

UTOPIA FORGOT

LEARNING FROM THE MEGASTRUCTURE

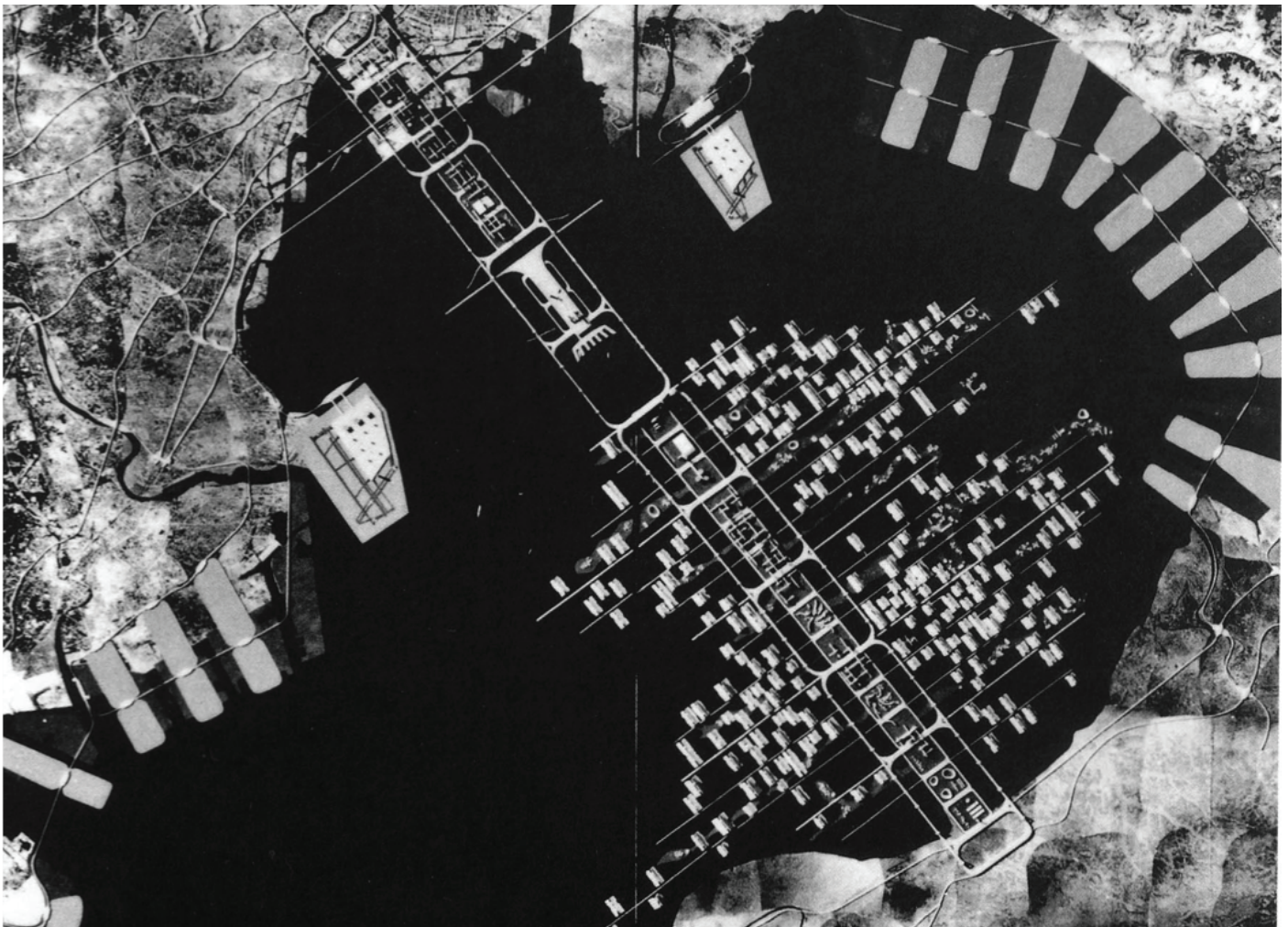
A BYERA HADLEY TRAVELLING SCHOLARSHIP PROJECT
BY
DANIEL SPENCE

This project proposes to reopen a conversation that was seemingly dismissed in the early 1970's: that of the megastructure as a radical form of urbanism catalyzed by mobility and transportation, and its implications for Sydney in light of a number of recent urban proposals.

In June 2013 the Sydney Morning Herald unveiled the Aspire Sydney consortium's plans for a massive urban re-configuration of Sydney¹. The seemingly outlandish \$100 bn proposal involved building the M4 East motorway in exchange for the rights to develop a large tract of land along the rail corridor from Central to Strathfield. The project, including the construction of up to 150 residential and commercial skyscrapers, would be realised by using prefabricated components manufactured in China and constructed largely by a Chinese labour workforce. It would involve prefabricated 'infrastructure tubes' and multi-storey building components, building a 'superpit' structure to support the new towers, and a close integration of transport systems with the functions of the city². Here then was a megastructure in our own backyard, a 'building at the scale of a city' with many of the defining characteristics (extendability, flexibility, prefabrication) of the utopic vision of the 60's. And yet this was a typology that had effectively been consigned to the scrapheap of history when Reyner Banham famously labelled the megastructure the "dinosaur of the Modern movement"³.

I found the idea that Banham may have been premature in his dismissal of the urban potential of the megastructure to be a fascinating one.

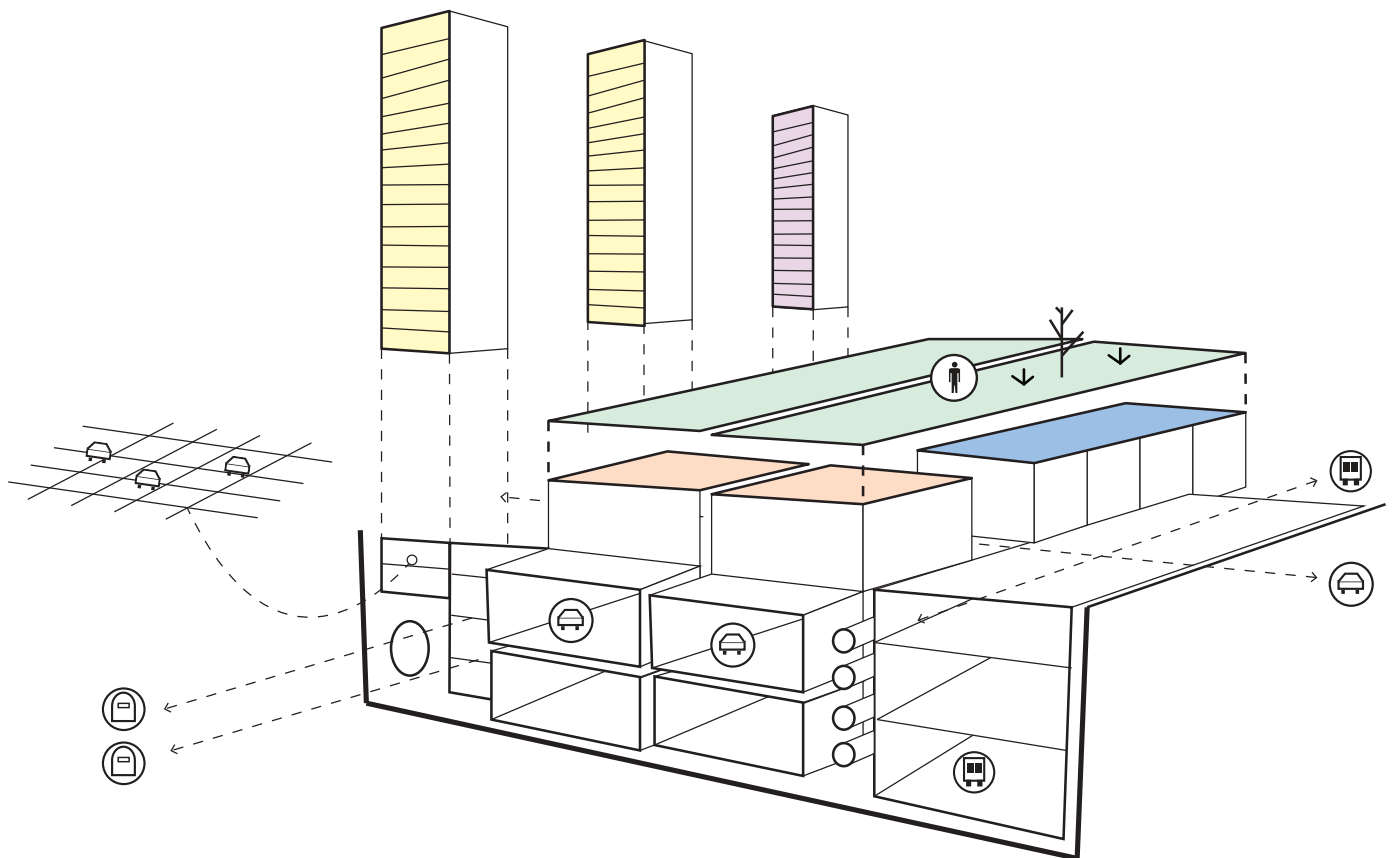
It seems to me that we live at a time when the issue that megastructure had pre-empted, that of radical population growth and urban expansion and the transport infrastructures needed to support it, is at the forefront of architectural debate in Sydney today. The city needs 80,000 new apartments but is faced with a chronic lack of space to build them, not to mention the various infrastructural requirements that would accompany them. Recent proposals like the Aspire consortium's are looking to use Sydney's brownfield sites to build high density multi-programmatic developments integrally linked with the transport networks around them. In fact such was the impact of the proposal that it was quickly followed by a call from Liberal Planning Minister Brad Hazzard for ideas to develop the Central – Newtown Rail corridor⁴. On paper megastructure seems a timely and relevant typology to investigate.



(above) Aerial view of Tokyo Bay proposal, 1960
Image Credit: Tange Associates

01

ASPIRE



- Residential
- Hotel
- Commercial
- Open Space
- Leisure & Shopping

It would seem that Sydney is fast coming to an infrastructural brink point. For years successive governments have tactfully avoided the issue of the growing gulf between the Sydney CBD and its increasingly far-flung suburbs. Train networks have proved time and again to be incapable of fulfilling the city's public transport needs, endemic of an outdated infrastructure well behind the majority of first world cities today. Sydney residents have in the absence of a viable and reliable public transport system taken to their cars in increasing numbers to the point where our motorways, particularly the M4 link with the south western suburbs often reaches a standstill in peakhour. Solutions past and present have focused on the assumedly untapped potential of the Parramatta Rd transit corridor and the \$13bn West Connex project. But with crossings every 800 metres, a limited width (22m) chock full of infrastructure, various vested commercial interests and a wealth of different council LEPS at play, proposals have been largely restricted to tunneling and burying whilst leaving the status quo on the surface untouched. We are in danger of losing the mobility required to keep pace with the rest of the world.

What is remarkable is not that the Aspire proposal has been put forward but that, in the 'Asian Century', it has taken 14 years for a proposal that combines the construction innovations and economic drivers of the Asian, and in particular Chinese market to reach our shores. Faced with the intimidating cost of construction labour and materials on the home front, and simultaneously skyrocketing residential property values it seemed inevitable that a solve-all proposal would be made by foreign investors to end Sydney's infrastructural quagmire. The question, it seems, was always going to be: are we willing to outsource Sydney? Not that that would present anything new: Asian, in particular Chinese investment in residential developments in Sydney has been propping up multi-residential developments in the inner city for the last 5 years or more.

A brief trawl through the internet would suggest that buildings at the scale of the megastructure, and the visionary pre-fabrication methods of the 1960s required to build them, have become an economic reality in China. Youtube provides some breathtaking footage of a 30 storey hotel built in 15 days using almost entirely prefabricated components⁵. A high speed train line using maglev technology bought from Japan is being built between Beijing and Shanghai at the rate of a kilometre a day. Pushed by a population explosion in many cities (Shenzhen discussed later has grown from 25,000 in 1980 to 12 million in 2014) and a wealth of investor capital, the construction market in China has become the fastest and possibly most innovative in the world today. Large conglomerates with varying degrees of government involvement have evolved to take advantage of the boom, and with the market at home becoming more competitive they have begun looking elsewhere for opportunities (for the most part highly controversial infrastructure/resource schemes in Africa and the developing world).

The rail corridor between Central and Strathfield it seems presents just such an opportunity, and so we come to the intimidating statistics and logistics of the Aspire proposal itself, presented to the NSW Government in an in-depth (at least in terms of economical and structural feasibility) report in 2011⁶. The proposal's standard-bearer has been the Federal Liberal MP Ross Cameron, who claims to have met with then transport director-general Les Wielinga in 2012 and received a positive and encouraging response. Taken from the report, the Aspire Sydney proposal would include:

- a) *Funding the M4 East by redevelopment of 120ha of under-utilised RailCorp and other Government held lands between Central, Erskineville and Newtown railway stations.*
- b) *The redevelopment of the rail corridor between Newtown and Strathfield to include the M4 East and increased rail capacity.*
- d) *The use of underground Infrastructure Tubes between Central and Strathfield to house rail, utility services and a platform on which the M4 East will extend for much of its length.*
- e) *Cut-and-cover tunnelled connection of the M4 East with the Cross City Tunnel system, Eastern Distributor, ANZAC Parade and surface roads in the CBD.*
- f) *The use of marine freight transport and an elevated carriageway from a new "Black Port" at Blackwattle Bay to move prefabricated building components directly to the construction site with no disruption to existing traffic flows.*
- g) *The use of an enclosed conveyer system included in the structure of the elevated carriageway to remove up to 10 million cubic metres of excavated materials to specialised ships docked at Black Port. CBD.*
- h) *Prefabrication of core construction elements in China to reduce costs, accelerate*

completion and mitigate construction inflation in Greater Sydney.

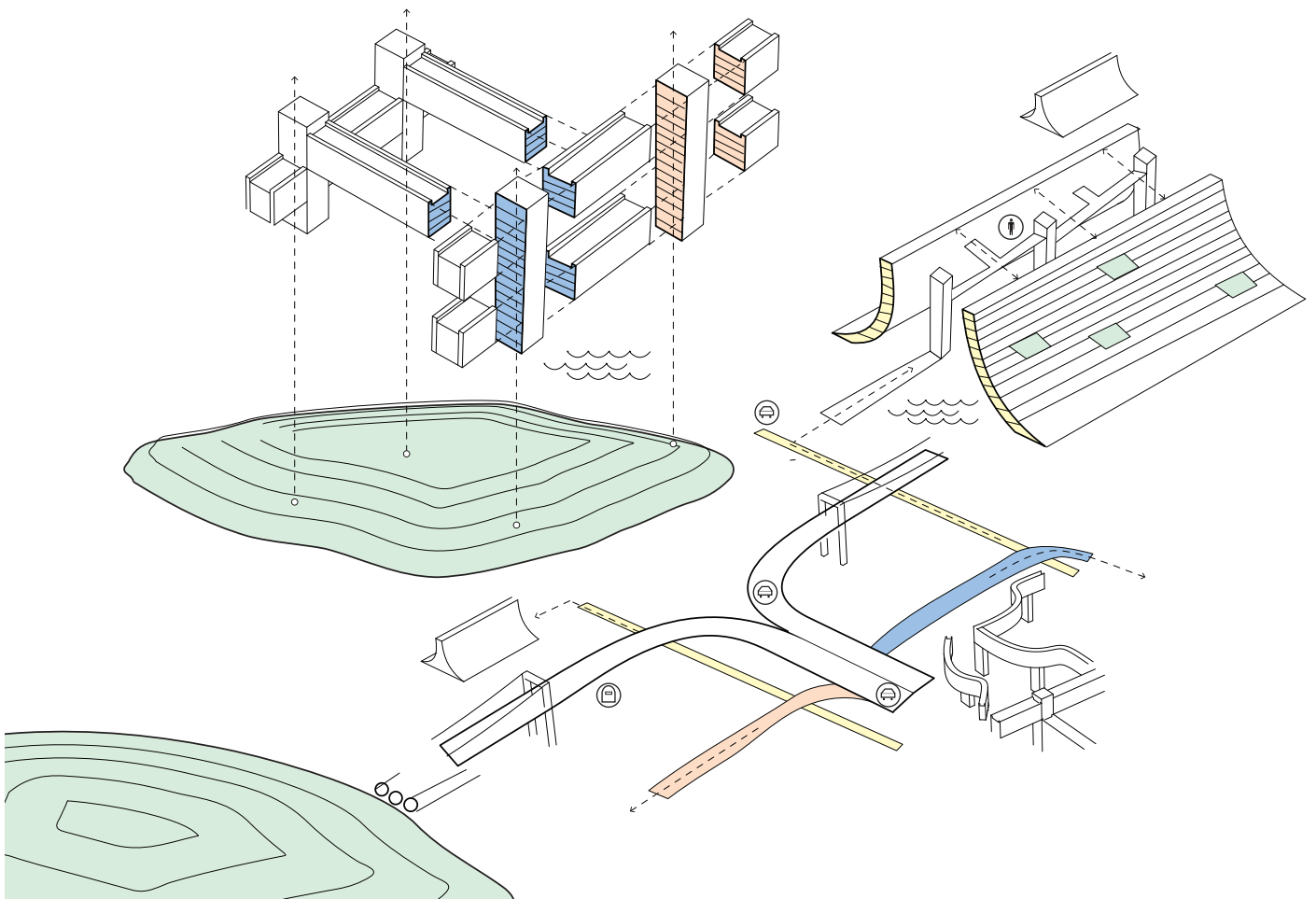
i) Partnership with Chinese manufacturers with proven capacity to provide the core construction elements.

At first glance it seems that many of the defining characteristics of the original 1960s utopian megastructures are alive and well in the Aspire scheme, and taken purely at face value the austere report could well be read as a kind of manifesto for realizing Sydney's latent potential. A datum plane of artificial ground would be constructed in the 45m rail corridor 'superpit' consisting of new local and high speed rail lines, carparking, motorways and light rail systems, mobilizing the citizens of the city and encouraging mass interaction and flows of communication in ways not yet seen. Into this towers of prefabricated components would be 'plugged in', their program dictated by swirling market forces, their prefab facades subject to global trends, material innovations and individual whims. Extension westward from Central would be driven by economic rather than social necessity, ebbing in time with rising and falling property prices and commercial/residential appeal. Overhead conveyor belts and prefabricated ports would become semi-permanent fixtures feeding the corridor for years to come. It is easy to get carried away with utopian visions of a seemingly very present future.

And yet: what about the human scale in the megastructure? Where and how successfully does the individual come into the equation? What happens to the fine grain, the alleys and terrace houses, the microstructure of a city? And can they coexist? This is surely the biggest 'but' for the megastructure that maintains its position as an almost taboo typology amongst first world architects of today. In the following pages this report will poke and probe the typology over the last 50 years for an answer to these questions.

02

ORIGINS



Whilst the megastructural principles present in the Aspire project might be alien to our sensibilities, they are certainly not new. Rising from the ruins of post war Japan, the Metabolist movement advocated the city as an organism, capable of adaptation and reinvention, of cycles of renewal as Japan changed socially and technologically into the future, which would free the country from the rigid traditional urban planning systems of the pre-war era.

From 1945 to 1960 the population of Tokyo surged from 3 million to a booming megalopolis of 10 million people (compared, say, with London whose population rose by only 400 000 in the same period)⁷. To the outside world Japan occupied a position at the forefront of the high-tech movement, of industrial pre-eminence only 15 years after it had been bombed and subjugated as the losing power in a world war. Industrial conglomerates like Mitsubishi and Toyota were using rigorous organizational hierarchies, modern mass production techniques and assembly lines to push themselves to the fore. It was seen as a nation where anything was possible, even if simultaneously there remained a measure of mistrust, of the exotic Orient where alien structures were perhaps more fitting than in the Western world.

This technological promise belied the urban reality at home. The pre-war feudal system of small individual parcels of land had largely remained intact, making any attempts at large-scale innovations nigh-on impossible. In 1958 the Tokyo Regional Plan was released which proposed a series of satellite cities and general decentralization as the solution to Tokyo's rapid population boom. However in 1958 the street system of Tokyo accounted for just 9% of the city surface and traffic was suffocating⁸. To make matters worse any outward expansion was limited by the city's geography, wedged between the mountains and the sea. There was no Cumberland plain to sprawl happily out into.

One of the keys to Metabolism, then, was the idea that the automobile and technological innovations in transportation would provide the basis for a much more dynamic and open society capable of a far greater level of social interaction than had been possible under the permanent and static existing urban planning structures. The idea of a masterplan, represented by the newly gazetted Regional Plan, was seen as static and easily made obsolete, whilst a masterform was an elastic and dynamic entity capable of infinite adaptation. Masata Otaka went as far as to ideologically split the city into 2 sections: space for speed (machine driven) and space for walking (the human zone)⁹. This open transportation network would break apart the class barriers of traditional Japanese society. Kisho Kurokawa called the new citizen 'homo movens', or 'man on the move', and Metabolist principles formed the basis for the World Design Conference of 1960.¹⁰

In order to bypass the congested bureaucratic nightmare of the groundplane an 'artificial ground' would need to be created, a fixed infrastructural core with a long-term life cycle that would provide a platform (physically and metaphorically) for a new transient program with a much shorter life cycle.

The ideals of the Metabolist Manifesto were perhaps best exhibited and advocated by Kenzo Tange in his 1960 Plan for Tokyo. Throughout much of 1959 Tange had taught at MIT in Boston and became inspired by the spatial freedom represented by the American highway network. His research led to the Boston Harbour proposal, a series of massive stepped A-frame terrassenhauser of artificial ground onto which new layers of housing, shops and leisure zones could be laid. Back in Tokyo, Tange argued that the movement that the automobile introduced into urban life had changed peoples' perception of space, and that this required a new spatial order for the city in the form of the megastructure, not simply a continuation of the radial zoning status quo. He proposed a linear structure that would extend out over Tokyo Bay, based on a 'fixed' open network of highways and subways around which a 'transient' program of commercial and housing zones (borrowed from the Boston Harbour scheme) would accrete as the needs of the population dictated. The plan was the result of rigorous research and analysis, with a team including Koji Kano (housing) Arata Isozaki (offices) and Kurokawa (transport). It was also apparently meticulously costed at \$50 billion over a period of 20 years, and presented to Japan and the world on national prime-time television by a deadpan and sharply dressed Tange. There was interestingly no mention of industry, with the new city expressed as a post-industrial entity designed for the tertiary sector and composed of flows of communication, information and road traffic. The traffic itself was organized like a giant assembly line, with a capacity for 200 000 cars an hour, flanked by a magnetic suspension railway system. Connections to existing infrastructure, streets and subway lines were also detailed in the proposal. Its reception was mixed, certainly taken seriously by the wider public and the profession but viewed skeptically by the engineering professions.¹¹

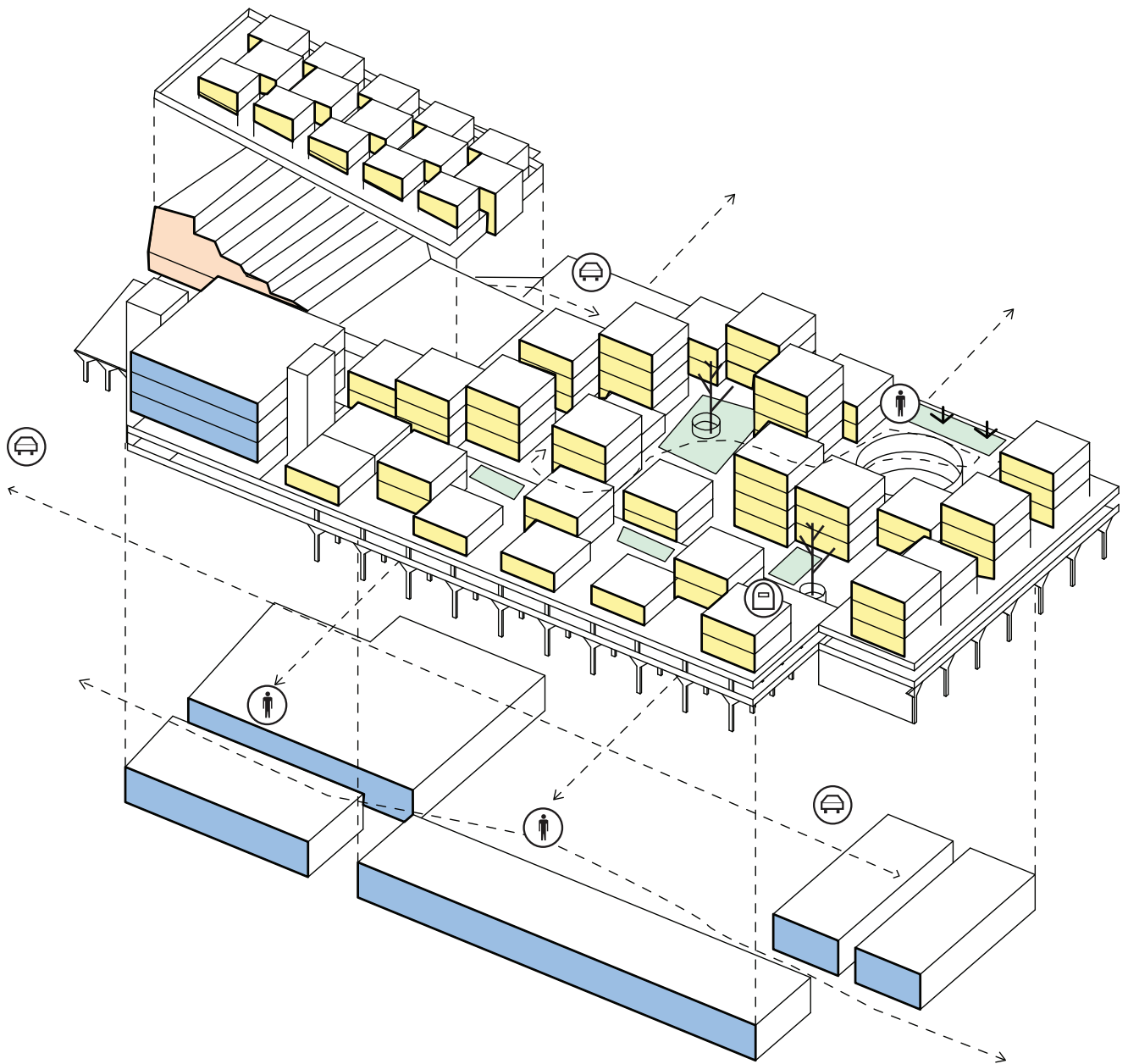
Sakaide Artificial Ground, Sakaide, Japan

Total Floor Area: 13 500 sqm

Architect: Masato Otaka

Client: Sakaide Public Housing Authority

Completed: 1986



Although none of the Tokyo Bay plan was ever realized, the driving principle of artificial ground can be seen at Masato Otaka's Sakaide Artificial Ground development completed in 1986 (having begun in 1968). In 1963 an Artificial Land Sub-Committee was set up and tasked with establishing an artificial datum over overcrowded and geotechnically unstable areas, an area of research that continued well into the 1980s as the Japanese government searched desperately for answers to overpopulation. Their primary focus was Otaka's scheme to build over a seismically unstable slum area in Sakaide using a fixed concrete slab and beam platform raised between 6 and 9m off the ground. Otaka reasoned "Artificial ground is a means to create an artificial nature, using reinforced concrete. If carefully applied, reinforced concrete can last for more than 200 years which allows us to use it just like natural ground. Artificial ground... is an alternative means of creating new land without reclaiming the sea."¹² The scheme would house itinerant salt workers in a series of prefabricated concrete housing structures on the slab, with the area underneath occupied by offices, shops, parking and a network of pedestrian alleys. Access to the slab by cars is provided via a ramp. Perhaps most importantly it was designed explicitly with extension in mind, with each of the 2 completed phases leaving the necessary haunches and reinforcing connections visible at one end of the slab ready for the next phase.

My first reaction to the development on site was that, for a structure so seemingly alien to its surrounding 2 storey masonry workers housing, it is remarkably well camouflaged. And that is in most part testament to the success with which it seems to have been 'kitted out' by its inhabitants with all the same accoutrements as its neighbours. Otaka provided a series of prefab planter beds both on the slab and plugged onto the concrete 2-3 storey housing to allow the residents to customize their houses to some extent. The presence of cars and paving on the slab means that it is easy to forget that you are no longer at ground level. At ground level the concrete structure has been for the most part, and as designed, infilled with a series of small eateries, tailors and laundromats, with the darker interior sensibly reserved for parking. Pedestrian paths through the ground level are generally dark and dingy but are primarily used as service alleys for the shops and exits for the parking. Apart from a road on one side the structure did not appear to have any detrimental impact on the density or quality of the housing around it. In short it seems to have been seamlessly integrated into the urban fabric around it.

It was an interesting exercise to extrapolate from Otaka's vision here to the built reality of Tange's Tokyo Bay scheme, with similar slab platforms stacked and stepped one atop the other to form an A frame with parkland, shops and parking in the centre. As to the transiency of the program here, the reality of the prefab concrete components that make up the buildings is a static one, but successfully static. The ground plane has for the most part simply been moved a couple of storeys up. The promise of extension does, however, still exist and may well prove a tempting move for planners in the future.



(above) Sakaide from south east, c. 1968
Image Credit: Osamu Murai¹³





Figureground Study 1:5000

03

TABULA RASA

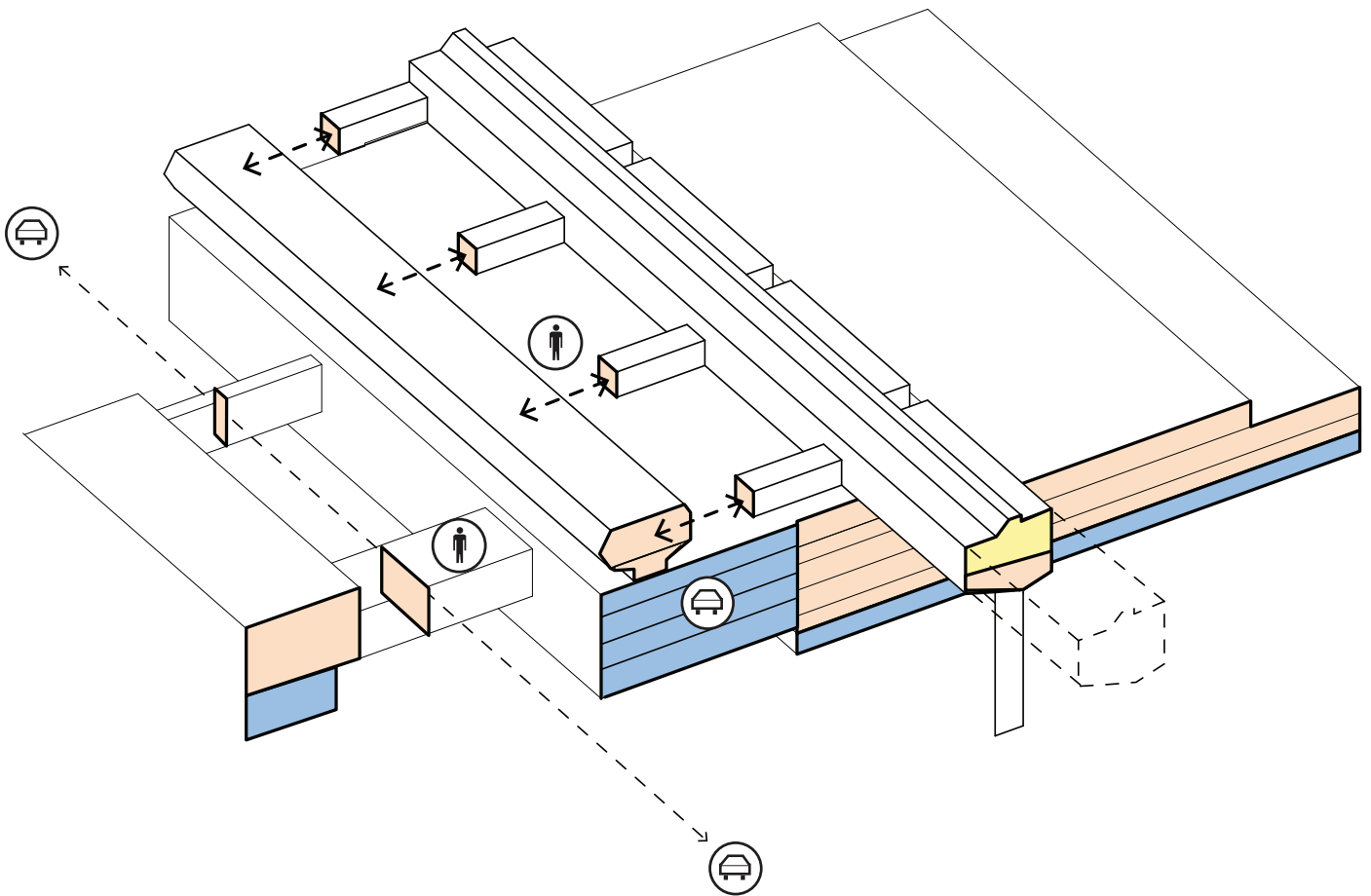
Cumbernauld Town Centre, Geoffrey Copcutt, Cumbernauld, UK

Total Floor Area: 200 000 sqm

Architect: Geoffrey Copcutt

Client: British New Towns

Completed: 1967



Cumbernauld is unique in this study in that it is the only example not to have simply been an addition to an urban context. Cumbernauld's original context, an hour outside Glasgow in the Scottish countryside, was primarily rural. This was megastructure as urban starter pack, a catalyst for the creation of a British New Town from scratch on a ridge surrounded by farmland, which relied heavily and was in part shaped by the highway which was its lifeline to Edinburgh and Glasgow. There were Metabolist principles at play here with a very different slant; the idea that a flexible and extendable megastructure with all the conceivable necessities of urbanity (housing, education, healthcare, religion, administrative offices and, in the automobile age, fuel stations) could be planted at whim in agricultural land from where it would seed and grow into a town, providing nutrients to housing and commercial zones around it and growing/extending in proportion to the population.

At its completion Cumbernauld was widely acclaimed as a bold new approach to urban planning, one that would provide for the mobility the automobile created without jeopardising the ability to walk freely around the town. The pedestrian network and road network were completely segregated, allowing the town centre to be reached from any point in the town in 20 minutes without crossing a road. Alternately motorists were completely free to drive in and around the town centre without having to stop for pedestrians. This was the 'City of Tomorrow' in promotional films and magazine articles, a new way of stitching the functions of the city together¹⁴.

Programatically the building takes the form of a pyramid or hill, beginning with carparking and smaller standalone shops at its edges and rising to a shopping mall core topped with a strip of penthouse housing and administrative offices. Health centres, daycare, libraries and offices form the communal heart of the building, a 'one stop shop' for the community's everyday needs. This part of the program is distinguished from the rest by its expressive structural form made up of 2 vaguely hexagonal concrete and glass forms (for the time structurally and visually bold) linked by walkways, with the abrupt and brutal sectional end façade ready for future extensions that were never to be. Motorways, loading docks, waste storage and carparking now occupy the ground plane, bridged by various glazed pedestrian walkways. It is interesting to compare that whereas Tokyo Bay and the realized Sakaide project looked to create artificial ground to liberate the ground plane for the free movement of pedestrians and the archaic flows of the old city, here in Cumbernauld the ground plane has been liberated (one would say sacrificed nowadays) to the movement of the car. This represented a departure from megastructure in the popular imagination, which in the late 60's took its cues from the elevated superhighways of Corbs Fort L'Empereur project in Algiers or Tange's recent Tokyo Bay project. It was hailed as a grounded and practical approach to megastructure, without the science fiction elements of other paper projects of the time.

The first step on site then was to test the two segregated flows of movement: by car and by foot. Approaching by car the town centre appears as an island surrounded by motorways, and having circled it a few times it certainly seemed custom built for the car, allowing the visitor to roam at will on the ground plane, parking or refueling without really registering the presence of the pedestrian realm above. The carparks become a kind of common ground where the networks intersect and the pedestrian flows begin. We began by walking from the carpark into the nearby residential neighbourhood, which did neatly bypass the motorways via a series of overpasses. Walking back towards the town centre there was a distinct hierarchy to the program: carpark, shopping centre (more modern and airy at first, then into the original condensed mallways). A series of stairways give the sense of climbing a stepped pyramid. The communal zone however is accessed primarily via elevator, leaving it high and dry above the consumerist zone below. This extreme disconnect between groundplane and communal core felt odd in an age where a strong connection is widely encouraged. Once inside the community spaces there is a generous scale to the circulation spaces, presumably to accommodate the lively interactions and high volume of foot traffic it had been designed for. Skylights and indoor planting add to the feeling of an interior streetscape, as if the local high street has been transplanted. However it is this foot traffic that seems desperately lacking in a series of innovative spaces that would otherwise be quite successful, and the decision to restrict access to either an elevator or emergency-exit style ramped walkways seems the primary culprit.

Another inescapable issue with Cumbernauld is that of the aesthetics of the megastructure. The town has been voted Britain's ugliest numerous times¹⁵ and this is in large part due to the designers' predilection for the raw off form concrete popular at the time, a choice that has generally not weathered well in the wet Cumbernauld climate, now water-stained and discoloured. The decision to glaze the walkways over the motorway, to reveal the 'miracle of the automobile' racing past below, has similarly proved costly. But the greatest impact was the palpable sense of incompleteness to the whole thing, which is perhaps to be expected given that the centre was never extended as originally intended. That feeling of an experiment tossed aside before it had been fully investigated weighs down the whole complex.

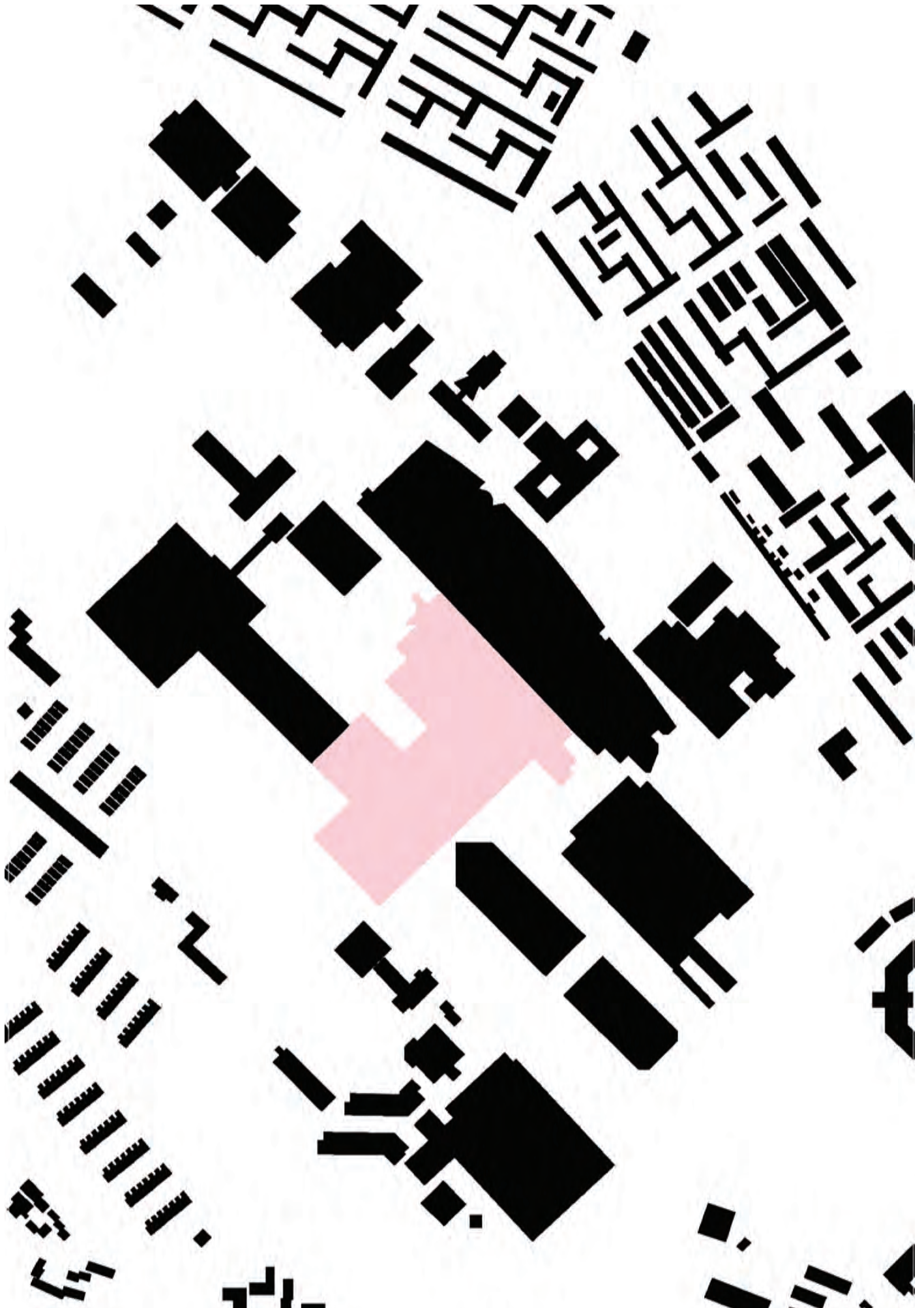
Cumbernauld is perhaps most relevant as a megastructural precedent for the Aspire proposal in its experimentation with separating out the two strands of movement that had by 1967 become crucial to urban planning: the pedestrian

and the automobile. In principle this reflects modern trends evident in the basic premise of Aspire, that pedestrian flow along and through the linear megastructure should be unimpeded if possible, with hints at a continuous greenbelt along the lines of New York's High Line. The solution in an age where the car is seen more as a necessary evil than a celebrated symbol of mobility is to bury the M4 East underground. More sustainable forms of public transport, notably completely absent from Cumbernauld, are foregrounded instead. But in Cumbernauld we see the potential of the indoor street, that the urban concept of the High Street with all its condensed functions might well be recreated above ground by megastructure if linked to existing pedestrian flows more successfully. The issue in a 'New Town' was that there weren't any. All in all it is a case of intentions proving wildly different from reality.









Figureground Study 1:5000

04

AUTOBAHN

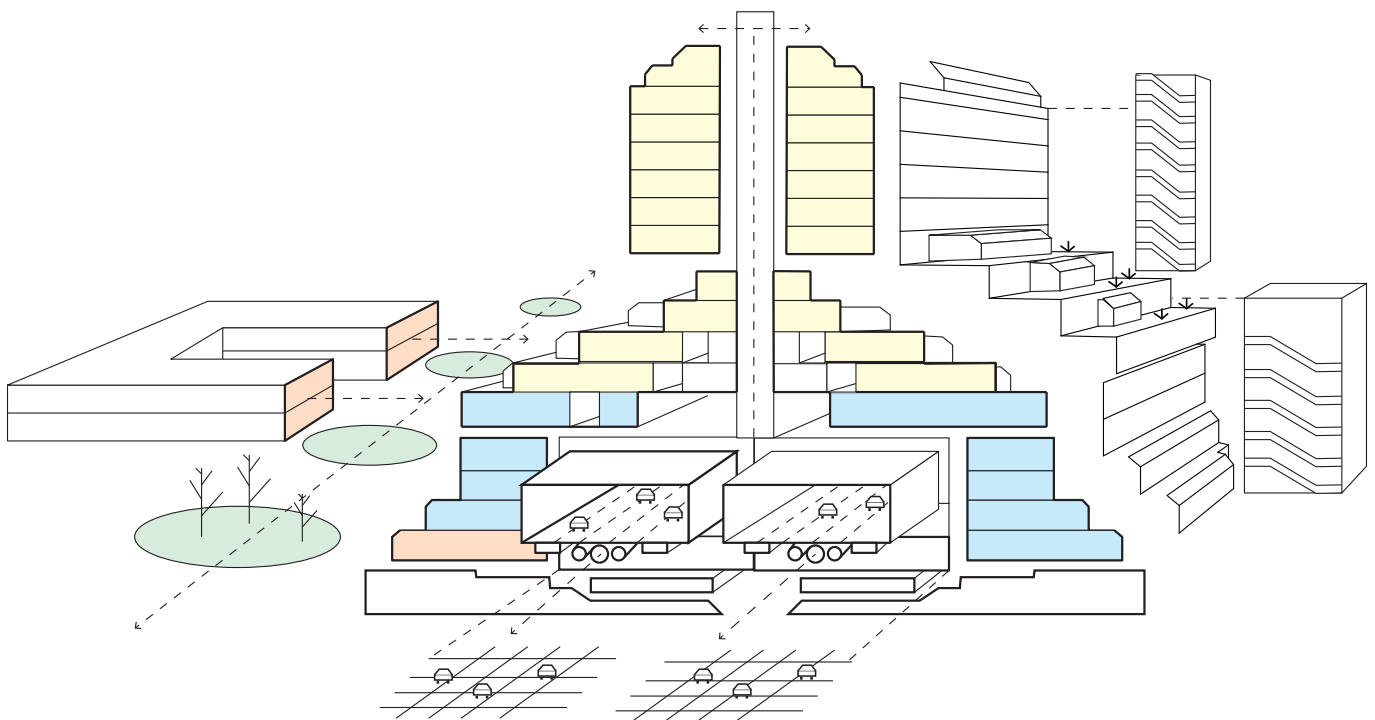
Autobahnüberbauung Schlangenbader Strasse, George Heinrichs, Berlin

Total Floor Area: 156 000 sqm

Architect: George Heinrichs

Client: DeGeWo

Completed: 1982



The Autobahnüberbauung, like the Aspire proposal in Sydney, arose first and foremost from a spirit of opportunism and was quickly subjected to the same political toing and froing that would almost certainly have been the fate of the Aspire proposal had it not been ‘nipped in the bud’. The physical and psychological presence of the Berlin wall had created a housing shortage in West Berlin, and government offices were looking to encourage real estate speculation in subsidized housing schemes not too far from the city through the Berlin Subsidy Law. The city offered the developer who had purchased the plot of land along Schlangenhäuser Strasse the prospect of a building permit to build over the public freeway property if they would cover the 40 million marks to build a tunnel for the Autobahn¹⁶. They recognized that the air space along the autobahn, with direct access to Berlin and Germany’s main mobilizing artery, was wasted space that could surely be taken advantage of with new advances in concrete structural technologies. It was at first glance a win-win situation for both sides, but like many such schemes of this scale they had not counted on the strength of the community backlash from the residents of surrounding middle class Wilmerdorf, who felt threatened not just by the alien scale of the building but by the implications of 4000 low income housing tenants moving in next door. The issue quickly became hyper-politicized, attacked in the press and hounded by resident action groups resulting in lengthy delays which brought the finishing date well into the 1980s.

The building was nicknamed ‘The Serpent’ on completion, and its statistics are testament to the immensity of scale and ambition behind the project. At a cost of 400 million marks, the building stands at 600m long and 46m tall at its peak (14 floors), consists of 1215 residential units, 118 hobby rooms, 4 guest units, 12 common areas, 28 warehouses and commercial offices, 2 parking decks with a total of 760 spaces and was eventually a (very popular) home to 5000 people¹⁷. In section Heinrich drew inspiration and, when attacked, justification from both Tange’s Boston Harbour terrassenhauser and Paul Rudolph’s much-publicized Manhattan Expressway project. The structural reality of the finished project was a less innovative stacking of mass concrete slabs tapering upwards, with the autobahn acoustically sealed in its own independent structure with a 1m buffer between it and the primary structure. Underground parking levels are given direct access to the autobahn, tapping into Metabolist ideals of homo movens exploiting an open veinlike network of communication and highspeed transportation and overcoming the Cold War ideological restrictions that the Wall represented. Commercial and retail tenancies occupied the deep plans of the lower levels whilst the terracing of the mid levels was used to drive light deeper into the plan and provide a series of landscaped outdoor spaces. It is a section that, due to the length of autobahn airspace available, could be easily extended.

In principle then this was Aspire in a nutshell: a developer looking to exploit wasted and valuable airspace above a transport corridor, building a series of concrete tubes containing the transport infrastructure, with layers of carparking allowing housing above to tap directly into that network without visually or acoustically registering its presence. Like Wilmerdorf, suburbs affected by the Aspire proposal like Newtown and Ashfield are generally leafy and of low density, and are likely to come out in protest against a project of such intimidating scale. The question of urban impact then becomes all the more relevant.

High occupancy figures attesting to the popularity of The Serpent were backed up by my own experience on site. The presence of the autobahn shooting through the centre of the development is neither seen nor heard from street level. Because the bulk of the building itself is placed over the motorway, opportunity is created for landscaped open space at street level without overly disturbing the pattern of the surrounding streetscape, as can best be seen in the figureground study. A later 4-storey perimeter block frames this open space and also mediates the scale of the building proper, visually camouflaging it from the street. Commercial spaces at ground level are seemingly prospering with a critical mass of tenants in the building to support them. DeGeWo, the original developers, still have their offices in the building (we were lucky enough to be given an impromptu tour). Whilst the sizes of the units themselves and their positions in the building are fixed, Heinrichs created a high degree of flexibility by providing 120 different floorplans, each with movable partitions to offer adaptation and self-expression. One penthouse apartment under renovation that we were able to look around in was a light-filled and innovative 3 storey collection of voids and skylights. This variation is visible from the outside, where tenants have customized their terraces with planting, garden furniture and a variety of colourful screens that successfully break down the scale of the building from the inner courtyard. Circulation cores have a publicly accessible ground floor entrance giving access to the opposite side, which lends a crucial porosity to the building. Whilst the building was initially greeted with skepticism when it was eventually finished in 1982, “caught up in the pendulum-like vicissitudes of a transient zeitgeist”¹⁸, Berliners have evidently warmed to The Serpent as a daring and generally well designed cultural item despite (or perhaps because of) its vast scale.









Figureground Study 1:5000

05

METABOLISM 2.0

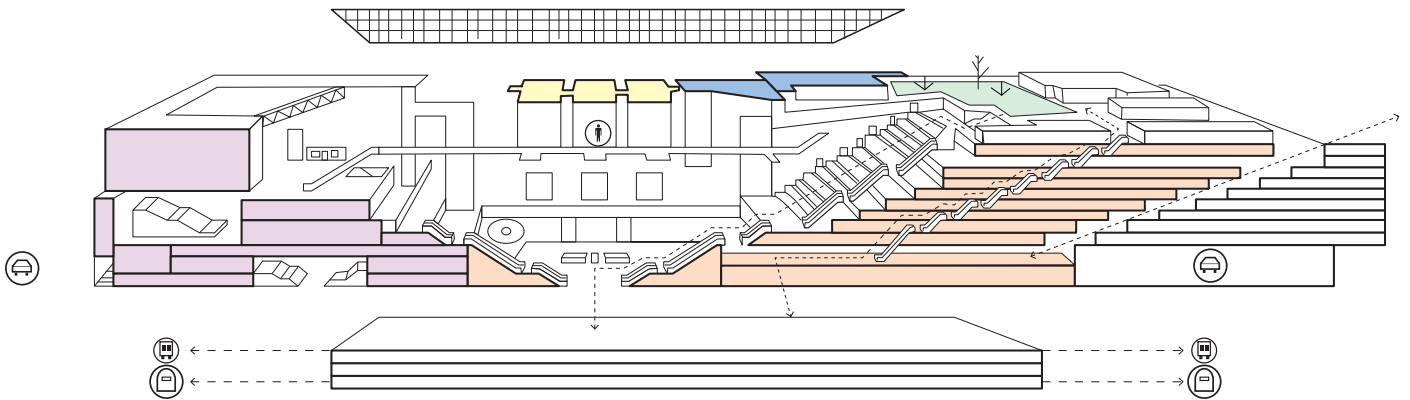
Kyoto Station Complex, Hirose Hara, Kyoto, Japan

Total Floor Area: 238 000 sqm

Architect: Hirose Hara

Client: Japan Rail

Completed: 1997

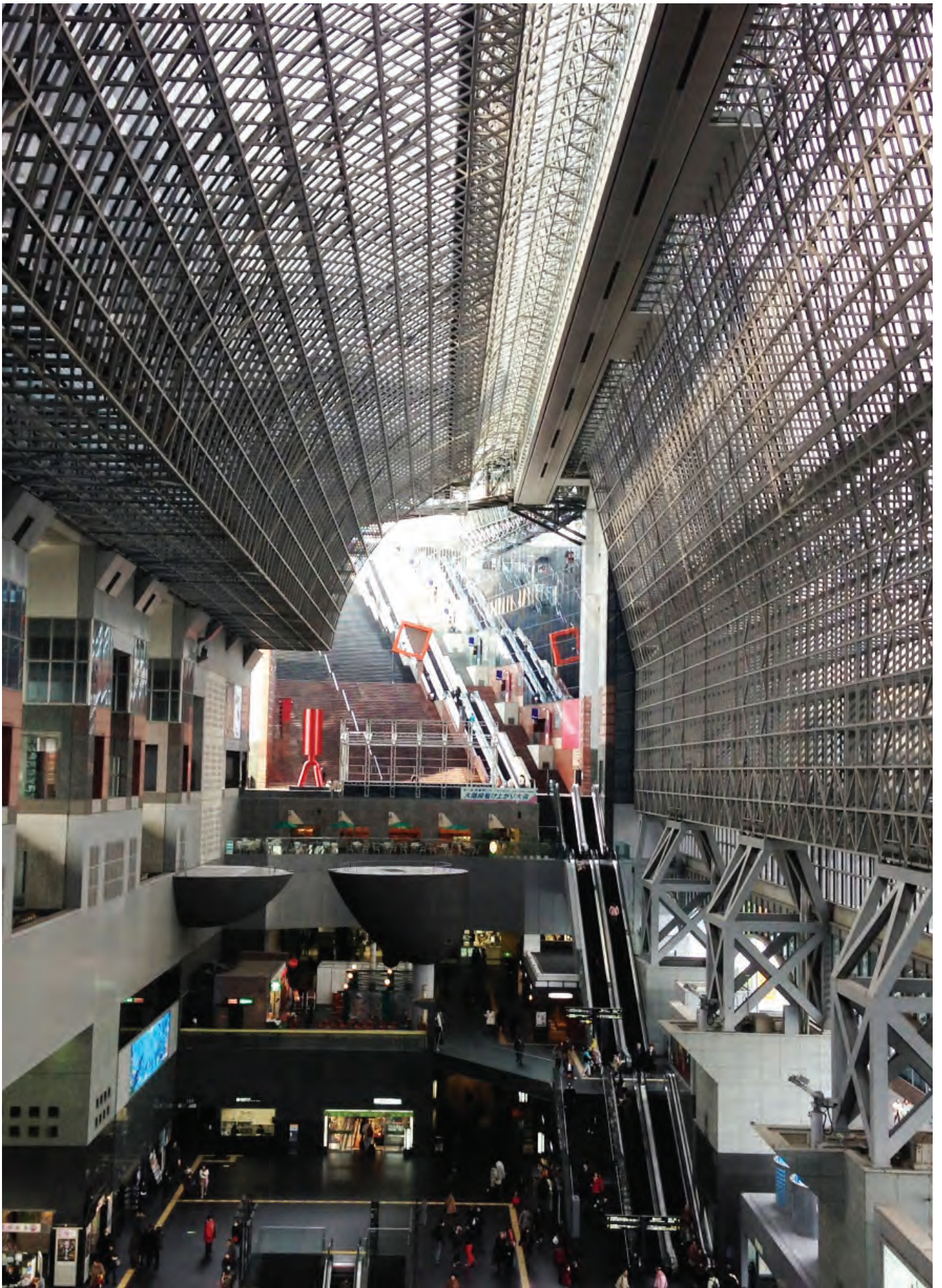


Hara himself has described Kyoto Station somewhat cryptically as a “frame” for viewing the city: “Frame is a concept that originated during the Renaissance as a sort of cosmic figure. It was later transformed into the Mercator projection, which eventually permitted construction of railroads and other infrastructural networks”¹⁹. Some of his meaning may well have been lost in translation but what is clear is that the building was always an expression of the transport infrastructures which gave birth to it and which fuel and form it; an arena for Kurokawa’s homo movens 20 years after its inception. The development was initially catalyzed as a reaction to the increased marginalization of culture-rich Kyoto in the face of neighbouring Osaka and Kobe’s industrial presence. It would serve two purposes: celebrate the high tech wonders of the Tokkaido Shinkansen line, at that time the fastest in the world, and also provide a tourist and consumerist gateway to Kyoto. It would also benefit from the newly opened Kansai International Airport a brief trainride away (as a symbol of the premacy of homo movens you can even check in airport baggage at the station). The station would be the new hub for the Kyoto-Osaka-Kobe region with a population in excess of 16.7 million, and was given a program and consequent scale to suit.

The overall form of the station is a “geographical concourse”, an arena to encourage and celebrate the thousands of human interactions that would occur there every day and an antidote to the stiff and formalized traditions of Tokyo. Upon rising to the ground floor concourse from the stations below ground the visitor is greeted by a massive 16-storey void crowned by a steel space frame apparently borrowed from Tange’s Expo 70 Big Roof. A series of stepped platforms linked by walkways and escalators then encourage movement upward towards the roof, or the many consumerist distractions along the way. This act of climbing over the Isekan department store is seemingly intended to emphasize the sheer scale of consumerist Japan, and it does so to good effect. A series of functions are juxtaposed on this infrastructural podium: shopping malls, a hotel and conference centre, apartments, commercial tenancies and a landscaped rooftop space. In this way the megastructure acts like a collage of the city as a whole, featuring discontinuities of scale, vertical dimensions, fluidities of space and interlocking networks. Whilst the program was designed into the structure from the outset, its place in the building fixed, the sheer scale of the station and the accessibility of its constituent parts gives a sense of flexibility and adaptability. A look at the structure of the building reveals a regular equally spaced grid of massive concrete columns which belie the complexity of the building above. Combined with the uniformity of the building’s height and the ample underutilized space to the west along the tracks there is the potential for extendability.

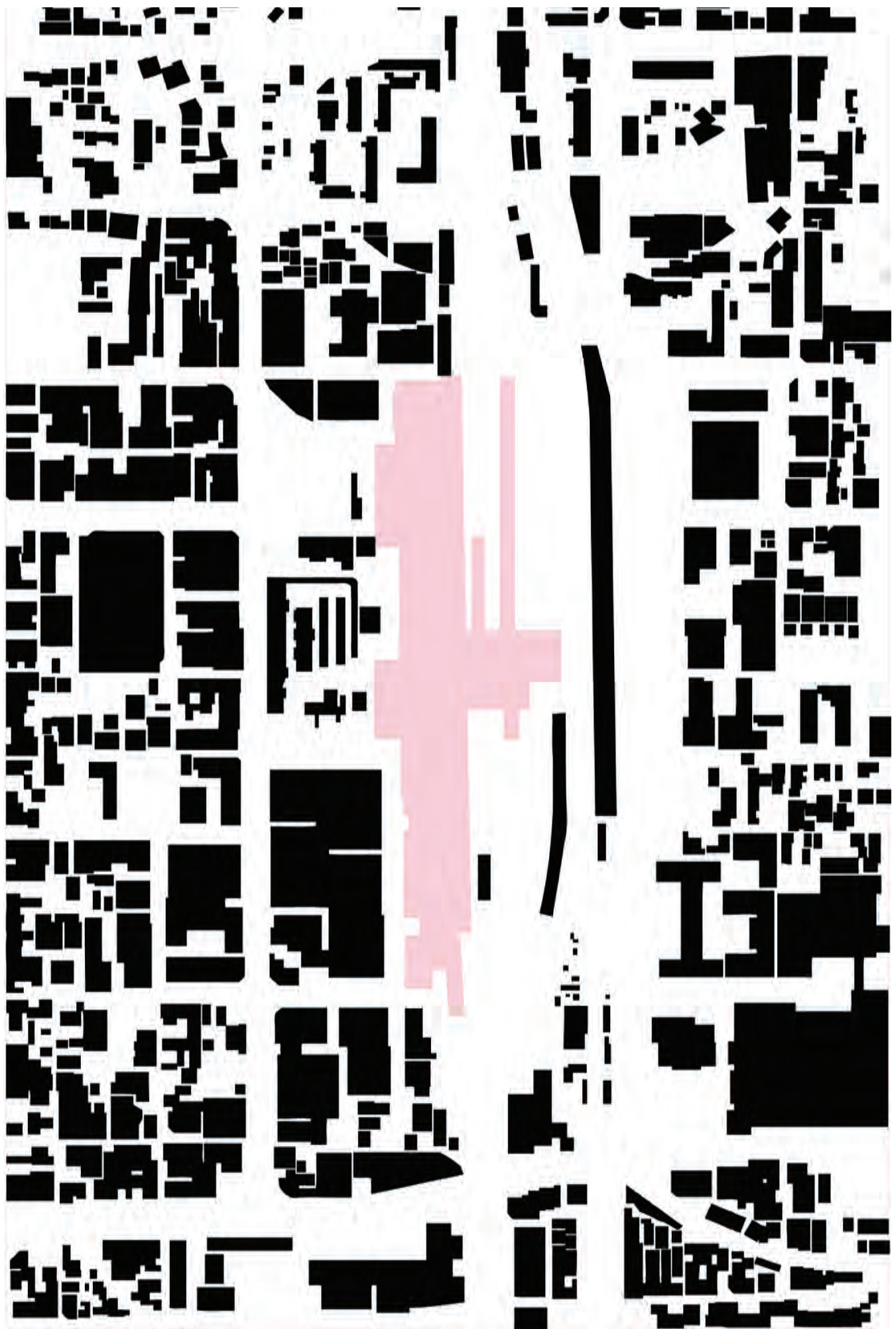
I was particularly interested by the chaotic circulation diagrams provided for the transport infrastructure below, which give a good indication as to the complexity of this organism, this habitat for homo movens, and its connections to the program above. The fact that most Japanese visitors could interpret these (to me) illegible wayfinding maps²⁰ suggested that here was a populace in sync with the technological innovations and flows of interaction and communication that the Metabolists had advocated. The ability to seamlessly and quickly move to another part of the city, a neighbouring city, or the outside world via the airport seemed to have become an everyday reality.

On site it is the issue of scale that is the most controversial aspect of Hara’s project, just as it would be with the Aspire project. There is a clear tension between the fine-grain historical city of Kyoto and the modern economic reality of mass infrastructure and consumerism when exploring the area round the station. There is almost a recognition that this new high-tech mobile lifestyle is at odds with traditional Japanese cultural and planning principles, and this ‘alien’ nature is celebrated with the rooftop terrace that encourages visitors to look down from the steel and glass megalith to the single storey timber districts beyond. Apart from this gesture I felt the building was for the most part inward looking with no real attempts at integrations with the built fabric around it. Internally the small scale, ad hoc nature of traditional Kyoto alleyways is perhaps reflected in the circulation patterns around, into and over the building, which lends it an intimacy and helps break down the scale into smaller digestible parcels visually distinguished from one another. The lack of porosity on the ground level turns the building into a barrier between Kyoto proper and a no mans land south of the tracks, dominated by paid parking lots, hotels and a series of large roads. I got the impression that the concentration of program within the station had somehow leached that variety from the areas around it. It dominates the area both physically with its bulky monumental form but also psychologically. Of course this has much to do with the fact that the rail lines are above ground and in themselves form a barrier, something which Aspire looked to solve by burying the lines in prefab infrastructure tubes. The issue of porosity, of allowing free flow of pedestrians between one side and another is clearly crucial given Aspire’s aspirations (excuse the pun) to stitch the divided areas of, say, Redfern and Chippendale together.









Figureground Study 1:5000

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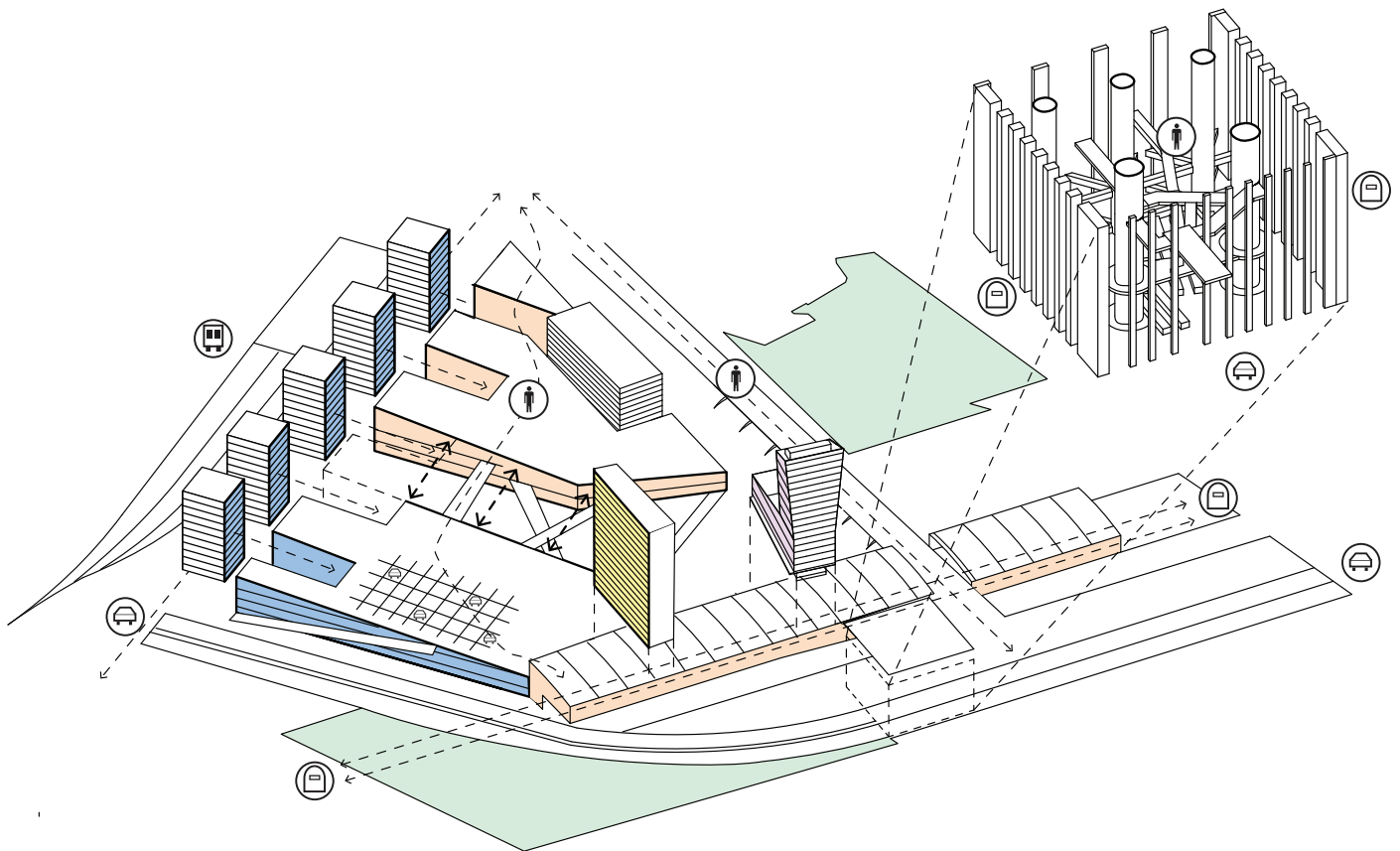
HOMO MOVENS EUROPIS

Euralille complex, OMA and others, Lille

Total Floor Area: 800 000 sqm

Architect: Rem Koolhaas with OMA, Jean Nouvel, Christian de Portzamparc, Jean Marie Duthilleul, Kazuo Shinohara and Marie and Francois Delhay

Client: SNCF



Whilst not strictly one building it is the ambition of Euralille to act as one integrated organism that makes it one of the most interesting examples of megastructure to explore in relation to Aspire. This ambition has been largely steered by its masterplanner, Rem Koolhaas, himself a fervent admirer of Tange and the Metabolists and co-author of the book *Project Japan: Metabolism Talks*. Koolhaas and his then fledgling practice OMA were the winners of a competition to masterplan an area owned by the SNCF with the purpose of developing a primarily commercial district that would take advantage of the new TGV line through Lille. The TGV, in combination with the Channel Tunnel, would reduce the travel time from London to Paris to 120 minutes with a stopover in Lille, as well as making Brussels, the administrative heart of the EU, a mere 18 minute jaunt. The mayor of Lille, Pierre Mauray, used his influence as the Prime Minister at the time to seize upon this opportunity to transform Lille into a high-speed hub for Europe's business and leisure travellers. The competition brief was broad and open-ended and the selection process involved a days discussion with each of the selected architects. Koolhaas immediately fixed upon the idea of realizing Kurokawa's *homo movens* in Europe, and it was this idea to celebrate the knot of transport infrastructure rather than conceal it that gave OMA the win.²¹

Crucial to the proposal was the idea that Euralille was the product of both local and now global forces, that it should be both an autonomous entity and contribute to Lille simultaneously. Koolhaas states "It has not been spawned by Lille, it has landed there"²² and "What is important about this place is not where it is but where it leads and how quickly".²³ The development would almost inhabit its own temporal framework set apart from the historical heart of Lille and defined by its proximity to other places ie London 70 minutes, Paris 50 minutes, Brussels 18 minutes. The act of arrival and departure, and the myriad interactions it would create, would be brought into the everyday consciousness of Lille, and the project would facilitate the meeting point of this mobile, transient population with the static residents of the city proper. OMA's masterplan involved an inclined triangular plane holding a shopping and leisure complex that would drop to reveal the station at one side and rise to a commercial zone at the edge of the existing local rail station. It also solves, and is in turn inspired by the "Gordian knot of infrastructure"²⁴ that existed on the site, a web of train and TGV lines, bus lanes and motorways. The solution was to bury the motorway and use carparking to bind the now parallel strands of TGV and motorway, thereby creating a podium for the rest of the program and for the first time since the motorway was built open up the city centre to the periphery. Structurally speaking the proposal employs a standard concrete slab solution which leaves little room for flexibility or extendability.

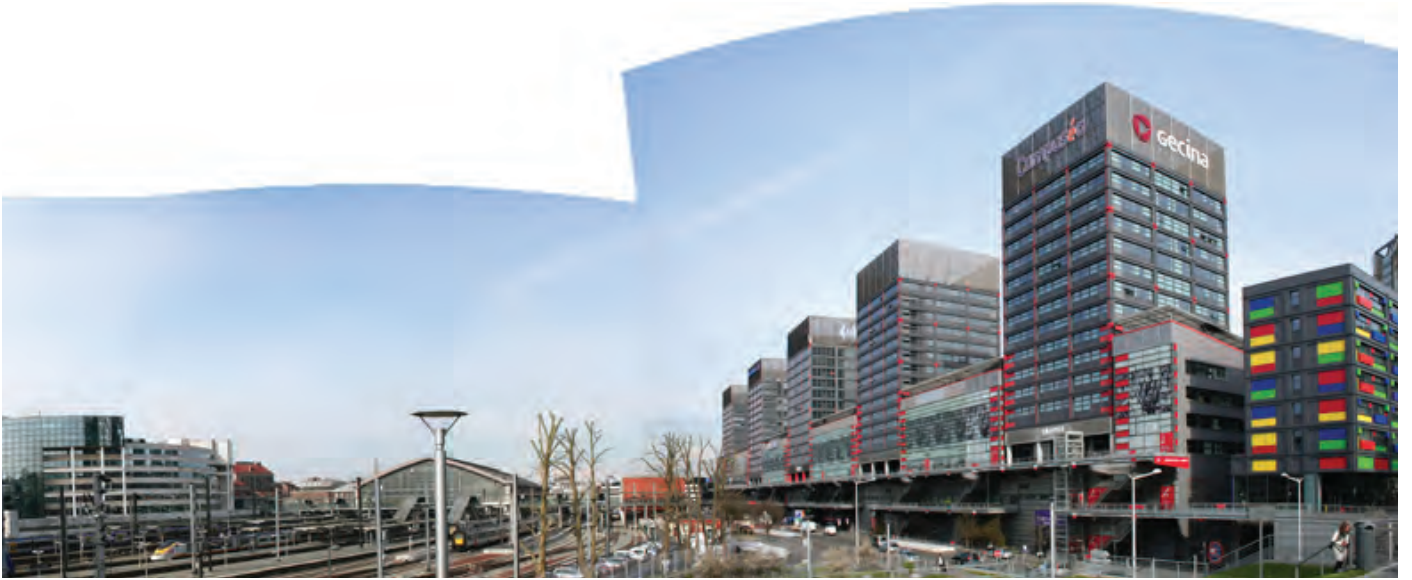
The OMA masterplan was a framework, both physical and symbolic which individual architects (including Nouvel et al above) could customize and shape to their will, or perhaps more likely the will of their clients and their economic imperatives. In this sense the process is true to the megastructural ideals of a static structure into which program could be plugged at will. And whereas up until now Euralille and Aspire have run on parallel courses, this is the point at which they diverge. For Aspire is economically reliant on a trade off: the consortium will build the infrastructure in return for the rights to develop the land above it. That is, in its purest form, one developer may well have the right to control all of the 'plugged-in' elements, bringing the very controversial Lend Lease owned Barangaroo instantly to the minds of most Sydney architects. Whereas here the state-owned SNCF owns the site and is free to sell airspace to a variety of clients with a variety of architects and programs, in the Aspire scheme, whilst the architects may change, the client remains fixed. Whilst for a cash-strapped NSW Government this may be the best way of delivering the scheme, it jeopardises any ideas of transiency or spontaneity of program.

The one part of Euralille that Koolhaas did design and build was what he called the 'Piranesian Space'²⁵. This was to be defined as a deliberate absence of space, a void between the intertwining infrastructure strands of parking, TGV and motorway that would act as a stage for the newly mobile citizens. Physically it would be a massive concrete well penetrated by lifts, walkways and escalators ferrying passengers from one place to the next. Such was the potency of the idea for Koolhaas that he posited a likely future scenario in which the high speed rail network would be continued through Russia and Korea and eventually to Japan, providing a truly global link.

I was interested to see whether the theoretical ambitions for the site would meet the physical reality of a project on such a large scale. One thing became immediately apparent, and that was that the much-vaunted Piranesian Space had been so convoluted in the process so that only one of its 4 sides was truly transparent, to the TGV station from whence we had come. I assume this was due to the engineering reality of a noisy, fume-ridden motorway and carparking station immediately abutting a public train station. Although visually still an interesting space, ideologically it does not deliver what had been promised. Similarly the porosity promised by the masterplan does not translate to reality. This in my opinion has much to do with the deliberately alien scale of the buildings ("...it has landed there" see above). The sheer physical scale of the thing is intimidating enough to make it a psychological barrier between the periphery and centre even if it is physically plausible to walk between them. The transparency between the commercial triangle and new and existing stations at either end is only partially realized, jeopardized by a convoluted wayfinding system

internally and only really possible by walking along the northern edge of Nouvel's shopping centre. Like Kyoto Station the exuberance of program seems to sap the energy from its surroundings, with the exception of the city square in the southwest corner, again strengthened by a look at the figureground study for the site. According to Koolhaas' logic for the site this is perhaps not surprising but nevertheless it is difficult to see what it offers Lille from an urban standpoint apart from a shopping playground and a ready stream of cashed up international travellers for the tourist market. The design of the station as a street to allow the people to "inspect the event that would completely transform the fate of the city"²⁶ is the part that stays truest to the intentions of the original masterplan.









Figureground Study 1:5000

07

THE NEW FRONTIER

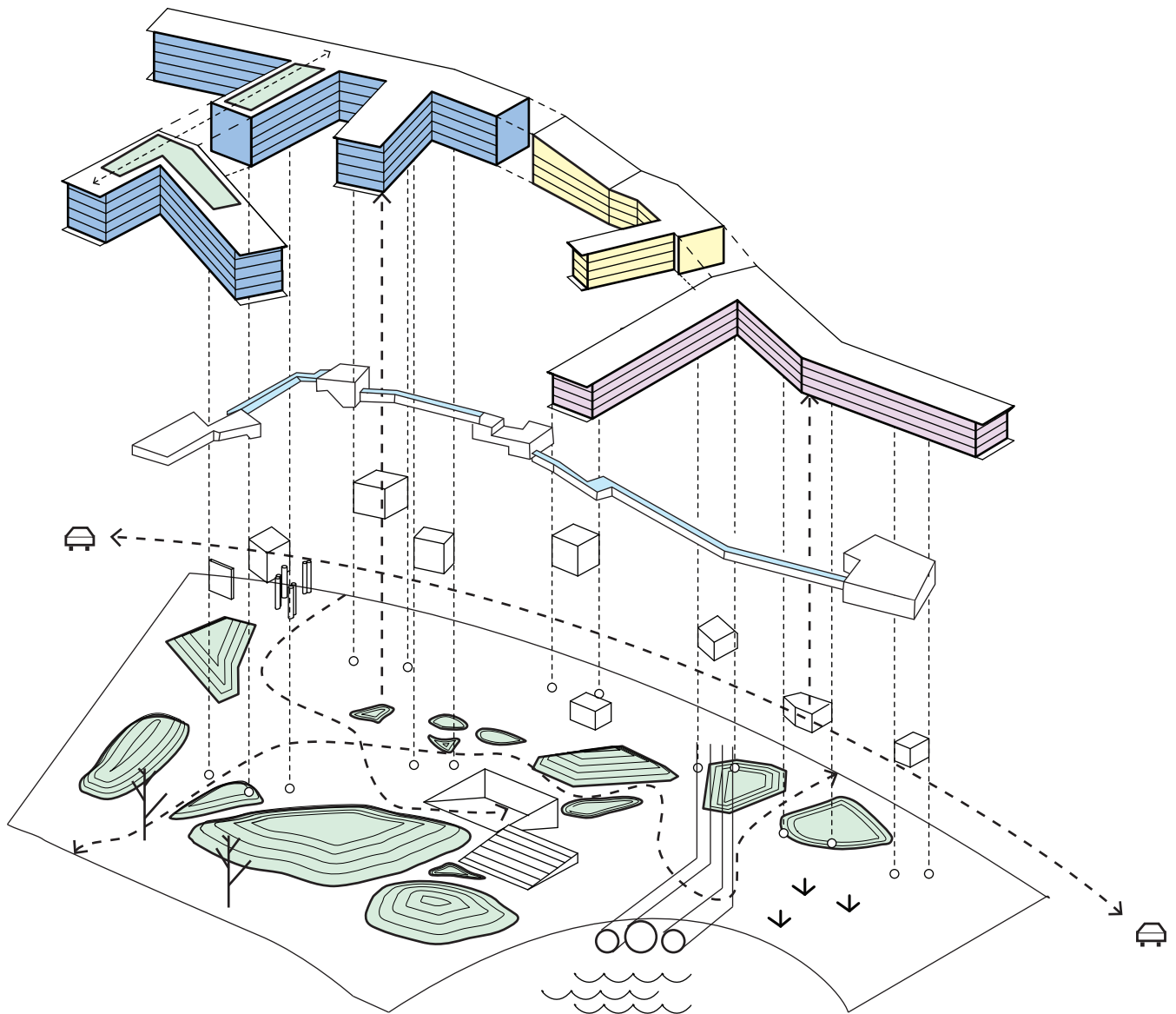
Vanke Centre, Steven Holl Architects, Shenzhen, China

Total Floor Area: 80 000 sqm

Architect: Steven Holl

Client: Vanke Corp.

Completed: 2010



We now come to a discussion of megastructure in what must be the most likely habitat for its resurrection as a meaningful typology: China. It is no coincidence that it was China that made a seemingly outlandish scheme like the Aspire proposal appear to be simply a matter of the NSW Government pushing a green button. For years the conditions there have been ripe for the realization of structures on the scale of the megastructure: a population explosion and subsequent housing crises, an influx of rural dwellers into urban domains, a cheap and easily organized labour force and, like Japan in the 1960s, an urge to stay ahead of structural and material innovations in the global market. The explosive growth of many cities, like Shenzhen discussed here, has created a planning void in which considerations as to the long term urban impact of such structures has fallen by the wayside in the search for quick and profitable solutions to very real problems. From 1980 to 2010 Shenzhen has grown from a fishing town of 25 000 people to a thriving megalopolis of 11 million. The Shenzhen Special Economic Zone created in that inception year of 1980 took advantage of the city's proximity to the global finance hub of Hong Kong only a half-hour train trip away, as well as to Macau, Taipei, Shanghai and Singapore.

The project is perhaps most unique in that, with the possible exception of the Pompidou Centre, it comes closest to realizing the lightweight steel utopias of the early paper megastructures, as well as integrating a mass of adaptable environmental systems. This repudiation of gravity also achieves Otaka's artificial ground, freeing the groundplane for gatherings and events, spaces for public interaction. Holl goes further to suggest that this symbolic freedom of the groundplane advances the democratic cause in China where incursions on personal freedoms are all too frequent²⁷. The innovative structural system relies on a series of massive concrete cores supporting a hybridized steel truss/concrete slab and beam structure inspired by cable-stay bridge technology. The diagonal truss members are capable of carrying a whopping 3000 tonnes of load, secured with massive custom cast iron connectors and anchors. The system allows some truly massive spans and cantilevers and, with no geotechnical considerations to deal with, an immense flexibility in length and siting. A series of environmentally responsive façade systems provide a programmatic flexibility, with shifting skins and materiality according to heating and cooling loads in the tropical climate.²⁸

Programmatically the project aims to provide a critical mass of different functions to achieve the megastructural ambition of the building as a city. As designed the project was divided into 4 sections connected by a common circulation spine with interaction spaces attached to it. The program included office space for the Vanke Corporation's global headquarters, a series of 'SOHO' live/work units, a hotel of 15 000 sqm with attached conference centre and a number of private condominiums. In a nod to its eco-credentials the ground was to be given over to a botanical garden, with carparking buried underground and a series of 'mounds' hiding conference rooms and exhibition spaces. The roof houses an array of solar panels contributing to the buildings Platinum LEED rating, with a series of vegetable gardens making use of the available space.

The building is situated in the resort town of Dameisha a 10 minute drive out of Shenzhen, and as such is heavily reliant on the program and internal circulation patterns generating a lively and interactive flow of communication in the absence of any 'street life' down below. It was designed to act as an autonomous entity in short, reliant on its global appeal in a resort town dependent on travellers coming to Shenzhen from surrounding Asian cities. In that sense, compared with many of the previous examples that are programmatically stitched to transport infrastructures, the Vanke Centre suffers from a lack of mobility to go with its structural and programmatic innovations. The workers are for instance entirely reliant on their cars to get to work. In the 1960s that may have meant mobility but post oil-crisis, and with a wealth of transport options to choose from, it can only be seen as the opposite. There is a Catch-22 here in that it would have been more successful with an existing urban fabric to feed off, and yet in a dense urban setting the client would most probably never have been afforded the luxury of leaving the ground plane unbuilt.

On site, after having caught the plane to Hong Kong, the train to Shenzhen and a taxi to Dameisha in a fluidity of movement which would have made Kurokawa proud, realities proved contrary to ambitions. The apparent naivety of the building plans on paper, with a 'one size fits all' width and height to almost all program (assumedly guided by structural limitations) is borne out in the flesh. We were lucky enough to be given a tour of the building, and heard that the pre-defined widths lead generally to massive wastage of space and a segregated workforce in a culture not known to spontaneously rise from their desk to have a chat with a colleague in the next 'arm'. In that sense the building really does read as a series of pre-determined slab platforms into which program is plugged (or occasionally uncomfortably forced in this case). It is clear though that extendability in 2, or even 3 dimensions is required for successful transiency of program. Similarly the concept of a liberated ground plane seems to have fallen by the wayside. A series of guards employed by the Vanke Centre stood watch and inquired (politely) what we were doing when we started to explore some of the vertical cores. The sense of Bond-villain lair was palpable. The ground plane ironically seems to act as a no-mans land which breaks the building's contact to its very seasonal surroundings.









Figureground Study 1:5000

08

AN ALTERNATIVE FUTURE?

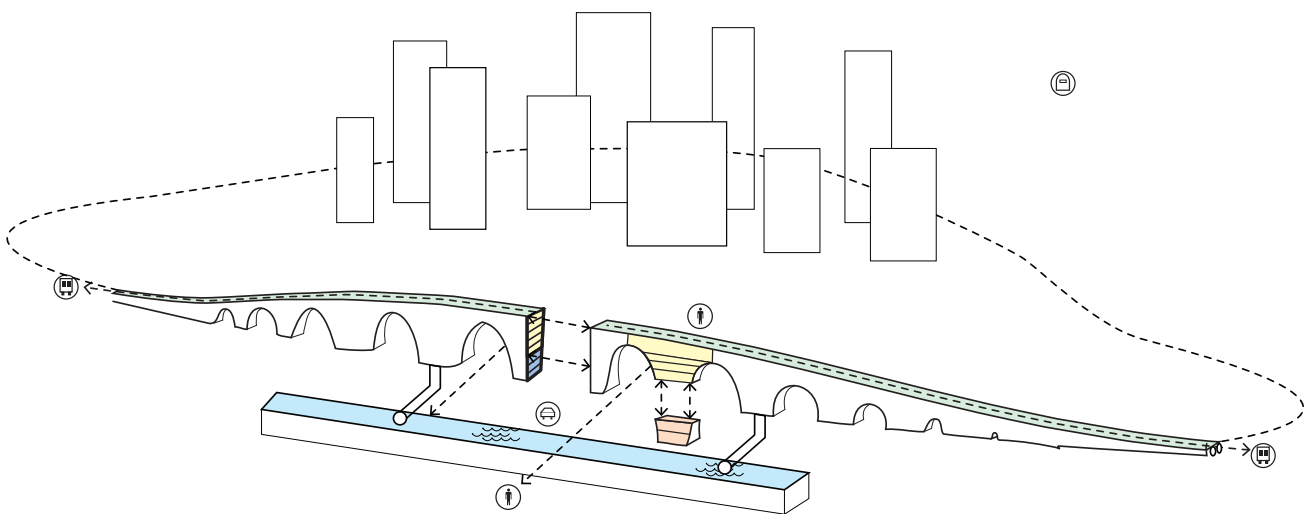
Loop City Project, Bjarke Ingels Group, Copenhagen, Denmark

Total Floor Area: 11 sqkm

Architect: BIG

Client: Realdania, DaC

Completed: Unbuilt



If Tange's Tokyo Bay proposal was a vision of an attainable future in 1960 then BIG's Loop City proposal is surely the modern equivalent. Its architect, the Dane Bjarke Ingels and its host city, Copenhagen, are perhaps best known for buildings and urban planning initiatives that combine a social agenda with a host of sustainable design innovations. Copenhagen has recently been voted the World's Most Liveable City according to a UN survey and its populace now exports both their creative designs and sustainable technologies to the rest of the world. It is therefore a promising environment to look for a possible workable prototype for the megastructure that combines the original utopian ideals of mobility and flexibility with a Scandinavian sensibility for urban planning and liveability. As an 'ideal megastructure' (the issue of naivety will be left alone for arguments sake) both drawn and described it combines many of the concepts raised in previous case studies and so is useful as a platform to attempt a summary of this investigation in relation to the Aspire proposal.

The concept of perception is an important one for buildings on the scale of the megastructure. At its unveiling in both digital media via TED talks and subsequent Youtube releases²⁹, and originally as part of the Venice Biennale 2010, the response to Loop City was overwhelmingly positive. Explained in a step-by-step presentation the logic seemed sound, the structure possible and the green initiatives (Copenhagen being what it is) achievable. In a city currently building a power station topped by a skyscraper this concentration of program in one place seems like just another step in the progress of densification. Tokyo Bay on the other hand is still viewed as the product of a bygone era. Put side by side however the ambition of these two projects 50 years apart is the same: to create a linear infrastructural spine that would combat an existing and problematic radial sprawl pattern. How then has our perception of the megastructure been softened in the case of Loop City?

The Loop City project was catalyzed by the search for a solution to the urban sprawl generated by Steen Eiler Rasmussen's Finger Plan of 1947, in which a series of development corridors along existing infrastructure would be used to channel Copenhagen's expanding population. Agricultural land and disconnected pieces of the city were increasingly having to make uncomfortable alliances (perhaps the best example would be Orebro, where a series of innovative apartment buildings like BIG's own Mountain Housing look out onto open fields and are completely reliant on the car or metro for access to the city). BIG realized instead the potential to redevelop a string of industrial areas across the 'palm' of the Finger Plan, a series of new mixed use neighbourhoods close to the heart of the city but also linked to one another via a light rail network. This would successfully house the expected population increase of 115,000 people by 2050 and help bind existing parts of the city together. In this basic premise there are already some obvious parallels with Sydney's urban sprawl issues, as well as the concept of redeveloping industrial areas along the Central-Strathfield train line which is a key component of the Aspire proposal. It is as a solution to major issues like overpopulation, the rising tide of retired baby boomers and resource efficiency that the scale of the megastructure can be brought to bear and seems most attractive. Certainly those examples that have arisen from these conditions like the Autobahnuberbauung and Sakaide, and to a certain extent Cumberland, seem more justified in their approach to scale than those that have arisen from a commercial need.

Structurally and programmatically the proposal would be based on the concept that a light rail network uses a rise and fall on approach to the station to slow down and speed up and thereby conserve energy. The project equates this rising and falling to a built topography, whereby the area under the tracks would be developed, becoming increasingly dense in relation to proximity to the station. This mass would then be punctured to provide a porous ground plane and accompanied by a continuous green belt regenerating biodiversity and providing opportunities for water filtration and urban food production. The superstructure would also be used to carry a network of infrastructure including electricity with a solar-generated component, waste and grey water, drinking water and district heating from waste combustion plants along the line. Electric car-charging stations and interactive jogging tracks complete the picture of a populace at the cutting edge of technology. The ideal of a building that simultaneously embraces, or at least provides scope for the latest technologies was at the core of the original Metabolist manifesto. Of the case studies completed it is the Vanke Centre that stands out and almost justifies itself as the epitome of modern structural and environmental innovations. It is easy to imagine that had its urban context been different, the building would have been a successful built version of the ideal Loop City toys with. In the high-tech construction methodology of the Aspire proposal there is certainly the promise of such an outcome.

Whereas Tange's Tokyo Bay proposal was based firmly in the automobile dream, with a harsh machine-like quality in both plan and material, Loop City is a megastructure realigned to the post oil-crisis ideal of public transport. It is perhaps the most direct precedent to date in equating physical mobility via a choice of fast and efficient transport modes (cycleways, light rail, electric cars) with social mobility. Where the architectural ideology of Euralille fed off the idea of zipping between autonomous multi-functional nodes, Loop City advocates the idea of a regional identity created by connecting Copenhagen with Helsingor, Helsingborg and Malmo on the eastern Swedish shore. By using the transport

itself to shape the architecture, megastructure here creates a psychological bond between this regional version of homo movens and the transport network that created them. Similarly whilst the Autobahnüberbauung largely conceals the Autobahn running through its core, its identity (revealed in the name) and its stepped bridging form are dependent on this roadway. The Aspire proposal would perhaps benefit from a more direct link between the mostly underground and out of sight transport infrastructures and the above ground plug-ins in order to reconnect the embittered residents of Sydney with the opportunities for social interaction inherent in public transport.

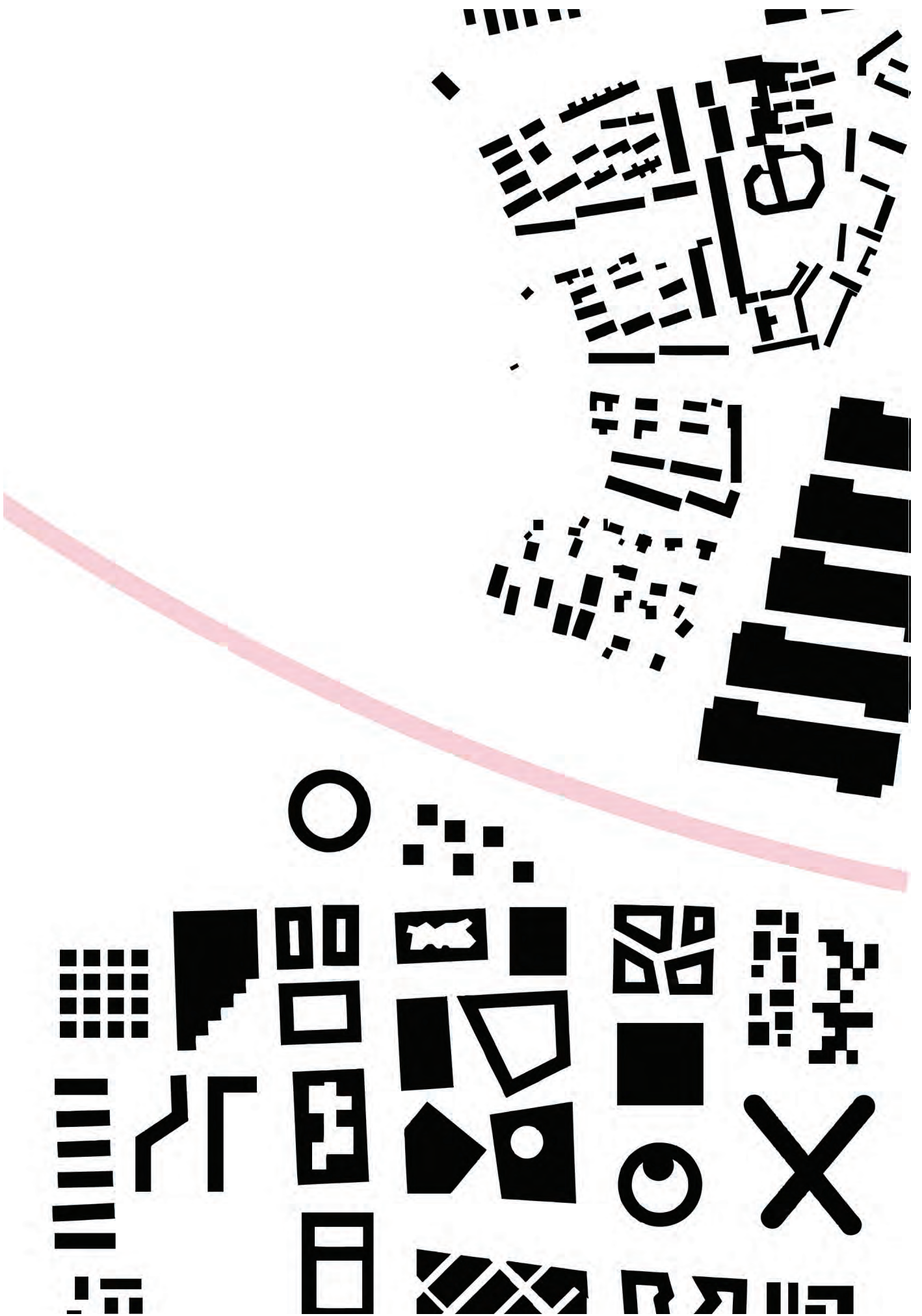
The primary point of difference, and perhaps the key lesson for the Aspire proposal, is that whereas Tokyo Bay was designed as an autonomous system, a rejection of the traditional city beyond it, Loop City aims to integrate with the varied conditions along its length. By reducing the permanent structure to a bare minimal transport and service spine the built forms themselves are free to adapt to their surroundings as needed. In this sense, whilst the individual built forms would be physically static, the system as a whole would be able to offer a level of transiency and flexibility over time in keeping with Metabolist ideals. The scale of Loop City is the key here: it becomes a mega system comprised of individual megastructures each formed by their own local conditions but sharing an integral link to the same transport and infrastructure core. What is more this system is seen to be actively contributing to the neighbourhoods it passes through. Its environmental integration via the provision of energy and heating and the purification of water and air makes it a less alien concept than say the Vanke Centre which harnessed these technologies to provide for itself as a self-sufficient entity. If there was a tangible benefit to areas like Redfern and Ashfield that surpassed mere economics (ie more people=more custom) and if it could provide a framework for adaptability of form & program, Aspire as an urban proposition might be easier to swallow. The idea of contribution becomes even more important when we look at the urban impact of the larger projects like Euralille and Kyoto Station, which at both eye level and in figure-ground studies seem to suck some of the vibrancy from their surroundings simply through the sheer weight and scale of program on offer. They were designed to act as autonomous entities, whereas the more successful examples like Sakaide and the Autobahnüberbauung were reliant on a connection with their urban contexts to support them. Perhaps the Metabolist vision of the autonomous megastructure has been replaced by an integrated one that looks more carefully at its urban context for cues.

The issue of how to procure buildings at the scale of the megastructure is probably at the core of the Aspire debate, and will be presumably for all attempts at the typology in the Western world. A major point of difference in the case of Loop City was that it was initiated by a non-profit organization, Realdania, with a mandate to “to initiate and promote ideas and practical solutions in the built environment that have the capacity to drive development and change”³⁰. Aspire on the other hand was initiated by a business consortium driven firmly by economics: they could offer a cash strapped NSW government the infrastructure they needed in return for the right to sell the air space above it. The assumption with Loop City is that the Danish government would provide the infrastructure and would then be free to sell the individual pieces to various parties with different vested interests, thereby providing some of the variety and adaptability in BIGs drawings. The case studies considered represent the spectrum of procurement methods. Private enterprises like the Vanke centre, and the Autobahnüberbauung relied at least in part on government subsidies and clemency to acquire the land and the approval for their designs. Euralille and Kyoto Station on the other hand represent megastructure instigated by government transport agencies in the SNCF and JR respectively. The issue of the private/public division of megastructure is a contentious one.

The idea of aesthetics mentioned earlier is also something that needs to be discussed as, in the public imagination, it is one of the shortcomings of the built megastructures. The use of concrete in those early examples has obviously much to account for. In the case of Sakaide, Cumbernauld and the Autobahnüberbauung, concrete provided both the economic and structural means to achieve the sheer scale of the building, and the monumental aesthetic desired. Untreated concrete in urban environments is however prone to a staining and discolouring over time, and materially and visually this is what first springs to mind in the public consciousness. Because Aspire was presented as primarily a practical engineering solution there was little time spent on the aesthetic reality of the buildings plugged into the infrastructural superpit. When left to the imagination this void is too easily filled with the brutal aesthetics above. Loop City on the other hand benefited enormously from the creative capabilities of its media-savvy instigators: BIG, reknowned for their presentations in an often comic-book populist style and with a young and socially big-hitting founder in Bjarke Ingels, the DaC (Danish Architecture Centre) with a worldwide reputation for architectural exhibitions and Realdania, well versed in the social media tools now crucial to any non-profit. In terms of form the project as drawn exploits the soft and fluid forms offered by the light rail, presenting as an extension of the landscape with a series of green roof spaces to help it on its way. Materially ‘glass’ (or at least a lively transparency) plays a big role in allowing the buildings to blend with their surroundings and bring the viewers imagination into the building. There is a missed opportunity here for the Aspire team to gain popular support for their project before weighing it down with the economic and engineering realities, thereby making it easier for the NSW government to get behind the project.



(above) LOOP City in principle
Images Courtesy: BIG Architects



Figureground Study 1:5000

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