

**Community and High-Density Housing:
An Architecture of Social Capital**

by

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ABSTRACT

This thesis examines community development at high-densities in Vancouver, British Columbia. It understands community development through the lens of bridging and bonding social capital and their related social network structures. It develops architectural strategies to encourage community, and then applies these strategies to the design of a high-density, mixed-use residential building. Extended family housing is employed programmatically as both an architectural strategy to encourage diversity, and to examine more complex communities at a domestic scale.

It takes the critical position that bonding social capital, while important to community development, is over-emphasized in relation to bridging social capital. The design seeks to more effectively balance these types of social capital. It uses a modified public courtyard typology, large circulation atrium and accessible rooftop overlaid with multiple programmatic elements, careful attention to thresholds, and a variety of flexible unit types and sizes to address this imbalance between bridging and bonding social capital.

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CHAPTER 1: INTRODUCTION

Overview

This thesis examines community development at high-densities in Vancouver, British Columbia through the design of a mixed-use residential building for a diverse range of people and family types, including extended families. Cities must continue to densify and this process offers both opportunity and consequence to community development.

It takes social capital as a mechanism of community development. It uses Robert Putnam's definition in *Bowling Alone: The Collapse and Revival of American Community*:

[Social] capital refers to connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense, social capital is closely related to what some have called “civic virtue”. The difference is that “social capital” calls attention to the fact that civic virtue is most powerful when embedded in a dense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital. (Putnam 2000, 19)

The critical aspect in his definition is that it understands social capital in terms of social networks. These networks form the core of the analysis, architectural strategies, and critical position.

This introductory chapter outlines the theoretical groundwork and subsequent architectural strategies. It is organized into six sections: “Social Capital,” “Social Networks,” “Thresholds,” “Sequence,” “Personal Expression and Sense of Control,” and “Stability.”

“Social Capital” elaborates on Putnam's definition, discussing the various types of social capital, their importance and particular roles. It concludes with an analysis of the types of social capital that contribute most effectively to community development.

“Social Networks” analyzes the social network structures common to the various types of social capital, reframing the discussion in terms of their associated network typologies. Importantly, these typologies can be visualized, compared, and analyzed. It then moves to a discussion of the physical networks that correlate with the social networks discussed. It concludes with recommendations for the types of physical networks that would support the types of social capital that encourage community development.

“Thresholds” furthers the discussion in “Networks,” understanding thresholds simultaneously as sites of interaction and definition between two or more communities in a system. It compares historical and contemporary meanings of threshold, framing the discussion in terms of social capital and networks. It concludes with ways in which thresholds can encourage or inhibit various types of social capital and the potential effects on community development.

Sequence adds context to “Thresholds,” placing the ideas developed into a sequence from public to private. It frames this public to private gradient in terms of social capital, associated social and physical networks, and thresholds that are important for community development.

“Personal Expression and Sense of Control” relates the sequence of thresholds to the sense of control people and communities have over their environment, as well as the necessity for personal expression within a community as a means of engaging with it.

“Stability” discusses the previous sections over time, arguing that a certain degree of permanence is necessary for any community to develop completely.

The additional program of extended family housing is introduced to the thesis next. The variety of family sizes and structure inherent to extended families allows for a more complete analysis of community development at a domestic scale. The ideas developed in the previous sections can be addressed at this scale more completely using more complex communities.

The introduction concludes with the “Thesis Question” and states its “Critical Position.”

The following chapter, “Design,” states the Architectural Strategies employed based on the theory and “Critical Position,” developing a “Framework for Design.” This framework is then applied to site and circumstance in downtown Vancouver, British Columbia.

It finishes with concluding remarks on the theory, strategies, final design, overall process, and potential further investigations.

Social Capital

When asking how architecture can promote community in high-density urban environments a practical definition of community is required. “Community”, as a broad concept, is understood here through “social capital”. Social capital describes mechanisms and structures that establish various senses of community.

The diversity of social capital can be imagined as a gradient between “bonding” and “bridging” social capital. Bonding social capital refers to sets of relationships that are inherently exclusive. They reinforce identity, typically forming homogenous groups. Types of bonding social capital can be familial groups, fraternal organizations, or exclusive country clubs. In other terms, a bonded community can often be defined by who it includes and who it does not. By contrast, bridging social capital refers to the looser sets of relationships that reach across a diversity of people and are inherently inclusive. Bridging social capital can include large movements such as The Civil Rights Movement, small groups such as the Boy Scouts, or sports teams and athletic clubs. A bridging community can often be defined by a common purpose. In reality, most communities simultaneously exhibit both bonding and bridging networks. Churches, for example, may bond along ethnicity, while bridging across class and income (Putnam 2000, 23). In many ways, the gradient between bridging and bonding social capital can be thought of as a corollary to the gradient between public and private.



Bridging ties

Bonding ties

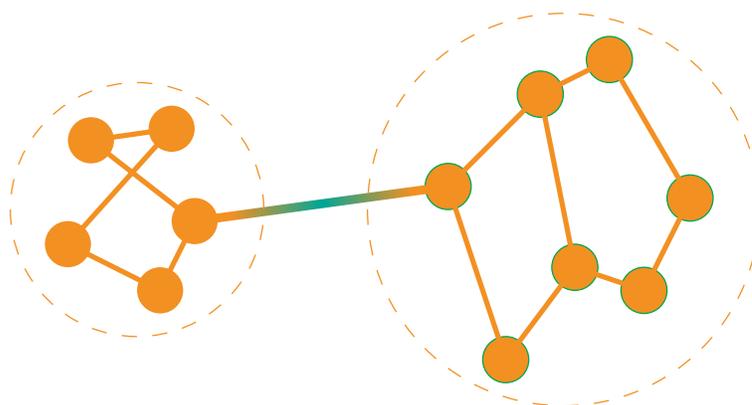
Bonding and bridging social capital as a gradient.

Bonding and bridging social capital serve different purposes. “[B]onding social capital constitutes a kind of sociological superglue, whereas bridging social capital provides a sociological WD-40” (Putnam 2000, 23). Despite the fact that WD-40 is a common degreaser that is often mistaken for a lubricant, his analogy is a good one. “Strong ties with intimate friends may ensure chicken soup when you’re sick, but weak ties with distant acquaintances are more likely to produce leads for a new job” (Putnam 2000, 363). Bonding social capital is relatively easy to create. Bridging social capital, however, requires people to move beyond their immediate identities to network with people unlike themselves. The

most important collective problems that society faces requires the bridging social capital that is the most difficult to create (Putnam 2000, 363).

Bonding social capital, while critical to a sense of community and well-being, can also produce a variety negative consequences. “Bonding social capital, by creating strong in-group loyalty, may create strong out-group antagonism” (Putnam 2000, 23). The decline of civic involvement and community participation over the last sixty years can, in part, be attributed to a decrease in bridging social capital. The book’s namesake refers to the decline of bowling clubs: an activity that bridged people of ethnicities and socio-economic backgrounds with a common activity. A balance between bonding and bridging social capital is required for healthy community and civic engagement.

Visualized, bonding social capital appears as a dense network with many overlapping, redundant relationships between closely related people. Conversely, bridging social capital appears as looser network connecting people between homogenous groups. In this view, we can begin to understand what the spatial and geographic implications of these types of networks could be.



Bonding (within) versus bridging (between) social capital network diagram

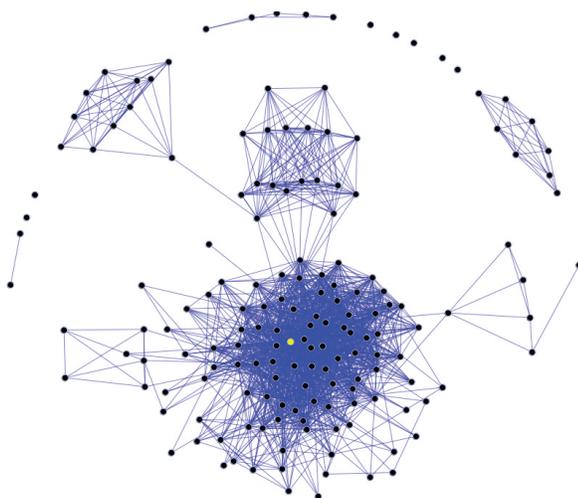
This discussion yields two important conclusions. The first is that social capital can be visualized and analyzed as a social network. The second is that a more productive balance between bridging and bonding social capital needs to exist.

Social Networks

The definition of social network is taken from John Scott's *Social Network Analysis: Theory and Applications*. He makes specific reference to social capital:

A social network is a social structure made up of individuals (or organizations) called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige. Social network analysis views social relationships in terms of network theory consisting of nodes and ties (also called edges, links, or connections). Nodes are the individual actors within the networks, and ties are the relationships between the actors. The resulting graph-based structures are often very complex. There can be many kinds of ties between the nodes. Research in a number of academic fields has shown that social networks operate on many levels, from families up to the level of nations, and play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals.

In its simplest form, a social network is a map of specified ties, such as friendship, between the nodes being studied. The nodes to which an individual is thus connected are the social contacts of that individual. The network can also be used to measure social capital – the value that an individual gets from the social network. These concepts are often displayed in a social network diagram, where nodes are the points and ties are the lines. (Scott 2013, 1)



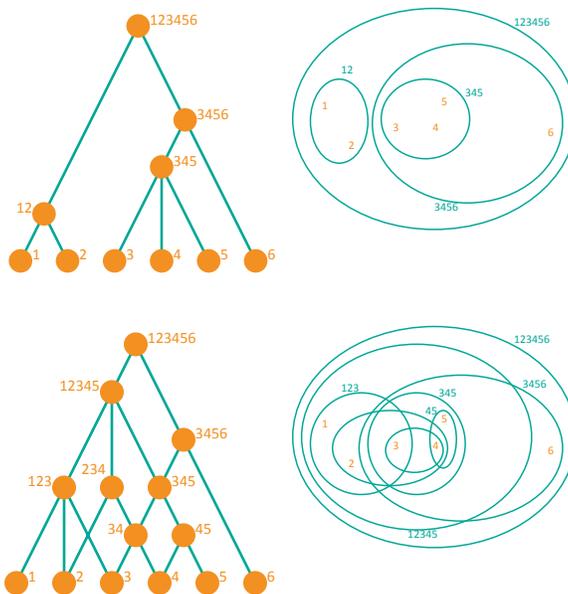
A typical social network map (Maklaan 2015)

Scott perhaps takes a narrower definition than Putnam of social capital, if only for the sake of analysis and quantification. He echoes closely many of the same arguments in strictly network terms. For example, he shows how the shape of a social network determines its utility to the people within it. "Smaller, tighter networks can be less useful to their members than networks with lots of loose connections (weak ties) to individuals outside the main network. More open networks, with many weak ties and social connections, are more

likely to introduce new ideas and opportunities to their members than closed networks with many redundant ties” (Scott 2013, 3).

As a tool for analysis, it distinguishes itself in two main ways. The first is that it does not treat individuals or organizations as the unit of analysis. Instead it focuses on the structure of the ties between nodes. Individuals and their attributes become less important than their relationships with others within the network. The second is that instead of assuming that socialization into norms affects behaviour, it tries to understand how the overall systems structure affects norms (Scott 2013, 3). Architecturally, this thesis seeks to understand how the physical systems of a home, building, and neighbourhood might structure norms that encourage community and social capital.

This discussion leads to two important questions. The first is, what are the types of social networks that the architecture should be trying to encourage or inhibit? Secondly, what are the attributes of the architecture that accomplish this? The first question has been answered: bridging social capital (and the loose social network structure it implies) needs to be encouraged.



A semilattice structure and corresponding overlap
 A tree structure and corresponding lack of overlap
 (Alexander 1966, 55)

The second question is, in part, answered by Christopher Alexander in his article *A City is not a Tree*. The article argues that many modern master-planned cities exhibit the simple structure of a tree, when in fact all the richness of the greatest cities comes from the complexity of relationships found in a semi-lattice structure (Alexander 1966, 53). A tree is a rigidly centralized, hierarchal structure, whereas the semi-lattice is a distributed one. The diagrams depicting the semi-lattice structure correspond strongly to the social network diagrams with an abundance of bridging social capital. The tree structure diagrams correspond strongly to high levels of bonding social capital and strongly bound communities. It should be noted that the bonding social capital structures are not absent from the semi-lattice structures, but rather include a much higher degree of overlap with other communities. Unsurprisingly, the diagrams depicting the spatial structure of semi-lattice cities are very similar to those loose, highly connected social network structures that define bridging social capital.

Alison Smithson similarly wrote to this effect at an architectural scale in *How to Recognise and Read Mat-Building: Mainstream Architecture as it has Developed Towards the Mat-Building*:

Mat-building can be said to epitomise the anonymous collective; where the functions come to enrich the fabric, and the individual gains new freedoms of action through a new and shuffled order, based on interconnection, close-knit patterns of association, and possibilities for growth, diminution, and change. (Smithson 1974, 573)

In contrast, both Putnam and Alexander make compelling arguments of what does not constitute these spatial structures. Alexander's is obvious: the tree in the title of his article. Putnam, more specifically, dissects suburbia, the spatial separation of work, home, and recreation, and the commute that this necessitates. He outlines three ways in which this form of spatial organization impacts community:

First, sprawl takes time. More time spent alone in the car means less time for friends and neighbours, for meetings, for community projects, and so on. Though this is the most obvious link between sprawl and disengagement, it is probably not the most important.

Second, sprawl is associated with increasing social segregation, and social homogeneity, and social homogeneity appears to reduce incentives for civic involvement, as well as opportunities for social networks that cut across class and racial lines. Sprawl has been especially toxic for bridging social capital.

Third, most subtly but probably most powerfully, sprawl disrupts community "boundedness." Commuting time is important in large part as a proxy for the growing separation between work and home and shops. More than three decades ago, when (we now know in retrospect)

civic engagement was at full flood, political scientists Sidney Verba and Norman Nie showed that residents of “well-defined and bounded” communities were much more likely to be involved in local affairs. In fact, Verba and Nie found commuting itself to be a powerful negative influence on participation. Presciently, they wrote that “communities that appear to foster participation--the small and relatively independent communities--are becoming rarer and rarer.” Three decades later this physical fragmentation of our daily lives has had a visible dampening effect on community involvement. (Putnam 2000, 214)

Alexander echoes Putnam’s arguments regarding the separation of work and home:

The total separation of work from housing, started by Tony Garnier in his industrial city, then incorporated in the 1929 Athens Charter, is now found in every artificial city and accepted everywhere where zoning is enforced. Is this a sound principle? It is easy to see how bad conditions at the beginning of the century prompted planners to try to get the dirty factories out of residential areas. But the separation misses a variety of systems which require, for their sustenance, little parts of both. (Alexander 1966, 13)

The architectural strategy must address the current balkanization of life. It must encourage the rich networks at a building, unit, and urban scale that promote bridging social capital. The architectural strategy is a highly-networked building. This means forgoing the rigidly hierarchical, tree-like structures common in high-density buildings for a highly linked, latticed one. Building infrastructure is redundant and overlapping. It provides varying types of programming, and small moments for sitting, reading, or socializing. The circulation can thought of as a front yard and street for the homes it links.

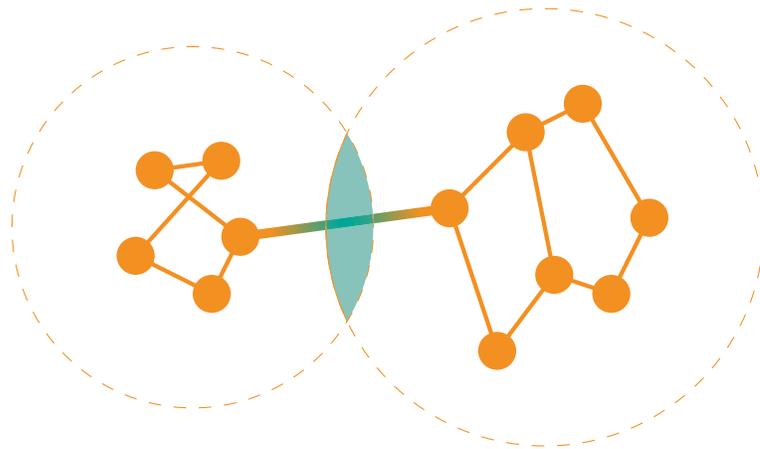
Thresholds

To live together in the world means essentially that a world of things is between those who have it in common, as a table is located between those who sit around it; the world, like every in-between, relates and separates men at the same time. (Arendt 1958, 37)

The previous section described how different types of network structures could better encourage bridging social capital and community. This section is concerned with the thresholds *between* two or more systems within the networks described above. In the case of a physical network, it is concerned with the qualities of the ties (the relationship) between two or more nodes (places). Most importantly, it seeks to understand the spatial qualities of thresholds that support appropriate social network structures.

Superficially, a physical threshold divides two discernible systems: inside and outside, public and private, warm and cold, or wet and dry. A building, almost by definition, is a collection of these thresholds. But they should not be reduced to this. They are sites of overlap, simultaneously defining two or more distinct systems or communities while

providing a venue for their interaction. Thresholds are the physical manifestation of social, political, economic, or environmental relationships, not the division between them. Christopher Alexander again illustrates this well using an example of a pedestrian and taxi. The two systems, while requiring some separation to function safely and efficiently, also require a degree of overlap. A pedestrian needs to be able to hail and get into and out of a taxi at any point in the pedestrian system and the taxi needs to be able to stop, pick up, and drop off the pedestrian in the taxi system. The curb does not necessarily separate the two worlds, but is rather a physical manifestation of the two system's relationship and interaction with each another. In this sense, an architectural threshold provides a unique opportunity to both define unique communities (bonding, exclusive), while encouraging outside interaction (bridging, inclusive) (Alexander 1966, 51).

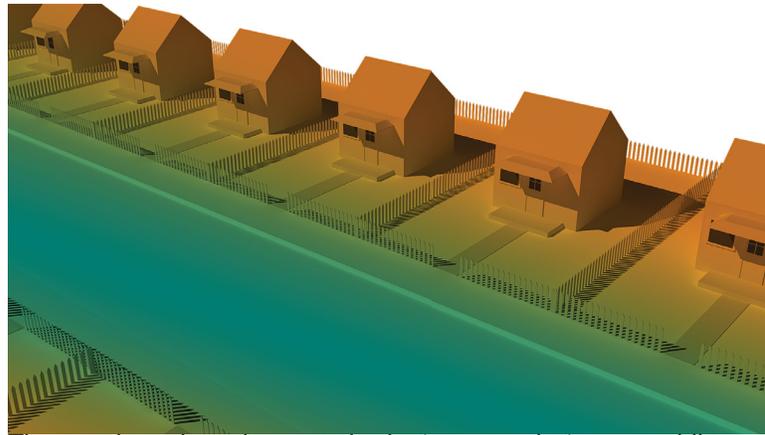


Elaborating on the previous diagram to incorporate the boundary condition of bridging social capital.

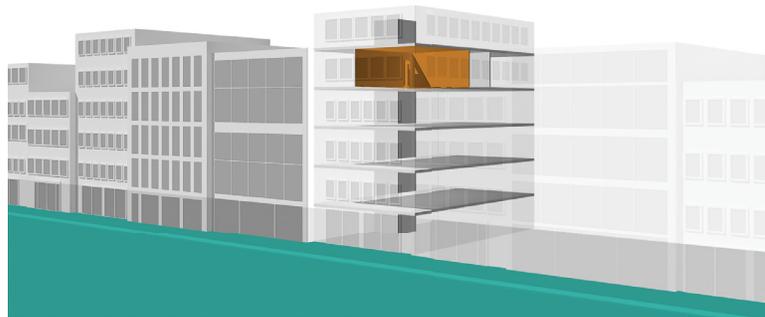
The thresholds of a traditional house on a public street have many of these properties. Its front yard and porch provide a threshold space in between the owner's private space and the city beyond it. It provides a site of interaction between the public and private; a "lingering between inner and outer spheres" (Mugerauer 1993, 107).

At high-densities, these simple sites of interaction between the varying degrees of public and private are easily lost. The lobby might offer brief visual encounters between residents and the rest of the city, but is restricted to residents and their guests. Most modern apartments are electronically limited to ensure residents can access only their own floors. Circulation is treated purely as an infrastructural space with no purpose other than to

move people. The relationship between a unit and the building's circulation is reduced to a solid door, and the relationship between a unit and the city becomes one-directional and privileged through the balcony or view.



The porch and yard as semi-private space between public and private.



There is often no correlating space at higher densities.

Mugerauer describes the condition between the unit and the city well, while also suggesting design direction:

An equal relation of dwelling place to street and natural environment is increasingly difficult to maintain as one moves from the scale of low-rise to high-rise buildings and from traditional to international styles. In large, “functional” housing forms, with their minimal balconies, distancing inevitably occurs. Not only are apartments substantially removed from the ground, but the force of winds and the angle of sunlight often force residents to keep openable windows and balcony doors closed. At the upper levels of high buildings, balconies tend to be symbolic and part of the continuity of building design rather than usable. When they are used, the increased size of the building tends to diminish the balcony and remove it from life below. The greater the height, the more participation in street life is replaced by the detached aesthetic attitude of “a view”. The result is weakened or indirect relationship between inside and outside. The central point is that balconies need to be socially non-distancing in egalitarian housing. In one sense, the balconies function

like porches. For occupants with no ground level entry, the balcony, like the porch, can extend one's living space outside. A multi-storey residence may have the same sort of balcony or gallery at each level. To be truly intermediate places, however, such balconies would simultaneously belong to inside and outside realms. Whereas a porch belongs to the inside by virtue of being directly connected to a doorway and threshold on the ground level, a balcony requires a compensating manner of continuity. It needs to be an integral part and extension of the inner realm, which is possible only when the balcony is set into the building and not merely tacked to the outside. If the balcony is recessed into the building it appears as part of the overall structure. It becomes a secure and semi-private area, providing physical and social comforts similar to those of the porch. Further, the balcony is a place to be used on an upper floor only when it is able to support everyday human experience—ie., providing an area where people can face each other and sit, read, eat and play cards. It seems, then, that the balcony has its own requirements of width and depth. Ideally, the space is large enough to accommodate a table and surrounding chairs. According to Alexander, balconies “manage to gather life to them or to get used” when they are at least six feet deep. In the usable balcony, the form remains close to an upper-level porch, though still derivative from the porch and limited in its direct mediation between inner and outer realms. (Mugerauer 1993, 117-119)

If we consider that, in traditional cities, boundaries were a more direct reflection of the relationship between systems—a physical record of a social relationship, for example—what then does a boundary mean in a contemporary city where the abstract boundary now begins to define the social relationships? If the relationship defined the boundary, how might a boundary define a relationship?

In *The Philosophy of Symbolic Forms*, Ernst Cassirer discusses the importance of boundaries within the city. They are important because they “modulate the distance between self and world” (Cassirer 1957, 98-99). Boundaries are not simply a tool to organize space, but rather are fundamental to it and carry immense significance. Architects, planners, and other city builders have often abstracted boundaries to lines on a page, failing to recognize the life and meaning within them. “The configuration of boundaries has profound significance within the physical landscape, and the interaction between different domains of city life may depend to a great extent on the nature of the interface provided by the configuration of the intervening boundary” (Rashid 1998, 42).

Boundaries inherently contain an ethical relationship. Hannah Arendt, discussing the rise of Christianity, distinguishes between the moral and ethical. Morality becomes an overarching concept as defined by the church. The ethical, on the other hand, is a relationship between two people: people and their actions have an ethical responsibility towards others and the public. Morality as a concept in this sense has consequences for the ethical. As an overarching concept, it effectively removes the ethical responsibility of individuals to each

other and the broader collective. One could be moral if they followed a predefined set of codes, without having to be held accountable for their individual action towards others and the public (Arendt 1958, 44). This had serious implications for the urban boundary. Where boundaries were once defined by an ethical relationship between people and related to context, the new concept of morality removed this immediate responsibility. Instead of developing community, joining people, and ethically defining the city, the boundary now only demarcated their separation (Rashid 1998, 43-44).

The diminishment of the boundary's importance in contemporary cities is reflected in the loss of distinction between the public and private, but more importantly the responsibility of each realm to the other. "Subsequently, all these factors contribute to the loss of a sense of placeness. Seen in this way, it would seem that the ethical structure of the built environment relates directly to the existence and recognition of the importance of the boundary" (Rashid 1998, 44). The boundary, through its careful articulation, provides a critical opportunity to remake them as sites of "ethical responsibility", to redefine them as places where people overlap in various relationships (Rashid 1998, 44).

Rashid echoes Alexander's perspective from a boundary perspective as opposed to a network one. Where Alexander took issue to the overall structure of relationships, Rashid takes issue with the individual relationships between parts: "An over-defined or too-rigidly defined boundary may be as harmful as a lack of boundary. Thus, the concept of zoning in modern planning has often resulted in too-rigidly defined boundaries that have segregated urban life into isolated functions; such boundaries eliminate the possibility of encounter and interaction, which is the basic ingredient of a public life" (Rashid 1998, 47).

Arendt notes the extreme effect of this:

...the reality of the public realm relies on the simultaneous presence of innumerable perspectives and aspects in which the common world presents itself and for which no common measurement or denominator can ever be devised... The end of the common world has come when it is seen only under one aspect and is permitted to present itself in only one perspective. [This could happen] under conditions of mass society or mass hysteria, where we see all people suddenly behave as though they were member of one family, each multiply and prolonging the perspective of his neighbor. In both instances, men have become entirely private, that is, they have been deprived of seeing and hearing others, or being seen and being heard by them. (Arendt 1958, 45)

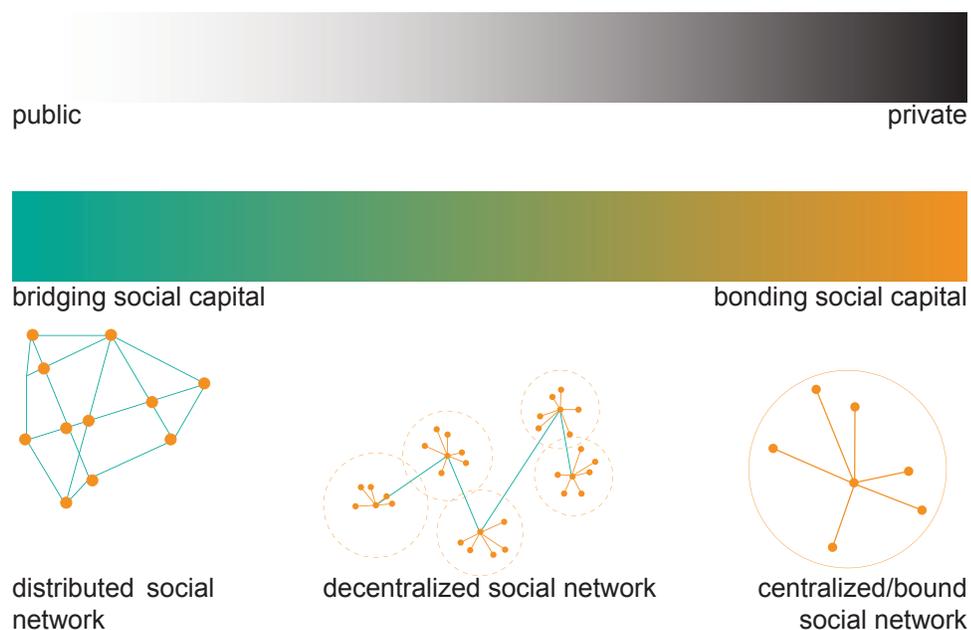
Arendt's statement can be conceived and visualized in terms of the social network

structure inherent in becoming entirely private. The structure is strictly centralized, and entirely bounded. It is closed off entirely from outside influence, and supports Putnam's thesis of increasing bridging social capital as a means of remedying community.

Many architectural strategies arise from this conversation of boundaries. Architectural boundaries and thresholds must be sites where communities are simultaneously defined and interact. This means a "blurriness"; program could be overlapped in shared spaces. The must also provide a venue for personal expression within a broader community.

Sequence

As shown, both bonding and bridging social capital are necessary for healthy communities. Their related networks have different spatial implications. If we imagine the structure of a healthy community, it is made of an intricate distributed network. Scale becomes important. Centralized networks associated with bonding social capital are necessary for families and privacy cannot reflect the broader urban patterns. Similarly, the weaker but more distributed networks that make bridging social capital so important do not create a structure conducive to close ties. The scale of these structures can be likened to the gradient of public to private: a distributed network at a public/urban scale with increasingly centralized networks zooming into private/domestic scales.



The gradient from public to private, corresponding social capital types, and corresponding social network typologies.

If thresholds continually define and redefine coherent communities while acting as the nexus of interaction between them, surely the sequence between these thresholds from public (the city) and the private (the bedroom) is also important. The diagram above suggests a sequence of these thresholds. They define smaller and small communities from public to private and from bridging to bonding social capital. A decentralized network is nested within the larger more complex distributed network and subsequently is composed of smaller centralized or bound networks.

The architectural strategy here is “nested communities”. Communities are nested at various scales along the spectrum of bridging and bonding and public or private. The thresholds placed along this sequence define smaller and smaller communities along a gradient from public to private while encouraging bridging social capital across all scales.

Personal Expression and Sense of Control

Related closely to this sequence is one’s sense of control over their environment along the public to private gradient. The sense of dwelling related to the immediate control over one’s environment cannot be understated (Heidegger 1971, 43). This sense of dwelling and security are inherent precursors for any individual to engage in a broader community (Putnam 2000, 19). The sense of control implied here strongly relates to the sequence of thresholds described above, and the sense of control that different network structures imbue. It is perhaps a major reason why bonding social capital is so much easier to generate than bridging social capital: the sense of control in a centralized social network is far greater than in a decentralized or distributed network.

Two architectural strategies arise from this discussion. Control over one’s environment correlates to the sequences of public (distributed network) to private (centralized network). Thus the architectural strategy is to build in increasingly more control from public to private spaces. The second strategy suggests various ways in which people might control their environment along the sequence itself. As John Habraken remarked in *Supports*,

[...P]ossession is different from property. We may possess something which is not our property, and conversely something may be our property which we do not possess. Property is a legal term, but the idea of possession is deeply rooted in us. In the light of our subject, it is therefore important to realise that possession is inextricably connected with action. To possess something we have to take possession. We have to make it part of ourselves, and it is therefore necessary to reach out for it. To possess something we have to take it in our

hand, touch it, test it, put our stamp on it. Something becomes our possession because we make a sign on it, because we give it our name, or defile it, because it shows traces of our existence. (Habraken 1972, 20)

A traditional example of this is the porch as an in-between space. Discussed in the *Thresholds* section as an example of a threshold where two communities both interact with and are uniquely defined, the porch space also offers a place for a person to exercise control over one's environment, to take *possession* in Habraken's words, and to express oneself within the broader community. Thus the second architectural strategy is to provide varying degrees of opportunity for residents to do this throughout their building and homes.

Stability

Putnam notes two seemingly obvious, but important facts regarding neighbourhood stability. The first is that "residential stability is strongly associated with civic engagement. Recent arrivals in any community are less likely to vote, less likely to have supportive networks of friends and neighbors, less likely to belong to civic organizations." The second is that "homeowners are much more rooted than renters, even holding other social and economic circumstances constant" (Putnam 2000, 204). He shows, however, that rates of mobility have, in fact, declined slightly over the last half decade. Changes in mobility are not responsible for changes in civic engagement and community development (Putnam 2000, 214).

Nonetheless, neighbourhoods that allow people to stay rooted, throughout life's changes, provide more opportunity for community to develop—especially in terms of bridging social capital. Bonding social capital, to a certain degree, can be transplanted. A family can move as an entirety, but the looser connections of bridging social capital need to be rebuilt.

The architectural strategy, then, is adaptability. The design must be flexible and adaptable enough to allow people and families to remain in their homes over the course of changing family structures, ages, income, and other unpredictable events.

Program

The additional program of extended family housing is used for two primary reasons. The first is to explore bridging and bonding social capital, social networks, threshold conditions,

and local control at a smaller, domestic scale. The second is the promotion of diversity in the city—a condition necessary for bridging social capital. Children and the elderly are often absent in high-density urban environments. Weak ties with distant acquaintances across a homogenous community lack the type of social networks representative of bridging social capital, and the diversity inherent in this program addresses this.

The benefits of having all ages in the city are numerous. It can be valuable for children to grow up downtown, valuable for other age groups to have children downtown, and for the city as a whole. Children growing up in the city tend to develop vocabulary and conceptual skills more quickly than those in less stimulating environments. Exposure to a diversity of people—ethnicities, ages, affluence, and ability—and interaction with them, helps children understand compassion, develop tolerance, and understand their ethical responsibilities towards others. Children witnessing the complexity of interrelationships of business, professions, and society in general are more adept at navigating their own futures (Lennard 2014). Louis Kahn famously said “A city is a place where a small boy, as he walks through it, may see something that will tell him what he wants to do his whole life” (Cousins 1981, 140). The exposure to cultural resources such as libraries, theatre, performing arts, museums and art galleries stimulates learning and understanding.

Children living in the city are also an asset to other age groups. Parents working downtown are able to cut commute times. Despite higher housing prices, the ability to remain in the city is often an economic one. The proximity to transit and other amenities reduces the need for owning cars and other large expenses associated with lower density neighbourhoods, offsetting the higher housing costs (Lennard 2014).

In terms of the city as a whole, families stimulate a more diverse economy, requiring access to a greater variety of consumer goods and services. Infrastructure such as parks and play areas that are necessary for families in the city are beneficial to all people. Safety of the city is enhanced for all by ensuring children’s safety. Measures such as traffic calming, wider sidewalks, and architecture that exploits Jane Jacob’s notion of eyes on the street all help to make the city a safer place (Lennard 2014). Brent Toderian, former Chief Planner for the City of Vancouver, referred to children in the city as an ‘indicator

species'. "When kids leave or families with children don't want to come, the canary has stopped singing." (White 2006)

Aging in the city provides the opportunity to live car-free, be close to cultural amenities, and potentially make a return on selling a suburban home and downsizing to an apartment (Schittich and Ebner 2007, 51).

Extended families cover a diverse spectrum of family structures, but are typically understood as "a vertical extension of a core nuclear family to include a third (e.g., grandparents) or even fourth generation" (Farber 2000, 1522). Other structures are possible as well. These families may include aunts, uncles, or non-familial friends. While the structure is often foreign to those brought up in a nuclear family, more and more people are realizing the benefits of this type of household. Vancouver's diverse population includes many immigrant families, many of which are some variation of these family structures.

There are many benefits to the extended family structure. It can allow grandparents to age securely in place while receiving care from their sons or daughters if necessary. It allows children to grow up with their grandparents close by. Parents have the benefit of having other caretakers in the household. As mentioned, there can be an economic advantage as well. If "empty-nesters" are looking to move back into the city, and a young family wishes to stay, the combined incomes can more easily afford a place that can accomplish this. Where the oldest generation might bear the larger economic weight initially, their economic contribution can decrease as the young parents establish themselves financially. The changing nature of family and homes also means that there is often opportunity for rental suites, potentially maximizing the investment (Williamson Chong Architects 2014).

The extended family structures for some immigrant groups has contributed to their settlement in the suburbs or existing ethnic enclaves outside of the downtown core. Prior to 1971, most immigrants tended to settle near the core, primarily East Vancouver. By 2006, however, the immigrant population was largely suburban. These groups tend to be spatially segregated, with large populations of Chinese in Richmond and Indians in Surrey. There are other contributing factors as well. Most notably, changes in Canadian Immigration Law have resulted in a considerably higher average wealth among immigrants moving to the country (Murdie 2008, 6).

The demographics of Greater Vancouver (the City of Vancouver and surrounding cities and suburbs) show the major ethnic groups (by region) that have a higher tendency to live in an extended family structure. East and Southeast Asian (584 895 people/27.88% of total population); South Asian (208 535/8.72%); West Asian (40 145/1.91%); and Latin, Central, and South American (28 575/1.36%) make up the predominant groups that have a tendency towards extended family structures (Statistics Canada 2006). The majority of these extended family structures are patriarchal in their power relations, patrilineal in structure, and patrimonial in economy (Harrell 2002). That is, families are comprised of a progenitor generation, sons and their families, and unmarried daughters that remain in the home until married. Younger sons may choose to leave the home to start their own families. Despite these broad structural similarities, the diversity between families cannot be over emphasized. Furthermore, these structures have not necessarily remained intact since immigration (Heibert 1999, 39).

As a city with diverse groups and ethnicities, Vancouver has had its fair share of racial tension. Some of this been expressed through the city's architecture in the context of family structure. The large wave of Hong Kong Chinese during the 1980s and 1990s created a "volatile debate over monster houses" (Todd 2007). At the time, it was the name given to large homes built by Hong Kong Chinese in historically Anglo communities. "Non-Chinese tended to see the word monster as an apt adjective for the grand size of new homes they thought ugly and out of place; Chinese saw the word as a racist put-down, suggesting that "monsters" lived in such new homes designed to hold multiple generations (Todd 2007).

An interesting difference emerges between Mainland Chinese and Hong Kong Chinese family structures living in Vancouver. The extended family common throughout China are represented in Vancouver almost exclusively by Hong Kong immigrants. Citizens of Hong Kong and Macau may hold dual citizenship whereas it is not permitted for those from outside of the Special Administrative Region. This allowed entire families from Hong Kong to immigrate while maintaining their Chinese citizenship. Those families in Vancouver from Mainland China, however, are typically comprised of a mother and children while the father remains in China to maintain citizenship (Todd 2007).

Critical Position

High-Density urban environments provide an inherent opportunity to exploit the type of bridging social capital that is so difficult to create, but so critical to the successful development of communities. Many of the current architectural typologies found in high-density urban environments continue to over-emphasize the physical structures that encourage only bonding social capital and its related social networks. If the densification of cities is to occur in a beneficial way, the physical environment must balance both bonding and bridging social capital. These two ends of the social capital spectrum have identifiable spatial and architectural structures. Architecture is in a unique position to encourage bonding social capital in positive manner, better exploit bridging social capital, and balance them in a way that constructs stronger, healthier, and more successful communities.

Thesis Question

How can the design of a high-density, mixed-use residential building encourage a more productive balance between bonding and bridging social capital?

CHAPTER 2: DESIGN

This section begins by reiterating the architectural strategies developed in the introduction to address the theoretical issues discussed in the opening section. It moves on to a discussion of site, site selection, and climate before applying the architectural strategies to the design of a residential structure.

Architectural Strategies: A Framework for Design

The discussion above lets us begin to answer the question of what architectural strategies can be employed to encourage community in high-density, urban housing. This question was further broken down into asking how bridging and bonding social capital, as mechanisms of community development, could be balanced and positively exploited. These ends of the social capital spectrum led an understanding of how social and physical networks interact and affect each other; how threshold conditions can become both sites of interaction between systems and definers of coherent communities; how a sequence of thresholds from public to private becomes important to a sense of control over ones environment, and finally, how built in stability and adaptability could permit the time required for community to emerge. The additional program of extended family housing was discussed to allow for an investigation into smaller scales of community development. Architectural Strategies are drawn from the conclusions above.

To begin to answer the “Thesis Question,” the conclusions reached in the “Introduction” suggest an architecture that accomplishes the following:

- Promotes Bridging Social Capital between neighbours, the overall building, and the community beyond.
- Uses architectural thresholds as a way to both define distinct communities while promoting their interaction.
- Establishes an appropriate gradient from the public spaces of the city to the private spaces of the home.
- Allows for personal expression in a community context.
- Is flexible and adaptable enough for a number of family structures, lifestyles and life changes.

The architectural strategies that correlate to the above list and other considerations that are applied to the design are as follows:

- **Highly Networked:** The building must connect as much as possible the residents to each other and the community in an effort to promote bridging social capital. These networks must pay attention to scale, utilizing a distributed network type to promote bridging social capital at building scales, while understanding when to use bounded networks to allow bonding social capital.
- **Threshold Expression:** Thresholds are sites that define communities and promote their interaction. Close attention to their articulation should take into account the particular communities involved and what kind of interaction is appropriate.
- **Nested Communities:** The sequence and type of thresholds should create increasingly smaller communities as one moves from public to private/bridging to bonding/or distributed to bounded.
- **Control and Expression:** The sequence should allow for increasingly more control over one's environment along the gradient from public to private. The architecture should provide appropriate opportunity along this sequence.
- **Adaptability:** The architecture provides opportunities for suites to change, expand, or contract given life changes or changing family structures.
- **Diversity:** The type and size of units must be varied enough to promote a wide array of people from varying socio-economic backgrounds, ethnicities, and ages.
- **Site Selection:** The location must be in a high-density urban environment. The neighbourhood should provide amenities that are appropriate to the program, supporting people of all-ages. It should also be a site where the design can attempt to promote community development at a neighbourhood scale.

This list of Architectural Strategies sets out a framework for design. The following section applies this framework.

Design: Architectural Strategies Applied to Site and Circumstance

The design attempts to best negotiate the above requirements and strategies in order to answer the thesis question through the design. It first describes site and site selection and then is organized by the features that utilize the strategies, generally in scale from urban to building to detail.

Site and Climate

Selection

A lack of child and senior related infrastructure in high-density neighbourhoods continues to deter families and seniors from living in high-density neighbourhoods. Site selection is therefore an important factor. Close proximity to urban amenities and infrastructure that support all ages, genders, and ethnicities was necessary. Specifically, access to a variety of modes of transportation, education of all levels, employment, health-care facilities, cultural amenities, and green space are identified as primary drivers of site selection.



Site map: Downtown Vancouver (City of Vancouver Open Data Catalogue, 2014)

Transportation

Access to a variety of modes of transportation is critical to the program and site selection. Children need to be able to walk to school, adults need easy access to employment, and seniors need to be able to move easily around the area without using a car.

There is a robust transportation infrastructure around the site. Most day-to-day activities including work, school, and grocery shopping are within a five to ten minute walking

distance. The Stadium Skytrain Station on the Expo/Millennium Line is located one block away at Dunsmuir Street and Beatty Street. The Skytrain is an automated light-rail system that comprehensively serves the City, airport, and many of the surrounding suburbs such as Burnaby, Surrey, Richmond, New Westminster, and Coquitlam. The Skytrain converges at Waterfront Station on the edge of Gastown, linking it with other Skytrain lines, Seabus, and West Coast Express. The West Coast Express is a heavy rail commuter train that services Downtown, Port Moody, Coquitlam, Port Coquitlam, Port Moody, Pitt Meadows, and Mission. The Seabus crosses Burrard Inlet, connecting North Vancouver's downtown area, Lonsdale, with Vancouver. A proposed streetcar could service in the area in the future, connecting Gastown to False Creek and Granville Island. Bus service throughout the area is ubiquitous.

In addition to transit, there are many car share services in the city. Car2Go, Evo, and Zipcar are the most common, offering complimentary and competing services. Both have dedicated parking throughout the area. Car2Go and Evo are both app-based reserving/locating system designed for short point-to-point trips. Zipcar is a round-trip service that provides a variety of vehicles and sizes for different purposes. The building's parking garage has dedicated spaces for these services.

Bicycle infrastructure is becoming more prevalent throughout the city. Most streets, including Beatty, have designated bicycle lanes, while others, such as Dunsmuir, form part of a larger, separated cycling network. This system is constantly expanding. Currently separated Lanes run along Dunsmuir and Howe Streets, the Burrard Street Bridge, and along Cornwall, effectively linking the University of British Columbia's (UBC) main Campus to the downtown core. Plans for separated lanes on Hemlock Street and across the Granville Street Bridge are being implemented. Furthermore, a bicycle sharing similar to Bixi in Montreal is anticipated in the near future.

Education

Access to education was also a major driver in site selection. Children should be able to walk and cycle safely to both elementary and high-school. A variety of post-secondary education institutions must be available nearby, offering programs for all ages.

Most significantly, International Village Elementary School will be the first new elementary school within Vancouver in many years. It is located only a few blocks from the site on Expo Boulevard between Abbott and Carrall Streets. Importantly, there are safe walking routes from the site to the school on quiet streets, occasionally separated from traffic. King George Secondary School serves the downtown core's high-school students. It is located at Barclay and Denman Streets in the West End, less than three kilometres away. A second elementary school, Elsie Roy Elementary, is located less than a kilometre away in Yaletown.

The area boasts numerous post-secondary institutions as well. Simon Fraser University's (SFU) downtown campuses are located Harbour Centre and the Woodward's Development, both within a few minutes walking distance. The University of British Columbia's Downtown Campus is located in Robson Square, approximately a ten minute walk away. The Vancouver Community College (VCC) is across Cambie Street from the site, offering continuing education, culinary arts programs, language classes, and trade schools. Finally, the Vancouver Film School (VFS) has multiple locations throughout Gastown. Emily Carr Institute of Art and Design, currently located on Granville Island, will for part of a large, multi-institution campus on Great Northern Way and Main Street. It is two stops on the Skytrain away from the site.

Healthcare

Healthcare is important during all phases of life, but is particularly acute for children and seniors. The types of facilities available are also important. Emergency care must be close by, and long-term care facilities must be within an easy visiting distance.

There is immediate access to two major hospitals: St. Paul's Hospital at Burrard St and Vancouver General Hospital at Oak St and 12th Ave. They are located two and three kilometres from the site, respectively. BC Children's Hospital is approximately five kilometres away at Oak St and 28th Ave.

Additionally, the Provincial government has announced that St. Paul's Hospital will shortly be receiving on site upgrades as well as an additional facility that will be located on False Creek flats less than a kilometre from the site.

Employment

Employment opportunities are abundant in the downtown core. They are perhaps the best way for people to benefit from proximity and remove an arduous commute and its related expenses. The site is in an area where parents could walk their children to school and then continue themselves to work.

Importantly, there is both a wide variety of employment and employment for all ages. Large number of restaurants and other service industry offers positions for younger people, and the Central Business District has all manner of jobs found in any major city. Gastown has a burgeoning tech and creative industry, and the Port offers opportunity for skilled trades and other industrial jobs.

Culture

Cultural amenities are one of the primary draws of urban living. The opportunity for young families to experience the arts is important. Access to these cultural amenities for retirees and empty nesters is one of the primary draws of urban life. There are a plethora of restaurants, major and minor art galleries, theatres, and professional sporting venues all within easy walking distance.

The Vancouver Art Gallery (VAG) currently resides the former Vancouver Courthouse at Robson and Howe Streets. In 2020, the VAG will move to a new, purpose-built facility designed by Herzog and de Meuron at Dunsmuir and Cambie Streets, only one block away from the site. Other small galleries are spread through Gastown and Chinatown, most notably the Rennie Collection at Wing Sang.

Major theatre facilities can be found in the immediate are. The Queen Elizabeth Theatre located three blocks away at Dunsmuir and Cambie Streets hosts opera, Broadway, music, presentations, and various other shows. At SFU Woodward's, the Goldcorp Centre for the Performing Arts and Fei and Milton Wong Experimental Theatre supports SFU's performing arts program and other performances.

Rogers Arena and BC Place play host to the Vancouver Canucks (NHL), Vancouver Whitecaps (MLS), and the BC Lions (CFL), and a variety of events and concerts. They are

both located within blocks of the site.

Libraries can be found at each University location, as well as The Vancouver Public Library's Central Branch at Robson and Homer Streets.

Parks

Access to green space and athletic facilities is critical to all ages. The site location offers access to a variety of these, many of which are tailored to specific ages and uses, and others that are more general purpose.

Victory Square is located across Cambie and Pender Streets from the site. It is a small, block-sized park offering general, day-to-day green space. In the midst of many offices and schools, it is a typical meeting spot for lunches and other unprogrammed uses. Its namesake war memorial sits at the park's northeast corner and plays hosts to numerous observances throughout the year, punctuated by a larger Remembrance Day parade and Ceremony.

Andy Livingstone Park offers both programmed athletic spaces and unprogrammed green space. It contains two all season soccer/baseball fields and tennis courts. International Village Elementary School will join with this park at its western edge and utilize its facilities when complete. A variety of soccer, football, baseball, and field hockey clubs and leagues operate on both the courts and fields.

To the east of Andy Livingstone Park and underneath the Georgia/Dunsmuir Viaducts is Vancouver Skate Plaza. One of the few covered skateboard/BMX parks in the city, it is a year round destination for these sports.

The Dr. Sun Yat-Sen Classical Chinese Garden is located on Pender Street, two blocks east of the site. It is divided into a free park and a pay-to-enter garden. The park is a City of Vancouver park whereas the Garden is operated by a non-profit group that provides programming and activities for tourists and school groups.

Portside Park is located on the western edge of the Vancouver Ports next to Waterfront Station. It offers large open expanses, dog-walking and off-leash areas, children's play

areas, and a large dock extending into Burrard Inlet.

When it begins to be developed in the next five to ten years, Northeast False Creek will also have some large waterfront parks.

The site is at unique confluence of amenities and program that support the program under investigation.

Climate

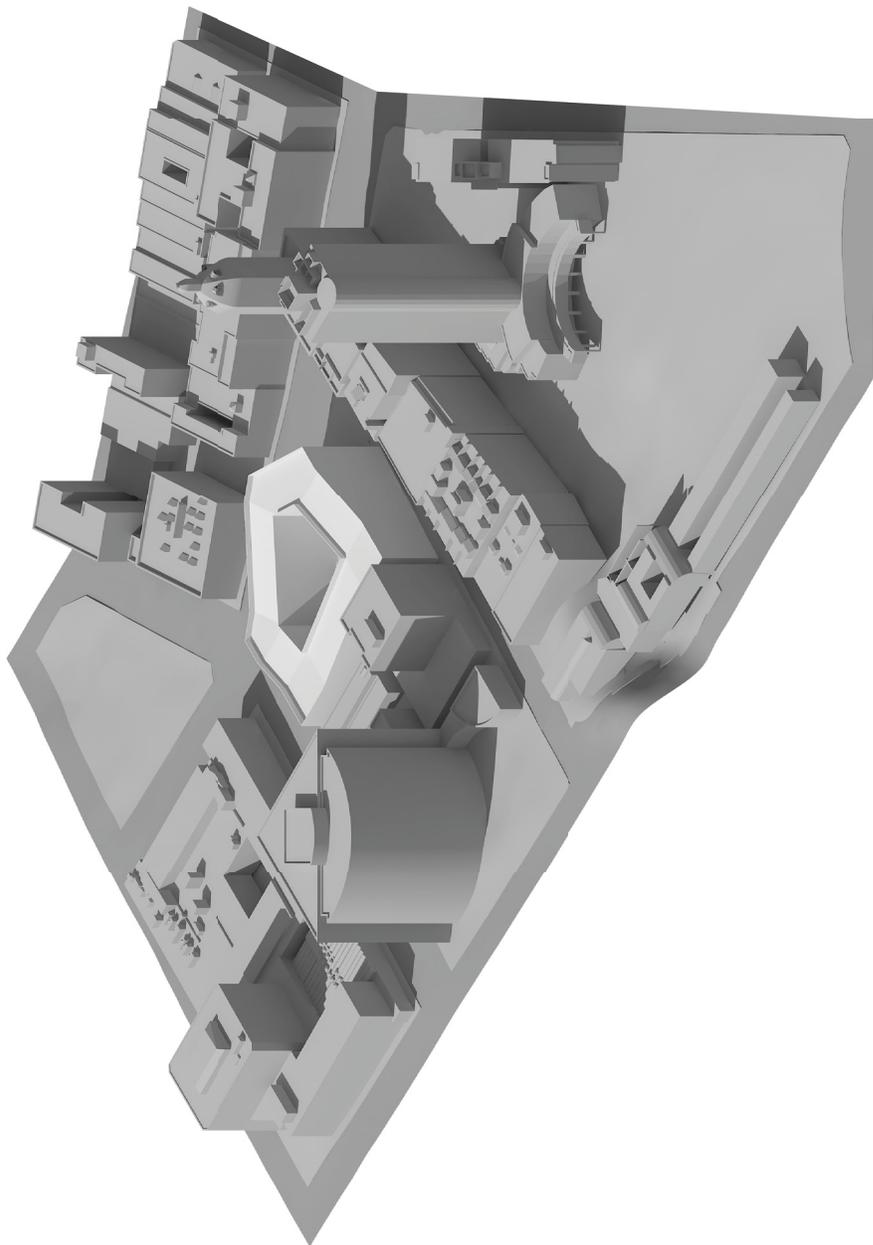
The building must maximize light in Vancouver's gray, wet, northern, and coastal environment. Whenever possible, light and ventilation from two sides should be made available.

Building Design

Typology and Overall Form

The building uses a large courtyard typology that ranges from three to eight storeys tall. The height is limited due to heritage district regulations and important historical buildings immediately nearby. The courtyard is the first in a series of thresholds and spaces that mediate between the city and the private as discussed in the *Sequence* section. Open to the public, it has four major entrances. Commercial spaces at the ground level are glazed on the street and courtyard side and service spaces oriented to allow clear views through the commercial spaces into the courtyard. An atrium on the courtyard side allows cafes, stores, and other uses to spill out into the courtyard. The courtyard itself overlaps various programs, containing a play area for children, planted spaces, and many social seating areas. Portals look down into the parking area below the courtyard providing views and natural light to the program below such as bike storage and maintenance, and shared workshop providing tools to the building residents.

The overall building form rises from the southwest to northeast to maximize the amount of daylight the courtyard receives. The sloping roof offers opportunity for further program such as shared spaces and small plots for growing vegetables. It intersects the circulation at most floors, providing a means of networking between floors. In plan the building takes the shape of the roughly triangular site.



Massing in context.



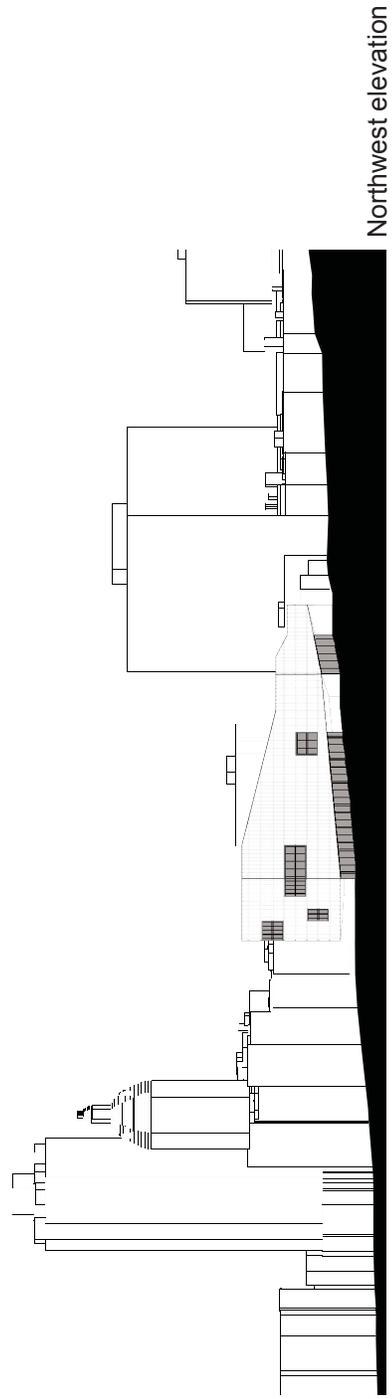
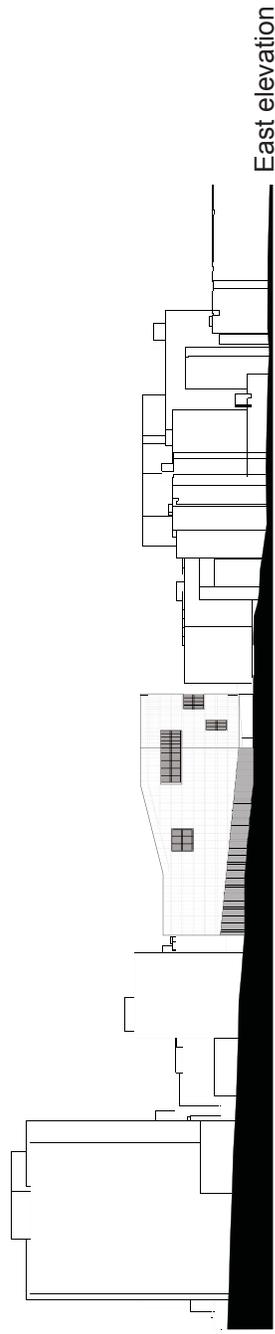
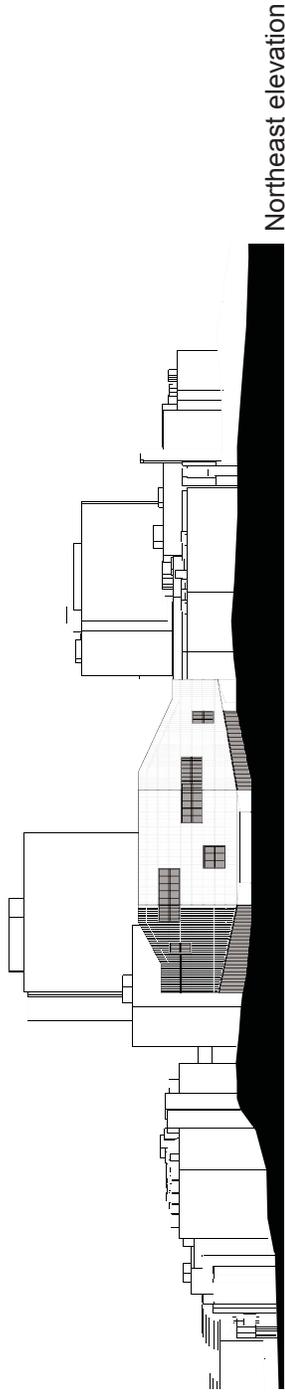
Northwest corner looking southeast from Victory Square



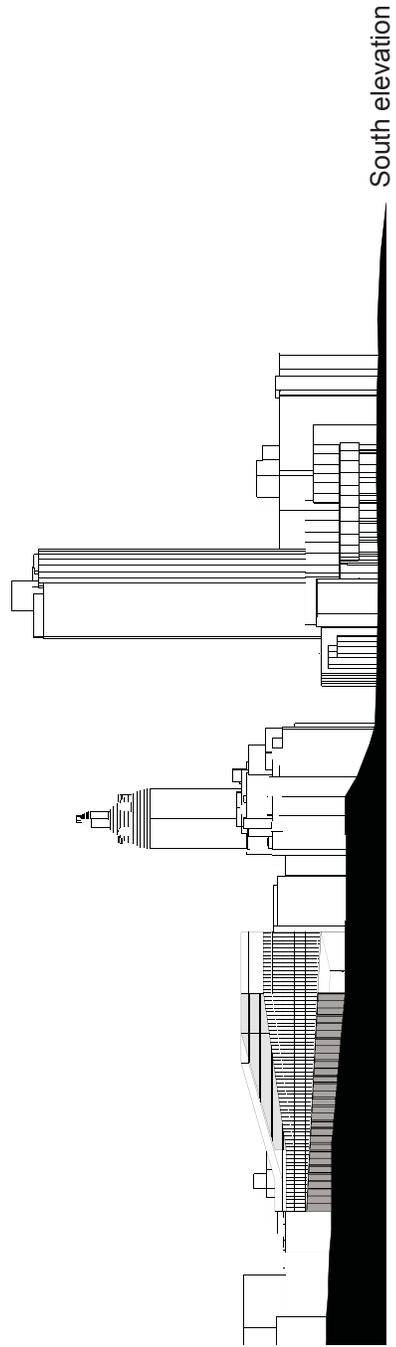
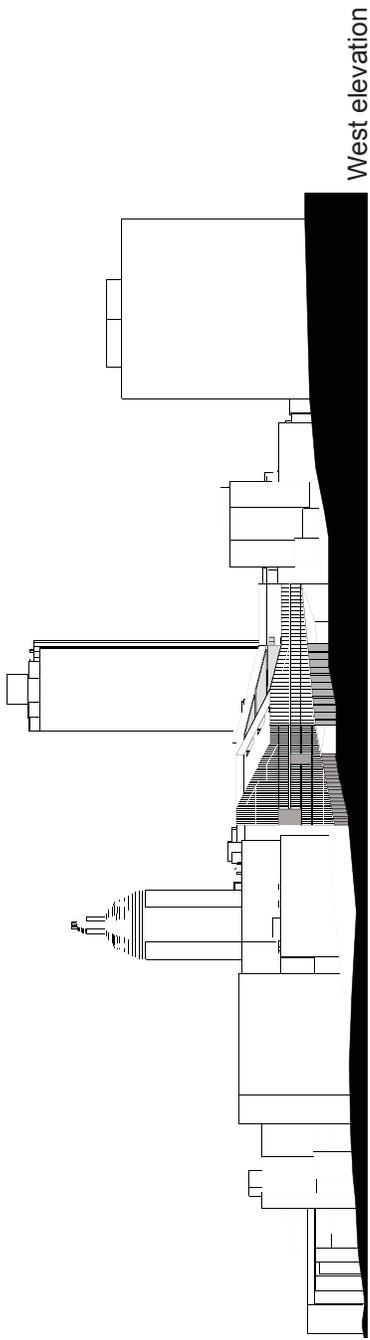
East facade looking north along Beatty Street



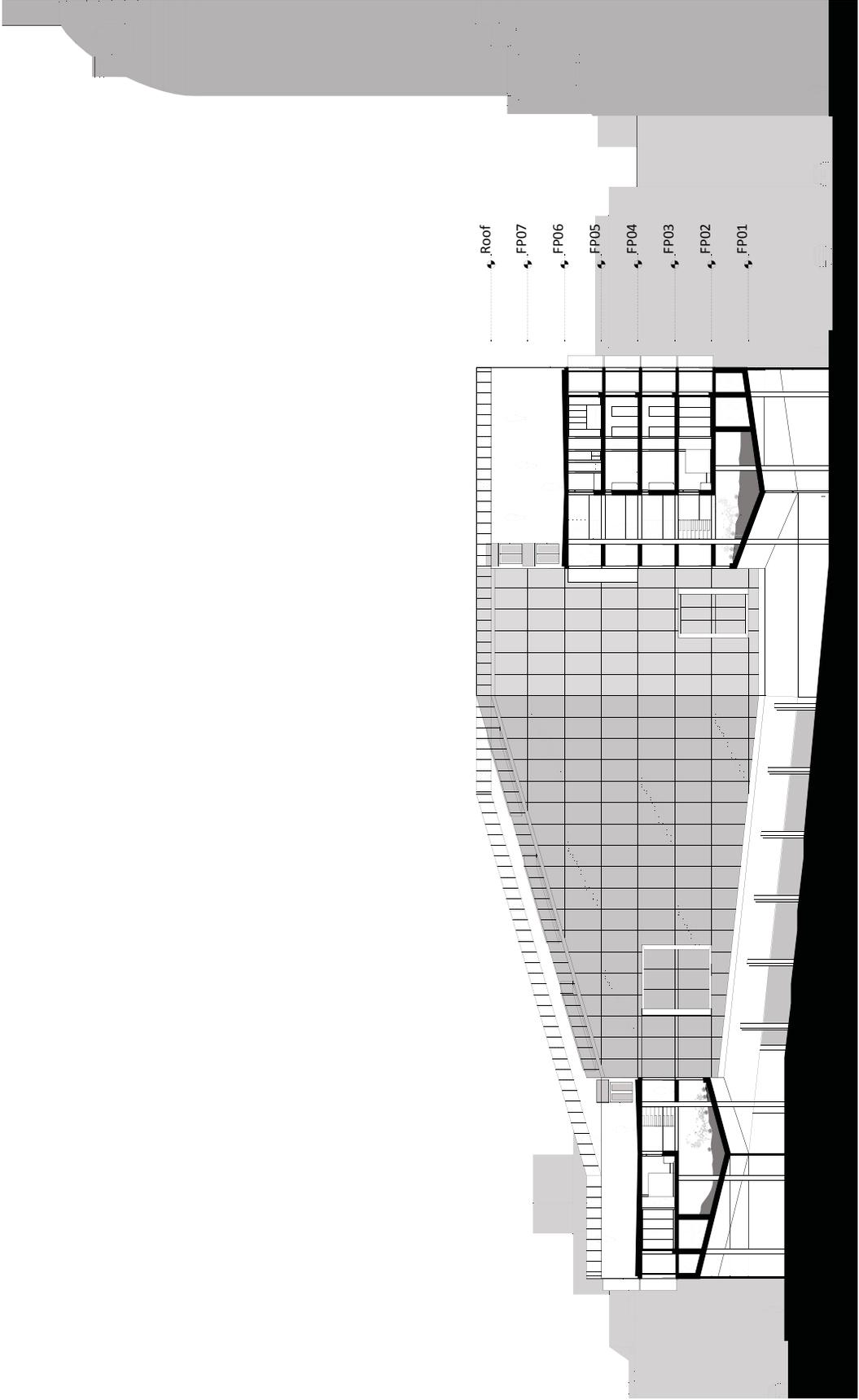
Main courtyard entry at Beauty and Pender Streets



Elevations in context. 1:1000



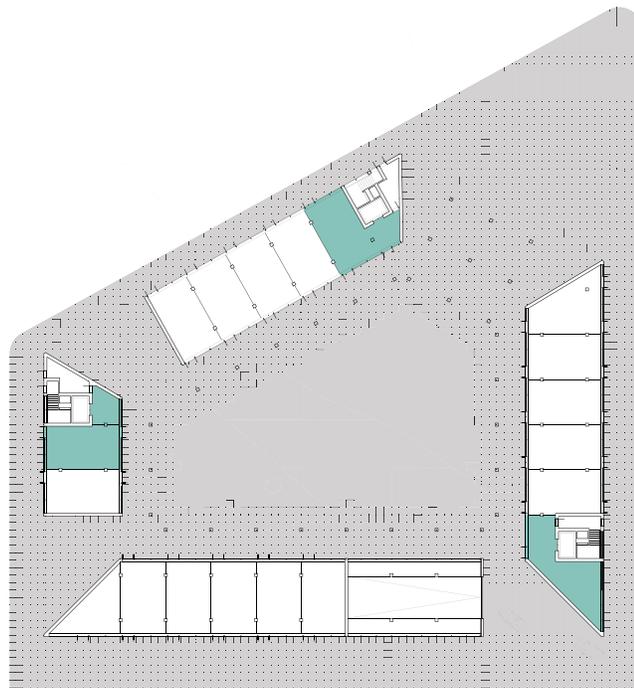
Elevations in context. 1:1000



Cross Section. 1:500

Lobbies

There are three lobbies located at the three elevator cores within the building. These spaces are treated as a threshold that provide a prime location to define the building communities while allowing them to overlap with the neighbourhood beyond. Instead of a traditional lobby that offers a degree of security, mail, a concierge, and small waiting area; these lobbies are overlaid with commercial program such as a coffee shop. Actual security is still provided at the elevator, and a resident only seating section near the elevator is behind the concierge desk. Mailboxes are located in the main area and treated like “dropboxes” allowing anyone to deliver something. They also offer a small opportunity for personal expression, designed to have their exterior doors modified or decorated. Whereas the ground floor commercial spaces open to both the street and the courtyard, the lobby spaces open only to the court (except for emergency egress) to ensure a sequence from the city to the courtyard to the lobby space. Furthermore, the three lobbies provide an opportunity to subdivide the building into smaller, related communities, with different street addresses.



Lobby locations in Ground Floor Plan 1:1000



Southeast lobby looking through to Beatty Street, the courtyard, and resident area



Collage of social interaction of lobby space. The lobby layers community program such as a cafeteria with the typical lobby elements of a building, purposefully overlapping the building and neighbourhood communities



Collage of social interaction of lobby space. The lobby layers community program such as a cafeteria with the typical lobby elements of a building, purposefully overlapping the building and neighbourhood communities

Circulation

The interior circulation of the building forms an atrium facing the courtyard. It provides a semi-private link between the public space of the courtyard and the private space of the homes. It is formed by bridges set off of the units by four metres and open to a garden below, allowing for windows on all units on the atrium side as well as the city side. It, in essence, creates a front yard and porch, a space between the circulation street and the home.

Elevators open into small waiting areas, often next to the additional program described in the following section. Seating and lingering areas are implemented wherever possible. The circulation as a desirable place—suspended above a garden and looking out to the courtyard and city beyond—is designed to be used not simply as infrastructure, but as a place to be.

This atrium forms one of the most important elements of the building: the interface between private units and the rest of the building. Walkways are spaced furthest from the units with a layer of climbing vegetation and trellis providing the initial screen between the most public part of the atrium. Stairs with small auditorium seating link each floor and provide a further layer of separation between the main circulation and the units. A second trellis and climbing vegetation on the unit side for another screen. Tall bamboo growing from the atrium floor will eventually provide a third green screen between the trellises. These two trellises define a porch space consisting of a bridge, bench, and planters from each unit to the circulation. These spaces are highly customizable allowing for a degree of control and personal expression where each unit engages the broader building community. This degree of expression can often be as simple as saying “my house is the one with the red door” or “my house has all the rhododendrons on the patio”.

The following images and drawings highlight the critical conditions, showing how this boundary space is mediated through a “blurry boundary” between units and circulation, and how this encourages a more productive balance between bridging and bonding social capital.



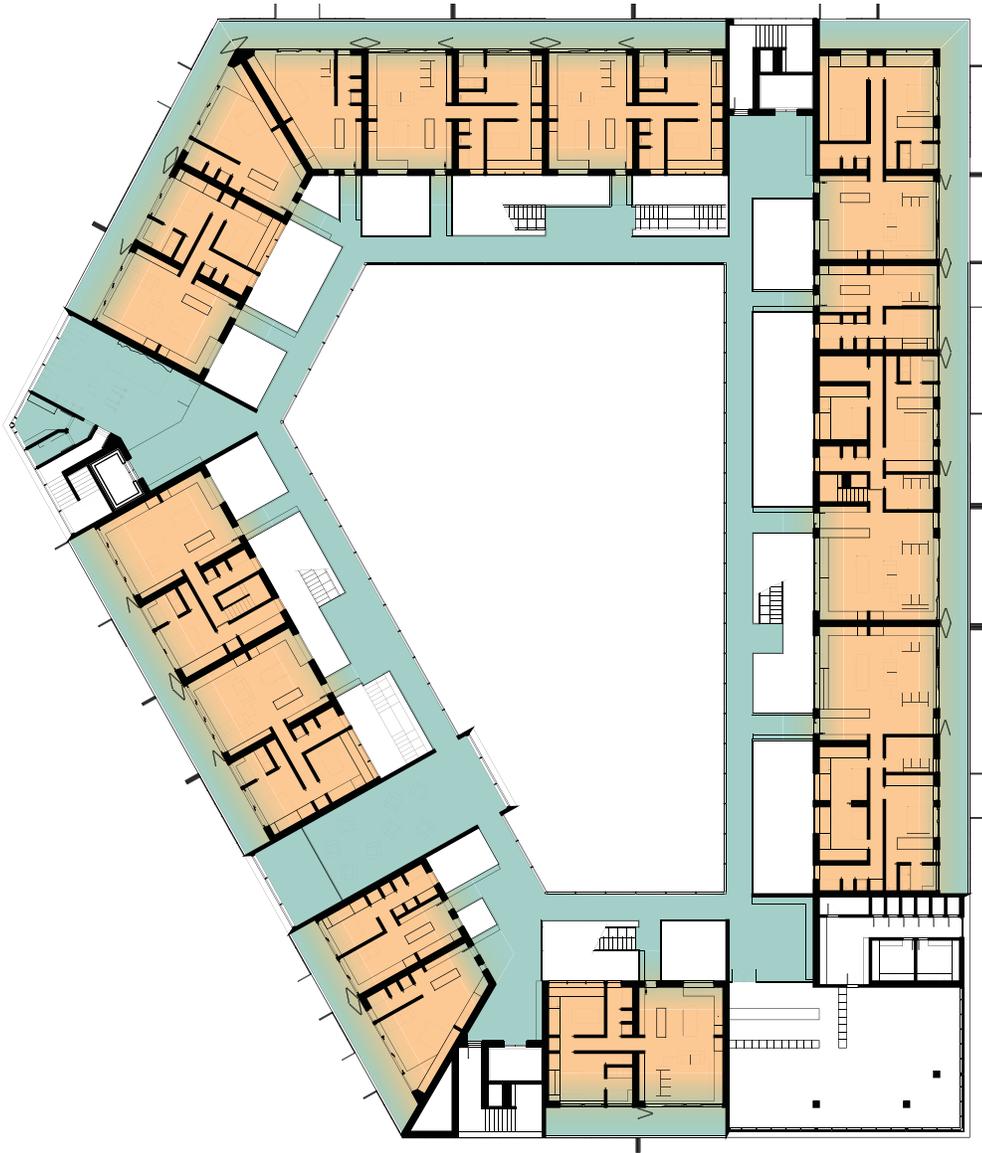
Atrium space looking out to courtyard and towards units



Atrium space looking towards program and units



Collage of social interaction in the atrium space showing how bridging and bonding social capital may be reinforced



Gradient map of bonding versus bridging social capital. Blue represents bridging, orange bonding. Not the blurriness created at important boundaries throughout the atrium and balconies. 1:500



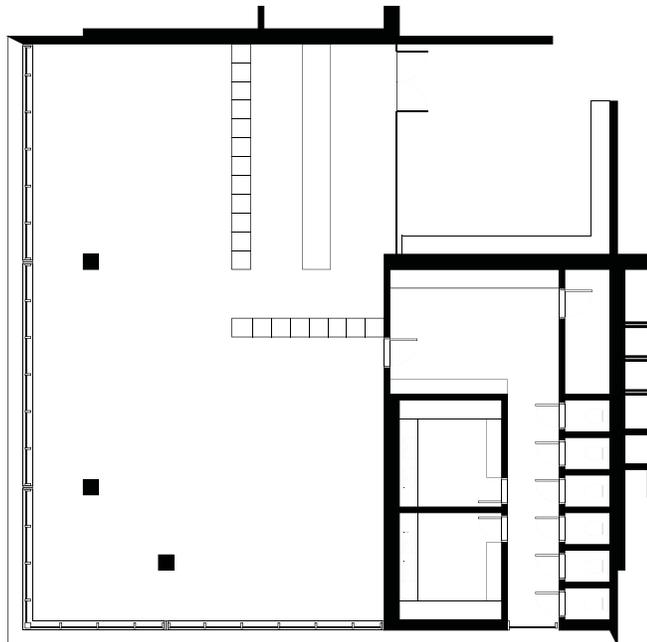
Section through one floor of the atrium, units, and balcony highlighting the architectural features mediating the boundary space between unit and circulation and unit and city. 1:80

Additional Program

The building introduces additional program as a means to both increase the physical network of the building and provide various social opportunities at a building scale. This additional program is scattered throughout the building. Each space is two-storeys high and intersects the circulation atrium, allowing this mixture of program to spill out into other areas. The scattering of program is designed to provide further opportunity for chance run-ins of the bridging kind.

Daycare/After School Care

A daycare is provided in support of the family programming. Careful attention is paid to the entry. Where it meets the circulation, there is a seating area outside of the secure glass entry. The entry features a lobby space with cubbies and storage that allow light through, but obfuscate views. The children's spaces inside are organized around the large, fully glazed corner. Bathrooms are broken up into gender neutral stalls with gender specific change rooms and sinks. Open storage spaces for children are also provided.



Daycare. 1:200

Farm

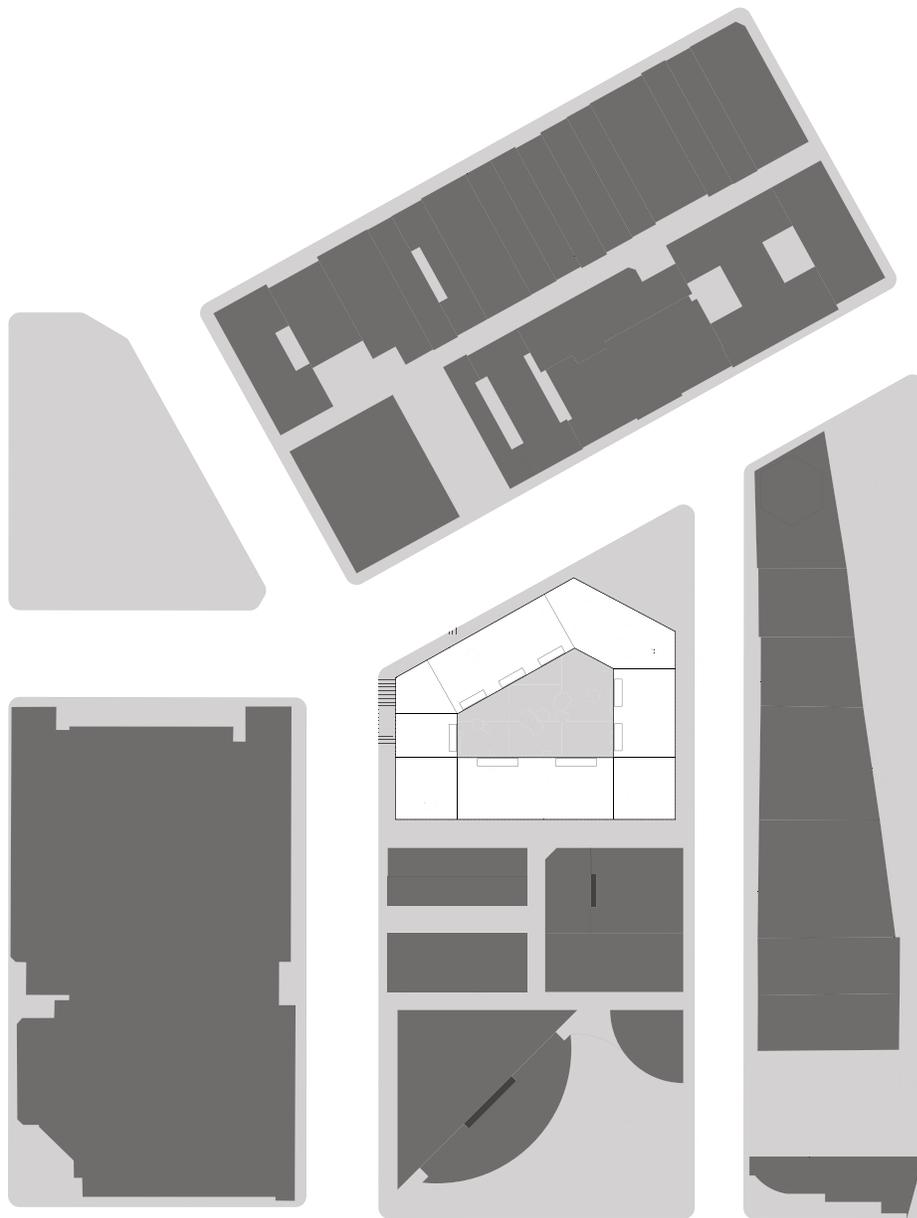
The building provides small allotments for farming and gardening on the rooftop. It is situated so that it receives as much sunlight as possible. Urban farming has become more popular in recent years, with many people in Vancouver having small allotments organized by the City on underused property such as the CP rail line.

The farm, combined with after school cares also provided in the building provide an invaluable opportunity for children to learn about food production. It provides an opportunity for all ages to engage in an activity together—the community-building

In January 2013 the City of Vancouver published its first Food Strategy. It is a document that outlines continuing goals of food production, access, knowledge, and recycling throughout the city. A small allotment garden begins to address these goals at high-density.



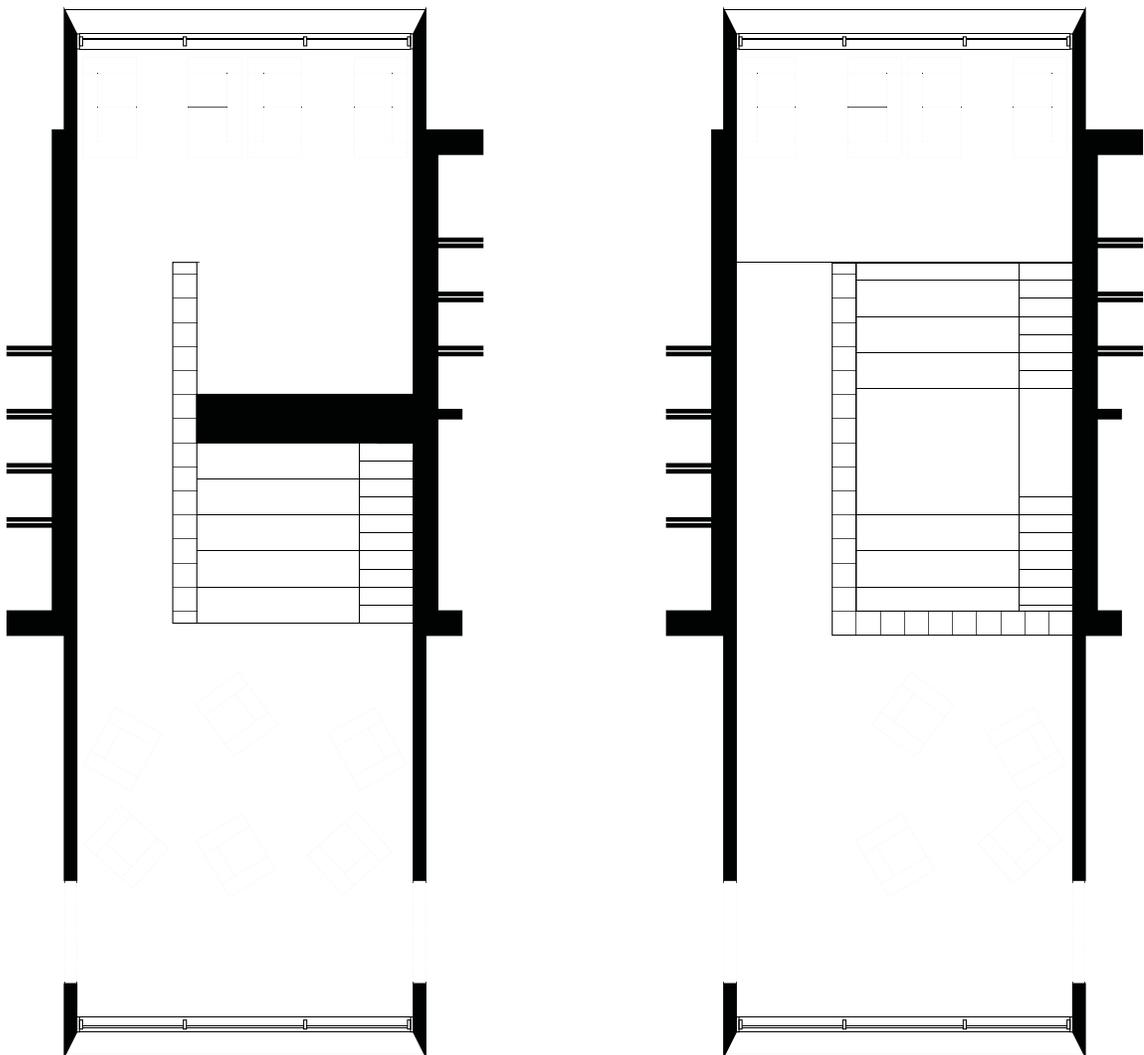
The rooftop farm and variety of loosely programmed activities available.



The rooftop farm in context. 1:2000

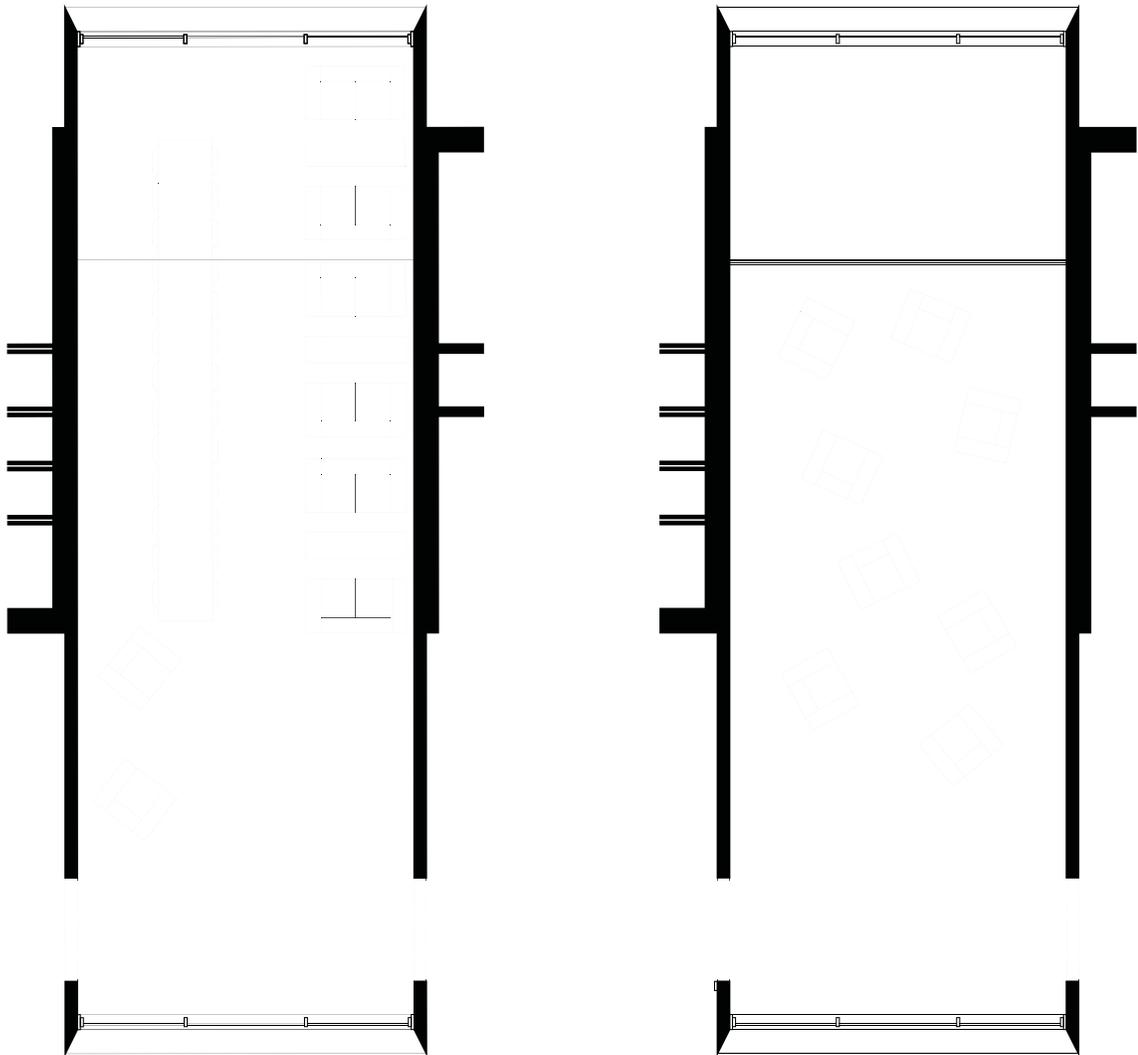
Library

The library provides a place for a community book drop as well as both quiet and social reading areas. The double-height space uses large auditorium style seating to bridge the two floors, adding more connection to the building network. More social spaces are oriented towards and overlap with the circulation while quieter spaces are oriented towards the large, north facing glazing.



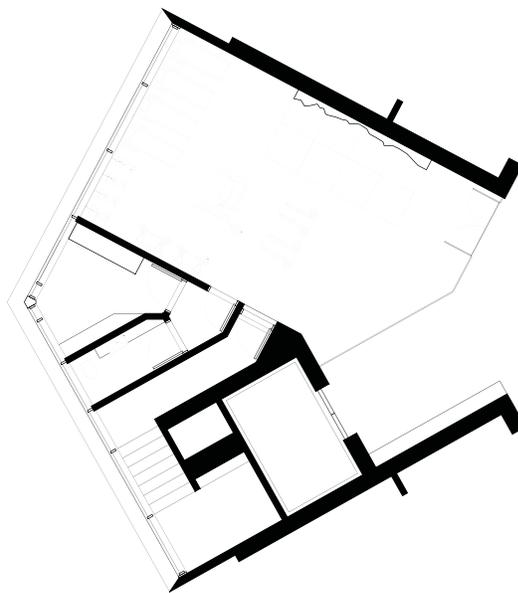
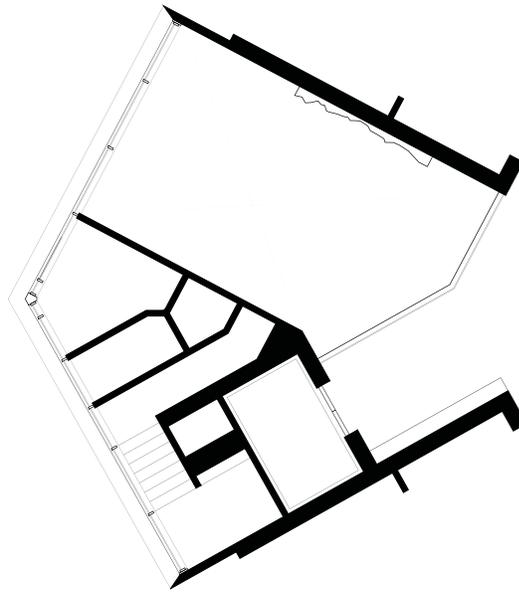
Workspace

Distinct from the quiet area and library, the workspace provides an area for meeting and other social work. It has bookable rooms for private meetings at designated times and other sociable areas for children to do homework together. Similarly to the Library, more social spaces are oriented towards the circulation.



Gym

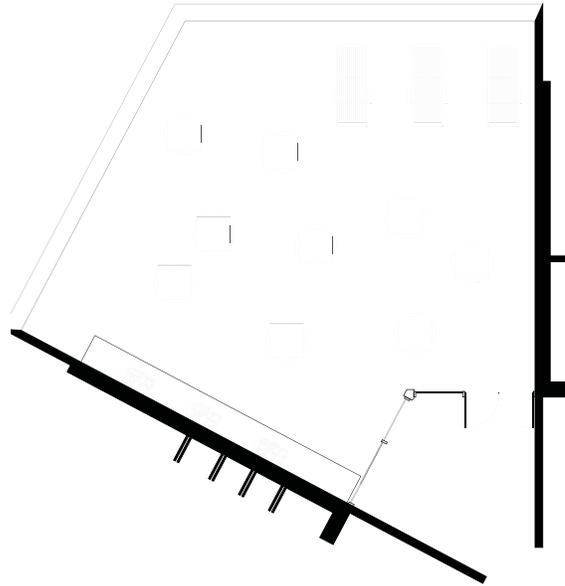
The gym utilizes its double-height space by incorporating a large climbing wall. It is oriented towards the northeast with large, full-height glazing that is the same exterior expression as the other additional programs. It offers large views from the inside-out, but is high enough from the ground to remain semi-private. Views from the circulation are available, but brief.



Gym. 1:200

Clubhouse

Lastly, the upper floor contains a large, relatively unprogrammed space for social gatherings or just relaxing. It is outfitted with lounge furniture, a large outdoor space, and cooking, cleaning, barbequing, and dining facilities



Clubhouse 1:200

Housing Units

Largely, the units are organized along a similar gradient of public to private that the overall building employs—understanding that there are sub-communities within the family unit. “Porches” from the circulation open into an entry space next to the kitchen and dining areas. The living spaces are oriented to the city side and balconies. Typically private rooms such as bathrooms are pulled apart into their component parts: washing, bathing, and the toilet and reconfigured into the private spaces that better represent the micro-communities in the household. For example, the master-suites have a separate washing room, bathing room, and toilet; allowing the toilet to be completely private, the sinks and bathing areas shared. Similarly in children’s bedrooms, there is a workspace and a sink and mirror, while the bathroom itself contains separated toilet and bathing areas. The threshold between the home and circulation offers brief views in and out, with operable

shades on the interior for complete privacy if necessary. This blurry threshold balances mixing communities (families and other residents) with security and control while providing opportunities through planters on the porch for personal expression in more public areas.

There are four main unit types: a 500 square-foot one bedroom, one bathroom unit; a 1000 square foot two bedroom, two bathroom, a 1500 square foot three bedroom, two bathroom; and a 1500 square foot three bedroom, two bathroom plus 1000 square foot one bedroom and one bathroom granny suite above. The granny suite has a separate entrance, but is connected via a staircase to the main unit.

Porches

The typology of a porch—as an in between space—has all but disappeared at high-density. There are a series of related strategies used to successfully reinterpret the traditional porch in a high-density environment. The first is a distanced, but internal circulation system, overlaid with manifold, but ambiguous programming such as networking stairs featuring auditorium seating and sweeping views of the courtyard, city, and southwesterly light. This is combined with carefully articulated glazing looking out of the most public places of the home. These windows are framed by large metal frame protruding into the circulation space, blocking views from outside in, while allowing views from the kitchen to circulation. Planters in these frames provide a small growing area for herbs and spices or taller plants if another degree of privacy is wanted. Finally, the seating on the unit bridge provides a social lingering space. Further, it adds a third-dimension of eyes on the street, where most units are able to view circulation above and below while having views to the courtyard and the goings-on in this semi-public space.

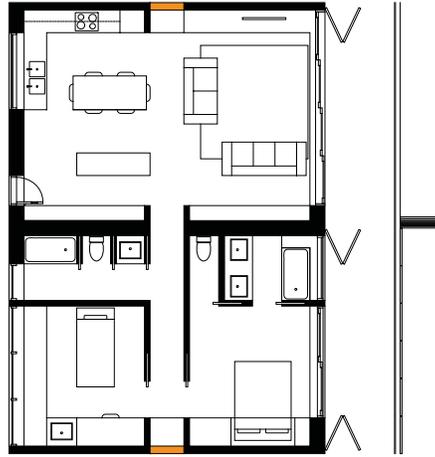
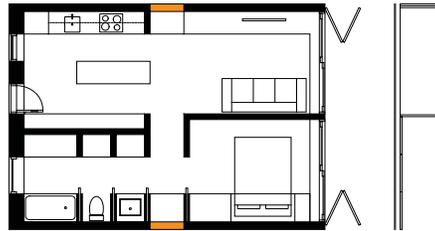
Balconies

By single-loading the building around the courtyard circulation atrium, every unit has a similar opportunity on the city side for a large—two metre deep—balcony spanning the entire length of the home. It provides enough space for public and social uses such as cooking and eating, while providing a semi-public space that allows more private spaces such as bedrooms, baths, and showers an abundance of natural light to remain private. Balconies play an important role in the building and neighbourhood. At high-densities, instead of being a porch space, balconies become distanced from the public space below.

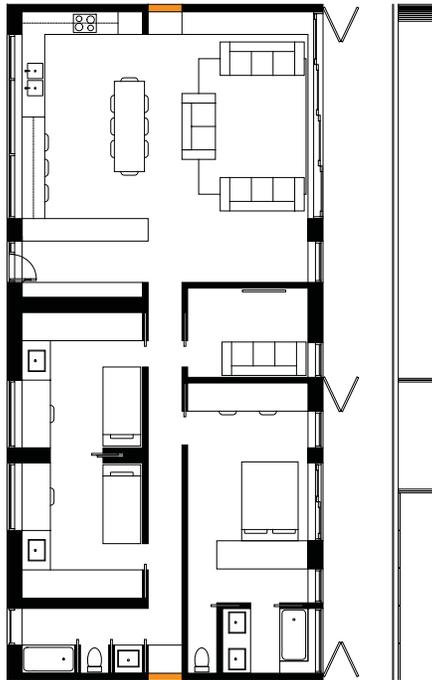
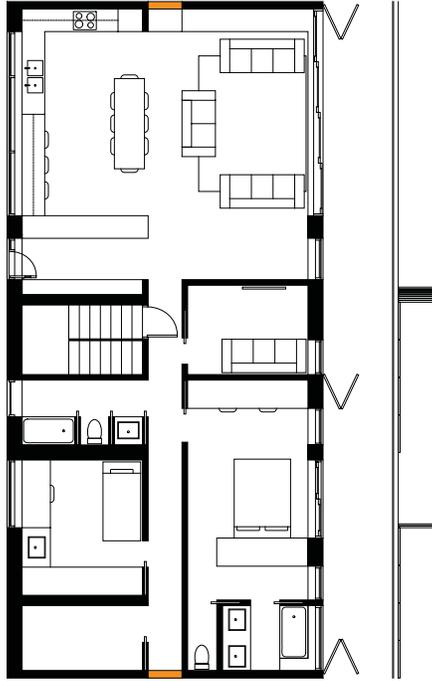
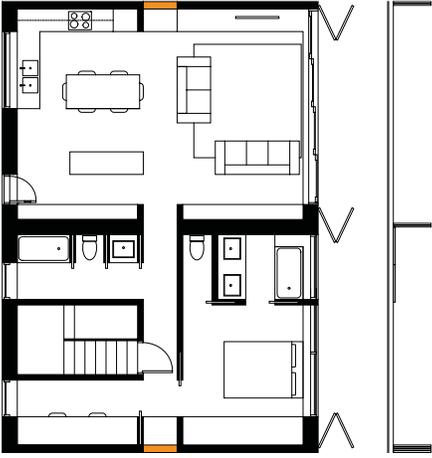
To maintain them as an intermediate space, semi-private, and belonging to both the inside and outside, they are set into the building, not simply tacked on. The depth is critical here as well, not simply in terms of being usable for residents, but as a space for the life of the building to be seen from the street level (Mugerauer 1993, 117).

Beyond being socially non-distancing with the street, their recession into the building form provides an additional opportunity for a relational threshold between immediate neighbours. Functionally similar to a shared hotel room with two locked doors operated from each respective room, the operable shutters defining the exterior of the building allow neighbours to fully open each other's home to each other via the balcony. The threshold condition represents one that is appropriate at this scale—largely private (at least between homes)—while offering opportunity for immediate bridging social capital. It is designed as a “two neighbours talking across their fence” condition. The threshold is inherently more private than a porch condition, sharing a space between only two homes at a distance from the public sphere, offering different community development opportunities related to social networks at this scale.

The functions of the shutters that define the exterior of the building are threefold. The first, most simply allows personal adjustment to the climate. While largely gray and rainy, the summer months can exceed temperatures of 30 degrees, while the northerly latitude still presents the challenge of a lower sun angle. The second is that allows a balance of exterior light and privacy. The third is that they serve to create an active façade and break up what otherwise would be a monolithic building form.



Units A and B Floorplans. Orange indicates areas designed for units to be joined or separated with neighbours. 1:200



Units C and D Floorplans. Orange indicates areas designed for units to be joined or separated with neighbours. 1:200



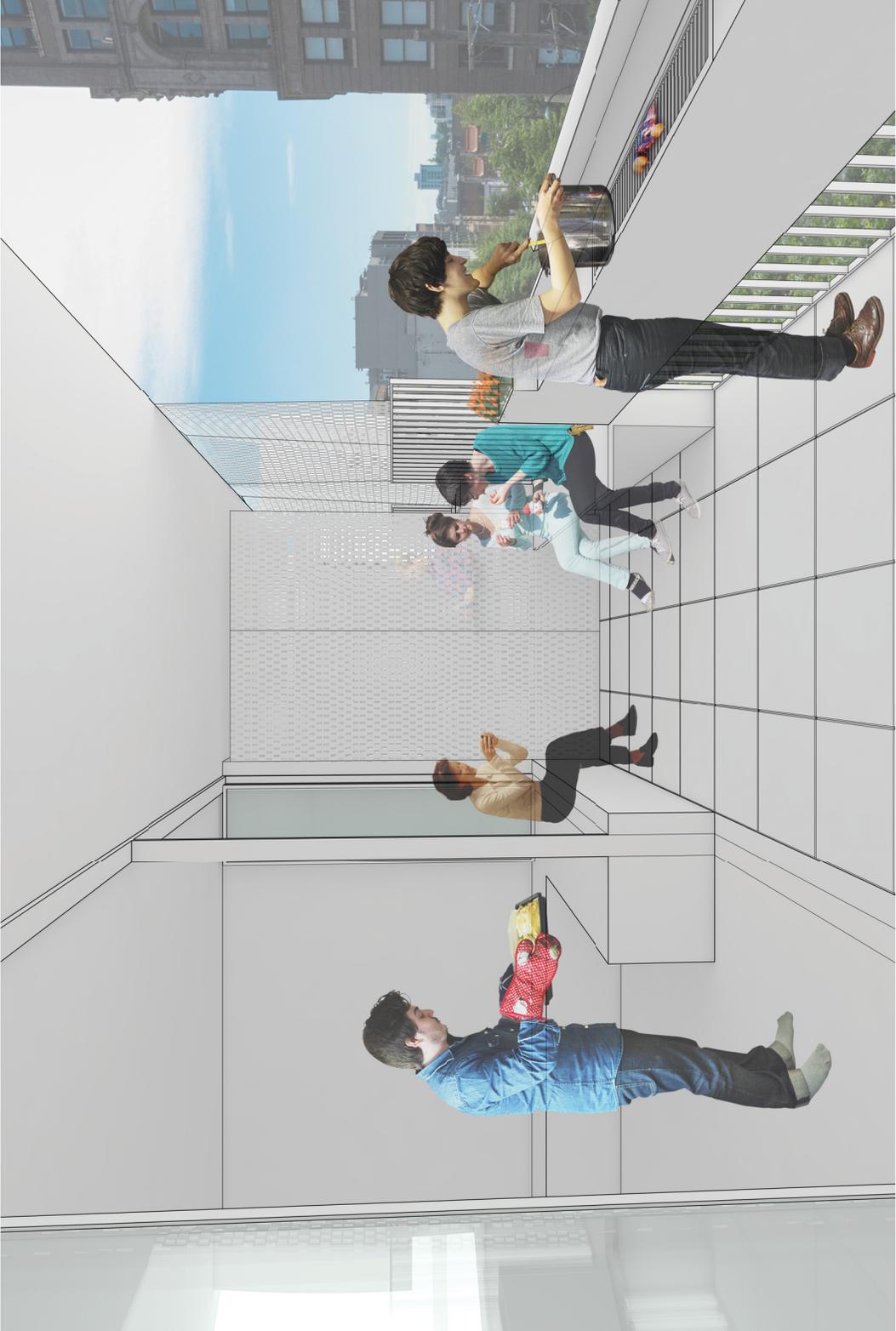
View looking towards the circulation atrium from the kitchen. Shutters are open.



View from kitchen to balcony to city.



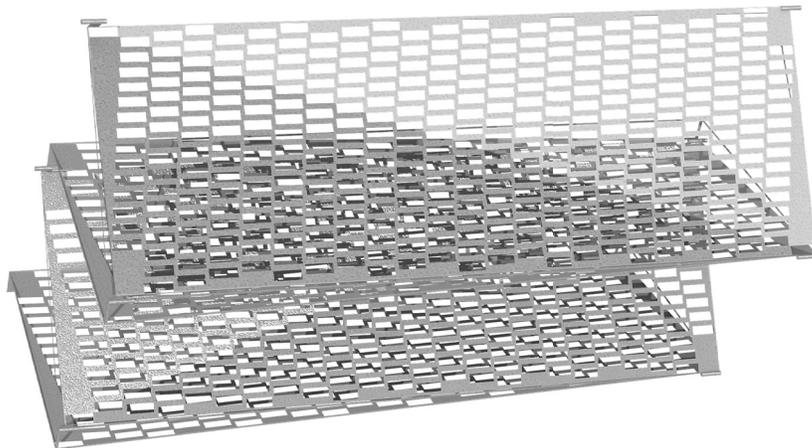
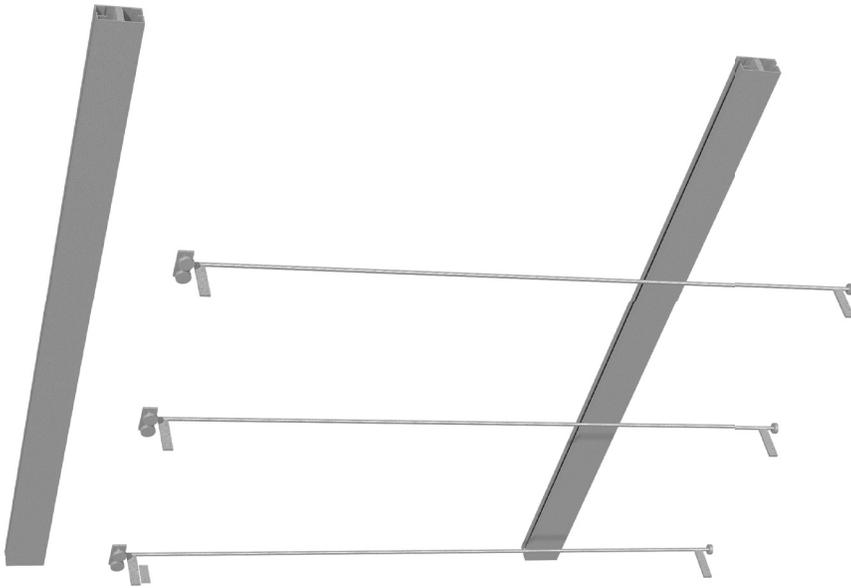
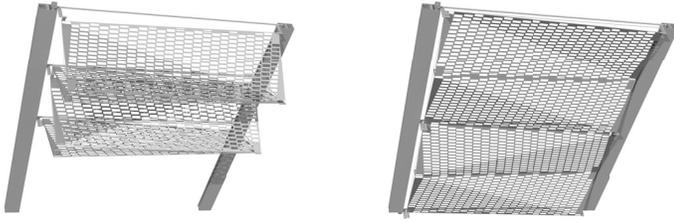
View of balcony between neighbours. The shutters are open between units.



Collages of closed balcony showing varying social interaction.



Collage of opened balcony showing varying social interaction.



Detail of shutters.

CHAPTER 3: CONCLUSION

Overview

The thesis explored how the design of a high-density, mixed-use residential building could encourage a more productive balance between bonding and bridging social capital. It looked at the relationships between social networks and their physical, architectural counterparts such as thresholds and sequence. It outlined architectural strategies to achieve a more productive balance between bonding and bridging social capital and then applied these strategies through design.

Difficulties Encountered

Difficulties encountered were largely pragmatic ones. It was important to apply the strategies developed through their application on a real site in a real place. Many explorations into the more theoretical aspects could have benefited from general situations not bound by site and place. For example, the strategy of nested communities was not pushed to the extremity it could have been. Ideas were abandoned in favour of resolution on the particular site within the constraints of the particular design. Separate addresses within the building, with their own interface were eventually abandoned because of the difficulties of site. This is, of course, inherent to design. It is why architecture will always be the expression of values. Choices are made in favour of one option or another, one set of values becomes more important and potentially incompatible with another.

This speaks potentially to aspects of methodology. Perhaps ideas should be investigated more fully with the least amount of constraints. With a more inductive approach the best solutions will eventually present themselves as the investigation continues and may be resolved on the specific site.

Site was important here insofar as the neighbourhood's relationship to program, perhaps one that was more of a tabula rasa would have allowed for a deeper investigation into the thesis topic.

Potential Directions

Cost

The thesis can be imagined as part one of a two part investigation. The first, here, explored the architecture without the constraint of cost. Part two would take what was learned and apply those lessons with the realities of economics in mind. It might ask what methods are available to ensure important infrastructure or aspects may be built within current building economics. It might develop further architectural strategies with these constraints in mind.

One potential avenue of exploration exists in the City of Vancouver already. The City uses what are commonly referred to as Community Amenity Contributions (CACs) to help pay for public amenities. CACs are essentially a negotiated tax levied against developers in exchange for density. That is, when a developer buys a piece of property and wishes to develop it at a higher Floor Space Ratio (FSR) than zoning would currently allow, a contribution to the city for amenity is negotiated to allow this up-zoning. The up-zoning provides the developer with the potential for higher profit margins on the land they've purchased, while the city is able to ensure the increased density brings positive change to the public realm (The City of Vancouver 2015).

Similar contributions could be used to negotiate the social infrastructure proposed in this thesis. Where CACs are used to ensure the public realm changes positively, a similar negotiation could be used to ensure this happens at a building scale.

Tokyo, for example uses a similar system that requires developers to incorporate fully public greenspace on their property. At the high-densities of the city, often this means that public greenspace is distributed throughout the building itself, often at the third or thirtieth floor (Hall 2015).

CACs do, however, have their criticisms. Many argue that the costs levied are directly passed on to homebuyers by developers, increasing cost in an already expensive housing market. Furthermore, they are negotiated on a project basis, making it difficult for developers to anticipate the total costs of the CACs. There are many lingering, built-in costs associated with these types of mandatory, and sometimes unnecessary, stipulations. Parking minimums in many cities, for example, require costly parking structures below

grade that no longer reflect either public desires or values.

Typology

Given the current context of the city, the thesis could perhaps have made a more pertinent argument had the typology been one far more common throughout the city: the podium tower. Podium towers are a highrise typology defined by a small, efficient floorplate and four to five storey street level podium. Since the late 1990s, they are by far the most common typology under construction within the downtown core of Vancouver (Price 2010). The tower presents many of the same issues explored in this thesis, but in a more challenging form. It is a form that inherently separates itself from the public spaces of the city, relegating it to simply a view. This version of the thesis might ask the same question and answer it with entirely different strategies.

While this typology is common in Vancouver for a variety of reasons, first and foremost it is economically viable. Addressing bridging and bonding social capital in the podium tower may be a first step in moving towards “part two” of this thesis mentioned above: addressing the issues in the full context of the economics of development.

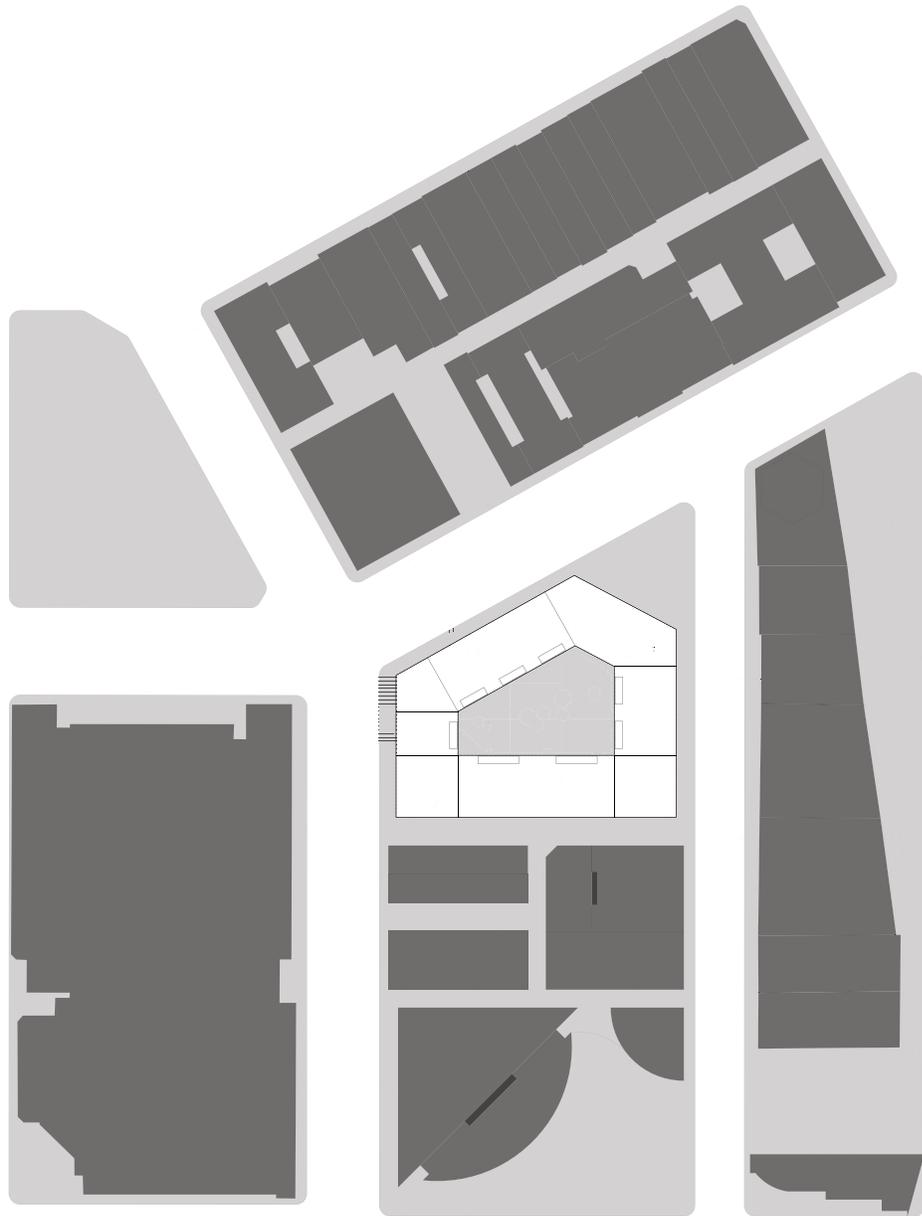
The Tokyo example discussed in regards to the CACs presents potential typological solutions to this problem. In what ways have architects been able to incorporate public spaces throughout highrise structures there and elsewhere?

Large Data

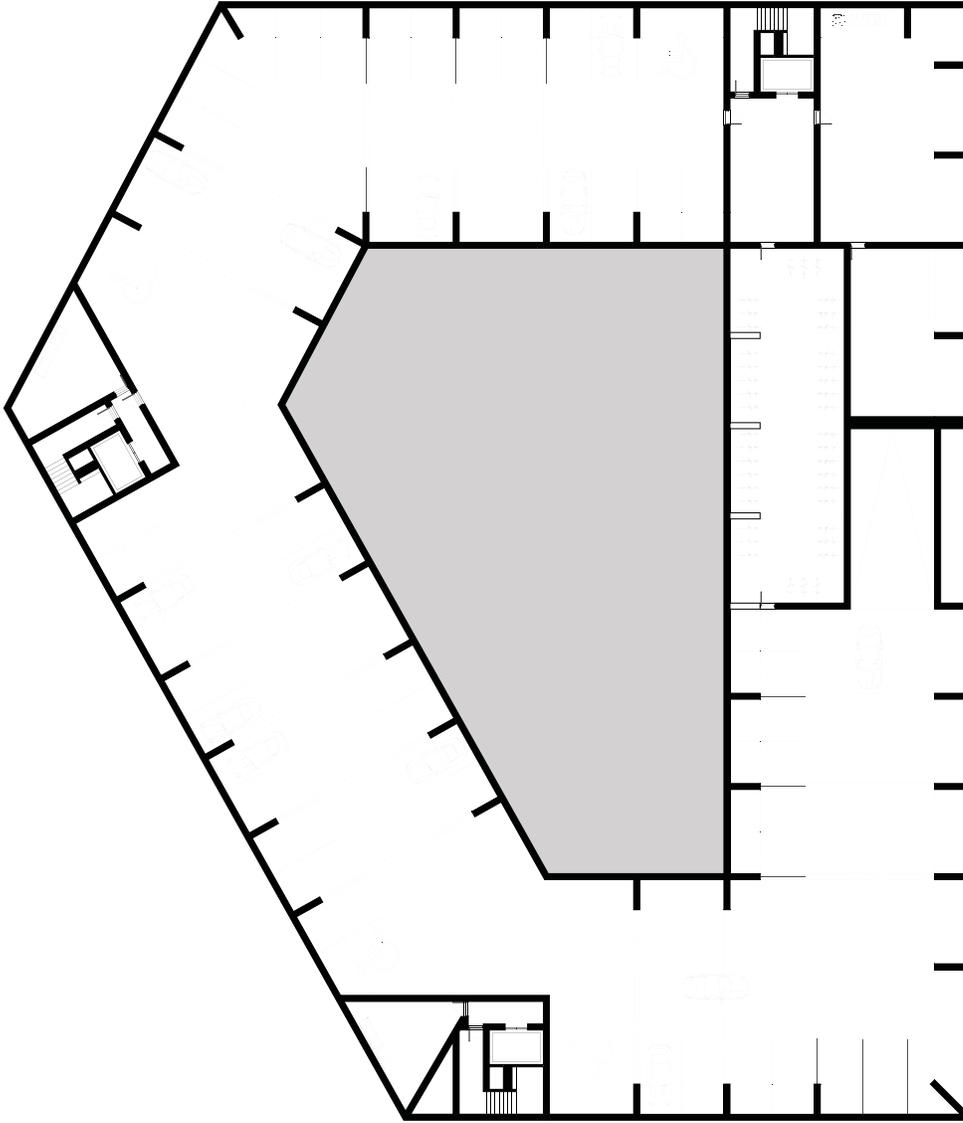
The thesis reveals a third possible avenue of investigation: large datasets. A typological analysis of social networks was used to analyze and discuss their relationship to physical structures and bridging and bonding social capital. These networks are highly quantitative, and the sciences investigating large datasets could reveal far more subtle details than the typological overview taken here. They have the potential to quantitatively describe certain aspects of the architecture necessary, as well as a continued analysis of relationships over time within a building. How might data be gleaned from its residents over time, and how might this analysis shape an architecture of social capital and community in high-density housing in the future?

APPENDIX 1: DRAWING SETS

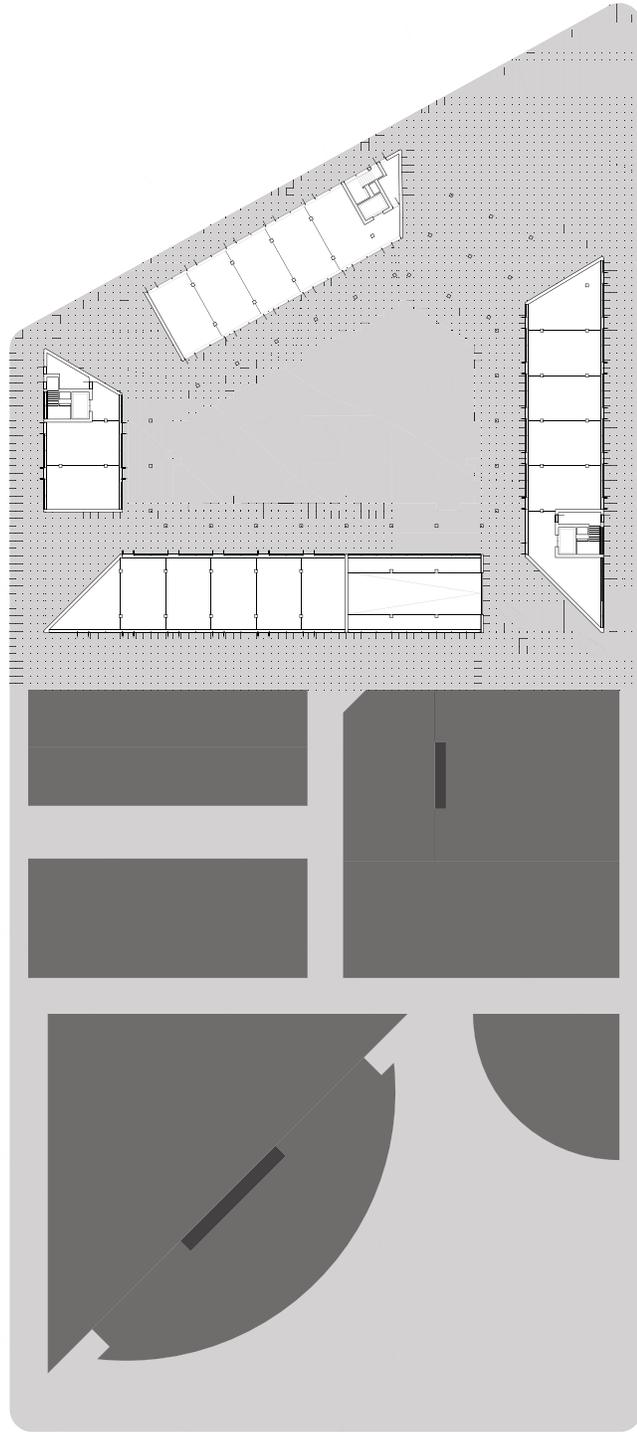
Plans



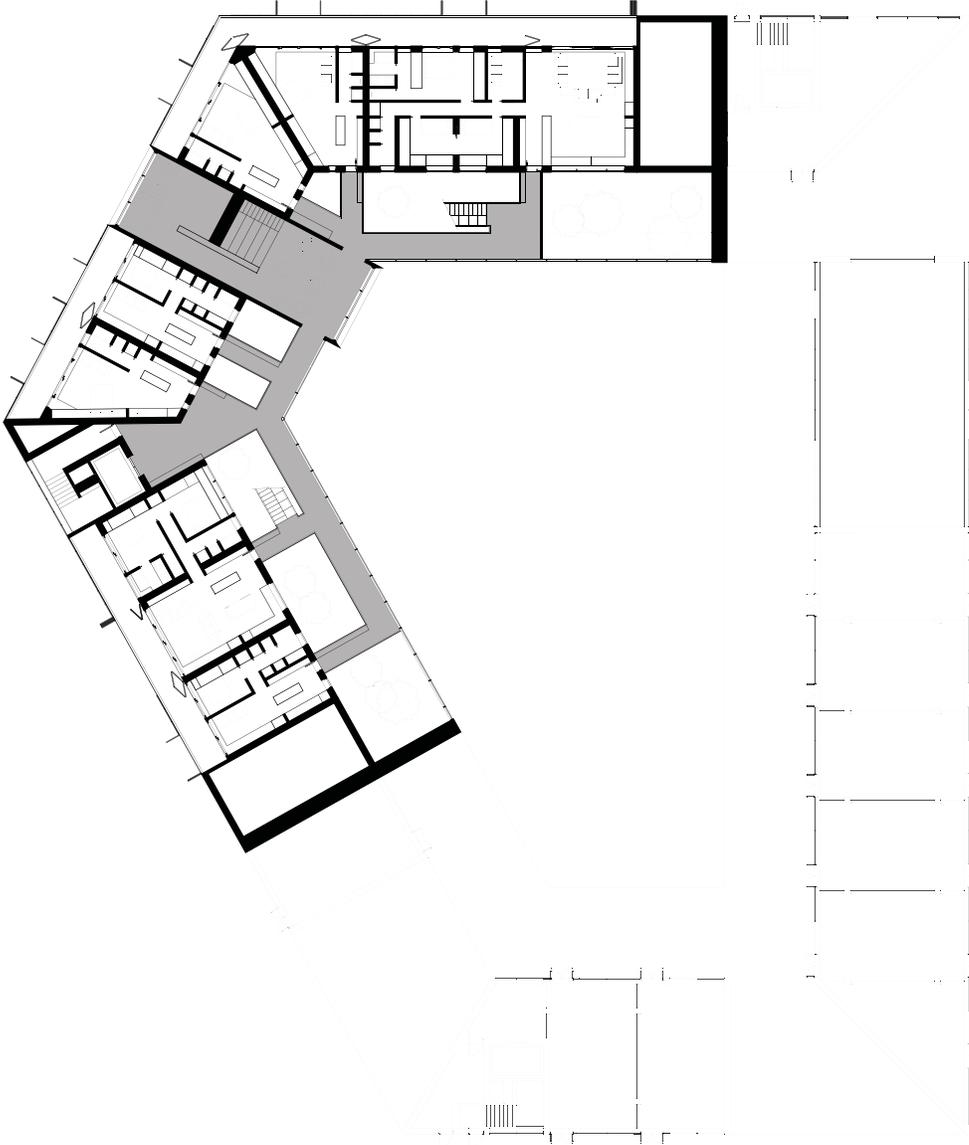
Context Plan 1:1000



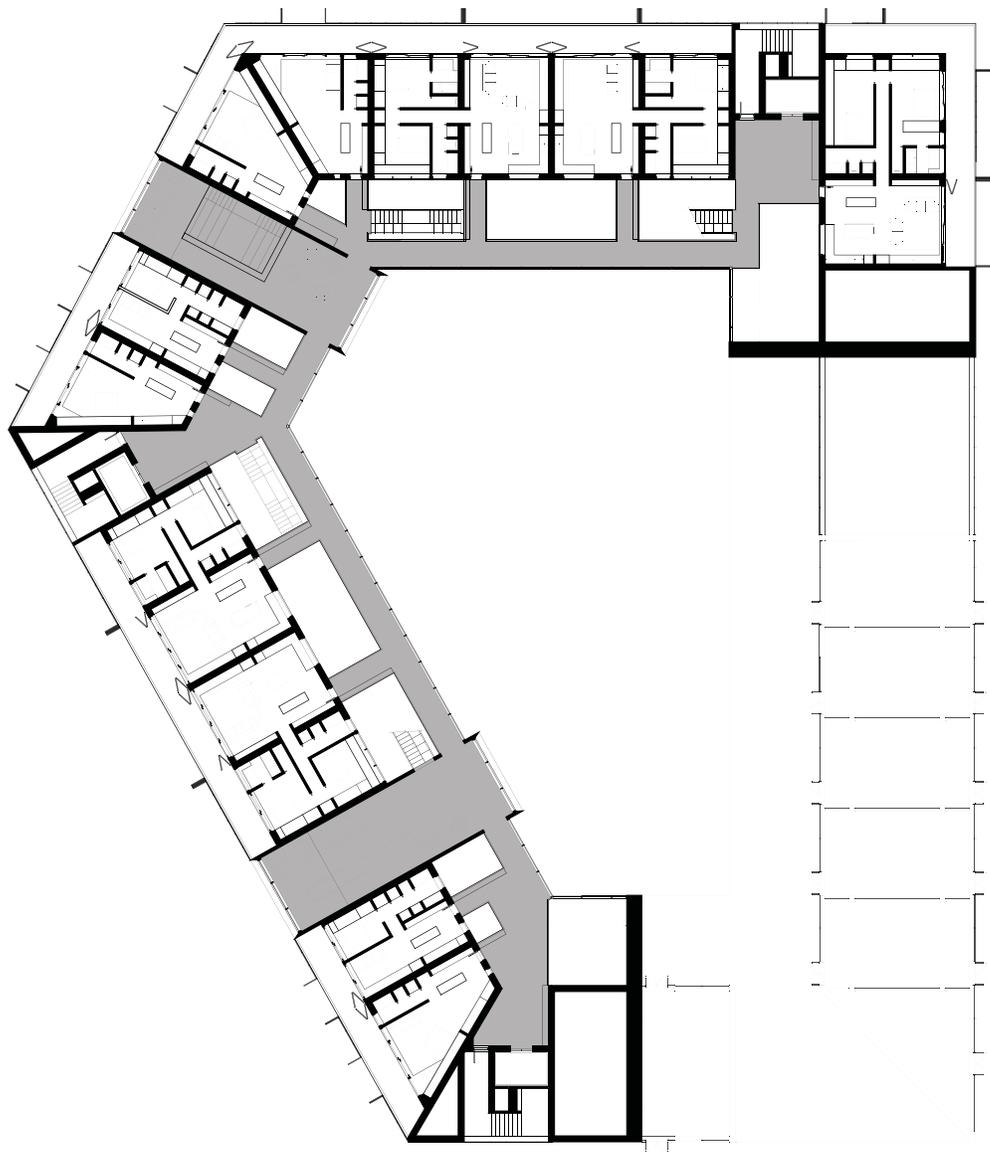
Underground floor plan. 1:500



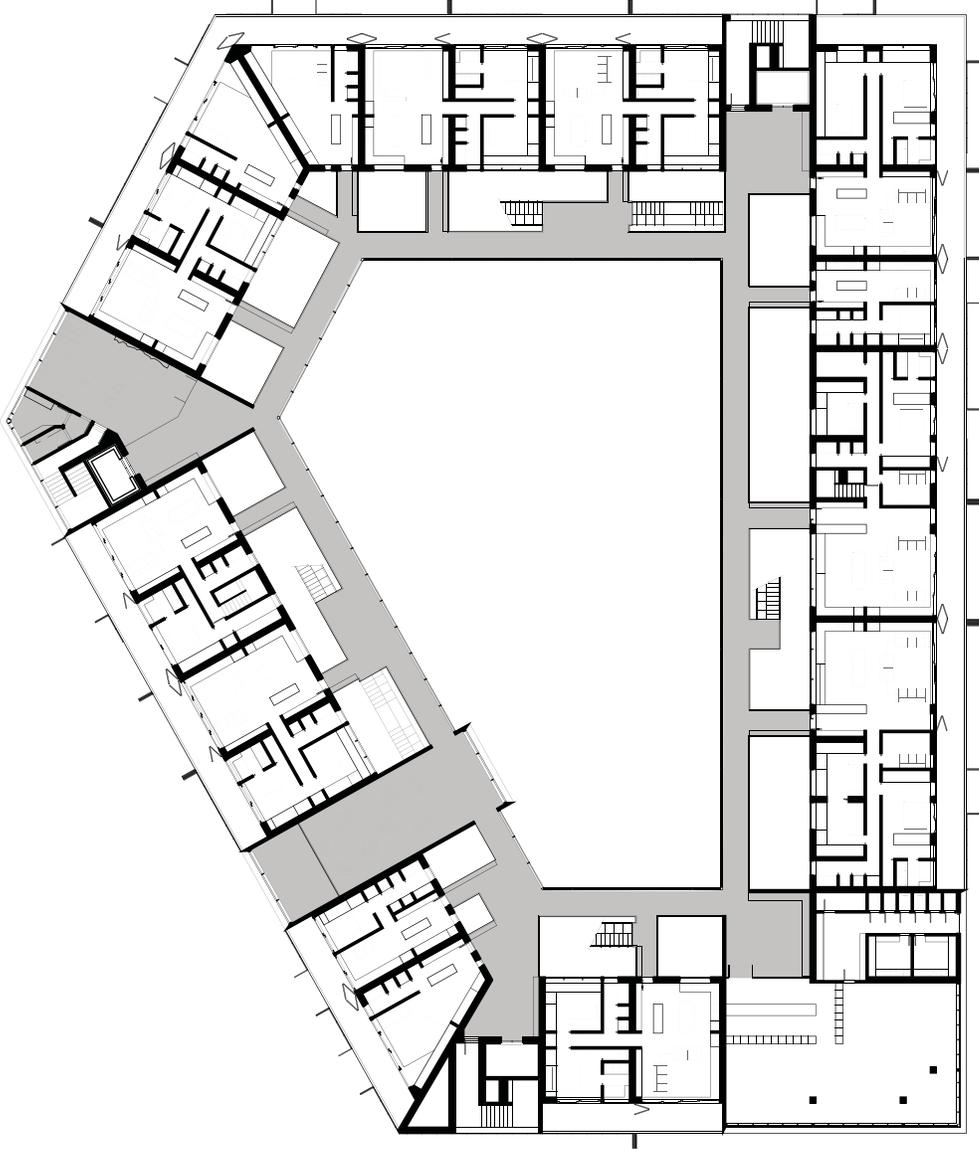
Ground floor plan. 1:1000



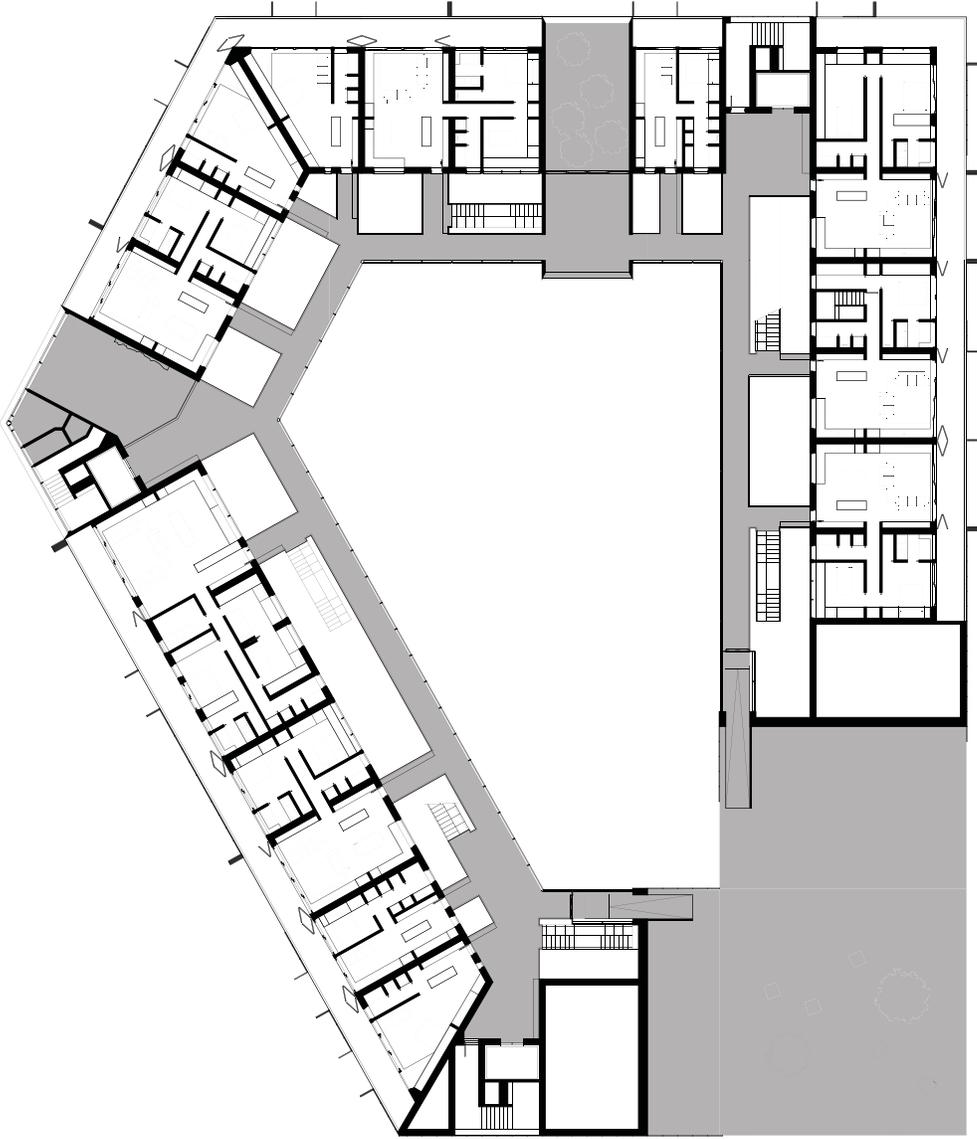
First floor plan. 1:500



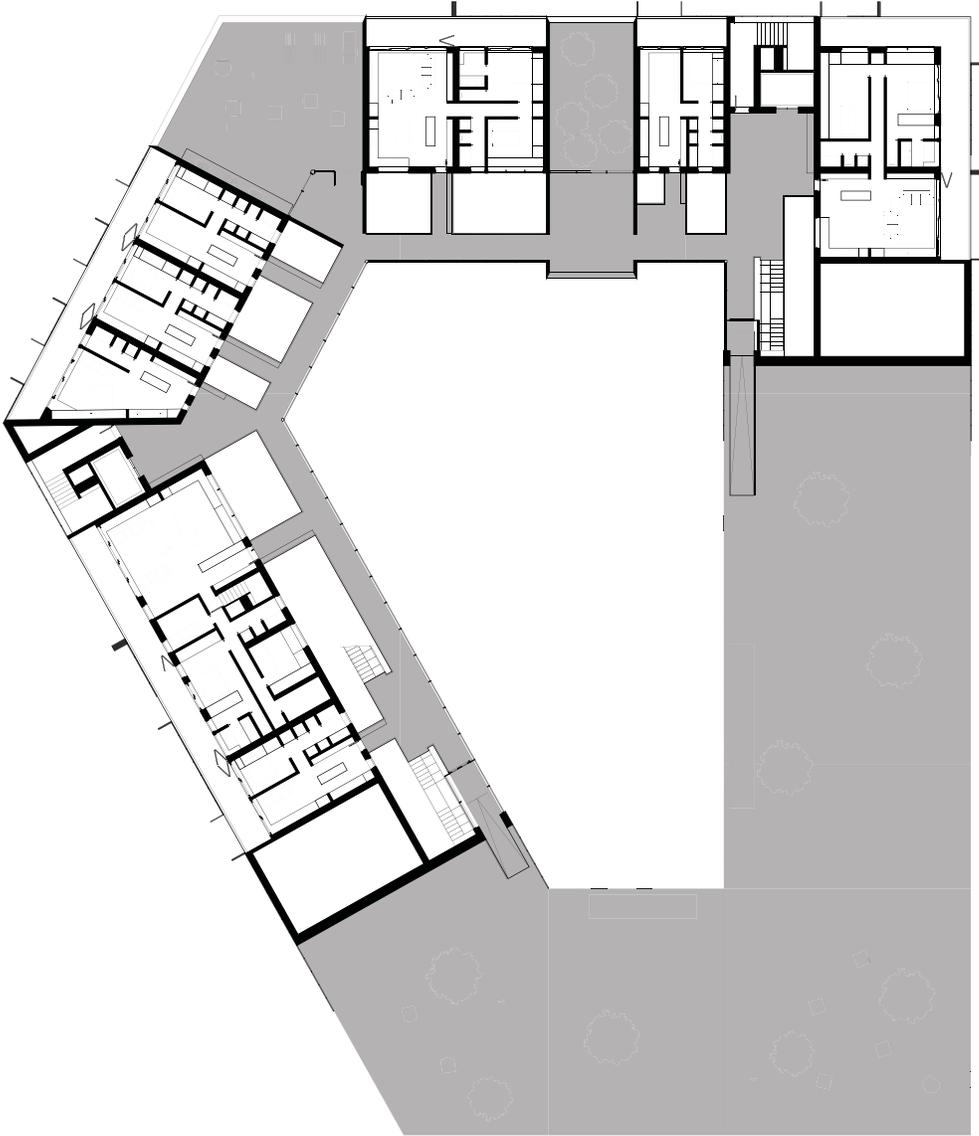
Second floor plan. 1:500



Third floor plan. 1:1000



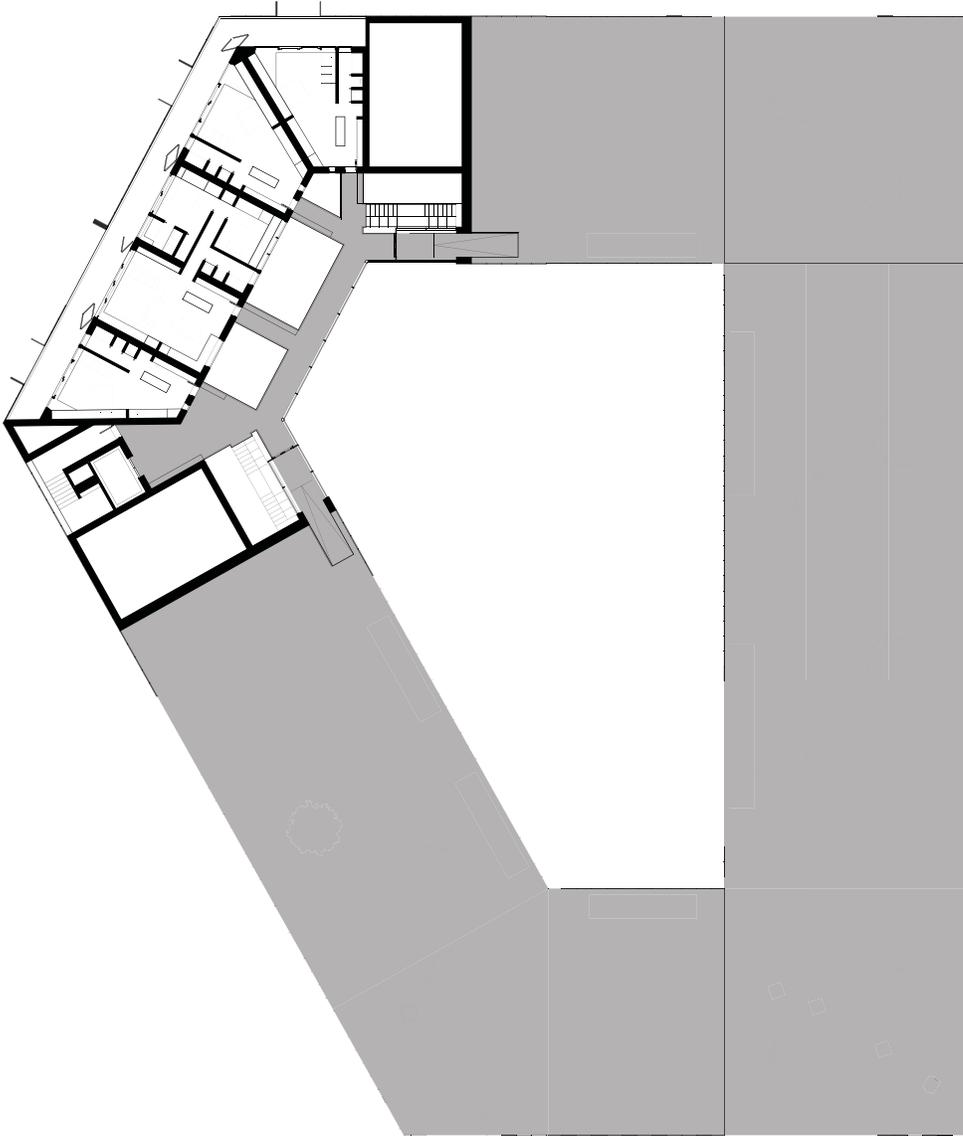
Fourth floor plan. 1:500



Fifth floor plan. 1:500

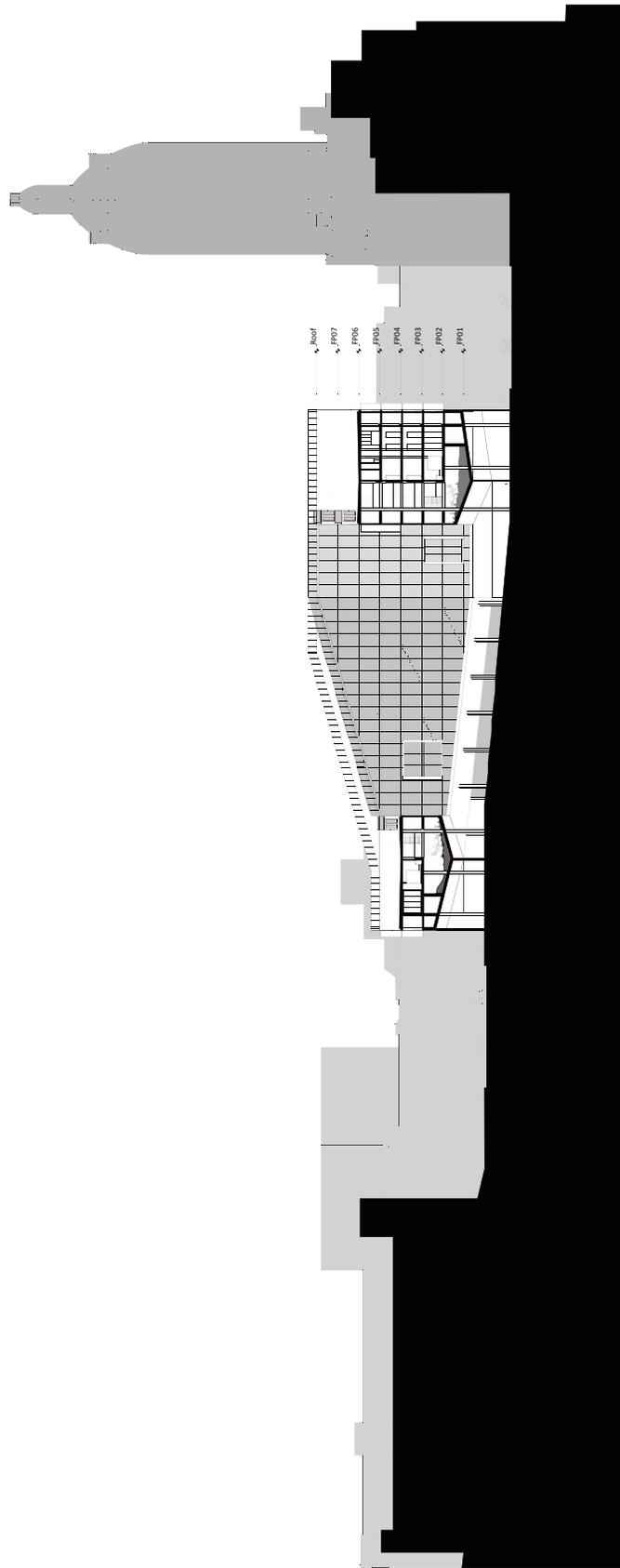


Sixth floor plan. 1:500

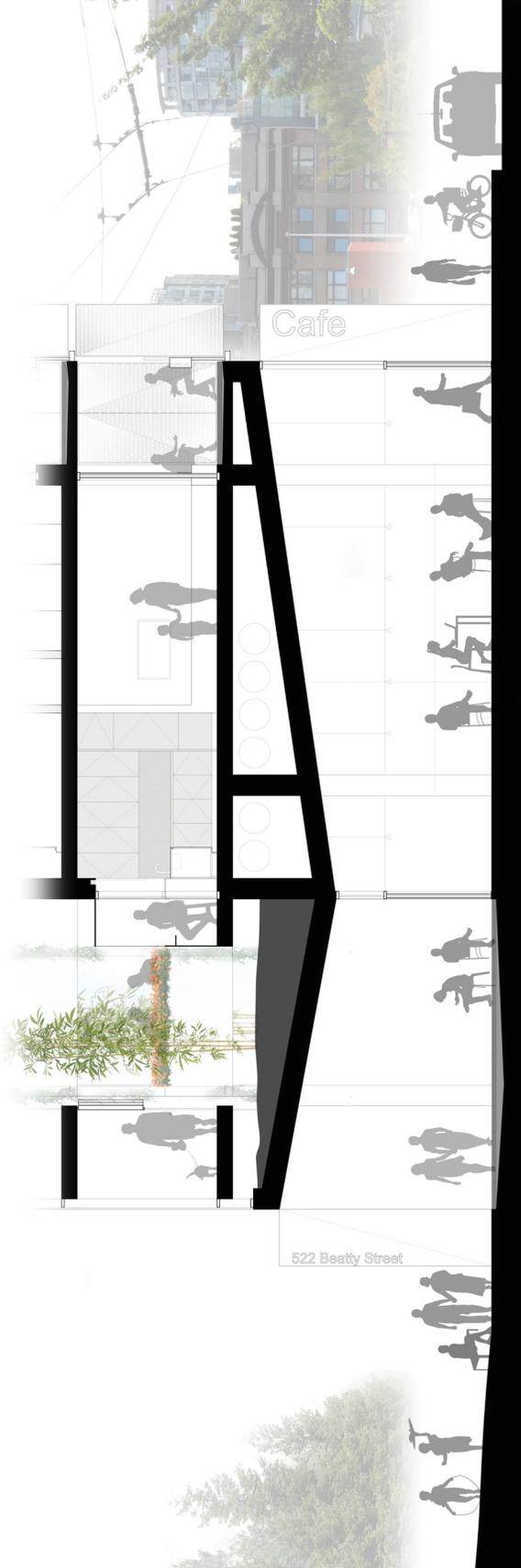


Seventh floor plan. 1:500

Sections

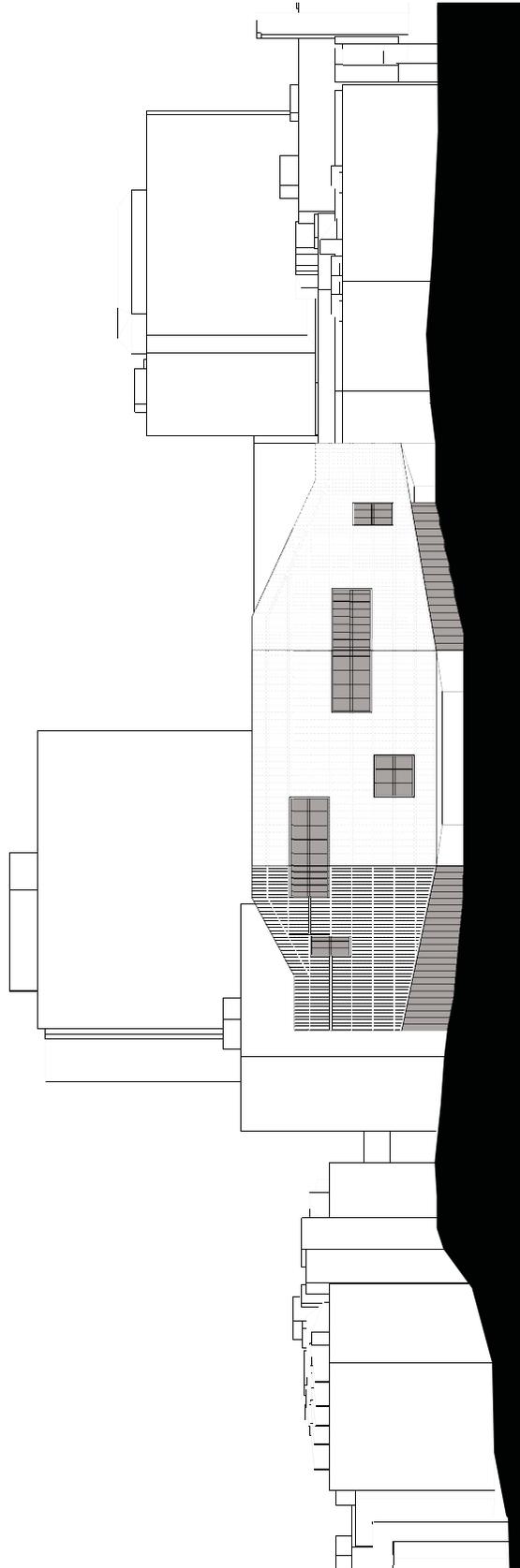


Cross Section. 1:1000

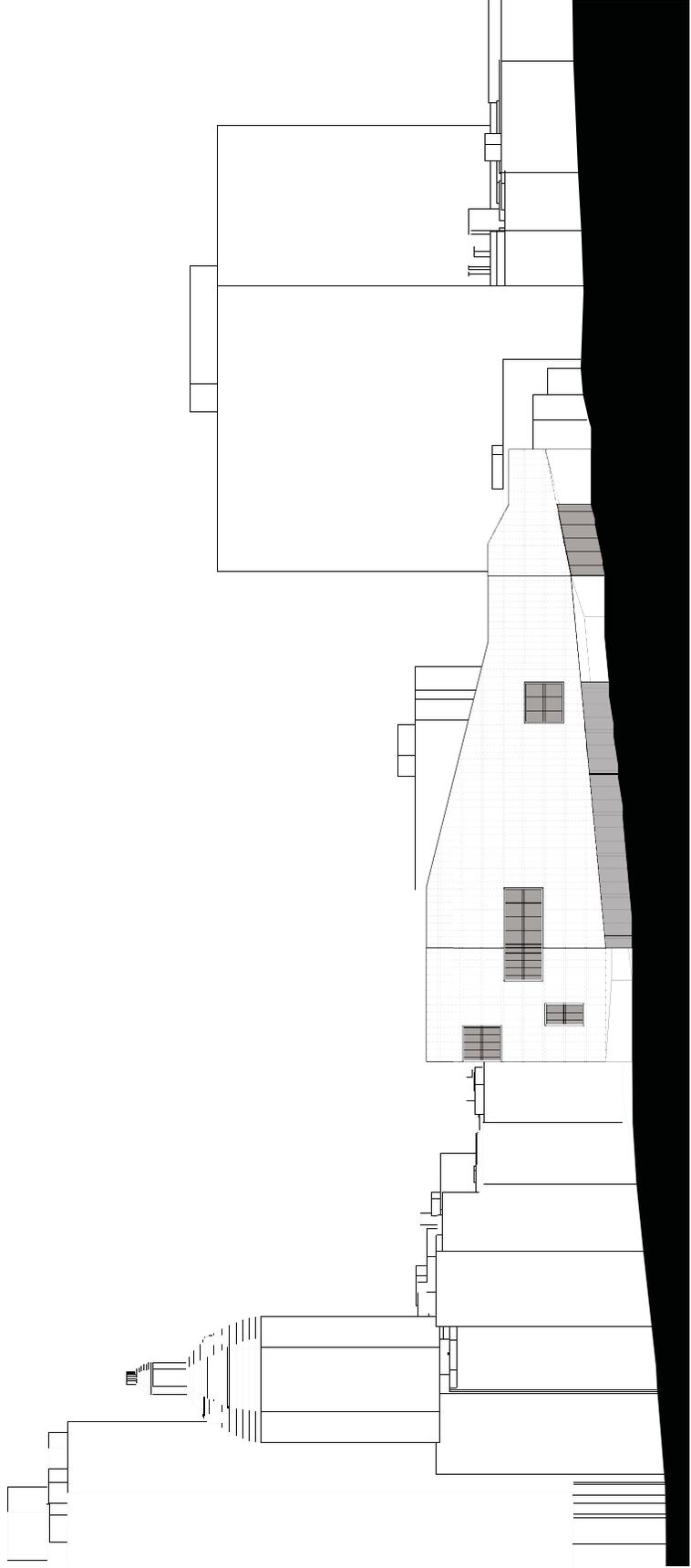


Detail Section. 1:80

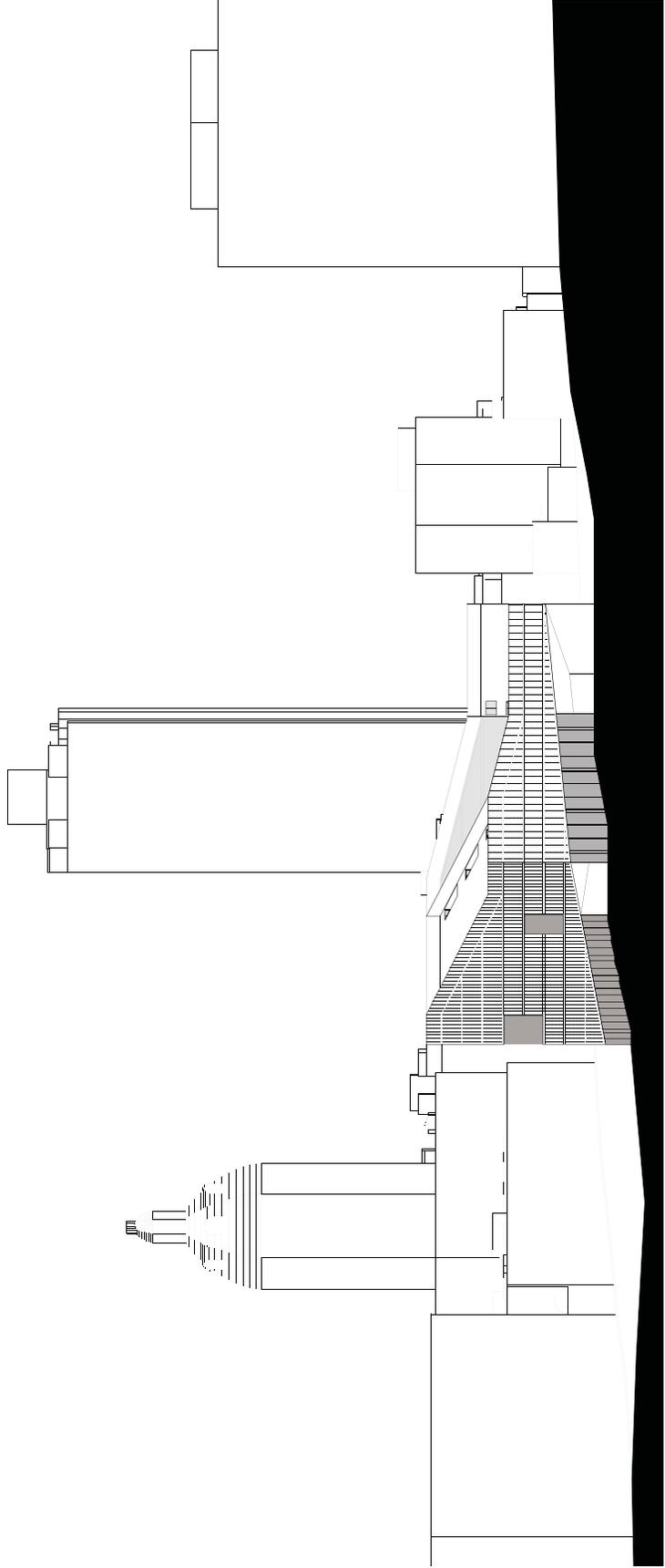
Elevations



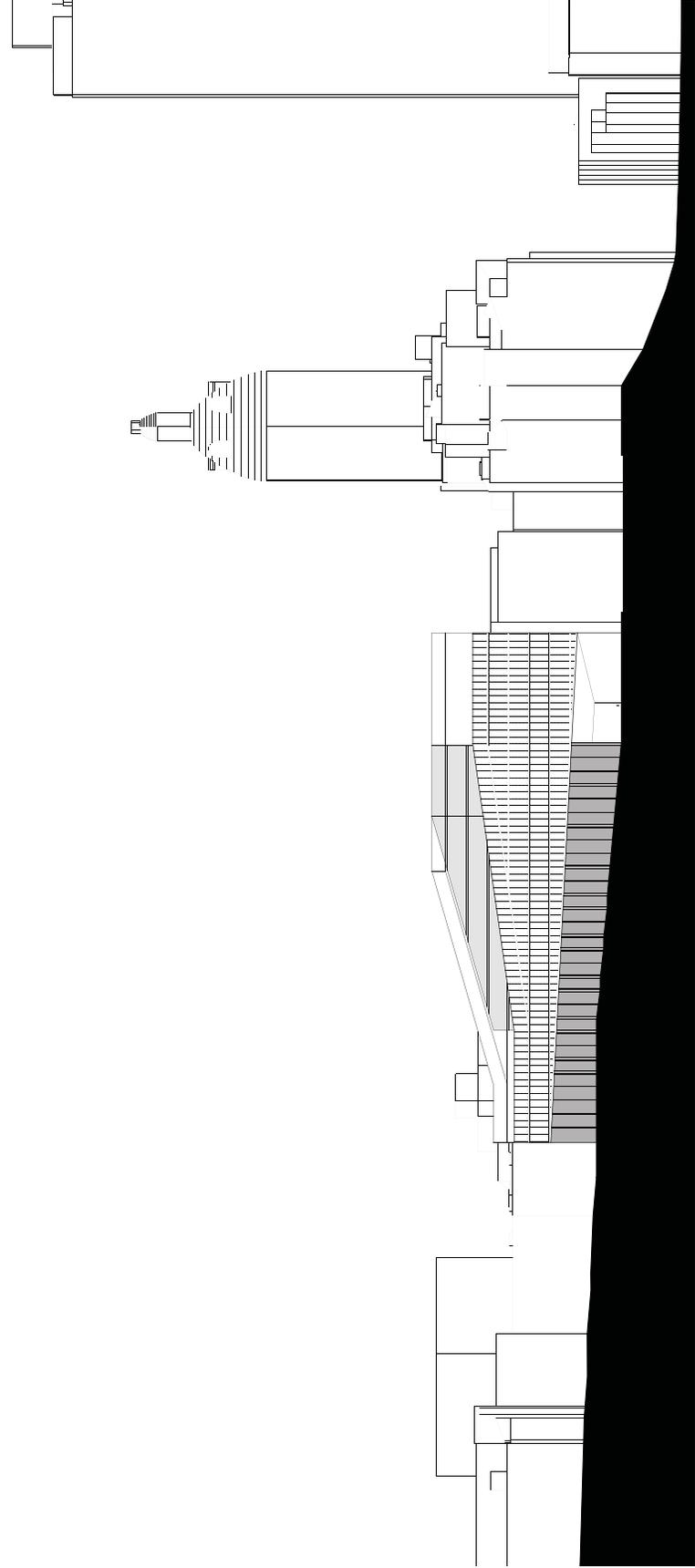
Northeast Elevation. 1:500



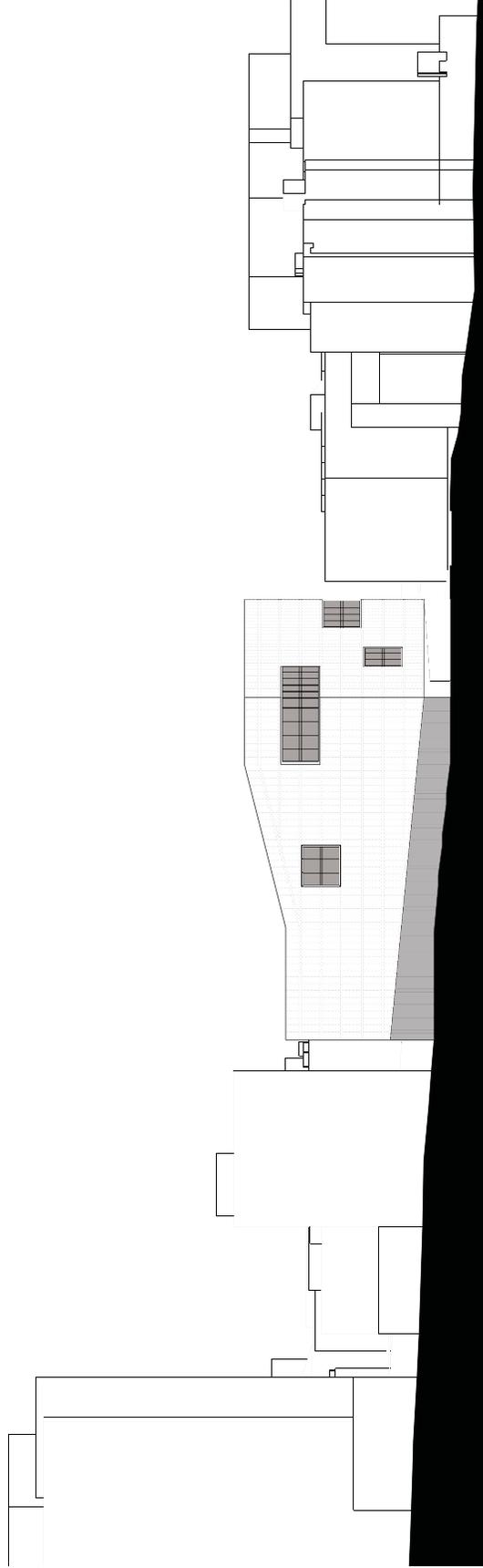
Northwest elevation. 1:5000



West elevation. 1:500



South elevation. 1:500



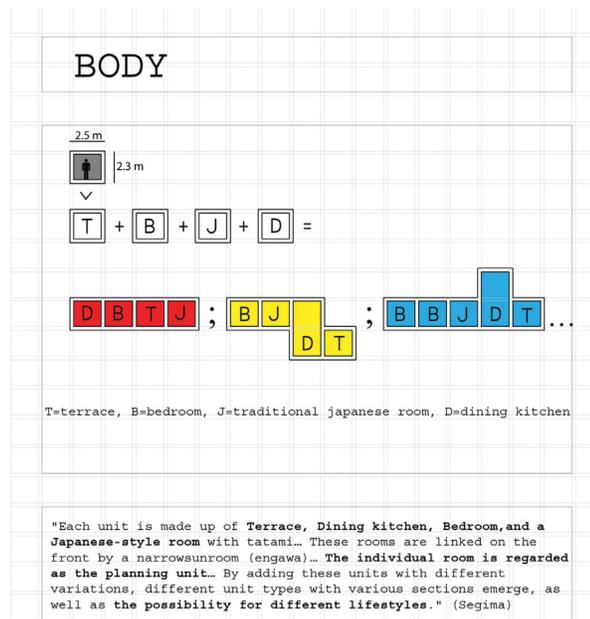
East elevation. 1:500

APPENDIX 2: CASE STUDIES

Kazuyo Sejima - Kitigata Housing, Gifu, Japan 1994-2000

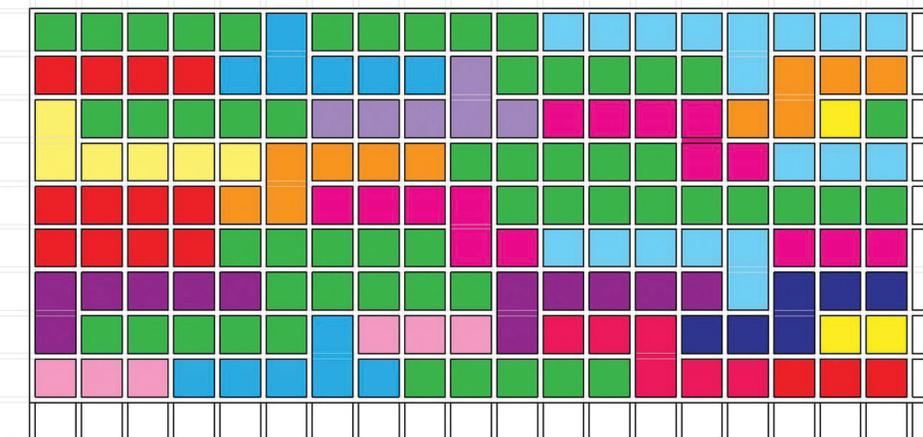
Kazuyo Sejima's Kitigata Housing project, located in Japan's Gifu Prefecture, is part of a large residential project in the city. It is one of four complexes surrounding a central public court space. It is a large, dense project that provides a variety of suite sizes and configurations. It is a long, linear, single-loaded building with external circulation on the city side with private views towards the court. Each suite is organized around the combinations of a terrace, bedroom, dining, and traditional Japanese room. The outdoor terrace spaces puncture through the building connecting interior spaces to the circulation and courtyard. The dining module is double height to increase the suite combinations possible while also providing variety in an otherwise monotonous façade. Interestingly, it seems to have avoided many of the unfortunate social issues associated with exterior and single-loaded circulation spaces through a blurriness of public and private developed through the provision of the terrace as an in-between-space separating suites from circulation (El Croquis 2005, 127).

The project informs the thesis in two major ways. The first is the presence of a large public courtyard. The second is the idea of public and private facades in relation to the courtyard side or the city side.



Suite combinations (Farkas, Chen, and Netta Gaash. 2007)

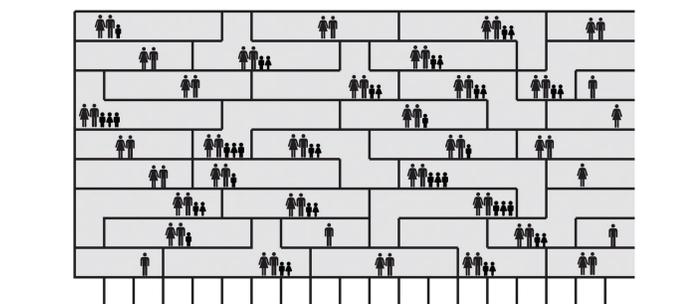
BUILDING



"There is a certain **anonymity**... a variety in the visual appearance that paradoxically acts to deemphasize the individual identity of each unit:" The composition of the units gives us some **privacy**, because no one can understand which part belongs to any given family".

Suite arrangements (Farkas, Chen, and Netta Gaash. 2007)

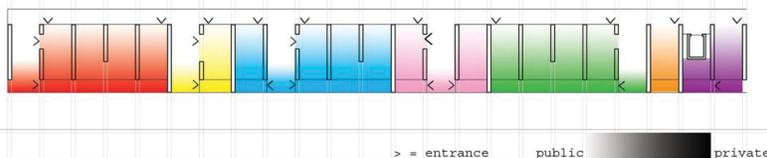
NEIGHBORS



 single
  couple
  couple+1
  couple+2
  couple+3

Family types (Farkas, Chen, and Netta Gaash. 2007)

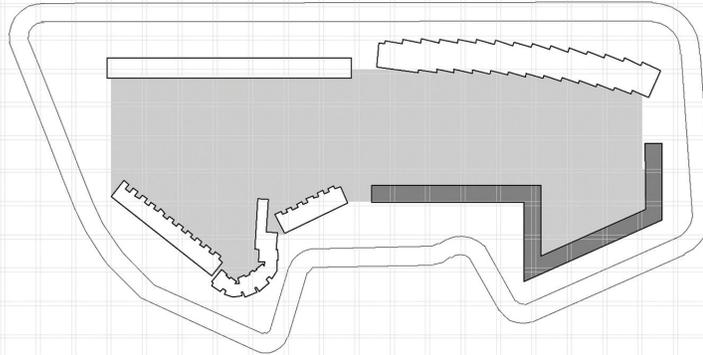
"In general, in a mid-high-rise apartment, the entrance door is the only element that directly relates the interior to the out door space... Here the apartment has at least three entrances... and up to five entrances which connect to the exterior. Each entrance would be used in different way, depending on the user's lifestyle."



NEIGHBORING

Public to private (Farkas, Chen, and Netta Gaash. 2007)

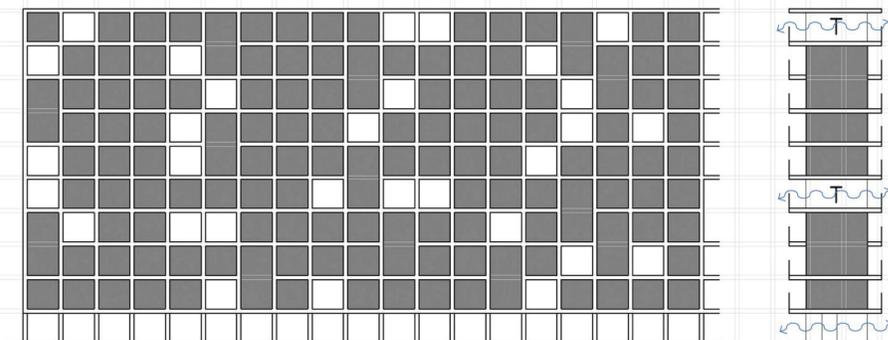
CITY



"... In an area mostly surrounded by low-rise residential neighborhoods, Arata Isozaki proposed master plan established four long, 10-story slab-shaped building occupying most of the **perimeter of the plot**, and leaving a **large public space in the center** which included community and parking facilities for the four buildings... This block was assigned to be build essentially on a parallel along the streets-side property line."

Urban response (Farkas, Chen, and Netta Gaash. 2007)

ENVIRONMENT



"In order to control the the massiveness of the built volume, we reduced the whole to a **thin slab**, perforated by random holes. each apartment has a terrace, and **107 terraces create as many holes** in the structure which allow for glimpses through the building to the landscape beyond.. Also, the terraces planned as a "room", with the intation of introducing as much exterior space as possible into the living areas."

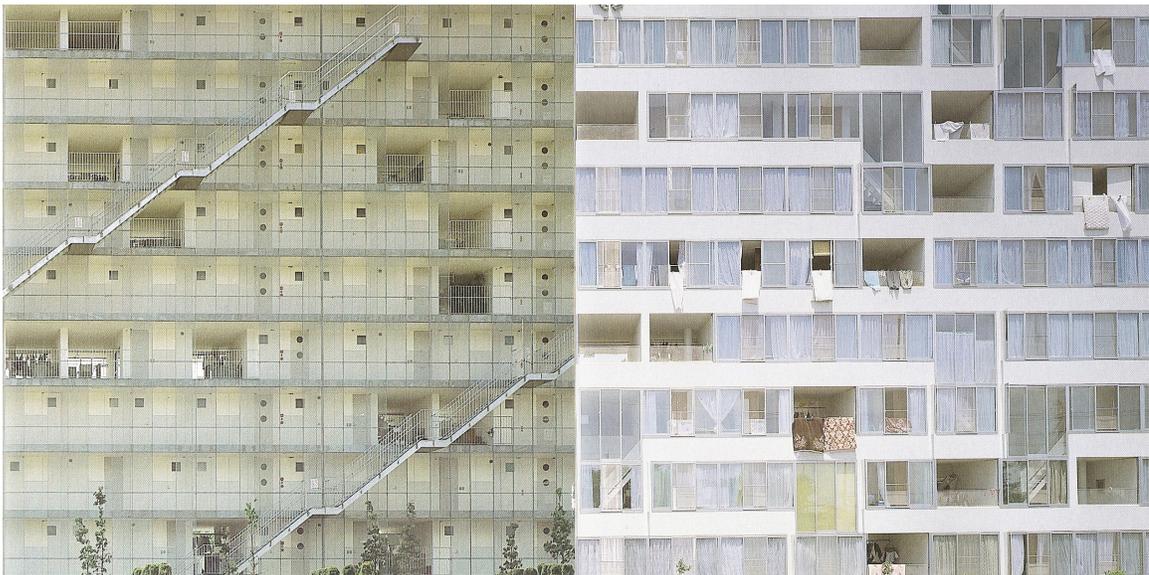
Terraces (Farkas, Chen, and Netta Gaash. 2007)



Sun room (Farkas, Chen, and Netta Gaash. 2007)



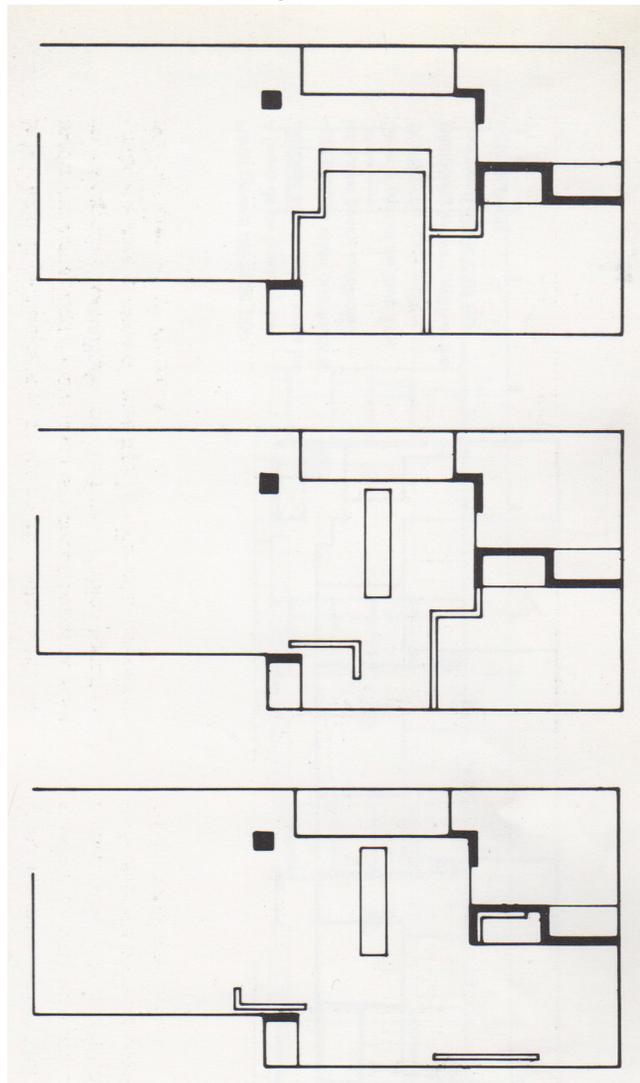
Terrace (Farkas, Chen, and Netta Gaash. 2007)



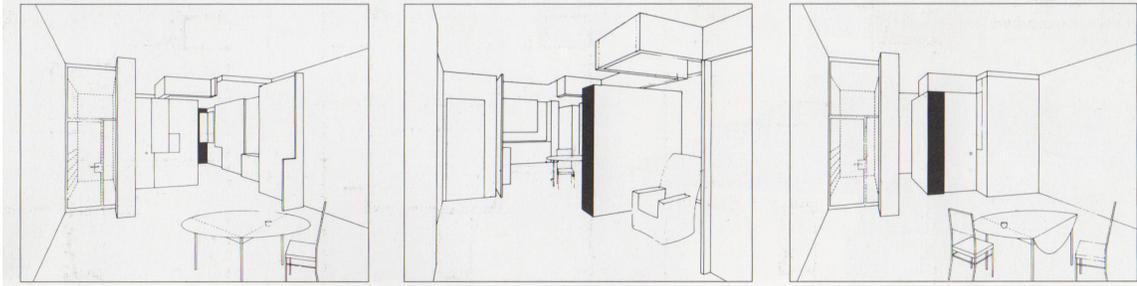
Public and private sides (Farkas, Chen, and Netta Gaash. 2007)

Steven Holl - Void Space/Hinged Space Apartments, Fukuoka, Japan, 1992

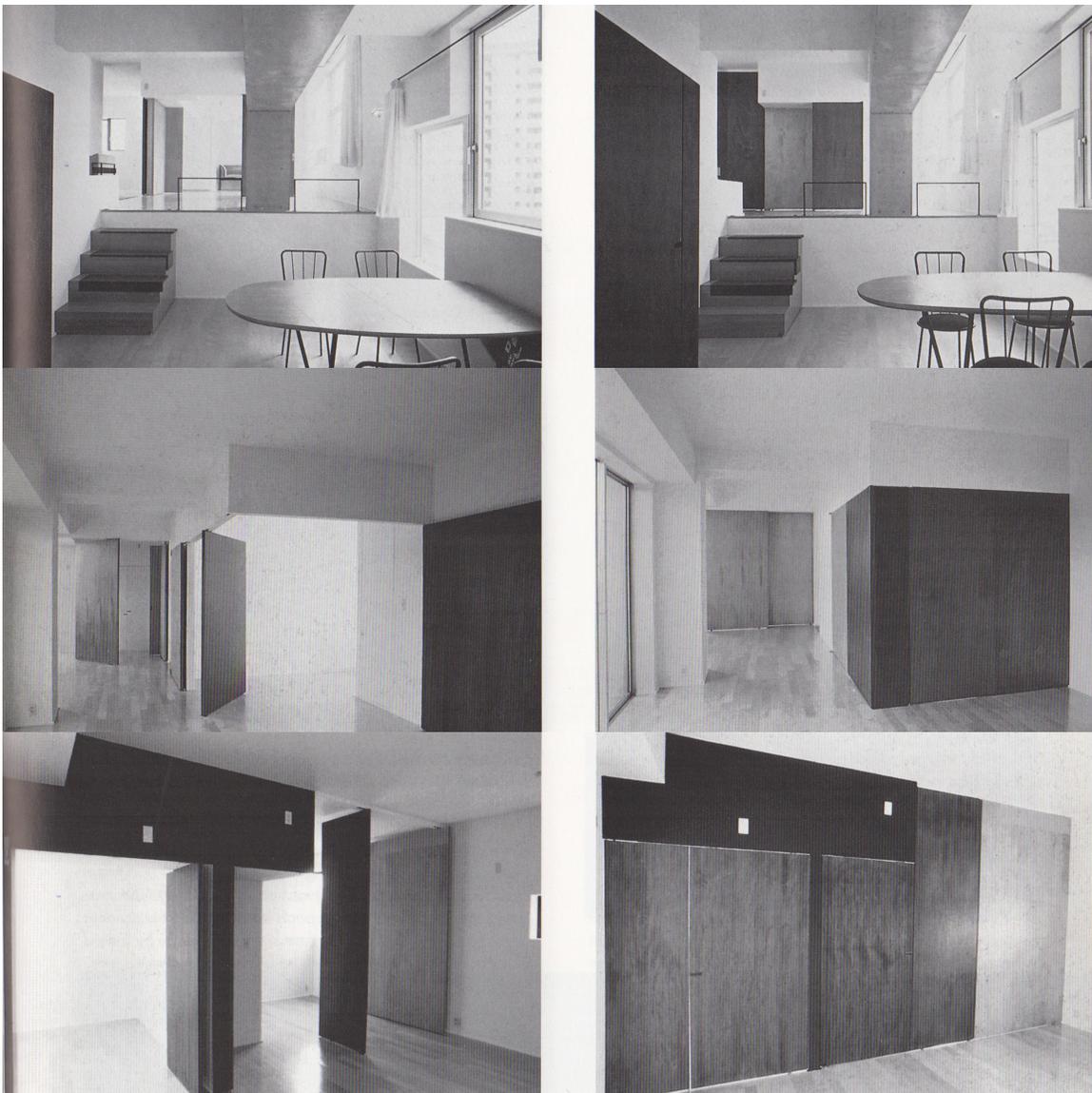
Steven Holl's Fukuoka Apartments were taken as a case study to understand how units could be adaptable to a variety of families, situations, and lifestyles. They utilize pivoting cupboards, panels, and doors that make the interior layout and organization highly variable. This changing layout responds to various time scales: a large living room converting to a large bedroom over the day; or the number of bedrooms changing as children grow up and move out. Interestingly, the variability of the apartments also had a community development effect. The occupants had formed a community association that met for sake parties every month on the shared roof. Neighbours had met through showing others the various options that had been used throughout the apartments (Galfetti 1997, 28).



Various floorplan options (Galfetti 1997)



Perspectives (Galfetti 1997)



Interior photographs (Galfetti 1997)

Jean Nouvel - Apartments and Office de Tourisme, Tours, France, 1993

This case study looks at a mixed-use residential complex by Jean Nouvel in Tours, France, completed in 1993. Much like Sejima's Kitagata project, it contends with inherent issues involved in exterior, single-loaded circulation spaces. It addresses this by creating a courtyard space on the private side of the building and "floating" the circulation throughout this space. Being set off from the apartments, this distancing allows windows in the apartments on both the city and court side, providing protected views of the shared spaces of the courtyard.



Courtyard Circulation (Gausa 1998)



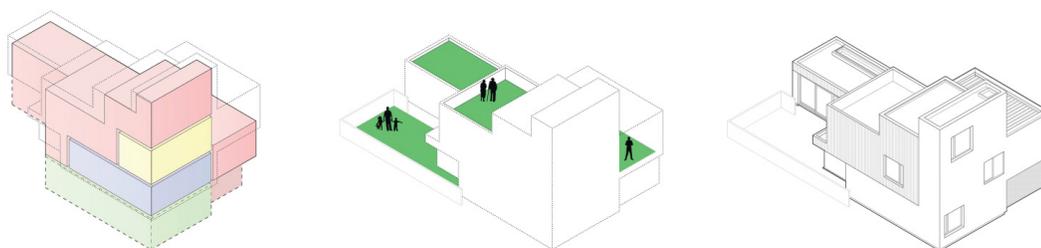
Exterior view (Gausa 1998)

Williamson Chong - Grange House, Toronto, Canada, 2014

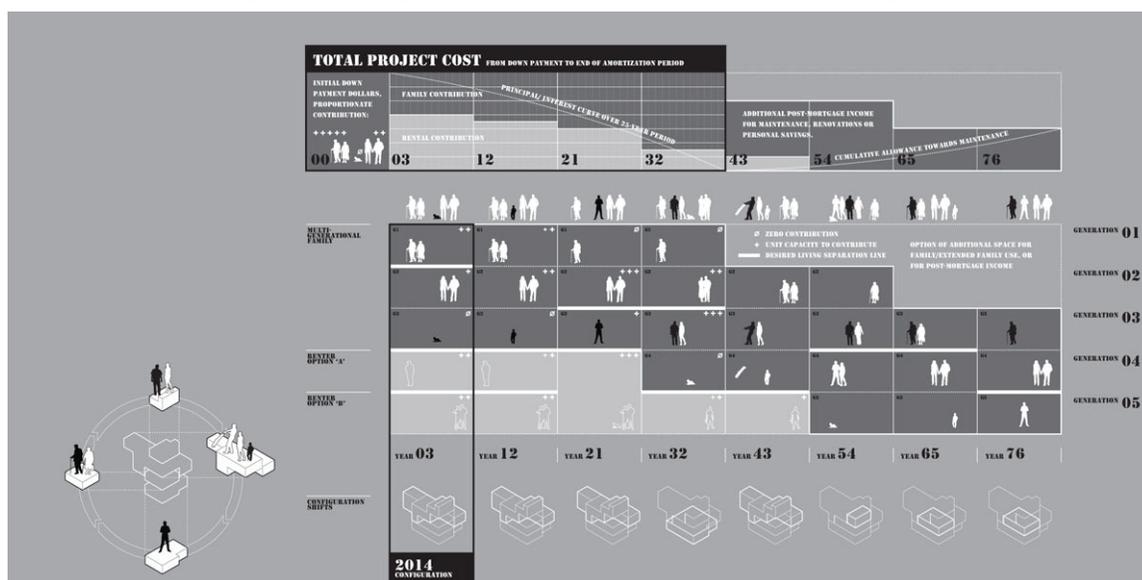
The Grange Triple Double is detached, inter-generational home completed this year in Toronto. Programmatically, it is similar to the units in this thesis, but at a low density. The home features three separate units: the main family suite, the grandparent suite, and a basement rental suite. Each has a separate entrance and is fully independent, with the grandparent and family unit having both shared and private outdoor spaces. The architect's description:

A corner lot in Toronto's gritty Chinatown neighborhood is the site for a multiunit, multigenerational house: the Grange Triple Double. Stacking a series of rental units—along with a grandparents' suite and living spaces for a young family—on a double-wide lot allows us to explore one of our recurring themes: Incremental Urbanism.

This project begins with the blending of two households. A professional couple with a young son sells its small, one-bedroom condominium; the grandparents sell their suburban home as a way to downsize after becoming empty nesters. Together, the two families create a new living arrangement that allows for autonomy, while still taking advantage of the benefits of proximity: The grandparents can look after their grandson, yet embrace the security of being looked after as they age. The professional couple, in exchange, is presented an opportunity for a ground-up home in the city, which might otherwise be unaffordable. (Williamson Chong Architects 2014)



Spatial and programmatic organization of the home (Williamson Chong Architects 2014)



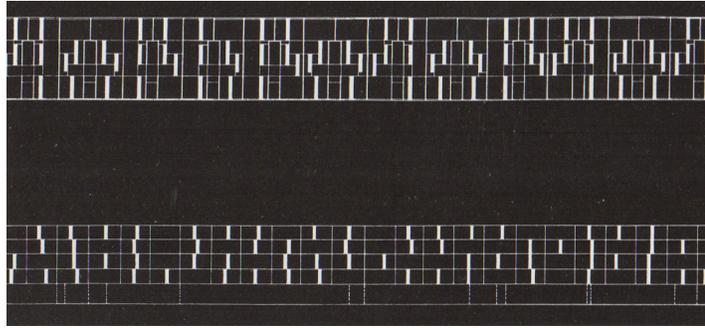
Lifespan analysis (Williamson Chong Architects 2014)



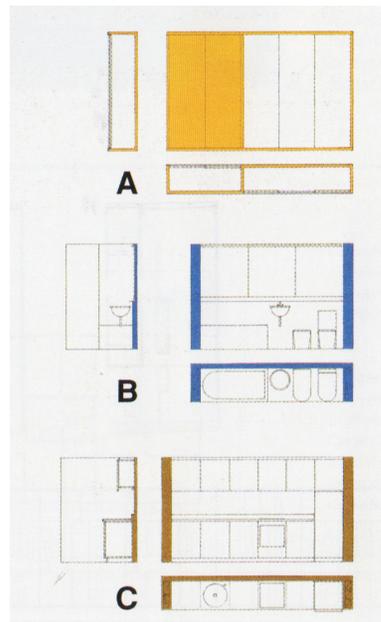
Exterior view (Williamson Chong Architects 2014)

Actar Arquitectura - Sistema ABC and Sistema RAIL

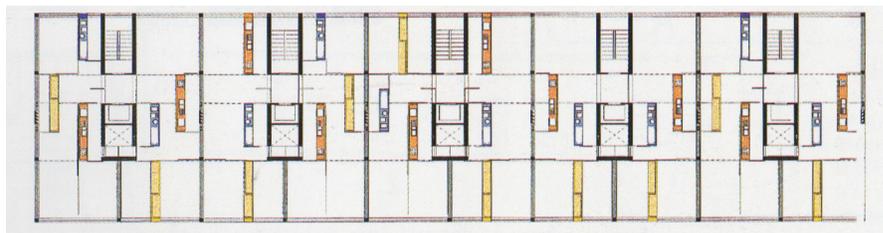
These two apartment concepts explore different modular schemes concerned with customizable unit layout, facade variation, and general usability. The first system, ABC, uses three distinct modules, A, a bedroom and closet module, B, a bathroom module, and C, a kitchen module. Each module can be placed in a variety of places throughout the unit, defining rooms and shared spaces. The units intersect with the facade, expressing this customizability at a building scale through the variable pattern they create. The RAIL system explores a similar system longitudinally. A variety of unit sizes and layouts are made possible through service modules placed variously along the outer walls, interspersed with glazing. Similarly, the system provides a varied facade reflecting the individual choices made inside.



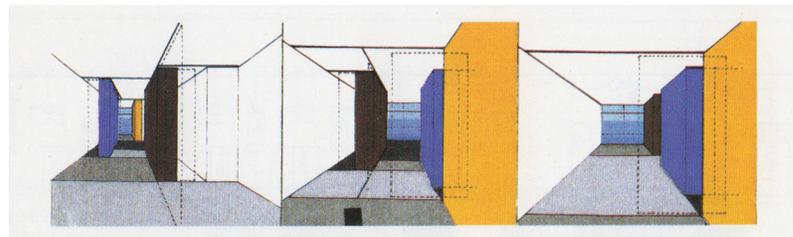
Sistema ABC Variable facade (Gausa 1998)



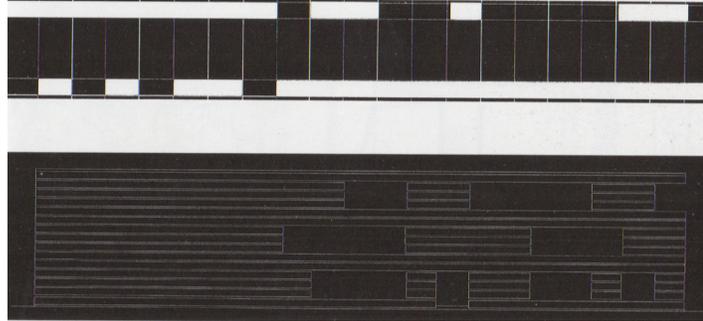
Sistema ABC Modules (Gausa 1998)



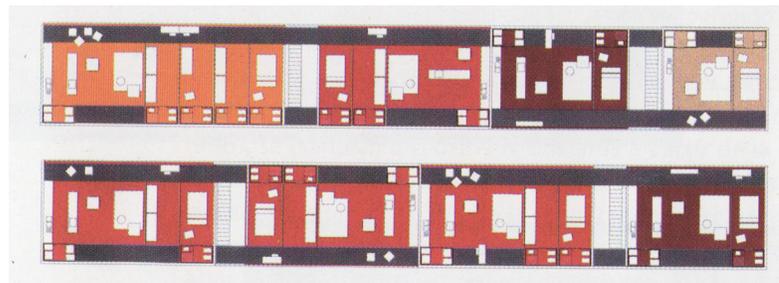
Sistema ABC Variable floorplans (Gausa 1998)



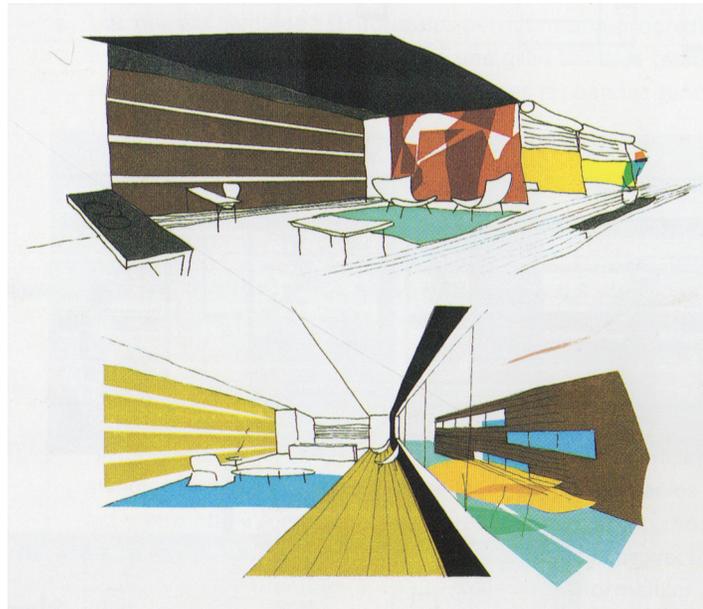
Sistema ABC Perspectives (Gausa 1998)



Sistema RAIL Variable facade (Gausa 1998)



Sistema RAIL Variable floorplans (Gausa 1998)



Sistema RAIL Perspectives (Gausa 1998)

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