An Infrastructural Ecology for Lima

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Submitted to the Department of Architecture in
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Abstract

Lima is facing an infrastructural crisis. Its infrastructure has reached the limits of elasticity, capacity and implementation. Its systems are ecologically challenging and are ecologically challenged. Born as top down system, they currently require too much investment from institutions in order to be governed and managed. We should rethink the conventional understanding of infrastructure as the hidden physical organizational structure of urban development, and favor a multi-scalar shared social approach to infrastructural production. Infrastructure needs to be civic and social, 'micro' and 'macro', hard and soft. Housing, the single, most powerful drive of Lima's growth needs to be reconsidered as an essential component of this infrastructure. This thesis proposes to analyze the set of elements that can constitute a new ecology of infrastructural pieces, in order to foster a new form of development and solidification of the peripheral informal settlements in the city of Lima.

The questions of open ended infrastructure in Lima, and the relationship between the limitations of 'hard' and 'soft' are on the table today: 46% of its citizens have resorted to informal housing for a place to live, most of which have no access to basic services1. Paired with population increase, immigration, and the unpreparedness of governments to provide infrastructure and services, this pressure is challenging risk management and governance capacities.

The limitations to achieve the next generation of infrastructure in Lima are neither technical nor financial; they are spatial, social and political2. This thesis challenges conventional understandings of infrastructure by looking at it through the lens of ecology (which implies the study of the interaction between the elements of a system, beyond their independent development) and uses this lens to propose a new infrastructural system. First, it catalogues the infrastructural pieces at play, defines their relationships, and documents how infrastructure is implemented throughout the region. Second, it proposes new pieces and partnerships of this system that encourage negotiations, develop new and existing relationships, and define operations and rules oriented towards a processes of urban solidification. These rules consist of physical, spatial and social interactions, moving energy, economy, and labour through the territory. These rules can mobilize dialogue between the built and unbuilt, objects and territories, organisms and environments. The thesis addresses the specific relationship between informal settlements and their geography, and proposes a dialogue between solidification and impermanence. The goal of the thesis is to define a system capable of supporting and expanding itself while producing a legible project in the territory: an infrastructural ecology that enables different lifestyles, new interactions, and civic dialogue.

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A Project of
Five Concepts

Conceptual Framework

1

Weak Urbanization: A dialogue between Impermanence, Instability and the Solidification of Informal Occupation.

Andrea Branzi speaks about the idea of 'weak models of urbanization'. It is important to frame this idea in the context of informal occupation because of the flexibility self-build provides. While establishing an ecology as a context for infrastructure, the concept of 'weak urbanization' has stirred thoughts of 'ecology' itself as a project. One that speaks in part of a scientific analysis and study of interactions among organisms and their environment - an understanding of the physical social and cultural patterns of relations between organisms and their immediate environment.

In Branzi's view, the city consists of a set of contradictory elements and logics, a complexity that cannot be solved but only managed by 'seeking a state of unstable equilibrium'[1] . A state that should rethink the concept of management - A managerial conception of urbanism or planning that has been deeply contested by people as David Harvey - but one that leads back to constructing the 'field' as a 'table of negotiations' for instability. This thesis goes beyond the concepts of management and weak urbanization by operating in a system that empowers stakeholders - political, social, economical and physical - to understand their limits and roles in its implementation.

This thesis opens up the idea of how could we produce a place and system that allows constant transformation, but also understanding what its limits are. One that produces economy and culture as a spontaneous effect of its own implementation energy. More importantly, if the focus lies on the operational and logistical, we should speak of which are the rules of engagement. Gianni Vattimo speaks about circular time as one 'weak' cohesive organizer of a.

By introducing circular time, one that transcends seasonality, to the solidification of the settlements in Lima, we can create a dialogue with the impermanence of several dynamics that will support development: Seasonal agricultural productivity, an

1 Martínez Capdevila, Pablo. 2016. "Towards a weak architecture: Andrea Branzi and Gianni Vattimo"

agenda for education cycles, mediating with temporal infrastructural systems that introduce a metabolic flow of not only nature, but its operation and implementation. The complexity of the urban and non-urban cannot be solved, but only understood through operations seeking a state of unstable equilibrium.

Informal settlements are by definition unstable: they are in constant transformation, physically and socially. In one week a cluster of houses could completely change. At the end of any given year, seasonal influxes of money by households to their houses change. The dynamics of human mobility are constantly changing. With new immigration patterns, population increase, and disperse access to jobs are shaping how people move and the time it requires to access these. From the apparition of new job sources in the peripheri, to the spontaneity of transport systems at the community scale, and at the metropolitan scale.

The relationship with governmental agencies is in constant tension, be that by a process of acknowledgement of the failed current situation and not doing anything about it, or by future political promises of development. Moreover, be that by the constant instability of the political system that addresses very short term planning projects limited by the time leaders remain in office.

The geographical conditions and climate change is presenting a constant threat of landslides, floods, and systemic activity. An overall instability that provides a potential introduction of a set of pieces - operations in the micro infrastructure - and their circular agenda for an equilibrium that embraces these instabilities to favor its adequate function and development.

2

A Vocabulary: The Various Forms of Infrastructure

Hard Infrastructure

The physical framework of the built environment; the networks of roads, underpasses, bridges, high speed rail, and others. It speaks of the physical networks that not only distribute but are the built medium that delivers services for a society's primary needs. Pipes Network for Water, Cables and Towers for electricity, Sewage for Housing.

Soft Infrastructure

The intangible representation matrix of social, political and economic institutions that support the general population's health, well-being, and individual advancement. All the institutions which are required to maintain the economic, health, and cultural and social standards of a country, such as the financial system, the education system, the healthcare system, the system of government, and law enforcement, as well as emergency services. It is the human capital and institutions that cultivate it.

Mega Infrastructure

Infrastructure network that transcend the scale of a certain administrative boundary, where such system is used to transfer and/ or distribute energy and/or resources from one place to another. Due to its large scale and bureaucratic nature, mega infrastructure is political in nature, and its implementation symbolizes not just pragmatic distribution of resources, but also a certain power regime.

Micro Infrastructure

Infrastructure network that is used to serve immediate need of its surroundings. The resources are usually distributed not far from the source. The management of micro infrastructure involves local community who directly benefits from the network. The device enabling the distribution of resources is typically visible to those who are serving or being served.

Civic Infrastructure

It's the basis upon which ordinary people are able to participate in ordinary civic life, from joining neighborhood watch groups to entering the voting booth. Civic infrastructure is made up of places, policies, programs and practices that enable us to connect with one another, address our shared concerns, build community and solve public problems. More of the neoclassical language adapted in the US. What is the language on infrastructure now?

Infrastructure Synthesis

Infrastructure systems should be related with each other in different prototypes and scales, instead of isolation. The effect of synthesis amplifies their functions and fulfills their potential. Channel systems have a strong relationship with electricity grids, transportation and water supply. With the advancement of technologies, the boundaries of diverse infrastructures are being blurred. The construction of new system is unnecessary for new infrastructure design; we should rethink of synthesizing into the existing ones. For instance, a power grid can also be a way for high-speed digital transmission. A shared network can become a new way of producing infrastructural design.

Splintering Urbanism

'Splintering Urbanism' has detected a strong way representing the transformations of how infrastructure was built. A thorough research on the transition from a top down approach towards a way more flexible set of solutions. It is presenting a paradoxical and different set of forms of top managed soft infrastructure and bottom up hard managed infrastructures. Marvin and Graham conclude with a request for the development of "more modest, local networks and argue for exposure and regulation of inequalities in infrastructure connections". Today, the relationship is now blurred and its is a necessity to clarify why, how and what are these jurisdictions and operations happening.

3

The Ecology of Infrastructure both as a Project and as a Reading

Defining 'Ecology' in Lima

Ecology is a nebulous concept. It can adapt several definitions. One that implies the study of the interaction between the elements of a system, beyond their independent development- an understanding of the physical, social and cultural patterns of relations between elements and their immediate environment. Stan Allen, speaks of it more as field conditions, defined as a bottom up phenomena. Defined not by overarching, nor totalizing schemes but by intricate and intense local connections. Connections and relationships as a critical part of what defines an ecology. The periphery of Lima and its parasitical development has developed unprecedented untapped social and physical connections. Relationships that are political, legal, environmental, material and organizational: between people and their community, informal habitants and the way land is occupied, between risk and occupation, between users and services.

The parasitical sprawl of the city has been developed due to its centralized form of infrastructure and services. As the city grew, the population started to settle as close as they could to the cities infrastructural framework. Geography and the corridors - or 'conos" - shaped the form and clustering of these settlements. Immigration increased and plugged itself into its already saturated system; taking infrastructure it to its limits of capacity and use. The distance (physical and socio-economical) between new settlements and infrastructure has been increasing ever since, resulting in the government failing to fill in that gap or provide an alternative strategy. This relationship is no longer linear, this means that human urbanization no longer depends to a centralized system. It is functioning, in one form or another, by resorting to self-made infrastructural alternatives. And the gap between one end to the other is compromised of several different cross sections that reveal opportunities of infrastructural production and management. This means that there is a space for which management, production and implementation of infrastructure can be rethought of. This space has produced a set of alternative pieces of infrastructure (NGO's providing alternative services, settlements producing elements that also occupation, internal social dynamics for the production of a community) that start to shed light of what the infrastructural ecology is in Lima.

The Opportunity of Looking through Ecology

Ecology provides a systematic lens for looking at an infrastructural project. It allows us to understand how every element works with each other and as a whole. When we speak of organism, we speak of things; the house, the water tank, the electricity source, the system

of paved roads, community roofs, educational facilities, healthcare, institutions, the NGO, the community program. And when we speak of the 'environment', we speak of its physicality; territory, the region, time, and social frameworks. When we speak of relationships, we speak of the relationship between one piece and another. Be those 'hard' and 'soft'. For example, the relationship between a water storage tank and a retaining wall that stabilizes the ground for agriculture. An ecology that is defined by a set of parts, objects operating (through relationships) as a collective. The idea of providing punctual interventions, through an organic, bottom-up approach, offers the possibility to rethink unserviced settlements. Using ecology as a framework of reading, and thus of revealing something that tends not to be seen as an system of parts. My thesis is in an important way, the proposition of an ecology –that is, the proposition of forms in which the existing situation will become an ecology or a more fully developed ecology.

Operating in an Infrastructural Ecology

I define the infrastructural ecology as one that implies a plan that admits change in its development, accident and improvisation. A project that is defined by a set of parts, objects operating as a collective, and the understanding of the patterns of relations between 'organisms' and their 'immediate environment'. A term that is not invested in durability, stability or certainty, but a plan that leaves space for the resilient uncertainty of the real conditions. A place that can accommodate real changes and expansions . Where agency lies on establishing how it operates rather than how it is. A space that emerges of negotiations, of the possibilities that geography allows us to settle.

Flexibility means being economically, socially and physically more efficient as a way to prepare for the unknown future. It should enable appropriate responses to several unknown possible futures. It should defer investments (saving interests) and lower not only the scale, but the cost of the project. In this sense permitting more projects, different projects and more services to more people. Operating in an ecology would mean having less energy on trying to predict the long-term future - which is in any case unknown - and less effort on producing infrastructure that will satisfy this 'guessed' future. This means understanding that over building for the scenario that we think we know. It should focus its emphasis on producing facilities and pieces that could, by extension or adaptation, meet several scenarios.

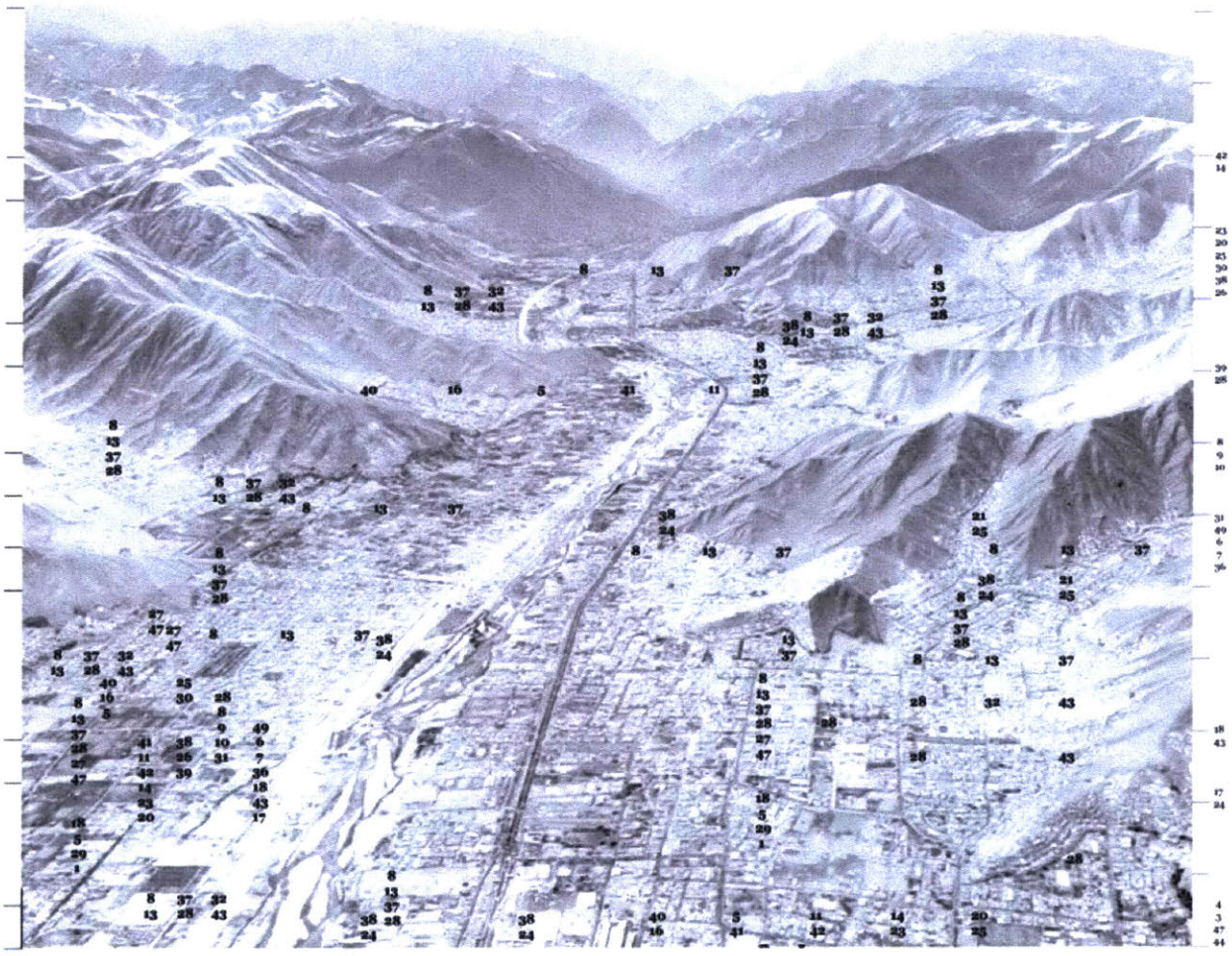
The power of the collective relies on territorial scale of the 'micro'. It offers the opportunity to set up the framework and open multiple possibilities for a more cohesive, diffused and multi centered development. Significant transformations are a result of micro operations; an opportunity to interpret urban quality of life as the result of an interconnected ecology made up of domestic objects, tools, services, goods and people.

Between the 'hard' and 'soft' of Infrastructure

While we can speak of Hard Infrastructure as the physical framework of the built environment; the networks of roads, underpasses, bridges, high speed rail, and others. Soft infrastructure on the other hand is the intangible matrix of social, political and economic institutions that support the general population's health, well-being, and individual advancement. They are all the institutions which are required to maintain the economic, health, and cultural and social standards of a country.

Nonetheless, these two require a common operative ground that can spread the meanings of these two definitions, allowing space for a horizontal shift through the intermediate; micro infrastructure, civic infrastructure, infrastructural synthesis and the diversification of infrastructure. It is

Specificities and Information
Legibility in the Territory



specifically in the dilatation of these two poles where the relationships between pieces acquire different forms. Pierre Belanger introduces Landscape as this common and operative ground - thanks to the possibilities that its metabolic flows provide. How can we rethink their social and physical dynamics through the territory as a common operative ground? And by doing this, how can we introduce new forms of mediation?

Agents of Change: The Social Institutions, NGO's & The Community

One important element that composes the pieces of the infrastructural ecology are the 'agents'. These agents are a piece in itself, but offer an embedded social relationship due to its nature. They are social organizations that operate as pieces in the ecology. The social enterprise and NGO market in Lima is already saturated with programs aimed at improving access to infrastructure services. These agents, while offering a physical product (water tanks, try toilets, fog catchers and others), also acquire and operate in a social dimension that is not physical (micro lending programs, off grid education, community strengthening programs, legal support). These pieces are both in a way 'hard' and 'soft', and it is in this specific relationship where the power lies of mediating between them; partnerships between these agents, collaboration, and incremental implementation of their services.

The idea of partnering NGO's and small-scale interventions, through an organic, bottom-up approach, offers the possibility to rethink unserviced settlements in a non-traditional way. Social institutions, while attempting to slowly tackle the issue of unavailable services ('hard' and 'soft'), lack base level data to operate, to build their programs, and to present realistic predictions of measurable change in their partner communities. The few organizations currently collecting data are doing so inefficiently and with poor implementation. Nonetheless. three significant factors are currently holding these efforts back; 1) a dearth of data from within the informal communities to inform providers of service needs; 2) A deficiency of knowledge of how basic needs- like access to water, sanitation, and electricity- are being met at the household, community, and regional level and there is an opportunity to mesh with emergent digital information and communication networks; and 3) a lack of coordination between these enterprises operating in isolation from others and social actors to encourage collaboration and priority setting. The project for these agents then relies on the realm collection, coordination and organization.

4

Physical and Social Partnerships

The Territorial Dimension of Lima

The periphery of Lima is a place that is in constant flux and transformation. Not only because of its internal dynamics, but because the periphery's instability is operating in a territorial scale. Its geography has led to a specific form of informal occupation. Its centralized services in the narrow coastline (where the metropolitan city is) and the steep relationship the city has with the Andes Mountains surrounding the city has resulted in utilizing the slopes and river valleys as corridors of habitation. Informal sprawl has occupied this transect - from the peripheral coastal city to the endangered slopes of the mountains; places of extreme risk. These 'Corridors of Scarcity' have been for decades the routes of internal migration, from the pre-hispanic Inca trails that moved products and connected the whole country, to informally occupied territories trying to attach themselves to its linear parasitical form of infrastructure (one road, one linear electricity grid and others).

The Architecture of the Infrastructural Place in Two Orders.

1. The Agenda for the Immediate

The first dimension will address the immediate needs of the informal settlements and their relationships with the infrastructural pieces. On the first order, the thesis will propose a system that can allow quick production, apparition and expansion, and be able to retreat and disappear almost immediately with little to no built impact. One that establishes a physical, social and civic infrastructure system/agenda for the immediate - a schedule of rules and negotiations that allow stakeholders to deploy. It is a project of mediating jurisdictional rules that diffuses the overarching shareholding of centralized implementation.

An operation that implies a plan that admits change in its development, accident and

improvisation. A definition that is not invested in durability stability or certainty, but a plan that leaves space for the resilient uncertainty of the real. A place that can accommodate real changes and expansions, with freedom and intelligent radicalism. It is within this framework, that Branzi's main intentions appear to be deleting architecture from the "stability governing the 'macro' and transferring it to the instability of the 'micro'". Engaging with the instability of human settlements in the short-term, the small scale: at the scale of the infrastructural piece.
to its linear parasitical form of infrastructure (one road, one linear electricity grid and others).

2. The Territorial Project of Infrastructural Seeding

The second dimension will address the legibility of the territory through a set of 'generic containers' that adopt and host different infrastructural functions and can serve as a tool of organization and representation. A territorial order that allows reinterpreting the colonization of the territory with built pieces that can host all types of functions. Buildings freed from the architectural, the typological and symbolic connotations which may act as 'generic hosts' systematically represented, regardless of their content, as open ended. In the models of 'weak urbanization' discussed by Branzi, this appears in various overlapping cycles: of the seasons, of consumer goods obsolescence, of reprogramming of functional containers. This would try to comprehend the background 'stability' affecting the long-term development, a second order of scale, and a structuring vision for Lima.
They are elements that have their own corporeality and physicality. Fixed elements within the network that play certain function and introduce not only references from institutions, but the metabolic flows and presence of natural elements.

A platform that connects communities and villagers with private service providers through an integrated planning strategy built on collected field data and population growth forecasting. Addressing the possibility of an online platform that acts as a global catalogue representing the current status of infrastructure services, housing vulnerability and status of development. A reading of the current condition through the settlements physicality and a reading of the current framework it uses to sustain itself. Access to water, electricity, sanitation collection, health, education, information and communication technology services.

This concept addresses the shape of the information and data collection that allows it to be used, as well as the infrastructure required to store, manage, understand, and implement data driven projects. A reading and a project that seeks to explore how existing small-scale, interlinkages in the formal/informal infrastructural network could improve the livelihoods of residents at the margins. It speaks of emergent forms of future interconnectivity – between analog/ digital and informal/formal configurations of infrastructure and services. A lens to uncover new technologies, services, education potentials and new ways of approaching urban and rural development.

Lima:
Land and Water

Conceptual Framework

Lima:
Land and Water

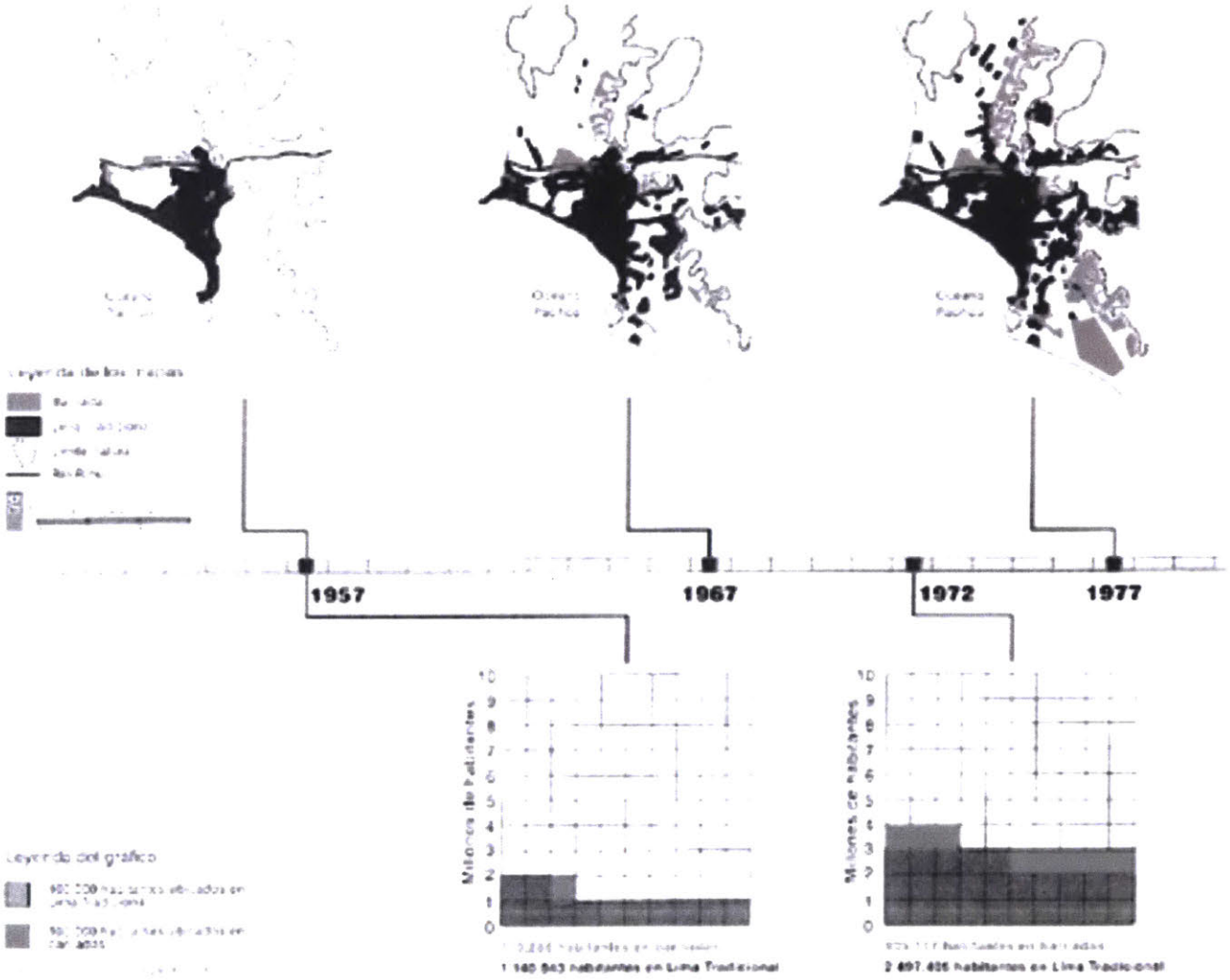
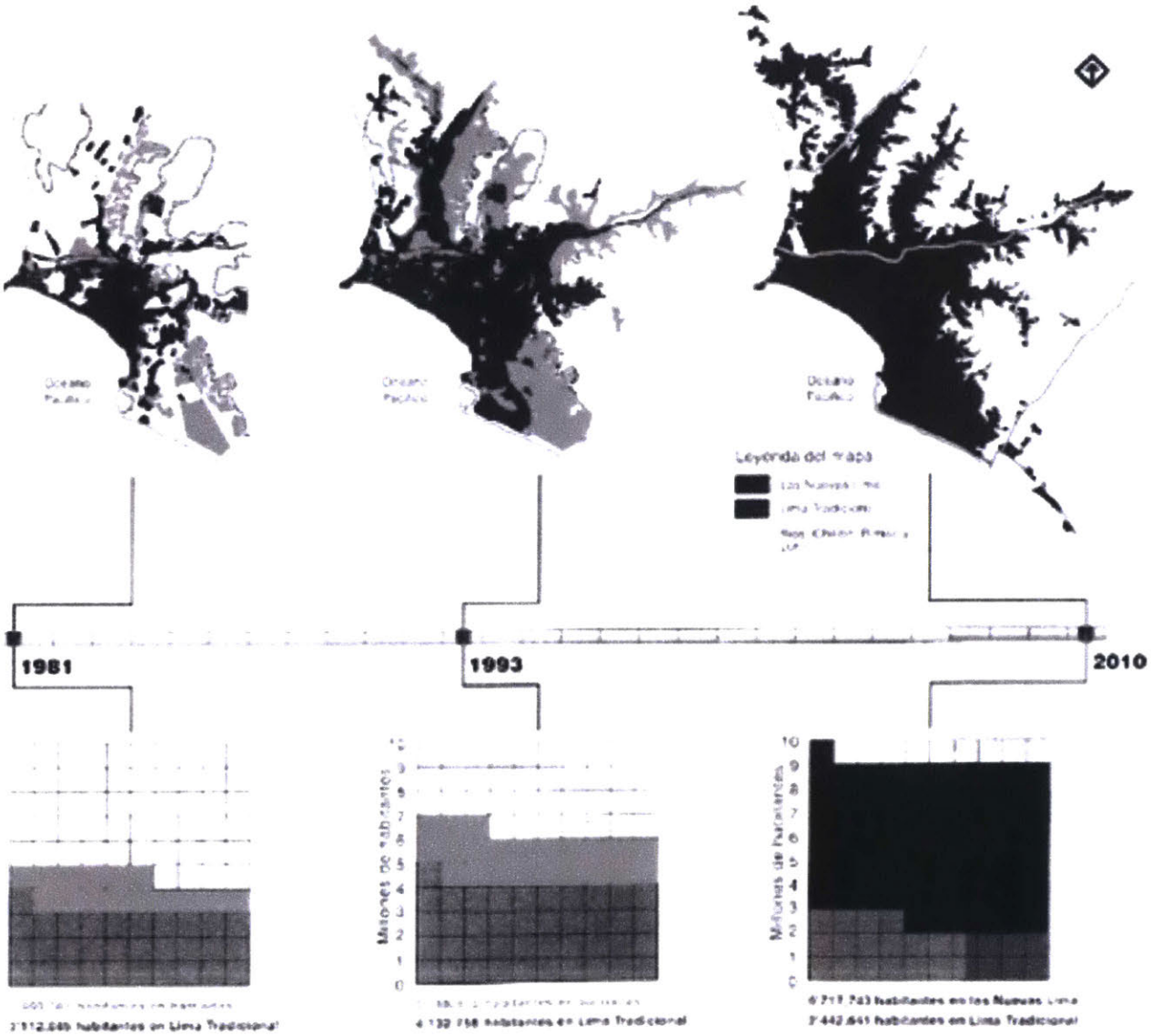


Fig. 1. Map of the Expansion of Lima.
Willey Ludeña



Two forces have been the main drivers of its expansion. The first is housing, and the second is water. Housing as the vector of promises. Lima has experienced an unprecedented growth. In 1980, the Peruvian government predicted that by 2010 the population of Lima would reach 2.5 million people. It is now 2018 and the city is capping at 10.5 million people. It is facing an infrastructural crisis. Its centralized form of management and its infrastructure system has reached its limits of elasticity, capacity, and implementation. In

Fig. 2. Human Occupation of Villa el Salvador

a city where the majority of its citizens have resorted to the informal market for a place to live, access to basic services and utilities is a serious and urgent problem. Lima has over 1,920,000 households, 45% of which have been built informally, and of which 286,000 exist without any basic water or sanitation services (INEI, 2007). Having to deal with a desert climate and steep terrain, the occupants of these dwellings are set in an extremely unstable condition of physical and socio-economic stress, they face a constant struggle accessing clean water, reliable electricity, safe toilets, basic quality education, affordable food, and information technologies. In response to the growing needs, dozens of social enterprises, NGOs, and corporations are actively deploying new programs and micro-grid systems to address the urgent needs of these urban areas.

The main drivers for displacement and mobility were Internal Migration and a Lima that hosted a centralized economic development of the country. Migration was fed by terrorism in the central part of the country. Cities and settlements in the isolated highlands suffered from the physical and social disconnection from the capital. A capital that hosted the main economic development of the country. Thousands moved through the territory, all to an idealized vision of Lima. A Lima that promised opportunities and shelter. Promises driven by political campaigns

Fig 3. Photography, Edi Hirose.
Archivo Fotográfico.

Fig. 4. Political Campaign of Keiko Fujimori

every 4 years. Promises of land tenancy, shelter, and water. Promises of a brighter future. A promise of an emerging "Peruvian Dream"- although Peru has been growing steadily for other 20 years. All of these to gain electoral votes. Campaigns, candidates and politicians "founded" and gave names to these settlements. Promising electricity, education, jobs and a recognition of citizenship. The political aspiration and the social instability of tenure and availability of land made people living in informal settlements a focus for politicians and developers. Politicians took advantage of this and steered their campaigns towards visiting these settlements and having a presence there - most of them arriving in flocks of cars, giving gifts to communities in hope of their votes. Settlements became the bargaining chip for politics.

Fig. 5. A House, A Life. Villa el Salvador

Fig 6. Seasons, Edi Hirose,
Archivo Fotográfico

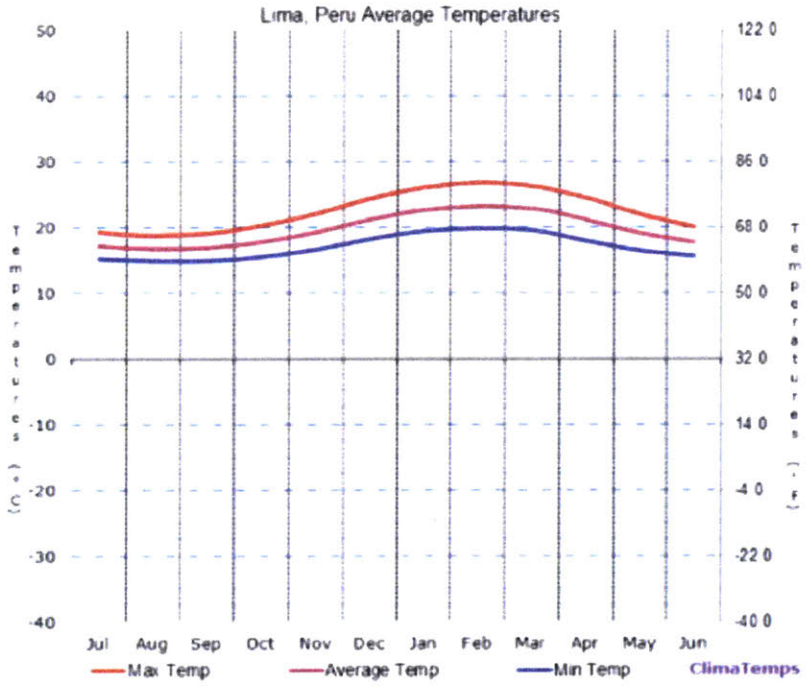


Fig 7. Precipitation
Lima, Peru

Another factor that has fed Lima's sprawl, is the fact that climate in Lima is extremely stable. And this leads the thesis to water. There are no high or low temperatures. Its the reason why materials are different. Labour is different. Economies are different. Regulations and building codes reflect that, setting a precarious bar on the construction of the built environment. The lowest average temperature in any given year in the region of Lima is 12 degrees Celsius, while the highest, 28 degrees Celsius. The universal understanding of climate in Lima is of two seasons, winter and summer. The transition between seasons is so nimble that even Lima has developed very nebulous building requirements for the city.

Fig 8. Lima 1954

Fig 9. Lima 2017

Fig 10. Plan of Lima 1713, Spanish Conquest

Fig 11. Ink Drawing of Rimac River and Puente Piedra

Places that were once agricultural fields and working estates have now been occupied by millions. The government has failed to provide even the most basic of infrastructural services to its newly established citizens: water in the span of one generation has become from a source of livelihood to a cause for concern. Water is the reason Lima was built. Upon the Spanish conquest, the walled city of Lima was located next to the river of Rimac. It was the territorial connection that allowed movement of resources and a link to the inner part of the country. Water is one of the reasons why Lima is how it is. It is why architecture and urbanism in Lima are so unique. Parasitical. You can walk from your room across the courtyard without getting wet, every hour of the day, every day of the year. What separates the most private area of a house from nature is a single sheet of glass. Water is the biggest fear of some and greatest desire to others. Water and Housing were the promises, promises that were never delivered. But water is making exceptional things, from the domestic scale and enabling a lifestyle, to destroying your home. Water, or rather, the lack of design for water, was responsible for the destruction thousands of homes. In 2017 a storm affected 7 thousand families, causing millions of dollars in damage and leaving 8 thousand people without a home. This is the water we see and this is the way in which water enters the city again.

A Territorial Reading:

The Transect of the Lurin Valley

Conceptual Framework

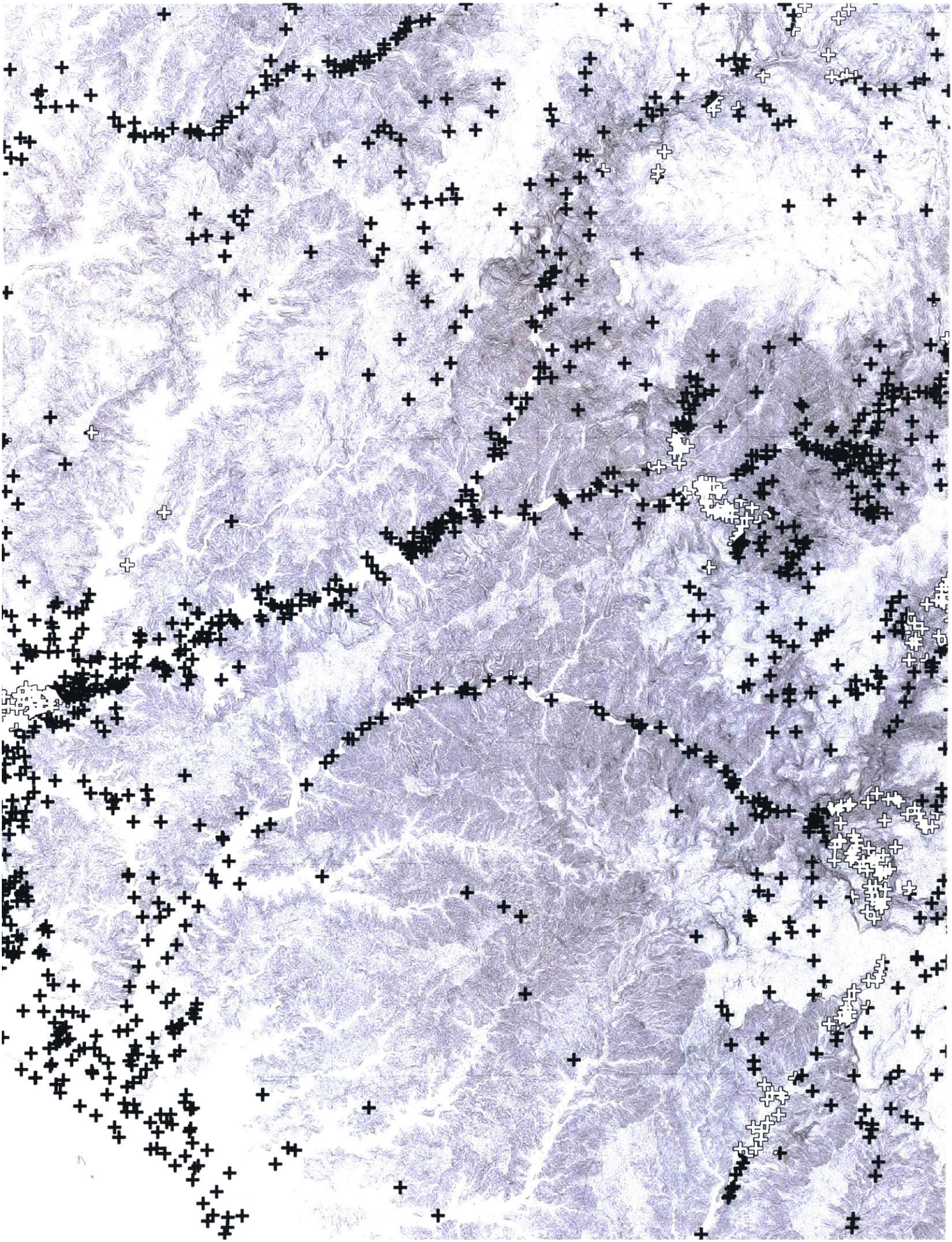
Lima's Five Corridors of Scarcity

In a centralized Lima, its under-serv
population is now capping the city's
and pushing people towards the inh
slopes of the Andes. This is developi
types of needs, morphology and soci
ics. If we read Lima's geography, we
five valleys - three of them that still
water and two of them that lost it hu
years ago. I present an alternative re
the territory. A reading of human oc
pushed by economical and social fac
the city towards high altitude.

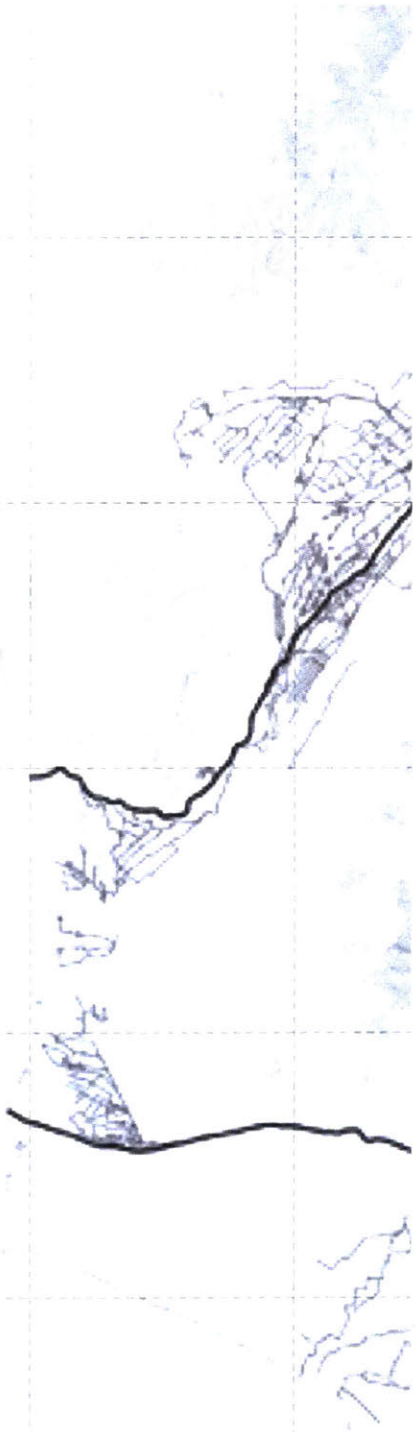
Key:

+ Population Settlements between 700
Without access to Basic Services

O Population Settlements between 100
With access to Basic Services



The Rivers of Lima: Chillon, Rimac and Lurin



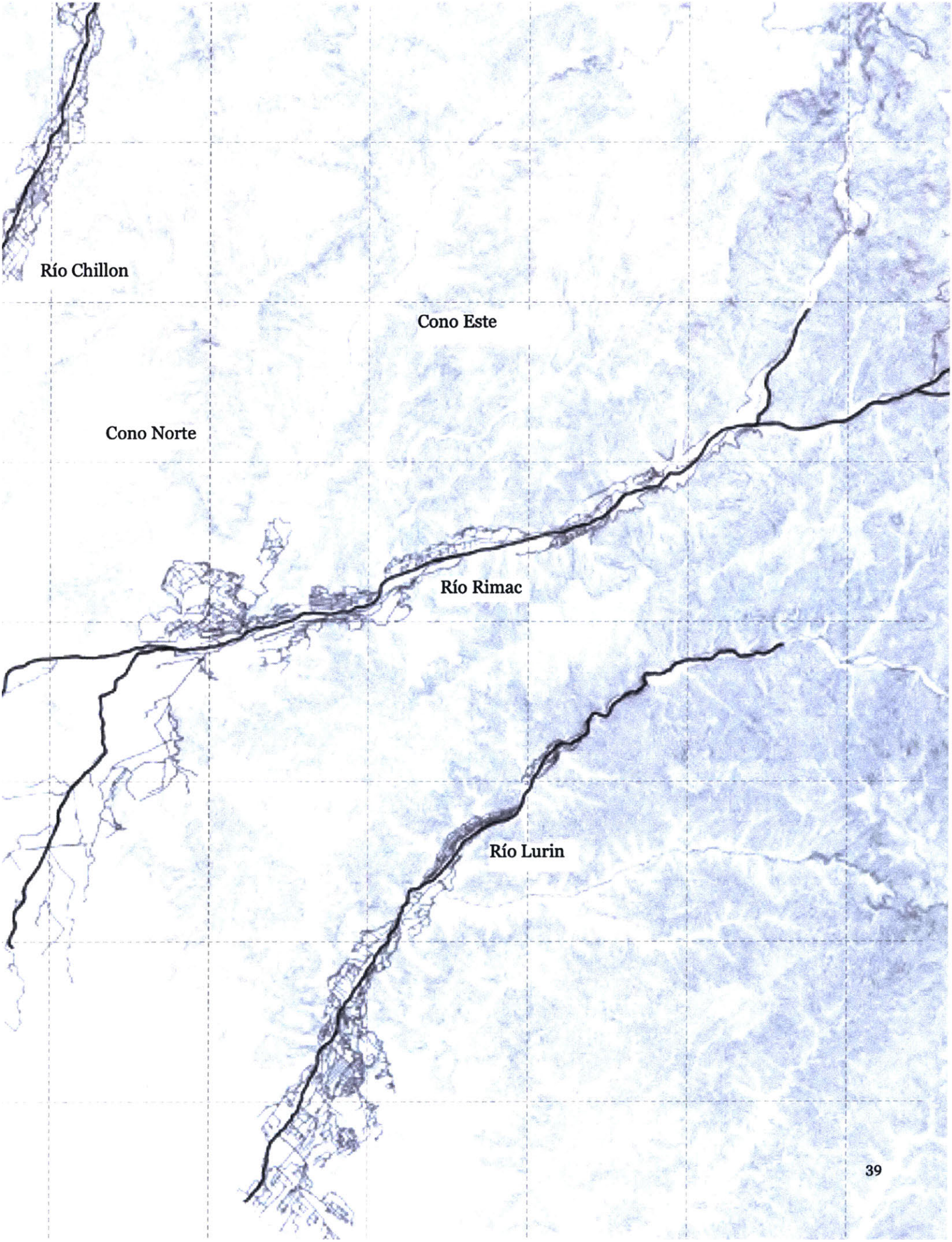
Lima has three rivers that cross its regional boundaries. The Chillon, the Rimac, and the Lurin. The Rimac river was the first river in the territory of lima to be urbanized. It was the place where the Spaniards settled and built the 'Walled city of Lima'. Today, the expansion of Lima has lead to very different relationships with every one of these rivers. The Lurin River has been the oldest infrastructure highway the city of Lima has.

From the ancient Pre-Incan times, it served as a critical piece of infrastructure that served and transported goods throughout the country. It was the essential connection from Cuzco, to the Nazca and Lima ancient populations. Built with clustered rocks and boulders, Lurin's valley holds the Qapac Ñam, an Incan Trail attached to the steep slopes of the valley. Its river was the essential lifeline for the production of agriculture and water supply throughout the section of the Andes. Urbanization is pushing habitation and needs to a new condition, and the river is confronting unprecedented needs.

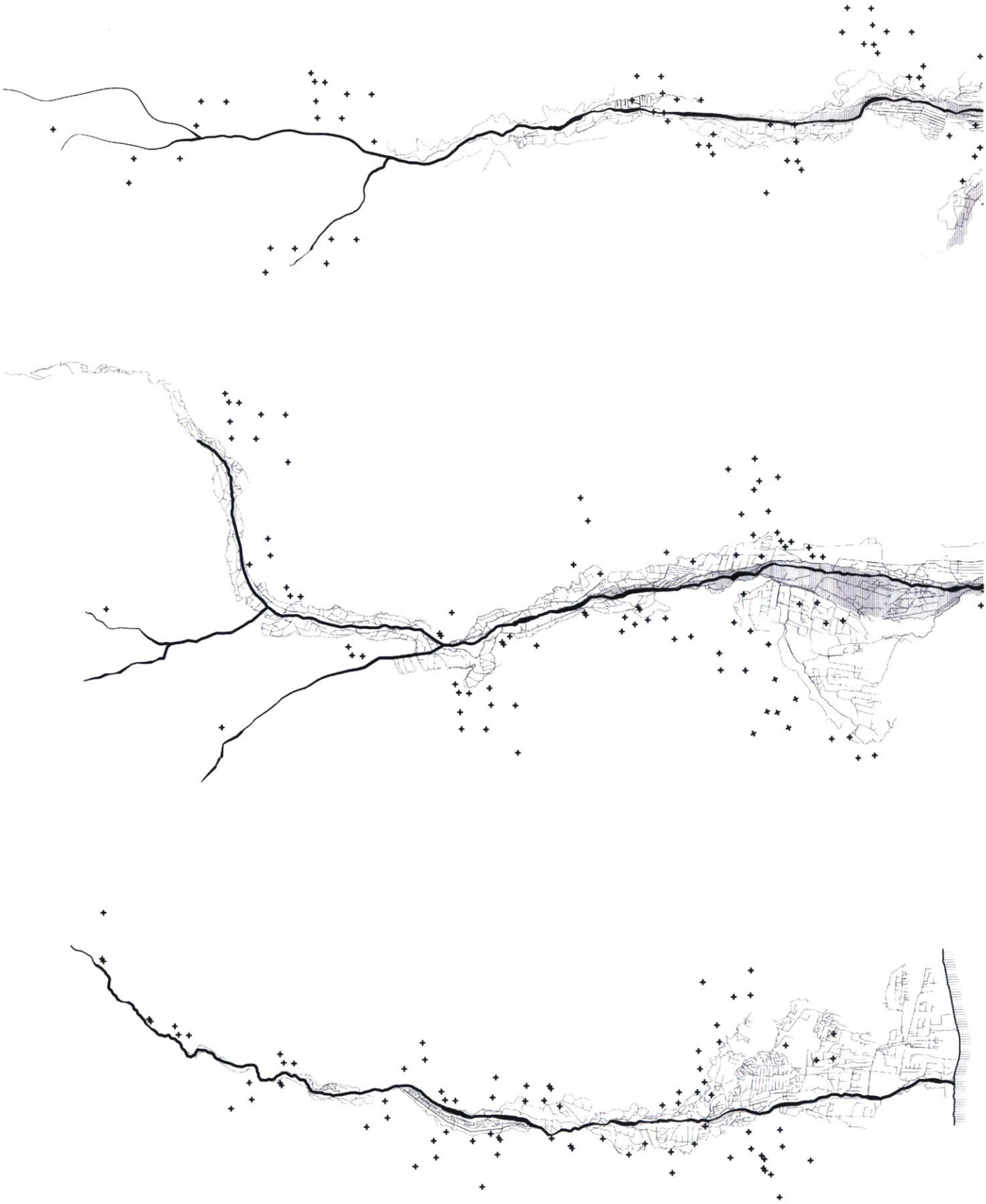
Key:

\+ Population Settlements between 7000-10000 Without access to Basic Services

o Population Settlements between 10000 + With access to Basic Services


Río Chillon
Cono Este
Cono Norte
Río Rimac
Río Lurin

The Rivers of Lima:
Chillon, Rimac and Lurin



Rimac River

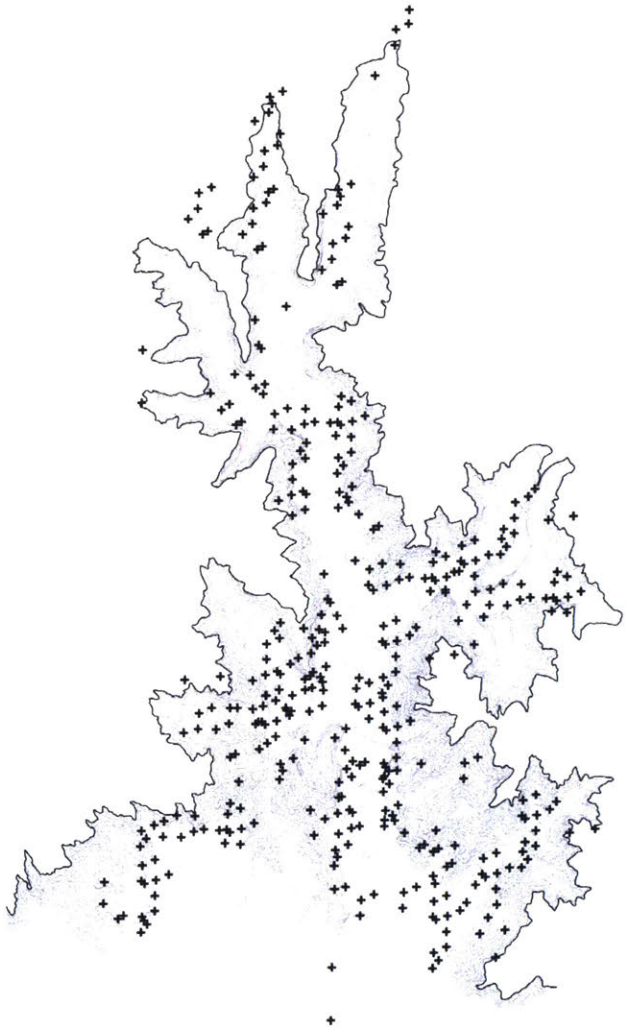
Lurin River

Chillón River

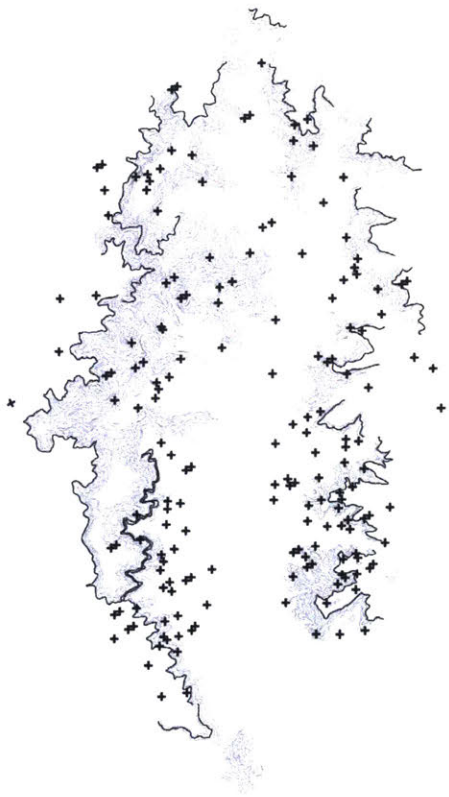
Key:

\+ Population Settlements between 7000-10000
Without access to Basic Services

Human Settlemets



Cono Norte



Cono Sur

Cono Este

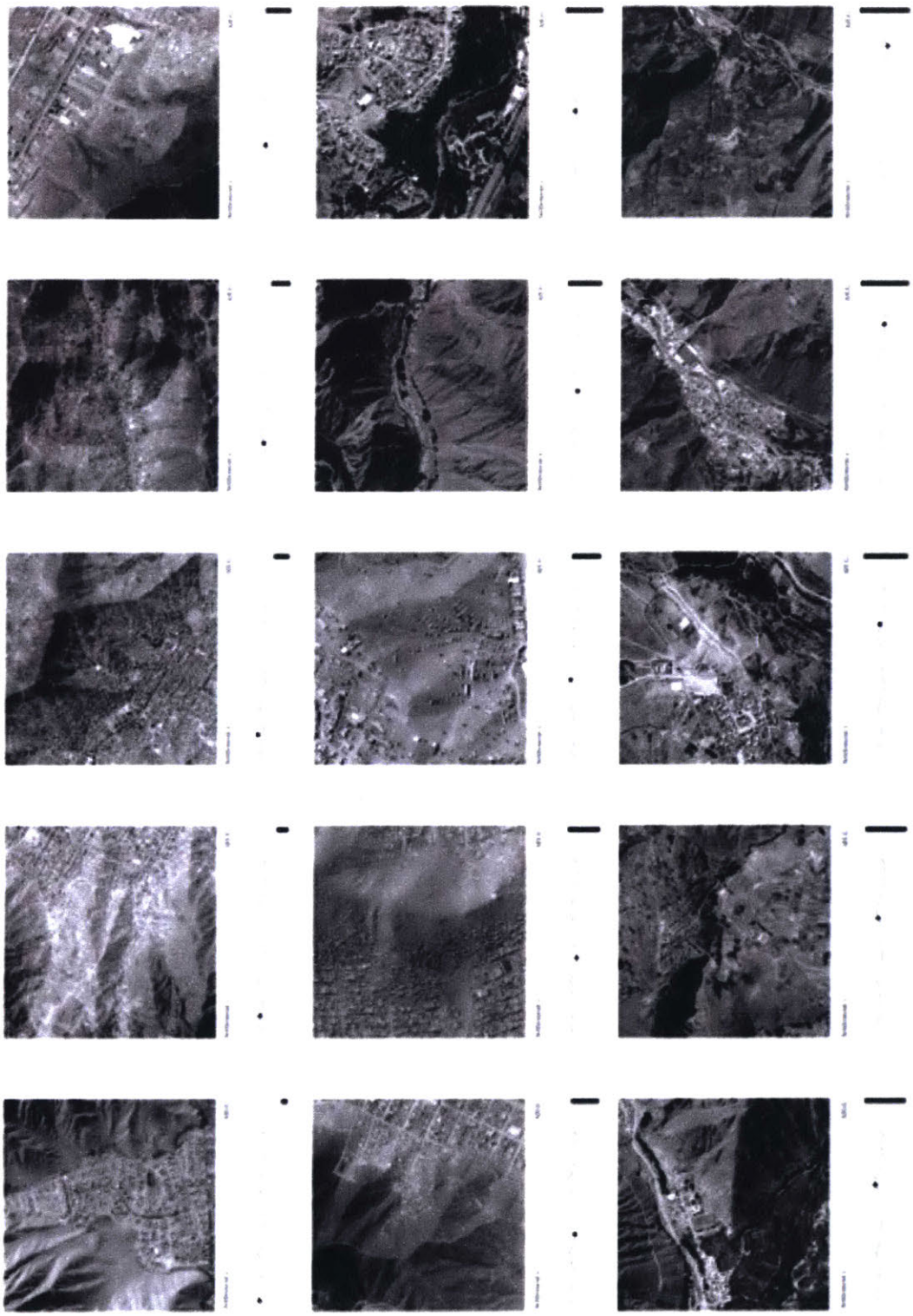
A centralized infrastructure system, high demand on land and disparity in job availability are pushing habitation to its geographical limits, exposing risk, polluting and draining the little water that is left in these rivers. By reading Lima through geology and water, five corridors reveal a parasitical occupation to a centralized system, different forms of opportunity and fear, and relationships to moving economies. But these narrow corridors where once Infrastructure itself. They where the "highways" for the Inca and Pre-Incan populations for hundreds of years. Places that hosted the transport of goods among settlements, allowed production and trade, civic interaction and defined an order in the territory.

Rimac River

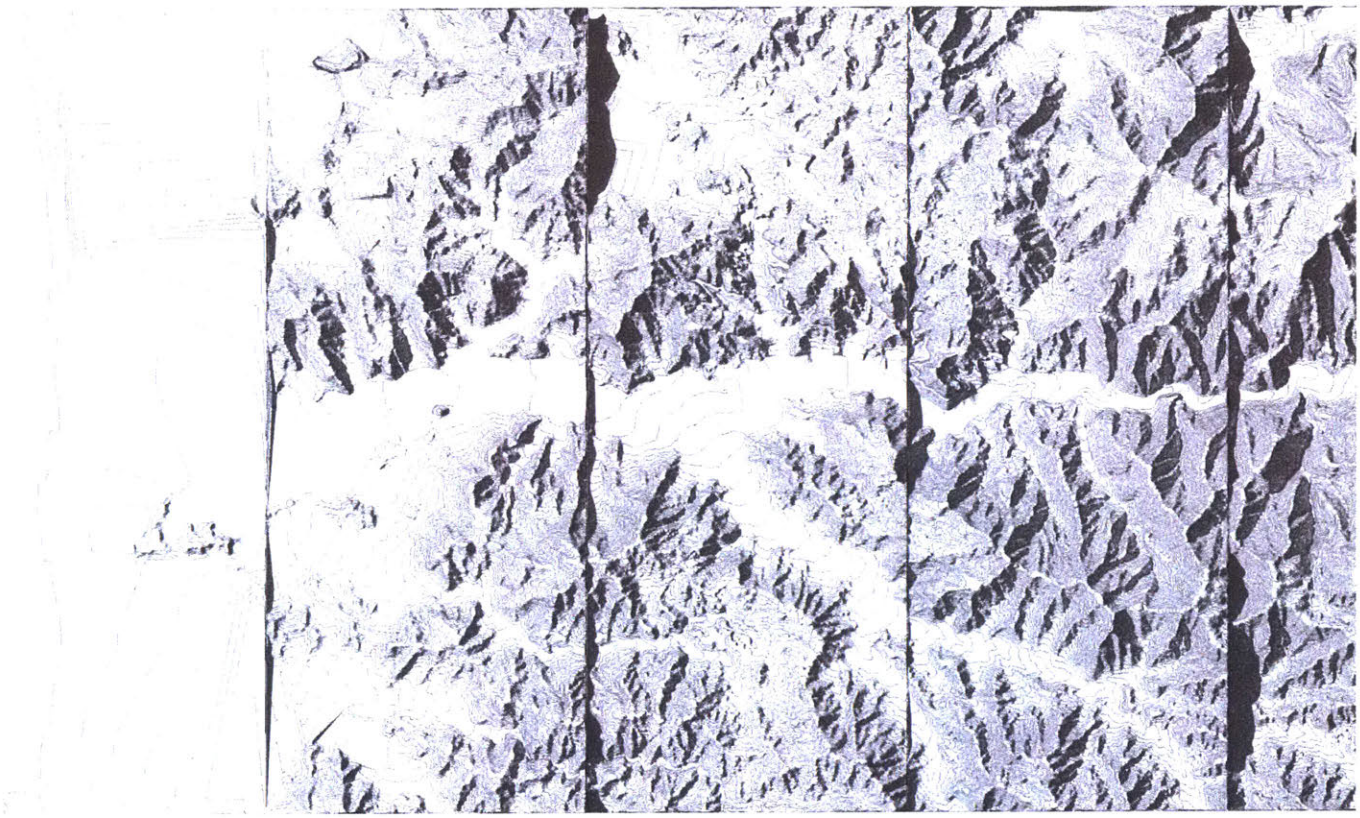
Lurin River

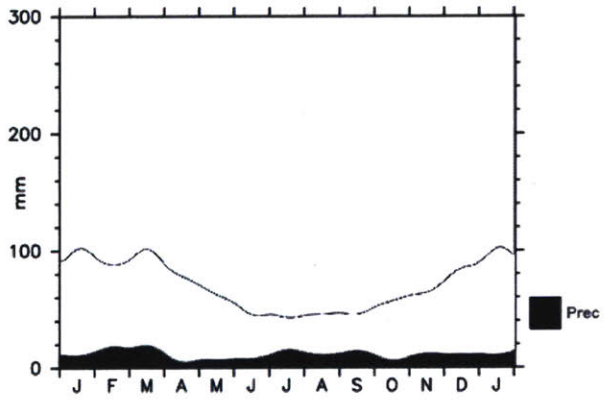

The Valley of Lurin
2
2
2
2
2

The Valley of Lurin

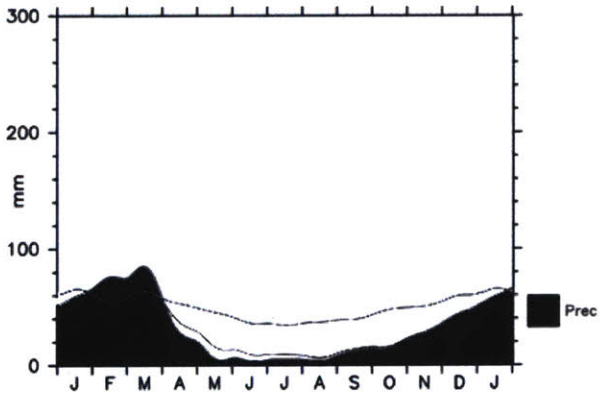


The Valley as a Site:
Managing Water Balances



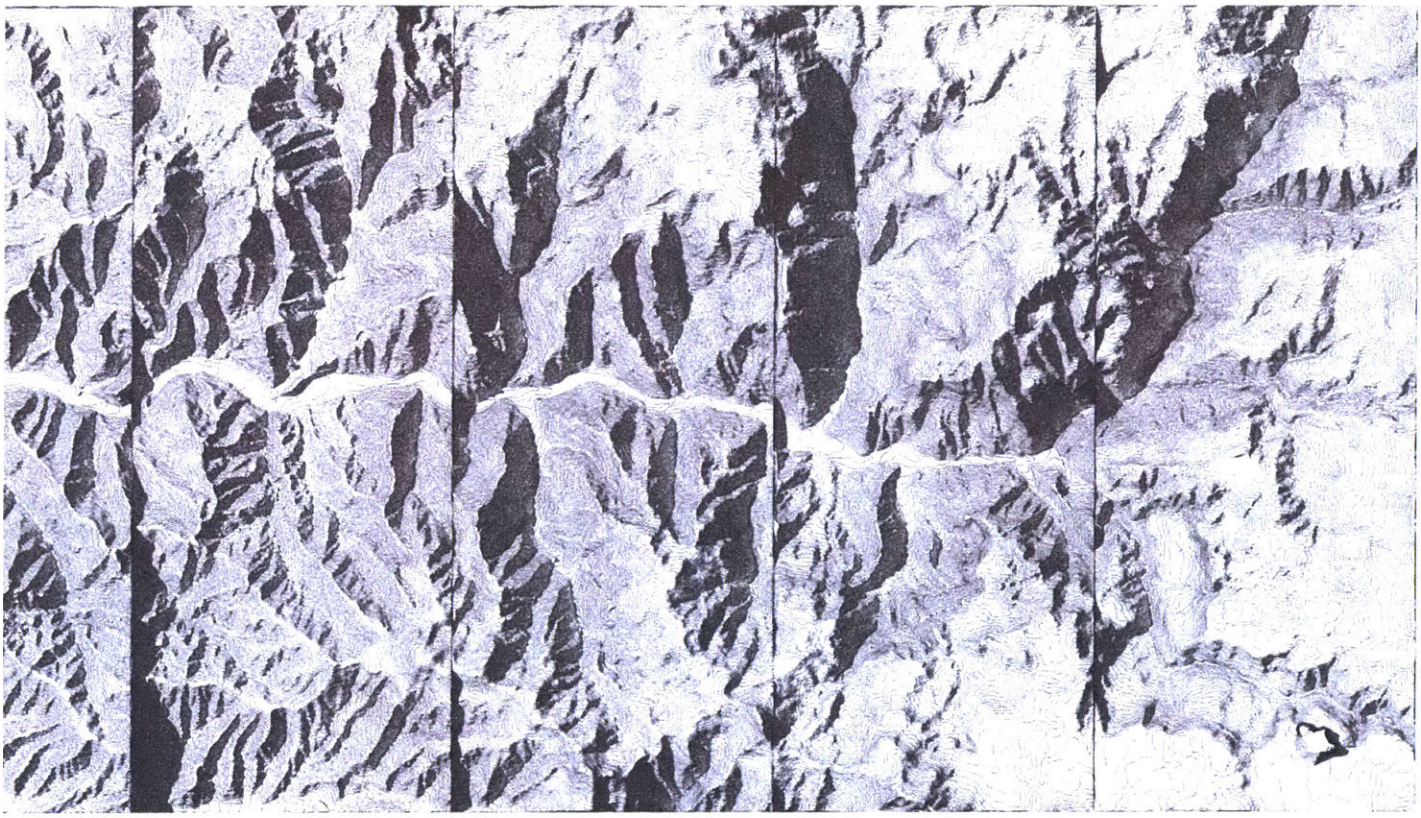


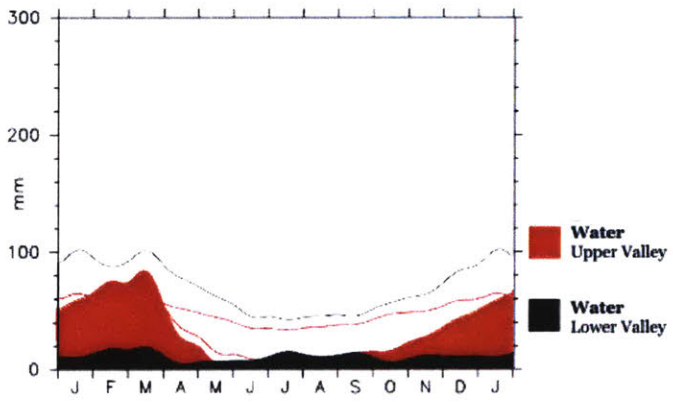
Water Balance
Lurin Lower Valley



Water Balance
Lurin Upper Valley

Unrolled Topographical Map of the Lurin River.





Water Balance
Lurin Upper Valley

Taking the valley of Lurin as a transect that allows us to think of the specificities of water, economy, jurisdiction, production and human habitation at the scale of the territory. This valley is the last remaining valley that still carries clean water, in one form or another. A water that is completely polarized. Being extremely scarce at its basin, where water reaches the city manipulated, polluted, drained, but seasonally abundant at the higher section of the valley, where excess of water erodes the fertile soil. But if we think of the Valley as a site, rules of a seasonal water management can mediate water resources across communities in the transect. Blurring the line between the Upper and Lower Valley but understanding their specific roles.

Human Settlemets

Cross Altitutude Urbanism

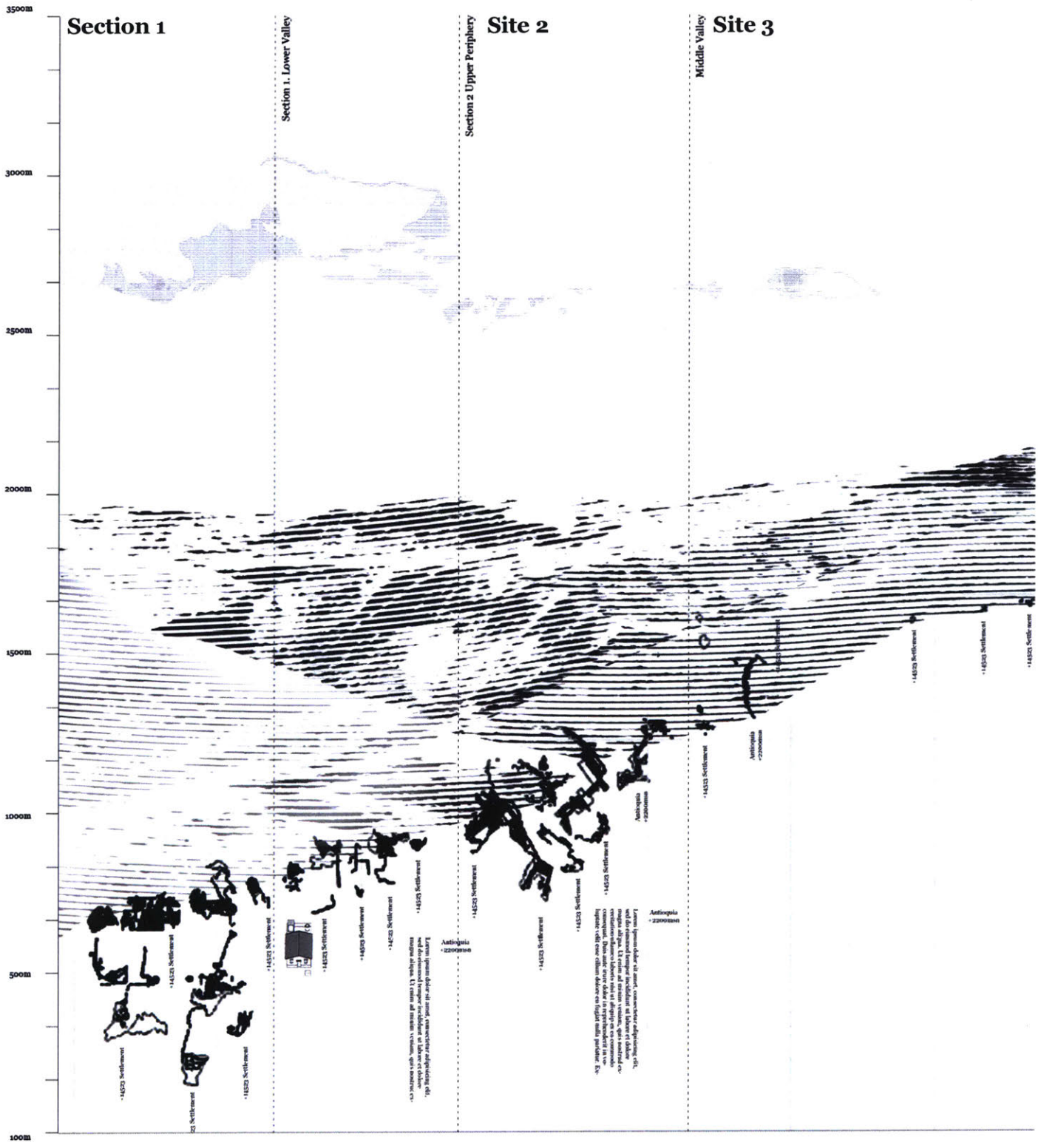
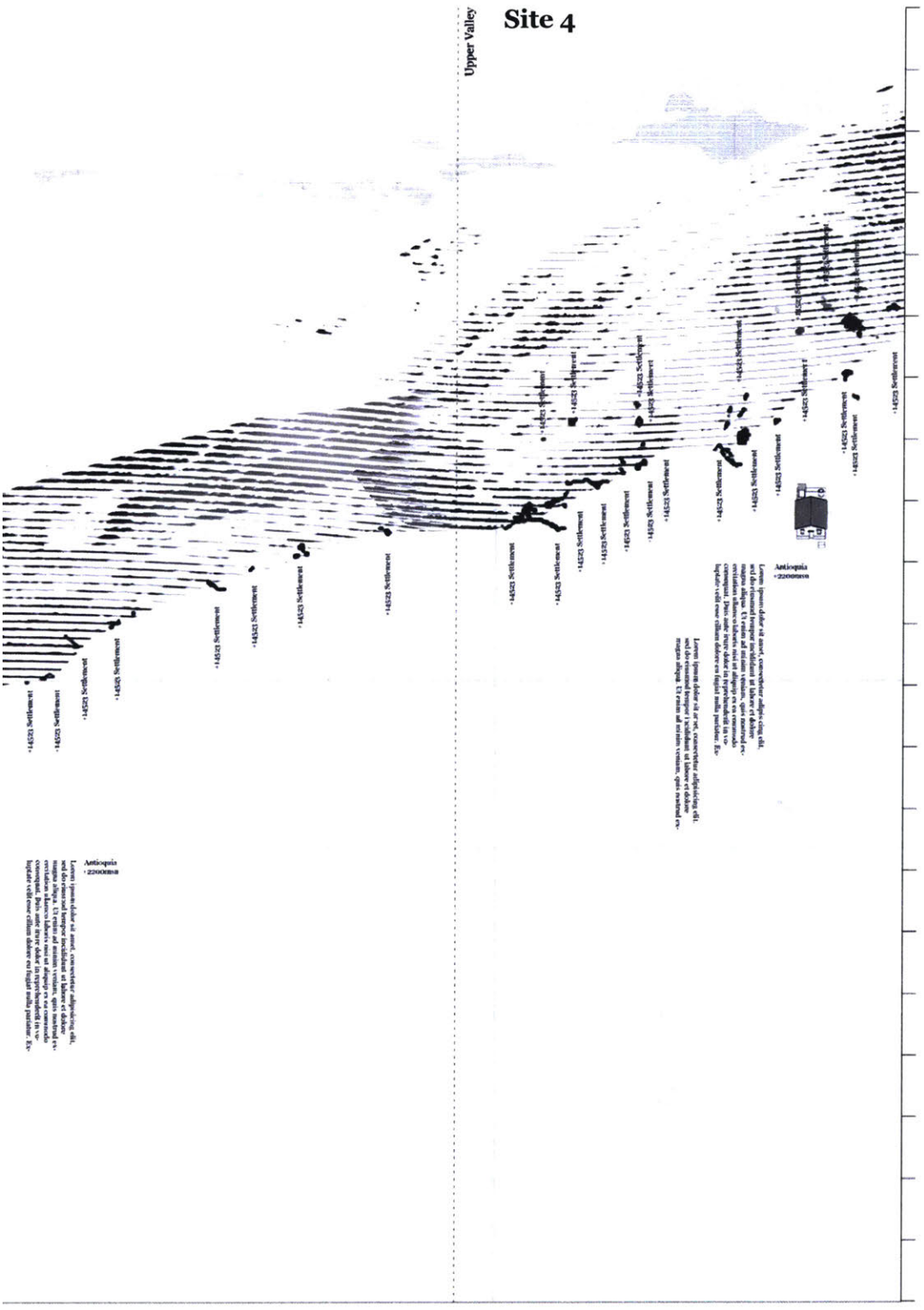
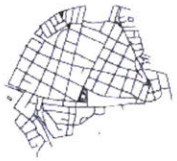


Fig Below. Section Analysis of Human Settlements across the transect

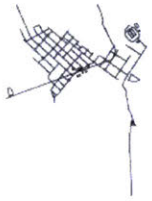




Site 1 - Las Palmas

Site 2 - Rio Seco

Site 2 - Cieneguilla

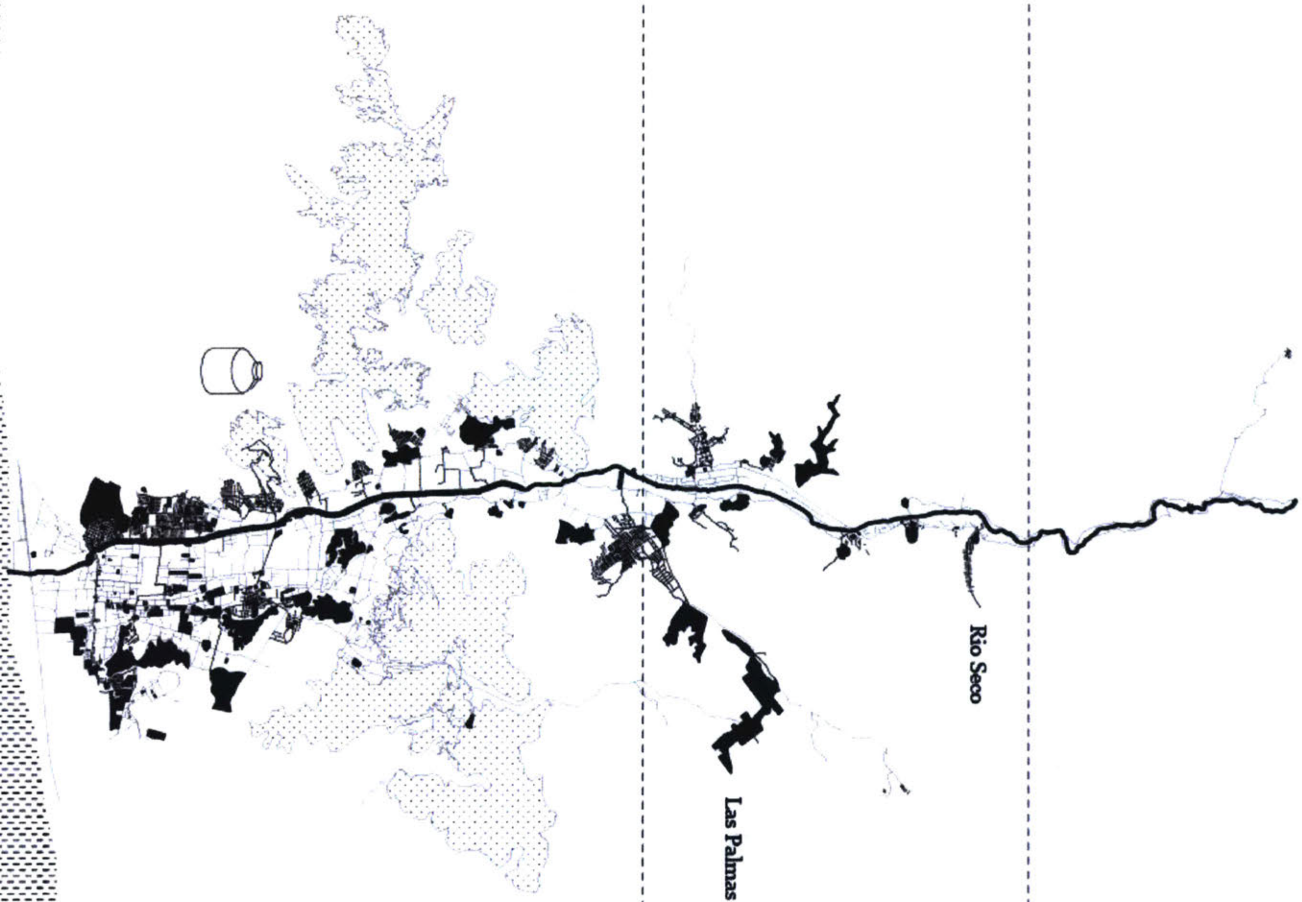


Site 3 - Antioquia

Site 4 - Huarochiri

Section 1: Las Palmas

Section 2: Rio Seco



Forages:
Alfalfa, corn, chala

Vegetables:
Tomato, pepper, chili, cabbage, cauliflower, broccoli, carrot, radish,

Aromatics:
Luisa herb, Ruda

Fruit trees:
Low: Melocotón, tuna, ciruela,man-zana, tumbo, chirimoya,granadilla, membrillo.

Roots:
Baja: Yuca, Camote

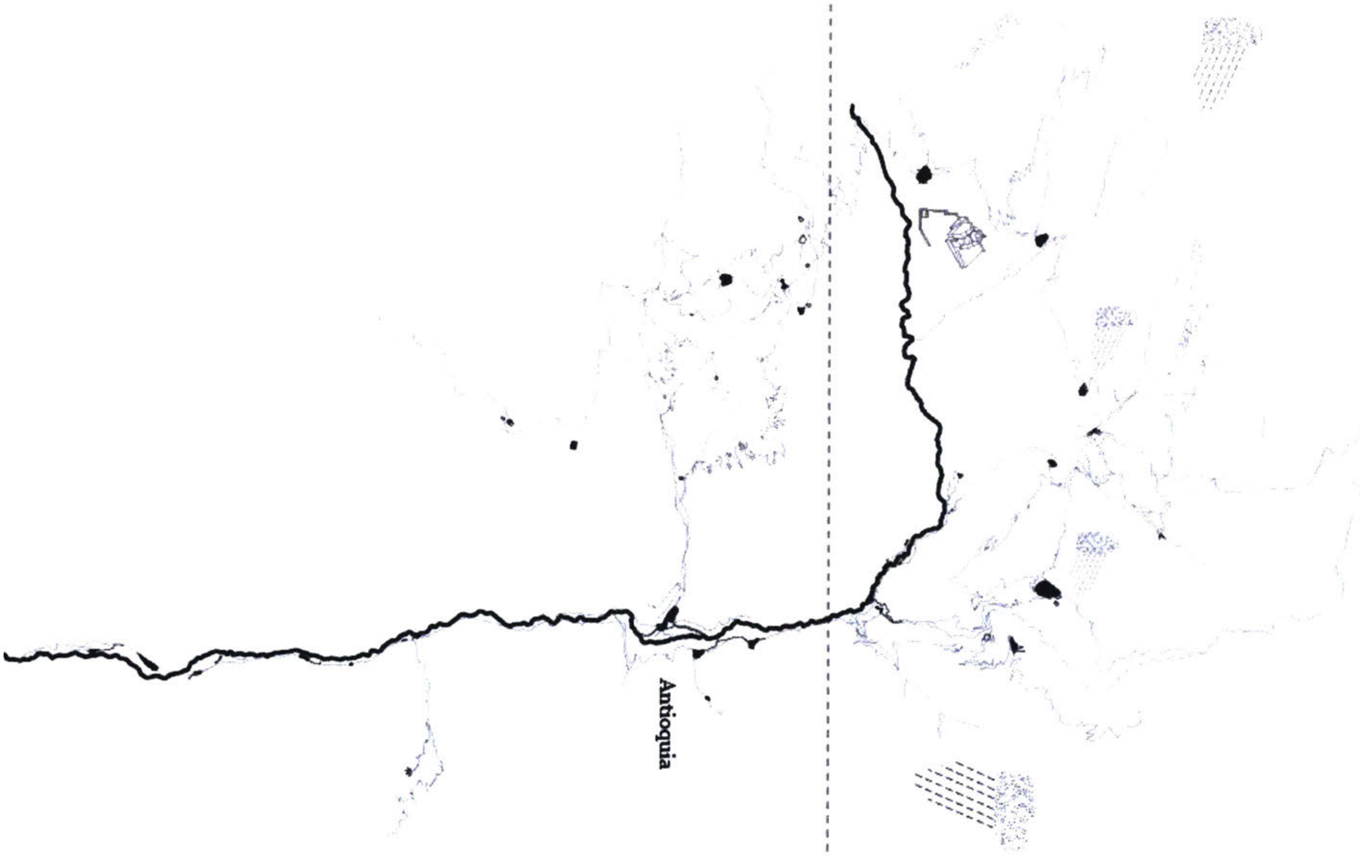
Cereals and Grains:
Yellow Corn, Choclo

Legumes:
Beans

Fruit trees:
Low: Melocotón, tuna, ciruela,manzana, tumbo, chirimoya,granadilla, membrillo
High: Fresa, banana, apple, peach, avocado.

Site 3: Antioquia

Site 4: Huarochiri



Roots:
Yuca, Camote, Potatoes, Oca

Cereals and Grains:
Yellow Corn, Choclo, Wheat, Barley

Legumes:
Peas, Beans, Giant Pea

Forages:
Oats, clover, rye-grass

Vegetables:
Cabbage, cauliflower, broccoli, carrot, radish, beet, lettuce, potato onion, onion chi-na, zucchini.

Roots:
Quinua, Olluco

Cereals and Grains:
Wheat, Barley, Corn

Legumes:
Peas, Beans, Giant Pea

Forages:
Alfalfa, oats, clover, rye-grass

Vegetables:
Carrot, radish, beetraga, lettuce, onion, Chinese onion, pumpkin,

Aromatics:
Ruda, manzanilla, ajenjo

Fruit trees:
Banana, apple, peach, avocado.

A Taxonomy of Pieces

Fig Below. Difussed Infrastructure Patterns.

The vocabulary of infrastructure today has expanded: in lima, we can no longer think of infrastructure as an external solution, rather the whole spectrum of infrastructure should be embraced - not so much a dispute between hard and soft, micro and macro, but the need for functioning as an ecology.

I propose an ecology that is defined by a multiplicity of parts and objects operating (through relationships) as a collective. Representing the current status of all its pieces, and informing the opportunity of producing new ones. From paved and unpaved road systems, retaining walls, water tanks, plinths to secure the soil, celular coverage zones, community centers. Speaking of the construction of relationships as a project. Responding to the social demands of high flexibility and participation. The effort of the thesis is looking at these collections of pieces as a whole. Defining an Infrastructural Ecology that studies the interaction between the elements of a system. A concept of rules: one that constructs an horizontal 'table of negotiations'. One that implies a plan that admits change in its development, accident and improvisation.

Public Toilets 1

Cost: $103
Relationship: Physical
Purpose: Accesibility

Benefit: Community
Stakeholder: NGO
Hard/Soft: Soft

The Retaining Wall 2

Cost: $103
Relationship: Physical
Purpose: Accesibility

Benefit: Community
Stakeholder: Community
Hard/Soft: Hard

The Plinth 3

Cost: $103
Relationship: Physical
Purpose: Stability

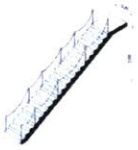
Benefit: User
Stakeholder: User
Hard/Soft: Hard

The Kitchen 4

Cost: $103
Relationship: Physical
Purpose: Accesibility

Benefit: Community
Stakeholder: Government
Hard/Soft: Hard

The Stairs on the Slope 5



Cost: $103
Relationship: Physical
Purpose: Accesibility

Benefit: Community
Stakeholder: Government
Hard/Soft: Hard

The Elevated Platform 6

Cost: $103
Relationship: Physical
Purpose: Accesibility

Benefit: User
Stakeholder: User
Hard/Soft: Hard

1. Urban Staircases

2. Rock Plinth

3. Land Slide Protection

13. Well

14. Public Seating

15. Outdoor Institution

4. Urban Kitchen

5. House Kitchen

6. Dry Toilet

16. Containing Wall

17. Water Tanks

18. Micro-Grid Solar Panels

9. Raised Platform Deck

7. Waste Disposal

8. Lighting

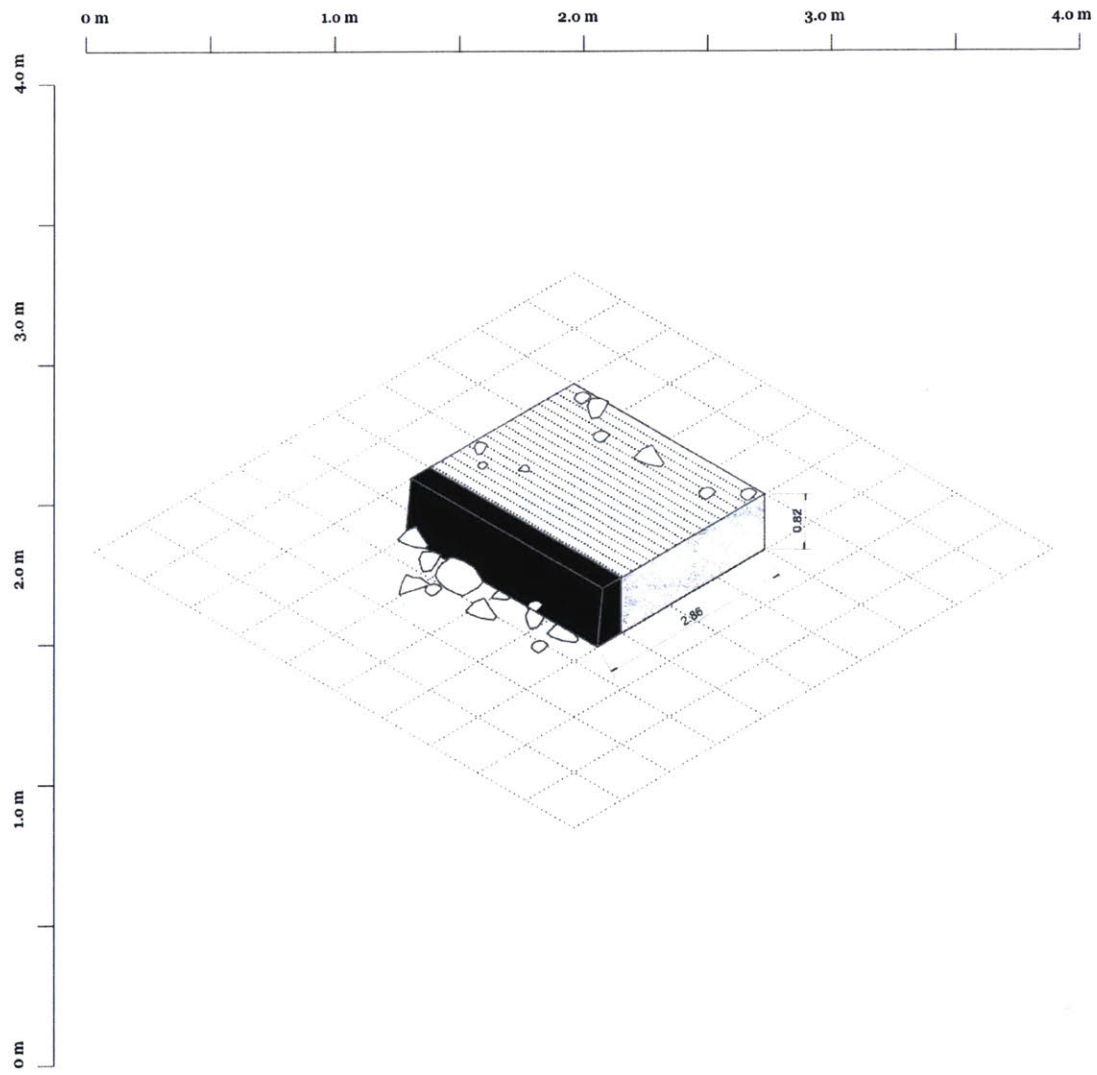
19. Vegetation/ Fertile Soil

20. Health/Emergency Posts

21. Public Shading

Retaining Walls

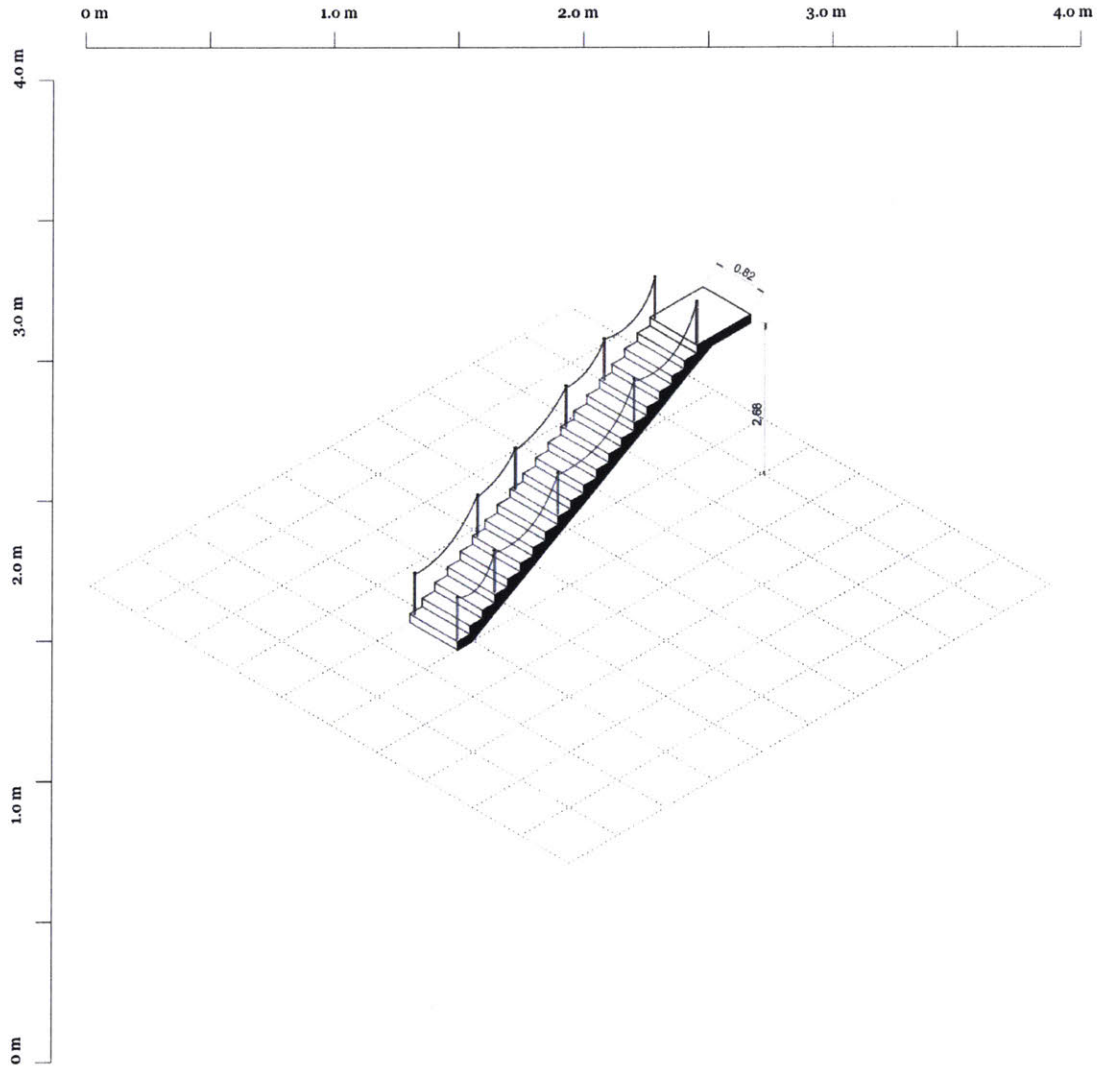
The Introduction of Pieces



Cost:	$103	**Benefit:**	Community
Relationship:	Physical	**Stakeholder:**	Community
Purpose:	Accesibility	**Hard/Soft:**	Hard

Urban Staircases

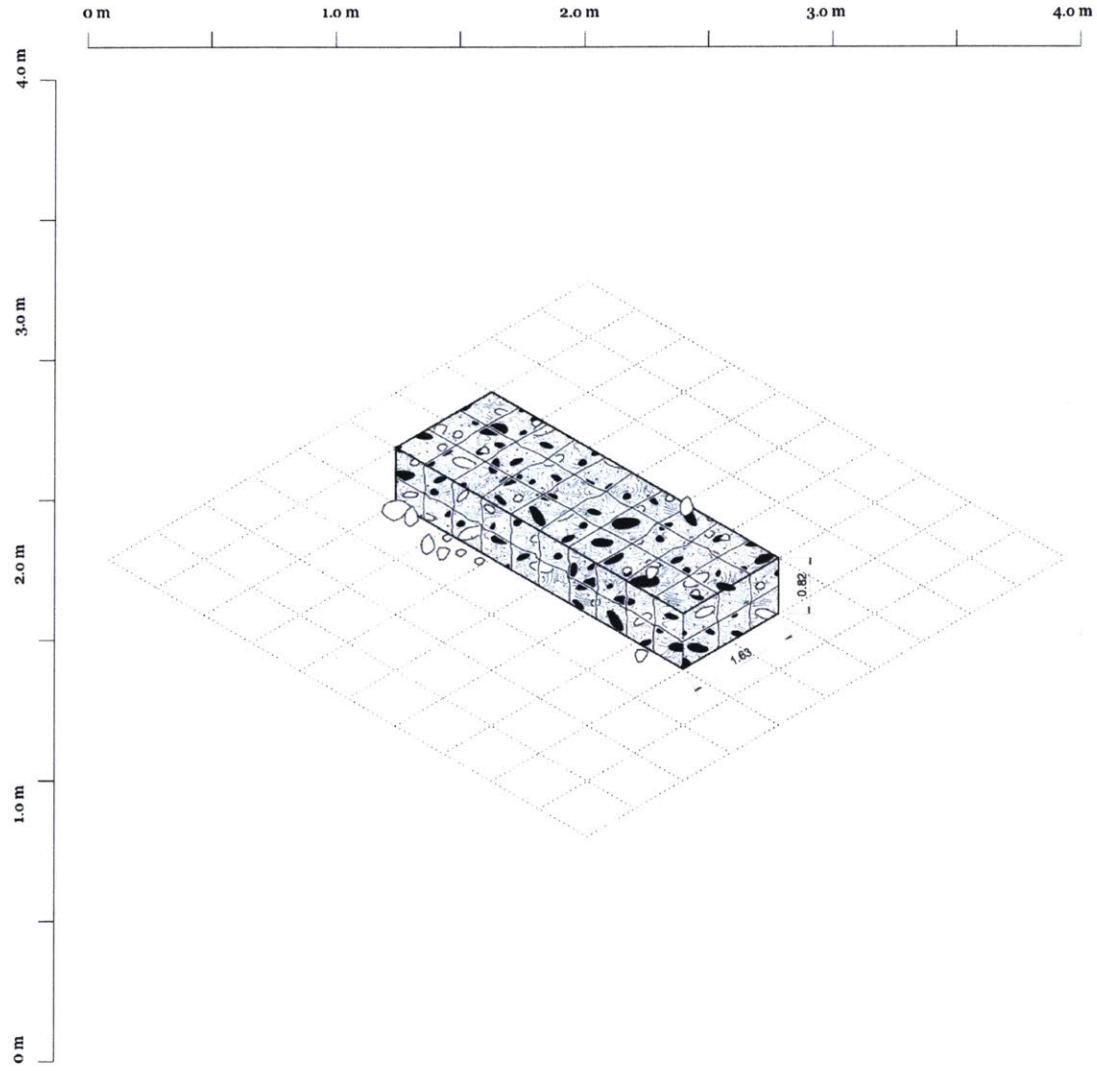
The Introduction of Pieces



Cost:	$103	**Benefit:**	Community
Relationship:	Physical	**Stakeholder:**	Government
Purpose:	Accesibility	**Hard/Soft:**	Hard

Plinths

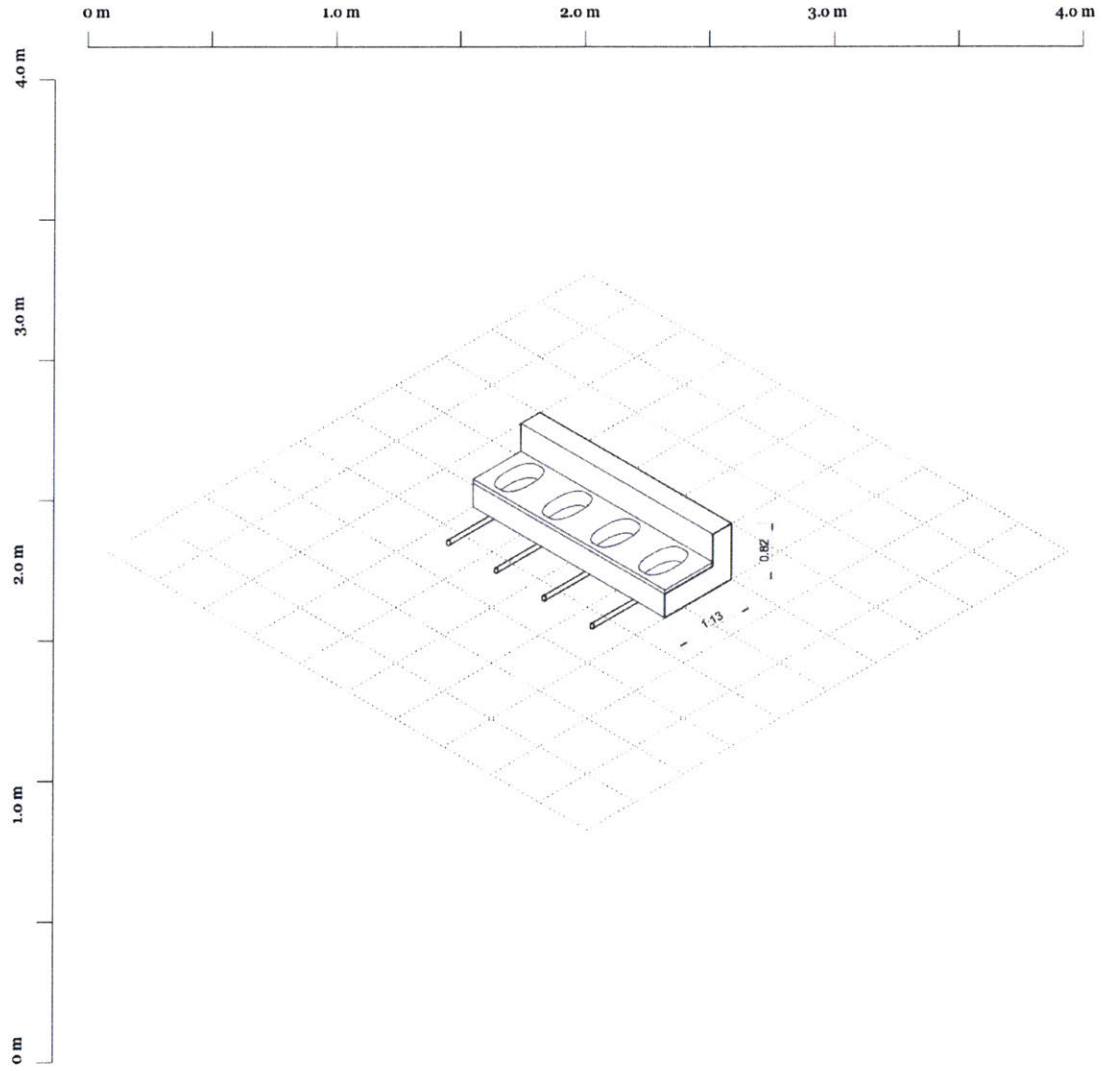
The Introduction of Pieces



Cost:	$103	**Benefit:**	User
Relationship:	Physical	**Stakeholder:**	User
Purpose:	Stability	**Hard/Soft:**	Hard

Public Toilets

The Introduction of Pieces

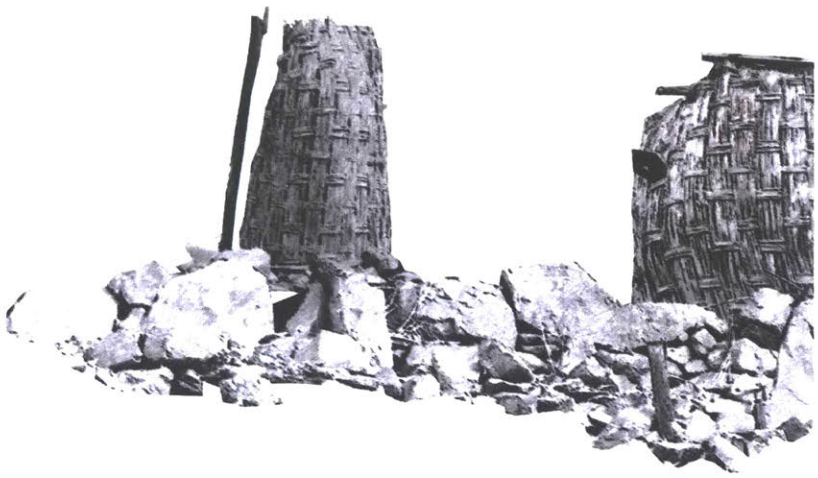


Cost:	$103	**Benefit:**	Community
Relationship:	Physical	**Stakeholder:**	NGO
Purpose:	Accesibility	**Hard/Soft:**	Soft

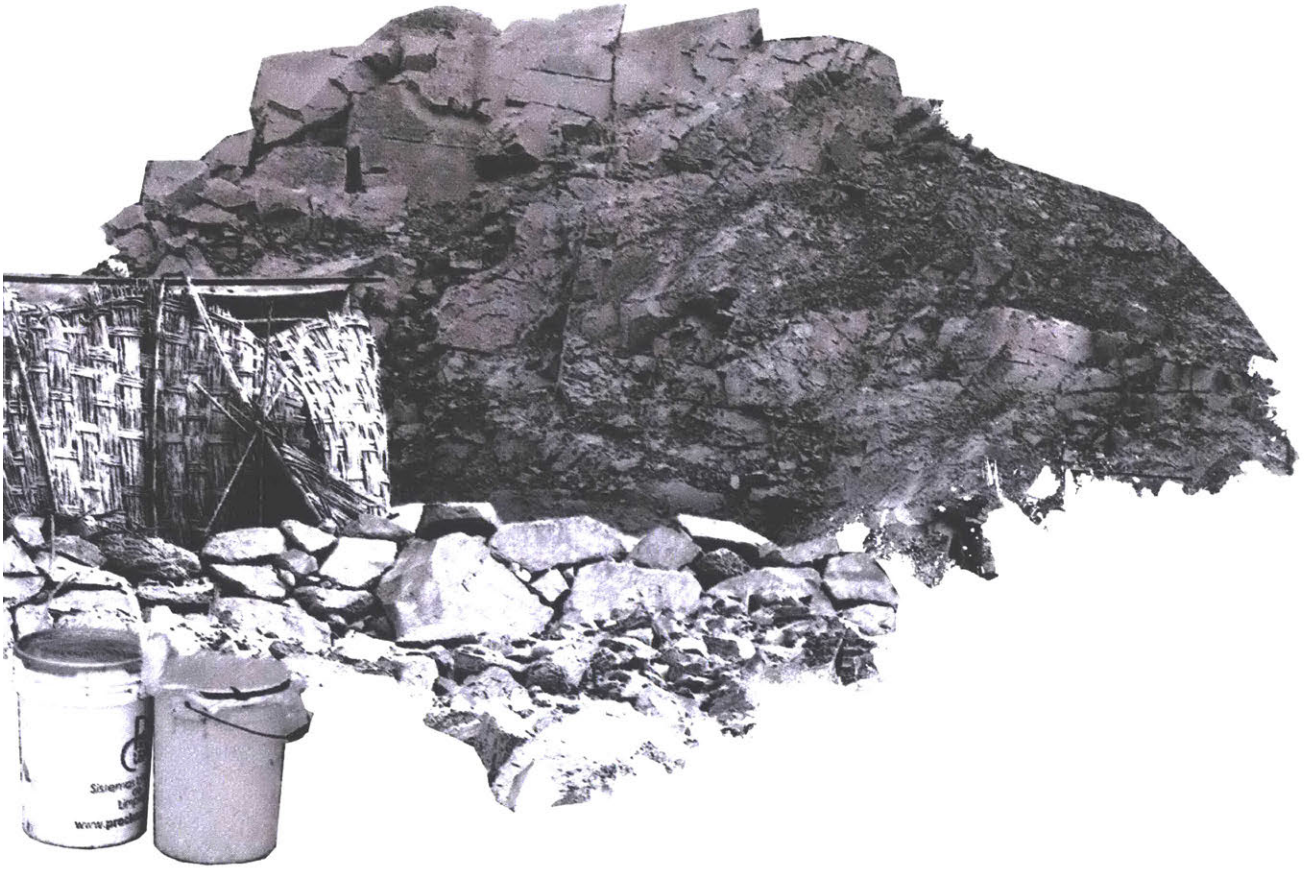
The Four
Projects

Las Palmas, Rio Seco, Antioquia and Huarochiri

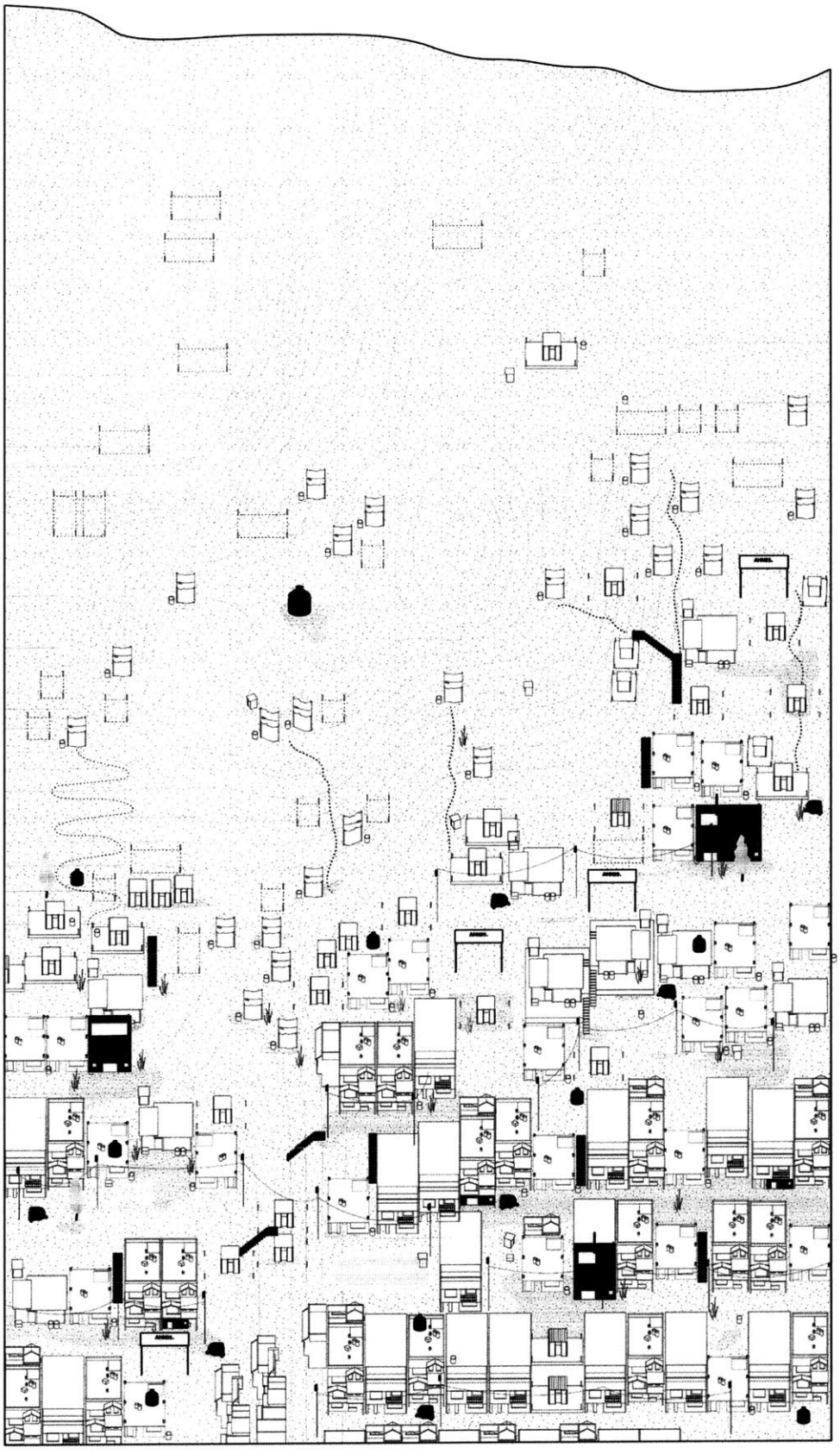
Site 1 Pamplona & Pica Piedra: Water Community Management



The first site sits at 150m above sea level. The driest, densest, and closest to jobs and water of them all. It sits in the periphery of the city. The partnership is creating a Water Tank, that stores the water coming from the valley. A place high enough to create pressure for water, but close enough that is at reach to engage with communities. It enables both a landmark and an institutional representation of water - a water that is civic. It is an anchor for other uses to happen, from collecting water from fog in winter and distributing it to sub-communities and smaller block-level water storage, empowering them to manage water and acquire a legitimate civic role while addressing a territorial issue. Resources are managed by the community, through partnerships between the "infrastructure of water" and corner stores, community kitchens, houses and internet stations with an infrastructural agenda. And as time goes by, these become appropriated by families responsible for their water budget, and of their neighbors. Creating dignity of different lifestyles and enabling human qualities.



Altitude: 150 msn



Pamplona & Pica Piedra

Pieces that Operate as Infrastructure

PVC House Water Tank

Moto-Taxi as Public Transport

Community Kitchen

Concrete Stairs

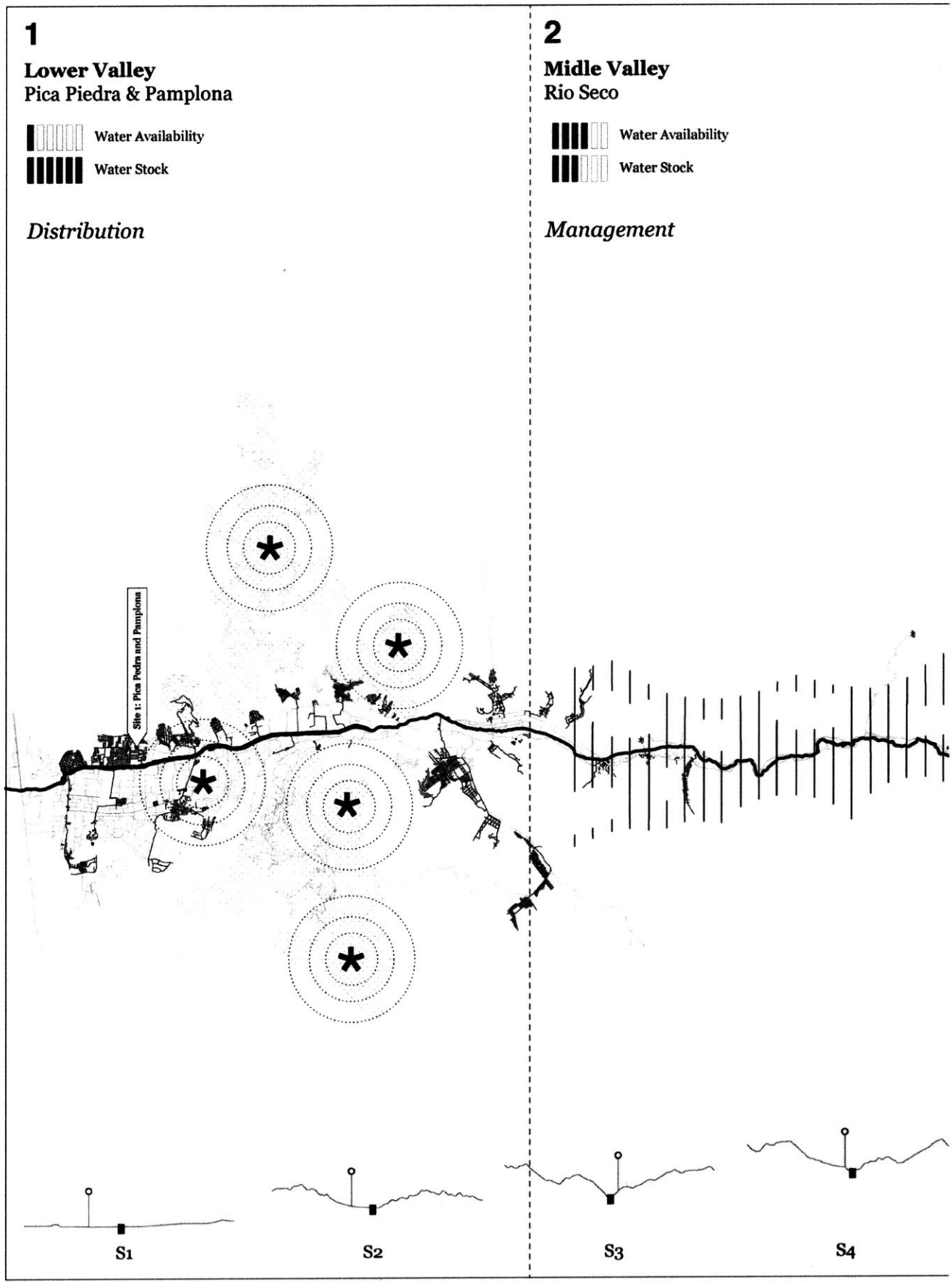
Corner Store

Informal Electricity Pole

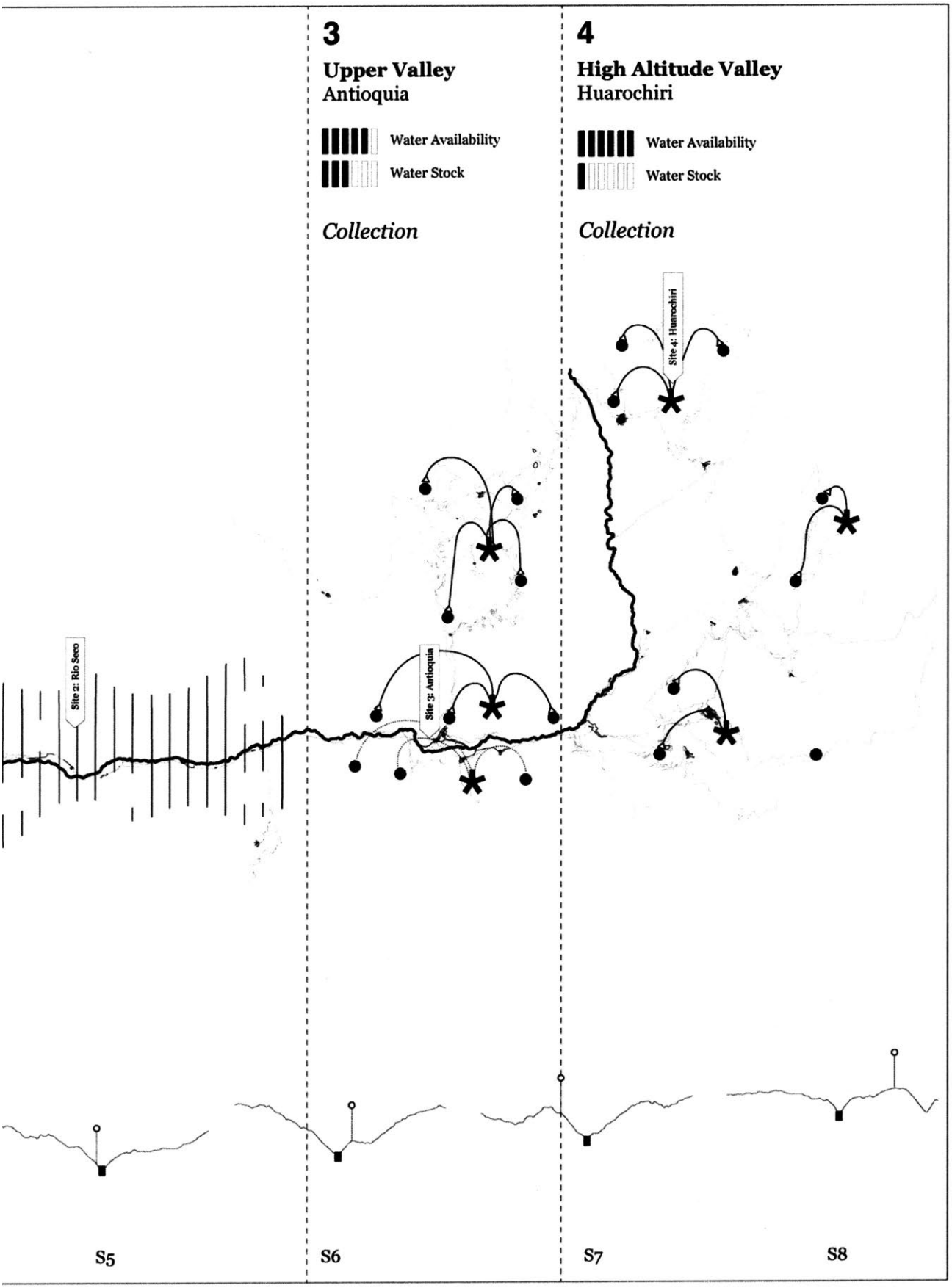
Plinth

Lang Adquisition Shed

Pit Latrines & Waste



Community Water Distrubution


3
Upper Valley
Antioquia
Water Availability
Water Stock
Collection
4
High Altitude Valley
Huarochiri
Water Availability
Water Stock
Collection
Site 2: Rio Seco
Site 3: Antioquia
Site 4: Huarochiri
S5
S6
S7
S8

Where Water Ends:
Community Distribution

District Wate
Water Collectin
Community Re
Electric Genera

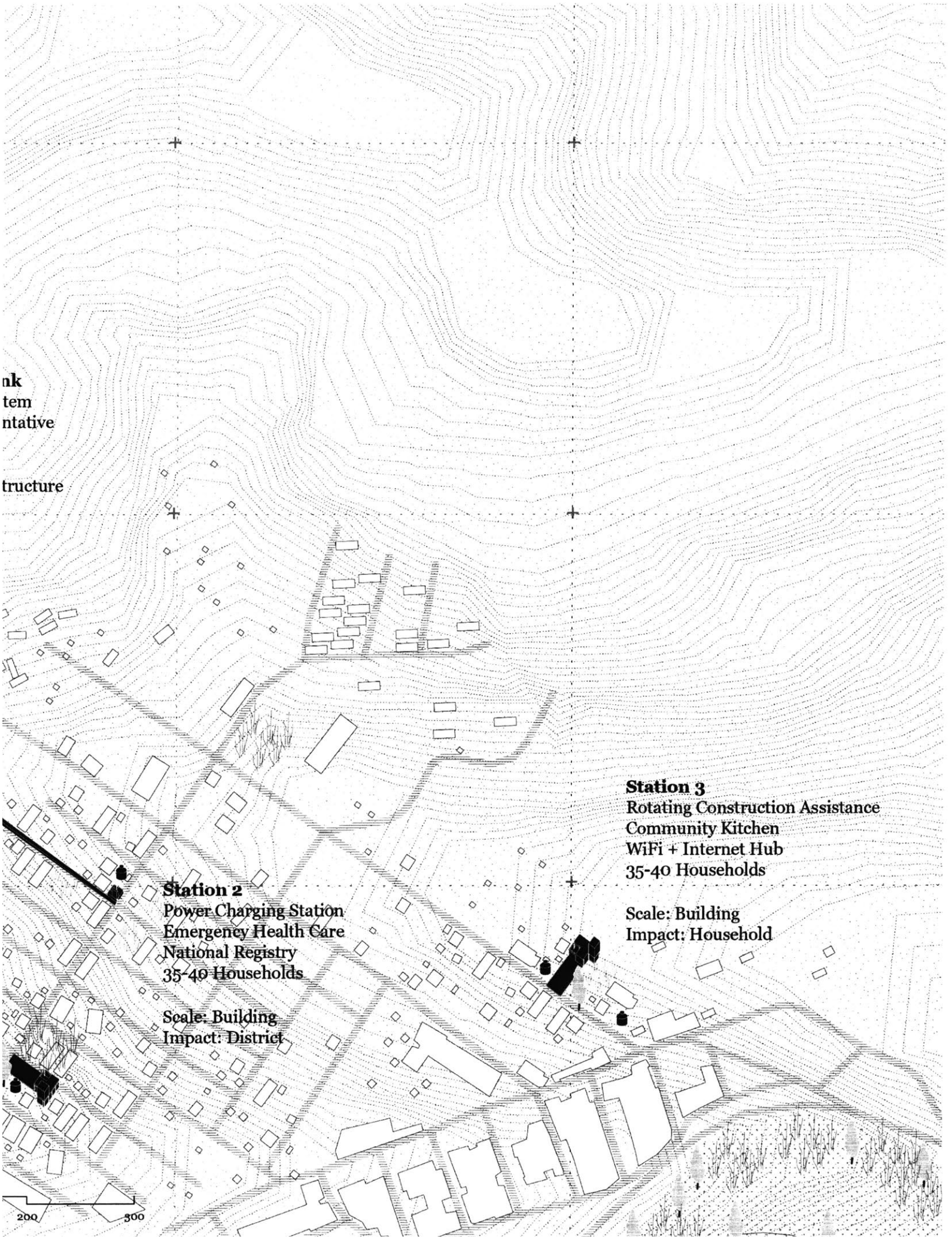
Scale: District I
Impact: Territo

Station 1
Management of Water
Job Center
35-40 Households

Scale: Building
Impact: Regional

Station 4
Community Foot Storage
Composting Facility
Legal Advice for Tensancy
35-40 Households

Scale: Building
Impact: District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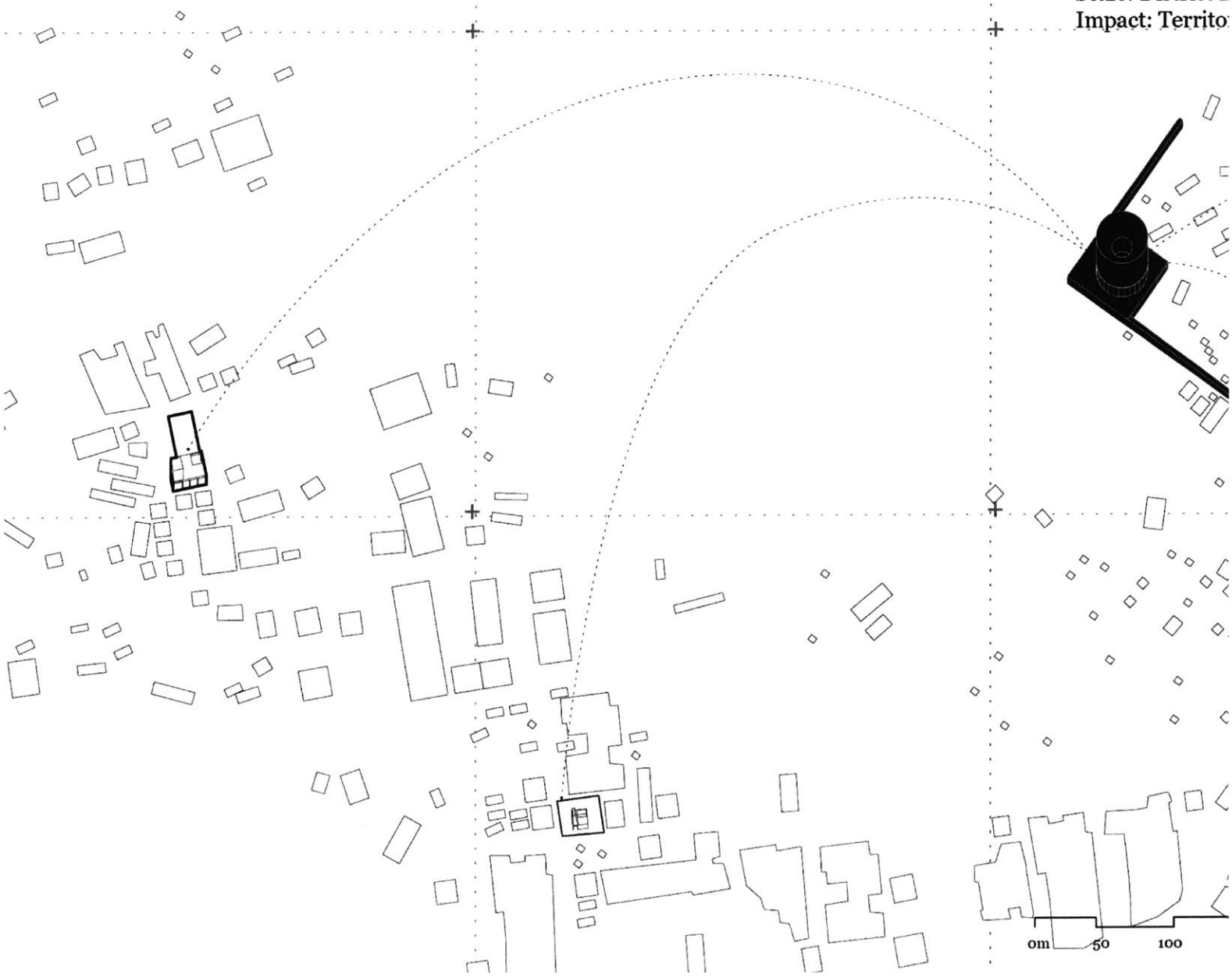
Station 3
Rotating Construction Assistance
Community Kitchen
WiFi + Internet Hub
35-40 Households
Scale: Building
Impact: Household
Station 2
Power Charging Station
Emergency Health Care
National Registry
35-40 Households
Scale: Building
Impact: District
200
300

Where Water Ends:
Community Distribution

District Wate
Water Collectin
Community Rej
Electric Genera

Scale: District I
Impact: Territo



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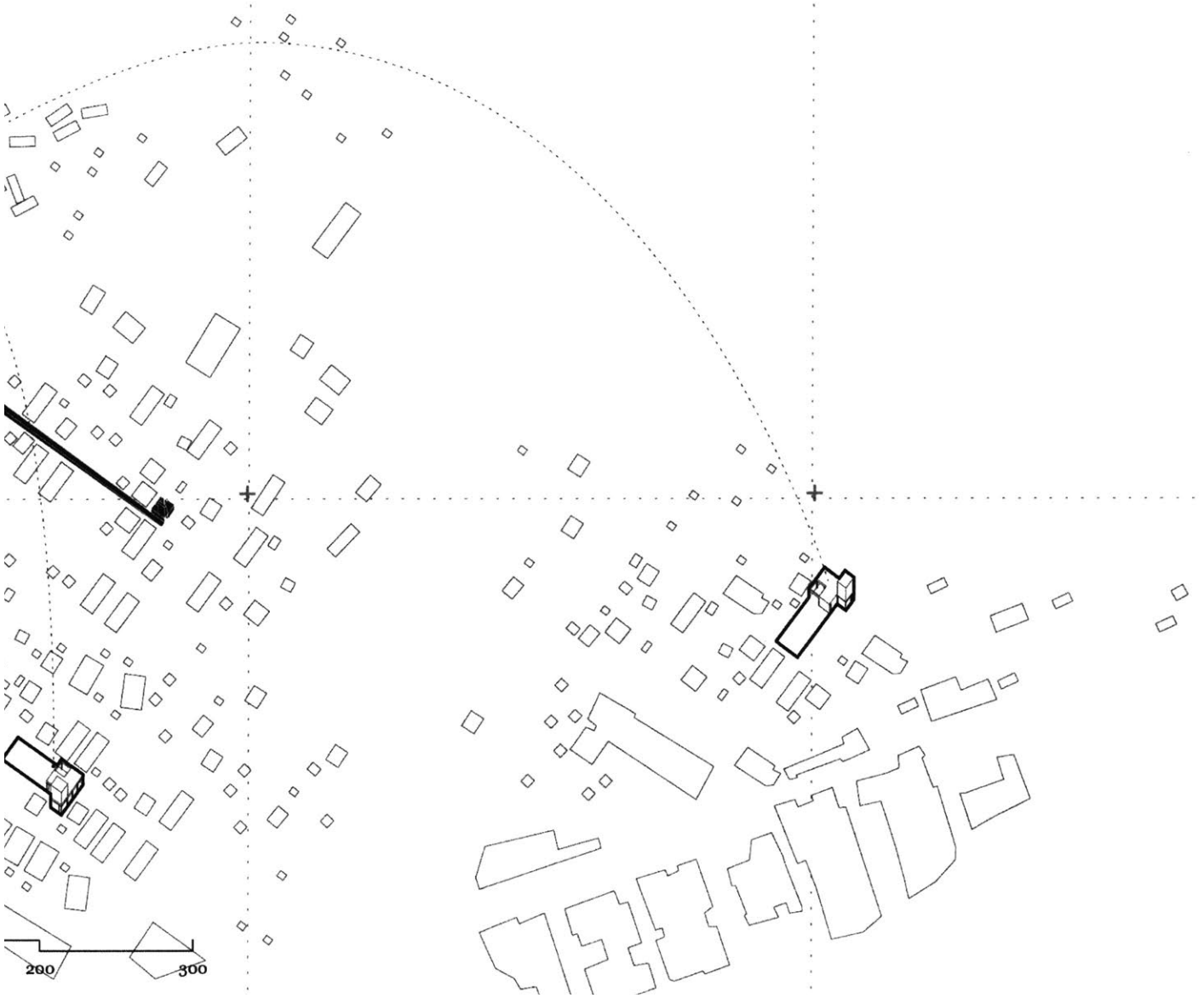
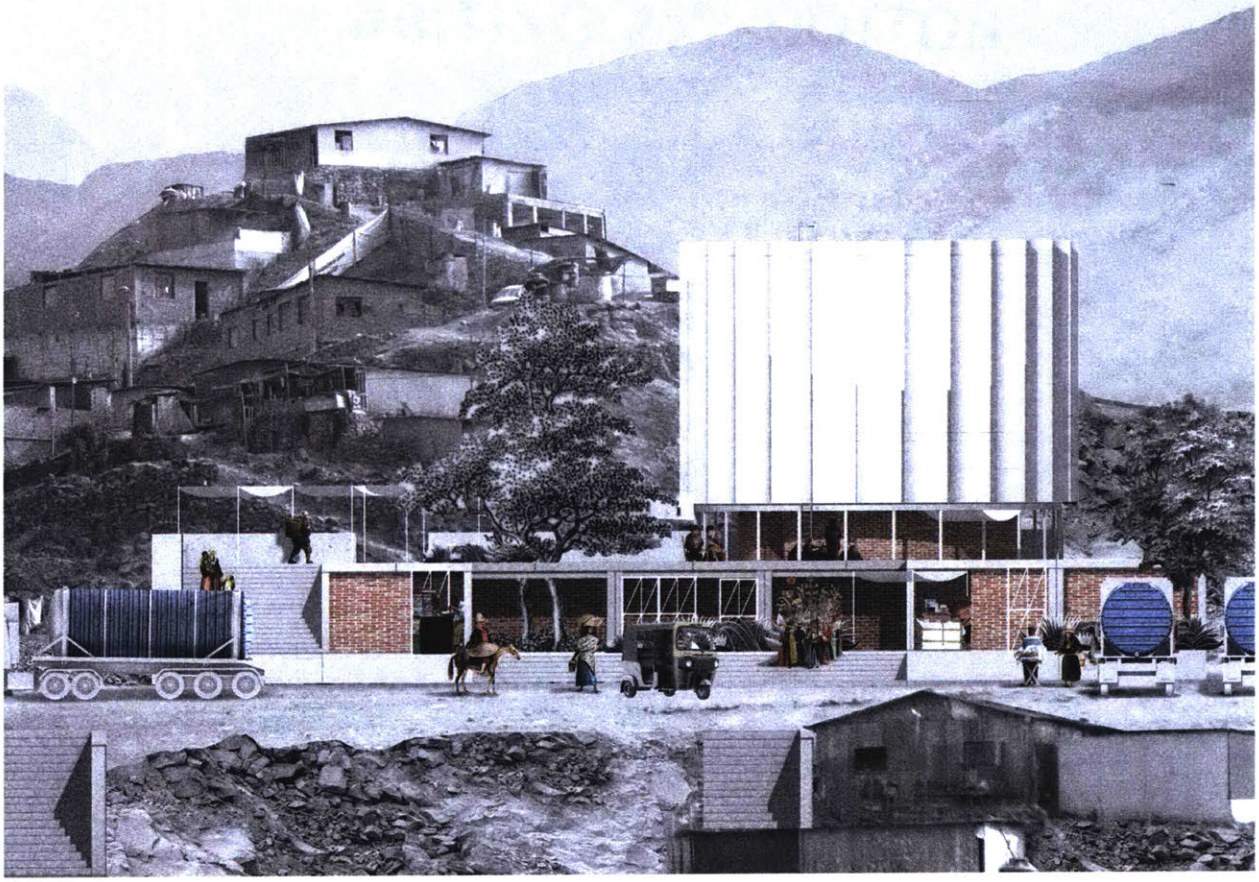
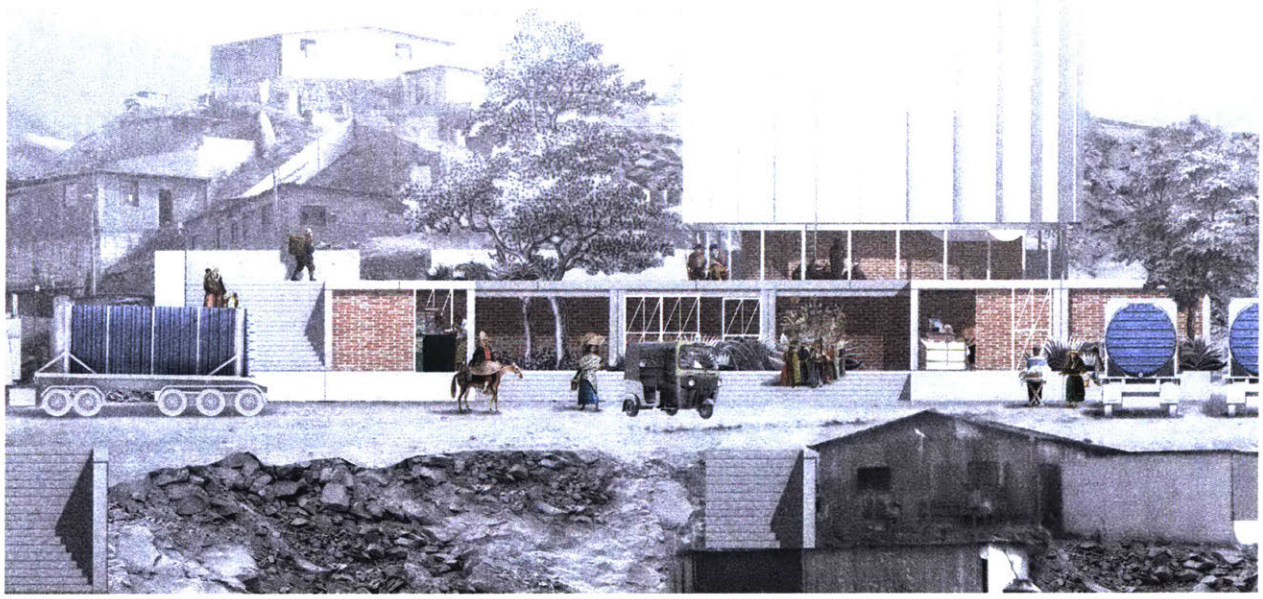




70 Water Tank Station
School Season



Water Tank Station
Fog Season

The Transect:
Managing Water Balances

Station 1
Management of Water
Job Center
35-40 Households

Scale: Building
Impact: Regional

Station 4
Community Foot Storage
Composting Facility
Legal Advice for Tensancy
35-40 Households

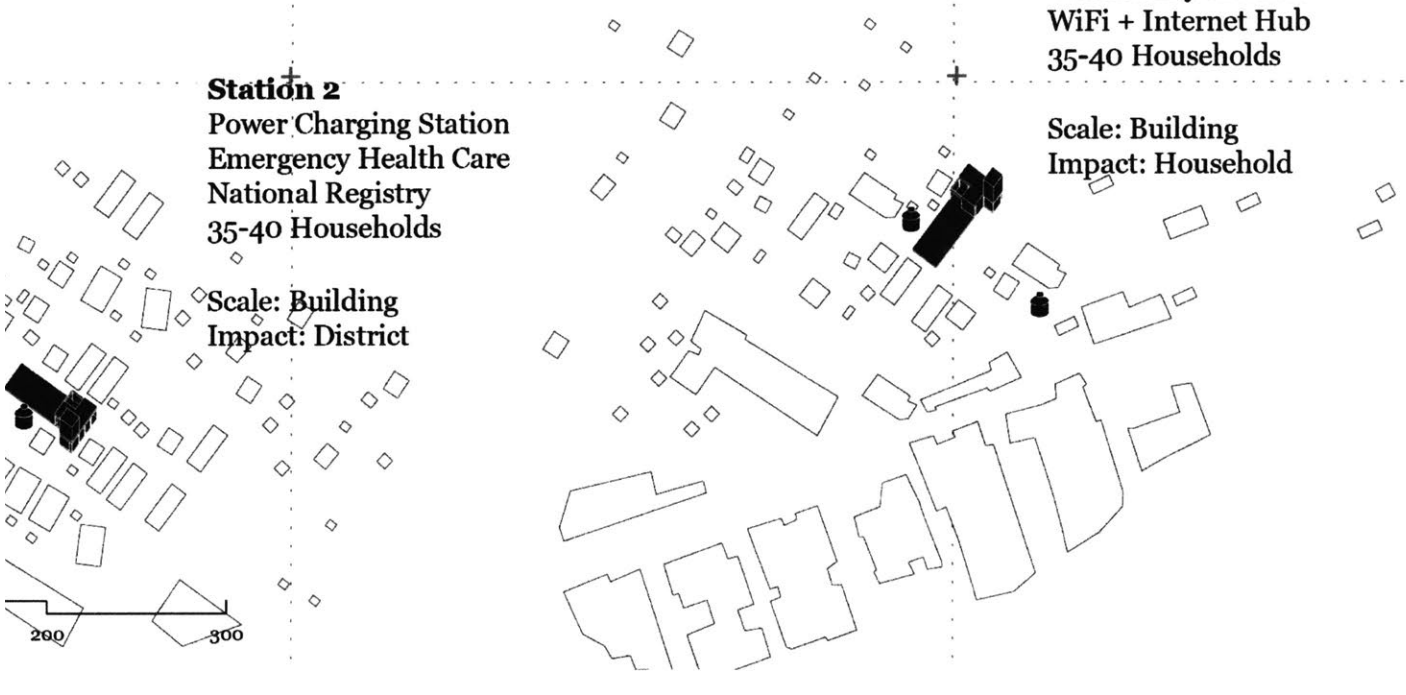
Scale: Building
Impact: District

Station 2
Power Charging Station
Emergency Health Care
National Registry
35-40 Households

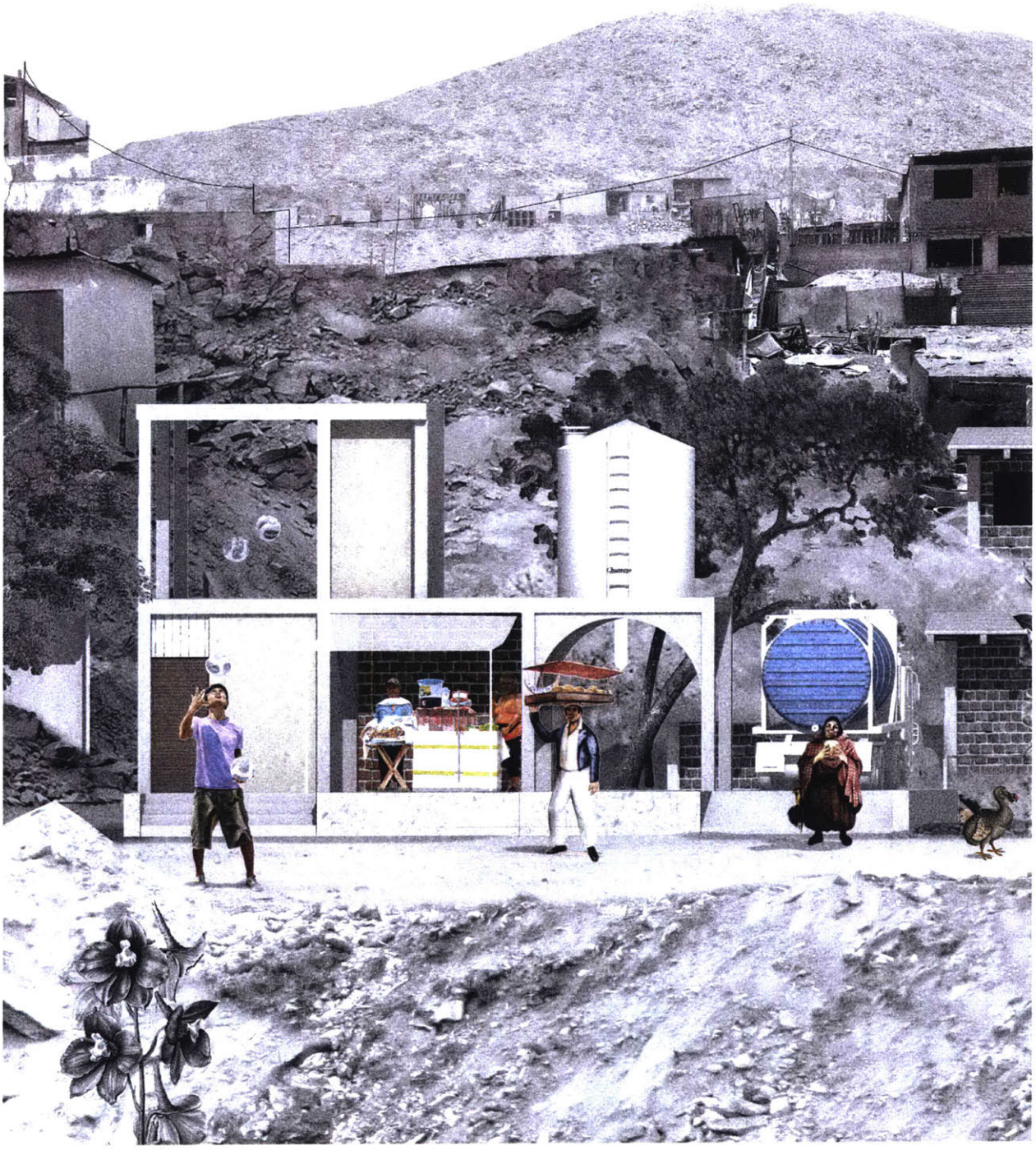
Scale: Building
Impact: District

Station 3
Rotating Construction Assistance
Community Kitchen
WiFi + Internet Hub
35-40 Households

Scale: Building
Impact: Household

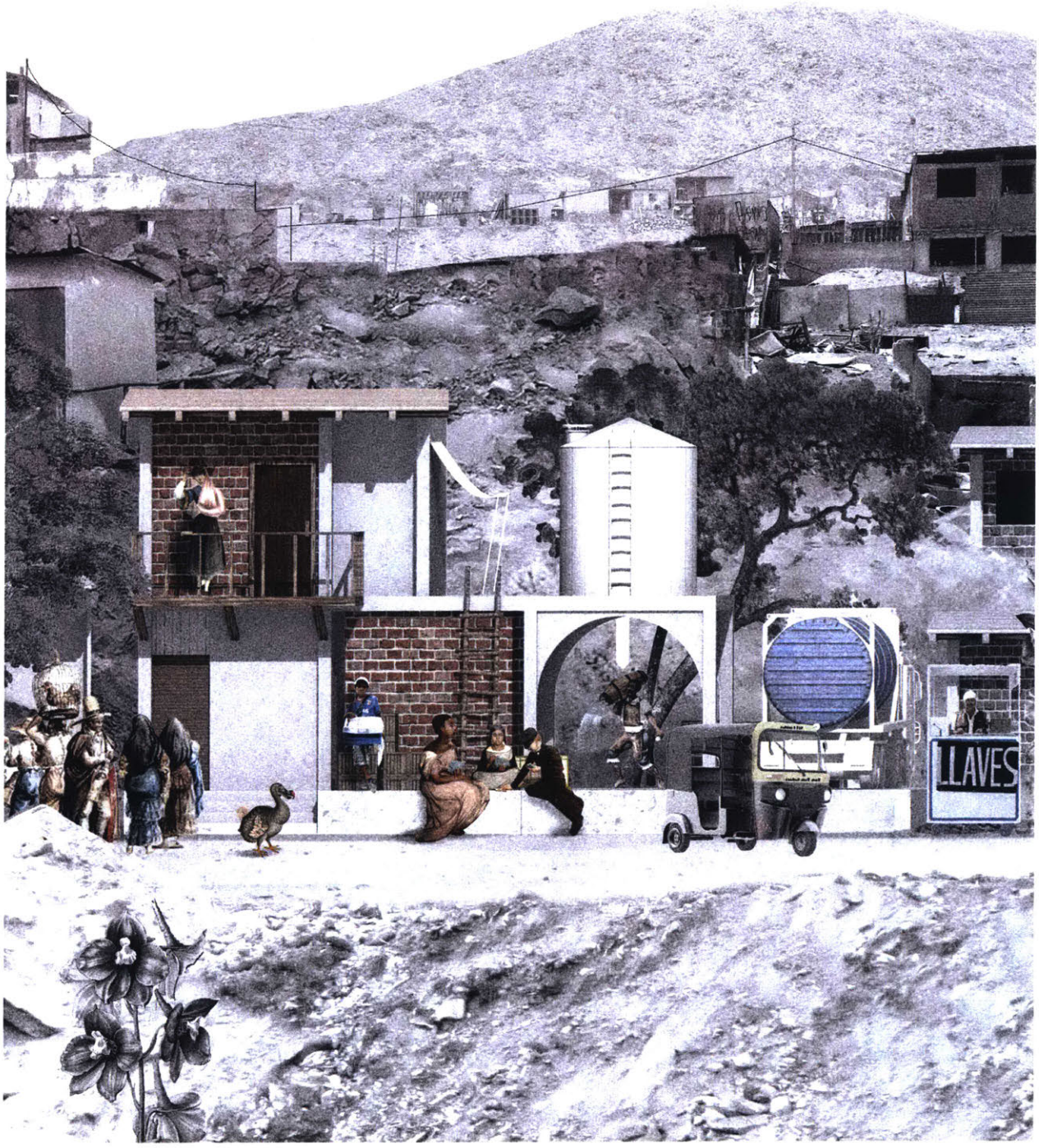


Sub Station 1
Phase 1 - Shop + Water Stop



Above: Illustration of
Pre Adoption Infrastructure

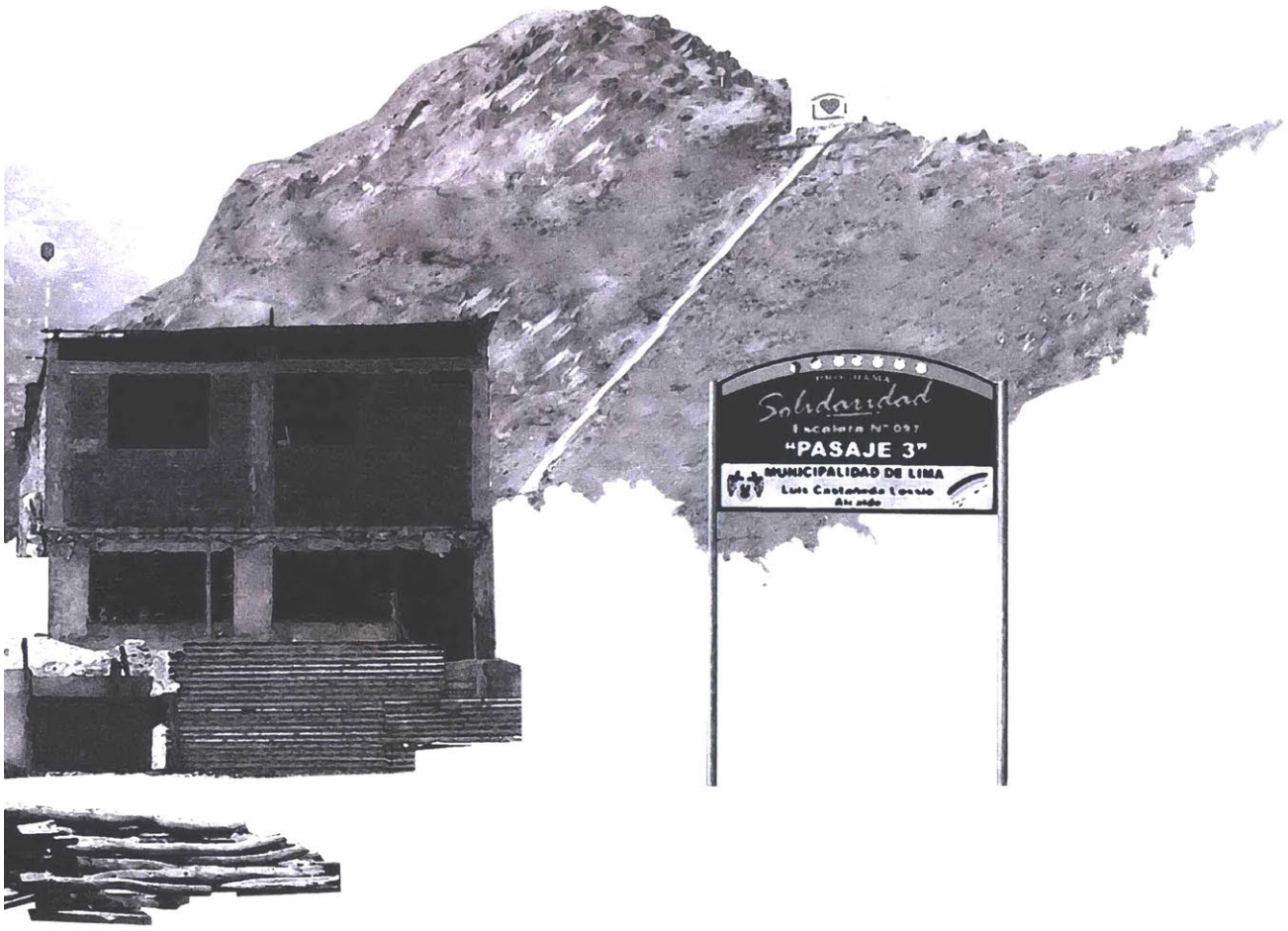
Sub Station 1
Phase 2 - House + Water Stop



Above: Illustration of
Pre Adoption Infrastructure

Site 2
Rio Seco:
Market
Community Bridge

The second site, at 648 meters, is perpendicular in form to the river, and is presented with the risks of dry slopes and landslides, polluting the river and destroying homes down the river. Rio Seco presents the hazards of high density in risk areas. Landslides and unstable ground pollute the river and make it hard to regularize agriculture. Communally managed plinths, shorten the path of slurry and landslides, accumulating boulders and filtrating water. Creating opportunities for agriculture along the slopes and securing the soil. But here, the road switches to the other side of the valley and marks the end of the mid valley. Creating a bridge partnered with other civic services, a line acts as a center that crosses the river and provides a new form of engagement with water, connecting the two sides of the valley. The water and the bridge as a form of civic encounter.



Altitude: 1400msn

Rio Seco

Pieces that Operate as Infrastructure

Settlement Name Portal

Waste Can

Informal Public Lighting

Moto Taxi

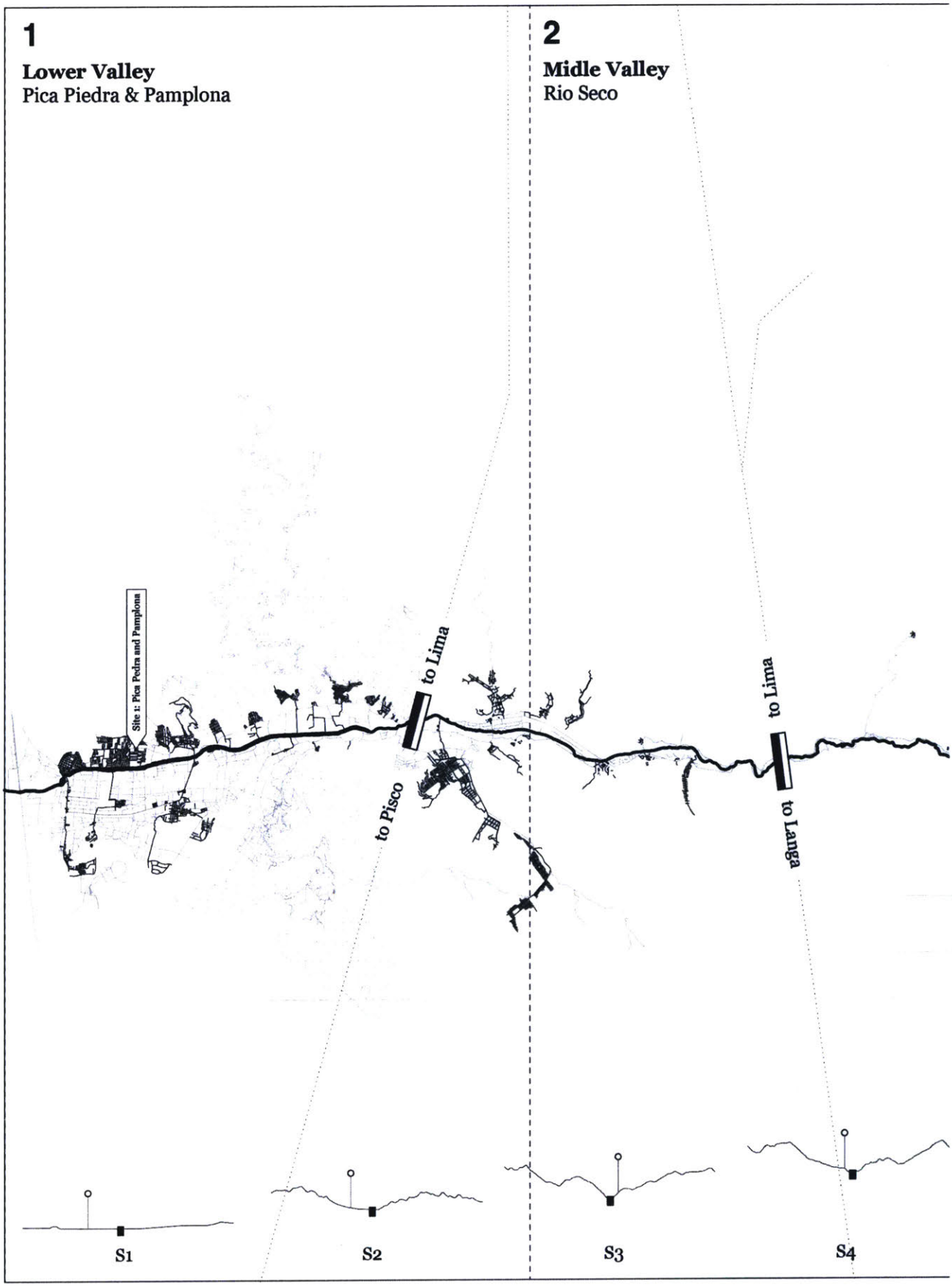
PVC Water Tank

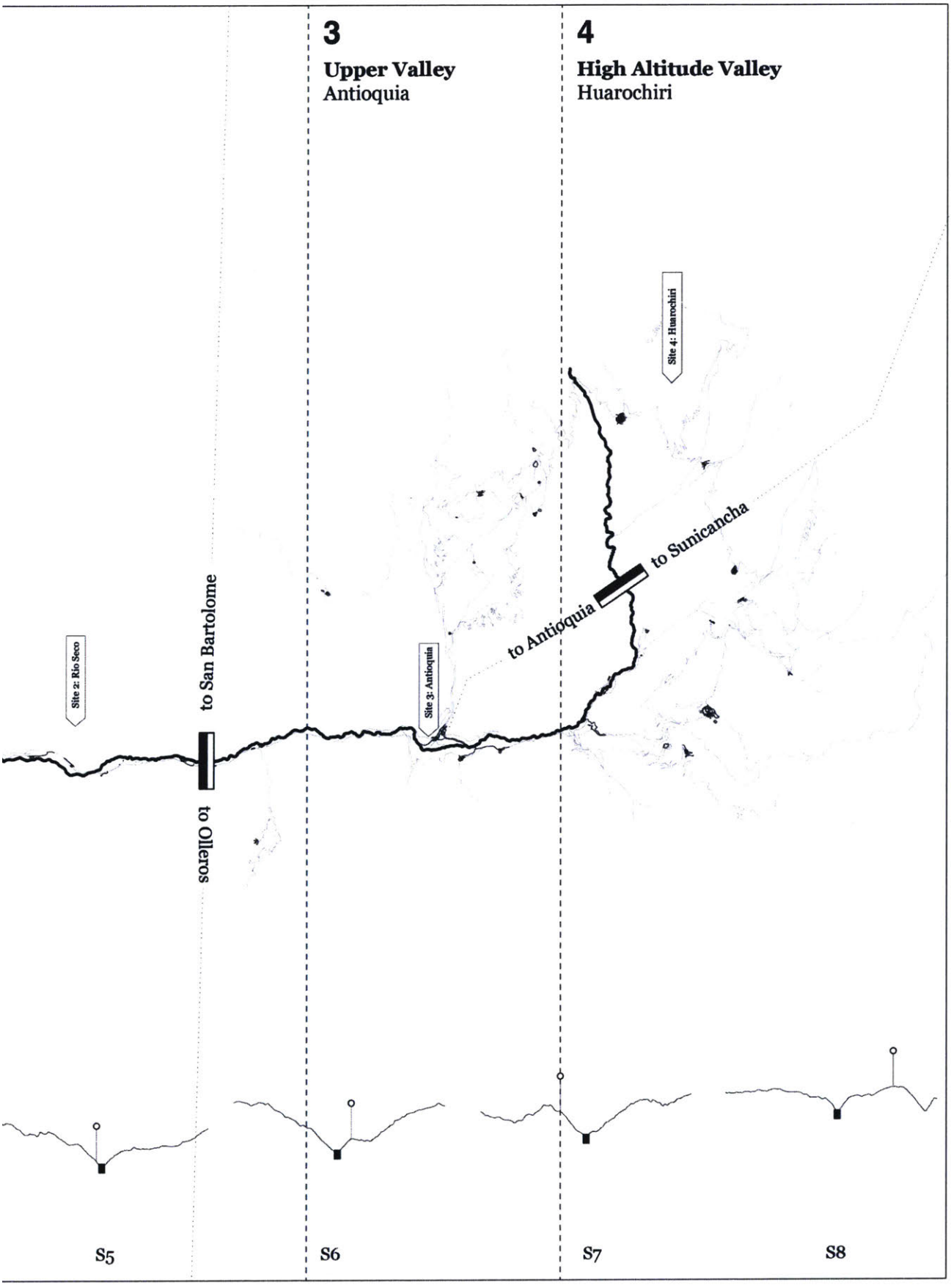
Perpendicular Gravel Plinth

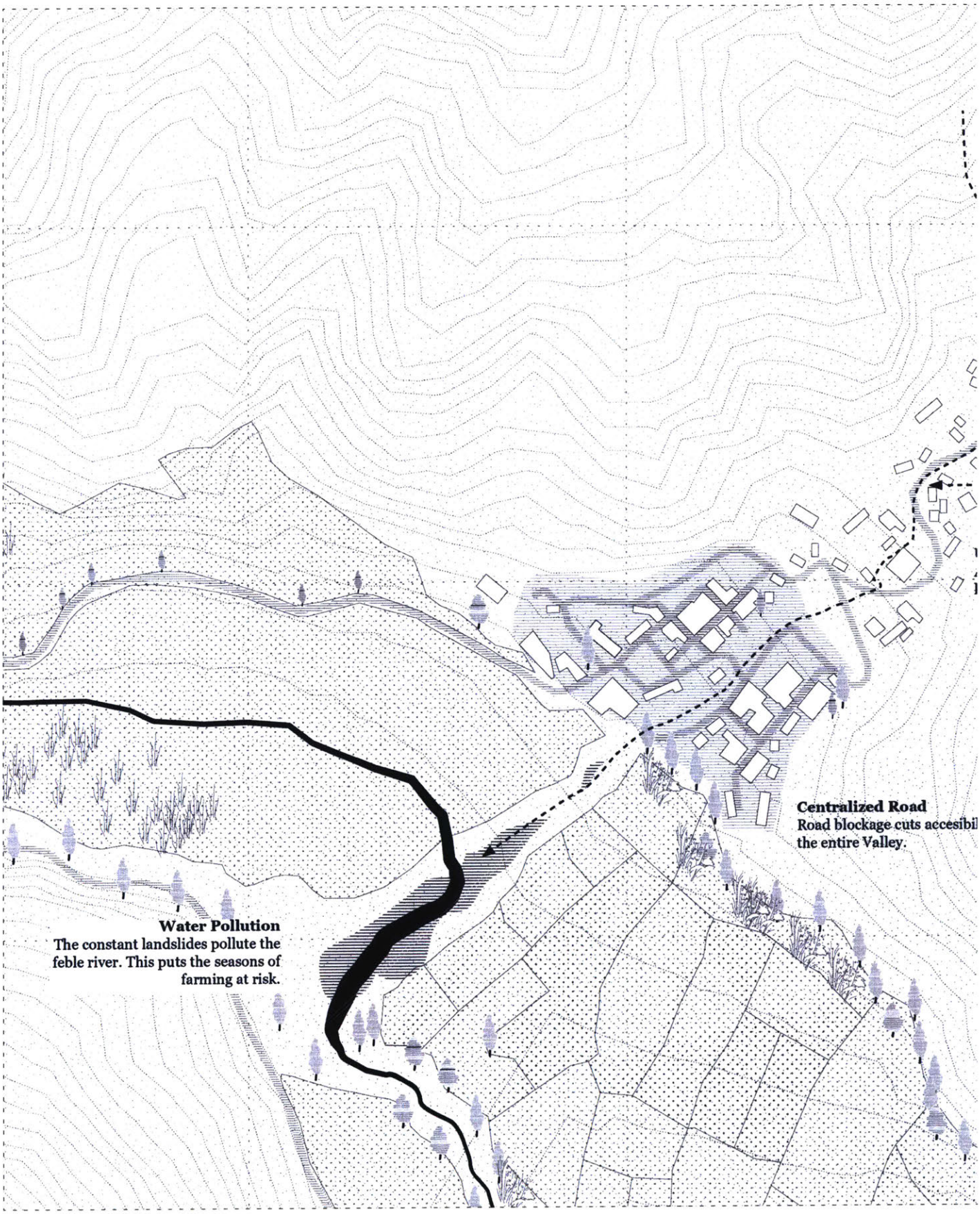
Boulders

Community Kitchen

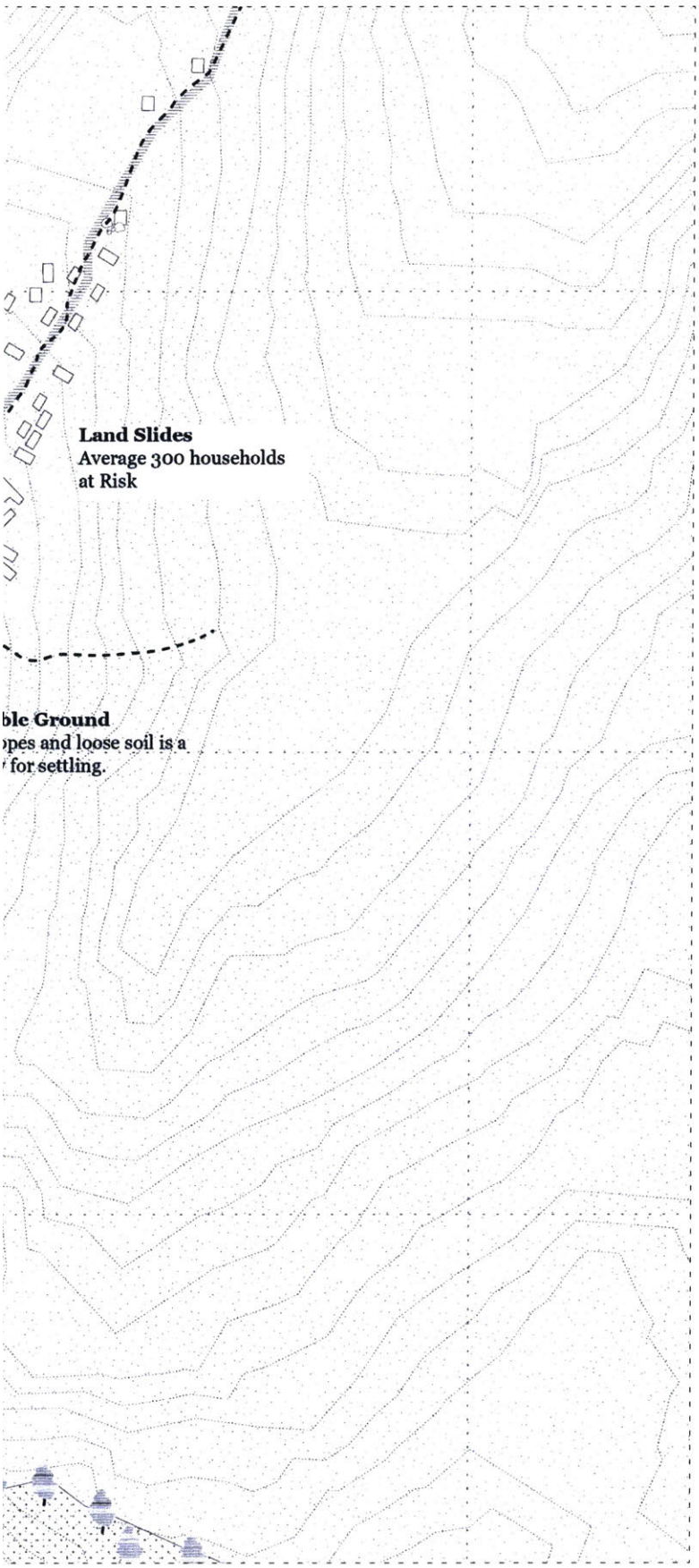
Checkpoints in the Valley



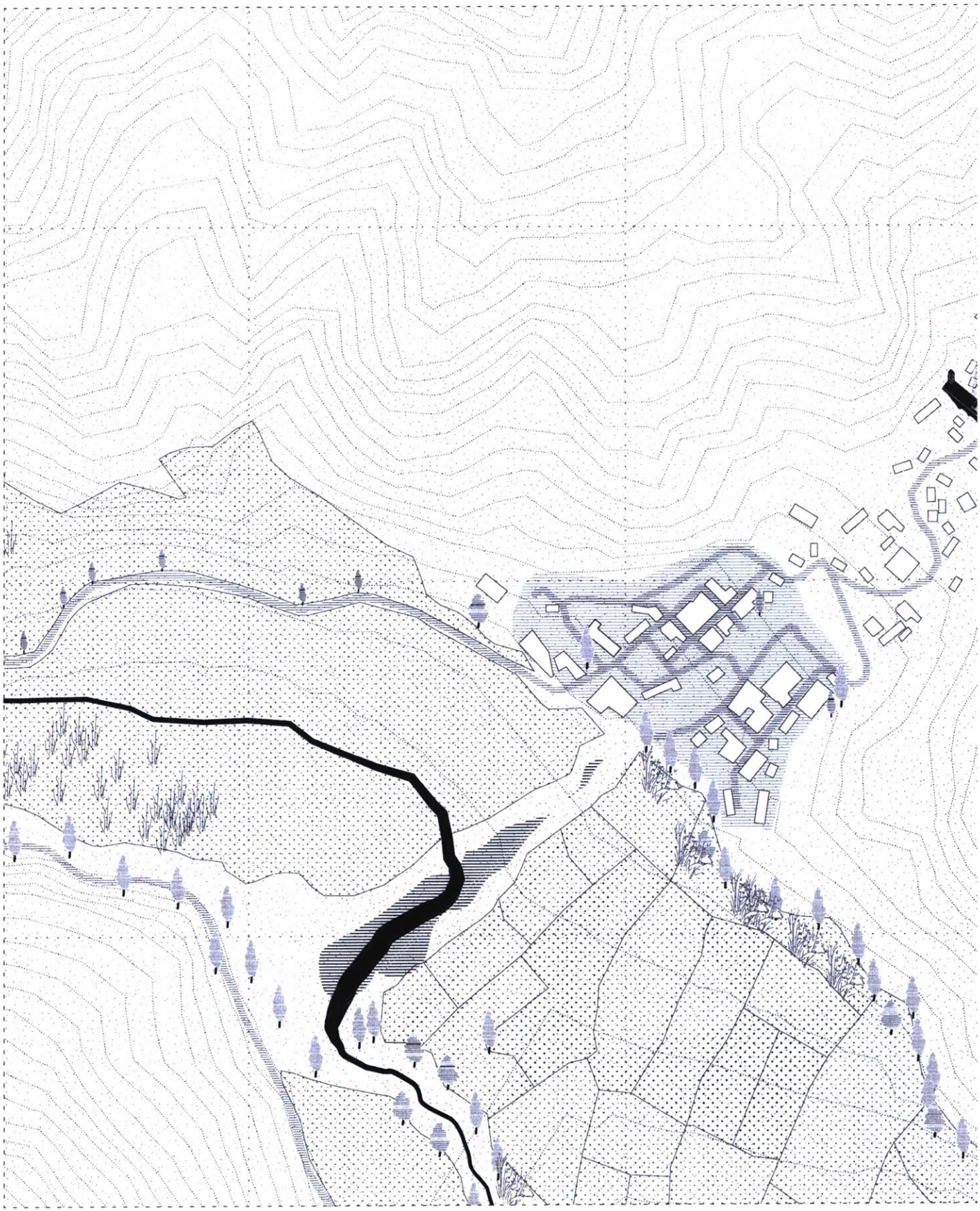

3
Upper Valley
Antioquia
4
High Altitude Valley
Huarochiri
Site 2: Rio Seco
to San Bartolome
to Ollers
Site 3: Antioquia
Site 4: Huarochiri
to Antioquia
to Sumicancha
S5
S6
S7
S8

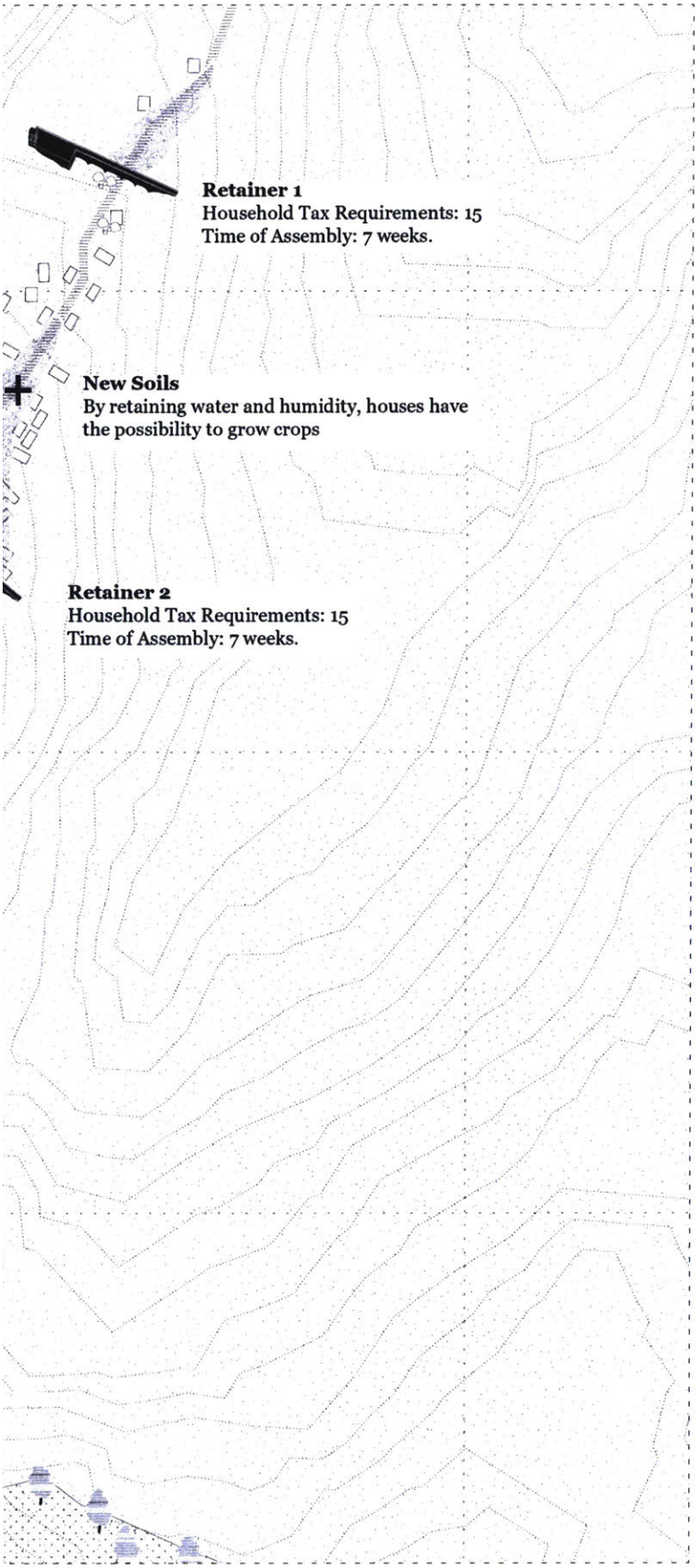

Centralized Road
Road blockage cuts accesibil
the entire Valley.
Water Pollution
The constant landslides pollute the
feble river. This puts the seasons of
farming at risk.

Geographical Conflicts



Left: Diagram of current problems and conditions.

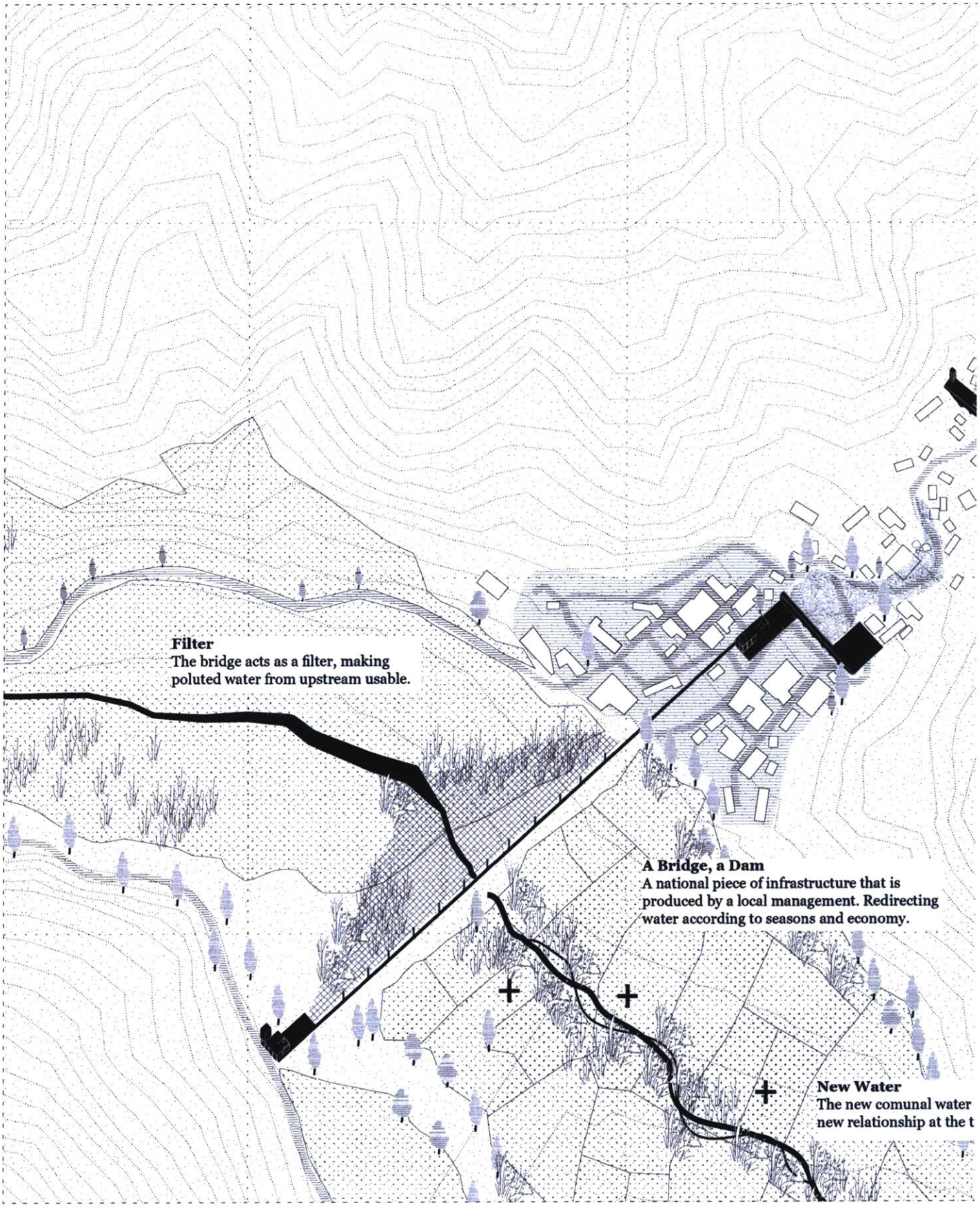


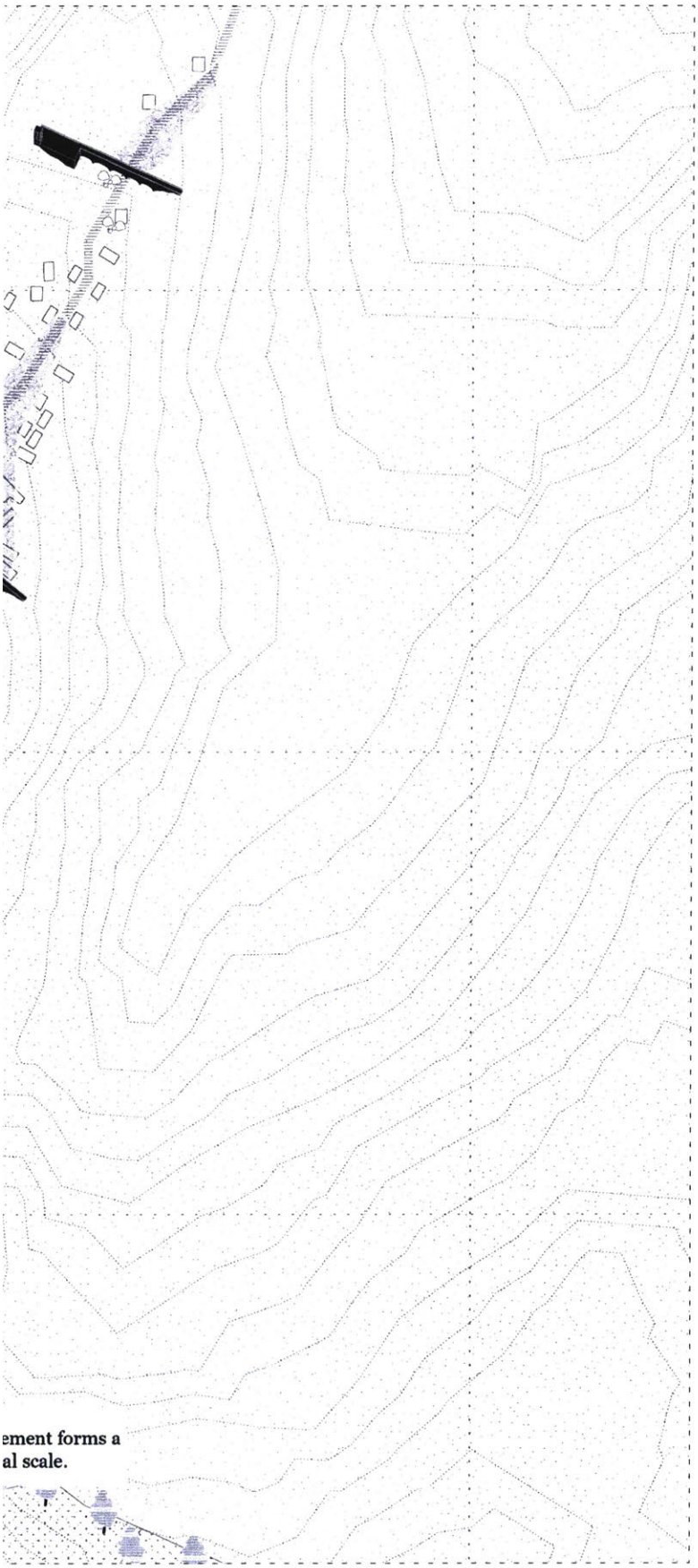


Building Steps

Understanding that the first phase is paid and implemented by the government: A road, stairs, and prefabricated concrete modules. The second phase becomes appropriated by the valley. Where each stall is paid by the collective fund tax from communities across the transect, with the right to use it to encounter other farmers, showcase new technologies, sell produce at the ending of the season, establish the prices for crops, acting as a representation of the Farming Institution. When the trucks are not moving people and produce through the transect, it becomes the space that enables a celebration of rituals. The bridge operates at the national scale of infrastructure while being produced by a local management. Creating new waters, new soils and a new economy.

Left: Market Bridge and Checked Dams


Filter
The bridge acts as a filter, making poluted water from upstream usable.
A Bridge, a Dam
A national piece of infrastructure that is produced by a local management. Redirecting water according to seasons and economy.
New Water
The new comunal water new relationship at the t

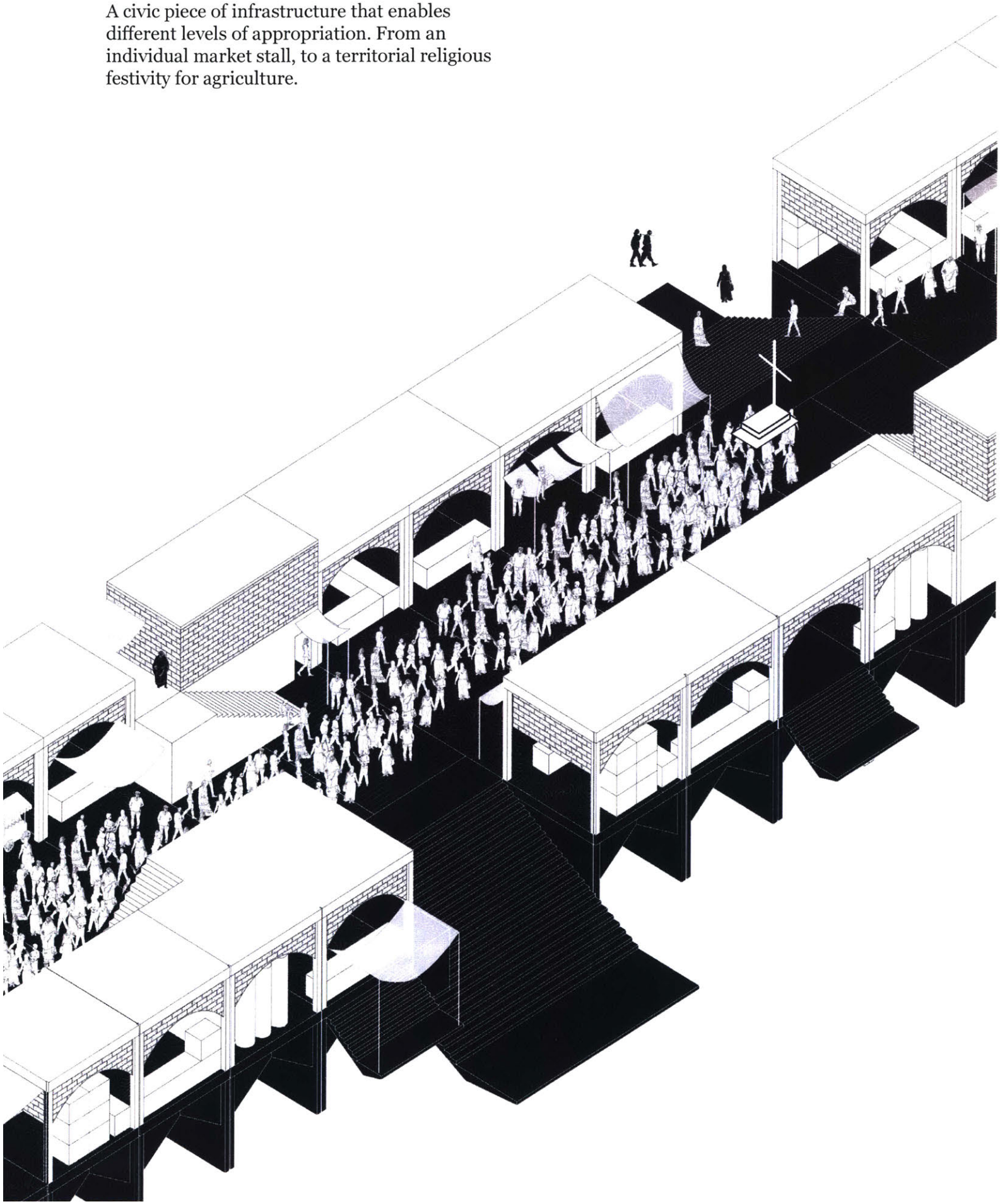


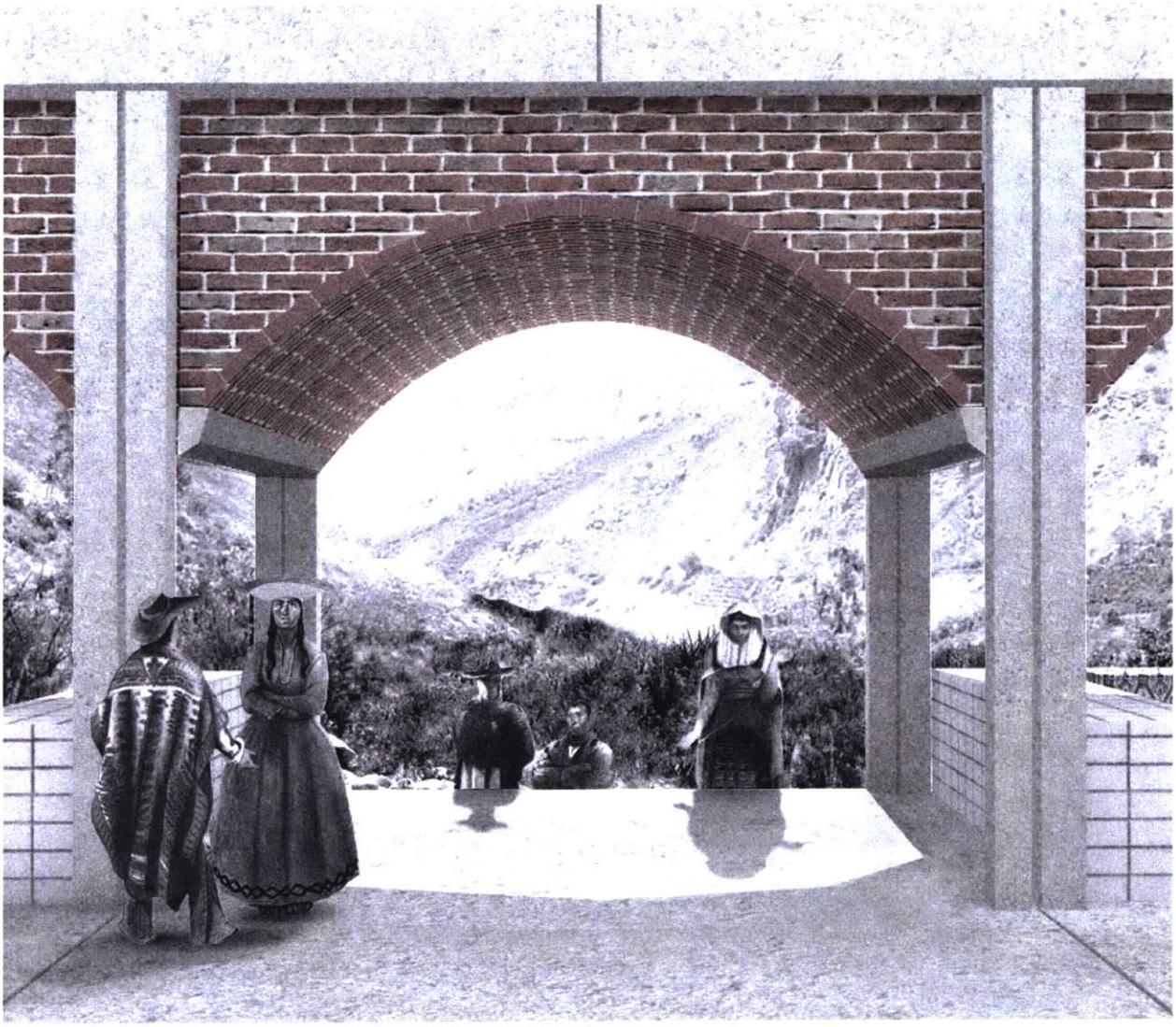
Bringing Water close to Humans

A new relationship with water. When the river floods its banks, it becomes a place that brings water closer to humans. Where architecture challenges the conventional understandings of infrastructure, escaping the limitations of the 'hard' and the 'soft' and enabling new life-styles. Enabling a new panorama, for the valley and its river and rules of engagement that make of infrastructure implementation and its space, a public sphere. Turning a bridge to both a critical piece of infrastructure and a portal for the valley of Lurin.

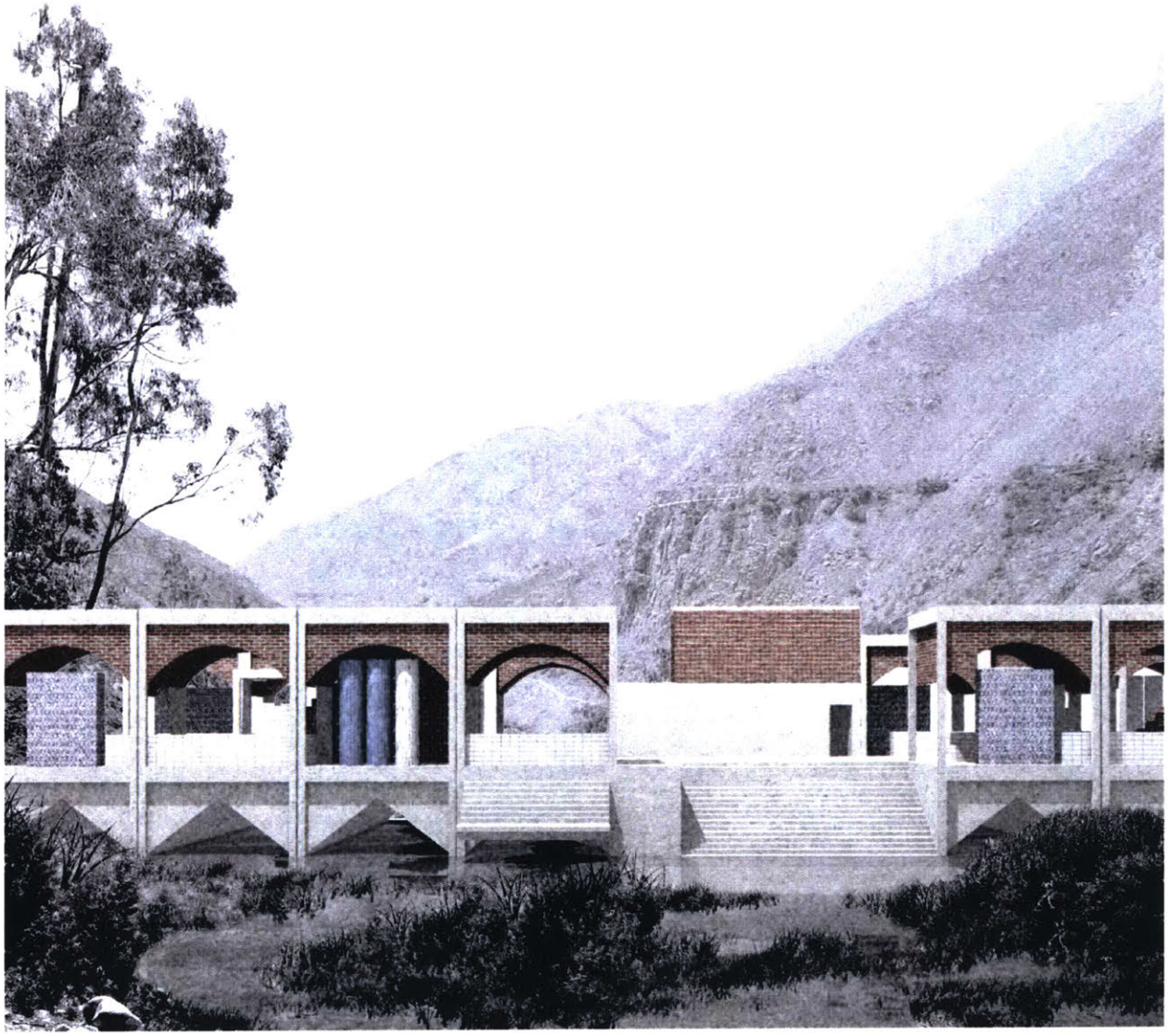
Left: Market Bridge and Checked Dams

A civic piece of infrastructure that enables different levels of appropriation. From an individual market stall, to a territorial religious festivity for agriculture.





When the river provides a surplus of water,
the bridge brings water and humans together.
Defining a new relationship with the river.



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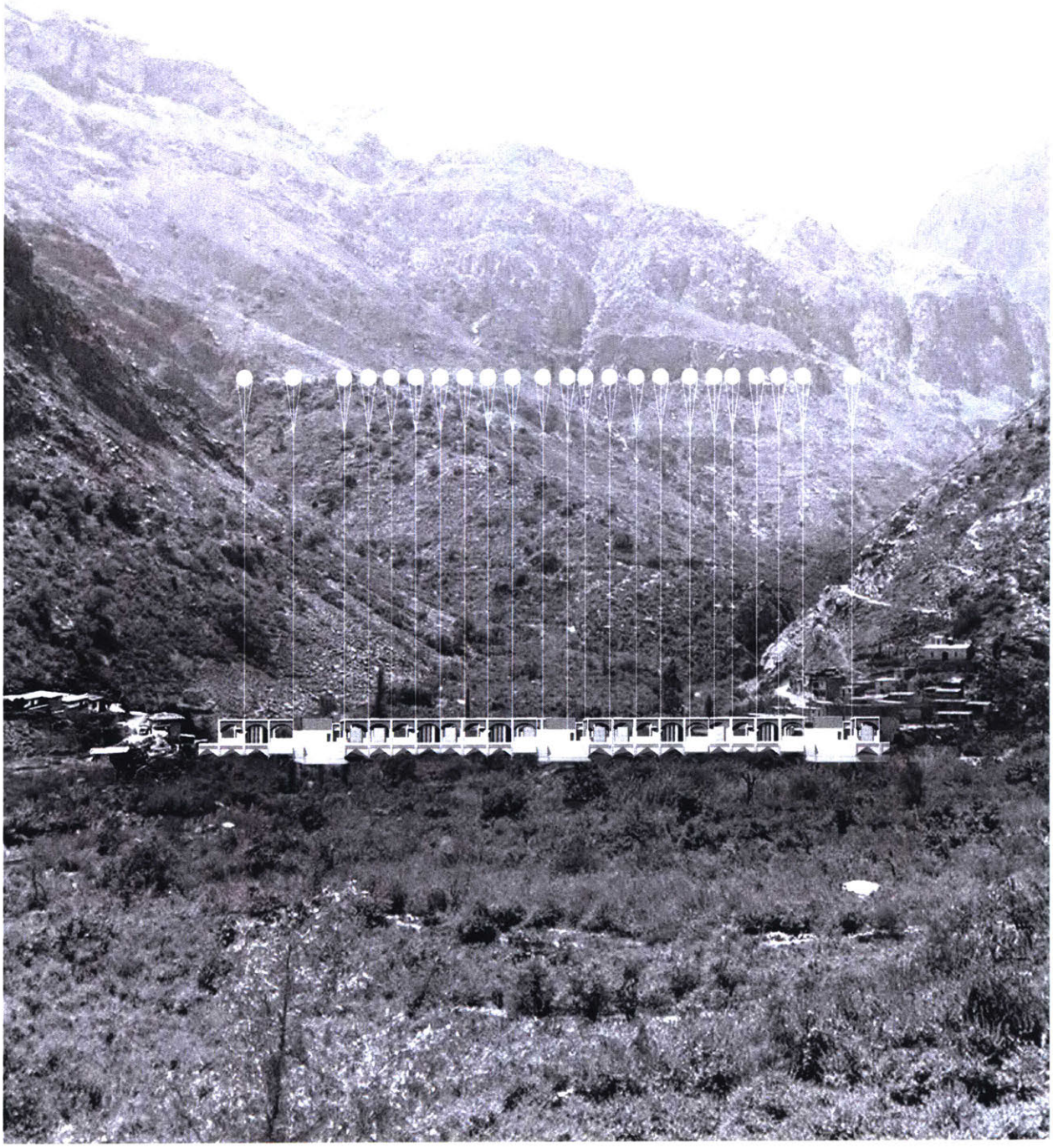
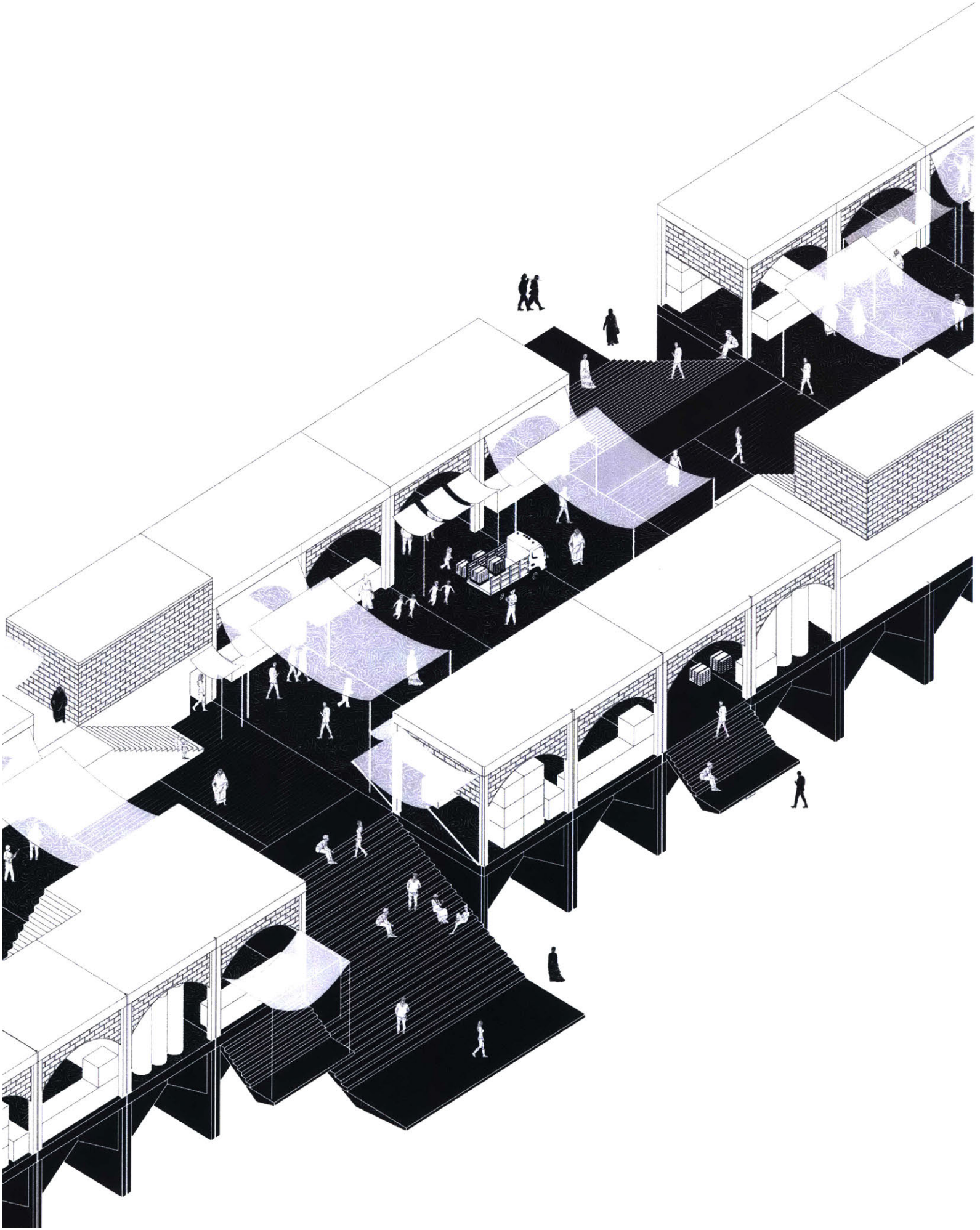
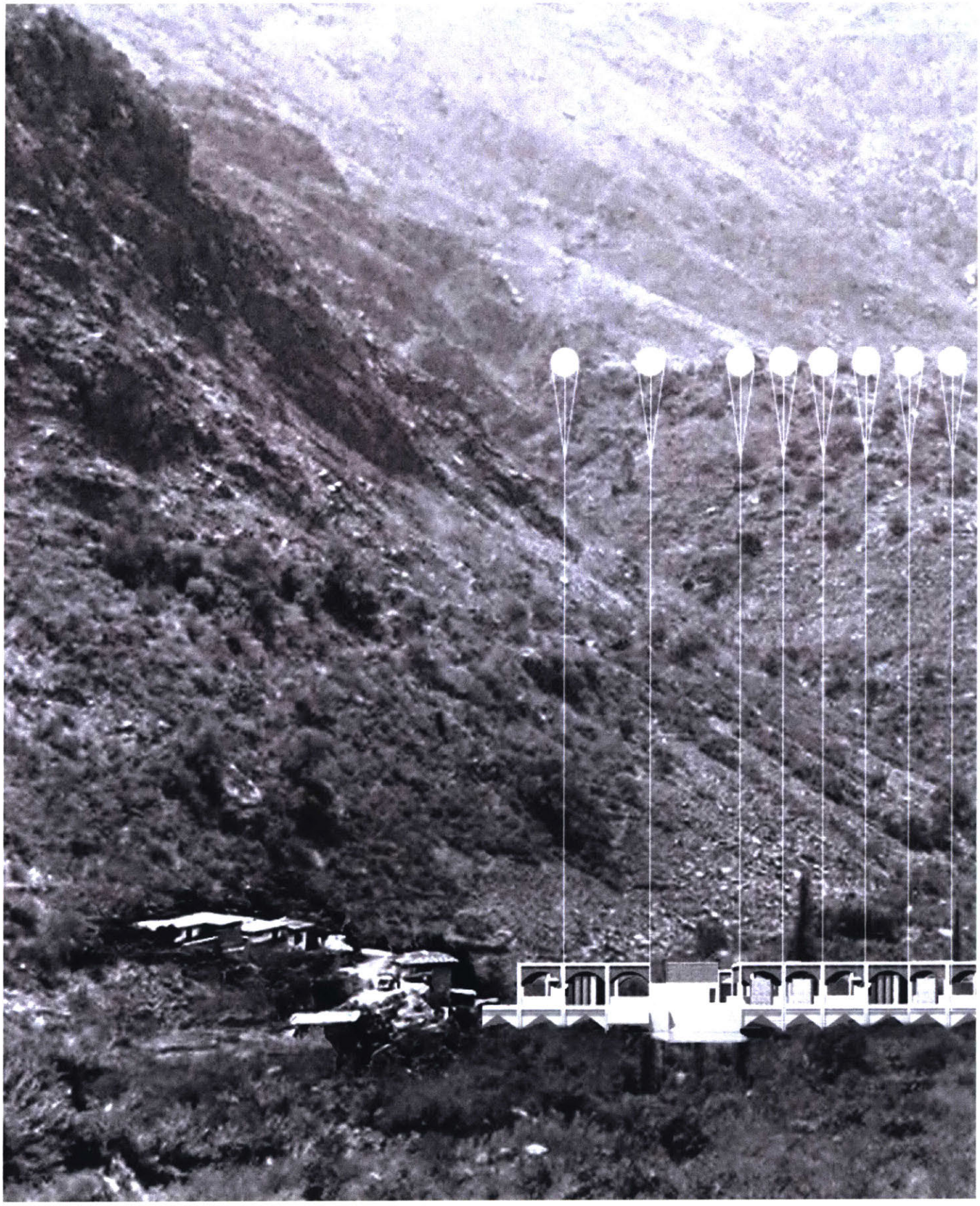
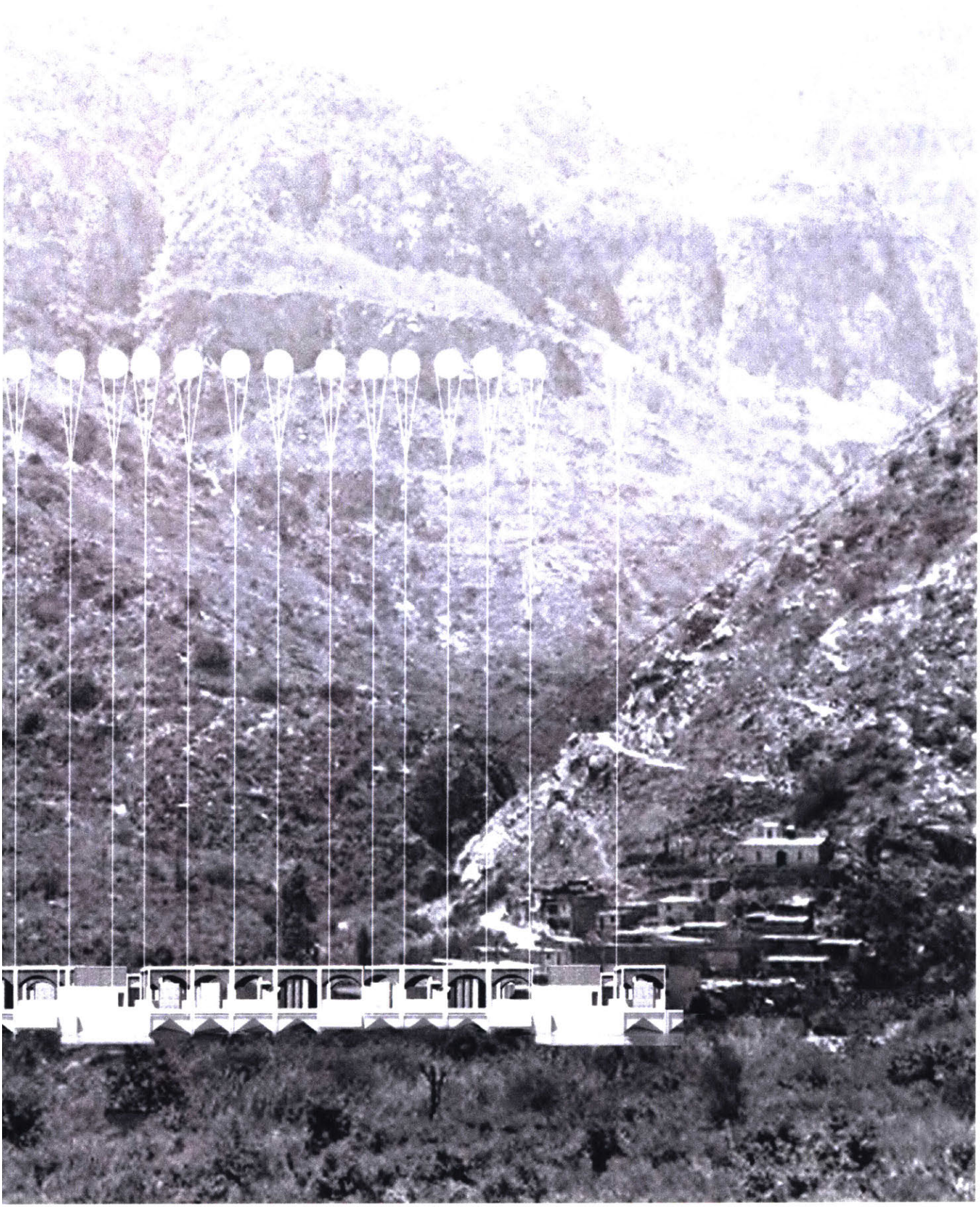




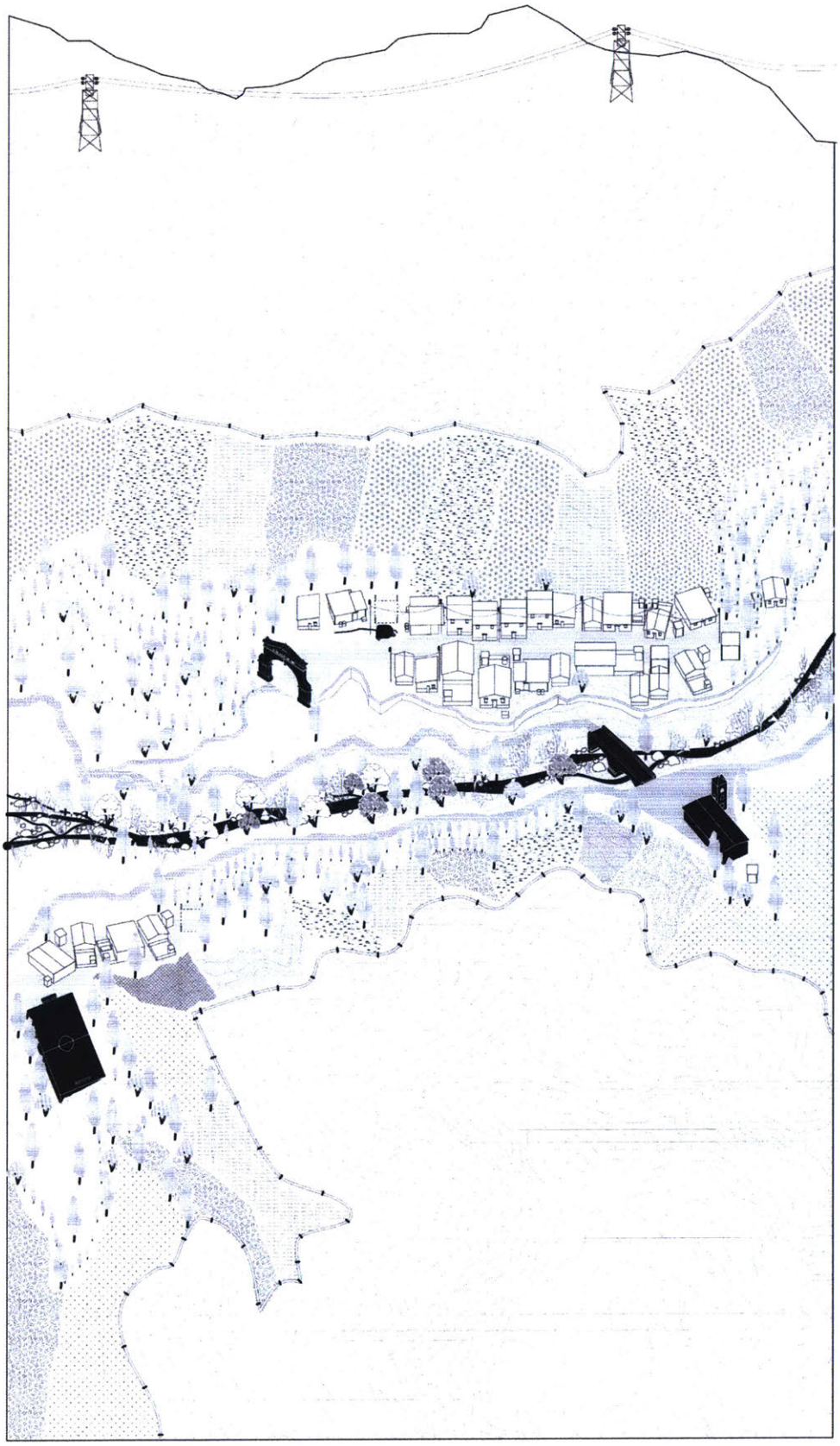




Site 3
Antioquia:
A Farming Institution

Antioquia, the last settlement of the lower valley of Lurin sits at 2320 m over the sea level. It is confronted by a single line of connectivity and dependent seasonal agriculture. The Gateway town of Antioquia is the human settlement that marks the end of the lower valley of Lurin. Its the place where the road ends. This partnership institutionalizes Farming and Agriculture. A station that consolidates technical farming and its political organization to manage water and crops throughout the seasons. It is a pivot point for production and movement of resources to the city of Lima and to the peaks of the Andes. 7 out of 10 tons of the agricultural production of the country comes from small scale agriculture and farmer economy, but in Lima, its the opposite.

Altitude: 2320 msn



Antioquia

Pieces that Operate as Infrastructure

Soccer Community Field

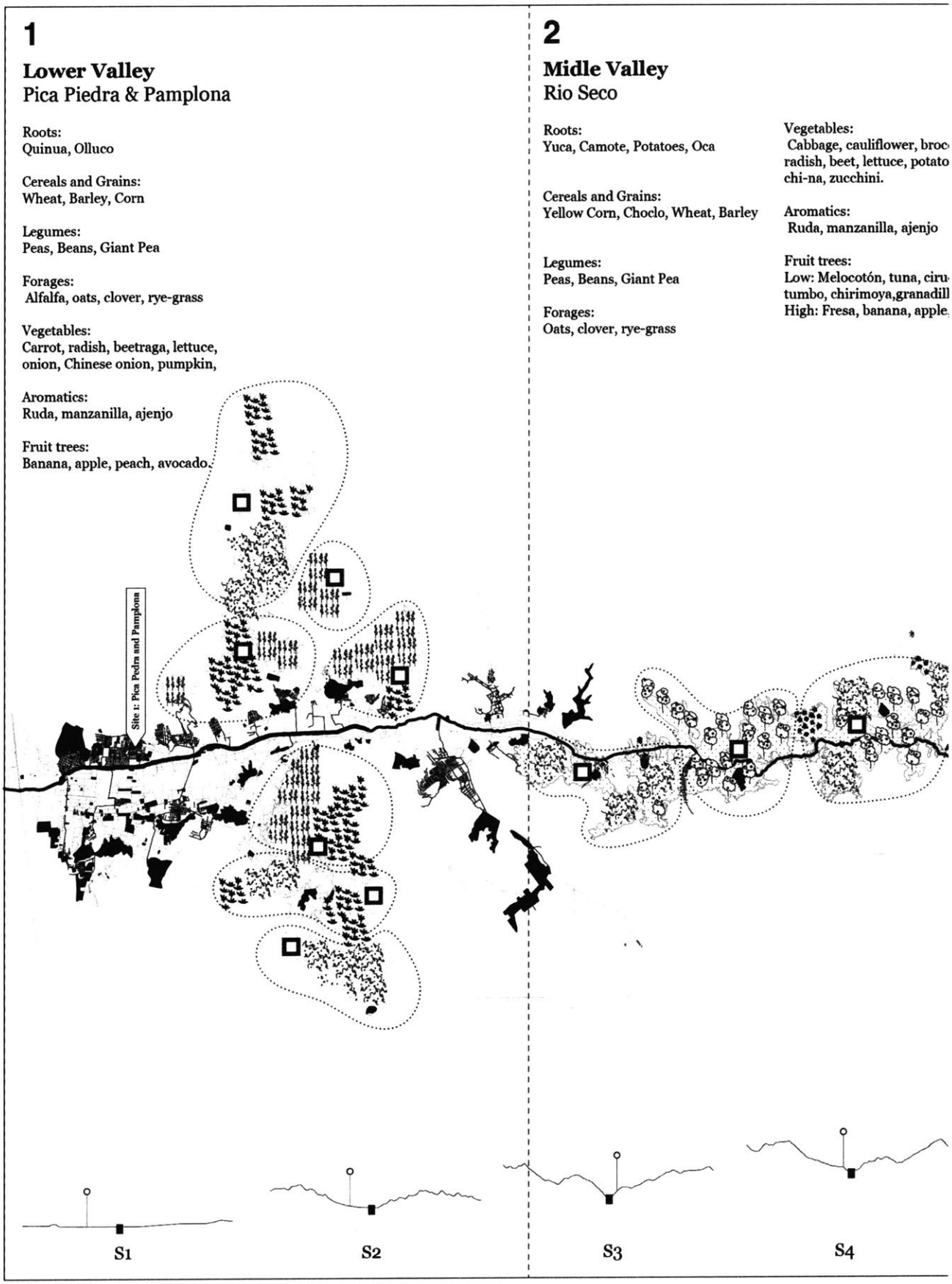
Bridge

Community Name Portal

High Tension Power Lines

Retaining walls

Church + School


1
Lower Valley
Pica Piedra & Pamplona
Roots:
Quinua, Olluco
Cereals and Grains:
Wheat, Barley, Corn
Legumes:
Peas, Beans, Giant Pea
Forages:
Alfalfa, oats, clover, rye-grass
Vegetables:
Carrot, radish, beetraga, lettuce,
onion, Chinese onion, pumpkin,
Aromatics:
Ruda, manzanilla, ajenjo
Fruit trees:
Banana, apple, peach, avocado.
2
Midle Valley
Rio Seco
Roots:
Yuca, Camote, Potatoes, Oca
Cereals and Grains:
Yellow Corn, Choclo, Wheat, Barley
Legumes:
Peas, Beans, Giant Pea
Forages:
Oats, clover, rye-grass
Vegetables:
Cabbage, cauliflower, broc
radish, beet, lettuce, potato
chi-na, zucchini.
Aromatics:
Ruda, manzanilla, ajenjo
Fruit trees:
Low: Melocotón, tuna, ciru
tumbo, chirimoya,granadill
High: Fresa, banana, apple
Site 1: Pica Piedra and Pamplona
S1
S2
S3
S4

rot,
onion

zana,
brillo
avocado.

3

Upper Valley
Antioquia

Roots:
Baja: Yuca, Camote

Cereals and Grains:
Yellow Corn, Choclo

Legumes:
Beans

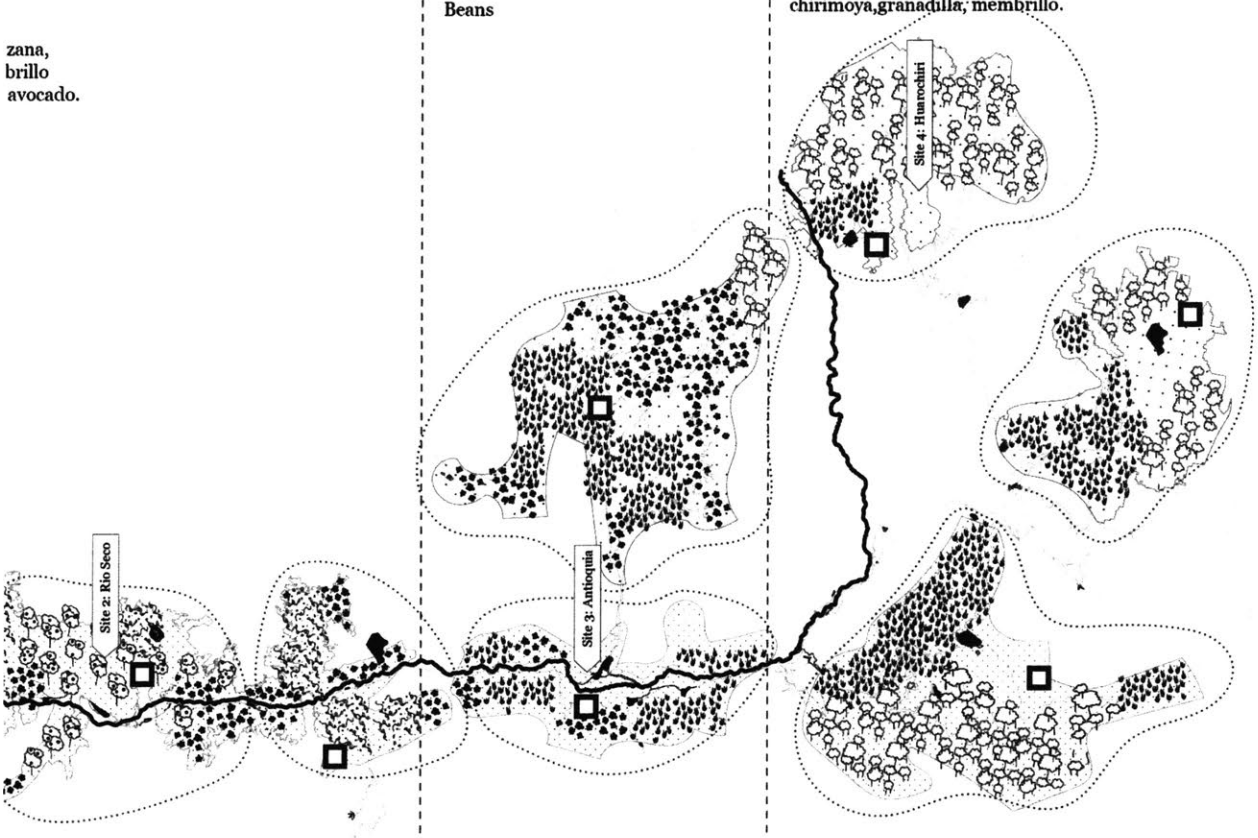
4

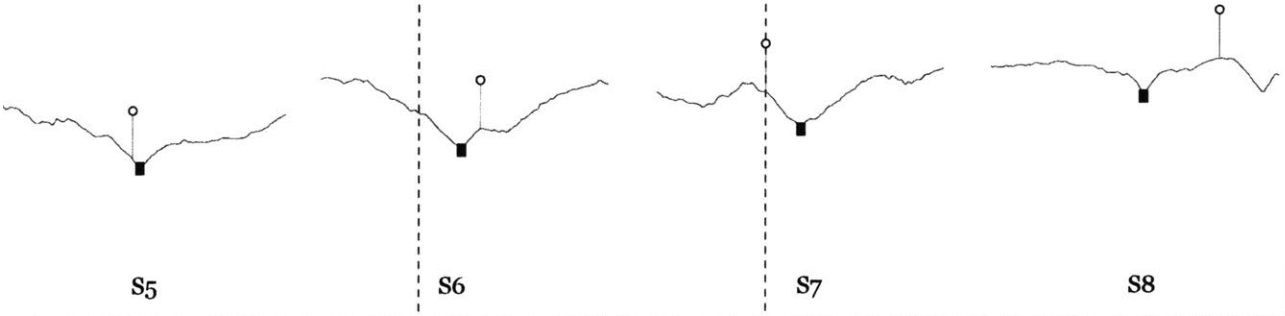
High Altitude Valley
Huarochiri

Forages:
Alfalfa

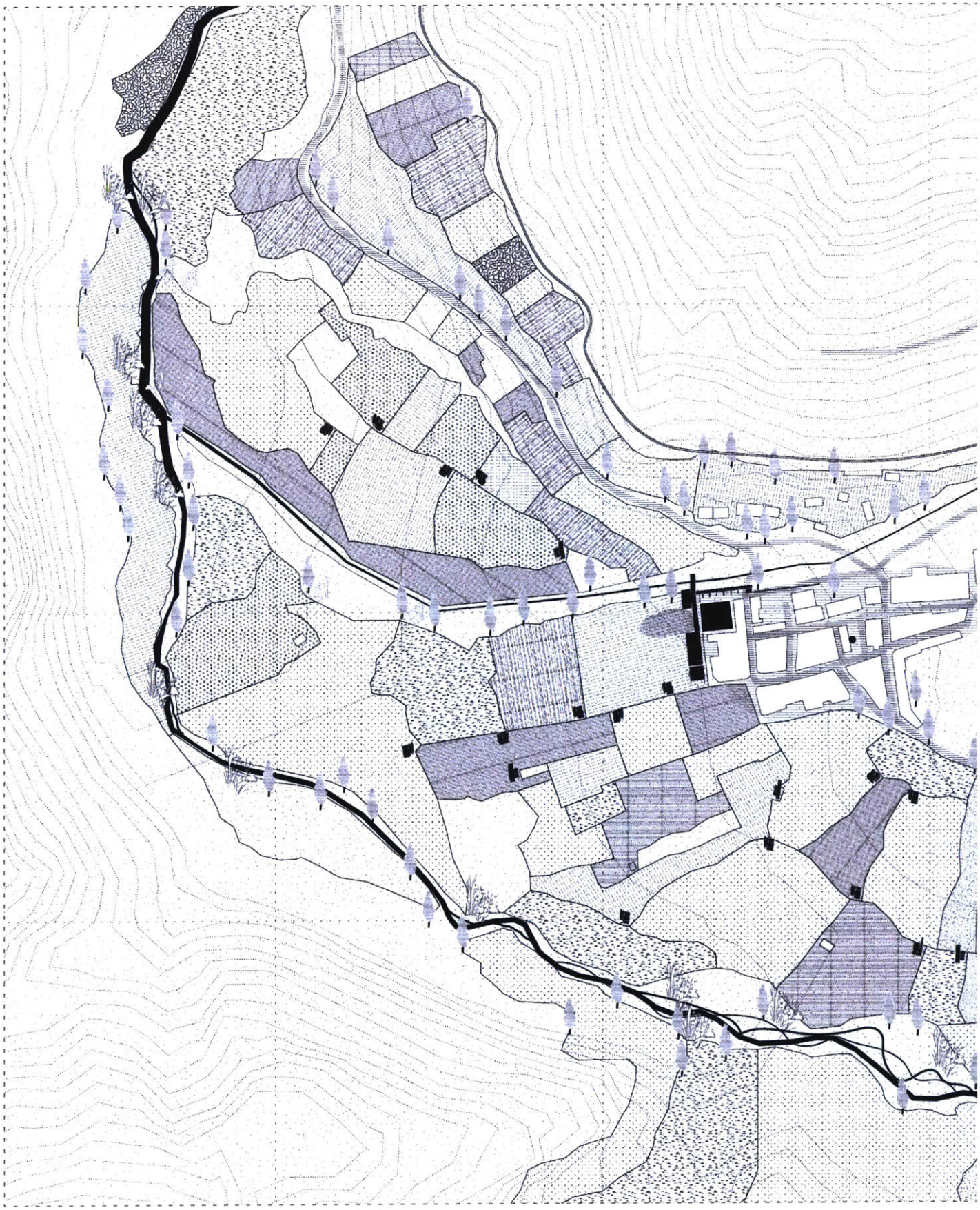
Vegetables:
cabbage, cauliflower, broccoli.

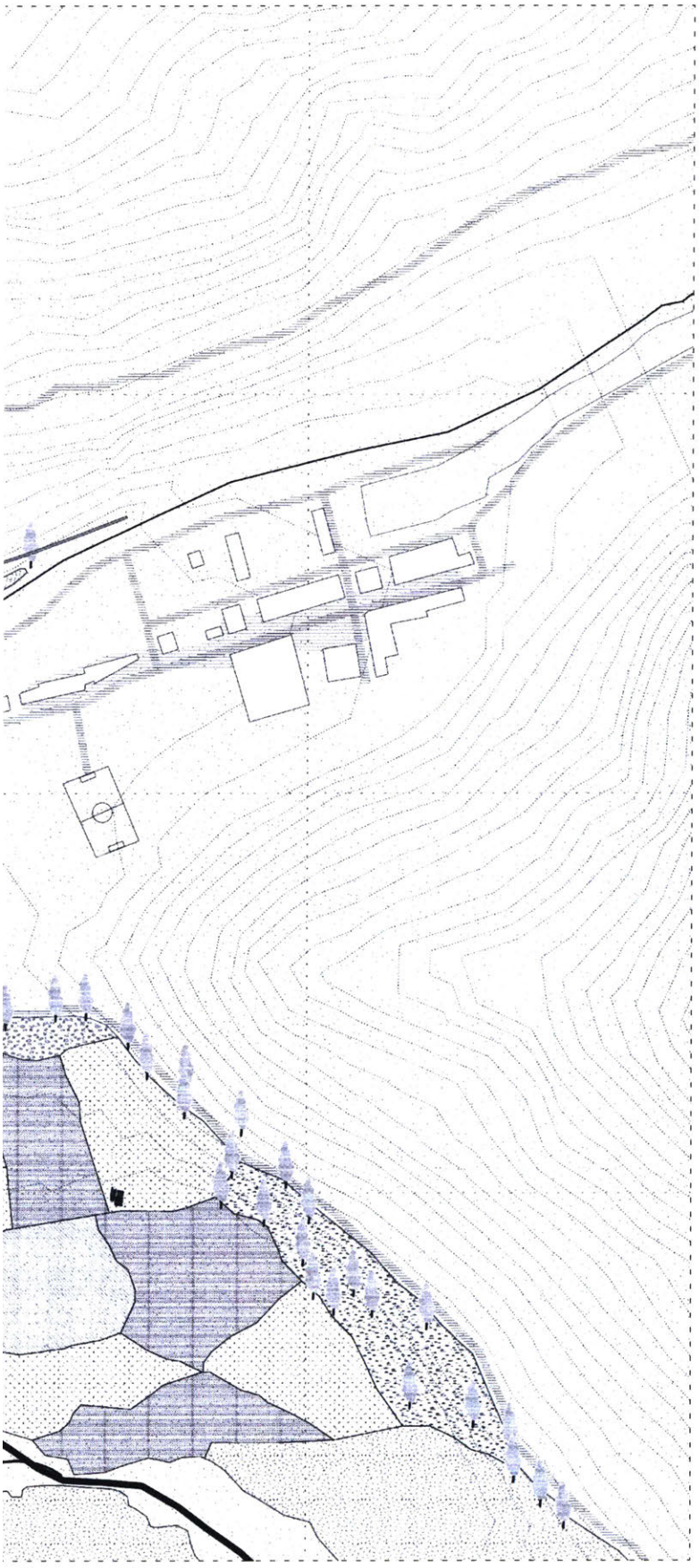
Trees
chirimoya,granadilla, membrillo.





S5 S6 S7 S8



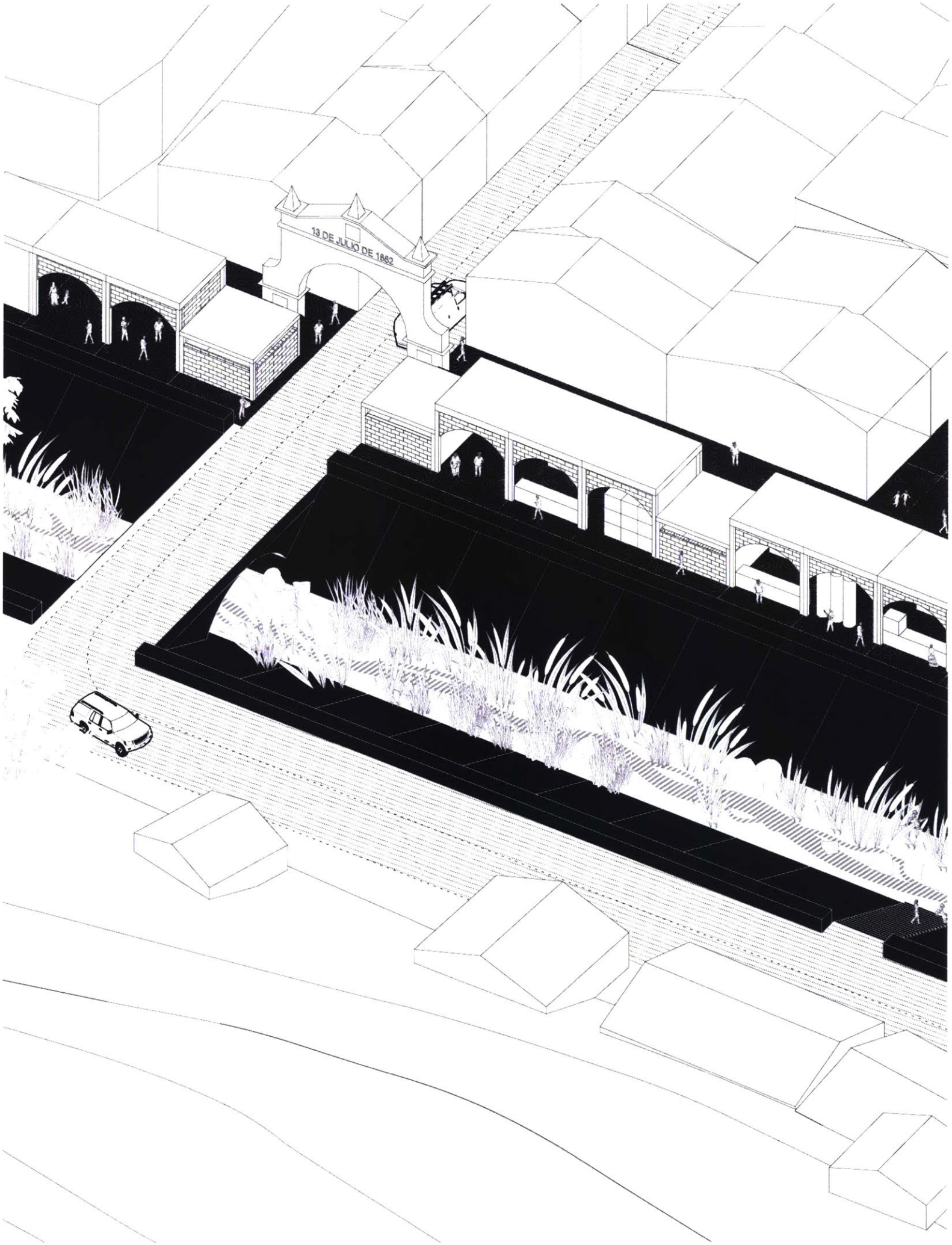


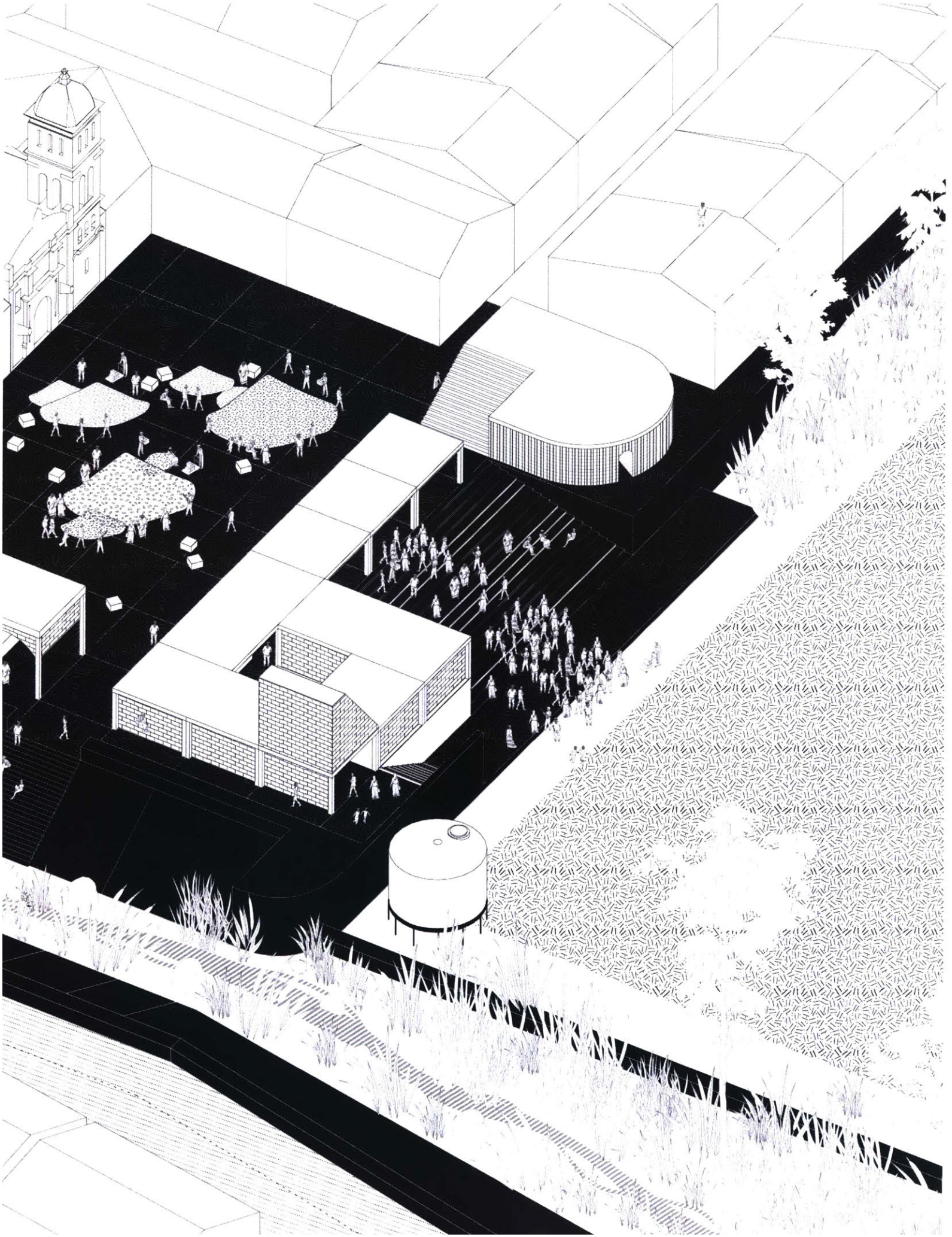
A Farming Institution

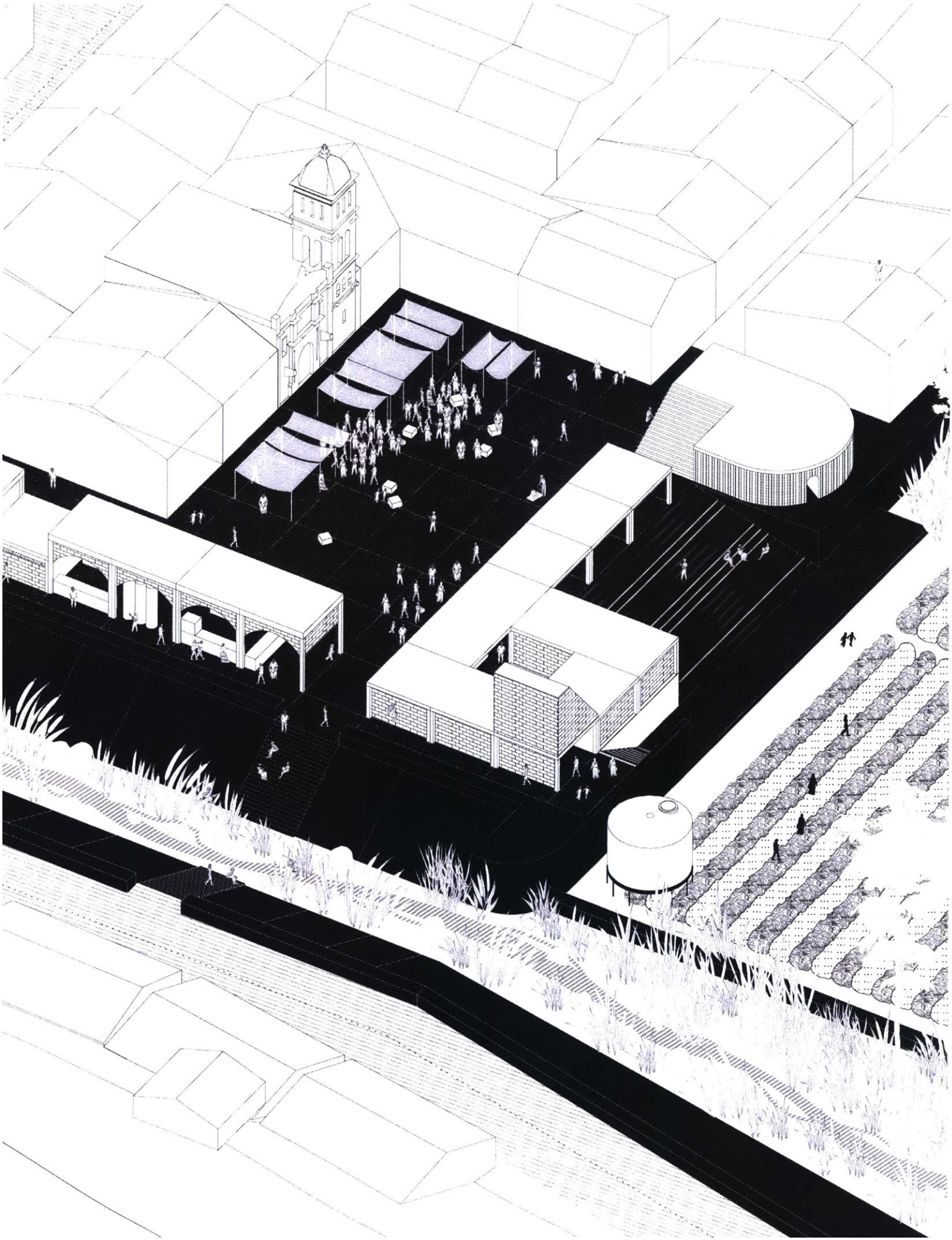
Antioquia, the last settlement of the lower valley of Lurin sits at 2320 m over the sea level. It is confronted by a single line of connectivity and dependent seasonal agriculture. The Gateway town of Antioquia is the human settlement that marks the end of the lower valley of Lurin. Its the place where the road ends. This partnership institutionalizes Farming and Agriculture. A station that consolidates technical farming and its political organization to manage water and crops throughout the seasons. It is a pivot point for production and movement of resources to the city of Lima and to the peaks of the Andes. 7 out of 10 tons of the agricultural production of the country comes from small scale agriculture and farmer economy, but in Lima, its the opposite.

It is by mediating its stake holders, the government funds a first phase, a retaining wall that secures the soil from eroding the village. The wall becomes part of its current pieces - the portal, the church, the road to the Andes peaks - but where appropriation of this space is enabled and constructed by villagers and farmers, creating a square where the Farming institution represents the collective agricultural intelligence at the midpoint of the valley, having the square as a space that brings institution and human endeavors together. The drying of the crops after harvest selling of equipment, a weekend festival, trading produce. Where the infrastructural becomes a representation of a tailored institution. A representation and legitimization of the community's acknowledg-

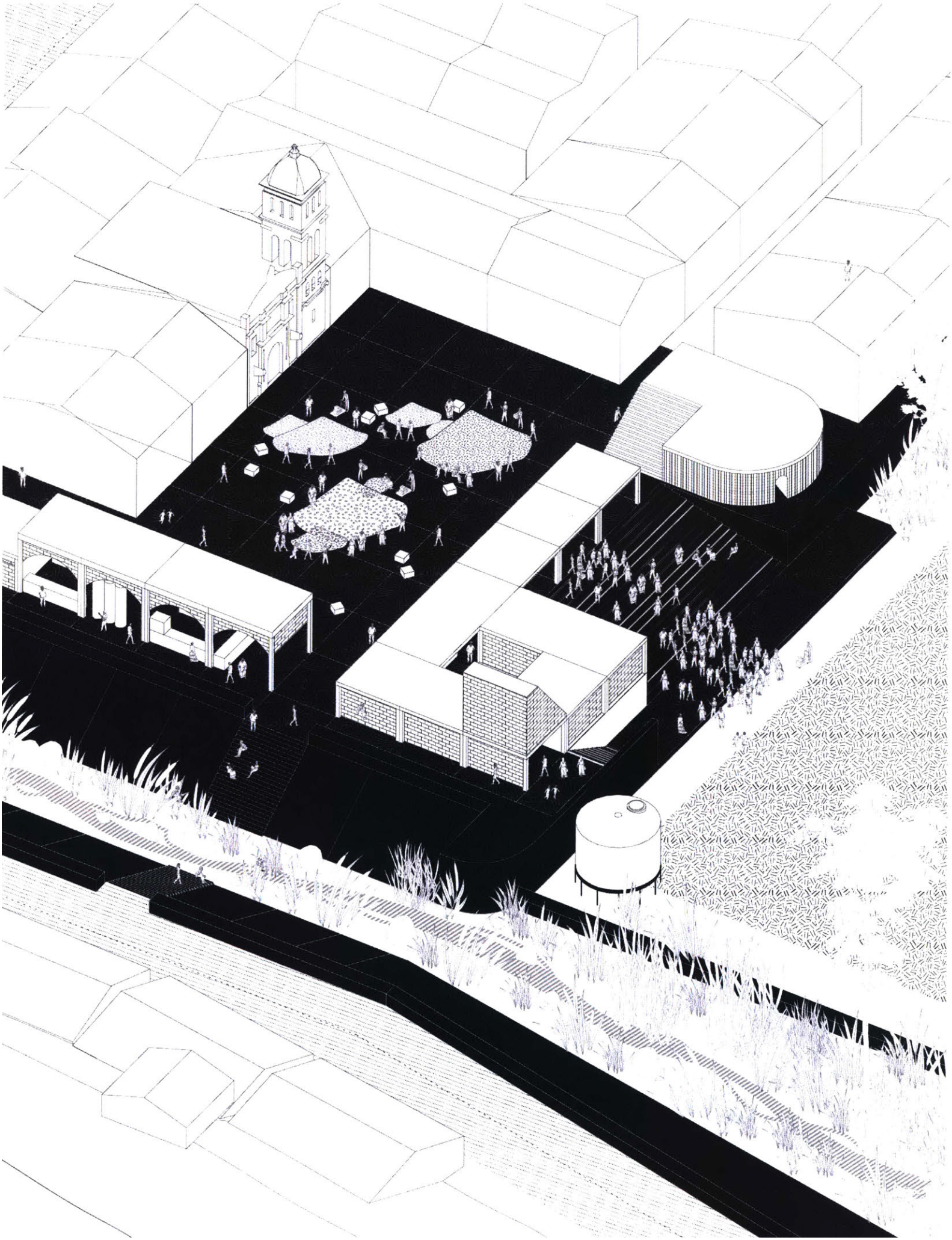
Left: Agriculture Institution and Farming Estates, Wet Season


13 DE JULIO DE 1862

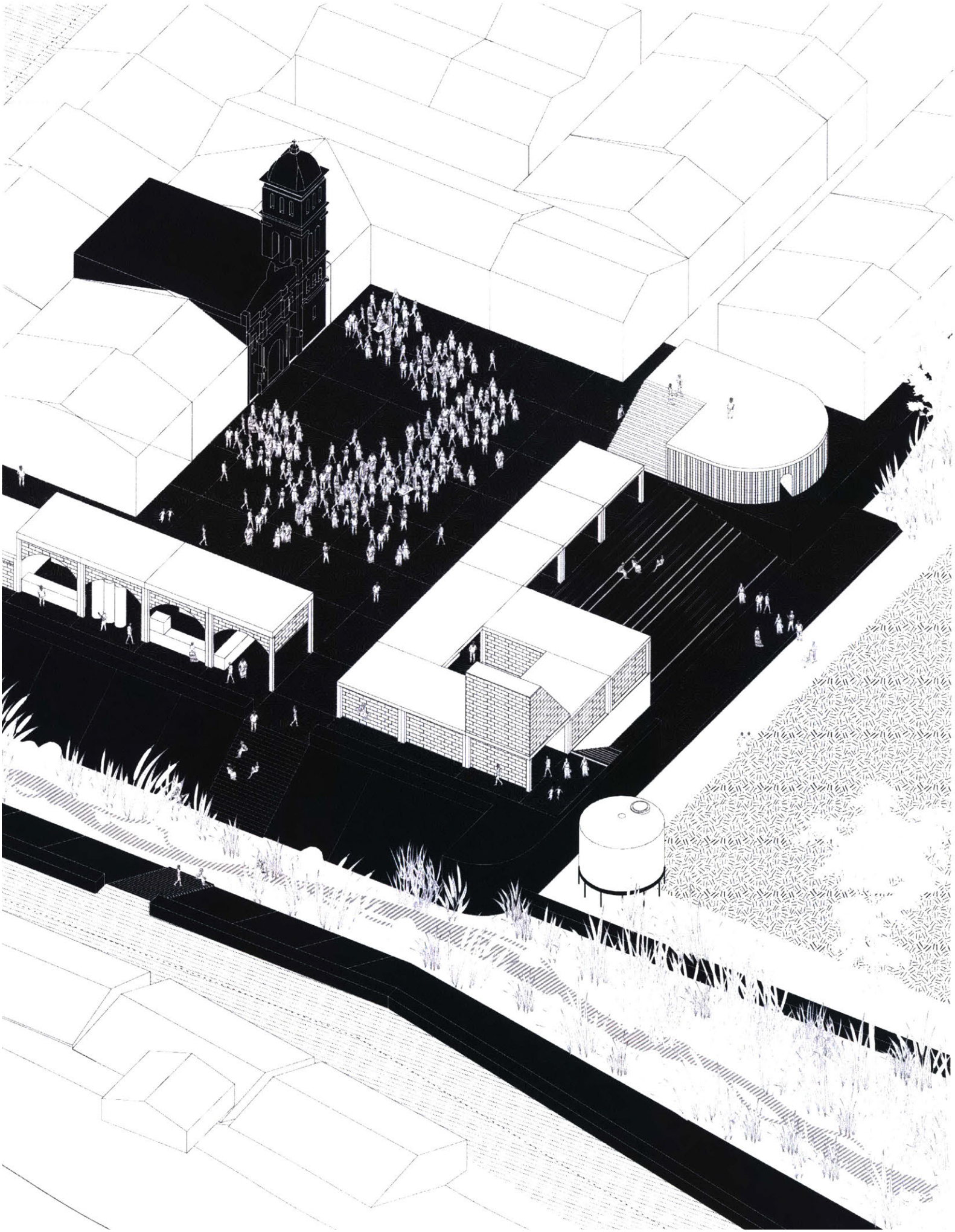


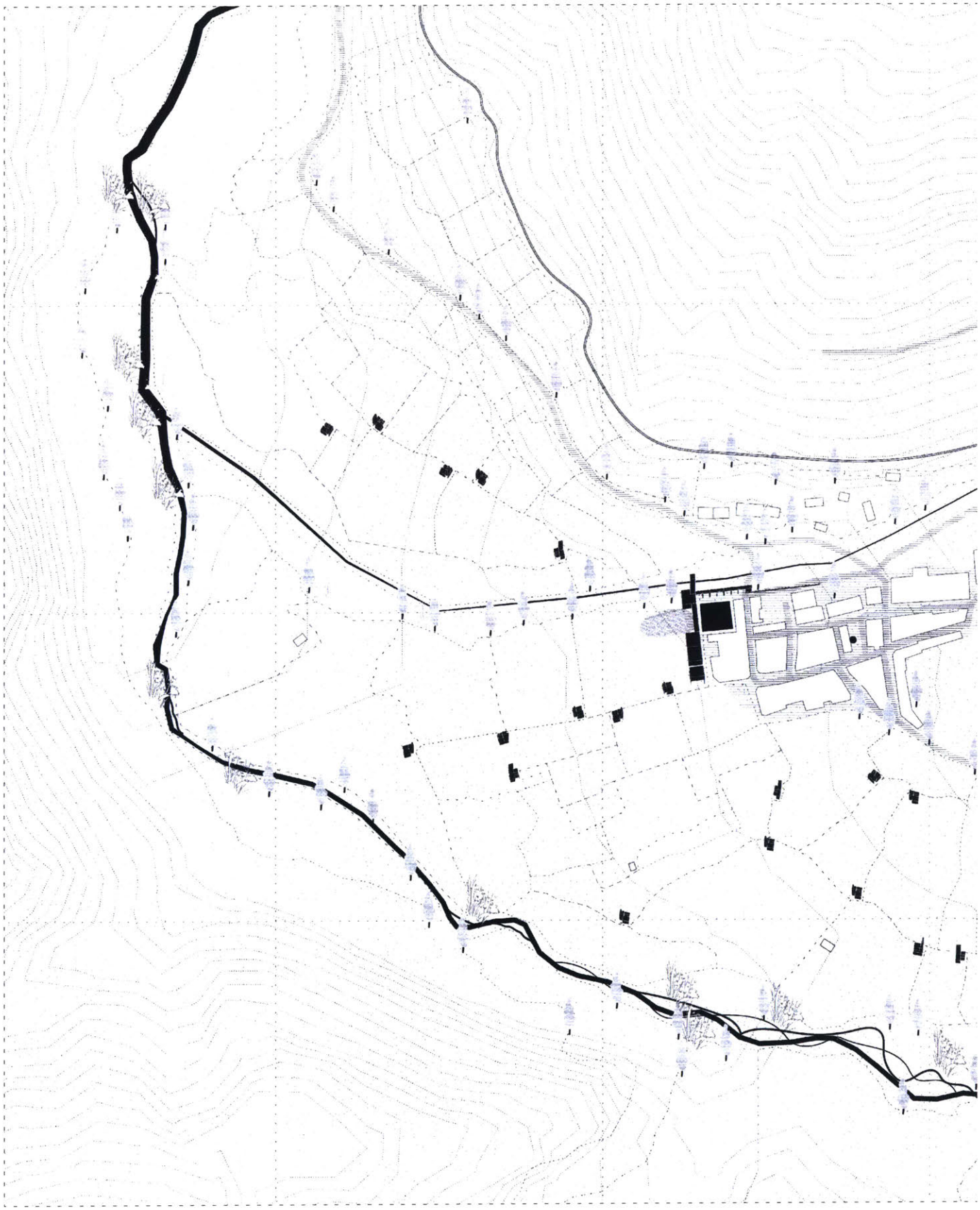


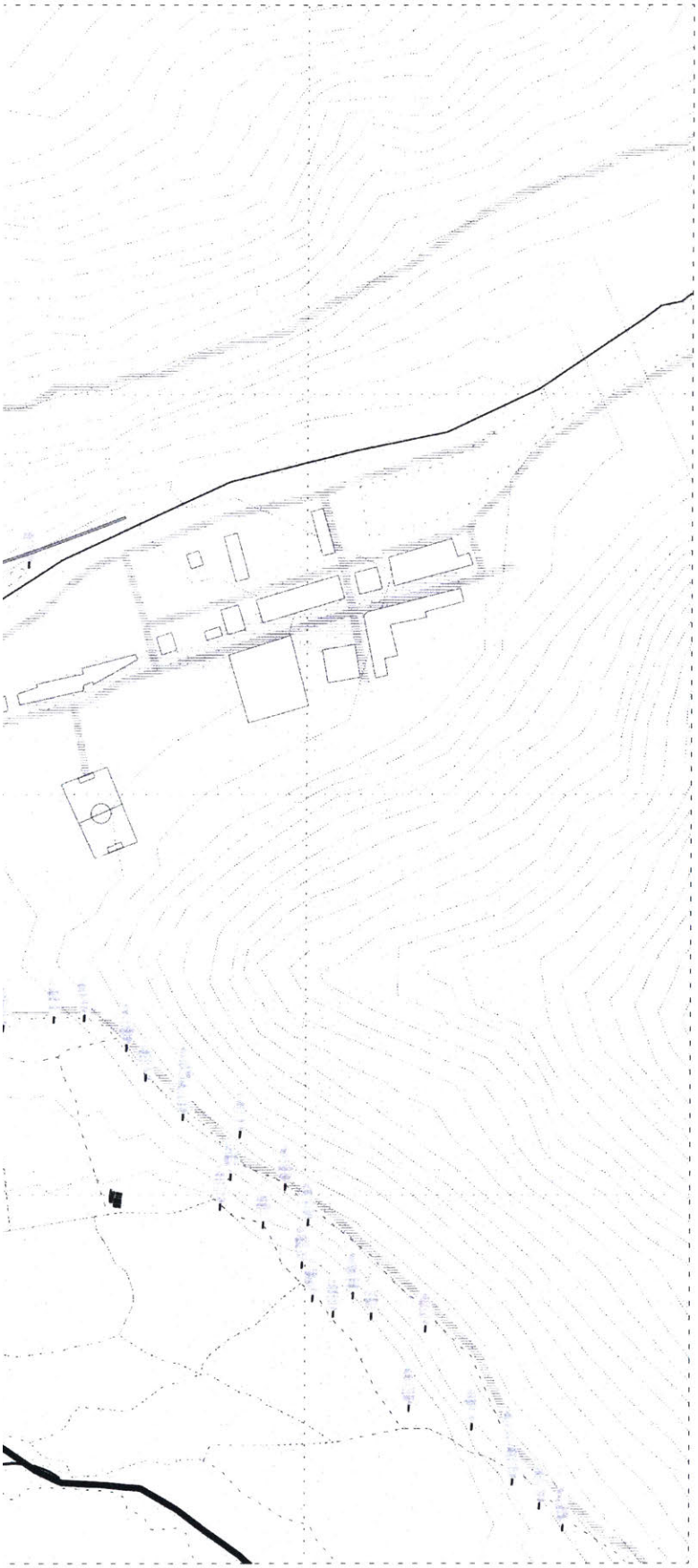
110 Water Absorbing Square: The Drying of the Crops



112 Farming Estate: Maiz Gigante Farmer







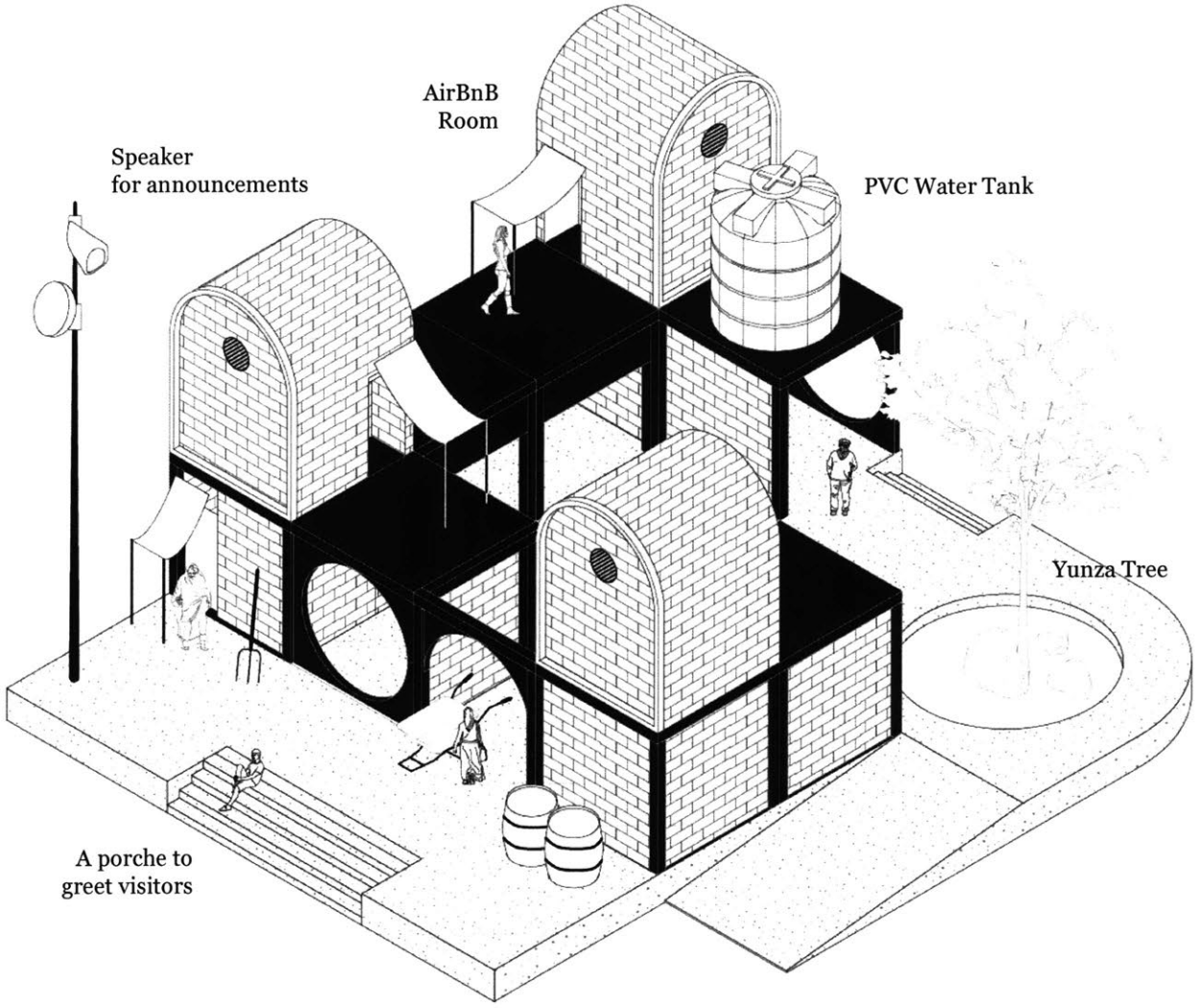
Relationships between the Pieces

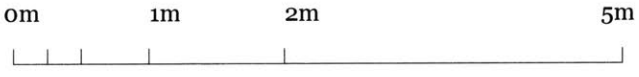
Reflecting a civic representation at the scale of the valley, between geography and the amount of water seasonally available. And where a collection of farmers move in and out through the valley based on seasonality and the type of crops. Working estate hubs legitimize their nomadity and citizenship at the same time. They define the relationship between humans and the environment, humans and water, humans and institutions and humans and humans.

Where in the dry seasons, these estates turn into rent based housing, enabling productive tourism and ephemeral accommodations. Bringing in a new economy to the village. Where each of these promote a different relationship to agriculture and the specificity of its crops. Establishing a richer ecosystem, allowing things to flourish and providing a new way of collective/work/living according to seasonality. Where the a quince farmer occupies one through the wet seasons, and yuca farmer takes his place to prepare the land when Yuca season comes in.

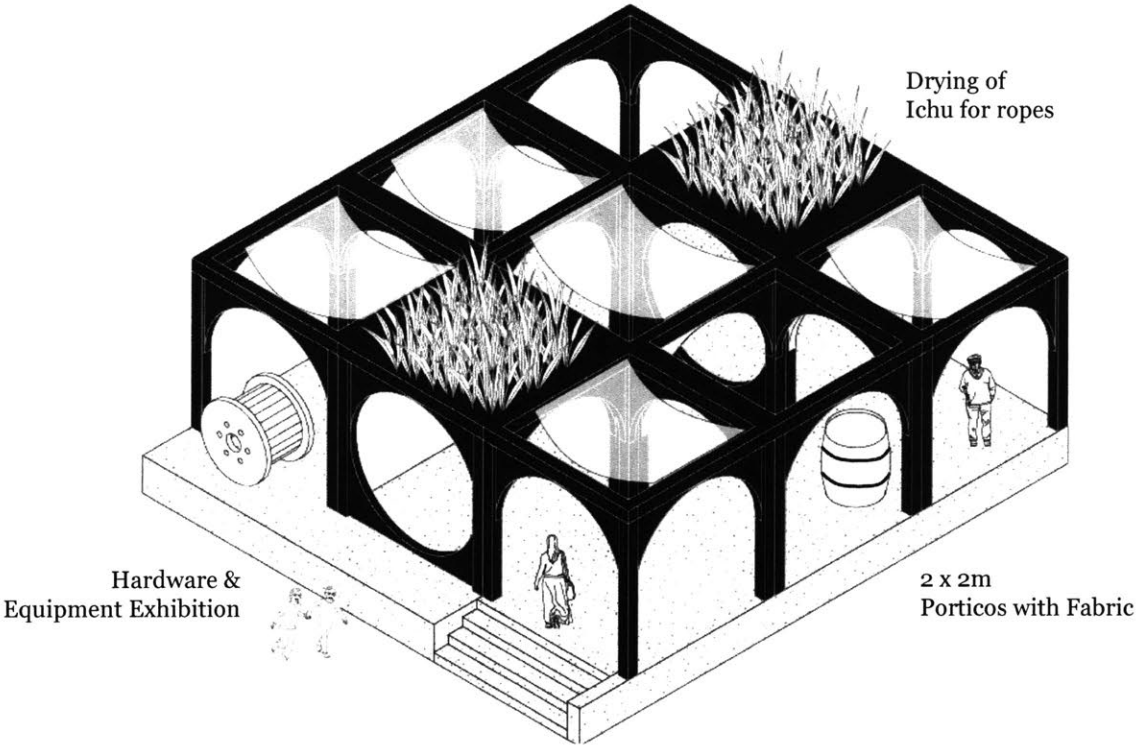
Left: Agriculture Institution and Farming Estates, Dry Season.

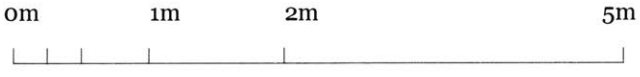
Station 1
An Agricultural Collective



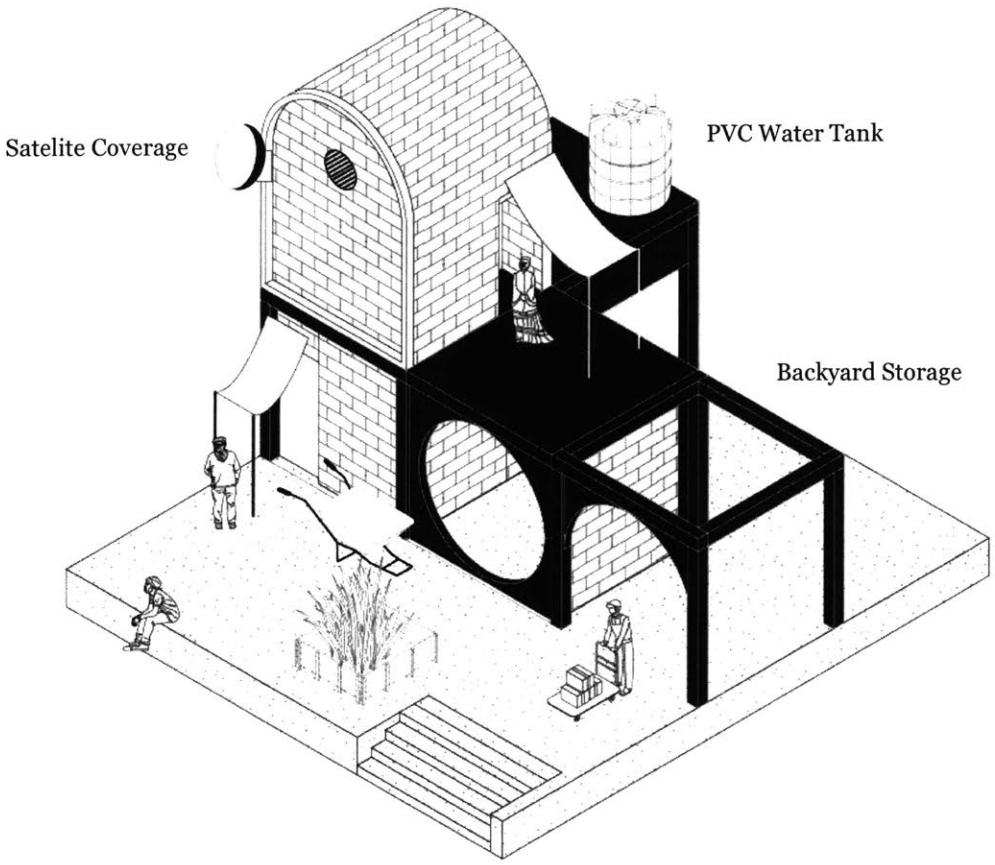


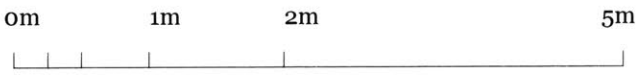
Station 2
Mini Market



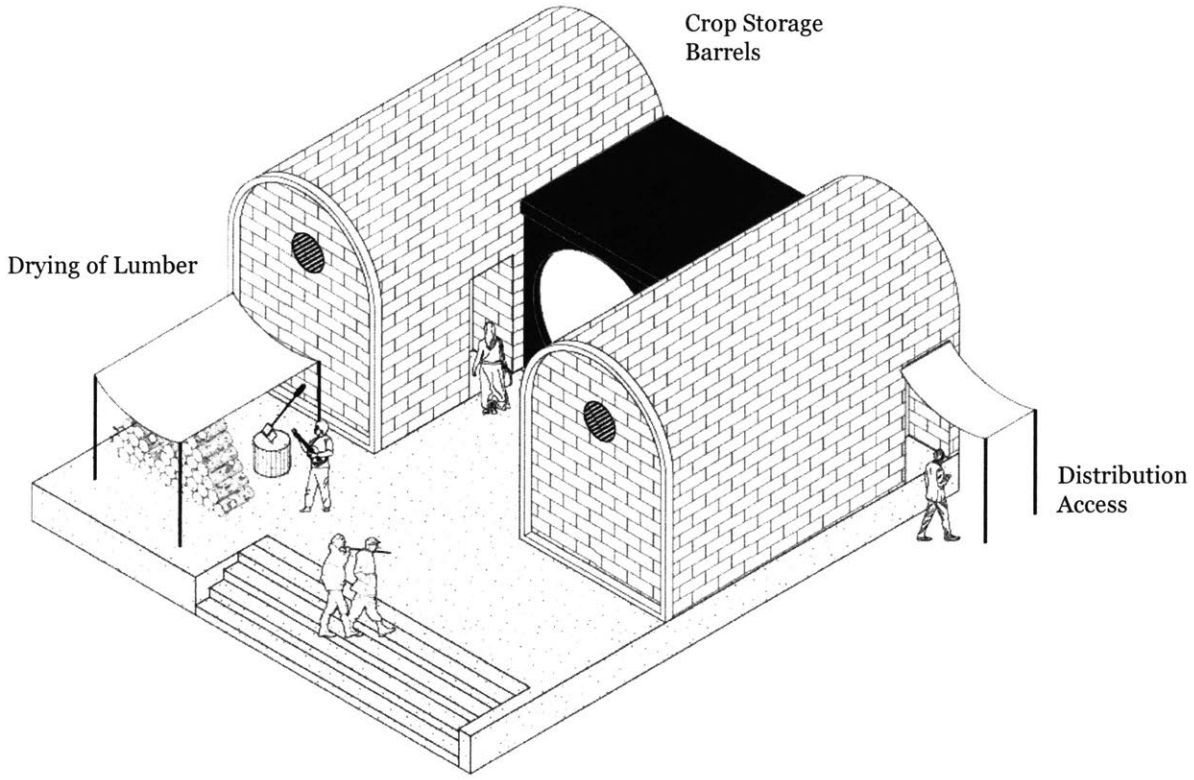


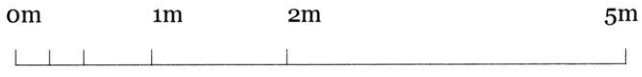
Station 3
A Workshop House



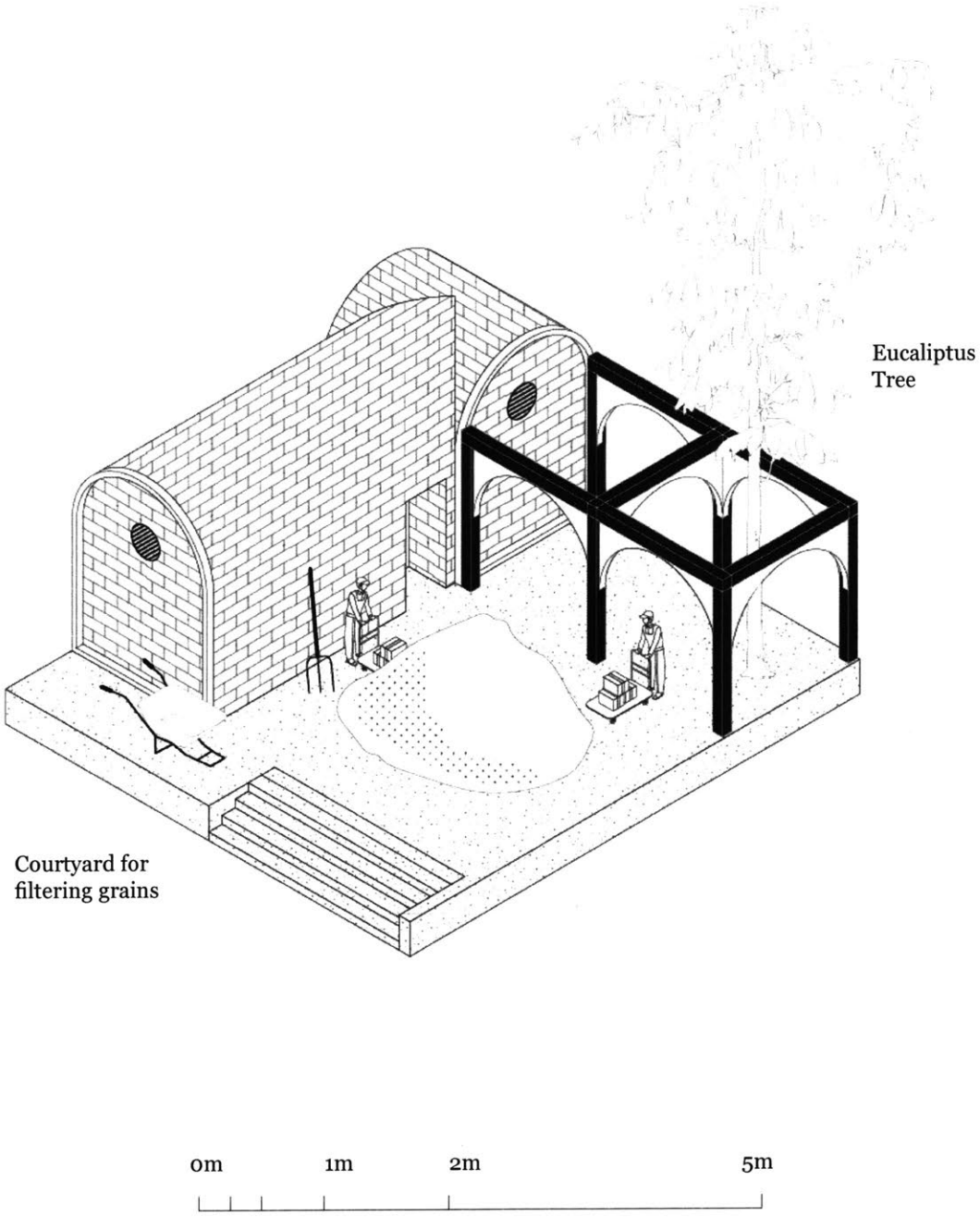


Station 4
A Delivery & Distribution Room

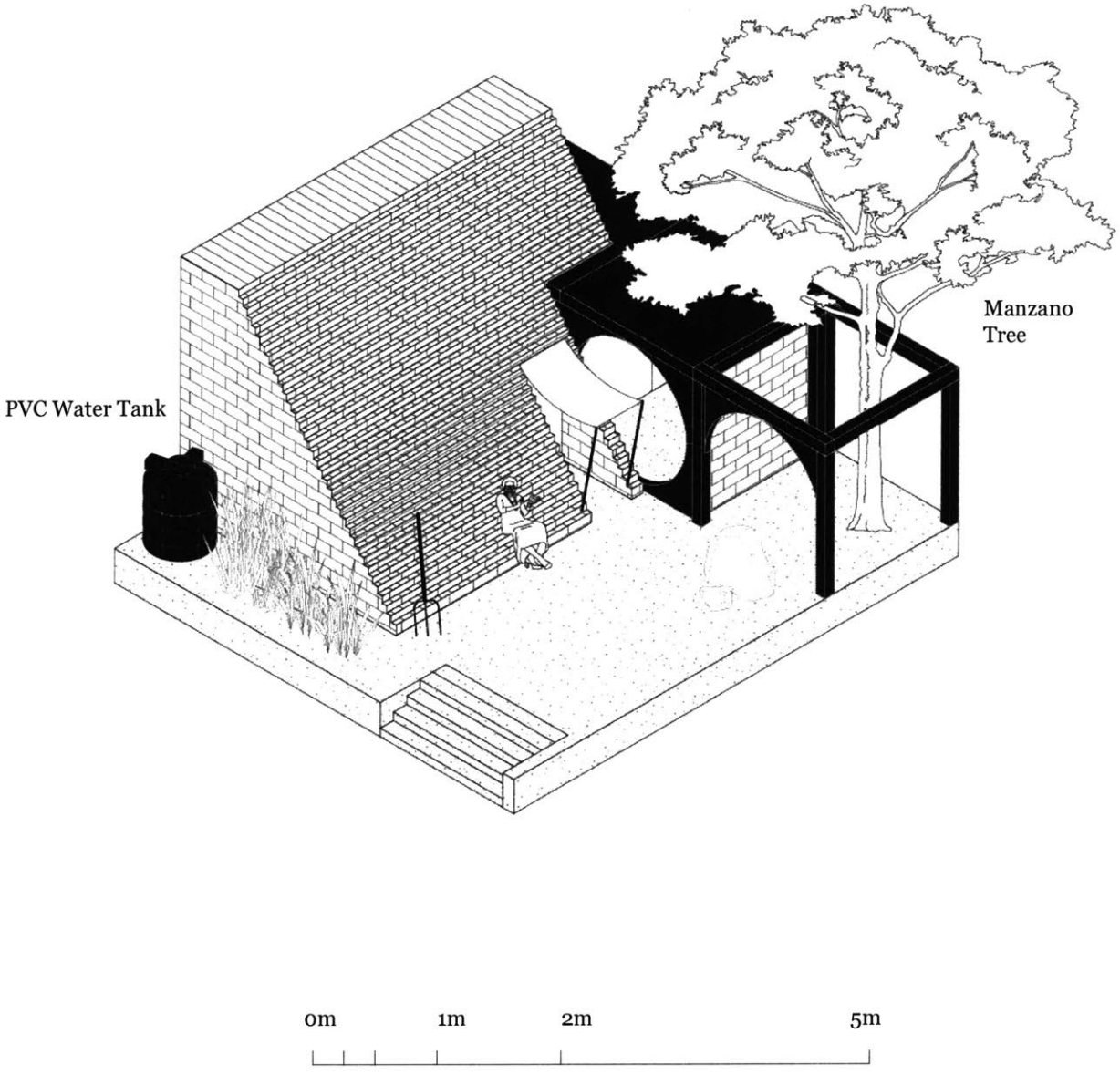




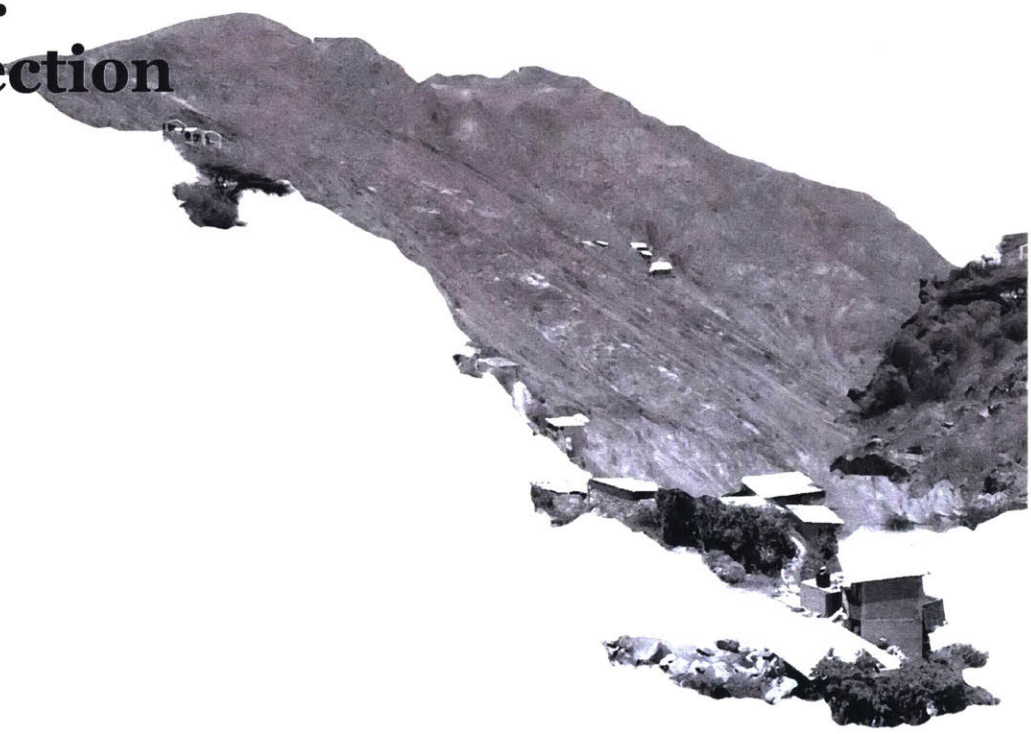
Station 5
A House for Filtering Produce



Station 6
A Shed for Drying Corn

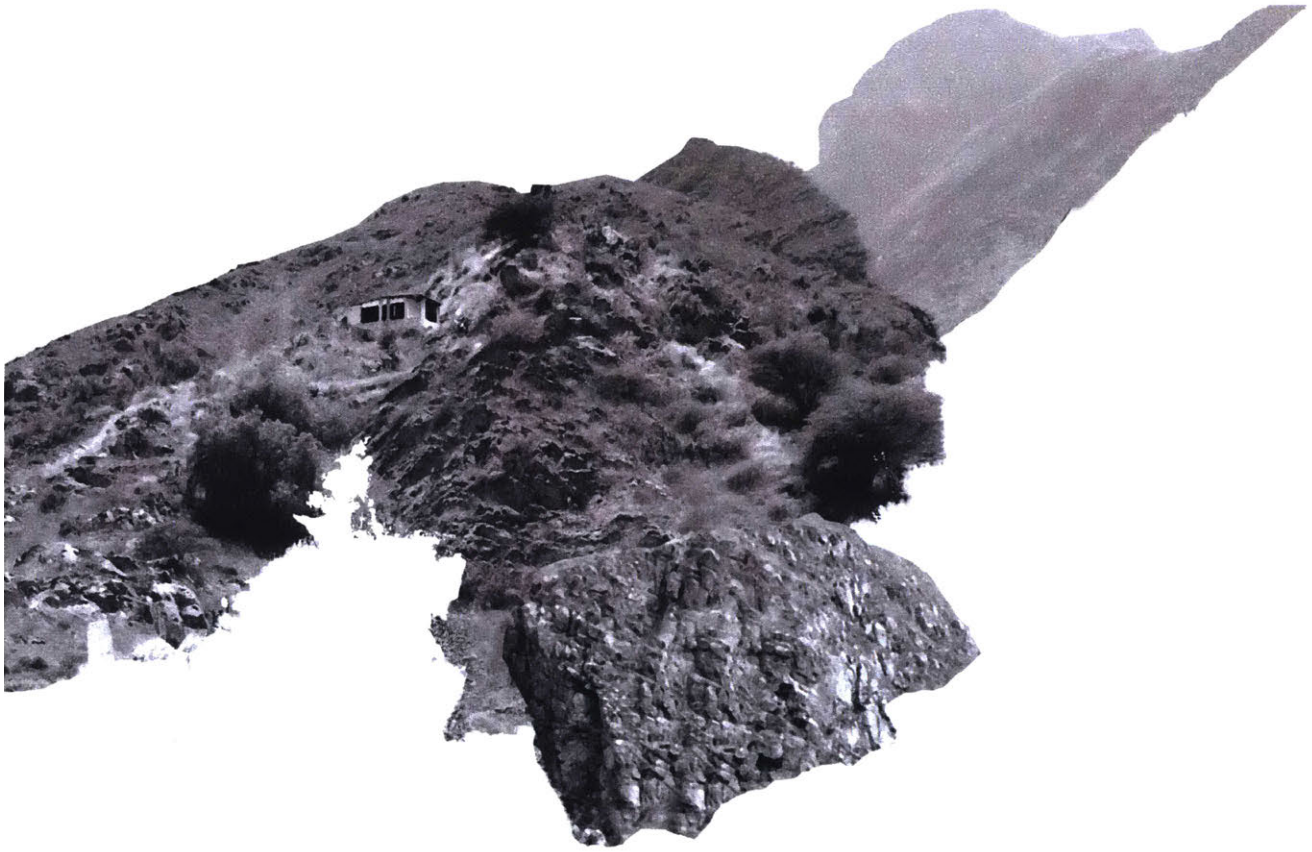


Site 4 Huarochiri: Water Collection Clusters

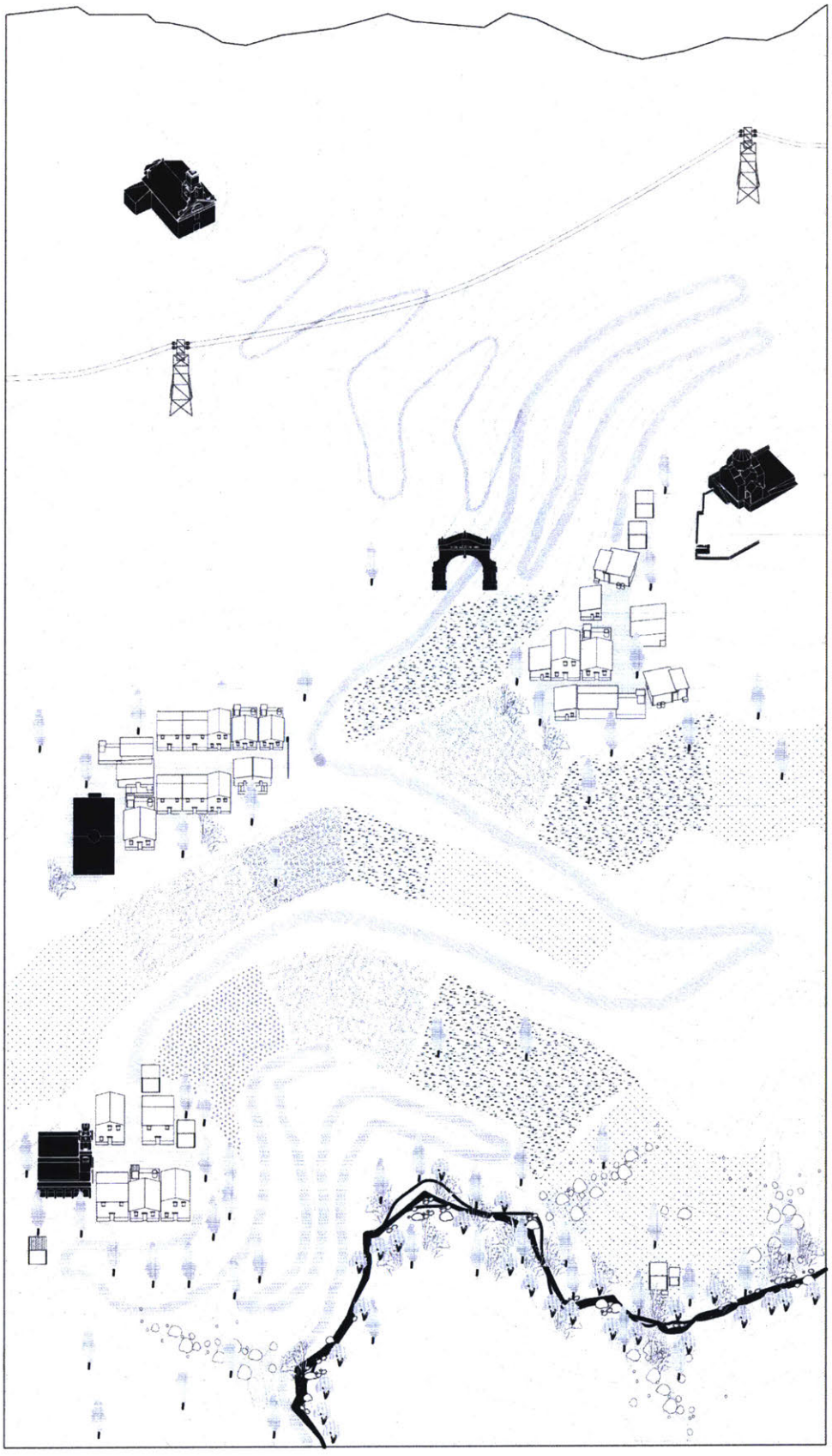


The region of Huarochiri, presents the highest and most scattered form of settlement. Where topography and the shrinking population is leaving labour and community buildings empty.

Lima's rainy season occurs in the first quarter of the year, from January through March, during which the majority of potable drinking water is collected. While current reservoirs exist in Huarochiri, issues arise from difficulties in retaining rain water and its distribution resulting from insufficient reservoirs. Although 14 billion cubic meters of water are consumed in Lima, reservoirs only hold 10% of this.



Altitude: 1400msn



Huarochiri

Pieces that Operate as Infrastructure

Portal with name

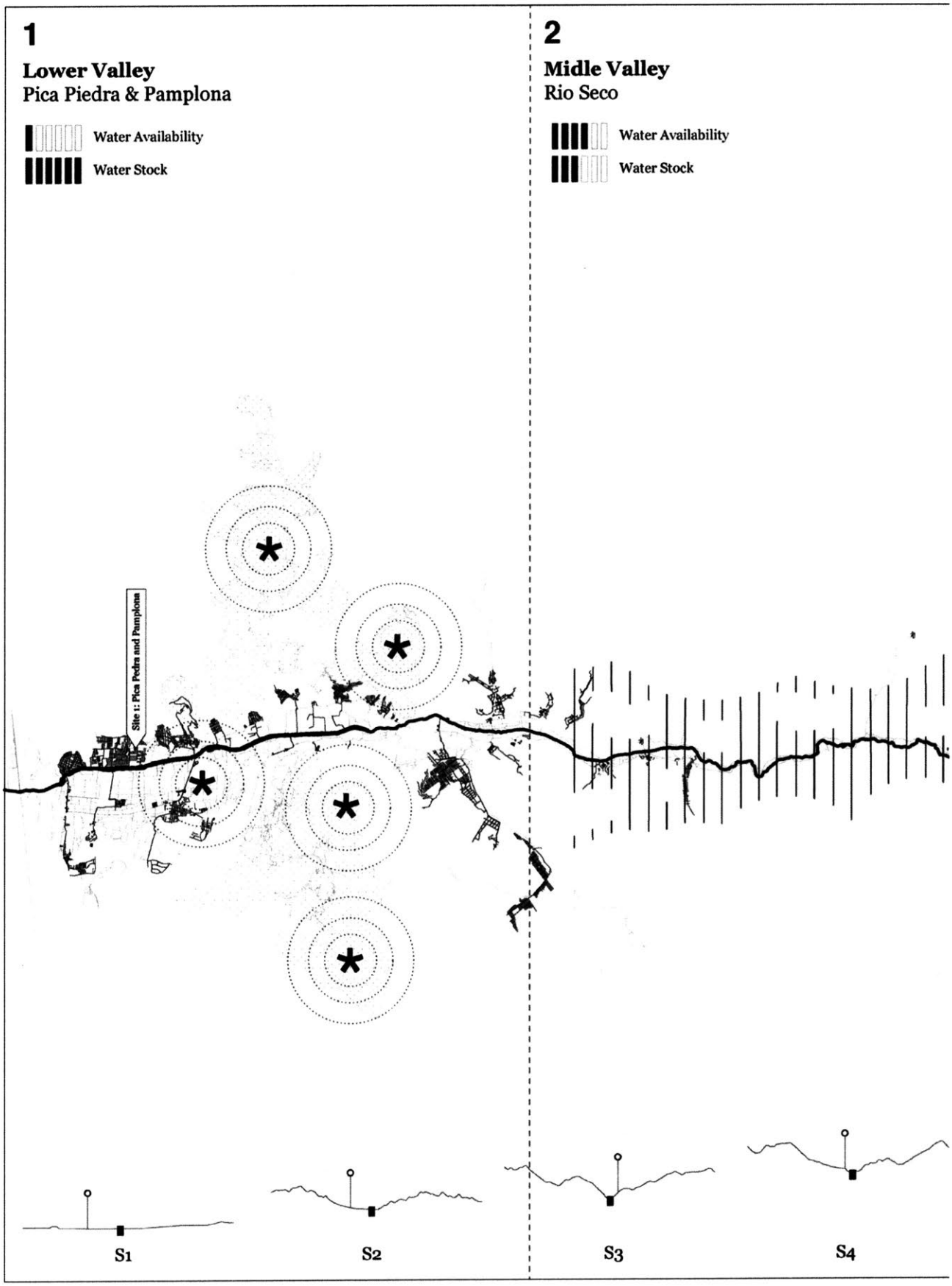
School

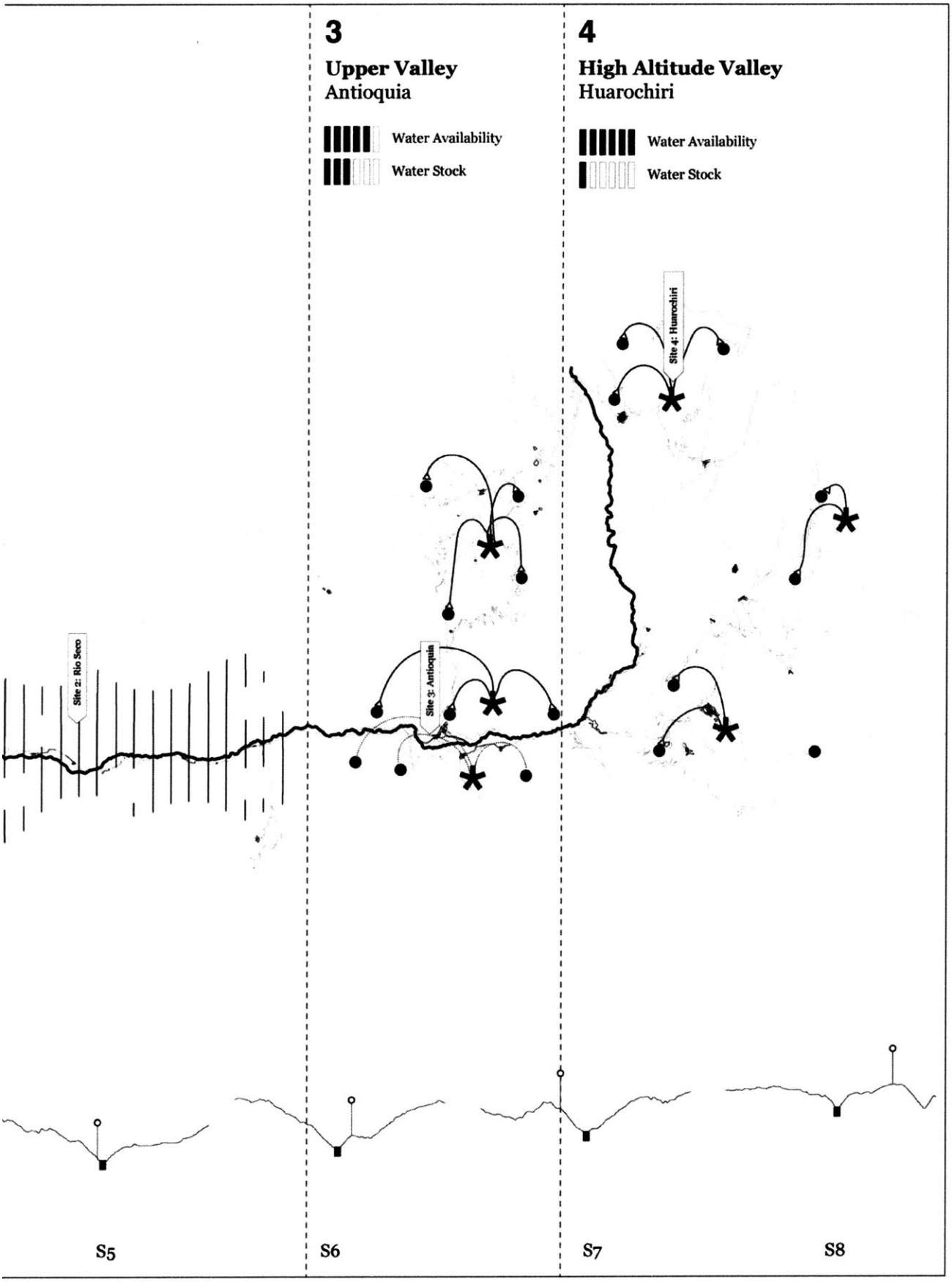
Community
Soccer Field

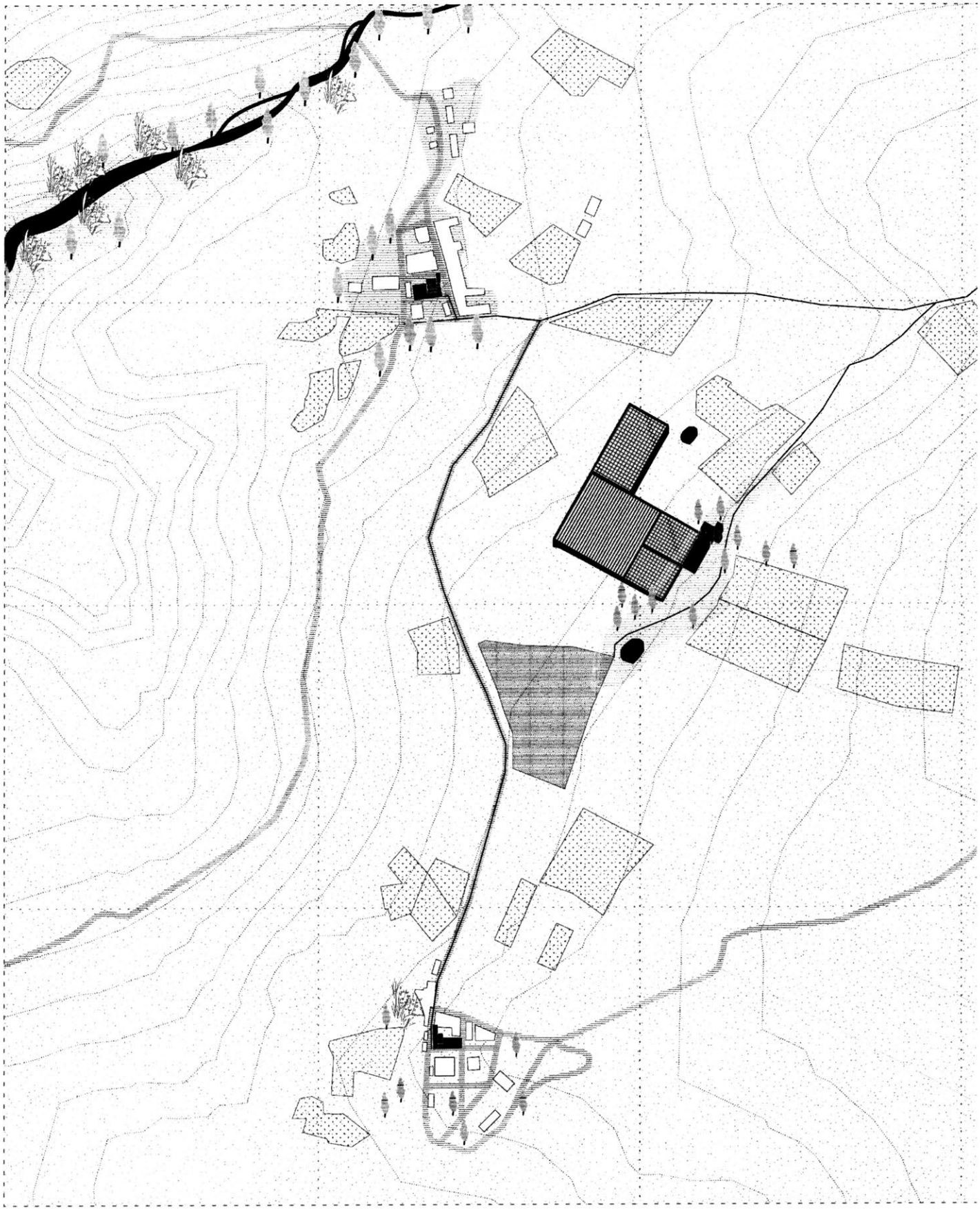
Church

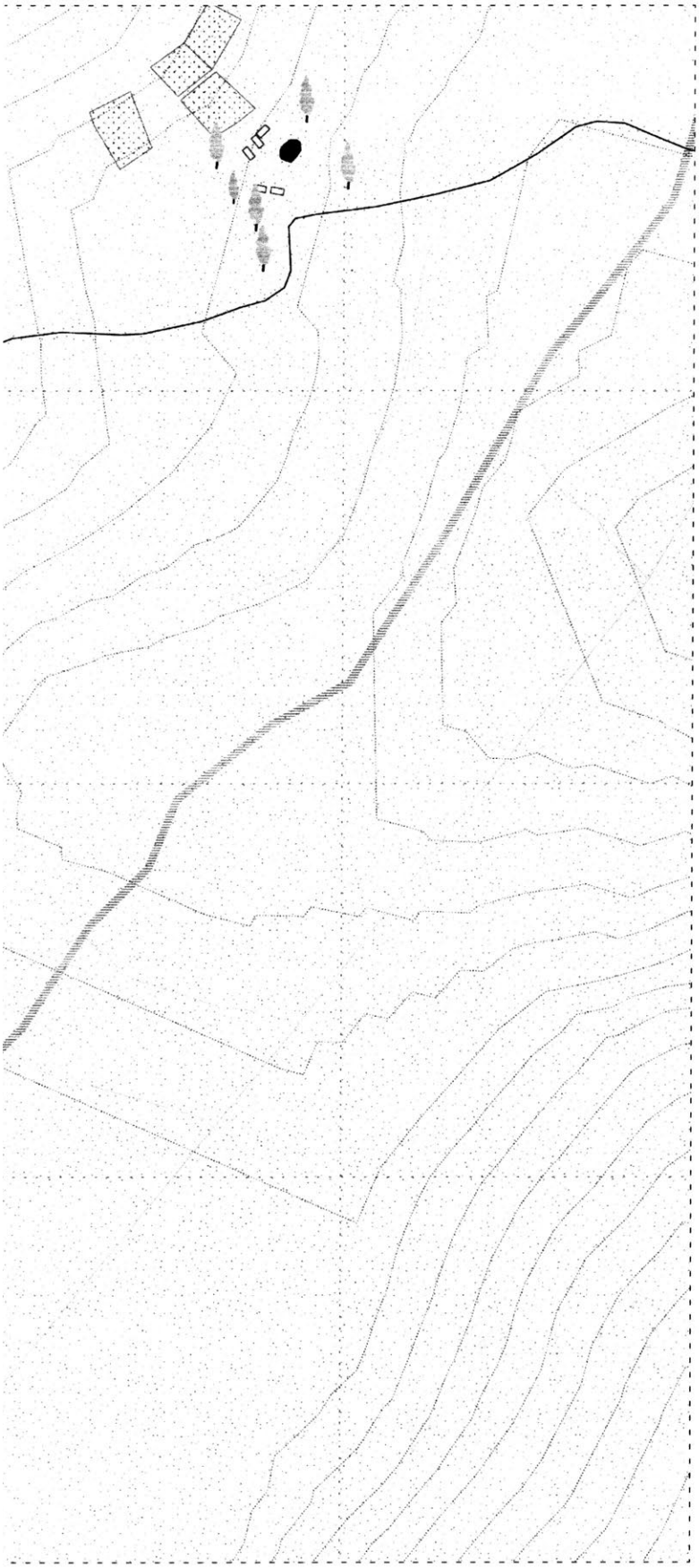
Municipality

High Tension Power
Line


1
Lower Valley
Pica Piedra & Pamplona
Water Availability
Water Stock
2
Midle Valley
Rio Seco
Water Availability
Water Stock
Site 1: Pica Piedra and Pamplona
S1
S2
S3
S4


3
Upper Valley
Antioquia
Water Availability
Water Stock
4
High Altitude Valley
Huarochiri
Water Availability
Water Stock
Site 2: Rio Seco
Site 3: Antioquia
Site 4: Huarochiri
S5
S6
S7
S8

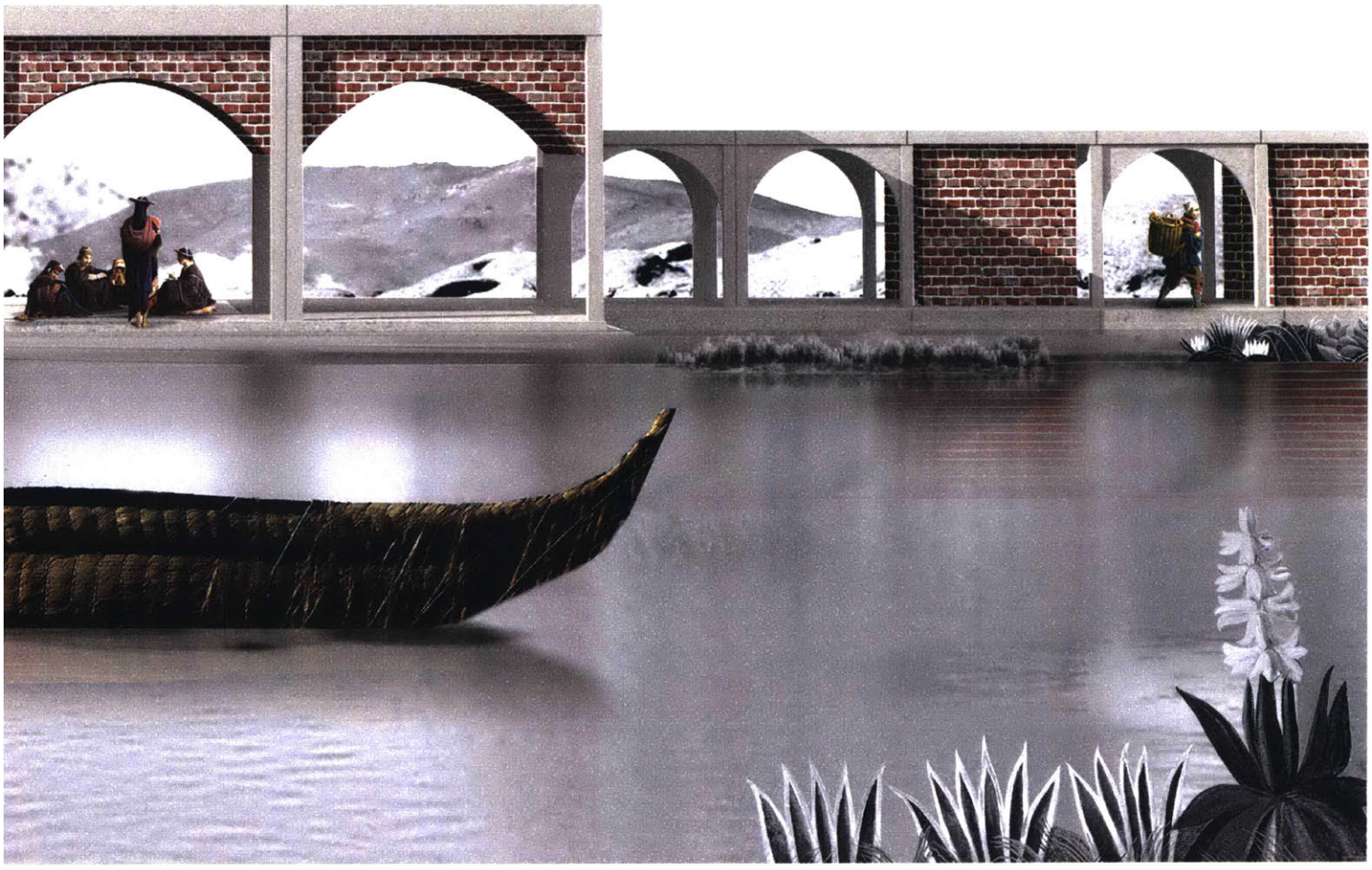




Relationships between the Pieces

Creating a diffused system of water reservoirs and distributing facility managed by its settlements, they can hold water for the total population of the valley and define an identity throughout the whole year. A local partnership that operates at the scale of the valley. And a partnership that speaks of an overlapping cycles through settlements: collecting water in the rainy seasons, bundling students along the settlements to attend school in one, a farmers market in another, and rotating local doctors in the third one. All of these mediating new incomes and lifestyles among them.

Left: Agriculture Institution and Farming Estates, Dry Season.



Conclusions

& Future Work

Las Palmas, Rio Seco, Antioquia and Huarochiri

Plastic Water Tank

Urban Staircase

Tuk Tuk

Public Toilets

Fog Catchers

Corner Store

Ghost Sheds

Informal Electricity Poles

Signs of Jurisdiction

Waste Buckets

Portal with Name

Tuk Tuk

Water Tank

Plinths

Boulders

Sheds

Informal Electricity Poles

Community Toilets

Bridge

Portal with Name

Retention Wall

Church

Portal with Name

Municipality Building

Soccer Field

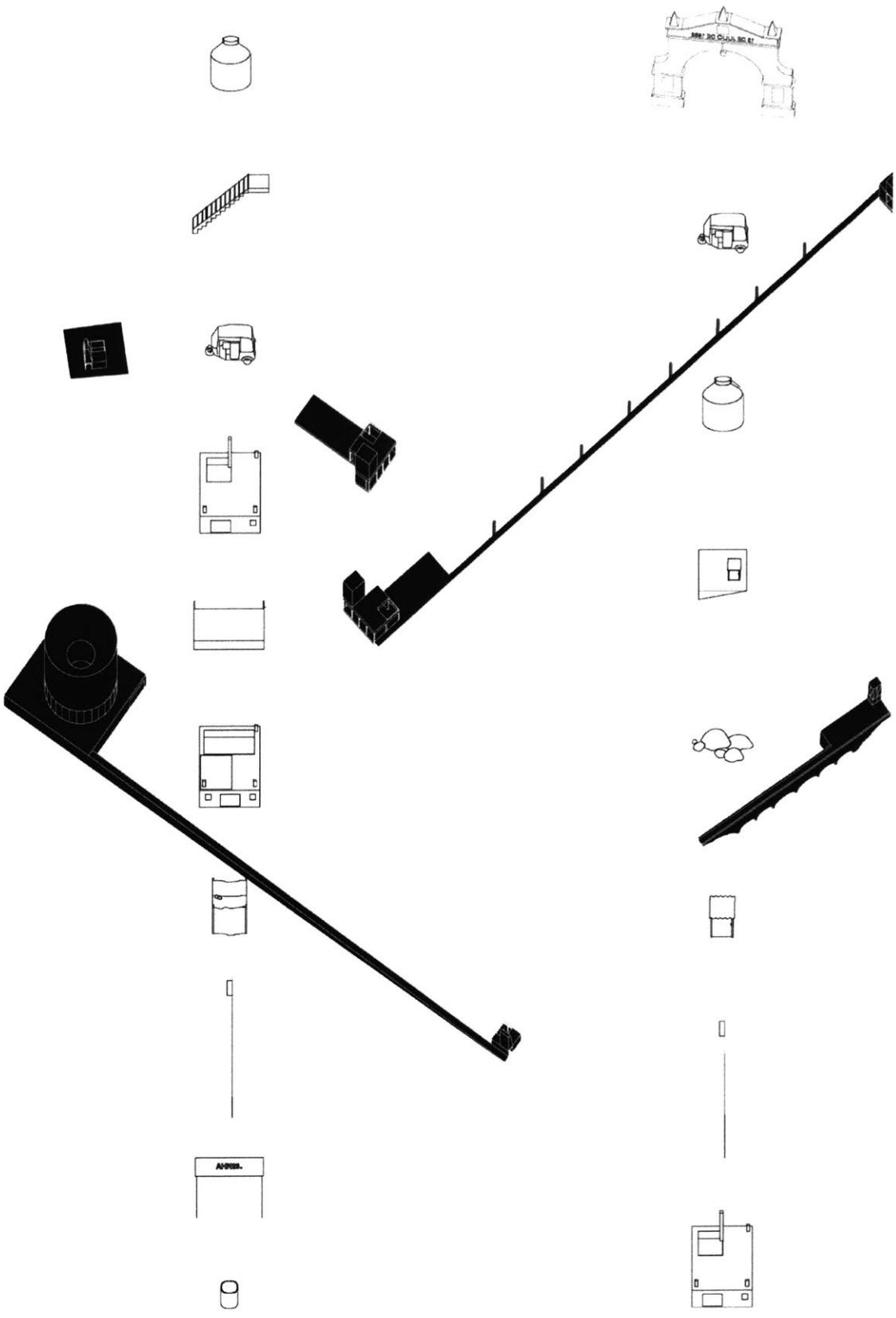
School

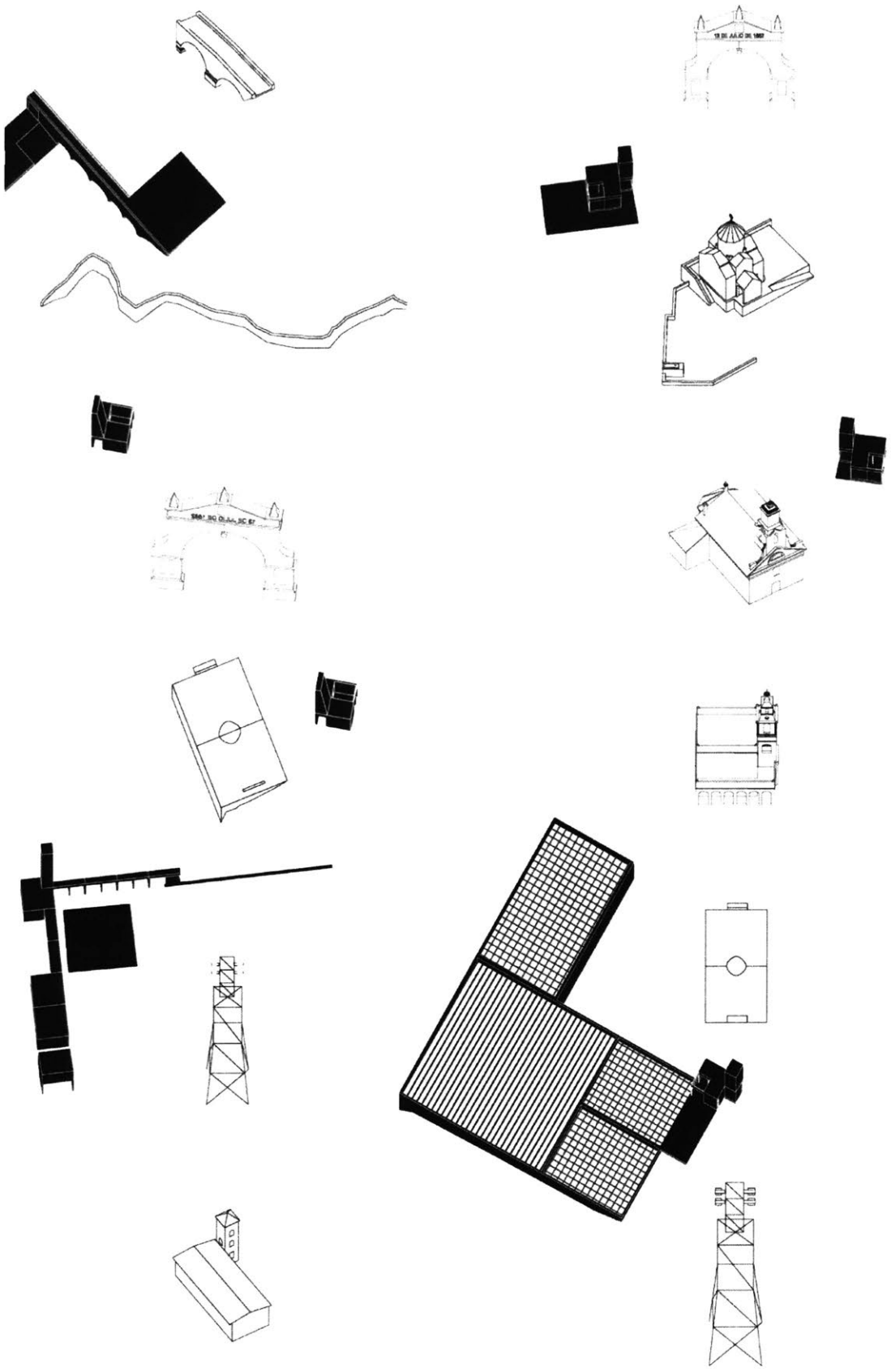
High Tension Power Line

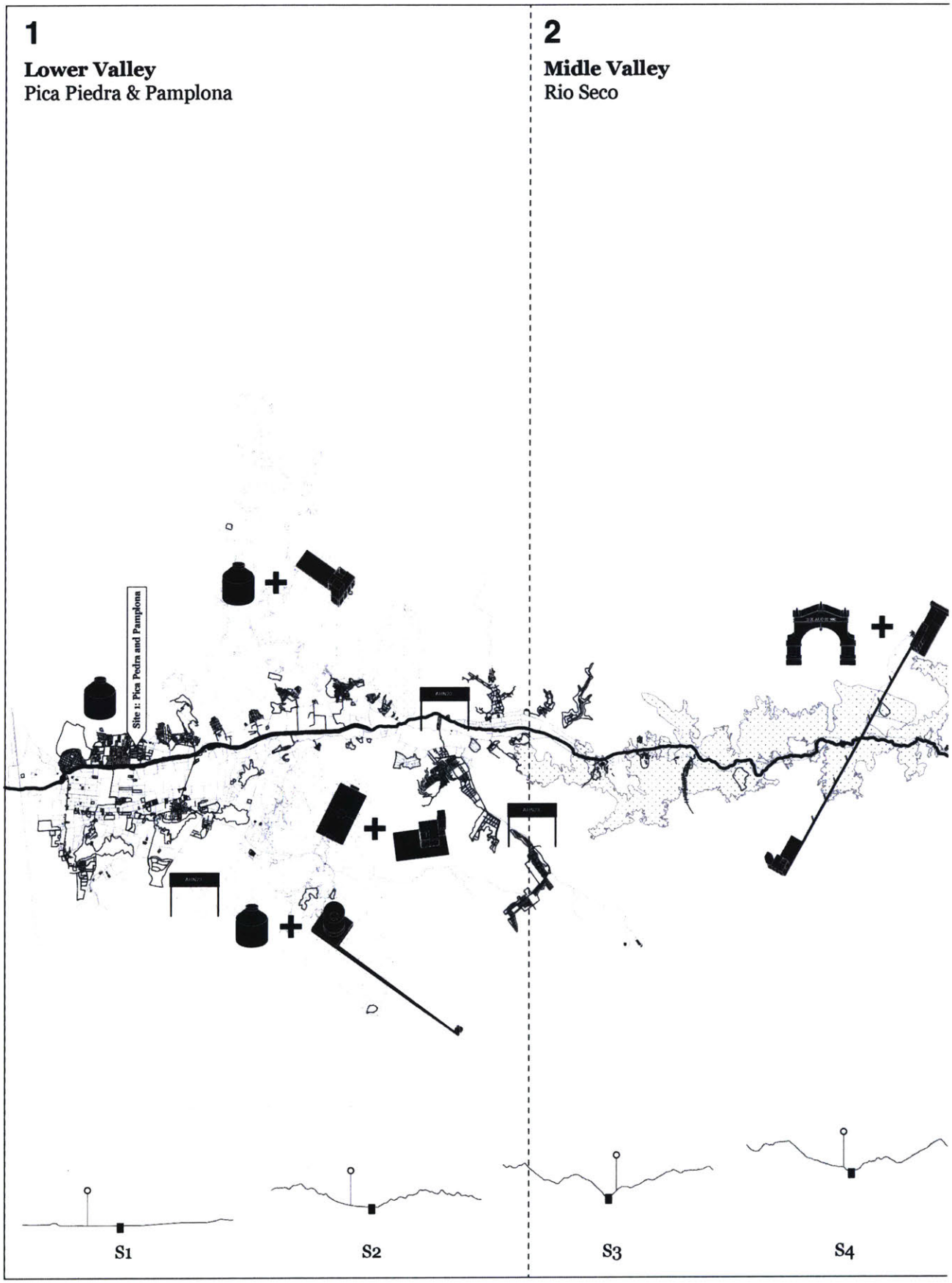
Soccer Field

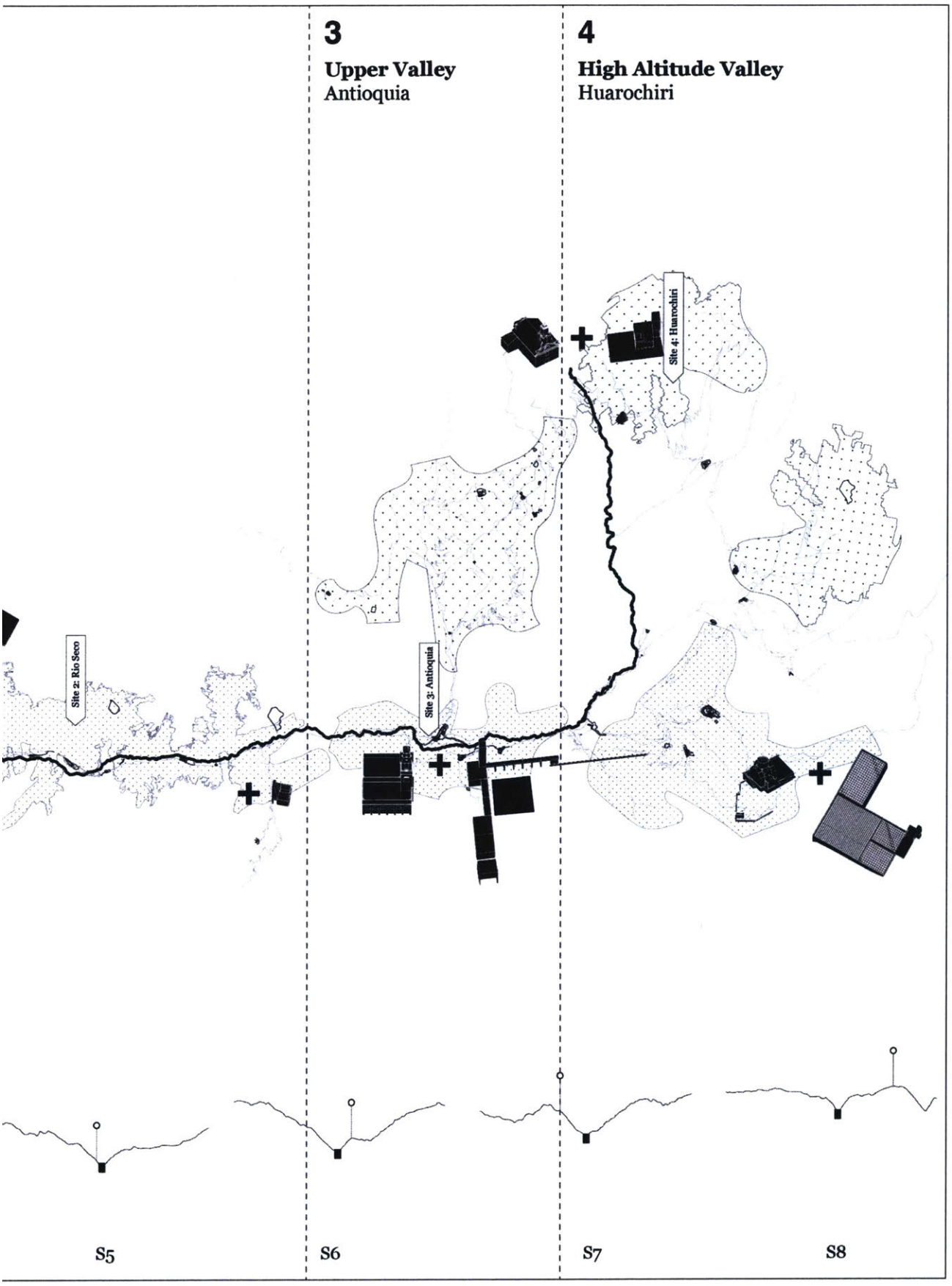
Public School

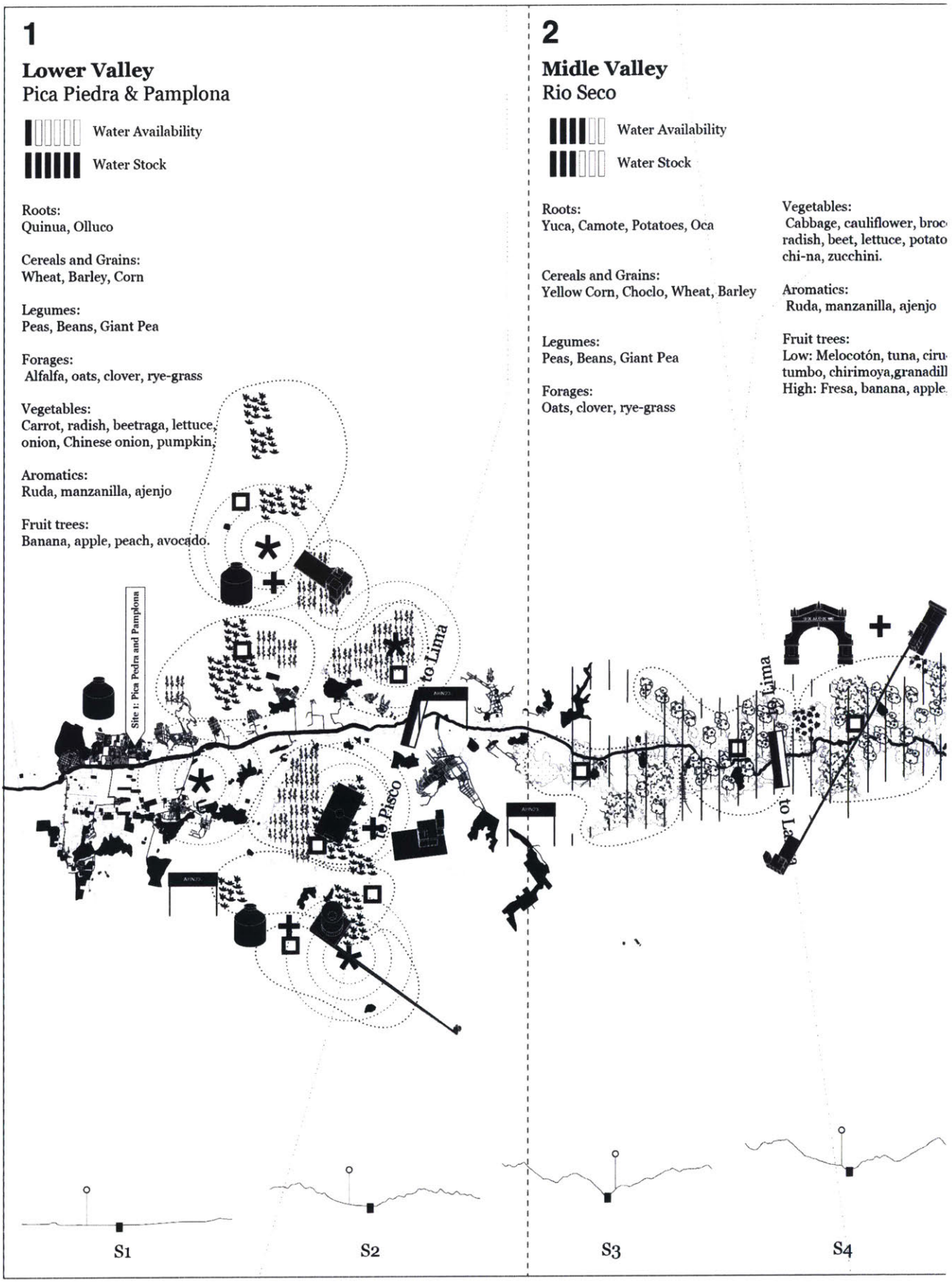
High Tension Power Lines

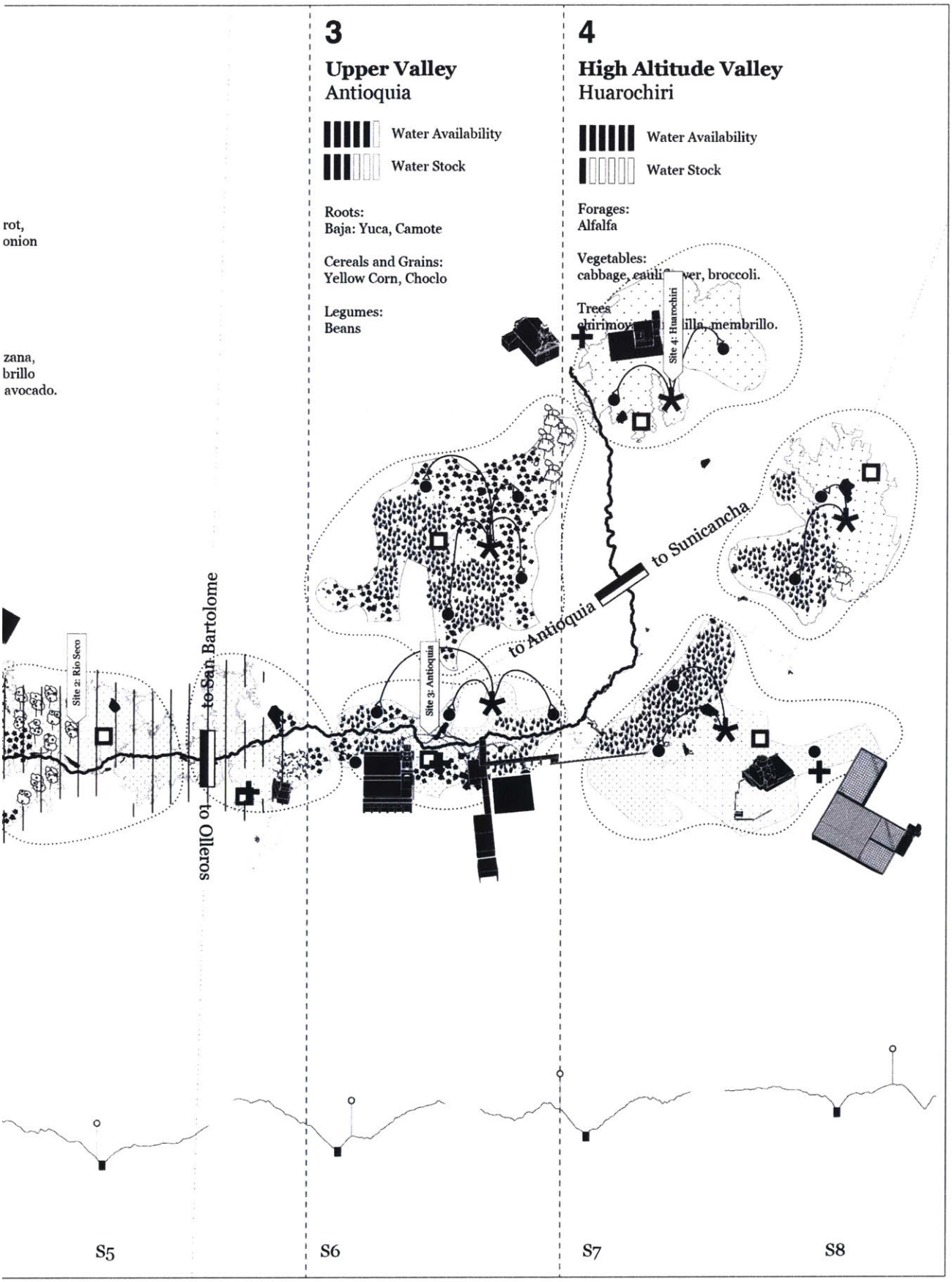


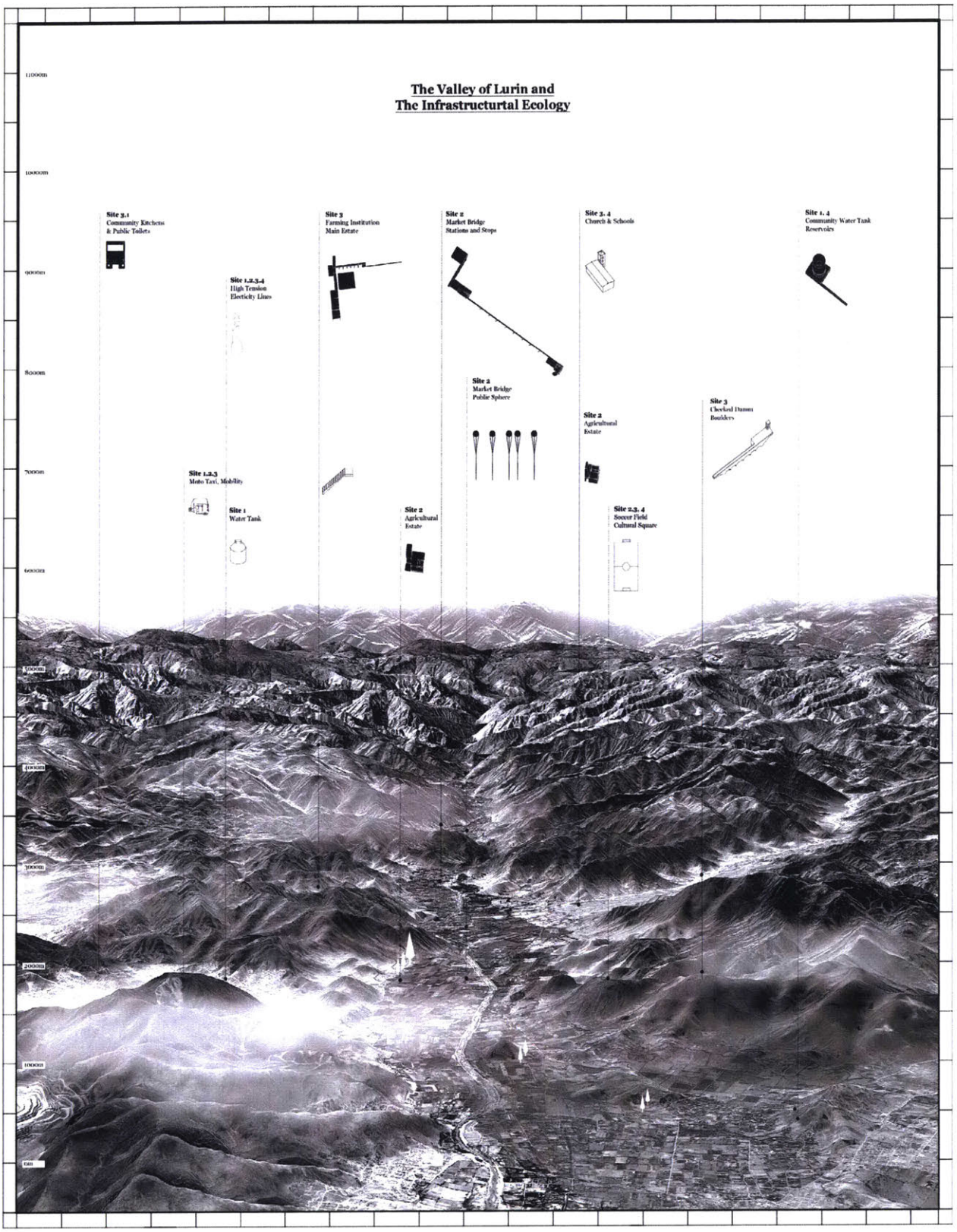



1
Lower Valley
Pica Piedra & Pamplona
2
Midle Valley
Rio Seco
Site 1: Pica Piedra and Pamplona
S1
S2
S3
S4


3
Upper Valley
Antioquia
4
High Altitude Valley
Huarochiri
Site 2: Rio Seco
Site 3: Antioquia
Site 4: Huarochiri
S5
S6
S7
S8


1
Lower Valley
Pica Piedra & Pamplona
Water Availability
Water Stock
Roots:
Quinua, Olluco
Cereals and Grains:
Wheat, Barley, Corn
Legumes:
Peas, Beans, Giant Pea
Forages:
Alfalfa, oats, clover, rye-grass
Vegetables:
Carrot, radish, beetraga, lettuce, onion, Chinese onion, pumpkin,
Aromatics:
Ruda, manzanilla, ajenjo
Fruit trees:
Banana, apple, peach, avocado.
2
Midle Valley
Rio Seco
Water Availability
Water Stock
Roots:
Yuca, Camote, Potatoes, Oca
Cereals and Grains:
Yellow Corn, Choclo, Wheat, Barley
Legumes:
Peas, Beans, Giant Pea
Forages:
Oats, clover, rye-grass
Vegetables:
Cabbage, cauliflower, broc
radish, beet, lettuce, potato
chi-na, zucchini.
Aromatics:
Ruda, manzanilla, ajenjo
Fruit trees:
Low: Melocotón, tuna, ciru
tumbo, chirimoya,granadill
High: Fresa, banana, apple
Site 1: Pica Piedra and Pamplona
to Lima
to Pisco
to Lima
S1
S2
S3
S4


3
Upper Valley
Antioquia
Water Availability
Water Stock
Roots:
Baja: Yuca, Camote
Cereals and Grains:
Yellow Corn, Choclo
Legumes:
Beans
4
High Altitude Valley
Huarochiri
Water Availability
Water Stock
Forages:
Alfalfa
Vegetables:
cabbage, cauli ver, broccoli.
Trees
chirimoy illa, membrillo.
rot,
onion
zana,
brillo
avocado.
Site 2: Rio Seco
Site 3: Antioquia
Site 4: Huarochiri
to San Bartolome
to Olleros
to Antioquia
to Sunicancha
S5
S6
S7
S8



Above: A Territorial Space of Partnerships

A Territorial Space

This thesis presents water and its infrastructure ecology as a democratizing system. It tests the overarching hypothesis that water and infrastructure can become a mechanism for democratizing urban form throughout the large geography of the valley. A system that can be reproduced and mediates between the boundaries of production, implementation, mobility and human development. When looking back at the pieces and introducing new ones through partnerships, the premise is that they are basically creating new contexts and managing the existing ones. Valleys, rivers and settlements create a new institution of economy, productivity, and management of resources - all of these enabling recognition at the scale of the community, the valley, the region and the country. Where each single piece and its boundary belongs to other territories. The limitations to achieve the next generation of infrastructure in Lima are neither technical nor financial; they are spatial, organizational, social and political. Lima needs urbanism; not an urban plan that totalizes the territory, nor a polarized bottom-up and top down mentality, but partnerships that embrace the political organizational structure and works with it. Agency lies on establishing how these pieces and regimes operate and how it relates to its condition rather than how it is. A territorial space that emerges out of negotiations, and out of the possibilities of their geographies. This project is not just about water, and not just about housing. It is about the creation an infrastructural ecology that enables new lifestyles, new economies and a new relationship with Lima.

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