolonged occupation of space demonstrates the use of space to do one activity by individual or multiple actors for a longer time, while overlapping activities demonstrate the use of space by similar actors for different activities together.

Vulnerability of cleaning creates disconnections between cleaning actors and users due to mismatched temporality of cleaning that create delays on picking waste and clearing the market. Some spaces are also omitted from the cleaning process, contributing to the presence of traces.

This thesis points out that the escalated presence of traces is often invisible from the local authority as they are blurred with the existing structure of space. The escalated presence of traces demonstrates failure of clearing out a temporary space, potentially bringing conflicts between local and regional authorities.

8.2.5 Potential design knowledge based on understanding of maintenance

As a PhD by Design thesis, design knowledge informed by maintenance is one of the primary contributions of this research. The thesis has consistently discussed the importance of maintenance for architectural design in the background context, literature review, methodology, and discussion chapters.

Arguing for the lack of design knowledge that values maintenance process, the background context highlighted fragmented development practice in Jakarta which brings the urgency of such knowledge. The literature review signified that maintenance study enables a more thorough reading of space from the perspective of backstage actors, and therefore potentially contributes to expanding design knowledge.

The methodology chapter created a structured definition of design research, objectives and contribution of knowledge in such research, expanding the lack of discussion regarding design research structures in architecture. The methodology chapter outlined the importance of design research to make the experience of maintenance visible, and equally develop design knowledge that can be the basis of future design practice of contested neighbourhood.

The discussion chapter explored such accumulated knowledge through assembling a design inventory that can be the basis of design guidelines for a contested neighbourhood. The inventory organises knowledge of maintenance based on case study findings into three propositions. Each proposition is then divided into corresponding themes, and each theme has an inventory of spatial and temporal qualities which can be used to develop design guidelines in the future.

The first proposition of design based on the pattern of movement, consists of two mechanisms. The first mechanism considers orientation and position of disposal space in accordance with path of movement. The second mechanism emphasises arrangements of dwelling, public amenities, and street configurations to widen territory of potential disposal space.

The second proposition focuses on diversification of actors and systems in conducting maintenance. The proposition emphasises different sizes of dwelling and arrangements of different types of dwelling to ensure socio-economic diversity of dwellers in an area. In addition, the proposition also encourages intersection with other infrastructural network outside the neighbourhood.

The third proposition suggests for a contrast of programs in the relation of time, protecting boundary of space from prolonged occupation to reduce risk of traces. The proposition suggests to increase space sharing, protect vulnerable areas and reduce overlapping activities in a spatial occupation.

These propositions offer a focused understanding of potential development in Jakarta contested neighbourhood that values maintenance, potentially contributing in expanding the generic and fragmented development practice of such context.

8.3 Implications of research

This research expands limitations of research and design in contested context, providing knowledge and tools to understand contested neighbourhood spaces. The following sections address the twofold significance of this research, both towards architectural and urban theories, and towards policy and practice of design and development of contested urban neighbourhoods.

8.3.1 Implications for theory

This thesis expands architectural and urban theories by providing an alternative understanding of space through exploration of backstage practices' perspective instead of user practices. The study annotates relationships of diverse actors in conducting maintenance practices, expanding the discussion on informal and formal relationships in the city which are one of the focuses of urban assemblage discourse as outlined by McFarlane, Sendra, and Simone.[439]

The study also expands Sennet's proposition of open spaces, by highlighting appropriation of spaces across spatial scales. Findings on waste practices in Kampung Pulo and clearing out practices in Pesing Koneng demonstrate appropriations of private spaces for public uses and vice versa. Such appropriation demonstrates that a subversive

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[439] Colin McFarlane, 'The City as Assemblage: Dwelling and Urban Space', *Environment and Planning D: Society and Space* 29, no. 4 (1 August 2011): 649–71; Pablo Sendra, 'Infrastructures for Disorder. Applying Sennett's Notion of Disorder to the Public Space of Social Housing Neighbourhoods', *Journal of Urban Design* 0, no. 0 (6 February 2016): 1–18; AbdouMaliq Simone, 'Cities of Uncertainty: Jakarta, the Urban Majority, and Inventive Political Technologies', *Theory, Culture & Society* 30, no. 7–8 (1 December 2013): 243–63.

temporary occupation in the city is not as fleeting as it may seem, but instead can be a product of contingent relationship between actors from in and outside the neighbourhood. This understanding of contingent relationship expands current discussion of urban theories that are limited to either see the informal and formal actors in the city to be at odds with each other,[440] or instead taking turns occupying a space and become hybrid.[441]

This thesis employs a situated practice research framework, connecting urban maintenance and practice theory to explore the spatiality of maintenance in a contested neighbourhood. It contributes further on practice theory by theoretically and empirically pinning down the spatiality of practice that has become the challenge of researching practice by some practice theorists such as Shove and Pink.

The creative methods developed in this thesis expand methodologies for situated maintenance discourses that tend to concentrate only on the material aspect of such space and overlook the spatial qualities of space of practice. The creative methods developed in this thesis also supplement the actor-network approaches in exploring the urban assemblages by drawing the practice in its actual contingency. The creative representation produced in this thesis also arguably expands limitation on current architectural representations, often unable to address the dynamic of space and matter, such as moving objects or spilt matter.

The thesis also provides implication of design research methodologies by creating a spatial inventory based on practices to aid design process for a contested neighbourhood. Such inventory enables future development to move beyond isolating a particular 'problem' or creating a certain ideal form of space, and instead focusing on the mechanism of practice outlined in the inventory. By doing so, it is argued that such inventory supports Dovey's quest regarding the need for architecture to move away from object-oriented thinking,[442] and allow a more integrated and inclusive process of design based on knowledge of maintenance.

[440] Michel De Certeau, *The Practice of Everyday Life*, 3rd edition edition (Berkeley, Calif.: University of California Press, 2011).

[441] Rahul Mehrotra, 'Negotiating the Static and Kinetic Cities', in *Other Cities, Other Worlds, Urban Imaginaries in Globalizing Age*, ed. Andreas Huyssen (Durham and London: Duke University Press, 2008), 205–18.

[442] Dovey, 'Informalising Architecture'.

8.3.2 Implication for architectural and planning practice and policy

Understanding maintenance provides implication for practice and policy, particularly within two processes; the process of maintenance around the contested neighbourhood spaces; and the process of relocation, development or regeneration of contested neighbourhood.

Policy regarding household waste organisation should better ensure capability of local neighbourhood groups to create consistent and thorough waste services. Such policy will arguably bridge the gap of maintenance that happens due to disconnections between municipal and local authorities discussed in Chapter 2.

Roles and jurisdiction of municipal sanitation and environment agencies should not only be limited to providing tools and general treatment of waste or monitoring the pollution level. These agencies should be also able to engage with the neighbourhood groups and monitor challenges of collection services or address other maintenance needs specific to the context. Such expansion of roles arguably shifts the understanding of maintenance from generic, passive or ceremonial activity, to be a dynamic and transformative process.

Apart from the policy implication, the research also creates implication to future development and regeneration practice of contested neighbourhoods. The research informs more inclusive and affordable relocation schemes and neighbourhood development strategies, while acknowledging and supporting the process of cleaning and disposing with limited access to space and resources, reducing risk to displacement.

For example, the findings suggest the importance of space size variety, with emphasis on the opportunity of occupying multiple spaces. This variety provides an opportunity of connection between extended families with different age brackets and maximises resources with less cost. The findings also highlight that it is useful to have a variety of options of accessibility of infrastructure in the scale of a neighbourhood (open for all or limited to a specific group or location of dwellers), so dwellers can use it when needed.

The variety of dwelling size and shared amenities also encourages actors to move and occupy spaces in and out of the neighbourhood, widening territorial space where they can potentially dispose of their waste. Where the government relocation scenarios underline proximity and density, the findings argue that instead the regularity of movement shaped by this variety of spatial arrangements are key in the

development of contested neighbourhood spaces that value maintenance.

This thesis argues that the government and stakeholders of developing contested neighbourhoods must shift the practice of relocation from individual-based resettlement to celebration of the diverse socio-economic background of dwellers in a contested neighbourhood. Newspaper reports have annotated how government relocated evicted dwellers in the housing spaces randomly, refusing to acknowledge social relations and the diverse economic background of the dwellers.

Future regeneration strategies might consider enhancing these social relations by creating multiple scenarios of dwelling plans that cater for the need of extended families, or different occupation schemes such as rental houses and boarding. To better support collective initiatives, the findings also suggest the need to design shared neighbourhood spaces and streets in certain position and orientation, that encourages collective disposal and avoid displacement.

Such social relations are also beneficial for local organisation of space. Stakeholders developing public spaces around contested neighbourhood must address possibilities of local organisation and employ it as a resource for future development instead of dismissing it. The case studies demonstrate that local organisation helps in securing the space and managing access to space and resources, particularly for temporary needs or in the event of breakdown or absence of infrastructure. Such organisation arguably brings higher resilience of occupation even with limited resources.

The creative methodologies and design inventory assembled in this thesis can potentially become instruments to aid future design practice. The methodologies highlight ways of surveying and analysing space that is more hidden. Furthermore, the spatial maintenance inventory can be used as a development tool that is more inclusive, focusing on the mechanism of practice instead of simply isolating and removing the alleged problem. Moreover, the inventory may also be developed further as future design guidelines for Jakarta contested neighbourhoods spaces.

8.4 Limitations and further study

Maintenance practices explored in this research has informed alternative understanding of spaces in contested neighbourhoods. Such research creates a further step forward towards a more comprehensive and inclusive development of the city, which has been

the primary driver of this thesis. This section addresses the critical limitations of this research and the opportunity of further study in reflection to the overall research process.

This thesis' limitation lies in the complex process of narrowing the focus of the study and the data collection. The thesis is interested in analysing spaces across spatial scales, resulting in multiple types of spaces that become the site of the study. The large variety of what activities are considered as maintenance also creates difficulties in narrowing the scope of this research, which leads to a time-consuming process of data collection and analysis.

The evictions happened in the middle of data collection and dislocating research participants also creates disruption to the research process. In the initial data collection, this research explored a larger scope of data collected within the fieldwork, spanning across four sites in Jakarta and engaged with around 150 participants. However, with constraints of time and ongoing evictions, the thesis decided to focus on analysis towards two main conditions of maintenance in two sites and a total of 93 participants as presented in the research.

The difficulty of narrowing the focus of the study was also influenced by the lack of prior architectural design research in urban maintenance discourse; leading to difficulties in finding the appropriate methods of analysis. This study then refers to the situated maintenance practice research conducted by geographers in studying maintenance process in buildings. This research expands such discourses' focus on the materiality of the environment and their emphasis of visual methodologies, developing a design-based research with the focus of representation making as a way of researching space.

In collecting the data, this research was unable to capture all practice movement as performed in real time, despite the importance of real-time records of practices as suggested by some practice theorists. Some practices, such as waste practices in Kampung Pulo were hard to capture as some of them are performed in times that are not feasible - creating safety issues, or instead inconsistently changes from time to time depending on the dwellers creating difficulty to track them down.

Moreover, some waste practices such as displacing to the river are perceived as illegal, making the actors tend to hide their practice and therefore not able to be recorded. The condition of the environment also makes it difficult to record the practice in real time. For example, in Kampung Pulo, some practices observed in the study are distributed in

700 m distance across a densely populated neighbourhood, making it difficult to precisely track the routes due to lack of appropriate tools and opportunity of recording movement between such distance.

Where possible, observation on traces and narratives of waste disposal were collected to offset such lack of real-time data and help understand the ways dwellers navigate their environment and create details of such experience. However, there was subjectivity in the interpretation of this data, and therefore there is a risk of imprecision. There is also a possibility of some actors being dishonest regarding their maintenance practice (self-report limitation), leading to inaccuracy, accordingly with their daily routes of disposal. These limitations are part of qualitative research challenges in contested context, which struggles with inconsistent practice, illegal perception, and complicated condition of the environment, contributing to an inability to standardise data collection process in the area comprehensively.

Collected narratives from the fieldwork are coded and then together with observation data are thematically analysed through creative methodologies. These creative approaches of analysis in the study have led to some unexpected results, such as the findings of actors organising traffic in train crossing areas in Pesing Koneng revealed from editing the observational video. However, while this thesis has summarised different types of drawing methodologies, there is subjectivity in drawing such representations. The thoroughness of the data collection also influences the possibility of such creative approaches to yield results, and therefore may require a detailed and iterative observation. Limitation of such creative methodologies may lead to the lack of the research's generalisability.

There may also be flaws and biases on interpreting interview narratives data that lead to spatiality of maintenance discussed in the discussion chapter. For example, the findings suggest that dwellers build territory based on their movements. However, it needs to be addressed that middle-aged women dominate participants of this thesis, many of them either not working or having business at home and therefore there might be bias regarding the pattern of their movements. Paying more attention to the social background diversity of participant (male, female, different ages) is an important measure to address this bias.

Future studies on maintenance in contested context should pay attention to the research shortcomings discussed in this section. A narrower focus from the beginning of research that clearly defines

particular maintenance practices (cleaning, repairing, or securing) or instead addressing particular spatial system of the environment (such as wayfinding system) that requires maintenance may lead to better research efficiency. Future studies of practice in contested context must also be better equipped with necessary tools to capture real-time data to ensure rigour of the study.

Future research can also focus on one of the concepts of maintenance spatiality articulated in this thesis, such as specifically researching territory of maintenance movements. Nevertheless, future research must address participants' social background better, as a participant from different gender or different age bracket may lead to a different pattern of movement and different spatiality. Finally, this thesis has developed the spatial inventory as the basis towards potential design guidelines for contested neighbourhood based on knowledge of maintenance. Further research is needed to assess the relevance of this inventory and its potential application for contested neighbourhood design.

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Appendix

1. Spatial inventory based on maintenance practices

2. Coded narratives of Kampung Pulo

3. Coded narratives of Pesing Koneng

4. Kampung Pulo narratives from field notes and interviews

5. Pesing Koneng narratives from field notes and interviews

6. Interview transcription of government and non-government agencies

7. Inventory of government large scale projects leading to eviction

8. Participant consent form

9. Participant information sheet local actor

10. Participant information sheet local authorities

11. Ethics approval letter 2014

12. Ethics approval letter 2015

1. Maintenance practice spatial inventory

Design propositions	Mechanisms based on findings (Concluded from reorganised and situated narratives from both case studies)	Spatial/temporal inventory
Design around pattern of movement Regularity of movement build an actor's territory of potential disposal space	**The position of waste disposed while moving is related to the actors' course of movement** Waste disposal to the gate junction while going outside the neighbourhood (Appendix 4 No.1-3) Disposal to the side of the street on the way to the workplace or leisure space (Appendix 4 No.1-3) Displacement of wet or small quantity household waste within hidden neighbourhood spaces (Appendix 4 No.16)	Accumulated household waste is placed in interchanges of movement or in centred orientation Litter from consumption waste is displaced alongside the path of movement Displaced household waste is placed in the hidden corner at the end of the movement path.
	The position of waste disposed while occupying space is related to arrangement of actors' living spaces Extended family share multiple dwelling space for domestic activities (Appendix 4 No.21 and 23) Some neighbours have bad connection to water which neccessitates sharing with nearby neighbours (Appendix 4 No.16) Waste is increasingly displaced in areas located more than >700 m away from the main street (Appendix 4 No.12, and Appendix 2 in the Situated narratives section, top row)	Different sizes of dwelling that cater to different actors' needs and capabilities, and encourage socio-economic diversity Shared amenities options and shared spaces across the neighbourhood A variety of economic spaces in and outside the neighbourhood, with access to the main road from all dwelling with less than 700 m distance
Design for diversification of actors and maintenance systems Locally organised spaces are mixed, subjective, and partial; and a maintenance process should reflect this understanding	**Mixed appropriation of space and resources across the neighbourhood** Occupying pedestrian spaces for neighbourhood security post and parking space (Appendix 5 No.8, Appendix 3	Occupation of public domain for private or neighbourhood purposes Occupation of private or neighbourhood spaces for public uses

There are different maintenance systems for collective and individual waste	in the Situated narratives section, top row) Using a private field inside the neighbourhood for storage purposes (Appendix 5 No.8) Electricity is provided by security post, while some areas uses diesel-based electricity (Appendix 5 No.7)	Sharing, extending and generating infrastructural resources in relation to position of users.
	Maintenance activities managed by multiple actors and systems Family and cultural ties of dwellers influence connection between them (Appendix 4 No.21 and 25) Some dwellers collectively accumulate and burn their waste in the shared space (Appendix 4 No.9 and No.17) Actors appropriate other spaces' cleaning network to perform maintenance practices (Appendix 4 No.14)	Resettlement should not be done individually but rather with an acknowledgement of the social diversity between neighbours Options of shared spaces and arrangements of dwelling types should inform development (configuration of board and rental houses in relation to regular dwelling) Integrated development with actors and spaces outside the neighbourhood that enable intersection with other systems
Design for contrasts of program in relation to time Exchange or overlap of program can determinate length of occupation Some programs inhibit disposal activities to happen in the area, while other program trigger disposal	**Contrast of spatial boundary during occupation** Some actors do not dispose smelly household waste in the gate due to conflicting association with a food stall (Appendix 4 No.4) Disposalof collective spaces take place in the sides of the shared spaces, or in the river nearby (Appendix 4 No.10, No.11, No.15, No.22; Appendix 5 No.13 and No.19) Excessive displacement of consumption waste along the gutter or unused corners (Appendix 4 No.22, Appendix 5 No.19)	Certain occupation of space inhibit household waste diposal due to associations of space Visibility of shared space from path of movement influence displacement of household waste and litter Protection of waste containment and vulnerable areas such as interstitial and unsupervised spaces (nook, gutter, or areas around the railways in the case studies) are necessary
	Contrast of spatial changes and dynamic temporality Street vendors starts and finish their trading time differently depending on the type of the goods (Appendix 5 No.15) Vendors who shares space remove their space and waste completely during clear out	Understand different times of occupation by different actors in one space to perceive the dynamic temporality Increase space sharing between vendors particularly with entirely different goods Annotate and separate areas with overlapping activities across period of time by similar actor in one space.

	(Appendix 5 No.19, Appendix 3 Situated narratives third row) Some vendors prepare, rest, and unpack their goods in the trading space within the day (Appendix 5 No. 6, No.12, No.16, Appendix 3 Situated narratives third row)	

2. Situated Narratives Kampung Pulo

Coded narratives (From the interviews and field notes) (See Appendix 4)	Reorganised narratives (Coded narratives grouped together based on similarity of theme)	Situated narratives (Information found from drawings produced in the data analysis)	Category (Based on reorganised and situated narratives)
1. Disposing while going for shopping at the market 2. Disposing while going for a leisure walk 3. Disposing while going to the workplace 4. Smelly waste from dwellers' groceries cannot be disposed in the neighbourhood gate 5. Large quantity waste comes from the market sellers 6. Food/organic waste belongs to the market 7. Not going to dispose in another neighbourhood groups space 8. Dwellers go to different spaces in and outside the neighbourhood regularly	1. Disposing while going for shopping at the market 2. Disposing while going for a leisure walk 3. Disposing while going to the workplace 7. Not going to dispose in other neighbourhood groups space 8. Dwellers go to different spaces in and outside the neighbourhood regularly 12. Waste is increasingly displaced in neighbourhood areas located far away from the main street 13. Waste is largely displaced by dwellers without regular routes of going outside of the neighbourhood	From map in Figure 9a in comparison with Table 1: Dwellers with younger kids have more regular routes. Dwellers with older children often has fewer regular routes and schedules. Dwellers with dwelling located more than 700 m from the main street and 300 m from the neighbourhood market tends to displace their accumulated waste.	**Regular routes of movement in and outside neighbourhood and potential space of disposal** The routes where dwellers regularly move in and outside the neighbourhood creates territories where they may potentially dispose waste
9. Burning requires a sizeable and hidden space from others 10. Displacing waste in the river requires attention to time where such action is less apparent. 11. Displacing waste requires spaces to hide from others to avoid reports 12. Waste is increasingly displaced in neighbourhood areas located far away from the main street 13. Waste is largely displaced by dwellers without regular routes of	8. Dwellers go to different spaces in and outside the neighbourhood regularly 20. Dwellers share work for each other to minimise risk, with less capital and less skill in and across the neighbourhood 21. Sharing jobs with family, or sharing family obligations (household chores and childcare roles) 23. Dwellers extending and occupying multiple spaces in the neighbourhood for domestic and economic activities 24. Limited access to consistent supply	From map in Figure 11: Options of disposal space dependent on the different routes taken by dwellers to use shared amenities, house sharing between families, and options of shopping/leisure spaces. From drawing in Figure 12: Dwellers share multiple houses with their extended family, which may locate near or far away from their original dwelling (>200 m away).	**Dispersal of dwellers' living spaces and options of space of disposal** Dwellers have different options of disposal spaces as how they occupy different spaces in and around the neighbourhood widen their disposal territory

going outside of the neighbourhood 14. Conflicting experience of disposal 15. Dwellers dispose waste to different spaces	and amenities leading to appropriation of space and infrastructure 26. Ask neighbours to share food together		
16. Household waste with small quantity often leads to displacement 17. Neighbouring dwellers with tight connection often organise accumulation of waste for burning their waste together 18. Seasonal needs influence quantity of waste 19. Spice sellers have less waste 20. Dwellers share work to each other to minimise risk, with less capital and less skill in and across the neighbourhood 21. Dwellers share jobs with family, or share family obligations (household chores and childcare roles)	4. Smelly waste from dwellers' groceries cannot be disposed in the neighbourhood gate 5. Large quantity waste from the market sellers 6. Food/organic waste belongs to the market 14. Conflicting experience of disposal 15. Dwellers dispose waste to multiple different spaces 16. Household waste with small quantity often leads to displacement 18. Seasonal needs influence quantity of waste 19. Spice sellers have less waste	From drawing in Figure 13 and Table 1: Dwellers with small quantities of waste tends to displace (despite relatively short distance ~300 m), but dwellers with large volume of waste can walk up to >500 m distance to dispose outside the neighbourhood. Space in front of the neighbourhood gates are occupied by dwellers hanging out or by a food stall, making it inappropriate to stack organic and smelly waste around it.	**Relations between accumulated waste forms and potential space of disposal outside the neighbourhood** Dwellers dispose accumulated household waste depending on its quantity and forms. They take into account the experience of moving between dwelling to disposal space and the experience in the disposal space itself.
22. Dwellers dispose in hidden space from neighbours 23. Dwellers extending and occupying multiple spaces in the neighbourhood for domestic and economic activities 24. Limited access to consistent supply and amenities leading to appropriation of space and infrastructure 25. Lack of neighbour relations due to uneven connection 26. Ask neighbours to share food together	9. Burning requires a sizeable and hidden space from others 17. Neighbouring dwellers with tight connection often organise accumulation of waste for burning 25. Lack of neighbour relations due to uneven connection	From Figure 14: Some shared spaces and unused nooks which are not easily accessible from the neighbourhood street are used as a secret waste burning site. Some shared space that is openly accessible from the neighbourhood street has a well-defined waste container Vacant spaces from abandoned houses are used for collective open space, including to accumulate waste From Table 1 and Figure 9a: Collective waste disposal is not found around areas occupied by rental/boarding house	**Collective waste disposal inside the neighbourhood based on connection with neighbours** Some dwellers collectively accumulate, dispose and treat their waste in spaces that are contained or not easily visible from the neighbourhood street. The act of collective disposal and treatment requires connections between neighbours to take turns in handling the waste.

	10. Displacing waste in the river requires attention to time where such action is less apparent. 11. Displacing waste to the river requires spaces to hide from others to avoid reports 15. Dwellers dispose waste to multiple different spaces 22. Dwellers dispose in hidden space from neighbours	From Figure 18 and 22: Waste produced in a collective space often leads to displacement (excessive beverage consumption) Waste displaced often comes from consumption activities that spill over to area around it (gutter, etc) Preparation activities lead to debris spilling over in the gutter and in the street Offering to eat onsite leads to longer time of hanging out and more waste	**Vulnerability of disposal for waste produced in shared neighbourhood spaces** Dwellers tends to displace waste produced during occupation of shared spaces, which may evolve from consumption or preparation activities in a certain period of time.

3. Situated Narrative Pesing Koneng

Coded narratives (From the interviews and field notes) (See Appendix 5)	Reorganised narratives (Coded narratives grouped together based on similarity of theme)	Situated narratives (Information found from drawings produced in the data analysis)	Category (Based on reorganised and situated narratives)
1. Family taking turns managing the stall 2. Family help closing the stall 3. Family inheriting the stall 4. Family help buying trading goods 5. Living near the market provides flexibility and access to space and resources 6. Human resources help on building the market – Pay people for labor to load goods and/or build the stall – Coordinating/waiting for parking space – Water seller distributing the water – Delivery man for vendors with similar goods 7. Multiple ways of acquiring electricity connections – Electricity is provided by security post for monthly fee – Some vendors use electricity created using diesel generator coordinated by the security – Electricity can be extended from home for occupation in front or around the home – Some vendors only use lights from surrounding sellers 8. Multiple ways of occupying spaces	7. Multiple ways of acquiring electricity connections – Electricity is provided by security post for monthly fee – Some vendors use electricity created using diesel generator coordinated by the security – Electricity can be extended from home for occupation in front or around the home – Some vendors only use lights from surrounding sellers 8. Multiple ways of occupying spaces – Local actors allowing land use for storage purposes for monthly fee – Areas around the railways can be used with help from the local people who hangout and supervise the area in the local coffee shop – Giving other's access to sell in the terrace area – Multiple ways of accessing water in the market 9. Local authority roles in managing the temporary market	From Figure 6: <u>Mixed access to space and infrastructural resources spans across spatial scales with fluid hierarchies based on contingent relationships</u> <u>Electricity access in the pedestrian area is distributed through a security post that occupies the pedestrian space, while out of reach areas uses diesel generators to create access to electricity</u> <u>Vendors occupying spaces in the railway employ electricity connections from houses around the railways</u> From video of train crossing area: <u>In area outside the local authority territory such as the train crossing area a combination of local actors help manage the area to be used as trading space safely.</u> <u>The actors guarding or managing the train crossing either live or work around the area or occupy shared spaces around the area such as a small coffee shop near the crossing area.</u>	**Territories created from mixed access to space and infrastructural resources** Vendors occupation in the overall market area is not controlled as a whole by the local authority. Time of use and fee are negotiated between multiple actors. The control of spatial occupations and management of traffic are distributed between local security, local owners, and local dwellers.

– Local actors allowing land use for storage purposes for monthly fee – Areas around the railways can be used with help from the local people who hangout and supervise the area in the local coffee shop – Giving other's access to sell in the terrace area 9. Local authority roles in managing the temporary market 10. Multiple ways of accessing water in the market – Use of private water pump owned by locals – The security post expands access to water for others for free, except the toilet 11. Different ways of sourcing goods between different vendors – Clothing sellers source their goods less frequently – Some vegetable sellers bought vegetables on their own, particularly the ones with smaller volumes – Some sellers with specific/seasonal goods source the goods further (fish, leafy vegetables, seasonal fruits) – Some sellers receive delivery, such as tofu or coconuts – Some food sellers buy from the market itself – Some sellers grouped with others to buy supplies collectively, particularly the ones with larger volumes. – Grocery sellers do all of the repackaging and sorting in their stall (peeling, rubbing, cutting, washing and so on) – Some vendors pre-packaged their vegetables to create a	10. Multiple ways of accessing water in the market – Using private water pump owned by locals – The security post expands access to water for other for free, except the toilet 18. The locals sometimes guard and operate the railway gate in absence of the operator		
	1. Family taking turns managing the stall 2. Family help closing the stall 4. Family help buying the trading goods 5. Living near the market provides flexibility and access to space and resources 15. Different trading times of vendors – There are two market shifts agreed by the authorities, but many vendors work less or more than these shifts – Some sellers work until midday – Other sellers do two segments continuously, or work at night until midday – Some dwellers work all day, particularly the food seller with portable cart 17. Before the train comes the railways area is also used by vendors 11. Different ways of sourcing goods between different vendors	From Figure 14 and Table 1: Some vendors occupy the trading space beyond the agreed shift, as their trading times vary dynamically, evolving in a short shift, long shift, or a divided shift. Vendors' dynamic trading times is related with their location of dwelling, family help allows management of the stall for a longer period of time with better working flexibility From Figure 16: Vendors dynamic trading shifts are related to their goods volume of supply and their supply process, either using deliveries, and collective or individual pick-up. Vendors with larger volume of goods tends to occupy the space longer, while	**Dynamic temporality of the Pesing Koneng neighbourhood market** The local security does not enforce similar opening and closing times between different vendors, leading to dynamic temporality of the market operation. Mixes of actors trading in the area (street vendors, ambulatory vendors, and shop owners) and their various goods influence such dynamic.

quicker process of buying 12. Vendors' different trading stall structures – Some dwellers have elaborate structure for hanging goods, particularly clothing stall – Some vendors' structures are simple, and only use tarp sheets and an array of boxes or other platform base or furniture – Some dwellers only use a tarp, particularly around the railways 13. Cleaning process managed by the local authority – There are cleaners working on a daily basis to clean the market, working from early morning to midday – Cleaners divide the street into three particular routes and pick up waste and clean street along these routes – Cleaners did not get paid from the local authority – The security collect money from all vendors, but it is used for waste pick-up services from higher authorities, not for the cleaners – Unreliability of waste pick up services from municipal agencies 14. River cleaning process 15. Different trading times of vendors – Market shifts agreed by the local authorities – Some sellers work until midday – Other sellers do two shifts continuously, or work at night until midday – Some dwellers work all day, particularly the food sellers with portable carts	– Clothing sellers source their goods less frequently – Some vegetable sellers bought vegetables on her own, particularly the ones with smaller volumes – Some sellers with specific/seasonal goods source the goods further (fish, leafy vegetables, seasonal fruits) – Some sellers receive delivery, such as tofu or coconuts – Some food sellers buy from the market itself – Some sellers grouped with others to buy supplies collectively, particularly the ones with larger volumes. – Groceries seller do all of the repackaging and sorting in their stall (peeling, rubbing, cutting, washing and so on) – Some vendors pre-packaged their vegetables to create a quicker process of buying	vendors with smaller and perishable goods tend to occupy the trading space for a shorter period. Vendors with portable cart and shops in the market opens throughout the day, as they are not considered as part of the temporary market.	
	6. Human resources help on building the market – Pay people for labour to load goods and/or build the stall – Coordinating /waiting the parking space – Water seller distributing the water – Delivery man for vendors with similar goods 12. Vendors have different trading stall structures – Some vendors have elaborate structure for hanging goods, particularly clothing stall	From Figure 24: Vendors around the railway tend to occupy the area for a short time, and some of them either have a simple structure or store their goods, structures, and furniture in the house around the railways From Figure 14 and 27: There are traces of people, objects, goods and structures left away around the neighbourhood street, which exist in relation to the vendors' trading process.	**Traces within the process of closing and repacking stalls structures** Traces of people, goods, objects, structures and people evolve due to the vendors' dynamic trading times. These traces are blurred and become a normal part of the neighbourhood, making the area to always exist as a temporary market.

16. Truck loading trading goods often creates traffic jams during peak hour 17. Before the train comes the railways area is also used by vendors 18. The locals sometimes guard and operate the railway gate in absence of the operator 19. Different ways vendors dispose their waste from trading process – Some vendors dispose to the cleaners directly – Some vendors accumulate waste in the stall for later collection – Some vendors dispose in the collective dumping, especially the ones who only remain for a while/sharing shifts with others – Some vendors dispose their waste to other actors particularly for specific waste – Some dispose to the river/street, particularly greywater or organic waste – Some left the structure and goods as it is as he/she will be back shortly – Some vendors repacked everything entirely when they sell for only very short period – Some vendors store the goods nearby particularly when they have a longer trading times with large volume of goods – Some vendors give goods to another seller to continue selling	– Some vendors structures are simple, and only use tarp sheets and an array of boxes or other platform base or furniture – Some vendors only use a tarp, particularly around the railways 16. Truck loading trading goods often creates traffic jams during peak hour 19. Different ways vendors dispose their waste from trading process – Some vendors repacked everything entirely when they sell for only very short period – Some vendors store the goods nearby particularly when they have a longer trading times with large volume of goods – Some vendors give goods to another seller to continue selling	Vendors who occupy the space for a long shift often remove their goods and structures completely after trading times are over. Vendors who occupy the space in a divided shift leave the majority of their structures and goods in the trading area. Vendors who have a short shift share spaces with others, and therefore usually do not leave traces. People occupy spaces for multiple activities, remaining and wandering in different spaces of the neighbourhood beyond their trading times.	
	3. Family inheriting the stall 19. Different ways vendors dispose their waste from trading process – Some vendors dispose to the cleaners directly – Some vendors accumulate waste in the stall for later collection – Some vendors dispose in the collective dumping, especially the ones who only remain for a while/sharing shifts with others – Some vendors dispose their waste to other actors particularly for specific waste – Some dispose to the river/street, particularly	From Figure 29: Vendors with short trading times and share their spaces with others tend to dispose their waste in a collective disposal area. Vendors with divided shift tends to dispose their waste around their stall structures. Vendors with trading times that coincides with the market cleaners cleaning times usually are the ones who trade from the morning until midday) Vendors with small quantity or wet waste	**Relations between vendors temporal occupation, waste forms and their waste practices** Vendors trading times create territories within the area that they occupy, that influence where they may potentially dispose their accumulated waste. However, such territoriality does not always apply for small quantities of waste or wet waste.

	greywater or organic waste − Some left the structure and goods as it is as he/she will be back shortly	tends to displace their waste.	
	13. Cleaning process managed by the local authority − There are cleaners working on a daily basis to clean the market, working from early morning to midday − Cleaners divide the street into three particular routes and pick up waste and clean the street along these routes − Cleaners did not get paid from the local authority − The security collect money from all vendors, but it is used for garbage pick-up services from higher authorities, not for the garbage men − Unreliability of waste pick up services from municipal agencies 14. River cleaning process	From Figure 37: Vendors with long trading shift that end at midday usually are able to dispose straight to the market cleaners. Some vendors who trade at night or who trade past midday may leave waste uncollected as their trading times do not coincide with the cleaners. Waste disposed in the middle of the train crossing area is not collected by the market cleaners as the area is not part of the neighbourhood district's territory Municipal collection services are inconsistent, leaving the waste in the cleaners' cart to be uncollected for up to three days.	**Vulnerability of cleaning services in subversive occupation of space** The market cleaning services are not managed hierarchically by the local authority as the market occupy the neighbourhood street subversively

4. Kampung Pulo Narratives Coded from Field Notes and Interviews

CODES

1. Disposing while going for shopping at the market

" Sometimes she will throw waste in the river if she is being lazy. There is not much of waste. Only waste from daily food. If she happens to walk to the market, she may also put waste in there" (field notes Y3, 2015)

"He sometimes throws waste in the river, but sometimes at the neighbourhood gate. He throws waste in the evening, depending on when he goes out from the house. Sometimes her wife will throw waste whilst going to the market. Now it is prohibited to throw waste in the river, but he still does it. Waste that are being thrown are food debris and other household waste, and it is not much." (field notes J2, 2015)

"Sometimes (my husband) likes to dispose waste in the late afternoon to evening when he goes to the market. But this market is a vegetable market (in the neighbourhood). If (he) only has time at night he will do it at night. Around 8 or 7.30 PM or after Magrib (around 7), it is not fixed, depends on what he prefer. If he wants to do it at night, it will be at night, if it is in the morning then it will be in the morning. Morning is the time to shop fishes, but for vegetables it is usually bought at night time." (interview transcription S1, 2015)

"He throws waste in the morning, when he goes to the market to buy vegetables (field notes T2, 2015)

" S1 compiles all of her garbage daily and dispose them in Jatinegara market where she usually shops in the morning." (field notes S1, 2014)

"There is no (waste collection service), I throw in the market Jatinegara, I throw in (the space) across. Every morning (when) I go to shop I will bring that waste. Because if it is late (morning) the waste (at the market) has been taken away, at 8 the waste has been collected."

" S1 disposes her garbage in various ways. There used to be a big garbage bin in front of local St. Maria School, but it has been moved. So S1 compiles all of her garbage daily and dispose them in Jatinegara market where she usually shops in the morning. There are two cartwheels in the market that are used to dispose the garbage from the market. S1 said that other people may also throw their garbage directly to the river or in the street in front of the housing to be picked by local street cleaner." (field notes S1, 2014)

"I usually throw waste at night, if I throw at the morning it means I don't have time at night or (I thought) just wait until tomorrow to buy fish. But usually at night, if the kids are asleep I went outside to throw waste. It is often me who throw to the street. I am afraid to bring kids to cross the street, so it is better if I go alone. It is around 10 PM. Waste thrown to the front is only dry waste put in a used plastic bag from groceries. It is not much, just dry waste. The wet waste has been disposed. We also throw waste to the river at night, I am afraid to throw at noon, as there is already regulations. (We) should not throw waste to the river." (interview transcription S7, 2015)

"He throws his waste when buying vegetables early in the morning (field notes M7, 2015)

"Waste is compiled and thrown in Gate 3 in late afternoon. Sometimes late at night. Sometimes also in the morning before buying tofu. There is not much waste to be thrown." (field notes H4, 2015)

2. Disposing while going for a leisure walk

"(I used to) throw waste in the late afternoon, or at night. It is rarely in the morning as (I have to) cook. Night (is better) as I go outside, my child can also be brought outside…It is not much (as) I throw (waste) everyday…(Sometimes) It's me, (sometimes) its (my) child…anybody, this is just when somebody go out, (ah) just bring it together, just whoever can"(interview transcription M2, 2015)

3. Disposing while going to the workplace

"Yes, there isn't any (people who collect waste)….So (I) use a plastic bag to throw (waste) to the front (of the neighbourhood gate) when I was going to take (people's) laundry…" (interview narratives J1, 2015)

4.Smelly waste from dwellers' groceries cannot be disposed in the neighbourhood gate

"It is not prohibited (to throw waste in the neighbourhood gate), but there is somebody selling food there, it is not okay if there is a smell around a meat soup stall." (interview transcription S1, 2015)

5. Large quantity waste comes from the market sellers

"Household waste is brought together with business waste" (field notes T2, 2015)

6. Food/organic waste belongs to the market

"The waste thrown in the market is waste left from the trading process, such as corns, vegetables, and so on. Waste thrown in the neighbourhood market is only small waste such as plastics" (field notes M7, 2015)

He throws his waste in the market. He said "bought in the market, thrown in the market". (field notes M7, 2015)

7. Not going to dispose in another neighbourhood groups space

"Most families throw their waste to the river. You shouldn't throw waste to other districts. It is hard to find a space for disposal. Usually the waste is compiled in an empty bucket and later thrown to the river. People who

dispose to the street is only a few, whose houses are located nearer to the street. All parts of the family can throw waste, not only the parents. Trash bin is useless because all waste will end up in the river anyway." (field notes H2, 2015)

"(Throwing outside the neighbourhood is done) through going out from gate 4, and then we cross, there is a junction, in front of the market, just cross for a while. (We could go to) gate 5, but it is quite further away, it is not that far, the neighbourhood post is even further. But it is more for people from around gate 5. Just put it in gate 4, there will be local cleaning men, (who) in early morning at 6 sweeps (the gate), and take the (waste). There will be (disposal space) on each neighbourhood gate, including in gate 3, in front of it there will be (people who) dispose waste in front of the gate." (interview transcription S7, 2015)

8. Dwellers go to different spaces in and outside the neighbourhood regularly

"She buys some daily needs in Kebon Pala Market or in a stall around her house" (field notes E3, 2014)

"Sometimes, she goes to Kramat Market to buy some daily needs. She usually goes to the market on foot or by motorcycle (with her daughter)." (field notes S4a, 2014)

"She buys some daily needs in Kebon Pala Market, Kramat Market, or Mester Market." (field notes S5h, 2014)

"She works as a housewife and a maid in a house near her house. She buys her house daily needs in the morning before she goes to work. She works from morning to the afternoon." (field notes R3, 2014)

"When she does cook, she buy ingredients in the vegetables market Kramat, around 8-9 in the morning." (field notes H3, 2015)

"I go to the market at 7, she is different, for me I go to the vegetable market, the one that is inside, within the Kampung Pulo. M4 prefer to cross (outside the neighbourhood)" (interview transcription S7, 2015)

"(I) usually go to the vegetable market, if my bin is full I would go to bigger market, sometimes in the morning but sometimes during the day. (I usually) wait for the waste bin to be filled first, around every two days. Usually only dry waste such as plastics, from kids snacks." (interview transcription S7, 2015)

"In the neighbourhood market, fish is expensive, in Jatinegara market it is much cheaper (around 8 and 9).(In neighbourhood market), vegetables and chili can be bought in small quantity, so it is better to buy in the neighbourhood. In jatinegara you have to buy (in bulk), 250 grams, or 500grams. In the neighbourhood we can buy per IDR 3000, or IDR 2000. But fish and sides are cheaper in Jatinegara market." (interview transcription S7, 2015)

"Sometimes (I) shop in the Bukit Duri puteran market. But (it is only) when I want to….there is a lot of people selling food throughout the day 24 hours, including meat and side dishes." (interview transcription Y3, 2015)

9. Burning requires sizeable and hidden space from others

"Waste is the most complicated problem. The government can only order people to not dispose waste haphazardly, but there is nobody who can work to collect waste away. The truck who collect waste is not compatible with the amount of waste. The government do not understand the cleaning men's difficulties. The bin has been provided, but no one could bring it to the front to be carried by the waste truck. Therefore, the accumulated waste is often get burnt, and therefore the neighbourhood will still be dirty. Currently plastic becomes the most problematic waste. Government needs to be involved in taking care of the waste problem." (field notes E4, 2015)

"She and her neighbors usually throw everything in that bin and burn them altogether. She explained that in her area the house does not located right next to the river so that there are spaces for them to collect their garbage and burn them. However in the area where the houses are so dense and it is situated directly next to the river there are no space to burn the garbage so people are either throw it directly to the river or bring it to the street in front of Kampung Pulo to be taken away later on." (field notes Y1, 2014)

"There is a recycle initiatives in neighbourhood groups 9, but it is not working and there is no result. This recycle is funded by Romo (leader of local NGO), but it is just temporary. There is no continuation. In the time of Soeharto, the people have to work first, and then they will be given money. Nowadays we were given money without looking at the result. The people actually need jobs, not only money. Now women are emphasised more and more women works. There are a lot of men unemployed and therefore more crime." (field notes E4, 2015)

"Sometimes the accumulated waste will be burned by local dwellers." (field notes Y3, 2015)

"(I) don't burn my waste as there is no space to compile it. I do not get any bin in here, in front (of the neighbourhood) they are given by the neighbourhood group leader." (interview transcription Y3, 2015)

10. Displacing waste in the river requires attention to time when such action is less apparent

"We like to see first, the stack in gate 4. If when we go out there is a lot (of waste), (we can) just put it to be taken away by the cleaning men. If it is already empty, (it means) we are late. Then we cross to the market, as (their waste) has not been picked up. We cross, just a little bit further, put the waste, and (it is) done. (This is) around 9AM, he come early (the cleaning men). Sometimes we go at night (to put waste), and in the morning it will be taken away. If we don't have time at night, we can go at the morning at 9 AM while going to the market, in Jatinegara." (interview transcription S7, 2015)

"I rarely throw waste, maybe once in two days. (I throw waste) after Isha prayer, around 9 PM. I don't go down to the river basin (in the *getek*) I just throw them from above. It stuck there, but what else can I do.." (Interview transcription Y3, 2015)

"(The waste is thrown) there in the bin near the gutter. There is time (to throw waste in the river), if it is in the morning or in the afternoon it is prohibited to dispose waste), just throw in the bin. People in here throw their waste to the river but the timing has to be in late afternoon or at night. In the afternoon it is prohibited, and there will be a fine of IDR 500,000. At least 5.30 PM or later at night, or at least in the early down is the limit." (interview transcription V, 2015)

She throws her waste in neighbourhood gate 2 at night together with trading waste. It is closer for the neighbourhood market seller to throw in the gate (field notes N5, 2015)

"She throws her waste in the neighbourhood gate 3. She disposes waste at night. Sometimes it is her children who do it" (field notes N4, 2015)

" N3 throw waste near gate 4. She throw waste at early dawn or at night." (field notes N3, 2015)

"(I) throw waste every night, using the waste bin, no longer with plastic. (I will go) down to the river basin to get it right first (and not stuck)" (interview transcription V, 2015)

11. Displacing waste requires spaces to hide from others to avoid reports

"In front of gate 4 there is a space to dispose waste. He always compile waste from his house and get it to the front of the neighbourhood to be disposed. Every 1 AM the waste compiled there will be taken away by a waste truck. He used to dispose directly to the river, but he has since stopped. This is because there is somebody who report to the neighbourhood group leader and fined for IDR 500,000." (field notes I4, 2015)

"Their family throw waste in the river. The ones who throw is usually H3 or her brother. Their waste is always thrown at night because if they dispose in the morning they are afraid that other dwellers will be angry at them." (field notes H3, 2014)

"He throws away his garbage into the Ciliwung River. He knows that throwing garbage into the river is not good, but he still doing that. He said that there is no place to put the garbage in Kampung Pulo, so he throws them into the river." (field notes A1, 2014)

"She said that there is a ban and penalty for people who throw away trash to the river, so she will not throw away the trash to the river." (field notes R2, 2014)

12. Waste is increasingly displaced in neighbourhood areas located faraway from the main street

"She throw her house trashes away to the river, she said because her house is far from the main street and there is not any trashbin around her house." (field notes S4a, 2014)

"In here (Kampung Pulo neighbourhood) it can be said that it is a slum area, the condition outside is better (in Bukit Duri *kampung* neighbourhood). Their houses is located next to the road, easier (for their waste) to be collected, while us in here is left with no one who can collect (our waste)…"(interview transcription Y3, 2015)

13. Waste is largely displaced by dwellers without regular routes of going outside of the neighbourhood

" D1 stocks supplies to make her sweets by shopping once a week in the main market. She usually stocks six sacks of glutinous rice, 10 kilograms of black rice, and other necessary ingredients such as sesame seeds and flour. As palm sugar is an important part of her ingredients, she arranged to have it sent from her village for about 10 kilograms in every delivery. She said that the price is lower at 12,000 rupiahs for 10 kilograms, and the quality is also better than the ones in the city. She shops alone using Bajaj (a three wheeled motorcycle) as her transportation, and usually asks for help when it arrives in front of the housing area to get it delivered to her home." (field notes D1, 2014)

"The goods of the stall are stocked from the market, usually in Mester Jatinegara market. But currently there is no fixed time of when the goods run out. " (field notes S11, 2014)

"She doesn't really cook for her family and usually buys from her neighbors that sells food at their home" (field notes I3, 2014)

 "Sometimes her children do not eat at home, so she cook depends on her child request. She also often buy food from outside." (field notes S9, 2015)

"She always cook rice, but rarely cook any mains or side dishes (meat or vegetables). Depends on what her child or her husband wants. If there are something they want, she will go to the nearby market and then cook. Her older children (23 and 20 years old) rarely eat at home. Only three of them eat at home, her husband and her youngest child (elementary school age)." (field notes S8, 2015)

 "Sometimes she would buy ready to eat vegetables, or cook things that are easier to cook. Her kids only likes eggs, chicken, and chicken liver and gizzard. Sometimes her child doesn't like to eat and being picky." (field notes Y3, 2015)

"She rarely cook, often buy ready to eat meals." (field notes H3, 2015)

"At home she cook, but also sometimes buy ready made meals. She go to the market at early morning in Kramat market as it is closer from home." (field notes D3, 2015)

14. Conflicting experience of disposal

"(I don't put waste in the neighbourhood gate, because) I am afraid that it will not be collected, sometimes the cleaning men are lazy. If it is not being collected, it will accumulate and becomes smelly…Sometimes the cleaning men dislike sweeping the area, particularly when everyone is putting their waste over there…" (interview transcription S1, 2015)

15. Dwellers dispose waste to different spaces

"The locals cannot be organised. In a neighbourhood groups maybe only three households who throw waste in the disposal space. The neighbourhood group leader should organise the dwellers, but the leader itself throw waste in the river. The banner that prohibit disposal in the river instead becomes a carpet in the local district leader. Both the district and the neighbourhood group do not work together to organise waste. People who do not have a business throw waste twice a day. There is no shame in disposing waste to the river. Nobody warn the people who throw waste in the river. Maybe some people who throw waste in the disposal space may warn people who dispose waste in the river." (field notes Nurhayati, 2015)

"When there are some trashes, the trashes are collected on the side walk of the main street, but sometimes it is also thrown to the Ciliwung River." (field notes S4, 2014)

"For the trash, E2 usually throw away her house trashes on the sidewalk of the main street, she said that there will be trash authorities from government that will put the trashes and carry it to the landfill. Sometimes, E2 also usually throw away her house trashes to the river." (field notes E2, 2014)

 (I throw) waste to the front (neighbourhood) sometimes, (because) there is no one who collect it, so it is us…(But as we are) human, there is still some who throw waste to the river, so throw waste to the front street in a day…it is in neighbourhood gate 4 in here, it is really coincidental that there is a waste disposal space in there…next to the market, we have to cross the street. It will be picked up by a big truck..(but) yet there is someone who throw waste in the river. If it is wet it goes to the river, if it is not much it goes to the river…" (interview transcription M2, 2015)

"We throw (waste) ourselves to the front (of the neighbourhood gate), but wet things (I) throw to the river, secretly. (An example) of wet waste is waste from raw fish, it is smelly if (we) keep it or if we put it in the neighbourhood gate, it is (located) straight to the street, the fish insides (is not appropriate)…" (interview transcription S7, 2015)

"Yes, just throw it away. If we wait until (the waste) accumulate before putting it to the front (of the neighbourhood) the smell is uncomfortable, it is better to just throw it away." (interview transcription S7, 2015)

"He throw waste in the neighbourhood gate 2, but sometimes in the gutter. She disposes waste early morning at 6.30, which she more often does. (than in the gutter). " (field notes R4, 2015)

16. Household waste with small quantity often leads to displacement

"She throws waste in the river, but also in the neighbourhood gate 3 sometimes. It is the river in the back of the public toilet. She doesn't throw that much of waste, but she does it every day. Because she rarely cooks, there isn't much waste. There is a waste disposal space in the back of the public toilet. It is nearer to throw waste in the back of the public toilet (to the river), it is too far too dispose waste in the front." (field notes Endang, 2015)

17. Neighbouring dwellers with tight connection often organise accumulation of waste for burning

"Y1 throws her garbage at a collective dumping area next to the nearby field adjacent to the river." (field notes Y1, 2014)

"E4 regularly throw waste in the waste bin and in the collective space in the field. The waste bin is provided for each neighbourhood groups. " (field notes E4, 2015)

18. Seasonal needs influence quantity of waste

"She only trade seasonally, only during Ramadhan she sells meat in the market." (field notes M6, 2015)

"She usually works by selling rice in Jatinegara market, however as it is Ramadhan and people are fasting or not working, she sells the rice in her home to cater the need of her neighbors." (field notes S1, 2014)

"in Ramadhan she only limits her menu into 4-5 kinds of sweets while in other months she can make more, such as rice ball with banana fillings and other kinds of desserts." (field notes D1, 2014)

"H1 usually cooks coconut steamed rice. But in Ramadhan she would change into fritters as rice is not really profitable during Ramadhan. Yeyen go to shop every night to Jatinegara. " (field notes H1, 2015)

"In regular days, his wife normally sells rice and other dishes while now she accepts cookies order for the Ied celebration." (field notes S11, 2015)

"Normally I do not do this (opening a food stall), usually I just wash….Every day I take laundry, this thing (the food business) is just a once a year thing…" (interview transcription J1, 2015)

"During Ramadhan no, I sell at home (interview transcription S1, 2015)

"No, it is just normal, maybe there is quite some waste from the used leaves, maybe one plastic bag, the ones with 1 kg size, just put together to make it practical and not bulky….Maybe one day is only one bag, all the waste, the vegetables and put it together in a pack. Normally I don't even thrown anything, maybe just a little bag I bring it to the front. But, if I sell food my waste does increases…" (interview transcription J1, 2015)

"Oh, it is different, there is more (waste in) Ramadhan, yes, it is because (I) cook many things. Usually it is only one bag, now it can reach until 3 bags. Because there are waste from making rice cubes, vegetable waste,…." (interview transcription S1, 2015)

19. Spice sellers have less waste

"Vegetables sellers has more waste. As N5 only sells spices, there is not much spaces. She also reuses plastic bags that can still be used as a shopping bag for her customer. (field notes N5, 2015)

20. Dwellers share work to each other to minimise risk, with less capital and less skill in and across the neighbourhood

" D1 only does the production side of her business. She once sold her sweets herself because she can sell them at higher price, but now she only sells her sweets to five local distributors for them to sell on their own. When we came, one of her distributor came and loaded her various sweets into two big baskets to sell on their own." (field notes D1, 2014)

"People in Kampung Pulo likes to eat, so if we sell food it will always profitable. People often works for each other in Kampung Pulo, such as selling food for the community. Washing clothes for the neighbours and other things. We only aim to have money to eat in that day, without burdening the neighbours. If we want to have a better life, we have to put kids to school until college. However, my youngest child opt to go straight to work. Now he felt unfit in his workplace as most of his colleague are older than him." (field notes H1, 2015)

"She is a washing maid for local dwellers. She takes laundry in the morning, and wash, brush, and hang them straight away. Sometimes others will bring a laundry for her to wash in mid-day. She will wash it at night. Usually 1 bucket per day." (field notes N2, 2015)

"Her wife makes cookies to be sold in the market. There are people who will collect them at home after order, around 50-100 jar of cookies for every order. . S11 has been unemployed for 10 years. He used to had IDR 1 million every day from his grocery stall, but now it is only IDR 200,000." (field notes S11, 2015)

"Sometimes (I) help S9 to make her fritters and the stuffed pastry. (Because) it is hard if you sell things but it is not sold out. (I) sell things before, when it is not sold it worries me because I don't have any capital (left). So it is better to (just) help your neighbours so you will get money." (interview transcription S7, 2015)

21. Dwellers share jobs with family, or share family obligations (household chores and childcare roles)

" S9 normally sells fritters as a supplier to other seller to collect in the afternoon. Because she has to look after her grandchildren, she could no longer go to sell the fritters herself." (field notes S9, 2015)

"She is start to cook at 6 o'clock in the morning and then she brings and sells *kolak* on their daughter's house." (field notes M1, 2014)

"She lives alone but her house is next to her daughter house. When we came to her house, M3 is cutting and cleaning some vegetables in front of her house and her daughter house (frontier of both houses), while her daughter is cooking in her kitchen." (field notes M3, 2014)

"She will stop selling even when not all the meat is sold. She went back home to cook and to take care of his grandchildren." (field notes M6, 2015)

22. Dwelllers dispose in hidden space from neighbours

"She throws waste to the river in the back of the public toilet." (field notes D3, 2015)

23. Dwellers extending and occupying multiple spaces in the neighbourhood for domestic and economic activities

Domestic

"There is a house who is occupied by 5 different household. His (house) is extended until the river terrain overthere. Next to that empty land (there are also) 5 more people, nephew, aunt, sister 5…." (interview transcriptions S1, 2015)

"(The ones who sells meat soup in the neighbourhood gate) lives in front of the small mosque. (But he) cook in the (house) in the corner (of the gate). His house is over here in the area below. His kitchen is up there….So if it is flooding he can still cook in the upper part (of the neighbourhood). (Because) if it is flooded (down here) the upper part is not flooded yet. So, it is better to be used for cooking. " (interview transcription S1, 2015)

" Y3 go to the toilet in her relatives' house, she could take a bath in the toilet." (field notes Y3, 2014)

" She actually has bathroom at home, but because it is really small, N4 prefer to shower at her child's house. She also cook regularly in her child's house." (field notes N4, 2015)

" S9 has eight kids, four of them still live with her, three sons and one daughter (already married). Downstairs are completely for kitchen, while upstairs is the room for the boys and S9 and her husband. Her daughter and her family lives in her parents' house in front of S9's house which is connected by a bridge in the top floor. They eat differently from time to time, either in the kitchen or in the connecting house." (field notes S9, 2015)

"He lives with his wife, children, in-laws, and grand children. He has five children, four of them lives with him while there are one child that has moved out from the home." (field notes S11, 2015)

". J2 lives with his wife and 3 kids, with one in-laws. One of his child works in the market, go early at 6 AM and come home at 3 PM. His other child works as a parking man. Her wife is also unemployed, only keep and clean the house." (field notes J2, 2015)

"One home is lived by Herawati and her husband, two of her brothers, her mother and her three kids, in total there are 8 people." (field notes Herawati, 2015)

"Her house is filled by three families, her mother, her sister, and her own family, with children of school age and a 2 year old." (field notes D3, 2015)

"This house is inherited from . I4's grandma. It is currently occupied by three households with 7 people in total. I4's father itself is a cleaning men leader in neighbourhood group 6. Other than that, his father and his brother also works as a construction labour." (field notes I4, 2015)

"He lives with two of his children, one of them are married with a child. So he lives with four other people in his house." (field notes S7, 2015)

"She lives with her husband, kids and grandchildren. She has four kids. In her house lives her daughter who is ill. Her daughter was involved in a drug abuse, but her brain got infected. She only go out for a medical treatment. Before KJS, her treatment will cost IDR 2 million. But with KJS she doesn't have to pay that much." (field notes N3, 2015)

"This is my nephew, my youngest child has just finished junior high school. This one that is asleep is my grandchild, his mom works. I was born here, this (house) belong to my parents. I have three siblings, this is family house. In here (I live) with my younges child, my second (child) follows her husband rent (elsewhere)…(everyday I am) a housewife taking care of my grandchild…" (interview transcription M2, 2015)

"(I don't know yet)…maybe I want to go to my first child's house in the front, near neighbourhood gate 4, it is bigger (if I get evicted)" (interview transcription M2, 2015)

But my parent sleeps upstairs, me and the kids sleep downstairs, as they are still wet their bed. (My parent) can still go up and down (the stairs). Sometimes one of my kids went upstairs to accompany his grandma…" (interview transcription S7, 2015)

Economic

" I2 sells spicy meat soup in front of her house." (field notes I2, 2014)

"His mother has a small stall in the first floor of her house that sells various kinds of daily needs." "Her house consists of 2 families. She lives there with her husband, her 2 children, and her sister-in-law, who sells ice jelly"

"At night it is really crowded. The youngest child go to school at noon 12 pm, and went back home at 3 PM. The oldest son is married, stays with his family upstairs. S8, her husband, and the rest of her children stay downstairs." (field notes S8, 2015)

"They own a grocery shop that she usually opens inside her house, but now she have a small booth made of bamboo next to her house where she opens her shop. The booth is located in a slightly higher position of her house, about 1 m higher. She said that they build the booth in a higher place so it is safer from the flood with water as high as 1 m." (field notes Y1, 2014)

"He sells *soto babat* in side of the alley of Kampung Pulo." (field notes F, 2014)

". S3's wife sells soto (some kind of chicken soup with yellow broth) in a small stall in front of his house's alley" (field notes S3, 2014)

".. and then she brings and sells *kolak* on their daughter's house." (field notes M1, 2014)

"(My stall) is not in front of Jatinegara Market but in the west exit in the back. Across the river, in front of the demolished shop (it is where I open my stall). Normally I sell rice, coffee, rice and dishes, I have indomie (instant noodle). I don't have any stall, just using cart and table (for people to sit)" interview transcription S1, 2015)

Her mother in-law has a small stall in front of their house. She sells kinds of dalily needs. She also sells snack for break-fasting in Ramadan. " (field notes Y1, 2014)

". A1 opens his small stall in the first floor of his house" (field notes A1, 2014)

"She said it is still crowded at night because her shop is located in front of local community field next to the river where many kids are playing around and men sitting together. They usually play carom games, fireworks, cycling across the field as well as football. Sometimes the ball will fall to the river and the kids will jump down to the river and take it. I3 said all local kids are able to swim because of the flood, so it is easy for them. People who hang out in the field also likes to buy light snacks from I3's shop, such as pop ice (a cold beverages), peanuts, and she even able to make instant noodle for them. " (field notes I3, 2014)

"The noodles and ice stall is in front of her house."(field notes M2, 2014)

Last year I actually sells, but as there is a neighbour who sell last year, I am uncomfortable (so I put it inside) " (interview transcription S1, 2015)

24. Limited access to consistent supply and amenities leading to appropriation of space and infrastructure

"In her home D1 uses water for a ground pump, because she didn't have access for the national water system. She said that it is too expensive to pay the company to put a pipe into only one house. The company only wants to install the pipe if there are 10 houses that wants to install at once. " (field notes D1, 2014)

" S8 uses water pump. She said that she could have installed pipes from the national water company, but the company refuses to install because her house is located further away from the street. Her jet pump depth is 11 m long, with good water quality." (field notes S8, 2015)

"(I get water from) S9's house, in here the water smells. I have (water) pipe, but the water cannot be drank. Other (people's water) is good, S9 and M2h, have good water. The water is yellow (ish). S8 (also) get her water from S9. So my water is only used for shower and washing….(the was dug) deeply, but installed with iron so there is a smell, he uses low quality tools, it is too troublesome to dig again. S9's water is not (smelly), she uses jetpump… " (interview transcription S7, 2015)

"Everyday I get the water two times, becase it is only used for cooking. (It is) enough, (because) the kids rarely drink, (they) drink bottled water…Aldo (her oldest son) always buy bottled water. This kids do not want to, particularly Jihan (her smalles child). She (also) does not want cooked water. Sometimes it is not smelly, (but she would say) no mum, just buy bottled water, there is a grocery stall here (nearby), jihan does not want to" (interview transcription, S7, 2015)

"Just put a water hose from the (water tap) downstairs to extend upstairs… Yes, (I) put a hose to be contained upstairs…We fill it full first…several buckets maybe..then we will turn it off again.." (interview transcription J1, 2015)

"(I make a) water tap upstair, so if there is flood, we have clean water upstairs. (There is) no (bathroom), only a tap, so there is some for backup." (interview transcription M2, 2015)

There is no water tap upstairs. We might move , we put a hose upstairs, it is quite long to reach upstairs, but not until the second floor (only) until the stairs. If it is a huge flood, we can no longer get any water. (We will) take from S9. S9 has a hose that reach second floor and she has a water tap in the second floor. Everyone takes from her. " interview transcription S7, 2015)

"We have a water pipe from the national company. The water jet pump often broke down, we use to use that. But we put a limit on it so it does not get too expensive. Mostly the water is used ofor drinking, cooking, bathing. But the bathroom is blocked, so now the water is only used for cooking." (interview transcription V, 2015)

"She has a bathroom in her house, but she does not have any water closet, so she have to got to public latrine when she needs water closet." (field notes S5, 2014)

"She has a bathroom in her house, but she does not have any water closet, so she has to go to public latrine when she needs water closet. (field notes R3, 2014)

" S8 has a toilet in the back, where the pipes go straight to the river." (field notes S8, 2014)

"She showered at home. But for toilet she went to the public toilet." (field notes M5, 2015)

"(I) wash in the river, in the *getek*. (I) have a bathroom, but it is blocked, so we wash where we can. (It has been) blocked for a while, maybe two or three weeks, something with the pipe." (interview transcription V, 2015)

"The toilet is in the river basin, in the *getek/rakit* (bamboo platform). Once a year we share the fee to make a new getek, and how many million it will cost. Who will hold (the money). It will be broken (along the time) as it is drown in the water and used for washing. (The broken down bamboo) will be reused to make the layer of the new platform, some getek has two layers, some has three layers, every year will need to save more money to make a new one. The neighbourhood group leader is the one who make them, together with other dwellers, to put the *getek* together in the basin. When it is broken down and become drowned the dwellers will pull it together." (interview transcription Y3, 2015)

"There is no toilet in here (her home), usually in the *getek* or in the public toilet, but there is fee to be paid in the public toilet. In *getek* there is no fee, but often there is a monthly fee (for making a new one yearly). The public toilet (that I use) is the one in neighbourhood group 14….I just take turns between public toilet and *getek*. Sometimes I will be asked money once a year to make a new *getek*." (interview transcription V, 2015)

"In *getek* there is no queue in the morning. We can see first before we step down to the river. Sometimes I also shower in the public toilet. If the (river) water is dirty then we go to the public toilet. We usually see it first, if the water is obscured and there are dirts on it, then we go to MCK. Currently it is a dry season, so the water's colour is not good." (interview transcription, V, 2015)

"(I put my grey water/food debris) to the drain. So in my bathroom there is a water drain. So I just put it there. And then it goes through the river. See here, this is where the toilet, and this is where it goes to shower, so it goes to the back…" (interview transcription J1, 2015)

"We have a toilet downstairs. Water from my cooking is thrown to the river through the bathroom, juts directly to the river. In the front there is no toilet. For us it is good to be near the river so it is easier to make the bathroom pipe so it directly goes to the river" (interview transcription M2, 2015)

25. Lack of neighbour relations due to uneven connection

"She commented that the river is now dirty, in the 1970s she can still wash her rice in the river. D1 throws her daily garbage straight to the river, because there is no local garbage bin and they are prohibited to throw their garbage to the street in front of their housing complex." (field notes D1, 2014)

"He always throws waste in the river, depending on time he have. Sometimes waste accumulate and there is nobody collecting them. . S11 will then burned this accumulated waste. It is much more comfortable to throw waste to the river instead of the neighbourhood gate." (field notes S11, 2015)

"Dirty water is still being used…They do not have any bathroom, public toilet is faraway in the front area (of the neighbourhood)..everyone here has their own bathroom…that one (who washes in the river) is the one who rent slum houses that are not equipped with toilet and bathroom…There were not that much people in here, (even when) it is flooded it never gets to the attic. Now it is full of people, Betawi people like me has been excluded by the migrant.. "(interview transcription Y3, 2015)

26. Ask neighbours to share food together

"She eats and cooks at home. But if the house is empty, she often goes to the neighbours house, which is either S9 or H1 which are still her relatives." (field notes N2, 2015)

5. Pesing Koneng Narratives from Field Notes and Interviews

1. **Family taking turns managing the stall**

   "She opens the stall from 4 pm until 11 pm for the next day, so she have to shift with her daughter for selling the vegetables." (field notes D2, 2014)

   "Every day she sells various kinds of tofu with her two acquaintances." (field notes I4, 2014)

   "For the late afternoon shift that lasts until 10 PM, he is accompanied by his wife so he doesn't have to work alone. He brings porridge to the area and serves it to people directly." (field notes A1, 2014)

2. **Family help closing the stall**
   "Her wife helps him daily in the stall, especially when he went shopping to fill his stall when it is crowded. In the usual day, his wife comes at 21.30 PM to help him close the stall." (field notes E1, 2014)

   "After cleaning and throwing out garbage each night, he will walk the cart back home together with his wife. "(field notes A1, 2014)

3. **Family inheriting the stall**
   "B1 said that the street vendors in here have stayed for a long time, and many of them passed the stall to their children/acquaintances when they grew old." (field notes B1, 2014)

4. **Family help buying trading goods**
   " N2 sells her goods together with her husband." (field notes N2, 2014)

   "She usually shops together with her husband using Bajaj" (field notes W1, 2014)

5. **Living near the market provides flexibility and access to space and resources**

   "He lives nearby in the same district as the stall, which is in neighborhood 8 district 2. "(field notes E1, 2014)

   "E1 likes to sell in this area because it is close to his home." (field notes E1, 2014)

   "M1 lives in District 2 Neighborhood 9 with his wife and two children, aged 13 and 8." (field notes M1, 2014)

   ". B1 lives with his wife and four kids in District 2 Neighborhood 07 , Kedoya Utara. When we came, he was busy controlling the security and coordinate with them, because the district's chairman was absent at the moment. He rode a motorcycle and talked to some of the security team before talking to us. " (field notes B1, 2014)

   "When she needs to go to the toilet she would just go to her home near her stall area." (field notes S2, 2014)

   " W1 lives near her stall area with husband and three kids." (field notes W1, 2014)

   "She said that most of the seller in the area has been there for a long time, and a new seller is rare." (field notes I4, 2014)

   "After building his stall, he come home first for taking a bath and after that he come back to his stall and start selling children clothing." (field notes D1, 2014)

   "He lives nearby the railway and is part of the local tribes." (field notes J1, 2014)

   "S5 lives with her aunt in her aunt's house at Pesing Koneng Distric 5 Region 1." (field notes S5, 2014)

   "Other than keeping the shop in the afternoon or shopping, he spends his early morning at home" (field notes E1, 2014)

   "He came home to rest and later in the afternoon he will continue working in repairing the television at his nearby stalls." (field notes J1, 2014)

6. **Human resources help on building the market**
   Pay people for labor to load goods and/or build the stall
   "When he want start his stall, before he build the stall, someone payed, already carry his goods (tarp, children cloth, bamboo, and iron bar). When he finish selling the product at 10pm, he has to tidy up and unbuilt his stall. The tarp, children cloth, bamboo, and iron bar are packed again in the cart, then someone payed will carry it to the cart field (a place where the carts are stored)." (field notes D1, 2014)

   Coordinating/waiting the parking space
   "There is a gate in the entrance of the field next her stall. She said that the gate always opens for 24 hours every day, but it is closed during Lebaran (Holy vacation at the end of Ramadhan). There are some goods that are deposited in the field, which are product (in the cart), carts, bamboo and tarps, motorcycles, and also cars. S2 also said that she just keep the field, not keep the traffic of the loading, so she does not take any responsibility if there is any goods lost or stolen." (field notes S2, 2014)

   Water seller distributing the water

"The water seller will collect the water from a water tank in jerry cans and sell it to coffee or beverage seller by using cartwheel. Every cartwheel can load into 4 jerry cans. The water seller usually sells it in 'pikul' or every 2 cans of water. The water seller starts selling from 2 AM in the morning to cater the morning market as well as the afternoon ones. " (field notes M1, 2014)

Delivery man for vendors with similar goods
". A4 does not work as a street vendor. However, he often helps them. He is acting as a delivery-man. He delivers coconut in and out of Pesing Market as their buyer. He comes to Pesing Market by riding a motorcycle and does not own any property within the market.

He had an empty plastic box strapped behind his motorcycle. His daughter who was seemingly tired was standing next to him. They're heading home after a long day at the market. He had been helping some vendors delivering their products to various places." (field notes A4, 2014)

7. **Multiple ways of acquiring electricity connections**
Electricity is provided by security post for monthly fee
 " D1 need electricity for his stall when the night has come. He gets the electricity source from the security post, which is payed frequently every month." (field notes D1, 2014)

"A3 gets electricity from the security post nearby" (field notes A3, 2014)

". M3 said that there currently 30 stall that got their supply of electricity from the security post, and there are 20 stall that is supplied using diesel machine. These stall are only the stall that opens from 6.00 PM until early morning after midnight." (field notes M3, 2014)

" N1 needs electricity for selling when the night comes. She get the electricity from security post, which is turned on and turned off by the authorities in certain time (only when the vendors need electricity)." (field notes N1, 2014)

"We asked M1 how every stall can be supplied by electricity. He explains that any stall that spans to about 50m in the left side of the security post is supplied by connecting electricity cable to the post, with the fee of 4000 rupiahs per lamp (about 0,2 pounds). He said that it is a bit pricey because of the huge size of lamp and its wattage." (field notes M1, 2014)

Some vendors use electricity created using diesel generator coordinated by the security
"Diesel machine is coordinated by the user but the person in charge is controlled under the district authorities." (field notes B1, 2014)

"For stall that is located in the right side of the security post, their electricity supplies is provided by a diesel machine operated by local people that used to live in District 2. " (field notes M1, 2014)

Electricity can be extended from home for occupation in front or around the home
"Her stall is next to the railway and is located in front of the house of locals that provide electricity for her" (field notes I4, 2014)

"At night, . A1's cart will get supplies of electricity from food shop behind him." (field notes A1, 2014)

"However she needs electricity for turning on her video, CD, or cassette player and testing her product for incoming visitors. She gets the electricity source from her house with monthly fees." (field notes S2, 2014)

 "She gets electricity source from the shop behind the stall for turning on the lamp in the stall when the night comes." (field notes D2, 2014)

Some vendors only uses lights from surrounding sellers
"As S7 start selling in the later hours than her fellow street vendors, she doesn't need any additional lamp. She said that the lights from other seller are already enough for her to see and sell her vegetables." (field notes S7, 2014)

"She does not use any specific electrical source because she gets the light from the shop behind." (field notes N2, 2014)

8. **Multiple ways of occupying spaces**
Local actors allowing land use for storage purposes for monthly fee
" S2 came from Garut, West Java and has been living around the area since she was born. She lives in the area near the field, where the carts are stored. S2 sells CD, DVD, and cassettes but in addition she is also the coordinator of cart storage field." (field notes S2, 2014)

"However, like other seller, he also put his cartwheel in the parking lot nearby, because it is easier than to put it in his home. The fee for parking his cartwheel is 85.000 rupiahs per month (2,25 pounds) while if anyone else is bringing a car inside, the cost is 300,000 rupiahs (about `15 pounds) per month." (field notes E1, 2014)

"These pick-ups are parked in a nearby local field that has been transformed into a parking lot. Many sellers also store their commodity here and only take them out when they went back to their village after Ramadhan." (field notes M1, 2014)

"Meanwhile, the table, bamboo, and cart are are all stored in the field" (field notes N1, 2014)

"All street vendors who store their cart in there have to pay Rp 85,000.00 every month." (field notes N2, 2014)

Areas around the railways can be used with help from the local people who hangout and supervise in the local coffee shop
"At the back of her stall there is a small coffee shop where local security officer sit and enjoy their coffee in the early morning." (field notes I4, 2014)

Giving other's access to sell in the terrace area
"She sells them in the stall in front of a groceries shop that is separated by the main road from the river" (field notes D2, 2014)
"Her stall is next to the railway and is located in front of the house of locals that provide electricity for her" (field notes I4, 2014)

9. **Local authority roles in managing the temporary market**

"When he started selling, the local authorities had picked a space for him to sell." (field notes E1, 2014)

"He is part of the security team that is responsible to secure the Pesing area that resides in District 2. His work shift ran into 24 hours with one day off the next day." (field notes M1, 2014)

"He is one of eight men that works as the security officer in the District 2's security post." (field notes M3, 2014)

"When asked about daily fee for electrical, garbage and security, he smiled and said that the security already knows who is he and he doesn't need to pay anything except 5000 rupiah (25 p) to light one lamp in his stall in the middle of the railways." (field notes J1, 2014)

10. **Multiple ways of accessing water in the market**

Use of private water pump owned by locals

"However, in the adjacent district there are private water pump that is operated by locals to be bought by local water seller." (field notes M1, 2014)

"The security post uses national water system to provide water for them and for the little mosque that is located next to the security post." (field notes M3, 2014)

The security post expands access to water for others for free, except the toilet
"The security post uses national water system to provide water for them and for the little mosque that is located next to the security post." (field notes M3, 2014)

11. **Different ways of sourcing goods between different vendors**
Clothing sellers source their goods less frequently
". E1 shops every one to three days to either Cipulir or Tanah Abang market with his motorcycle, depends on the crowd level." (field notes E1,2014)

Some vegetable sellers bought vegetables on her own, particularly the ones with smaller volumes
"She sells vegetables like chillies, tomatoes, onions and red onions, potatoes, cucumber, chayote, and string beans in Pesing Market. She bought the vegetables from Induk Market and she would bring the vegetables directly to the Pesing Market by car. " (field notes D2, 2014)

Some sellers with specific/seasonal goods source the goods further (fish, leafy vegetables, seasonal fruits)
"She carried the product from Muara Angke, Muara Kampung, or Muara Kamal by motorcycle or bajaj. She will use bajaj if the goods are around 200kg." (field notes N2, 2014)

"She gets the product from Muara Angke, Muara Kampung, and Muara Kamal. It takes 30 minutes in a way from Muara Angke to Pesing Market and 10 minutes in a way from Muara Kampung." (field notes N2, 2014)

" J1 explained that he took his cucumber in a number of crates early morning from the habor and usually loads them in his pick-up." (field notes J1, 2014)

"Every midnight he would drive to Cengkareng where he picks most up his product in sacks and put it in his pick-up." (field notes H1, 2014)

Some sellers receive delivery, such as tofu or coconuts
"His products are mainly purchased from Lampung or Pandeglang and delivered by a truck." (field notes A2, 2014)

"His products are purchased from Lampung, Sumatra. They are delivered by a pick-up truck and that will be brought to his relatives' shop or other stall that sell the same thing in the area." (field notes A3, 2014)

"The snacks and syrups are purchased from Tangerang while the coconuts are purchased from Lampung. The coconuts will be delivered by a pick-up truck and will be brought to his shop. As these coconuts are shared with other coconut seller they will be delivered to each vendor by using cart" (field notes R1, 2014)

"Her coconuts come from Lampung. They were carried by a mini truck and then delivered to . R1's shop. Like many other coconut sellers in Pesing, the coconuts are then shared by carts." (field notes S4, 2014)

"She purchases her products from Lima Angke Bridge and has them delivered by motorcycle or other means of public transportations." (field notes P1, 2014)

"She said that she usually rides a motorbike from her house to the market and wait for the truck from the factory to come and deliver her tofu at 1.30 AM." (field notes I4, 2014)

Some food sellers buy from the market itself
"She purchases noodles outside of Pesing Market and has it delivered by a motorcycle. In addition, she purchases vegetables for the noodle in Pesing Market." (field notes S5, 2014)

Some sellers grouped with others to buy supplies collectively, particularly the ones with larger volumes.
"The vegetable sellers' supplies are from Main Market Tangerang and Kramat Jati. They usually use pick-ups that can be shared by 2 to 3 sellers at once." (field notes M1, 2014)

" N1 sells vegetables, which are bought and carried from Tangerang using pick-up truck." (field notes N1)

Groceries seller do all of the repackaging and sorting in their stall (peeling, rubbing, cutting, washing and so on)
"She usually shops together with her husband using Bajaj and put the goods directly to her stall area because it is impractical to put it in her home beforehand. She did all the repackaging and sorting directly in her stall." (field notes W1, 2014)

"She was rubbing cassavas and yams as we approached her. There was only a bucket filled-with water to rinse her products. By the time we got there, the water was brown of mud and soils. She was preparing to open her shop in 6 pm. There were several hours left. She was using a pile of newspaper to scrub her products. Weird as it might seem, it did work. It removed mud and soils from the skin." (field notes P1, 2014)

"H1 often pour waste to his vegetables to prevent them from drying up…" (field notes H1, 2014)

Some vendors pre-packaged their the vegetables to create a quicker process of buying
"To simplify things for her customer, she already prepackaged her vegetables based on the dishes that the customer wants to make that consist of various kinds of soup. " (field notes S7, 2014)

12. **Vendors' different trading stall structures**
Some dwellers have elaborate structure for hanging goods, particularly clothing stall
"He then bought his own material to build a stall structure and make it himself using samples from his friend." (field notes E1, 2014)

"Before open his stall, he has to built his stall by his own. The stall is made from bamboo, tarp, and iron bar. He said that using bamboo is more cheap then using iron bar, but iron bar is more resistance than bamboo." (field notes D1, 2014)

Some dwellers structures are simple, and only use tarp sheetsand an array of boxes or other platform base or furniture
"She use tarp, table from wood, and bamboo to build her stall." (field notes N1, 2014)

" D2 used a sheet of tarp and wood to make the stall." (field notes D2, 2014)

"Her permanent stall is build using bamboo and tarp." (field notes N2, 2014)

"His stall is built using tarp and some bamboos." (field notes A2, 2014)

"She didn't have to prepare anything other than chair to sit upon and tables for her tofu tray. She didn't even need water to soak the tofu in because it has been provided by the factory." (field notes I4, 2014)

"His stall is made from a board that serves as a tray to display his array of cucumber and supported by crates in the bottom. The bottom crates store a number of cucumbers so he can easily reload the board when it is sold out. His remaining cucumber from the harbor is stored near the train office and closed with layers of cloth. Although his stall is located directly in the middle of two railways and in the middle of the train junction, . J1 said he wasn't afraid. His chair is located next to his stall that means he is located directly next to one of the railways." (field notes J1, 2014)

Some dwellers only use a tarp, particularly around the railways
"As he does not own any permanent shop or open a stall, he would sell his goods bellow the shade near the railways. He primarily uses diesel-generated coconut machine in selling his goods." (field notes A3, 2014)

"Her stall is not permanent and made out of a table and shaded using tarp (heavy-duty waterproof cloth). It is assembled very early in the morning, before she opens up the shop." (field notes S4, 2014)

"H1's selling area is located in front of J1's stall in the middle of two railways. He sells various types of green vegetables, from kenikir leaves, peanut leaves, spinach and kale. He has been selling vegetables for the last 15 years, but he doesn't have a permanent stall like others." (field notes H1, 2014)

"In the stall, he will put his vegetables in the ground above the newspaper and other vegetables sacks behind the newspaper." (field notes H1, 2014)

13. **Cleaning process managed by the local authority**
There are cleaners working in the daily basis to clean the market, working from early morning to midday
". U1 is one of the three garbage men that are employed to collect the garbage at the market street in District 2." (field notes U1, 2014)

"To deal with garbage issues, the district employs cleaners that works in a daily basis." (field notes M1, 2014)

"B1 said that he coordinates 5 men as garbage men in total, that works from 2 AM in the morning to 11 AM. It is cheaper that way." (field notes B1, 2014)

"In addition, all garbage from the market is being taken away every night and day by three garbage men." (field notes M3, 2014)

Cleaners divide the street into three particular routes and pick up waste and clean street along these routes
The garbage men divided the street into three and start collecting the garbage when the morning market starts to close, about 10-12 AM. They need to collect all the garbage that is compiled in the sides and the middle of the streets. They will need to sweep clean the street and put the garbage in their garbage cartwheel and transport it to the nearby local garbage area near the lightbulb factory in the adjacent district." (field notes U1, 2014)

"U1 said that he usually cleans up in the street between the kindergarten and the local security office. He cleans and sweep and load all of the garbage that has been accumulated throughout the day, especially from the morning market that starts from 2 AM to 10 AM… His shift only last for half a day, from 06 AM in the morning to 12 AM in the afternoon, after that he can go straight to his nearby home at neighborhood 08 district 2." (field notes U1, 2014)

"There are three routes that is used by these men, from traffic light to the kindergarten, from kindergarten to post office, and from post office to the railway. The district gets several garbage trucks that they bought from the local authorities." (field notes M1, 2014)

Cleaners did not get paid from the local authority
"However, he did not get paid by the local district authorities. He has to ask directly to the street vendors for their share in garbage cleaning. Usually he can get about 50,000 rupiahs per day (about 2,5 pounds) from about 20 street vendors." (field notes U1, 2014)

"The cleaners will be paid directly by the street vendor when they collect their garbage." (field notes M1, 2014)

The security collect money from all vendors, but it is for waste pick up services from higher authorities, not for the cleaners
"The security also collect money from street vendors, however the money is used to pay for the garbage that has been collected by the garbage men to be taken away by truck to the Regional Garbage Dumping area at Bantar Gebang for the cost of 300,000 rupiahs (about 15 pounds) every month. Before it was taken, the garbage is stored in the district's garbage dumping area." (field notes M1, 2014)

Unreliability of waste pick up services from municipal agencies
"However, sometimes there is less truck available that can collect the garbage compiled by these men. As a results, it can be 2 or three days until the garbage is collected from their storage." (field notes B1, 2014)

"In the next morning, early at 6 AM a truck from regional garbage division will come to collect the garbage from the cart so it can be emptied and reuse again that day." (field notes U1, 2014)

14. **River cleaning process**
"When we came to the side of the river, . S6 and his partner were scouring the river from trashes. They rode a big canoe that carries some sacks. The sacks are filled with the trashes, and it is watery and smelly. The trashes from the river are mostly consisted of plastics and baby diapers and it can be assumed that mostly it is a domestic waste. . S6 said that there are no trashes from the market in the river because the trashes from the market are already carried by the garbage man." (field notes S6, 2014)

"As part of the river sanitation authorities, . S6 and his partner i have a task to to clean the river from its waste. In doing this task, . S6 and his partner use water that is pumped from the river. The water is used to clean the sidewalk from the trash that has been lifted out from the river. The remaining of the trash will be placed in the sacks and after that the sacks will be stacked on the sidewalk." (field notes S6, 2014)

"Regarding to the river's garbage, . M1 said that the district works together with agency public works to clean up the river by employing seven men from the district. They will clean the river daily from 8 AM to 4 PM by picking up the garbage from the river. A truck from the agency will tow the garbage and dispose them directly without storing it first." (field notes M1, 2014)

15. **Different trading times of vendors**
Market shifts agreed by the local authorities
He explained that Pesing market consist of two kinds of market, the food market from 02 AM to 11 AM, and clothing market from 4 PM to 11 PM." (field notes M1, 2014)

"They all follow the District's rule to sell in the radius of 0,5 m from the street and load their stuff from 11 AM to 1 PM when the market is in recess. This is before the afternoon market start selling their stuff by taking their cartwheel out of the parking lot that is owned privately." (field notes B1, 2014)

Some sellers work until midday
". D1 sells children clothing in Pesing Market, in the stall next to the security post. He opens his stall from 4pm until 10pm because sometimes he works in Kodam Jaya (soldier office) from morning to afternoon." (field notes D1, 2014)

"She opens the stall all day except at 7.30am until 10am because she also teaches in a kindergarten around that time." (field notes S2, 2014)

" N1 open the stall from 1am until 11pm." (field notes N1, 2014)

"She opens the stall from 4 pm until 11 pm for the next day… " (field notes D2, 2014)

"For the past five years, she has been selling various types of vegetables, from tomato, carrot, and green leaves. She starts selling her vegetables at five AM until 12 PM in the afternoon" (field notes S7, 2014)

"He started selling from five in the morning, buying his stuff in the market and then starts selling at the morning when the sun has risen until eleven AM in the afternoon." (field notes N4, 2014)

"It opens from early in the morning (approximately at 5 AM) and closes at 9.30 PM." (field notes S9, 2014)

Other sellers do two shifts continuously, or work at night until midday
"At 4 pm she will open up the tent of the stall that is hanged to the wall of the river border, and start prepping her vegetables for sale at 5 pm until late night." (field notes W1, 2014)

". A1 usually pushes his cart and walk to the market every day in two different shifts, which are morning and late afternoon shifts" (field notes A1, 2014)

". A2 sells mostly coconut and processes it for customer by cutting the coconut and draining its water. He also sells some bananas. He works daily in the morning from 3 to 12. After taking lunch break, he continues selling coconut from 2 pm to 6 pm." (field notes A2, 2014)

". A3 sells coconut milk every day from early morning until early afternoon." (field notes A3, 2014)

". R1 works in Pesing Market together with his friend and they share two shifts in watching their store from 3 AM until 12 AM." (field notes R1, 2014)

" S4 sells coconut milk (also known as santan) and she works in two shifts daily. 02.00-07.00 AM and 03.00-09.00 PM." (field notes S4, 2014)

"S5 sells chicken noodle from 11.00 AM-10.00 PM at night." (field notes S5, 2014)

"He explains that he works every day from 6 AM to 6 AM next morning, after that he will take the day off." (field notes M3, 2014)

Some work in a short time, only 3-6 hours
"I4 works from 2 AM in the morning to 8 AM. (field notes I4, 2014)

"J1 opens his stall from 05 AM to 08 AM " (field notes J1, 2014)

" H1 works from midnight to 10 AM in the morning" (field notes H1, 2014)

Some dwellers work all day, particularly the food seller with portable cart
 ". I3 sells grass jelly with ice and syrup (also known as es cincau hijau). During the fasting month, he works from 12 to 9 pm. However, he usually works much longer in other months, from 9 am to 9 pm." (field notes I3, 2014)

16.   Truck loading trading goods often creates traffic jams during peak hour
"When the vegetables are loaded to her stall, the mini truck is parked on the side of the road. Sometimes it will make the road jammed because of the loading activity. The traffic will be more heavy while the truck is parked on the side of the road and a train is passing through the railway. When the train passes, the railway gate will be closed and no vehicle could pass through, so the traffic is more packed." (field notes N1, 2014)

17.   Before the train comes the railways area is also used by vendors
"Before he came, the train hasn't come through and the railway is used to display vegetables like kale and spinach by other vegetables seller. When it is time for the train to come, the vegetables are wrapped and the space is emptied for . N4 to come." (field notes N4, 2014)

18.   The railway gate guarded and operated by locals
"Every gatekeeper's station is equipped with signal lamp regulator, door opening machine, sirens and a phone. If the gatekeeper wants to go to the toilet or eating, one of the local people will take over and help him doing his job. In Pesing, there was a young man that accompanies him in doing his job, such as opening the door and taking the phone call. There was also a deaf man that usually stays near the post and pushes people away when there is a train coming." (field notes S8, 2014)

He is one of the four men who take turns in three different shifts to guard the railway gate together. His main job is to close and open the gate based on the signal he received from command center. He will also get a phone call that confirms the signal from previous station where the train is coming from, approximately five minutes before its arrival. Shortly after that he will light up the siren to warn other people to stop crossing the railway and closed the gate to prohibit people from entering the railway area. The locals and the gatekeeper will understand from the center's signal frequency from which side the train is going to come." (field notes S8, 2014)

"S8 said that the problem usually occurs when there is traffic jam in the road around the railways. However, the local security officer will help in clearing the railway area by moving vehicles that blocked the road and telling the market's visitor to walk from the area quickly." (field notes S8, 2014)

19. Different ways vendors dispose their waste from the trading process
Some vendors dispose to the cleaners directly
"In her stall, usually there isn't any trash but if there is trash there, it will be carried by the garbage man in the afternoon." (field notes S2, 2014)

"Every day, a garbage man comes to the stall to take the trash away, then throw it to the local collective dumping area." (field notes D2, 2014)

"His coconut shell is usually given to the customer who buy the milk, but the remaining parts will be gathered in a sack and put it nearby to be collected later on by the garbage men." (field notes A3, 2014)

Some vendors accumulate waste in the stall for collection later

"Everyday, he stacked trashes from his stall in the stall area and the next day in the afternon, the trashes will be put and carried by the garbage man (. Unang)." (field notes D1, 2014)
"The vegetables waste are stacked in the stall until the garbage take it and carry the trash away." (field notes N1, 2014)

"She will put her trash in front of her stall to be picked by the garbage man after selling hours." (field notes W1, 2014)

Some vendors dispose in the collective dumping, especially the ones who only remain for a while/shifts with others
"He will later carry his food waste to be thrown away in the collective dumping area next to the railway." (field notes A1, 2014)

". A1 said that usually when the garbage men come there were a pile of food waste already left next to the rail." (field notes A1, 2014)

"He throws trash on the side of the road. But in doing so, he said he did it carefully. He avoids causing accident by throwing a plastic bag recklessly." (field notes I3, 2014)

"She compiles all of her trash that mostly in the form of plastic bags as part of the packaging of the tofu and throw in a collective haphazard dumping next to the railway in front of her. This trash will be collected by the garbage man later in the afternoon." (field notes I4, 2014)

" S7 stall is located next to the collective garbage area compiled by her fellow street vendor. It is easier for her to repack her vegetables and throw any excess and debris on the side of her stall immediately. Later on this garbage will be collected by the local garbage man." (field notes S7, 2014)

Some vendors dispose their waste to other actors particularly for specific waste
"When cleaning the coconut for his buyer, there are plenty waste that comes from the coconut coir. Some of this coconut coir will be given to the costumer who asked for it. Other will be kept inside a big bag altogether." (field notes A2, 2014)

"His waste is mainly coconut coir as to make coconut milk he has to grate every coconut after peeling it from its shell. . R1 compiles all of his coconut coir in a sack and puts it in front of his shop. Later, a man hired by the coconut provider will come by the shop and pick it up." (field notes R1, 2014)

"She hired the same men to pick her coconut coir waste as . R1's." (field notes S4, 2014)

Some vendors dispose to the river/street, particularly greywater or organic waste
"Chicken porridge is a rice dish cooked with broth and served with chicken pieces, leek, peanut and shrimp crackers. As making and selling porridge and cleaning it produces water waste as well as food waste, at the end of his shift he will throw his waste water directly to the river." (field notes A1, 2014)

Some vendors left the structure and goods as is as he/she will be back shortly
"When the stall is closed, the vegetables are covered by another tarp and she would just left it there while she went home. The stall and its tarp are built permanently so she doesn't have to rebuild it every day" (field notes D2, 2014)

"In the morning , if she didn't sold out all of her vegetables, she will leave it stacked in there and will only cover it with vinyl cloth from the roof of the stall. She will return afterwards in the afternoon with new goods she bought and sell it again through the night." (field notes W1, 2014)

"All of his products are stored under the tarp when the stall is closed." (field notes A2, 2014)

"Since he does not own a permanent shop, every day after he closed his stall he would store his utensils and materials in his relative's shop." (field notes A3, 2014)

"Unsold coconuts are stored in the shop's location; even though the shop is built for temporary use." (field notes S4, 2014)

Some vendors repacked everything entirely when they sell for only very short period
"The vegetables that are not sold out are brought to home by mini truck." (field notes N1, 2014)

"Later on, if his vegetables didn't sell out, he will bring them back to his house. " (field notes H1, 2014)

Some vendors repacked the goods and leave some part of the structure
"After her shift ends, she will leave the cart in front of her house and store other things inside." (field notes S5, 2014)

"She brings all her products to her house after the shop is closed." (field notes P1, 2014)

Some vendors store the goods nearby particularly when they have a longer trading times with large volume of goods
"When she finished selling her goods, the salted fish except the squid one are packed in a cart – that later on stored in a field that is used as a parking place for the cart…The salted squid are later brought to the their home to be stored in their freezer."(field notes N2, 2014)

Some vendors give goods to another seller to continue selling
"When she stopped selling at 8 AM, she will sell all of her remaining tofu to the vegetables seller that will take over her place at that time. She will also give the container to the vegetables seller to be picked by the factories at later hours." (field notes I4, 2014)

"When . J1 stopped selling, he will leave all of his cucumbers and his property in his fellow street vendor that sell vegetables. He will tell him about the price points and space for plastic bags to package the cucumber….His crates and boards will be packed to store with his remaining cucumbers after the morning market is closed. When the crates is no longer used, it can be sold to the bean curd seller to be used for cooking fuel (wood fire)." (field notes J1, 2014)

6. Transcriptions Narratives of Government and Non-Government Agencies

<u>Transcription of Ciliwung Merdeka NGO narrative</u>

The view of the Governor regarding the status of the Kampung Pulo village came out on the papers today. Even though we have helped the villagers since the 2000s, and recently, intensively to help gather data regarding their land ownership papers and evidence of their residence. This is because the villagers, during this time, has been characterised by both the Government and the media as squatters. The media in particular did not do any fact-checking before characterising them as such. Therefore, we are answering their words by verifying the data that we have. To do this, we have gathered the villagers' papers, that were given to us voluntarily. The nature of the deals are varied land ownership letters ranging from formal to informal. But despite this variance, they have verifiable, government electricity accounts, water accounts, and residential evidence as proven from their identity card. These people are legal residents here. You can't say that they're squatters. They even have historical anthropological evidence. The residents here have been around since the time of Habeb Sayid, since the 1930s. His grandchild, Habeb Soleh still lives here. So their land ownership evidence is valid, and the fact that they have been here for a long time is valid. That area named Mester market, its named after Cornelis Mester, and it's become a large economic area and that can't be disputed.

Now the problem is that they're saying these people are illegal residents and their property will be demolished outright without compensation. They're saying that these residents don't have proper ownership papers. The people are anxious, and this is actually based on Local Regulation 1, 2012, regarding plans to normalise the Ciliwung lake. Now, the process of information dissemination from the government is very unclear. The people had seldom seen the map planning the whole normalisation process. The people finally saw these plans only because we were the ones that looked for them. From our research permits, those plans were given to us. In fact, the government in 2011 has released Local Regulation 1 that detailed regional plans about the river and the change of land use. It's a mess.

These traditional land titles are valid under Agrarian law under article 3. Or even the Indonesian Law No.5 in 1960. They validated traditional land ownership. After Independence, using Agrarian Law in 1960, the government had to convert all those formal and informal land ownership titles into certificates. This was done through the PRONA program and Larasika. PRONA is gone now, there's only Larasika. But that program failed because the people couldn't do it. They were told it was free, but they were charged. The people were poor, they had no funds. That's the status now. Now, because they can't afford to change their papers to certificates, they lose ownership and these lands became the government's property. That doesn't legally make sense. This is the government stealing lands from the people.

Now, Miss Ika from the Jakarta Housing Agency said that those with certificates only get 75% of the basic land value as set by the government's national land agency. It's not fair. Even if they get 100% of the basic land value, they can't use those funds to buy a new house somewhere else, because basic land value is always below actual land value. Where will they go? Citayam? Outside of the island?

It's that logic that bothers the people's sense of justice. Every time there's regional planning - the little people, these people who are "native" residents (Native in the sense that there is no real native people in Kampung Pulo, there's Betawi, Banten, Chinese, and even Arabs) who have lived here for decades, who have assimilated through the market, their existence is rendered invalid. The government is just going to demolish everything. The

most painful thing is that these calculations from the government is just physical. They didn't calculate the building, the land. These people built their own survival system, their own access to the market, their own social access, their own social facilities. For example, they made their own clinic here. The Ciliwung Clinic. Here, residents can be medically checked out for only 2K IDR because there's a lot of volunteer doctors and medical help there. That money is for when they have to be taken to the hospital, not for the doctors - they couldn't afford that.

We also mapped out the economy of the people. There's a lot of informal economies here, traditional management. What's unexpected is that this economy is linked through the entirety of Jakarta. See, this is beyond only Kampung Pulo. If they demolish this area, the government will effectively kill several economic links to this place. This isn't even considered by the government. They didn't receive any help from the Small Businesses Service, no help from the government at all but they still survived. And the survival rate of these small businesses are high. For instance, if there's flooding, it'll only take it 2-3 weeks and then they can do business again. This is because they help each other. They learned from the Sakato model in Minang.

These are just examples. If the government is making calculations, don't just calculate the physical stuff - they need to count the social economics as well. If they're going to map this out, they need to count the economics, the social politics. But this government instead just stigmatises the people. Yes, they did wrong with dumping the trash to the river. I'm not justifying that action. But research shows that the floods happen not only because of the trash. That's not correct at all. There's a lot of factors. I can even show you the research that has been done here. There's Pauline's paper in 2002 for instance, there's lots of research. The evidence is that the overhead forest is now barren, there's also housing developments, parking spaces, water that goes everywhere. Because the water isn't absorbed, the space in the city is a mess, and of course sedimented trash and rivers that have become thinner. The fact is Jakarta is sinking every day. The geological factor is also there. The fact that the people is part of the problem is correct. But blaming it all on them is not right. There's even research from Singapore that states that the flooding will not stop completely after normalising the river. Absolutely not. There's only a small chance it'll affect the flooding positively. That comes from the NUS. The Civil Engineering department of NUS.

My biggest concern is the regional government's effort in getting the people involved in this. Because so far they haven't done that at all. Because they failed the first criteria in getting the people involved, they did it incorrectly. For example, in taking care of the flood. They said the people did nothing. I've been involved since the year 2000. I even lived in the shores of Ciliwung river. In the first three years, we built a work system where the people would take care of their own needs. The people not only made a communal kitchen, or even humanitarian systems like flood command posts, but also they distributed help correctly - we even made a search and rescue team with the people. In 2007, the biggest flood in Jakarta, the youth from Bukit Duri helped out in Kelapa Gading, in the Pluit Dam. We had four rubber boats, even though our place sank. But because of our organising, we were able to help thirty flooded areas in Jakarta. We even helped out the German Embassy. Even the moms in Bukit Duri is involved. We even organised and kept data about the people who took refuge, like in the previous floods - we made maps. It became a defacto command post, and it's crowded here with volunteers. Now, the regional government didn't take that into account. They only counted police involvement, the army, those who are paid by Ahok. He likes to just pay police. Yes, the military gets paid, it looks like they're working. Cleaning the river is not a one or two days process. It has to become a pattern. Like in the Netherlands, Germany, and Switzerland, I saw that the rivers there are also dirty. I saw with my own eyes, in front of a market, there was somebody throwing his bicycle to the river. But in there, there was a system, at least once or twice a month the river is cleaned. That thing (the bicycle) has already gone the next day. It's not like that here.

Perhaps after decades the river might be cleaned, when there is a ceremony, then the Army would come and on clean the river banks.

The community has been accustomed to cleaning the river. But nobody believed them. It is extraordinary how the urban poor are disbelieved in the city. Until the officials who manage the housing does not want to give the housing unit to be owned by the community. Even if they pay nobody would give them because they afraid that it will be dirty, and the community does not have sense of responsibility to clean them. Why don't they make a system for the community to be responsible to clean for themselves?... The absence of such belief destroys their potential to participate actively. Always with their prejudice, "oh they can't", they never give them a chance, they never give them a system. The government doesn't have the creative mind to bring in the people. That's the gist of it. And the people is just passive. People that aren't trusted with responsibilities always are. I've proven this myself, give them a bit of stimulus and the response will be amazing. The youth here. I gave them a place to hang out - the theatre. Through music, dance, theatre, I mobilised it. We practiced for seven months, the whole village performed in Taman Ismail Marzuki. It was amazing. We were praised by Riantiarno. We never did theatre but the performance was natural. That's just an expression of their reality. They said it was the biggest community theatre in Indonesia because 150 people came on stage. The theatre people were disappointed in me because I didn't train them to become artists. For me, this musical theatre is a place of education. I made the bones of the story, I tell it to them and they express it themselves. I casted the parts, and at the end, I wrote the narration. These people have incredible potential, and it spread everywhere, to even the residents at the other shores of the Ciliwung.

That proved, give them a bit of a system and a bit of stimuli, and their potential will bloom naturally. Song, dance, theatre - they couldn't copy anyone else, they made it themselves. This authentic spirit, this originality, grew inside them, to fight the tropes in TV dramas, crybaby songs, and this gives them their own confidence. This should be appreciated. But these people are never given a chance.

To be honest, I'm very anxious about statements from the governor, even though I met him in a CM meeting last week. Yes, it's a small community, but we're helped by 25-30 urban space experts like Professor Santoso from UNTAR. And that's personal volunteering, not through organisations. There's also 7-9 lawyers that help out predicaments like Kampung Pulo. They have their own offices, but they help out here and a couple of other researchers. These people make designs, like Yusing and Ivana, who works here, if you help these people then we can do it. I'm actually hoping for an economic expert. This is a humanitarian mission after all, we need to do this together, we can't do it alone.

The government released two regional regulations that are bothersome. Normalisation has a high cost, the victims are high in number too because they demolish a lot of property. Then there's river planning and change of land use as well. That's why we approach them like this. This is because we're certain of our thesis - that the people own these lands, and that they have evidence of so. That's the first basis of our argument with the regional government. Where are you going to put 3800 family cards of the people? The regional government wouldn't know what to with them. This is the people's land. The people here accepts it. They don't need river planning. Normalising the river is fine but the people stays in Kampung Pulo. This is Governor Ahok's command. The land is the regional government's. So the people's land would be bought 1.5 times the price of the basic land value, they don't exchange with money but with land. Something like that in Kampung Pulo would give the people certificates and the regional government would get the land they want. This is a system that we can agree with. The building itself is simple. If this is Kampung Pulo, then that part of Jatinegara is a bit higher. There's going to be land where the water would rise and fall. If there's flooding, they don't need to take refuge - there's a road here.

Incrementally build a village complex that looks like a village, the land we'll keep. There should be a lake of some sort that catches rainwater. This lake, can be a small farm or park when its not full of water. If it floods, well the people can use this water. The people would live here. It'll be different from an apartment housing. Apartment housing has a different connotation. It'll be like a birdhouse. There's no room for economies to thrive.

Informal sector citizens everywhere tend to work from home. See the "panggung" houses in Bukit Duri and other places. Top floor to sleep, bottom floor to work. They think its more important to work rather than to sleep. They're protesting being moved to apartments because they'll lose their work. I've given them TVs and they still wouldn't want it. Because the people need to live. How much do they make? Spending 750k a month is already hard for them, it can even reach 1 million IDR a month. Say that's just operating costs.

The housing itself is what the housing is always looked like, like a pigeon cage. It is remarkable what the provincial government have done in developing housing for the river bank dwellers. But it is only a place to sleep, not a place to work. If their land is converted to there (the housing unit) it is very luxurious, yes, but it is a place to sleep. It is for living, not for working. That has not been understood. Now you can ask for all people (other relocated dwellers) who now lives in this housing. They all stopped working, because their land has been substituted into housing units. But if you have five kids it is not enough. Many of them went out from the housing. Not because they don't want to live there, but (simply) because they have to work.

Jokowi had experience with this in Solo, he understands. This (current) governor never had this experience. I lived for nine years in Duri's river terrain. I can do it.

Transcription of BAPPEDA (Jakarta Planning Agency) narrative

I would like to say that the Tupoksi (basic tasks and functions) for Jakarta Regional Government is specific and somewhat different from other provinces. In Jakarta it is indeed BAPPEDA (Regional Planning Agency) who as the macro planner create RTRW (spatial planning and territory), RPJMD (Regional Medium Term Development Plan) and supervise the yearly budget as well as APBD (Revenue and Expenditure Budget). Basically, looking after the budget. And it is SKPD (executive) that is carrying out its activities. Regional work units. Actually, BAPPEDA is also SKPD but we call it institution above institution that can coordinate all other SKPD.

Long term plan BAPPEDA RJPD (Regional Long Term Plan) 2005-2025, RPJMD 2013-2017 ... ... These two planning documents (long and medium term) illustrates the arrangement of *kampung* improvements and waste management. From the title (of the interview) these documents are still related with the informal settlements and waste management.

For the short-term plan, Jakarta Regional Government is working with BBWSCC (Ciliwung Cisadane River Agency), related to its study in Kampung Pulo, we collaborate with BBWSCC to normalize (regenerate) the Ciliwung river and arrange the river construction while the regional government relocates the residents there.

For the housing related tasks is handled by another Subdit (Sub Directorate), I focus more on the waste. I do not know about the MOU (Memorandum of Understanding).

I have some presentations from Kasubdit (Sub Directorate Chief) about terrain that can be copied directly later, like Hidung Petruk Kampung Pulo, etc.

If we plan on relocating the people on the banks of the river, we must first know where the residents can be relocated to. Usually, the housing agency would prioritise to relocate them) to the nearest affordable housing. But if the closest one is full, (as it often turns out now because there is a lot of

evictions currently performed on the banks of the river), many of the residents need to be in the waiting list. Each housing has UPT (Technical Implementation Unit), there are UPT managers of the housing area 1, 2, 3, so if you want to know how life after the relocation you might want to interview the manager of UPT. I have a friend there but I do not know where he is now because for the last year a lot of rotations from staff to echelon 4 had happened.

UPT 1: North Jakarta

UPT 2: Central and West Jakarta

UPT 3: East and South

So maybe it is the UPT 3 who needs to be asked. So, (that is how it is), the residents should be relocated to the nearest tower.

(Other scenario is that) the housing agency could have a plan to develop a new affordable housing. If the agency already have a land for example, they just need to develop the housing in that land. Or if they do not have land, they can look for the land first and then develop the housing. Usually when the land needed has been already acquired, the project will run faster because they would just need to propose the budget for housing development. But, if for example there is no land yet, it is more difficult, longer time needed to relocate because the land must first be sourced, approved then purchased, and it can be two years because at the first year at most buying the land. This whole process couldn't happen just in one year.

One of the obstacles to the relocation process is the plan the implementation in the budget year of APBD. It is almost impossible to buy a land and also develop it in one year. That's usually very difficult.

There is something wrong if I personally see it, there is something wrong in the scheduling the budgeting mechanism (in Indonesia). It is different with other country abroad. (For example, between) our tropical country with the European countries who have four seasons. Their budget planning was targeted to be finished before winter, let say October. Before October, all physical development must be finished. Because October, November, December is winter and if it's snowing, it will be hard to do physical work like building the road so it would not be possible. That is why they can start using the budget and working from the beginning of that year. Meanwhile, we who live in this tropical climate, even though we got sunshine throughout the year, the budgeting is more complicated both nationally and regionally.

The soonest APBD can be used by a government agency is in the month of July. And there is a mechanism called APBD change, for example if there is incorrect allocation from that year and needs to be changed, there is a scheme called the APBD change mechanism. Usually this change happens between September-October, so there is only two months left (to implement the budget) and work in a hurry on physical work. That is why the absorption of government budget at the beginning of the year was usually very low because there is no fund available yet. The fund is not available yet (in the beginning of the year), it cannot be taken from the national treasury. Accelerated steps are then performed or skipped. If the local government want to propose an APBD we must first finalised it from the executive then to the legislative council of DPRD (Regional People's Representative Assembly) for a month, then to the Mendagri (Minister of Home Affair) for 3 weeks, then back again to us, if the APBD has been finalised, then it will go back to the council again for DPRD. Yesterday it has been really exciting when for the first time in 2015 we do not use our DPRD approval but directly to Mendagri using the Pergub (Governor Regulation).

Well, (this complex budgeting) causes difficulties for affordable housing to be available in a year, especially if there is no land yet. Because we require a year to buy a land in a yearly budget, then another year to develop it. We also need another process to plan the housing, (this process is) called x-1, which is where we made a detailed engineered drawing (for the housing).

The planning process cannot be done parallel with the land acquisition itself, because we don't know yet regarding the size of a land that we can acquire. Land acquisition may not reach target.For example, from the target of 10 hectares, we might only be able to obtained 8 hectares, because the owner of remainder 2 hectares do not agree with the price offered (and to release their land). It is complicated to find a location to build infrastructure, or an affordable housing (to relocate dwellers) in this case. If in an area all the housing is already full, usually we would search for another vacant housing elsewhere (in Jakarta) for the prospective occupants. Usually it ends with the dwellers to refuse their relocation as they know they will be moved (further away from the city, so then) they do not want to move. It is tough to move when there is a distance (from the original living area).

There is one mechanism to avoid dwellers going back again to the site, yesterday I had a meeting with the governor who notified me on how to do it. So, the KK (households) who inhabit the housing are not allowed to sell their unit, each of them will be given an ID card which also function as their saving card in the Bank DKI. They will get the unit and provided with an ID card. They will pay the retribution (rental fee) to that account to which they are being subsidised to, and would just need to pay 20 percent not like the general public.

They are not allowed to sell the unit because the card cannot be hand over (from the owner to another). If for example they still sell it then they can be prosecuted for violating banking rules and city administration. So that is how the government can constrain them not to sell their relocation unit to other parties. But I do not know exactly because there is a lot of concerns in affordable housing, you might want to interview UPT directly.

So now we have the RDTR (Detailed Spatial Plan) and RTRW.

It can be seen there what the development plan for the Ciliwung segment is.

At RDTR we try to keep the border of the river to be secured. Although there are some that were legalised (to be occupied). The river border must actually be emptied as RTH (Green Open Space).

When there is still a study (to develop something else around the river) it is not going to appear in RDTR yet.

In each sub-district map (of RDTR) the zoning designation in the area until 2030 is already colour-coded. You should see it at the location of Kampung Pulo whether there is any river straightening. If yes, then there will be some water there and a kind of small island will be formed. If anything, it will be pretty final when it already exists in RDTR ...Just need to be executed maybe.

Housing agency may (not) build there (around Kampung Pulo) because there is already public affordable housing exist nearby. Maybe the dwellers will be relocated to it.

Yes, essentially if they (the dwellers) can be more certain they might more willing to follow the rules.

The dwellers usually become so angry, disappointed and demanding if there is no certainty (or if) their expectations are not met. Usually decisions regarding their relocation has been delayed for so long and they will fret at the end. However, if (relocation plans) already exist in RDTR maybe it already has a policy that is almost final. Unless there is not yet any.

Just wait for the housing agency to do the budgeting needed to build the housing.

Indeed, if we talk about relocation and automatically also talk about the river. I just do not understand why we talk about domestic waste, how would it related.

So the (Ciliwung) river is more complicated because the Ciliwung River crosses provinces. There is an ownership of the river basin. A cross-provincial river is owned by the central government which is the Kemenpu (Minister for Public Works and Human Settlements) through the BBWSCC.

That organisation is the one who manage the overall river. So if Jakarta cannot handle the flood in the city, it is because the river itself is managed (and can only be developed) by other (institution). It would be a different story if it is a river that is managed by Jakarta's Waterworks Department for example, who oversees all ancillary river in Jakarta area. We can easily do it. But it is not (the case). The river flows from Bogor, Depok to Jakarta.

That's why if BBWSCC wants to develop the river at the top, the bottom area would be affected. And it must be done together not only by one institution.

Indeed, BBWSCC Tupoksi duty is only for river (basin) technicalities only. When the river normalisation (regeneration) work is on, admittedly there would need for a coordination with the city planning agency of Jakarta for developing the terrain. Informing the neighbourhood dwellers about current development work underway.

Currently there is no lead in planning the riverbank areas. The Jakarta province itself, the sanitary agency is only responsible for taking the waste from the waste disposal areas. Other than that, they might organise the waste disposal area, for instance, if there was illegal waste disposal area in the embankment they might either close it down or conversely make it more permanent using waste pushcarts so that it is tidier and does not fall off the river. So, yes, the area is organized together.

Jakarta for example, we agreed about the housing positions, the river development positions. Ok, so this can be implemented exactly as it is planned spatially as concluded in RDTR, which can be said as almost final, because there was already a discussion about how Kampung Pulo would be like.

What makes RDTR a long process is that all who involved should be engaged with.

The Landscape agency is connected because the river demarcation border is (actually) included as green corridor. So, when, BBWSCC has done the normalisation, to make this area attractive, then who would organise it? The Landscape agency came in, creating the greenery on the river border and around the housing. The public housing agency will also come and build the housing itself. The sanitary agency will create the waste collection site in the area. An area organisation would require inter-sector collaboration. They are usually organised together by the town mayor (municipality) who would be responsible to manage collaboration in the field because they are the one who create the budget, if it in the region the Sub-district, Sanitary Agency will do the TPS, and greeneries will be created by The Landscape and Burial Agency.

The one who check the list and coordinate is the Mayor (of municipality).

For example, the Municipal Housing Agency of East Jakarta. Because of its big level (of development) then maybe the budget is managed at the provincial level. This municipal housing agency tasks are to prepare the dwellers, set up the management, then inform the Housing Agency when to develop and speak to the Mayor regarding the affordable housing plan. So, if you want to know about how cross sectors happened in the area and how the regeneration program is being implemented it will be with the Mayor.

The Sanitary Agency also has a program called "stop disposing waste to the river". At the time, the agency has a campaign about it, so there should be a socialisation to the residents of the river banks at least, then give notice to the residents, controlled by the municipal Sanitary Agency in the region. Because we are in BAPPEDA we can see that they created a budget to do such agency, which should already be done because the agency itself has reported that they have done it (the activity).

In addition, in the Sanitary Agency there is also a 3R training, to nurture 3R TPS and waste bin in the community. To empower the community to treat their waste, the waste bank can be independent, You know, like the garbage

disposal mechanism, so residents can come with waste, and exchange their waste for money. So they will be coached and assisted for implementation.

Find "Jakarta in the number" to see the ways residents dispose their waste and how many residents who get the waste bin in the area. If for example the arrangement of waste and grey water were related with the grey water treatment plant. So that the river become dirty because they dispose of the grey water from the bathroom directly there and no septic tank. Well, according to the Ministry of Health of WHO a bathroom drain dumped into the river is considered equal to the open defecation. That's a bad note for Jakarta. In minimum, all the houses in Jakarta should own a septic tank, but not the one that is carelessly built. There are a lot of unstandardised ones. They said they have one, but they never pumped it out or it is not sealed and went directly through the ground..... It is hard. We don't even have enough manpower to visit new housing development and check their septic tanks one by one..... In minimum, if people did not distribute their wastewater to the river, we would have reached better BOD level (Biological Oxygen Demand) that now is 20 times worse than the aimed standard level. If it is fixed then the river will be cleaner. In minimum, the citizens should not dispose their waste into the river.

At the moment we still don't know if the 2015 MDGs (Millenium Development Goals) will be achieved or not. One of the goals is to create a proper sanitation access and drinking water access. I don't know, it's the overall responsibilities of the National Planning Agency.

Kanpeko is located in eastern Jakarta area at Pulogebang Jl. Dokter Sumarno.

Transcription of BBWSCC (National River Agency) narrative

So, in this year there has been a very concerning condition happening especially in the downstream area of Jakarta, where the river condition is really damaged and (we also need) to be concerned about both the condition of the settlement and the arrangement of the area around the Ciliwung riverbanks.

Therefore, what we are doing in this year is to normalise (regenerate) the Ciliwung area for zone 1. So, zone 1 is in Jakarta, 2 is in Depok, 3 is in Bogor. Now we are handling the normalisation for the zone 1 taking place for as long as 19 km along the river, starting from the water gate Manggarai to the bridge of TB Simatupang toll.

So now this part of implementation (in zone 1) includes the Kampung Pulo. With regards from such existing conditions we start from zone one (ideally intervention should be done from upstream to downstream) as the damage in downstream zone is already too severe. Our aim with the normalisation is by widening the river, from 20 to 30 meters wide to 50 meters wide. Current water flow conditions that exist now is 200 m3 / second, we would like to increase it to 570 m3 / sec. This act of widening will include some affected areas where the regeneration work will be carried out.

Make one executive summary (of your completed document) to be send here.

The neighbourhood dwellers on the banks of the river will be involved in the relocation by approving the government's normalization plan with the aim of restoring / increasing the water capacity as well as development of the river basin.

The regeneration starts from Kampung Pulo to the Manggarai water gate, to the tollbridge of TB simatupang. It's Kp Pulo, Manggarai, Kp. Melayu. Bidara Cina, Kebon Baru, Kalibata, Condet, to Gedong. From the end of 2013-until 2016 the plan. The problem (of river normalisation) is not as easy as responding to technical challenges, but it is its social feature that is most problematic, in relation to the people (of river banks residents). The provincial government is included in this issue, for example if the central government in this case is BBWSCC, the provincial government will be its

city planning agency, both provincial and town government. In terms of relocation it is the area of public housing agency.

We make one development plan, then decides who will make what and where should we adjust based on conditions on the ground. But currently the one who manage the Ciliwung regeneration is BBSWCC. For example, the community must be relocated, (we discuss who) has the responsibility. (It is the responsibility of) the housing department. The housing agency is an extension of the Jakarta regional government.

The execution happening on site is carried by the local municipal government. Later the city government will follow up (to develop the area further) in accordance with its function. Incidentally, the zone 1 is carried by two different municipalities, from the city of east Jakarta and the city of south Jakarta.

Currently not all of the (river terrains) are bordered, so in a densely populated residential area there are no (proper) terrain, for example in the Condet area. In there there may still be some riverbanks. The area of regeneration that we currently focus on in urban areas is Kampung Pulo and Manggarai, where we will create a concrete embankment. For some it may not be a concrete embankment. These different interventions (are intended to) reduce the areas that should be relocated.

Currently the local who lived in the area is always affected when the Ciliwung River is flooded. The local people would sometimes got flooded to two, three, even five or six times per year. In this case of course the government couldn't possibly let them continuously live like that. It is why we devise the Ciliwung river normalisation plan and perform it. This plan is the commitment of the national and regional governments in developing and managing Ciliwung river. So the community is still involved in socialisation which also engage with people who have different views and desires. Therefore, the function of local (municipal) government is very important. Ciliwung normalisation is the main government program, part of a presidential directive program early in 2013. It is government's commitment to answer issues of water flow coming from upstream to downstream, which particularly impact Jakarta. It is not possible for inundation to be controlled without us fixing the existing water channels such as Ciliwung river. There is socialisation happening, the transfer is also conducted in the socialisation.

Inside the Government Regulation no. 38 of UU7 of 2011, there is a regulation that adjust the conditions at the time from UU 11 1974. UU 7 is about water resources. While Government Regulation no. 38 is more about a river problem. We need to conduct the river regeneration based on the arrangement, as well as giving limits on the inspection path along the river bank.

(As stated before) the normalisation plans to widen the river from the width of 20-30 m, we would increase to 50 meters plus left and right inspection path with 7.5 meters wide. There will be drainage. Any activity will be limited for at least a few meters from the dike. So with the presence of the inspection road, normalisation does not mean just looking in terms of its river. But also looking at the region and see the condition of problems in areas close to the normalisation position. So if this can all be completed (the inspection path for) 19 km left and 19 km right there are 38 additional road, which indirectly increase the ratio of the road in the city. If there are traffic jam conditions that occur in the east this path wil be an alternative to pass the inspection road. Same with when cars are passing through the south part of the city.

So actually, normalisation does not only concern with the river, but also adds roads ratio of the road and later we will also develop green open space when the normalisation has been settled. The model and shape (of green open space) will be adjusted to the field conditions. We work together with University of Trisakti for landscaping design. But we have not started

because the normalisation is still not finished. But the idea is there will be a green space, where there is a studio, an arena, and an open park, we will adjust the design based on land availabilities.

We hope that by normalising the river we could obtain the water volume as planned, we would have access for inspection road, and we could have borders between community and river management areas. We hope that if previously there is a barn and a kitchen in there (the river bank) then now we could have house facades facing the river. It becomes the river view. The kampung (neighbourhood) facing to the river.

So we have done an inventory for affected dwellers in Kp. Pulo which consist of 530 families. We plan to move them to West Jatinegara affordable housing. There are two towers in there, which at least can accommodate 90 percent (of the dwellers). There are 516 dwellings there (in the towers).

There is a proposed model (about creating a housing in Kp. Pulo area) but we still need to review that proposition. Do not let it be a bigger problem which will create environmental problems later (and turn the area) to be slum again. The model shows how the housing can have a shelter in the ground. It is a proposition that is still unclear regarding its implementation, submitted to the governor.

The proposition needs further assessment, perception and commitment. If the housing is being built, how it will be managed and supplied? Because building something on water is not as easy as normal building. Commitment and consistent environment is important.

Currently we have not talked about the development of the remaining six hectares of Kampung Pulo. What we are talking about is the regeneration of the river bank first (within the neighbourhood periphery). We may need to relocate more around Jatinegara. If it is being developed just like the propositions, there will be arrangements. It is okay to do the such form of housing but should be reviewed and evaluated properly. If it's a housing it is okay. The river agency will coordinate it later. It is a proposal from the people who submit to the governor.

We don't have to use any theories. It all comes back to the community's sense of belonging towards a clean river. The second thing is law enforcement. (Even) if an angel guards the area, if the angel left it will still be dirty. How if it happens in their garden. No one disposes waste. If there is rain coming, just stand by in some place (near the river). Then there will be spring beds (mattress) and sofas flowing by.

For the waste problem it is also not just caused by the community living nearby. There is this example of people going to work bringing two bags of waste in their car. When they drive through the river he would open up his window and throw it to the river. That is how it goes and then the big flood comes…

So I would say, what technology we use? There is none available. We just need sense of empathy to maintain the environment. I said that. If angels exist, people will not dispose haphazardly. When the angels left they will discard their waste. That is how it is in Jakarta.

Actually, the community is in the responsibility of the local government. I would like to ask scavenger to let me know when someone dispose their waste. But yes, we have to get a camera (to get evidence). Scavengers do not have cameras. And mostly no one has. Later we are given information by the NGO friends who became the community support here. But I cannot do anything about it, I need local government support. Because that is not the roles (of River Agency, we) do not get there. It's a community and territory issue. So we are concerned too, by the way I would also want to see it. But I never caught hands (of people who dispose waste). (While there is) a lot of them. I'm just looking for people who can documented the act of dumping, clarify the person's name and address and I would give them rewards (for the information). I can't do anything because I cannot accuse. I want to expose the people who dispose haphazardly and embarrass them.

The government hope to return (the river in its conditions) in 1958. The governor stated that there used to be an area called by villa nova. His desire is to restore the old days. Not exactly. But it is not possible because of the state of our environment has changed due to growth. Either the growth of the region or population growth. Once in the 50s the Ciliwung river was still clean. There were 41 -44 species of fish. Now only one. Do you know what's that fish? Broomfish because it's a resilient fish.

Sanitation problems is not ours. We can only urge dwellers to not shower into the river. Created septic tank first. Or collection area. (The river agency) wanted to coordinate that smaller problems, but it has yet to be materialised.

The normalisation starts from the downstream of Jatinegara area near Kp.Pulo. Then around the Utan Kayu, Kp Melayu, Kebon Baru, Bidara Cina, Kalibata, then Condet. Affected Ciliwung River area in Jakarta is only the East Jakarta and South Jakarta area. The Depok area is less problematic, as the settlement is located faraway from the riverbanks. Except at the area of Manggarai Water Gate until Banjir Kanal Barat. In there the quality of the water reservoir is adequate, just needed some maintenance only. And the problem in the estuary is only settlements and a protected forest mangrove area. The left side of the angke there is a protected forest, the right is a settlement that is dense. But at the top of the river the condition is not bad. So, the local government has also cleared (the area). Example such as Karet, the area have been cleaned.

For long term plans, we want to integrate all stakeholders to care about the river. In the future, management wants to invite all stakeholders to play their roles depend on the level of stakeholders itself. The progress is not always physical or a form of something but more in the form of awareness and sense of belonging that the river must be kept clean.

Local government there is a rules that it is prohibited to dispose waste haphazardly, with IDR 500,000,- We need to control ourselves first.

The gubernatorial regulation (regarding plans of canalising the river in Kp. Pulo) is called Pergub Terase. There is no government regulations regarding canalisation of Kp Pulo. There is only regulation regarding 19 km of ciliwung river terrain plus two canalisations in Kebon Baru and Kalibata. Kp. Pulo still consist of the river channel. The plans in RDTR and RTRW is more macro. Kp Pulo canalisation has not been formalised.

The river development deals with river rules, both technical and non-technical.

Normalisation of the river by the government is not merely thinking about the river. Because the condition of the area is quite damaged. Especially in Jakarta area. The existence of settlements, the designation of place of business, everything will affect the quality of the river water itself. With normalisation the main objective is to provide water reservoirs as they need to be, as well as to organise its (surrounding) area. So we can have boundaries between occupancy and management. For the future, what we expect is that the normalisation will restore the existing problems (of flood), overcome the chaos, increase the ratio of roads, reduce traffic hours at a certain point in the east and south, and better environment quality for the community in the future.

Talking about the river is something we have to manage with the power of God. The water comes from the Almighty. Once it comes because the condition of space that has been limited then the water will go everywhere. But how do we manage. Manage what with? Maintain and preserve. Preserve what? Conserve the watersheds, keep the catchment area, include all catchment spaces available.

So if that's what we hope for in the future, then hopefully ciliwung is much better.

There is a different form of normalisation happening in Depok, different with Jakarta and Bogor as it has deeper river. There is not a flood there, but

landslides because the river is deeper. It is different when it passes JORR (tollroad highway) , from JORR to Pasar Minggu. There is no concrete embankment in there as the space is rather steep. In there it was not a flood (that is the problem) but a landslide. On the riverbank there are many landslides occur. That's the problem we have to deal with, which is different from the Ciliwung area in Jakarta.

7. Inventory of Government Large Scale Projects Leading to Eviction

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
A	2015					
1	1/6/2015	Toll road Bekasi-Cawang, Kampung Melayu development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) and BPJT (Badan Pengatur Jalan Tol) (Tollroad Management Agency) together with sub-contractor BUMN (Badan Usaha Milik Negara) (Government owned company)	RW 05, 08, dan 12 Pondok Kelapa, Duren Sawit, Jakarta Timur	220 households (based on 2015 LBH Report)	Poskota news. Accesed 18 October 2017. ohttp://poskotanews.com/2015/01/06/dikerjakan-lagi-pembangunan-proyek-tol-becakayu/
2	1/11/2015	Pluit reservoir restoration	Jakarta Public Works Agency coordinating with private sub contractor	RT 16 dan RT 19 / RW 17, Kelurahan Penjaringan, Kecamatan Penjaringan, Jakarta Utara	200 households (based on 2015 LBH Report)	Merdeka. Accesed 18 October 2017. https://www.merdeka.com/foto/jakarta/483403/20150111112714-pemukiman-waduk-pluit-digusur-warga-tertib-evakuasi-barang-008-dru.html
3	1/12/2015	Pluit reservoir restoration	Jakarta Public Works Agency coordinating with private sub contractor	Kelurahan Penjaringan, Kecamatan Penjaringan, Jakarta Utara.	1000 households (based on 2015 LBH Report)	Merdeka. Accesed 18 October 2017 https://www.merdeka.com/foto/jakarta/483403/20150111112714-pemukiman-waduk-pluit-digusur-warga-tertib-evakuasi-barang-008-dru.html
4	1/18/2015	Sports facilities and city garden development	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	RW 01, 03, 04, 05 dan 011 Kelurahan Petamburan, Kecamatan Tanah Abang, Jakarta Pusat 100	100 households (based on 2015 LBH Report)	Antara. Accessed 18 October 2017. http://www.antaranews.com/berita/474853/pemkot-jakpus-tertibkan-bangunan-liar-di-petamburan

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
5	2/3/2015	Toll road Bekasi-Cawang, Kampung Melayu development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) and BPJT (Badan Pengatur Jalan Tol) (Tollroad Management Agency) together with sub-contractor BUMN (Badan Usaha Milik Negara) (Government owned company)	Pangkalan Jati hingga pintu air Kalimalang di Jalan DI Pandjaitan, Cipinang Melayu, Makasar, Jakarta Timur	376 households (based on 2015 LBH Report)	Okezone. Accessed 18 October 2017. https://news.okezone.com/read/2015/02/03/338/1100790/proyek-tol-ratusan-rumah-di-cipinang-digusur
6	2/22/2015	Toll road Bekasi-Cawang, Kampung Melayu development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) and BPJT (Badan Pengatur Jalan Tol) (Tollroad Management Agency) together with sub-contractor BUMN (Badan Usaha Milik Negara) (Government owned company)	Jl. Raya Kalimalang, Duren Sawit, Jakarta Timur	120 households (based on 2015 LBH Report)	Republika. Accessed 18 October 2017. http://nasional.republika.co.id/berita/nasional/jabodetabek-nasional/15/02/22/nk6b4z-warga-kalimalang-nrimo-digusur
7	3/23/2015	Pluit reservoir restoration and road widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jl Jalan Gedung Pompa RT 020 RW 017, Kelurahan Penjaringan, Kecamatan Penjaringan, Jakarta Utara	60 households (based on 2015 LBH Report)	Merdeka. Accessed 18 October. https://www.merdeka.com/jakarta/rumah-dibongkar-warga-kali-gendong-bingung-tinggal-di-mana.html
8	3/9/2015	Pluit reservoir restoration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	RT 22/08, Bantaran Kali Karang dan Jl. Pluit Karya Timur, Penjaringan, Jakarta Utara	240 households (based on 2015 LBH Report)	Beritasatu. Accessed 18 Ocotber 2017. http://www.beritasatu.com/aktualitas/255585-warga-kali-karang-bongkar-sendiri-bangunan-rumahnya.html
9	3/30/2015	Kalimalang road widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jl. Raya Kalimalang, Duren Sawit, Jakarta Timur	81 households (based on 2015 LBH Report)	Sindonews. Accessed 18 October 2017. https://metro.sindonews.com/read/982882/170/kena-pelebaran-jalan-81-bangunan-di-kalimalang-ditertibkan-1427685146

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
10	4/9/2015	River widening and development of inspection path	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Bantaran Kali Cipinang, RT 12/ RW 06 Cipinang Besar Selatan, Jatinegara, Jakarta Timur	126 households (based on 2015 LBH Report)	Sindonews. Accessed 18 October 2017. https://metro.sindonews.com/read/987196/170/ratusan-bangunan-di-bantaran-kali-cipinang-dibongkar-1428553822
11	4/21/2015	Pluit reservoir restoration and Gendong river widening	Jakarta Public Works Agency coordinating with private sub contractor	Sisi Timur Bantaran Waduk Pluit, Bagian Selatan Kali Gendong, RT19 dan RT20/RW17, Kelurahan Penjaringan, Kecamatan Penjaringan, Jakarta Utara	310 households (based on 2015 LBH Report)	Beritasatu. Accessed 18 October 2017. http://sp.beritasatu.com/home/310-bangunan-di-bantaran-kali-gendong-waduk-pluit-ditertibkan/84791
12	4/27/2015	City water channel restoration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jalan Gaya Motor I dan III, RW 09, Sungai Bambu, Tanjung Priok, Jakarta Utara	53 households (based on 2015 LBH Report)	Okezone. Accessed 18 October. https://news.okezone.com/read/2015/04/27/338/1140567/petugas-bongkar-53-bangunan-liar-di-priok
13	4/29/2015	Duri river regeneration, development of inspection path and street widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Bantaran Kali Duri, Jalan Bidara Raya, RW 04 & 05, Kelurahan Pejagalan, Kecamatan Penjaringan, Jakarta Utara	200 households (based on 2015 LBH Report)	Tribunnews. Accessed 18 October.http://wartakota.tribunnews.com/2015/04/29/bangunan-liar-jalan-bidara-raya-dibongkar
14	5/27/2015	Ciliwung ancillary river regeneration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	RT 04, 05, 06 / RW 06 & RT 01/RW 07, Kali Pinangsia, Taman Sari, Jakarta Barat	178 households (based on 2015 LBH Report)	Kompas. Accessed 18 October. http://megapolitan.kompas.com/read/2015/05/27/10174131/Warga.Pinangsia.Berurai.Air.Mata.Penggusuran.Dijaga.Ketat.Ratusan.Polisi
15	5/28/2015	Ciliwung ancillary river regeneration, development of inspection path and street widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	RW 02, di bantaran Kali Jabaludin, Kelurahan Rawa Terate, Kecamatan Cakung, Jakarta Timur	72 households (based on 2015 LBH Report)	Poskotanews. Accessed 18 October. http://poskotanews.com/2015/05/28/pemprov-dki-terus-sikat-habis-bangunan-di-bantaran-kali/
16	5/27/2015	Ciliwung ancillary river regeneration, development of inspection path and street widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Sepanjang Anak Kali Ciliwung, Jalan Kencur, RT 07,9/01, RT 04/08, RT 13/04, Kelurahan Ancol, Kecamatan	714 households (based on 2015 LBH Report)	Beritasatu. Accessed 18 October. http://www.beritasatu.com/aktualitas/277525-penertiban-bangunan-liar-di-ancol-dilanjutkan.html

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
				Pademangan, Jakarta Utara		
17	6/4/2015	Kelapa Gading reservoir development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Kampung Kandang, RT007/RW013, Kelurahan Kelapa Gading Barat, Kecamatan Kelapa Gading	500 households (based on 2015 LBH Report)	Beritasatu. Accessed 18 October. http://www.beritasatu.com/aktualitas/279667-dapatganti-untung-warga-kampung-kandang-bongkar-sendiribangunannya.html
18	6/15/2015	Toll road Bekasi-Cawang, Kampung Melayu development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) and BPJT (Badan Pengatur Jalan Tol) (Tollroad Management Agency) together with sub-contractor BUMN (Badan Usaha Milik Negara) (Government owned company)	Jl. Haji Dasuki hingga Kali Sunter, Cipinang Indah	106 households (based on 2015 LBH Report)	Okezone. Accessed 18 October. https://news.okezone.com/read/2015/06/15/338/1165737/proyek-tol-becakayu-106-bangunan-liar-dirobohkan
19	6/15/2015	Asian Games athlete accommodation development, food tourism area development, integrated waste disposal facility development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) together with sub- contractor	Jalan H. Keneng, RW09, Kelurahan Kebon Kosong, Kecamatan Kemayoran, Jakarta Pusat	300 households (based on 2015 LBH Report)	Poskotanews. Accessed 18 October. http://poskotanews.com/2015/06/15/300-bangunan-di-kebon-kosong-kemayoran-dibongkar/
20	7/23/2016	Restoration of space under the highway and garden development	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	RW 16, Kolong Tol Wiyoto Wiyono, Pejagalan, Penjaringan, Jakarta	120 households (based on 2015 LBH Report)	Kompas. Accessed 18 October. http://megapolitan.kompas.com/read/2015/07/23/17495471/Bekas.Hunian.Kolong.Tol.Wiyoto.Wiyono.Jadi.PR.bagi.Kasudin.Pertamanan
21	8/62015	Rawa Badung river development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Situ Rawa Badung, Kampung Rawa Badung, RT 10/08, Jatinegara, Cakung, Jakarta Timur	85 households (based on 2015 LBH Report)	http://www.jatinegaraindah.com/2015/08/85-bangunan-di-situ-rawa-badung-jl-dr.html

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
22	8/20/2015	Ciliwung river regeneration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Kampung Pulo, Jatinegara, Jakarta Timur	920 households (based on 2015 LBH Report)	Liputan 6. Accessed 18 October. http://news.liputan6.com/read/2298240/ahok-vs-warga-penggusuran-kampung-pulo
23	9/16/2015	Regeneration of spaces under Prof. Sedyatmo highway	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	Penjaringan Jakarta Utara	300 households (based on 2015 LBH Report)	Tribunnews. Accessed 18 October. http://wartakota.tribunnews.com/2015/09/16/photo-breaking-news-ratusan-bangunan-di-kolong-tol-digusur
24	9/16/2015	Inspection path around the river development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	pinggir Kanal Banjir Barat (KBB) RW 07 Kelurahan Cideng, Gambir	51 households (based on 2015 LBH Report)	Poskotanews. Accessed 18 October. http://poskotanews.com/2015/09/16/51-bangunan-di-cideng-dibongkar-ahok-saya-siap-hadapi-gugatan/
25	9/23/2015	Regeneration of river water channel	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jalan Tanjung Duren Utara, Grogol Petamburan, Jakarta Barat	100 households (based on 2015 LBH Report)	Okezone. Accessed 18 October. https://news.okezone.com/read/2015/09/22/338/1218890/bongkar-tanjung-duren-petugas-temukan-alat-hisap-sabu
26	9/30/2015	Krukut river regeneration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Kali Krukut, Jalan Petojo Utara, Kecamatan Gambir, Jakarta Pusat	100 households (based on 2015 LBH Report)	Tempo. Accessed 18 October. https://store.tempo.co/foto/detail/P3009201500027/penertiban-bangunan-liar-di-bantaran-kali-krukut#.WeSd_IWfj2A
27	10/6/2015	Food center and fashion center development	Dinas Koperasi Usaha Mikro Kecil-Menengah dan – Perdagangan (Jakarta Co-operation, Small enterprises, and Trade Agency)	Kemayoran, Jakarta Pusat	400 households (based on 2015 LBH Report)	Tribunnews. Accessed 18 October. http://wartakota.tribunnews.com/2015/10/06/digusur-puluhan-warga-gang-laler-kemayoran-galau
28	10/26/2015	Ciliwung river normalisation and inspection path development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jalan Raya Sawah Besar, tepatnya depan Cafe Exotic, Sawah Besar, Jakarta Pusat	70 households (based on 2015 LBH Report)	Tribunnews. Accessed 18 October. http://wartakota.tribunnews.com/2015/10/26/berdiri-di-bantaran-kali-puluhan-bangunan-liar-dibongkar
B	**2015**					
29	1/12/2016	Ciliwung river regeneration	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	RT 11, 12, 15 RW 10, Jl. Kampung Melayu Kecil, Kelurahan Bukit Duri, Tebet	163 households (based on 2016 LBH Report)	Beritasatu. Accessed 18 October. http://www.beritasatu.com/megapolitan/340370-basuki-pastikan-bukit-duri-akan-tetap-digusur-hari-ini.html

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
30	1/27/2016	Railways space regeneration	PT Kereta Api Indonesia (KAI) (National Railways)	Pinggir rel Kereta Api Kelurahan Kramat, Senen	108households (based on 2016 LBH Report)	Poskotanews. Accessed 18 October. http://poskotanews.com/2016/01/27/ratusan-gubuk-digusur-aparat-di-senen/
31	2/23/2016	Toll road Bekasi-Cawang, Kampung Melayu development	Kementrian Pekerjaan Umum and Perumahan Rakyat (PUPR)(Ministry of Housing) and BPJT (Badan Pengatur Jalan Tol) (Tollroad Management Agency) together with sub-contractor BUMN (Badan Usaha Milik Negara) (Government owned company)	Kelurahan Cipinang Besar Selatan dan Kelurahan Cipinang Muara, Kecamatan Jatinegara	97 households (based on 2016 LBH Report)	Tribunnews. Accessed 18 October. http://wartakota.tribunnews.com/2016/02/23/breaking-news-97-bangunan-di-kalimalang-ditertibkan-terkait-tol-becakayu
32	2/23/2016	River normalisation and inspection path development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Kelurahan Kali Apuran, Kelurahan Kapuk dan Kedaung Kaliangke, Cengkareng	125 households (based on 2016 LBH Report)	Kompas. Accessed 18 October. http://megapolitan.kompas.com/read/2016/02/24/19321921/Warga.Kapuk.Melawan.Pembongkaran
33	2/29/2016	Development of RPTRA (Ruang Publik Terpadu Ramah Anak) (Children Friendly Public Space)	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency) bersama together with PT BU Serpong Damai	Kalijodo. Jl. Bandengan Terusan, Kelurahan Pejagalan Penjaringan	282 households (based on 2016 LBH Report)	BBCIndonesia. Accessed 18 October 2017. http://www.bbc.com/indonesia/berita_indonesia/2016/02/160229_indonesia_kalijodo_update
34	3/1/2016	Regeneration of spaces under highway and development RPTRA	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	Jl. Kepanduan Satu, Kelurahan Pejagalan, Kecamatan Penjaringan	800 households (based on 2016 LBH Report)	Kontan. Accessed 18 October 2017. http://m.kontan.co.id/news/satpol-pp-gusur-bangunan-liar-di-kolong-tol-pluit
35	3/2/2016	Regeneration of spaces under highway and development RPTRA	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	Kolong Tol Sedyatmo, Pluit, Penjaringan	380 households (based on 2016 LBH Report)	Okezone. Accessed 18 October 2017. https://news.okezone.com/read/2016/03/02/338/1325567/bangunan-liar-tol-kolong-pluit-dibongkar-hari-ini
36	3/12/2016	Kali Baru river regeneration and inspection path widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	RW 01, RW 07, Kelurahan Tengah, Kecamatan Kramatjati	87 households (based on 2016 LBH Report)	Poskotanews. Accessed 18 October 2017. http://poskotanews.com/2016/03/12/ida-menangis-melihat-rumahnya-dibongkar-aparat/

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
37	4/11/2016	Kota Tua and Pasar Ikan revitalisation	Dinas Ketahanan Pangan, Kelautan dan Perikanan DKI Jakarta (Jakarta Food Security Agency, Jakarta Maritime and Fisheries Agency) together with private contractor	Kawasan Pasar Ikan, Kelurahan Penjaringan, Kecamatan Penjaringan	500 households (based on 2016 LBH Report)	Liputan6. Accessed 18 October 2017. http://news.liputan6.com/read/2480797/4-fakta-penggusuran-kawasan-pasar-ikan-penjaringan
38	4/16/2016	ASIAN GAMES venue development	Kementrian Pemuda dan Olah Raga, Dinas Olah Raga dan Pemuda DKI Jakarta (Ministry of Youth and Sport, Jakarta Youth and Sport Agency) together with private contractor	Pacuan Kuda Pulomas	81 households (based on 2016 LBH Report)	CNNIndonesia. Accessed 18 October 2017. https://www.cnnindonesia.com/nasional/20160420092433-20-125178/pulomas-digusur-demi-arena-pacuan-kuda-internasional-ag-2018/
39	4/20/2016	ASIAN GAMES venue development	Kementrian Pemuda dan Olah Raga, Dinas Olah Raga dan Pemuda DKI Jakarta (Ministry of Youth and Sport, Jakarta Youth and Sport Agency) together with private contractor	RT 8 RW 16, Kelurahan Kayu Putih, Kecamatan Pulogadung	105 households (based on 2016 LBH Report)	Metro. Accessed 18 October 2017. https://metro.tempo.co/read/764275/satpol-pp-bongkar-105-bangunan-di-pacuan-kuda-pulomas
40	5/2/2016	Menceng raya road widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Jl. Menceng Raya, Tegal Alur, Kalideres	206 households (based on 2016 LBH Report)	Sindonews. Accessed 18 October 2017. https://metro.sindonews.com/read/1105533/171/bangunan-liar-marak-pemkot-jakbar-kebut-pelebaran-jalan-menceng-raya-1462155542
41	1/8/2016	BMW Football Stadion Development	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub contractor	Taman BMW, Jl. Ancol, Papanggo, Tanjung Priok	151 households (based on 2016 LBH Report)	Detik. Accessed 18 October 2017. https://news.detik.com/berita/d-3581357/penertiban-di-taman-bmw-tanpa-perlawanan-warga
42	11/8/2016	Regeneration of spaces under highway	Dinas Pertamanan dan Pemakaman DKI Jakarta (Jakarta Landscape and Burial Agency)	Kolong Tol Warakas, Tanjung Priok	259 households (based on 2016 LBH Report)	Tempo. Accessed 18 October 2017. https://metro.tempo.co/read/795159/209-bangunan-liar-di-kolong-tol-warakas-ditertibkan

No.	Commencement Date (M/D/Y)	Project Name	Carried By	Location	Number of eviction	Source
43	1/9/2016	Regeneration of spaces around railways	PT Kereta Api Indonesia (KAI) (National Railways)	Jl. Rawajati Barat, Pancoran, Jakarta Selatan	60 households (based on 2016 LBH Report)	Kompas. Accessed 18 October 2017. http://megapolitan.kompas.com/read/2016/09/01/07334371/penggusuran.di.rawajati.memanas.warga.dan.petugas.sempat.ricuh
44	27/9/16	river regeneration and inspection path widening	Dinas Pekerjaan Umum DKI Jakarta (Jakarta Public Works Agency) with private sub-contractor	RT 06 RW 12 Bukit Duri, Tebet, Jakarta Selatan	363 households (based on 2016 LBH Report)	Republika. Accessed 18 October 2017. http://nasional.republika.co.id/berita/nasional/jabodetabek-nasional/16/09/27/oe60uy361-lbh-jakarta-rencana-penggusuran-bukit-duri-penuh-intimidasi

8. Participant Consent Form

Participant Consent Form A

Title of Project: The study of solid waste disposal practices in water banks occupation towards Jakarta's ecological development

Name of Researcher: Kristanti Dewi Paramita

Participant Identification Number for this project:

Please initial box

1. I confirm that I have read and understand the information sheet/letter (delete as applicable) dated *[insert date]* for the above project and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. *Should there be a question please don't hesitate to contact the lead researcher at the following details:*
Kristanti Dewi Paramita
Tel. _____

3. I understand that my responses will be anonymised before analysis.
I give permission for members of the research team to have access to my anonymised responses.

4. I agree to take part in the above research project and provide consent for the researcher to take photograph and video recording of area under my supervision and my interviews

_____   _____
_____
Name of Participant   Date
                    Signature
(*or legal representative*)

_____   _____
_____
Name of person taking consent   Date
                    Signature
(*if different from lead researcher*)
To be signed and dated in presence of the participant

_____   _____
_____
 Lead Researcher   Date
                    Signature
To be signed and dated in presence of the participant

Copies:
Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy for the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Participant Information Sheet

PARTICIPANT B

1. **Research Project Title:**
   The study of flows in the intersection between informal system and city network to inform architectural design methods towards Jakarta's future ecological development.

2. **Invitation paragraph**
   You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

3. **What is the project's purpose?**
   The purpose of this project is to investigate the flows of people and the logistics of raw material, goods, energy, water and waste in the interstitial space between an informal system (informal market, industries or settlements) and infrastructure network (railways, streets, river) in Jakarta, Indonesia. This project is a preliminary observation that will span for the following three months. The results of this investigation will be used to inform appropriate design methods for Jakarta's ecological development.

4. **Why have I been chosen?**
   This research project requires information from people that uses an area occupied by informal trader and residents that situated near a city infrastructure daily, such as the informal trader (consist of stall holder and street vendor), informal supplier, informal residents, and customer's buying the goods/services as well as visitors. You have been asked to participate because you have fulfilled the above respondent's sample criteria. The sample will consist of a maximum 25 people from the area.

5. **Do I have to take part?**
   Taking part in the research is entirely voluntary. If you do decide to take part, you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw at any time without having to give a reason.

6. **What will happen to me if I take part?**
   Upon agreement to take part in this research, I will also ask for your consent to carry out an observation by taking photograph and video recording of your activity area including the market stalls and/or your settlements areas. I will also conduct an interview with you, which will take approximately 40-45 minutes to complete. I will ask for your permission to record the interview using video recording so that the information can be analysed later in my research. Your identity will be kept anonymous in this research. I would expect you to answer the question based on your experience in managing/using the city area in relation to the informal community. I may contact you sometimes after the interview, to cross-check on the accuracy of my interpretations of the interview with you.

7. **What are the possible disadvantages and risks of taking part?**
   There are no risks taking part in this research. However, some of the questions may raise sensitive issues and problems about the current practice of local urban management and maintenance practices in regards to informal community and the city infrastructure.

8. **What are the possible benefits of taking part?**
   Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will help in developing a full understanding of flow in urban environment, particularly between informal system and city infrastructure. Furthermore, it is also hoped that this research will contribute in developing architectural design methods that will be substantial to ecological expansion of Jakarta in the future.

9. **What if something goes wrong?**

If there is a problem with our research please contact my supervisors Dr. Tatjana Schneider and Dr. Stephen Walker at the School of Architecture at the University of Sheffield on the contact number given at the back of this information sheet. If your complaint is not handled to your satisfaction then please contact Dr. Philip Harvey, the 'Registrar and Secretary' of the University of Sheffield by post (Office of the Registrar and Secretary Firth Court Western Bank Sheffield S10 2TN), telephone: 0114 222 1100, fax (0114 222 1103) or email (registrar@sheffield.ac.uk).

10. **Will my taking part in this project be kept confidential?**
All information that you provide will be strictly confidential and no individuals will be identifiable in any reports or publications.

11. **What will happen to the results of the research project?**
The PhD Thesis will present the research results. The results may also be presented in a conference and will be published in academic journals, during or after the completion of the research. Copies of the published results can be obtained through contacting the School of Architecture at telephone number +44 (0)114 2220399 and email ssoa@sheffield.ac.uk .

12. **Who is organising and funding the research?**
This PhD research is funded by Directorate General of Higher Education, Ministry of National Education, Indonesia.

13. **Who has ethically reviewed the project?**
This project has been reviewed through the School of Architecture's Ethics Review procedure in accordance to University of Sheffield Ethical Policies and Procedure.

14. **Will I be recorded, and how will the recorded media be used?**
The observation and interviews will be recorded using both audio and video recordings. All audio and video recorded observation and interviews data will be transferred to an encrypted laptop which can only be accessed by the researcher and the researcher's supervisors. The back-up copies of these data will be securely locked in a filing cabinet.

The observation and interviews recording data will be used only for analysis and for illustration in conferences presentations and lectures. For publication purposes such as journals a separate release form will be given to obtain written permission from the local authorities and local informal community leader.

15. **Contact for further information**
Sheffield School of
Architecture The University of
Sheffield

Arts Tower, Western
Bank Sheffield S10
2TN, UK Email:
ssoa@sheffield.ac.uk

International Tel: 00 44 114 2220399

International Fax: 00 44 114 2220315

Research Supervisors:
Dr. Tatjana Schneider
Tel: +44 (0)114 222
0320

Email: t.schneider@sheffield.ac.uk

Dr. Stephen Walker

T: +44 (0)114 222 0345

E: s.j.walker@sheffield.ac.uk

This information sheet is for you to keep. Thank you for your time and help.

Participant Information Sheet

PARTICIPANT A

1. Research Project Title:
   The study of solid waste disposal practices in informal water banks occupation towards Jakarta's ecological development.

2. Invitation paragraph
   You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

3. What is the project's purpose?
   The purpose of this project is to investigate the solid waste disposal practices carried by the residents and civic workers in the water banks occupation in Jakarta, Indonesia, such is in a river, lake, or canal. This project will span for the following three months. The results of this investigation will be used to inform appropriate design methods for Jakarta's ecological development.

4. Why have I been chosen?
   This research project requires information from people that supervise and manage the area occupied by informal residents that situated near the water banks, such as government agencies, local authorities and waste management. You have been asked to participate because you have fulfilled the above respondent's sample criteria. The sample will consist of a maximum 15 people from the area.

5. Do I have to take part?
   Taking part in the research is entirely voluntary. If you do decide to take part, you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw at any time without having to give a reason.

6. What will happen to me if I take part?
   Upon agreement to take part in this research, I will also ask for your consent to carry out an observation in area under your supervision as well as taking photograph and video recording of the area. I will also conduct an interview with you, which will take approximately 40-45 minutes to complete. I will ask for your permission to record the interview using video recording so that the information can be analysed later in my research. Your identity will be kept anonymous in this research. I would expect you to answer the question based on your experience in managing/using the city area in relation to the informal community. I may contact you sometimes after the interview, to cross-check on the accuracy of my interpretations of the interview with you.

7. What are the possible disadvantages and risks of taking part?
   There are no risks taking part in this research. However, some of the questions may raise sensitive issues and problems about the current practice of local urban management and maintenance culture in regards to informal community and the city river.

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   Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will help in developing a full understanding of flow in urban environment, particularly between informal system and city infrastructure. Furthermore, it is also hoped that this research will contribute in developing architectural design methods that will be substantial to ecological expansion of Jakarta in the future.

9. What if something goes wrong?
   If there is a problem with our research please contact my supervisors Dr. Tatjana Schneider and Dr. Stephen Walker at the School of Architecture at the University of Sheffield on the contact number given at the back of this information sheet. If your complaint is not handled to your satisfaction then please contact Dr. Andrew Dodman the Director of Human Resources of the University of Sheffield by post (Office of the Registrar and Secretary Firth Court Western Bank Sheffield S10 2TN), telephone: 0114 222 1100, fax (0114 222 1103) or email (registrar@sheffield.ac.uk).

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15. Contact for further information

    Sheffield School of Architecture
    The University of Sheffield
    Arts Tower, Western Bank
    Sheffield S10 2TN, UK
    Email: ssoa@sheffield.ac.uk
    International Tel: 00 44 114 2220399
    International Fax: 00 44 114 2220315

    Research Supervisors:
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    Email: t.schneider@sheffield.ac.uk

    Dr. Stephen Walker
    T: +44 (0)114 222 0345
    E: s.j.walker@sheffield.ac.uk

This information sheet is for you to keep. Thank you for your time and help.

Kristanti Paramita
Registration number: 130110206
School of Architecture
Programme: PhD by Design

Dear Kristanti

PROJECT TITLE: The study of flows in the intersection between informal system and city network to inform architectural design methods towards Jakartas future ecological development
APPLICATION: Reference Number 000126

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 29/05/2014 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 000126 (dated 14/04/2014).
- Participant information sheet 000179 version 1 (14/04/2014).
- Participant consent form 000182 version 1 (14/04/2014).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

Michael Phiri
Ethics Administrator
School of Architecture

12. Approval Ethics Letter 2015

The University Of Sheffield.

Kristanti Paramita
Registration number: 130110206
School of Architecture
Programme: PhD by Design

Dear Kristanti

PROJECT TITLE: The study of solid waste disposal practices in informal water banks occupation towards Jakartas ecological development
APPLICATION: Reference Number 004439

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 24/07/2015 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 004439 (dated 29/05/2015).
- Participant information sheet 1008668 version 1 (29/05/2015).
- Participant information sheet 1008667 version 1 (29/05/2015).
- Participant consent form 1008670 version 1 (29/05/2015).
- Participant consent form 1008669 version 1 (29/05/2015).

The following optional amendments were suggested:

Please respond to the reviewer comments.

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.
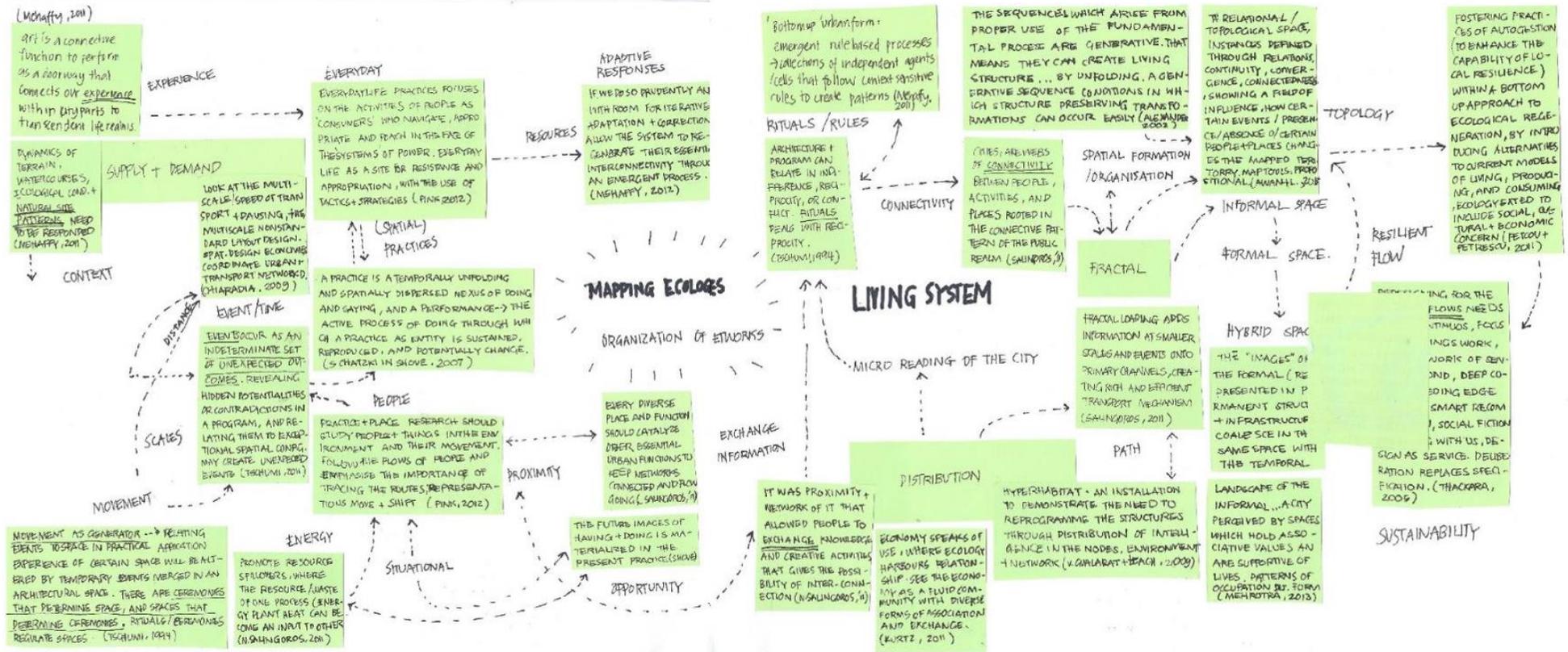
Yours sincerely

Email Arc Ethics
Ethics Administrator
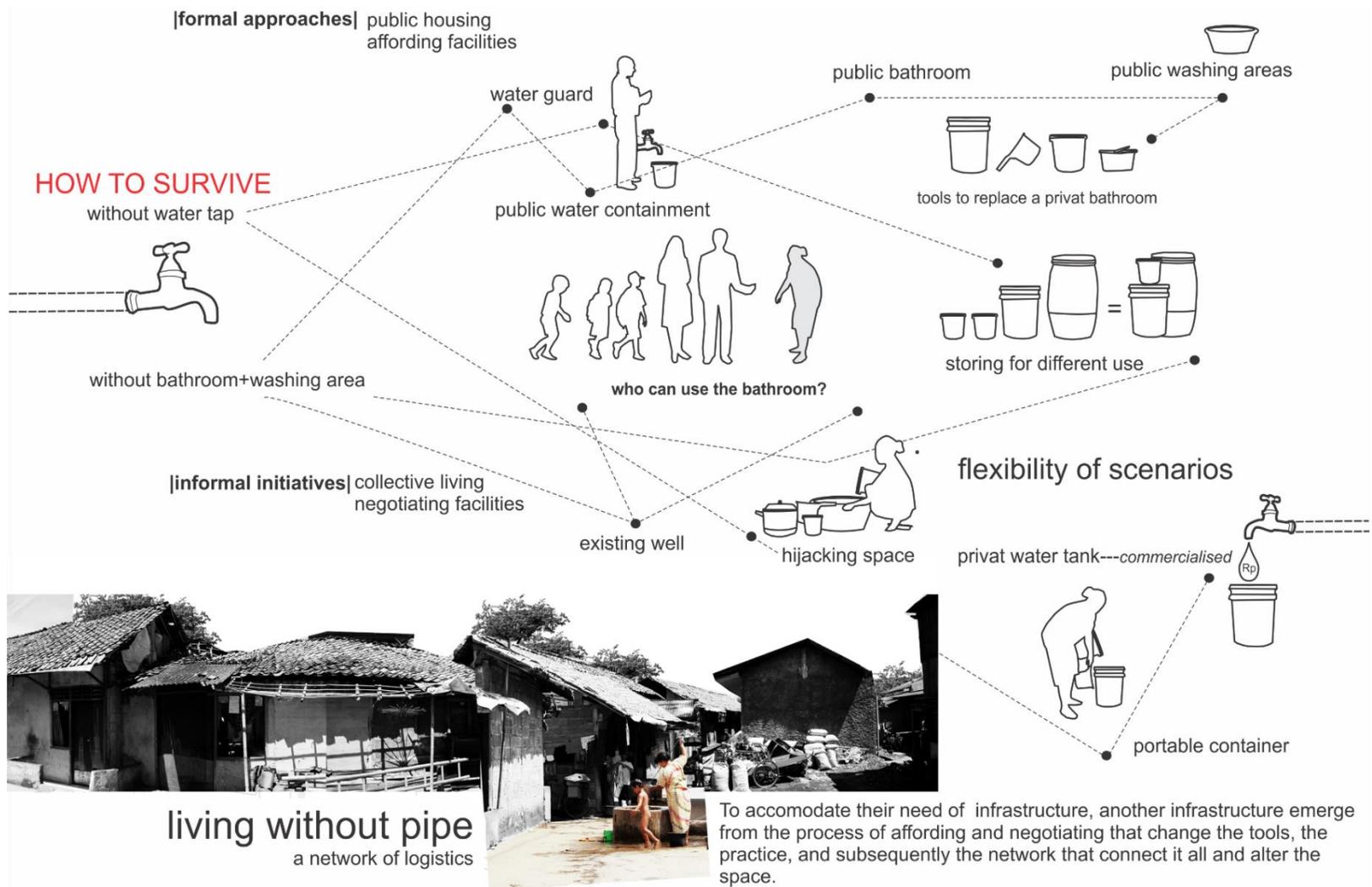School of Architecture

Appendix PLATES

1. Theoretical explorations diagrams drawing

2. Spatial explorations diagrams drawing

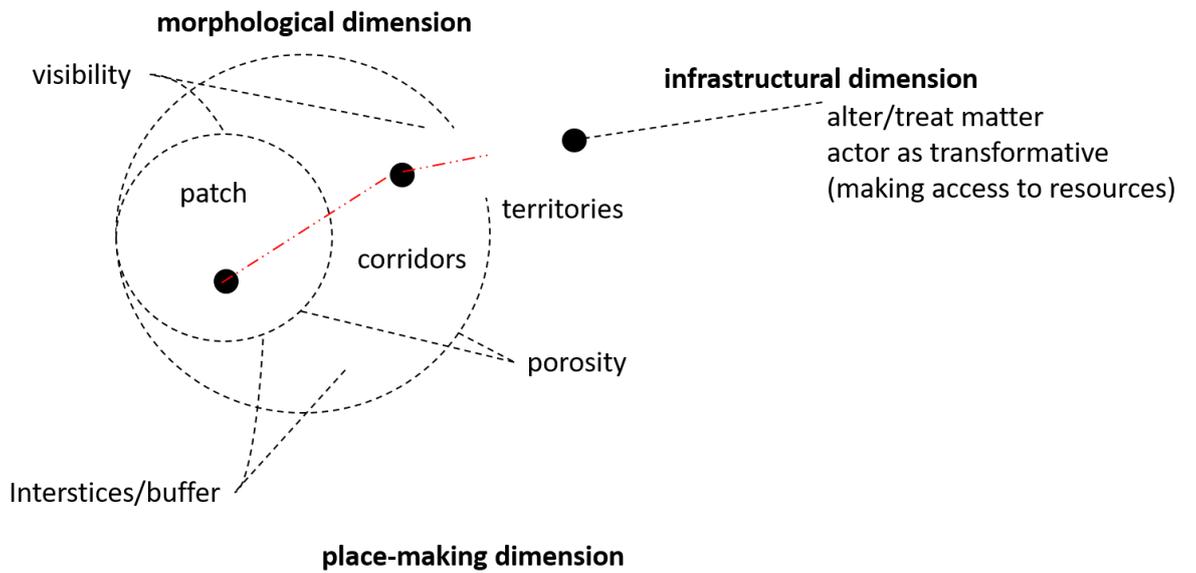3. Design explorations drawing
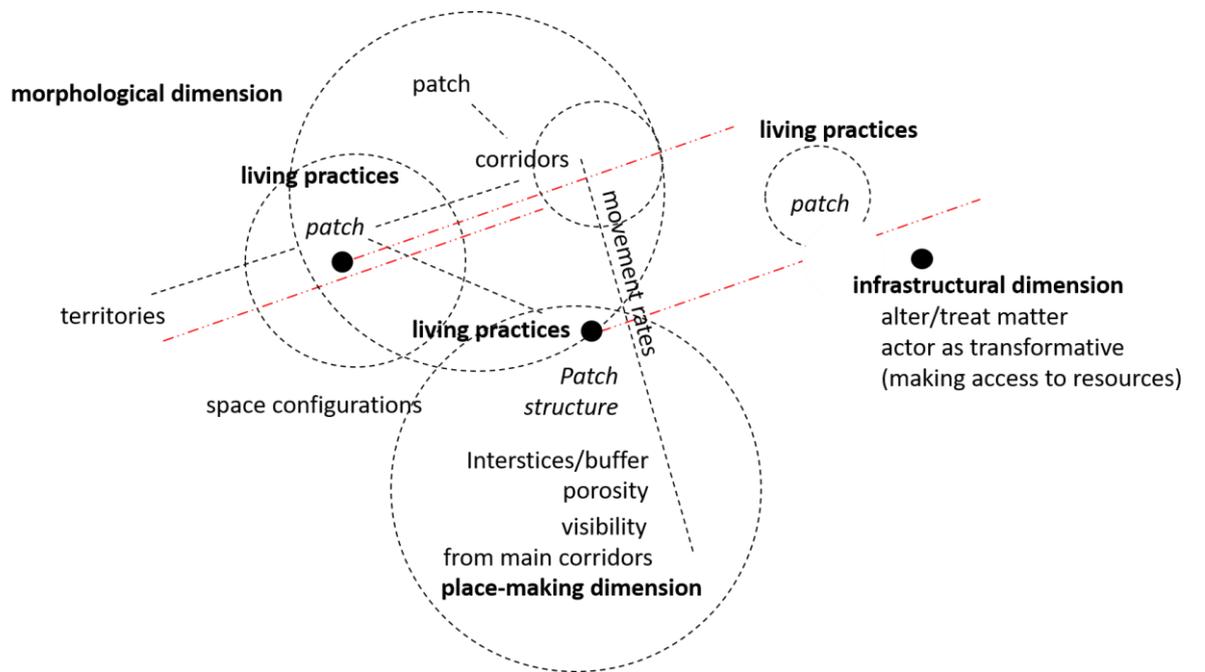
4. Video explorations

1. Theoretical explorations diagram drawing

Early collages on understanding different theories in relations with ecologies, and changing systems that later brings understanding of maintenance, 2014

Drawing a schematic concept of informal infrastructure or infrastructure as a process, 2014

Drawing a schematic concept of disconnected waste within space of flows, 2014

|formal approaches| public housing
affording facilities

water guard

public bathroom

public washing areas

HOW TO SURVIVE
without water tap

public water containment

tools to replace a privat bathroom

storing for different use

who can use the bathroom?

without bathroom+washing area

flexibility of scenarios

|informal initiatives| collective living
negotiating facilities

existing well

hijacking space

privat water tank---*commercialised*

portable container

living without pipe
a network of logistics

To accomodate their need of infrastructure, another infrastructure emerge from the process of affording and negotiating that change the tools, the practice, and subsequently the network that connect it all and alter the space.

Drawing connections of actors, infrastructure, and objects that allow for dwellers to live without individual access to water, 2014

295

morphological dimension

patch

corridors

living practices

patch

movement rates

living practices

territories

living practices

Patch structure

space configurations

Interstices/buffer
porosity

visibility
from main corridors

place-making dimension

living practices

patch

infrastructural dimension
alter/treat matter
actor as transformative
(making access to resources)

morphological dimension

visibility

patch

corridors

territories

porosity

Interstices/buffer

place-making dimension

infrastructural dimension
alter/treat matter
actor as transformative
(making access to resources)

Drawing scheme of space as changing in the process of maintenance in contested context, 2015

2. Spatial explorations diagram drawing
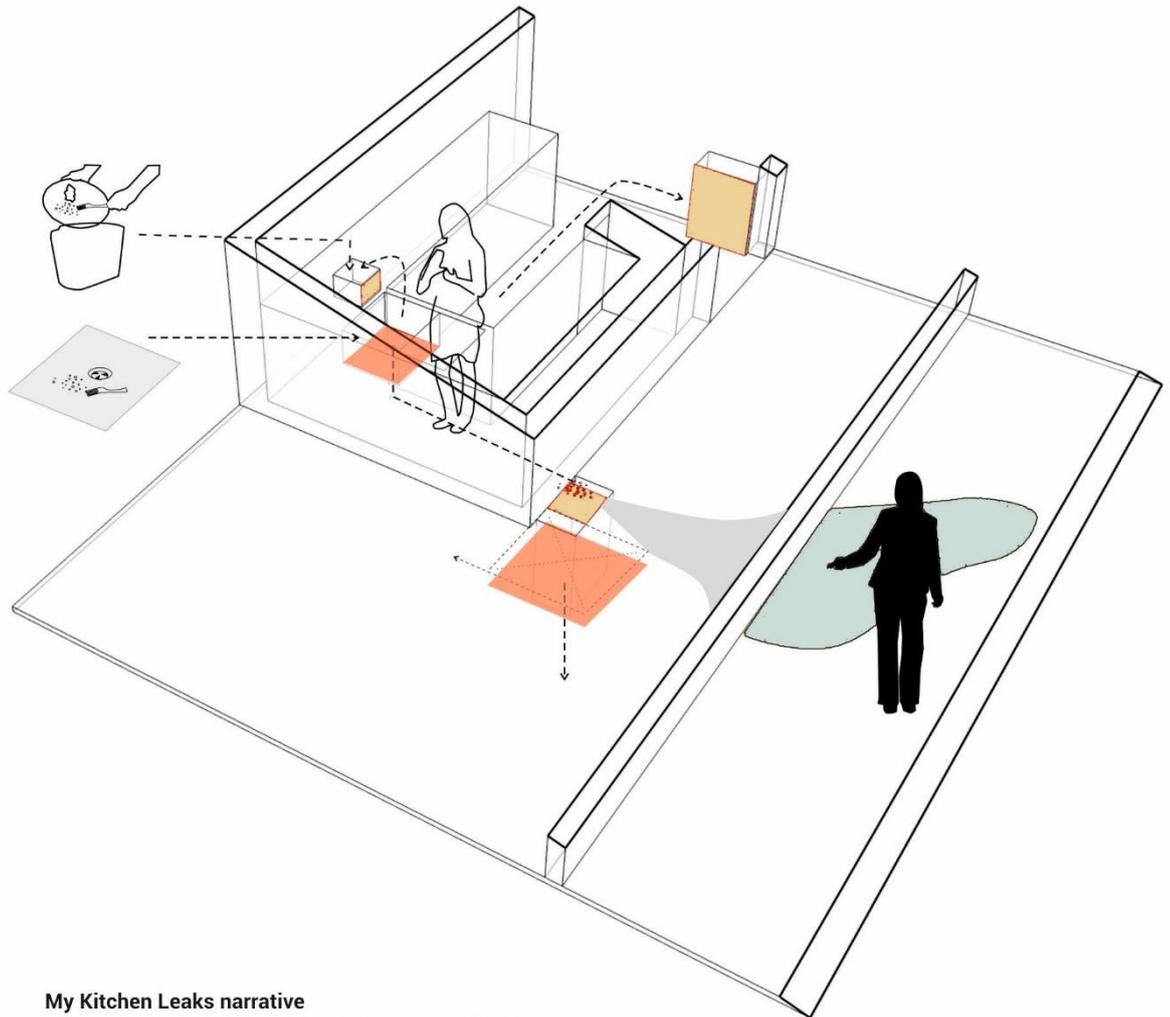
My Kitchen Leaks narrative
The experience of space of maintenance within the context of my kitchen is presented below.

'*Today my neighbour knocked on my kitchen door to let me know that the gutter in the side of my kitchen outer wall has been blocked. The water from the pipe connected to the kitchen sink inside the kitchen has poured down all the way to my backyard and her backyard.*
*Our backyard is not strictly separated from each other as my backyard fence has just been broken down by the windy storm a few days ago and the new fence has not been installed. She asked me to clear up the gutter from remaining debris first, otherwise it will still leak.*
When we managed to dig up the gutter, there are plenty of rice grains that blocked the space and therefore prevent the water from flowing through. I always tried to clear up the rice from plates and cookers in the smaller bin next to the sink before or while washing the dishes, nevertheless, there are still many rice flow through…'
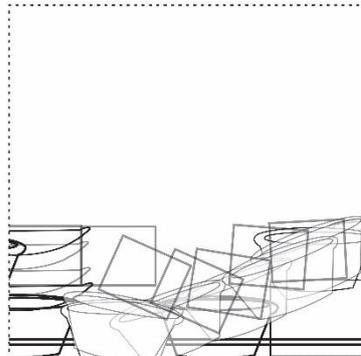(March 2016)

Drawing disconnections of systems using my own incident of kitchen leak, 2014
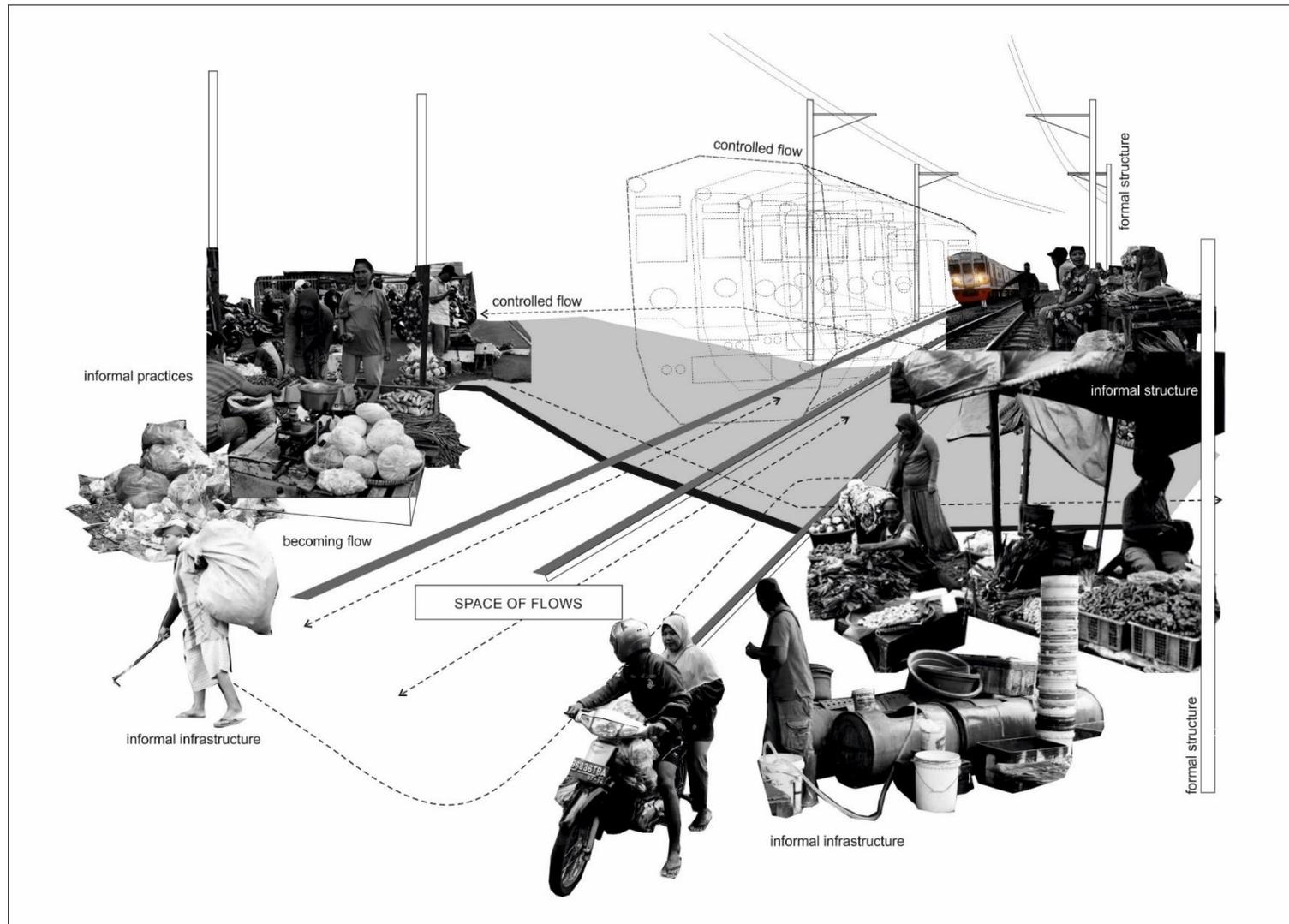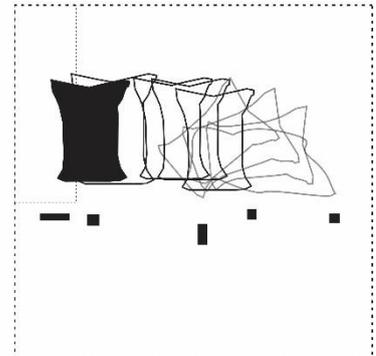
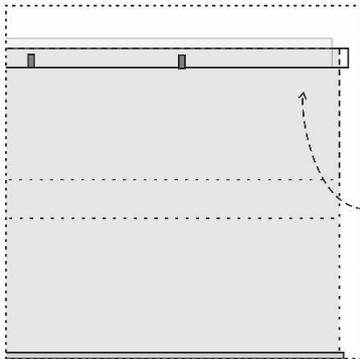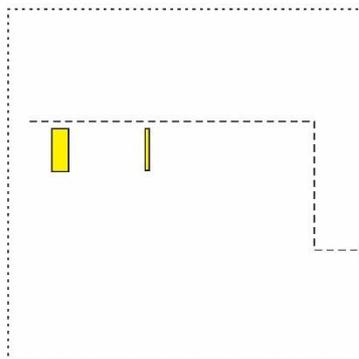Drawing street vendors in Kebayoran Lama around train crossing area, 2014
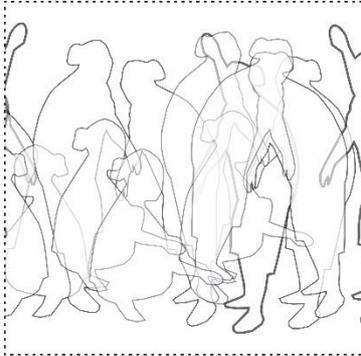
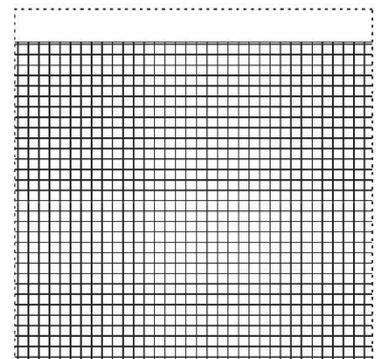performed movement

tools + matter

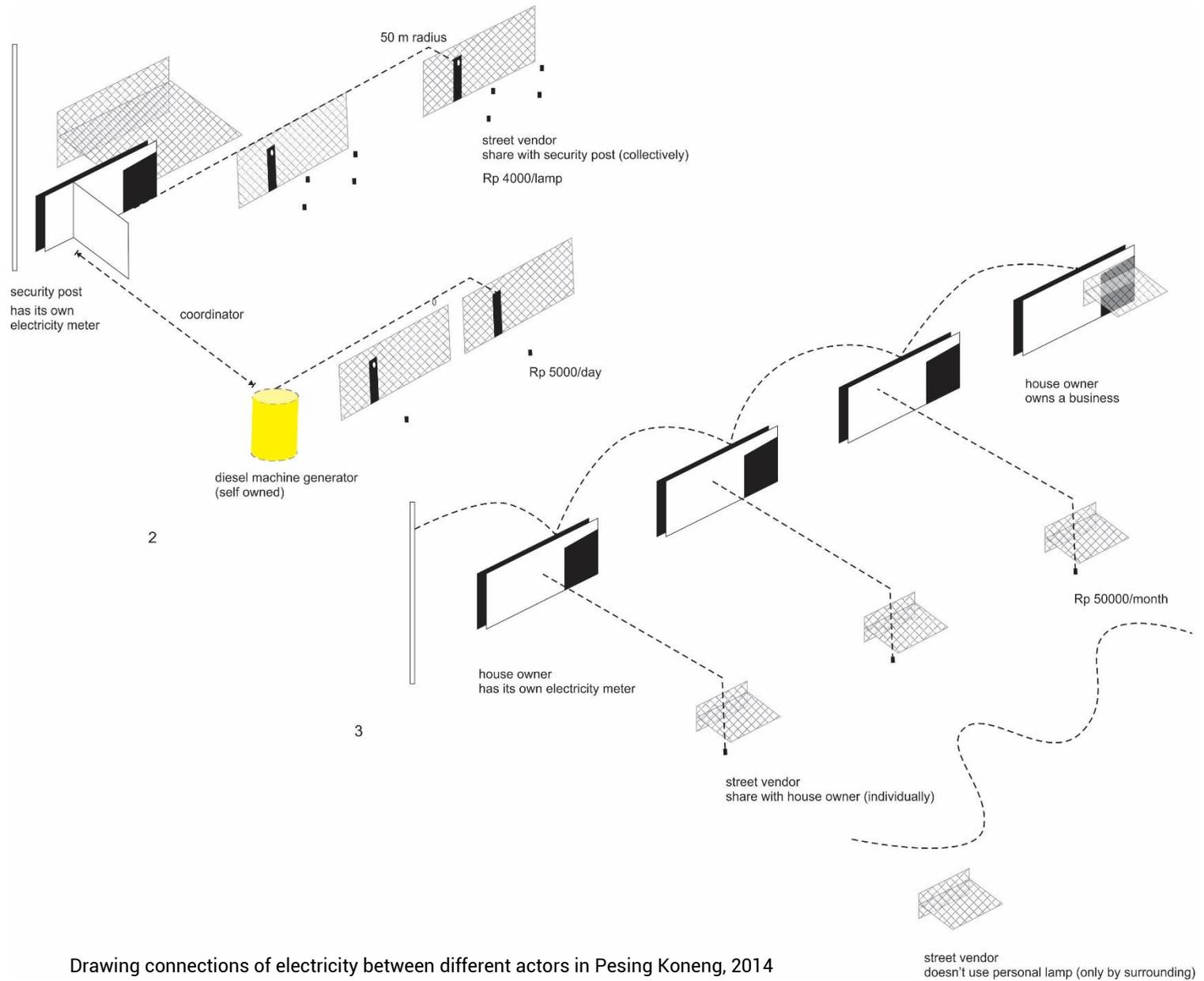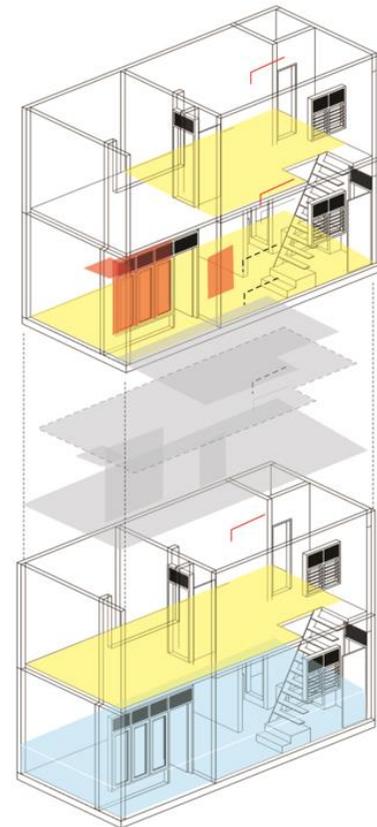traces

extended structure

circuit

background

Drawing changes of positions and materials of a street vendor in Pesing Koneng, 2014

50 m radius

street vendor
share with security post (collectively)

Rp 4000/lamp

security post
has its own
electricity meter

coordinator

Rp 5000/day

diesel machine generator
(self owned)

2

house owner
owns a business

Rp 50000/month

house owner
has its own electricity meter

3

street vendor
share with house owner (individually)

Drawing connections of electricity between different actors in Pesing Koneng, 2014

street vendor
doesn't use personal lamp (only by surrounding)

+ open racks (display only)

+refrigerator is elevated

+chair needs to be mobile
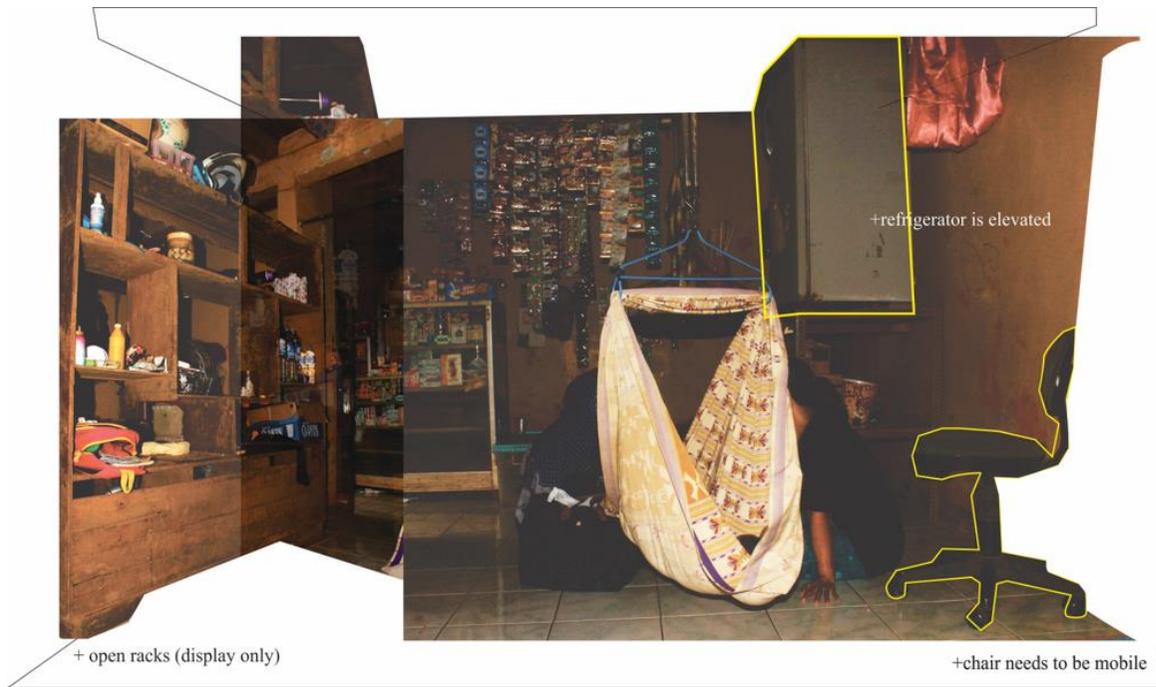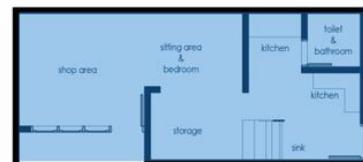
Exploration of changes of using space in I3 dwelling during the flood in Kampung Pulo, 201

+ steel racks

+ no window glass

+ no doors needed

+ wash area without doors

+ food storage above

+ no chair needed

flood condition

bathroom roof | storage (not livable)

2nd floor

bathroom roof | bedroom

2nd floor

washroom & bathroom | living area | storage

1st floor

washroom & bathroom | living area | storage

1st floor

Drawing Exploration of changes of using space in D1 dwelling during the flood in Kampung Pulo, 2015

1
maintained
intersection
high crowd
open
direct
visible

2
maintained
intersection
high crowd
open
direct
visible

3
maintained
nook
high crowd
open
interstitial
visible

4
maintained
nook
high crowd
open
interstitial
visible

5
maintained
corner
high crowd
open
direct
visible

6
maintained
corner
empty
limited
interstitial
non visible

7
maintained
nook
high crowd
open
direct
visible

8
not maintained
intersection
empty
limited
interstitial
visible

9
not maintained
side
high crowd
open
direct
visible

10
not maintained
side
high crowd
open
direct
visible

11
not maintained
side
high crowd
open
direct
visible

Exploration of drawing positions of waste being disposed across different neighbourhood spaces in Kampung Pulo, 2016
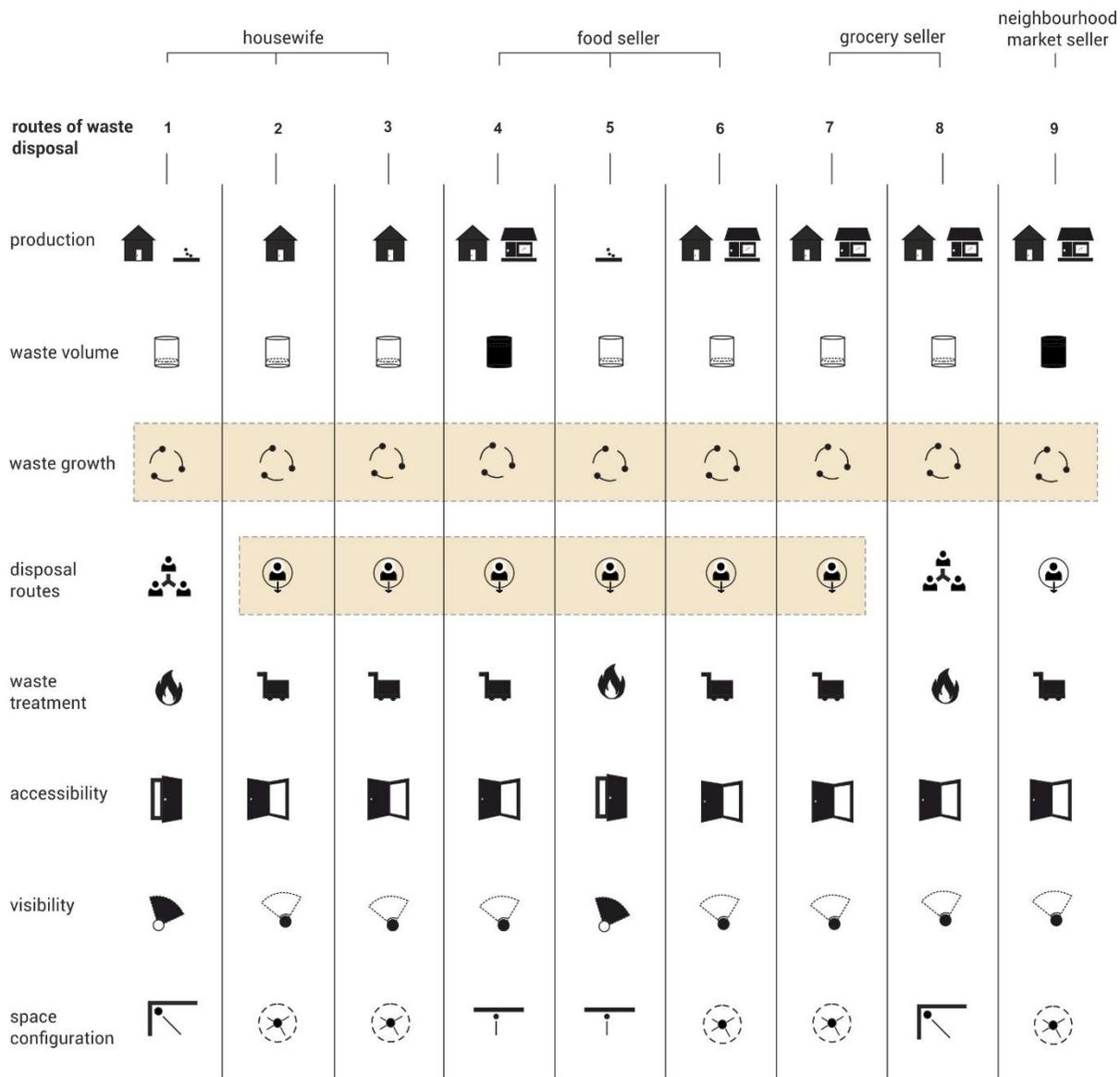
Exploration of drawing different positions, source, distributions and forms of waste in Kampung Pulo, 2017

TRADING PREPARATION PRACTICES
micro-stories of **'building trading space'**

carrier's of practice: clothing seller (sample routes participant EJ)

N8

N7

KALI SEKERTARIS
SEKERTARIS RIVER
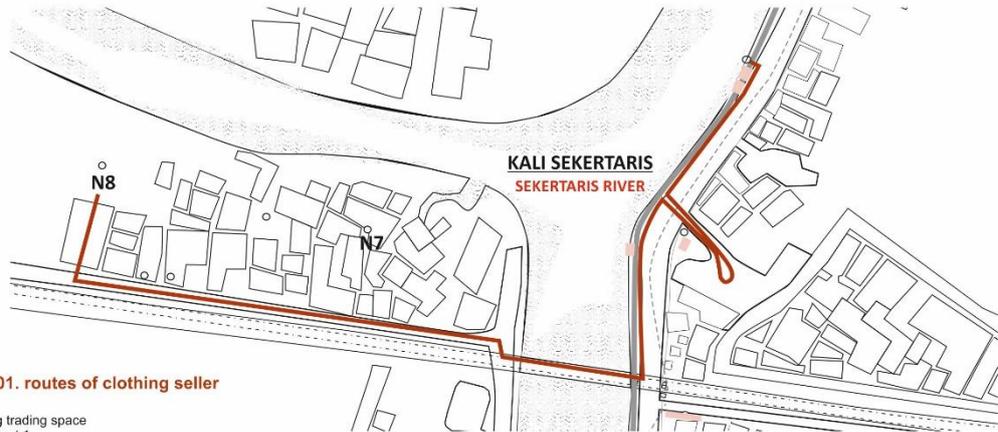
map 01. routes of clothing seller

building trading space
movement 1
'moving structure to location'

competence
goods type

knowing trading
location
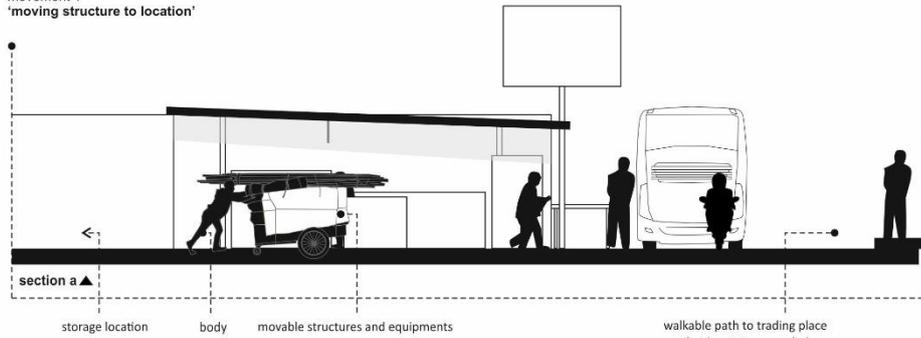
material

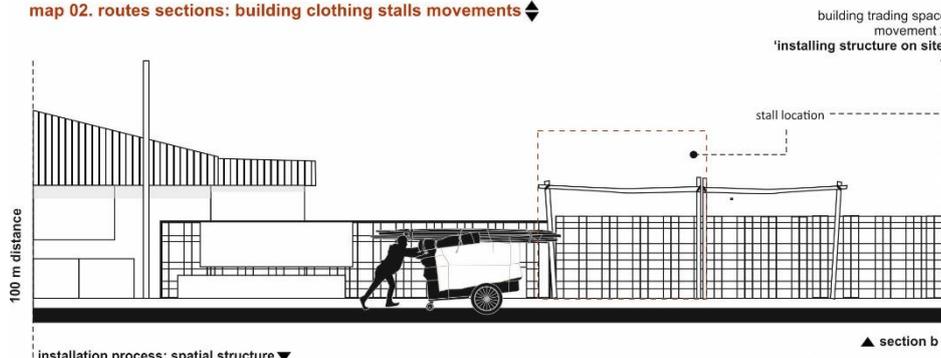section a ▲

storage location   body   movable structures and equipments
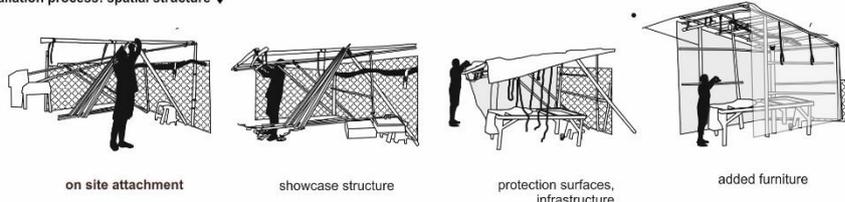
walkable path to trading place
that is not too crowded

map 02. routes sections: building clothing stalls movements ⬍

building trading space
movement 2
'installing structure on site'

stall location

meaning

clothing stalls as
showcase
tools

100 m distance

installation process: spatial structure ▼

▲ section b

competence

building clothing
structure
knowledge

on site attachment   showcase structure   protection surfaces, infrastructure   added furniture

Exploration of drawing practices and its elements, 2016

3. Design explorations drawing

Design of sitting area equipped with water pump around playing grounds
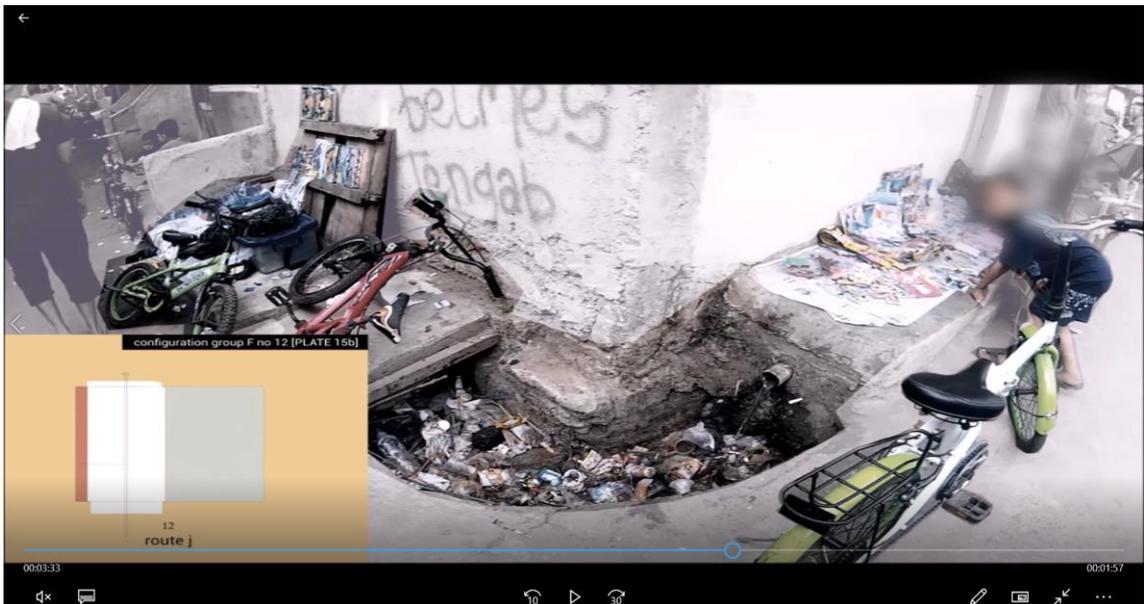to minimise waste, 2017

Design of trading and preparation platform that can store waste in Kampung Pulo neighbourhood market, 2017.

4. Video explorations

Video 1: Local actors managing vendors in railways crossing area in Pesing Koneng (see USB attached)

Video 2: Positions of waste disposed and displaced in Kampung Pulo neighbourhood (see USB attached)