

SUBURBAN / URBAN GRAFTING:
TOWARDS AN ARCHITECTURAL AND URBAN HYBRID

By

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Author's Declaration

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Suburban / urban grafting: Towards an architectural and urban hybrid

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Master of Architecture, 2013
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Abstract

Land is a finite resource which does not support the low density suburban model on a large scale. The alternative, the urban condition, does not satisfy the needs of families. The goal is to define a middle ground, to create a hybrid, by taking the best qualities of the suburbs and urb to develop a new vision for the city. Is it possible to combine the typological characteristics and spatial qualities of the suburbs in an urban format where the disadvantages of the suburbs are mitigated by the multiplicity of urbanity? For the purpose of this thesis the design proposal is tested on Ijburg, Amsterdam, the Netherlands. The resultant hybrid is manifested through the mixing of different housing typologies both suburban and urban in conjunction with an elevated street which provides private access to individual units and public access to recreational and leisure facilities.

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Dedication

To my family

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Source: John Kotsampouikidis

Figure 4.4.2.5b One-storey apartment elevation

Source: John Kotsampouikidis

Figure 4.4.2.5c One-storey apartment 3D section

Source: John Kotsampouikidis

Figure 4.4.2.5d One-storey apartment location key

Source: John Kotsampouikidis

Figure 4.4.2.5e Two-storey apartment floor plans

Source: John Kotsampouikidis

Figure 4.4.2.5f Two-storey apartment elevation

Source: John Kotsampouikidis

Figure 4.4.2.5g Two-storey apartment 3D section

Source: John Kotsampouikidis

Figure 4.4.2.5h Two-storey apartment location key

Source: John Kotsampouikidis

Figure 4.4.3.1 Ijburg section a-a'

Source: John Kotsampouikidis

Figure 4.4.3.2 Ijburg section b-b'

Source: John Kotsampouikidis

Figure 4.4.3.3 Ijburg section c-c'

Source: John Kotsampouikidis

Figure 4.5.4.1 Southeastern street perspective

Source: John Kotsampouikidis

Figure 4.5.4.2 Waterside Cafe

Source: John Kotsampouikidis

Figure 4.5.4.3 Beginning of the elevated street

Source: John Kotsampouikidis

Figure 4.5.4.4 Ascending the elevated street

Source: John Kotsampouikidis

Figure 4.5.4.5 Playground on the 5th floor

Source: John Kotsampouikidis

Figure 4.5.4.6 View of the courtyard

Source: John Kotsampouikidis

Figure 4.5.4.7 Elevated street on the north side

Source: John Kotsampouikidis

Figure 4.5.4.8 Elevated street on the north, courtyard side

Source: John Kotsampouikidis

Figure 4.5.4.9 Lighthouse and Bistro Bar

Source: John Kotsampouikidis

1.0 Introduction

The purpose of this thesis is to investigate the development of a new residential type that combines both suburb and urb in a new hybrid condition. This thesis is about exploring the possibility of creating a suburban / urban hybrid, where the typological characteristics and spatial qualities of the suburbs are grafted onto an urban typology whereby the disadvantages of suburbia are mitigated by the multiplicity of urbanity. It is about reconciling two opposing ideals, urb and suburb by extracting the most favourable characteristics and qualities that may lead to a development of a new hybrid type.

The word grafting suggests an application of combining 'B' to 'A' and by doing so making the condition 'AB' superior to the parent 'A' and 'B'. In *The City of To-morrow and its Planning*, Le Corbusier alludes that the afflicted city needs surgery to heal. To heal the city Le Corbusier suggests cutting part of the sickness out, i.e. the closely packed buildings of the metropolis and replacing them with high-rise buildings surrounded by a sea of green. Taking a cue from Le Corbusier's allusion to the medical field, this thesis will propose grafting as a solution to merge the two ideals of suburb and urb. In the medical world grafting is used to heal a patient. Skin or muscle tissue from one area of the body is taken to heal another part of the body. In horticulture grafting is used to make a hybrid. For example, if the desirability of creating a hardier plant to survive in a colder climate, the desired plant is grafted to the roots of the hardier plant, thereby allowing it to survive the frost. Another example in horticulture is creating a tree that could bear two fruits. This is done by grafting a branch of one tree with the main tree and allowing it to heal and grow. Similarly, the goal of this thesis is to graft the typologies and desirability of the suburbs with the condition of the urban environment.

Cities at the turn of the 20th C. were poor, run-down products of the industrial revolution. They were sites of industrial work and not for living. They had poor sanitation and living environments. For this reason most

people left the city for healthier options to raise a family. The city thus became synonymous with industrial work and the poor and unfortunate who could not move family and home. The suburbs became synonymous with healthy living and a safe place to raise a family in light, air and space. However, for the 21st century this is not always the case. City living is seen as sustainable whereas the suburbs consume vast amount of resources. There are flaws with both conditions however pros can be mutually beneficial. "Two urban models were developed in the 20th century as responses to these desires - the individuality of suburbia and the density of the tower block – neither of which is suitable for our increasingly populated and resource-scarce planet (MVRDV, 2012, p 64)." How do we combine the density of urban environments with the individuality of suburbia?

There is a problem with the archetypical condo/apartment building type. In some senses it fails to be a house. Moreover, why do people choose to live on top of each other? Why do these people not choose to live in the suburbs with space and nature around them? Perhaps it is for the proximity to the city centre or for better chances at employment. However these aspects can easily be found in today's suburbs as suburban environments are increasingly changing to serve the needs of those people removed from the centre of the city. Perhaps people live in the city for the multiplicity and spontaneity of activities which the suburbs seem to lack. At the same time, there is a problem with the single-family dwelling in suburbia. The problem with suburbia is that it is the perfect ideal for a home but it is not a viable solution on a mass scale. Most people would want to live in a suburban dwelling. What makes a single-family dwelling so desirable? Perhaps it is because people are in search of privacy, isolation and protection from the others. Perhaps people have a desire for something to call their own, finding those primitive instinctual qualities for living. The single family home is the primitive hut – it symbolizes innate needs (primordial needs) of shelter (roof over the head), protection from the elements, privacy, for land to call our own, to be masters of our own domain. It is a symbol of personal affirmation and individuality. However the single-family dwelling consumes too much

space, energy and resources.

The single-family dwelling in suburbia is the ideal, but it cannot be the mass solution. Moreover the conditions that created the suburbs no longer exist at the intensity developed following the industrial revolution. The western world lives in cities that have switched from an industrial production economy to a service, commerce and tech economy, therefore the city no longer resembles the industrial city and the suburbs no longer retain the original intent or ideals. So the question remains, why not emancipate the best from each ideal, since their original factors for the development of both no longer exist?

This thesis proposes that the suburban / urban hybrid is an opportunity to create a different option for living where architecture can be used as a device to ameliorate pressures on land consumption by densifying and building vertically. The idea of the suburban / urban hybrid is to provide the comforts, luxuries and positive lifestyle of the suburbs while increasing densities to encourage smart land use and create a more sustainable atmosphere through compactness. It is about taking the horizontal and making it vertical in hopes of being more compact, more sustainable and to limit sprawl. The suburban / urban hybrid strives to bring things closer together and share amenities but still have the freedom, openness and character of the suburbs.

2.0 Background information

Twentieth Century utopias: the legacy of remedying the resultant maladies of the industrial city

The industrial revolution was a significant event that increased migration to the city. Industrialization brought rural dwellers to the city for opportunities in work and life. Oddly enough, it was also the event which influenced the disillusioned city dwellers to leave and desire healthier and safer living environments. Before the industrial period, houses accommodated peoples' businesses, their household, their apprentices and servants, however, as houses became noisier and dirtier the middle class decided to divorce work from dwelling. Thus, the dwelling became about the household and leisure. The middle class moved out of the city to the periphery (French, 2006, pp 8-9). At first it was the privileged few who could escape the congestion, degradation and squalor of the chaotic city life, in search of a privately owned dwelling in the country. The cost of commuting in and out of the city was inhibiting for the masses. Fleeing the city became the ideal for those who could afford it and an unattainable goal for those who could not.

Cities up to the beginning of the 20th C. were considered to be dreadful, a site of misery. Laissez-faire tendencies of the 19th C. great cities created, poor, chaotic and inhuman jerry-built dwellings. These conditions led to the formulation of city building ideals which called for the use of modern technology and materials to remedy the abysmal state of housing and produce the cities of tomorrow. The 19th C. industrial city was influenced by many factors. The opening of new industries and factories fueled by the technological revolution created new opportunities for people in the city, specifically for the rural population. The rural population left the country and their agrarian roots because new technologies allowed for efficiency in agricultural production, meaning there was less work for them there. The transportation and communication revolution also aided in the increased viability and desirability for people to move to the city. All these factors increased migration to the city. Further to this increase of people from country to city there was massive population growth in cities, which was made possible by the greatest factor of the period, the increase of food production. The rapid

increase of population in the industrial city created the poor conditions associated with it. The industrial city could not cope nor grow in response to the large increase of population. The political, social, economic, and philosophical thought created legitimacy for laissez-faire tendencies. Darwinism, for example, ultimately left it up to individuals to better their own lives (Mumford, 1961, p. 454). The main tenet of Darwinism was that nature evolves, it does not design itself. From the struggle to survive the specie adapts, it evolves to deal with its environment. Similarly for the struggle to survive better forms of urban structure will evolve into a better specie, it will potentially lead to newer and better forms, therefore, let the city evolve and grow naturally. Allow the free market to create demand and provide for the citizens. The pressure and the struggle that will come out of a bad situation will create success. In the struggle for success, the city and its people will either survive by adapting and evolving or it will die. Anything subpar will perish and be replaced with a superior condition.

Escaping the city was about leisure and recreation, but it was also about sanitation and health. During the Black Death epidemic in the medieval period people left the city to be in healthier pastures. Likewise people left the cesspools of the 19th C. industrial city. Large amounts of chlorine, ammonia, carbon monoxide, phosphoric acid, fluorine and methane spewed into the air from factories in the industrial city. These chemicals and other carcinogens created poor living conditions. Poverty and a poor environment produced rickets in children, malformations in bone structure, defective functioning of endocrines, caused small pox, typhoid, scarlet fever, septic sore throat, tuberculosis, bronchitis and pneumonia which caused wide spread death (Mumford, 1961, p. 467). What became apparent was the imperative to bring back fresh air, green open space and sunlight, which meant either changing the city or moving out.

From this period five plans stood out. The Garden City was conceived by Ebenezer Howard, a British stenographer in 1898; A Contemporary City created by Le Corbusier, a French architect and urbanist, in

1922; Plan Voisin also created by Le Corbusier in 1925; Broadacre City created by Frank Lloyd Wright, an American architect in, 1932; and the Radiant City created also by Le Corbusier in 1933. These three men each had a specific vision of how the modern city should operate and function. Each was influenced by the poor city conditions of their time and their personal ideology on how to better society. Each wanted to take the best of two conditions such as the spatial environment of the country including leisure and recreational activities and combine them with the emerging dense metropolis to make a superior condition. Le Corbusier believed that centralization will improve lives through the communal aspect of amenities and the proximity of buildings to reduce wasted travel time, while Howard and Wright believed in a decentralized city where people have a closer relationship with the land.

Ebenezer Howard: centralized-decentralization, and the first Garden City

The Garden City was a schema conceived by Ebenezer Howard in the late 19th C. (figure 2.0.1). Originally published in 1898 as *To-morrow: a peaceful path to real reform*, the Garden City was predicated on the idea of decentralization and a belief in a more egalitarian communal society. He was influenced by the early

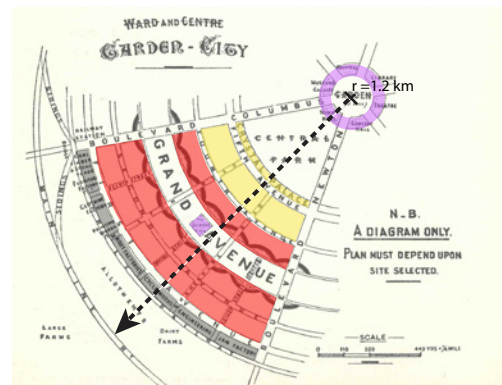


Figure 2.0.1: Garden City

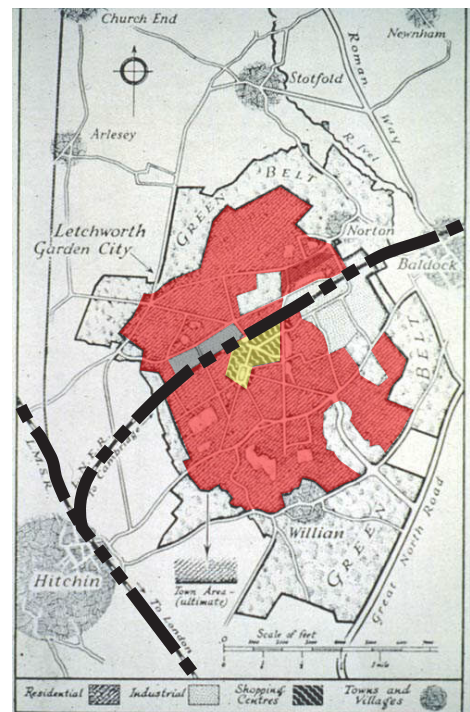
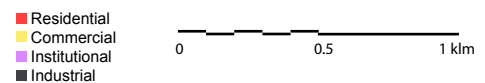
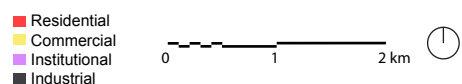


Figure 2.0.2: Letchworth First Garden City



socialist writers condemning the early industrial city. He was motivated to find a solution against the social degradation of a capitalist society. His objective was to move to a more communal society where the industrial population, the workers, were closely linked to the land. The basic tenet of the plan was to merge together the fundamental benefits of the Town-Magnet and the Country-Magnet. The Town-Country Magnet described the hybrid between the two existing conditions. He argued that each existing condition has its own disadvantages but with the proliferation of the hybrid Town-Country Magnet the resultant condition would be better than both original conditions. Howard states that the best of the Town-Magnet was that “human society and the beauty of nature [were] meant to be enjoyed together,” and, therefore, in his conception, the two magnets should be made into one unifying schema (Howard, 1965, p. 48).

Howard's sketch of the Garden City was based on a series of concentric rings. The Garden City was conceived to be 2428 hectares (6000 acres) with the city comprising only 1/6th of the total area, which means the agricultural area created the majority of Howard's schema. In the centre was a garden which was surrounded by the public buildings such as the town hall, theatre, lecture hall, library, museum, picture-gallery and hospital. These buildings were surrounded by a central park and the Crystal Palace which was a covered glass arcade that opened up to the park. The next ring was the location of retail. On either side of Grand Avenue was the public sector. This was the location of the residential area comprising of dwellings with gardens and schools, parks and playgrounds. The residential district in the Garden City was conceived to be inhabited by 300,00 people. Here there were 5500 building plots which had an average lot size of 6.1 by 39.6 meters (20 by 130 feet) with a minimum of 6.1 by 30.5 meters (20 by 100 feet). On the outer ring, fronting the railway which links back to the main city, were the factories, warehouses, markets and coal yards. In the outer agricultural belt of the Garden City, Howard proposed living space for 2000 people (Howard, 1965, pp. 53-55). The total population of the Garden City was not to exceed 32,000. The density of the entire Garden City was to remain at 2 inhabitants per hectare. Considering only the center of the city which is about 400 hectares, the

density was 12 inhabitants per hectare.

The Garden City upon reaching its maximum capacity was conceived to grow into other satellite cities. They were to provide relief from the density of the central city while still maintaining links to the city. However, the Garden City began to be seen as the beginning of a suburban sprawl. This was not Howard's intent, but this misconception, "unfortunately, would lead many vocal critics to blame Howard for the ill of urban flight, suburban sprawl and low-density development (Fishman, 1997, p. 46)." The concept of the Garden City was misconstrued, as pointed out by Lewis Mumford. According to Mumford it was "not a suburb but the antithesis of a suburb: not a more rural retreat, but a more integrated foundation for an effective urban life (Lewis Mumford in Howard, 1964, p. 35). The Garden City was supposed to be, in most cases, self reliant. It had all the facilities, educational, industrial, commercial and recreational functions that it needed. It was a small town straddling the rural/urban paradigm, a mini-city with a population that would not exceed 32,000. When the Garden City reached 32,000 another Garden City would be started until a constellation of satellite Garden Cities were created around a central city.

Ebenezer Howard's theories were made manifest with the foundation of First Garden City Ltd. in 1904. The objective of the First Garden City Ltd. was to "promote and further the distribution of the industrial population upon the land upon the lines suggested in Mr. Ebenezer Howard's book entitled *Garden Cities of To-morrow* ... and to form a Garden City, that is to say a town or settlement for agricultural, industrial, commercial and residential purposes (Purdom, 1925, p.58)." Letchworth was selected as the site of the first Garden City as it was a location that emulated attributes developed by Howard and a place to start the beginning of a new society of cooperation (figure 2.0.2). Letchworth at the time of purchase was a small village located 34.5 miles (55.5 km) northeast London via the Great Northern Railroad. Letchworth, a Greenfield site, had a population of only 50 people with a few buildings on site. The size of Letchworth, the Garden City, was attributed to the

consolidation of different estates in the surrounding villages of Willian, Norton and Radwell by First Garden City Ltd. These estates totaled 1547 hectares (3822 acres) (Purdom, 1925, p.58). Later on more land was purchased at a total amount of 1840 hectares (4548 acres). The agricultural belt was just over 1214 hectares (3000) acres leaving 626 hectares (1548 acres) for the city proper (Purdom, 1925, p.129). The railroad bisected the site which provided challenges and opportunities for the planning of Letchworth.

The design and planning of Letchworth was taken on by architects and planners Barry Parker and Raymond Unwin. Their goal was to emulate the spirit of Howard by adopting his tenets. Parker and Unwin decided to take a more organic approach to the plan which was based on the terrain of the location instead of imposing and replicating the concentric circles and the radiating boulevards. This approach was sensitive to the site which was expected from Howard. Howard put a disclaimer on his drawings that they were only diagrams and that a plan cannot be drawn until a site was selected. Parker and Unwin created an urban plan that followed Howard's in the sense that institutions were centralized in the scheme and was surrounded by agricultural land. The industrial area, however, was supposed to be located on the periphery of the Garden City as Howard suggested, but the nature of the site would not allow it. The railroad that bisected the site forced Parker and Unwin to segregate portions of Letchworth. They placed the industrial sector on the northern side of the railroad and the commercial, institutional and residential areas to the south. They wanted to ensure and maintain reasonable walking distances to the train station. They initially wanted to have the industrial sector upwind from the residential sector however more residential buildings were added to the north (Purdom, 1925, p. 104). The resultant plan of Letchworth was in direct contrast to Howard's original schema. The location of the railroad effectively centralized the industrial areas.

In the spirit of maintaining the idea of a cooperative society, the team designed Letchworth to have a cohesive architectural language. Keeping with the times, the architecture was not to be an eclectic sea of individual

dwellings in an array of different architectural styles as was seen in the richer suburbs of London. The architecture was to represent the society that would live therein, one of cooperation. Parker and Unwin, on the writing of Howard, developed dwellings called “quadrangles.” These dwellings were arranged around a common courtyard. Three sides of the quadrangles were devoted to apartments. The fourth side was preserved for common functions, such as the dining room, recreation room and nursery. The needs of everyday life such as food and coal would be purchased jointly by the residents and they would share the cost of hiring cooks and maids for the upkeep of the dwellings (Fishman, 1977, p. 70). By living together and sharing expenses the residents could potentially have more and enjoy other aspects of life.

Another dwelling type used in Letchworth was based on the English cottage. The middle-class English cottage was formulated for the individual on a sizeable plot with land for personal gardens of fruits, vegetables and herbs and recreational purposes. In Letchworth however, Parker and Unwin used the English cottage as a foundation and attached them in rows of three up to ten. By attaching them together and effectively creating row houses, Parker and Unwin consumed less land than the original cottages and increased the density. By consolidating the plots of land they were able, in the spirit of Howard, to provide either a common courtyard or a field, while still maintaining a private single-family two-storey dwelling with a personal garden (Fishman, 1977, p. 74). These houses were not just scaled down versions of the traditional English cottage but were designed in order to emphasize Howard’s conception of living in the Garden City. Emphasis, even within the house, was given to the communal functions such as the living room and kitchen combination (Fishman, 1977, p.74). Thus, it became the largest portion of the house, the hearth, the focal point and centre of family life.

Howard was a stenographer. He was neither trained as an architect or an urban designer, thus he did not

provide any plans on such lines. He provided a vision of an ideal society that was based on principles of equality and community where neighbours would share amenities of everyday life. His plan was a diagram rather than a physical vision. He abstained from placing constraints on how the architecture and urban design should manifest. He purported in his sketches that his representation was only a diagram. Howard merely provided a frame of mind, a network of thinking that established the paradigm of the new Garden City. It was not canonical in what style the dwellings should be designed in or how the roads should be designed. It merely stated the goal of the Garden City as brining the Country-Magnet and Town-Magnet into a new Town-Country Magnet. He left it as a theory, a vision, and a philosophy on how a new society should live their lives and be saved from an ever consuming capitalist city. Howard left it up to real architects such as Raymond Unwin to give life to his vision. He did not have a particular image of the city, planning method, or building type, it would be based on the landscape, climate and the industries and technological facilities available. "His ideal city was a combination of the possible and the practical, ideal enough to be desirable, close enough to contemporary practice to be realizable (Fishman, 1977, p. 518)."

Frank Lloyd Wright: extreme decentralization and Broadacre City

Broadacre City was conceived by Frank Lloyd Wright and published in *The Disappearing City* in 1932. In 1935 he exhibited a scaled model of a portion of his city. Interestingly enough, he exhibited his city at Rockefeller Center, which represents the opposite goal of his ideal city. He presented his future city in the heart of the monstrosity he was trying to avoid. Rockefeller Center represented the very essence of an industrialized urban city. It represented the density, multiplicity, spontaneity of a centralized city. Broadacre City was about highlighting democracy, freedom and American values, whereas the industrialized city, with spawn like Rockefeller Center, was about the centralization of money and power. The industrialized city was destructive to individuality and freedom. Wright's schema presents the following goal: "...uniting desirable features of the city with the freedom of the ground in a natural happy union: such reintegration as here called Broadacre

City (Wright, 1958, p 71).” To achieve a better city he would do it through decentralization and reintegration. Decentralization of power, money and governmental authority and reintegration of the citizen back into nature to create a more wholesome life. Where the industrialized city was about centralization, Broadacre City was about freedom. Wright wanted to decentralize power, money and governmental authority in order to create a better relationship amongst the citizens with themselves and the land.

Wright’s rhetoric takes on an anti-capitalist, anti-communist and pro Jeffersonian democratic stance. Capitalism a factor which influenced industrialization became a subject of influence for Wright’s future city. What was interesting with Wright’s approach was that most critics of the industrial revolution decried capitalism and accused it for the poor sanitary conditions it created. These critics turned to a more egalitarian communal model for society. There was plenty of documented Marxist rhetoric mostly centered in Europe. Howard, for example, decided for a more communal society which was illustrated with the use of the quadrangles with many aspects of the house being used communally. While Wright’s rhetoric found the same assault on capitalism as the cause of the degradation of society, he turned to democracy. He believed that for people to live more humane lives they had to be completely free. Jeffersonian democracy appealed to Wright in which authority had little power in regulating how society performed. The same assault on capitalism lead Wright to decry against centralization of power and money. For Wright capitalism and centralization went hand in hand which eventually in his belief would result in communism, which was inhibiting to proliferation of the individual. Wright writes that “democracy was conceived as the free growth of human individuality, mankind free to function together in unity of spirit (their own skill in making); by nature thus averse to formalism and so to institutionalizing (Wright, 1958, p 45).” The industrialized city kept mankind shackled to the machine of capitalism. Wright wanted a city that would remove the constraints of capitalism to create a society that was more in touch with itself as an individual.

For Wright the future city must move away from a centralized and capitalist schema to a more natural and democratic one to ensure individual values of people. To ensure that his city would be decentralized and continue to be decentralized in the future, it had to be decentralized politically, economically and physically. Decentralization politically and economically ensures the removal of the citizen from the trappings of capitalism. In the centralized city the urbanite was required to pay rent for rent, rent for money, and rent for land (Wright, 1958, p 35). Conversely, in Broadacre City, the citizen would live freely, through owning their own land and dwelling. Decentralization physically would allow citizens to live, work, play and grow as they saw fit. Through physical determinism, the decentralization and reintegration of the natural environment, would save and liberate the American citizen. Those who lived in the city have lost the value of the earth and in order to gain a more wholesome life, the citizens must leave the centralized, capitalist city. Wright writes that the urban citizen was a slave to the "heard-instinct, fatally committed to vicarious power... a weed he grows rank in the urban field (Wright, 1958, p 18)." For Wright the city and the urbanites were debased, spiritually inept and out of sync with reality and nature which gave them essence.

In Broadacre City the citizen became an individual because the trappings of a capitalistic society no longer exist. People were no longer "owned" by corporations. The new city was to ensure physical, economic and political independence of the citizen. For Wright democracy equated to the family, ergo the individual unit was the family. "In democracy family is norm. The family holds within itself the very seeds of cultural that is native, organic therefore, and has a future (Wright, 1958, p 87)." The land became theirs, their ideologies became their own, they do not owe the bank money, they would not pay rent, they would not pay rent on their money, etc. Individuality based on Jeffersonian ideals of the self-reliant citizen. It became the first time for self determination and affirmation. Whatever a person achieves in creating their own dwelling on their acre and working the land to provide sustenance was with their own sweat at tears, which for Frank Lloyd Wright is the natural process of things. "Broadacres is our free city for the sovereignty-of-the-individual! Not simply

because it is based upon the minimum spacing of an acre to the individual, but more important, because when democracy builds, this is the natural city of freedom in space, of human reflex (Wright, 1958, p 110).”The natural way to build a dwelling, the natural way to build a society, which builds a free city which is a cyclical process that ensures democracy.

In the creation of Broadacre City, Wright was never against industrialization. Broadacre City was conceived to bring the citizen back to a simpler rural life with more individuality and a better relationship with nature and

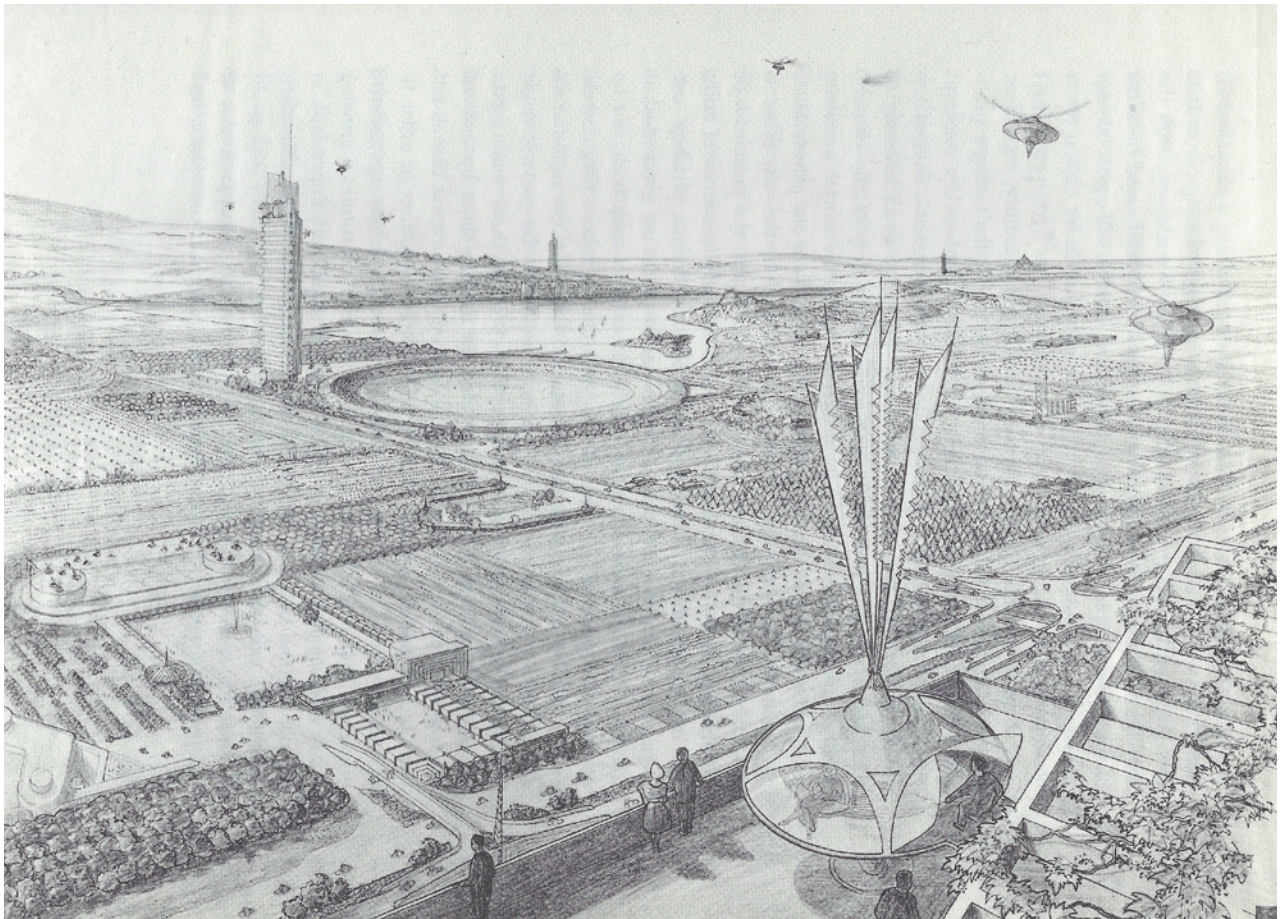


Figure 2.0.3 View of Broadacre City

with each other, but without getting rid of modern technology. His schema in fact was extremely reliant in the technologies and materials that were produced during the industrial revolution. He only cautioned against the role of the machine in relation to the new organic citizen. The machine could not control the life of the citizen, as the capitalistic city did. It must aid in the affirmation of the citizen's individuality. The automobile, for example, compliments the citizen's individuality. Wright writes, "... out of this automatic turnabout against his own industrial revolution without a soul now fast running away from modern man he may yet emerge as master instead of machine-age conscript (Wright, 1958, p 20)." The automobile in conjunction with a vast and complex super highway system allowed the citizen to go wherever the citizen desired and as quickly as possible. Personalized helicopters also aided the citizen in the freedom of traversing the city as the citizen wished. "Machine design is now principle means of making use of power for decentralizing the big city and dispersing it; collecting it into what we, at first, call countryside (Wright, 1958, p 71)." Everything from the planning of districts to the governing power was decentralized. Wright believed that modern technology would allow people to live further apart and since he was designing in the machine-age he thought it was imperative for modern man to take advantage of modern technology. The telephone and radio helped people communicate over long distances and the automobile helped them transverse those distances. The extreme decentralization was made possible by the invention of the automobile.

Wright saw the cultural spirit of America being of organic and natural forms of architecture that responded back to the landscape. Organic architecture, as he phrased it, was created with nature and the landscape in mind where form and function were situated harmoniously with nature. Organic architecture was Wright's way of saying that there can be no waste and since he was creating a decentralized city that was predicated in the affirmation of the horizontal, architecture needs a better relationship with the ground. By building organically the citizen could become more democratic and freer. Organic architecture "seeks spaciousness, grace and openness; lightness and strength so completely balanced and logical that it is a new integrity bound to scatter

servile imitation, to take away all urban stricture and depravity (Wright, 1958, p 97).” Wright further writes that, “once we understand to live on an organic basis we can be free and create a more human civilization (Wright, 1958, p 27).” For Wright living more natural meant living more democratic, living more democratic meant living individually. Every aspect of Wright’s future city was based on the idea of a more democratic and individual society achieved through the vehicle of organic architecture. To achieve one aspect of Wright’s society was to achieve another aspect and vice versa, however with the first condition there could not be a second. For example, to live naturally, to be more democratic, the citizen must be democratic to live naturally. They must shed their capitalist shackles and return to the land. Similarly, in order to live more individually, to be democratic, the citizen has to be more democratic to live individually – in essence free. In essence, to live democratically is to live naturally through organic architecture.

Broadacre City was designed and planned so that each person could have a minimum of one acre to themselves. Frank Lloyd Wright believed that there should no longer be a distinction between rural and urban lifestyles and that if both were to be reconciled, then there would no longer be any separation of rural and urban environments. Therefore, in Wright’s schema, all aspects of urbanity were found in rural locations. Since the physical nature of Broadacre City was horizontal planning, all essential units of the industrialized city must be recreated on a smaller decentralized level. The industrialized city was variegated both vertically and horizontally. Broadacre City was only variegated horizontally at intervals that were related to the distance covered by the automobile. “Normally the factory, farm, office, store or dwelling, church or theater would be within ten minutes radius of vast, variegated wayside markets and schools (Wright, 1958, p 121).” In Broadacre City, therefore, buildings were created on smaller scales and were placed in each area, usually near highway junctions, to ensure that a center was not created and to deter power and wealth from accumulating in one area. The big factory of the industrial city, for example, was scaled down into pieces and evenly dispersed within the city. The factory in Broadacre City was given much more space around it.

Business offices are virtually non-existent, they have been amalgamated into the factory or more likely into the homestead. Similarly the offices of the professionals were also amalgamated into the homestead. The community center, bank, and other essential bureaucratic and civic offices have been attached to the fire and police stations which were located near a major highway junction. The greatest product of Broadacre City, other than the homestead, was the markets (Wright, 1958, pp 164-168). The Markets were large spacious roadside pavilions where the farmers would sell their product. These places were sites “designed as places of cooperative exchange, not only for commodities but of cultural facilities (Wright, 1958, p 168).”

Since Broadacre City was meant to be democratic and foster the individual spirit in conjunction the natural environment, the city was manifested horizontally. The city was horizontal where the power of the individual reigns instead of the vertical, as in the industrialized city, which the collective was norm. Therefore in Broadacre city it was the individual dwelling that was the predominate typology. The professor, farmer factory worker, doctor, entertainer, as well as millionaires live in the same location, side by side on their own acre. There was no distinction between class hierarchy and privilege in location. The dwelling was to relate to the citizen who builds it and to the natural environment it was located in. This was the homestead, where the democratic family unit lives and works the acre of land to their benefit. The homestead represents the economic and political locust in Broadacre City. Each homestead in the spirit of decentralization and individuality has the authority to carry out such tasks (economic and political) as they deem proper. The homestead was also the site of business transactions and the office of a home professional. In Broadacre City the dwelling finds its pre-industrial roots. Human interaction in general finds its pre-industrial relationships.

The skyscraper was not banned from Broadacre City. Although it is a key figure in the proliferation of the centralized city, Wright found value for it in his new city. The skyscrapers value was not strictly in its ability to densify and therefore centralize, but by its economic abilities of affordability. Furthermore, Wright realizes that

the new city and its agrarian lifestyle would not appeal to everyone. The skyscraper provides another option. Wright writes that, "Cooperative apartment houses might be erected for immured, untrained urbanites desiring to enjoy the beauty of the country but yet unable to participate in creating or operating it. But apartments houses need no longer be tier on tier of glass used as curtain walls, but each extended level with its flowers – a vine-festooned balcony-terrace (Wright, 1958, p 122)." While the skyscraper was welcomed in Broadacre City, it was dispersed like all other buildings. For the skyscraper to find acceptance in this new organic architecture it must be far removed from other buildings as not to cast a huge shadow on other citizens' property. Broadacre City was meant to be free and democratic so the casting of a shadow and a large tower in close would potentially impinge the freedom, security, space, light and privacy of other citizens. Therefore the skyscraper was placed inside a giant park several acres large.

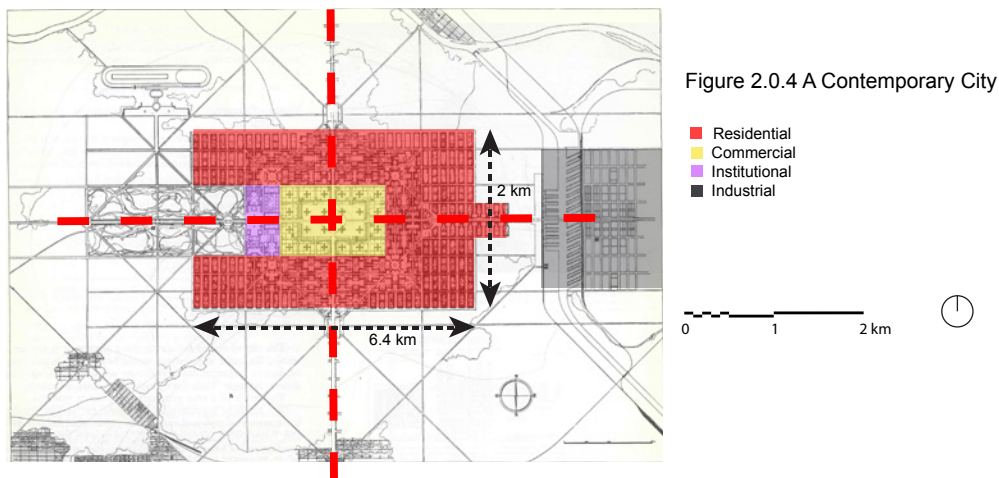
Broadacre City was about bringing man back to nature through the use of modern technology. Wright's schema was a "juxtaposition of the past and future: the ideal of Jeffersonian democracy given new meaning in terms of technology of the future (Fishman, 1977, p. 124)." It was a hybrid that merged the efficiency and futurism of the modern metropolis and the humble humanity of the natural environment of the rural country. Wright's schema was manifested through the affirmation for suburbia. It was back to the country ideal and fully decentralized, but not without the full technological arsenal that aids the citizen in the assertion of the individual as described above. Howard's schema like Wright's was the withdrawal from the dense capitalist city and back to the country ideal. Where Howard and Wright differ was in the physical planning of the new city. Wright's city was decentralized to a point where there was not conceivable center, while Howard's city is a string of small towns.

Le Corbusier and the vertical proposition

A Contemporary City

Le Corbusier's formulation of a Contemporary City (figure 2.0.4) was in ways the antithesis of Howard's Garden City. Le Corbusier writes that when "...more garden cities are suggested, these decision are reached in a sort of frantic haste in order as it were, to hold a wild beast at bay. That BEAST is the great city (Le Corbusier, 1971, p. 161)." Le Corbusier's "beast" was a city for three million inhabitants proposed for a Greenfield site. In this city the technocrats and the leading elites of society would live in the center and the lower class would live on the periphery. In the center of the city were twenty-four sixty storey cruciform high-rises for business. At the periphery was the "supple, extensive and elastic," garden city. Le Corbusier refers to these two zones as the "organs" of the city. Le Corbusier's fundamental tenet for a Contemporary City was to increase the open space for leisure and recreation while decreasing the time and distance needed to transverse the city. Thus the modern city must be built vertically (Le Corbusier, 1971, p. 162). A Contemporary City was created by Le Corbusier to be streamlined, modern and efficient. It was a vision of high-rise buildings and highways to produce high densities and a compact city, which will lead to free time, leisure and recreation.

In creating these residential blocks, it was Le Corbusiers proposal to make everything vertical in the hopes



of increasing density. For Le Corbusier, verticality gives way to density; density gives way to leisure and recreation via the freeing up of the ground floor plane; density creates a more compact city reducing the distance from place to place in order to make the city more efficient and streamline operations. The residential quarters built within the city, therefore, must also be built densely and vertically. In a Contemporary City the density of the residential blocks, both with set-backs and on the cellular principle were 49 hectares (120 per acre). Both kinds of residential blocks have a total population of 600,000 inhabitants. Most of the people live in the garden cities which comprise of 2 million people. The other 400,000 inhabitants live in the twenty-four sky-scrapers. (Le Corbusier, 1971, p. 168).

In discussing the sick and dilapidated residential quarters of the 20th century, Le Corbusier proposed to remove “corridor streets,” his term for side streets. Since all these units will be closely packed together and designed for verticality with shared amenities, they will also share one door. Instead of forty doors opening to the side-street, there will be one door opening to a car port which indeed eliminates the need for corridor streets. These corridor streets, as he would see in Paris and most early century metropolis were tightly packed with houses or more likely tenements. They were extremely narrow and often insufficient for any movement decent enough for the 20th C. and they did not provide any leisure for residents. He writes that corridor-streets were, “full of noise and dust and deprived of light,” It is a simple matter to build urban dwellings way from the streets (Le Corbusier, 1971, p. 163).” Le Corbusier vehemently decried those corridor streets as stifled dead spaces with light, air and sky blocked out by the overbearing heights of buildings in tight corridors constricting daily life. He noted the importance of light, air and sky on human life and health. Therefore Le Corbusier removed the corridor streets and replaced them with lush communal green space for recreation and leisure.

In a Contemporary City there were a few different housing types built on the same ideas of open green space, light and air, but they differ in their proximity to the centre of the city which has to do with social hierarchy

as proposed by Le Corbusier. In the centre of the city lived the technocrats, those who ruled the city. This social class lives in apartments and they constitute a very small minority. The elite and well off live outside the commercial centre in high-rise residential blocks. These units were double storey apartments and form maisonettes with double loaded corridors. Le Corbusier calls these apartments: residential blocks with “set-backs.” The residential blocks with set-backs were the luxury dwellings. The residential blocks did not have internal wells as each unit looked on either side onto immense parks. These are strictly located within the city. These were the apartments for the richer citizens who could own their own apartments. The residential block based on the cellular principle or the honeycomb had hanging gardens. Like the set –back residential blocks, they also looked onto immense parks and again they have no internal wells. Another apartment type that Le Corbusier employs was the residential block based on the “cellular” or “honeycomb” configuration. These residential blocks were located on the periphery. The workers lived outside the city, beyond the protective zone in garden cities. These garden cities, while being outside the city proper, were different from Ebenezer Howard’s Garden City. Le Corbusier’s inclusion of the garden city at the periphery of the city is quite peculiar when he distastes the Garden City calling it leprous. Le Corbusier’s solution is to make it denser. Le Corbusier explains that the Garden City:

“consists of a plot of roughly 400 square yards with a little house in the middle. Part of the plot is a flower garden, and there are few fruit trees and a tiny vegetable garden. It is complicated and difficult to keep up, and involves endless pains (call it the romantic simple life if you like) for the householder and his wife to keep things tidy, to weed it, water it, kill the slugs and the rest; long after twilight the watering-can is still on the go. Some people may call all this a form of healthy exercise. On the contrary, it is a stupid ineffective and sometimes dangerous thing. The children cannot play there, for they have no room to run about in, nor can the parents indulge in games or sports there. And the result of all this is a few pears and apples, a few carrots, a little parsley and so on. The whole thing is ridiculous (Le Corbusier, 1971, pp. 202-203).”

Le Corbusier adapted the Garden City idea to be denser and have more amenities and by doing so be more communal than Howard’s schema. In a Contemporary City, the garden city:

“Occupies an area of 50 square yards and is built in two storeys, which gives 100 square yards of habitable floor space. The flower garden would take up 50 square yards. For sports

I would allow 150 square yards, and for the kitchen garden another 150 square yards so we have our 400 square yards in full use (Le Corbusier, 1971, p. 203)."

These dwellings became the houses with "hanging gardens" or houses based on the cellular or honeycomb configuration. These houses with "hanging" gardens, as Le Corbusier calls them, can be put together to form larger blocks which are set back from the street to create a sea of green space around the block. These spaces can be joined with neighbouring plots to create larger kitchen gardens or can be combined for leisure and recreation (Le Corbusier, 1971, p. 205). The hanging gardens provided privacy and shelter from the elements while still being outside. This is the combination of individuality and communalism which Le Corbusier instills in a Contemporary City, but again it is class specific because the elite live in villas with maid services. These residents either must commute into the city or beyond the city into the industrial zone. The people who live here are of lower income. They are workers who rent. In the garden city people live in villas or in dwellings in working class quarters or in small working-class dwellings which they rent. Le Corbusier called the people who live in the garden city suburbanites. Le Corbusier's garden city was not really a city in the sense of how Howard defines it. Le Corbusier misappropriates the word and reduces it to a mere suburb or dormitory town.

Plan Voisin

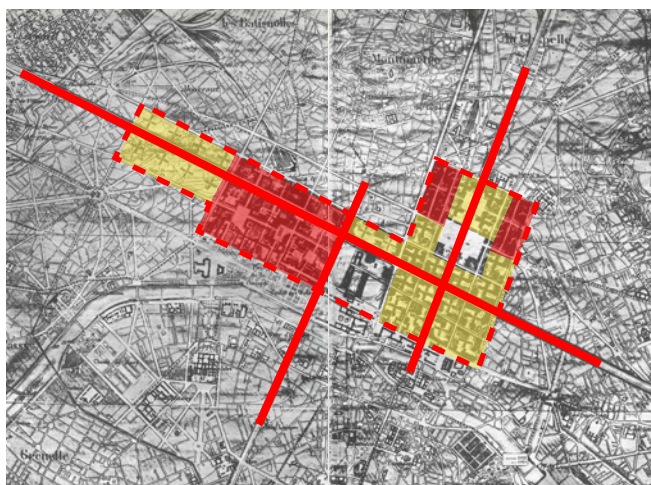


Figure 2.0.5 Plan Voisin for Paris

- Residential
- Commercial
- Institutional
- Industrial

0 1 2 km



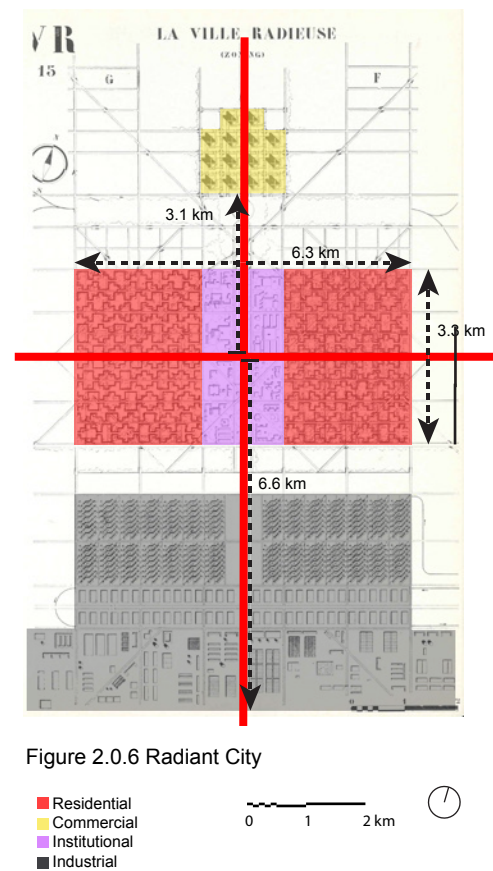
Plan Voisin was an urban design proposal for the centre of Paris in which the principles of a Contemporary City were applied. The plan entailed combining two essential elements: a commercial city and a residential city (figure 2.0.5). Le Corbusier called for the demolition of a large portion of Paris. The commercial city would occupy 600 acres of the unhealthy parts of Paris, while the residential would replace the overcrowded middle-class houses which were turned into offices. Plan Voisin was created to have a density of 1400 inhabitants per acre. It is $\frac{1}{4}$ the size of the Contemporary City, but it is denser (Le Corbusier, 1971, pp. 275-6).

In *The City of To-Morrow and its Planning* Le Corbusier talks about surgery and physics in relation to fixing the city. Surgery is comparable to the medical act of using a scalpel to cut and remove portions of damaged tissue. Physics is comparable to fixing through therapy. If the city is symptomatic; if it is congested, dirty, sick crowded etc.; if it is cancerous then there are two routes of it becoming healthy: removing the tumor or going through rounds of chemotherapy. Le Corbusier states that surgery must be used for the centre of the city and physics for everywhere else (Le Corbusier, 1971, p 256). It was important for Le Corbusier to place his intervention in the centre of Paris because for him, it was difficult to create another new heart of a city. He believed it was impossible to create a new centre for a great city beside an old one such as Paris, therefore surgery must be applied to the centre of the city.

Plan Voisin was the epitome of Le Corbusier's vision for the modern city. Plan Voisin was about verticality and density. He wrote about Plan Voisin, stating that a vertical city must be created, "a city which will pile up the cells which have so long been crushed on the ground, and set them high above the earth bathed in light and air (Le Corbusier, 1971, p. 280)." This was a poetic and symbolic gesture of rising up from the dirty industrial cities as a sort of evolution of man to live in the sky, in the clear air in the presence of the sun, by means of technology that came out of the industrial revolution.

The Radiant City

In 1930, Le Corbusier presented a new city for modern society: the Radiant City (figure 2.0.6). The Radiant City was a large city which was designed to be more compact than current cities. Like a Contemporary city it was to be streamlined, efficient and dense in order for things to be closer and distances to be shorter. There were no garden cities, or dormitory towns in the Radiant city, which meant no commuting in and out of the city and no wasting time (Le Corbusier, 1967, p. 94). His conviction of a centrally planned denser metropolis did not change, but his conception on the hierarchy of society did. A Contemporary City was led by the industrial and commercial elite, the technocrats, whereas the Radiant City was more libertarian. Robert Fishman writes that Le Corbusier “had lost the enthusiasm for capitalism which had led him originally to segregate housing in the Contemporary City according to class- elite in the center, proletariat at the outskirts (Fishman, 1977, p 227).” Le Corbusier wrote, “If the city were to become a human city, it would be a city without classes (Le Corbusier quoted in Fishman, 1977, p. 230).” The Radiant City was designed to be a city for the people, including the working class citizens, those without the means to achieve light, air and sky. These people were located in the centre of the city in apartment buildings called Unités as opposed to the periphery and outside the city as was found in a Contemporary City. The



residential district of the Radiant City was centrally located in the plan. It measures 3.3 by 6.3 kilometers. Each occupant in the residential district had 14 square meters to their disposal. It was using the 14 square meters principle that allowed him to achieve 1000 inhabitants per hectare in residential areas (Le Corbusier, 1967, p 114).

These Unités were like the residential blocks of a Contemporary city. The Unités were not designed to emphasize the individuality of the occupant but manifest the collective services available for all residents. As in the Garden City paradigm, Le Corbusier fostered the idea that if there was more cooperative sharing of facilities and amenities, it could lead to a more varied environment for a family than could be provided in a homogeneous single-family dwelling setting (Fishman, 1977, p. 231). The Radiant City was compact and centralized, which may potentially lead to more variations than a decentralized schema could. Le Corbusier extols that “urban concentration favours the introduction of ‘communal services’ (Le Corbusier, 1967, p. 38).” Le Corbusier fosters the idea of communal services through density. Catering, laundry, sports grounds, sandy beaches on roof tops were part of the residential blocks. These places were completely devoted to the residents. The sharing of facilities and the use of new modern technologies helped create new modern city for a modern man so that the residents were allowed to focus on other aspects of life like leisure and recreation (Le Corbusier, 1967, pp. 115-6.)

The Unités were compromised of maisonettes configured into double loaded corridors. They were designed to be 4.5 meters high and divided into two 2.2 meter floors. Each unit had a large window the full height and width of the unit. By creating large window, it was Le Corbusier’s intent to allow the dwelling to be flooded with sunlight and penetrate deep inside the unit so that he may design the units to be thin and deep (Le Corbusier, 1967, p 44). By doing this he could make his residential blocks more compact and denser. Furthermore, the floor to ceiling 4.5 meter windows allowed for direct and expansive views of the Radiant City which was

bathed in light and green. Residents could bask in the light, sky and air (Le Corbusier, 1967, p 44).

To further emphasize the verticality and compactness in the Radiant City, Le Corbusier further purports that the use of “artificial sites” must be deployed to build the city. Moreover there was more energy and time wasted in the decentralized city whereas in the Radiant City, the multiplication of artificial sites were “equipped with modern utilities: water, gas, electricity; and drains,” and “communal services eliminate waste and bring the urgently needed benefits of emancipation to the running of each home (Le Corbusier, 1967, p. 57).” Instead of decentralized horizontal garden cities, Le Corbusier emphasized the idea of the vertical garden city (Le Corbusier, 1967, p. 57). Taking what was originally thought out as horizontal and flipping it on its side to be vertical and in doing so adding more communal services and freeing up the ground for recreation and leisure.

In the Radiant City, Le Corbusier turns back on the idea of the suburbs. Although two million people lived in what he termed garden cities, he says “suburbs are broken, dislocated limbs (Le Corbusier, 1967, p. 92).” Since the Radiant city became about the resident, he planned for the residential area to be in the middle. Le Corbusier wrote that suburbs are not places of individualism but they are places of isolation. The suburb, “brings in its wake the destruction of social spirit, the downfall of collective forces; it leads to annihilation of the collective will; materially, it opposes the fruitful application of scientific discoveries, it restricts comfort; by increasing the amount of time lost, it constitute an attack upon freedom (Le Corbusier, 1967, p. 38).” Le Corbusier made the revelation that people who lived in the suburbs take forever to go there and back to the city even if he provided efficient transportation. Moreover suburbanites may have other contacts in other suburbs or in the city and never get to spend time with them because it took too much energy and time to go there.

Le Corbusier believed that the centre of any great city should be the business district. It should be the brains,

so to speak, of the city. This rang true for the placement of the technocrats and the hierarchy of classes from the centre of the city to the outskirts and beyond. What made Le Corbusier's schema possible was the implementation of the skyscraper for the business sector and the high-rise residential blocks for the residential sector. These types allowed Le Corbusier to provide higher densities while providing extensive recreation and leisure space on the ground plane for the residents. Imagine if the principles of vistas, grand boulevards, could be coupled in an interesting type where commercial aspects and residential aspects are combined together. Le Corbusier wrote about the stacking of artificial sites. Why not multiply and stack the ground floor, the parks and the grand vistas? It would be interesting to combine these different aspects in a new typology.

Summary

The industrial city was crowded and dirty. What became apparent from the above schemes was a proposal for the freeing up of space and bringing in green space. The idea was that green spaces would potentially create healthier cities, ergo healthier people. What was interesting was that each believed that physical determinism would help cure the ills of the city and its society. They believed the physical city would help shape the society which would live therein.

All three plans were utopias and idealistic. They were large-scale urban plans that were well thought out in their entirety. They were never just snippets of a possible idea, but whole plans that were large scale solutions for large scale problems. They designed from the macro to the micro and vice versa – finding solutions to every detail possible driven by social, political and economic idealisms. They used technology produced from the ills of the industrial revolution to create a better city. For Howard, it was the use of the railroad that would help commuting and moving goods. For Wright, the automobile and superhighways made his extreme decentralization possible along with communication tools such as the telephone and radio to allow people to be further apart but at the same time be much closer. For Le Corbusier, it was steel and glass to create the

skyscrapers and high-rises which made his vision for a compact dense city possible. They adapted the good things out of a bad situation and applied them in a new or better way with new ideals to create a better city.

Frank Lloyd Wright's conception of the ideal city was in some ways similar to Ebenezer Howard's. They both proposed plans that were decentralized, but Wright's schema was the destruction and then creation of new cities, whereas Howard advocated for a passive approach of building new Garden Cities away from current cities (Fishman, 1977, p.163). Moreover, Wright's schema was extremely more decentralized than Howard's to the point where the Garden City looks conventional in comparison with Broadacre City. In the Garden City everything was symmetrical, compact and centralized. One could see a unifying intent of man on nature and could pinpoint a centre. In Broadacre City the plan was so decentralized that there was no conception of city. Nature and the man-made were blurred to the point of no distinction (Fishman, 1997, pp 91-92). Howard's schema was geared, as stated previously, to a more egalitarian communal society so a decentralized, centralized city made sense to him, where people lived together in cooperation, "where sharing and fellowship would be the basis of everyone's life (Fishman, 1977, p. 93)." For Wright, his extreme decentralization was fundamental to his belief of individualism.

Le Corbusier, like Frank Lloyd Wright, believed in the restructuring of current cities. They believed that industrialization created the perfect condition for replacing current cities with new communities built on the principles of modern technology, thus creating a new society for the future. Le Corbusier believed in centralized planning, in the construction of a centralized metropolis. Le Corbusier believed that a city has to be denser than current ones and that the current cities "offered too much expression to 'archaic individualism' (Fishman, 1997, p. 164)." In Le Corbusier's plans, modern technology and materials must create a unifying and coherent city. "If Howard's deepest value was cooperation and Wright's individualism, Le Corbusier's aim was a society in which both cooperation and individualism could find simultaneous expression (Fishman, 1997, p. 164)."

Conclusion

What is apparent from this discussion was the importance of density, typology and hybridity, to create a city of tomorrow and how architecture can be used as a device or tool to achieve these elements.

Density was an important factor to the shaping, viability, extent and variability of communal living on residential life. For Howard, it was essential to create a communal society that was denser than a rural location, but not as dense as a city. It was important for Howard to provide a happy median, dense enough for a vibrant social and communal life, but not dense enough to recreate the city he was trying to escape. For Wright, his schema was extreme low density, in which it was about individuality and solidarity of families. It was imperative for individual people to shape their own lives through decentralization and extreme low densities. For Le Corbusier, density was extremely important. Densities lead to a compact city which lead to closer proximity of people and justified a higher variability of amenities. A streamlined efficient city would allow its citizens to enjoy leisure and recreational activities instead of wasting time commuting. Also, density will allow for more space and free up the ground floor plane.

Typology was an important device in the creation of each plan. For Howard, who envisioned an egalitarian communal society, it was imperative that this ideal be made manifest through the architecture. Parker and Unwin designed single-family dwellings in the form of quadrangles. For Wright, his society was about fostering and protecting the family unit. He therefore gave at least one acre per family to use as agricultural production or as they sought fit. Therefore, the homestead acted as the collection of the family unit. For Le Corbusier the prevailing typology was the residential block. The residential block was both communal and individual. The residential block allowed for Le Corbusier to increase density, provide a variably degree of amenities, and consolidate the ground floor plane for leisure and recreation.

All the above schemes combine two opposing ideals into one hybrid solution. They take the best of both conditions to off balance the worse in the other and make a better condition. Most apparent, Howard combined the best aspects of the Town-Magnet with the best aspects Country-Magnet into the Garden City. His plan was based on an egalitarian communal society. In Wright's schema, he placed the urban forms and typologies into a rural environment. His schema was based on the individual. Le Corbusier merged his notion of the garden city with the metropolis. In effect he merged what he described as suburb and city together. He lifted his buildings in order to bring in green open spaces, leisure and recreation. Le Corbusier's schema was based both on the communal aspects and the individual. These plans, however, are hybrids insofar as they combine two distinct elements into one unifying idea. The idea was a hybrid between two things, but the actual planning and design of these schemes were not hybrids. Each plan, more apparent in Howard and Le Corbusier than Wright, segregated functions. All plans were functionally zoned into districts. This type of planning, especially the voice of Le Corbusier, influenced CIAM and the creation of the Athens Charter which in turn influenced city making around the world. It was not until the 60s with the emergence of Archigram, Superstudio, and the metabolists where the idea of the functional city was challenged via the megastructures that combined a multitude of aspects of city into one structure.

2.1 What is a Suburb?

2.1.1 Definitions

The most traditional and basic definition of a suburb describes a physical location in regards to the city. A general definition given by the online Oxford dictionary describes that a suburb is “an outlying district of a city, especially a residential one (Oxford online dictionary, 2012).” The online dictionary also gives the etymology of the word. Suburb comes from the Latin *sub* meaning “near to” and *urb* meaning “city.” From the definition above and the etymology of the word, one could deduce that a suburb alludes to a physical location and perhaps the shape and form is in some way inferior or secondary to that of the city. It is plain that there is a hierarchy to this order. Projecting and connoting further meaning from these two words one could postulate that since there is an inherent hierarchy of a city the suburb must be somehow part of it, or subservient to it. The suburb is “near” the city but it may also depend on the city and may even be under the influence or control of the city in terms of governance or even in terms of a multitude of functional venues such as commercial, cultural or institutional uses. If it is subservient, may it also be submissive or docile to the city?

Hans Meyer provides a definition in an article titled, The Suburban Challenge, found in *European 7* along the same lines as the online dictionary, as a physical location. He breaks the word down into its constituent parts sub and urb describing that it is part of the urban fabric, evoking a sense of hierarchy. He further writes, “it is an area that belongs to the territory under the influence of the city, but it is not part of the physical urban structure that is called ‘the city’ (Meyer, 2004, p. 9).” Meyer goes beyond the typical definition of boundaries and states that physical form of the suburb is different than the composition of the city. The suburb does not share the same land use tendencies that are employed in the city such as plazas and public urban space, street patterns, and accessibility. For example, most North American cities are dominated by the urban grid whereas the stereotypical dendritic street pattern is typical of suburbs. Furthermore, buildings in the city come into contact with public space such as the street and other urban forms much differently than in the suburb.

One marked difference is that buildings in the urban context are used to define urban plazas and public life on sidewalks, whereas buildings in suburban locations are pulled away from the street. Urban plazas and sidewalks are replaced by parking lots and grass.

Similarly, Robert Fishman supplies a definition that orients the understanding of the suburb to a place outside the city. Robert Fishman writes in *Bourgeois Utopias: The Rise and Fall of Suburbia*, that suburbs “can refer to any kind of settlement at the periphery of a large city (Fishman, 1987, p. 5).” He further goes on to write that although suburbs are separated from the core they still depend on all the cultural, institutional and commercial aspects of urban life. Fishman describes a sociological and cultural disposition between suburb and urb, citing that cities have more opportunities in aspects of social and cultural life and more variety. He states, “the suburb must be large enough and homogeneous enough to form a distinctive low density environment defined by the primacy of the single family house set in the greenery of an open, park like setting (Fishman, 1987, p. 5).”

Conversely, Ellen Dunham-Jones, in *Retrofitting Suburbia*, goes beyond the physical location and describes the physical form of suburbia. She describes the characteristics typical of suburban development and physical form. She gives a broader definition that is not pertinent to any one type of building or function. She provides a couple of contemporaneous points of what suburban form looks like:

- “Suburban form is characterized by buildings designed “in the round” to be viewed as objects set back in a landscape they dominate; in urban form, clear focus is on the fronts of buildings and how they line up to meet the sidewalk and shape the public space of the street.
- “The dominant spatial figures in suburban form are private buildings. Public roadways, schools and parks exist but are rarely treated as dominant spatial figures or outdoor public rooms, as is the case in urban form.

- “Suburban buildings tend to be dedicated to a single use – residential, retail office, or industrial – while urban buildings are more often mixed in use or may transition in use over the life span of the building.
- “Suburban form is almost entirely auto dependent, typically involving surface parking lots surrounding buildings, while urban form is not.
- “Suburban roads are often organized in a dendritic pattern with dead ends and cul-de-sac, while urban streets are organized into interconnected networks.
- “Suburban form tends to be lower-density and evenly spread out, while urban form tends to have a higher net density as well as a greater range of localized densities. This is true for densities measured by population and by building area (Dunham-Jones, 2009, p viii-x.)”

She argues that suburbia no longer looks as it did. It goes beyond the traditional classification of Myer and Fishman. Her main argument is that suburbs are looking more and more like cities, but the physical form is what gives the characteristics of suburban development. It is one-sided and very narrow of a definition to say the suburbs are a location at the periphery or outside a city. Ellen Dunham-Jones allows for the identification of contemporary suburbs. These suburbs have become part of the city. It is hard to distinguish them as suburb and city because in many cases those lines have become blurred.

A suburb, therefore describes a physical location which is part of the city but is also distinguishable by the physical urban structure, it is culturally, institutionally, and commercially inept, and it is characteristic of single-use, low density development which is spread out. The intent of the suburb is to regain the country ideal of open green spaces, fresh air, sunlight, recreation and leisure. The main differences between suburb and city are in amenities, densities and typologies.

2.1.2 Historical view of suburbs

Historically suburbs were found all over the world, not at the same intensity, but were locations at the periphery

or outside the city. Like the suburbs of the industrial period, these early suburbs were sites for rejuvenation and health. People who had the means left for health reason from the dirty and congested city. During the Roman period, for example, many of the emperors and the high aristocracy had summer villas to escape the city for leisure and indulgence; Tiberius escaped to Capri, while Hadrian retired to his villa at Tivoli when he wanted to get out of the city. Even before Roman decadence, building outside of the city proper was evident in excavations around Ur. Early surgeons and physicians sent their patients outside the city to health spas for therapy and recovery (Mumford, 1961, p. 483). Monks and nuns withdrew from populated areas to monasteries for self reflection and contemplation in prayer.

Moving out of the city to preindustrial suburbs for a period of time was a trend reserved for the wealthy, who could buy estates and build villas. It was extremely different from the general population. A 19th C. writer describes the inhabitants of Cripplegate suburb in the 17th C. as:

“A population of tanners and skinners, catgut makers, tallow melters, dealers in old clothes, receivers of stolen goods, charcoal sellers, makers of sham jewelry, coiners, clippers of coin and silver refiners, who kept their melting-pots ready day and night for any silver plate that might come to hand, toilers in noisome trades and dishonest dealers... Forgers of seals, of bills, of writes, professional pick purses, sharpers and other thieves, conjurors, wizards and fortune tellers, beggars and harlots found a refuge here (as cited in Fishman, 1987, p. 7).”

Located partially without the city walls, Cripplegate was a pre-industrial English suburb. Before the industrial period places on the urban fringe were considered inferior and debased. To live in a suburb in this period was considered low-class. To call someone a suburbanite was offensive as it carried negative connotations (Fishman, 1987, pp. 6-7). The aristocracy and the wealthy resided in the city where the monarchy had its primary residence. The elite and wealthy merchants primarily lived inside the medieval walls while the poor agrarian peasants lived outside. The poorest of people lived in Cripplegate, which was in stark contrast to the industrial period where the situation was the opposite. The poor and unhealthy were stuck in the centre while the wealthier elite were able to leave the city for healthier options.

In 1907 the Garden Suburb idea was initiated by Dame Henrietta Barnett in Hampstead. It was a suburb created to save the people of the industrial city. A place for living that was far removed from the evils of the city. It was originally intended to be available to all income groups. The wealthier, like Barnett, would live in their mansions, while the artisans would live in cottages subsidized by the richer residents. While this was the intent, it soon became difficult to privately subsidized housing because material became expensive during and after the First World War. The emphasis of the Garden Suburb was reflective of the person who initiated the scheme and the majority of people that lived therein. The Garden Suburb was located far enough outside London to be secluded but close enough to maintain much needed ties with the city. It therefore, did not include any industry or agricultural production and was limited in any other activity. The Garden Suburb was in some regards contrary to the Garden City idea. Whereas the Garden City wanted to produce independent cities in all aspects of life with short commute times to the city, the Garden Suburb was heavily reliant on the city as it did not incorporate any industry and had few commercial venues.

Dame Henrietta Barnett enlisted Barry Parker and Raymond Unwin to create her vision. Unlike Parker and Unwin's work at Letchworth, Hampstead's design was inspired by the medieval town not a modern city. Emphasis was given to the dwelling and how it was to be incorporated into the setting of the picturesque suburb. They wanted to avoid monotony and uniformity by creating different scales of houses, variety between setbacks, variety between streets, and differentiation of styles. Although there was great flexibility, there was still a sense of unity. Parker and Unwin used material, roof height and slope, the number of chimneys and dormers to create rhythm and the species of plants to create at some degree a sense of unity of dwellings on the same block (HGS Trust, n.d.). Barnett wanted the suburb to have tree lined roads, with houses separated by hedges not walls, with woods and public gardens available for everyone, and no noise. In other words, Hampstead was to be a true suburb: green and docile. To help foster a sense of a healthy, secluded and

independent suburb the density was to be low, 3 dwellings per hectare (8 dwellings per acre) instead of the 6-10 dwellings per hectare (15-25 dwellings per acre) that was typical at the time (HGS Trust, n.d.).

Leaving the city for healthier options was a trend the aristocracy had exclusively benefited from. It was during the industrial period in which an increase of wealth in an ever growing powerful middle class wanted to mimic the aristocracy. It was only after the industrial revolution that this type of lifestyle was possible for the masses. What was the prerogative of kings was now available to the masses, but at a reduced scale. The asylum that was created in the past was infringed on and mimicked in a poor recreation. The increasing availability of suburban life allowed an ever increasing number of people to get there. The suburbs became crowded and diminished the original intent which was more land, open space, fresh air, sunlight, recreation and leisure. The suburbs became a poor reflection of their original intent. They were neither luxury spacious areas nor were they bustling urban areas full of life. They were neither country nor city, but stuck in twilight of “pseudo-country” and “pseudo-city” (Alexander & Chermayeff, 1963, p. 62-3). Dwellings became too closely packed together to offer any meaningful seclusion acoustically or visually. The cultivation of suburbia was thus left to the mediocre in stark contrast to the vast Roman villas and estates of the aristocracy.

One of the greatest needs for suburbia was open green space. The clarity of the suburbs in intent has been lost. “The closed packed, freestanding suburban house is an anomaly left over from the time when spacious terrains made it possible for the house to stand really free (Alexander & Chermayeff, 1963, p. 126).” The suburb was about the dwelling in the country ideal. It has become harder and harder to attain unless one goes further away from the city. It has increasingly become reasonable to leave suburbia in that the country is no longer there and it seems better to regain the advantages of the city which is increasingly becoming further and further away (Alexander & Chermayeff, 1963, p. 66). Originally, living outside the city in early suburbs allowed for easy access and relatively short commute into town which at the time served as the best of both

worlds. It was far enough to be away from the crowded city, but close enough to make it relatively painless to commute to work and benefit from the commercial and cultural venues of the city. However, if suburbia is to exist, if it is to resemble in some state the suburbs of the past, then it needs to keep going further out into virgin or reclaimed land. Suburbia needs space to thrive and the only space left is further and further away from the city, which means either cutting off ties with the city, to become more rural, or longer distances to get to the city. Today, with the increasing desire to live in the suburbs people have been either pushed further away from cities, or suburbs turned the city into a polycentric metropolis. But what is the other option? Living in the city or creating both? Bring the suburban country-house ideal to the city.

2.2 What is density?

2.2.1 Definition

Density is the ratio of how much of something exists within a contained abstract area. It is usually measured as the ratio of people or dwelling units per area of land (Lozano, 1990, p 318). Density is a two-dimensional measurement which may allude to or give evidence of the capacity or threshold of a site or building. Density, as will be described below, can be discussed in terms of physical density and perceived density. Physical density is the hard metric that is objective and abstract, while perceived density is a soft parameter that is not measurable in the traditional sense because it is subjective and personal, and may pertain to influences from cultural normative patterns.

2.2.2 Density as physical metric

Physical density is the relationship between area and the number of things located in that area. Physical density is typically a calculation of population or dwelling units per area. These calculations give clues to the intensity of a site or building. The understanding of density aides in the creation of urbanity. Eduardo Lozano, in *Density in Communities*, describes urbanity as the potential for people to interact in a city. Lozano writes, “density and urbanity is based on the concept of viable thresholds: at certain densities (thresholds) the number of people within a given area is sufficient to generate the interactions needed to make certain urban functions or activities viable (Lozano, 1990, p 316).” Potentially at higher densities there can be more variability and more potential for interaction. Meta Berghauser-Pont and Per Haut in *Spacematrix: Space, Density and Urban Form*, similarly attribute urbanity with the plurality of human interaction and a requisite of density (Berghauser-Pont & Haut, 2010, pp 225-226). Winy Maas suggests that higher densities are a “positive side effect [which] lead to much more programmatic variety... more synergy, efficiency and mix [which] will lead to more social encounters, urbanity and possibilities for architecture (Maas, et al., 2005, pp 270-71).” A multitude of programs and people have the potential to create variability, diversity, complexity, animate street life which in turn are prerequisites for a complex urban life. An understanding of density is

needed because density creates urbanity. The perception of crowding or too much density convolutes the intent of city making which is to create a thriving urban life but instead creates overcrowding, congestion, fear and perhaps urban flight (Berghauser-Pont & Haut, 2010, p 227).

The evaluation of density is typically perceived in the crude understanding of a ratio in the form of a numerator over a denominator. Typically understood as population per area, dwelling units per area and / or floor space index (FSI) this type of physical density does not fully evaluate the spatial capacity of a building or site. It only alludes to the intensity or physical capacity of that building or site however, Berghauser-Pont and Haut point out that there needs to be a further evaluation than dwelling units per area alone. This measure of density does not give a full conception of urbanity. In this case low-rise row housing can have the same dwelling units as a slab or point tower, but have different influences on the creation of urbanity. Intensity measured as floor space index (FSI), or floor area ratio (FAR) gives a limited view of urbanity. For example, in figure 2.2.1 the diagram illustrates the misleading aspects of dwelling units. All three scenarios have the same dwelling units, but take on different urban forms. Similarly in figure 2.2.2, the diagram illustrates that FSI is also misleading. Although all three diagrams have the same FSI, their forms and open space is extremely different.

2.2.3 Density as perception

Perceived density is the negative subjective experience of physical density. Physical density pertains to a set of planning rules which aides in determining the size of a development and the types of building. It is a good tool to use, but it does not really allow for a comprehensive human scale evaluation of the effects of density. While physical density is a good metric to determine development on a high scale it does not relate to the intimate daily interactions. Amos Rapoport in *Toward a Redefinition of Density* discusses the subjective parts of density and makes a case for perceived density being linked to cultural patterns which influence the perception of crowding.

Crowding is the perception of limited space. This is based on a person to person, or person to object, or object to object perception. Amos Rapoport describes crowding as the unwanted interactions between people. He writes that in “high perceived density, when the various mechanisms for controlling unwanted interaction with other people are no longer working all the cues indicate potential interaction demanding attention (Rapoport, 1975, p 153).” This statement would suggest that privacy is lacking in a development, where there is insufficient boundaries to limit interaction. Moreover, boundaries or barriers may limit the view of people and objects which reduces intricacies and stimuli of a perceived high density environment. However, on the other hand, it may cause isolation. Similarly, Lozano describes crowding in the same manner. Lozano further adds “the noise and light levels in a space, the number of objects and their arrangement, the social situation, the activities taking place, and the personal psychology are all factors that, together, determine the perception of crowding and the level of stress (Lozano, 1990, p 320).” Design may help to diminish the perception of density by: a) reducing visual cues from the environment and b) reducing human interaction. Both of which interrelate and affect each other.

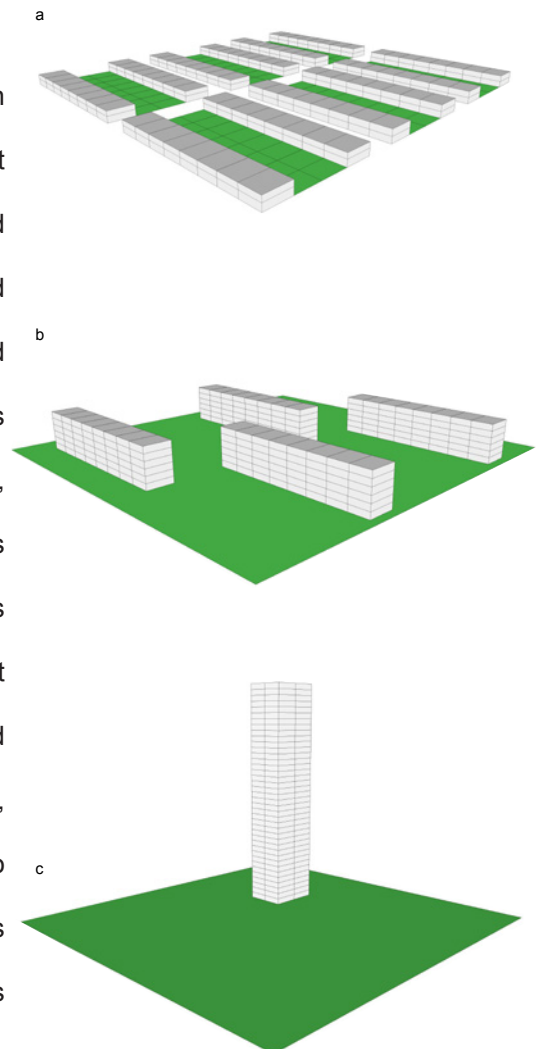


Figure 2.2.1 Density exploration showing equivalent densities - a) low-rise single-family dwelling; b) mid-rise apartment block; c) high-rise tower

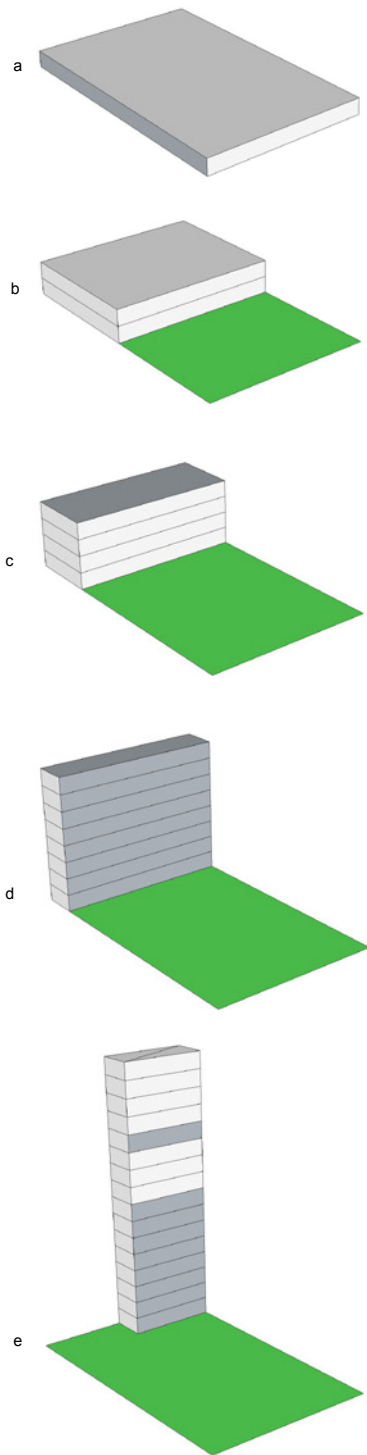


Figure 2.2.2 Density exploration showing equivalent FSI

Different cultures perceive density differently. The density in Hong Kong is not acceptable culturally in America. These cultural patterns are found, illustrated and made concrete in predominate housing types found therein. Rapoport gives the example of a Middle Eastern bazaar versus the supermarket (Rapoport, 1975, p 137). The cramped enclosed highly populated bazaar such as the Grand Bazaar in Istanbul is welcomed, it is a cultural phenomenon, while the supermarket such as Wal-Mart is designed to be a large volume that is well lit with a straight forward layout and no separating walls (save for the shelving). The bazaar with its intricacies and complexities is perceived as overcrowded while the supermarket may appear less dense and more open. This affects the daily activities of people. If people feel something is dense regardless if it is or is not they will not use the space. So there is an understanding of physical and perceived density to help design a place that will increase the viability of amenities be more compact and eco-friendly but also make people feel the space is not crowded. This illustrates the acceptance of perceived density, which relates more to crowding than dwelling units per area.

A closer look of the example stated in the first section will illustrate the complexities of physical and perceived density. If the perception of density is linked to a reading of the environment

from built space to open space than a further reading into Berghauser-Pont and Haupt's model is needed. As Berghauser-Pont and Haupt point out FSI cannot illustrate spatial aspects, it also cannot allude to different programmatic space such as office, commercial and/or other amenities. They suggest to also look at parameters such as ground space index (GSI) which describes the amount of built- area. An area with a large GSI value would suggest the development is compact. Open space ratio (OSR) describes the intensity of the non-built space. Layer (L) would be an indication of the height in an area. Altogether FSI, GSI, OSR and L, will potential help differentiate between different spatial layouts (Berghauser-Pont & Haupt, 2007, pp 14-15). Taking figure 2.2.2 into consideration once more, while FSI remains the same GSI, OSR and L are different. Diagram E has a larger OSR than diagram A. It is therefore deemed to be more spacious according to Berghauser-Pont and Haupt. If open space is one of the greatest factors in perceived density then diagram E would be the least dense. Using Berghauser-Pont's definition goes to show the relationship of open space, built space and how they are independent from dwelling units or population density.

Le Corbusier's residential blocks In A Contemporary City resemble the ideal of diagram E from figure 2.2.2. Le Corbusier

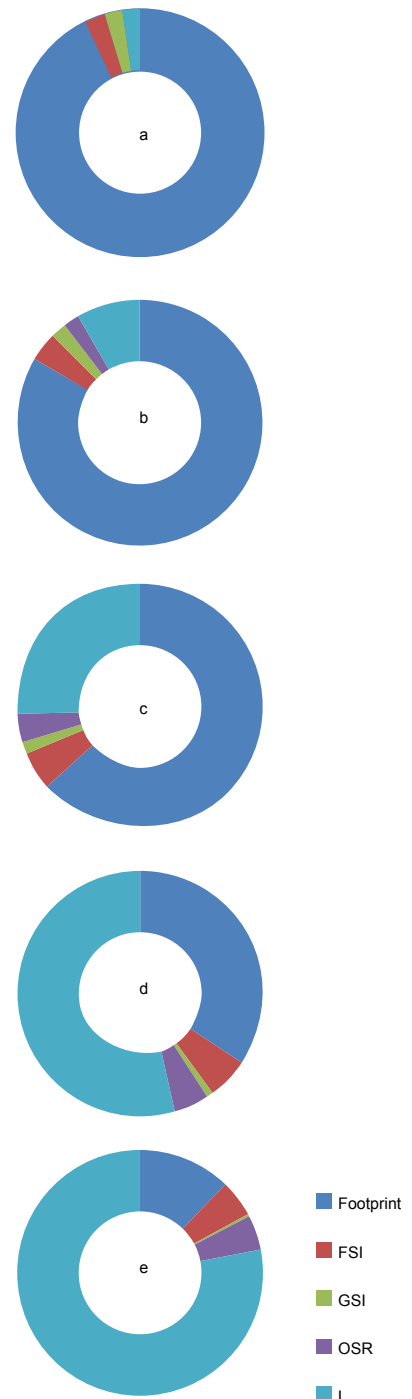


Figure 2.2.3 Density exploration show that while FSI from Figure 2.2.2 remains the same, GSI, OSR and L change

advocated high-rise and high density for more open space for leisure and recreation. If open space is one of the greatest factors of perceived density, then Le Corbusier's scheme seems less dense than the other two. The negative perception of density can be mitigated through design. For example Le Corbusier provided high density but committed 85% of the ground floor for leisure and recreation. Considering the image of Parisian housing at the time compared to Le Corbusier's Contemporary City, illustrates the power of perceived density. Le Corbusier provided a vast amount of space. If the space would have been used as Le Corbusier idealistically intended, that is another issue on its own.

Going from the suburban to urban paradigm the objective is to ameliorate the pressures density can bring. In suburbia there is not much variability in terms of visual stimuli so it is perceived as not dense even though it can be as dense as some urban locations. In taking in the idea of bringing the suburb to urban densities while still maintaining the qualities of the initial condition then the perception of suburb to urban densities must be mitigated. Physical density is only one part of it. Lozano describes the major difference going from suburban to urban and the perceived stereotypes and misconceptions of overcrowding. Most have to do with perceived spatial qualities in the form of crowding and privacy issues in the form of barriers. "The close, personal proximity of urban life, when seen from the vantage point of suburban life, may seem threatening since the attraction (or focus) of urban activities may not be sufficiently perceived by suburban observers (Lozano, 1990, p 320)." Lights, sounds, noise, smells and movement can influence perceived density. The idea is to protect these from the suburban environment, when transplanting suburban characteristics into the urban fabric, because after all the desired goal is bringing suburban qualities to urban densities. Therefore, it is necessary to have an understanding of the limits or threshold of how dense something can get before it becomes overcrowded. The idea is to maintain all the luxuries and comforts that a suburb entails, therefore privacy and spatial limits are important.

2.2.4 Density as typology

Density does not necessarily mean high-rise, but it does mean intensity. There are benefits from which different typologies can give. Low-rise can give a perception of low-density, but dwellings can be tightly packed with limited open space such as a garden for each individual house, but this space, it must be noted, remains a singular place for the sole purpose of leisure and recreation for only one household. This space is not shared with other people. The high-rise solution on the other hand can support the same density and have an increase of open space. This open space is not parceled to each unit, but remains in a weird twilight of half public and half private. It does not necessarily belong to anyone. Same can be said with the mid-rise. For example, Le Corbusier through high-density and high-rise was able to create a vast array of communal open space whereas Ebenezer Howard had smaller space for each household and at times communal space in regards to the quadrangles. The low-rise can have its disadvantages as can the high-rise. While densities offer an opportunity to maximize the floor area ratio, it does not mean that certain typologies will lead to a denser fabric. There are many examples that have managed to tightly pack a site to increase the density while maintain low-rise buildings. The success of a project comes from a proper gradation of individual privacy and collective space of the area. Interaction is encouraged in dense urban patterns because of the range of privacy of the house combined with more public spaces (Lozano, 1990, 325).

What is important when dealing with typology are the perceived notions of density discussed above. What is important is not the physical density because as was determined it does not make a difference what is achieved. It is about the soft parameters. For example, Lozano explains that different typologies yield different thresholds. For detached single-family homes, he has determined that the density for this typology can range from 1-2 hectares (1 to 5 dwelling units per acre) up to 3 hectares (8 dwelling units per acre) for tighter construction. Semi-detached homes can range anywhere from 2-5 dwelling units hectare (5 to 12 dwelling units per acre) while town houses can range from 4-6 dwelling units per hectare (10 to 16 dwelling units per



Figure 2.2.5 IJ-Plein Housing, Amsterdam, the Netherlands, 1988, OMA. An example of low-rise housing.



Figure 2.2.6 Kravel 25, The Hague, the Netherlands, 1992, KCAP. An example of mid-rise housing block.



Figure 2.2.7 The Whale, Amsterdam, the Netherlands, 2000, de Architekten Cie. An example of high-rise housing.

acre). Two story flats can begin at 4 dwelling units per hectare (10 dwelling units per acre) while low-rise apartments can range from 14-20 dwelling units per hectare (35 to 50 dwelling units per acre). Mid-rise apartments range from 26-28 dwelling units per acre (65 to 70 dwelling units per acre) while high-rise apartments typically range from 20-40 dwelling units per hectare (50 to 100 dwelling units per acre). Lozano suggests that from 18-20 dwelling units per hectare (45 to 50 dwelling units per acre), so beginning with low-rise apartments, the first threshold is met. This first threshold level is visual intimacy, which is an important consideration, since part of the comforts and luxuries of the suburbs are a level of private space and visual barriers. At the upper limits visual privacy is further stressed however these densities allow for added amenities (Lozano, 1990, p 317).

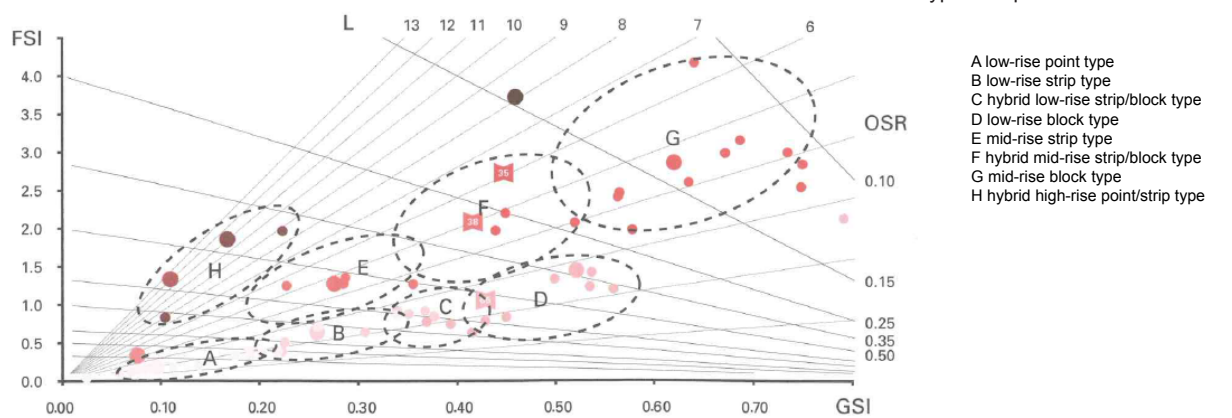
On a building by building basis high-rise has a higher density than a low-rise building in terms of FSI, dwelling units and population density. However, when compared as a network or rather a site comparison FSI does not necessarily change. Dwelling units remain equal. Take into consideration the first example. One typology is not denser than the other, if the area is kept constant and the desired amount of dwelling unit is also constant than the equation gross footprint per area, dwelling unit per area population per area remains the same.

Berghauser-Pont and Haupt completed a study of Dutch typologies. They looked at low-rise, mid-rise and high-rise buildings. In the Netherlands, low-rise is considered to be 2-4 floors (figure 2.2.5). Low-rise can either be spacious or compact. They can consist of either strip development such as canal houses or they can be semi-detached. Mid-rise developments are divided into open, spacious, closed and compact building blocks. They usually range from 3-6 floors or 5-8 floors for superblocks (figure 2.2.6). High-rise in the Dutch context consist of seven floors or higher (figure 2.2.7). These are either strip developments or tower blocks (Berghauser-Pont & Haupt, 2007, pp 18-19). Berghauser-Pont and Haupt plotted these typologies on chart and determined that “aspects such as urbanisation, open space typology, granularity and functional blending can also relate to positions and clusters in spacemate (Berghauser-Pont & Haupt, 2007, p 19).” As was explained previously high-rise areas can have the same FSI as an area with closed building blocks. The high-rise area is less compact than the super blocks and so has a lower GSI. What is interesting is the position of the high-rise relative to the mid-rise super block. The mid-rises are all pushing greater FSI with fewer floors. However they have a higher GSI. More of the area is built on, which means there is less OSR.

2.2.5 Conclusion

Density is more than just a measure of dwelling units, or population in an area. Density is a tool which can allude to capacity and intensity of a site that can be used to measure the viability, variability and urbanity of that site. Density allows for the identification of thresholds which affects perceived density such as privacy, open space and noise. Density can be used as a tool in architecture to aid in identifying the kind of development in terms of typology which can support the desired goal in terms of physical and perceived density. If spaciousness and the amount of open space determine perceived density and the disparity between suburban and urban development then a balance must be achieved between built form and open space. Looking at Berghauser-Pont and Haupt’s model, shows that to achieve open space OSR must be increased, which means decreasing

the GSI. One reading from this analysis will say to go vertical, but it does not take into account the possibility of expanding the ground floor. Multiplying landscapes can effectively expand the ground floor into some sort of public realm like a green roof and also increase the potential for more amenities. This is one way to balance built and open space. Furthermore, Berghauer-Pont and Haupt's graph (Figure 2.2.8) shows that high-rise is not the only viable option and other creative solutions are available through experimentation of typologies and functional blending.



2.3 Typology

2.3.1 Definition

Typology originates from the Greek word, *typos* and *logos*. *Typos* is a set of properties, or characteristics of a pattern or model of an abstract object. Therefore, typology is the study of *typos*, or characteristics or properties of an object. "Type refers to formal characteristics and the spatial/functional characteristics that go along with them and permits organization on that basis (Komossa & Meyer, 2005, p. 8)." Furthermore, an archetype describes a set of original or first ideal of these principles and characteristics that describe a type. *Arche*, from the Greek word for origins or first. It describes the original intent or behaviour of the type. Moreover, a prototype is the first or primitive manifestation in usually a series of types. Prototypes are usually used to advance or delineate a type to a better version of that type without actually changing the type completely. Archetype and prototype sound relatively the same as they are both types of beginnings. They are different through the differentiation between ideal and object. For example, the archetype of a house is described by Marc-Antoine Laugier's concept of the Primitive Hut in *Essai sur l'Architecture*, which ideally responds to mankind's needs for shelter. Also, the low-density single-family dwelling can be the archetype of suburban development. On the other hand, a prototype is represented in a series of housing catalogues of the post-war era, which has multiple iterations of a type, such as the ones provided by the Canadian Mortgage and Housing Corporation.

An investigation in typology is to reduce and isolate parts of architecture to identify characteristics to compare and contrast. The study is also to find out the history and lineage of types to understand where certain typologies come from. "Typological research therefore seeks to distinguish relevant types, and to define and systematise their characteristics (Komossa & Meyer, 2005, p. 8)." If the discussion of type is about functional use then what is to be measured if everything is housing? Should floor plans be compared? What would be pertinent in the evaluation of housing typologies and advancement of a type? Giulio Carlo Argan in *On the*

typology of Architecture says that,

“Firstly: typological series do not arise only in relation to the physical functions of buildings but are tied to their configuration. Secondly, although an infinite number of classes and sub-classes of types may be formulated, formal architectural typologies will always fall into three main categories; the first concerned with a complete configuration of buildings, the second with major structural elements and the third with decorative elements (Argan, 1996, p 244).”

These three categories are the plan or section (configuration), the structural grid (structural elements) and the facade treatment or architectural style (decoration). In this investigation of type, the focus will be on configuration which looks at types as the changing requirements of spatial systems, changing functional needs of users and socioeconomic changes which give rise to new typologies and organizations. Typologies give evidence to recurring patterns, regular geometries, universal principles and the possibility of reducing architecture of housing to a single idea

The purpose of this investigation is to come to a solution that combines different typologies. The configuration of that typology will be evaluated. However, the question still remains: how are housing types different? What is the regressive trait that differentiates housing typologies? Crudely, all housing can be reduced to the unit, the room, which at its basic form is represented by the country dwelling. Housing types (detached, semi-detached, terrace housing, apartments, condos, low-rise, mid-rise, high-rise, multi-unit residential buildings) are based on the unit but in different orientations, configurations, and combinations. In studying various typologies, the following questions will be looked at, which were adapted from Roger Sherwood in *Modern Housing Prototypes*: “How will the individual units be arranged? How will the mix of different unit types be accommodated? What circulation systems – horizontal and vertical – can service this mix of units? What is the best circulation system? Walk-up or single-loaded, double-loaded, or skip-stop corridor system? Where is entrance and access to the vertical circulation system (Sherwood, 1978, p 2)?”

2.3.2 Dwelling Organizations

In *Modern Housing Prototypes*, Roger Sherwood discusses three basic unit types and three basic building types. The unit types are primarily classified in regards to their orientation and also to a lesser degree their spatial and functional capabilities. The unit types are classified as single-orientation, double-orientation (90 degrees) and double-orientation (open-ended). Each unit type has its own variations which largely depend on the core elements of the unit such as the kitchen, washroom and the internal stairs (in case of a two storey unit). The location of the primary entrance and also the secondary in the case of an apartment building, also has a factor in the different variations as does the depth of the unit which is dictated by the amount of daylight which is able to come through (Sherwood, 1978, pp 2-3). The building types are a function of the corridor system of the building, therefore instead of building types, corridor types will be used here on. The corridor types are primarily classified in regards to the quality of access to each unit and directly relate to how unit types are strung together in different forms to create buildings. There are two main types of access, private access and multiple vertical access (figure 2.3.1). Private access is one of the greatest commodities in housing especially in multi-unit residential buildings, which is usually rare. Private access is usually impossible to justify after two to three storeys. The multiple vertical access type is most common in buildings greater than two to three storeys originally found in the form of walk-up, but are now commonly elevator cores. This type of access serves multiple semi-private entrances to units on each floor. The various corridor types include the single-loaded corridor system, the double loaded corridor system and the double-loaded split level system (Sherwood, 1978, pp 17-19). All housing can potentially be regressed to these three basic unit and building types.

Unit types

The single-orientation unit looks outward on one side and is covered on the other three by the entrance corridor and adjacent units (figure 2.3.2). This type of unit allows for easy multiplication of units strung along

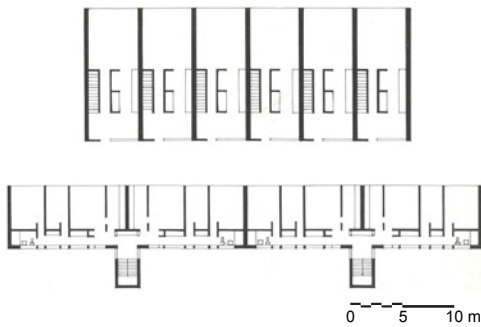


Figure 2.3.1 Public and private access

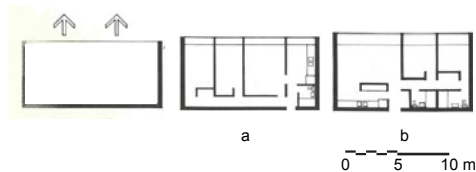


Figure 2.3.2 Single-orientation unit; a) Single-orientation unit transverse core; b) Single-orientation unit interior core along the corridor

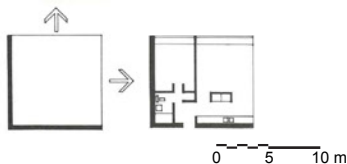


Figure 2.3.3 Double-orientation unit (90 degrees)

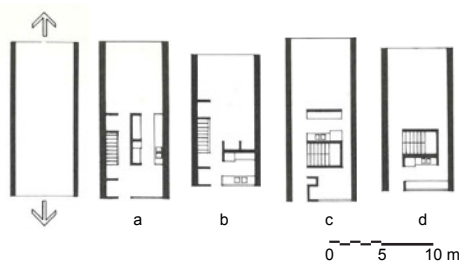


Figure 2.3.4 Double-orientation unit (open-ended); a) Interior stair and core, longitudinal stair; b) Exterior kitchen, longitudinal stair; c) Interior stair and core, transverse stair; d) Exterior kitchen, transverse stair

a corridor on one of the three closed sides. This corridor as will be discussed later can be a gallery corridor either open or closed to the exterior. More likely the corridor would be double-loaded which allows a more cost effective approach to housing. The main consideration for this type of unit is the location of the core elements. In the variation of the single-orientation unit, transverse core, the core elements are located usually on one of the transverse walls or they can be split up. For example, the kitchen can be on one side of the unit and the bathroom on the other. This allows for easy back-to-back arrangements of subsequent units. Conversely, the core elements can be placed on the corridor wall, which may allow for a more flexible floor plan (Sherwood, 1978, pp 3-6).

The double-orientation unit (90 degrees) is essentially open on two sides (figure 2.3.3). This unit is usually found as the corner unit of a predominately single-orientation building. There are some dwellings that use the double-orientation unit (90 degrees). However, it is not cost effective because it is not easily repeatable in a linear fashion as is the single-orientation unit (Sherwood, 1978, pp 6-7).

The double-orientation unit (open-end) is open on each end (figure 2.3.4). This unit, like the single-orientation unit, is easy

to repeat. Access to this unit can be from either side, which can be beneficial in creating variety. Units have the ability to switch orientation providing access or a garden on one side and then on the other creating a higher degree of privacy. The stairs and core elements can be used to draw separate zones between public and private areas. The main considerations for this type are the depth of the unit because of daylight, the size of principle rooms, orientation, and entrance. Primary variations have to do with the location of the core elements and the internal stairs. The entrance to the unit is either private access, single-loaded or double-loaded with a skip-stop system (Sherwood, 1978, pp 10-16).

Corridor Types

The single-loaded corridor system is used when there are units only on one side of the building (figure 2.3.5). This system can be used if there is a general focus in one direction in terms of a vista or where a building abuts another one. The corridor could become a gallery either open or closed to the outdoor environment, each with its own benefits. Usually when there is a corridor on every floor the general unit type that is used is the single-orientation unit. Alternating corridors can allow for double-orientation units, maisonettes or split-level units. A corridor every third floor provides access via stairs up or down

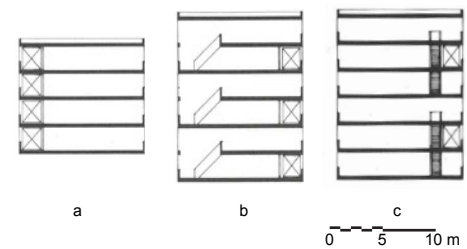


Figure 2.3.5 Single-loaded corridor system; a) Corridor every floor; b) Corridor every second floor; c) Corridor every third floor

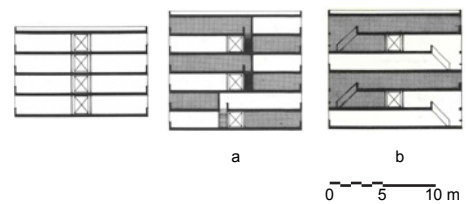


Figure 2.3.6 Double-loaded corridor system; a) Corridor every second floor; b) Corridor every third floor

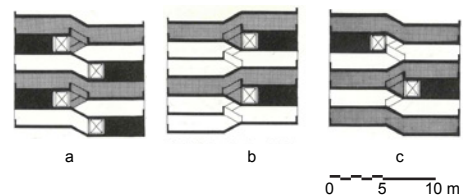
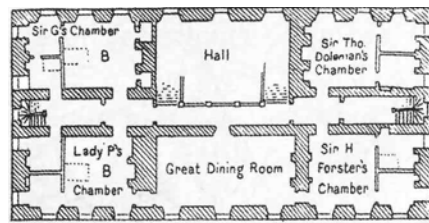
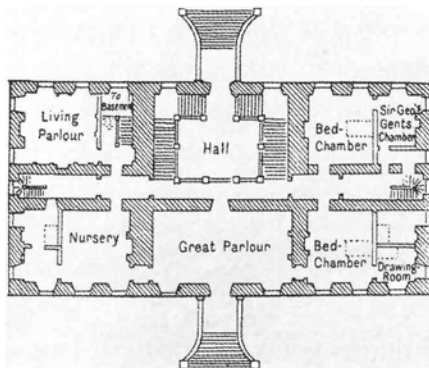


Figure 2.3.7 Double-loaded corridor split-level system; a) Corridor every second floor, alternating position; b) Corridor every third floor; c) Corridor every third floor, alternating position



Second floor



Ground floor

0 5 10 m

Figure 2.3.8 Typical villa: Colehill House in Berkshire, 1650, Sir Roger Pratt

a level. While extremely rare, the corridor on every third floor allows for either a spacious two storey double-orientation unit with a smaller unit underneath, or a combination of split-unit and maisonette (Sherwood, 1978, pp 19-21).

The double-loaded corridor type is most popularly used because it allows for more variation in the combination of units (figure 2.3.6). With a corridor at every level single-orientation and double-orientation units (90 degrees) can be used and multiplied quite easily on successive floors, which makes for an economical system. Corridors at every second or third floor allows for a variety of combination of unit types. Particularly the corridor at every third floor allows for interlocking maisonette units a system made popular by Le Corbusier. One unit is entered from the corridor at the living room area, while the other from the balcony (Sherwood, 1978, pp 21-22).

The final type is the double-loaded split level corridor (figure 2.3.7). This type has corridors at every second or third floor. Part of the unit is split either upwards or downwards a half level from the corridor. This type lends itself to a great degree of different unit types (Sherwood, 1978, pp 22-23).

2.3.3 Single – family dwelling

Detached / semi-detached

There are two stemming ideals for the single family dwelling, which come from the rural dwelling and the adaptation of the villa from the aristocratic and industrial elite. Those who left the early industrial city settled in villas beyond the city limits. Others who did not have as much money and could therefore not go as far settled into poorer versions of the villa. Those who stayed in the city resided in tenements and or row houses.

The villa was a symmetrical two storey dwelling which was entered on the ground floor in the center of the building (figure 2.3.8). The entrance opened up to a great hall which was flanked by public rooms on either side. These rooms were for entertaining guests. On the second floor were the bedrooms and supporting amenities. The kitchen and other domestic facilities were located in the basement. Later on the kitchen was brought upstairs as in the example of Bedford Park by Norman Shaw (figure 2.3.9). He brought the kitchen upstairs to improve the functional relationship with the dining room and to benefit from daylight and ventilation. Moreover, for the masses who did not have servants who were meant to be out of sight out of mind, i.e. in the basement, they needed a dwelling that worked for them. The kitchen was turned into a prominent feature with the dining room and living room combination as

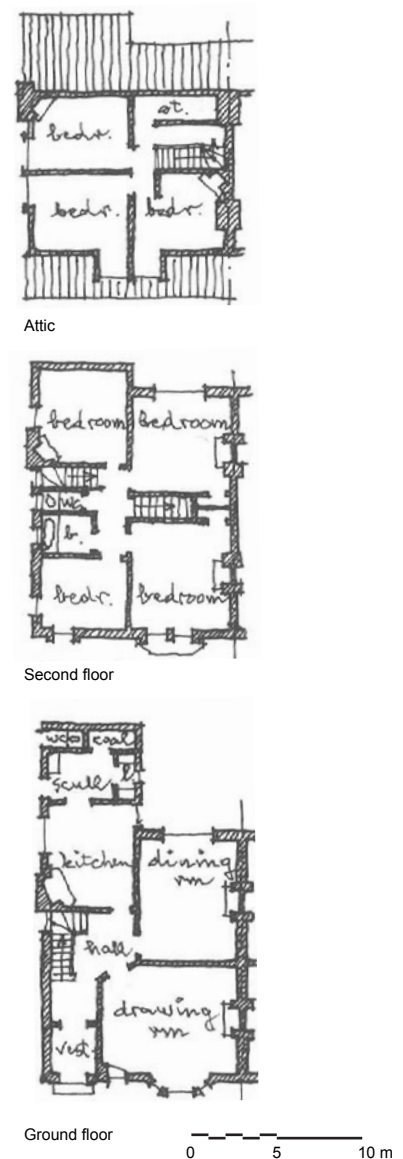


Figure 2.3.9 Semi-detached house, Bedford Park, Richard Norman Shaw

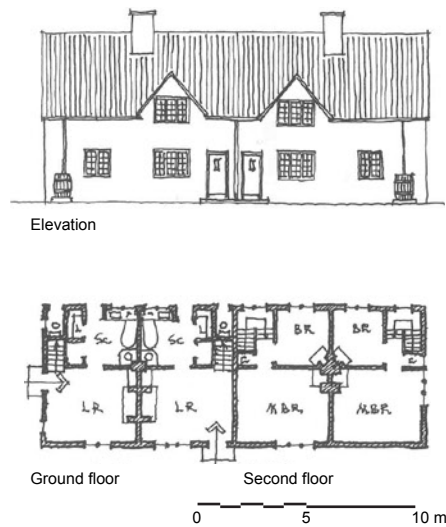


Figure 2.3.10 Four room house, Letchworth, 1905, Barry Parker and Raymond Unwin

seen in Letchworth by Parker and Unwin. There was a clear demarcation between public and private spaces. In the case of the villa and its adaptations, this demarcation was achieved through splitting the dwelling in two levels. In the single storey dwelling it was demarcated between the front public area and the back private area. One of the prominent features of the villa was the landscape it was surrounded by. Particularly it was the garden which was a times seen as the extension of some interior rooms (Schoenauer, 1981, p 303).

In the late 19th C., Victorian builders were merging ideals of the villa and the economic backings of the town house in the form of semi-detached dwellings. This allowed for more lower-income people to acquire such dwellings. These types became the ideal houses (Schoenauer, 1981, p 304). For example, Shaw created semi-detached villa-like dwellings for the lower middle class, for those who could not afford to commute daily to the city at Bedford Park. Parker and Unwin also adapted the villa type. They used the English cottage as inspiration at Letchworth. They did not scale it down but changed it to make the living room and dining room combination become a feature in the house (figure 2.3.10).

Much of today's housing stock is reflected on these ideals.

There has not been significant variation on this housing type. Particular variation of today's single-family dwelling is based on emphasis of different rooms which are reflected in the size.

Row houses, terrace houses, canal houses

The escape to the suburbs was in a way also the result of the perverted evolution of tenements in the city. The rural cottage house evolved over the years from a single room to a two storey dwelling with multiple bedrooms and auxiliary rooms. It then regressed in the urban context to a single room dwelling. The need for more economical housing developments on less land led to row housing that were attached on three sides. This meant that there were poor conditions and no ventilation as outlined in the previous chapters. This is the main reason why this type was not used in suburbia in England and North America. The row house was equated to workers housing. This typology was not used in the suburbs until the middle of the 20th C. when compact and economical development was necessary. In the Netherlands, however, this was not the case. The Dutch used row housing since the early 20th C. because of the belief of land use efficiency in order to preserve agricultural land (Schoenauer, 1981, p.400). This type of dwelling was then replaced by low-rise to mid-rise multi-unit residential row houses. These row houses created the perimeter block and the open block in the form of parallel rows of walk-up apartments called *Stokenbouw* in the Netherlands.

The row house does not necessarily have an immediate positive connotation. Row housing was identifiable with workers cottages from the beginning of the industrial revolution. These did not serve the needs of the occupants but rather served the needs of speculators and builders. Row houses could be joined on two or three sides which created denser environments and increase profits. However, row houses have become an economical option for the single-family dwelling. Row houses allow for the single-family dwelling with the garden, but at higher densities. Strength of row houses lies in its economic advantage. Capable of joining other units together lead to a balance of living spaces versus open space. Row houses have the capacity to



Figure 2.3.11 Stuyvesant, New York City, USA, 1869, Richard Morris Hunt

- 1 Main stair
- 2 Back stair
- 3 Private hall
- 4 Parlour
- 5 Dining room
- 6 Chamber
- 7 Servant's room



Figure 2.3.12 Albert Hall Mansion, London, England, 1879, Richard Norman Shaw

- 1 Entrance
- 2 Kitchen
- 3 Pantry
- 4 Sitting room
- 5 Dining room
- 6 Bedroom
- 7 Spare room
- 8 Porter

increase the density and therefore increase the urbanity of the area. They have entrances that relate directly to the ground floor. They can range from one storey to three storeys. Row houses are also used in the urban model quite successfully because they can be compact and highly dense. It is also beneficial because it allows for direct ground floor access which is a commodity in multi-unit residential buildings. Considerations for row houses include the individuality and privacy of occupants, entrances to individual houses, day lighting for long and narrow dwellings and noise separation from each unit. Also, there is an adverse effect of stringing the same dwellings together which leads to banal liner structures. Row houses can lack urban accentuations which diminishes some of the positives of this type.

2.3.4 Multi – Unit Residential Building

Multi-unit residential buildings (MURB) are the three dimensional versions of the single-family home. MURBs take cues from single- family dwellings in creating urban complexes. The early apartment types in North America and England resembled the single-family dwelling. For example, the Stuyvesant in Manhattan by Richard Morris Hunt included many aspects that a middle-class family would have in their dwelling, such as servant quarters and separate entrances. The rooms were design the

same way as would typically be found in a single-family dwelling. At Albert Hall Mansion in Kensington, Norman Shaw wanted to provide apartments that were worthy of the English people (figure 2.3.12). He provided two storey apartments that mimicked villas (French, 2006, p12). Also, Le Corbusier's Maison Domino was a prerequisite for his housing blocks in A Contemporary City and the Radiant City like the Immeuble Villas, while the Maison Citrohan (figure 2.3.13) informed aspects of Unité d'Habitation (Schoenauer, 1981, p 391).

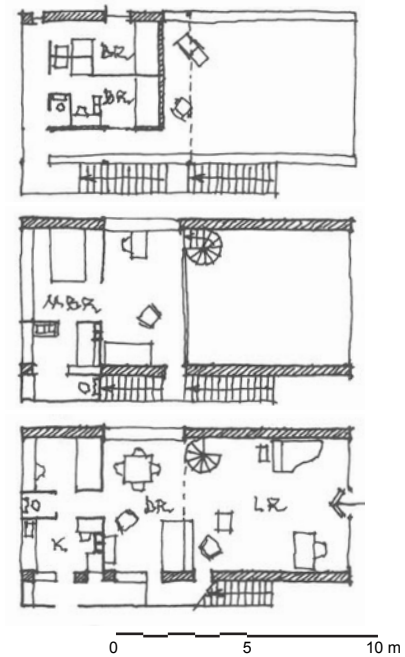


Figure 2.3.13 Maison Citrohan , 1920, Le Corbusier

In England and North America, the living preference was predominately the single-family dwelling. However, for Manhattan, building horizontally unlike London was geographically prohibiting because of limited land resources, therefore Manhattan took cues from Parisian apartment types. In France urban apartments were predominate living option. The rich lived in large apartments near the tree lined boulevards. The middle-class followed suit. They lived as close as economically possible to the elite. Going to the suburbs was not an option for the French. Where England could grow horizontal, France, especially Paris was forced to grow upward because of military defences. The closest type to an early model of the apartment was the hotel building (French, 2006, p 11). Early apartments adapted hotel-like qualities such as the common public areas

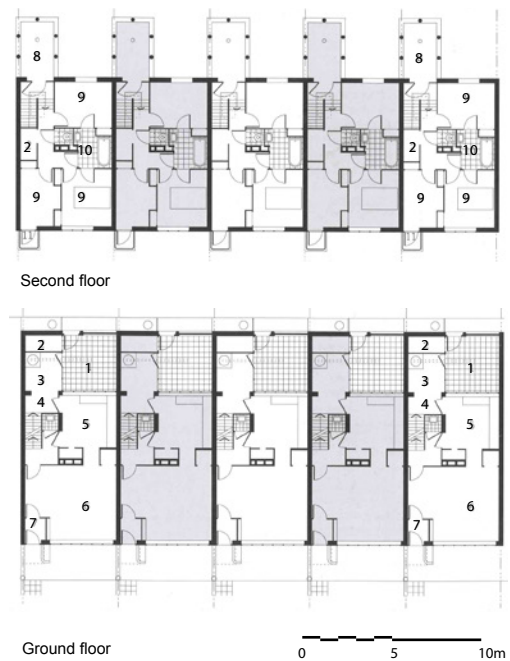


Figure 2.3.14 Weissenhofsiedlung Row House, Stuttgart, Germany, 1927, J.J.P. Oud

- | | |
|----------------------------|-------------|
| 1 Yard | 9 Bedroom |
| 2 Store room | 10 Bathroom |
| 3 Laundry | 11 Balcony |
| 4 Stair to cellar | |
| 5 Kitchen | |
| 6 Living room | |
| 7 Porch to garden entrance | |
| 8 Drying room | |

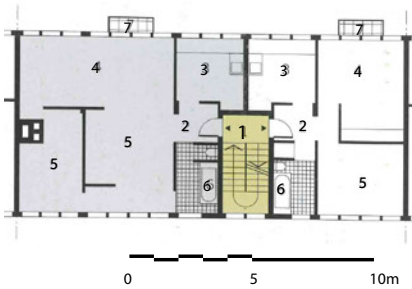


Figure 2.3.15 Weissenhofsiedlung Apartment Building, Stuttgart, Germany, 1927, Ludwig Mies van der Rohe

- 1 Access stairs
- 2 Entrance / hallway
- 3 Kitchen
- 4 Living room
- 5 Bedroom
- 6 Bathroom
- 7 Balcony

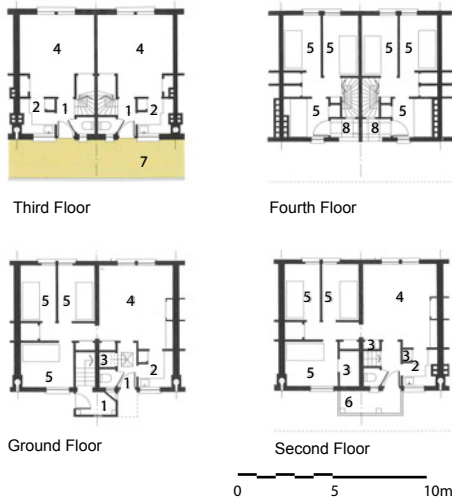


Figure 2.3.16 Spangen Quarter, Rotterdam, the Netherlands, 1921, Michiel Brinkman

- 1 Entrance
- 2 Kitchen
- 3 Storage
- 4 Living room
- 5 Bedroom
- 6 Balcony
- 7 Access balcony
- 8 Loggia

which included the entrance hall, dining rooms, collection and delivery of mail, laundry services and garbage collection. By the end of the 19th C. apartment buildings were the norm for all classes and were designed for all incomes (French, 2006, p 12). In France, this was the case leading up to WWI. Between the wars, however more people moved to the suburbs. In the Netherlands, in contrast to Britain, detached and semi-detached houses were considered wasteful use of land and economically unsustainable. Hence, H.P. Berlage adopted the closed block pattern of perimeter development. Families preferred the closed block pattern, because their children could play safely in a protected communal space, or garden, in the center of the block (Schoenauer, 1981, p 377).

Low-rise

The WeissenhofSiedlung Row House (1927), built in Germany by J.J.P. Oud is a 2 storey repetitive row house (figure 2.3.14). These are identical houses duplicated straightforward. Entrance to each building is by private access which is either from the street in the front of the building or from the garden in the back. These units like all row houses are double-orientation (open-ended).

WeissenhofSiedlung Apartment Building (1927), built in

Germany by Ludwig Mies van der Rohe is a 4 storey apartment building (figure 2.3.15). Each apartment is a double-orientation (open-ended) unit. There are no corridors, but four semi-private walk-up accesses which serve two apartments on each floor.

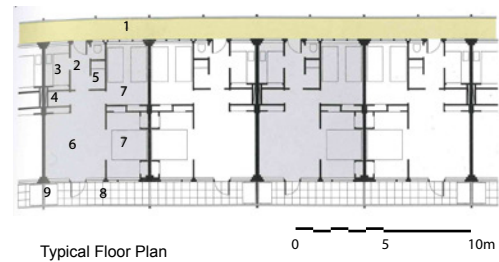


Figure 2.3.17 Bergpolder Building, Rotterdam, the Netherlands, 1934, Willem van Tijen

Mid-rise

Spagen Quarter (1921), built in the Netherlands by Michiel Brinkman is a 4 storey row house complex (figure 2.3.16). The apartments are double-orientation (open-ended) units which have a single-loaded access system. Access to the apartments is either from the courtyard or the second floor access gallery.

- | | |
|---------------------------|-------------------|
| 1 External access gallery | 8 Private balcony |
| 2 Entrance | 9 Broom cupboard |
| 3 Kitchen | |
| 4 Store room | |
| 5 Shower | |
| 6 Living room | |
| 7 Bedroom | |

High-rise

The Bergpolder Building (1934), built in the Netherlands, by Willem van Tijen, is an experimental high-rise building in Rotterdam (figure 2.3.17). The 9 storey apartment building has an open access gallery with vertical circulation on either side of the corridor. The elevator only went to every other floor, which meant stairs must either be taken up or down to access every other floor. The apartments are all identical double-orientation (open-ended) units.



Figure 2.3.18 High-point II Flats, London, England, 1935, Berthold Lubetkin

- | | |
|----------------------|--|
| 1 Access lift | 9 Balcony |
| 2 Entrance | 10 Bedroom |
| 2 Stairs | 11 Void over double-height living room |
| 4 Servants' entrance | 12 Bathroom |
| 5 Kitchen | |
| 6 Dining room | |
| 7 Living room | |
| 8 Study | |

The High-Point II Flats (1935) built in the London, England, by Berthold Lubetkin, feature eight apartments per floor (figure



Figure 2.3.19 860-880 Lake Shore Drive, Chicago, USA, 1951, Ludwig Mies van der Rohe

- | | |
|---|----------------|
| 1 Access corridor, stairs and elevators | 7 Bathroom |
| 2 Entrance | 8 Service hall |
| 3 Kitchen | |
| 4 Dining space | |
| 5 Living room | |
| 6 Bedroom | |

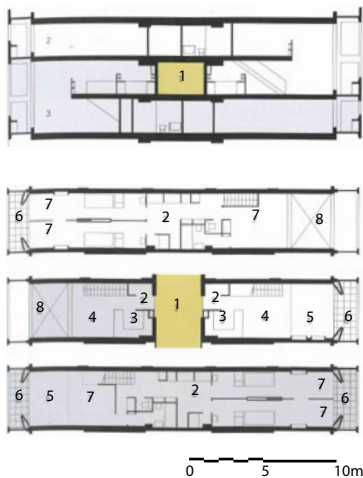


Figure 2.3.20 Unité d'Habitation, Marseilles, France, 1951, Le Corbusier

- | | |
|-----------------------------|---------------------------------------|
| 1 Access corridor | 7 Sleeping |
| 2 Hall | 8 Void over double-height living room |
| 3 Kitchen | |
| 4 Dining / living room | |
| 5 Double-height living room | |
| 6 Balcony | |

2.3.18). There are no corridors in this project, therefore access to each unit is from the elevators. There are four apartments to each circulation core. The apartments are double-orientation (open-ended) 2 storey apartments.

860 -880 Lake Shore Drive (1951), built in the USA, by Mies van der Rohe are a pair of 26 storey towers (figure 2.3.19). Both towers have a central core access point which is typical of high-rise towers. They both have double-loaded corridors. The North tower apartments comprise of a mix of single-orientation and double-orientation (90 degree) units. The south tower features large units which create double-orientation (90 degree) units.

Unité d'Habitation (1952), built in France by Le Corbusier was a departure from his residential blocks which created continuous courtyards like the Immeuble Villas. Unite d'Habitation is a 17 storey slab which is comprised of interlocking maisonette units (figure 2.3.20). The maisonettes are double-orientation (open-ended) units which are access by a double-loaded corridor every third floor.

Hansaviertel Tower (1960), built in Germany by Van den Broek en Bakema is a 15 storey tower (figure 2.3.21). The tower is extremely complex in section as it features split-level units. The

tower features a combination of single-orientation and double-orientation units. The double-orientation units are the split-level units which connect living spaces on one side of the tower with bedrooms on the other. The apartments are identical but switch orientation. The apartment below the split-level is a single-orientation studio flat. Access to the apartments is through a double-loaded split level, every third floor, alternating position corridor.

Marina City (1964), built in the USA by Bertrand Goldberg is a pair of mixed-use twin towers (figure 2.3.22). Buildings such as Marina City begin to alter the initial typology. The shape makes it difficult to distinguish it as a single-loaded or double-loaded corridor. However the building is identified as a double-loaded system with single-orientation units.

The Whale (2000), built in the Netherlands by die Architekten Cie is a high-rise courtyard block (figure 2.3.23). A typical floor plan shows double-orientation (open-ended) units with a single-loaded, open gallery corridor on every second floor. What is interesting about this particular access system is that the corridor does not fully go around the building but alternates each floor. Moreover, each corridor serves two floors. It serves the unit on that floor and the unit above via a private entrance

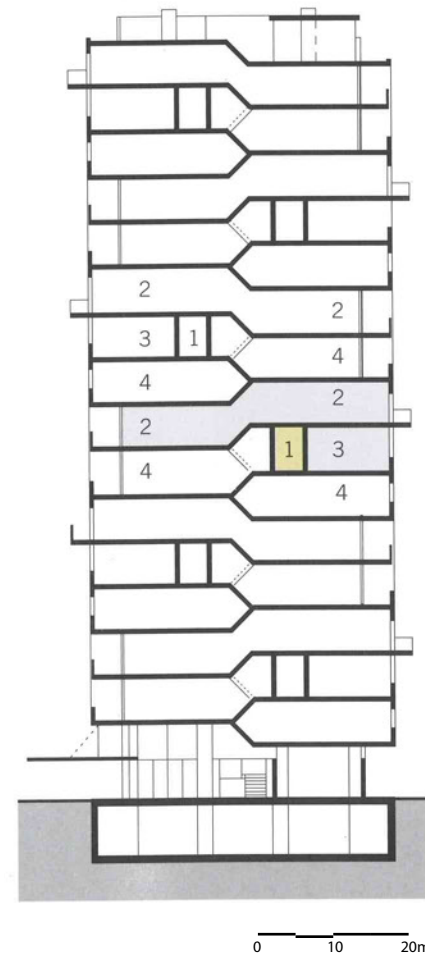


Figure 2.3.21 Hansaviertel Tower, Berlin, Germany, 1960, Van den Broek en Bakema

- 1 Access corridor
- 1 Upper two-bedroom flat
- 3 Studio flat
- 4 Lower two-bedroom flat

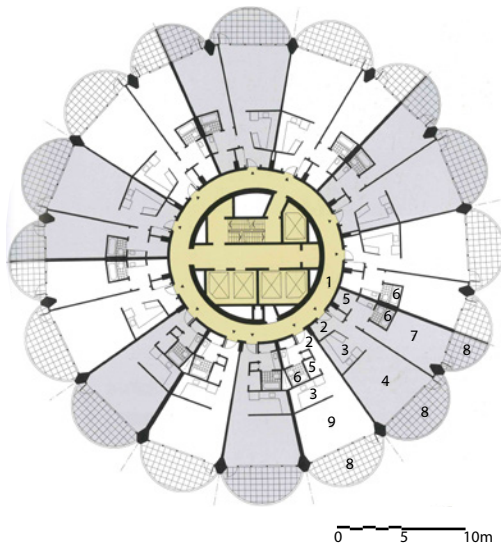


Figure 2.3.22 Marina City, Chicago, USA, 1964, Bertrand Golberg

- 1 Access corridor
- 2 Entrance
- 3 Kitchen
- 4 Living/dining room
- 5 Store room
- 6 Bathroom
- 7 Bedroom
- 8 Balcony
- 9 Living/bedroom

from that corridor.

VM Houses (2005), built in Denmark, by the B.I.G is a 12 storey high-rise (figure 2.3.24). The typology is adapted from Le Corbusier's Unité d'Habitation. The apartments form maisonette-like units that are accessed by double loaded corridor every third floor. The apartments are interlinking units, but are more complex than Unité d'Habitation. The maisonette-like units are influenced by the "V" and "M" for and go beyond the apartment with a mezzanine relationship of Le Corbusier to include duplexes, triplexes. B.I.G boasts 80 different unique variations. However these variations can be regressed to the unit types discussed at the beginning of this chapter. VM Houses presents an interesting case in that it works through typologies to find interesting and creative responses to new housing.

Conclusion

Continuing further with type investigation there will be a need either to have to work through existing typologies or to create a system for prototyping new typologies by repetition or difference. Generate new typologies by transforming the old ones. The process of transformation may involve issues listed above such as: The changing requirements of spatial systems, changing functional needs of users and socioeconomic changes give rise

to new typologies. It may also be a process of merging together two types in a process of “breeding” or hybridizing. Looking at type allows working through that configuration to advance the type either by inbreeding with itself or crossbreeding with another type. For example, B.I.G’s VM House advances the maisonette unit Le Corbusier developed by inbreeding. Unit and corridor types are the protoypical building blocks to be combined to create a more dynamic and interesting building. For example, VM Houses takes the maisonette to another level by removing the constraints of an apartment with a mezzanine and reimagining the type. Either change the type through difference and multiplicity or change it by creating a hybrid which will be discussed in the next chapter.



Figure 2.3.23 The Whale, Amsterdam, the Netherlands, 2000, de Architekten Cie

- 1 Access gallery
- 2 Entrance
- 3 Kitchen
- 4 Living room
- 5 Bedroom
- 6 Loggia
- 7 Bathroom

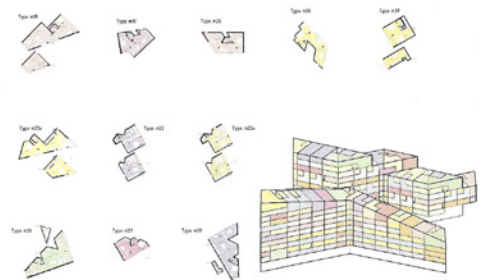


Figure 2.3.24 VM Houses, Copenhagen, Denmark, 2005, B.I.G

2.4 What is a Hybrid?

2.4.1 Definition

A hybrid is a juxtaposition of multiple consolidated facets. A hybrid is a combination of two or more different “things” fused together to potentially create a better condition. Joseph Gottlieb Kolreuter a botanist describes hybridization in science as “the tendency of cross-breeding to produce an animal or plant with a greater hardiness and capacity for growth than either of the parents (Kolreuter in Kaplan, 1985, p 4).” Similarly the idea of cross-breeding plants or animals can be translated to an architectural hybrid which combines elements of at least two parent attributes to create a better condition. The architectural hybrid thrives in dense, difficult situations that create complex and interesting buildings from opposing or sometimes complimentary ideals combined through a hard polemic of conflicting interests, types, cultures and socioeconomic impacts. The hybrid meshes these attributes into an interesting thought provoking and dynamic combination of superior form.

In architecture a hybrid building should not be mistaken with a mixed-use building. Both hybrid and mixed-use buildings overlap function, however, while a hybrid has all the characteristics of a mixed-use building it goes beyond simply mixing two or more functions. The hybrid incorporates unexpected uses and functions. It is accessible from the city twenty-four hours a day seven days a week. It is not regulated by private or public rhythms of the city (Mozas, 2011, p 43). The hybrid goes beyond architecture and enters into the realm of urbanism and landscape. Landscape becomes important as a tool for stacking and multiplying functions to create three-dimensional urbanism. The hybrid elevates the mixed-use building and brings it beyond the scope of architecture into the city where it becomes an organism which shares a symbiotic relationship with the city. Hybrids become the very foundation of the city. City and architecture become blurred. The urban fabric is merged seamlessly with the hybrid as the hybrid is blurred into the fabric of the city. Infrastructure and mobility become an important aspect in the hybrid process. Transportation and circulation of the city are

incorporated into architectural form (Mozas, 2011, p 24).

If in a hybrid building, “the programme tends to be common, luxury apartments, well-equipped offices, shopping center with top brands and five-star hotels, all varnished with cultural services, auditoriums or theatres and works of art spread throughout highly cared-for public spaces but which give culture a mere decorative function,” according to Javier Mozas, “This is not a hybrid (Mozas, 2011, p 40).” An architectural hybrid is a “cosmopolitan building” which adapts and transforms to contemporary urban life. A hybrid is:

- An infusion of complex, diverse and multifaceted programs
- An intricate factor in developing both public and private spheres of life
- A non-type, because it cannot be classified, but is an amalgam of typologies not yet fused
- Created from intense environments (economy, density, capacity, land consumption, cultural, etc)
- A type of social condenser
- Goes beyond the realm of architecture (Mozas, 2011, p 43-5)

2.4.2 The evolution of the hybrid

Javier Mozas in *This is Hybrid*, writes that the hybrid evolved out of the pressures of the American metropolis at the end of the 19th C. He states that since the 1916 change of New York zoning ordinances, which reflect issues that came out of the industrial revolution, such as the regulation of uses, height and setbacks created economic and pragmatic pressures which gave birth to the hybrid (Mozas, 2011, p 13). While the economic pressure and density of land-strapped Manhattan forced the creation of innovative multi-use building, which hybrids thrive off of, this was not the first manifestation of hybrids. Early examples of hybrids include the dwelling on top of the shop seen in Medieval Europe and the mixing of infrastructure and other uses like the Ponte Vecchio in Florence. Furthermore, the hybrid as a genetic concept was used by Aristotle to describe the giraffe as a hybrid between a camel and a leopard. Moreover, in the 18th and 19th C. Kolreuter and Mendel established biological and mathematical foundations for the hybrid process. They discussed hybrid vigour, the successful outcome of the hybrid when the transplanting or breeding worked to create a better type, or

conversely, hybrid sterility, when the resultant hybrid dies or can no longer grow, prosper, or work properly (Kaplan, 1985, p 4). This distinction can be applied to architecture.

The 20th C. hybrid signals a new era of mixing that incorporated newly created technologies and material that resulted from the industrial revolution. The hybrid found particular influence and freedom, as stated previously, to reign in the American metropolis. Escalating land values and constraints of the urban grid made horizontal growth restrictive so the vertical was exploited (Fenton, 1985, p 5). Examples such as the Downtown Athletic Club (figure 2.4.1) and Rockefeller Center (figure 2.4.2) are early buildings which found these constraints favourable.

The Downtown Athletic Club, by Starrett and van Vleck, groups functions together. For example, the sports areas including the gym, pool and changing rooms are grouped together. Above the sports volume was the kitchen and restaurants and above that was the hotel. As the building moves vertically the floor plate changes in anticipation of the functional use, this is also reflected on the facade (Mozas, 2011, p 15). Rockefeller Center was built during the Great Depression which was reflected in its success as a hybrid: one of hybrid vigour. It is a multifunctional buildings which incorporates offices, auditoriums, apartments, underground commercial venues, access to the subway, and of

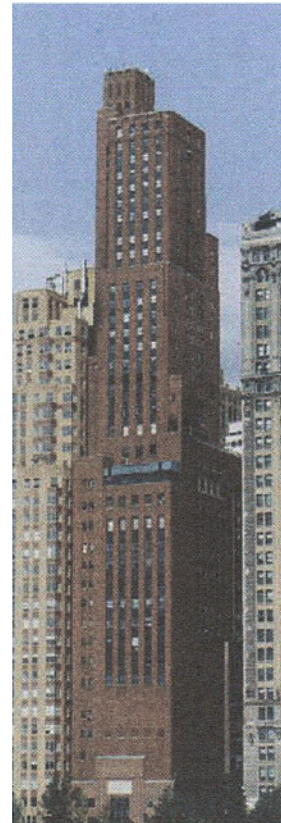


Figure 2.4.1 Downtown Athletic Club, New York City, USA, 1930, Starrett and van Vleck



Figure 2.4.2 Rockefeller Center, New York City, USA, 1930-1939, Raymond Hood

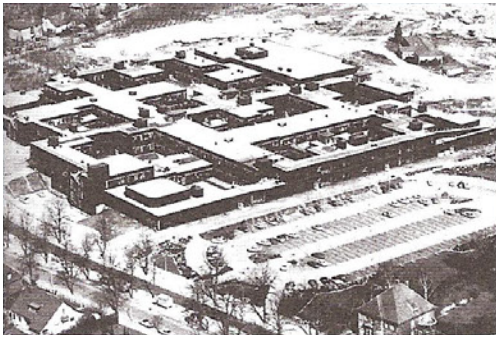


Figure 2.4.3 Free University of Berlin, Germany, 1963, Candilis, Josic, Woods and Scheidhelm

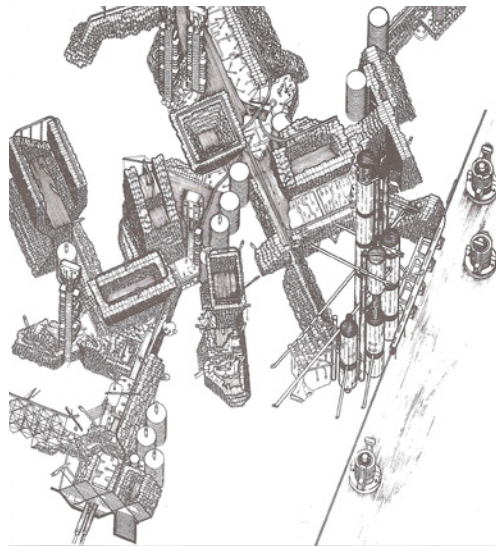


Figure 2.4.4 Plug-in city, 1964, Peter Cook – Archigram

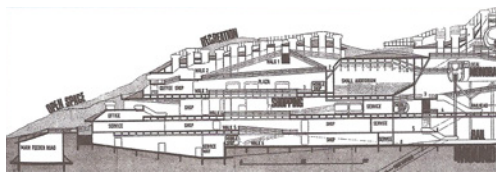


Figure 2.4.5 The mound, 1965, Peter Cook – Archigram

course venues for leisure and recreation. Rockefeller Center is diverse and complex which acts as a city complex. Rockefeller Center goes beyond architecture and is incorporated into the urban fabric. It is a city in a city, but is well integrated that it does not become an island (Mozas, 2011, p 14).

In the 1930s with the creation of CIAM and the Functional City exhibit, the hybrid lost favour. The principles of CIAM killed the hybrid through systematic segregation of function in the city which was influenced in part by the resulting evils of the industrial revolution. Dwelling, work and recreation were segregated within the city. Dwelling, which was considered the most fundamental aspect of the city was to become a spatial and functional unit in the city. The modern residential district was to be segregated by a green system. "For hygienic reasons, buildings should not be built along transportation routes, and modern techniques should be used to construct high apartment buildings spaced widely apart, to free the soil for large green parks (Mumford, 2000, p 89)." CIAM concluded that the chaotic conditions of present cities do not correspond to the "primordial biological and psychological necessities of the population (Mumford, 2000, p 90)." However, these chaotic conditions are necessary for the hybrid to thrive and take its cues for innovation and new

building form. CIAM dogma was the antithesis of the hybrid. CIAM restricted the proliferation of the hybrid.

In the 1950s and 60s there was a re-emergence of the hybrid with the dismantling of CIAM. Yona Friedman commented that “by applying the technique of superposition, new housing, industry and agriculture will be added all the while conserving as much of today’s city as possible (Friedman in Mozas, 2011, p 22).” The re-emergence of the hybrid found favour in the mega-structures and mat building such as the Free University of Berlin by George Candilis, Alexis Josic, Shadrach Woods and Manfred Scheidhelm, 1963 (figure 2.4.3), Plug in City by Peter Cook, 1964 (figure 2.4.4), Messa City by Paolo Soleri, 1955-1964, The Mound by Peter Cook, 1965 (figure 2.4.5), Villes Crateres by Jean-Louis Rey, 1963 and aircraft carrier in the landscape by Hans Hollein, 1964. Peter Cook’s Mound project like all mega-structures and mat buildings asserted the position to create a building that would encompass the city in a single structure. The Mound is a hybrid that incorporates many different functions such as a small auditorium, shops, offices, and plazas, which are all linked by pedestrian passages. Furthermore, there are transportation roads, railways and a monorail that would transport people to different parts of the building and to other

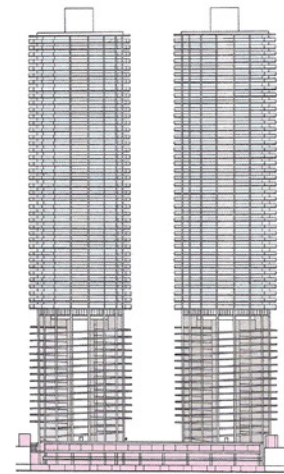


Figure 2.4.6 Marina City, Chicago, USA, 1964, Bertrand Goldberg

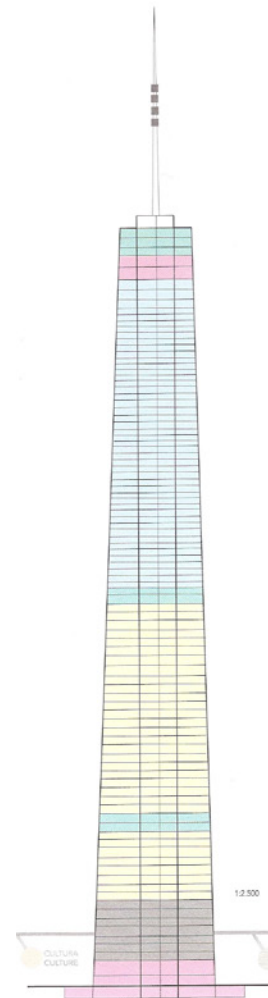


Figure 2.4.7 John Hancock Center, Chicago, USA, 1970, Skidmore, Owings & Merrill

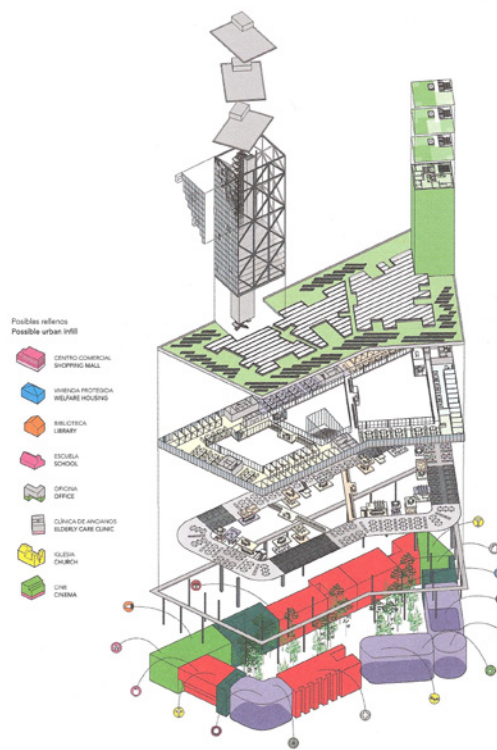


Figure 2.4.8 Mixed-use low2no, Helsinki, Finland, 2009, REX

cities. All these functions are layered on top of each other like the mountain typology. Functions are layered on artificial sites and landscapes which create The Mound. The whole structure is covered with grass which serves as the main locations for leisure and recreation. The Mound has the potential to multiply artificial sites through landscape and to aide in the layering and multiplication of functions and different typologies.

What became apparent from these buildings was the importance of landscape, the importance of infrastructure, mobility and circulation. Mega-structures also strove to show that cities could be contained in one building, highlighting the possibility of highly multifunctional dense buildings with the potential to go beyond the realm of architecture; however the greatness of these megastructures found the sterility of Kolreuters model. Most megastructures could not integrate into the existing fabric and became islands onto themselves.

Today hybrids have the potential for reconciling suburban and urban environments. In the case of American cities, Steven Holl suggests that cities are transplanting suburban types, free standing corporate headquarters, industrial parks, freeway deformed towns, shopping centres and suburban housing, in their cities, obliterating original urban patterns and destroying

the potential future of urban development in a desperate attempt to attract commerce. Hybrids have the ability to invigorate towns, socially as well as provide the physical architecture to rebuild common spaces (Holl, 1985, p 2).

The main issues of creating the hybrid are the dynamism of the program and the form, or rather the volume and resultant space it will create. In *Hybrid Buildings*, Joseph Fenton describes two ways of programmatic coupling: thematic and separate. Thematic programming is combining those programs that naturally would be joined together (Fenton, 1985, p 6). For example, a university and hospital can be thematically hybridized. The interdependency of parts promotes interaction that is beneficial to both, such as lecture halls and auditoriums. Disparate programs are those which would otherwise never be joined together. They are only joined because of different pressures which create mutually beneficial symbiotic relationships (Fenton, 1985, p6). For example, a parking garage is joined with residential dwellings. They are joined together but they do not necessarily need each other to function. They are joined in a single building because of economic and land pressures (Fenton, 1985, p 6). For example, both functions are found in one encompassing volume in the Marina City towers (figure 2.4.6).

Hybrid functions are put together in different forms which can both celebrate and express the cross-breeding of different types and functions or they can be repressed. Fenton identifies three different hybrids: the fabric hybrid, the graft hybrid and the monolith hybrid (figure 2.4.9). Fabric hybrids have little variation in their building forms. They tend to blend in the fabric of the city. For graft hybrids their function are read distinctly as parts to a whole. The monolith hybrids are like the fabric hybrid in that they have little variation in building form (Fenton, 1985, p 8). Usually creating a single volume and putting as much programme in it as possible is one form of regression as seen in the Marina City towers, John Hancock Center (figure 2.4.7) and in the Downtown Athletic club. These buildings have little variation in the vertical volume. Hybrid expression can

come from housing different functions in different volumes and bringing them together (Fenton, 1985, p 7). Functions read separately relying sometimes on the initial typologies. Contemporary examples of this type of 'welding' of function can be seen in REX's Low2No (figure 2.4.8).

2.4.3 Conclusion

The strength of the hybrid in this thesis does not come out of the functional mixing of otherwise disparate combination of uses, but from the primary approach of cross-breeding of types discussed in the last chapter. The hybrid is used as a mechanism to fuse two opposing paradigms together; that of the suburban single-family dwelling grafted onto the urban paradigm. The possibility of cross-breeding, interbreeding and working through typologies discussed last chapter to create a hybrid that is dynamic and diverse, integrated with the urban fabric, and fosters and interrelationship between public and private spheres of urban life.

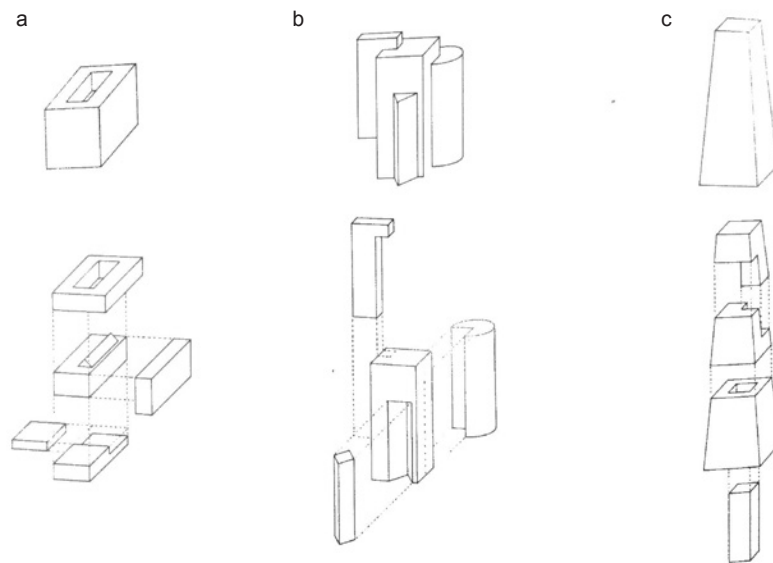


Figure 2.4.9 Different types of hybrids described by Fenton. a) Fabric hybrid. b) Graft hybrid. c) Monolith hybrid



Figure 2.5.1 General location map of the Netherlands

2.5 Why the Netherlands?

To test the application of the suburban / urban hybrid, the Netherlands was chosen as country to study. The Netherlands was chosen for its unique cultural design impetus and its strong cultural ethos towards the architecture of housing. Any discussion on Dutch architecture involves a profound discussion of housing.

The Netherlands is located in continental Europe and shares adjacencies with Belgium and Germany. The Netherlands is identified as a delta, like Denmark, a low-lying country close to sea level. In fact, most of the country is located between -1 to 6 metres above sea level (figure 2.5.2). The Dutch have a long history of battling with the sea. The Netherlands is to a considerable degree a man-made country, shaped by its never ending struggle against water. Many parts of the country have been reclaimed from the sea which today requires constant vigilant protection of its polders in the form of dikes and dams (figure 2.5.3). Land is therefore very precious. This has created a Dutch ethos of respect for the land they have so painstakingly reclaimed from the sea. Therefore Dutch architecture is influenced by pragmatism and efficiency. The single-family detached home, predominate typology in North America with an abundance of land, is not that well accepted in the Netherlands.

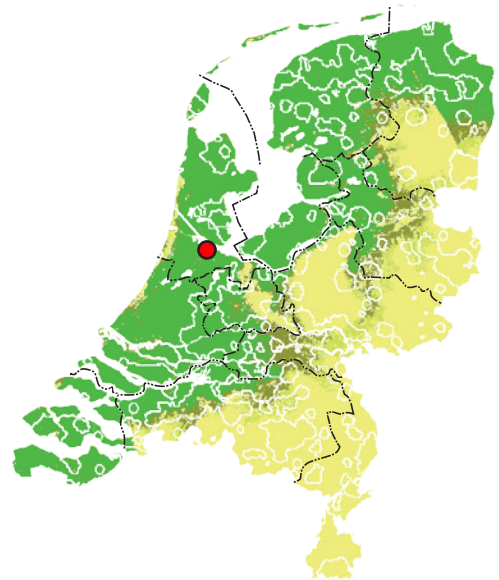


Figure 2.5.2 Topographic map above sea level



Figure 2.5.3 Polders from 1300-1980

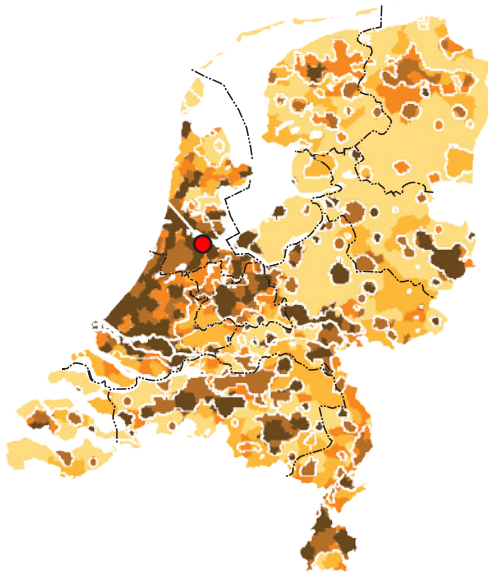


Figure 2.5.4 Population density / km²

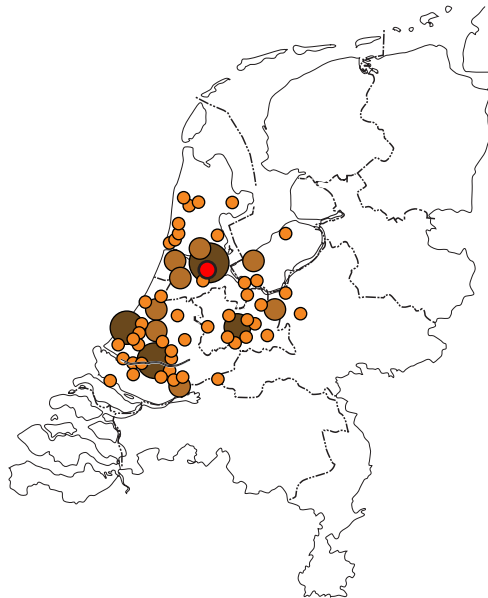
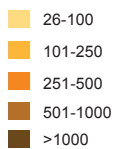
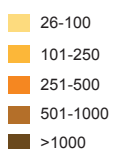


Figure 2.5.5 Population density concentration in the Randstad / km²



A denser adaptation of suburbia is however evident throughout the country, therefore the Garden City movement of close knit compact dwellings with a higher degree of communal spaces found more favour than plans such as Broadacre City which was individualizing and sprawling. The semi-detached single family dwelling and row house with a front and back garden is the predominate type of suburban development in the Netherlands. Usually for a denser option row houses are employed to create a closed or open block to form a courtyard which can be public or semi-public.

There is a connection between the limitations of land, the far degree the Dutch have gone to reclaim and protect that land through dikes and dams and the high degree of spatial planning. Flood defence, water management and urban development created a specific and unique Dutch approach to spatial planning, urban design and land-use policy. Constant need of poldering, the need to drain, dredge and reclaim, and the lack of land created an ethos of efficiency and no land waste. The Dutch approach is evident through land-use policy.

Rapid urbanization of the Netherlands as seen in the United States and the United Kingdom, particularly Manhattan and London, did not occur until the late 19th C. to early 20th C. The

Netherlands was part of the second wave of the industrial revolution and therefore many of its cities were a fraction of the population of other great cities. In the 19th C. the Netherlands comprised of small towns and villages. The total population of the country was only 5 million (Ibelings, 1999, p 6). However, when agricultural failure occurred in the second half of the 19th C. a large migration of people moved to larger industrial centers such as Amsterdam, Rotterdam and The Hague. In Amsterdam the population rose from about 220 000 to half a million (Gaillard, 1983, p 145). Migration to the city paralleled the effects of other metropolises discussed in Chapter 2.0. The city could not cope with the amount of people and could not provide proper accommodations, which created poor dwellings. As workers were coming to the city, the wealthier were leaving, settling just outside the city. H. Van der Kloot Meijburg in 1906 remarked: “the big cities have spread and in so doing sacrificed much of their appeal to the demands of modern life, so the tide of those who have moved hearth and home to places where the nerve-racking urban bustle has not yet penetrated has grown (quoted in Ibelings, 1999, p 6).” The wealthier created “villa parks,” upmarket houses set in an English-like landscape with winding roads, planned gardens and water features.

Growth in the Dutch city, as in all industrial centres went unabated. However, in the early century the Dutch government produce the Housing Act of 1901. This legislation required that all municipalities formulate building codes in regards to health and safety. The Housing Act dealt with streets, roads, water mains. As H.P. Berlage put it, the Housing Act dealt with “utility issues,” not aesthetic ones.

The Garden City Movement was introduced in the Netherlands a decade after the Housing Act. The principles of the Garden City spoke to Dutch planners who adapted them to fit their cultural response to housing, however Garden Cities as Howard intended were never built. These merely became housing estates in village-like settings. Much of the 1920s were dominated by the Garden City Movement which created momentum to leave and settle outside the city. The next decades were marked by the immergence of CIAM and the

Functional City in the 1930s and reconstruction in the post-war era.

In 1958, to help preserve the Green Heart for continuous use as agricultural land and recreational uses the government produced a policy on *Town and Country Planning* which encouraged development in the north and eastern parts of the country. This development was encouraged to be located in peripheral areas of existing cities (Dieleman et al, 1999). Policy of industrial decentralization allowed companies to locate outside the Randstad. The Randstad is equivalent to the size of other major European urban agglomerates such as London, Paris and Milan. However, the Randstad Holland is a conurbation which is not centered on one major city, but incorporates four large cities, Amsterdam, Rotterdam, The Hague and Utrecht, and one hundred and fifty other smaller cities and towns. However in the 1960s with the *Report on Spatial Planning*, the government called for an even dispersal of population and industry across the Netherlands (figure 2.5.6). The reason was that they wanted to balance the population in the Randstad and the rest of the country. The Randstad was becoming more congested so the government selected over 100 sections in other parts of the country (Ibelings, 1999, p 85).

The Second Report on Spatial Planning in 1966 was aimed to reduce the disparities between the Randstad population and the rest of the country. In 1966, however there was a second document produced on the urgency of encroachment on the Green Heart. There was a prediction that the country's population would exceed twenty million by the year 2000 (Dieleman et al, 1999). In anticipation of this population growth and realizing the Randstad would be the centre of growth, the government designated fourteen growth centers in the country, only four of which were in the Randstad. Clustered dispersal was advocated by the government. The policy wanted to find a middle ground between concentration on urban centres and dispersal (Figure 2.5.6). Its goal was to disperse the population in order to avoid a congested Randstad, but not allow uncontrolled suburban growth. So the government opted to concentrate growth in a few number of municipalities.

The megastructures of the 60s, like Bijlmeemer, were in part a response to *The Second Report on Spatial Planning*. Keeping in touch with the report, the municipality of Amsterdam created a new borough for growth, however, the sheer size of the project and its alienating effects change public sentiment to a more rural retreat. The Megastructures sparked anti-urban mentality. People were moving away from the bigger cities and at the same time people were moving away from rural areas to the pseudo rural-urban land of suburbia. People wanted to regain rural peace and quiet (van der Burg, et al., 2004, p 105). The government's response to suburbanization was still the clustered dispersal from *The Second Report on Spatial Planning* (Figure 2.5.6). This policy created growth areas. *The Third Report on Spatial Planning* in 1973 made it clear that they wanted to deter from suburbanization. The Third Report wanted to focus on other methods of transportation like the bicycle in order to reduce mobility and therefore deter the desire for suburbanization.

By the 80s and 90s the city came back into favour in the form of the compact city. *The Fourth Report on Spatial Planning* released in 1988 turned to a policy of straightforward concentration. Compactness was the new word for development. Development was to take place in close proximity to existing urban centers



Figure 2.5.6 Three urbanization scenarios - concentration, dispersal and clustered dispersal

and the Green Heart of the Randstad was off limits. Suburbanization nevertheless continued throughout the 80s and 90s. In 1990 a memorandum on the *Fourth Report on Spatial Planning* was issued called the *Fourth Report Extra* (Dutch acronym: VINEX). This strengthened the resolve of the original report. The scope was to create controlled areas around the country of government specified development, to build as much as possible closer to existing cities (van der Burg, et al., 2004, p 136-37).

In the 21st C. the Netherlands has become one of the densest countries of the Western World and even denser than some East Asian countries such as Japan. With a population of roughly 16.7 million the density of the Netherlands is 494 people per km² (Statistics Netherlands, 2012), while the density of Japan is only 341 per km² (Statistical Survey Department, Statistics Bureau, Ministry of Internal Affairs and Communications, 2011). The Netherlands seems to be “full” however, this density is not evenly spread across the country. Most of the population as described above lives in the western part of the country mostly in the Randstad conurbation. Forty percent of the Dutch population lives in the Randstad which makes up only fourteen percent of the country (Engel et al, n.d, pp 93-95). The density of the Randstad is 1,534 per km² which is three times the density of the country. The significance of the population in the Randstad is a favoured place to live and do business and will therefore grow. This growth will put pressure on land consumption and also pressure on the Netherlands’ agricultural landscape (Dieleman et al, 1999).

The Dutch people want to live in single-family dwellings. People want the privacy, the garden, the individuality and everything else that suburbia offers. Koos Bosma said “the Dutch would rather live in either a little farmhouse, or a semidetached house with a small yard front and back, a parking place on the property and, if at all possible, a suburban location (Bosma et al., p 322).” Similarly, Winy Maas stated when designing a building in Hengelo that “every typical Dutch family wants a house and a garden to call their own. Families typically prefer a house over an apartment (quoted in Klerks, 2010, p 38).” Hans Ibeligns also said that “a

major portion of the Dutch population is of the opinion that the single-family dwelling with garden in a suburban setting is perfectly adequate for developing an individual lifestyle (Ibeligns, 1996, p 10).” However there is not enough land for everyone to live that life. This means providing other alternatives such as compact and dense development. This does not mean vertical towers, as was discussed in chapter 2.2, but allows an impetus for new and innovative ways to house the Dutch population which combines the qualities of suburbia with the compactness and density of the city. Combining urbanity will help create virility, bring specificity and life in the suburb paradigm.

The Netherlands Environmental Agency released a report on *New Regional Population Forecasts to 2040*, which predicts that growth will be mainly in the Randstad. The rest of the Netherlands will see a fall in the number of inhabitants by 2.5 percent, while the Randstad will see a rise of 1.25 million inhabitants. The growth will be the result of foreign migration and a natural birth surplus. Current trends illustrate that a large majority of young people move from the peripheries to larger urban areas. Young people move to larger cities in order to attend schools for higher education and to look for jobs. These young people stay in these cities and create families. As a result more children are being born in urban centers. When families grow young couples and their children tend to move to the periphery of urban centers to find single-family homes and more space to raise their children. As a result suburban areas around municipalities are increasing and are projected to continue increasing up to 2040 (Netherlands Environment Assessment Agency, n.d.).

The Netherlands will constantly need to find new and innovative ways to house its ever growing population. The Netherlands needs to efficiently use land because more land is needed to accommodate a larger population through land for building dwellings and supporting buildings and land for agriculture. The hybrid is created by the pressure of density and economy and the scarcity of land. Here lies the perfect opportunity to let the hybrid develop itself through economic pressures of land development and the need for innovative

housing. This would be an excellent place to develop the hybrid of the suburban and urban paradigm that takes into account different typologies, public aspects and how it relates back to the urban fabric.

2.5.1 Amsterdam

Amsterdam is the constitutional capital city of the Netherlands, while The Hague is the seat of government. Located in North Holland, it is the northern most city of the four cities that make up the Randstad. Amsterdam started off as a small fishing village on the banks of the Amsteel River. Amsterdam in the 14th C. evolved from a modest town to fortified city. The city continued to grow throughout the centuries creating a series of canals and fortified walls to accommodate growth. By the 18th C. the city grew to its limits, to what is known as the city of canals. During this period the city did not grow any further. It was not until the end 19th C. when Amsterdam started to grow again in which new rings of houses were created outside the ring of canals. The biggest growth was at the beginning of the 20th C when the first suburbs were built outside the rings of canals to the extension plan of H.P. Berlage. In the 1950s thousands of dwellings were created in the garden suburbs at the edges of Amsterdam. By the end of the 20th C. Amsterdam came to incorporate Amstelveen and Bijlmermeer. Amsterdam's 21st century suburb is IJburg, a man-made island wrestled from the sea to provide relief for an ever growing city.

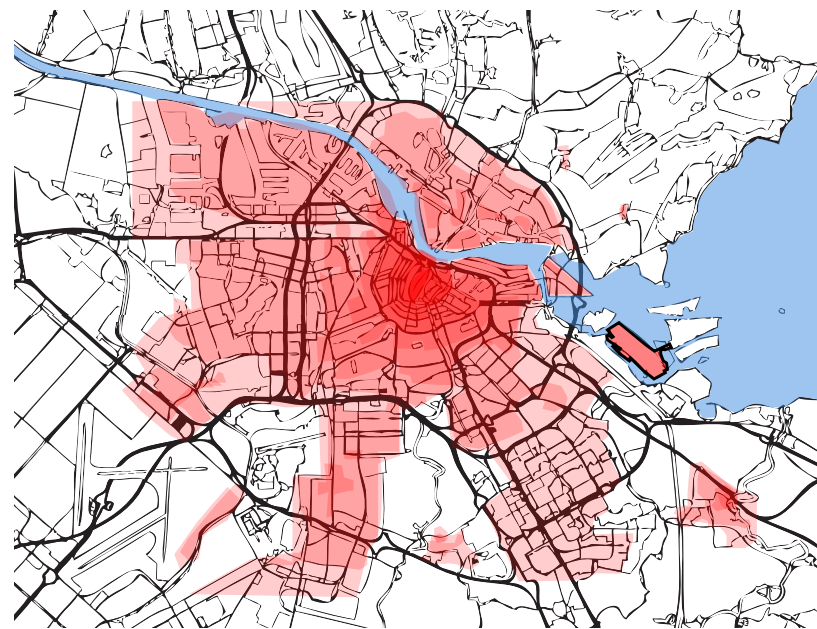
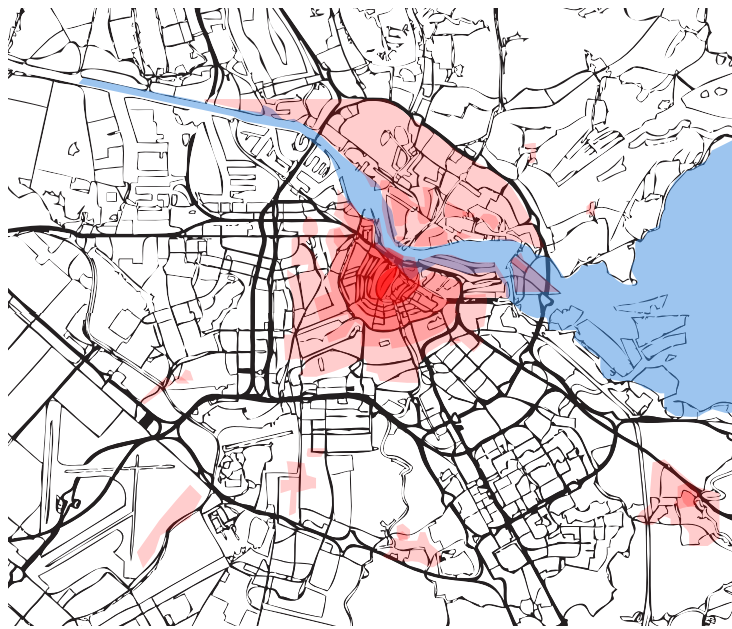
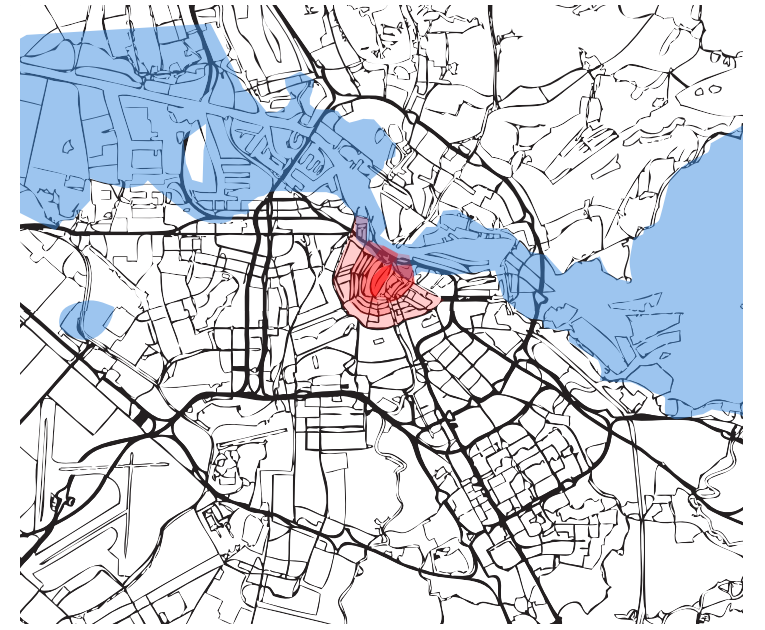
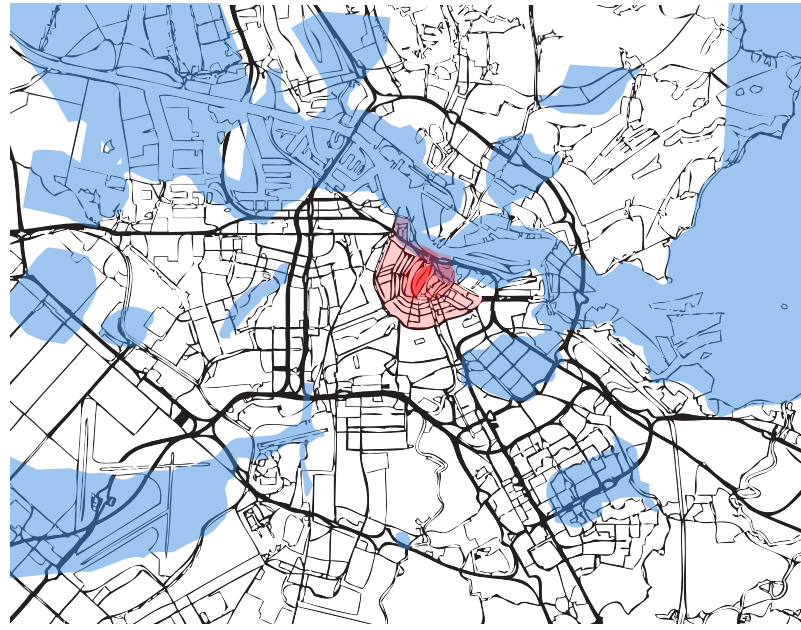
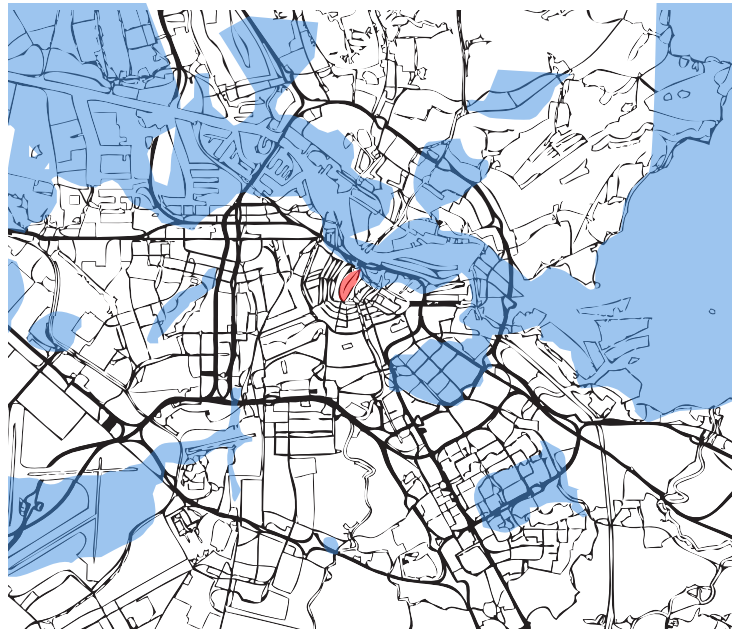


Figure 2.5.7 Development of Amsterdam from the 13th C. to the 21st C.

3.0 The Proliferation of the Hybrid in Contemporary Practice

3.1 Literature Review

The purpose of this thesis is to investigate the development of a new type of residential environment that combines both suburb and urb in a new hybrid condition. This thesis is about exploring the possibility of creating a suburban / urban hybrid, where the typological characteristics and spatial qualities of the suburbs are grafted onto an urban typology whereby the disadvantages of suburbia are mitigated by the multiplicity of urbanity. The point of this review is to document the proliferation of the suburban / urban hybrid.

As described in length in previous chapters the rise of the suburb was triggered by the industrial revolution. The creation of the suburb was aided by the products of the industrial revolution such as wealth, poor urban conditions and new technology and materials. Leaving the city and the squalor conditions also meant leaving the intricacies of urban life, the multiplicity and the spontaneity of the city. The search for open green spaces, fresh air, sunlight, recreation and leisure has left the suburbs culturally, institutionally, and commercially inept. Moreover, it created an uncanny condition of pseudo-country and pseudo-city, an unnatural twilight between the two. By the turn of the century there were proposals to bring the suburban ideal to the city.

3.1.1 A.B. Walker's '*theorem*', Cooperative apartment building

One of the earliest manifestations of the idea of stacking dwellings, or rather stacking plots of land was the 1909 Life Magazine cartoon by A.B. Walker (Figure 3.1.1). Walker, in an extremely crude way, stacked not only the suburban dwelling but also the suburban plot. He brought the ideals and benefits of living in the suburbs to an urban environment. The quote that accompanied the sketch read: "Buy a cozy cottage in our steel constructed choice lots, less than a mile above Broadway. Only ten minutes by elevator. All of the comforts of the country with none of its disadvantages (Celestial Real Estate Company)." The disadvantage

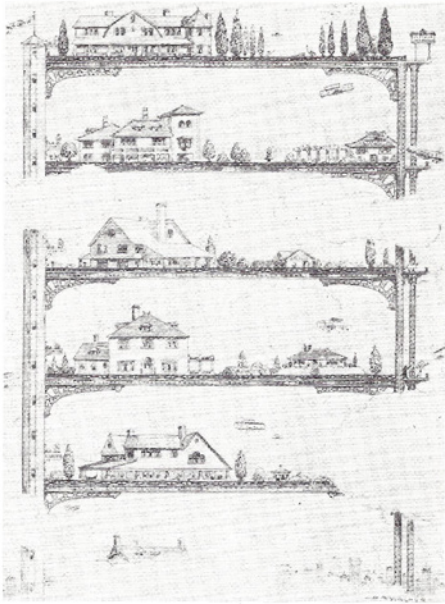


Figure 3.1.1 A.B. Walker, Life Magazine, 1909

of being in the country was that it was far away which meant time wasted commuting. The advantages it seems was that one can own their own plot of land as in the country. One may also own their own house, their own space, and can have their own garden. From the image there appears to be ample open green space. Moreover, it appears that there was not much contact between floors and therefore people could live their lives how they saw fit without much interference and in full privacy. A dwelling on one floor does not necessarily need to relate to the dwellings on subsequent floors.

Rem Koolhaas rediscovered this image in the architectural world and comments on it in *Delirious New York* as a precursor to the skyscraper. The *theorem* as he calls it describes the performance of the skyscraper. Koolhaas writes:

“Each of these artificial levels is treated as a virgin site, as if the other did not exist, to establish a strictly private realm around a single country house and its attendant facilities, stable, servants’ cottages, etc. Villas on the 84 platforms display a range of social aspiration from the rustic to the palatial; emphatic permutations of their architectural styles, variations in gardens, gazebos, and so on, create at each elevator stop a different lifestyle and this an implied ideology, all supported with a complete neutrality by the rack. The “life” inside the building is correspondingly fractured: on level 82 a donkey shrinks back from the void, on 81 a cosmopolitan couple hails an airplane. Images on the floors are so brutally disjointed that they cannot conceivably be part of a single

scenario (Koolhaas, 1994, p 85)."

This hybrid of typologies, a villa within a skyscraper, increases the possibility of a site by multiplying these types and stacking them vertically. The extreme individuality of each "rack" allows for the greatest variation of a single plot of land, which would be impossible in the suburbs. The scheme presents hyper-individuality and privacy. The benefit of stacking all these plots was that anything could happen on each floor without disrupting the function of the other "rack" above or below. Imagine other functions inserted in some of the racks such as agricultural, institutional or cultural venues. Instead of the urban realm restricted to the ground floor, imagine the variability if it were allowed to penetrate upwards throughout the building. The possibility then of each plot of land has the potential to increase the spontaneity of activities simultaneously. The possibility of combinations is then only limited by the imagination.

Similar to the 1909 drawing, another drawing showing a typological hybrid was created in 1920, showing a cooperative apartment building (figure 3.1.2). Different typologies and architectural styles were collided together. The drawing shows a mixture of typologies such as a retail base on the ground floor and a castle as a penthouse at the top. Whether it was a satirical take on conditions at the turn of the century or a

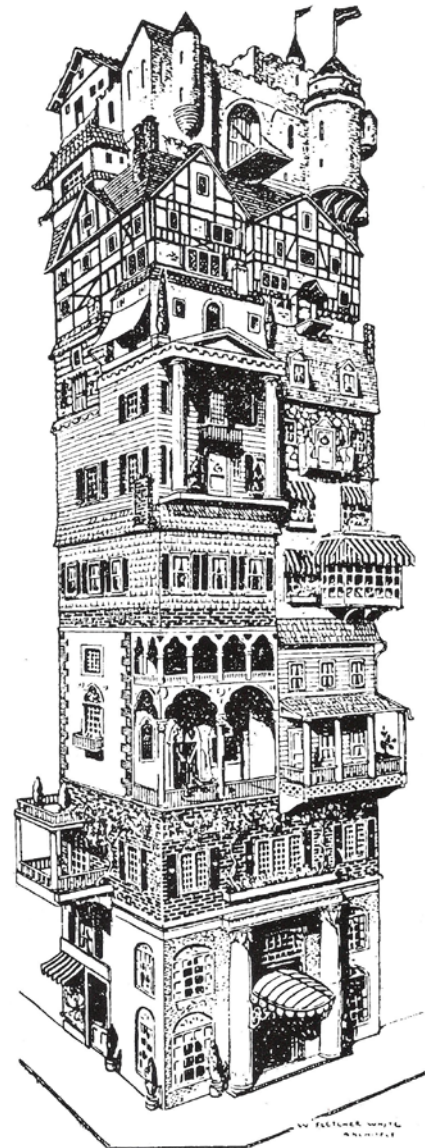


Figure 3.1.2 Cooperative apartment building, Life Magazine, 1920

legitimate visionary proposal, both drawings have become a basis for inspiration in architecture.

3.1.2 Le Corbusier

In the 1930s Le Corbusier was one of the first architects to create the suburban / urban hybrid. He implicitly describes the merger when he decided to dissolve the garden city he included in a Contemporary City to consolidate it with the city when he proposed the Radiant City. His inclusion of the garden city in a Contemporary City was not along the same lines as Ebenezer Howard intended it to be. While Howard's Garden City was meant to be autonomous from the city by having its own industrial, commercial and institutional venues, Le Corbusier's garden city was to some degree a dormitory town. In a Contemporary city he describes three groups of people and where they live,

“A) Citizens are of the city: those who work and live in it; B) Suburban dwellers are those who work in the outer industrial zone and do not come into the city: they live in garden cities; C) The mixed sort are those who work in the business parts of the city but bring up their families in garden cities (Le Corbusier, 1971, p 162).”

He further comments that “these suburbanites, according to their social condition, live in villas, or in dwellings in working-class quarters, or in small working-class houses which they rent (Le Corbusier, 1971, p 202).” In Le Corbusier's scheme the garden city resembles more of a suburb. In *The Radiant City*, Le Corbusier says the garden city is pointless and that he would merge to two. “These basic pleasures are dreams come true – the chimerical dreams of ordinary garden cities. Here then are “artificial” garden cities, efficient ones: instead of horizontal garden cities, we have created vertical garden cities. The vertical solution has all the advantages (Le Corbusier, 1967, p 57).” He lifted up the city on pilotis and lay the garden city down like a mat. To make room for leisure and recreation he piled all the cells of the city on top of each other. Through verticality he took the ideas of the suburbs and filtered them into the city.

3.1.3 SITE Architects and the High-rise of homes

The High-rise of Homes developed by James Wines and SITE Architects was a collection of single-family dwellings placed vertically in a steel and concrete frame (figure: 3.1.3 - 3.1.5). SITE Architects cite A.B. Walker's cartoon as an 'antecedent' for the High-rise of Homes, along with the fantasy project by another 1920 cartoon in Life Magazine, the proposal for a Cooperative Apartment Building (figure 3.1.2). The High-rise of Homes was similar to the A.B. Walker's cartoon in that it took the idea of the single-family dwelling and replicated it. These dwellings were literally organized and placed on 'racks'. These 'racks' were intended for purchase as new real estate for tenants. The dwellings are arranged in a "vertical community of private homes" which were "clustered into distinct village-like compounds (Site, 1982, p 47)." The premise of the High-rise of Homes was that "industrialization and standardization, while expediting multiple story housing construction, have eclipsed the personalization and variegation in preindustrial housing. With land use becoming more stringent, verticality has become an urgent requirement in many areas of the world, yet the need for individualized and visually diverse housing has not changed (Site, 1982, p 17)." SITE Architects recognize the need of providing high capacity apartments that serve the needs of people in a dense city, but lament the monotony and neutrality they create, preferring the idealized detached single-family home for its individualizing capabilities.

The High-rise of Homes was a reaction of its time to the monotonous apartment towers being built quickly for profit. SITE Architects state that, "designers usually concentrated their attention on the development of expedient solution which could be reduced to some form of mass manufacture and modular construction (Site, 1982, p 11)." SITE Architects did not just want to re propose the stacked collection of units because that would just be another apartment. They saw the High-rise of Homes as more than developer mentality of profit and the architect's subjectivity over the users' desires and needs. They saw the High-rise of Homes as a building where people were involved in building their own homes. "The High-rise of Homes is based on

the premise that people need the personal affirmation and territorial definition associated with the detached “house” even though living in the compressed environment of a multi-storied structure (Site, 1982, p 47).”

SITE Architects used the American suburban dwelling archetype as a point of departure. The American Dream is provided by the propagation of plots in the sky, which allow the freedom and personal affirmation that comes with owning land and a house. These are always usually clichés of what a house should look like and how a house should perform. SITE Architects state that a house is different for every person because they put their personal touches on it. “Like all architecture the house is expressive of a larger cultural realm, yet there is a persistent and changing dialogue between the personal preferences and tastes of the different inhabitants and architectural convention (Site, 1982, p 13).” For Site it is more important what the users want so they let them choose what their houses will look like. Like the pattern books of the past, SITE Architects set up a catalogue where the users could choose, “ the composite conditions of variables in a dwelling – windows, doors, colours, additions – [to] compose a compelling collage of tastes and tradition, and tenacious transformation (Site, 1982, p 13).” Basically houses are as different as their owners. Residents have a say on how their houses will look like from inside to out from colour to trimming type. Residents have full say versus a high-rise apartment where the architect selects everything for them – so there is no more personality, no more individuality – things are usually chosen to be cost effective and easy to construct. This informs their idea of having a steel structure to then insert dwellings that are typical of the American house and actually physically resemble a house that would be found on the ground.

Through collage and multiplicity of style, allegory and allusion the high-rise of homes creates a hybrid. The predominate typology is the single-family detached dwelling wrapped inside a high-rise with a variation of housing choices such as two-storey or duplex dwellings. According to Javier Mozas, it appears that the high-rise of homes would be a fabric hybrid, where the program is stuffed into the general form of the building.

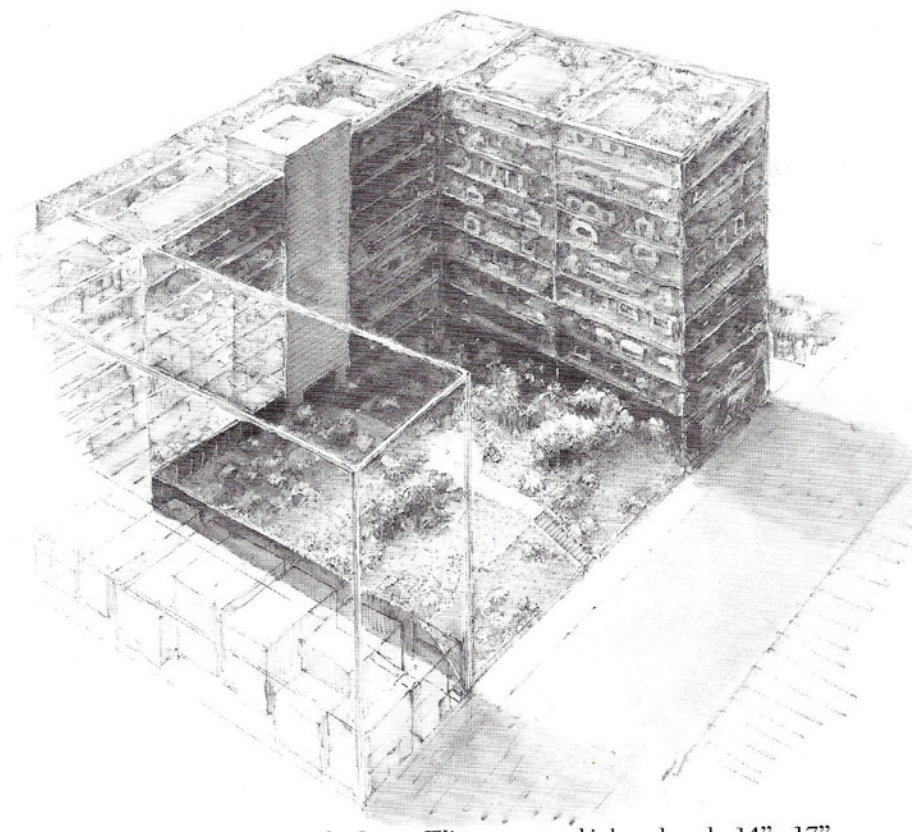


Figure 3.1.3 A high-rise of homes James Wines' Drawing

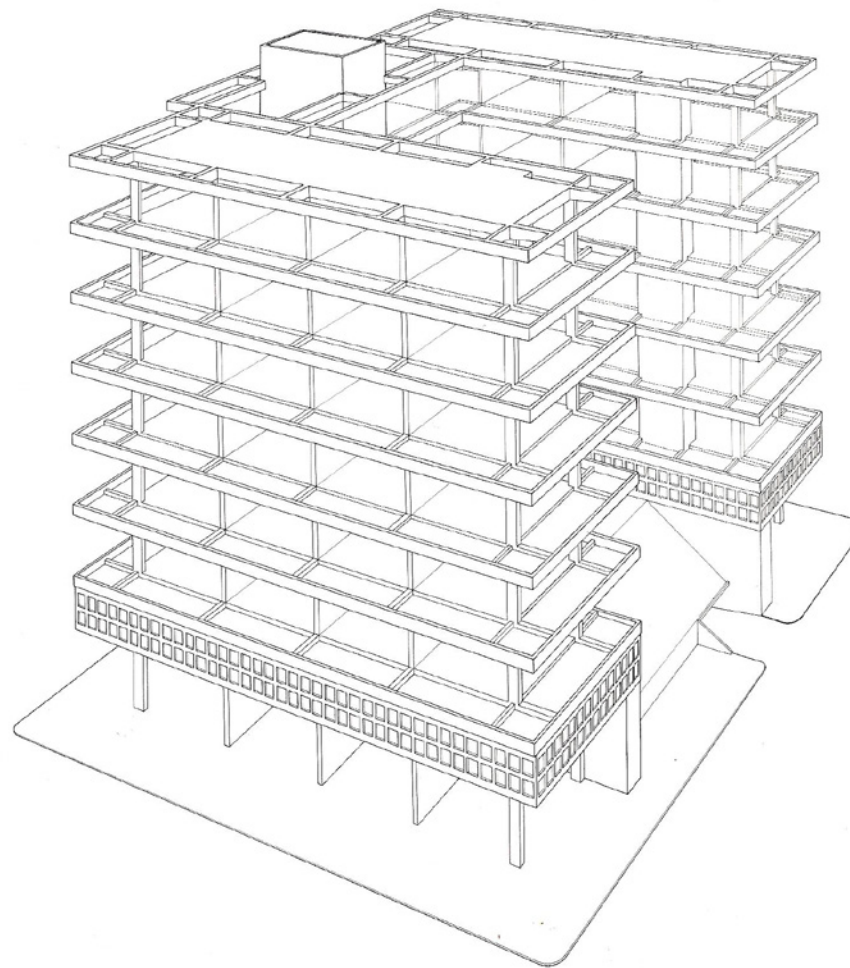


Figure 3.1.4 A high-rise of homes structural matrix



Figure 3.1.5 A high-rise of homes elevation

The hybrid is formed through the collection of houses crudely stacked on top of the other in a vertical format. What is interesting about this building is that it tries to make a real proposal for A.B. Walker's sketch. The High-rise of homes is not just a collection of single-family detached dwellings, but an affirmation of the suburban plot and an excerpt of its physical location in suburbia, even though it was crudely achieved. Unfortunately, SITE Architects have failed to create any such projects to this day. Moreover, the use of the racks does not offer any advantages. The dwellings below do not see the sky but the underside of the ceiling above. In this regard it is an apartment building with no external walls.

SITE Architects describe the imperative to make each dwelling look different, however in the whole composition if the tower is rigid in plan section and elevation there is no variability. Why not use the form of the building to create specificity and individuality? Of course allow some spaces to be left to the user to be changed and adapted as they see necessary to their life. Even in suburban development the same dwelling is copied to infinity, however there is still a persistent idea of individuality as a singular entity which a group of people identify as their home, even though millions of other people do the same. Perhaps then the colour of one's door, gate, fence or the size and width of the pediment, column, mouldings or light fixtures does not matter to the identity of a dwelling. Furthermore, these features from the third floor and higher are not seen from the street, diminishing the hype of individuality from the mass of the building. In the High-rise of Homes SITE Architects simulated a front door condition that would be found in a single-family dwelling in the suburbs. However access to each dwelling is from a common public access point to the building which diminishes the intent of having a private entrance to the dwelling. In the end the access sequence is similar to other apartment buildings: public entrance to the building, followed by semi-private corridor which then leads to the private unit.

3.1.4 MVRDV and “multiplying landscapes”

MVRDV's design prowess is in part centred on density, the idea of layering and the multiplication of landscapes in order to increase the capacity and intensity of a site and thus provoke, tease out, or force the creation of an innovative hybrid. Part of MVRDV's architectural production over the last ten years can be positioned within this ambition of enlarging the capacity of compact environments to create the three-dimensional city. Pushing higher densities, enlarging the existing floor plate and creating more public levels, according to MVRDV, enter urbanism into the third dimension. The suburban / urban hybrid is part of this three-dimensional project.



Figure 3.1.6 Expo 2000 Netherlands Pavilion, Hanover, Germany, MVRDV, 2000

The Expo 2000 Netherlands Pavilion in Hanover Germany is a perfect example to MVRDV's theory of multiplying landscapes and expanding the floor plate (figure 3.1.6-3.1.8). The project was a statement in increasing the landscape for population, water, oxygen, and energy and food resources in the limited amount of space that would be restrictive if built horizontally. The pavilion enlarges the capacity of a given site. MVRDV stacks the Dutch landscape on multiple levels to simulate more space. Anything from a poplar forest to a ski resort can be found in the pavilion.

Silodam was one of the initial housing projects MVRDV designed in correspondence to the idea of the three-dimensional city. Designing Silodam, the wish for the municipality of Amsterdam was to achieve a high density scheme. For Silodam, MVRDV put together a vertical three-dimensional neighbourhood with a mix of different dwellings differentiated by distinct access sequences. Each of the apartments was intended to include the house with a garden feeling. For example, some units on the lower floors simulate canal houses which have private access to each unit. Other units have the typical doubled loaded corridor while others have a gallery access sequence.

In designing Silodam, MVRDV asked the question: is it possible to combine densification to an enlargement of the spatial experience? Meaning, to create the built area required and still provide a seemingly open non-dense environment. The goal, then, for the three-dimensional project is to increase the density, but more importantly enlarge the floor space, add more levels and stack more floor plates. However, “for the drive for density not only houses or offices should be stacked, factories, agriculture, parks and retail would accelerate this imagined three-dimensional life (Maas, et al., 1998, p 396).” Furthermore, to increase and create a potential for a viable three-dimensional city the movement of people must be considered. How does one transverse the city? To create vertical urbanism one must take into account movement – three-dimensional movement within and around a building – and movement that relates back to the urban environment. Circulation therefore becomes a critical component when stacking function and putting together typologies that would not otherwise be placed together. The original intent of Silodam was to incorporate more than just apartments. It was to include a fluid transition from apartment neighbourhoods to auxiliary spaces such as the “sand pit” to simulate a beach atmosphere, mini-golf area and sports facilities along with other functional uses such as a restaurant and offices. Silodam becomes the quintessential housing project in its original design for the multiplication of landscapes.

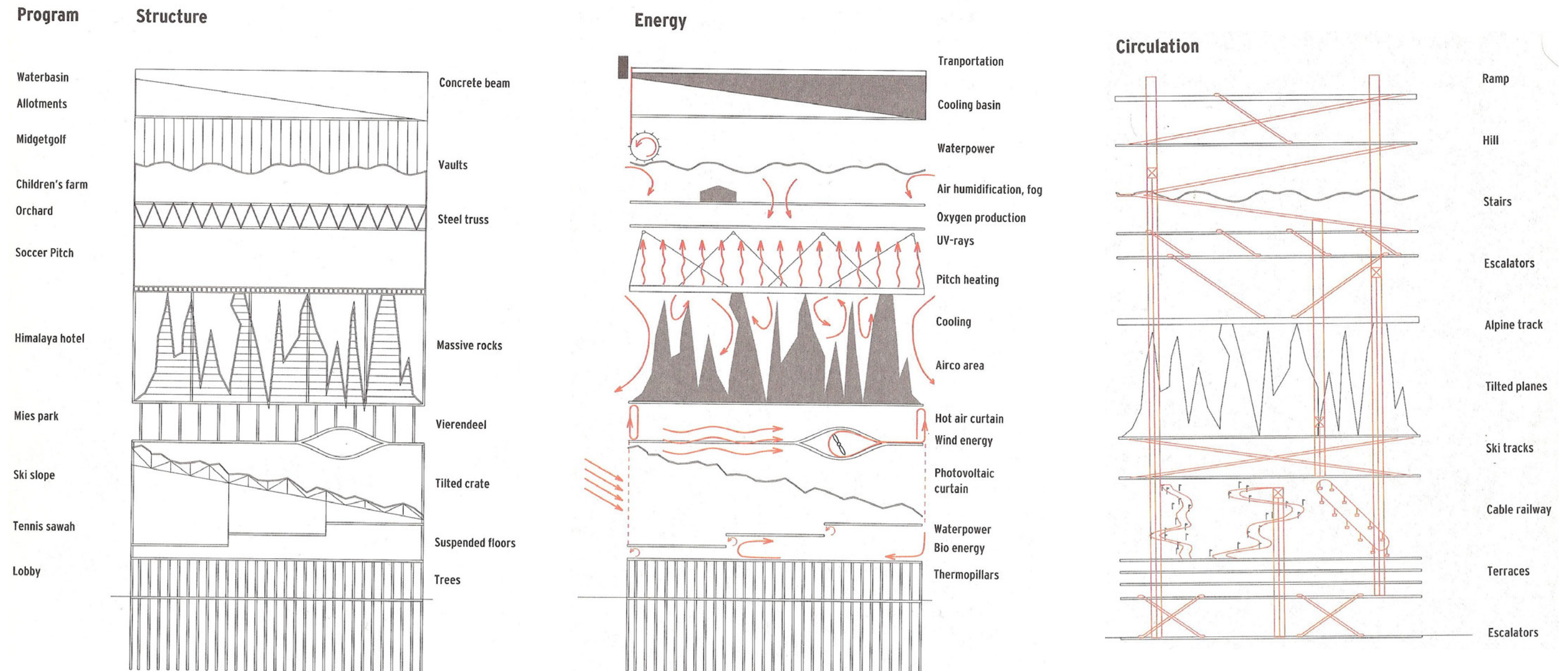


Figure 3.1.7 the logistics of stacking, layering and multiplying different functions together. The building takes care of itself. Expo 2000 NL Pavilion, Hanover, Germany, 2000, MVRDV

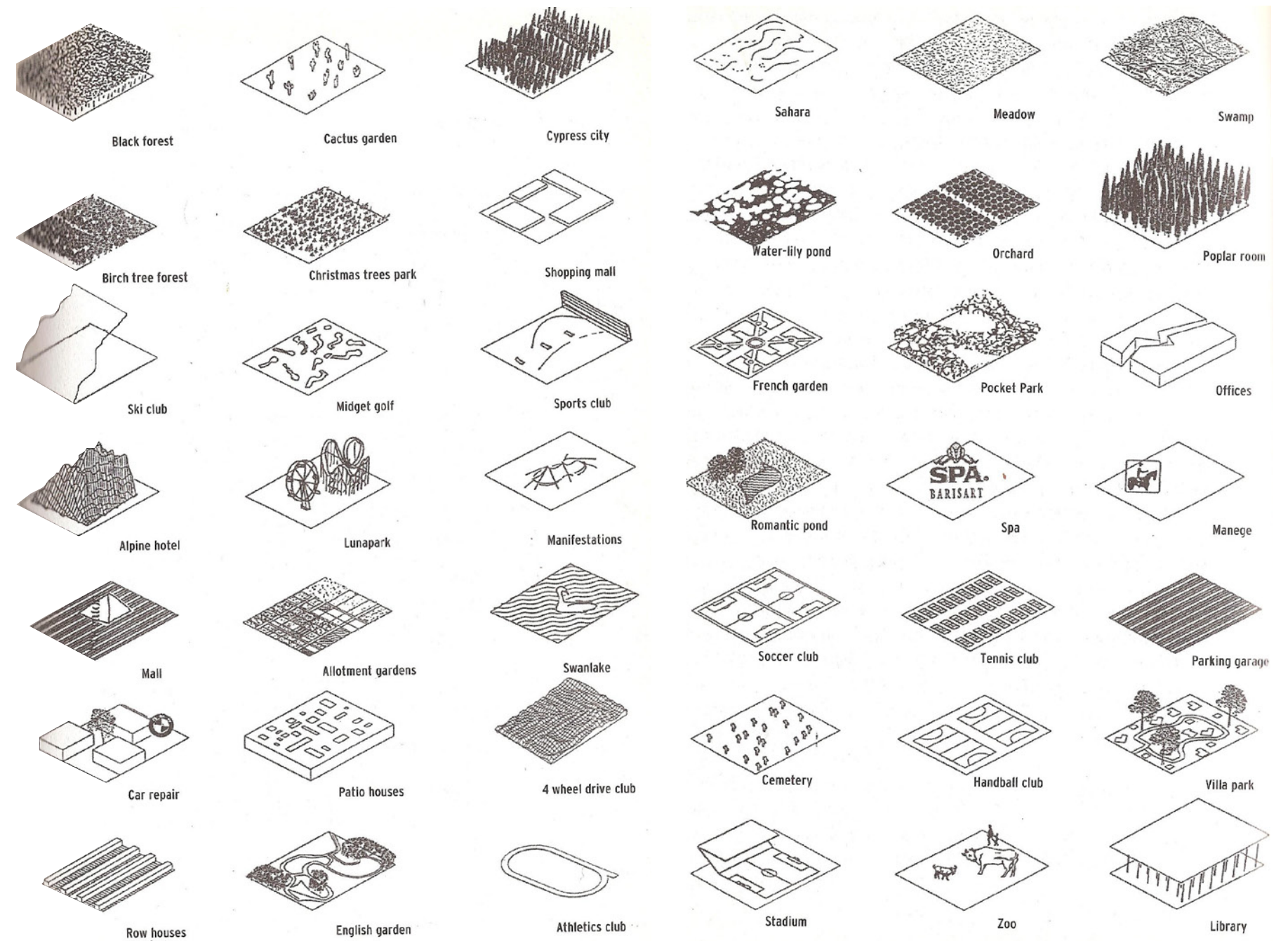


Figure 3.1.8 potential of stacking and layering different functions together.
Expo 2000 NL Pavilion, Hanover, Germany, 2000, MVRDV

MVRDV designed a theoretical tower for Hengelo in the Netherlands that would incorporate gardens in a potentially more robust way. Instead of stacking dwelling units on a green site, MVRDV also decided to stack green plots and hang them off of each dwelling unit to form a three-dimensional garden project. MVRDV writes:

“For the Dutch city of Hengelo, we designed a tower containing what every typical Dutch family wants: a house and garden to call their own. Families typically prefer a house over an apartment. When thinking in terms of density, you imagine a tower with large, garden size balconies, or even hanging terraces, including trees. So instead of stacking apartments on a green plot, we designed a building in which residential space is literally mixed with green space (quoted in Klerks, 2010, p 38).”

MVRDV literally stuck oversized balconies to each unit. While this was a great first approach to intertwining green space with the built form in a non-conventional way this urban form is really only one of many solutions as was shown in chapter 2.2. Moreover, the balconies only address one aspect of suburban development, suggesting that the lure of suburbia is only credited to the provision of personal outdoor space. However, suburbia was more than that, but has been reduced to that simple parameter because the reason that gave rise to the suburbs no longer exists. Hygiene, safety, wealth, upper-class, recreation and leisure are no longer relevant to distinguish suburb from urb. Furthermore, Le Corbusier illustrated that the city can also be a site for recreation and leisure at a greater intensity than the suburbs.

Projects like Hengelo and the real scheme which was used at Torre Huerta, in Valencia Spain, present an interesting case of merging suburban ideals such as the landscape to urban solutions such as the tower typology and density. However, to achieve a greater value of multiplicity, diversity and spontaneity that clearly the three-dimensional city is about more attention to the auxiliary spaces that unite the major function need to be developed. Indoor and outdoor spaces such as those found in the original scheme of Silodam connect the different uses and even the dwelling units to each other allowing for a creative interaction between them.

3.2 Precedent Review

3.2.1 Introduction

The following case studies are projects which show evidence of density, diversity, urbanity, variability and vitality to entice and provoke creative responses for the hybrid. These projects were considered because they look at density, diversity, typology, mixed use, and relationship between private and public realms. They will be evaluated at what extent they resemble the suburban / urban hybrid. The first two projects are examples of high-rise high-density and are both towers. Skyvillage designed by MVRDV seeks to create a vertical village through stacking of pixels. Torre Huerta also designed by MVRDV seeks to reintroduce the Valencian *huerta* (Spanish for garden) vertically by means of balconies. The third project, Silodam a slab apartment building also designed by MVRDV seeks to create a vertical neighbourhood through a mix of apartment typologies and uses centered on a collective garden, patio, corridor and amenity spaces. The last project, Borneo-Sporenburg, a masterplan for Amsterdam's Eastern Harbour District by West 8, features a predominant low-rise single-family typology with access to dwellings from the ground floor. Mid to high-rise blocks such as the Whale by de Architekten Cie are employed to add diversity, provide different dwelling typologies for different users and income groups. These building typologies in the master plan help increase the density of the area. All case studies are meant to show the potential of creating the suburban / urban hybrid. What is evident from all projects is that there is an emphasis on mixed use and different housing typologies.

3.2.2 Rodovre Skyvillage (programmatic and typological hybrid)

Skyvillage, located in Rodovre, was designed by MVRDV. Rodovre is a sub area of the Metropolitan Area of Copenhagen, Denmark. Rodovre is a dormitory suburb which consist of single-family dwellings and open blocks. Skyvillage was designed in 2008 for a competition for Brainstones Aps in which it won first place. The constraints of the project took into consideration the fiscal climate of Denmark and Copenhagen as a city, therefore making it mixed use and multifunctional was essential. The other constraint was context. Located in a highly residential district height was a considerable factor. Casting large shadows on the residential district

must be avoided. The form and scale of the building was also an important consideration because of its location and its relation to a predominately low-rise environment.

The building was designed for multi use purposes. The building incorporates residential with offices and a hotel. The residential portion is 3 650 m², which only compromises ten percent of the building. The predominate programmatic function is office space which takes up 15 800 m². The hotel accounts for 970 m² and the basement which includes storage and parking is 13 600m². The building is predominately office space. It has a formal plaza on the ground floor with shops and restaurants as well as open outdoor area for playing and relaxing. Although these spaces were predetermined to reflect the current needs of the area, the building was designed in a way that the uses can change. For example, if more residential units are needed and office space is not needed the office space can change into residential units and vice versa.

MVRDV's design strategy was to combine the characteristics of the low-rise single family dwelling of the surrounding area with the "strong appearance of the block next to the main street." It is not immediately understood that the building incorporates the character of the low-rise homes. Skilvillage was design as a giant cube made from tiny 'pixels'. These pixels are arrange on a 7.8 m by 7.8 m grid and are inevitably 7.8 m by 7.8 m themselves with a height of 4 m. This translates to units that are 60 m² or have a volume of 240 m³. In effect this building creates a 48.6 by 48.6 by 48.6 meter cube, however since the impact of the building on its context is largely considered, MVRDV takes the pixels from the bottom and redistributes them. This redistribution is as much about limiting the impact of shadows, creating light and views for the buildings' residents and creating green space on top of the pixels. These pixels are modular and were created to be able to change use relatively easy. They can also expand by joining two pixels to make larger units. This increases the flexibility of the building. It can adapt itself to the changing economic climate of Copenhagen and the aspiration of its residents. Although not intended by MVRDV the pixel lends inteelft to the idea of

growth, that residents could potentially start with one pixel and as the family grows in size and income they could buy another pixel to be annexed. The pixels are only recognizable in so far as they are a distinct unit that can be volume for any of the uses; office, residential or commercial. The fact that these pixels can be either residential or office diminishes the recognition for the residential characteristic of the area.

☺ 207
🏠 94

☺ 376 / ha
resident density
🏠 171 / ha
dwelling density

6 219 ☺ / km²
density of Copenhagen
129 ☺ / km²
density of Denmark

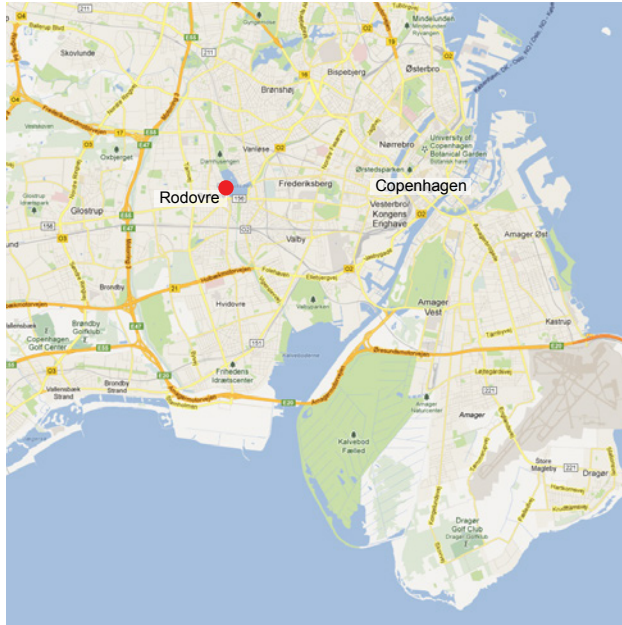


Figure 3.2.2.1 location map

scale km
0 2 4



Figure 3.2.2.2 site map

scale m
0 50 100

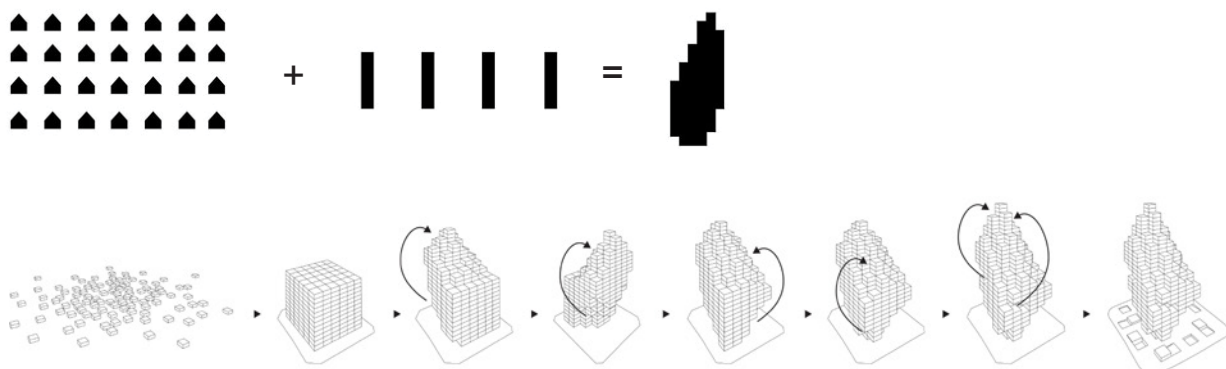


Figure 3.2.2.3 concept



Figure 3.2.2.4 site plan



Figure 3.2.2.5 fifth floor plan



Figure 3.2.2.6 tenth floor plan



Figure 3.2.2.7 fifteenth floor plan



Figure 3.2.2.8 nineteenth floor plan

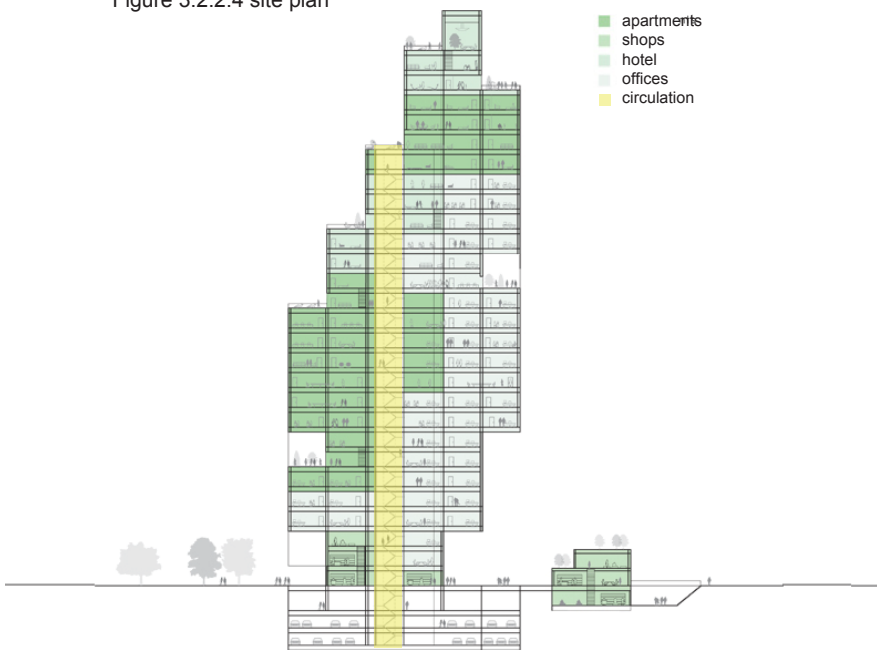


Figure 3.2.2.9 section



Figure 3.2.2.10 massing model



Figure 3.2.2.11 circulation

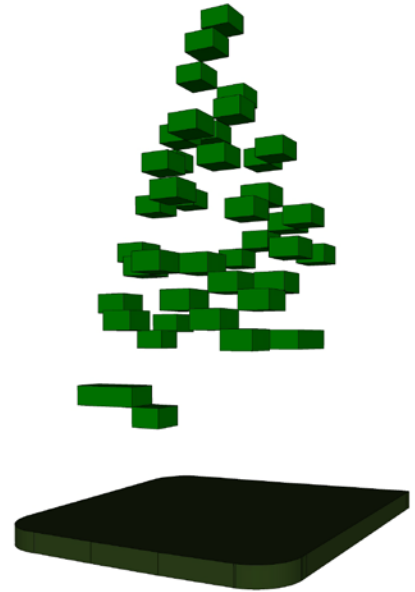
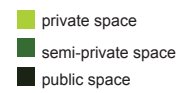


Figure 3.2.2.12 public / private open spaces



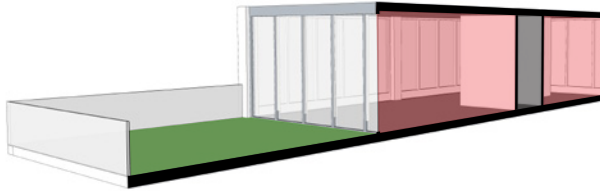


Figure 3.2.2.13 typical 1 - 2 bedroom apartment.
Three pixels - two housing and one open space

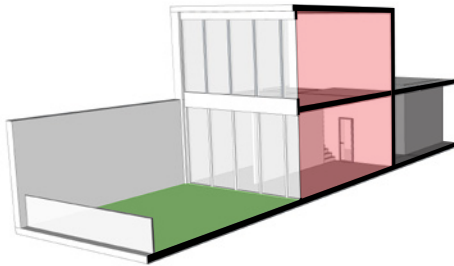


Figure 3.2.2.14 typical 1 - 2 bedroom apartment.
Three pixels - two housing stacked and one open space

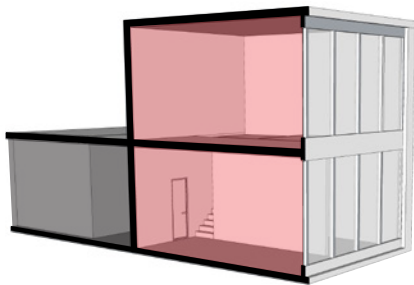


Figure 3.2.2.15 typical 1 - 2 bedroom apartment.
Two pixels - two housing no open space

3.2.3 Torre Huerta (suburban / urban hybrid)

Torre Huerta is located in La Torre district of Valencia Spain. It is part of the Sociopolis master plan. Sociopolis presents a new model neighbourhood. It takes into account new social relationships that are becoming increasingly predominant in the 21st C. Sociopolis is a neighbourhood for changing demographics, one that involves young people under thirty, elderly and single-parent families. The neighbourhood is predominately residential but it also incorporates institutions such as schools and art centres. The main feature of the master plan is the urban *huerta* (urban garden) which is centred in the middle of the development. The residential buildings are located around the central urban huerta and central park which incorporates a soccer field and skating rink (Sociopolis, n.d.).

The premise for Torre Huerta is that Valencia used to be a city covered with green space, in particular fertile agricultural land. However the city of Valencia is continually expanding and the huerta is being colonized by the metropolis. The same phenomenon can be observed in Randstad Holland with encroaching development. MVRDV proposed a twenty-one storey residential building for Torre Huerta. Apartments range from single storey one to four bedrooms and two storey apartments. On each floor there are five apartments around a central core. At grade there are commercial establishments. MVRDV incorporates the surrounding huerta by taking it vertical. Like typical huerta farmhouses of the past, each apartment has a huerta plot. The 'plot' is in fact a balcony in which MVRDV sees it as an extension of the main living space. There is also communal space on the roof for residents to enjoy.

The vertical huerta is superficial. It is literally a tack on in the form of a balcony with a tree on it. The balconies, however, privatize and individualize open space which is typical of the suburban context. The balconies are the private open areas while the roof is left for the collective.

269
96

210 / ha
resident density
75 / ha
dwelling density

6 010 / km²
density of Valencia
93 / km²
density of Spain



Figure 3.2.3.1 location map

scale km
0 2 4



Figure 3.2.3.2 site map

scale m
0 50 100

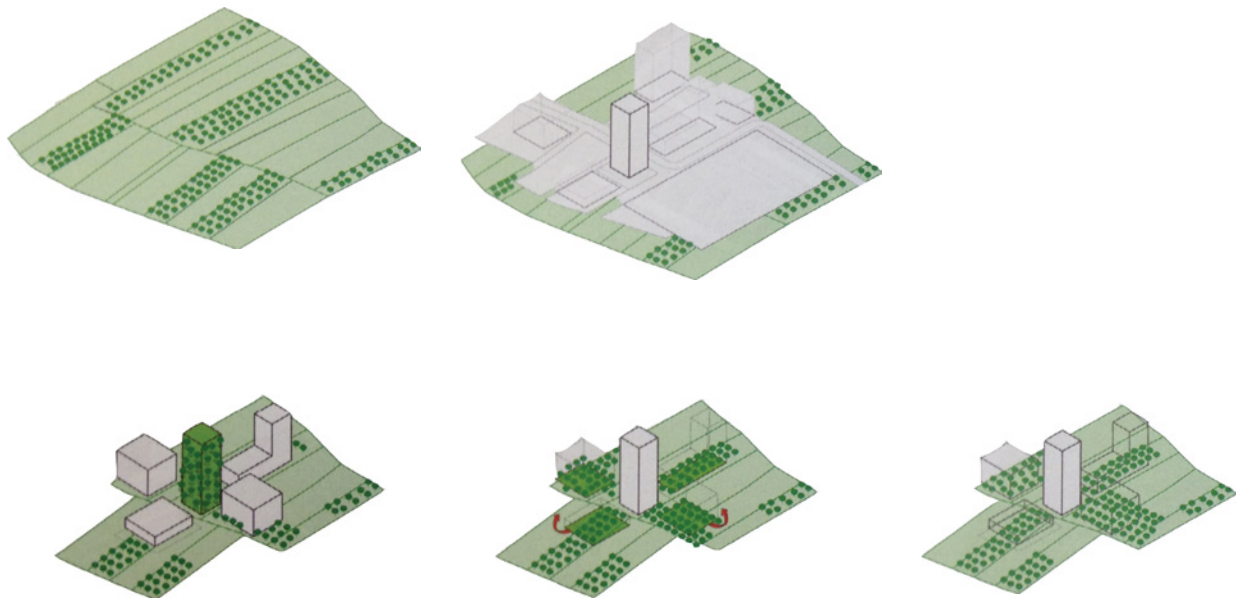


Figure 3.2.3.3 concept



Figure 3.2.3.4 typical floor plan

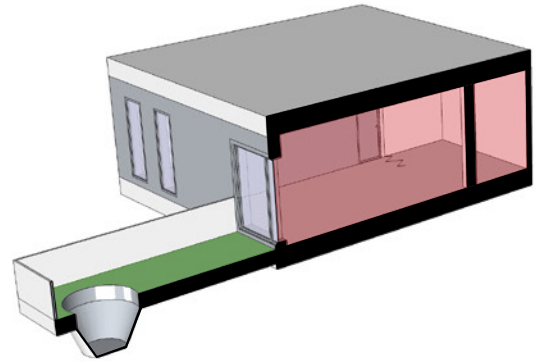


Figure 3.2.3.8 typical three bedroom unit

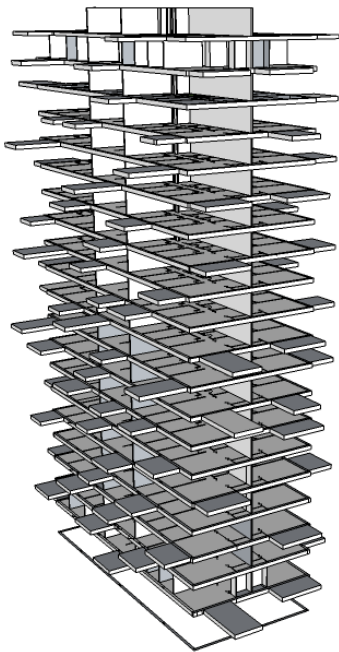


Figure 3.2.3.5 massing model

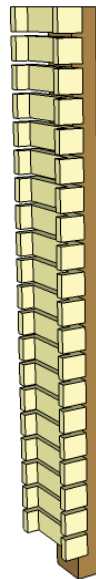


Figure 3.2.3.6 circulation

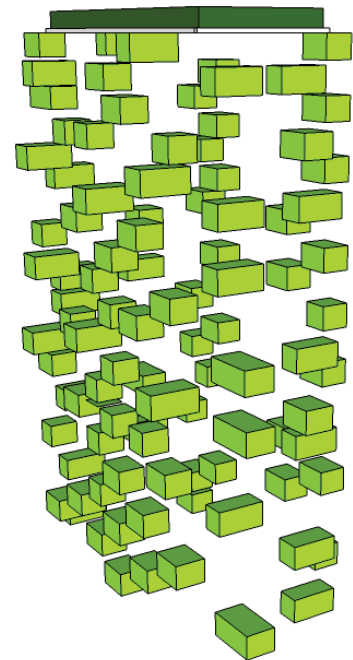


Figure 3.2.3.7 public / private open spaces

horizontal circulation
elevator
vertical circulation

private space
semi-private space
public space

3.2.4 Silodam (typological hybrid)

Silodam is located in the western part of Amsterdam. The building was designed in part of a larger initiative to densify Amsterdam. Silodam was supposed to be a mix use building of residential, commercial and offices, but is now strictly residential. In designing the building, MVRDV did not simply want another apartment building that was functionally segregated or stratified. Instead they proposed to have a haphazard mix of all uses throughout the building, resembling a mosaic instead of creating a stagnant monoculture.

Silodam was designed to have different apartment types. This is something that appeals to the Dutch people. There are fifteen different apartment types of different organization, orientation and size. The different apartment types range from studios, maisonettes, lofts, two storey galleries, patio houses to flats. The different apartment types are organized into neighbourhood of eight to twelve apartments. "The extreme variety of wishes has been addressed by finding the common size within the programme: a series of mini-neighbourhoods, which as a reaction to the increasing individualization try to create a more social and safer living environment (Maas, et al., 1998, p 534)." Each neighbourhood consists of a gallery, garden and hall. Neighbourhoods are recognizable as units from the treatment of the exterior facade. Each neighbourhood has its own characteristic of colour and facade treatment (Maas, et al., 1998, p 534). "Staking them independently next to and on top of each other, a system of public routes through the building emerges. When mixed with workspaces and open zones a vertical neighbourhood is the result, one that tries to give the apartments equivalents of the house-with-a-garden feeling (Maas, et al., 1998, p 534)." Silodam was based on this idea of bringing together neighbourhoods. To create a neighbourhood in a vertical form MVRDV uses many different typologies to suit many different people and social groups in order to foster a potential for a highly diverse neighbourhood.

The mosaic of apartment types and functional uses in the neighbourhoods helps foster a sense of a three-

dimensional building. The sense of the neighbourhood could have been more fluid and evident through building form instead being driven solely by material application on the facade. The neighbourhoods start and stop at every floor, they are confined to one floor and visually noted by the ribbons of different material on the facade. Circulation for Silodam is generally okay you can transverse the building from one end to the other but there is not point to it because there is nothing at the other end to experience. There are no destinations. Moreover, it is not a destination for people in the wider district. There is no drive for people other than residents to come to Silodam. Perhaps if it was designed as it was originally conceived it would have been much more dynamic.

☺ 377
△ 157

☺ 1 450 / ha
resident density
△ 603 / ha
dwelling density

3 506 ☺ / km²
density of Amsterdam
494 ☺ / km²
density of the Netherlands

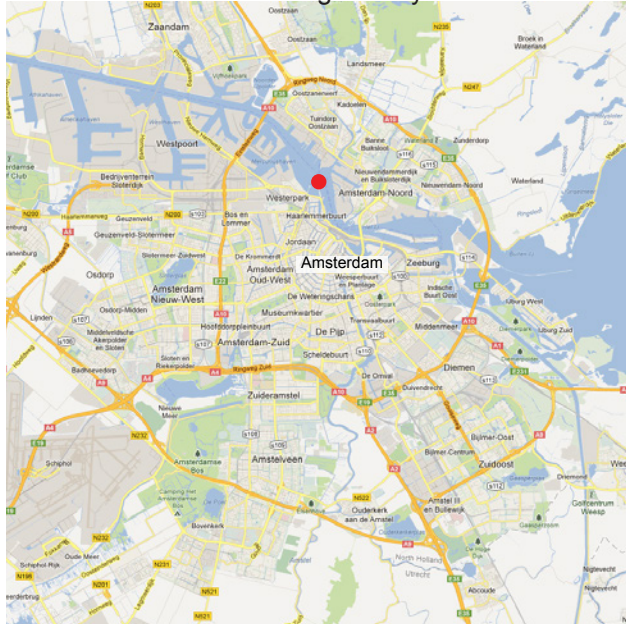


Figure 3.2.4.1 location map

scale km
0 2 4

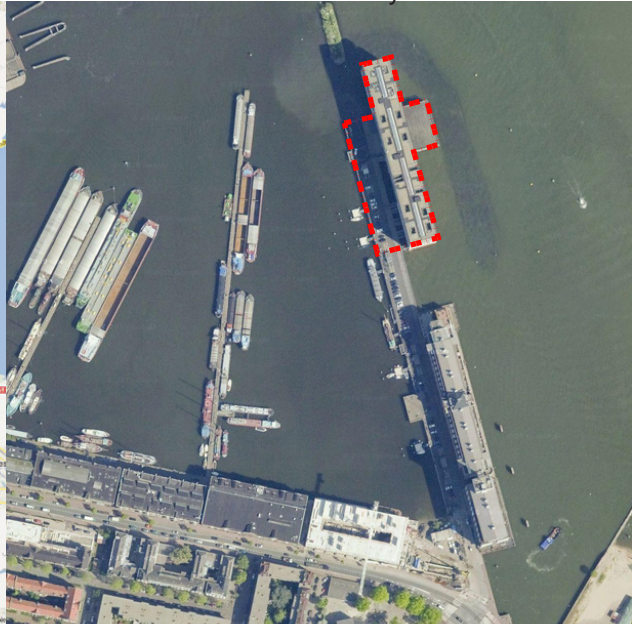


Figure 3.2.4.2 site map

scale m
0 50 100

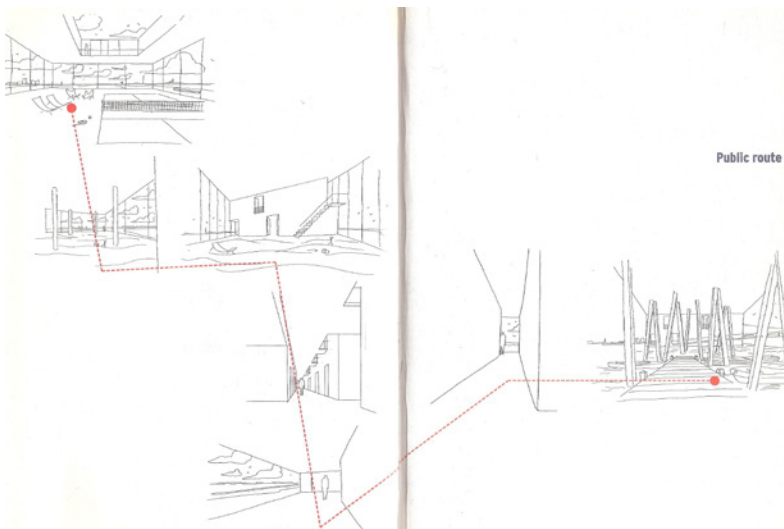


Figure 3.2.4.3 original intent of Silodam: providing public roots and destinations throughout the building

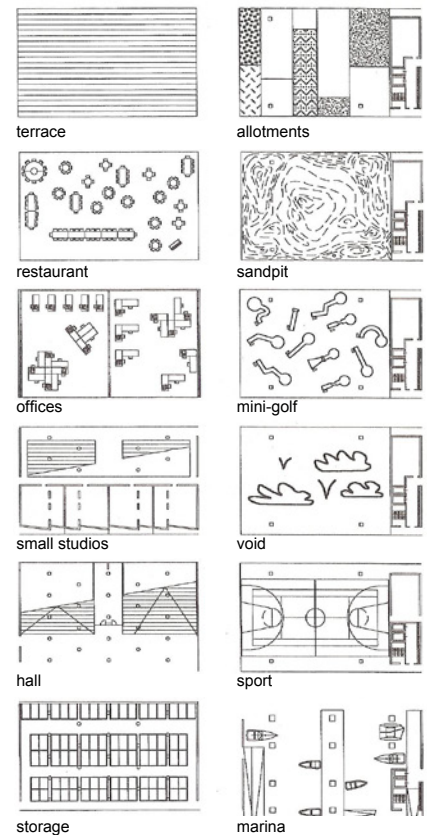
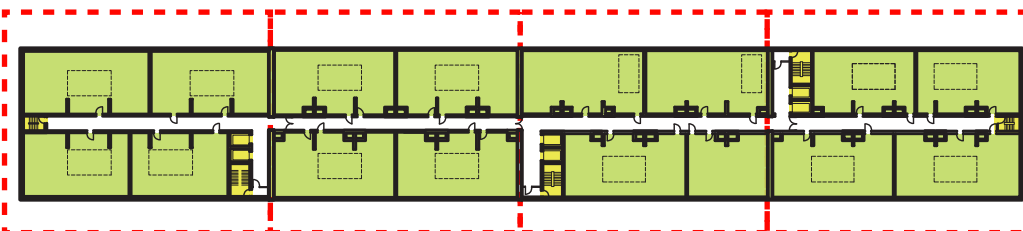
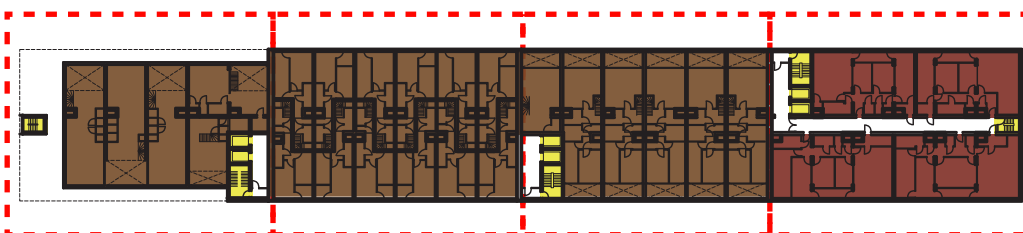
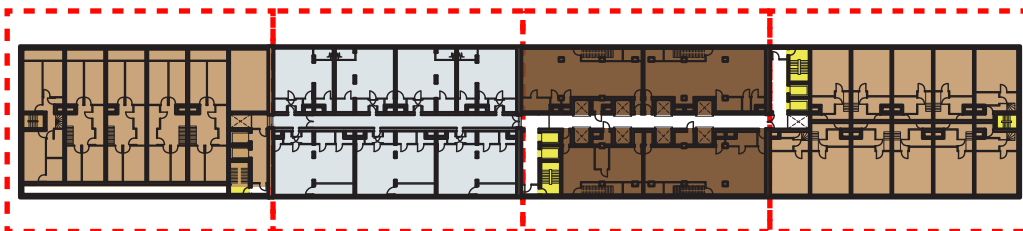
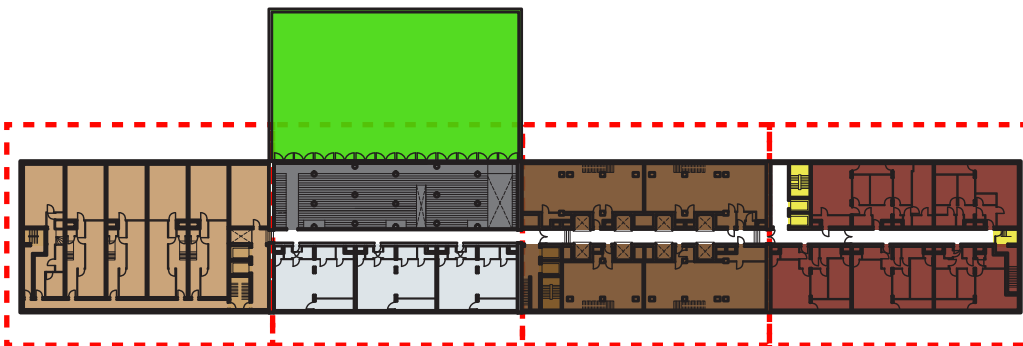
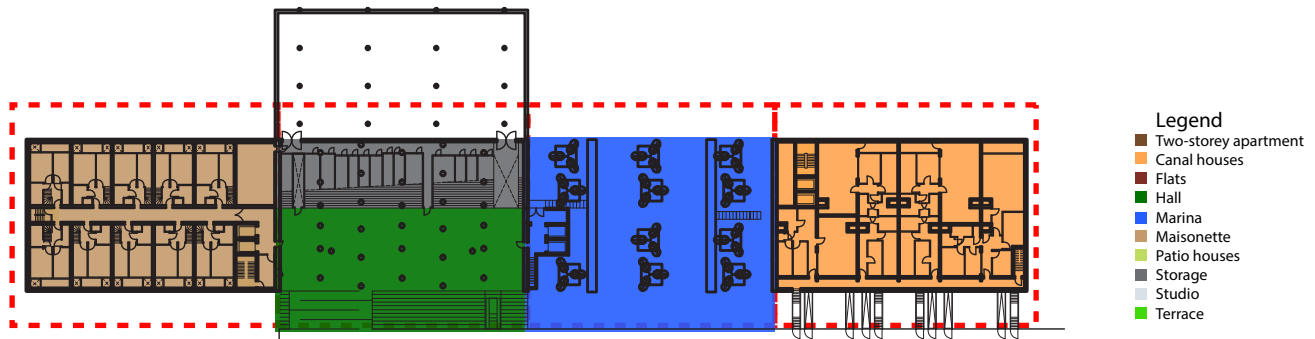


Figure 3.2.4.4 mixed use mini-neighbourhoods: each neighbourhood was to have its own amenity space



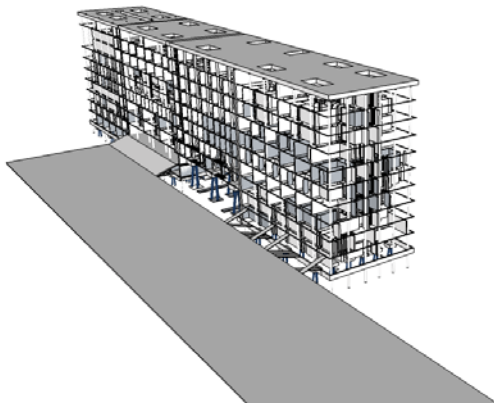


Figure 3.2.4.10 massing model

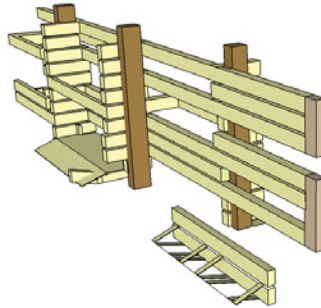


Figure 3.2.4.11 circulation

- horizontal circulation
- elevator
- vertical circulation

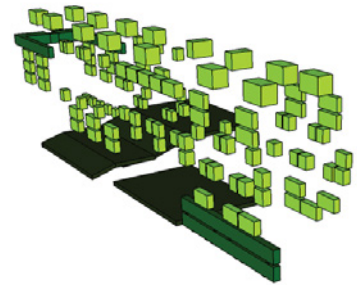


Figure 3.2.4.12 public / private open spaces

- private space
- semi-private space
- public space

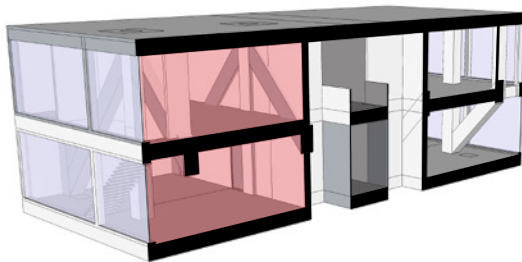


Figure 3.2.4.13 two-storey apartment

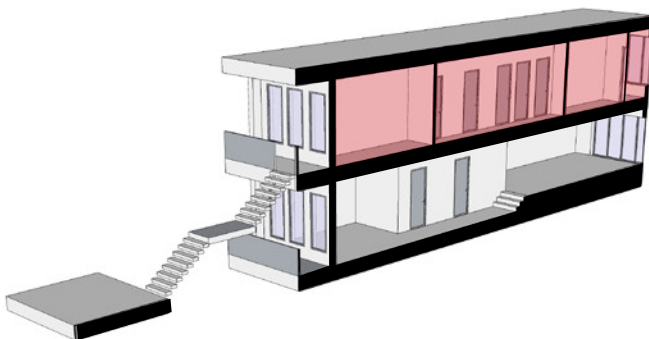


Figure 3.2.4.14 canal house with private entrance

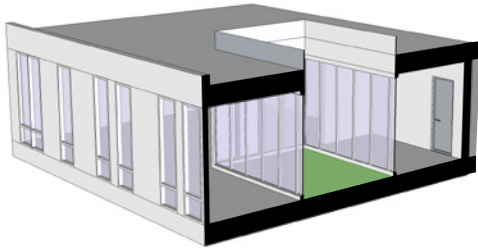


Figure 3.2.4.15 patio house

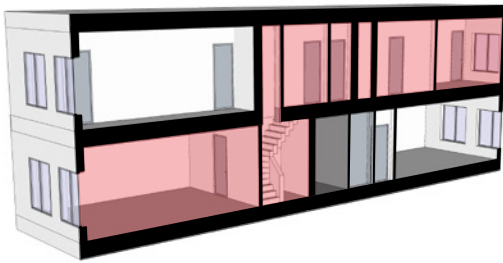


Figure 3.2.4.16 maisonette

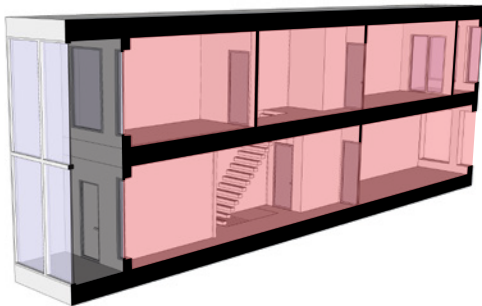


Figure 3.2.4.17 two-storey apartment with closed gallery access

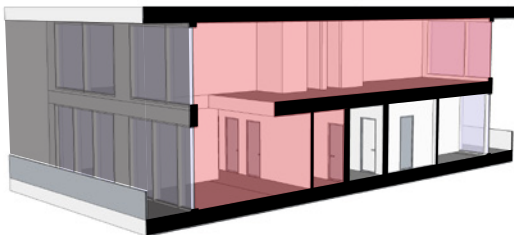


Figure 3.2.4.18 maisonette with open gallery access

3.2.5 Borneo- Sporenburg (bringing suburb to urban)

As part of the spatial strategies for the Netherlands outlined in the Fourth Report, the municipality of Amsterdam wanted to increase the density of areas that were close to the city, instead of areas in the suburbs. The East Docklands presented a perfect solution to the problem. It was a chance to redevelop a brownfield site and increase the housing stock near the centre of Amsterdam. West 8 was chosen to work out a master plan to redevelop the two docks of Borneo and Sporenburg. The desire was to create an area that was suburban-like but have a significantly higher density. To achieve this, the approach of West 8 was to take the typical Dutch suburban dwelling, the single-family dwelling with a front and back garden, by making them much more narrow and internalizing the garden aspect. In effect the internalization of the garden aspect created the patio house typology. Since the dwelling was narrower and deeper the internalization of the garden in the form of voids would help counter balance this effect by allowing light into the dwelling. To make the area even denser some dwellings were closed on three sides. By doing this West 8 was able to increase the number of single-family dwellings which meant a large number of dwellings would have ground floor access.

To further increase the density of the area, West 8 provided strategic locations for mid to high-rise apartment blocks. For example, the Whale designed by de Architekten Cie stands in direct contrast to the single-family dwellings. The Whale contains 214 apartments which allow for the opportunity for other people, income groups and family compositions to be part of this new community.

The Whale uses building form to respond to views and day lighting considerations. It also uses form to interact with the ground floor. The building however is not a hybrid. Furthermore, the roof presents a missed opportunity, it could have been a green roof or an area for detached single family dwellings. The same way the building form interacts with the ground, the roof could have been an interesting public space that provides extra amenities and views to the surrounding area.

⊙ 5750
⬆ 2500

⊙ 203 / ha
resident density
⬆ 100 / ha
dwelling density

3 506 ⊙ / km²
density of Amsterdam
494 ⊙ / km²
density of the Netherlands

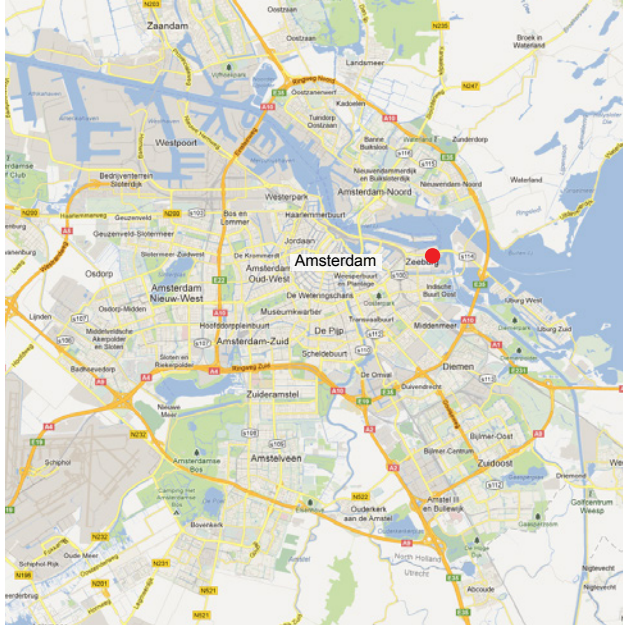


Figure 3.2.5.1 location map

scale km
0 2 4



Figure 3.2.5.2 site map

scale m
0 50 200

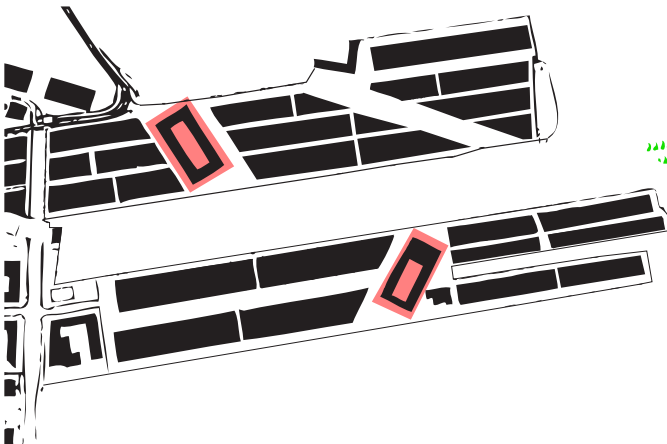


Figure 3.2.5.3 master plan - apartment blocks help increase the density of the area

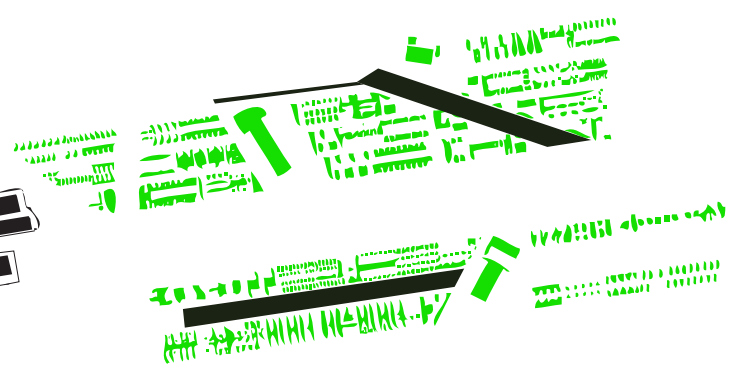


Figure 3.2.5.4 master plan - public / private open space

■ private space
■ semi-private space
■ public space

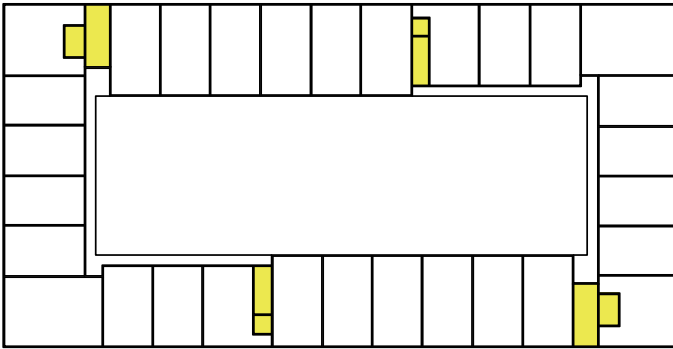


Figure 3.2.5.5 the Whale fourth floor plan

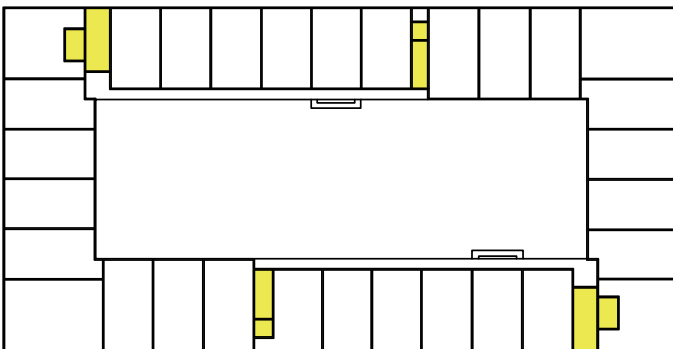


Figure 3.2.5.6 the Whale fifth floor plan



Figure 3.2.5.7a Patio house elevation developed from the concept from Figure 3.2.5.7b

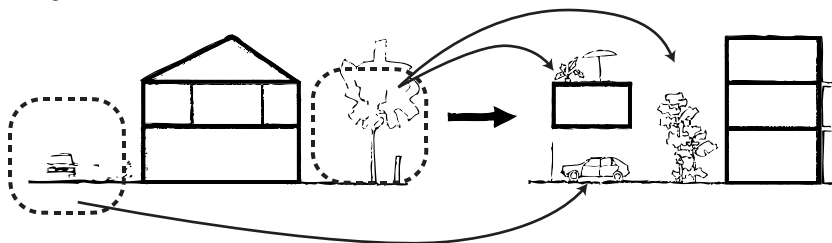


Figure 3.2.5.7b concept - make as many single-family dwellings with direct private access by internalizing the typical front and back garden to create patio houses.



Figure 3.2.5.6a the Whale perspective

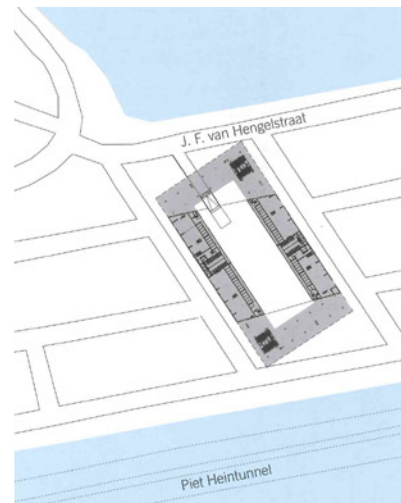


Figure 3.2.5.6b the Whale site plan

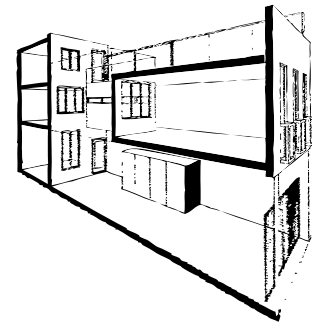


Figure 3.2.5.8 patio house proposed by West 8 as the predominate housing typology for Borneo-Sporenburg

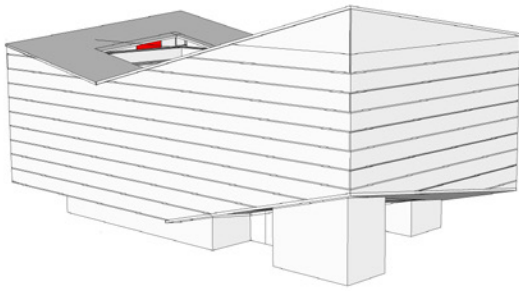


Figure 3.2.5.9 massing model

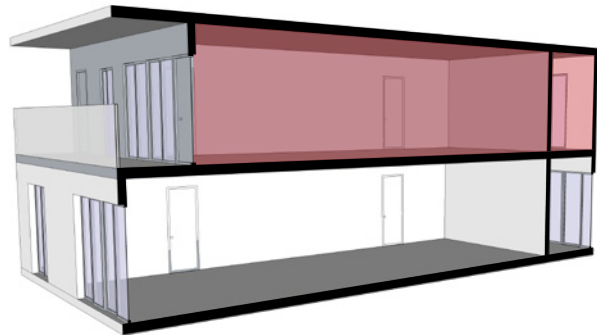


Figure 3.2.5.12 typical unit open gallery access

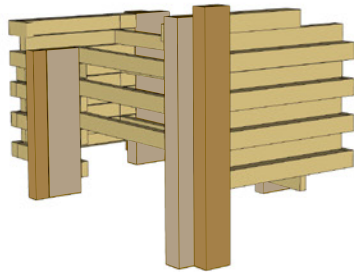


Figure 3.2.5.10 circulation

- horizontal circulation
- elevator
- vertical circulation

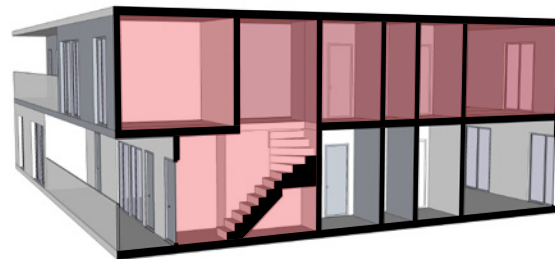


Figure 3.2.5.13 typical unit open gallery access

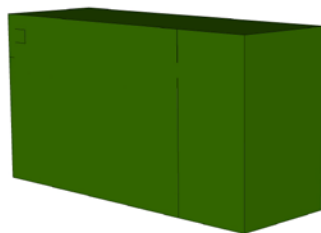


Figure 3.2.5.11 public / private open spaces

- private space
- semi-private space
- public space

4.0 - Design Proposal

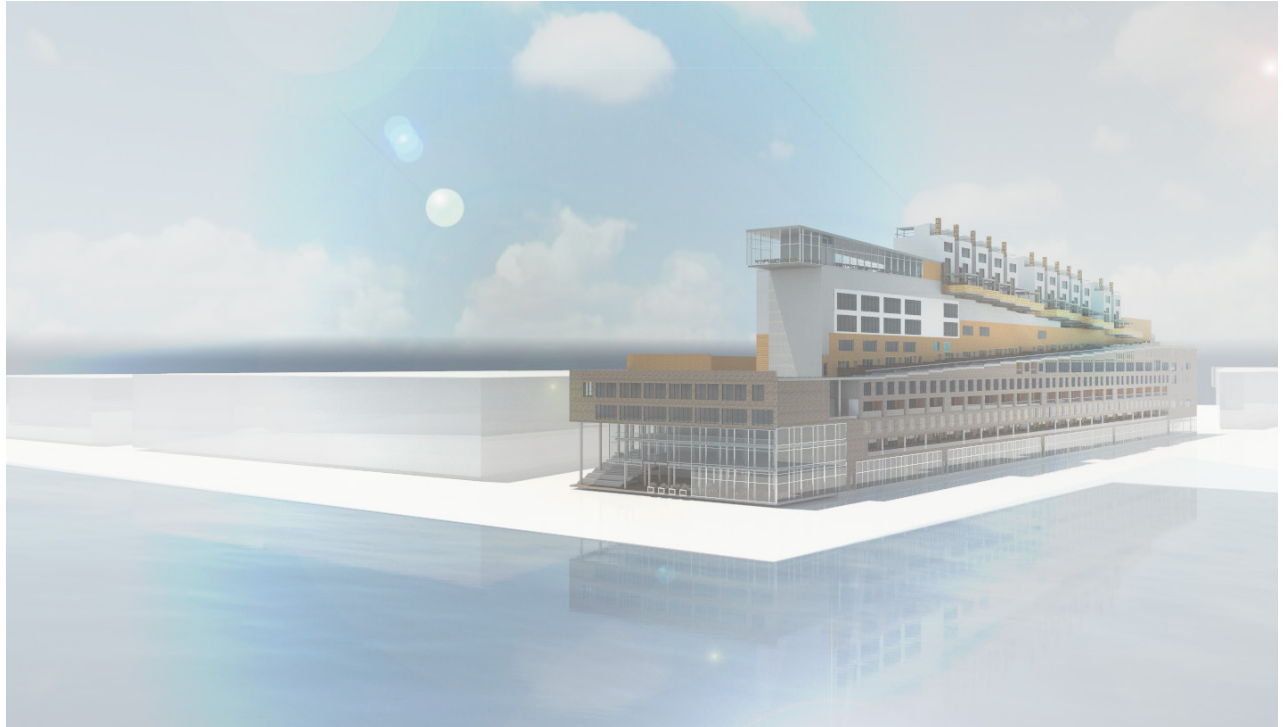


Figure 4.0 The suburban / urban hybrid perspective from the lj

4.1 - Design approach and brief

This thesis proposes a merger through grafting. Grafting suggests an application of combining two things together to make a superior condition – such as grafting two species of trees together to create a superior hardier tree, or a tree that bears two fruits. Or in the medical field a graft is used to heal bone and skin of a patient. Using this allusion, the thesis proposes merging suburb and urb, to graft the typologies and desirability of the suburbs with the condition of the urban environment. The aim of this design experiment is to create a new residential type that takes into account the suburban and urban factors described in previous chapters. The intent is to merge the suburban typology and the urban typology to create a hybrid. The hybrid represents the best qualities of both conditions. It represents a synthesis of work throughout the thesis in a single design intent.

The exploration of this experiment is taking place in the Netherlands, particularly the densely populated conurbation of the Randstad which incorporates four major cities, Amsterdam, The Hague, Rotterdam and Utrecht. As discussed in Chapter 2.5, the Randstad is a preferred place to live and here lies one of the significant dilemmas, the Randstad is also the location of the Netherlands Great Heart the agricultural foundation. This presents a dilemma of land availability, to land buildable and land reserved for economic, industrial and agricultural production comes to the forefront. Quite frankly the history of the Netherlands is coloured by the constant reclamation and vigilant protection against the sea, thus land as a resource is precious and the Dutch go a long way to make efficient use of it. The suburban typology predominate in North American would be utterly unthinkable and rejected in the Netherlands, however it is not to say that it is not the preferred housing typology as discussed in Chapter 2.5.

In Visionary Cities, Winy Maas along with the Why Factory pushes the idea of consolidation of uses to make

superior space. Using the idea of the power of 10 they ask the questions, “How many times can we multiply the individual unit (home, car, swimming pool) by then before it takes over the city, the region the country, the earth? (Maas et al., 2009, p 22).” The approach for this experiment is along the lines of Winy Maas and the Why factory theories of the power of numbers published in Visionary Cities. It takes into consideration the land availability versus built space versus energy, food and economic production. The average Dutch house according to Winy Maas is 126 m² with an equivalent size of external space. What if we multiply the houses to the power of 10? What if we needed 100 dwellings of this size it would be 25,200 m²; 1000 household would be 250,000 m²; 10,000 households would be 2,520,000 m² and so on. To put this in perspective only 41 such dwellings could be build on the proposed site, back-to-back with no room for driveways, walkways, or any other access to the units.

To push ideas forward of the consolidation of individual dreams, Winy Maas and the Why Factory in the same publication employ the idea of apocalyptic planning. The idea is to use crisis as an agent of change to propel a thought forward. Following this train of thought, what if there was no land left to build the ideal suburban dwelling. How would we then go about providing the suburban ideal? Apocalyptic planning is yet another way to provoke and create a hybrid through the manufacturing of stress and pressure. Imagine if there was no more land, how do we continue to provide suburban ideal to provide a feeling of the single family dwelling? How do we manufacture the ground floor condition? How do we manufacture the plot of land for suburban dwellings to sit on? The goal then is to achieve this by manufacturing the ground floor, by creating artificial sites (Le Corbusier) or multiplying landscapes (MVRDV).

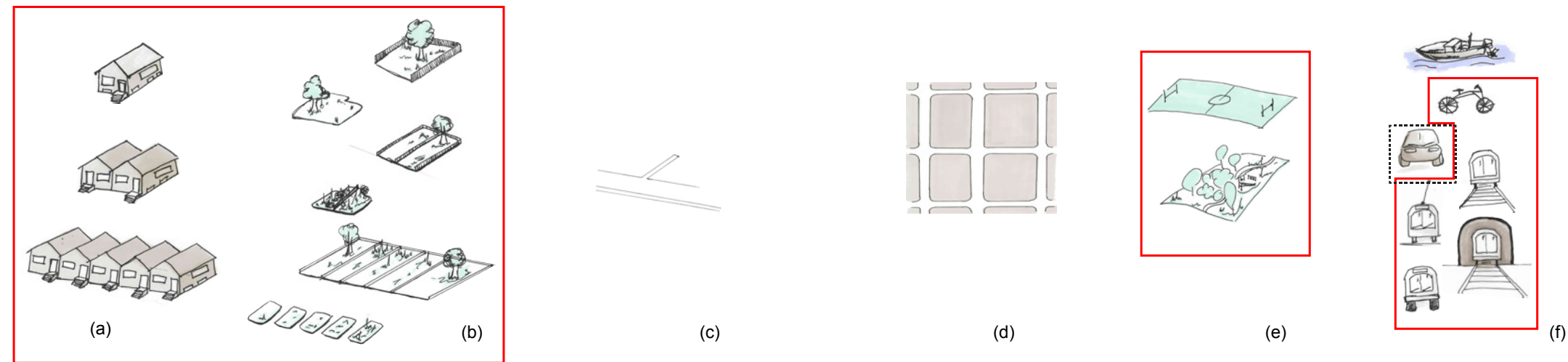


Figure 4.1 The suburban dwelling and its environment is a combination of elements which include the single-family dwelling unit (a) and the immediate amenity space, the garden (b). Access to the unit is private access directly from the street (c). The street patterns in the Dutch context are not usually the stereotypical dendritic pattern, but follow a more urban approach (d). The local recreation and leisure venues are in most cases walking distances from the dwelling units (e). A multitude of transportation opportunities are available in the Netherlands to move from suburb to urban location. However, typically in low density suburban locations different types of mass-scale transportation are not available. Subways, railways and trams are too expensive to justify for low capacity areas, therefore the automobile becomes the primary vehicle for transportation.(f).

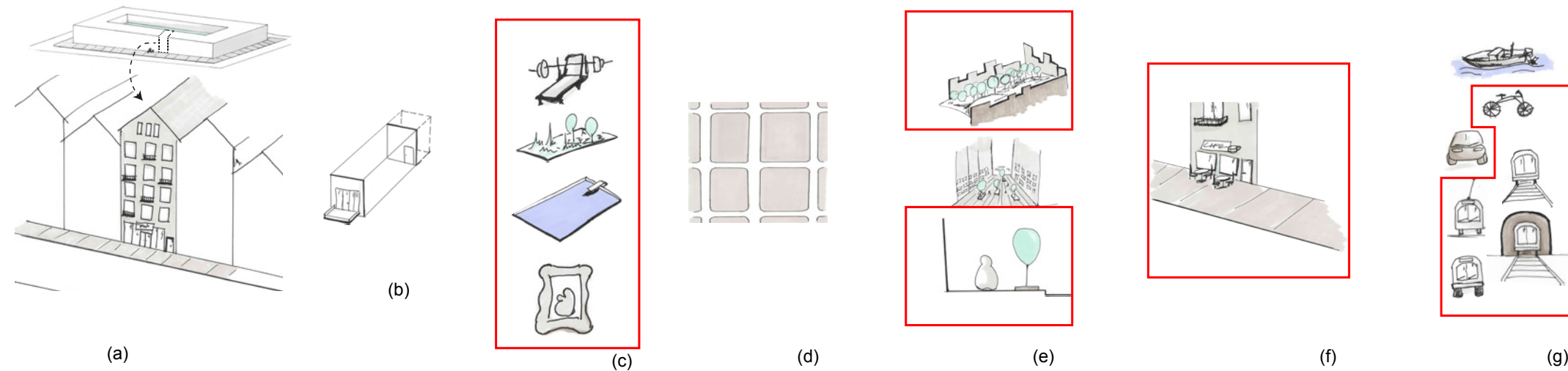


Figure 4.2 The typical urban dwelling is the urban block (a) which is comprised by the apartment unit (b). The apartment shares access to the building through a public lobby with other residents. Its primary amenity space is the balcony. However, like the lobby the apartment unit shares other amenities that are only viable at larger densities such as a recreation room, a pool, and a communal roof garden amongst other things (c). Green spaces within the city are in the form of office parks or urban parks (e). The benefit of urban locations is the multiplicity of functions within the same building, for example an urban dwelling can have a commercial or retail base which has potential in creating an urban life and animated streets (f). Like the suburbs moving around the city is available in multitude of transportation opportunities.

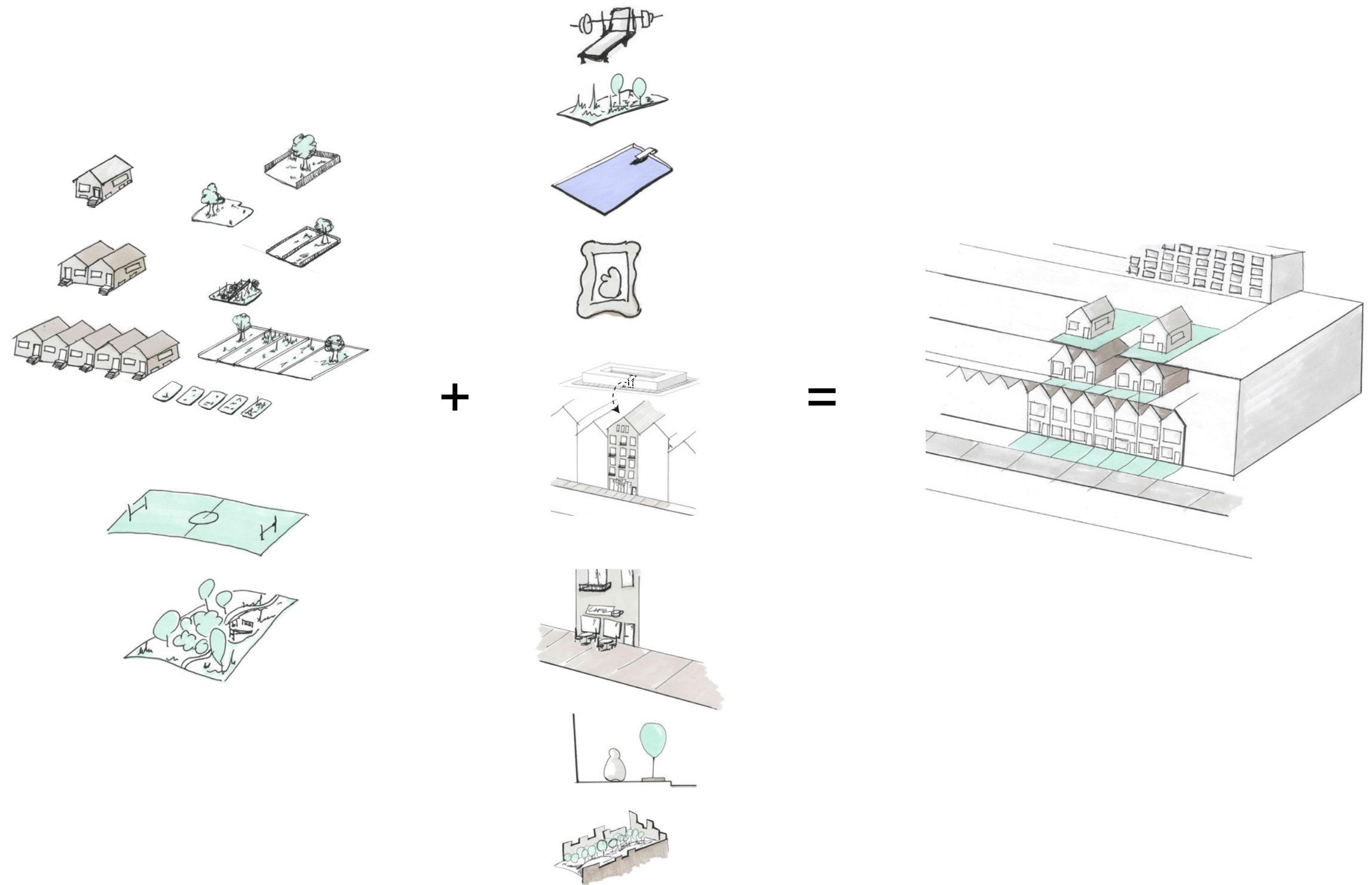


Figure 4.3 The solution is to take the most desirable elements of the suburbs and combine them with the urban elements to create the hybrid

4.2 - Location and site

The site chosen for exploration in the Netherlands is that of newly created archipelago of IJburg. IJburg is located to the east of Amsterdam on reclaimed land from the inland sea, the IJmeer. The plan for the whole IJburg district was created by Frits Palmboom and Jaap van den Bout. The master plan for Haveneiland, the island that this thesis project will be focusing on was by Felix Claus, Frits van Dongen and Ton Schaap which was accepted by the municipality in 2000.

Like KNSM Island, Java Island and Borneo-Sporenburg, IJburg is an area favourably situated with respect to the ring road and the city centre, and moreover has a beautiful location on the water. With this attractive expansion, the city sought to add a completely new district to Amsterdam. IJburg was proposed during the Fifth Report on Spatial Planning, specifically the Fourth Report Extra. Vinex sites were supposed to be growth centers around major urban centres. IJburg is one of those growth areas around Amsterdam.

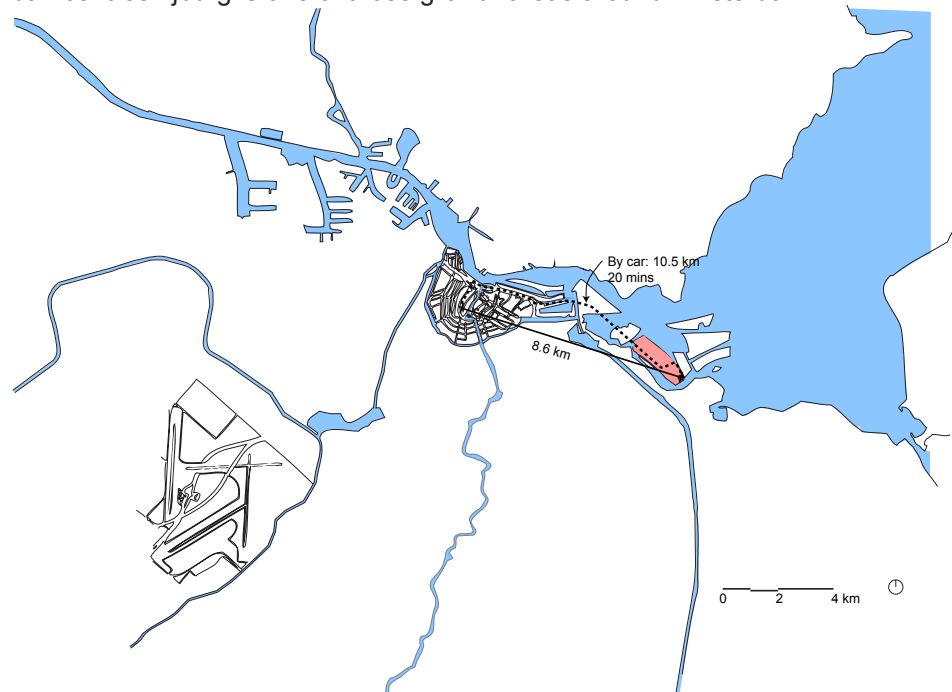


Figure 4.2.1 IJburg is located in the Eastern Harbour District, Haveneiland highlighted in red

The housing stock being produce under Vinex conditions was limited in that they are usually terraced houses or semi-detached with four bedroom usually catering to families. Also there was a lack of urbanity in these location as 95 percent of Vinex locations were housing with 5 percent set aside for services. Thus Vinex locations were becoming dormitory towns which leach off the main urban centres. Ijburg is well conected with the city of Amsterdam but it is no longer seen as an overspill area where dwelling predominates, but as a full-fledged component of that city.

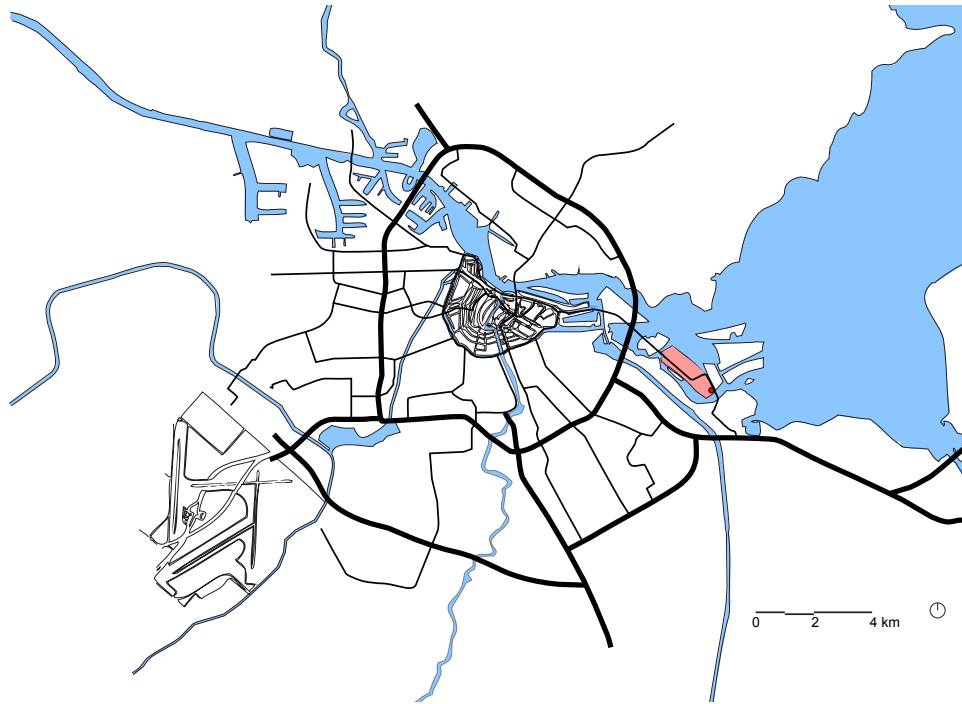


Figure 4.2.2 Amsterdam road network

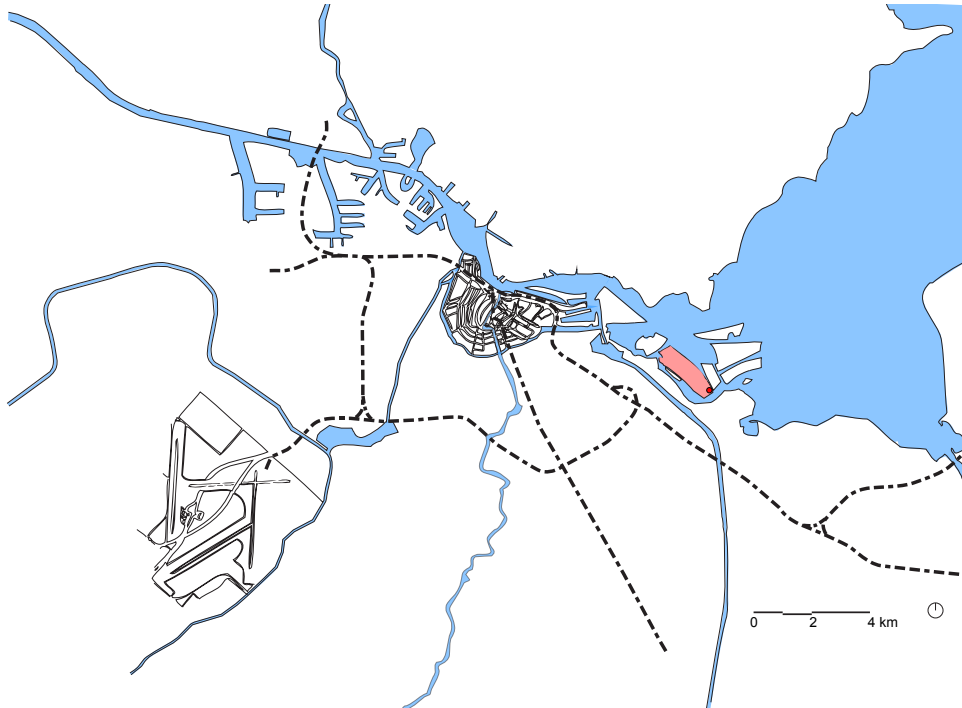


Figure 4.2.3 Amsterdam train network

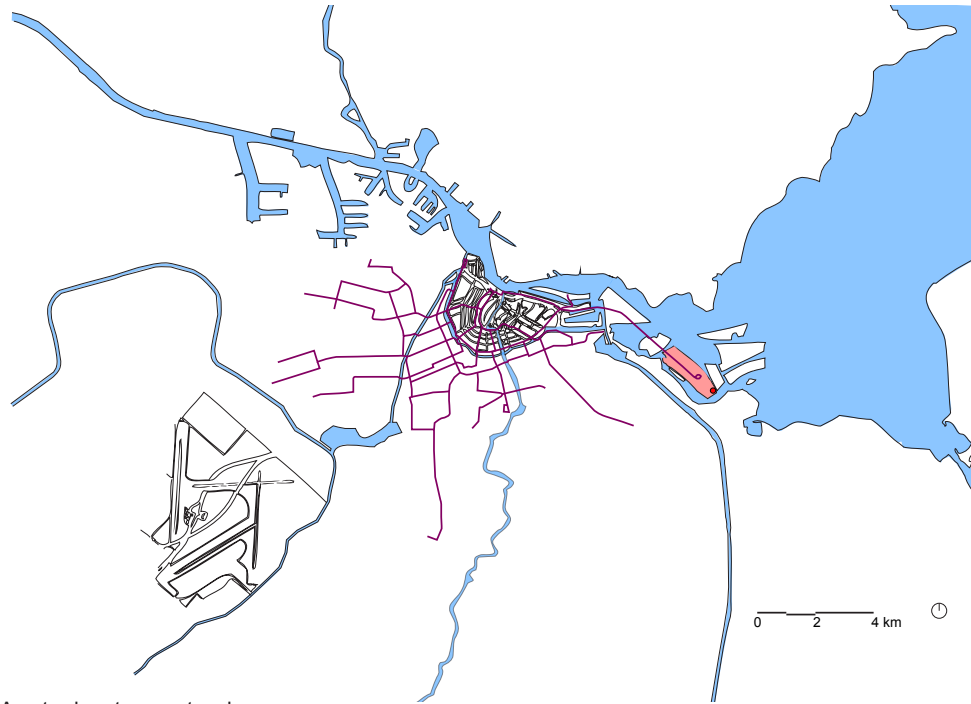


Figure 4.2.4 Amsterdam tram network

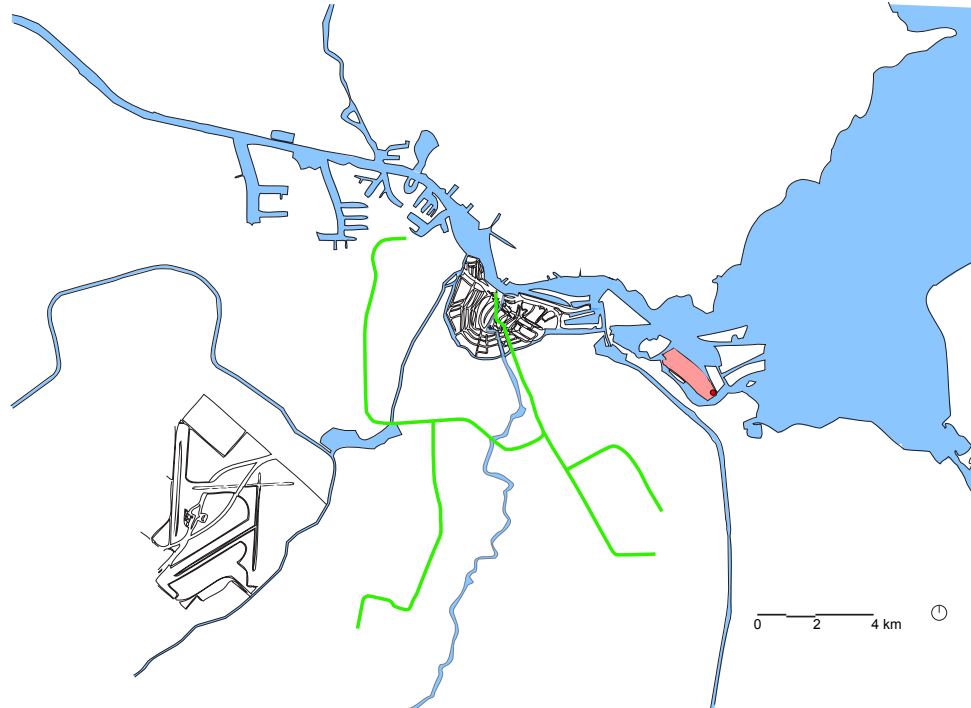


Figure 4.2.5 Amsterdam metro network

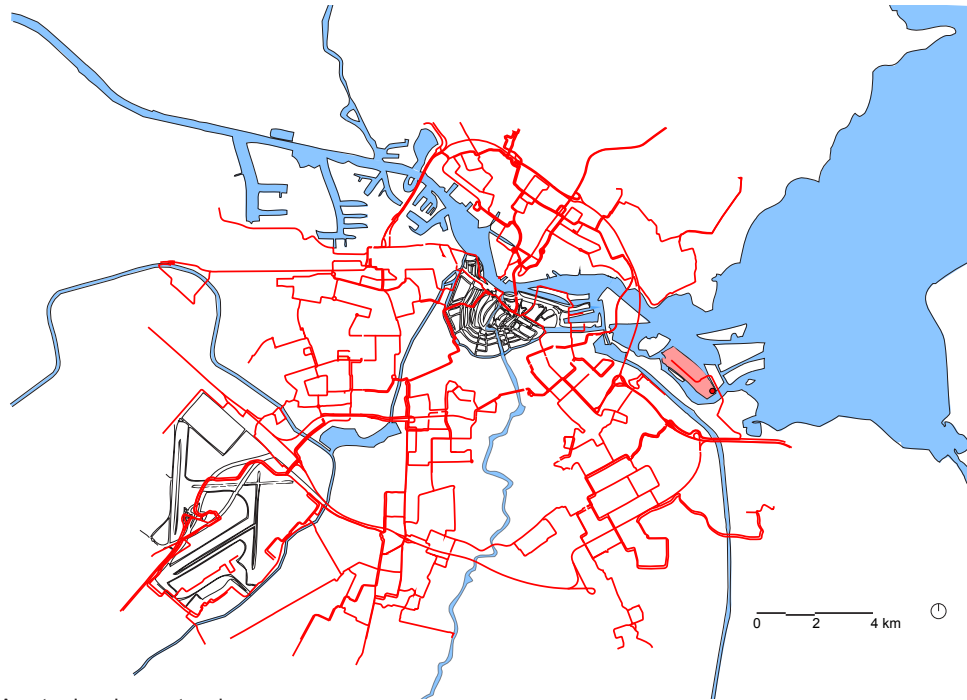


Figure 4.2.6 Amsterdam bus network

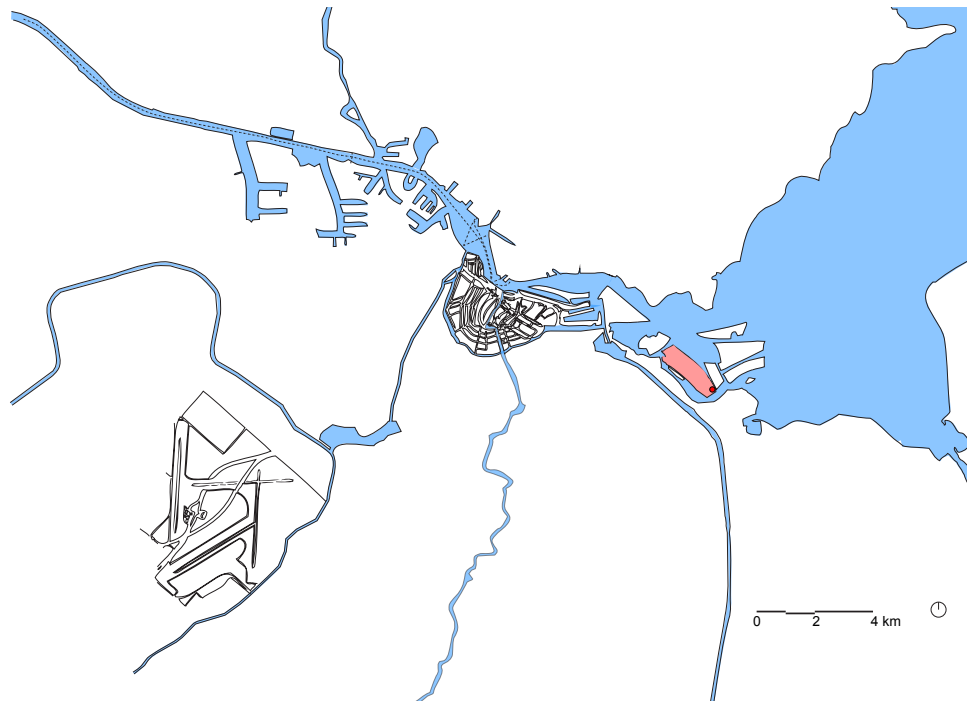


Figure 4.2.7 Amsterdam ferry boat network

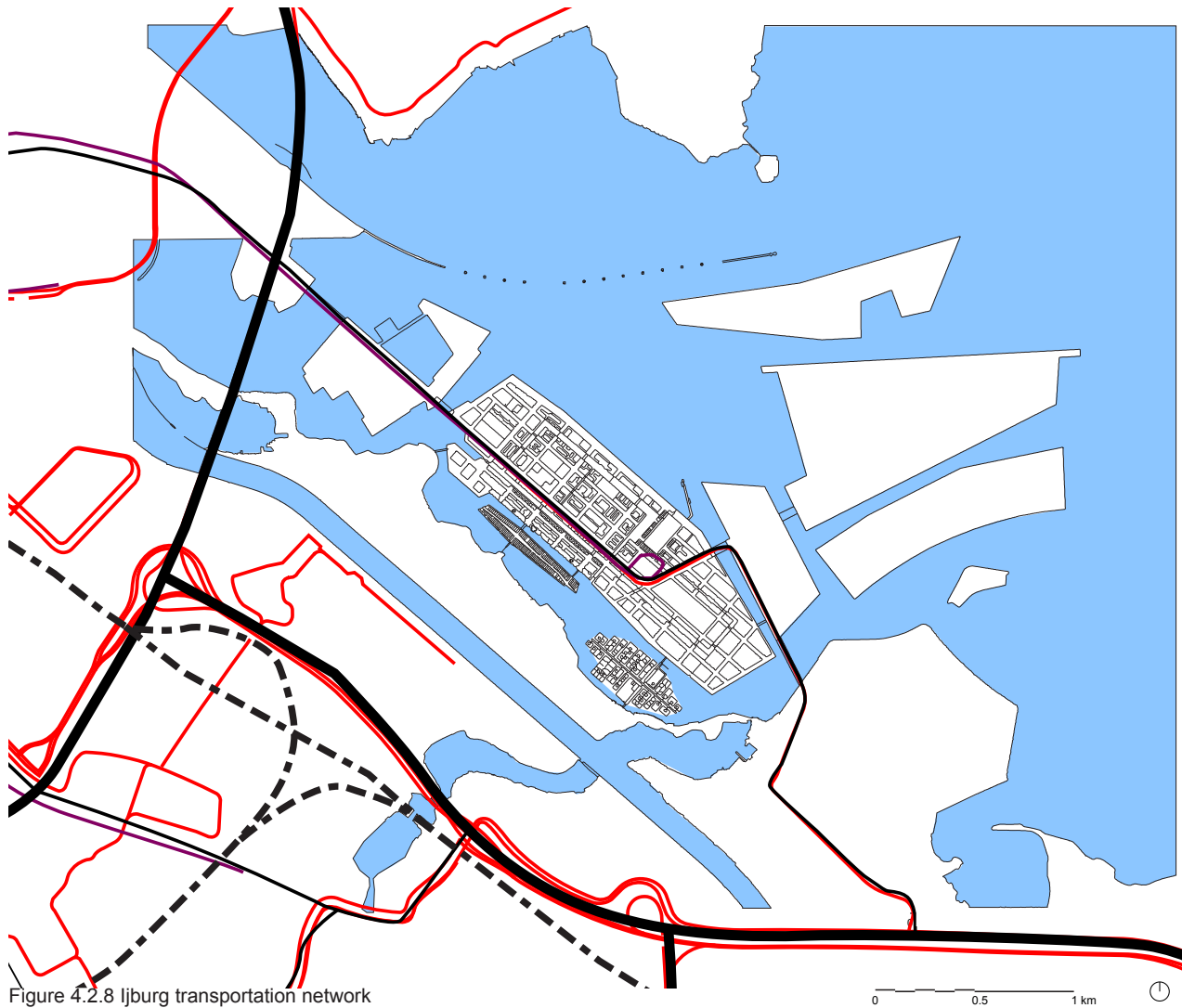


Figure 4.2.8 Ijburg transportation network

- Major roads
- - - Train network
- Tram route
- Bus route



Figure 4.2.9 Haveneiland site location

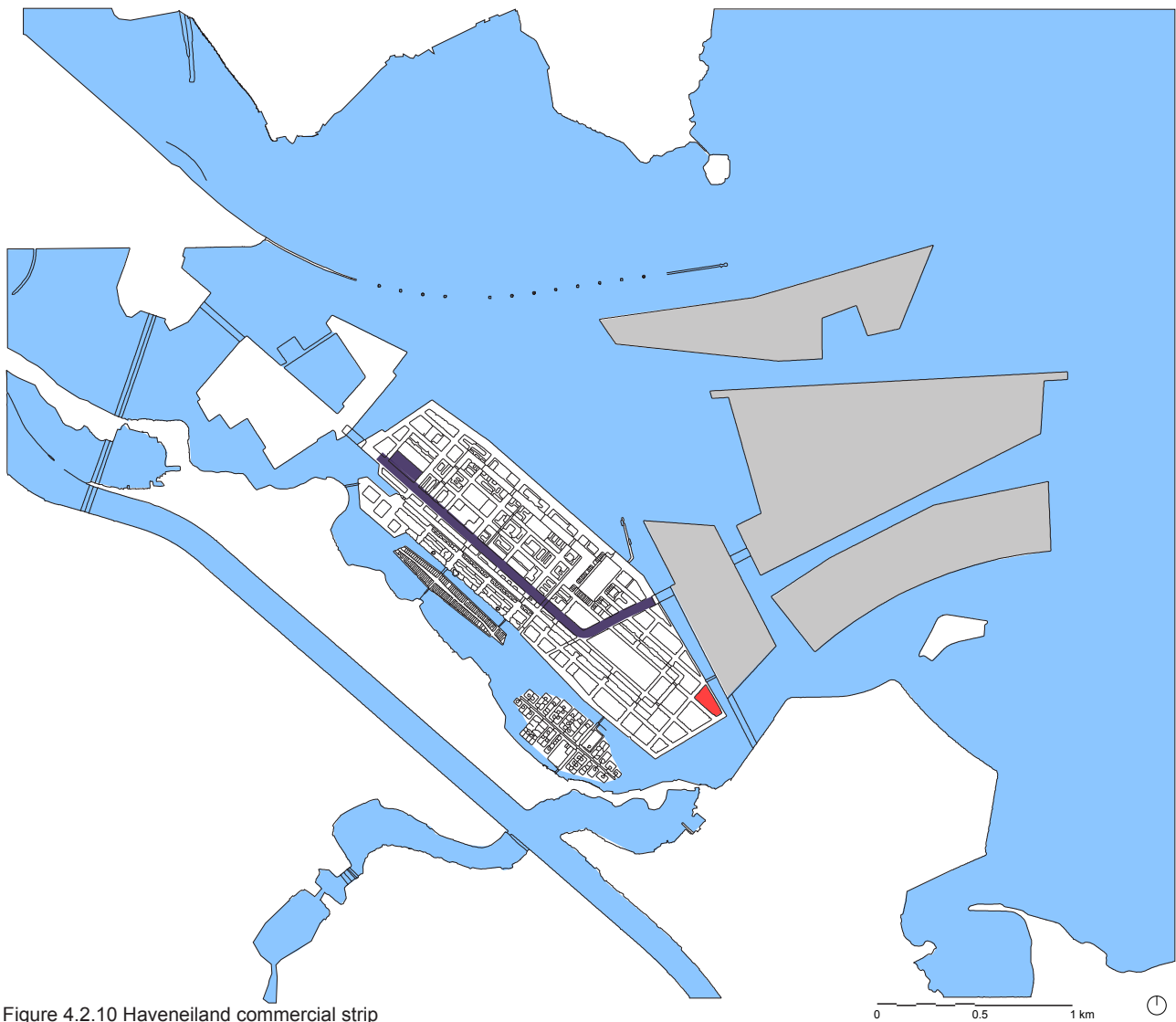


Figure 4.2.10 Haveneiland commercial strip



Figure 4.2.11 Haveneiland water features

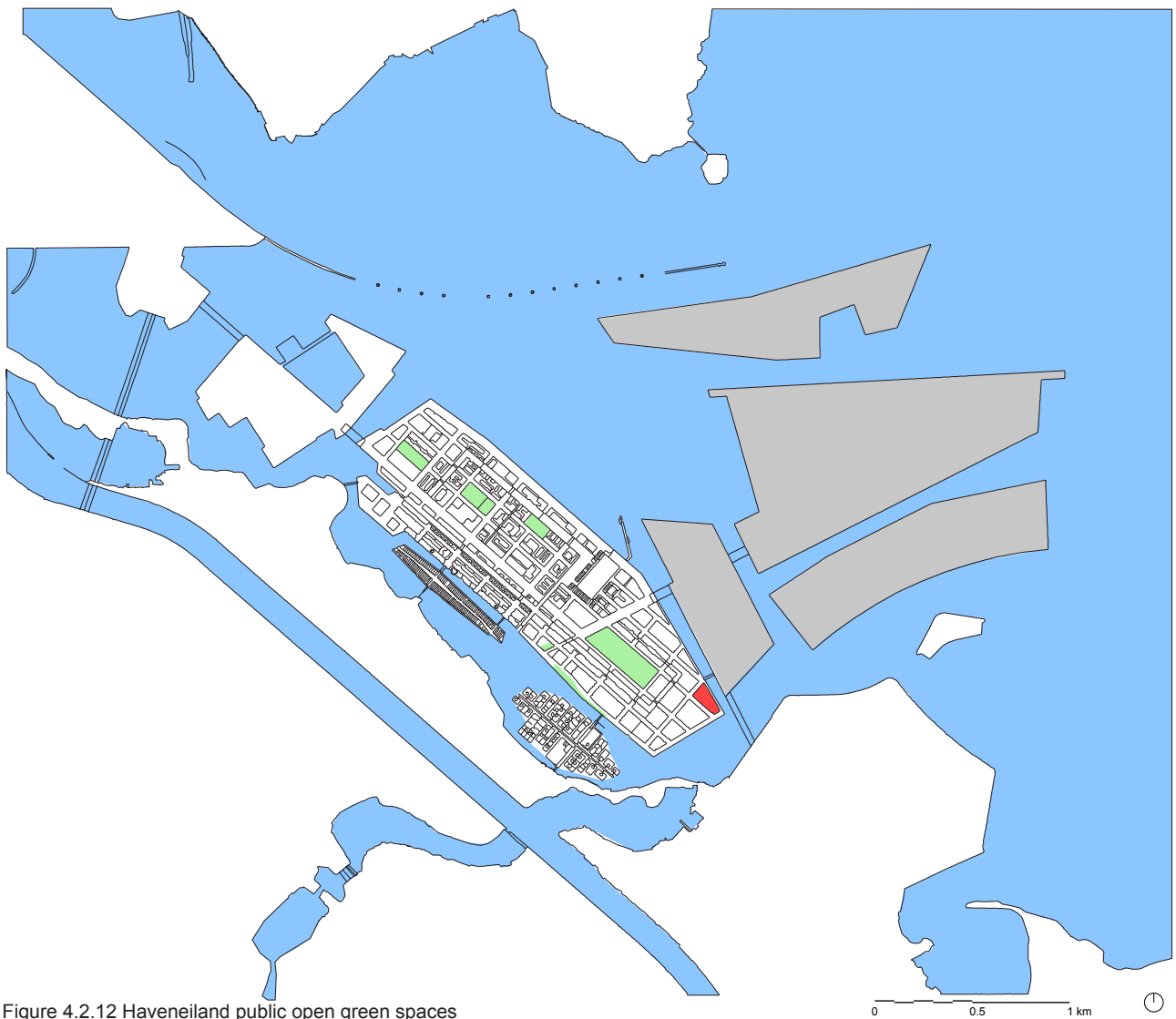


Figure 4.2.12 Haveneiland public open green spaces

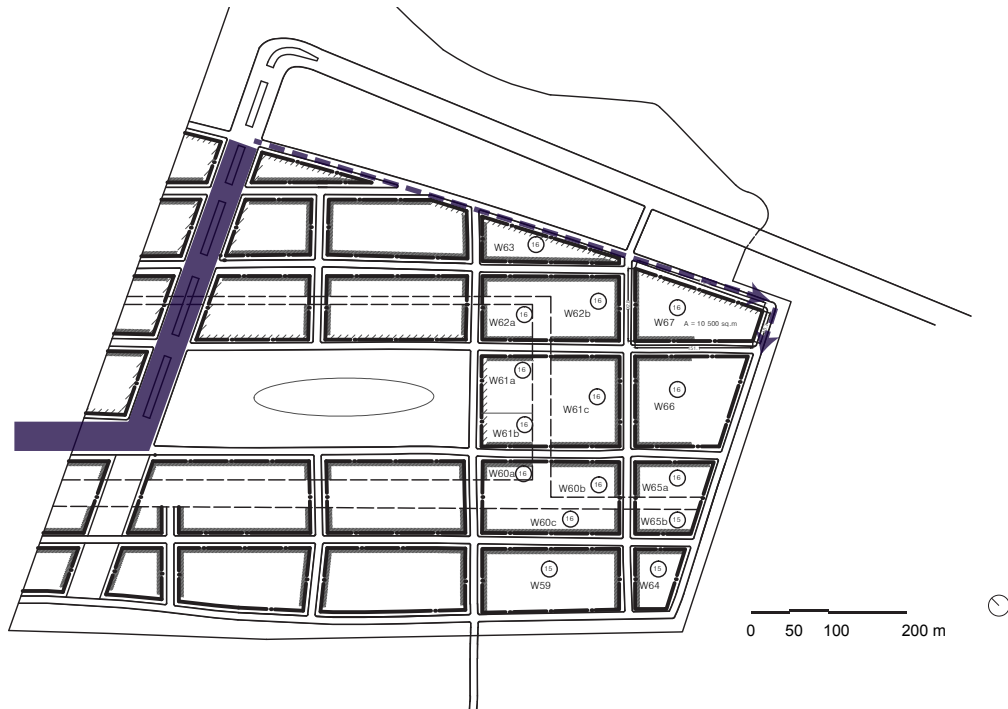


Figure 4.2.13 Extension of the commercial strip down to the proposed site in order to draw people to the south side of the island. People who would otherwise have no business there.

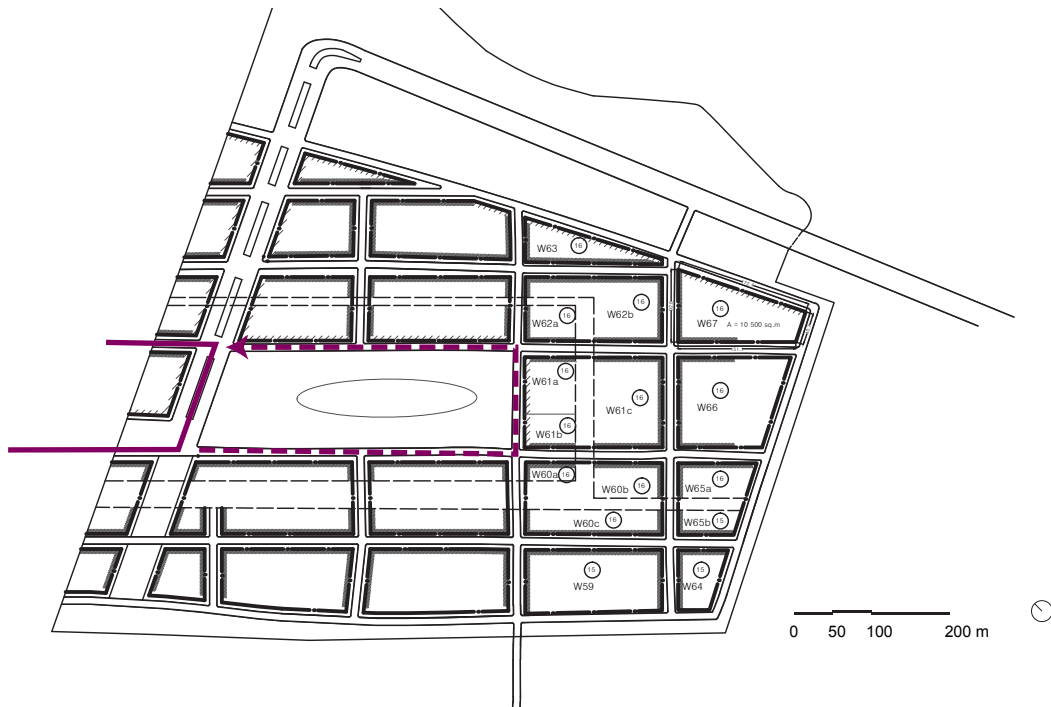


Figure 4.2.14 Extension of the tram to go further into the site around Van Gough Park to provide access to downtown Amsterdam

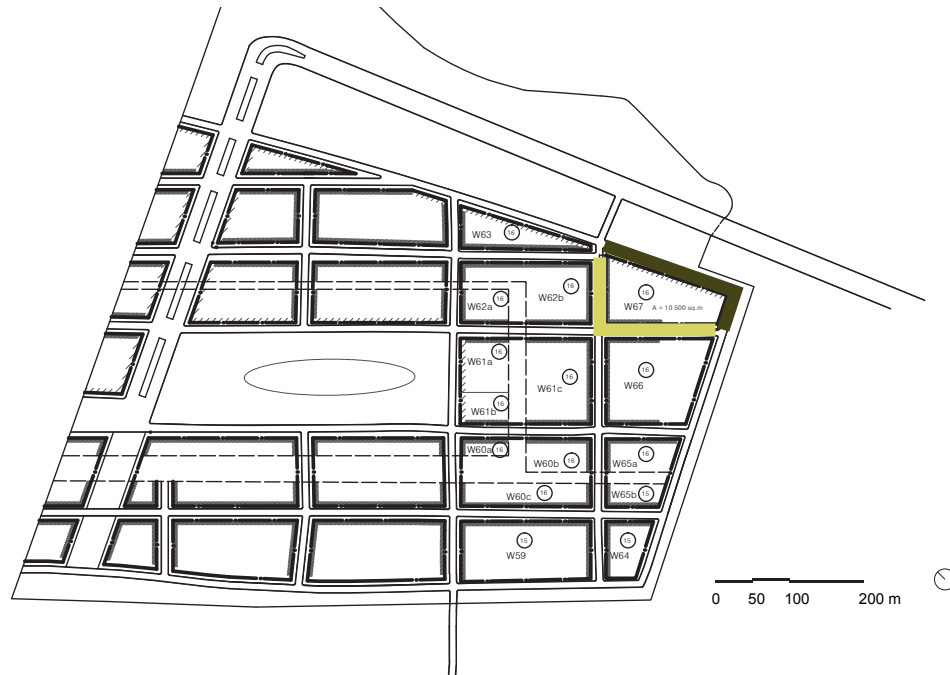


Figure 4.2.15 Through the site analysis of the previous images, there arises a public (outward) domain, which is the north and east side of the building and a private (inward) notion which is the south and west side of the building. The north side thus becomes a public avenue that includes various retail and office outlets on the ground floor and maisonettes, studios, one and two storey apartments on the upper floors typical of the urban typology. The south side in contrast becomes the location for development of the row house with private access from grade or the elevated street. This side is geared towards the typology of the suburb.

To understand the potential for higher density than what was originally proposed for Haveneiland, different parts of Amsterdam and Manhattan were superimpose on Haveneiland (figure 4.2.16). In example 'a', a Dutch urban location was superimposed on Haveneiland. This location includes portions of Amsterdam city of canals and Jordaan. The average density of this area is about 196 people per hectare (Statistics Netherlands, 2011). The predominate housing typology in this area is the low to mid-rise perimeter block. Dwellings are extremely dense in the Jordaan area distinct as it is an older part of Amsterdam and was originally created as a suburb for the working class.

In contrast to example 'a', example 'b' is a typical Dutch suburban location. Amstelveen is located 8.8 km, roughly 20 minutes south of the center of Amsterdam. It is about the same distance from Amsterdam as Haveneiland. The average density of Amstelveen is about 58 people per hectare (Statistics Netherlands, 2011). The predominate typology of Amstelveen is the single-family row house. There are also some mid-rise slab apartment building which help increase the density of the wider area and also provide alternative accommodations for different user types (single parent families or young adults and students) and income groups to an otherwise homogeneous housing stock.

The third example 'c', is a portion of Manhattan superimpose on the outline of Haveneiland. Manhattan was chosen because it presents an island condition such as Haveneiland, but at a different scale. Moreover as a previous Dutch colony and as an industrial area Manhattan shares similarities with Amsterdam. The average density of Manhattan is 260 people per hectare (U.S. Census Bureau, 2013). The predominate typology is the mid-rise apartment type.

For Manhattan there is not a lot of personal recreational and leisure space. Like typical urban areas the

majority of that space is communal in the form of parks, squares, etc, as appose to the suburban area where that space shares a direct relationship to each single-family dwelling.

The building for this experiment is a MURB but it still strives to give space that is directly relatable and belongs to an individual unit. It strives to at least provide 30 m² of open space. In most cases there are two 2.5 by 6 m spaces, front and back, to give the house-with-a-garden 'feeling' which MVRDV employed in Torre Huerta.

Haveneiland can stand to be denser. It has the potential to be more than just a suburb. Moreover, Haveneiland and the whole IJburg archipelago strives to be more than a suburb and has a great potential to be a contributing factor for the city of Amsterdam instead of leaching off of it for its cultural, institutional and economic venues. The following few pages will try to make a case for increasing the capacity and intensity of Haveneiland.

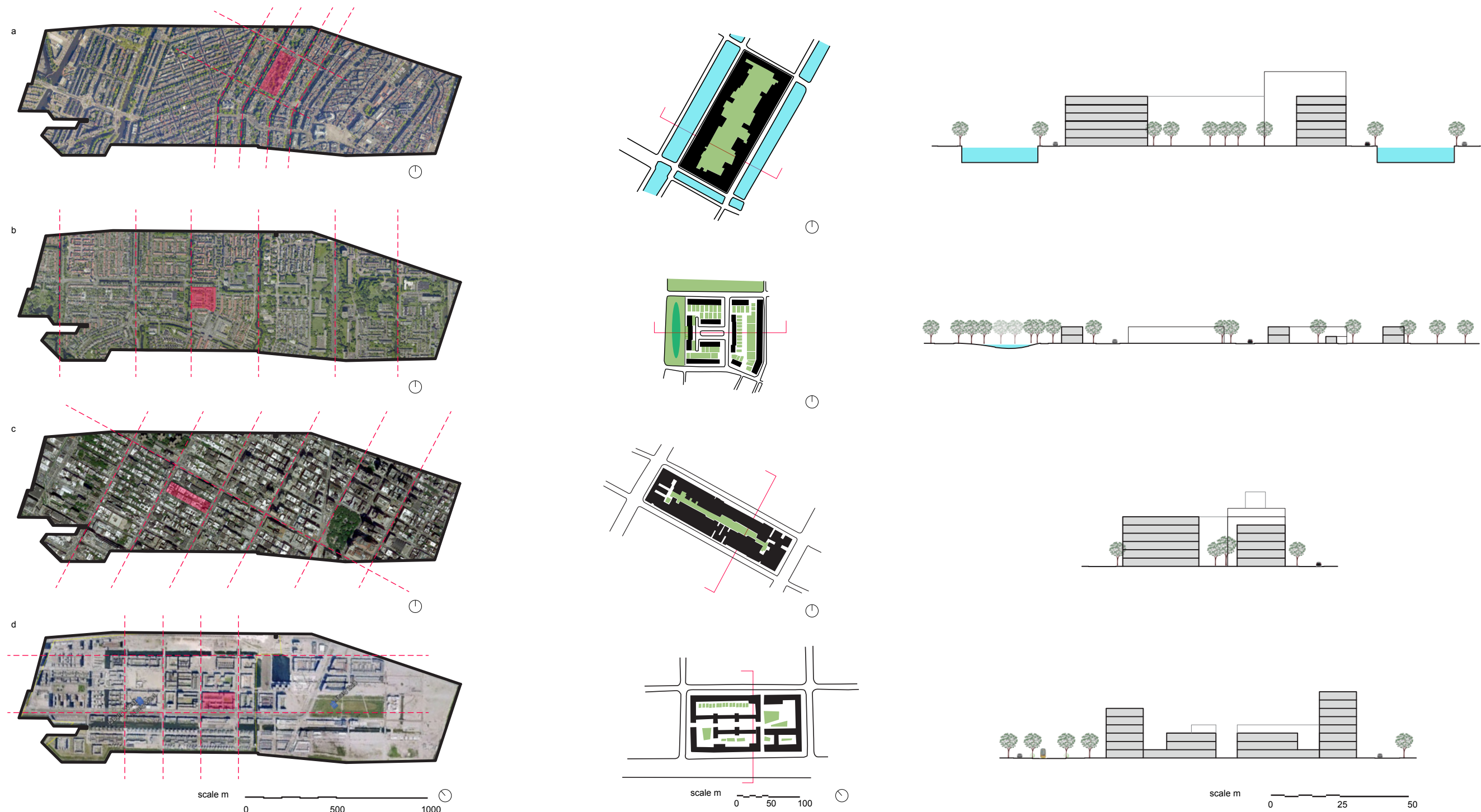


Figure 4.2.16 Cities superimposed on Haveneiland. a) Amsterdam city of canals and Jordan. b) Amstelveen. c) Manhattan. d) Haveneiland

The zoning for Haveneiland provides for a relatively low to mid-rise (4-5 storeys) building stock. There could have been strategic places where the zoning could allow for more variety. The desire is to make the site denser. By looking at other portions of Amsterdam it can be seen that the whole development of IJburg can stand to be denser and have a more flexible building height.

There is potential for providing variety based on views and sun considerations. The height restriction could potentially become more variable which could lead to view corridors and visual variety (figure 4.2.17a-4.2.17d). The idea is to create a tiered system that would allow for an increase of height as the buildings stepped back towards the center of the island. A tiered system as was adopted in the East Bayfront Precinct Plan (2005) in Toronto and as can be seen in Manhattan. This would allow for more variety, view corridors and a connection and visual confirmation for residents of buildings in the center of the island that they truly live on an amazing island. Adopt a tiered system to increase potential for views, increase solar exposure for buildings in the middle of the island and increase variety and interest.

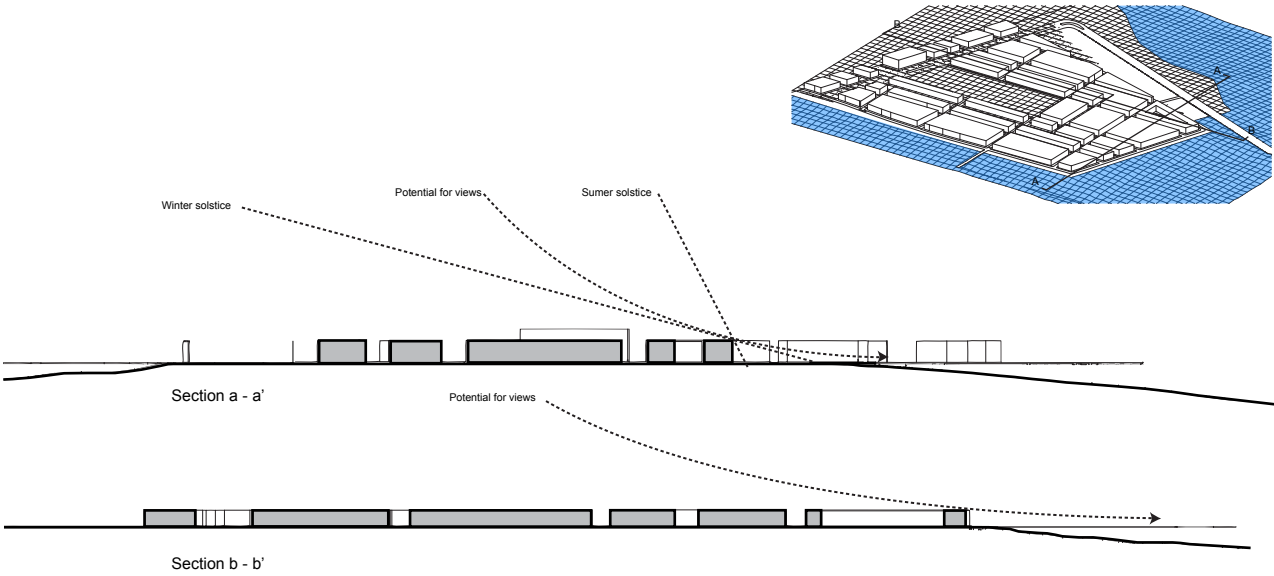


Figure 4.2.17a. This is the as of right condition with volumes and the maximum prescribed height. There is absolutely no variation of building stock. The arrows for the summer and winter solstice and the potential for views curve show the possibility of a tiered system.

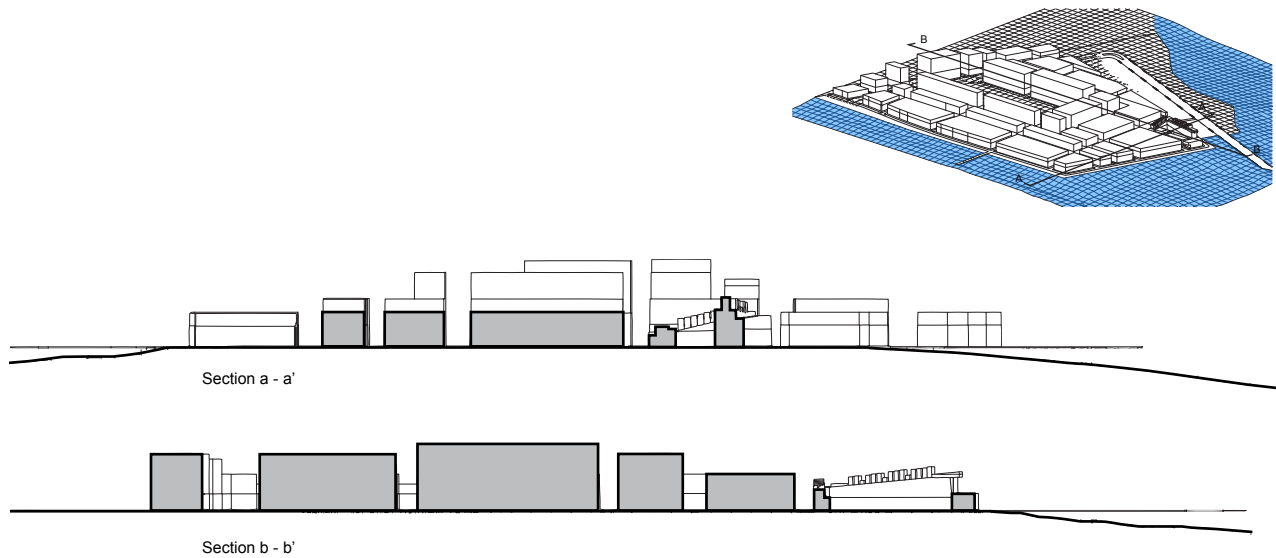


Figure 4.2.17.b. The diagram begins to suggest increasing the height of the buildings. Starting with 3-4 storeys at the edge of the island and then increasing the height to 6-8 storeys, 8-10 storeys and then 12 storeys in the center of the island.

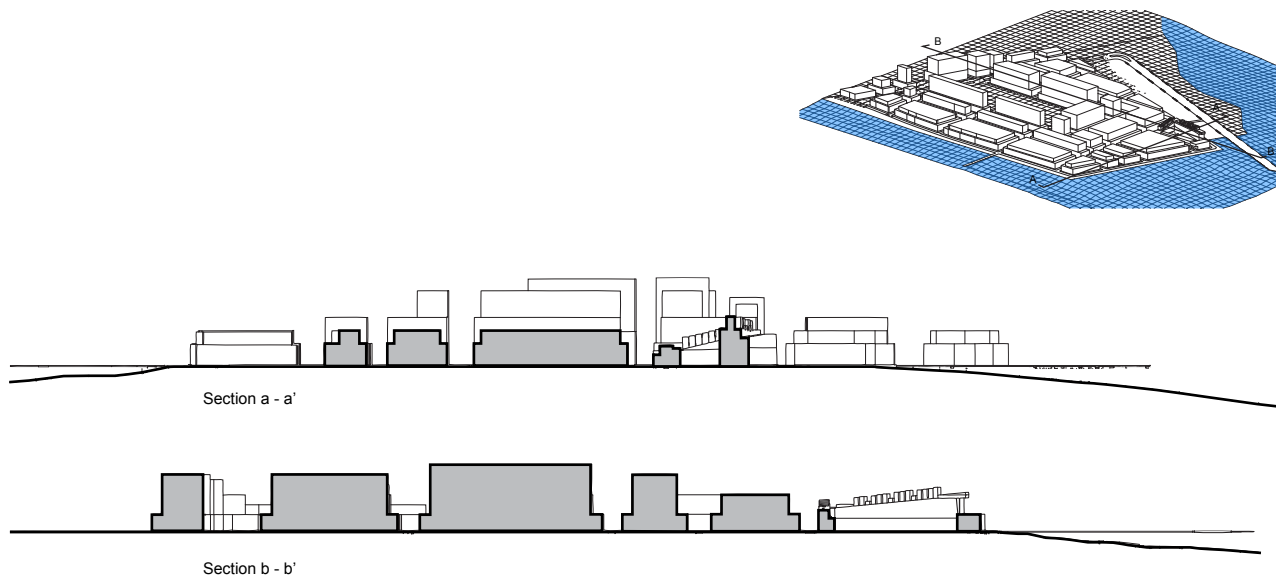


Figure 4.2.17.c. This diagrams show the profile of the building that relates to the street. The idea is to create a podium condition to relate to the street condition and the pedestrian while retaining and offsetting the rest of the mass 5 to 8m from the edge of the podium. By having the podium condition it can add to the idea of multiplying landscapes and create a potential for streets and gardens in the sky.

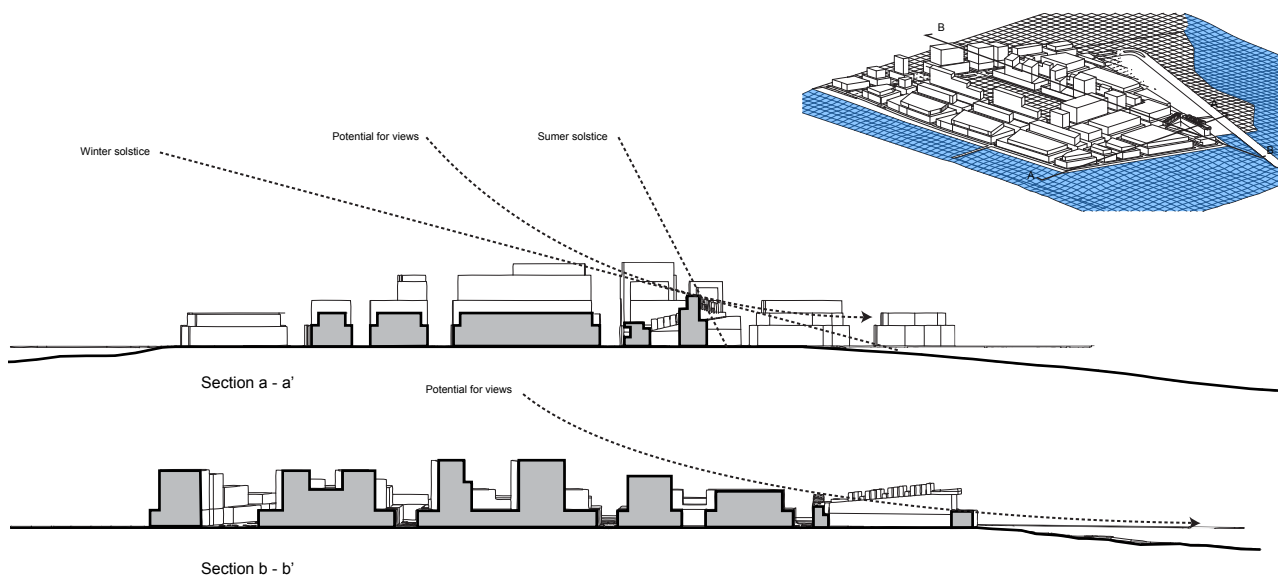


Figure 4.2.17d. This diagram illustrates the idea of carving out the existing mass of a volume that relate to the angles of the summer and winter solstice to minimize the impact of shadows and potentially increase daylight and view corridors.



Figure 4.2.18 Google street view of the two properties above the proposed site. To the right, the building is built to seven storeys. This building is on the waterfront side. The building on the left which is only two storeys has no views to the lj.

4.3 Preliminary design concept

Coming out of that understanding the desire is to make the site denser but not just physically by measure of dwelling units or people but by thresholds and perceived density which takes into account the amount of amenities a site can support and the relationship of people to people and people to objects and objects to objects.

Going from the suburban to urban paradigm the objective is to ameliorate the pressures density can bring. In suburbia there is not much variability in terms of visual stimuli so it is perceived as not dense even though it can be as dense as some urban locations. In taking in the idea of bringing the suburb to urban densities while still maintaining the qualities of the initial condition then the perception of suburb to urban densities must be mitigated. Physical density is only one part of it. Lozano describes the major difference going from suburban to urban and the perceived stereotypes and misconceptions of overcrowding. Most have to do with perceived spatial qualities in the form of crowding and privacy issues in the form of barriers. It is density not just to increase dwelling units, but to create multiplicity, spontaneity and foster urbanity which the suburbs clearly lack.

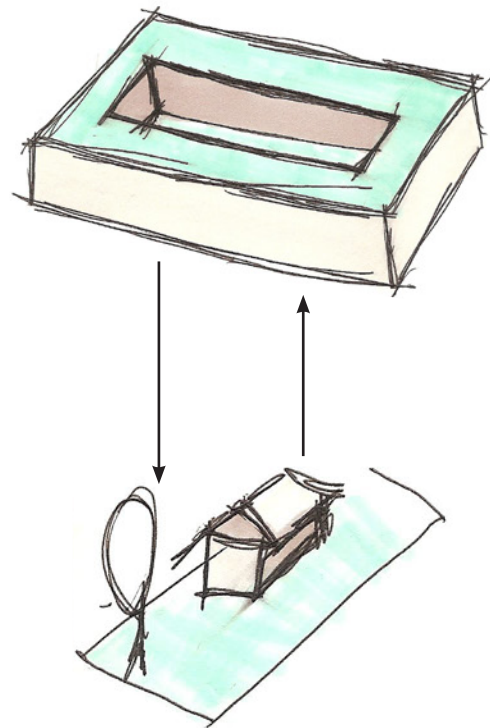


Figure 4.3.1 Suburb and urb graphic. The idea is to take the best of both suburban and urban

Case studies

Looking at these case studies the question posed was: how can we provide single-family dwellings and by extension suburban values in a high density urban format? Starting with the Whale as the base, it is a high-density, mid-rise apartment building which has a clever interaction between public spaces, solar orientation and its building form. Combined with Silodam for its identity from the facade and window treatment and more importantly the combination of unit types and their configurations. Combined with the high density low-rise, private access, highly identifiable and great variety of houses from Borneo-Sporenburg. Combined with the huerta giving the apartment unit the house-with-a-garden feeling from Torre Huerta (figure 4.3.2).

This graft of case studies suggest and portrays the idea of layering and the multiplication of landscapes in order to increase the capacity and intensity of a site – the ambition of enlarging the capacity of compact environments – to create higher densities, enlarging the existing floor plate and creating more public levels. Such as was seen in the Dutch Pavilion at Expo 200 (chapter 3.1). The pavilion increases the potential of

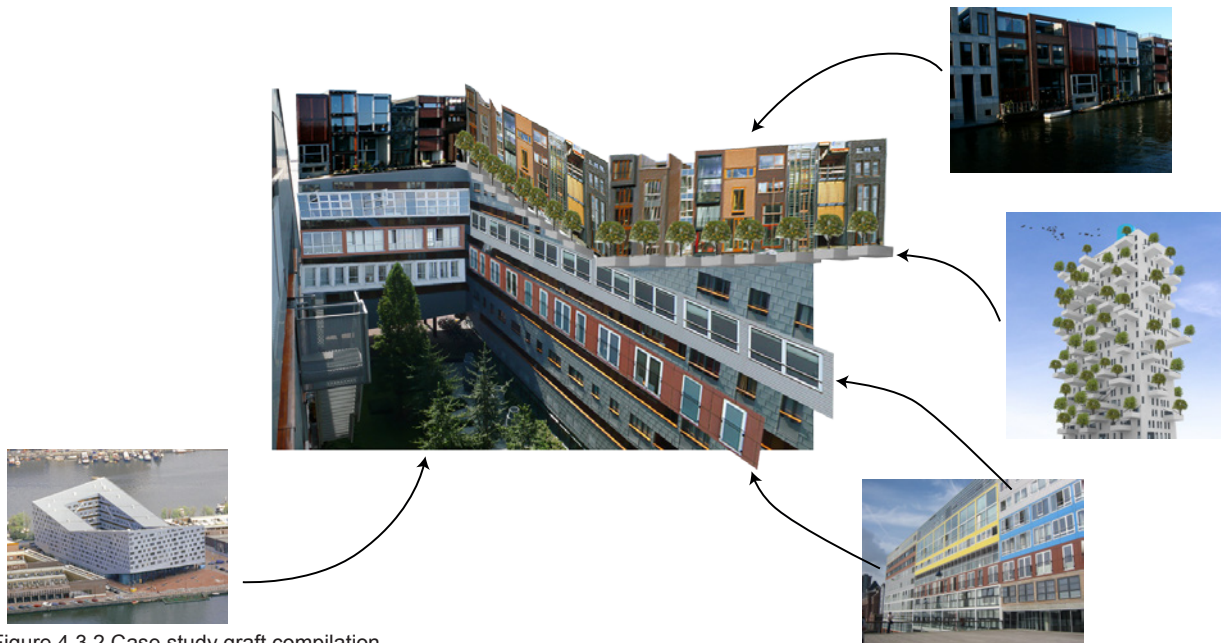


Figure 4.3.2 Case study graft compilation

a site and the landscape in terms human population, water, oxygen, energy and food – a statement to the Dutch condition of land as a precious resource.

To say all units will be houses typical of the suburban location with plot of land as property on all four sides is unrealistic because of the site restriction which inevitably include economic restrictions. SITE Architects and the Highrise of homes their problem was that the house were on shelves they were units in an apartment with high variability but zero access to sky. The very essence of a single-family dwelling is to have no one above you. In the Highrise of homes units had concrete slabs on top of them. There was no breathing room between house and the upper floor. From this limitation presented in SITE Architects project the property and garden plot of suburbia is carried to this project as leisure and recreation not as ownership or tenure.

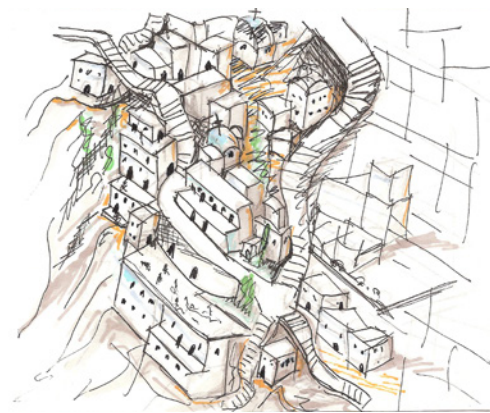


Figure 4.3.3 Santorini Greek mountain village. The mountain village paradigm is always an enticing example of providing the essence of a low-rise single-family dwelling in a high-rise format, where the interconnectedness of one dwelling relates to the other but allows for the identification of the single dwelling.

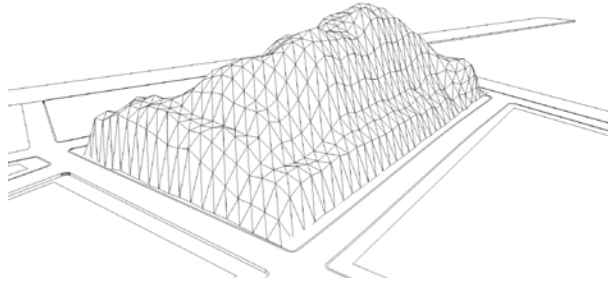
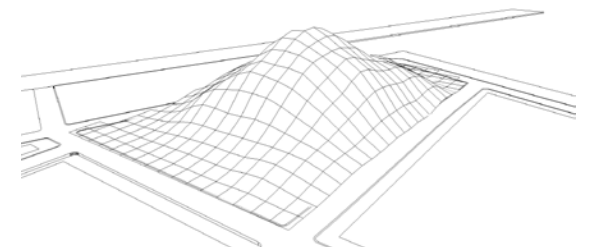
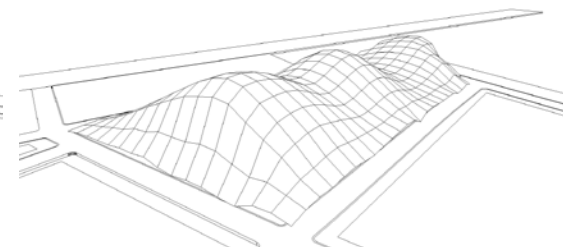
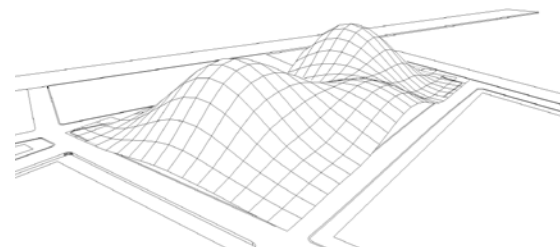
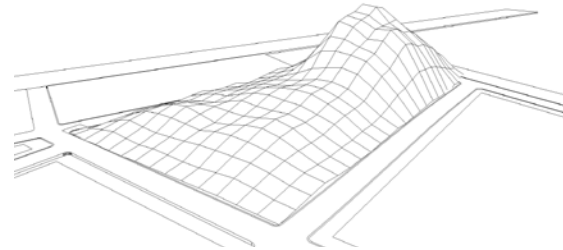
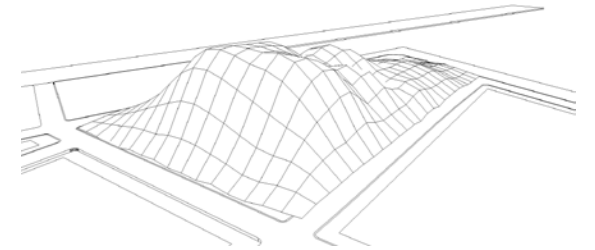
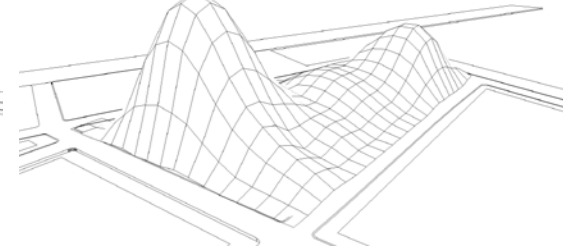
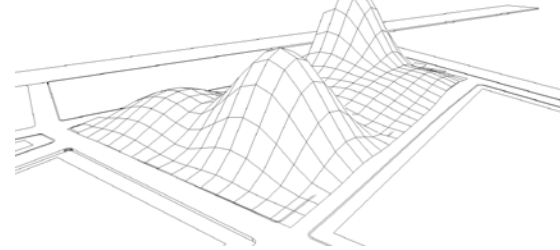
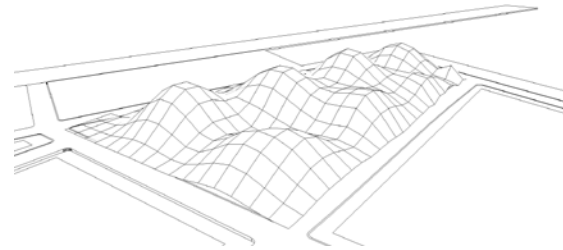
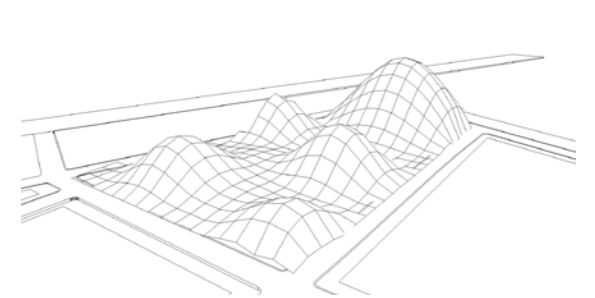
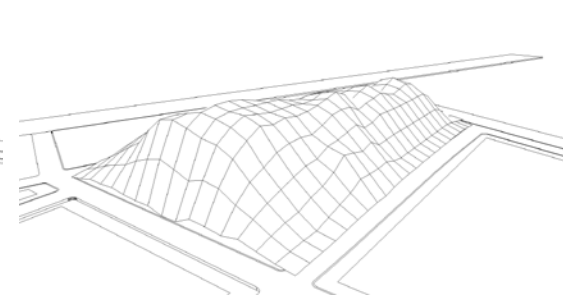
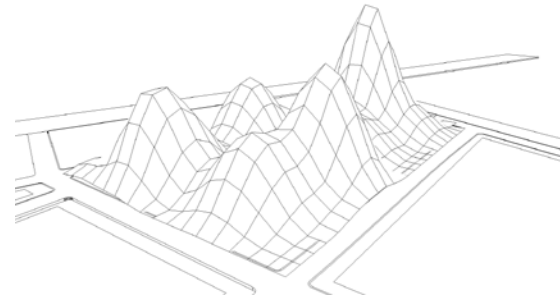
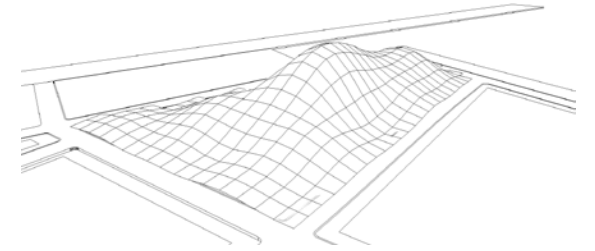
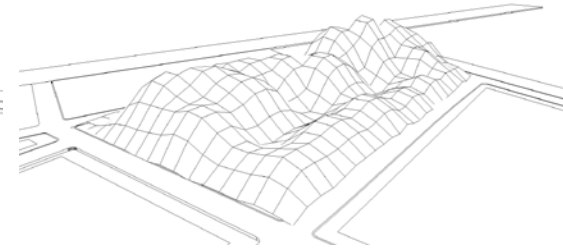
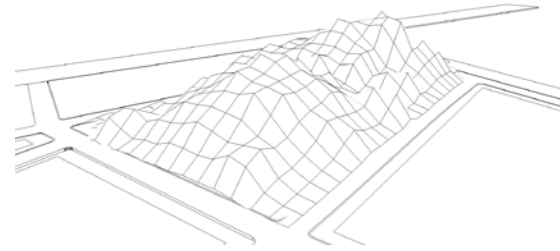


Figure 4.3.4 Mountain volume on site. The above image is one of many possible permutations created and chosen in the goal to create a layered hybrid. Through multiplying landscapes and using artificial sites the goal is to blend housing typologies and public space via an elevated street. These images were not produce with any specific software or informed by data. They were just random formations produced to illustrate the idea of the mountain village. Similar to Peter Cook's Mound (Chapter 2.4 Figure 2.4.5) these images are used to spark an idea and imagery of the potential use of the mountain typology as a foundation for exploration. Following MVRDV's train of thought, this exploration would have incorporated a series of data to create data meshes, which would have yielded a more specific output.



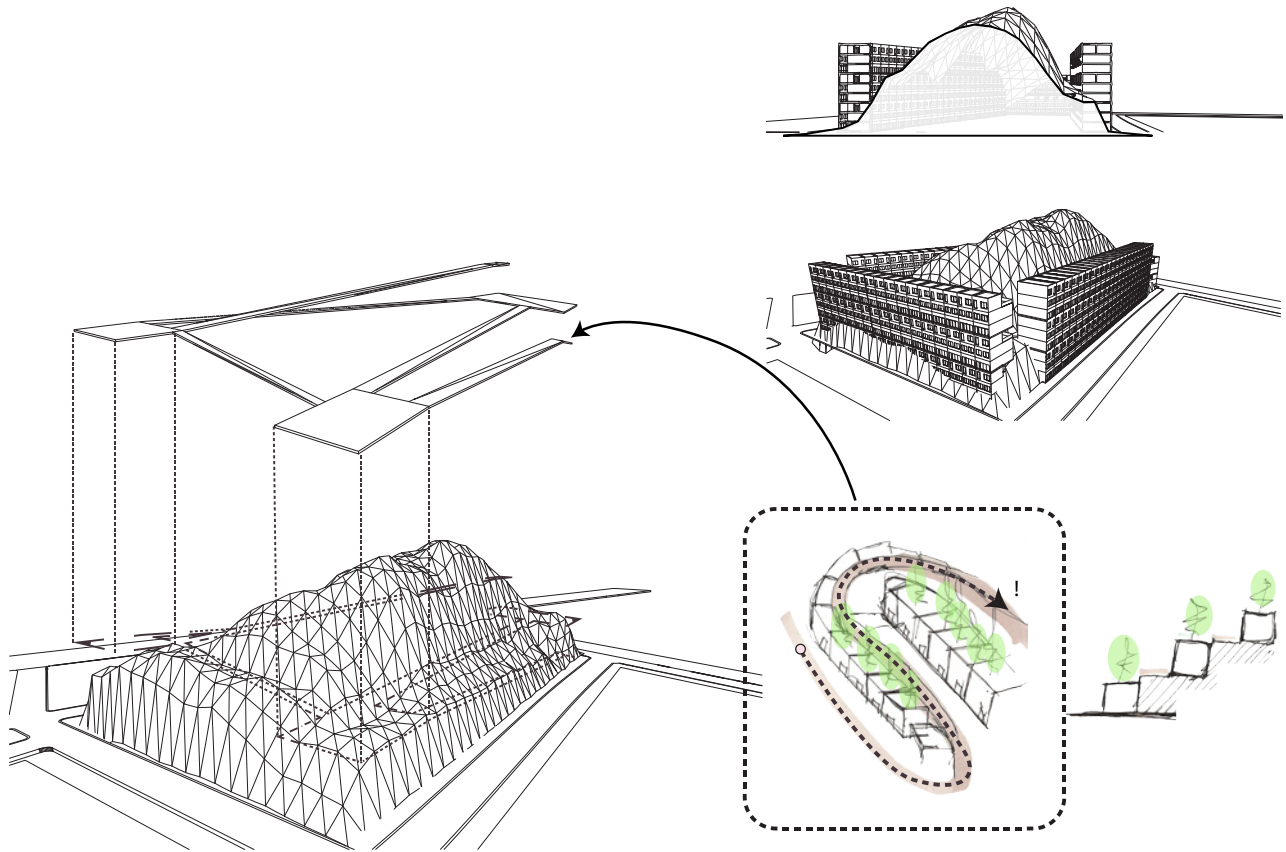
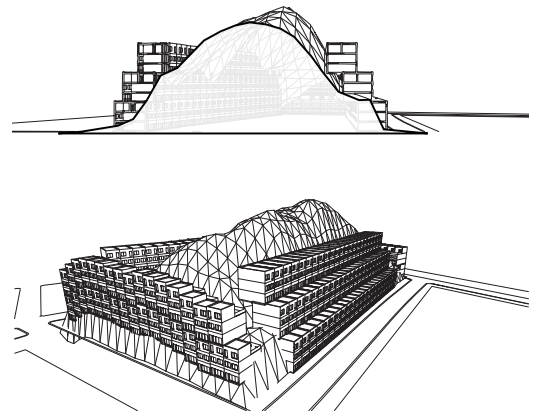


Figure 4.3.5 Mountain volume carved out to anticipate a courtyard and the circulation route up the mountain. The idea is to organize the units around the elevated street, just as dwellings, public buildings and public outdoor space are intertwined with the circulation of the mountain village typology.



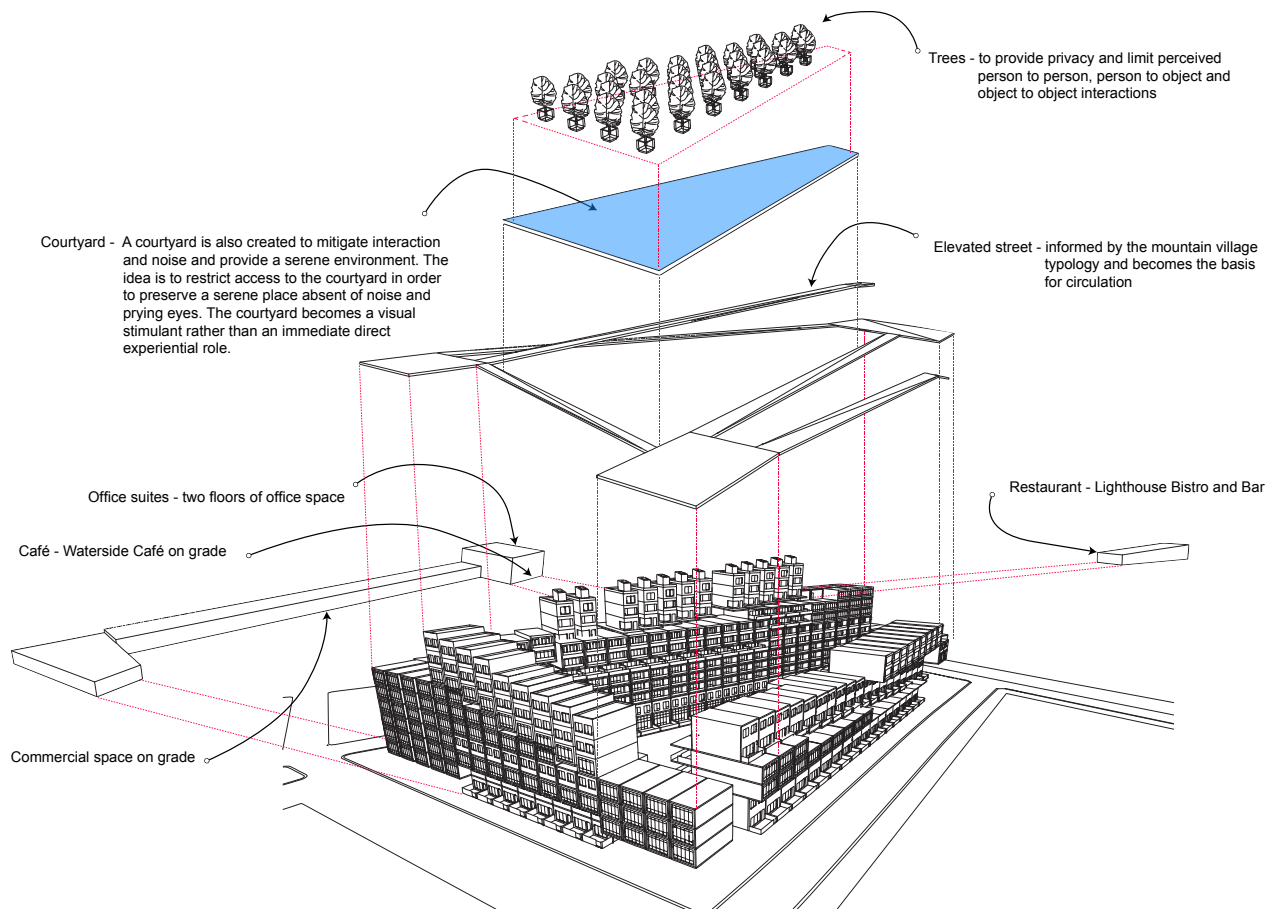


Figure 4.3.6 Summary of the design intent

The elevated street as circulation and access - fabrication of the ground floor. Access and circulation is one of the most apparent factors that define a single-family dwelling which is typical of the suburban location and the apartment building of the urban location access will be provided through the expansion of the ground floor. The ground floor will be multiplied to subsequent floors via a ramp that begins from the ground floor, circulates around the building and extends to the highest floor. The ramp allows for the extension of the perimeter of the building, thus effectively allowing more potential for ground floor access to each dwelling unit.

The Netherlands is that it is a rather flat country, especially in the western part of the country like Amsterdam and the whole Randstad conurbation. Any variation in land elevation was created by the Dutch. The Dutch make their landscape. If one wants to have any view of the area you have to build a tower to get above the existing buildings. There are no natural land formations that allow for that in the Netherlands. So to get a view of Amsterdam I am multiplying landscapes. I am taking the street and pulling it vertically and wrapping it around my building like a mountain.



Figure 4.3.7a Pottery Road Google street view



Figure 4.3.7b Pottery Road contour map
scale 0 100 200 m

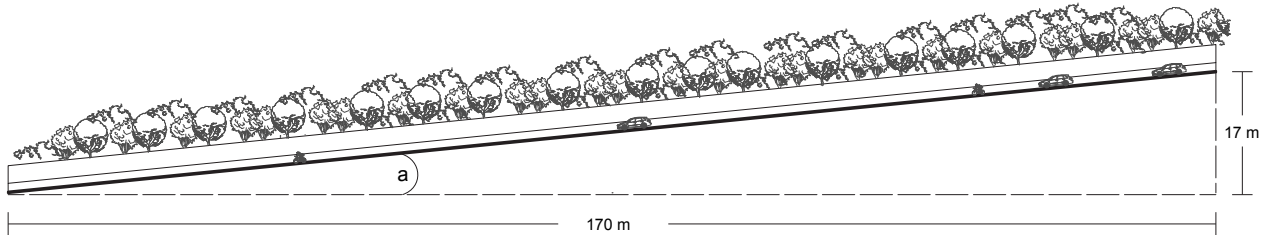


Figure 4.3.7c Pottery Road section
scale 0 10 20 40 m

$$\text{angle 'a'} = \tan^{-1} (17 \text{ m} / 170 \text{ m})$$

$$\text{angle 'a'} = 5.5^\circ$$

$$\text{slope \%} = (17 \text{ m} / 170 \text{ m}) \times 100$$

$$\text{slope \%} = 10$$

$$\text{slope ratio} = 1 : 10$$



Figure 4.3.8a Filbert Street Google street view



Figure 4.3.8b Filbert Street contour map
scale 0 200 400 m

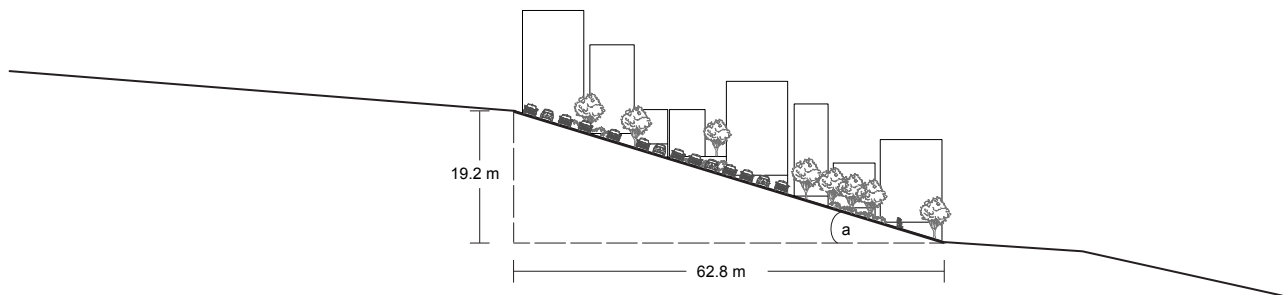


Figure 4.3.8c Filbert Street section
scale 0 5 10 20 40 m

$$\text{angle 'a'} = \tan^{-1} (19.2 \text{ m} / 62.8 \text{ m})$$

$$\text{angle 'a'} = 17^\circ$$

$$\text{slope \%} = (19.2 \text{ m} / 62.8 \text{ m}) \times 100$$

$$\text{slope \%} = 30.6\%$$

$$\text{slope ratio} = 1 : 3.3$$



Figure 4.3.9a Oslo Opera House view from the southwest



Figure 4.3.9b Oslo Opera House view from the roof

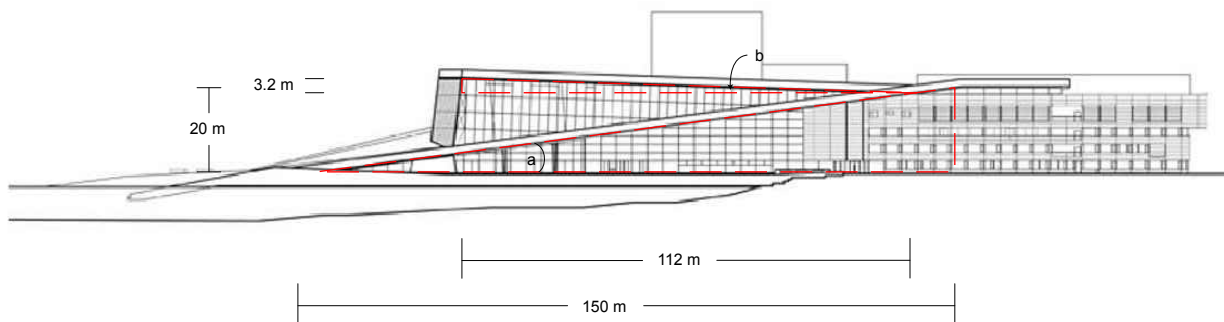


Figure 4.3.9c Oslo Opera House elevation
scale 0 10 20 40 m

$$\text{angle 'a'} = \tan^{-1}(20 \text{ m} / 150 \text{ m})$$

$$\text{angle 'a'} = 7.6^\circ$$

$$\text{slope \%} = (20 \text{ m} / 150 \text{ m}) \times 100$$

$$\text{slope \%} = 13$$

$$\text{slope ratio} = 1 : 8$$

$$\text{angle 'b'} = \tan^{-1}(3.2 \text{ m} / 112 \text{ m})$$

$$\text{angle 'b'} = 1.6^\circ$$

$$\text{slope \%} = (3.2 \text{ m} / 112 \text{ m}) \times 100$$

$$\text{slope \%} = 3$$

$$\text{slope ratio} = 1 : 35$$

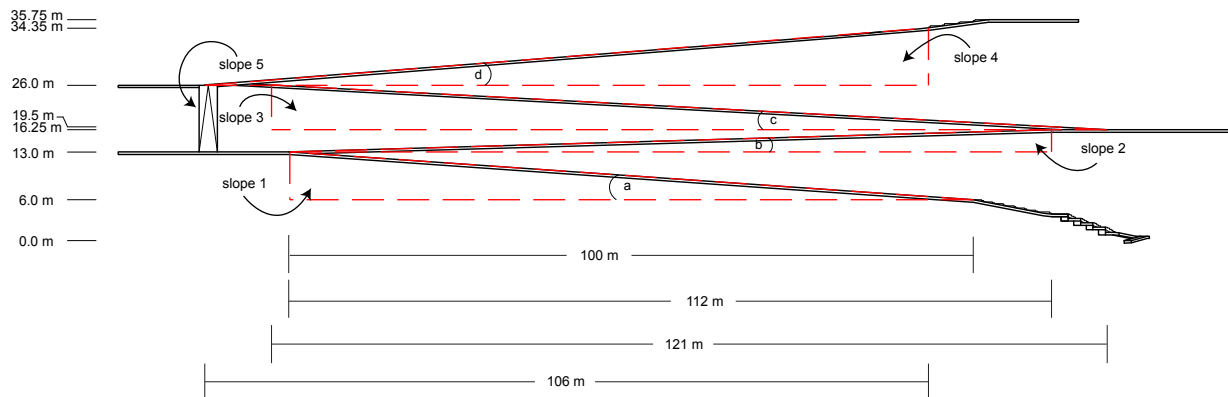


Figure 4.3.10 Elevated street section
scale

0 10 20 40 m

slope 1

angle 'a' = $\tan^{-1}(7 \text{ m} / 100 \text{ m})$
angle 'a' = 4.0°

slope % = $(7 \text{ m} / 100 \text{ m}) \times 100$
slope % = 7

slope ratio = 1 : 14

slope 3

angle 'c' = $\tan^{-1}(6.5 \text{ m} / 121 \text{ m})$
angle 'c' = 3.0°

slope % = $(6.5 \text{ m} / 121 \text{ m}) \times 100$
slope % = 5.3

slope ratio = 1 : 19

slope 2

angle 'b' = $\tan^{-1}(3.25 \text{ m} / 112 \text{ m})$
angle 'b' = 1.7°

slope % = $(3.25 \text{ m} / 112 \text{ m}) \times 100$
slope % = 3

slope ratio = 1 : 34

slope 4

angle 'd' = $\tan^{-1}(8.35 \text{ m} / 106 \text{ m})$
angle 'd' = 4.5°

slope % = $(8.35 \text{ m} / 106 \text{ m}) \times 100$
slope % = 7.8

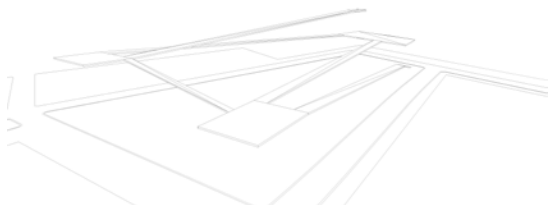
slope ratio = 1 : 13

slope 5

angle 'e' = $\tan^{-1}(13 \text{ m} / 46.8 \text{ m})$
angle 'e' = 15.5°

slope % = $(13 \text{ m} / 46.8 \text{ m}) \times 100$
slope % = 28

slope ratio = 1 : 4



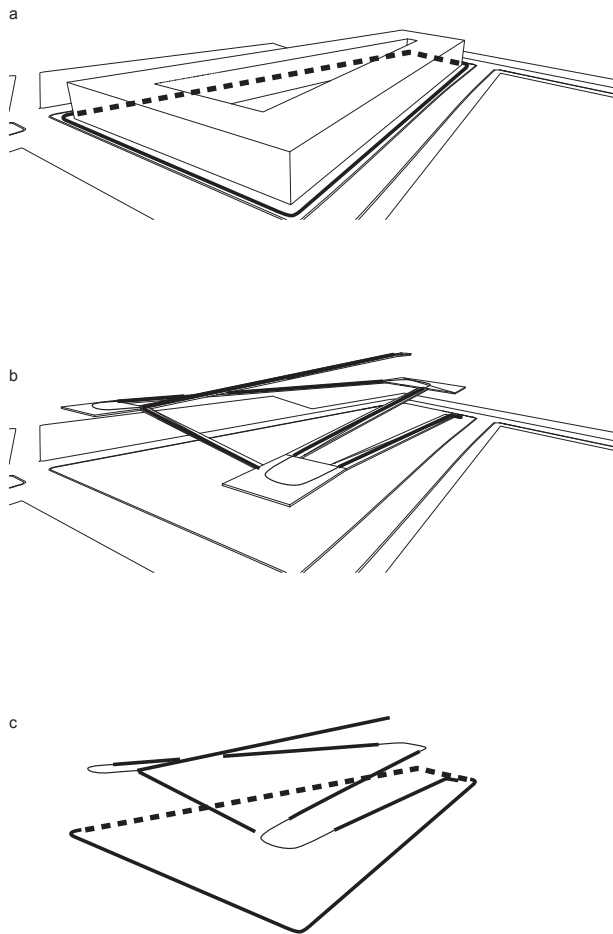


Figure 4.3.11 Increasing the perimeter of the building. a) The as of right perimeter is 456.8 m. b) The elevated street increases the perimeter by adding 528.7 m. c) The total amount added is 985.5 m which has implications seen in Figure 4.3.12

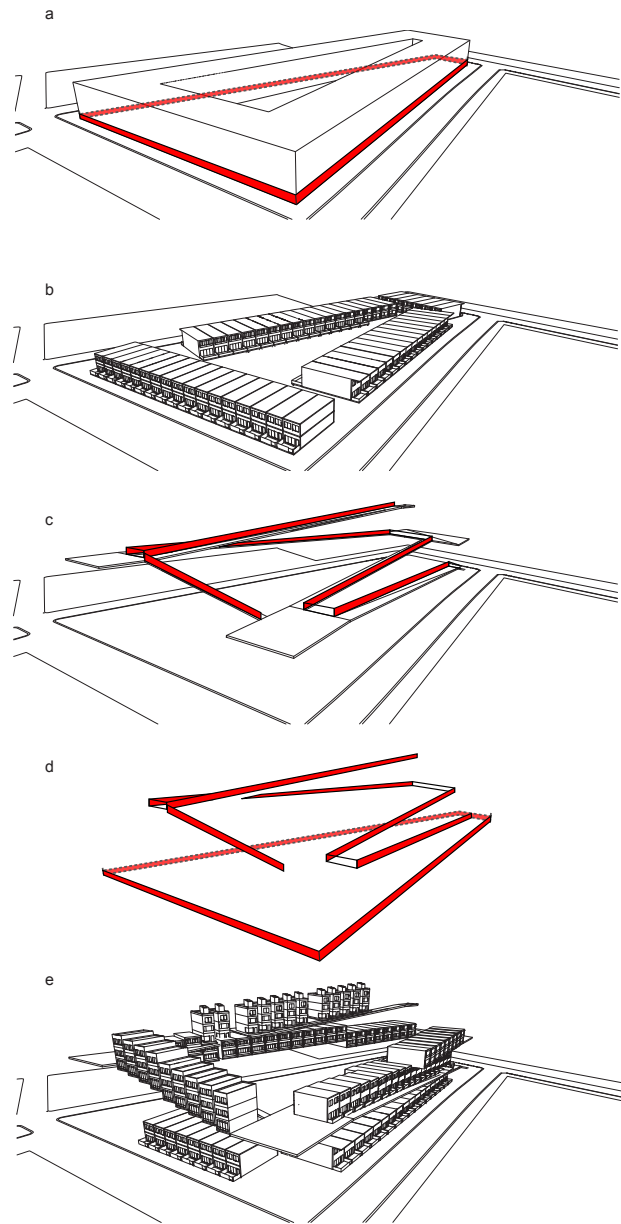
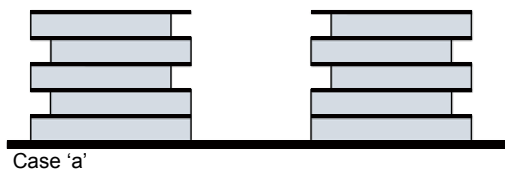


Figure 4.3.12 Increasing private access off "grade". a-b) The as of right conditions allow for a potential of 58 units which have ground floor access. These units are equivalent in size to the ones being propose for the experiment and have an equivalent outdoor space. c-e) The elevated street which increases the perimeter as seen in Figure 4.3.11 yields 99 units with "ground floor" access. It should be noted that the design experiment calls for commercial venues on grade. If these venues were not included then the total would have been 120 units with a ground floor equivalency

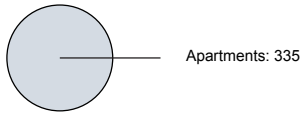
A key aspect of the urban environment is density. Density will help aid in the search for variability and multiplicity that lack in the suburbs. However, spaciousness is a contributing factor to the idea of perceived density. Through the multiplication of the ground floor the desire is to mitigate the idea of crowdedness through open space that the ramp brings. A courtyard is also created to mitigate interaction and noise and provide a serene environment. The courtyard speaks to the aspect of multiplying landscapes in order to create a three-dimensional landscape in conjunction with the public ramp that goes around the building. The idea is to restrict access to the courtyard in order to preserve a serene place absent of noise and prying eyes. The courtyard becomes a visual stimulant rather than an immediate direct experiential role.

The amenity space of the single-family suburban home is the front and / or back garden. To simulate this condition a “dock” will be created for all town houses on the ground floor in the courtyard. These same units also have space in front of the dwelling to separate between sidewalk and individual dwelling. Other units will also have this same condition at different intensities on different floors.

Typology plays an important role in the grafting of suburban to urban typologies. The suburban typologies will be grafted onto a typical Dutch urban typology, the mid-rise urban block. The suburban typologies will include detach houses and row houses. The urban typologies will include maisonettes, studios and one and two-storey apartments.

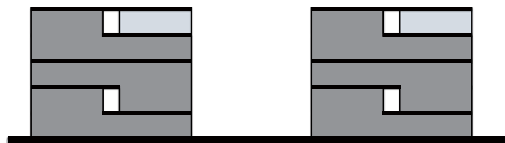


Case 'a'

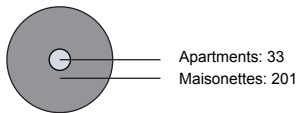


To explore density further, consider a mid-rise perimeter block with an equal size foot print and courtyard with as of right zoning restriction (figure 4.3.13):

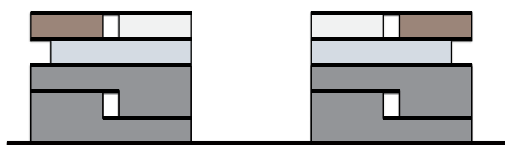
Case 'a' presents an example of a monoculture of housing type. If every unit is a single-story apartment with open gallery corridor access this arrangement yields 67 units per floor. As per zoning regulation the maximum buildable height is 16 m which results in five floors (2.9 m floor to ceiling) floors. In total case 'a' would yield 335 units.



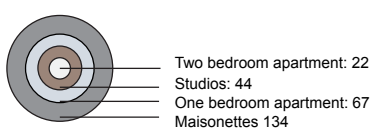
Case 'b'



For case 'b' if maisonettes become the dominant unit type the building would yield 201 maisonette units. Since there are an odd number of floors there is a possibility to add an apartment. The skip stop corridor access arrangements create a possibility for a 16 m by 6 m apartment. In total it would allow for 33 apartments unit on the fifth floor. This would vie a total unit count of 234 units.



Case 'c'



Case 'c' presents a mix of four different units. The example yields 134 maisonettes, 67 one bedroom apartments, 44 studios and 22 bedroom apartments. This example results in a total of 267 apartments.

Figure 4.3.13 Density and typology study

The suburban/urban hybrid on the other hand has 5 different typologies and 2-3 variations of each typology (figure 4.3.14). There are 78 row houses, 75 1-storey apartments, 66 maisonettes, 30 studios, 21 houses and 18 2-storey apartments. The proposed case presents an extremely high variety of unit types. Moreover, there are several commercial spaces and a daycare on the ground floor, 2 floors for the possible location for office suits and a restaurant on the 11th floor. Furthermore, every unit has a variable amount of private outdoor space that mimics a front yard and/or a backyard condition that ranges from 15 m² to 100 m². There is also a playground on the fifth floor on the same corner the daycare is located. The children and daycare workers just have to take an elevator to the park. On the southeastern side on the 6th floor there is park of soft and hard landscaping for leisure and recreation and another on the northwestern on the 8th floor. These parks are located at the termini of the elevated street.

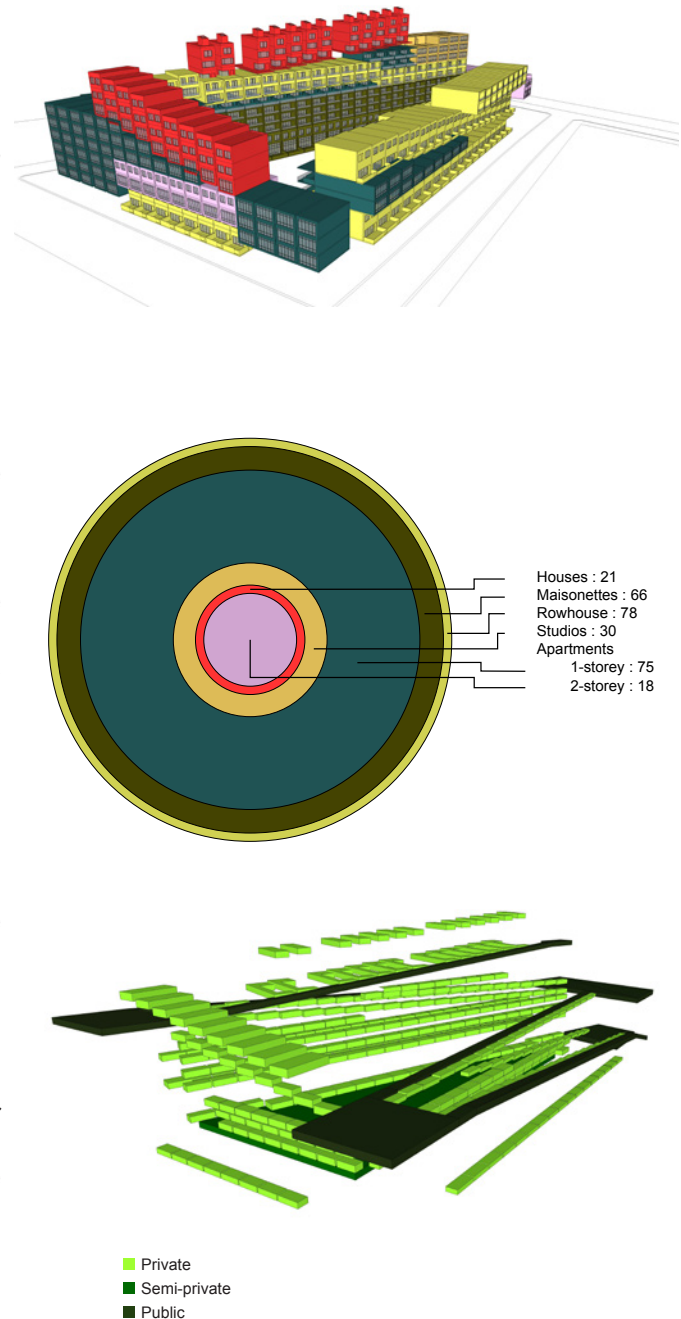


Figure 4.3.14 Typologies for the proposed design

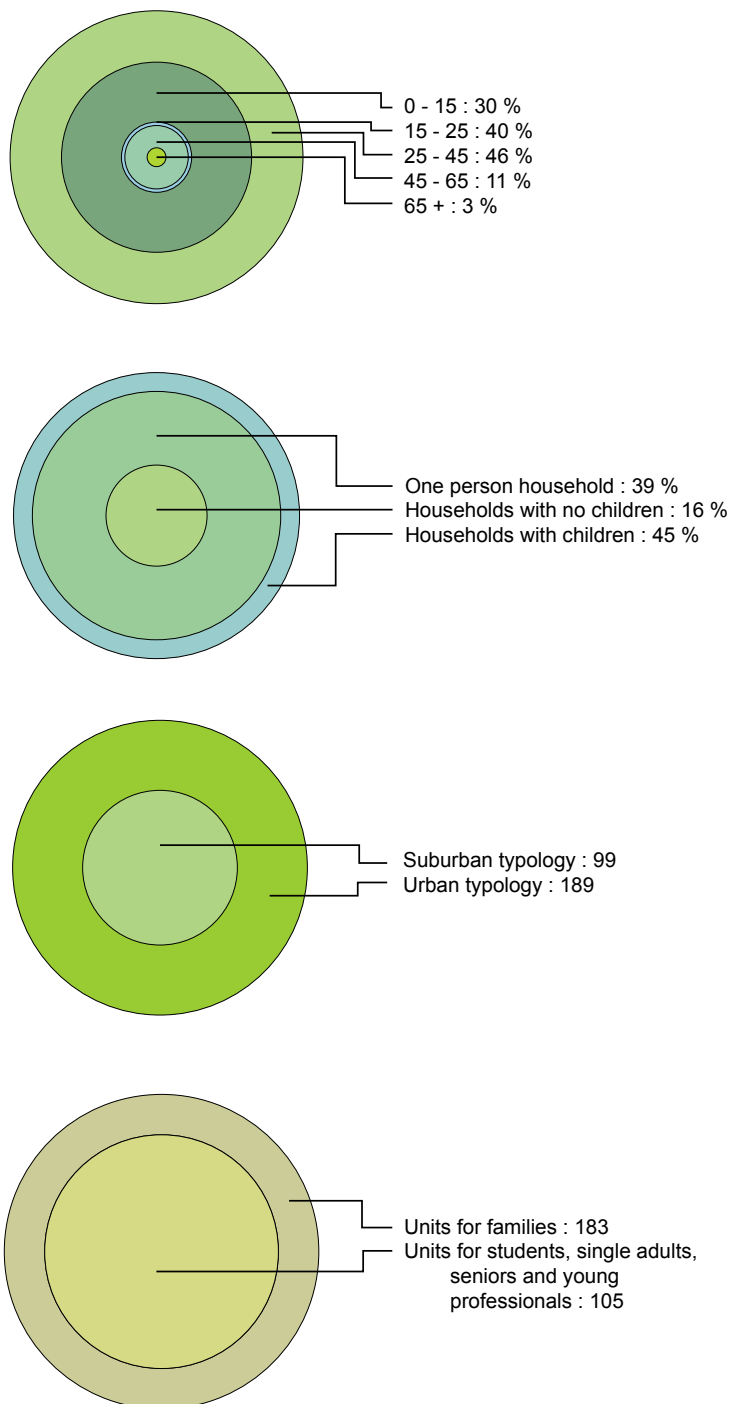


Figure 4.3.15 Demographics and typology allocations

The proportions and allocation of dwelling types are based on the demographics of Haveneiland (figure 4.3.15). The demographics for the area are consistent with the findings of the Netherlands Environmental Agency published New Regional Population Forecast to 2040. There is a predominate young demographic of young adults and young families with children. There are 39% of one person households who are most likely young adults who are studying at higher education schools or are looking for jobs on Haveneiland or downtown Amsterdam. Also consistent with the report the demographics show 46% of people are aged 25-45 and 45% of households are with children. A large portion of the population is young families with children (30% 0-15 years old).

4.4 - Design Proposal
4.4.1 - Site and floor plans



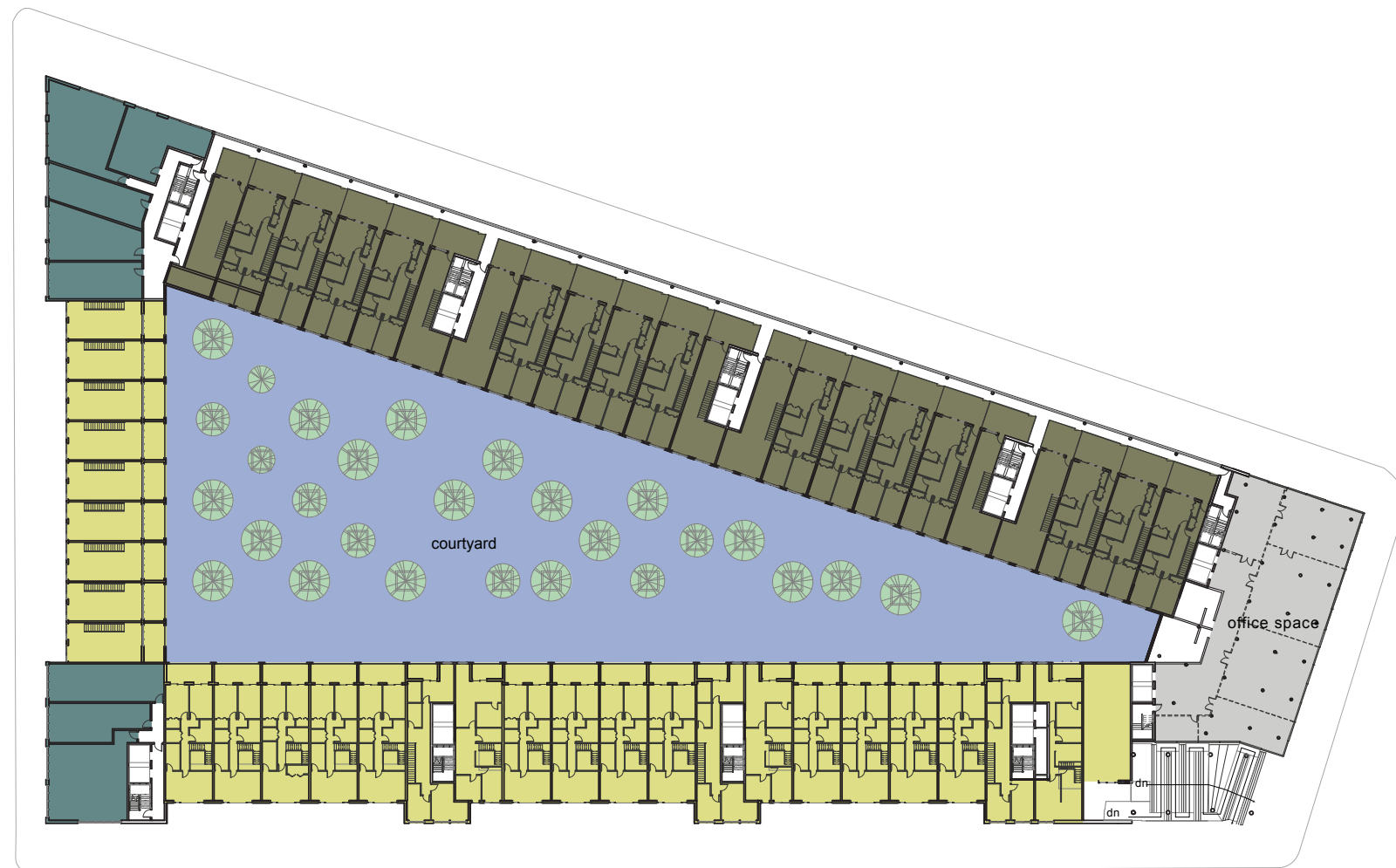
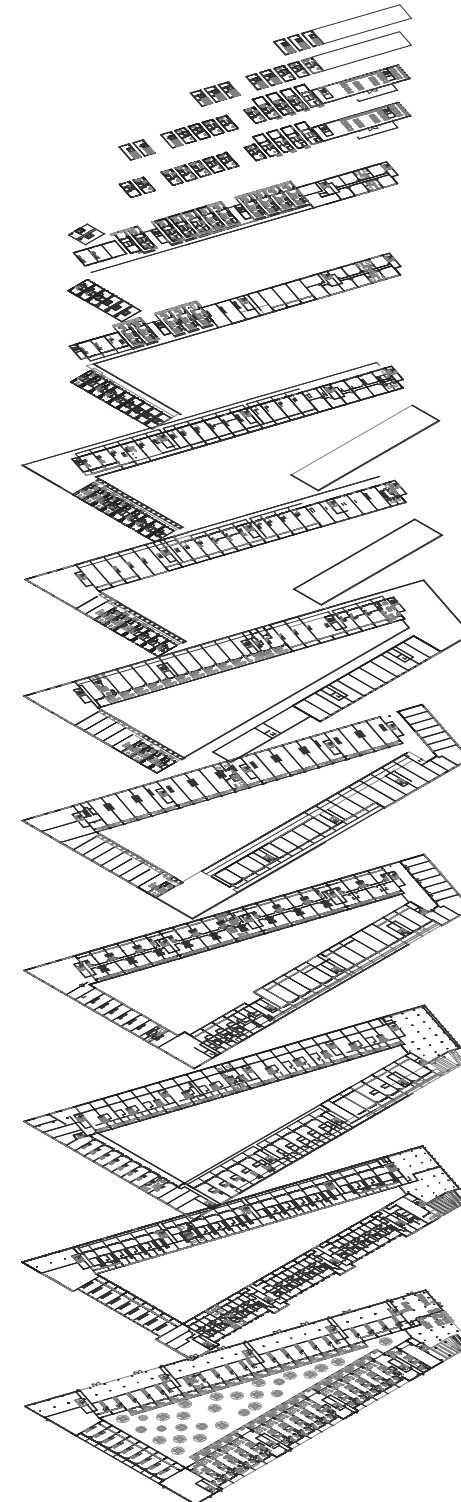


Figure 4.4.1.2 Second floor plan

scale 0 20 40 m



4.4.2.1 Houses

The units termed houses are located on the higher floors of the building. They follow the slope of the elevated street on the west and north side. The houses have direct access off the elevated street which serve as the only way for residents to get to their unit. There is no interior corridor access for these units. Access is off the street eight storeys in the sky as if they were on grade. The elevated street begins on the southeastern side. This would be one way of leisurely walking up to the unit. Conversely, if one wanted quick access to the unit they could take an elevator on the north side from grade up to the 8th, 9th or 10th floor. The elevator opens up to the elevated street, at which point the resident would walk either up or down the elevated street to their house.

These units are the only unit type that can be truly considered suburban, as a house on a plot of 'land'. This house sits on a concrete pad which becomes the basis for outdoor leisure and recreational space. Furthermore, they can be viewed as standalone dwellings with nothing on top of them except sky. They are intended for families with children. The unit has a master bedroom with an extra room and den. The den could potentially be turned into a third room. The size of the unit is 120 m2 with an outdoor space of 105 m2 which include the

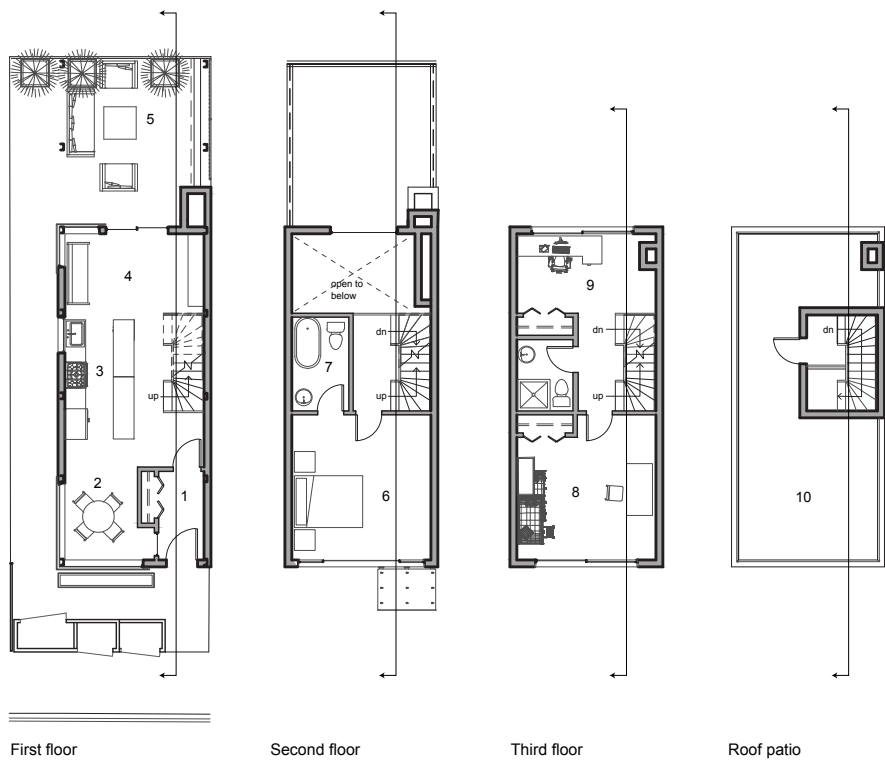


Figure 4.4.2.1a House floor plans scale

1. foyer / mud room	6. master bedroom
2. dining room	7. master bathroom
3. kitchen	8. second bedroom
4. family room	9. den / or third bedroom
5. backyard	10. roof top garden

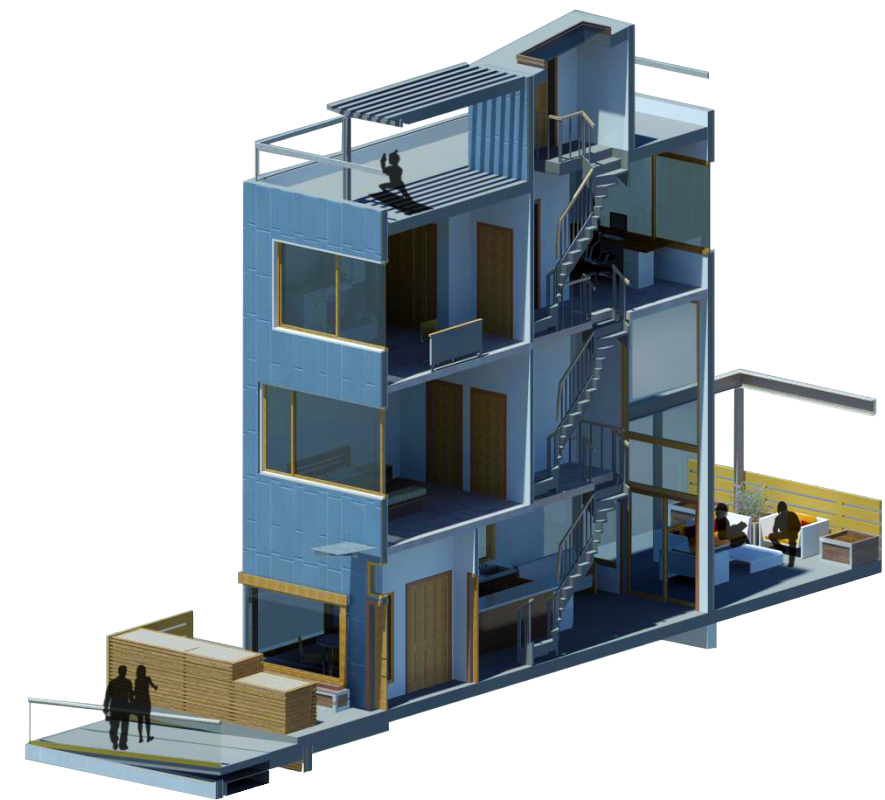


Figure 4.4.2.1c House 3D section

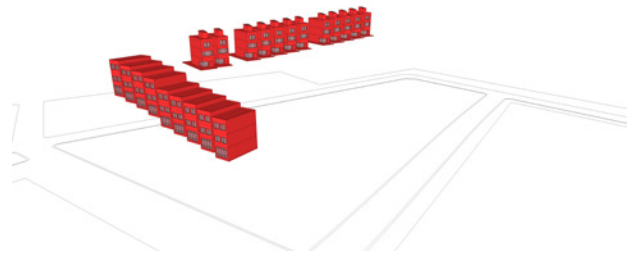


Figure 4.4.2.1d House location key

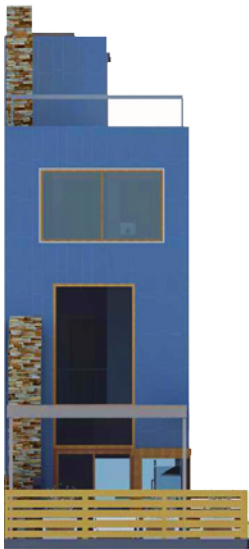


Figure 4.4.2.1b House elevation

front yard, back yard and roof terrace.

Since these units are located on the highest floors and do not necessarily follow the same structural grid as the rest of the building it is important for them to be lightweight. To carry the load of the unit and to allow for flexibility in the location of fenestrations and doors a Vierendeel truss is used. The structures are made of lightweight steel stud construction with a composite steel deck and wrapped in a blue zinc metal panel facade. The different colour paneling sets them apart from the rest of the building as distinct shimmering blue volumes in the sky. They also connote a nautical and industrial language which represents the area.



Figure 4.4.2.1e House backyard

4.4.2.2 Row houses

The popular housing type in Dutch suburbs used as a tool to increase the density of a single-family low-rise area is the row house. Row houses make efficient use of land and resources. There are technically two less external walls to worry about and therefore can be more energy efficient. The row house shares walls but still maintains the essence of a single-family dwelling with a house-and-a-garden feeling. However it becomes challenging when taking the row house and layering them to form a three-dimensional project because as soon as another layer is added the essence of the single-family aspect is diminished. Someone else now lives on top of you. Since the goal of the experiment is to combine and stack different typologies creative ways are needed to create the distinction of a singular unit. In this project it is achieved with highlighting the idea of private entrance and front yard through the elevated street.

Row houses on grade (figure 4.4.2.2a-c) are offset by 2.5 m to allow for a private space that distinguishes the unit from the public sidewalk. Moreover the units on grade have a backyard condition called a 'dock' which extends into the courtyard. The courtyard is 0.75 m deep reflecting pool filled with trees to add privacy. The total outdoor space is 60 m2 which consist of the

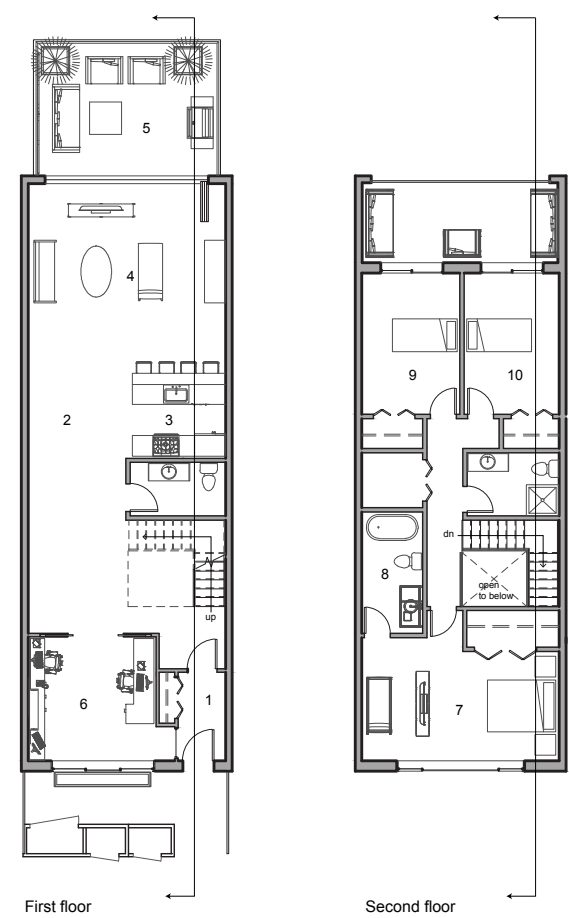


Figure 4.4.2.2a Row house on grade floor plans

scale 0 5 10 m

- | | |
|---------------------|----------------------|
| 1. foyer / mud room | 6. home office / den |
| 2. dining room | 7. master bedroom |
| 3. kitchen | 8. master bathroom |
| 4. family room | 9. second bedroom |
| 5. backyard | 10. third bedroom |



Figure 4.4.2.2b Row house on grade 3D section



Figure 4.4.2.2c Row house on grade elevation



Figure 4.4.2.2d Row house backyard 'dock'

front yard, the ‘dock’ and balcony on the second floor. The total size of the unit is 240 m2. This unit is intended for a growing family with one or more children. There is room to grow in this unit. There is ample and flexible space for a family to grow and hopefully deter them from leaving to the suburbs. Row houses are distinguished with wood siding on the street side and grey brushed zinc paneling on the courtyard side.

Row houses along the elevated street (figure 4.4.2.2d-f) are similar in intent to the row houses on grade. They are for families, but do not have the same amount of garden space and are smaller. The row houses on the elevated street are 165 m2 with 30 m2 garden space in the form of a front and back yard. Access to these units is similar to that of the houses. Residents can either take the elevated street which starts on the southeastern side of the building or they may take an elevator to where the elevated street coincides with their unit. The facade treatment is similar to the row houses on grade.

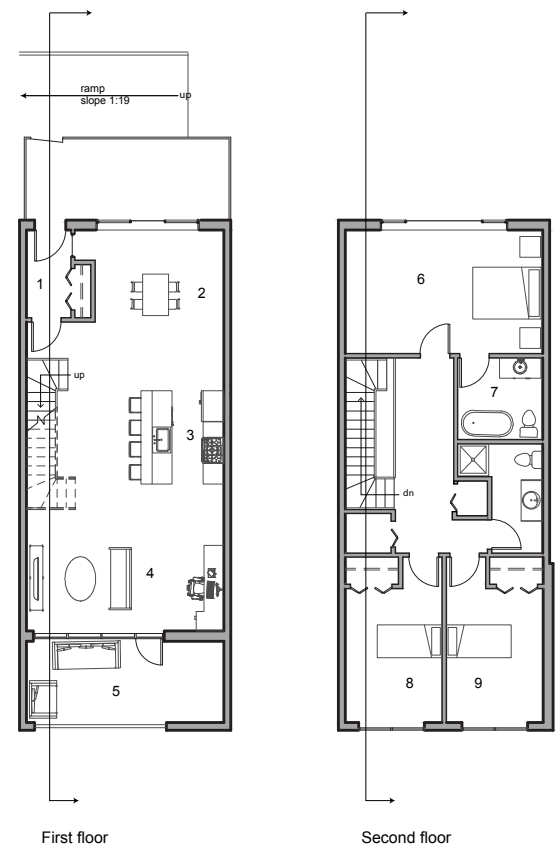


Figure 4.4.2.2e Row house on elevated street floor plans scale

1. foyer / mud room	6. master bedroom
2. dining room	7. master bathroom
3. kitchen	8. second bedroom
4. family room	9. third bedroom
5. backyard	



Figure 4.4.2.2f Row house on elevated street 3D section

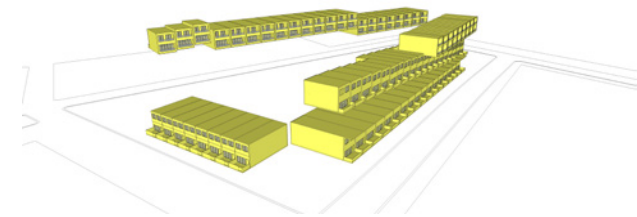


Figure 4.4.2.2h Row house location key



Figure 4.4.2.2g Row house on elevated street elevation

4.4.2.3 Maisonettes

The maisonettes are located on the north side of the building. They are intended for families. There are two variations of the type. There are twenty-two units of the first variation. These maisonettes have an open gallery access and share adjacency on grade with the commercial venues along the north side. There are forty-four units of the second variation. These maisonettes have a double loaded corridor system.

The first variation of maisonettes is accessible on the second floor only via elevators. The second floor, which is the entry floor, is the private area with the bedrooms. This area is closed off from the entry mud room. From the entry there are stairs which lead to the public areas, the kitchen and living room combination and the outdoor living space (the ‘dock’). The total size of the unit is 150 m2 with 48 m2 which consists of the ‘dock’ and the front yard on the second floor. The facade treatment for this unit is wood siding on the street side and brushed metal zinc paneling on the courtyard side.

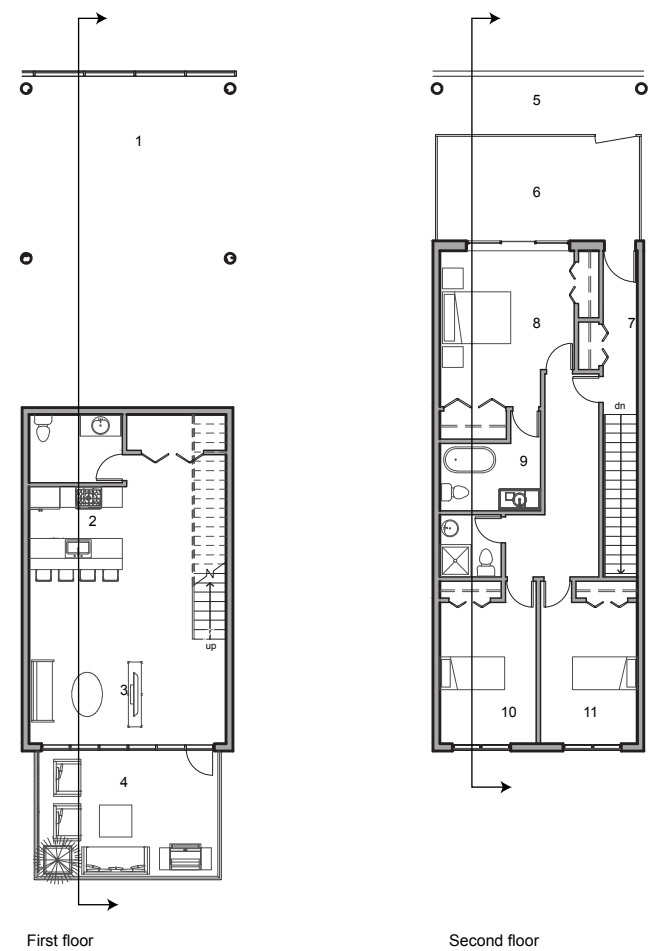


Figure 4.4.2.3a Maisonette with commercial on grade floor plans scale

0 5 10 m

1. commercial	6. front yard	11. third bedroom
2. kitchen	7. foyer / mud room	
3. family room	8. master bedroom	
4. backyard	9. master bathroom	
5. open gallery corridor	10. second bedroom	



Figure 4.4.2.3c Maisonette with commercial on grade 3D section



Figure 4.4.2.3b Maisonette with commercial on grade elevation

The second variation of maisonettes is located on the third to fifth floor. These units are similar to the other maisonettes but have a different internal configuration and limited outdoor space. The unit size is 150 m2 with 24 m2 of outdoor space. The facade treatment for this variation is brick veneer on the street side and brushed metal zinc panelling on the courtyard side.

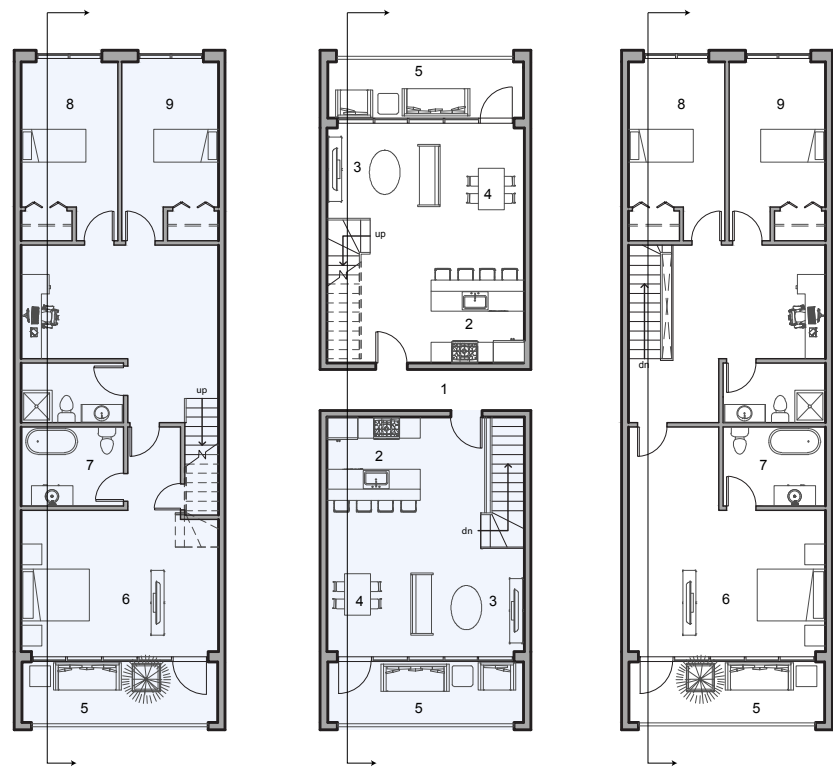


Figure 4.4.2.3d Maisonette floor plans
scale 0 5 10 m

- 1. corridor
- 2. kitchen
- 3. family room
- 4. dining room
- 5. balcony
- 6. master bedroom
- 7. master bathroom
- 8. second bedroom
- 9. third bedroom



Figure 4.4.2.3e Maisonette 3D section

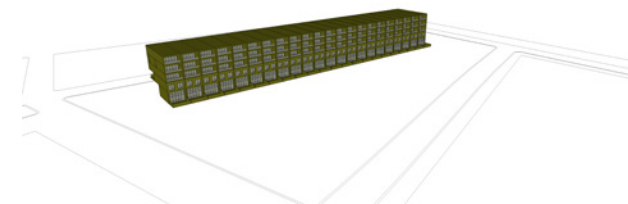


Figure 4.4.2.3g Maisonette location key



Figure 4.4.2.3f Maisonette elevation

4.4.2.4 Studios

There are only 30 studios which cater to young adults living on their own in the city seeking higher education or job hunting. The studios are located on the higher floors from the 8th to the 10th floor on the north eastern side of the building underneath the restaurant and on top of the row houses. They follow the single orientation double loaded corridor system and are only accessible by elevators. The studios are 40 m2 open concept units with zero outdoor space. The facade treatment for the studios on both street and courtyard side is corrugated metal. The idea is to differentiate from the wood siding on the street side and the zinc on the courtyard and to reflect to pure utilitarian nature of studios.

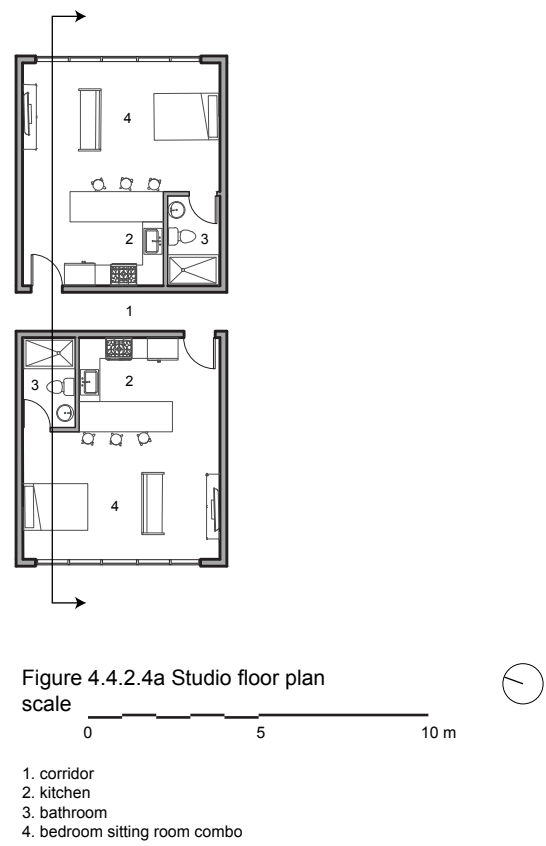


Figure 4.4.2.4c Studio 3D section

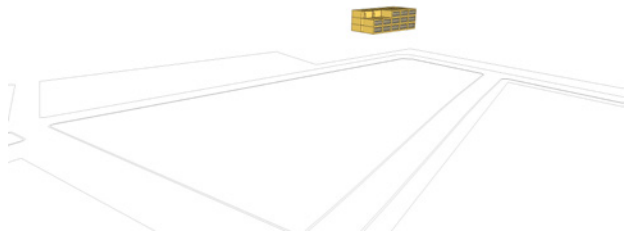


Figure 4.4.2.4d Studio location key

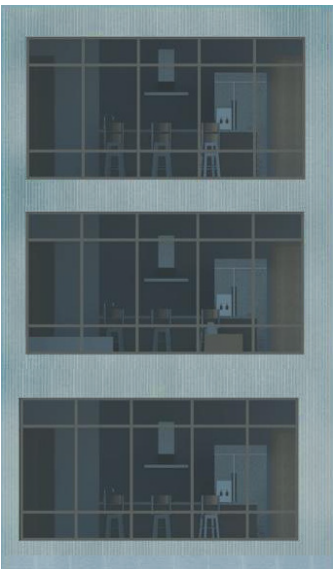


Figure 4.4.2.4b Studio elevation

4.4.2.5 Apartments

One-storey apartment units are intended for single adults, young professionals and seniors. They are located throughout the building on various floors. These units are like fillers for the elevated street. They are located between units with “street” access, particularly the row houses. Access to these units is either open or closed gallery corridor via an elevator. They range in size and amount of outdoor space (if any) depending on their location and corridor type. Units along the north and south are larger two bedroom apartments, while the ones on the west side are smaller units. A one bedroom single storey apartment is about 50 to 60 m2 with zero outdoor space or balcony. A two bedroom single storey apartment building is 90 m2 with 20 m2 outdoor space. The facade treatment is brick veneer on the street side and wood siding on the courtyard side.

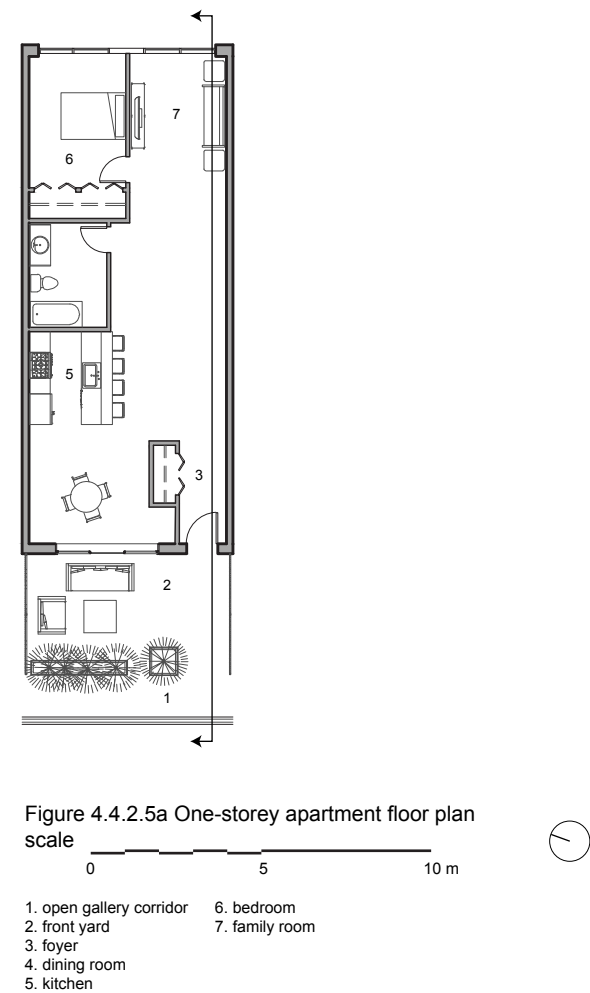


Figure 4.4.2.5c One-storey apartment 3D section

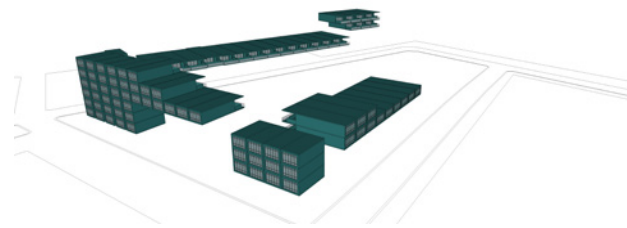


Figure 4.4.2.5d One-storey apartment location plan



Figure 4.4.2.5b One-storey apartment elevation

There are very few two-storey apartment units. They are located on the west and east side. They are accessible only by double volume open gallery corridors via elevators. These units are intended for single adults, young professionals and young starting families. The units are 120 m2 with 15 m2 outdoor space in the form of a front yard. The facade treatment is similar to single storey apartment units, brick veneer on the street side and wood siding on the courtyard side.

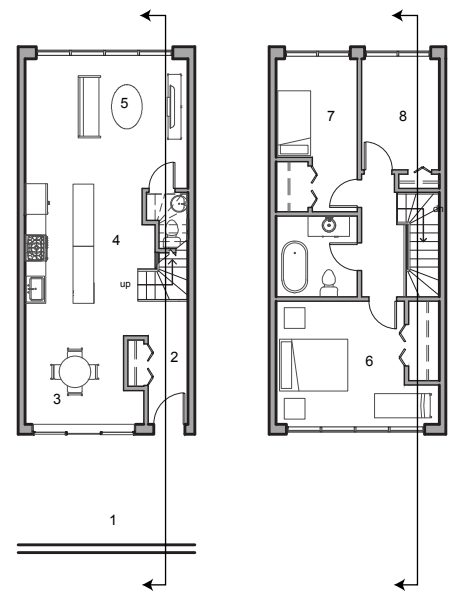


Figure 4.4.2.5e Two-storey apartment floor plans scale



Figure 4.4.2.5g Two-storey apartment 3D section

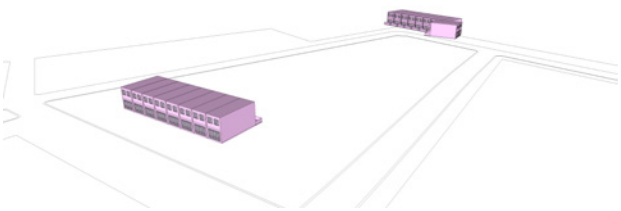


Figure 4.4.2.5h Two-storey apartment location key



Figure 4.4.2.5f Two-storey apartment elevation

4.4.3 Building Sections

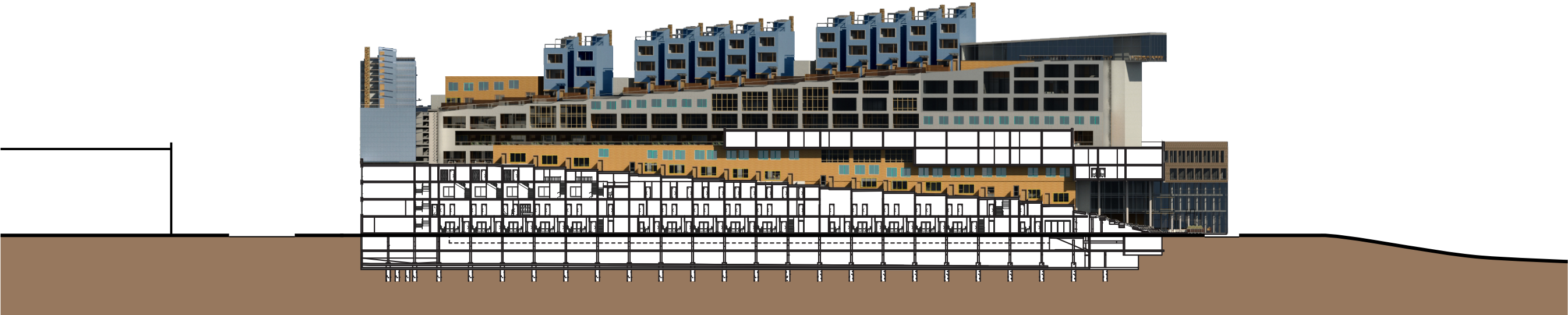
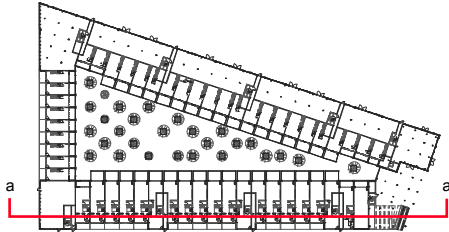


Figure 4.4.3.1 Ijburg section a-a'
scale 0 20 40 m



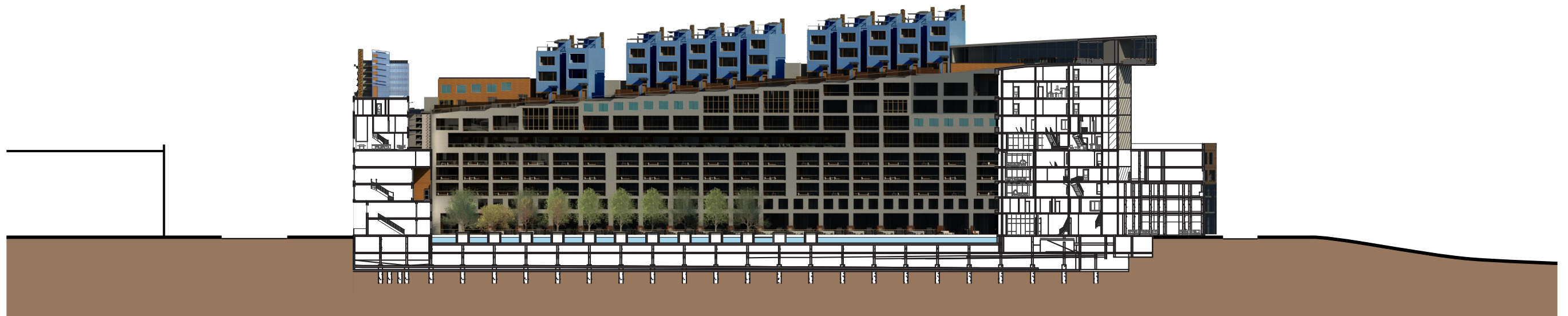


Figure 4.4.3.2 Ijburg section b-b'
scale 0 20 40 m

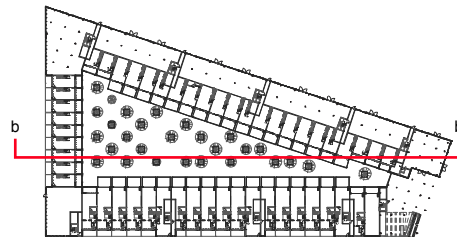
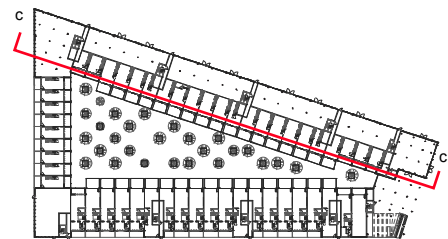




Figure 4.4.3.3 Ijburg section c-c'

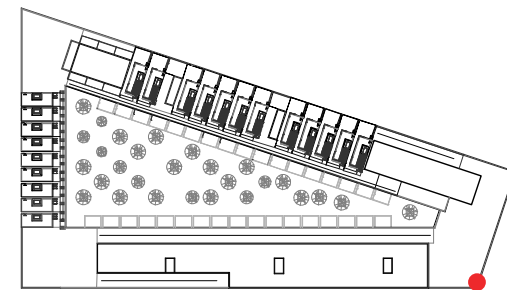
scale 0 20 40 m



4.4.4 Select renders – walk-through

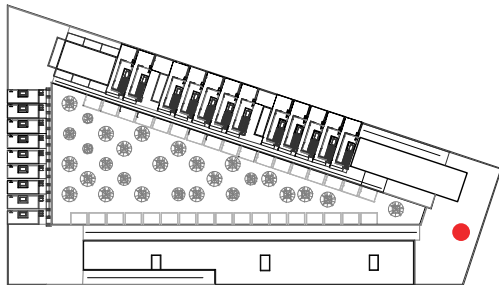


4.5.4.1 Southeastern street perspective. On grade is the Waterside Cafe and above two floors for office suites. The next two floors are two storey apartments. On the roof there is a 600 m² park.



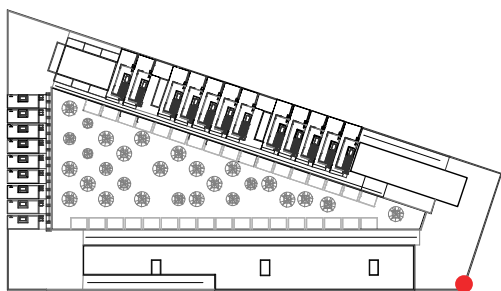


4.5.4.2 Waterside Cafe. View of the outdoor patio and the Ij in the background.



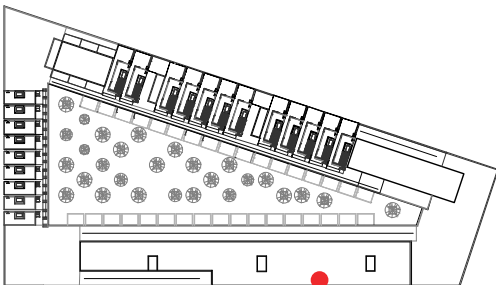


4.5.4.3 Beginning of the elevated street. The elevated street begins on the southeastern side of the building with a series of stairs combined with ramps (stramps).



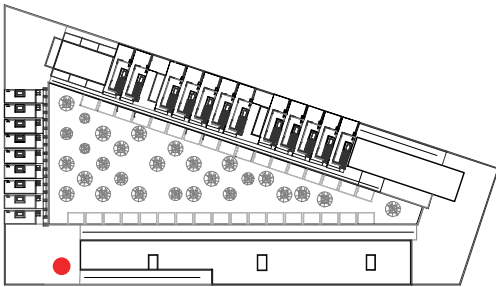


4.5.4.4 Ascending the elevated street. The slope of the ramp is shallow enough to allow for a leisurely way up to the parks and restaurant. The elevated street also serves as access to the row houses on the right.



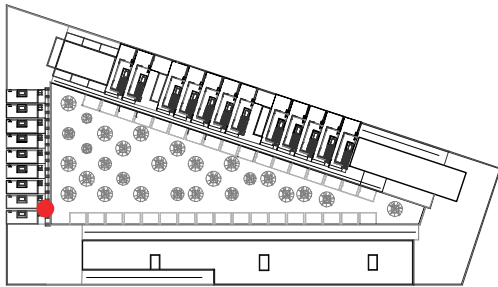


4.5.4.5 Playground on the 5th floor. This is the first terminus of the elevated street. From this point one could continue taking the street which will pass by row houses similar to figure 4.5.4.4 or take the stairs and come to figure 4.5.4.6.



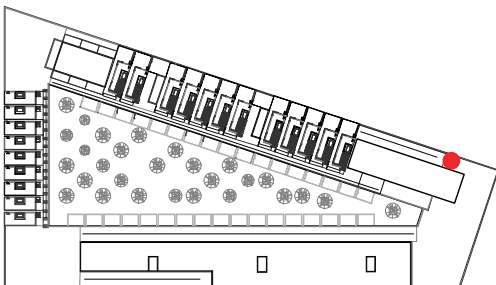


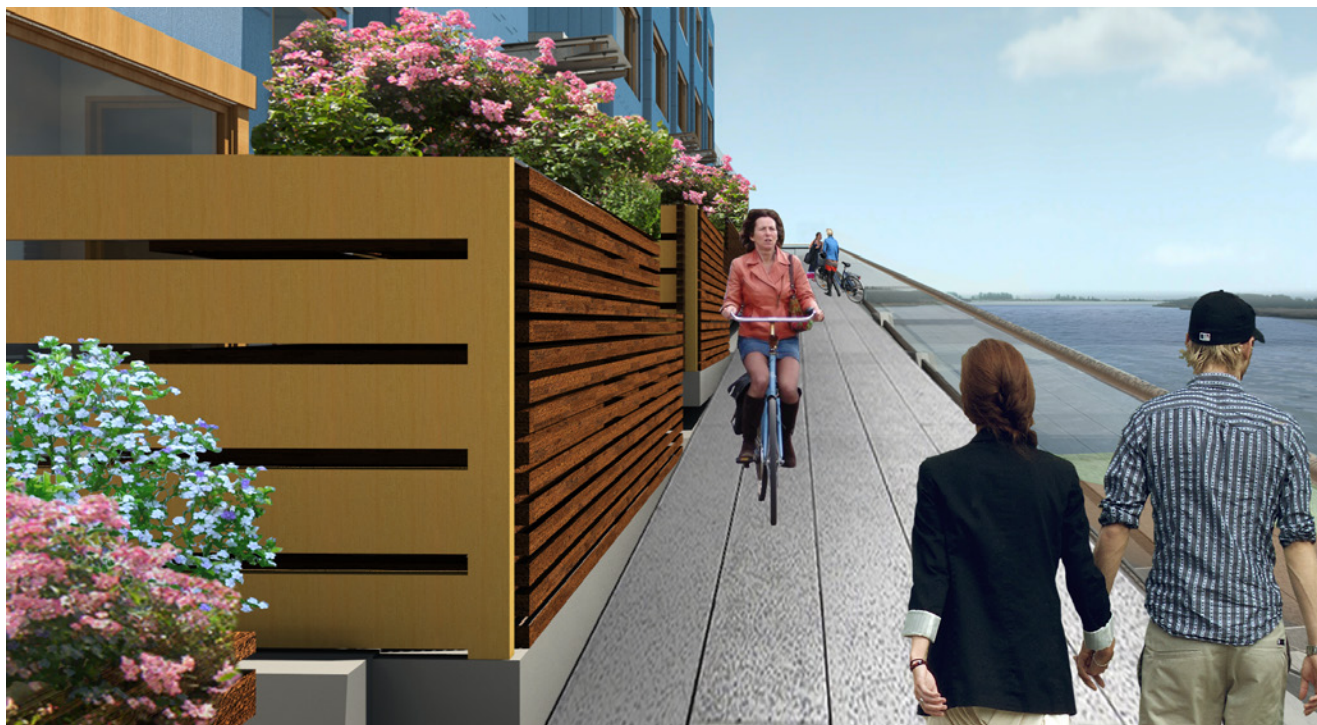
4.5.4.6 View of the courtyard. This point of the elevated street system is a series of ramps and landings which give access to houses on the west side. This also serves as a quicker way to the 8th floor and the north side of house seen in the distance of the image.



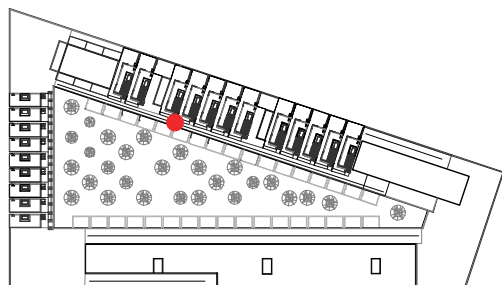


4.5.4.7 Elevated street on the north side. If the person decided not to go with the stairs option from figure 4.5.4.5 they would eventual get to the north side at this point. To the left are row houses with studios above them. The overhangs above are the backyards of the houses on the north side. This portion of the 'street' is also perfect for having a picturesque walk up to the houses or to the restaurant.



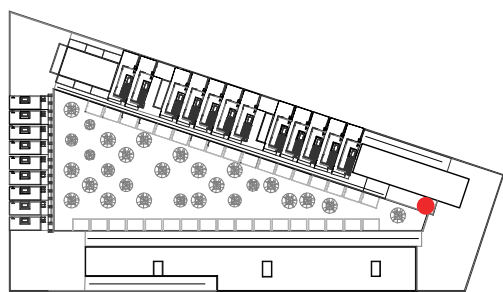


4.5.4.8 Elevated street on the north, courtyard side. To the left are the front yards of the house and to the right is the IJ with a view of the artificial island of Diemervijfhoek.





4.5.4.9 Lighthouse Bistro and Bar.



5.0 - Conclusion

The conditions that created the suburbs in the late 19th C. such as crime, poverty, hygiene and social status, no longer exist in the same intensity as when the suburbs were created. Contemporaneously, the aforementioned aspects are not only predicated to the city, but are found throughout the city and suburbs. Why not begin to merge the two ideal? Why not propose the emancipation of suburb and urb?

Everywhere in the world there is a balance of land as a resource for living, production and economic development. Further it is a common desire to call things our own and to have our own house. In the western world this usually means the single-family detached dwelling as the ideal to aspire to. This building experiment is not a perfect solution, it is an exploration into certain possibilities and response to a world of too many people trying to occupy too little land surface and all vying for the suburban ideal with a front and back garden. The experiment is but one solution for one location. The initial intent was to find universal values and ideas that could be applied to any context in any location. However, the experiment that was carried out in the Netherlands was influenced by cultural and local pressures. The experiment would most likely manifest differently in another country such as the United States or China.

The goal of the design experiment was to combine the typologies of the suburban and urban conditions. The idea was to start with the building blocks of the single-family dwelling, the house and row house and graft them in a three dimensional scheme of the mid-rise block. In essence, the goal was to take the single-family dwelling and combine it in an urban typology such as a pixel in an image, the single-family dwelling would be a part that would make up a whole. The intention was to provide many different typologies to allow different income groups and to draw diverse amount of people to increase the density, but not lose the house-in-a-garden feeling. This was done through the multiplication of landscape, by the expansion of the ground floor. This allowed for the increase in potential of possibilities in providing private access of a “street” condition and increasing amenities. Through expanding the floor we can provide the space and freedom of Frank Lloyd

Wright, the communalism of Ebenezer Howard and the concentration of Le Corbusier.

After completing the experiment there was a couple issues that were brought forth. The first issue has to do with the understanding of the archetype suburban dwelling as a dwelling on a plot of land. One of the greatest assets of suburbia is the property / land that the dwelling sits on. Being a home owner and property owner means that one can do what they wish on their property. It is a form of status and also of wealth, however, ownership and tenure types were not considered in this thesis. The point of home ownership and land ownership becomes less relevant. The use of the “property” thus becomes more important. Simulating the suburban ideas of leisure and recreation and that feeling of home rather than the condition of property ownership becomes more important. The plot of land or property in the experiment was viewed as open space for recreation and leisure. The goal of the experiment was similar to MVRDV’s goal at Torre Huerta to provide the house-in-a-garden feeling and not necessarily providing “plots” of land as in A.B. Walker’s cartoon and SITE Architects High-rise of homes.

The second issue that emerged was the fact that dwellings in the suburbs while sometime repetitive have the element of change over a period of time. The user can add and grow their house as the family grows and chose to change and upgrade the exterior finish of the dwelling or the colour of the door. Although customizability was not explored in the design it is fully compatible with the building for further explorations. The structure of the building is designed so the facade becomes an application fastened to the 3.25 m by 6 m grid in elevation. The straight forward design of the structure would allow for customizing facades in terms of doors, windows, trims and finishes.

The third issue was the end result of the hybrid and whether it was successful. The intention was to graft the suburban typologies on the urban mid-rise block along with the amenities of both conditions. The graft was

intended as the vehicle to achieve the hybrid. In this regards the hybrid is successful. As stated before the experiment is one solution. In this solution the suburban typologies were grafted in layers. However, the only truly identifiable suburban type in the experiment is on the 'roof' of the building. This arrangement becomes localized and almost village-like instead of being dispersed throughout the building in a larger intensity. In this regard, perhaps, the hybrid loses its strength. This project then becomes an apartment building with village-like units on the roof, a segregation and identification of types, which clearly the hybrid is not about.

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