



Fig. 1 Zongo landscape.

ZONGO

Water Infrastructure and Public Life

FORMING A SUSTAINABLE INFORMAL SETTLEMENT
IN CAPE COAST, GHANA

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A truly ecological landscape architecture might be less about the construction of finished and complete works, and more about the design of ‘processes,’ ‘strategies,’ ‘agencies,’ and ‘scaffoldings’—catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect, and differentiate.

– James Corner, 1997¹

Project Overview

The project, “ZONGO Water Infrastructure and Public Life,” proposes long-term strategies for restructuring the current unsanitary and inefficient water systems in a small Muslim community called the Zongo in Cape Coast, Ghana. Rather than developing a master plan to be executed by the municipal government, the design

All images by author.
¹ James Corner, “Ecology and Landscape as Agents of Creativity,” in *Ecological Design and Planning*, ed. George F. Thompson and Frederick R. Steiner (New York: John Wiley, 1997), 102.



Fig. 2 West Africa > [country] Ghana > [city] Cape Coast.



Fig. 3 Map of the Zongo and edge demarcations.

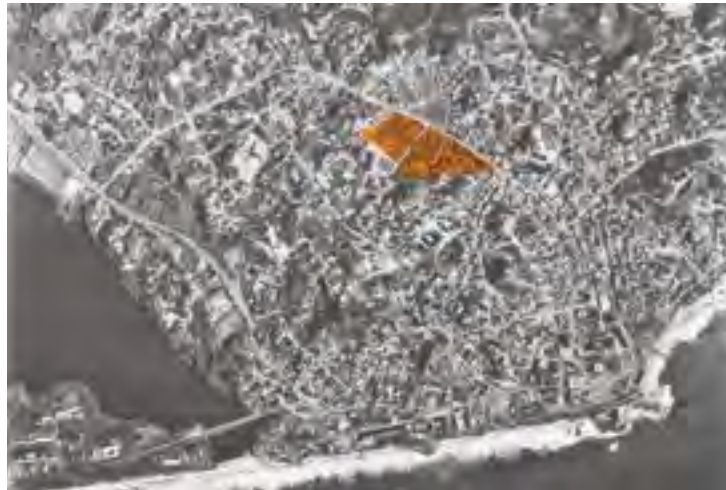


Fig. 4 Map of Cape Coast and the Zongo region (in orange).



Fig. 5 Mosque under construction.



(left to right) **Fig. 6** Zongo religious leader. **Fig. 7** Bath house in the Zongo. **Fig. 8** House with courtyard in the Zongo.



Fig. 9 Urban condition – Zongo.



Fig. 10 Urban condition – Cape Coast.

approach creates a community-based watershed framework that collects, filters, stores, distributes, and absorbs water by incrementally adding new constructed systems to extant ones. By constructing these systems of roof, edge, ridge, weir, and ground over time, residents form a new hydration and social infrastructure. To achieve a sustained result, new community-based organizations are necessary. These organizations will be able to produce simple architectural and landscape systems that perform like a watershed, while simultaneously providing the Zongo with new opportunities for social and cultural transaction. Integral to this way of working with the community is a design approach that privileges a bottom-up, grassroots strategy in which residents drive the entire process from beginning to end.

This project aims to overlay political, cultural, and ecological contexts to create a vast range of choreographed systems able to adapt to changing environmental conditions, needs, and desires. Instead of a determined layout, the goal is a flexible system that empowers the community with new social and economic opportunities.

Political Context

Throughout Western Africa, religious minority Islamic communities live in impoverished residential and commercial districts known as Zongos, the Hausa word for "stranger quarter."² These economically marginalized, politically isolated communities can be found in almost every urban center. In a predominantly Christian area in

² Deborah Pellow, *Landlords and Lodgers: Socio-Spatial Organization in an Accra Community* (Westport, CT: Praeger, 2002), 1.



Fig. 11 Public space in the Zongo.

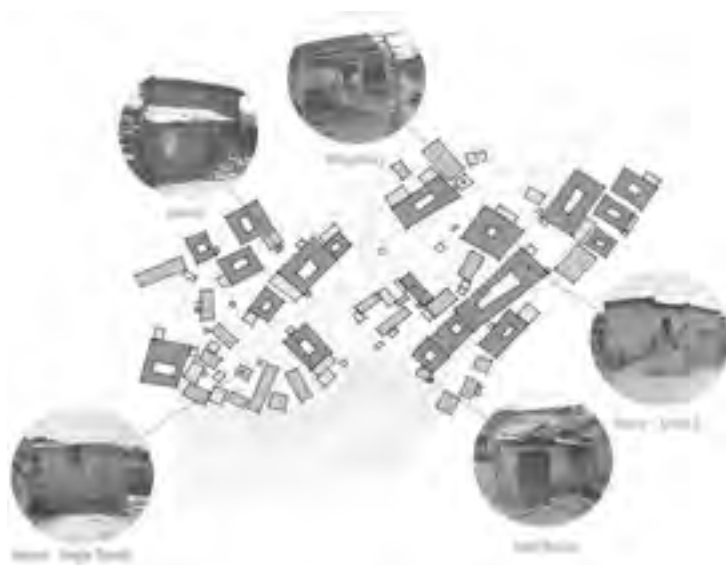


Fig. 12 Building structure typologies in the Zongo.



Fig. 13 Watershed of major open sewage canal in the Zongo.



Fig. 14 Watershed of the Zongo community.



Fig. 15 Watershed of Cape Coast.

the central region of Cape Coast, Ghana, the Zongo originated in the late 19th century as a temporary settlement for Nigerian Hausa migrants who were recruited by the majority Fante to fight against British colonial authorities. The Zongo settlement has now been situated in Cape Coast for over a century but its position within the city remains provisional. While its community members participate in most of Cape Coast's economic, cultural, and political activity, the city's municipal government forbids construction of any permanent architecture in the Zongo district. The one exception is the large mosque built in cast-in-place concrete that sits at the edge of the neighborhood, along one of Cape Coast's busiest streets. Despite the precariousness of political exclusion that has resulted in a destitute built environment, the majority of the Zongo residents view this area as their permanent and rightful home. They have become dependent upon the market adjacent to their community for trading. Moving to another city or even to the outskirts of Cape Coast would be devastating to their livelihoods.

Pocketed within the dense urban fabric of the city, the Zongo territory itself is sited on a steep slope and is demarcated by Cape Coast's municipal government complex to the north, an old dumping ground for waste to the west, and Kotokaraba, the city's largest market to the east. Inside this boundary, the organization of earthen dwellings appears to have been constructed haphazardly without recourse to any underlying systematic urban plan. Thin passages weave around the houses, making room for pedestrian movement through the neighborhood. Occasionally these paths open out into larger vacant spaces that serve as sewers for the deposition of trash and human waste. It is precisely where these sewers connect to the urban water infrastructure that the neighborhood meets its oppositional, predominantly Christian context. In contrast to the Zongo's unplanned urban fabric, which has grown organically over time, the rest of the city's structure echoes Western colonial influences in its systemized, grid-like organization and orthogonally-built, internally-contained dwellings that adhere to land use regulations.

Cultural Context

Clusters of housing dominate the Zongo urban fabric with small shops lining its edges. While Western ideas about the single-family home often assume a private unit for a nuclear family subdivided into parts assigned to different activities, the Zongo offers a very different conception of dwelling. Indoor and outdoor spaces together constitute a house and are of equal importance, satisfying different needs for the inhabitants. Just as the interior provides privacy and shelter from the sun and rain, the shared exterior courtyard sponsors human exchange and serves as the site for domestic activities such as washing and cooking. When inhabitants require more

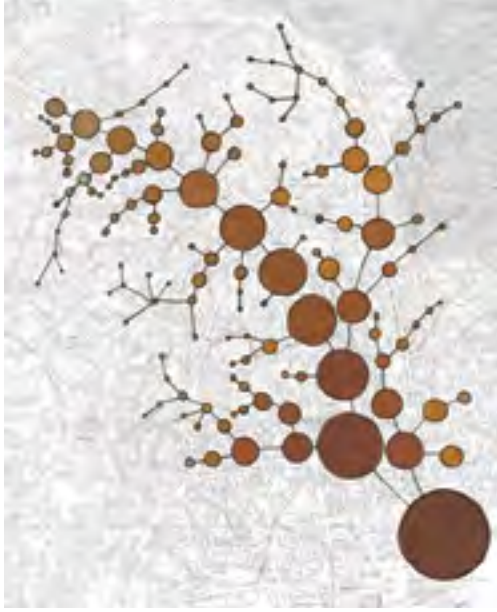


Fig. 16 Compounding effect of dirty water collecting in Cape Coast.



Fig. 17 Annual rainfall in Cape Coast—water scarcity (orange) and water flooding (blue).



Fig. 18 Open sewage canal in the Zongo.

space, new components such as bath-houses, shelters for tenants, or porches, can be added to either the courtyard or the structure. These houses have the ability to expand or contract quickly depending upon need, and the form of the house has developed over time to accommodate cultural modifications. In the past century, for instance, the roof systems have changed from flat to pitched roofs. Aside from the house, shops and other temporary structures are often assembled in the morning just to be taken down once night falls. The built elements of the Zongo, therefore, are always evolving and act as fundamental players in its cultural geography.

Ecological Context

Water is the most urgent issue at hand not only because of sanitation and erosion, but also because of its cultural significance. At the intersection between culture and ecology is perhaps the most important daily ritual to take place in the Zongo: washing five times a day before prayer.

Presently, vast networks of open sewers containing acid rain run-off, trash, and human waste move down the slope of the Zongo, through the rest of the city, and empty out into the ocean creating increasingly unsanitary conditions downhill. The amount of water the region receives is also an issue. Over the course of a year the community receives plenty of water (44 inches), but the amount of rainfall per month

is extremely inconsistent and there are long periods of flooding and drought.

To resolve these problems, water not only needs to be collected and stored on site, but also separated by use so that the clean water is not contaminated. While the existing built systems of the Zongo fail to do this, a natural watershed system is able to collect, store, filter, distribute, and absorb water through a series of linked dynamic processes related to the land, climate, and other ecologies. The system is comprised of high areas (ridges) connecting to low areas (valleys). Water runs from the high to the low, accumulating more and more volume as various tributaries merge with one another. Water is distributed through the branches of the watershed's rivers and streams, and also collected and stored in ponds, lakes, and aquifers, where it is filtered through plants and sediment, and absorbed by permeable ground surfaces. If the community could develop its infrastructure to operate in a way similar to that of a natural system like a watershed, then there would be an opportunity to create a mutually reinforcing landscape in which the human systems and natural systems build upon and support one another. The constructed systems of roof, edge, ground, weir, and ridge provide a range of programmatic configurations that take on the performative attributes of the watershed, while simultaneously generating spaces for social and cultural exchange.

Constructed Systems and Process

Like a tent, the roof systems, composed of local folded corrugated metal sheets and steel trusses, would be constructed over an existing dwelling with a separate structural support. Water would be channeled to specifically chosen points or sides of the roof. In order to accommodate the courtyard house, the roof construction would distribute most of the water to the public edge of the house and a small amount to the private (fig. 19). From the roof, water would then move to the vertical edge of the structure where it could be filtered, stored, and distributed depending upon the inhabitant's needs. This edge could, for instance, become a terraced garden where the water is filtered and then absorbed by the plants and soil (fig. 20). Once the water reaches



Fig. 19 ROOF – collection at four points (1 interior, 3 exterior).

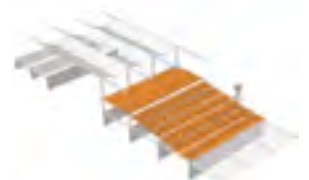


Fig. 20 EDGE – filtration and absorption.



Fig. 21 WEIR – ritual washing.



Fig. 22 GROUND – goat zone.



Fig. 23 RIDGE – gathering (high & slope).

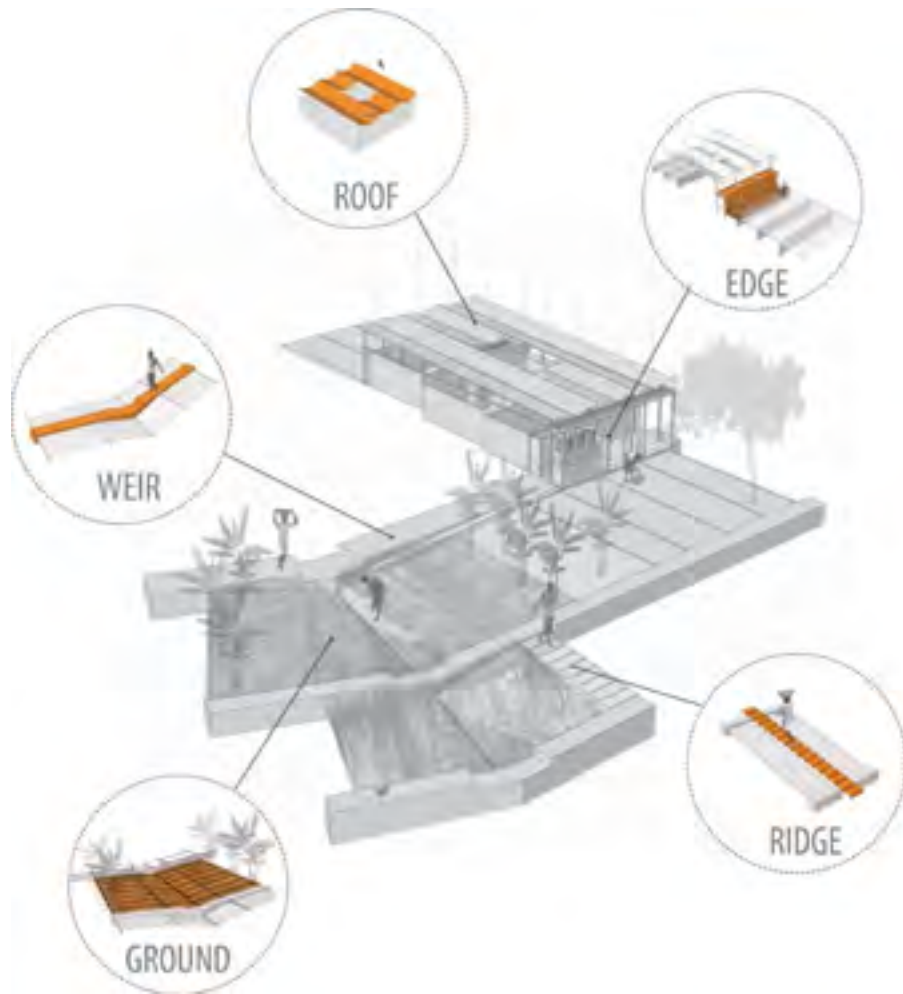


Fig. 24 Key to constructed systems.

the ground, weirs spanning from one ridge to another could slow the water flow enough to facilitate absorption in the valleys. The weir could be widened to accommodate human activity. For instance, it might include an area where a resident could wash her hands and feet before prayer (fig. 21). The ground between the weirs could be developed into zones for small-scale agriculture, water retention, or contained pasture for goats (fig. 22).

Because the ridges are the highest and driest areas within the community, they could serve as zones for the bathhouse and collective kitchen unit. Either attached to the edge of the house (fig. 26) or sitting independently along a ridge (fig. 28), the bathhouse and collective kitchen unit would perform like a small-scale watershed, collecting water from the roof, storing it in a tank, and filtering it before use. In a separate

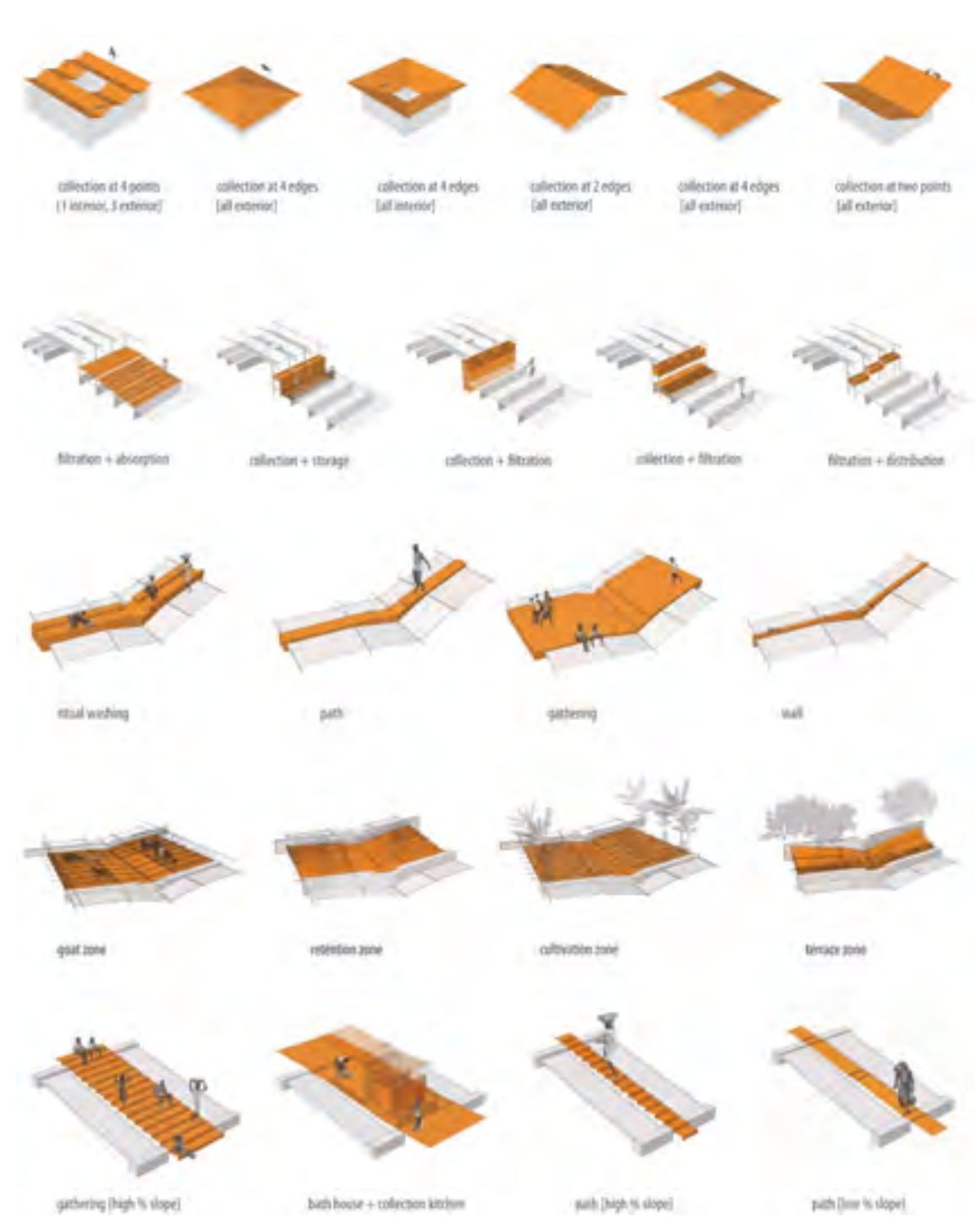


Fig. 25 Constructed systems: roof, edge, weir, ground, and ridge.

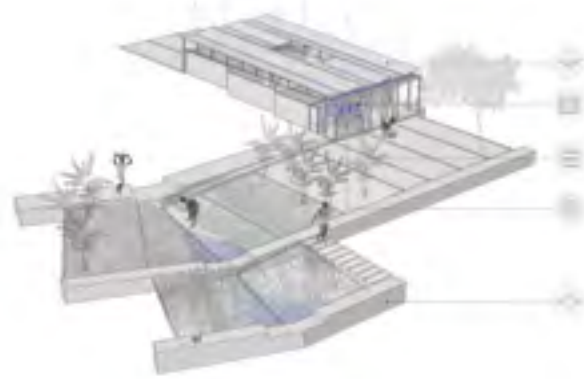


Fig. 26 Example of a roof-to-ground water system.



Fig. 27 Natural cyclical processes – wet (blue) and dry (orange).

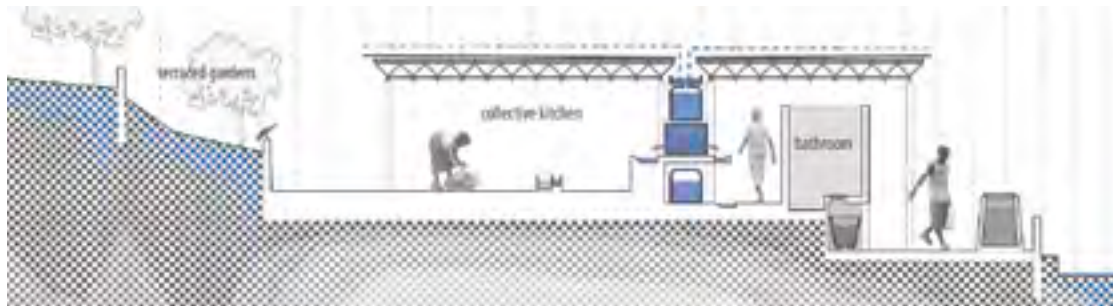


Fig. 28 Section through the bathhouse and collective kitchen showing porosity of the ground.

zone, the composting toilet would enable community members to safely mix human waste, soil, and agricultural waste products to eventually produce new nutrient-rich soil that could then be layered upon the exhausted landscape. This action is one of many dry and wet cycles (fig. 27) that could become part of the larger ecological system within the Zongo.

The effects of this set of natural and human systems would extend beyond the boundaries of the Zongo into the rest of the city. Kotokaraba Market, the primary place of exchange and gathering for all inhabitants of Cape Coast, is an ideal location to test out some of these ideas. While some of the contextual systems would need to be adapted to fit this larger framework of cultural convergence, the infrastructure of the water system, from roof to edge to ground, would remain constant. The water collected from the roof could be shared and what is learned from this demonstration could be applied to the Zongo and adapted to operate in other areas throughout Cape Coast.



Fig. 29 Constructing the Zongo – phase 1 > trash still covering the ground, old corrugated metal roofing being taken off, weirs beginning to be built, goats still roaming everywhere, little vegetation.

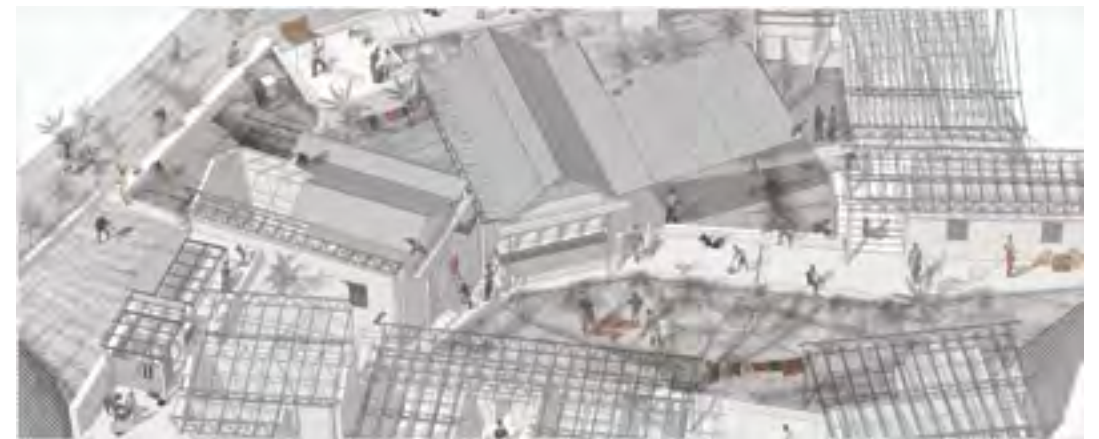


Fig. 30 Constructing the Zongo – phase 2 > trash collected, new roofs being constructed, weirs thickened to accommodate human activity, ridges and edges added, more vegetation and fertile soil.



Fig. 31 Constructing the Zongo – phase 3 > new roofs constructed, shading devices, chairs and tables along weirs added, larger trees growing along the ridges, gardens maturing, goats fully contained.



Fig. 32 Model of the largest drainage system in the Zongo and its adjacent systems under construction.



Fig. 33 Mixing of sandcrete.



Fig. 34 Application of landcrete.

Derived from the existing political, cultural, and ecological contexts, the project, “ZONGO: Water Infrastructure and Public Life,” is composed of simple structures that negotiate between the natural and built landscapes. Together they generate a flexible system that plugs into and affects local, regional, and global networks. Beyond the specific strategies for the Zongo, an open design methodology that focuses on process, adaptability, and community sustainability is especially germane to informal settlements in extremely impoverished zones around the world where human systems remain elastic and adaptable. The project, therefore, offers new ways of conceiving and implementing urban infrastructure in any culture: it not only supplies an economy of function but is also an active contributor to public life. *emj*

EMILY A. WILLIAMSON graduated with a Masters degree in Architecture from the University of Virginia in 2009 and now lives in Washington, DC. Her current research, grounded in the ideas of her thesis, explores the relationship of the built environment to that of its social, ecological, economic, and political infrastructures. She thanks the Zongo community for their continued assistance and support. More of Emily's design work can be viewed at www.openstudiodesign.org.



Fig. 35 Perspective – entry into the Zongo.



Fig. 36 Perspective – at the top of the hill in the Zongo.