MEDIATING PEOPLE + SERVICE NETWORKS:

Holistic Spatial Design Strategies for Accra's Streets + Waterways

Millennium Cities Initiative
Earth Institute | Columbia University

Credits and Acknowledgements

Authors: Kathy Kurtak, Jose Ernesto Melara Arguello, Abdul Rashid Alhassan

Urban Design and Scenario Planning: Kathy Kurtak

GIS Mapping*: Jose Ernesto Melara Arguello, Kathy Kurtak, Abdul Rashid Alhassan

Graphic Design and Layout: Kathy Kurtak

Edited by: Dr. Susan M. Blaustein (Director, Millennium Cities Initiative)

* Basemap GIS data provided by AMA Urban Management Land Information and Geological Survey Department.

Please cite this report as:
Earth Institute Millennium Cities Initiative (2013). *Mediating People and Service Networks: Holistic Spatial Design Strategies for Accra's Streets and Waterways*. NY: Earth Institute.

Acknowledgements

We express our gratitude to our partners at the Accra Metropolitan Assembly, including: Honorable Mayor and CEO Alfred Oko Vanderpuije, Ms. Lydia Sackey (Chief Budget Officer), Abass Awolu (Director, Department of Urban Roads), Doris Tetteh (Director, Town and Country Planning Department), and Timothy Oman (Director, Metro Planning Coordinating Unit). We would also like to thank the respective Accra Metropolitan Assembly members for Korle Gonno, Nima East, Kwao Tsuru and Chorkor. Finally, we wish to thank the community leaders and residents of the aforementioned constituencies for their collaboration in amassing the information needed to produce this report.

Table of Contents

List of Maps and Visualizations

Maps

Concept Site Plans

Concept Visualization

Concept Process Diagram

This page intentionally left blank

Introduction

In 2010, the Accra Metropolitan Assembly and the Earth Institute at Columbia University entered a partnership to help the people of Ghana's capital city work toward achieving the Millennium Development Goal targets by facilitating healthier, more inclusive urbanization under the Millennium Cities Initiative program. Despite its preeminence as the political and administrative heart of Ghana and an emerging economic hub for West Africa, Accra continues to face challenges particularly in relation to Millennium Development Goals 1 and 7, due to its increasing urban poverty and the expansion and/or further deterioration of "slums."[1]

In assessing progress towards MDG 1, Accra was found to have experienced an increase in its poverty incidence from 4.4 percent in 1998-1999 to 10.6 percent in 2005-2006, countervailing the downward trend that most of Ghana had experienced during that time (UNDP 2007). Moreover, unemployment, underemployment and saturation in the informal petty trade sector prevail in many areas of the city. The 2000 Census estimated a higher unemployment rate in Accra than in rural parts of Ghana (GSS 20000); this was particularly true for youth, markedly so for young males. Recent, reliable employment statistics were not available at the time of publication, but numerous surveys, interviews and stakeholder meetings conducted in these communities by MCI have revealed significant challenges among residents seeking employment and/or business opportunities, particularly among young adults (see Earth Institute 2012a; Earth Institute 2012b).

The Accra Metropolitan Assembly estimates that there are 29 "squatter" and "slum" settlements or neighborhoods across the city (AMA 2010). Several such communities, including Old Fadama, Nima, James Town and Chorkor, have experienced surges in population (both natural and from in-migration), and insufficient livelihood opportunities have constrained

[1] MDG 1, the first Millennium Development Goal, is defined by the United Nations as halving by 2015 those in extreme poverty; MDG 7, Target 7D, is to significantly improve the lives of 100m people living in slums worldwide, also by 2015.

residents' abilities to invest in upgrading their homes and in adequate amenities. Compounding the issue are the significant strains on already deteriorating housing and infrastructure. Unsurprisingly, demand for municipal services overwhelms the municipality's capacity to provide them at appropriate levels.

The municipality's struggle to meet the needs of its underserved residents led to the partnership between the Accra Metropolitan Assembly and Columbia University's Earth Institute, and to the establishment of Accra as a Millennium City. Collaborating with residents, youth groups, community-based organizations, local NGOs and development organizations such as UN-HABITAT and the World Bank, the approach of the Millennium Cities Initiative (MCI) has been to identify through careful assessment the most appropriate and context-specific interventions for improving the livability and livelihood prospects for the residents of Accra, particularly for the poor. An essential task has been to work in tandem with local partners in profiling the most physically and economically underserved neighborhoods in the city, assessing current conditions of housing, community assets and municipal services, and identifying practical and innovative approaches to upgrading these areas so as to integrate them more effectively into the city's economic nodes. These communities include James Town, Ussher Town, Korle Gonno and Chemuna, in the Ashiedu Keteke and Ablekuma South Submetros; and Nima, Maamobi and Accra New Town, in the Ayawaso East and Central Submetros.

Since 2010, MCI architects, planners and urban designers have worked with the AMA and other development stakeholders to further build the city's urban knowledge base and to improve access to municipal services. The outcome has been a set of profiles and briefings on each community participating in the MCI program, with accompanying recommendations

for improving living conditions for residents in the target communities.[2]

Of course, considerable research and interventions relating to urban poverty and "slums" already exist in Accra. For example, CHF International (2010) conducted an exhaustive profile of all "poverty pockets" in the city, using a weighted index with eight indicators related to the state of housing, sanitation, flood prone-ness, etc. More recently, as part of the Land, Services and Citizenship program spearheaded by the Government of Ghana, partnerships are being created between national and local government, NGOs and urban poor communities to continue documenting areas of need and the effectiveness of negotiating for improvements in municipal services. Much of the discourse and interventions have revolved around improving access to such services as water, sanitation and waste management, as well as youth employment programs.

FOCUS ON SPATIAL PLANNING AND COMMUNITY UPGRADING

In addition to improving access to municipal services and livelihood opportunities, the consensus among local government and NGOs is that improving spatial planning in Accra is a priority. Indeed, the importance of land use policy and spatial planning in poverty reduction strategies has been well established: aside from public and environmental health benefits, there continues to be recognition and advocacy for developing policies and planning schemes aimed at facilitating local economic development and job creation in cities such as Accra by efficiently integrating land use and housing upgrading interventions with appropriate social safety nets and investment in industrial infrastructure (Banerjee and Duflo 2012: 231-233).

The Ghana Institute of Planners has made important baseline assessments and guidelines for spatial planning, and the launch of the Land Administration Project has begun to add robust measures for a Town and Country Planning ordinance that had not been updated since 1945. The AMA is currently developing its own slum-upgrading program, as well.

Yet there continues to be a need for further stakeholder dialogue on evidence-based approaches to spatial planning and design, particularly at the interface between urban poor communities and key environmental and engineered networks of the urban fabric, specifically, water bodies and transportation infrastructure. Often, the resulting edge conditions are not planned, with damaging results. It is this interface that is the focus of this report.

Waterways, transport infrastructure and land use have profound impacts on urban poor communities, and those impacts radiate out to the rest of the city in various manifestations. As such, spatial design becomes a very important part of a bundle of interventions that includes sensitization, building citizenship and capacity, local economic development and slum upgrading. In this report we probe the aforementioned interfaces by documenting the dynamics between settlements along primary and secondary drainage networks; the resultant incompatibility of land uses; and the oft-neglected streets and pathways in low-income, high-density neighborhoods. These dynamics are worthy of further examination and intervention because they affect all levels of public health and municipal service provision, as well as economic development. The poor state of these networks is illustrative of poor spatial and community planning and as such warrants further attention. We aim to make inroads in this area of the urban knowledge base by conceptualizing urban design techniques that can mitigate adverse impacts at the networks-slums interface, thereby hopefully facilitating a more harmonious and beneficial built environment for residents, workers and entrepreneurs alike.

[2] These profiles and briefings are available at the Millennium Cities Initiative website: www.mci.ei.columbia.edu.

The objectives for this report, therefore, are as follows:

- To provide a brief overview of the evolution of physical development in Accra, including some of the causal factors that have led to certain areas of the city having been neglected and deteriorating into "slums;"

- To review current policy and planning guidelines developed by national and local governments to mitigate and/or support upgrading for such living conditions;

- To present the MCI team's relevant research findings culled over the past two years from site work, and to identify any gaps between policies/instruments and reality on the ground;

- To illustrate potential interventions, including planning and design standards that may facilitate the improvement of living conditions in settlements near drainage networks, and to improve prospects for local economic development along key streets in the target communities. Although these adjacencies are now often problematic, there is the potential for waterways and circulation routes to improve living conditions in the surrounding area. It is important to plan that intersection condition for the sustainable function of the individual communities and of the city as a whole. (Today, these often work at cross purposes.) The design strategies proposed here embrace the edge condition and use it as an opportunity to create centers of community activity and identity (rather than simply as a nuisance or pass-through).

Methods of Analysis

The analyses presented in this report draw from data culled over a two-year period in the MCI communities in Accra. These communities include Korle Gonno and Chemuna in Ablekuma South Submetro, and Nima and Kwao Tsuru in the Ayawaso East and Central Submetros.

Rather than focus on these sites as specific case studies, we use them to illustrate a prominent condition in some of the most underserviced neighborhoods in Accra. Mindful that each neighborhood has different gradations of urban poverty conditions, we nevertheless hold that the scale and magnitude of the problem in these sites effectively capture the task at hand in ways that are extractable to a broader knowledge platform.

The assessment tools used in these communities include substantial GIS mapping, land use inventories, household surveys, rapid assessments, in-depth firm interviews, focus groups, interviews with community residents and research field observations. We briefly elaborate on each method below, pertaining to the two primary themes of this report.

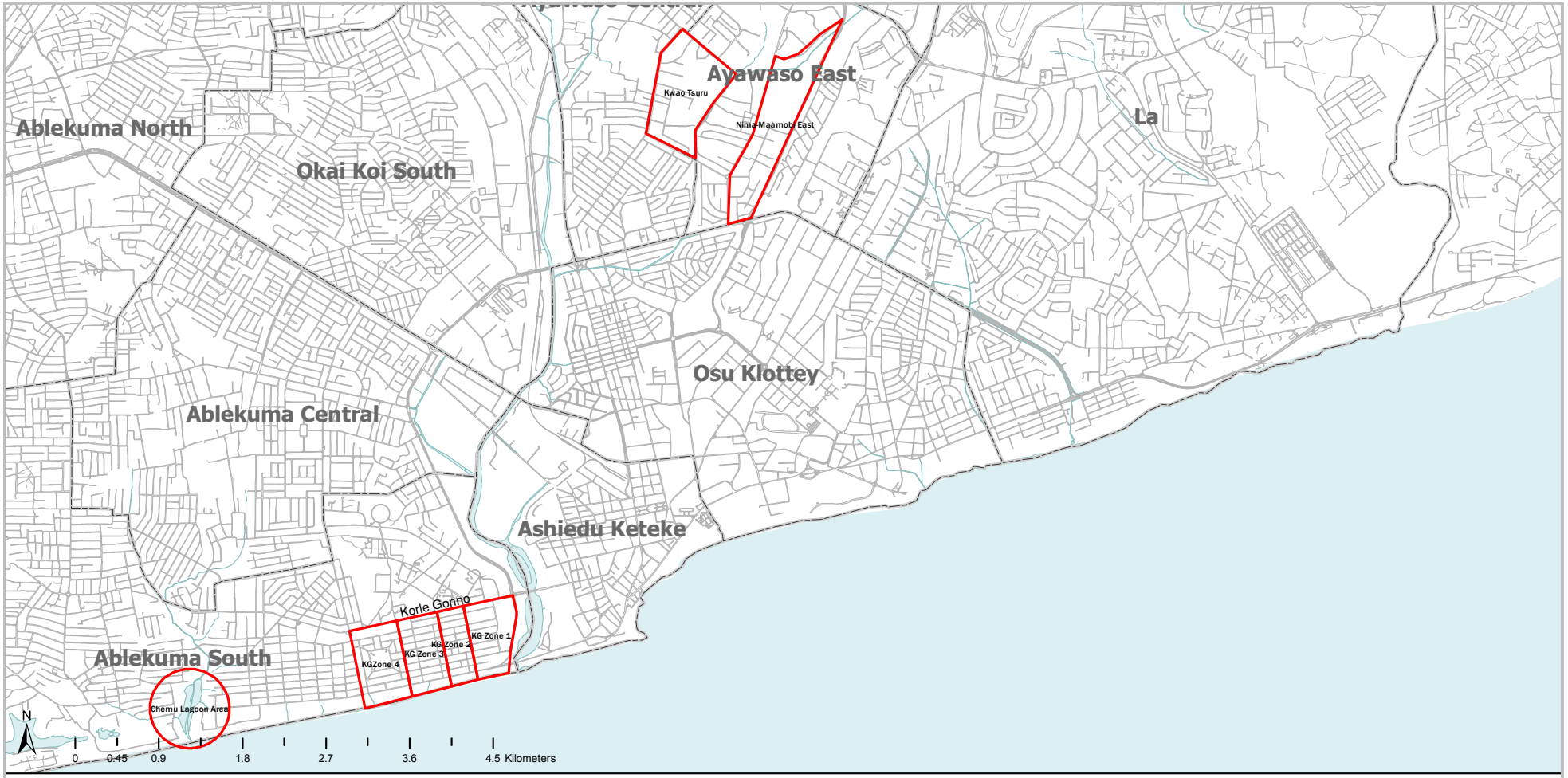
SETTLEMENTS ALONG PRIMARY AND SECONDARY DRAINAGE NETWORKS

GIS mapping was conducted in each site using shapefile data from the AMA Urban Management Land Information System (UMLIS) as the base layer. Additional data layers were added using primarily GPS waypoint data to spatially reference elevation, stream and/or drain widths, road distance from streams/drains to housing, adjacent land uses, etc. Elevation contours were calculated from GPS waypoint data using ArcGIS Geostatistical Analyst - Inverse Distance Weighting Prediction Output. Secondary drain widths were recorded with metric tape and added as attribute data, then drawn in as new lines in the shapefile. Physical conditions of secondary drains, such as paving condition, were inventoried and added as attribute data.

For the Sempe Drain sites, data from the 2011 MCI Korle Gonno household survey are drawn upon to provide resident perspectives on access to municipal services, including drainage. The survey has a sample size of 254 households, including family heads and tenants. We also draw upon information from resident interviews to present key information on living conditions adjacent to drains and key streets/paths in Kwao Tsuru, Nima, Korle Gonno and Chemuna. For the Chemuna and Kwao Tsuru sites, residents and school administrators provided important information on the level of service for waste management, flooding conditions and incidence of disease, such as cholera, malaria and diarrhea.

COMMUNITY KEY STREETS AND PATHWAYS

Extensive GIS mapping was conducted in all street/pathway sites to capture their physical conditions, connectivity to key destinations and adjacent land uses. Base shapefile data were obtained from the AMA Urban Management Land Information System (UMLIS). Data layers were added using GPS waypoint data, which were used to spatially reference elevation, road widths, distance from roads to housing, physical condition of streets/pathways, economic activities taking place nearby, etc. Elevation contours were calculated from GPS waypoint data using ArcGIS Geostatistical Analyst - Inverse Distance Weighting Prediction Output. Road widths were recorded with metric tape and added as attribute data. Paving conditions of roads/paths were inventoried as and added as attribute data. We used information from firm interviews conducted Korle Gonno and Nima East to inform our analysis on economic activities taking place along key streets and paths in the neighborhoods. In addition, interviews were conducted with entrepreneurs and residents along the sites to get their input on needed services for improving mobility and access both to the community and to further business opportunities.



MCI ASSESSMENT AREAS

Accra

Legend

Area of Analysis

Sub-Metro

Source: Urban Management Land Information System, Geological Survey Department
Map by The Earth Institute, MCI

Map 1. **MCI Assessment Areas:** Accra

Historical Context of Physical Development

In this chapter we present an overview of the historical context of physical development in Accra and how the uneven distribution of municipal services evolved. Land use, land speculation and resident coping strategies, in lieu of adequate infrastructure provision and local economic development, have had a hand in the emergence of drain/waterway-side settlements. We also present a brief overview of drainage networks in Accra and the drainage-housing interface, followed lastly by an overview of streets emerging as economic lifelines in the Millennium City communities (James Town, Ussher Town, Korle Gonno, Chorkor, Nima, Maamobi and Accra New Town).

There are a number of factors that have had a lasting impact on the creation, expansion and physical deterioration of low-income, high-density (LIHD) neighborhoods in Accra and their spatial distribution, among them, the following:

- A European colonial imprint on physical development
- Population growth – both natural and migratory
- A poorly evolved system of spatial planning
- Lack of integrated spatial and economic development planning

The written record details the uneven distribution of municipal services in Accra having its origins in the European (especially British) colonial era. Urbanization in Accra began significantly increasing subsequent to the establishment of the cocoa and mining industries, with Accra serving as an administrative and commercial node for trade with European markets (Songsore, 2009). As European occupation later established itself, spatial planning and infrastructure were provided mainly in European residential neighborhoods and districts of strategic importance. Such neighborhoods included James Town, Ussher Town, Osu, Korle Gonno, Cantoments, Airport Residential and Roman Ridge. In 1945, British town planners introduced land use regulations with the Town and Country Planning

Ordinance.[1] A master plan was drafted in 1958, but its policies were not implemented, save for state-acquired lands (Larbi 1996). As employment opportunities in Accra increased, settlements began expanding into the peri-urban areas. Migrant residential neighborhoods such as Nima, Maamobi and Accra New Town developed as soldiers returning from the Gold Coast and workers from various industries came to Accra looking for work (Owusu 2008). These settlements expanded in a spatially unplanned manner, and enforcement of health bylaws occurred only in European-occupied areas, thus establishing a trend of neglect in these areas that would persevere into current times.

Aside from the cessation of segregating European from indigene and other African migrant communities, post-independence urban development reinforced practices introduced in the colonial era (Larbi 1996, Konadu-Agyemang 2001, Songsore 2009). Accra continued to evolve as a primary city, relative to other towns in Ghana, and this continued to serve as a "pull factor" for migrants from all over the country (especially the Northern regions) to move into the "zongos," or "strangers'" quarters, where mostly Muslim migrants settled. The population of these and other neighborhoods began to surge, and compound housing was constructed in an ad-hoc manner, with little or no planning support from municipal authorities. For example, by 1958-1959, Nima was already classified as a slum by the Town and Country Planning Department (TCPD) (Brand, 1972). The TCPD recommended investment in infrastructure upgrading in the Nima-Maamobi area out of public health concerns, but for the most part, this never came to fruition. Despite the lack of investment in infrastructure and economic development, neighborhoods such as Nima and Sabon Zongo – some of the only areas with affordable housing, as land prices continued to surge through the years -- became crucial starting points for migrants trying to establish themselves in the city.

[1] This ordinance would remain the sole legally binding planning instrument up until 2010-2011, with the establishment of the Land Administration Project.

Demographic statistics, while considered to be better for Ghana than for other Sub-Saharan African countries, have not been considered to be reliable for Accra, due to suspected under-counting (Konadu-Agyemang, 2001). This is particularly highlighted regarding a floating population within the Accra Metropolitan Assembly that was only in 2010 estimated at over half a million (World Bank and Accra Metropolitan Assembly, 2010). Further, demographic projections disaggregated by community from the 2010 Census were not made available at time of publication. That said, nearly all neighborhoods chosen by the AMA for the Millennium City program (Nima, Maamobi, Chorkor, James Town, Ussher Town, Accra New Town and Korle Gonno) evolved to have very high population densities of approximately 20,000-30,000 residents per square kilometer, and housing densities of 1,200-1,500 houses/km2 or more (CHF International, 2010: pp. 12-14). Other such Accra communities include Old Fadama, Sabon Zongo, Kaneshie, Sabon Zongo, Sukura, Avenor and La, to name a few.

Worth noting is that this data was extracted from the 2000 Census, and it is all but certain that these figures have increased dramatically since then. For example, in Korle Gonno, the population taken from the 2000 Census was 27,826; the AMA projected its population to have increased to 44,088 by 2008. Given the lack of availability of 2010 population estimates, the closest source for population projections was a tally by the local assemblyman, which he estimated to exceed 60,000 in 2011.[2]

A major factor behind the establishment in Accra of "informal" settlements and deteriorating neighborhoods over time has been the absence of integrated spatial and economic development planning. The two practices have always been separated from each other at the municipal level, with the Town and Country Planning Department tasked with spatial planning, and the Metro Development Planning Unit in charge of economic development. Only recently has the need to integrate these two departments been recognized. Of course, the lack of integrated planning impacts employment opportunities in these neighborhoods and others across the city that are disconnected from the broader urban economy and hinders the ability of residents to provide their own housing improvements where the municipality falls short. This effect, coupled with a poor and ineffective tax collection system, leaves few opportunities for significant upgrades in housing and infrastructure such as sewerage. In combination, these factors create an environment where housing and infrastructure, where they exist, have become heavily strained and deteriorated to barely functioning or wholly dysfunctional levels. Residents who settle near drains - who do so in part because such settings are among the few areas where land values have not surged – value their proximity to drains, where they still feel free to defecate and to dispose of grey water and solid waste, which will eventually be washed away. Our Waterways section discusses this condition in further detail. We present a brief overview of the drainage network beginning at the Greater Accra Metro level down to AMA's boundaries, in order to provide a snapshot of how upstream activities can affect some of the city's most vulnerable neighborhoods. We subsequently summarize existing conditions for the relevant MCI sites – Kwao Tsuru, the Sempe drain in Korle Gonno and the Chemu Lagoon – and discuss the environmental health challenges present in each site.

[2] Source: Interview with Korle Gonno Assemblyman, June 30, 2011.

This page intentionally left blank

ACCESS ROUTES

Rethinking Roads and Paths

For the majority of low-income high-density (LIHD) neighborhoods in Accra, roads, streets and pathways are not only the main mode of access to the rest of the city but are strong "pull factors" for economic activity – particularly of the "informal" variety. A few examples of wellknown streets running through LIHD neighborhoods include High Street in Old Accra (James Town and Ussher Town), itself connecting to the Central Business District, or CBD; Guggisberg Avenue in Korle Gonno, where the national teaching hospital, Korle Bu Hospital, is located; and Nima and Kanda Highways in Nima, which are both important commuter routes. As is the case in many cities in sub-Saharan Africa and across the developing world, severe traffic congestion brings with it opportunities for street vendors to earn a living selling their goods during gridlock and other stoppages. There are often tensions between local government, vendors and passing drivers as vendors sometimes slow down traffic while working. Of course, this has become a fixture in the landscape; yet little has been done to assuage the condition, as there has been more focus put on enforcement rather than on pre-empting enforcement via effective land use and local economic development planning.

It is often the case that there are at least a couple of streets or pathways within these communities whih connect vehicular and pedestrian traffic to key roads such as High Street. Generally, a mix of local businesses or street vendors concentrates in these streets, so they might cater to customers from within and beyond the neighborhood In some cases, a particular street or path also serves as a connector to two important (parallel) corridors. Such connectors are vital to the community for mobility, access and economic opportunity, in circumstances where such opportunities are otherwise in short supply or nonexistent. However, this vital use can create conflict between different user activities, since most of these connectors were not planned to accommodate all uses. In this section we highlight two such connectors: Awestse Kojo Street in Korle Gonno, and the "Zone 1" pathway in Nima. We highlight these types of streets because they have often been neglected in upgrading programs, despite their potential to bring improvements in amenities and business to the neighborhoods.

chapter 1

Residential Streets

Awestse Kojo Street

Awestse Kojo Street is a paved residential street that connects Guggisberg Avenue with Old Winneba Road. The Korle Bu Hospital is situated along Guggisberg Avenue and as a result, has attracted numerous healthcare-related services and commerce. Old Winneba Road, along the waterfront, has seen the opening of small-scale resorts and tourism-related businesses in recent years. The corridor has struggled to "take off" as a tourism hotspot, due to environmental hazards (the infamous Lavender Hill, currently the city's main liquid waste disposal site situated on prime beachfront property, among them) and a lack of investment in such essential infrastructure as sewerage and stormwater treatment. That said, tourism and hospitality activities are slowly increasing. Awestse Kojo Street not only connects to these two "corridors," but is also adjacent to the Tuesday Market, one of the important markets in Ga Mashie. Despite its proximity to these key economic landmarks, it has retained its purpose as a residential street, with many small businesses catering to the needs and desires of nearby residents. The street is not brimming with social life as one might find in the streets of nearby James Town, but has a fair amount of movement and activity, centered more around commerce and connecting to nearby destinations.

STREET PROFILE:
AWESTSE KOJO STREET
(Korle Gonno Community, Accra)

Satellite image source: Google Earth.
Map by Earth Institute MCI, Columbia University

Map 2. **Area of Analysis:** Awestse Kojo Street

STREET PROFILE:
AWESTSE KOJO STREET
(Korle Gonno Community, Accra)

Land Uses For Buildings (using 2006 UMLIS data)

- Commercial
- Mixed Use Commercial
- Health
- Mixed Use Health
- Sanitary
- Education
- Government Service
- Worship
- Tourism
- Residential
- Unconfirmed
- New structures (2010) *using Google Earth

Base data source: Urban Management Land Information System, Geological Survey Department,
Land use data source: Earth Institute MCI, Columbia University

Map 3. **Economic Activity:** Awestse Kojo Street

DESIGN NEED

The role of Awestse Kojo Street as an attractor to neighborhood-centered commerce is in fact what makes it so important within the community. As time goes by and Old Winneba Road becomes more established, the street could very well attract tourism-related complementary economic activities. Eventually, it will be important to consider how to balance the preservation of Awestse Kojo Street as a cluster for neighborhood services, with the potential economic (and job) opportunities arising from the healthcare and tourism industries. Adding to the complexity is the premium of space: most of the businesses along Awestse Kojo Street are microenterprises housed on the sidewalks in kiosks or containers. By way of municipal planning regulations, these structures are illegally sited, because they impinge on the sidewalks as a public good (that is, as pedestrian thoroughfares). Given that virtually all land in Korle Gonno is privately owned by way of customary tenure, there are few opportunities to allocate land to relocate these businesses, even under the assumption that the land would be situated along the same road, thereby giving entrepreneurs the same kind of access to customers. Right now, informal commerce, drainage, parking and pedestrians all compete for the unplanned space between the street's edge and the property line. With thoughtful spatial planning and visual cues, zones can be created that allow that "leftover'"space to be used effectively without denying any user group access (e.g., by removing kiosks).

Visualization 1. **Existing Condition:** Awestse Kojo Street

DESIGN STRATEGY

It has been suggested that the solution to this dangerous problem is to force the demolition of the informal businesses. With so few economic opportunities in the area, this approach seems unwise. It is also unnecessary, since the setback along the road is ample. The solution is to accept the new condition and redesign the walkway to safely accommodate businesses and related activities.

- **Define parking and pedestrian zones:** It is important to address the biggest safety hazards first. Sidewalks should be built to get pedestrians out of traffic. Roadside parking needs to be well defined, to avoid traffic congestion. Using sidewalk extensions at crosswalks, known as "bulb-outs,"[1] and painting pedestrian crossings will help define zones.

[1] Bulb-outs provide a protected path to the outside of the parallel parking zone. Such extensions improve visibility for crossing pedestrians and shorten the length of the crosswalk.

- **Reaffirm existing building and fence setbacks:** It is clear that when the neighborhood was initially established, planned setbacks were followed. Over time, new fences and structures have been built closer and closer to the road.
- **Cover drainage:** The existing open drains are not compatible with the pedestrian traffic encouraged by commercial activity.
- **Define informal commercial zone:** There are many small businesses that are well established in the area. Those commercial vendors can be accommodated in a designated commercial zone between the sidewalk and the street. It is important to define the acceptable structures for that zone and the associated requirements:
    1. **Container/kiosk:** Self-contained commercial structures may be erected in the commercial zone between the sidewalk and street. To do so, the structure must occupy the entire depth of the commercial zone. To "occupy" the zone, there must be interior building space or shaded/paved space to the front of

Visualization 2. **Proposed Redesign:** Awestse Kojo Street

the structure, in order to avoid trash accumulation, haphazard additions, etc.

2. **Temporary/Portable Stands:** Smaller scale businesses play a critical role in the local economy. Yet the flexibility of this business format can also disrupt the new order created by the zones. Stands cannot be in parking or sidewalk zones; instead, paved areas in the commercial zone can be used for this purpose. However, this space is not leftover space that can be used for any purpose. Structures that are non-commercial (storage, housing, etc.) must be removed or repurposed.

- **Formalize commercial street facade:** It is important not to disrupt existing healthy commercial activity unless it is necessary. There are many businesses that are permanent structures and do not encroach on the right-of-way. These can be maintained, but rules should be created to insure a consistent street facade that does not impede other street functions. The two critical building types are:

1. **In-Fence Commercial:** A commercial space that is in line with the fence setback. The entrance of the building must be flush with the fence line, and no part of the structure may extend into the sidewalk beyond the fence.
2. **Building extension:** Existing commercial buildings situated away from the fence setback may be maintained, but improvements must be made, in order to occupy the space in front of the building up to the sidewalk. Such improvements can include paving, seating, shading, roofing, etc. The business must also maintain the space and the ability to pass unimpeded.

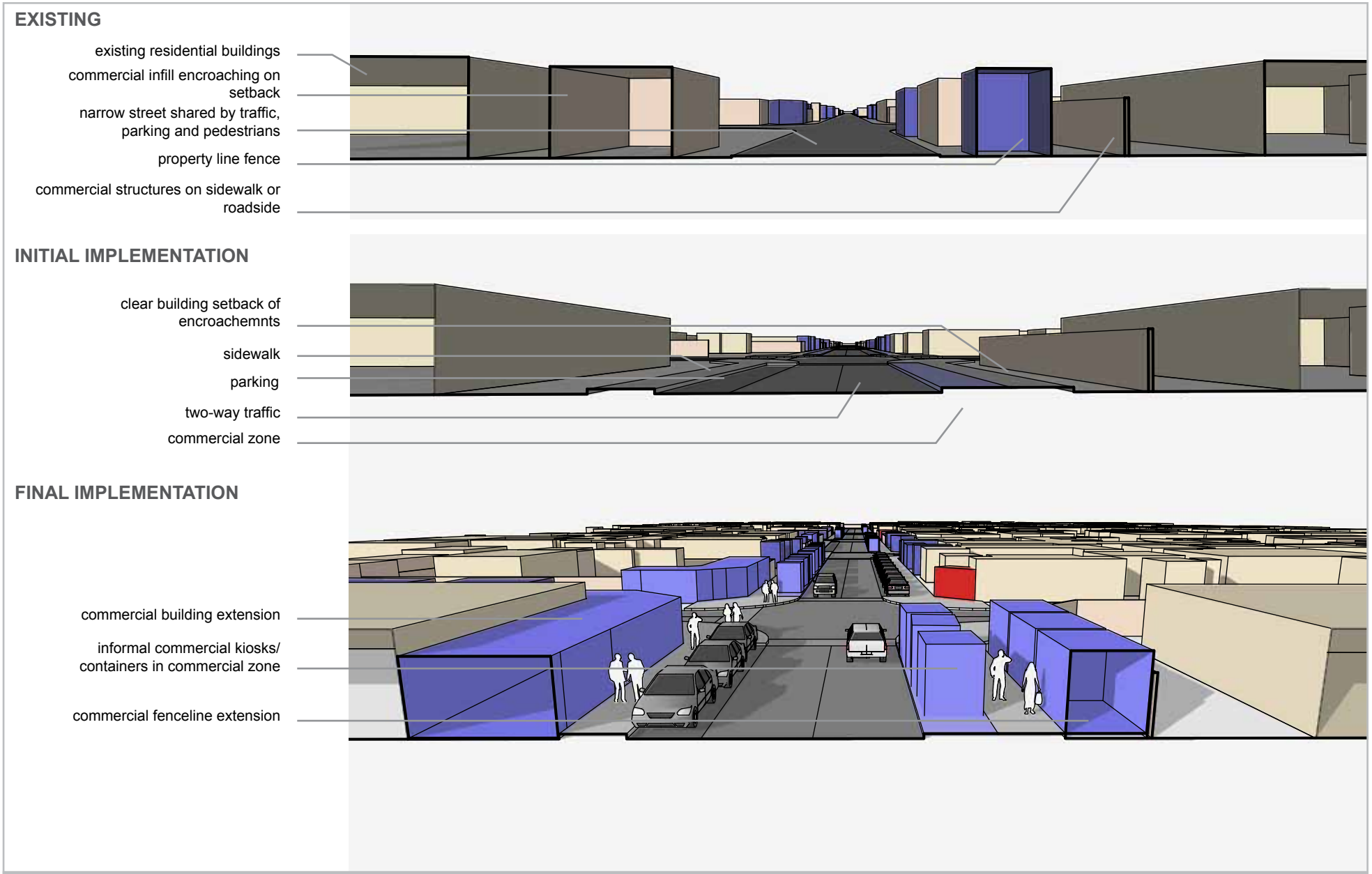


Diagram 1. **Concept Implementation Process:** Awestse Kojo Street

Site Plan 1. **Concept Site Plan:** Awestse Kojo Street

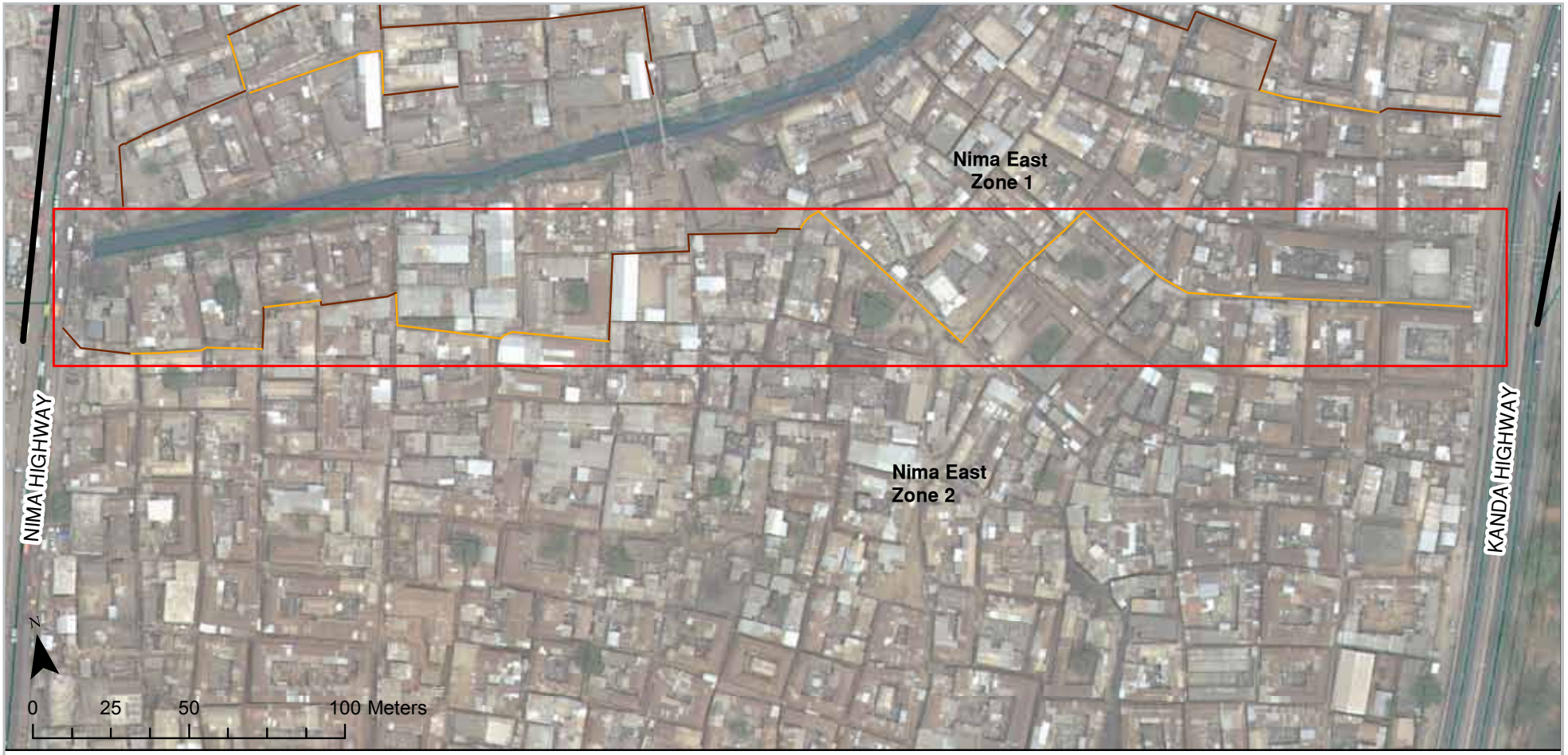
chapter 2

Pedestrian Pathways

Nima East Connector Path

The “Zone 1” pathway in Nima East is the only route that clearly zig-zags through the neighborhood from Kanda Highway to Nima Highway, both of which serve as commuter routes for workers and trucks hauling goods. Given that there are no other streets running perpendicular to these highways, the Zone 1 pathway is vital for residents to move to and from their homes to their workplaces.

Nima Highway is one of the most wellknown routes in Accra, due to its intense traffic and the flow of goods into both the Nima Market (particularly on Wednesdays) and all other stores along the highway. Kanda Highway is more of a true highway that connects Nima East to the rest of the city (albeit poorly, as there are currently no roads connecting to Kanda Highway from the community, other than Kawkodi Road, in Maamobi East). Nima East has one of the highest housing densities in Accra, and its informally planned layout makes road construction difficult. It can be effectively argued, however, that it may not be possible to build roads to provide access to every corner of the community, making pedestrian pathways all the more important for access. Unsurprisingly, the Zone 1 pathway has attracted many stalls and shops providing various goods to sell to passersby (see Map 6).



NIMA EAST ZONE 1 CONNECTOR PATHWAY:
Paved and unpaved areas

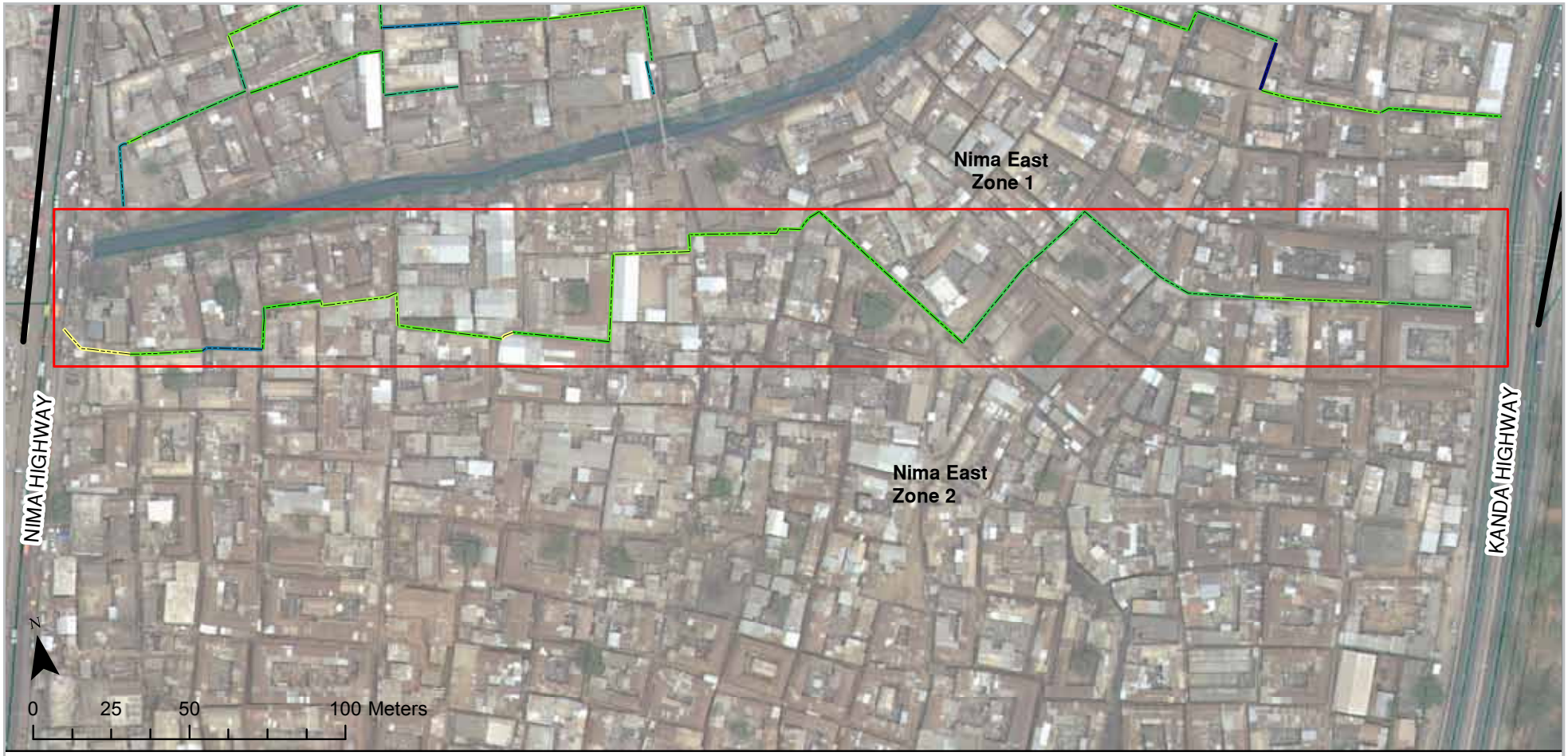
Legend

No Paving

Paving (at least partial)

Base data source: AMA UMLIS; Geological Survey Dept;
Site data: Earth Institute MCI.
Map by Earth Institute MCI (2012)

Map 4. **Area of Analysis:** Nima East Connector Pathway



NIMA EAST ZONE 1 CONNECTOR PATHWAY:
Individual path widths (in meters)

Legend

0.000000 - 0.499999	1.500000 - 1.999999	3.000000 - 3.499999	4.500000 - 4.999999
0.500000 - 0.999999	2.000000 - 2.499999	3.500000 - 3.999999	5.000000 - 5.499999
1.000000 - 1.499999	2.500000 - 2.999999	4.000000 - 4.499999	5.500000 - 6.019800

Base data source: AMA UMLIS; Geological Survey Dept;
Site data: Earth Institute MCI.
Map by Earth Institute MCI (2012)

Map 5. **Path Widths:** Nima East Connector Pathway

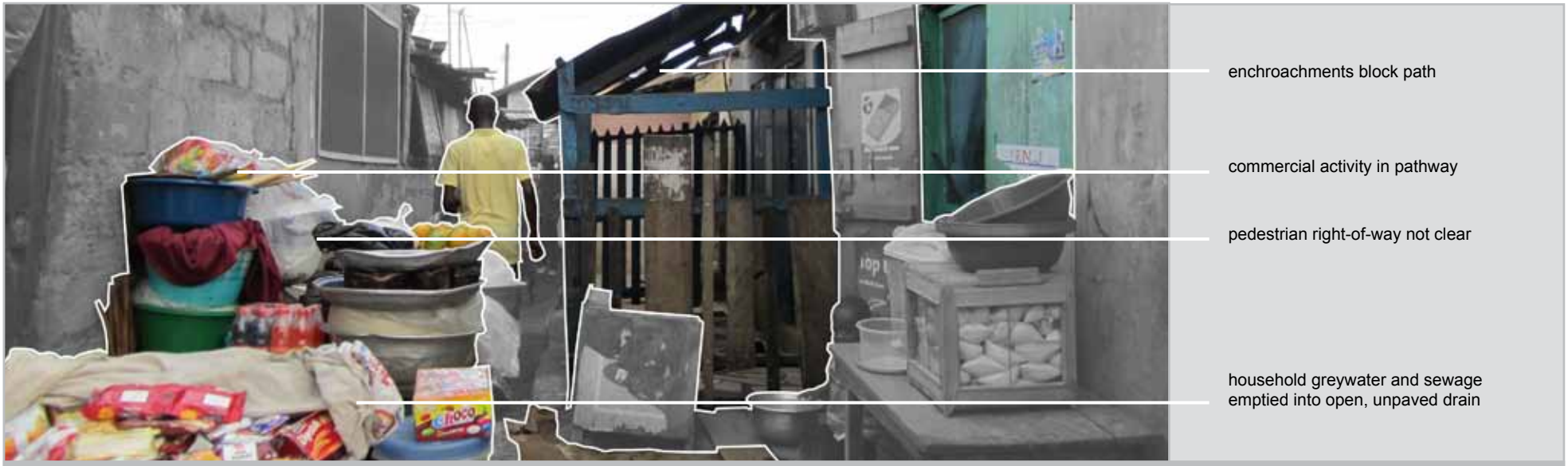
NIMA EAST ZONE 1 CONNECTOR PATHWAY:
Neighborhood commerce/trade activities

Legend

- Artisan Service
- Beauty Service & Retail
- Food & Beverage Service
- Retail Clothing
- Retail Other
- Retail Provisions
- Service Other
- Small-Scale Manufacturing
- Tailoring Service

Base data source: AMA UMLIS; Geological Survey Dept;
Site data: Earth Institute MCI.
Map by Earth Institute MCI (2012)

Map 6. **Economic Activities:** Nima East Connector Pathway



Visualization 3. **Existing Condition:** Nima East Connector Path

DESIGN NEED

The social and economic bustle of this pathway is quite impressive, particularly when residents returning home from work stop by to pick up vegetables and grains, phone credit, hardware or a bowl of *tuo zaafi* for dinner.[2] This path can serve as an example of local ingenuity in the face of layout limitations, whereby some specific upgrading interventions can support its potential and take the "next step," as a dynamic mixed-use walkway. The success of this crucial corridor is limited, since it was never designed to accommodate so much activity. Small businesses encroach and narrow the paths, which also double as public space and are often blocked by social events or by craftsmen at work. Informal, open drains create an obstacle and often cause erosion that makes the paths even more difficult to navigate. There is also an absence of basic amenities, most importantly, of street lighting, the lack of which discourages women from using the pathway at night out of fear of being harassed or assaulted. More safety concerns arise from motorcyclists accessing the pathway to return home; while they do so only for lack of other options, this is particularly problematic, given that children play at various parts of the pathway. Additionally, there appear to be no public toilet facilities anywhere along the pathway.

[2] *Tuo zaafi* is a meal imported by Northern Ghanaian migrants, consisting of pounded cassava and cornmeal, typically served with meat smothered in a red sauce made of peppers.

DESIGN STRATEGY

For the longterm welfare and safety of residents, paths need to be recognized as essential access routes. These essential routes need to be maintained to ensure that they can be used in case of emergency. To do this, the surface must be even and the path kept clear enough for people, deliveries and emergency vehicles. The challenge is how to do this without losing the existing vibrant social and economic activity that is

Visualization 4. **Proposed Redesign:** Nima East Connector Path

happening there. Here are some suggestions:

- **Designate access routes:** There tend to be a few paths through the community used as major routes between key points of the neighborhood: designate those key routes for improvement.
- **Establish minimum clearance:** A minimum width of 2m is necessary for circulation and emergency access. Any encroachments on that must be removed.
- **Construct covered drains:** Drains should be located in the center of the path and covered with a grate. That way future building or kiosk construction will not hamper their functionality. Covering the drain is essential for safety and sanitation.
- **Pave the path surface:** An even, finished surface will improve access. The old or disabled can get around more easily, and this will also enable wheeled carts and bicycles to be used, thereby improving overall service delivery (e.g., waste collection, product deliveries, evacuation in the event of medical emergencies, etc.). Paving combined with better drains will also prevent erosion. Using pervious paving blocks will help minimize flooding and help restock groundwater reserves.
- **Establish "flex commercial/social zone:"** Designate any leftover space as a zone for commercial and social activity. This can take many acceptable forms: Containers/kiosks, Building extensions, Tables/stands, Covered "porches." A clear distinction should be created between the circulation path and the flex zone for commercial and social use. This can be done with a material change and a low curb.
- **Encourage commercial retrofits:** Provide expertise and financing assistance to households along the widened path. This will encourage expansion or renovation of existing buildings to include new commercial space that will reinforce the path as a key corridor.
- **Commercial setback:** Future construction must include commercial space in the initial construction or a 2m first-floor setback to accommodate commercial activity. Upper floors can extend to the path boundary.

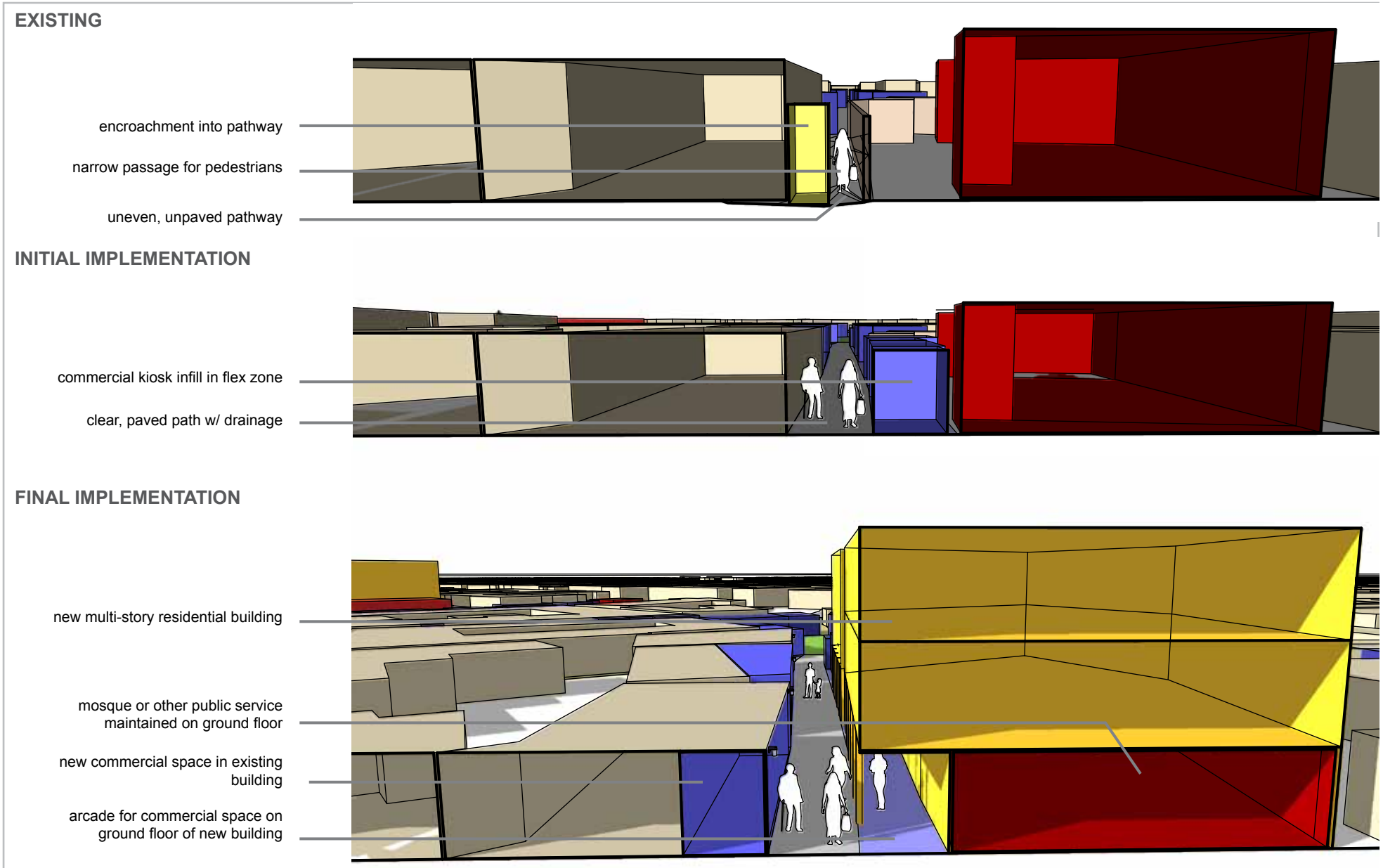
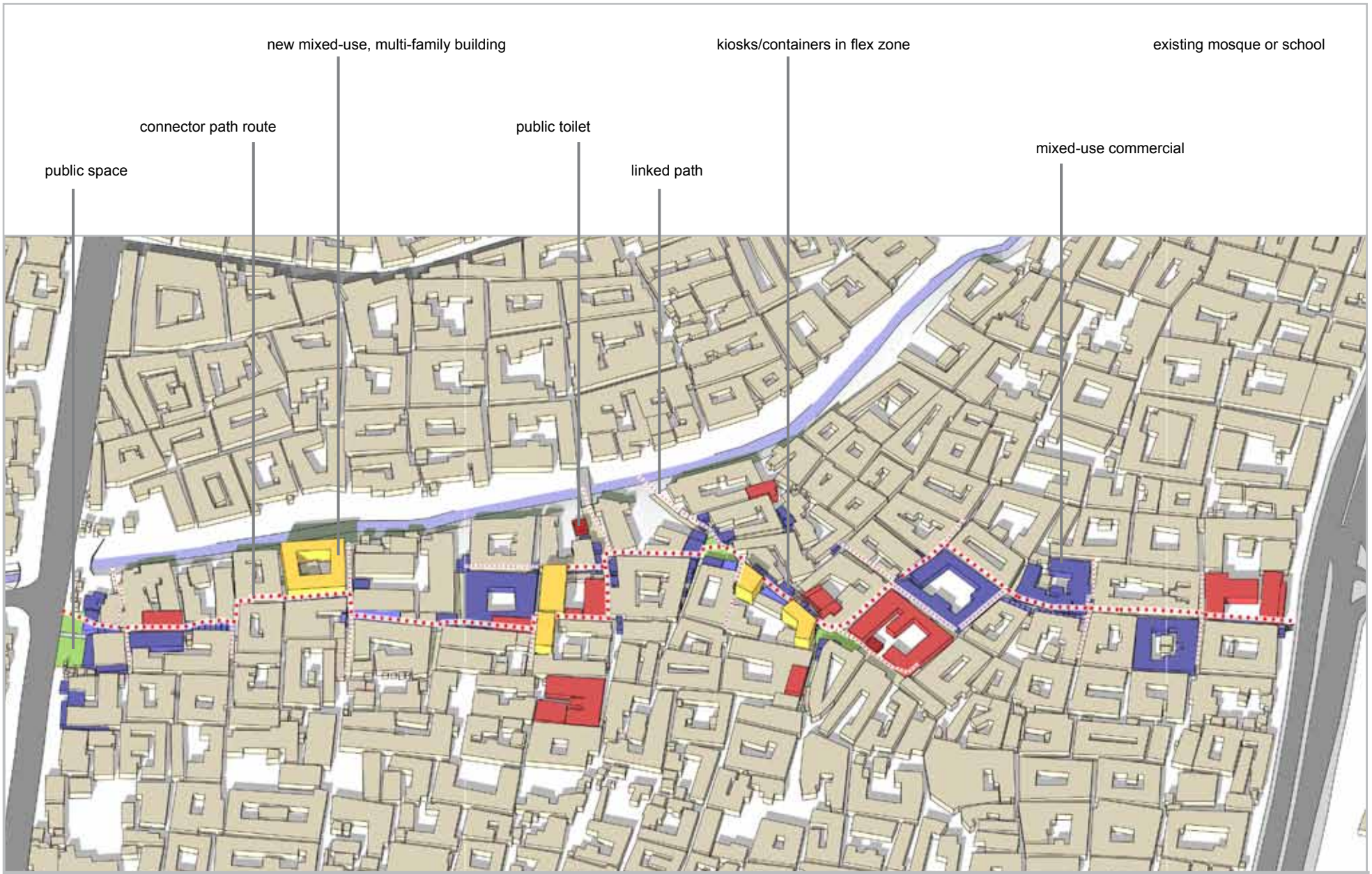


Diagram 2. **Concept Implementation Process:** Nima East Connector Path



Site Plan 2. **Concept Site Plan:** Nima East Connector Path

WATERWAYS

Rethinking Accra's Drainage Conditions

In this section we offer a brief overview of the drainage network, beginning at the Greater Accra Metro level down to AMA's boundaries, in order to provide a snapshot of how upstream activities can affect some of the city's most vulnerable neighborhoods. We subsequently summarize conditions for the relevant MCI sites – Kwao Tsuru, the Sempe drain in Korle Gonno and the Chemu Lagoon – and discuss the environmental health challenges present in each site.

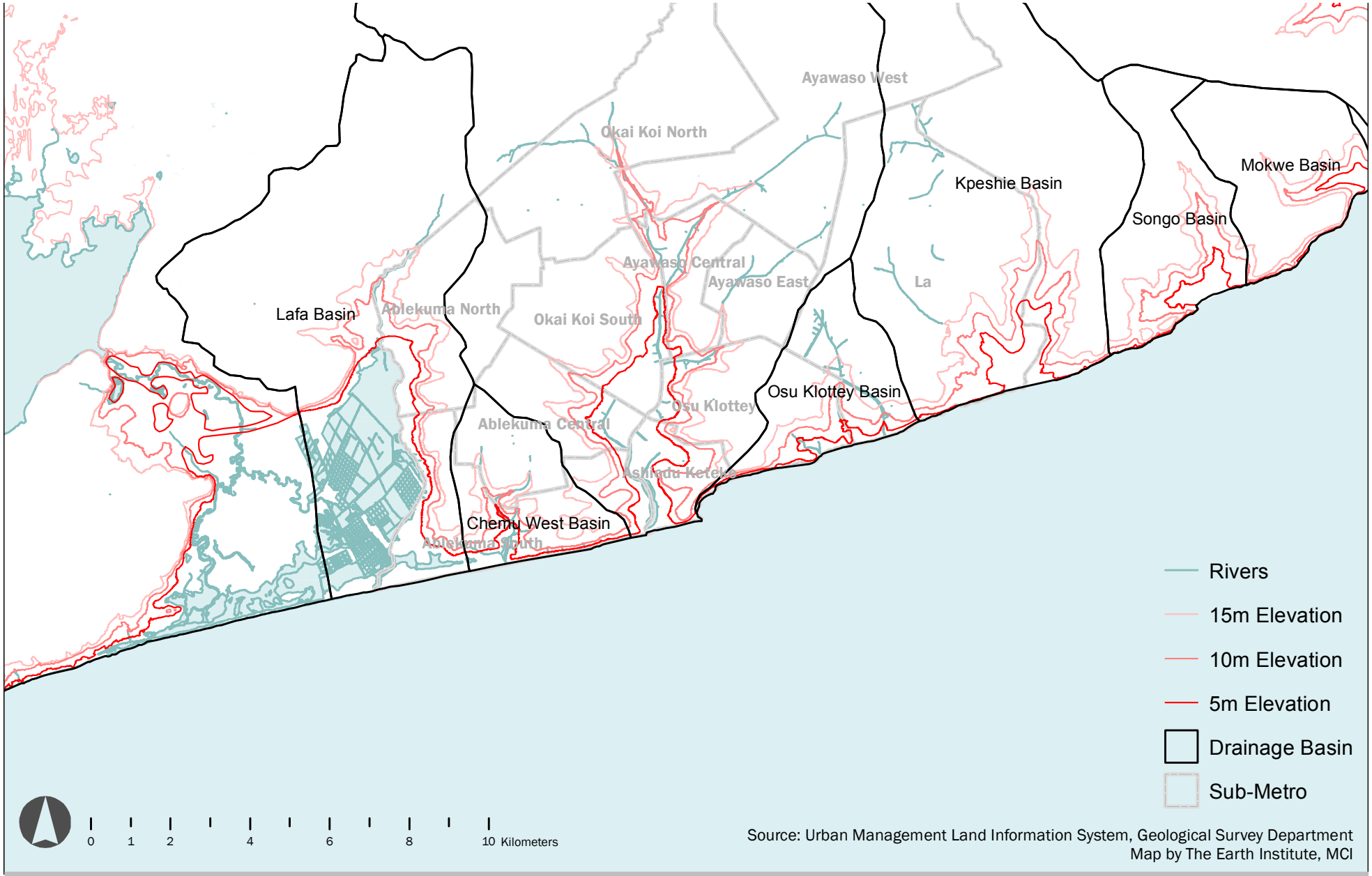
DRAINAGE NETWORKS IN THE GREATER ACCRA METRO

The Greater Accra Metropolitan Area is comprised of eight basins – the Densu, Lafa, Chem, Korle, Osu, Kpeshie, Songo and Mokwe. Map 7 delineates their estimated boundaries.

In general, most stormwater runoff in Accra is channeled through primary (natural) drains, such as the Odaw River and the Korle Lagoon. The Nyarko study (2002, as cited in SWITCH 2010) estimates a runoff coefficient in urbanized areas of GAMA to be between 0.7 and 0.95, which may increase with further impermeable surface coverage, as a result of rapid urbanization. As the runoff coefficient and peak flow increase, of course, the hydraulic capacity of secondary and tertiary drains will decrease, resulting in an increase in flood risk, particularly in the lower-lying areas of Accra. Secondary drainage infrastructure (larger drains, such as the Nima Drain) is designed with a 25-year maximum rainfall occurrence (SWITCH, 2010).

Drainage Challenges

Drainage is a prominent issue in Accra, as most drains also carry grey and black water, as well as solid waste (SWITCH, 2010). Most secondary and tertiary drains in Accra are uncovered, and in numerous cases, drain linings



Map 7. **Drainage Basins:** Accra Metropolitan Area

have been eroded. It is also common across the city to see shacks, kiosks and containers built directly over drains or blocking them. The dumping of solid waste into drains is especially problematic in Accra, particularly in unplanned settlements, as residents dump their trash (including plastics and inert material) into drains so that they do not have to keep it in their home. As mentioned above, the dumping of refuse into drains by residents is in part a strategy to cope with a poor level of municipal solid waste management. Over time this has become embedded in the behavior of residents, and significant time and resources will need to be invested in order to sensitize them as to proper waste disposal methods in order to improve drainage in their community; this of course assumes significant improvement in the MSWM level of service.

Municipal Service Provision

The relevant service providers for drainage are the Hydrological Service Department (HSD) within the Ministry of Water Resources, Works and Housing, and the Department of Urban Roads (DUR).[1] The HSD is responsible for construction and maintenance of primary and secondary drains, while the DUR is responsible for tertiary drains – that is, street gutters alongside roads. Currently, the Urban Environmental Sanitation Project within the AMA is also assisting with maintenance of the Korle Lagoon.

Recent studies have shown very real concern and dissatisfaction over the quality of drainage services in Accra. A survey by the World Bank and AMA (2010:30) cited gutters and drains as ranked second as a priority among seven municipal services, while gutters and drains were ranked last in satisfaction with the level of service. Such concerns were also echoed during a survey by MCI (Earth Institute 2012a: 113) in the community of Korle Gonno, which ranked drainage first among all municipal services requiring intervention in order to improve the level of service.

[1] The Department of Urban Roads operates within both the Ministry of Urban Roads and Transport and the relevant District Assembly, in this case, the AMA.

THE SETTLEMENT/WATERWAY INTERFACE: MCI SITES

Given that the MCI program activities took place within the AMA, we limit our analysis accordingly. All MCI sites were located within the Korle and Chemu basins, the most urbanized, containing many of the city's poorest neighborhoods (AMA 2010). The primary drains in these basins, such as the Korle and Chemu lagoons, are well known for their polluted state (Boadi and Kuitunen, 2002). Poor design and maintenance of secondary and tertiary drains are fairly common in these communities, particularly Old Fadama, Chorkor, Dansoman, Nima, Maamobi Kwao Tsuru and parts of Kaneshie (AMA 2010, SWITCH 2010, Earth Institute 2012a, Earth Institute 2012b).

The MCI sites – **Kwao Tsuru, Sempe Drain in Korle Gonno and the Chemu Lagoon** – are representative of different conditions respecting the interface between Accra waterways/drains and poor communities. Common problems exist, to varying degrees, at all the sites: flooding, erosion, disease and water pollution. Most of these problems occur because the natural water system has become synonymous with the constructed drainage system. Although both systems will always be integrated, it is important to develop spatial plans that reflect the nature of each portion of the overall system. To fix this, the natural system needs to be reconstructed so that natural filtration and flood mitigation is restored, with mechanical or manual systems put in place to safely handle what can't be managed naturally.

To be successful, the system restructuring described above will have to be citywide and beyond the scope of the neighborhood-level considerations proferred here. In support of such a major undertaking, this proposal will look at how individual neighborhoods can reconstruct a functioning waterway/people relationship. The approach varies according to where the waterway of concern is situated in the overall drainage network: constructed open drain, natural river, stream or lagoon.

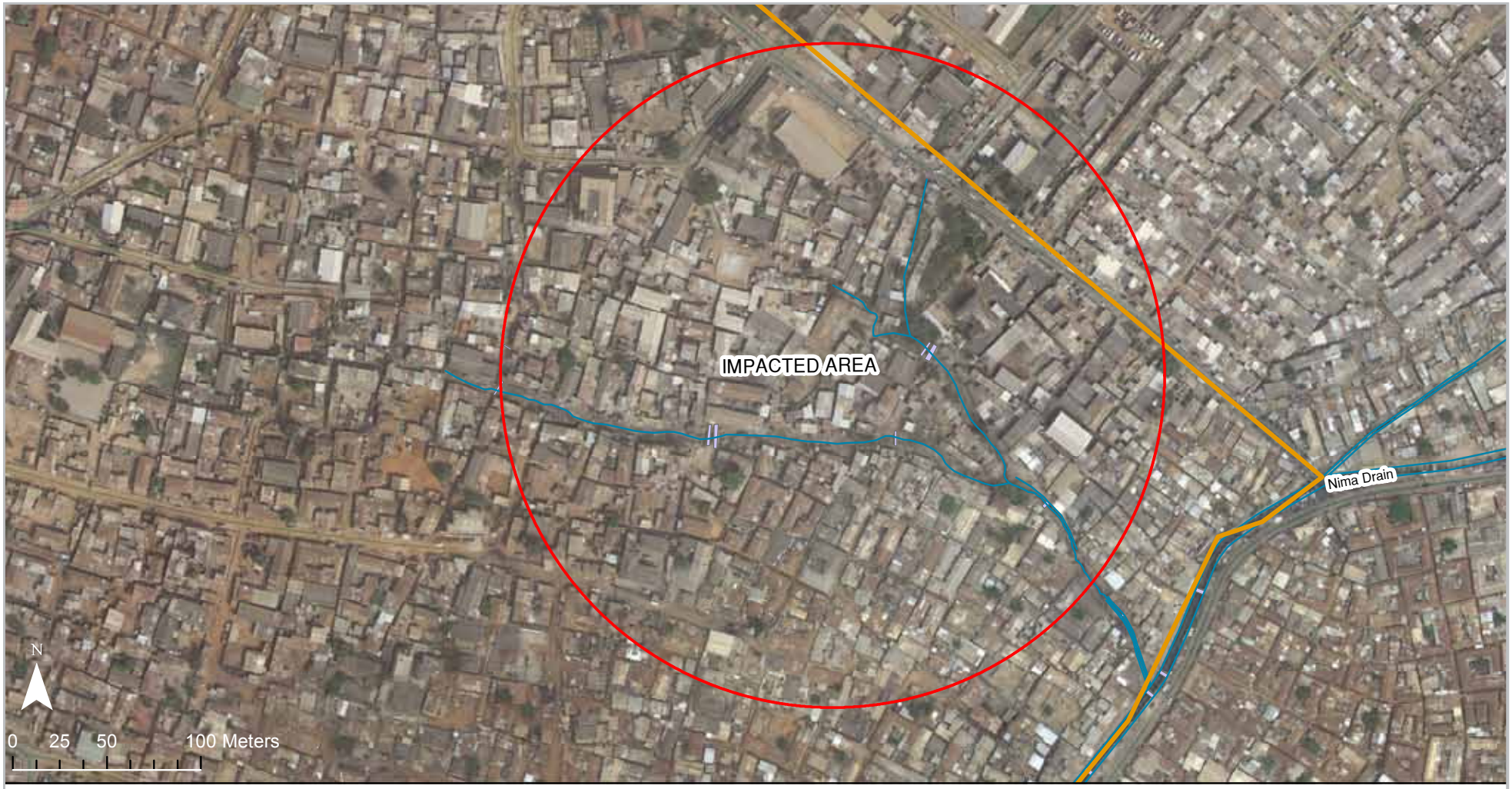
chapter 3

Open Stream

Kwao Tsuru Drainage Stream

Kwao Tsuru is a predominantly migrant neighborhood located in the East Ayawaso Submetro (see Map 9). The community has a high population and housing density, with a mixture of compound housing and shacks taking up the vast majority of the land. There was very little spatial planning in the area, so it is unsurprising that there is no stormwater sewer system in the community and very few gutters. Sanitation (including access to toilet facilities) and solid waste management are both extremely poor. The housing density and low access to municipal services factor into an alarmingly low state of environmental health in the community, where risk of disease is high.

An eroded stream running through its northwest section has become so polluted over the years, with grey and black water and solid waste, that water cannot channel well, resulting in stagnant, sludge-like conditions. The greater part of the stream remains unpaved, with a few portions paved either by local authorities or individual households, especially where it runs through or right in front of their homes. The local clinic records a high incidence of cholera and malaria, the latter attributed in part to the breeding of mosquitos in the stagnant, polluted stream water. Risk is especially high for those residents who have built structures alongside the stream.



KWAO TSURU (in Accra New Town)
Stream Impact Area

Legend

- Boundary Area
- Stream/Drain

Base map data source: Accra Metropolitan Assembly UMLIS; Geological Survey Department.
All other data layers: Earth Institute MCI, 2012.

Map 8. **Area of Analysis:** Kwao Tsuru

KWAO TSURU (in Accra New Town)
Community Demarcations

Legend

— Boundary Area

Base map data source: Accra Metropolitan Assembly UMLIS; Geological Survey Department.
All other data layers: Earth Institute MCI, 2012.

Map 9. **Community Demarcations:** Kwao Tsuru

MCI conducted site assessments in Kwao Tsuru in 2010 and again in 2012; the latter concluded that the conditions along the stream have further deteriorated. Filth continues to choke the stream, where the waste is composed of mainly 'pure' water sachets and other forms of plastics, plastic bottles, milk and other metal tins, Styrofoam, and organic waste from nearby houses. Human excreta are thrown either directly on the ground or in plastic bags by the stream, indicating that residents continue to use the area to defecate or dispose of these so-called flying toilets.

An interview with residents revealed that there is generally no serious flooding when it rains, due to the sloppy nature of the landscape, which helps carry the rainwater into the Nima drain. However, they indicated that during the rains, the stream occasionally overflows its boundaries, and this sometimes threatens the houses close to the stream.

DESIGN NEED

The existing stream cuts a relatively narrow and steep path through the area. It is consistently used to dump waste and for defecation. The edge of the bank is lined with toilets that empty directly into the streambed, and many informal drains have been run to the stream's edge. The stream itself is choked with plastic waste, and the banks, heavily eroded in some areas, are also covered in waste. These sanitation issues are exacerbated because people often use the narrow space between their homes and the water for food preparation and washing, substantially raising the risk of food contamination.

The challenges in effectively addressing the conditions of a community such as Kwao Tsuru are: 1) to bundle dredging and waste removal works with a significant investment in awareness-building aimed at changing waste disposal methods gradually over time; 2) to rehabilitate the stream to a level where infiltration can occur and reduce peak flow during the rainy season; 3) to introduce spatial design techniques aimed at a more harmonious interface between residential and commercial land uses and the stream; and 4) to plan and provide for demand-driven sanitation and waste management services along the stream area, so that residents are not compelled to use the stream for defecating and disposing of their personal waste. It is important to note that while such interventions may dramatically reduce environmental health risks and improve overall livability and the relationship between residents and the stream, activities taking place *upstream* also need to be accounted for, to further mitigate adverse conditions and ensure that any improvements are lasting ones.

Visualization 5. **Existing Condition:** Kwao Tsuru Drainage Stream

DESIGN STRATEGY

The Kwao Tsuru drain is part of the original, natural drainage basin of the region. The goal is to remove current contaminants from the water and create a spatial plan that avoids future contamination. The stream would then become a resource to the neighboring residents, rather than a hazard.

- **Establish missing services:** One of the reasons people use the stream for dumping waste and defecation is that adequate facilities are not available. Waste collection points and public toilets need to be established nearby (but outside of the buffer zone). Private toilets must be relocated away from the stream and should include proper septic or pit waste collection.
- **Reinforce stream bank:** The new vegetation will help control erosion in the long run, but immediate measures need to be taken to stop the erosion that threatens nearby structures. The retaining walls need to hold back soil without stopping infiltration and vegetation. This can be done with stone-filled wire blocks.
- **Create buffer zones:** Natural streams have a buffer area called the riparian zone. This area is vegetated and gradually slopes to the water, filtering groundwater before it enters the water and providing the temperature control/nutrients to create a healthy water ecosystem. Recreating a buffer zone protects the water while also keeping people from engaging in unsafe water behaviors. To do this, the area directly adjacent to the stream must be cleared of debris and encroachments. Once this is done, a temporary fence should be put in place, to keep people from recontaminating the area and to protect the new plants as they take root and begin to thrive. (Relevant experts would need to be brought in to implement proper remediation.) Once the area is clean and safe, residents will be able to use parts of the buffer area for agriculture.

Visualization 6. **Proposed Redesign:** Kwao Tsuru Drainage Stream

- **Establish path along buffer zone:** Once the stream edge is stabilized, the boundary between the buffer zone and residences needs to be turned into an asset. Fencing in the stream will be challenged locally if it does not bring immediate improvements to the area's livability. People will find ways to get in and continue to dump there. They already use the bank as a circulation path, and numerous footbridges exist across the stream. These paths could be formalized into a paved circulation route, with some public spaces and seating incorporated. When the stream is clean and residents have established new waste disposal habits, the buffer could be used as a shaded park space and community garden for the neighborhood. Once the fence is gone or partially open, the path will be important to reinforce the boundary of public and private space. That definition is crucial to fighting encroachment.
- **Reconfigure homes to face path:** Since few roads reach this area of Kwao Tsuru, the new path can become a new economic and social center. To do this, buildings need to be renovated so that some space opens to the path and so containers and kiosks can be introduced to provide services. The increased level of activity and visibility will also help fight the tendency to encroach on or dump in the area.

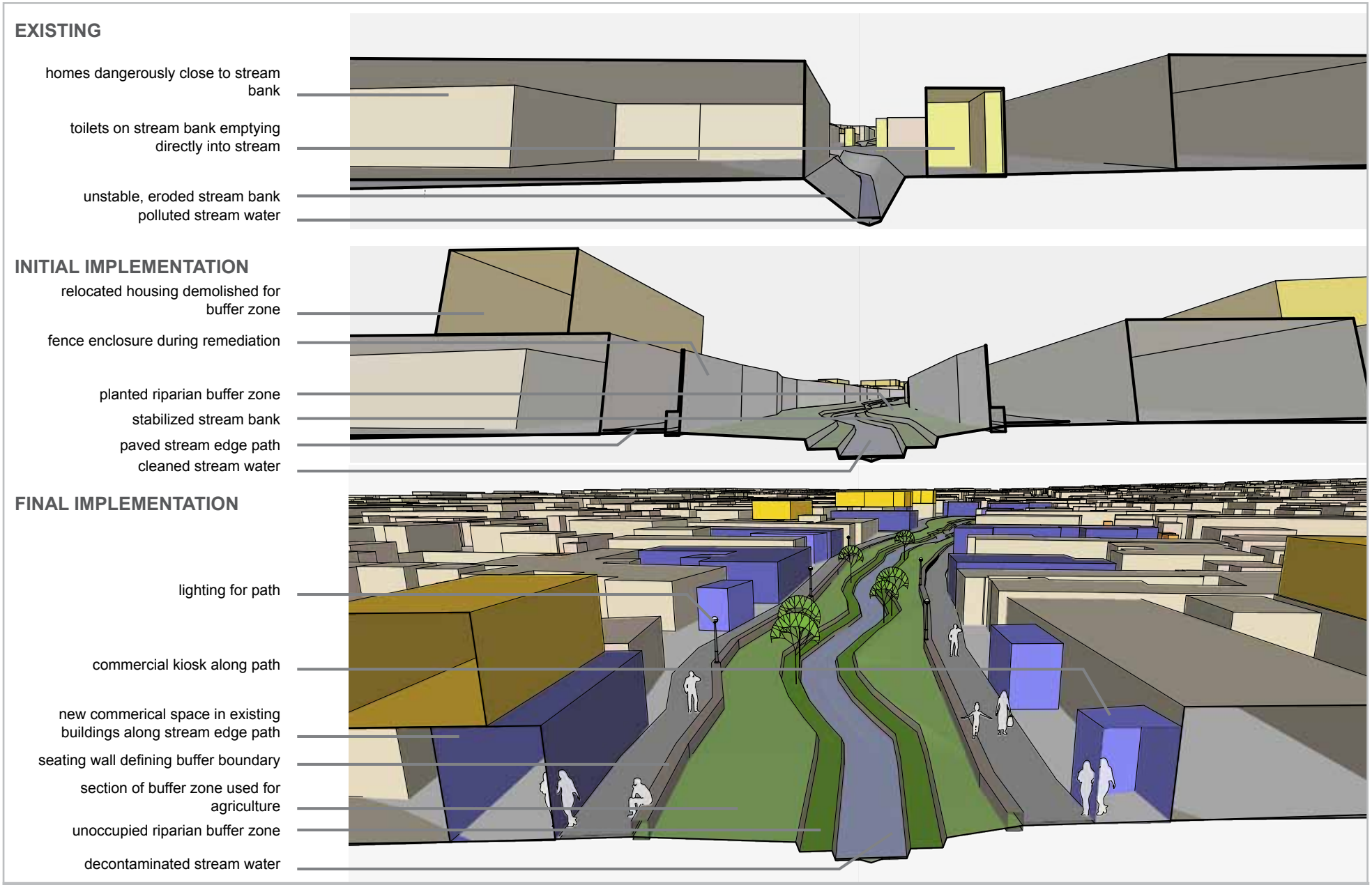
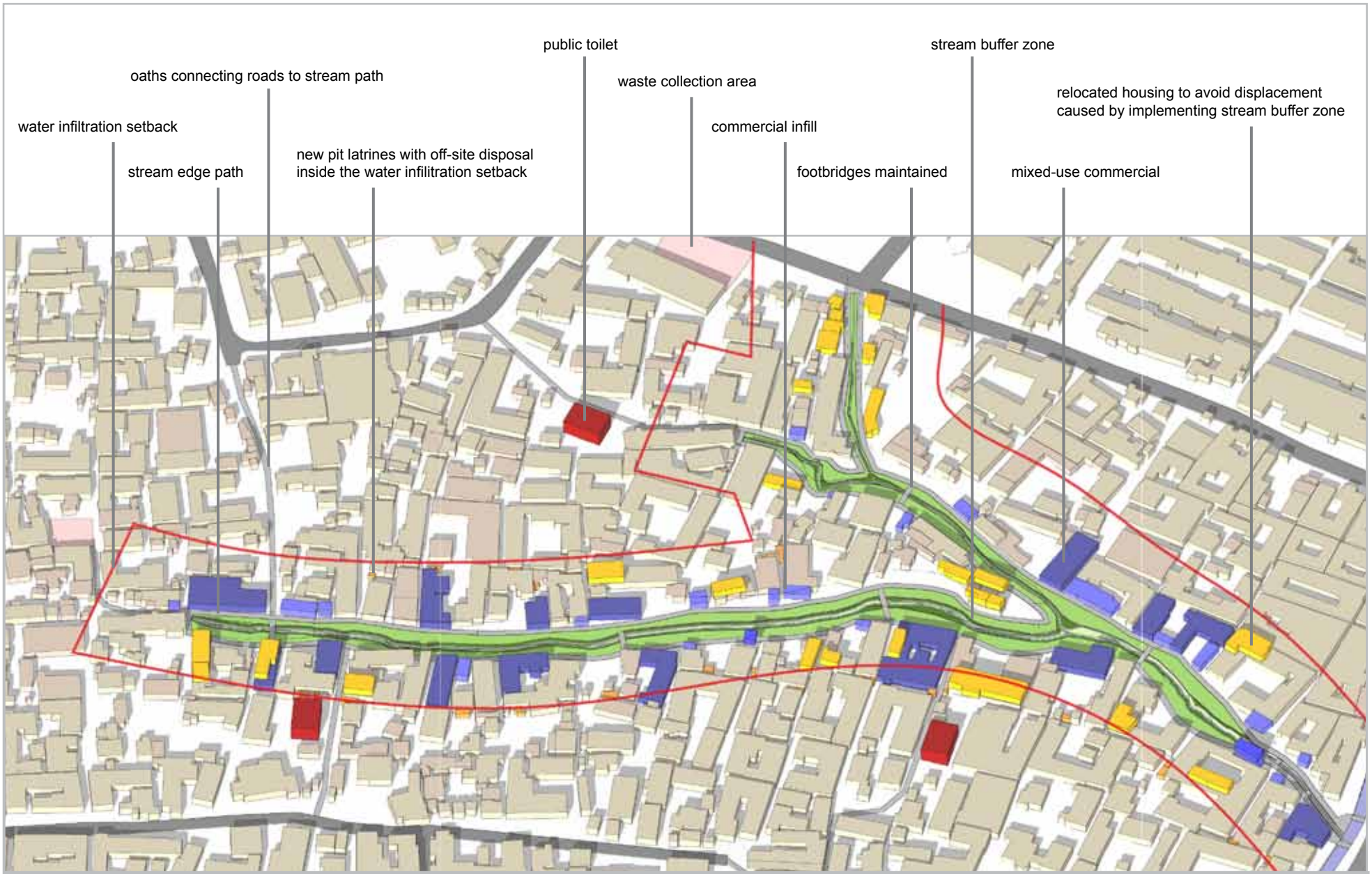


Diagram 3. **Concept Implementation Process:** Kwao Tsuru



Site Plan 3. **Concept Site Plan:** Kwao Tsuru Drainage Stream

chapter 4

Paved Drain

Sempe Drain

The Sempe Drain is a secondary lined but uncovered drain approximately 300cm wide, located in the community of Korle Gonno near the Korle Bu Teaching Hospital. Korle Gonno is by and large an indigenous Ga community, but some migrants have recently settled there to be close to their places of work, in the Central Business District.

Interestingly, Korle Gonno is one of a small number of indigenous Accra communities planned with a grid system and good transport infrastructure. However, the housing stock in this community is quite old and has deteriorated significantly over time. Many houses have converted their bathrooms into bedrooms to accommodate relatives or to rent to tenants. The poorest quality housing stock in Korle Gonno is located in the residential block where the Sempe drain passes through, between Glover Addo Road and Nii Tacki Owuowo Road, near to the St. Mary's Secondary School (Earth Institute 2012a).

The block measures approximately 38,141 square meters. The drain channels stormwater from Guggisberg Avenue and other nearby street gutters, ultimately discharging into the Korle Lagoon, untreated. GIS building footprint data from 2006 show there were 175 structures in the block, but this number has certainly increased exponentially since then. Much of the housing here is made of sandcrete, or of a combination of sandcrete and timber scraps. Access to toilet facilities is extremely poor, which is the main factor behind many residents'

SEMPE DRAIN (KORLE GONNO):
Aerial Image - 2010
- Site highlighted in red

Source: Google Earth

Map 10. **Area of Analysis:** Sempe Drain

SEMPE DRAIN (KORLE GONNO):
Building Footprints - As of 2006

Legend

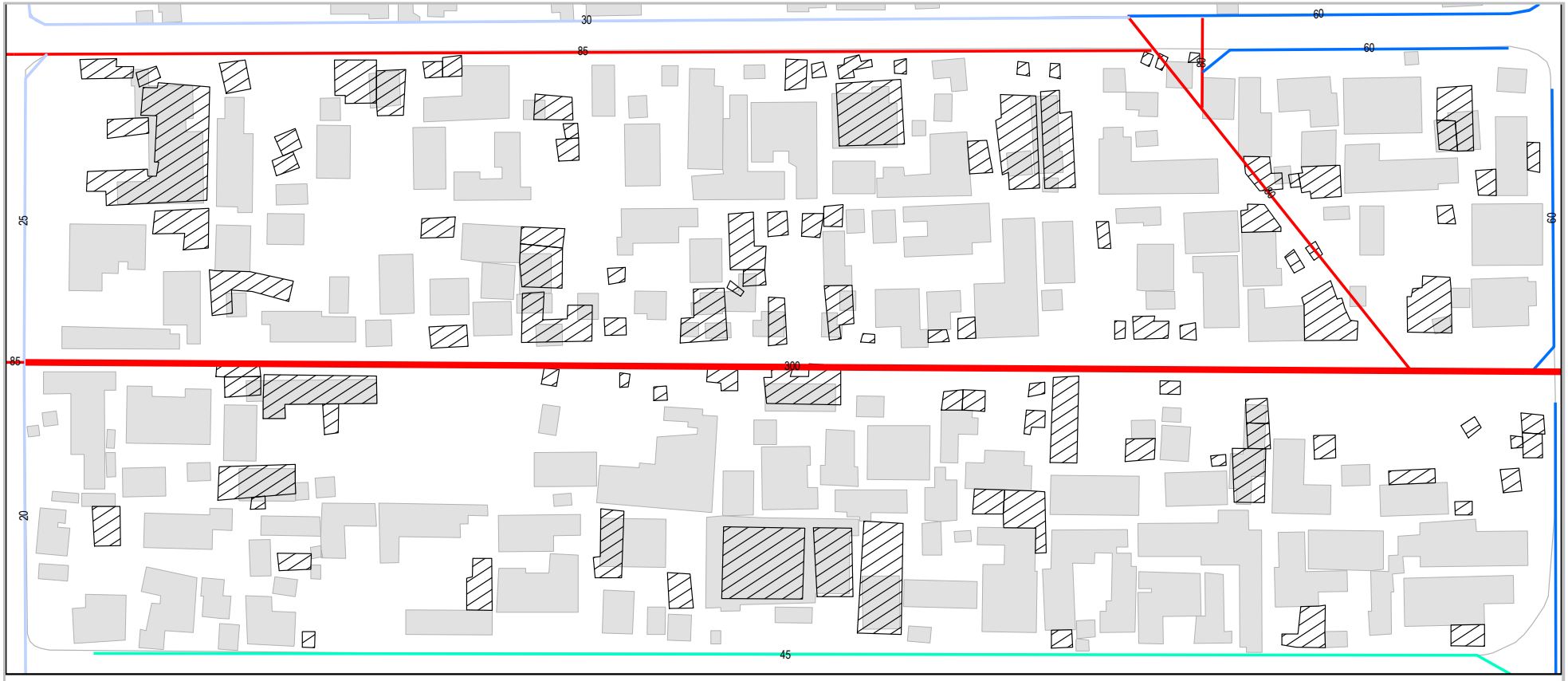
Buildings (2006)

Drain widths

- 91 - 300
- 61 - 90
- 46 - 60
- 31 - 45
- 20 - 30

Base data source: AMA UMLIS; Geological Survey Dept.
Drainage data source: Earth Institute MCI, Columbia University

Map 11. **Building Footprints and Drainage, 2006:** Sempe Drain



SEMPE DRAIN (KORLE GONNO):
Building Footprints - As of 2010

Legend

Buildings (2006)
New Buildings (2010)

Drain widths
91 - 300
61 - 90
46 - 60
31 - 45
20 - 30

Base data source: AMA UMLIS; Geological Survey Dept.
Drainage data source: Earth Institute MCI, Columbia University

Map 12. **Building Footprints and Drainage, 2010:** Sempe Drain

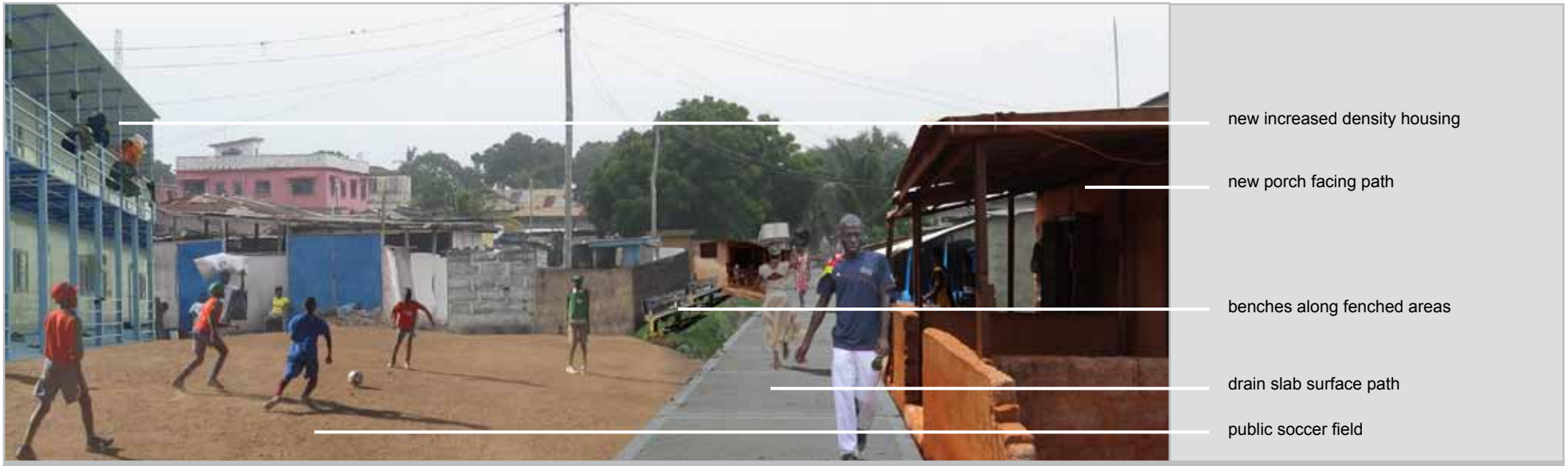
Visualization 7. **Existing Condition:** Sempe Drain

resorting to defecating outdoors in the drain, especially during the early morning and at night. The eastern side of the drain, near the St. Mary's School, is used as a solid waste dump, impeding stormwater runoff and contributing during the rainy season to the pollution of the Korle Lagoon. Additionally, groundwater seepage runs parallel to the drain inside the block. The groundwater lies stagnant in some parts of the block, attracting mosquito breeding. An in-depth community profile conducted by MCI in 2012 concluded that this block should be prioritized for upgrading, given its current deteriorated physical condition and environmental health issues.

DESIGN NEED

The large paved drain runs behind many houses and is used for garbage and defecation. This has lead to the degradation of the surrounding homes and open land and has exposed residents to unhealthful and unsanitary conditions. The drain is completely manmade and paved; there is no ecosystem to reconstruct. It is also very tightly inserted, in between existing streets and houses.

The challenge in effectively addressing a condition such as this is to reconfigure the entire block for upgrading, starting with: 1) the slabbing of the drain itself, to prevent defecating and throwing waste into it; 2) creating space for pedestrian and recreational use along the drain, and re-siting housing accordingly; and 3) providing sufficient sanitation and waste management services, to account for the loss of the open drain as a de-facto public toilet. Provision of toilet facilities is crucial, as the problem of open defecation will only move from one location (the Sempe Drain) to another (likely the beach), if the appropriate amenities are not available to residents. The need for a complete upgrade in this block raises the obvious question of how best to mobilize the resources



Visualization 8. **Proposed Redesign:** Sempe Drain

necessary to implement the project; this aside, the spatial design approach taken is critical in the upgrading process.

DESIGN STRATEGY

Slabbing the drain is only a starting point. If the newly created space is not planned, it will attract another set of undesired activities. Therefore, thoughtful planning, in consultation with the community, needs to be undertaken well before implementation begins. Since the drain is located in line with the existing street grid, it could provide a natural community circulation and recreational space. Possibilities abound:

- **Slab drain:** Enclosing the drain allows for more control of those pollutants that would otherwise feed into the natural system downstream. Doing so will also ensure that people will not be exposed to the contaminated water.
- **Redevelop as a public path:** Once slabbed, the new space on top of the drain and the adjacent space should be redeveloped as functional spaces for the community. If not, they will continue to be used for dumping and for building encroachments.
- **Reconfigure adjacent buildings:** The path needs to become the center of the immediate community's activities, if people are to use it. Right now, it is treated as the back alley. As a result, people feel that their dumping and encroaching have no ill effect. The houses adjacent to the drain should be reconfigured to face the drain. This step should improve the livability for residents and should ensure that there is always activity along the path. This improvement could be as simple as adding a door and building a porch between the existing house and the path edge or building improved kitchen facilities for each house. In either case, it is important that the new construction align with the edge of the path and reinforce the established boundaries.

- **Reclaim adjacent space for new amenities:** The new path needs to be linked to new amenities to establish its usefulness. Also, to ensure that the area doesn't continue to be used for defecation and waste dumping, those services need to be provided nearby. In addition to public toilets and waste collection points, other amenities might include a soccer field, event space, etc. Additional private land along the drain would be needed to provide such amenities.
- **New higher-density housing:** To use the adjacent land, an agreement must be reached with surrounding landowners. This would be done by providing an upgraded, larger home on a portion of the property, in exchange for the public use of another portion. It is important that the existing housing capacity not be reduced in the implementation of drain improvements. The new path and public space should have well-defined boundaries and functions. It is important that the area not be perceived as leftover space that can be reclaimed for any use by an individual. The new housing and public facilities should be strategically located to reinforce the public boundaries.

This page intentionally left blank

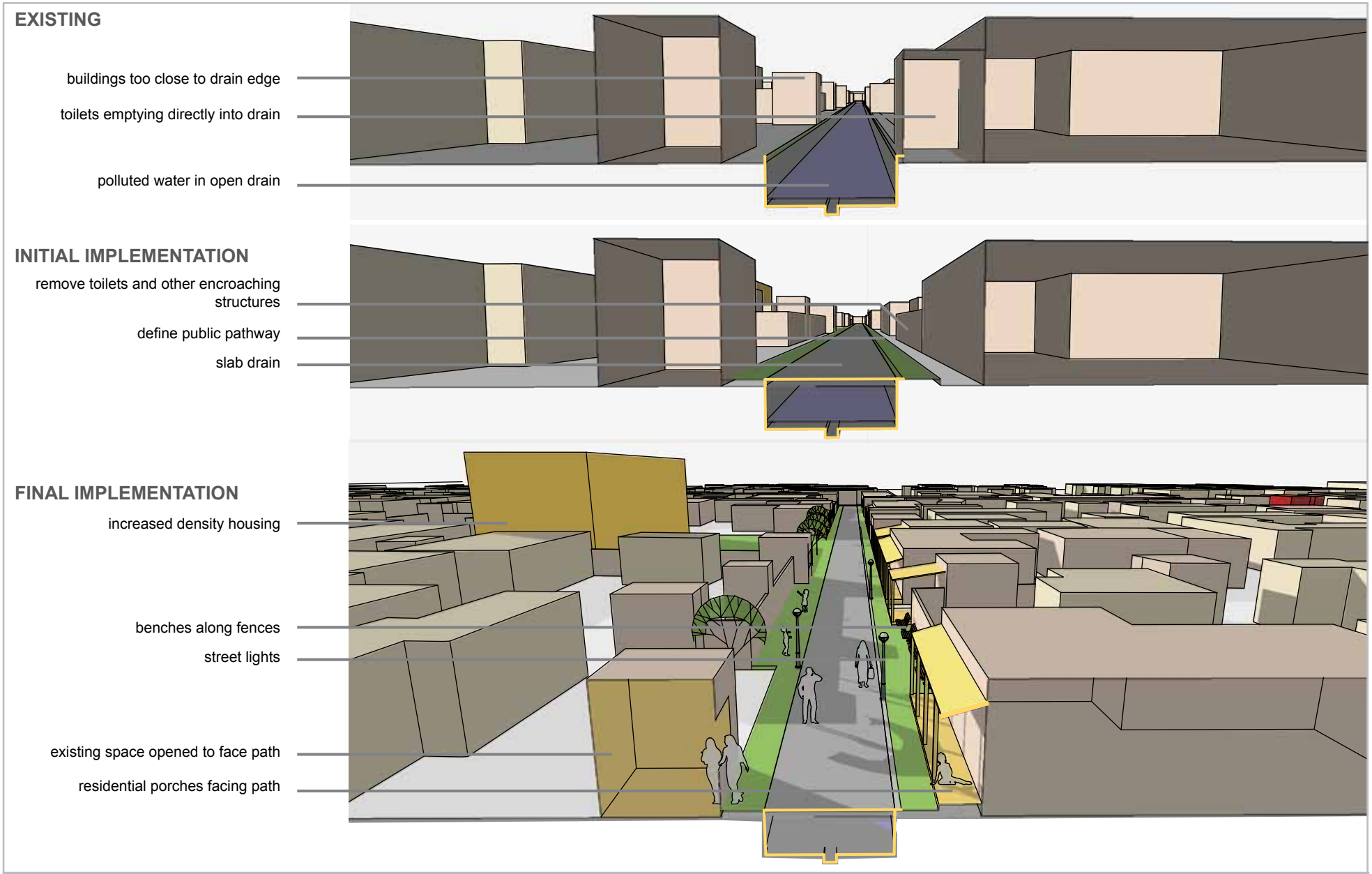


Diagram 4. **Concept Implementation Process:** Sempe Drain

Site Plan 4. **Concept Site Plan:** Sempe Drain

chapter 5

Lagoon

Chemu Lagoon

The Chemu Lagoon is located between the communities of Gbegbeyise and Chorkor in the Ablekuma South Submetro and is one of Accra's key primary drains. The area, including these communities, is known as "Chemuna." The lagoon receives stormwater from upstream, flows directly to the ocean and is notorious in Accra as being one of the city's "waste sinks." A site assessment conducted by MCI in 2011 documented the following conditions:

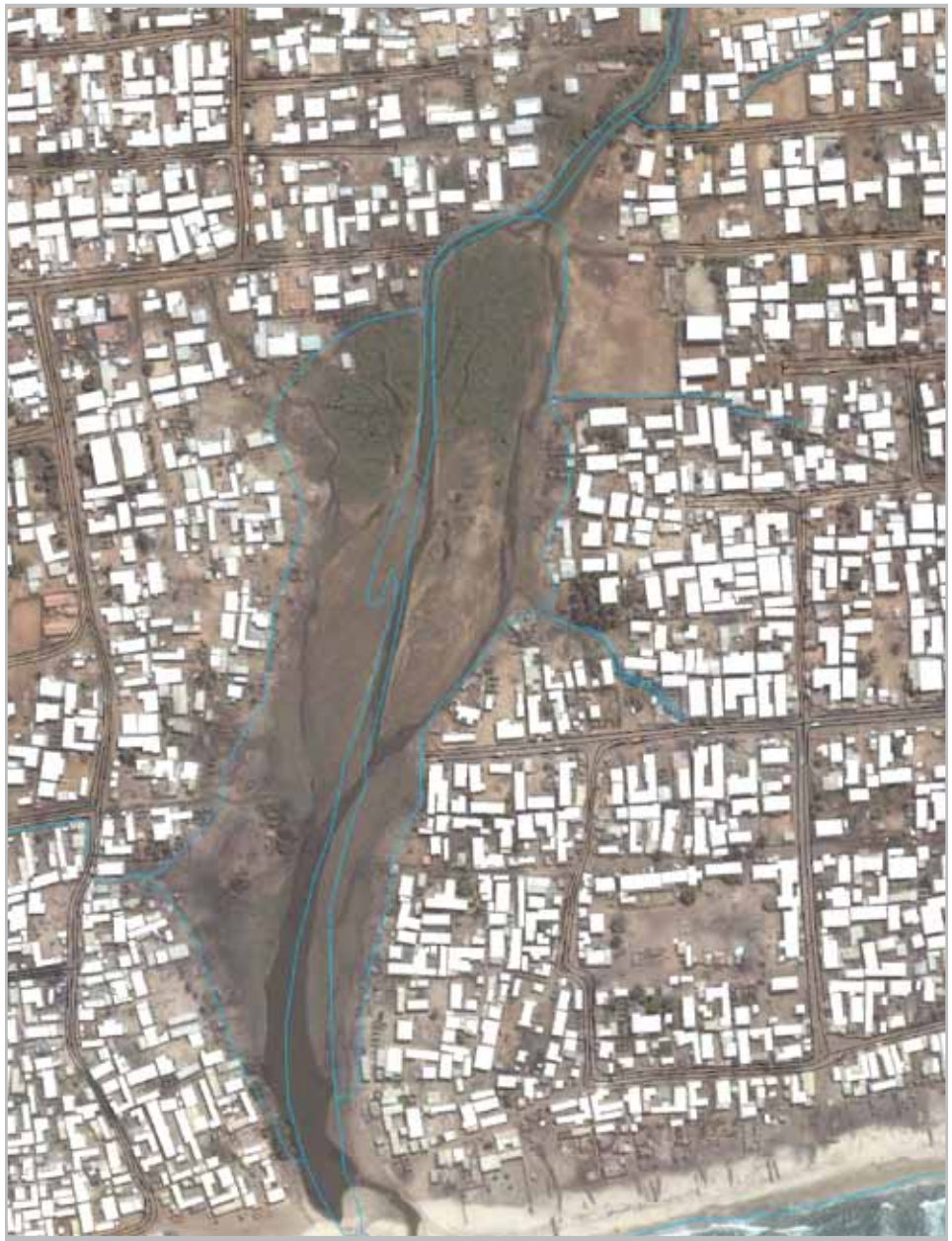
- Severe choking from solid waste inside the lagoon, adjacent channels and drains
- Frequent incidence of open defecation along lagoon environs
- Mosquito breeding and frequent reports of cholera outbreaks, as reported by the Chorkor assemblyman
- Schools sited nearby, exposing students to disease-carrying mosquitos near the lagoon
- Reports of fights between residents and people defecating in the open
- Sediment mounds mixed with waste, located close to homes for months at a time
- Illegal waste collection and incineration service
- One communal container for refuse, for the entire lagoon environs
- New structures being constructed on land created by recent dredging/narrowing of the lagoon waterway.

AREA ANALYSIS: CHEMU LAGOON

Chemu West Basin

Source: Urban Management Land Information System, Geological Survey Department
Map by The Earth Institute, MCI

Map 13. **Area of Analysis:** Chemu Lagoon



Map 14. **Building Footprints 2002:** Chemu Lagoon

Map 15. **Building Footprints, 2010:** Chemu Lagoon

Map 16. **Key Points:** Chemu Lagoon

Visualization 9. **Existing Condition:** Chemu Lagoon

Map 16 illustrates the conditions of the Chemuna environs as recorded during MCI's 2011 field assessment.

DESIGN NEED

The Chemu Lagoon area presents a rather formidable challenge for the city authorities and local development partners, as a significant amount of dredging, waste removal and remediation is needed. Additionally, as is the case with Kwao Tsuru, the Sempe Drain and many other settlements adjacent to waterways, there is very poor access to toilet facilities, propagating a level of acceptance with open defecation along the lagoon. The pervasiveness of cholera outbreaks following the rainy seasons also poses a significant issue, considering the number of primary and secondary schools nearby, as well as residences. Reconfiguring land uses may be needed, in combination with environmental remediation interventions.

DESIGN STRATEGY

The natural cleaning and flood management ability of the lagoon had been completely destroyed. It has been turned into a water-transmitting channel, rather than a water-retaining lagoon. To reestablish this function, the floodplain must be recreated and the slum reconfigured as a resilient waterfront community.

- **Define flooding zones:** To live safely near floodprone areas, it is important to define the flooding zones. A low, vegetated area (floodplain) should be established, to contain minor water level rises from regular rain. Areas that flood regularly during heavy rains

Visualization 10. **Proposed Redesign:** Chemu Lagoon

can be used for community activities without permanent structures (soccer fields, event space, etc.); areas with only periodic flooding (once a year or less) can have structures, but the buildings need to be constructed with appropriate precautions, to ensure that residents are safe. Nothing can be constructed in that zone that could be contaminated or that could contaminate the water (toilet blocks, water supply, waste disposal, etc.).

- **Build permanent relocation housing at new Lagoon Community edge:** In preparation for recreating the floodplain, new housing must be constructed that will relocate residents currently residing in the floodplain zone. The housing should be located along the perimeter road proposed below, to reinforce its use and identity.
- **Locate and build necessary services:** Long-term public toilet blocks, water supply points and waste collection points should be constructed, based on the new zoning.
- **Fence off designated lagoon area:** It is important to protect and define the remediation area. Control of the area is crucial during remediation so that people cannot dump waste or re-encroach on the site. Professional clean-up and environmental remediation can begin from there. Functional features can be added to the fence line to change the perception of the boundary and to encourage community investment in the project. Features could include things like seating, information boards, children's games, etc.
- **Build lagoon perimeter path/road:** Once the lagoon is clean and public perception changed, the lagoon will serve as a public asset. Establishing public use of that edge during construction will help that transition and can turn the lagoon into the center of the neighborhood.
- **Allow temporary commercial structures along the road:** Small-scale economic activity will likely be attracted to the new road, which will help reinforce the identity of the lagoon edge. However, this area is still within the periodic flooding zone and should be planned accordingly. No permanent buildings should be constructed there.

Kiosks and containers could be placed on elevated platforms and moved or closed during high rain periods.

- **Open new public space:** Once the preliminary clean-up and land work are complete in the fenced area, the higher periphery zone of the site can be used for public use (soccer fields, events, etc.). Build gates into specific areas that can be closed. Schools, organizations, etc., could potentially use keys to access the area as trust is developed.
- **Build temporary housing:** Since houses in the periodic flooding zone will need to be rebuilt, temporary housing should be established along the perimeter road. Shipping containers could be stacked and transformed into housing. This is a good option because it reduces material and construction costs and can be constructed and deconstructed quickly.[2]
- **Rebuild flood-ready housing cores:** Each home in the periodic flooding zone should have a raised housing core that will minimize property loss and health risk during flooding. A loft area can be built so that people and their belongings can be moved temporarily above floodwater levels. A platform should also be installed above average flood levels, for such contamination-prone functions as kitchens, water storage, bathing and toilets. In this area, people can only construct pit latrines with pits sited above the average flood levels. The core building would be constructed to include these essentials. The core might be attached to existing structures, or homeowners can add buildings/rooms as needed.
- **Open lagoon as a public park:** In previous generations, people swam and fished in the lagoon. If this kind of transformation can happen throughout the city, the lagoon could once again become a place of family recreation for area residents.

[2] Shipping container housing is being constructed throughout the world. One such project is illustrated in an article from *Architectural Record*: http://archrecord.construction.com/features/humanitarianDesign/Japan/container-housing.asp

This page intentionally left blank

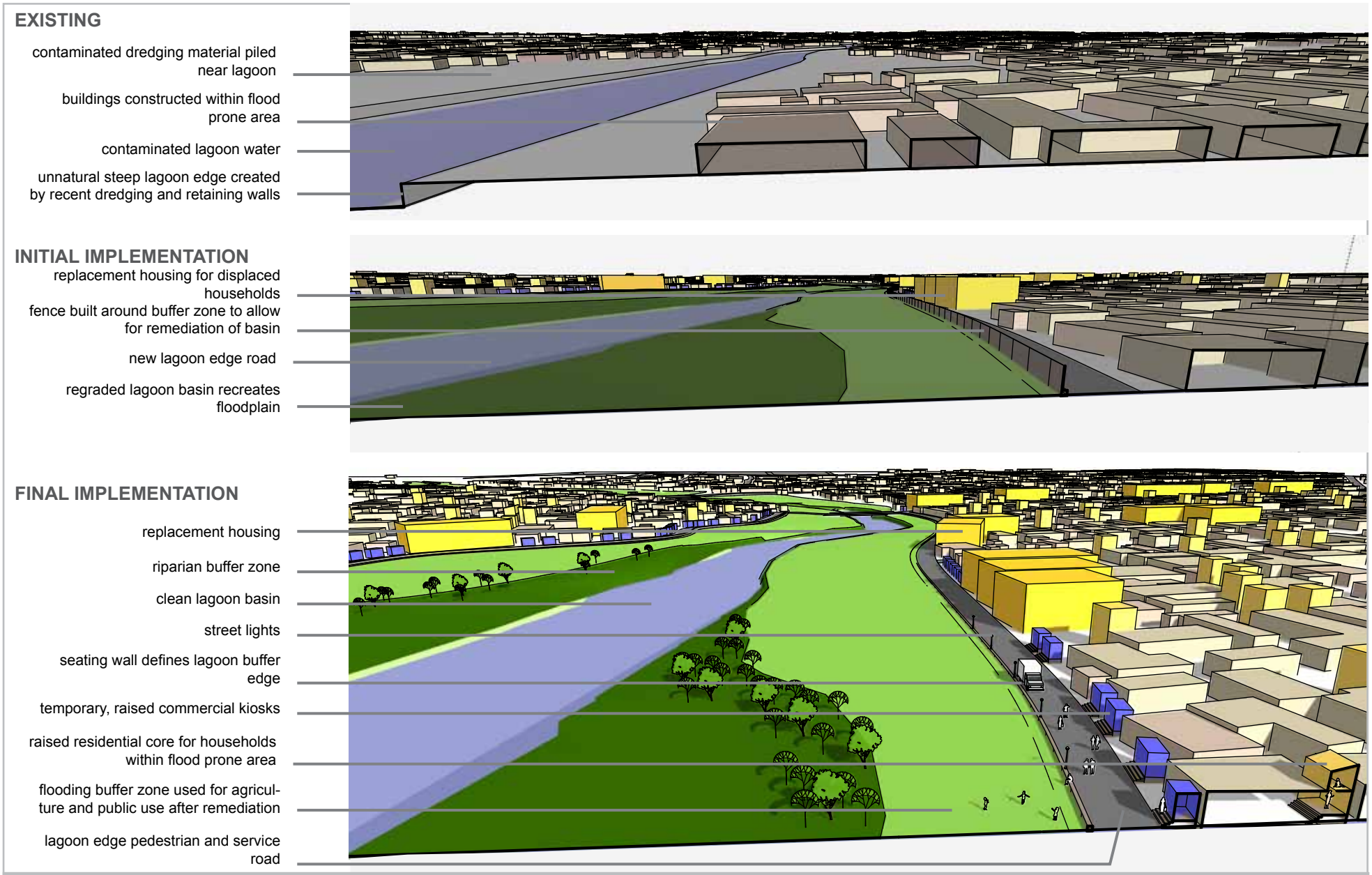


Diagram 5. **Concept Implementation Process:** Chemu Lagoon

Site Plan 5. **Concept Site Plan:** Chemu Lagoon

References

Accra Metropolitan Assembly (2010). *Medium Term Development Plan*, 2010-2013.

Banerjee, A.F., Duflo, E. (2011). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. New York: Public Affairs.

Boadi, K.O. & Kuitunen, O. (2002). Urban waste pollution in the Korle Lagoon, Accra, Ghana. *The Environmentalist,* 22(4): 301-309.

Brand, RR. (1972). The spatial organization of residential areas in Accra, Ghana, with particular reference to aspects of modernization. *Economic Geography,* 48(3): 284-298.

CHF International (2010). *Accra Poverty Map*: *A Guide to Urban Poverty Reduction*. Accra: CHF International.

Earth Institute at Columbia University (2012)a. *Millennium Cities Initiative AMA Community Upgrading Profile: Korle Gonno*.

Earth Institute at Columbia University (2012)b. *Millennium Cities Initiative AMA Community Upgrading Profile: Nima-Maamobi Drain Area*.

Ghana Statistical Service (2000). 2000 Population and Housing Census. Accra: Ghana Statistical Service.

Konadu-Agyemang, K. (2001). A survey of housing conditions and characteristics in Accra, an African city. *Habitat International, 25*(1), 15-34.

Larbi, W.O. (1996). Spatial planning and urban fragmentation in Accra. *Third World Planning Review,* 18(2): 193-215.

Owusu, G., Agyei-Mensah, S., & Lund, R. (2008). Slums of hope and slums of despair: Mobility and livelihoods in Nima, Accra. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography, 62*(3), 180 - 190.

Songsore, J. (2009). *The urban transition in Ghana: urbanization, national development and poverty reduction*. London: International Institute for Environment and Development.

SWITCH (2010). *Towards integrated urban water management in the Greater Accra Metropolitan Area: Current status and strategic directions for the future*. Accra: SWITCH.

United Nations Development Programe (2007). *Ghana Human Development Report: Towards a more inclusive society*. Accra: United Nations Development Programme.

World Bank & Accra Metropolitan Assembly (2010). *City of Accra, Ghana: Consultative Citizens' Report Card*. Washington, D.C: World Bank.