



REDEEMPTIVE LANDMark

A NEW HABITAT FOR MONTREAL



FIG 1/PERSPECTIVE AT GRADE TOWARDS ENTRY

Contents

Introduction	5
Program	7
Site	13
Architectural Response	15
Mechanical	21
Appendix	24



Introduction

An examination of current thinking about zoos reveals an institution which has cemented its position in our hearts and minds, our cities and in our cultural tapestries, and yet it is one that is fraught by so many ethical dilemmas, so much so that its very existence never ceases to be called into question. Zoos, too often, conjure up images of magnificent beasts housed in dreary confines. Such institutions lack the stimulation and the space for the exhibition of normal behaviour. In fact, it is the desire to witness this very behaviour, amongst the animals' other evocative qualities, which is, and has always been a primary motivation for the exhibition of wild animals in captivity, in the first place. This paradox – destroying that which we are seeking by the very pursuit itself – is, and continues to be, the plague of our zoos. If the ethical zoo aims to educate, and inspire awe and appreciation for biodiversity, primarily through an alleged realism in habitat exhibit, than to which world is it referring?

The Central Glass International Architectural Design Competition for an “Environmental Zoo” laid out a fairly ambiguous request for ideas that might propose new ways of shaping such a program, with more “desirable” relationships created between humans and wildlife. It is deliberately vague, and this fuzziness is in direct proportion to the contentiousness of the territory. Do desirable conditions not hinge on a value system and an understanding of the world that seems to be perpetually undergoing revision? To suggest that collecting animals, for expositional purposes in a controlled setting, can ever really fully satisfy the complex needs of the animals themselves, or even, as some suggest, place their needs before the visitors of the institution, is verging on the absurd. But perhaps there are individuals for whom such a setting might be appropriate, even some for whom there is no other option. This architectural proposal sets out from the premise that even the most evolved zoos, however far they have come in asserting that the well-being of their hosted animals is top priority, must compromise their well-being towards creating an institution with communicative power- and thus forfeit such claims. They ultimately do not go far enough to achieve their stated aims, leaving us wondering whether the solution is still a contribution to the problem.

This paper will reveal the motives and operations of my competition proposal and situate its strategies within a continuum of cultural history. It will guide the reader through the project, from a declaration of mandate and program, though to site selection, and architectural response. It should be noted that the submission is of a conceptual nature, and with a particularly polemical perspective. It is my intention to provoke the architectural reader into recognizing the frailty of the territory, that, while drawings and words have been prepared as though they were “expressions of reality”, evidence of difficulty within the submission is pervasive.

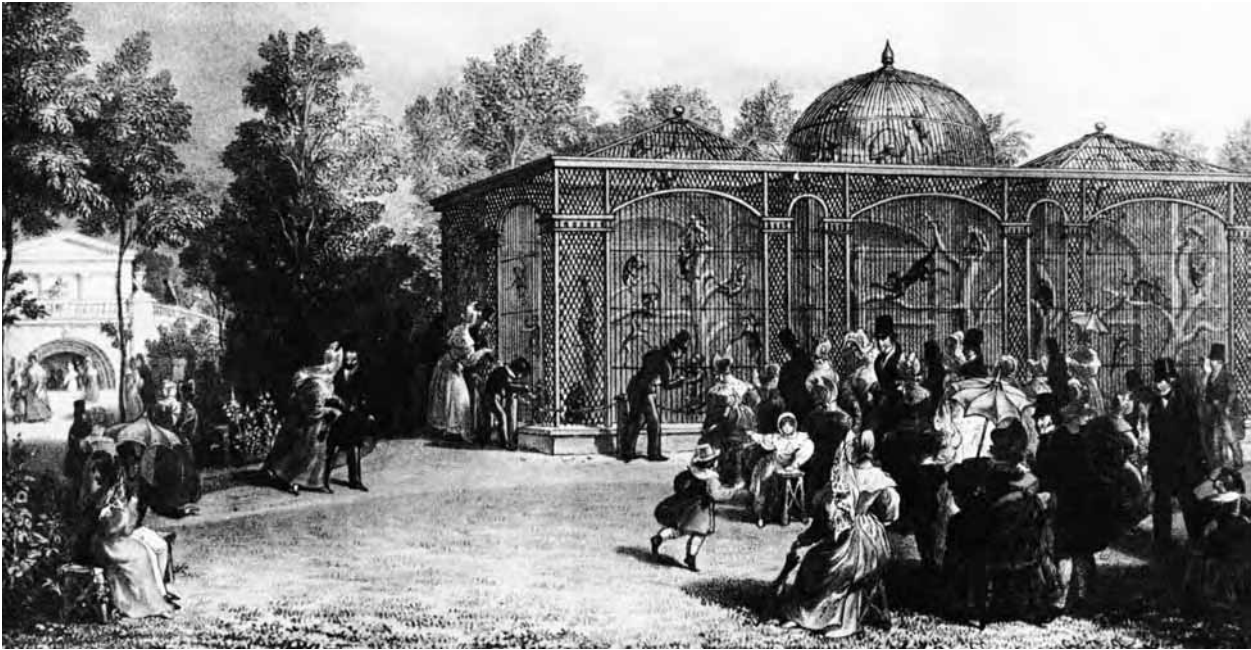


FIG 2/MONKEY HOUSE, LONDON ZOO

FIG 3/IMAGES OF ANIMAL CRUELTY -
PROPOSED RESIDENTS OF THE ENVIRONMENTAL ZOO



Program

While the competition calls for an architectural proposal, it is implicit that it must contend with the controversial program. There is nothing stable about the history of zoos, in form or program. The mandate of my proposal assumes the position that the only innocuous form of holding animals captive is in the form of guardianship -especially to counteract abuses dealt to them by their human stewards. These animal abuses are multi-dimensional and widespread. They range from the depletion of habitats, and the extinction of species by poachers and mismanagement, to cruel forms of imposed labour, certain types of breeding for fur and meat, savage experimental laboratory testing, and acquisitions of exotic species as pets. This proposal for an environmental zoo suggests that as the distinction between artifice and nature has disintegrated - humankind is an active agent in the management and control of the natural world - we must, ensure the security and remediation of species that have been endangered, stripped of their nature, by human interference.

If the first displays of undomesticated animals were intended to signify the wealth and power of its keepers¹, today such displays suggest the vestiges of an impoverished world on the brink of extinction. They are reminders of a time before the transgression of natural law, portraits of a world that is now with us only virtually. Despite the rhetoric of even progressive zoological institutions, humans are still the prime benefactors of decisions guiding the design of new exhibits and collections. Whether motivated by a desire to communicate authority, dominion, superiority, or even to return to a position which reveres the natural world, they are caught in a perpetual construct that puts such messages above the well being of the inhabitants of the zoo's enclosures, and the local ecology.

Though zoos have made great strides towards more humane methods of animal treatment and exhibition, their primary concern has wavered very little from an anthropocentric tradition of catering to its visitors first. The metaphor of the theatre is continuously used to explain the centrality of communication in the role of zoos in our society. And it turns out that, due to attendance figures exceeding professional sporting events, zoos may make for the perfect conduit to get conservationist messages out to the public.² That said, there are dangers in the argument, that it is through realism, that we can best evoke the respect and appreciation for nature.

When Jones and Jones designed their first Landscape Immersion exhibits at the Seattle Woodland Park Zoo back in the 1970s, their work was instantly hailed for its eloquence and realism in execution. In fact, it was so realistic that visitors wondered why the grass was not being cut in the exhibits.³ I believe that this attempt at literally mirroring the world as we believe it to be in exhibits as walking a dangerous line. While the idea of environmental normalcy may be more palatable to those of us still clinging to romantic visions of an unspoiled natural world, it may deny actual conditions on the ground. The defiling of the natural world asks that we confront it courageously and not seek the shelter of a false sense of security. As Jean Baudrillard would suggest, these realistic habitats are more and more coming more to resemble a virtual world, caricatures of a reality that is no longer with us.⁴

While the emphasis on stewardship has traditionally taken a back-seat to the communicative potential of zoos, most recently about issues related to conservation and maintaining the integrity of our world's biodiversity, this proposal suggests that conservation should supplant the former as a priority. The care of mistreated animals demands to take centre-stage. This is the difference between conservationist values imbued implicitly through the theatricality of exhibits and those that are communicated via explicit action itself. How would a zoo look if it were to be structured by conservation in action? What role would the visitor assume in such a scenario?

This proposal re-imagines the zoo as part animal hospital, rehabilitation centre, retirement home, and temporary shelter. The scheme is specifically geared towards health care provision for animals that have directly been harmed by human interference. Part emergency animal hospital, part long-term care facility, patients are admitted who cannot be released to the wild either due to physical ailments, the loss of natural instincts, or the loss of habitat. Typical patients will be ac-

1 Cherfas, Jeremy. *Zoo 2000 : A Look Beyond the Bars*. (London: British Broadcasting Corp., 1984) p.7-34.

2 Hancocks, David. *A Different Nature: The Paradoxical World of Zoos and their Uncertain Future*. (Berkeley: University of California Press, 2001), p.163.

3 Ibid. p. 126.

4 Baudrillard, Jean and Mark Poster. *Jean Baudrillard : Selected Writings [Selections.]*. (Stanford; Stanford University Press, 1988), p. 166.



FIG 4/PANORAMIC EXHIBIT AT STELLINGEN, CARL HAGENBECK

FIG 5/MAPPIN TERRACES FEATURING ARTIFICIAL ROCKSCAPE
LONDON ZOO, REGENT'S PARK



quired from derelict zoos, delinquent circuses and other institutions where animals are demanded to perform in perverse and unnatural ways.

Aside from the typical care afforded by hospitals and retirement homes, the zoo will take a pro-active role by engaging in preventative and regenerative measures. It will facilitate, through expertise and amenities, husbandry, and in particular the regeneration of species on the brink of extinction. It will store a repository of genetic samples of the world's species in a cryogenic freezer for the day when re-animation will be possible. Financial surplus from attendance and campaigns generating additional income will directly aid in the preservation of real habitat facing devastation.

A significant portion of this zoo's mandate is aimed at education through increased awareness. While the zoo's policy is to secure a shelter and care facility for animals in-need, should such animals remain undisclosed to the wider public, it would be too easy to ignore the negative impact humankind has had on the rest of the world. A key principle of the zoo is to expose such abuses, to exhibit a world of wild species in a 'de-natured' state, and to provoke its visitors to reconsider their habits.

A key program of any responsible zoo is education. The mandate typically tries to raise an awareness of the crucial role that biodiversity has in successful ecologies. Integral to this message, is the demonstration of the inextricability of species and their habitats, interspecies dependencies, and especially our dependence on the by-products of healthy, dynamically stable, natural systems. When devastating changes occur in such systems, their effects ripple throughout its entirety so that the loss of just one crucial habitat or 'keystone' species can have harmful effects on aspects of the globe that are worlds apart.⁵

We must also recognize larger misconceptions about the way nature is structured and organized. Fuelled by simplistic arguments towards a single end, these problematic systems have inadvertently contributed to a method of conservation of our earth's resources, marked by imprecision, and ignorance about biodiversity. Early menagerie style zoos, as can be seen at the Schonbrunn Zoo, typically organized their collections according to taxonomy, with each major order of species under the mammalia class grouped together and housed under one roof, with adjoining pens.⁶ Such a directive emerged out of the Enlightenment's obsession with cataloguing and organizing the natural world. This principle was legitimized by Darwin's theory of evolution, and it permitted easy and direct comparison of species that stemmed from a common evolutionary path. This approach had great illuminative power in a time when science, and its diminutive status within popular consciousness was met with the long held beliefs that the world as we know it was given to us by design, and consequently had not undergone any revisions. Zoos until the present day still display their animals in such a fashion, though this strategy has waned in relevancy; progressive institutions now favouring to reify the web of relationships amongst species within a common habitat.

Propelled by conservationist efforts, zoos have opted to make the grand narrative tour of their collection guided by groupings of species native to bio-geographical zones; the first example of such a system can be seen at the Metro Toronto Zoo. This methodology has great appeal in its power to evoke holistic representations of biodiversity within natural habitats, but for all its rewards in evocation, it lacks in organizational principles about efficient day-to-day housekeeping and management across the zoo. Animal keepers, zoologists and other specialists are typically trained and have experience working with one major order of species.⁷ Along the same line of thinking, common orders can generally be described to have similar requirements vis-à-vis enclosures, nutritional habits, waste and so on. Furthermore, such an approach cannot easily absorb species that move between different habitats and is denies The strategy, of gathering mixed assemblages of species under one habitat, may have great educational appeal, but it is neither intuitive nor economical when it comes to the construction and upkeep of exhibits.

These unilateral methods of organization clearly do not hold well under close inspection. Analysis yields a certain conceit

5 Buchanan, Mark. *Nexus : Small Worlds and the Groundbreaking Science of Networks*. 1st ed. (New York: W.W. Norton, 2002) p.153

6 Polakowski, Kenneth J. and University of Michigan. School of Natural Resources. *Zoo Design : The Reality of Wild Illusions*. (Ann Arbor: University of Michigan, School of Natural Resources, 1987) p. 19.

7 Cherfas, Jeremy. *Zoo 2000 : A Look Beyond the Bars*. (London: British Broadcasting Corp., 1984) p.59 .

that any contrived attempt to organize the constitutive parts of the natural world is in the end merely speculative, the construct of human imagination. In fact, one system does not do justice to the complex underpinnings of reality. While this may sound like a trivial digression into a purely theoretical critique, it actually points towards foundational ethical/philosophical flaws in the entire social construct of the zoo as an institution. Accepting these systematic flaws, we are called upon to re-imagine the zoo as a structure that founded upon the complex relationships found in healthy ecological systems. Focusing on the simulation of these complex relationships, rather than their visual effects, may create an organizational system that can function on numerous levels. The mandate of the zoo under consideration is to offer a system that will propose multiple readings of the environment. It is crucial to remove the potential for a single reading to assume an authority that is susceptible to being absorbed into an erroneous concept of nature; one that is abstract and removed from reality.

As our cities grow and our landscapes become perpetually domesticated, we are losing sight, and subsequently sensitivity, to our environment – the space that predated our species, prefigured our coming into being, and whose laws we are still obliged to observe. A key aspect of raising public awareness towards conservationist principles is in the simple yet unambiguous act of rendering visible the effects of our behaviour – those that are typically out of our visible range, those that are concealed for political or other power-motivated ends, those that may lie underfoot but that we are no longer able to perceive because they have become “naturalised”.

At best, both zoological institutions and their missions have had limited street presence, and visibility – due largely in part to vast footprints required to run commercially popular attractions they have come to be sited outside the everyday paths of a city’s inhabitants. Older zoos typically expressed their presence along gateways culminating in visual spectacle adorning the main points of entry.

At a different scale, there are issues related to proximity to the animals. Responding to the lack-lustre style of exhibiting species in barren concrete cells enclosed by walls or bars, Hagenback’s revolutionary approach emphasized scenography. Influenced by romantic English portrayals of landscape, whose techniques included the use of ‘ha-ha’s artificial islands ringed by ditches filled with water, his exhibits grew critical renown for their ability to show numerous species within the same vista, and without the use of any apparent obstruction between one another.⁸

While not completely satisfying our long-standing desire to come within close contact to wild species – to engage with them using all our sensory perception – the transmittal and broadcast of live, and even perspectives inaccessible to naked human eyes could allow for an enriching experience without the sacrifices associated with treading on fragile ecosystems. The proposed zoo will exhibit such video feeds for those habitats facing immanent ruin. In addition to such a privileged perspective, the zoo will offer other glimpses into territory otherwise out of reach. Through perpetual advances in photographic technologies we can now peer into the world of microscopic biologic entities, into the behaviour of creatures that are beyond our perception due to their speed, and witness the behaviour of nocturnal animals. Such demonstrations of awe-inspiring performances assist in the assertion that wonder can emanate from all scales, destabilizing our predilection for interest in that which we can plainly see. Using media and video feeds we can show natural phenomena without either negatively impacting it, or just as bad, trying to re-create a crude simulation of it.

Beyond these approaches the facility will be equipped with additional resources geared towards animal care and welfare, sustainable development. An extensive library of materials will be collected to study and preserve the memory of our biodiversity.

8 Hancocks, David. *A Different Nature: The Paradoxical World of Zoos and their Uncertain Future.* (Berkeley: University of California Press, 2001) p. 65.



FIG 10/PANORAMIC OF ONE OF PARC MAISONNEUVE'S FAIRWAYS



FIG 11/VIEW OUT FROM EXISTING LODGE AT SOUTHWEST CORNER



FIG 12/VIEW TOWARDS THE NORTH



FIG 13/VIEW TOWARDS THE RIVER



FIG 9/ VIEW INSIDE MONTREAL'S BIODOME

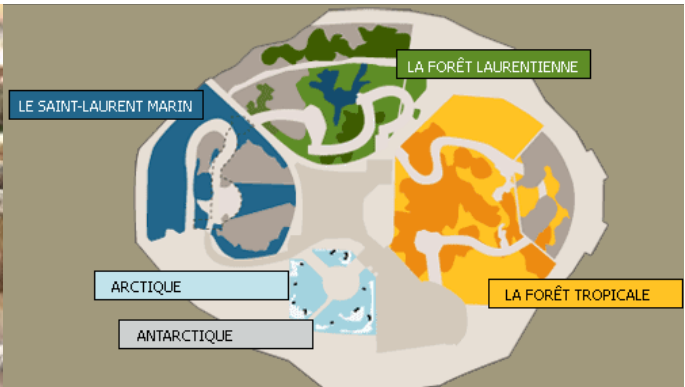


FIG 8/ MAP OF MONTREAL'S BIODOME

Site

With visibility high on the zoo's agenda, from the outset it was evident that the zoo should be sited in proximity to the daily operations of the city and its inhabitants. Already home to a number of natural science museums, Parc Maisonneuve in Montreal's east end, was chosen for its potential to provide such a presence while capitalizing on its identity of place and its existing infrastructure.

The area is rooted in an early industrial past aiding in the development of the greater Montreal area. The area was under the jurisdiction of the town of Maisonneuve until it was amalgamated into the City of Montreal and is now known as the riding of Hochelaga Maisonneuve. Among Francophones, the park is known as the site of the Jean Baptiste festivities. Once the site of an 18 hole golf course, Parc Maisonneuve is a landscape of soft rolling lawns divided into what were once fairways by densely treed linear strips. Fences demarcate much of the park's boundary. To its northern and western edges are main urban thoroughfares lined with unremarkable semi-detached single family housing facing the park. The Botanical Gardens makes up the other half of the green block. On the northern edge of the botanical gardens lies the Insectarium, North America's largest.

To the east lies the main arterial road, Sherbrooke Street, which provides primary access to the museological institutions and the Olympic Park on the other side of the street. The zone to the east is a conglomerate of big box theatres, sports arena, paved parking lots, and of course, the Olympic buildings. Critical to the zoo's program, yet in contradistinction to it, is the Biodome - a structure originally used as a velodrome, now repurposed to house a limited number of species in reproductions of the habitats of several major biomes.

By situating the zoo structure in an urban park, it receives the desired visibility, while maintaining a modest buffer zone between it and its closest human neighbours. Additionally, the generous park landscape could be re-populated with species that have been displaced by the expanding metropolis' development. The intended consequence is the subversion of the zoo's boundaries – especially by making explicit the effect that the decision making process has on local ecology. The message of the zoo is not one that should stand in isolation, but should reverberate out from its confines. The ethic to conserve land is in direct response to the grotesque consumption of land for typical zoos, which one might see as sharing the ideological principles of suburban planning. Both try to create a grey middle ground between the urban and the natural, but the result satisfies neither simultaneously.

Evident in the sheer quantity of institutions alone, this area has been made the place of the city's natural science museums. To site an additional institution of similar kin in this arena, is to both reinforce this quality of place, and simultaneously take advantage of its existing infrastructure and ready potential. Furthermore, this situation provides the fertile ground on which future cross-pollination between institutions might occur.

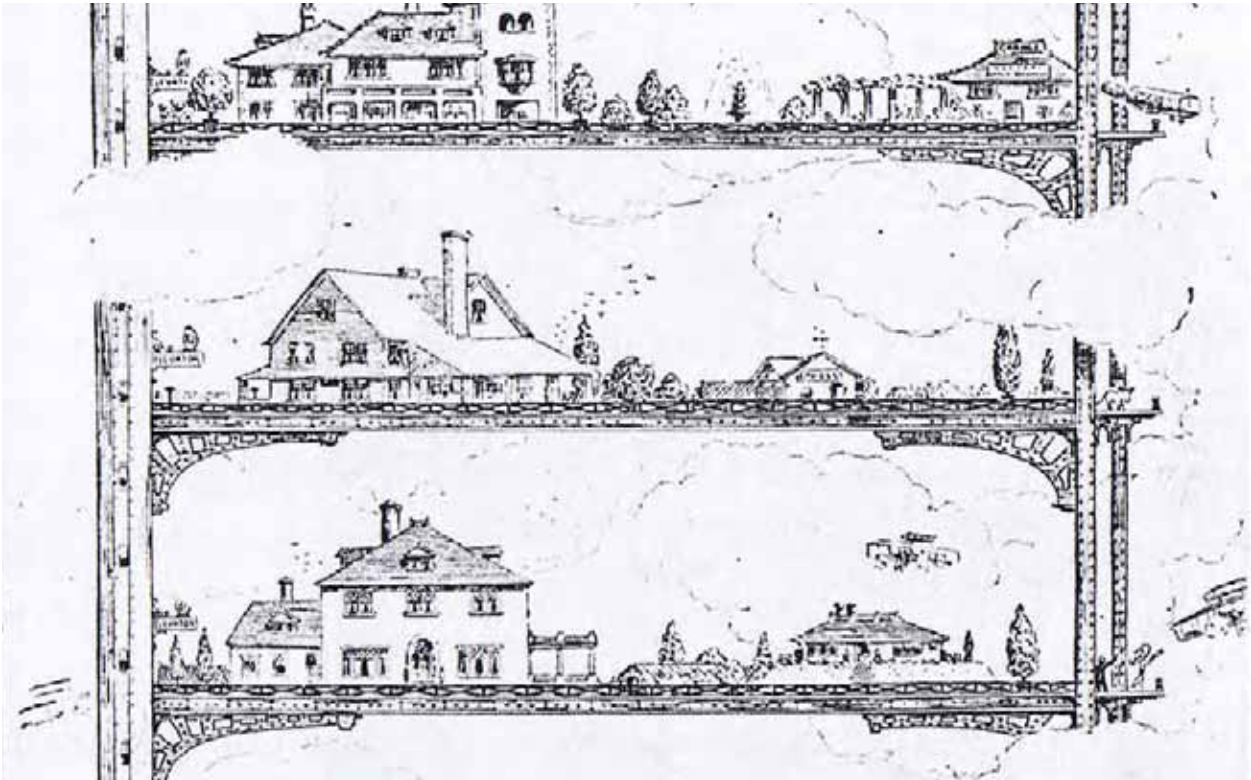
One might wonder what a zoo would be doing in such proximity to the Biodome, already showcasing in a delicate and progressive manner a select few species. This in fact highlights some unique aspects in the theoretical underpinnings of the project. Beyond expanding the collection of species - in particular those de-natured specimens necessitating human protection and care - a purpose-built institution has much to gain by integrated design and planning. By building around the needs of the animals, rather than forcing their needs to fit within an existing structure not conceived for such a purpose, communicates the zoo's ambition to make its specimens its prime benefactors and removes inefficiencies, redundancies, limitations on size and expansion.

By situating the zoo in Parc Maisonneuve, the institution will be taking advantage of existing infrastructure. In particular, the area is extremely well connected with the rest of the city with two metro stations nearby, major bus routes and bicycle paths. There is already existing parking on-site which could easily be expanded should the need arise. The exploitation of these available amenities reduces the net impact of the zoo and related construction.



FIG 14/CARHOUSE/PARKSTADT BY NL ARCHITECTS

FIG 15/CARTOON FROM 1909 ISSUE OF TIME MAGAZINE



Architectural Response

A band of constant width and height weaves its way back and forth, escalating into the sky as it travels along its length. This constructed ground has a depth to conceal those parts of the program catering to human visitors, and those spaces under direction supervision by human stewards, while atop it, lays the domain of the animals and their habitats. Each level habitat at the centre of the structure connects up to the one above or below via a transitional habitat, both inclined and reorienting the movement of the volumes flow. Spaces with soffits overhead are enclosed; the covered habitats are wrapped in high performance insulated curtain-wall glazing, while the covered ground plane is draped in metal fabric mesh. Double height spaces create interlocking volumes where larger trees are permitted to grow and views between adjacent habitats are unimpeded. The structure suggests neither a front, nor back, neither beginning nor end.

It is a gesture that combines architecture and infrastructure, and it immediately resembles the morphology of NL Architects Parkhouse/Carstadt. This project makes explicit the interdependence of urban life and infrastructure by literally using one to support the other. Taking the automobile as a given part of the city's lifeblood, it speculates on a new form of urban inhabitation, where meaning is made via the intertwinement of divergent programs, and not in spite of them. The urban street is extended into a contorted kilometre strip with parking, and supported by a volume containing interior program including retail, office, housing and restaurants.⁹

The project's morphological strategy emanates from a desire to limit the building's footprint and free up local terrain. The first operation works to reverse the tide of ex-urban growth sprawl. By moving skywards, the proposal identifies that it is only through heightened densification, by way of new ground, that we will be able to sustain our levels of consumption. This strategy clearly owes a debt to the work of several Dutch architects all of whose work can in one way be traced back to Rem Koolhaas and the Office for Metropolitan Architecture. The cartoon, taken from an early 20th century publication and referred to by Koolhaas in *Delirious New York*, depicts a utopian vision where unlimited stacked floors promise that the world can be made again, remarkably, each aerial plot of land with its own identity¹⁰. One could surely speculate that such an interest might stem from the tradition of Dutch engineering reclaiming land from the sea – and consequently making the country inhabitable despite it being below sea level.

Aside from freeing up the ground plane, moving vertically transforms the invisibility of typical zoos into a warning sign, making its presence felt outside its immediate environment. It plants a symbol of the predicament facing our natural environment within our urban space, typically a bubble sheltered from such concerns. It contributes to raising awareness of animal cruelty, as well as the toll that societal behaviours are taking on the planet and its ecosystem. Just as we build tall to proclaim our wealth and power, so too should we build tall to demonstrate the implicit expense with which has amassed in such pursuits. The unavoidable reminder in the skyline.

Similarly, the tongue-in-cheek project by Terraswarm for an ideas completion to design a new welcome sign for Las Vegas, proposes an experience of the exuberant city that acts as both distant sign, and experiential passageway. They extend the highway leading into the city in a skyward spiral in the form of a building, which decongests traffic and offers tastes of the city without ever having to leave the car. In what they describe as “the first gamble in and the last chance out” the building absorbs the excesses of the Las Vegas lifestyle into its spiralling body and presents an ominous warning sign at the threshold.¹¹

From within the exhibition spaces, clear vistas allow a view out to the horizon. On the one hand the unimpeded gaze expands on the limited space being afforded – makes things feel bigger than they are. Beyond that views of the species from the visitors' pathway place the city in the scene's backdrop. This situation lends itself to reinforcing a conversation about patterns of societal behaviour and their effects on the natural world

Exhibit floors are conceived as open territory only to be subdivided as required per type of species or curatorial requests. The only fixed element to be contended with in this space is the visitor path. Raised off the floor of the exhibit, in open

9 Archiprix 1996 | *Parkhouse/Carstadt*. Archiprix Foundation. http://www.archiprix.nl/e/1996/carstadt_eng.html

10 Koolhaas, Rem. *Delirious New York: A Retroactive Manifesto for Manhattan*. New ed. (New York: Monacelli Press, 1994).

11 Aranda, Benjamin, and Chris Lasch. *10-Mile Spiral: A Gateway to Las Vegas*. 2004. <http://www.terraswarm.com/vegas/>

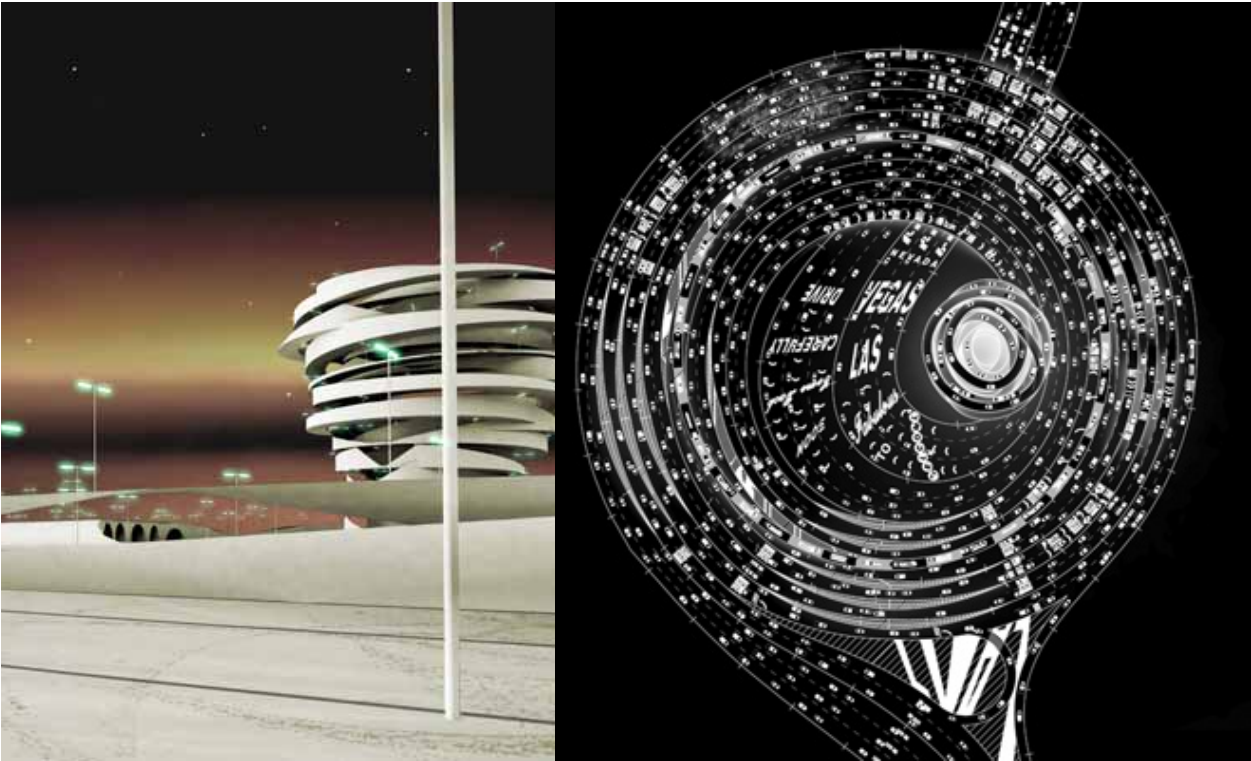


FIG 16/10-MILE SPIRAL BY ARANDA/LASCH OF TERRASWARM,
PERSPECTIVE AND TOP VIEW

metal grating, its walls are made of one way mirrored glass. This path makes its way from one edge of the exhibit floor's width to the other connecting one core to the next. Open ceilings and continuous landscaping underneath the open metal grating affords a multi-sensory awareness.

As the each habitat is divided into multiple pieces by the visitor path traversing across its width, the path itself starts a process of splitting large parcels of enclosure into smaller more reasonable sized spaces. Each parcel can be organized to assemble taxonomically related species in groupings or in individual enclosures. Each species and scenario demands its own attention. Each enclosure has direct access to private sleeping quarters below via a ramp.

Where the continuous exhibit overlaps itself in plan, it provides overhead shelter/enclosure to the floor below. These conditions are created to facilitate special environmental conditioning. High performance curtainwall outlining this overlap creates a thermal seal, isolating those spaces that require climatic management. Beneath the slanted elbows connecting the level habitat exhibition floors, woven metal fabric is strung from the underside. These enclose multi-storey aviaries because of their co-existence with exhibit floors they allude to migratory behaviour of the birds – not confined to one biome.

Essential to the arrangement of the weaving exhibition pathways, is that it allows for visitors to traverse the entire collection according to an agenda which they themselves can choose. The simplest form of circulation- walking linearly along the visitors' pathway, as it winds its way across the width of the floorplate over the course of the entire loop - tells the story of the bio-geographical zones. These zones bleed one into the other, each mountainous or sloped region performing as a threshold into the next plateau. The path along this route, were one to follow it throughout its course, tells the story of the relationship between the species and their habitats as well as talking about the connections of one habitat to the next. Because the level floorplates fold back over themselves one atop the other, vertical circulation shafts provide means to skip levels as desired. It is intended that the same order of species - regardless of its native biome and consequently floor level - be arranged into vertical collections. For those seeking to examine and compare species using a taxonomical approach, a visit along a vertical pathway would allow for this reading. If horizontal circulation tells the story of significance of habitat, and vertical circulation describes evolutionary processes and genetic development, a third, diagonal pathway might enable yet further readings.

One of the primary aims in the consideration of the exhibition floorplan, to bring visitors within close proximity to the animals and yet, simultaneously, to provide a sense of safety and security for the animals despite such close contact. In order to reduce the instinct to flee – aside from the other senses – the visual prospect of humans in close range is eliminated by one-way mirror clad pathway. This reflective tunnel burrows its way right amidst landscaped habitats rendering the visitors – which the animals will associate both with natural predators and their experiences with humans having been abused – invisible.

More than a strategy to force animals out into the open, this is about a system that counteracts the abundant consumption of land that is typically associated with landscape immersive designs and other exhibitory which must tack on for both safety and a sense of security a buffer zone between animals and visitors. This buffer adds to the net footprint of the zoo, and pushes the animals further away.

Beyond the fundamental saving of space and negotiation of the animals' sensitivities, there are a few other interesting side effects of the mirrored enclosure. First off, small enclosures are at least virtually infinitely extended. This of course presumes that animals perceive space through vision which most likely they do not. But for those whom sight is at all a contributive factor to their perception and identification in the world the mirror will also produce multiples from the one, and might provide social stimulus. Furthermore mirrors might prove to add to an expanded sense of space for the animals, and potentially enliven their enclosures by the prospect of being surrounded by familial animals, however virtual they might be. .

The other interesting side effect is that from any vantage point in the zoo, along this path, one can gaze across to any number of other habitats and not see other visitors. This invisibility both extends space and suggests being able to tip toe within this however abstracted, natural realm, without human presence felt.

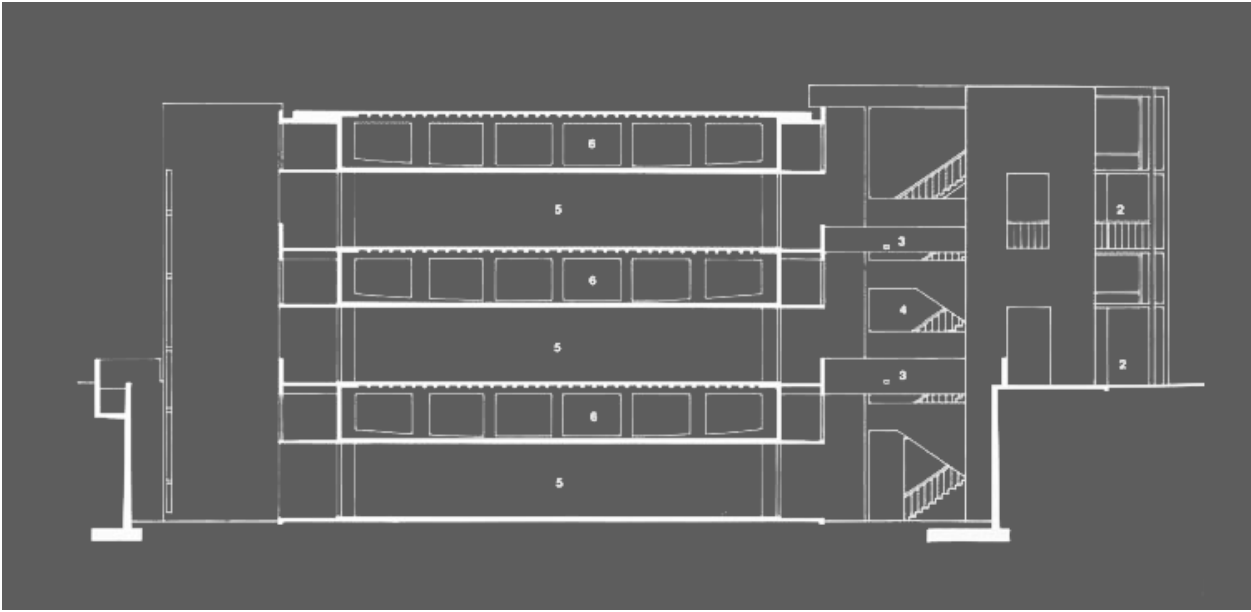
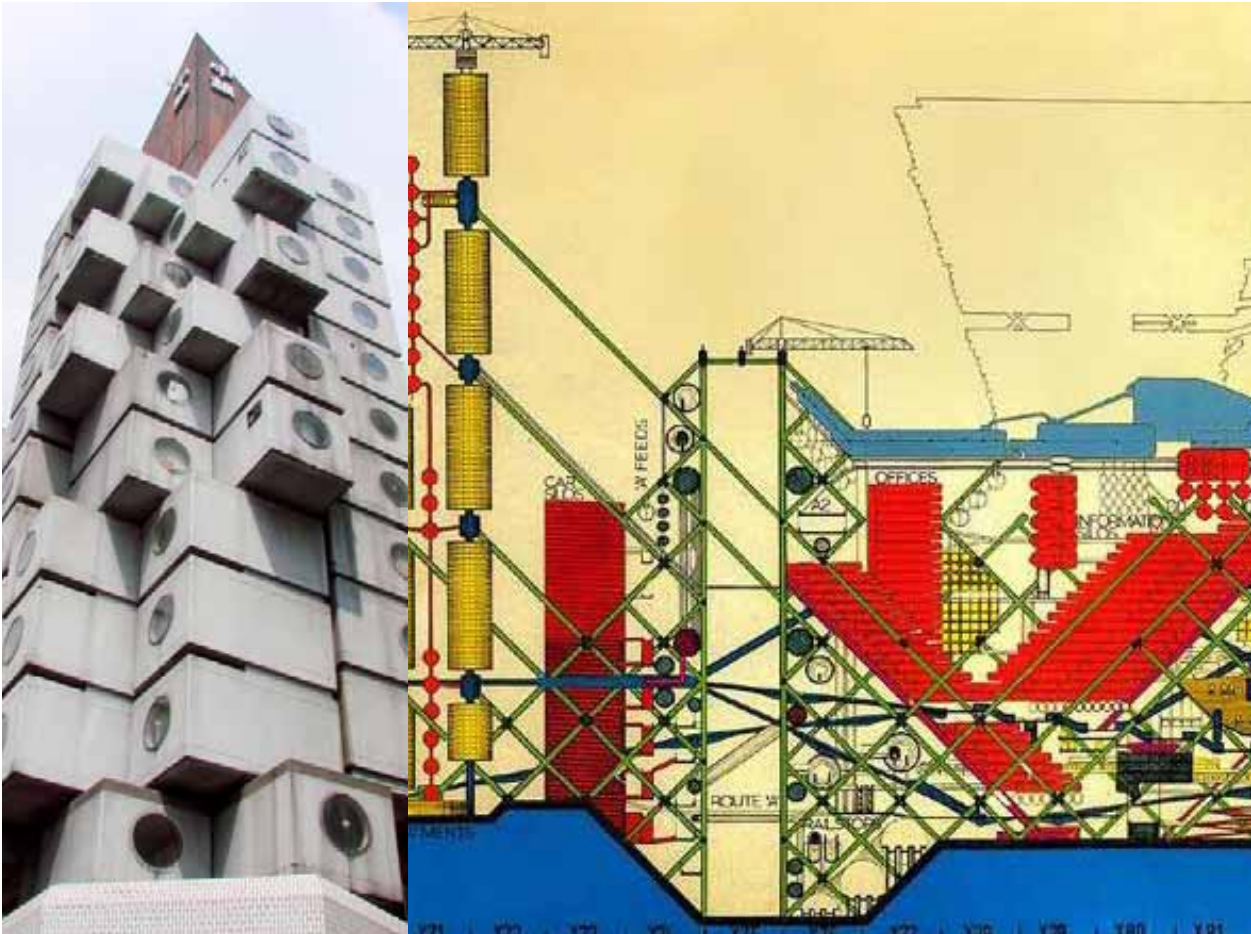


FIG 17/SALK INSTITUTE BY LOUIS KAHN,
CROSS SECTION ILLUSTRATING SEPARATION BETWEEN OPEN LAB FLOORS AND SERVICES

FIG 18/SYSTEMS THINKING IN '60S ARCHITECTURE, METABOLISTS AND ARCHIGRAM



Always one level below an exhibit floor, these, quite literally, 'support' floors provide both the ground – artificial terrain – and the service spaces required for the upkeep of the zoo. They recall the placement of services in interstitial floors as was done by Lou Kahn at the Salk Institute. Typically at zoos, such program is housed in pavilions sometimes styled to suit a vernacular architecture of the culture associated with a habitat. The first function of the proposed indoor spaces is to provide holding cells during the cold winter months, during the night, and for scenarios where animals must be held in isolation. Other typical functions housed indoors, include food and supplies storage, health care facilities, nursery, administration, and research related facilities. Animal holding cells lie along the outermost edge of the ribbon and have access to natural light and ventilation. These spaces are partitioned by walls that are independent of the vierendeel superstructure, and consequently they can swell and shrink as per the spatial requirements of a given species.

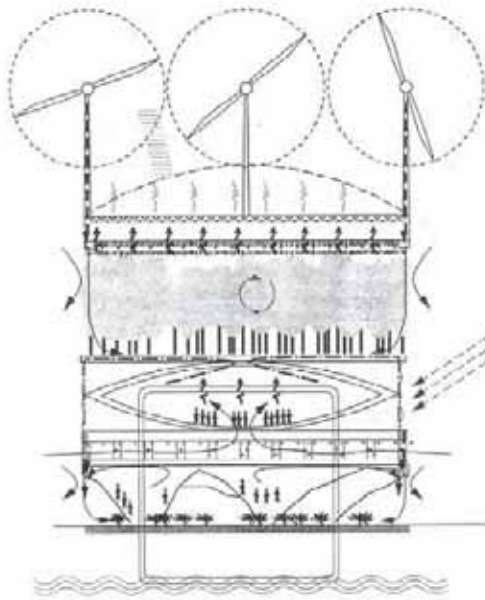
The support floor too is divided by a zigzagging line, which demarcated the public from the private. The two halves interlock, and provide moments where one can peer from one side into the next. The public side of the support floor contains program geared to the visitor including entry gallery and ticket kiosk, cafeteria, film screening area. Like the exhibit floor, adjacent areas on the support floor relate one to the next so that there is a proximity between the messages being raised in the public areas and the implication and role of human interference being contended with. The inner edge of the ribbon, which will get natural light is reserved for administrative offices and laboratories. These spaces overlook exhibition floors.

Three poured in place concrete cores, set equidistant from one another, do double duty as the main path for vertical structural loads and the prime arteries for the movement of goods, people, animals, waste, and conduits for water, electric, communications cabling, and HVAC supply. Each core provides a means of fire egress which also allows visitors to change the course of their visit quickly mid-exhibition.

Vierendeel trusses span between the concrete cores, and between them and the steel lightwells. As Cecil Balmond and Koolhaas notes in his discussion of the emergence of the vierendeel (which would be used in his proposal for the Karlsruhe Center for Art and Media Technology) in *S,M,L,XL*, that the spanning capacity made the spectacular gain of not requiring columns either below or above such a floor.¹² With the trusses running in all directions the depth of support floor becomes an inhabitable space frame. Four light-wells have been inserted into the floorplan to bring light and ventilation within its broad depth. A living wetland greywater system located in the two below grade level floor is planted with crawling vegetation allowed to make its way up through these shafts. Reveals the continuous regenerative action being enacted.

The most fundamental aspect of this proposal in both design terms and application, (though this has not been dealt with in this paper thus far) is the application of systems thinking in architecture. Over the course of the design process a logic and hierarchy of values informed a series of rules out of which emerged a formal arrangement. What in the end might resemble a highly stylized object (maybe even seemingly divorced from a context) is less important than the rules and performance from which it has materialized. The scheme is not about creating a communicable logo, icon, symbol so much as staging possibilities. It is this open ended-ness, delivered through the complexity of the infrastructure – which attempts foresee possible futures – that recalls the '60s conceptual work or architectural groups like Archigram and the Metabolists. Like much of their work, what is drawn is really just one expression of an infinite number of arrangements given a set of rules. Given a different scenario (and perhaps a program with real specified area requirements) various factors might shape different manifestations of the same underlying principles; amongst them the size of the overall zoo, the number of habitats to feature, the number of animals in each habitat, the amount of open air exhibit vs. indoors exhibit, site conditions and limitations etc. In fact this system, due to its highly rationalized order, would make expansion quite economical. This is the prime strategy by which to eliminate the supremacy of human conjecture stemming from visual hegemony.

¹² Koolhaas, Rem, Bruce Mau, Jennifer Sigler, Hans Werlemann, and Office for Metropolitan Architecture. *Small, Medium, Large, Extra-Large : Office for Metropolitan Architecture, Rem Koolhaas, and Bruce Mau*. 2nd ed. (New York, N.Y.: Monacelli Press, 1998) p. 671-695.



FACTORS AND PROCESSES

Windmills

Air dome for protection ag

Vapor cooling

Waterbasin as heatstorage

Electrical light

Air curtain and reuse natu

Floorheating with used air

Heat of people, photovolta

Natural air conditioning to

temperature, and moisture

Biomass to produce energy

Groundwater for cooling

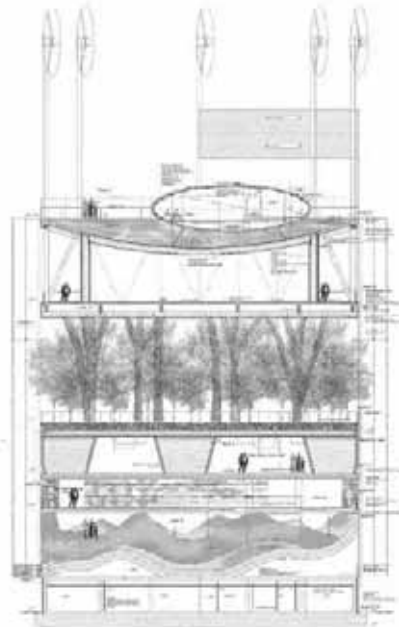


FIG 19/ MVRDV DUTCH PAVILLION FOR EXPO 2000 IN HANNOVER, SECTION AND ENVIRONMENTAL DIAGRAM

Mechanical

Ecologically sound building methods, and the design and implementation of sustainable systems are crucial to the integrity of the message that accompanies the environmental zoo. The core of proposed strategy grapples with issues related to recycling materials and resources immediately at its disposal. This posture follows suit from the one which sees a need to tackle the most immediately pressing problems we face, without further contributing to such problems – that we must mend those parts requiring reparation first, and that for every well-intentioned decision there may be negative and unforeseen consequences. Just as this zoo proposal commences from the decision to care to those animals most needing our attention, instead of procuring healthy specimens out of the wild towards an end greater than the value of those particular specimens, the zoo aims to tread as lightly as possible, to make the best of what is available to it, without importing new problems into the equation.

The project takes some cues from MVRDV's Dutch Pavilion for the Expo 2000 in Hanover. It consists of a number of distinct landscapes native to Holland stacked one atop the other, and suggests a solution to the country's over-densification. Aside from the novelty of engineered landscaped in the sky, the building is self sufficient; it has its own internal water cycle and produces its own energy.¹³ Used as a model in the proposal, it demonstrates a line of holistic thinking where disparate parts of a program can mutually benefit from their divergent interests.

The control of the building's climate starts off with passive measures. The elemental stacking of habitats provides exposed areas for high solar gain, and covered areas for those areas requiring levels of control and shade. This stacking roughly correlates to the latitudinal order of bio-geographical zones moving from the equator towards one of the poles. The African savannah naturally sits atop the structure closest to the sun, while below grade, only really exposed indirectly to natural sunlight lie the polar region.

Radiant poured in-place conduits run throughout the structure and distribute temperature controlled water to supplement the passive gains. In order to maintain the climates of polarised habitats energy recovery tactics are used to achieve both simultaneously. The polar region at the habitat level below grade is cooled by removing heat from this part of the radiant piping loop and sending it up to the tropical rainforest habitat. Heating is enriched by the water drawn from geothermal wells dug deep below the site.

Of remarkable interest in the design of the environmental zoo is the on-site implementation of anaerobic digestion. The daily production of animal waste can be processed by a living wetlands system located below grade, This system will process the methane and produce energy in the form of heat with its other by-product being fertilizer. This heat can be used directly to warm the building, converted to electricity for operations or even sold back to the city grid. The fertilizer would be used to feed the vegetation planted within the exhibits and the botanical gardens next door.

Open air exhibits are fitted with drainage systems, whose rain water leads feed into cisterns stored on the mechanical level, below grade. This harvested water, is fed throughout a living wetlands system, which filters the water to feed the plants and animals in the zoo.

¹³ Maas, Winy, Nathalie de Vries, Emilio Túrion Alvarez, Luis Moreno Mansilla, Stanley Allen, and Bart Lootsma. "Mvrdv Maas vanRijs deVries 1991-1997." Croquis no. 86 (1997).

Bibliography

- Allan, John and Berthold Lubetkin. *Berthold Lubetkin : Architecture and the Tradition of Progress*. London: RIBA Publications, 1992.
- Aranda, Benjamin, and Chris Lasch. *Tooling. Pamphlet Architecture. Vol. 27*. New York: Princeton Architectural Press, 2006.
- Aranda, Benjamin, and Chris Lasch. *10-Mile Spiral: A Gateway to Las Vegas*. 2004. <http://www.terraswarm.com/vegas/>
- Archiprix 1996 | *Parkhouse/Carstadt*. Archiprix Foundation. http://www.archiprix.nl/e/1996/carstadt_eng.html
- Baratay, Eric and Elisabeth Hardouin-Fugier. *Zoo : A History of Zoological Gardens in the West [Zoos : histoire des jardins zoologiques en occident.]*. London: Reaktion, 2002.
- Baudrillard, Jean and Mark Poster. *Jean Baudrillard : Selected Writings [Selections.]*. Stanford; Stanford University Press, 1988.
- Bell, Catharine E. *Encyclopedia of the World's Zoos*. Chicago, IL, USA: Fitzroy Dearborn Publishers, 2001.
- Benyus, Janine M. *Biomimicry : Innovation Inspired by Nature*. 1st ed. New York: Morrow, 1997.
- Bonner, Jeffrey P. *Sailing with Noah : Stories from the World of Zoos*. Columbia: University of Missouri Press, 2006.
- Buchanan, Mark. *Nexus : Small Worlds and the Groundbreaking Science of Networks*. 1st ed. New York: W.W. Norton, 2002.
- Cherfas, Jeremy. *Zoo 2000 : A Look Beyond the Bars*. London: British Broadcasting Corp., 1984.
- Croke, Vickie. *The Modern Ark : The Story of Zoos : Past, Present, and Future*. New York: Scribner, 1997.
- Fisher, James. *Zoos of the World*. Modern Knowledge. London: Aldus, 1967.
- Gissen, David, ed. *Big & Green: Toward Sustainable Architecture in the 21st Century*. New York: Princeton Architectural Press, 2002.
- Guillery, Peter and 20 Royal Commission on Historical Monuments. *The Buildings of London Zoo*. [Royal Commission on the Historical Monuments of England]. 1993: .
- Hancocks, David. *A Different Nature : The Paradoxical World of Zoos and their Uncertain Future*. Berkeley: University of California Press, 2001.
- Hanson, Elizabeth. *Animal Attractions : Nature on Display in American Zoos*. Princeton, N.J. ; Oxford: Princeton University Press, 2002.
- Kirchshofer, Rosl. *The World of Zoos: A Survey and Gazetteer [Zoologische Garten der Welt.]*. London: Batsford, 1968.
- Koolhaas, Rem. *Delirious New York : A Retroactive Manifesto for Manhattan*. New ed. New York: Monacelli Press, 1994.
- Koolhaas, Rem, Bruce Mau, Jennifer Sigler, Hans Werlemann, and Office for Metropolitan Architecture. *Small, Medium, Large, Extra-Large : Office for Metropolitan Architecture, Rem Koolhaas, and Bruce Mau*. 2nd ed. New York, N.Y.: Monacelli Press, 1998.
- London Zoo (London, England) and P. Chalmers Mitchell. *Illustrated Official Guide to the London Zoological Society's Gardens in Regent's Park*. 18th -- ed. London: Zoological Society, 1920.
- Maas, Winy, Nathalie de Vries, Emilio Túrion Alvarez, Luis Moreno Mansilla, Stanley Allen, and Bart Lootsma. "Mvrdv Maas vanRijis deVries 1991-1997." Croquis no. 86 (1997): .
- Polakowski, Kenneth J. and University of Michigan. School of Natural Resources. *Zoo Design : The Reality of Wild Illusions*. Ann Arbor: University of Michigan, School of Natural Resources, 1987.
- Robinson, Phillip T. *Life at the Zoo : Behind the Scenes with the Animal Doctors*. New York ; Chichester England: Columbia University Press, 2004.
- Stevens, Peter and Paignton Zoological and Botanical Gardens. *Fourth International Symposium on Zoo Design and Construction, Torquay, Devon, U.K., 14th-18th may, 1989*. Devon, U.K: Whitley Wildlife Conservation Trust, 1992.
- Zuckerman, Solly Zuckerman. *Great Zoos of the World : Their Origins and Significance*. Boulder, Colo.: Westview Press, 1980.

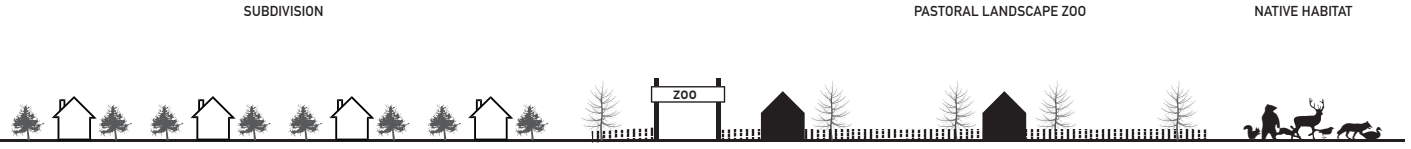
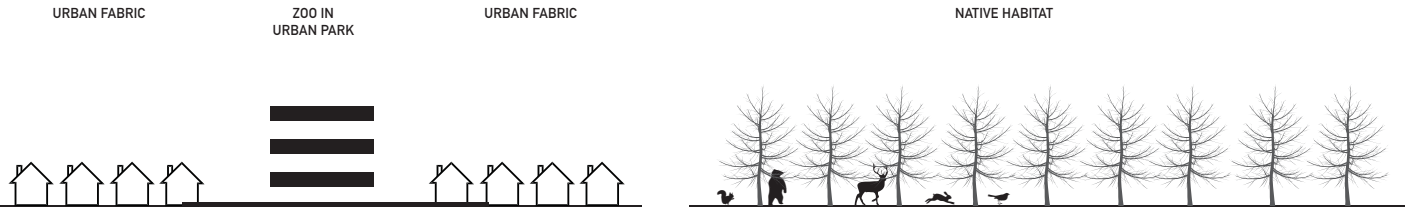
Appendix

List of Figures

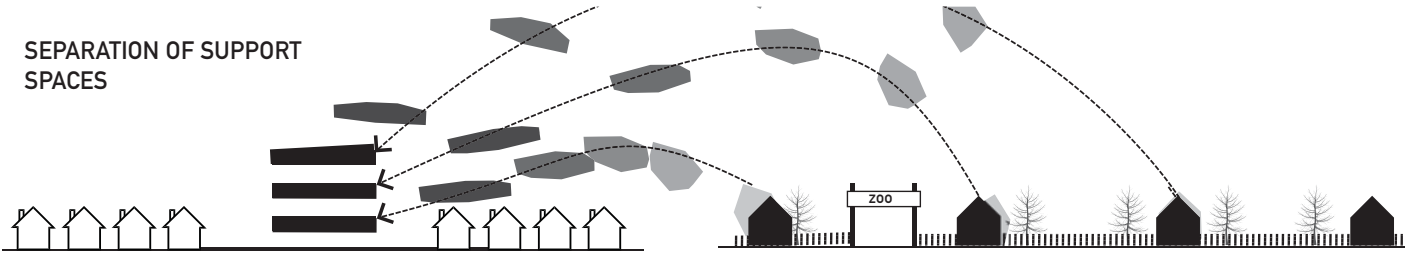
FIG A/PLANNING PRINCIPLES	I
FIG B/ANIMAL STUDY	II
FIG C/3 SECTIONAL PATHWAYS	
FIG D/GENETIC ARCHIVE	III
FIG E/ACCESS THE INACCESSIBLE	III
FIG F/RE-INTRODUCE NATIVE SPECIES	III
FIG G/CLOSE ENCOUNTERS	III
FIG H/IMAGES OF ANIMAL CRUELTY	IV
FIG I/HABITAT LAYOUT DIAGRAM	IV
FIG J/INTERNAL LAYOUT AXONOMETRIC	V
FIG K/EXPLODED AXONOMETRIC - BUILDING ELEMENTS	VI
FIG L/SITEPLAN	VII
FIG M/SUPPORT FLOOR PLAN - MECHANICAL SYSTEMS	VIII
FIG N/HABITAT FLOOR PLAN - ARCTIC TUNDRA	IX
FIG O/SUPPORT FLOOR PLAN - ENTRY AND RECEPTION	X
FIG P/HABITAT FLOOR PLAN - BOREAL FOREST AND TAIGA	XI
FIG Q/SUPPORT FLOOR PLAN - MEDIA CENTRE	XII
FIG R/HABITAT FLOOR PLAN - TROPICAL FOREST	XIII
FIG S/SUPPORT FLOOR PLAN - HEALTH CENTRE	XIV
FIG T/HABITAT FLOOR PLAN - SAVANNAH AND CHAPARRAL	XV
FIG U/SECTION A-A	XVI
FIG V/SECTION B-B	XVII
FIG W/PERSPECTIVE AT GRADE TOWARD THE SOUTH	XVIII
FIG X/PERSPECTIVE FROM CHAPARRAL PATH	XIX
FIG Y/PERSPECTIVE FROM TROPICAL RAINFOREST FLOOR	XX
FIG Z/PERSPECTIVE FROM TEMPERATE FOREST FLOOR	XXI

Appendix

FOOTPRINT



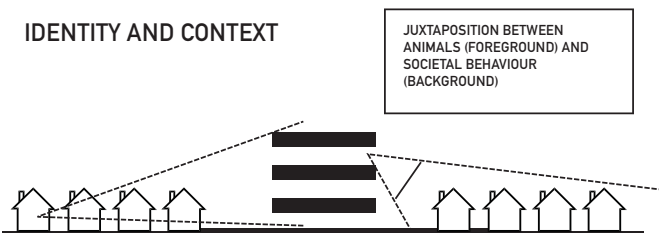
SEPARATION OF SUPPORT SPACES



BIOME SIMULATIONS BETWEEN DEEP PLATFORMS
FOR STORAGE OF WASTE, ANIMAL SUPPLIES, ANIMAL HEALTH CARE
FOR VISITOR SUPPORT SPACES, ADMIN

DISCRETE PAVILIONS
FOR SIMULATING ALIEN BIOMES
FOR STORAGE OF WASTE, ANIMAL SUPPLIES, ANIMAL HEALTH CARE
FOR VISITOR SUPPORT SPACES, ADMIN

IDENTITY AND CONTEXT

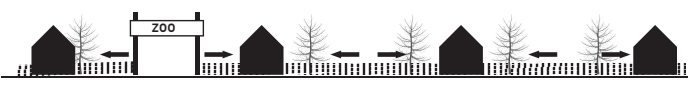
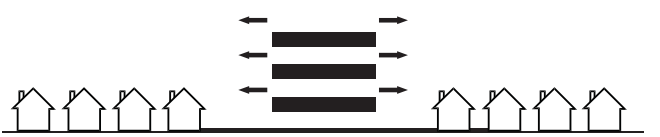


ISLAND DEVELOPMENT BUFFERED BY PARKING LOTS, STRIP MALLS, AND INFRASTRUCTURE - NO VIEWS IN OR OUT



BILLBOARD FOR CONSERVATION, ECOLOGICAL AWARENESS AND ANIMAL RIGHTS

PERCEPTION OF SPACE



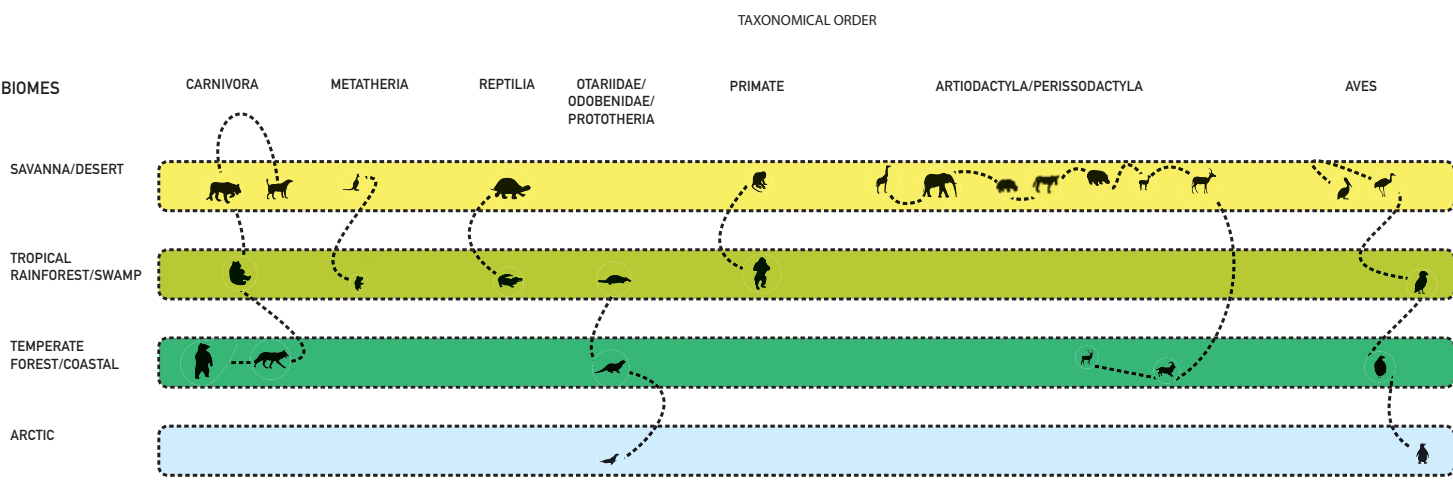


FIG B/ANIMAL STUDY

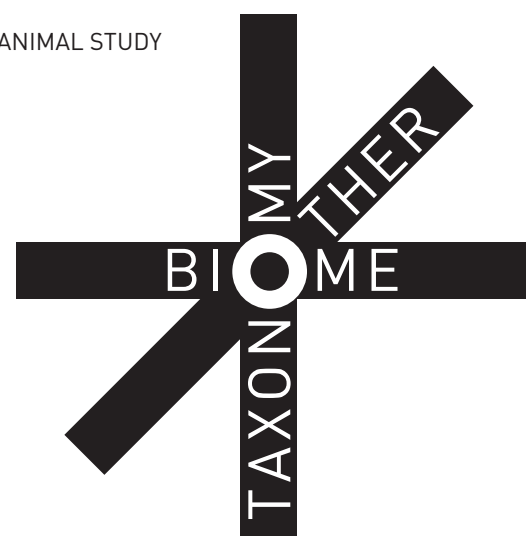


FIG C/3 SECTIONAL PATHWAYS

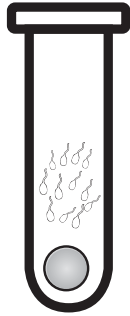


FIG D/GENETIC ARCHIVE

SAMPLES OF ENDANGERED SPECIES COLLECTED AND STORED ON-SITE FOR LATER RE-ANIMATION

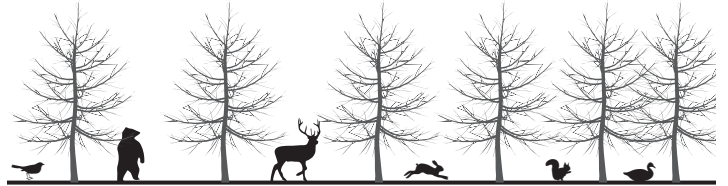


FIG E/RE-INTRODUCE NATIVE SPECIES

HAVING MINIMIZED THE FOOTPRINT, POPULATE THE LOCAL ENVIRONMENT WITH SPECIES THAT HAVE BEEN SQUEEZED OUT BECAUSE OF URBAN SPRAWL

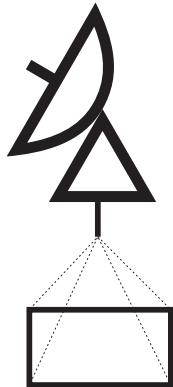


FIG F/ACCESS THE INACCESSIBLE

RECEIVING IMAGES FROM AROUND THE WORLD, A BROADCAST CENTRE ALLOWS FOR ENLIGHTENING PERSPECTIVES WITH MINIMAL EFFECT ON WILDLIFE AND THEIR ENVIRONMENT

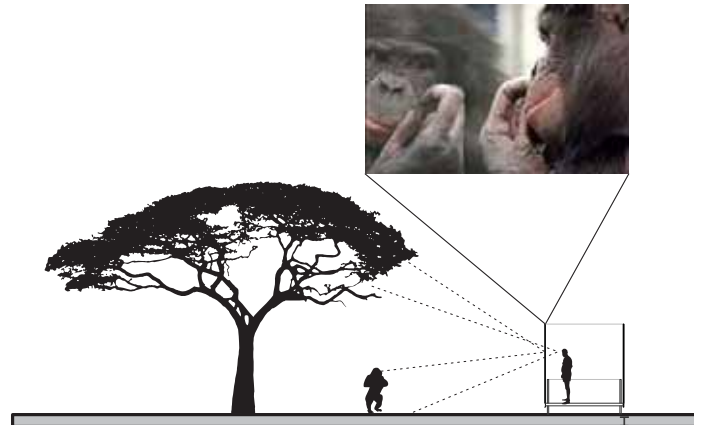
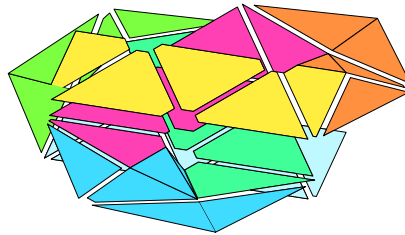


FIG G/CLOSE ENCOUNTERS

ONE WAY MIRRORS OFFER AN INTIMATE GAZE INTO THE MIND OF A SUBJECT AND CONSEQUENTLY help MINIMIZE the zoo's FOOTPRINT



FIG I/IMAGES OF ANIMAL CRUELTY



MAJOR TERRESTRIAL BIOMES

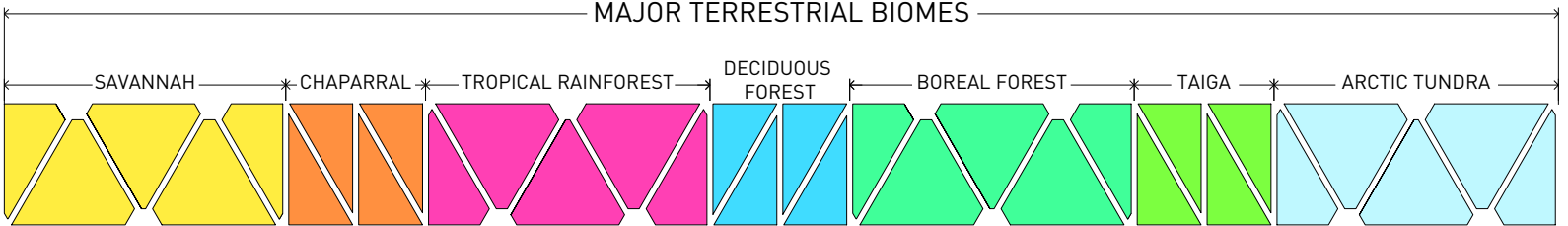


FIG H/HABITAT LAYOUT DIAGRAM

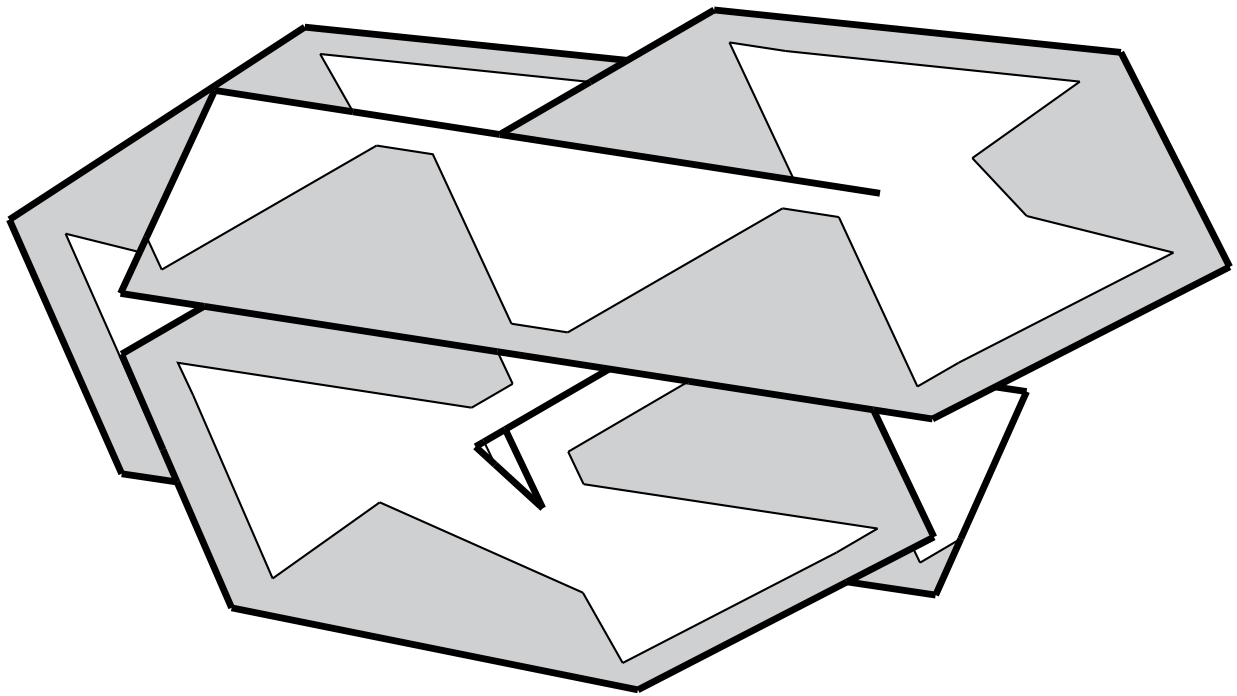


FIG J/INTERNAL LAYOUT AXONOMETRIC

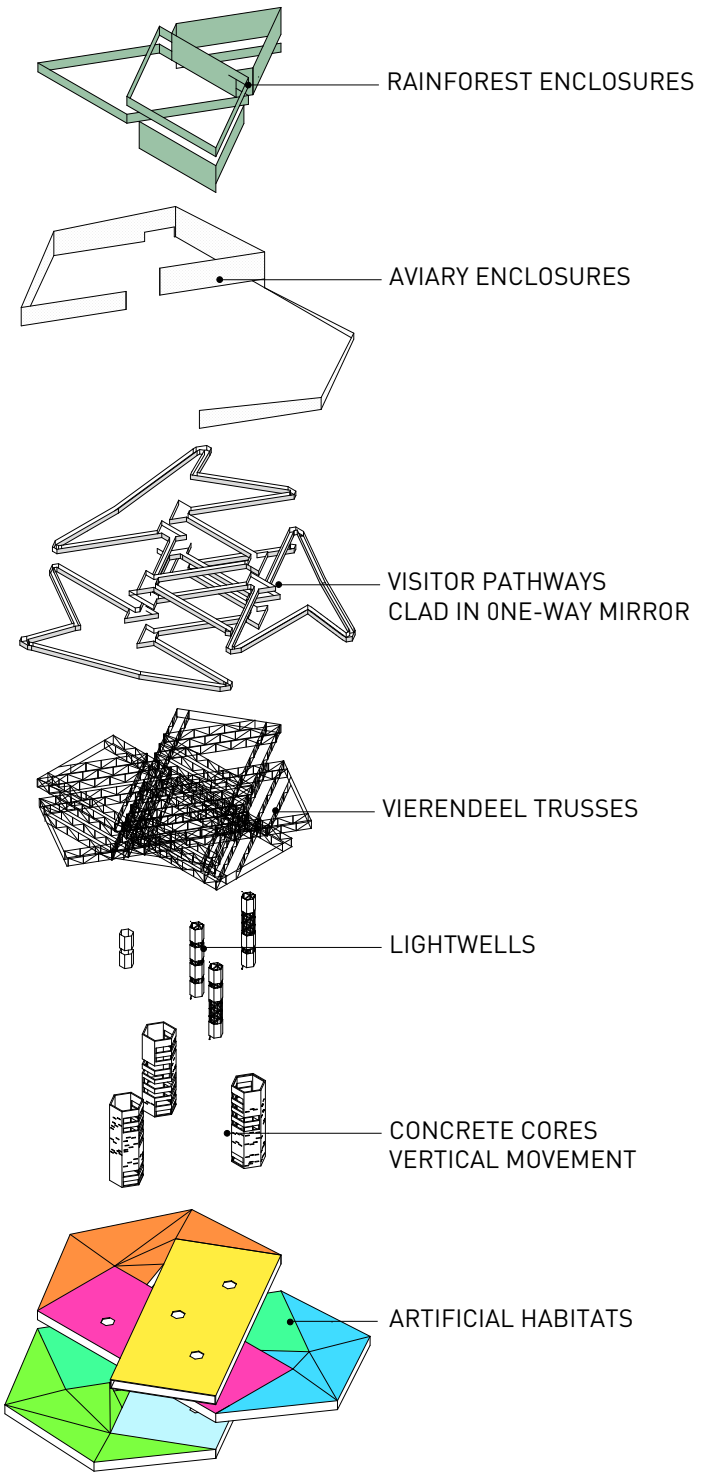


FIG K/EXPLODED AXONOMETRIC - BUILDING ELEMENTS



FIG L/SITEPLAN

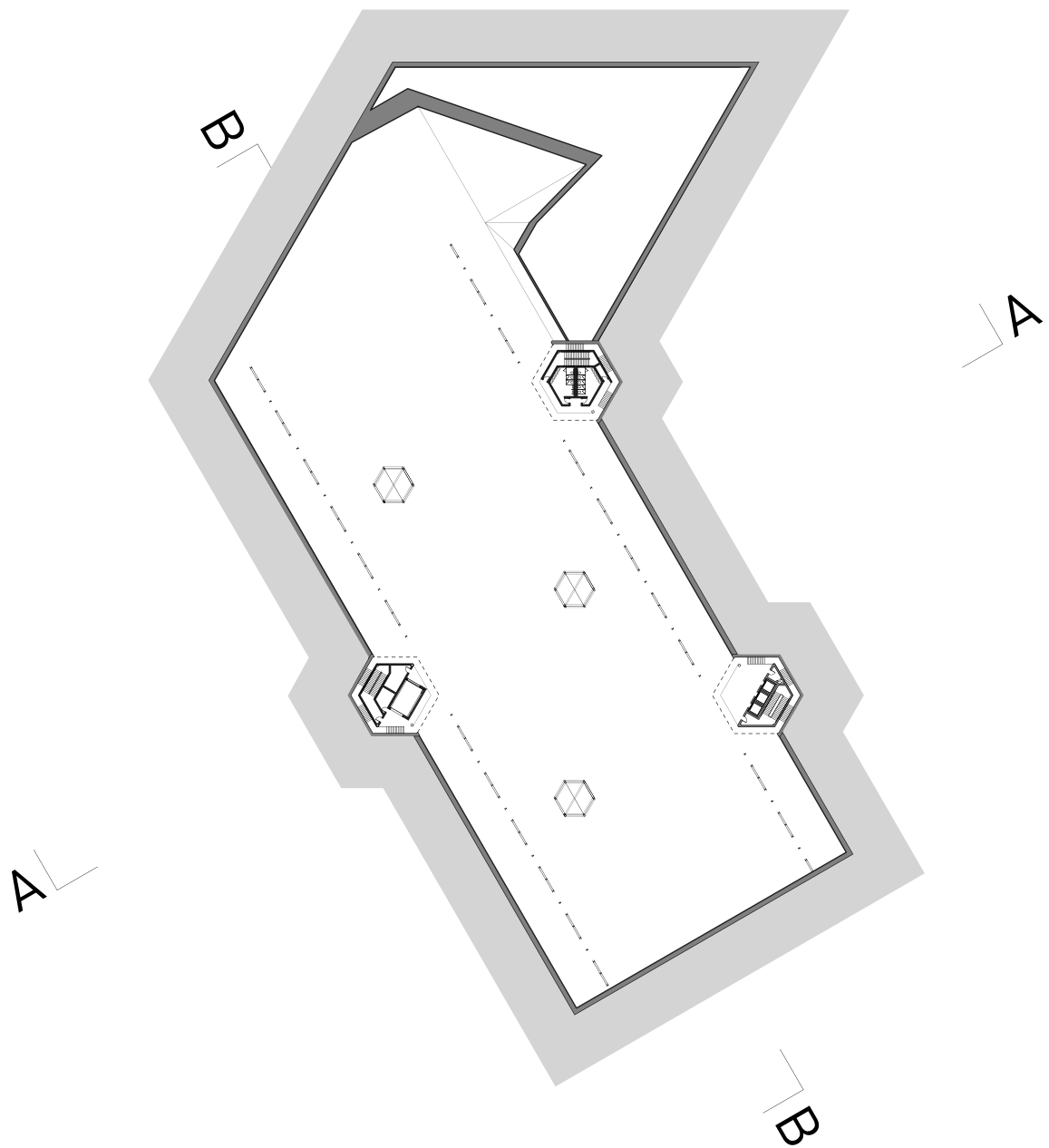


FIG M/
SUPPORT FLOOR PLAN - MECHANICAL SYSTEMS

ANAEROBIC DIGESTIONS
RAINWATER HARVEST CISTERNS
LIVING WETLANDS
RADIANT HEATING MANIFOLD

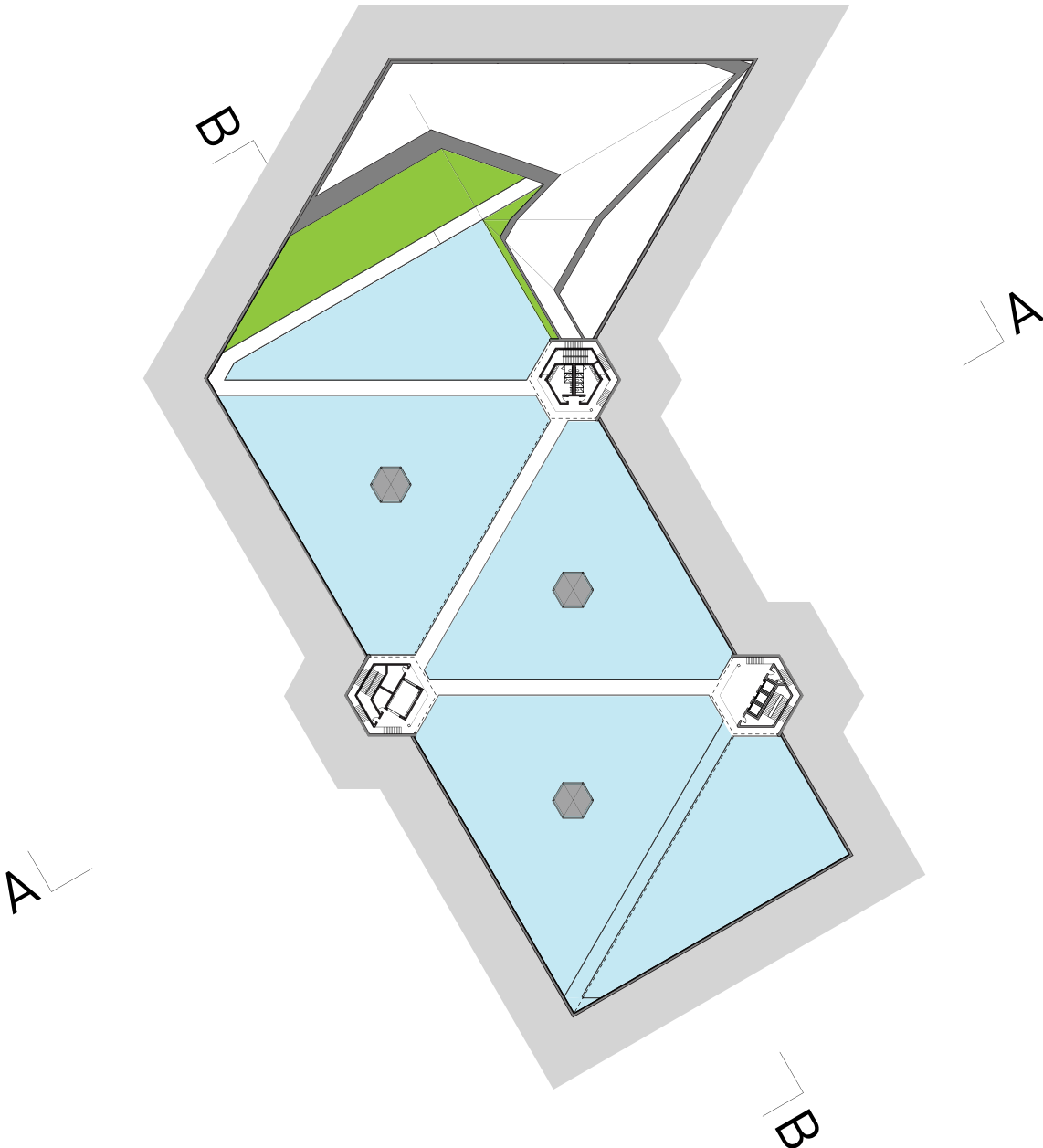


FIG N/
HABITAT FLOOR PLAN - ARCTIC TUNDRA

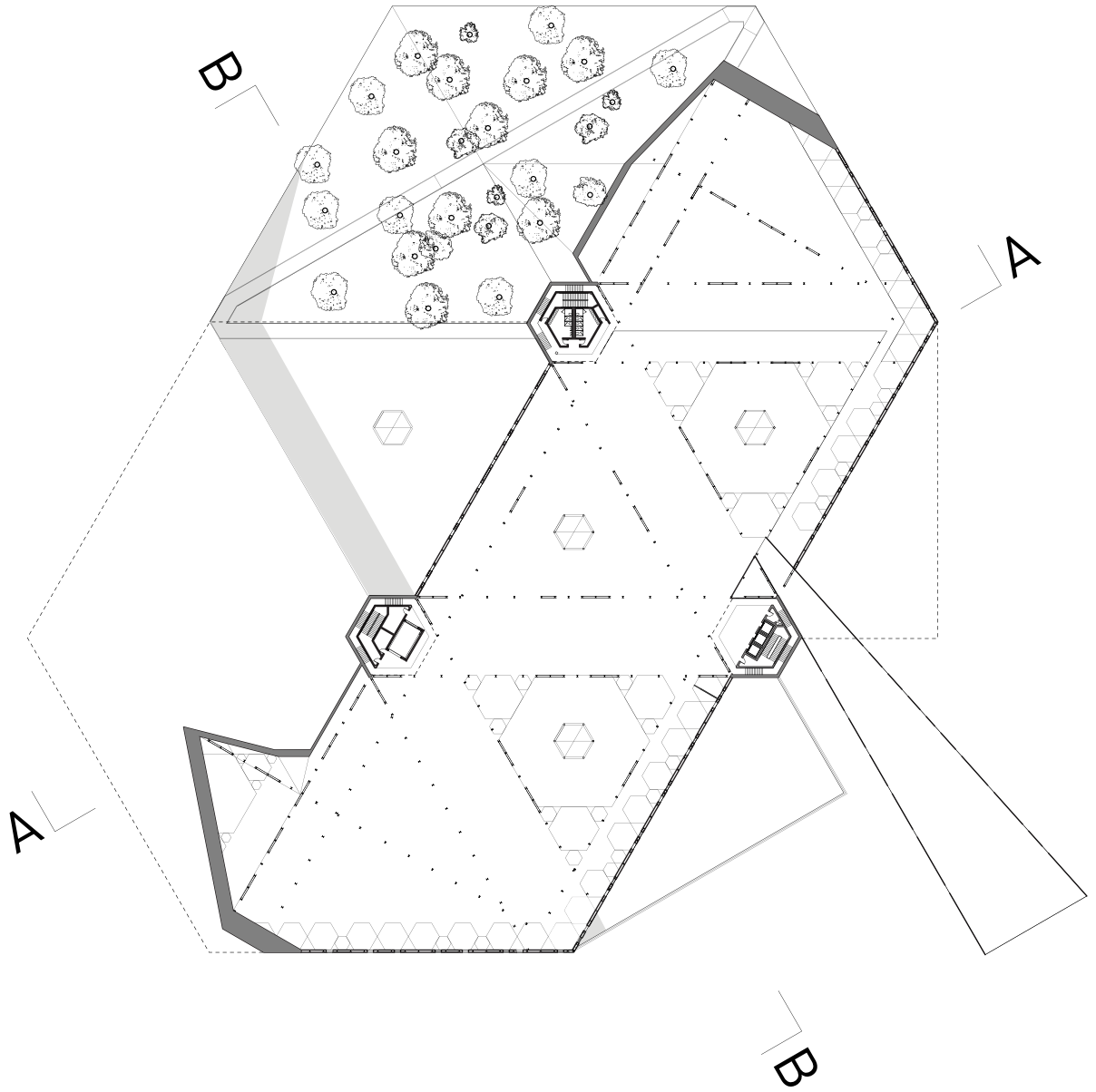


FIG 0/
SUPPORT FLOOR PLAN - ENTRY AND RECEPTION

- ADMISSION
- GIFT SHOP
- GALLERY

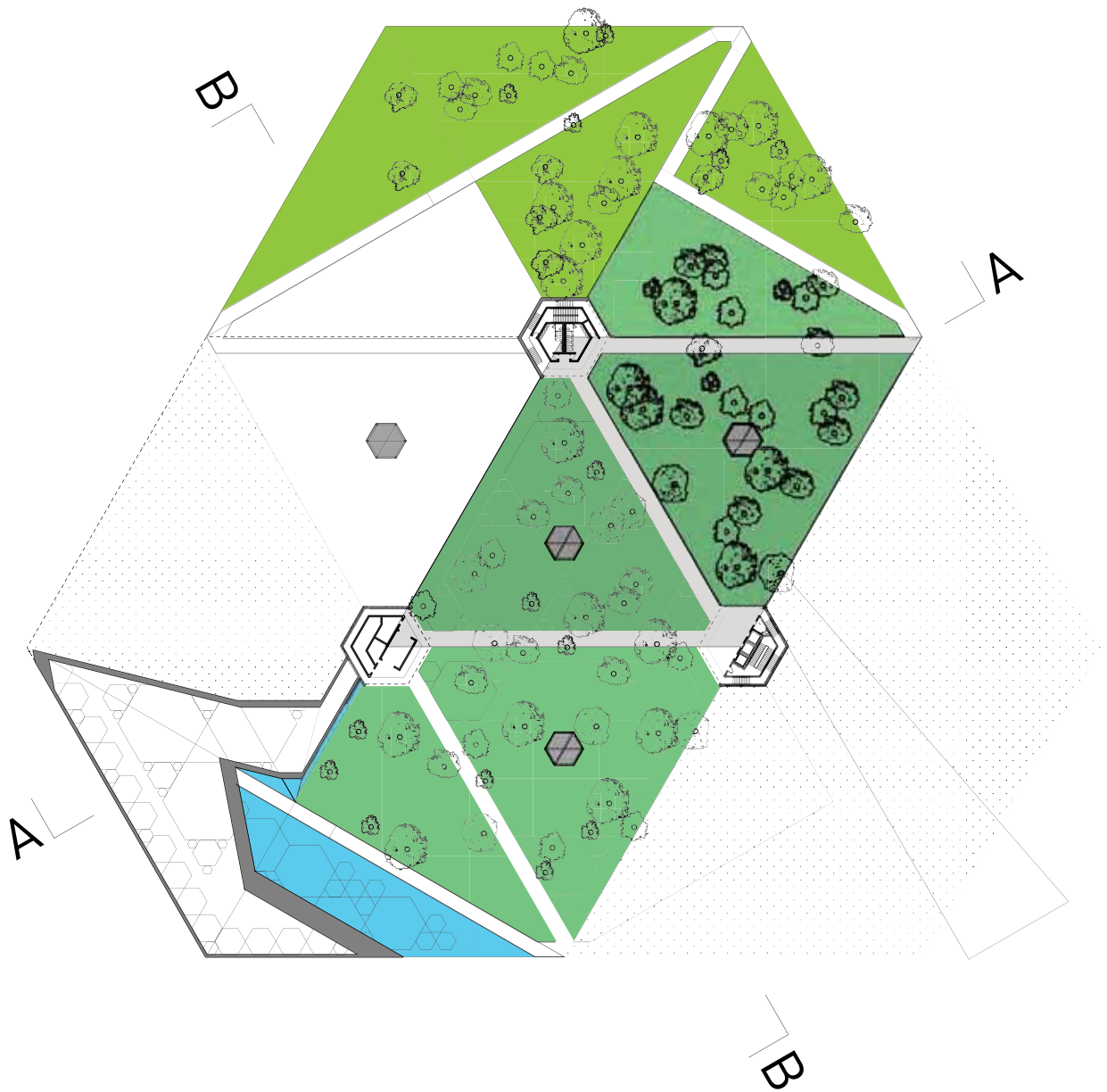


FIG P/
HABITAT FLOOR PLAN - BOREAL FOREST AND TAIGA

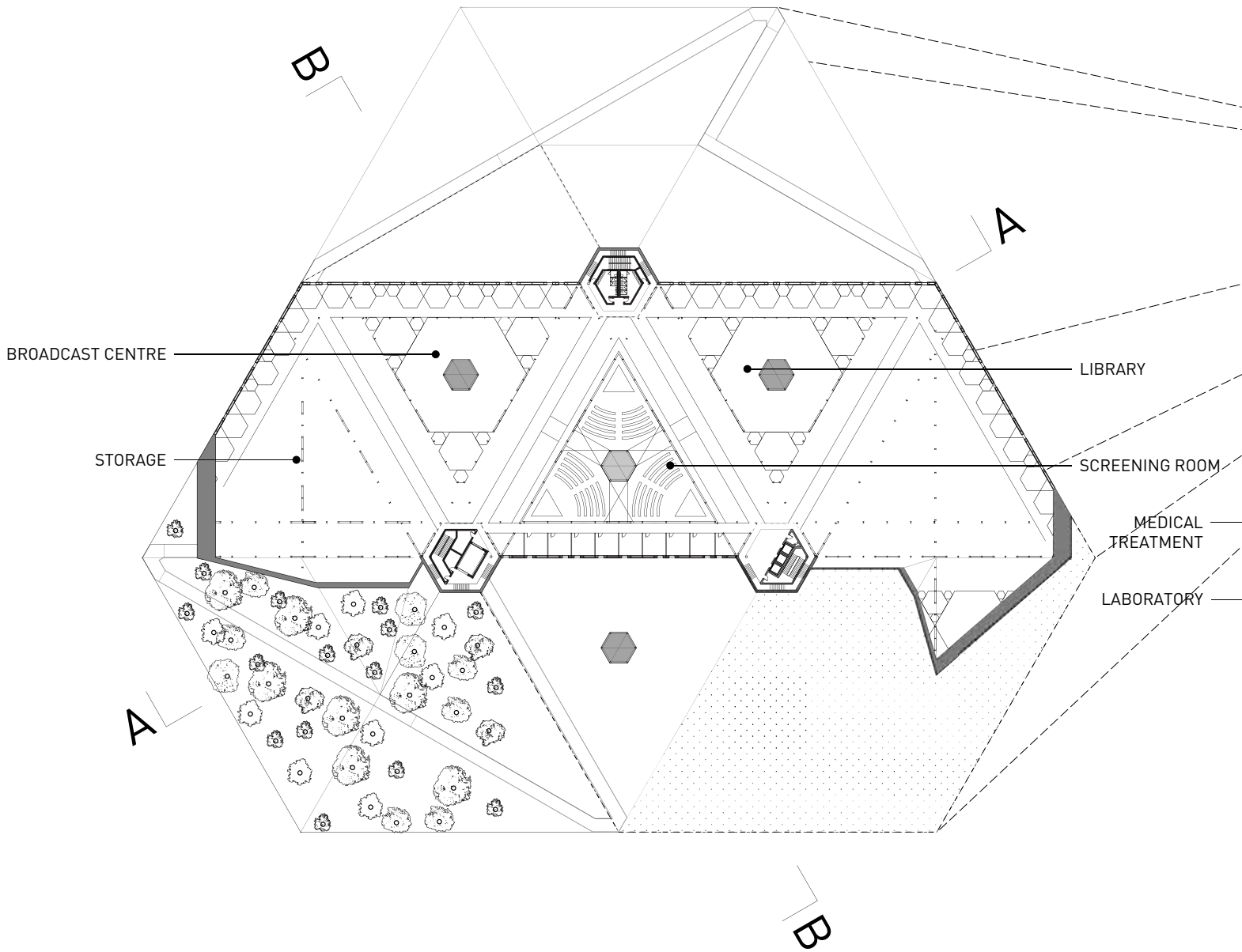


FIG Q/
SUPPORT FLOOR PLAN - MEDIA CENTRE

BROADCAST STATION
SCREENING ROOMS
LIBRARY

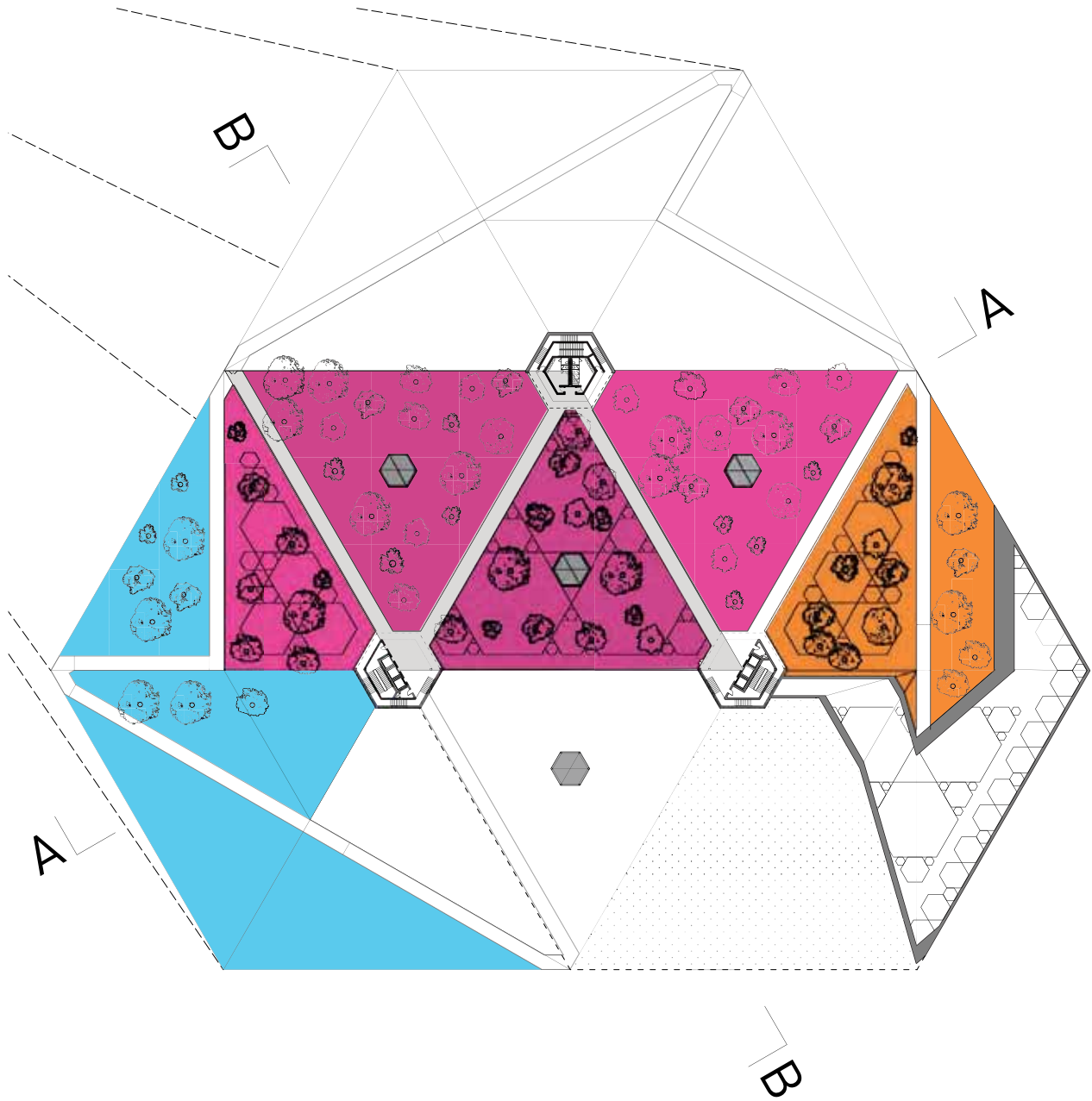


FIG R/
 HABITAT FLOOR PLAN - TROPICAL FOREST

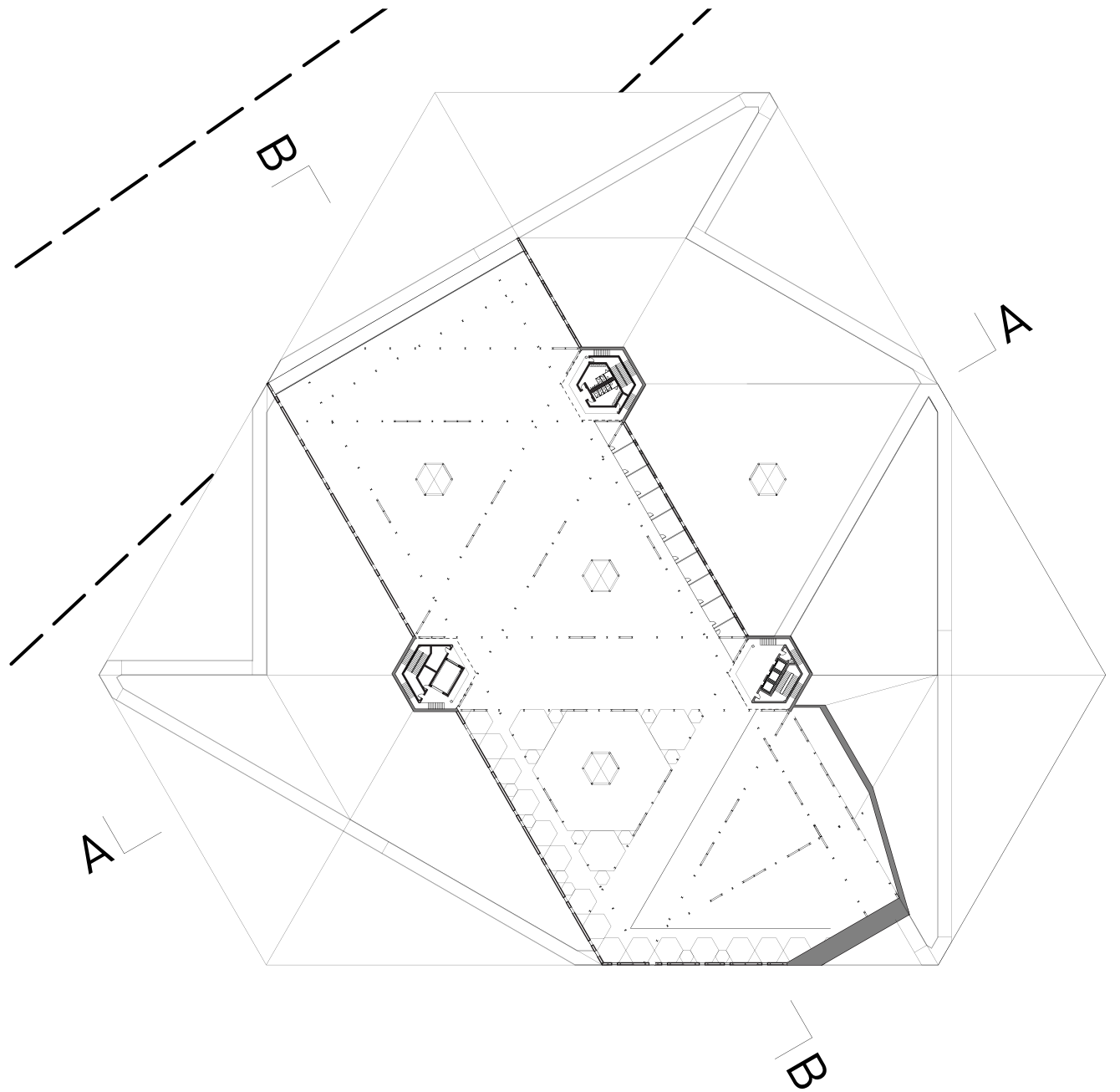


FIG S/
SUPPORT FLOOR PLAN - HEALTH CENTRE

CAFETERIA
ANIMAL HOSPITAL
ANIMAL NURSERY

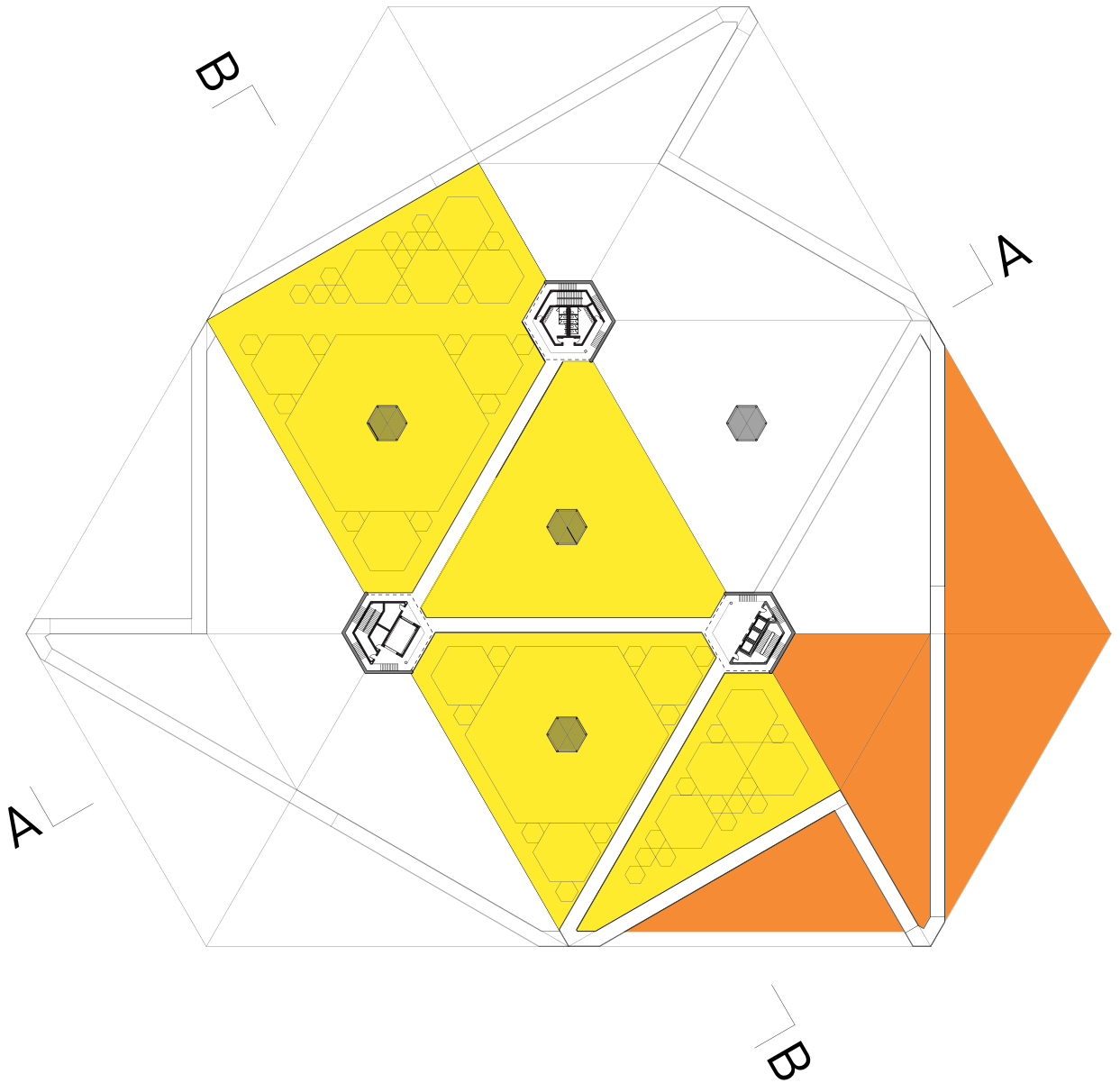


FIG T/
HABITAT FLOOR PLAN - SAVANNAH AND CHAPARRAL

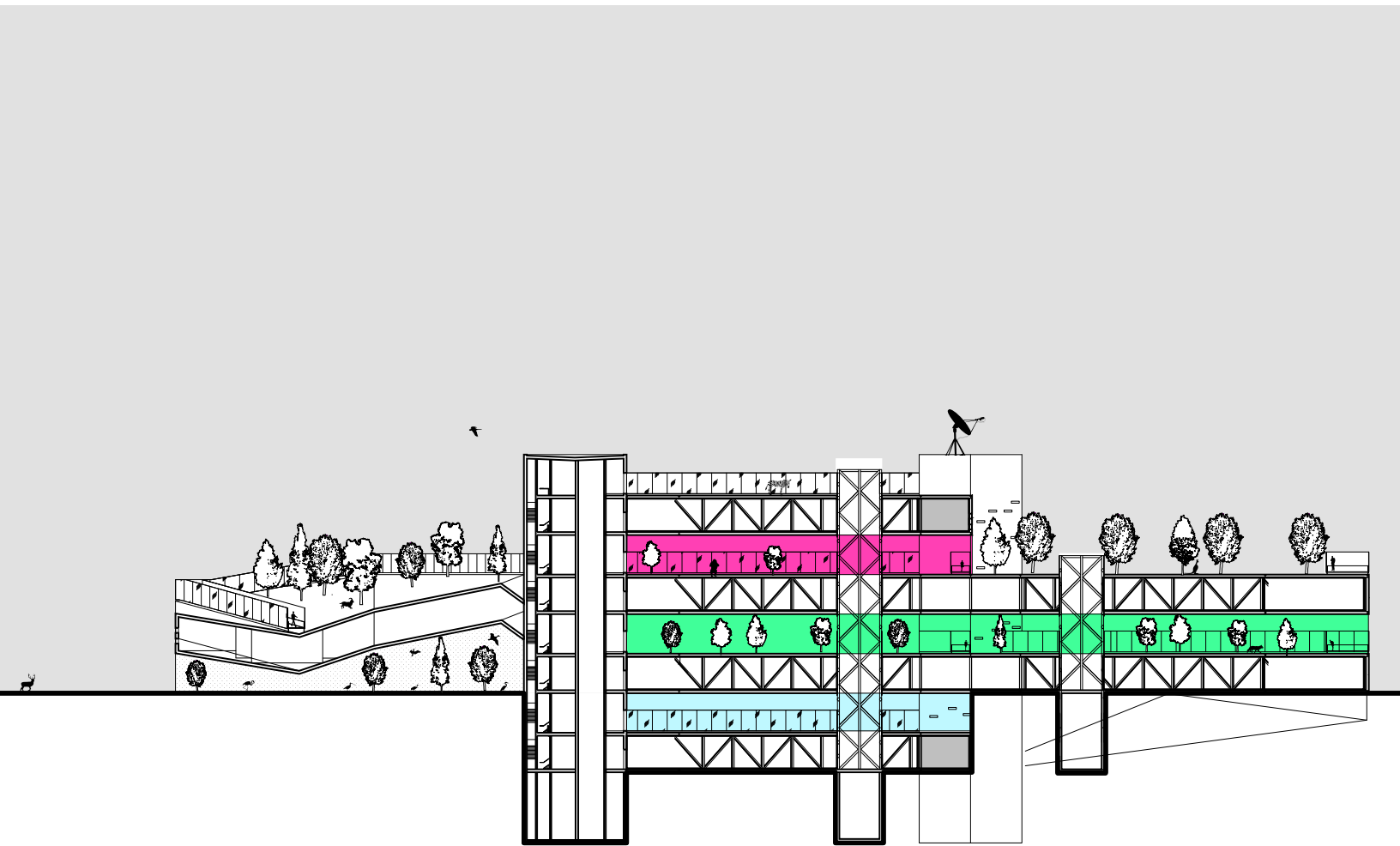


FIG U/
SECTION A-A

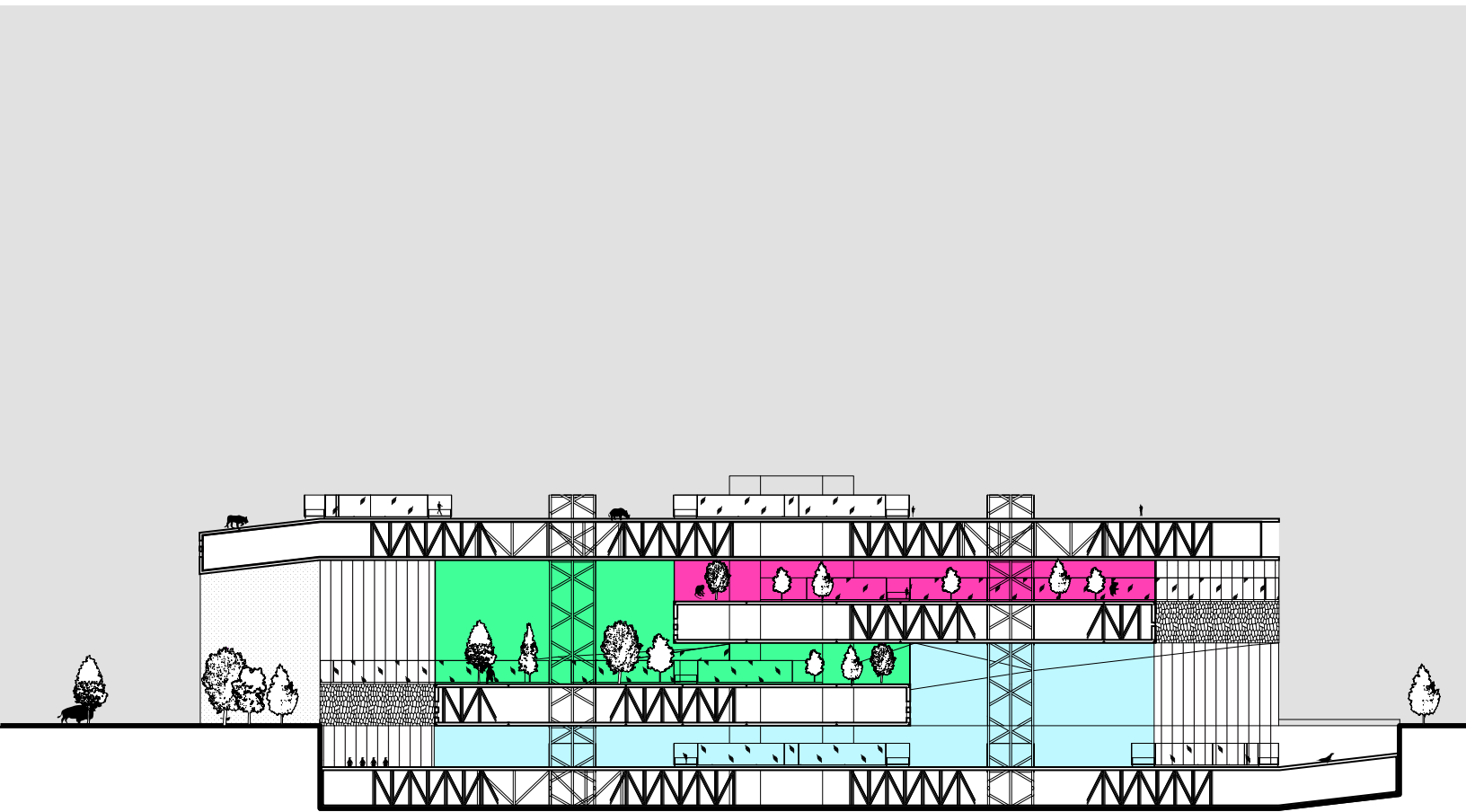


FIG V/
SECTION B-B



FIG W/PERSPECTIVE AT GRADE TOWARD THE SOUTH



FIG X/PERSPECTIVE FROM CHAPPARAL PATH



FIG Y/PERSPECTIVE FROM TROPICAL RAINFOREST FLOOR



FIG Z/PERSPECTIVE FROM TEMPERATE FOREST FLOOR