Montréal Space For Life Architecture Competition

The Insectarium's metamorphosis

Renewed Biodôme

Botanical Garden Glass Pavilion

SUMMARY PROGRAM

February 10, 2014

MONTRÉAL
UNESCO CITY
OF DESIGN

Bureau du design
Montréal

espace pour la vie montréal
biodôme
insectarium
jardin botanique
planétarium
rio tinto alcan

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MONTRÉAL SPACE FOR LIFE

1. SPACE FOR LIFE: A PLACE, A MOVEMENT, A COMMITMENT

Through their outreach, conservation, research and education activities, the Montréal Biodôme, Insectarium, Botanical Garden and Rio Tinto Alcan Planetarium help people enjoy nature to the fullest.

Together, they form **Canada's largest natural science museum complex** and constitute the **first space in the world dedicated to humankind and nature**.

Together, they form an active hub of biodiversity, open to the world, in the heart of the city: a SPACE FOR LIFE.

A place

THE MONTRÉAL SPACE FOR LIFE is made up of four nearby attractions: the Botanical Garden, Biodôme, Insectarium and Rio Tinto Alcan Planetarium. These four prestigious institutions form Canada's largest natural science museum complex and represent a major hub enjoying local, national and international recognition. With 1.7 million visitors a year, the SPACE FOR LIFE is Quebec's leading paid attraction and one of the most popular tourist sites in Montréal and Quebec as a whole.

It not only combines a number of historic and symbolic Montréal landmarks, but also has the potential to impress and thrill visitors with nature, explain nature and encourage behaviour that respects nature. This is a living laboratory where the infinitely small takes on gigantic proportions and the infinitely large is brought within reach.

A movement

THE MONTRÉAL SPACE FOR LIFE is an original, distinctive and unique movement that invites everyone to rethink the bonds between humankind and nature. By offering visitors immersive experiences combining science and emotion, the Biodôme, Insectarium, Botanical Garden and Planetarium invite them to look at nature in a new way, urging them to cultivate a new way of living, through a participatory and fundamental approach.

Like nature itself, which belongs to us all, it is a collective movement, encouraging everyone to become involved and make it their own. This includes the staff of all four institutions, local players, stakeholders in the project's development and visitors from around the world who can leave their marks.

A commitment

THE MONTRÉAL SPACE FOR LIFE signals a commitment to humanity. This commitment represents the promise to allow life and biodiversity to resume their rightful places in the urban fabric. It also represents the commitment by the city of Montréal to continue building a green city, focusing on sustainable development and respectful of its biodiversity.

1.1 MISSION

Through its outreach, conservation, research and educational activities, help people enjoy nature to the fullest.

1.2 VISION

Biodiversity feeds us, cares for us, even lets us breathe. Its deterioration, exacerbated by human activity, is a truly vital issue for the planet.

This is why the Montréal Botanical Garden, Biodôme, Insectarium and Rio Tinto Alcan Planetarium, building on their extensive knowledge and the beauty of their collections, decided to speak with one voice so as to jointly create the world's largest place devoted to humankind and nature.

The Montréal SPACE FOR LIFE wants to join with the public and rethink the connection between humankind and nature, to reconcile nature and urbanity. **It plans to do so by combining art, science and emotion in a bold and totally original way.**

The vision underpinning the SPACE FOR LIFE has three central goals:

- **impress and thrill visitors with nature** through **immersive and interactive experiences** that bring them face to face with nature, by revealing its beauty, complexity and diversity;
- **explain nature** by making its messages clearer;
- **encourage behaviour that respects nature** by fostering open-minded attitudes and change.

This vision will make it possible to **position Montréal as the flagship of a vast global movement for biodiversity.**

1.3 COMMITMENT TO SUSTAINABLE DEVELOPMENT

THE SPACE FOR LIFE has drawn up a charter laying out a commitment to sustainable development in connection with its activities. The goal is to minimize its impact on the environment while improving the quality of life of individuals, peoples and generations to come.

THE SPACE FOR LIFE is committed to integrating sustainable development principles in all its activities, encouraging innovative projects that foster sustainable development, organizing eco-responsible events and managing its resources and waste in keeping with this commitment. Guided by the latest concepts of urban planning and perfectly aligned with the evolution of lifestyles and major trends in urban renewal, it goes without saying that the SPACE FOR LIFE aims for the highest standards of eco-design in all its development, maintenance and construction work. Lastly, the SPACE FOR LIFE plans to encourage reflection on the place, roles and responsibilities of humankind in nature, through bold approaches in everything it does.

In keeping with its mission and vision, this commitment to sustainable development is founded on the intrinsic values of the four founding SPACE FOR LIFE institutions: **daring, openness, respect and integrity**.

1.4 BACKGROUND AND DESCRIPTION OF THE SPACE FOR LIFE INSTITUTIONS

1.4.1 BACKGROUND

In 2008, the arrival of a new Executive Director breathed new life into the organization comprising the Montréal Biodôme, Insectarium, Botanical Garden and Rio Tinto Alcan Planetarium. The 650 employees of the four attractions met in November 2008 to discuss the future, social role and potential impact of the SPACE FOR LIFE. Everyone agreed that in future the four institutions should speak with one voice, to send a stronger message concerning the importance of biodiversity and nature as a whole, and the role of the human beings at its heart. This is when the existing group of institutions was renamed the MONTRÉAL SPACE FOR LIFE, a name expressing its vision and mission.

1.4.2 An exceptional natural heritage

The SPACE FOR LIFE houses plant, animal and insect collections as well as an exceptional collection of meteorites, all of them sources of wonder. The four unique institutions complement each other admirably. Their impact exceeds the sum of their individual fields of expertise – botany and horticulture, ecology, entomology and astronomy. Together they let visitors discover nature from a more global and integrated perspective, and grasp the connections between its different elements.

Individually and collectively, the four institutions encourage dialogue between their respective disciplines so as to offer a more complete and integrated portrait of nature. Together they are committed to sharing their vast heritage and knowledge with as many people as possible.

Today the SPACE FOR LIFE is:

- over 1.7 million visitors every year
- 650,000 young people
- 40% local and other tourists
- 22 million Web pages consulted
- $642 million in assets

1.4.3 The Botanical Garden

The Montréal Botanical Garden, opened in 1931, covers 75 hectares next to Maisonneuve Park.

The Garden is one of the world's largest, a leading centre for education, botanical research and horticultural excellence. It was declared a National Historic Site in 2008.

Aside from the Reception Centre, administration buildings, production greenhouses and technical facilities, there are a variety of specialized gardens and greenhouses:

- over twenty thematic gardens
- 10 exhibition greenhouses
- 20 conservation greenhouses
- 22,000 plant species and cultivars
- 625,000 live specimens
- hundreds of rare or threatened species
- the First Nations Garden, presenting the traditions, cultures, knowledge and know-how of the first inhabitants of the Americas
- the Tree House, next to the Arboretum
- the Japanese Garden and Pavilion, consisting of a bonsai courtyard, a tea garden and a dry landscape garden
- the Chinese Garden, assembled by Chinese craftspeople, thanks to the close bonds between the Botanical Garden and the city of Shanghai
- the Courtyard of the Senses, a unique garden that appeals to all the senses

In addition, the Botanical Garden's Main Exhibition Greenhouse hosts a number of special exhibitions throughout the year: *The Great Pumpkin Ball*, a Christmas exhibition, *Butterflies Go Free* (produced in partnership with the Insectarium) and various horticultural exhibitions. The *Gardens of Light* event, which illuminates the Chinese Garden and the Japanese Garden, alone attracts over 250,000 visitors.

The Botanical Garden has remained popular all this time because it has been renewed over and over again. Throughout its 80-year history, it has always offered attractions and events that have earned it visitors' affection and enthusiasm.

Visitors to the Botanical Garden

Admission to the Botanical Garden also includes access to the Insectarium. The Montréal Botanical Garden welcomes nearly 900,000 visitors a year, and an average of 350,000 also visit the Insectarium.

The Université de Montréal Biodiversity Centre

Set in the heart of the Botanical Garden, the Université de Montréal Biodiversity Centre is a natural outgrowth of the longstanding collaboration between the two institutions behind the plant biology research institute (Institut de recherche en biologie végétale, or IRBV). The Biodiversity Centre is an internationally renowned centre of excellence in biodiversity.

The LEED Gold building, a perfect setting for sharing resources and expertise, houses ultramodern facilities and some 200 researchers, student researchers and associate researchers working to inventory and preserve biodiversity and increase public awareness of its importance. It is a unique learning environment.

The new building consists of two separate volumes on two floors, wrapped in silkscreened glass, with one wing of laboratories and one wing devoted to raising awareness of biodiversity, an exhibition room open to Botanical Garden visitors.

It also offers ideal conservation conditions for the prestigious collections in its safekeeping: 1.7 million insect specimens, including the Insectarium's collections, along with 900,000 plant specimens and 2,000 fungi species.

1.4.4 The Insectarium

The Montréal Insectarium, opened in 1990, was the first museum in North America entirely devoted to insects. Its immersive and intimate, playful, youthful and contemporary approach lets visitors interact directly with live insects, play in the BuzzGround, and enjoy hands-on activities through school programs like Monarchs Without Borders.

Exhibitions, events and activities
The current permanent exhibition, *We Are the Insects*, opened in 2011. Since then it has been illustrating insects' amazing adaptations for survival and their astounding diversity. It features over 3,000 magnificent mounted specimens and about 100 live specimens.

The *Butterflies Go Free* event remains very popular. Nearly 150,000 visitors turn out in the depth of a Quebec winter to stroll through a lush tropical grove and admire more than 1,500 butterflies and moths flitting about. The event is held in the Botanical Garden's Main Exhibition Greenhouse, in co-operation with the Garden.

In summer, budding entomologists enjoy the BuzzGround, a fun and educational playground full of activities and discoveries. Its butterfly garden, a pond with aquatic insects and the interactive modules and activities are always a hit.

Scientific and research collection
The Insectarium has a scientific collection of 250,000 mounted insect specimens from around the world, with the accent on local insects. The collection is housed in the Université de Montréal Biodiversity Centre.

Through its collection efforts and research into insect biodiversity, the Insectarium is working to safeguard our global entomological heritage.

Visitors to the Insectarium
350,000 visitors on average to the museum
150,000 visitors on average to *Butterflies Go Free*

1.4.5 The Biodôme

The Biodôme opened in 1992 in the former Velodrome at the Olympic Park, taking advantage of the bright space with its roof full of skylights.

The Biodôme seeks to make individuals and our society as a whole aware of the importance of protecting the environment, through its educational activities, exhibitions and events on the theme of biodiversity, enhancements to its live collections and research.

Its approach is based on:
- Live specimens

- Authentic representations of nature
- An immersion experience for visitors

A focus on the ecosystem concept
The Biodôme presents plants and animals of the Americas, in representations of ecosystems that reflect the interactions between living organisms and their environment as faithfully as possible. To illustrate these interrelationships, the Biodôme depicts several ecosystems of the Americas, each with its own physical environment and individual climate. Aside from the animal species, there are basins, rocks and plants that evoke the natural environments with maximum accuracy. There are five ecosystems represented:

Tropical Rainforest: This ecosystem corresponds to the Amazon basin. The climate is stable, but the diversity of species is astounding, and includes cecropia trees, sloths, caimans, bromeliads and many others.

Laurentian Maple Forest: This ecosystem illustrates the mixed forest typical of Quebec north of Montréal. Here visitors can see maple, birch and fir trees, trilliums, brook trout, beavers, otters, lynx and more. Just as in nature, the trees lose their leaves in the fall, and everything goes into dormancy in winter. Spring arrives at the Biodôme a month earlier than in Montréal.

Gulf of St. Lawrence: This ecosystem corresponds to the marine portion of the St. Lawrence. Its cold, salty waters are rich with cod and pollock, crabs, anemones, seastars, common eiders, terns, etc.

Labrador Coast and Sub-Antarctic Islands: This section presents the habitats and bird families of the sub-Arctic (auks) and sub-Antarctic (penguins) regions.

Highlights:
- 5 ecosystems of the Americas under one roof
- 4,000 animals
- 230 animal species
- 1,500 plants

Conservation
The Biodôme is part of various national and international programs aimed at conserving and restoring threatened species, including golden lion tamarins, and protecting fragile natural habitats.

Scientific research
The Biodôme's research team works to advance knowledge through projects focusing on a number of strategic aspects of biodiversity, sustainable development and bio-engineering. Most of its researchers are professors associated with Quebec universities.

Biodôme visitors
Every year, the Montréal Biodôme welcomes over 800,000 visitors, including 130,000 young people in school groups.
- 30,000 young people take part in school activities;
- 77,000 young people come on self-guided tours (from elementary and secondary schools, CEGEPs, universities and day camps);

- 78,068 visitors come with group tours.

1.4.6 The Rio Tinto Alcan Planetarium

The Rio Tinto Alcan Planetarium opened in spring 2013. Built at a cost of $48 million near the Olympic Stadium and the Biodôme, it forms one side of the public square that is to become the Grande Place of the SPACE FOR LIFE.

The building is an impressive achievement, the fruit of an international architectural competition held in 2008. Its spectacular, green architecture and its original approach to astronomy, drawing on science, art and poetry, combine to make it a unique place that offers visitors special contact with nature, the sky and humanity.

The concept is built around two cones pointing skyward like giant telescopes, which house the two star theatres.

The building is aiming for LEED Platinum certification, thanks to the way it integrates advanced concepts in energy efficiency and different architectural elements:

- reduced energy consumption through natural air displacement ventilation
- reduced water consumption
- optimal use of natural daylight
- green roof
- use of recycled materials

The Rio Tinto Alcan Planetarium replaced the downtown Montréal Planetarium. Between its opening in 1966, when it was known as the Dow Planetarium, and its closing in 2011, it welcomed nearly 6 million visitors.

1.4.7 The Grande Place

The Grande Place is at the heart of the MONTRÉAL SPACE FOR LIFE and represents its core values. It stretches from the Botanical Garden and the Insectarium to the Biodôme and the Rio Tinto Alcan Planetarium, uniting the four institutions as one SPACE FOR LIFE.

By 2017 this vast esplanade will offer visitors new ways of moving around, coming together, enjoying the spaces, building, and experiencing everyday life. Its design is still in the planning stages, but it will be based on public input. Everyone will be invited to take meaningful actions to leave their imprint on the space. A constantly evolving agora, shaped and brought to life by its users, will gradually take form. Though its harmonious, fluid and intuitive character, the Grande Place and its experience will symbolize the connection between humankind and nature.

The Grande Place will make life simpler for visitors wishing to move between the Biodôme, Insectarium, Botanical Garden and Rio Tinto Alcan Planetarium. It will connect to the metro, making it fully accessible. It will serve as a unique pathway between the institutions, guaranteeing that no one will be bored. Accessible day and night, it will offer various experiences in every season, and a place to relax and briefly escape the hustle and bustle of the city. The Grande Place will include a central gathering space, to be brought to life and shaped by its users.

1.5 AN AMBITIOUS DEVELOPMENT PLAN

In 2009, the SPACE FOR LIFE undertook an ambitious $189.3 million business plan, to be carried out by 2017, when Montréal celebrates its 375th anniversary. The investments made at its prestigious institutions, true jewels of Montréal's heritage, will help position the city as the flagship of a vast global movement for biodiversity, with the goal of inventing new ways of living so as to reconnect humankind with nature.

Following the opening of the Université de Montréal's Biodiversity Centre at the Botanical Garden in March 2011 and the Rio Tinto Alcan Planetarium in April 2013, the SPACE FOR LIFE has launched plans for its three other major projects, already identified as major legacies to mark Montréal's 375th anniversary. These projects, which are the subject of this competition, are:

- **INSECTARIUM METAMORPHOSIS (PROJECT A)**
- **BIODÔME RENEWAL (PROJECT B)**
- **GLASS PAVILION AT THE BOTANICAL GARDEN (PROJECT C)**

The proposed **Grande Place of the Space for Life** (not part of the competition) will link the four attractions.

These three projects have much in common, in terms of their architecture and design and the memorable, distinctive visitor experience. They are distinguished, however, in their nature, their objectives and their challenges. They are all located in the same place, nonetheless: the SPACE FOR LIFE. The creative approach applied in these three projects must be based on its unique mission and vision. These projects will allow the SPACE FOR LIFE to play its role properly, by inviting the public to reconnect with nature and invent new ways of living.

2. OBJECTIVES OF THE COMPETITION AND PROJECTS

The SPACE FOR LIFE wants to become the largest "space" devoted to building awareness about and furthering research into biodiversity, one that showcases nature and our connection with it.

The general objective is for the projects chosen through this competition to convey and transcend the vision and overall concept of the SPACE FOR LIFE.

Through these three projects, the SPACE FOR LIFE wants to consolidate the experiences offered in its "Space" and to rethink its approach to increasing awareness of biodiversity.

The immersive approach is to be updated and integrated into the natural and built environment of the "Space." The innovative approaches in this museum environment must bring humankind and nature together at the heart of the immersive experience.

2.1 ARCHITECTURAL OBJECTIVES

- **Current situation**

The SPACE FOR LIFE complex is located on two very separate sites in both physical and architectural terms: the Olympic Park and the Botanical Garden.

The one site contains the Biodôme and the Rio Tinto Alcan Planetarium, set in the Olympic Park, a venue with a sports vocation and iconic architecture. The other site contains the Botanical Garden, with the Insectarium on its grounds.

The facilities and the current architectural context are characterized by the pavilion treatment. This is also the approach called for in the urban planning by-laws applying to the two sites.

- **Creating a "Space," a unified museum complex**

The conceptual objective for the SPACE FOR LIFE is to create a **unified museum complex.**

How is it possible to create a common "Space" by amalgamating a series of buildings and facilities with such a wide range of styles and functions? The answer lies in **unifying** the visitor experience as it relates to nature and biodiversity.

The immersive experience must henceforth be the unifying conceptual approach for visitor experiences at the SPACE FOR LIFE. This will mean that the architecture for each part of the complex can correspond to this essential principle without giving up its own identity.

- **Creating "A site"**

Aside from the diversity of its facilities, the SPACE FOR LIFE is also divided into two very distinctive settings: the greenery of the Botanical Garden, and the concrete of the Olympic Park for the Biodôme and the Rio Tinto Alcan Planetarium.

Since the three projects in the competition are located on these two sites, they offer excellent opportunities to reconsider how the entire complex can be given a unified look.

This will clearly be the role of the future Grande Place (not included in the competition), but this future is not far off. It should be taken into account in the way the three parts of the project are handled and how they relate to this planned space.

- **Integration**

The concept of integration applies to several aspects of the SPACE FOR LIFE: the site, the setting and the immersive visitor experience.

Nature consists of an infinite variety of distinctive elements, each with its own role. This is what we call biodiversity. In these projects, accordingly, we are looking for:

- integration with the SPACE FOR LIFE vision
- integration of the human, natural and architectural elements
- integration with the natural Botanical Garden site
- integration with the built and heritage environment
- integration with existing structures
- integration with operations

Although the facilities and pavilions offer different visitor experiences, the SPACE FOR LIFE wants to see them integrated into a common vision. In that connection, the SPACE FOR LIFE would like the new buildings to integrate or evoke specific architectural language elements, so as to begin creating the image of a more coherent architectural ensemble.

For the Insectarium Metamorphosis (Project A), the concept of integration will be reflected in the museum program. Its current location means that the building is not highly visible, and it is somewhat difficult to get to from the main entrance. The expansion will be an opportunity to make the building easier for visitors to find and to grasp its vocation, other than as seen from above.

The volume and height of the Glass Pavilion (Project C) must also be considered, since it will adjoin the new Université de Montréal Biodiversity Centre and the exhibition greenhouses, two vital attractions for the SPACE FOR LIFE.

- **Visibility**

While it may seem odd to speak of visibility in an overall concept like the one we are seeking, it is actually very significant in expressing biodiversity, a part of nature.

Just as nature is made up of the same fundamental elements, which are infinitely recombined and interdependent, each project is entitled to its own identity, becoming a reference point on the many different routes visitors might follow through the SPACE FOR LIFE. The SPACE FOR LIFE is seeking to create an overall collective space where everything is interconnected and interdependent.

- **Functionality**

One of the strengths of the SPACE FOR LIFE is the way it bases its immersive experiences on authentic encounters with nature. Most of its collections consist of live specimens that require specialized surroundings, maintained and renewed by experienced teams. Everything seems to work as if by magic, but in fact depends on impressive life support systems. The aspect of functionality, then, is vitally important for maintaining the world-renowned level of quality.

The idea of a hierarchy in the types of movement through the institutions and the functional organization of the spaces must take account of the expectations of the different parties: visitors, staff, researchers and live specimens. In addition to letting visitors peek behind the scenes, the functionality must be appropriately integrated and add to the immersive experience.

- **Innovation in the experience**

The mission set for itself by the SPACE FOR LIFE team is all about "innovation."

For the SPACE FOR LIFE, the concept of an immersive experience goes beyond what has been seen before and calls for an approach combining a number of disciplines in the fields of museology, science, architecture and scenic design.

The focus is on nature. The visitors and other players interact with and blend into their surroundings. The idea is to develop the space so as to stimulate all the senses that help us connect with nature; the architecture will play with perceptions of space and light, scenic design with the authentic depiction of nature, and museography with the information content – all in a biophilic environment.

- **Quality approach**

The design quality must be in keeping with the SPACE FOR LIFE vision, and this vision is present on the two sites, which also contain important elements of Montréal's heritage. The experience of the architectural space must be clearly expressed and complement the built heritage of the SPACE FOR LIFE. It is an integral part of the experience, while retaining its own identity.

This quest for quality led to Montréal being designated a UNESCO "City of Design," and this architectural competition is in line with the city's focus on design.

Architectural identity is timeless, without being symbolic; it endures thanks to its intrinsic quality and its adaptability.

In architectural terms, the renewed Biodôme (Project B) will add the discovery of its enlarged "space," its distinctive roof, to the visitor experience. The other two parts (A and C) call for a distinctive architectural quality that promises fascinating experiences.

2.2 MULTIDISCIPLINARY APPROACH

Creating new immersive mechanisms and spaces calls for an integrated multidisciplinary approach, reflecting the management approach of the SPACE FOR LIFE.

The vision of openness to the world, in its many facets, entails a far-reaching reflection by experts in different disciplines, inspired by the theme in question.

For the SPACE FOR LIFE, this idea of integrating resources is more than an objective; it is a requirement that determines the make-up of the desired team.

2.3 SUSTAINABLE DEVELOPMENT

- **General objective**

"[Development that] meets the needs of the present without compromising the ability of future generations to meet their own needs."
Excerpt from the Brundtland Report by the World Commission on Environment and Development, 1987

Sustainable development is an approach, an evolving process, much more than a set of standards to be attained. The idea is to think and act differently, and to adopt ways of producing and consuming based on a new ethical foundation.

Sustainable development is a concept that integrates economic viability, environmental quality and social responsibility: the principle of sustainability implies a number of actions and measures that help to improve the well-being of building occupants (users and employees), social justice and respect for the ecosystems.

- **Objectives**

Sustainable development objectives for the SPACE FOR LIFE are in keeping with the *Montréal Community Sustainable Development Plan*.

The SPACE FOR LIFE is aiming for LEED Platinum certification for its new buildings, and also wants to integrate the Living Building Challenge principles and respect for biophilic values in their architecture.

Accordingly, the SPACE FOR LIFE subscribes to the LEED principles but also to the broader philosophy of the Living Building Challenge, to biophilic design and architecture, and takes inspiration from biomimicry.

LEED objectives

- Project A Insectarium Metamorphosis
  /LEED Platinum certification, NC (new construction) and C1 existing building

- Project B Biodôme Renewal
  /LEED CI certification CI (commercial interiors) not required, but desirable

- Project C Glass Pavilion
  /LEED Platinum certification, NC

LBC (Living Building Challenge) objectives

- Project A Insectarium Metamorphosis
  /Basic LBC certification is not required, but desirable

- Project B Biodôme Renewal
  /LBC certification is not required

- Project C Glass Pavilion
  LBC certification is not required, but desirable

2.4 MUSEOLOGY OBJECTIVES

The SPACE FOR LIFE concept has brought four nature museums together around a single mission: Helping people enjoy nature to the fullest and making them aware of its biodiversity, through immersive experiences. Each of the museums has developed its own museological approach in this regard.

The SPACE FOR LIFE is looking for a new type of museology, one that is even more immersive and participatory, and better suited to its mission. The message conveyed must stay with visitors after they leave. It must imbue them with a new vision of nature, and encourage them to change.

The concept of experience opens the door to new forms of awareness building, specific to each institution, with the common point being immersion. The museology programs are presented as part of the description of each project.

3. DESIGN CRITERIA

3.1 BIOPHILIA: INSPIRATION

Biophilia is a deep-seated relationship we hold with other living organisms. Biophilia is a genetic heritage that calls on us to value nature for the benefits and enjoyment we derive from it. Because it is so deeply anchored in our biology and evolution, biophilia is also an important argument for protecting this nature, so essential to our lives. We feel responsible when we realize the extent to which we are connected with nature.

This “approach” draws its inspiration from the theory that humans have an innate need, in many spheres of our lives, to be exposed to nature (sunshine, fresh air, living plants, weather, animals/insects, etc.), since this kind of affiliation with nature contributes to their physical and psychological health, according to many sources and studies.

Biophilic designs, in other words, are thought to help establish this essential connection with nature, so beneficial to human beings.

According to Stephen Kellert, author of *Biophilic Design* and other books, biophilia may be direct, indirect or symbolic.

The connection with nature may be obvious in places (natural ventilation, daylight, organic materials, outdoor views) or indirect, as in when nature is reproduced to give us its benefits (a pond, vegetation, a variety of sensory experiences including breezes, temperature, textures and variations in light, or forms borrowed from nature). Lastly, biophilia may lie in a more subtle or even symbolic evocation, borrowing natural mechanisms or provoking emotions that we sometimes unconsciously associate with a nature-related experience.

The design of the three projects must take account of the values inspired by biophilic architecture and design that apply to each of them.

Humans’ innate biophilic values are:

Attraction: Nature is a source of aesthetic moments. “Be inspired by insects’ beauty.”

Aversion: Nature gives rise to fears, revulsion and phobias. “Recognize these emotions.”

Affection: Nature elicits our affection. “Create an attachment.”

Exploitation: Nature is an economic resource. “Recognize insects’ economic importance.”

Dominion: We master and control nature for our own needs. “Admit this reflex, so as to rise above it.”

Symbolism: Nature nourishes our imaginations. “Create, taking inspiration from insects.”

Spirituality: Nature inspires reverence and peace. “Become one with a world far greater than ourselves.”

3.2 INTEGRATED DESIGN

Any construction project must demonstrate a spirit of functional, formal and temporal continuity on the part of all players, so as to maximize the gains and minimize the inconveniences involved in carrying out the project.

The integrated design process fits with sustainable development principles. It is an alternative to the linear design process, and brings all players in a project together, from

architects to engineers, museologists and consulting designers, and seeks comments and approvals from the client and sometimes from future users.

The integrated design process makes a significant contribution to improving project quality. The technical requirements it imposes lead to excellent energy performance and take account of environmental impacts, the indoor environment, functionality and a wide range of parameters.

3.3 LEED

The most common North American standard is “Leadership in Energy and Environmental design” (LEED). (See the table and criteria in Appendix B.)

3.4 LIVING BUILDING CHALLENGE

The Living Building Challenge is a philosophy, an awareness-building tool and a certification program that deals with all types of development. It encompasses seven performance areas: site, water, energy, health, materials, equity and beauty. These seven areas are then subdivided into 20 “Imperatives,” each of which focuses on a specific sphere of influence.

The Living Building Challenge is the most advanced measurement of sustainability in the built environment today, and helps to reduce the gap between current limitations and ideal solutions. The certification program covers all buildings, at all scales, and is a comprehensive tool for designing transformation, allowing us to envision a future that is more socially just, culturally rich and ecologically restorative. Regardless of the nature of a project, the Living Building Challenge provides a framework for its design and construction and the symbiotic relationship between people and all aspects of the built environment.
(See the table and criteria in Appendix B.)

3.5 BIOMIMICRY

Life has been evolving on Earth for 3.8 billion years. Over time it has developed an infinite variety of adaptive strategies to cope with the unending transformations of the biosphere and, in turn, bring about far-reaching changes in the biosphere. Whether to transform light and food into vital energy or to survive in their environment and reproduce so as to perpetuate the species, living organisms have developed increasingly inspiring solutions.

Biomimicry is:

Drawing inspiration from nature so that we can emulate nature’s solutions.

Transferring and applying remarkable materials, forms, processes and properties observed at different scales in nature to the design of human processes, objects and architecture.

The vector, according to many scientists, for a shift toward a greener, simpler, cleaner and safer economy and technologies.

Thus it is possible to conceive that such designs will also lead to more sustainable architecture, even if that is not the primary objective.

At its most simple level, i.e. representing natural forms, biomimicry can help us attain certain biophilic design principles.

3.6 UNIVERSAL ACCESSIBILITY

To ensure the most complete experience possible for visitors, universal accessibility must be an essential design criterion in all SPACE FOR LIFE projects.

Universal accessibility is a design concept that calls for environments in which everyone, including users with functional limitations, can live with maximum freedom and safety.

Universal accessibility goes much farther than the requirements of the city's construction by-laws and the *Quebec Construction Code*.

The seven main universal accessibility principles are:
- equitable use
- size and space for approach and use
- simple and intuitive use
- flexibility in use
- low physical effort
- tolerance for error
- perceptible information

Specific universal accessibility objectives apply to:
- layout of the building
- organization of the building
- traffic in the building

3.7 LEGAL REQUIREMENTS

The project must comply with all the by-laws and regulations in effect, and all the federal, provincial and municipal codes, acts and regulations, including but without being limited to:
- *Quebec Construction Code*, Chapter 1 – Building, and the *National Building Code,* 2005 edition (amended)
- *National Fire Code* (NFC), 2005 edition, its amendments and related documents
- *Model National Energy Code of Canada for Buildings* (MNECB), 1997, including the latest amendments. The recommendations of this Code are to be applied in addition to the requirements of the *Regulation respecting energy conservation in new buildings* (c. E-1.1, r.1)
- *Canada Labour Code*, September 2006
- The municipal urban planning by-laws of the Ville de Montréal and the Rosemont–La Petite-Patrie borough (for the Insectarium and Botanical Garden) and the Mercier–Hochelaga-Maisonneuve borough (for the Biodôme)

- Air-conditioning, ventilation, heating, plumbing and fire protection systems will be subject to various codes and the following municipal by-laws and provincial and federal regulations:

  Regulation respecting safety in public buildings, S-3, r.4
  Regulation respecting the quality of the work environment, S-2.1, r.15
  By-laws and regulations concerning pressurized devices
  Act respecting the conservation of energy in buildings, E-1.1, r.1 (amended September 24, 1992)
  Standards of the Quebec Ministère de l'Environnement
  Quebec Construction Code, Chapter V, Electricity, *Canadian Electrical Code*, Part 1 (21st edition) and Quebec amendments (CSA standard C22 10-10)
  Regulation respecting energy conservation in new buildings, c. E-1.1, r.1
  Building Act, c. B-1.1
  Act respecting occupational health and safety, c. S-2.1
  Decree concerning the construction industry

4. URBAN CONTEXT

4.1 NEIGHBOURHOOD

The SPACE FOR LIFE site is part of two large Montréal neighbourhoods, or "boroughs," in the centre of the Island of Montréal.

The Botanical Garden and Insectarium are located in the Rosemont–La Petite-Patrie Borough. The second part of the name comes from a novel by Claude Jasmin, a Quebec writer.

The Biodôme and Rio Tinto Alcan Planetarium, both located in the Olympic Park, are in the Mercier–Hochelaga-Maisonneuve borough.

(See the descriptions of the two boroughs in in Appendix C.)

4.2 SITE

The SPACE FOR LIFE occupies two separate sites. A major thoroughfare, rue Sherbrooke, divides the site in half.

There is a steep slope between Pierre-de-Coubertin and Sherbrooke streets, which is why the Olympic Park was built on a huge concrete esplanade halfway down the slope. Underneath it is the parking garage. The Botanical Garden & Insectarium are on a rise, making them more than two storeys higher than the Olympic Park, where the Biodôme and the Rio Tinto Alcan Planetarium are situated.

The proposed Grande Place (not included in this competition) is intended to join up the two sites and make it easier for pedestrians to get between the institutions, in addition to creating synergy between the SPACE FOR LIFE attractions.

4.2.1 The Pôle Maisonneuve district

The block formed by rue Pierre-De Coubertin to the south, boulevard Rosemont to the north, boulevard de l'Assomption to the east and boulevard Pie-IX to the west is known as the Pôle Maisonneuve district.

The city of Montréal currently owns over 75% of the land in the Pôle Maisonneuve district. The district consists of 255 hectares used for recreation, tourism, and science and technology purposes:

- 75 hectares for the Botanical Garden (including the Insectarium)
- 60 hectares for Maisonneuve Park and the Olympic Village residential complex
- 55 hectares for the Olympic Park (including the Biodôme and Rio Tinto Alcan Planetarium)
- 65 hectares for the Parc industriel technologique l'Assomption (industrial park)

Olympic Park

The Olympic Park, a bold architectural statement by French architect Roger Taillibert, was built for the 1976 Olympic Games. It included the Stadium, the Velodrome (later converted into the Biodôme) and the esplanade above the parking garage. Since then, the Olympic Installations Board (OIB) has overseen the operation, development and maintenance of these Olympic facilities, which are part of Montréal's modern heritage.

In that the Biodôme and the Rio Tinto Alcan Planetarium are both located on the Olympic Park site, it is a crucial partner in the SPACE FOR LIFE.

Characteristics of the Olympic Park site

Total surface	550,000 m^2
Building coverage	107,000 m^2
Surface of the concrete esplanade	337,000 m^2

See the Montréal Biodôme website, "Nature Under Glass" section, for a video of the site.

Uses

Sports	aquatic centre and stadium
Administration	OIB offices
Community	premises leased to Regroupement Loisir Québec
Cultural	the Observatory, Tourist Hall, Biodôme and Rio Tinto Alcan Planetarium
Community and industrial	parking lots and heating plant

Special features of the Stadium
The world's highest inclined tower, leaning nine times more than the Tower of Pisa. The Observatory is the third highest in the world.

• References

The Montréal city website has maps of the different boroughs, in the “Neighbourhood life” section.

The www.navurb.com urban navigator has maps and photos of the city of Montréal.

See Appendix C/Urban context for maps of the boroughs.

4.2.2 Access

• Olympic Park

Given the sloping ground, most types of access – metro, automobile and pedestrian – are along rue Pierre-de Coubertin, the street on the south side of the Olympic Park block; there is a parking lot entrance on Pie IX and one on rue Viau, also used for the Centre Pierre Charbonneau and the Saputo soccer stadium.

There is good access to the site by public transit, with the Viau and Pie-IX metro stations; the latter is a transfer point for the city bus system as well.

Visitors reach the Biodôme by metro (Viau station) or by car, via a loop that extends onto the Esplanade, with a drop-off point for the Biodôme and Rio Tinto Alcan Planetarium. The same route leads to the first level of an underground parking garage serving the Biodôme and the Rio Tinto Alcan Planetarium. There is another parking lot entrance, on Viau, leading to the lower level of the same parking garage and the group entrances for the Rio Tinto Alcan Planetarium and Biodôme.

There is no pedestrian tunnel between the Olympic Park and Botanical Garden. At present, visitors must use the delivery route for the Olympic Stadium and its overpass, or the stairs and traffic lights to get between the two parts of the SPACE FOR LIFE site.

• The Botanical Garden/Insectarium

The main pedestrian entrance to the Botanical Garden is at the corner of rue Sherbrooke and boulevard Pie-IX; it leads to the Administration Building, the greenhouses, the Reception Centre, the Biodiversity Centre and, farther on, the Insectarium.

Drivers can reach a parking lot from rue Sherbrooke, leading to the Reception Centre and the main ticket counters.

There is a second entrance, along with ticket booths, near the Insectarium, farther east on rue Sherbrooke. This entrance also serves Maisonneuve Park.

Automobile access is only possible via the two parking lots on rue Sherbrooke.

An east-west bike path runs along Sherbrooke in front of the Botanical Garden.

4.2.3 Buildings

- **Olympic Park**

The Olympic Park comprises the Olympic Stadium and its tower, the sports centre, the administration spaces allocated to the OIB and the Regroupement Loisir Québec, the heating plant and a large parking lot (3,600 spots). One-third of the surface area (about 75,000 m^2) of the Olympic Stadium and Tower remains vacant. Nearby are the Pierre Charbonneau sports centre, the Starcité movie theatres, the Maurice Richard arena, the Saputo soccer stadium, the Biodôme and the Rio Tinto Alcan Planetarium.

The Olympic facilities largely filled the site already occupied by the Maurice Richard arena and the Pierre Charbonneau sports centre. The Olympic buildings contrast with the 1950s-style architecture of these two pavilion-type buildings.

With their organic shapes, the Stadium and the Biodôme (the former Velodrome) form an ensemble that dominates its built surroundings. The addition of the new Rio Tinto Alcan Planetarium, with its architecture emerging from and shaping the ground, creates a formal dialogue and a connection with this significant architectural heritage, a legacy of French architect Roger Taillibert.

- **The Botanical Garden**

Over the years, the Botanical Garden has come to include many different structures, all creating very different environments, in terms of both their architectural style and their landscaping.

The architectural concept of the Insectarium, in the form of a stylized insect, is more than just symbolic: it signals the building's vocation.

With the new SPACE FOR LIFE vision and mission, the architectural vocabulary has been updated, as evidenced by the Tree House and the latest building, the Université de Montréal Biodiversity Centre.

4.2.4 Unified heritage interest, sharing the same vision and mission

In the borough's Master Plan, the Biodôme is deemed a "significant immovable," a status that also applies to the entire Olympic Park block. The Olympic complex block is also covered by a development program adopted in 2001, section IX of which sets out developmental, architectural and design criteria. (N.B. For purposes of the application of these criteria, the Biodôme lot is located in "sector C." The Botanical Garden buildings have this same "significant" status.

4.3 URBAN BY-LAWS

4.3.1 Olympic Park

The by-law governing construction in the sector affected by the competition is No. 01-301, dated December 17, 2001, entitled *By-law concerning the construction and occupancy of*

a lot in the quadrilateral bounded by Pie-IX Boulevard, Sherbrooke and Viau Streets, and Pierre-de Coubertin Avenue. The site, included in this perimeter, is divided into four sectors, authorized for institutional and commercial uses.

In addition, any proposed construction must be submitted to the OIB, the city and the borough Urban Planning Advisory Committee (CCU): see the *By-law concerning the procedure for the approval of construction, alteration or occupancy projects, and concerning the Commission Jacques-Viger*, R.B.C.M., P-7.

The project designer will have to co-operate with the Urban Planning Department, answering any questions and submitting any plans or documents necessary for the review of the project. If the Urban Planning Department issues any recommendations, including those requiring changes, the project designer will have to comply with them or justify its refusal; otherwise the permits and authorizations may not be issued.

The by-law governs the addition of new structures, heights, sightlines toward the Stadium entrance, and access for firefighters. It also covers the integration of mechanical services and parking lots with street access.

In the Biodôme sector, the by-law requires that projects:

- favour the development of views and visual corridors toward the Olympic Stadium and pyramids, and enhance the Stadium (see Appendix C);
- ensure the continuity of the pavilion treatment;
- favour a building line that takes into account the continuity of outdoor walkways;
- add to the continuity of the built area on walkways serving the site;
- favour a building treatment with ground floors opening onto outdoor public spaces;
- favour an architectural treatment and the use of materials that enhance both the special character of each new pavilion and the harmony of dominant site components, as to materials, openings and fenestration;
- favour the treatment of accesses to parking areas to ensure that pedestrian and vehicular traffic is functional and safe;
- ensure the continuity of walkways and their safety;
- ensure that precedence is given to walkways instead of vehicular traffic;
- set up accesses to parking areas and service areas so that they have the least impact on pedestrian traffic.

Fire safety

Designers are responsible for ensuring that their projects comply with the legislation in effect. It would be advisable, nonetheless, to obtain specific information on this subject from the appropriate city authorities at the design stage.

4.3.2 The Botanical Garden

The buildings that are part of the built heritage on the Botanical Garden site are deemed to be part of a “significant sector” by the Rosemont–La Petite-Patrie borough (By-law 01-275, see section 108). The project will have to be presented to the Urban Planning Advisory Committee (CCU).

This classification means that a specific procedure must be followed before a construction permit for the new building can be issued. This procedure may require the assessment of

the exterior design parameters of the project, relating mainly to its volumetry, the treatment of its facades and the use of its roof areas, by the borough Urban Planning Department.

The construction permit will be submitted to the borough Urban Planning Advisory Committee (CCU) for review. The CCU is a group mandated by City Council to give its opinions on urban planning and land use applications submitted to it.

The project designer will have to co-operate with the Urban Planning Department, answering any questions and submitting any plans or documents necessary for the review of the project. If the Urban Planning Department issues any recommendations, including those requiring changes, the project designer will have to comply with them or justify its refusal; otherwise the permits and authorizations may not be issued.

In the Botanical Garden sector the by-law concerns the following factors, among others:

- the degree of homogeneity of the immediate environment
- the use of the building and its architectural features
- the site of the building on a block
- the contribution of the building to the built-up area
- the character of the building to be extended, its architectural features
- the respect for the main volume
- the effects on the lot and adjacent structures, in accordance with their value
- the consideration of the distinctive character of adjacent structures
- the consistency with the block, its visibility and its significance in the city
- the preservation of the unique and distinctive character of buildings considered “significant”
- the preservation of dominant features of the urban landscape
- the maintenance of the existing mode of building coverage
- its effects on the site and on adjacent structures
- the extent of adaptation to the landscape, vegetation and topography of the site
- respect for and highlighting of sightlines
- the preservation of existing tree groves and rows on the site

5. CONSTRAINTS

5.1 SITE

- **Zoning**

The building coverage rules are not clearly defined for the Botanical Garden site, and will be validated by the borough Urban Planning Advisory Committee (CCU).

Its classification as a distinctive building entails a special procedure for granting the construction permit for the new building. The procedure may require an assessment by the borough Urban Planning Department of the exterior design parameters for the project, mostly in terms of its volumetry, the treatment of its facades and the use of its roofs.

Some requirements are already known, however:

- **Height**

Project A: No restrictions other than the functional program

Project B: Does not apply, since the use of vertical space will be inside the existing structure.
No addition to the roof is allowed.

Project C: The juxtaposition of this new volume with the Biodiversity Centre must not block the new building's visibility; preferably limited to two storeys.

- **Visual axis**

Project A: No restrictions

Project B: The new location of the Biodôme entrance and its "marquee" must not block the sightlines from rue de Pierre-de Coubertin toward the Olympic Stadium entrance.

Project C: No restrictions

- **Buildable area**

Despite the size of the sites, only a limited space is available for construction (see

Project A: The ticket counter at this entrance to the Botanical Garden/Insectarium (to be integrated into the concept), the tree groves to be conserved and some landscaping to be preserved all limit the buildable area.

Project B: Any new structure added on the Esplanade must comply with the restrictions imposed by this structural slab.

Project C: This building is located in a very densely built and developed section of the Botanical Garden, near the main Garden entrance.
The space is very tight and the trees must be protected.

- **Access**

The project layout must respect the existing entrances, roadways and services and join up with the current tour route.

No budget is allocated for modifying roadways.

- **The planted environment**

The property around the Insectarium and Glass Pavilion is heavily landscaped and planted – part of the Botanical Garden.

Significant trees must be protected, such as the row of larches behind the Insectarium and the row of oaks along the access road and the Glass Pavilion site.

- **Existing structures**

The borough classification of “significant immovable” entails requirements to respect existing structures.

- Project A: the current structure should be incorporated in the new building.
- Project B: It is essential to keep and use the roof of the Biodôme and the traces of its former vocation, like the bleachers. The exterior envelope must be retained.
- Project C: N.A.

5.2 MAINTAINING OPERATIONS

The Biodôme will remain partially open during the work. This means that some animals will have to be moved and plants protected.

The Insectarium wishes to remain open to the public as long as possible and to have the option of continuing its administrative and operational activities (laboratories and breeding rooms, plant production) at certain times during the work, in order to prepare for re-opening.

The construction of the Glass Pavilion must not interfere with the operation of the Biodiversity Centre or the greenhouses or with access to the Botanical Garden.

5.3 ACCESSIBILITY

The concept of universal accessibility applies to all new municipal sites and buildings. As such, all ecosystems and public spaces must be accessible, even in the immersive approach proposed. All visitors must be able to enjoy the same experience or an equivalent experience.

5.4 OIB (Olympic Installations Board)

The Biodôme is part of the Olympic Park, managed by the OIB. The Board must be consulted concerning any construction or alterations to its structures and buildings.

5.5 MAINTENANCE

The concepts must take account of maintenance budgets for the assets, which are covered by the city and subject to review.

The three new investments must not give rise to maintenance costs that compromise operations.

The three projects must have an optimal life cycle, with interventions adapted to local climatic conditions, maintenance protocols and current rules and regulations, including

accreditations (Zoological Association of America and Canadian Association of Zoos and Aquariums).

5.6 BUDGET

The budget for each project, validated when the functional and technical programs (PFT) were prepared, reflect the construction procedures in general use in Quebec. In addition, LEED sustainable development objectives were included in the estimates.

The budgets per square metre are limited, so good co-ordination among members of the multidisciplinary team will be needed in order to respect them.

See the project descriptions for the budgets specific to each one.

6. PROJECT DESCRIPTIONS

6.1 INSECTARIUM METAMORPHOSIS (PROJECT A)

6.1.1 The Insectarium today

Building
The Insectarium building (2,143 m^2, two storeys) is a museum whose main use is A2, according to the *Quebec Construction Code* (CCQ 2005).

With its unusual **architectural design** resembling an insect, the current Insectarium dates to 1989. It covers about 1,000 m^2. The building's functions are distributed over three levels, but it is too small to meet current needs.

The building requires many changes to its envelope and infrastructure. Many technical functions are currently located elsewhere, because of a lack of space.

The main Insectarium entrance is located across from Maisonneuve Park, via the second Botanical Garden entrance.

The main entrance is used by both visitors and staff (administration, laboratory, housekeeping, visitor activities, deliveries and so on).

On the ground floor, there is the reception counter, a rest/lunch area for visitors near the main entrance, an exhibition space overlooking the exhibition room below, washrooms and offices. A cloakroom with lockers and coat racks is located just off the lobby. The reception functions are grouped together in an open space just inside the building entrance.

The exhibition spaces on the ground floor and on the lower level, mostly open onto one another, are served by two open stairways allowing visitors to circulate between the two floors.

About one-quarter of the area of the lower level is double height, open onto the ground floor, from which it is clearly visible. The lower level houses most of the exhibition functions, a visitor activity room (movie theatre) and laboratories (breeding and dry mounting room). Support rooms (storage and electromechanical) are also in the lower level. The original windows were covered for various museographic reasons, so there is no longer any natural daylight in these spaces. There is an elevator for visitors and staff between the lower level and the ground floor and for staff only between the ground floor and upper floor. In addition, two emergency staircases serve these three levels.

Insect breeding rooms and plant production greenhouses are located in the Botanical Garden greenhouse complex.

The outdoor spaces for visitors are located southwest of the main building, and consist of the BuzzGround, including an outdoor agora, a playground, the insect pond, the butterfly garden and pathways shared with the Botanical Garden.

Mechanical systems

After close to 25 years of use, all the Insectarium's mechanical systems have reached or are close to the end of their useful life. They will need to be renewed and updated in the next few years to keep them functional. Given the different modifications over the years in the building's uses and developments in the applicable codes and standards, some systems will need to be retrofitted to ensure that the facilities continue to operate safely.

Current surface areas

FONCTIONS	SUPERFICIES EXISTANTES - m²		
	Qte	unité m²	Total m²
Accueil et services aux visiteurs			
Entrée/vestibule	1	29,5	29,5
hall d'entrée/espace d'attente	1	55	55,0
Espace détente lunch /vestaire	1	70,8	70,8
Guichet d'accueil Insectarium	1	12,5	12,5
Bureau régisseure/techn. AV	1	45,1	45,1
Dépôt audiovisuel	3	var.	5,9
Sonorisation	1	3,5	3,5
Entreposage accueil et "Amis de l'insectarium"	1	22	22,0
Entretien ménager	1	4,9	4,9
Vestiaire guichet	1	0,8	0,8
Toilettes adaptées	2	5,2	10,4
Toilettes hommes	1	24,5	24,5
Toilettes femmes	1	16,8	16,8
Total			**301,7**
Muséo/animation			
Aire d'exposition rez-de-chaussée	1	168,5	168,5
Aire d'exposition sous-sol	1	450	450,0
Salle de vidéo	1	75,7	75,7
Régie	1	17,7	17,7
Entreposage	2	var.	35,4
Atelier	1	5	5,0
Total			**752,3**
Entomologie/horticulture			
Salle d'élevage	1	40,5	40,5
SAS	1	4,9	4,9
Salle de montage sec et entretien des vivariums	1	42,5	42,5
Salle de rencontre et montage des vivariums	1	51,3	51,3
Entreposages vivariums	1	18,4	18,4
Total			**157,6**
Administration			
Centre de documentation	1	13,9	13,9
Bureau directrice	1	18,9	18,9
Aire d'attente (inclus garde robe)	1	6	6,0
Bureau secrétaire de direction	1	11	11,0
Bureaux	4	12,2	48,8
Bureau	1	5,6	5,6
Dépôt archives	1	1,8	1,8
Cuisinette	1	8,4	8,4
Toilette personnel	1	4,3	4,3
Bureau muséo/salle de projet Métamorphose	1	113,8	113,8
Total			**232,5**
Mécanique			
Système principal	1	33,1	33,1
Mécanique	1	31,3	31,3
Mécanique géothermie	1	15,4	15,4
Télécom	1	8	8,0
Local entrée d'eau	1	13	13,0
Chambre électrique	1	23	23,0
Total			**123,8**
Total superficie nette			**1567,9**
Circulation , murs et cloisons			**1,37**
Total superficie intérieure brute			**2143,0**

6.1.2 The Insectarium Metamorphosis project

- **Vision: Dizzying wonders**

The Insectarium will spread its wings on its current site to approximately double in size. Its new environment is intended to "offer sensory experiences and original encounters that rekindle the connection between humans and insects, in order to foster the emotional ties essential to the future of the planet, as well as our own." This is the main objective of the Insectarium Metamorphosis**.**

- **Program and museological concept**

(See the complete program and museological concept in Appendix D.)

The genetic code of the Insectarium Metamorphosis

The Metamorphosis project was developed through a collaborative design process (living lab, co-design, public participation), leading to a "genetic code" consisting of educational approaches and design principles, to be applied to guide the overall project. This genetic code defines the required elements for the development of the overall project in terms of the visitor experience, architecture and life of the Museum.

Approach

The approach is simultaneously immersive, relationship-based and participatory.

General principles

- Authenticity, of the encounter with insects
- Evolution, with the seasons and over time
- Collaboration, through an iterative and integrated design process
- Porosity-fluidity, between indoors and outdoors
- Senses and movement, bringing visitors closer to the world of insects

Architectural principles

- Biophilia
- Integration
- Transparency
- Biomimicry

Concept

The Insectarium's Metamorphosis starts with a human metamorphosis, significantly transforming our relationship with the world of insects and nature. It is also an overall experience inviting us to be "in and with" nature rather than simply "visiting" it. The tour route encourages us to become players rather than mere spectators and offers a privileged glimpse of an unsuspected, important, highly varied, complex and splendid world. The Insectarium becomes a place that brings natural processes to life, making us realize that "even the smallest is much bigger than you think."

Visitors get closer to the world of insects as they explore using all their senses, their bodies and movement. This helps them perceive the differences from and similarities with humans. The visitor experience centres on an appeal to their senses.

The architecture, spaces and museography all play with scale and perspective, "insect time" and natural patterns (like fractals, spirals and natural symmetry). Visitors are ushered into a disorienting world that encourages them to reflect on their own humanity.

The experiences are authentic encounters with insects and nature. The technology used is like an extension of the senses, allowing visitors to see, hear and experience otherwise inaccessible things as an insect would.

The visitor route in short

- At the entrance, a sensory "**reset**" prepares visitors for what they are about to experience
- A lounge area, where all the paths offer **perceptual experiences** involving visitors' bodies, senses and movement, to start the visit
- Experiential spaces (**face-to-face**) along the route
- **An immersive space** (insect aviary): a large space (greenhouse), bright and filled with plants
- A **creative space**, appealing to visitors' creativity and encouraging them to rekindle their connection with nature, parallels the tour route
- Cut-outs let visitors glimpse **behind the scenes** (life support processes and green building functions)
- Access to **outdoor activities**

Description of the different types of visitor experiences

Reset

When visitors arrive they are given their first disorienting experience, to dispel their prejudices about the insect world and prepare them for their visit.

Perceptual experiences (space and time)

The perceptual experiences convey visitors into the world of insects, where they can live at insects' scale and their pace. This should be reflected in the architecture itself.

Space: sudden shifts in perspective and changes in scale

Through changes in scale, perspective and form, and through sensory-motor and virtual experiences, the architecture and design of the spaces themselves depict the insect world. Visitors encounter these disorienting features throughout the entire museum, making the Insectarium a physical and sensory experience in and of itself, conveyed by the architecture and the scenic design. They are encouraged to use their bodies and all their senses to perceive the world more clearly, as insects do: edging through a tunnel, climbing high steps and crossing enormous structures like an insect walking across a leaf, for instance.

Time

After actively passing through insect space in this way, visitors will be invited to get closer, to slow down, to set their clocks to insect time and admire the Insectarium's fabulous collection. First, to experience their evolutionary time: insect biodiversity is the fruit of 440 million years of evolution here on Earth

in response to the tremendous variety of conditions in which they are found. Then, to experience their individual time, to understand insects' cycles and processes: seasonality, many species' brief lives, other species' lengthy larval phases, etc.

Face-to-face
Encounters with insects, individually or in small groups.

Total immersion

After this strange route that stirs and heightens their senses and emotions, visitors enter a large, bright and plant-filled immersive space full of dazzling live insects of every kind. All around them are butterflies flitting about and grazing their shoulders, flower beetles buzzing nearby, large stick insects chewing on plant leaves and bees browsing on flowers, much too busy to be disturbed by the humans who have just entered their world. Cut-outs offer glimpses of insect breeding rooms and plant greenhouses, revealing the complex hidden processes involved in managing this living world.

The insects will greatly influence the design of this space, in view of the constraints involved in allowing them to roam free, in a controlled zone (temperature, moisture, ventilation, plants, natural and artificial light, etc.).

Consequently, the Insectarium wants above all to create a space it is now lacking. This kind of immersive space (insect aviary) will require more insects to be raised in the breeding rooms and more plants to feed these new "residents."

Creative workshops and hands-on activities
Creative workshops to reinvent the world in insects' image.

Behind the scenes
Cut-outs, windows and doors so that visitors can see behind the scenes. The green building will be used as a teaching tool, through views of the building's systems and life-support processes for the insects.

Outdoor spaces
The aim is to provide a landscaped space around the building similar to the current BuzzGround, and even to preserve as much of it as possible.

- **Issues and challenges**

Some of the main issues and challenges involved in the project:

- Including the features inherent in the desired visitor experience as detailed in the museological program.
- Expanding the Insectarium and renewing the existing building on the existing site, adapting it to the physical constraints of the setting and the outdoor environment.
- Integrating the new building and making sure it fits into the Botanical Garden site, with a view to its eventual future expansion.

- Offering essential visibility for the building and integrating it into its setting so as to make the different entrances more obvious.
- Offering visual and sensory permeability between the inside and outside of the building; responding to the need to be a part of nature rather than seeing it from a distance.
- Offering an outdoor area in tune with the seasons and nature, closely linked both physically and visually with the inside of the Insectarium.
- Letting humans reconnect with nature through a structured exploration using biophilic architectural values.
- Offering disorienting physical experiences allowing visitors to feel and understand the sudden shifts in perspective and changes in scale that distinguish the human and insect worlds.
- Making the laboratories and breeding rooms (for butterflies and other insects) and plant production greenhouses self-sufficient and centralized so as to render the immersive space possible and autonomous.
- Offering an elaborate physical and visual approach in keeping with the visitor experience, even if some parts of the site, like the parking lot, are not part of the project site.
- Giving the Insectarium all the functionalities described in the program and meeting the spatial, technical and other specific requirements inherent in the requisite spaces for the new Insectarium, especially dedicated greenhouses for plant production, laboratories, breeding rooms and the immersive space.
- Providing all the relevant and necessary functional links between the different groups of rooms or individual rooms to make for efficient operation for all building users, meaning all categories of visitors and all staff members.
- Meeting the sustainable development objectives described above, i.e. LEED Platinum certification, and adopting the Living Building Challenge philosophy (see Appendices F and I).
- Continuing to offer a wide variety of family and tourist activities; attendance is expected to rise to 450,000 visitors a year (future attendance to be confirmed by a study now in progress). Thanks to the Insectarium Metamorphosis and, in particular, the permanent attraction of an immersive space with butterflies and other insects roaming free, it is expected that visitors will return several times a year. Note that close to one-third of Insectarium visitors come from outside Quebec.

Overall quality of the built environment

- A quality project, proud to be part of the community and associated with the Insectarium as a synergetic component in the heart of the Montréal SPACE FOR LIFE.
- Timeless design of the building, able to evolve over the years.

- **Functional program**

The Insectarium Metamorphosis project has very specific physical requirements as concerns the necessary spaces and their technical considerations – in short, pragmatic and quantifiable requirements. But above all the emphasis is on making Insects, with a capital I, the focus of the visitor experience, restoring humans to their proper place in. Consequently the visitor experience is an authentic encounter, shaped by the values associated with biophilic design.
The different activity sectors include:

- Reception and visitor services

- Museology/public programs and activities
- Entomology
- Administration, staff support and documentation centre
- Marketing
- Horticulture
- Landscaping

One of the key aspects of the program is a space that is now lacking at the Insectarium, an immersive space where humans and live insects can coexist, in a large insect aviary.

The proposed expansion and renewal of the Insectarium will bring the gross surface area to about 4,385 m^2. The following table shows the surface area of each sector in the new Insectarium:

New surface areas

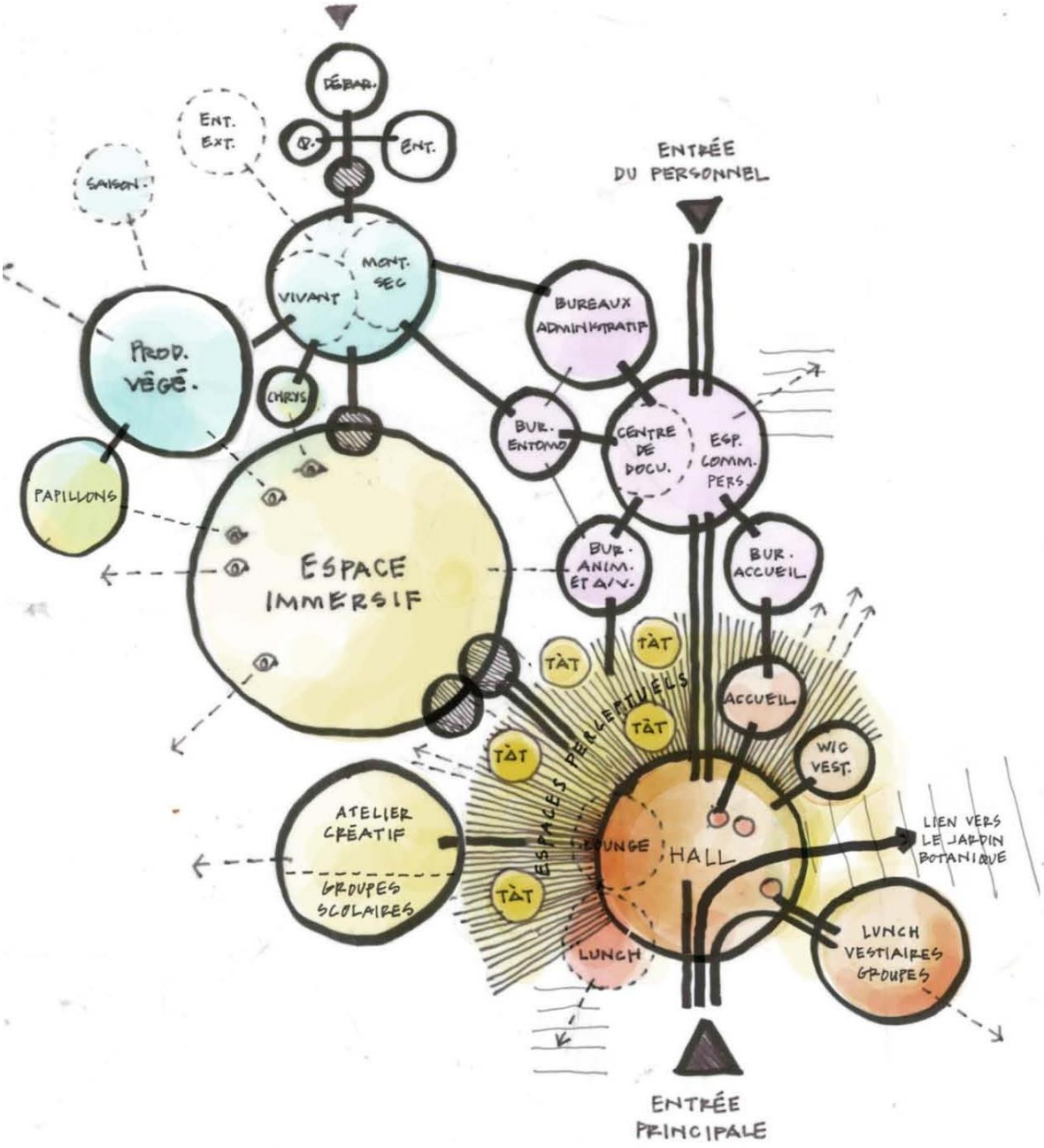
Remarques	FONCTIONS	SUPERFICIES PROJETÉES - m² Qte	unité (m²)	Total (m²)
	Accueil et services aux visiteurs			
	Entrée/vestibule	1	30	30,0
	Entrée vestibule vers Jardin Botanique	1	10	10,0
	Point d'information	1	2	2,0
dont 1 guichet de vente de produits	Guichets d'accueil Insectarium visiteurs	2	7	14,0
	Guichets groupes	1	7	7,0
	Guichet d'accueil "Amis de l'Insectarium"	1	7	7,0
	Hall/Espace d'attente	1	100	100,0
	Espace "lunch" visiteurs	1	30	30,0
	Espace Lounge-"Amis"	1	30	30,0
	Vestiaires visiteurs	1	20	20,0
	Zone d'accueil des groupes	1	30	30,0
inclut cuisinette	Espace "lunch" des groupes	1	90	90,0
	Vestiaires groupes	1	30	30,0
inclut table à langer+ comptoir lavabo	Espace d'allaitement	1	8	8,0
inclut comptoir lavabo	Local de premiers soins/bureau de sécurité	1	15	15,0
Bureau fermé	Bureau régisseure (C2)	1	13,4	13,4
inclut espace sécurisé billetterie et voûte	Bureau surveillant d'encaissement (A3)	1	8,9	8,9
Bureau fermé	Bureau directrice Amis de l'Insectarium (A3)	1	8,9	8,9
	Aire de travail ouverte Amis de l'Insectarium	3	4,5	13,5
	Rangement matériel roulant et dépôt accueil /"Amis"	1	22	22,0
	Entretien ménager	1	5	5,0
	Toilettes femmes	1	24	24,0
	Toilettes hommes	1	24	24,0
inclut table à langer	Toilette adaptée	1	5	5,0
	Total			**547,7**
	Muséologie/programmes publics et animation			
	Espaces perceptuels	1	300	300,0
	Espace Têtes à têtes	5	15	75,0
	Espace immersif	1	600	600,0
	Sas public (entrée et sortie)	2	6	12,0
	Atelier créatif	1	100	100,0
inclut comptoir cuisinette	Atelier groupes scolaires	1	50	50,0
	Rangement mobilier	1	15	15,0
inclut comptoir et lavabos	Salle de lavage	1	8	8,0
	Régie audiovisuelle principale	1	12	12,0
	Réserve audiovisuelle	1	15	15,0
	Réserve animation	1	30	30,0
	Réserve mobilier d'exposition	1	45	45,0
	Total			**1262,0**
	Entomologie			
	Débarcadère (sas thermique) / garage	1	55	55,0
	Sas	1	8	8,0
	Espace de quarantaine entomologie	1	8	8,0
	Laboratoire quartiers d'élevage	1	40	40,0
	Quartiers d'élevage - chambres contrôlées	2	7,5	15,0
Inclus dans laboratoire des quartiers d'élevage	Local de rangement pour animation (matériel vivant)	1	2	2,0
Pouvant être subdivisées au besoin	Serres de production des papillons	1	210	210,0
en lien visuel avec espace immersif	Cage d'émergence (espace accrochage des chrysalides)	1	6,5	6,5
	Walk-in réfrigérateur	1	5	5,0
	Préparation des vivariums	1	12	12,0
incluse dans laboratoires quartiers d'élevage	Cuisine de préparation des diètes	1	8	8,0
incluant 5 postes de travail	Salle de montage et alcôve	1	56	56,0
inclut hotte	Atelier de fabrication	1	16	16,0
	Sas entre espace immersif et secteur des laboratoires	1	4	4,0
	Toilette du personnel entomologie et horticulture	1	2,5	2,5
	Local déchets	1	6	6,0
	Entretien ménager	1	5	5,0
	Entreposage entomologie/horticulture	1	75	75,0
	Total			**534,0**

	Horticulture			
	Débarcadère (sas thermique) / garage			
	Sas	1	4	4,0
	Espace de quarantaine horticulture	1	25	25,0
Pouvant être subdivisées au besoin	Serres de production des plantes	1	465	465,0
	Zone de multiplication	inclus dans serre		
	Espace de travail	inclus dans serre		
Bureau fermé	Bureau horticulture (A1-A4)	1	8	8,0
Partagé avec entreposage entomologie	Entreposage entomologie/horticulture			
	Total			**502,0**
	Administration			
2 personnes - inclut garde-robe	Espace attente/aire de réception	1	6	6,0
	Alcôve pigeonniers / relève du courrier	1	2	2,0
	Bureau technicien audiovisuel (A2)	1	6,7	6,7
	Bureau directrice (C3)	1	20	20,0
	Bureau secrétaire de direction (P1)	1	7,4	7,4
	Bureau préposé au soutien administratif (A1-A4)	1	6	6,0
	Bureau chef de section entomologie et recherche (C2)	1	13,4	13,4
	Bureau chef de section programme et services publics (C2)	1	13,4	13,4
	Bureau entomologiste (A1-A4)	1	6	6,0
	Bureau assistant entomologiste (A1-A4)	1	6	6,0
	Bureau agent de programmes éducatifs (A1-A4)	1	6	6,0
	Bureau coordonnateur en loisir scientifique (A1-A4)	1	6	6,0
	Bureau préposés à l'animation (A1-A4)	3	6	18,0
	Aire de travail ouverte animateurs	1	18	18,0
	Bureau préposés renseignement entomologie (A2)	2	6	12,0
	Centre de documentation	1	25	25,0
4 à 6 personnes	Salle de réunion	1	15	15,0
20 personnes	Salle de réunion	1	50	50,0
	Archives actives	1	10	10,0
	Atelier reprographie	1	15	15,0
	Papeterie	1	6	6,0
	Total			**267,9**
	Soutien au personnel			
	Vestibule entrée personnel	1	5	5,0
proximité aire de pique-nique extérieure	Cuisine et lounge du personnel	1	30	30,0
inclut espace casiers (40 casiers)	Vestiaire du personnel	1	15	15,0
	Douche du personnel	1	4	4,0
	Toilette du personnel	1	4,5	4,5
	Local à déchet	1	10	10,0
	Total			**68,5**
	Mécanique			
	Espaces mécaniques Espace électrique			400
	Telecom	2	3	6,0
	Salle technique multimédia (espace d'expression)	1	6	6,0
	Total			**412,0**
	Total superficie nette			**3594**
	Circulation , murs et cloisons			**1,22**
	Total superficie intérieure brute			**4384,7**

Operation

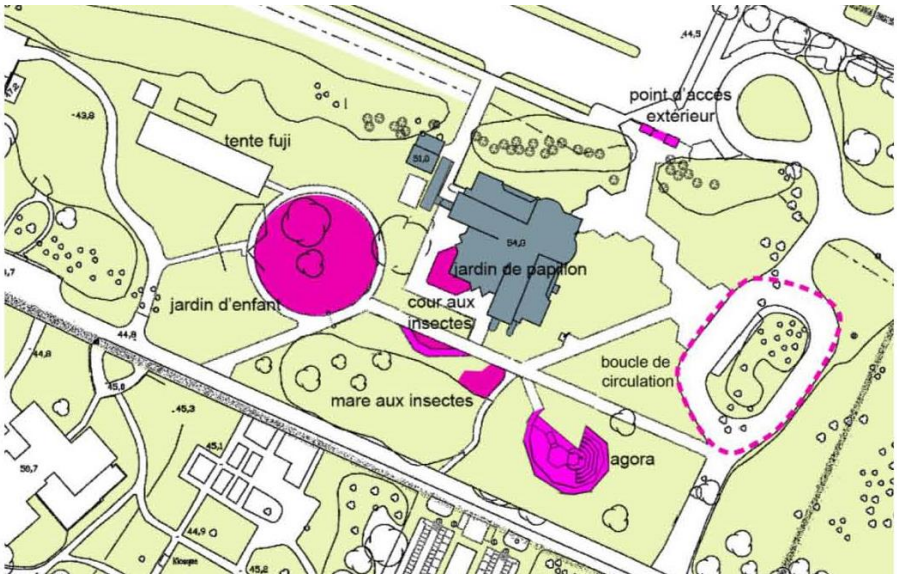
Below we present the general organization chart illustrating relationships among the different activity sectors. This is an overview of the different sectors, without going into detail about their components. It includes visitor reception and services, administration and staff support, entomology and horticulture, museology and, lastly, visitor activities.

In the detailed functional organization chart, all the rooms are shown and their links described.

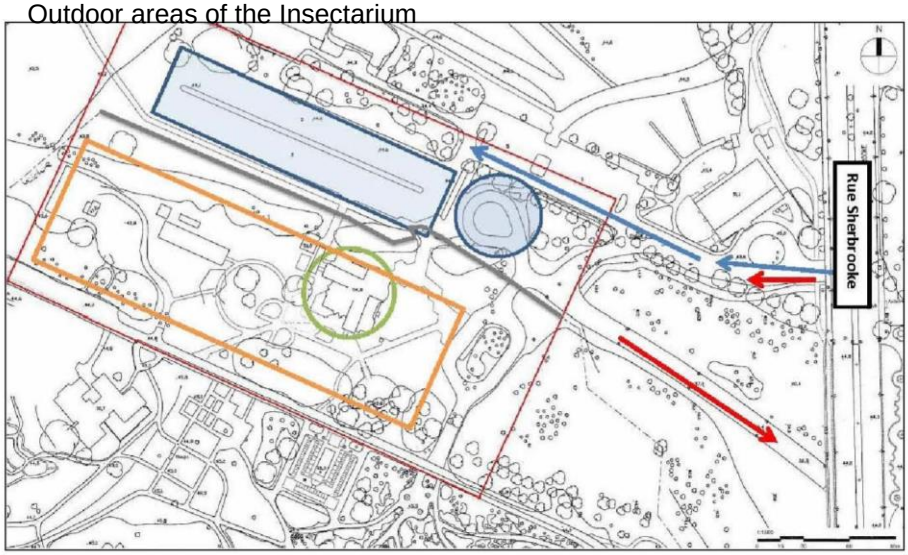


- **The location**

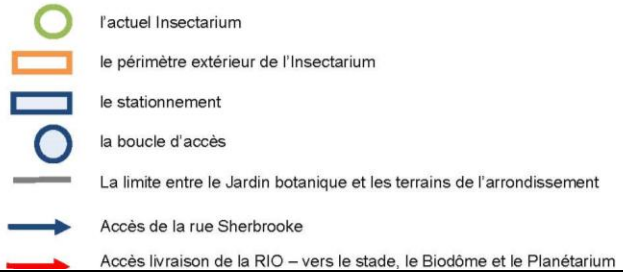
The new Insectarium will spread its wings on the site of the current building, and incorporate it. In other words, the new Insectarium will have to be located in its existing physical setting. This will encompass both the existing built part of the Insectarium to be renewed and its nearby dedicated outdoor space as well as the outdoor setting that is not part of the project zone.



Outdoor areas of the Insectarium



Indoor and outdoor areas related to the Insectarium



6.1.3 Architectural parameters

A number of bold parameters are of key importance to the proposed visitor experience and must be taken into account in the project's architectural design.

The site's **showcase architecture will add to the experiences of authentic, meaningful encounters between visitors and insects**. First and foremost, the building must be part of the experience. The new spaces must have a minimal footprint on the Botanical Garden site and be integrated naturally and optimally with the site. Plant-covered walls and ceilings could be a way of highlighting the many bonds between insects and plants.

- **Biophilic design**

The space and architecture must help rekindle the connection between humans and insects. This rapport with nature must be immediate, and integrated all the way into the architecture of the building, by exploring the potential of biophilic design, encouraging the rapport with nature, transforming inert envelopes into green spaces, rejecting any unhealthy products, reducing the building's ecological footprint to a strict minimum, turning to renewable energy sources or even producing them, encouraging local production, and guaranteeing access to fresh air and natural daylight wherever it makes sense. Biophilic design is central to the building's architecture.

- **Integration**

The Insectarium must be seamlessly integrated into the Botanical Garden site, blending into the background – perhaps even to the point where it becomes a non-building – while having its own signature.

- **Transparency**

Transparency will make it possible to see and understand the building's ecological functions: its filter marsh, rainwater recovery, solar panels and other similar features will all be visible. The same is true of the systems and certain spaces used to support the insects' lives. Cut-outs will open onto breeding rooms, plant production spaces and some laboratories, and to all the workings of the museum, with respect for people's and workers' privacy. This transparency will help visitors grasp the complexity of natural processes. The building will be a living organism, and the mechanisms that contribute to its life will be visible.

- **Biomimicry**

The spaces could also draw their inspiration and functions from the principles and forms of living organisms, a trend known as **biomimicry**. Imagine a building designed to function as elegantly and efficiently as a flower (or an insect!), generating its own energy, with a benign impact on its environment and an inspiring esthetic. Imagine an Insectarium that manages some of its own waste … thanks to insects!

6.1.4 Estimate

Please refer to the Competition Rules (Manual).

6.2 BIODÔME RENEWAL (PROJECT B)

6.2.1 The Biodôme today

A bird's-eye view of the Biodôme

The Biodôme opened in 1992, to mark Montréal's 350th anniversary, in the Velodrome from the 1976 Olympic Games, designed by architect Roger Taillibert.

The Biodôme, meaning "house of life," is a unique place that showcases and recreates some of the most beautiful ecosystems in the Americas. Its exceptional habitats and rich live collections combine to offer an authentic representation of nature. The links between the landscapes and the plant and animal species are shown in all their complexity and delicacy. The renewed Biodôme will rely on these strengths.

Twenty years on, this technological masterpiece still has no equal anywhere in the world.

- **The building**

Seen from above, the building housing the Biodôme resembles a trilobite, one of the earliest fossilized crustaceans.

Its main entrance is on the northeast side, across from the Olympic Stadium. It now has an underground entrance as well, which links it to the Rio Tinto Alcan Planetarium.

The building's concrete, skylight-lined structure has a surface of 15,472 m^2 and a floor area of 34,593 m^2.

Its functions are laid out on four levels, including two basement levels, as follows:

2nd basement: offices and meeting rooms, technical rooms, workshops, animal service room, veterinary clinics, delivery and storage areas, and part of the ecosystems, such as the basins.

1st basement: lower lobby, exhibition room, washrooms, a family room, cloakroom, offices and storage spaces, rooms for visitor activities, rooms for school groups, technical rooms, animal night quarters and collection room. Underground passage to the Rio Tinto Alcan Planetarium.

Ground floor: main lobby, ticket counter, the five ecosystems including night quarters and service area, laboratories, an auditorium, an exhibition room, a gift shop and its storage area, two food service (bistro) areas.

Floor 1 mezzanine: Biodôme administration offices. This floor is above the main entrance to the bistro area and the exit.

The Biodôme incorporated some of the existing structural elements from the old Velodrome, including the bleachers, the roof and the basement. All the ecosystems are located in the centre of the building, on the ground floor. Some sections of the bleachers were used to support the cliffs and rocks. The ecosystems are either enclosed in glass, like the Tropical Rainforest, or beneath a net hung under the roof, like the Laurentian Maple Forest and the Gulf of St. Lawrence.

These life-support systems make it possible to faithfully recreate five ecosystems of the Americas, with different climates, under one roof.

The Biodôme, bathed in daylight coming through the huge skylights, offers a total immersion in the ecosystems reproduced, from north to south. Moving in just a few seconds from the stifling heat and humidity of the Tropical Rainforest to the cool air of the Laurentian Maple Forest is an experience in itself, just as it is to fill one's lungs with the salty air of the Gulf of St. Lawrence.

Toiling behind the scenes are expert biologists, horticulturists, animal keepers, technicians, cooks, veterinarians, electrical technicians, engineers, mechanics and others. The Biodôme is accredited by such prestigious international organizations as AZA (Association of Zoos and Aquariums), and is known for the quality care of its collections.

With its 850,000 visitors every year, the Biodôme is the most popular permanent admission-charging attraction in Quebec.

- **Ecosystems**

Five ecosystems of the Americas constituting four distinct climate zones, under one roof:

- Tropical Rainforest

- Laurentian Maple Forest (where, remarkably, the cycle of the seasons is reproduced)
- Gulf of St. Lawrence
- Labrador Coast
- Sub-Antarctic Islands

- **Strengths and weaknesses**

Strengths:
- staff expertise
- the tour through the Americas
- the unique building with its remarkable architecture
- daylight
- worldwide renown
- international accreditations

The ecosystems:
- authentic representations
- complex, varied collections
- attention to detail
- quality of the rocks and respect for geomorphology
- coexistence of five ecosystems
- natural barriers

Weaknesses:
- Tour route too short
- lack of rest areas on the tour route
- one-way paths
- transition zones – eco transits (airlocks) between the ecosystems too “hermetic”

The ecosystems:
- nets above the ecosystems
- the Polar World, in particular because visitors are hemmed in
- the lynx, caiman and capybara habitats
- non-integrated structures (empty spaces, holes, visible walls)
- narrow passages-corridors: the tunnel along the river leading to the bat cave; the wall with the trout basin; the public space beneath the beaver dam; the corridor in front of the lynx habitat.

6.2.2 The Biodôme renewal project

The Biodôme is undeniably popular. As a living museum, it embodies the concept of a SPACE FOR LIFE remarkably well. Even though it is more than 20 years old, it remains current, avant-garde and decidedly unique. It is important to renew its attractions, however, so as to keep its message about evolving environmental issues up to date.

And what better way to reinvigorate it than by taking a new immersive approach? More effectively than any film, the ecosystems can explain the role of humans in nature through sensory and interactive experiences.

The goal of the project is to transform the experience for Biodôme visitors, to make it more immersive, more introspective and more moving, **by offering new views of the ecosystems and experiences that awaken visitors' different senses.**

The project targets the interior of the Biodôme, i.e. the ecosystems and public spaces.

- **Vision**

Relying on its distinctive approach and the wealth of its live collections, **the Biodôme is setting off on a migration that will let it offer its visitors a powerful immersive, sensory and moving experience.**

The existing tour route will be enhanced by adding experiences and new perspectives, based on the following concepts:

Nature versus humans
The Biodôme project is in line with the mission of the SPACE FOR LIFE, i.e. to make people more aware of biodiversity and encourage them to adopt a new way of experiencing nature. It will make humans more central to its presentations and messages, for instance by focussing more on the Biodôme's collaborative research projects.

More immersion and more life
New habitats will add new plants and animals, to make the visitor experience even more stimulating, thought provoking and educational. New elements like snow and rain will mean more involvement for visitors' bodies, their senses of hearing, smell, touch and sight.

All the ecosystems will undergo changes – some in more depth than others. For example, imagine a Polar World where visitors can get closer to the animals and feel the harshness of the climate.

- **Project objectives**

  - Highlight the ecosystems of the Americas and offer other views of the ecosystems.
  - Transform the experience for Biodôme visitors, appealing to their senses to make it more immersive, more introspective and more moving.
  - Thrill visitors and awaken their admiration for nature.
  - Encourage an attitude of gratitude toward nature.
  - Make visitors more aware of the efforts required to recreate nature and show them just how ingenious and absolutely irreplaceable nature is, on a large scale.
  - Encourage actions and real changes in behaviour toward nature, and create public commitment to preserving and appreciating biodiversity.

- **The genetic code of the Biodôme Renewal project**

Certain principles and approaches must guide the Biodôme Renewal project:

Principles

The living world
All the Biodôme's activities revolve around life. So any changes to the ecosystems must make it possible to add to and renew the collections and bring them closer to visitors.

Authenticity
The authenticity of the ecosystems, the real presence of the living world and awareness of its natural needs all help deepen the experience and the message. This encounter lets visitors appreciate the complexity of living systems and the importance of the relationship between their various components.

Continuing evolution
It is essential that the Biodôme constantly evolve with the seasons and the years. Its infrastructure is flexible enough for this to happen. It presents dynamic programming, with various key events throughout the year. Some aspects of the ecosystems make the renewal of animal species possible. The seasons are even more visible. Visitors see falling leaves, and snow. This evolution will draw them back again.

Calling on visitors' senses
Our senses and our entirely animal corporality remain our primary sources of information, much more than our minds. By stimulating all their senses and appealing to their bodies as much as possible, the Biodôme awakens visitors to their own environment and their own animality, bringing them closer to nature. We make them move like animals, try physical experiences, even causing them some discomfort at times that will anchor them in the present, as they explore the ecosystems of the Americas.

Approach

Systemic approach
Over the past 20 years, the systemic approach has become embedded in the institutional culture. The approach lets the Biodôme show the connection between its landscapes, plants and animals. It fosters greater authenticity and more consistency. It makes it possible to illustrate the complex, important and fragile interactions between the abiotic and biotic worlds, and show how the slightest change can provoke an unexpected domino effect.

The Biodôme is different from zoos and museums, and must maintain this distinction. Zoos have changed over the past twenty years and are now more immersive. But this more systemic approach is characteristic of the Biodôme.

Total immersion
Immersion is the approach favoured by the Biodôme and must be used to the utmost in the Biodôme Renewal project. From the moment they arrive to the moment they leave, visitors will find themselves in a surprising and disorienting environment. They will undertake a real journey. The three dimensions of the space will all be put to use, and experiences will call on all visitors' senses to achieve this result.

This is particularly true in the ecosystems. All the elements that dissociate visitors from nature, that reduce their sense of being “in” nature, will be rethought. Corridors will be opened up, walls will disappear and barriers will be removed. Sounds, smells and textures will all be part of the experience.

The live collections will be brought closer to visitors, with the greatest respect and concern for the animals’ and plants’ well-being. Stepping into the Tropical Forest, visitors may come face to face with a caiman, for instance. They will shuffle through leaves in the fall, in the Laurentian Maple Forest. They will wander in the fog in the St. Lawrence Marine ecosystem, or leave their footprints on the ice in the Polar World. Rain, snow, wind and smells and sounds can all contribute to the immersive experience.

It will be important not to disrupt this feeling of immersion between the ecosystems, while at the same time showing visitors that they are changing spaces. This will be a considerable challenge.

Verticality

Nature is not all at eye level. There is a whole living world above our heads and beneath our feet. To open visitors’ eyes to this fact, give them new perspectives and perhaps let them see more of nature and view it more clearly, we want to work with both the vertical and horizontal axes in the Biodôme. At the moment the focus is much more on the horizontal. This means presenting life in the air and even under the ground.

This is why the renewed Biodôme intends to add infrastructures to take visitors closer to the roof of the building. This access will also give them a better appreciation of the Biodôme’s architectural heritage, and let them peek behind the scenes, looking down from above on the ecosystems and showing them some of the support systems.

It must be a moving experience, taking visitors to new heights.

- **The tour route**

Migration as a theme

The project theme is based on the idea of a route, evolution, perpetual change, and a destination. In nature, it is the annual journey of a population from its breeding grounds to its wintering area and vice versa. It may also be a natural, accidental or anthropogenic change in the geographic distribution of a species. In addition, the migration theme allows us to raise the issue of climate change. Lastly, it supports and reinforces the original concept of the Biodôme, of a journey, a migration through the Americas. It suggests an effort to support the continuity of the immersive experience, and makes it possible to integrate the human experience in the tour route.

Reception and services

As soon as they enter, at the ticket counter, visitors are disoriented. They know that they are embarking on a migration, a voyage. Different activities are offered so that they don’t feel that they are waiting, but rather departing. The immersion is also felt in the public service spaces. All dimensions of the space are put to use.

The experience in the peripheral spaces and the lobby is more consistent with sustainable development principles. It encourages visitors to explore the environment and learn about biodiversity and informs them about actions they can take to help the environment.

Ecosystems
The route continues with a tour of the existing ecosystems, offering a more immersive, complex and varied experience. Visitors come to the Biodôme because it is a place where they feel good. They can enjoy the spaces to rest and reflect.

Behind the scenes
Showing visitors the behind the scenes operations (the systems and activities making the ecosystems at the Biodôme possible) is a way of introducing them to life's complexity. Visitors become more aware of the efforts required to recreate nature and just how ingenious and absolutely irreplaceable nature is, on a large scale.

The idea is to use cut-outs to show them this hidden dimension. The program regularly offers short tours of certain specific areas (animal quarters, kitchen, water filters for the basins). Devices are added to some of these areas so that the Biodôme's nature guides can give more elaborate presentations.

Rediscovering the Velodrome: The work in the ecosystems and public spaces will help to remind visitors of how the Velodrome was converted for the benefit of nature, and yet remains intact in this modern structure. The immersion will be even more pronounced and this symbolic Montréal "cocoon" will be better appreciated.

- **Issues and challenges**
  - The reception areas must be linked to the Grande Place (not part of the competition)
  - The spaces must be transparent and flexible (reception, ticket counter, food services, lobby) to adapt to the number of visitors
  - The ecosystems must change with the seasons
  - The current tour route must be improved
  - Take advantage of the verticality of the space to offer a new view of nature
  - The new facilities must encourage learning through human contact (nature guides)

- **Functional program**

The Biodôme Renewal project must focus on revamping the existing spaces. The ecosystem enclosures will be altered only where necessary to comply with the recommended conceptual orientations. The project will not result in any expansion or additional surface area, with the exception of the new entrance (70 m^2).

Aside from the ecosystems, the route will include a new experiential mezzanine and revamped service areas, so as to extend the service areas and offer new viewpoints.

The public and administration sector may be rethought and reorganized, on both levels, but will remain within the existing space.

The current floor areas are detailed in the estimate.

- **The ecosystems**

The project is intended to extend the tour route, not only by expanding it physically but also by developing strategies to slow visitors down, especially in the ecosystems.

The idea is to refine the five existing ecosystems and make them more complex, for instance by revealing other facets of certain parts (view from above or behind the scenes) and adding habitats and microcosms so as to display a greater diversity of life.

These new habitats will bring in new plants and animals to make the visitor experience even more stimulating, thought provoking and educational.

The ecosystems will be altered, sometimes considerably. For example, imagine a Polar World (sub-Arctic and sub-Antarctic ecosystems) where visitors can get closer to the animals and feel the harshness of the climate.

In the transition zones functioning as air locks between the ecosystems, imagination and technology will be applied to create new landscapes and ecosystems: deserts, underground worlds, mountains, caves, etc.

The ecosystems should include a larger human presence, such as more information on scientific research, views behind the scenes and references to human populations living near or in these ecosystems.

More emphasis will be placed on the seasons. Insofar as possible, the collections will evolve with the seasons.

We would like to see some changes made to the existing ecosystems:

- more natural treatment of the features and enclosures (walls, boundaries)
- closer proximity to the animals, by eliminating some physical barriers
- use of the transition zones to make the tour route flow more smoothly
- discovery of the vertical nature of the space and the architectural vault, with a tour above the ecosystems (possibly in the Tropical Rainforest and the Polar World)
- a new experience in the sub-Arctic and sub-Antarctic ecosystems, while keeping the basins if possible

Tropical Rainforest ecosystem

Suggestions

A.
Main zone
More immersion and experiences

B.
Improve the view of the varzea basin and add new species to it.

C.
Give more depth to the river basins by extending the forest behind the basins.

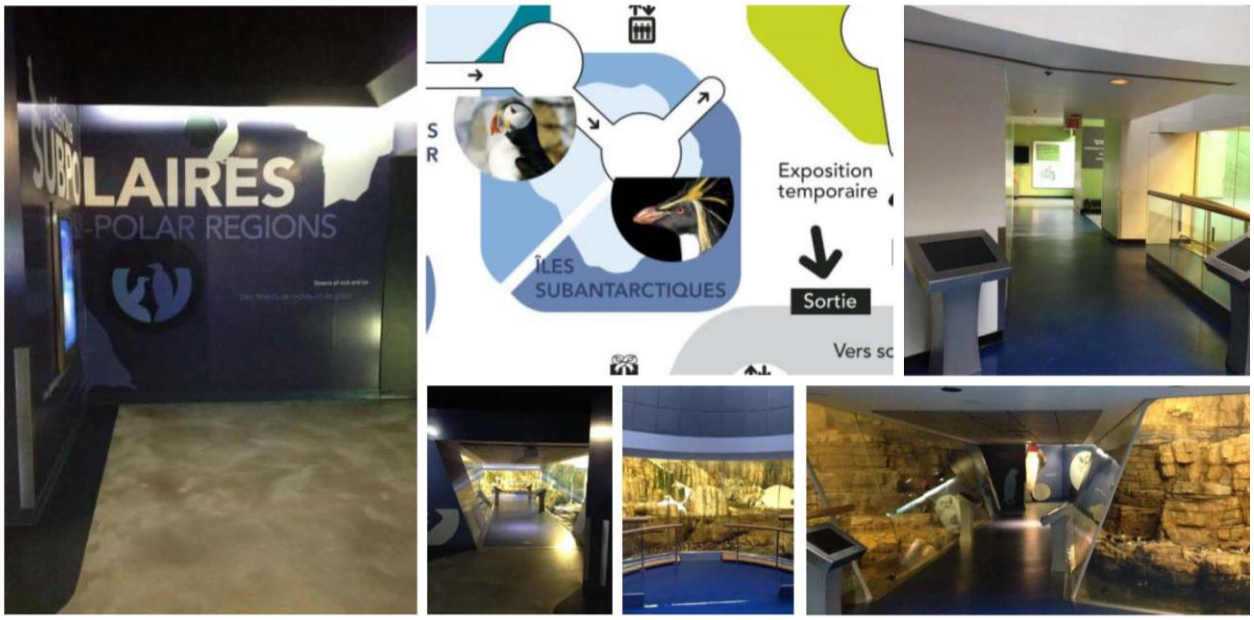
C./D. link
Create a more immersive link along the river leading to the bat cave.

D.
Make the cave more immersive by adding new species.

Laurentian Maple Forest ecosystem

Gulf of St. Lawrence ecosystem

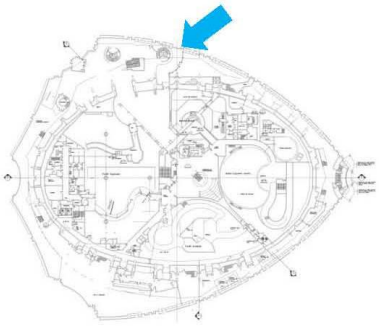
Sub-Polar Regions ecosystem



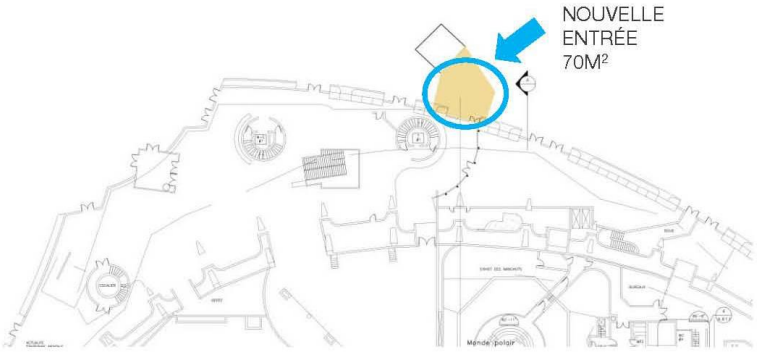
Peripheral public spaces

The project includes plans to relocate the main Biodôme entrance to make it more visible and indicative of the building's function, and so that it maintains a dialogue with the Rio Tinto Alcan Planetarium. It must create a "SPACE FOR LIFE" identity on the Olympic Park site.

The large linear public space beneath the bleachers (including the main lobby, the gift shop, the ticket counter, the bistro, a long corridor and the cafeteria) will be revamped, depending on where the main entrance is moved so that it opens onto the Esplanade and the future Grande Place.



PLAN NIVEAU 200



PLAN AGRANDI

Design criteria for the peripheral public spaces

- A welcoming, immersive and “submersive” lobby
- Add activities for visitors waiting in line, to make it a positive aspect of the visit; different visitor zones or spaces for individual visitors, children, groups and families
- Ticket counter: one fixed section, one mobile section (adaptable stations); reach out to visitors
- Integrate the living world
- Provide washrooms on this level
- Rethink the gift shop
- Rethink the fast food area and bring the cafeteria closer to the lobby
- Rethink the stairs leading to level 100

6.2.3 Estimate

Please refer to the Competition Rules (Manual).

6.3 GLASS PAVILION AT THE BOTANICAL GARDEN (PROJECT C)

6.3.1 The Botanical Garden today

The Montréal Botanical Garden is recognized as one of the world's finest and largest, and a wonderful way to explore the whole globe. Throughout the year, the Botanical Garden hosts a wide range of exhibitions, events and activities. Our nature interpreters, botanists and horticulturists help visitors experience and admire nature in all its glory. A versatile space is needed, however, to house events and horticultural exhibitions, so that the institution can better fulfil its community and corporate mission.

6.3.2 The Glass Pavilion

The Glass Pavilion project is an appropriate addition to the Botanical Garden, since it has long needed a versatile space for events and receptions.

For the moment, the Botanical Garden meets this need by using a variety of greenhouses and pavilions to host the following numbers of guests, depending on the space available on its site:

- Cocktails: 20 to 100 guests
- Banquets: 20 to 70 guests (all seasons) and 130 guests in the outdoor tent during the high season
- Lectures: 15 to 282 guests

The Glass Pavilion is an excellent opportunity to convey the values of the Montréal SPACE FOR LIFE, while meeting the Botanical Garden's specific need for a multipurpose reception space.

- **Vision/Image/Atmosphere**

The Glass Pavilion, with its flowing, light architectural lines, will fit seamlessly into its setting and emerge from its natural surroundings at the Botanical Garden.

The innovative project will reflect an image based on transparency and daylight.

The envelope allows a dialogue between indoors and outdoors, playing with the idea of seeing and being seen at the same time. While offering the image of an inviting, welcoming space from outdoors, it will feel intimate inside. In the evening, the Glass Pavilion will be visible thanks to the light it gives off, radiating into the Garden. The delicate and opalescent skin of its envelope will have to make it possible to adjust this dialogue as desired and as necessary. Its physical and visual porosity will create sensory connections with nature, as guests perceive the changing weather at different times of day and the year.

The Glass Pavilion will offer a refined, warm and harmonious visitor experience

.

- **Concept**

The Glass Pavilion will be a **remarkable** and distinctive structure, intended primarily to host nature-related events.

Its innovative, bold **architectural signature** will house a versatile space for events and receptions, open to the outdoors and integrated into its overall setting as part of the SPACE FOR LIFE and into its superb immediate surroundings in the Botanical Garden.

This **rapport with nature** must be immediate, and reflected in the building's design, by exploring the potential of biophilic architecture, encouraging the rapport with nature, rejecting any unhealthy products, reducing the building's ecological footprint to a strict minimum, turning to renewable energy sources or even generating its own energy, encouraging local production, and guaranteeing access to fresh air and daylight wherever it is relevant.

In short, the project must be a **high-quality space**, both functional and esthetic, inspired by nature. Simply inspired, but also conscientiously and methodically.

Emerging from the Botanical Garden's natural surroundings, the Pavilion must be **open and permeable to the outdoors**, visually and physically, immersing visitors in the heart of the Garden. As such, even the orientation of the space in its immediate setting must comply with this essential design criterion.

The Glass Pavilion hall and its connected public spaces must be refined, distinguished, intimate and warm, encouraging transparency and bathed in natural daylight. This ambience may be expressed in different ways through its architecture (proportions, choice of organic and natural materials, etc.), but also in its technical aspects (quality acoustic treatment, simple and discreet integration of technical equipment). Particular attention must be paid to the acoustic quality, so as to guarantee an exceptionally comfortable setting for any kind of event.

In short:

- Build a Pavilion with a bold, innovative architectural signature on an approximately 1,160 m^2 site, a flexible, versatile and organic structure incorporating recycled materials.
- Create a multipurpose reception hall, a technologically efficient and flexible space for hosting various eco-friendly horticultural and corporate functions, with seating for 350.
- Integrate the highest green and sustainable building standards, in keeping with LEED Platinum certification, certain Living Building Challenge Petals and biophilic design principles.
- Offer great visibility from and of the building and integrate it into its setting so that the different entrances are evident.
- Increase the number of visitors to the Botanical Garden.
- Raise new net self-generated revenue from rental fees.
- Landscape the outdoor spaces integrated into the building's architecture and the adjacent parts of the Botanical Garden to allow events to be held both indoors and outdoors, by having an outdoor area open off the reception hall, to offer an exceptional view and quality facilities.
- Offer a visual, olfactory and tactile immersion in the plant world.
- Extend the operating season.

- **Design criteria**

The concept must optimize the potential, from both a functional and esthetic viewpoint. Since the project will be connected to the Biodiversity Centre via the André-Bouchard exhibition room, the link with an existing built context must allow for optimal functional and visual links, to facilitate synergy and ensure that the ensemble fits together smoothly. The concept of "glass" does not refer to a greenhouse, but rather an architectural inspiration.

- Distinguished and timeless design, able to evolve over the years.
- Envelope design with all the requisite porosity and visual connections between the indoors and outdoors, a biophilic design that blurs the envelope.
- Emphasis on and preferred use of natural daylight.
- Impeccable, integrated and carefully designed acoustic quality.
- Careful segregation of the public and private zones (access to spaces for staff, deliveries and services must be monitored and secure).
- Maintaining the visibility and architectural integrity of the Biodiversity Centre.
- Natural, locally sourced and easily maintained materials.
- Climate control for the different activities, using means of generating and saving energy in line with LEED objectives.

- **Biophilic design**

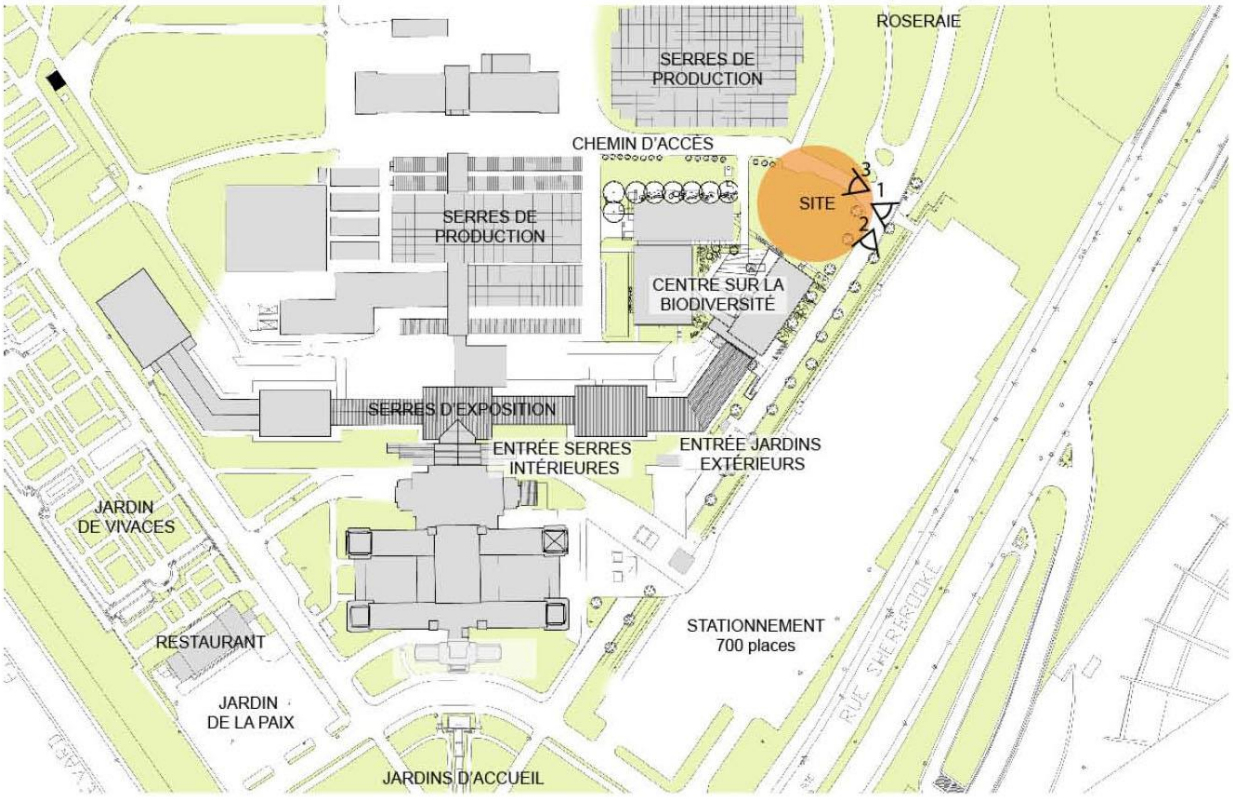
The main biophilic architectural and design considerations for the Glass Pavilion, in addition to its vision, are as follows:

- ensure sensory connections with nature
- use natural, sustainable materials
- make it possible to perceive seasonal and time-of-day changes in lighting and temperatures

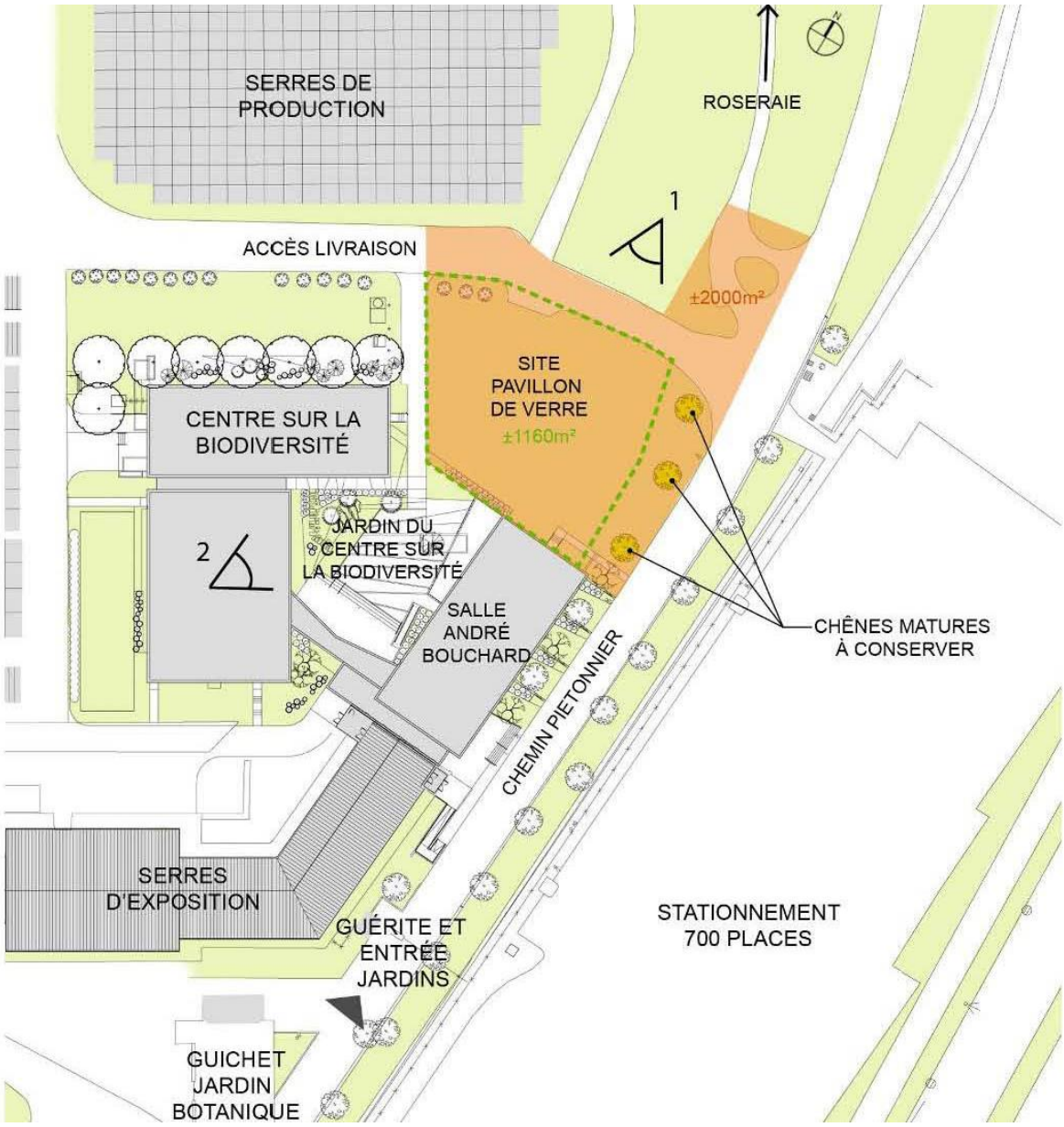
- **The site**

The Glass Pavilion will be located east of the Biodiversity Centre, in the Botanical Garden, on an approximately 1,160 m^2 site, connected to the Biodiversity Centre via the André-Bouchard room.

The Glass Pavilion will be a continuation of the route through the Botanical Garden's exhibition greenhouses. Visitors will reach it immediately after the exhibition greenhouse complex. It will also be located next to the entrance to a large and very popular thematic garden, the Rose Garden. The Pavilion will be clearly visible and easily accessible from the Botanical Garden parking lots and the Rose Garden path.



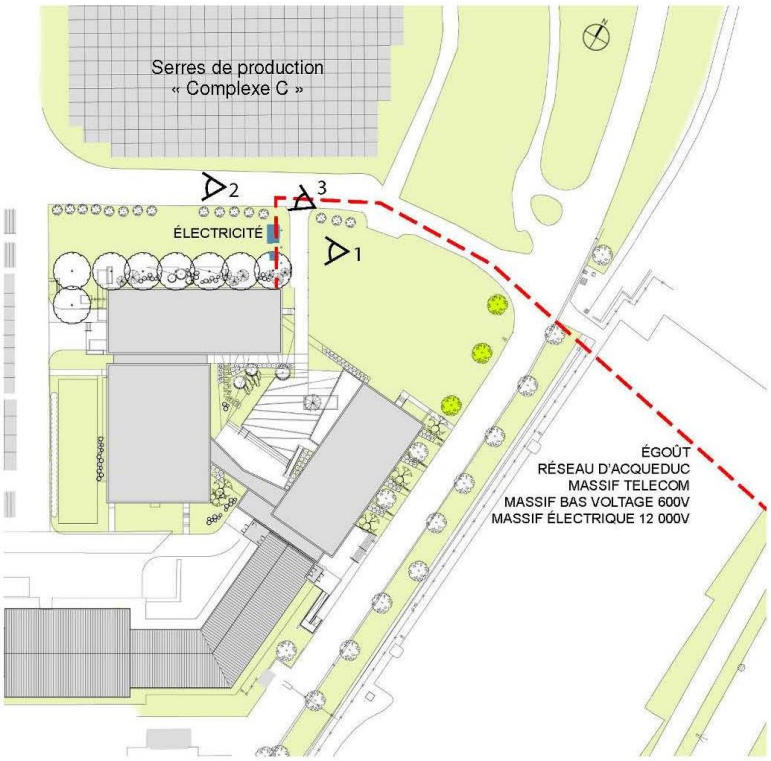
The orange zone represents the total project zone for the new building, including its dedicated landscaped area (about 2,000 m^2). The dotted green line represents the building footprint, about 1,160 m^2 included in this overall 2,000 m^2.



Walkway to the east of the site

Walkway to the east of the site

The site is bounded to the east by a footpath that runs alongside the parking lot and to the north by a service road between the Biodiversity Centre and the Botanical Garden's production greenhouses. A service entrance with controlled access is located farther along this service road. The section of the service road between the Rose Garden and the buildable zone may be redeveloped, but without touching the Rose Garden.



1. Electrical infrastructures: L pad-mounted transformer

2. Service access road

3. Production greenhouses

The site is now used as a parking lot for high-season shuttles and is not currently designated for any specific function. It is has a gravel and rock dust surface.

The site is part of the Botanical Garden, where every natural element has its place and value. The Rose Garden, next to the site, must be protected, as must the three high-quality mature oak trees on the eastern boundary of the site.

While the location of the main entrance is not stipulated, it should be noted that visitor access will be via the existing visitor entrances to the Botanical Garden, while deliveries will have to be made via the service entrance, on boulevard Pie-IX.

- **Functional program**

The Glass Pavilion will consist of two large functional ensembles: the public reception hall for eco-friendly horticultural events and corporate functions (seating for 300 and standing room for 400) and all the related and support spaces for its primary function. The main component remains the reception hall and its lobby, whose ambiance and atmosphere will represent the heart and soul of the project. A brief description of its essence is appropriate before delving into any functional details.

The different activity sectors include:

- A lobby and public area
- Multipurpose hall
- Horticultural spaces
- Common support spaces
- Technical spaces
- Outdoor area

Reception and public area

The reception area will consist of the lobby and all the public facilities (cloakrooms, washrooms).

The lobby will be a major, signal element of the project, since it represents the visitor's first physical contact with the building's interior. It is an interface between the outdoors and the reception hall, like a preamble, an inviting foretaste that makes visitors want to know more. This is where cocktails can be served and speeches given prior to a reception, with the option of expanding directly outdoors. Its design must incorporate the values conveyed by the Glass Pavilion, and its elements must be majestic.

It will be used to welcome visitors and centralize access to all the facilities described above.

Multipurpose hall

This space must accommodate seating for 300, for banquets, or 400 people standing, and about 25 to 30 information booths during horticultural events. The space must also accommodate a small mobile stage, regardless of the event.

Given its functions, it will need immediately adjacent support facilities, including space for a caterer, dishwashing and refrigeration, a control room, dressing rooms and dedicated storage space for rental events.

Horticultural spaces

The horticultural spaces will mainly include a meeting room for the organizing committee, which can be combined with a plant preparation room. This will make it possible to hold workshops for up to about fifty people.

Common support spaces

The rest of the Glass Pavilion will be support spaces for the various uses: a heated and protected loading dock, storage and housekeeping spaces, a space for waste/recycling/compost, and all the technical and electromechanical spaces required for environmental control of the different rooms (humidity, temperature, etc.).

The key to the requisite versatility and flexibility for the multipurpose hall lies in the careful design and siting of all these support spaces, to guarantee efficiency (setting up and taking down) and hence service quality.

Outdoor area

The building and its landscaping must form a whole referred to as the Glass Pavilion.

The landscaping will extend the ambiance in the reception hall, leading almost imperceptibly to the rest of the Botanical Garden. It will allow guests, without necessarily even thinking about it, to step outdoors during a reception or cocktail party and stroll about the Garden in the last rays of the setting sun. The building envelope must be a very thin "skin" allowing easy transitions between the reception hall/lobby and the outdoors.

The landscaping is not stipulated, since no events other than informal gatherings will be held outside. Thus there is no need to provide a patio or other space to accommodate a specific number of guests.

All the areas around the building must be landscaped, all the way to the boundaries of the project zone.

Just like the lobby, the landscaping will be an interface between the reception hall and the Garden. It will be very pleasant for guests to take their drinks outdoors and stroll around the Glass Pavilion, ending up in the Rose Garden without even realizing it.

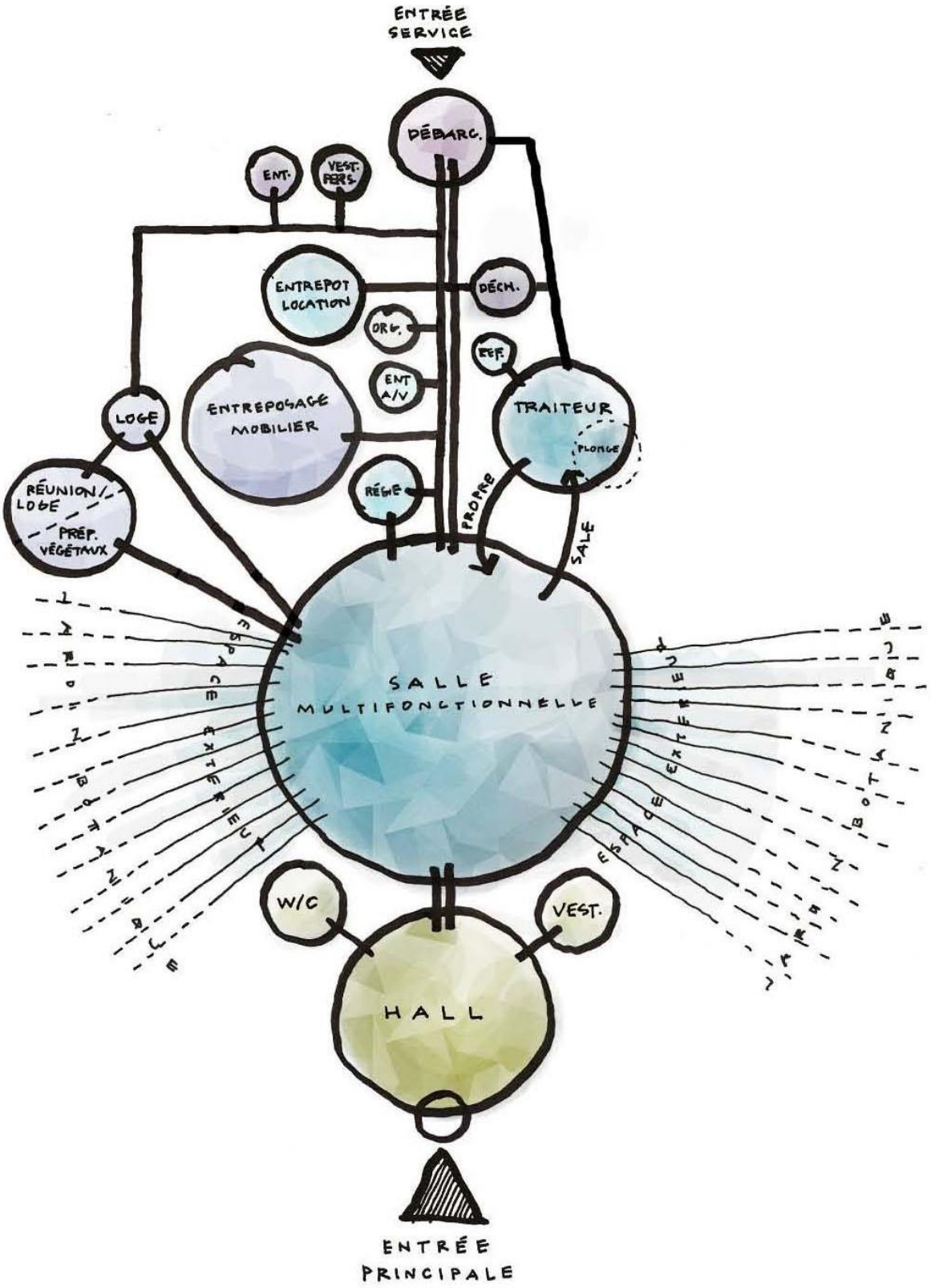
13-206_Pavillon de verre
Programme fonctionnel et technique
FONCTIONS

EN COURS

SUPERFICIES PROJETÉES - m²

Remarques		N° FICHE	Qte	unité m²	Total m²
	1. Espaces d'accueil et de soutien au public	100			
	Vestibule		1	20	20,0
	Hall/accueil		1	325	325,0
	Vestiaire		1	30	30,0
	Salle d'entreposage vestiaire		1	20	20,0
	Toilettes femmes		1	25	25,0
	Toilettes hommes		1	15	15,0
	Total				**435,0**
	2. Espaces Salle multifonctionnelle	200			
capacité 350 personnes à 1,7m2/personne + 150m² d'espace libre pour scène	Salle multifonctionnelle		1	750	750,0
	Petite loge		1	15	15,0
12,5% de la salle multifonctionnelle / incluant douche oculaire	Espace traiteur		1	115	115,0
incluant évier et comptoir inox	Alcôve plonge/entreposage (*inclut dans espace traiteur*)				
	Walk-in réfrigérateur		1	10	10,0
	Régie audiovisuelle		1	15	15,0
	Entreposage audiovisuel		1	20	20,0
	Entreposage matériel de location		1	80	80,0
	Total				**1005,0**
	3. Espaces horticulture	300			
pouvant fusionner avec salle de réunion	Salle de préparation des végétaux		1	30	30,0
incluant comptoir cuisinette	Salle de réunion horticulture (grande loge)		1	50	50,0
dédié au J.B. pourrait être plus grand 105m² + 38m²	Entreposage mobilier d'exposition/mobilier JB		1	150	150,0
à proximité de la salle de réunion	Entreposage comité organisateur		1	10	10,0
	Total				**240,0**
	4. Espaces de soutien communs	400			
pour camion cube 18'	Garage tempéré		1	50	50,0
pour serveurs ou exposants	Vestiaire exposants et personnel		1	20	20,0
	Local déchets/recyclage/compostage		1	20	20,0
	Local entretien ménager principal		1	6	6,0
	Local entretien ménager		1	4	4,0
	Entreposage entretien ménager		1	10	10,0
	Total				**110,0**
	5. Mécanique	500			
en cours de validation	**Total**				***140,0***
	Total superficie nette				**1930**
	Circulation , murs et cloisons			*	***1,25***
	**** ratio net/brut en cours de validation***				
	Total superficie intérieure brute				**2412,5**

This is a general organization chart showing the relationships between the different kinds of activities. It gives an overview of the different sectors, without going into detail regarding the different rooms in a sector. It shows the public spaces (reception hall, lobby and facilities) and all the spaces used for horticultural purposes (plant preparation room, meeting room), rental support spaces (caterer, storage) and lastly all the spaces for common services (loading dock, storage, waste, etc.).


ENTRÉE SERVICE
DÉBARC.
ENT.
VEST. PERS.
ENTREPOT LOCATION
DÉCH.
ORG.
FEF.
ENT A/V
ENTREPOSAGE MOBILIER
TRAITEUR
PLONGE
LOGE
RÉUNION / LOGE
PRÉP. VÉGÉTAUX
RÉGIE
PROPRE
SALE
SALLE MULTIFONCTIONNELLE
W/C
VEST.
HALL
ENTRÉE PRINCIPALE

6.3.3 Estimate

Please refer to the Competition Rules (Manual).

Appendices (attached)

APPENDIX A / History of the SPACE FOR LIFE institutions involved in this competition

APPENDIX B / Environmental certification

APPENDIX C / Urban context

APPENDIX D / Insectarium Metamorphosis/Program and museological concept

APPENDIX E / General information

APPENDIX F / Augmented reality

APPENDIX G / Insectarium Metamorphosis

APPENDIX H / Biodôme Renewal

APPENDIX I / Glass Pavilion at the Botanical Garden

APPENDIX A – HISTORY OF THE SPACE FOR LIFE INSTITUTIONS INVOLVED IN THIS COMPETITION

As early as the mid-19th century, there was talk in Montréal of creating a large botanical garden. It was not until the 1920s, however, that the idea took root in the mind of a young botany teacher by name of Brother Marie-Victorin.

Marie-Victorin, a key player in the history of the Montréal Botanical Garden
The project finally took shape, despite the Great Depression, municipal elections and World War II, spurred on by Brother Marie-Victorin's enthusiasm. All his hard work over the years paid off when the city executive committee passed a resolution officially creating the garden and setting aside part of Maisonneuve Park for the project. Then, under the impetus of Henry Teuscher, the Garden's first curator, the administration building and reception gardens were built (from 1936 to 1939), along with the exhibition greenhouses (officially opened in 1956).

Tremendous growth since the 1970s
Thanks to the booming economy and growing interest in the environment, the Montréal Botanical Garden underwent a growth spurt in the1970s.

A renewed emphasis on research and the success of the 1980 Floralies internationales event fostered a new openness to the world.

The pace has continued ever since, with a new reception area and the Molson hospitality greenhouse, Tree House, Chinese Garden, Japanese Garden and Pavilion, First Nations Garden and Courtyard of the Senses, a garden dedicated to visually impaired visitors. The Garden's vitality has done much to make it one of the city's major attractions for over 75 years.

The two passionate individuals behind the Insectarium
The Montréal Insectarium, officially opened on February 7, 1990, was the brainchild of Georges Brossard, a passionate entomologist, and Pierre Bourque, the Director of the Montréal Botanical Garden at the time. The Insectarium was the first museum in North America dedicated entirely to insects.

It took three years of speeches, exhibitions and public and private fundraising appeals to convince the government authorities to build an entomology museum. Right from the start, the Montréal Insectarium attracted large crowds, winning Montrealers' and tourists' hearts. Its original activities over the years (exhibitions, Insect Tastings, Butterflies Go Free and Monarchs Without Borders) have all contributed to its popularity with visitors and its scientific renown.

The Biodôme: a one-of-a-kind concept
After the 1976 Olympic Games, the city wanted to revamp the facilities, including the Velodrome, so that they could be enjoyed by Montrealers. After the 1980 Floralies internationales event, Pierre Bourque came up with the idea of turning the Olympic Velodrome into an institution dedicated to nature and the environment. Thanks to the municipal aquarium and the zoo in Angrignon Park, the city already had experience in displaying live animals. Zoologists, ecologists, botanists, horticulturists and museologists combined their expertise to create a highly innovative, one-of-a-kind institution.

The Montréal Biodôme, opened on June 19, 1992, is neither a zoo, an aquarium, a botanical garden or a museum … but all of those things combined.

APPENDIX B – ENVIRONMENTAL CERTIFICATION

LEED

The LEED NC system comprises four certification levels:

• Platinum	80 or more points	$$$
• Gold	60 to 79 points	$$
• Silver	50 to 59 points	$
• LEED certified	40 to 49 points	

Main LEED certification criteria:

• Site development	up to 26 points
• Water efficiency	up to 10 points
• Energy and atmosphere	up to 35 points
• Materials and resources	up to 14 points
• Indoor environmental quality	up to 15 points
• Innovation in design	up to 06 points
• Regional priority	up to 04 points
• **Total:**	**Maximum of 110 points**

Montréal municipal sustainable development principles
In addition, from a sustainable development perspective, Montréal expects the building's LEED certification to meet certain basic criteria:

Site development
- Erosion and sediment control
- Alternative means of transportation: bicycle racks
- Stormwater management: runoff and quantity
- Site development to reduce heat islands: roof

Water efficiency
- Water use reduction: 20%

Energy and atmosphere

- Optimize energy performance
- Renewable energy: 5%
- Enhanced commissioning
- Ozone layer protection

Materials and resources
- Waste management: 50% of debris diverted from disposal in landfills
- Reused materials: 5%
- Reused resources: 10%
- Recycled content: 7.5% (post-consumer recycled content + ½ post-industrial materials)
- Regional materials: 10% of materials extracted and manufactured within the region
- Regional materials: 20% of materials extracted and manufactured within the region

Indoor environmental quality

- Carbon dioxide (CO^2) monitoring
- Enhanced ventilation efficiency
- IAQ management plan: during construction
- IAQ management plan: pre-occupancy analysis
- Low-emitting materials: adhesives and sealants
- Low-emitting materials: composite wood and agrifibre products
- Indoor chemical and pollutant source control
- Thermal comfort: verification
- Daylight and views: daylighting in 75% of spaces

Innovation and design process

- Innovation in design, diffusion « vert2
- Innovation in design, green housekeeping
- LEED accredited professional

LIVING BUILDING CHALLENGE

The Living Building Challenge (LBC), launched in 2006 by the Cascadia Region Green Building Council (CRGBC), is a third-party certification program for sustainable buildings and projects aimed at raising environmental performance standards and defining the most advanced measure of sustainability in the built environment. Version 2.0 of this voluntary program is based on twenty “Imperatives” that vary depending on the project typology and are divided into seven different categories, or “Petals.” All of the Imperatives must be met in order to qualify for LBC certification. Since Living Building Challenge certification is based on actual, rather than modeled or anticipated, performance, projects must be operational for at least twelve consecutive months prior to evaluation.

In early 2010, no fewer than seventy LBC projects were in the design or completion phase and the first projects were certified that year, after one year of operation. In 2009, The CRGBC founded the International Living Building Institute (ILBI) as an umbrella organization to promote the LBC program globally.

- **Identification**

Living Building Challenge (LBC)

- **Organization**

Cascadia Region Green Building Council (CRGBC) and International Living Building Institute (ILBI)

- **Applies to**

- New construction, major renovations, interior design, landscaping, infrastructure and neighbourhood development
- Commercial, institutional, industrial and residential buildings and neighbourhoods
- Projects in the United States, Canada and internationally

Systems
Living Building Challenge 2.0/ four project typologies
- Renovation
- Landscape or infrastructure
- Building
- Neighbourhood

Categories
Seven Petals
- Site
- Water
- Energy
- Health
- Materials
- Equity
- Beauty

Levels
LBC Certified or certification for individual Petals

REFERENCES: LIVING BUILDING CHALLENGE

1. Living Building Challenge (LBC) criteria

Site – Water – Energy – Materials – Equity – Health – Beauty

http://living-future.org/case-study/bertschiscience
http://living-future.org/case-study/hpaenergylab
http://living-future.org/case-study/omegacenter
http://living-future.org/case-study/tysonllc

Details on the various Petals

http://living-future.org/lbc/petalhandbooks

Overview
http://living-future.org/lbc/about

Document
http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%2012-0501.pdf

2. Examples of buildings certified for a single aspect (or Petal, in LBC parlance)

http://living-future.org/case-study/dpr-phoenix
http://living-future.org/case-study/ideasz2
http://living-future.org/case-study/paintershall
http://living-future.org/case-study/zhome

3. Examples of certified buildings meeting all or some of these criteria:

http://www.biophilicdesign.net/featured-locations.html

4. Biophilic design

The term **biophilic design and architecture** does not refer to certification, but rather to criteria (or prescriptions, based on meta-analyses of research into human relationships with nature, in terms of health, psychological well-being, healthy childhood development, etc.) aimed at ensuring that new buildings help to reconnect humans with nature and contribute to human health.

A short film describing the essentials of Biophilic design
http://livinglabinsectarium.com/details/designers/5/stephen-kellert

APPENDIX C – URBAN CONTEXT

Rosemont–La Petite-Patrie borough

- **Background**

In 1905, the Petite Côte municipality became the village of Rosemont, bounded on the west by the Canadian Pacific tracks, on the north by boulevard Rosemont, on the south by rue Rachel and on the east by boulevard Pie IX.

Rosemont grew with the arrival of the Angus Shops, a heavy industry that provided jobs for many workers who decided to live nearby.

Residential development and cultural diversity ensued, with the opening of the Jean Talon Market, the Botanical Garden and the heart institute (Institut de cardiologie) at the Maisonneuve-Rosemont hospital.

Over the past fifteen years or so, the borough has enjoyed significant economic renewal, as the Angus neighbourhood has been revitalized and new industrial and residential neighbourhoods have taken shape, boosted by the high-tech sector.

The "hospital hub," one of the major ones on the island of Montréal, continues to expand and create jobs.

- **Overview**

Number of residents:	133,618
Area:	14.4 km^2, third-largest borough in terms of population
Population density:	8,430 residents/km^2
Population:	7.2% of the population of the Montréal agglomeration 43% ages 20 to 44, primarily French-speaking
Average income:	$24,214
Urban environment:	disadvantaged

Urban planning
The borough landscape is marked by its traditional heavy industries, and this represents a major challenge in terms of urban planning and preserving the built environment.

Efforts to strike a balance between industrial and residential functions will have to draw on this potential, while addressing the need to upgrade the supply of rental housing.

Housing
Rental housing starts are up in the borough since 1994 – this housing type accounts for 74% of all dwellings.

Recent "condo-type" development has changed the local resident mix. These new households are demanding improved municipal services and facilities.

Economic profile

The borough is undergoing structural renewal, with the transition from heavy industry (the Angus Shops) to advanced technology (the Angus Technopole).

Many jobs in the borough are in the retail trade (13,000) and the health and social services sector (12,000).

There are three shopping districts: around Jean Talon Market, Saint-Hubert Plaza and Promenade Masson.

- **Social profile**

Local community and institutional players are working hard to address the social issues resulting from poverty in the borough.

- **Parc Maisonneuve**

This 80-hectare park is adjacent to the Botanical Garden. It is takes up much of the block bounded by Sherbrooke, Viau, boulevard Rosemont and Pie-IX, and has a reception building. The Olympic Village is nearby – this 150,000 m^2 residential complex includes 18,000 m^2 of retail space and 980 housing units.

Mercier–Hochelaga-Maisonneuve borough

This borough, located in east-end Montréal alongside the St. Lawrence River, is one of Montréal's four most densely populated boroughs.

With an area of 24.5 km^2, Mercier–Hochelaga-Maisonneuve is the city's fifth largest borough. It is bounded on the north by the Rosemont–La Petite-Patrie, Saint-Léonard and Anjou boroughs; on the south by the St. Lawrence River; on the east by the Ville de Montréal-Est; and on the west by the Ville-Marie borough.

The population has grown in recent years and now stands at 129,110, 12% of whom are immigrants and 92.9% of whom are French-speaking (language spoken at home).

Consumer-service jobs account for 35% of local employment, with 40% of them in retail; there has been marked growth in professional and scientific services, as well as in manufacturing, wholesale trade and transportation. Non-profit organizations contribute significantly to economic life in the borough. Average household income in 2000 was $39,152, as compared with the Montréal average of $49,429.

- **Urban planning**

There are three main residential neighbourhoods in the borough, one of them being Hochelaga-Maisonneuve, in the western part. These neighbourhoods are separated from each other by a number of large industrial zones, including the Port of Montréal, and several major arteries, including the Louis Hippolyte-Lafontaine bridge-tunnel, Highway 25 and rue Notre-Dame.

There are three industrial parks in the borough, home to some one hundred companies.

The borough also has a large recreational and tourism hub made up of the Olympic Park, the Biodôme and the new Rio Tinto Alcan Planetarium. In terms of culture, there are the

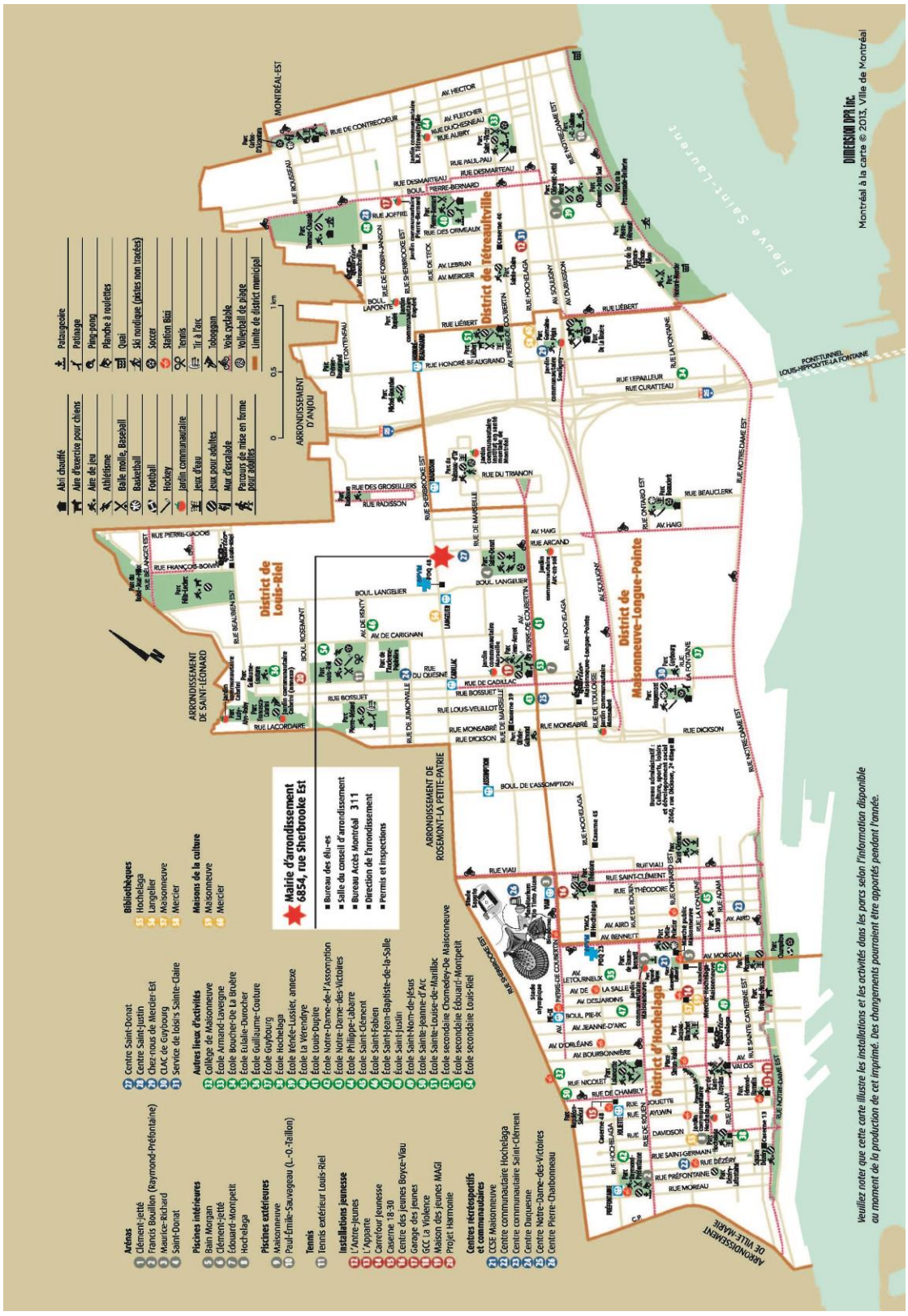
Denise-Pelletier theatre, the Château Dufresne museum, two Maisons de la culture – Mercier and Maisonneuve – and four libraries – Hochelaga, Langelier, Maisonneuve and Mercier.

In terms of sports infrastructure, the Charbonneau-Richard complex (Centre Pierre-Charbonneau and Maurice Richard arena) and the Olympic Park sports complex have facilities for playing high-level sports and can also host major public events, from exhibitions to conventions, conferences and shows.

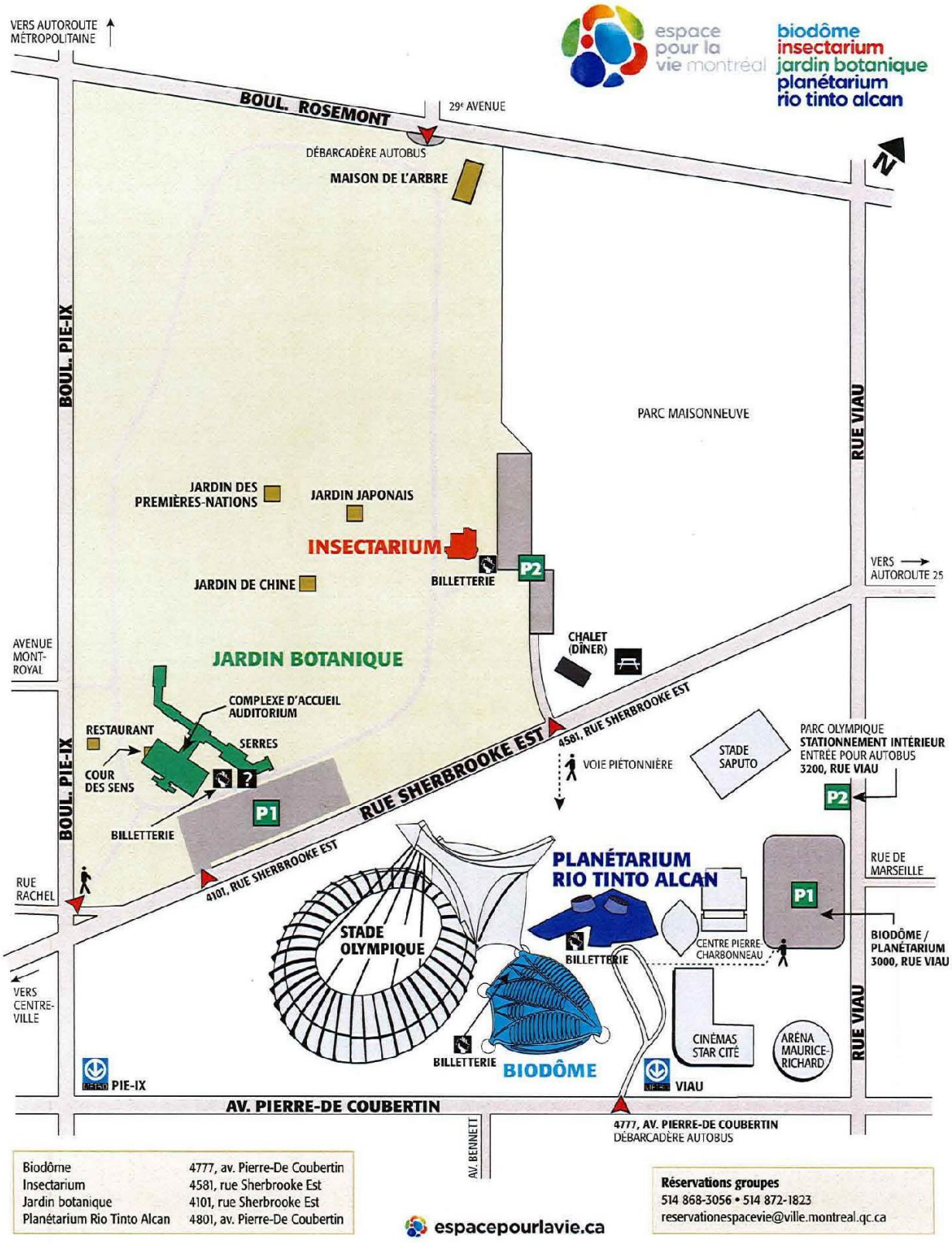
Social, urban and economic trends in Mercier–Hochelaga-Maisonneuve over the next several years will be shaped by a number of structural projects that have already been announced or are in the planning stages, including upgrades to the Olympic facilities, and must be taken into account.

1- MAP OF THE ROSEMENT–LA PETITE-PATRIE BOROUGH

2- MAP OF THE MERCIER–HOCHELAGA-MAISONNEUVE BOROUGH

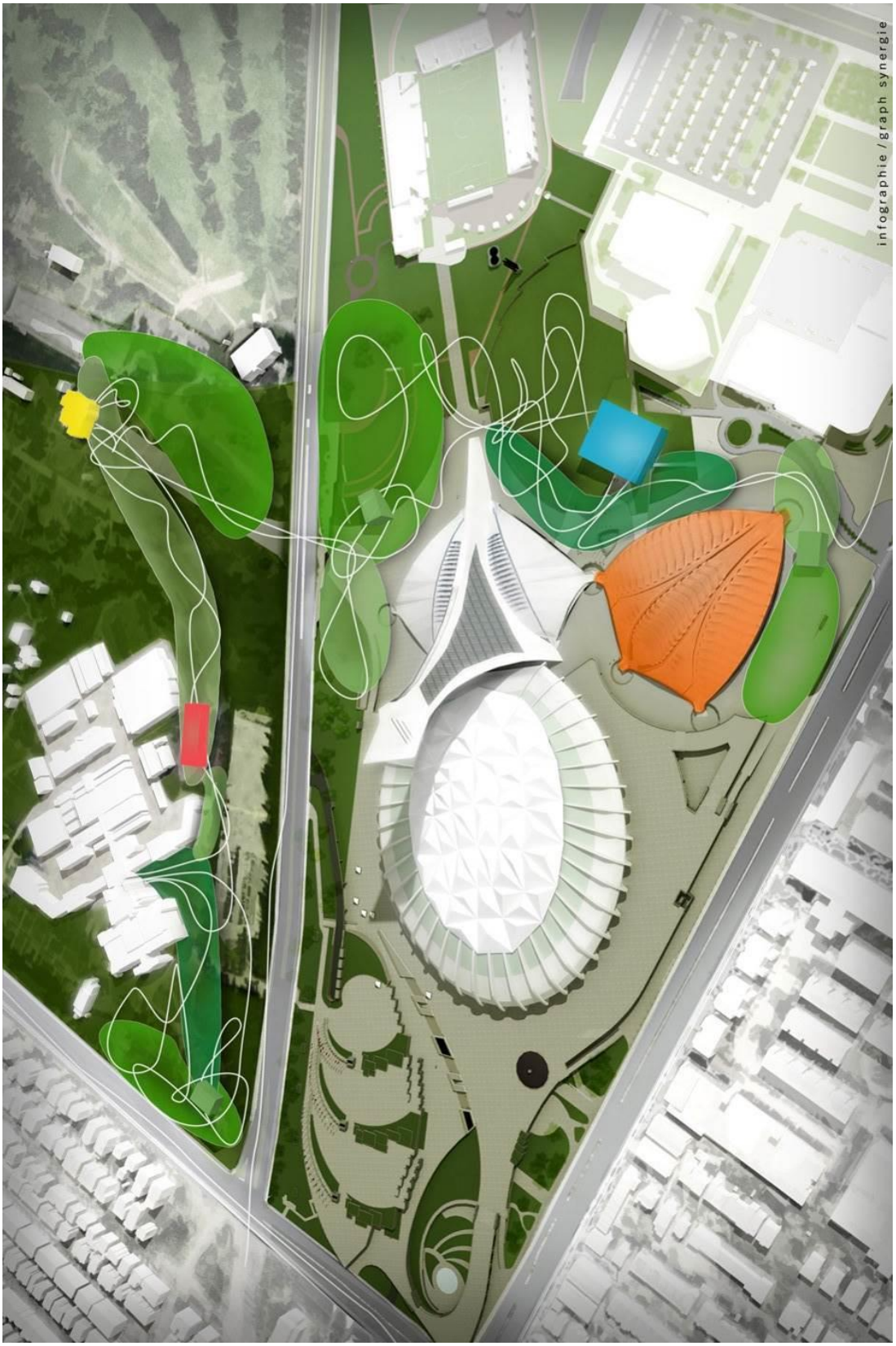


3- PLANS / SPACE FOR LIFE



ESPACE POUR LA VIE // PLAN
PARC MAISONNEUVE
INSECTARIUM
JARDIN BOTANIQUE
PAVILLON DE VERRE
STADE SAPUTO
CENTRE PIERRE CHARBONNEAU
PLANÉTARIUM RIO TINTO ALCAN
ARENA MAURICE RICHARD
CINÉMA STARCITÉ
STM-VIAU
BIODÔME DE MONTRÉAL
TOUR DE MONTRÉAL
STADE OLYMPIQUE
PARC OLYMPIQUE
STM-PIE-IX
SEPTEMBRE 2013

4- SPACE FOR LIFE / 3D



5- BY-LAW CONCERNING THE CONSTRUCTION AND OCCUPANCY OF A LOT IN THE QUADRILATERAL BOUNDED BY PIE-IX BOULEVARD, SHERBROOKE AND VIAU STREETS, AND PIERRE-DE COUBERTIN AVENUE

VILLE DE MONTRÉAL
RÈGLEMENT
01-301

RÈGLEMENT SUR LA CONSTRUCTION ET SUR L'OCCUPATION D'UN TERRAIN SITUÉ DANS LE QUADRILATÈRE DÉLIMITÉ PAR LE BOULEVARD PIE-IX, LES RUES SHERBROOKE ET VIAU, ET L'AVENUE PIERRE-DE COUBERTIN

À l'assemblée du 17 décembre 2001, le conseil de la Ville de Montréal décrète :

CHAPITRE I
TERRITOIRE D'APPLICATION

1. Le présent règlement s'applique au territoire montré au plan de l'annexe A.

CHAPITRE II
AUTORISATIONS

2. Malgré la réglementation d'urbanisme applicable au territoire décrit à l'article 1, la construction et l'occupation de plusieurs bâtiments, à des fins institutionnelles et commerciales, dans le secteur délimité par le boulevard Pie-IX, les rues Sherbrooke et Viau, et l'avenue Pierre-De Coubertin sont autorisées aux conditions prévues au présent règlement.

À ces fins, il est permis de déroger aux articles 7, 8, 21, 56, 76, 80, 130, 410, 422, 570, 571, 597 et 602 du Règlement d'urbanisme (R.R.V.M., chapitre U-1) et au Plan d'urbanisme (CO92 03386). Toute autre disposition réglementaire non incompatible avec celles prévues au présent règlement s'applique.

CHAPITRE III
CONDITIONS

SECTION I
INTERPRÉTATION

3. Dans le présent chapitre, l'identification alphabétique des secteurs fait référence à l'identification des secteurs contenue au plan de l'annexe B.

SECTION II
USAGES

4. En plus des usages autorisés par le Règlement d'urbanisme (R.R.V.M., chapitre U-1), les

usages suivants sont également autorisés :

1º pour le secteur A, les usages galerie d'art et bureau;

2º pour le secteur C, les usages galerie d'art, salle d'amusement familiale et salle de billard;

3º pour le secteur D, les usages , hôtel et galerie d'art.

SECTION III
HAUTEUR

5. Dans les secteurs C et D, un bâtiment ne doit pas avoir une hauteur supérieure à 20 m.

6. La hauteur prescrite peut varier de plus ou moins 1 m.

SECTION IV
MODE D'IMPLANTATION

7. Dans les secteurs C et D, seule l'implantation des bâtiments en mode isolé est autorisée.

SECTION V
ACCÈS VÉHICULAIRES ET PIÉTONNIERS

8. Dans le secteur C, l'aménagement d'une rue privée et un maximum de 3 accès sont autorisés à partir d'une voie publique.

9. Dans le secteur D, l'aménagement d'une rue privée et un maximum de 3 accès sont autorisés à partir d'une voie publique.

10. Aucun lien véhiculaire ou rue privée ne doit relier les secteurs C et D.

SECTION VI
AIRE DE STATIONNEMENT

11. Seul l'aménagement d'un débarcadère incluant un maximum de 3 places de stationnement est autorisé par bâtiment.

12. Aucun aménagement d'aire de stationnement extérieur, excluant les unités visées à l'article 11, n'est autorisé.

SECTION VII
ZONE DE CONSERVATION ET DE MISE EN VALEUR

13. Dans le secteur B soit la zone de conservation et de mise en valeur, aucune construction

hors sol n'est autorisée.

14. Dans le secteur B, un axe piétonnier nommé la « Grande allée », d'une largeur minimale de 20 m, doit être aménagé. Cet axe monumental devra être aménagé dans l'axe de la tour du mât du stade de façon à mettre en valeur le lien avec les pyramides olympiques.

15. Le caractère boisé de la zone de conservation doit être maintenu. Les travaux d'entretien et de reboisement nécessaires à cette fin doivent être effectués.

SECTION VIII
ESPACES COLLECTIFS

16. Dans le secteur C, l'implantation des constructions doit permettre la réalisation d'une place extérieure intégrée au réseau des voies de circulation des piétons.

17. Une demande de permis relative à une construction autorisée doit être accompagnée d'un plan d'aménagement paysager prévoyant l'aménagement de liens piétonniers avec le réseau existant.

18. Les éléments végétaux prévus à l'article 17 doivent être entretenus et remplacés au besoin afin de maintenir un caractère végétal sain.

SECTION IX
CRITÈRES D'AMÉNAGEMENT, D'ARCHITECTURE ET DE DESIGN

19. Aux fins de la délivrance d'un permis de construction ou de modification relatif à une construction autorisée par le présent règlement, en plus des critères prévus à l'article 29 du Règlement sur la procédure d'approbation de projets de construction, de modification ou d'occupation et sur la Commission Jacques-Viger (R.R.V.M., chapitre P-7), les critères suivants s'appliquent :

1º pour le secteur A, les interventions doivent, de façon générale, assurer la préservation et l'intégrité des caractéristiques architecturales des bâtiments;

2º pour les secteurs C et D, la conception des nouveaux pavillons doit, de façon générale :

a) favoriser la mise en valeur des perspectives et des corridors visuels vers le stade et les pyramides olympiques, et assurer la préséance du stade;

b) assurer la continuité du traitement pavillonnaire;

c) favoriser un alignement de construction qui tienne compte de la continuité des voies de circulation piétonnes extérieures;

d) contribuer à la continuité du cadre bâti sur les voies de circulation desservant le site;

e) favoriser un traitement des bâtiments privilégiant l'ouverture des rez-de-chaussée vers les espaces publics extérieurs;

f) favoriser, dans l'aménagement des rez-de-chaussée, l'implantation des services communautaires;

g) préconiser un traitement architectural et une utilisation de matériaux qui, tout en favorisant le caractère distinctif de chaque nouveau pavillon, contribuent à l'harmonisation de l'ensemble des composantes dominantes du site, notamment par la continuité en termes de matériaux, d'ouvertures et de fenestration;

h) contribuer à la continuité du réseau d'espaces publics extérieurs;

i) favoriser le traitement des accès aux aires de stationnement de façon à ce que la circulation piétonnière et véhiculaire soit à la fois fonctionnelle et sécuritaire;

j) assurer la continuité des voies de circulation des piétons et favoriser leur utilisation sécuritaire;

k) assurer la préséance des voies de circulation des piétons sur celles des véhicules;

l) localiser les accès aux aires de stationnement et aux aires de services aux endroits causant le moins d'impacts sur la circulation piétonnière;

m) favoriser une conception privilégiant la localisation des éléments techniques ou mécaniques à l'intérieur des bâtiments et favoriser, le cas échéant, un traitement minimisant leurs impacts visuels;

3º pour le secteur B, l'aménagement paysager du site doit tenir compte de l'élément suivant : assurer l'aménagement d'un parc linéaire dans l'axe du mât du stade; cet axe devra être monumental, à l'échelle du site et du stade;

4º pour le secteur C, la conception des nouveaux pavillons doit, de façon générale :

a) favoriser l'aménagement d'une place sur le parvis du stade;

b) assurer la continuité du cadre bâti autour de la place;

c) favoriser la localisation des accès aux bâtiments à partir de la place publique située sur le parvis du stade;

5º pour le secteur D, la conception des nouveaux pavillons doit, de façon générale :

a) favoriser l'implantation des bâtiments vers la « Grande allée » de manière à assurer une continuité du cadre bâti;

b) favoriser le traitement de toutes les façades des bâtiments comme des façades principales.

20. Dans le secteur C, la superficie maximale d'enseigne autorisée par bâtiment est de 250 m².

21. L'installation de toute enseigne dans le territoire d'application doit être approuvée conformément à la section III du Règlement sur la procédure d'approbation de projets de construction, de modification ou d'occupation et sur la Commission Jacques-Viger (R.R.V.M., chapitre P-7).

SECTION X
DÉLAI DE RÉALISATION

22. Les travaux de construction doivent débuter dans les 120 mois suivant la date d'entrée en vigueur du présent règlement. Si ce délai n'est pas respecté, les autorisations qui font l'objet du présent règlement seront nulles et sans effet.

23. Les travaux d'aménagement paysager prévus à l'article 17 doivent être terminés au plus tard 12 mois après la fin de la construction d'un bâtiment.

24. Le Règlement sur la construction et sur l'occupation d'un terrain situé au nord de l'avenue Pierre-De Coubertin à l'est du prolongement de la rue Sicard sur les lots 237-1PTIE et 237-18PTIE (99-237) est abrogé.

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ANNEXE A
PLAN INTITULÉ « TERRITOIRE D'APPLICATION DU RÈGLEMENT » ESTAMPILLÉ PAR LE SERVICE DU DÉVELOPPEMENT ÉCONOMIQUE ET URBAIN LE 8 NOVEMBRE 2001 *

ANNEXE B
PLAN INTITULÉ « PLAN DES SECTEURS » ESTAMPILLÉ PAR LE SERVICE DU DÉVELOPPEMENT ÉCONOMIQUE ET URBAIN LE 8 NOVEMBRE 2001 *

* *Voir dossier S010489118.*

Ce règlement a été promulgué par l'avis public affiché à l'hôtel de ville et publié dans *Le Devoir* le 21 décembre 2001.

6- PROVISIONS OF URBAN PLANNING BY-LAW 01-275

Dispositions du Règlement d'urbanisme 01-275

108. Les travaux suivants doivent être approuvés conformément au titre VIII, selon les critères énoncés dans la présente section :

1º la construction ou l'agrandissement d'un bâtiment situé dans un secteur significatif ou sur un terrain désigné comme immeuble significatif;

2º la transformation d'une caractéristique architecturale, lorsque cette caractéristique appartient à un bâtiment situé dans un secteur significatif ou sur un terrain désigné comme immeuble significatif;

3º la transformation ou le remplacement d'une grille de fer forgé, d'un mur de briques ou de pierre et la construction d'une clôture ou d'un mur, lorsque situés sur le terrain d'un immeuble significatif ou en cour avant d'un immeuble localisé dans un secteur significatif à critères;

4º l'abattage d'un arbre lorsque celui-ci fait partie d'un massif d'arbres aménagé ou d'un alignement d'arbres situé sur un terrain d'un immeuble significatif ou dans la cour avant d'un immeuble localisé dans un secteur significatif à critères;

5° la modification et l'aménagement d'une cour anglaise;

6° l'installation, la modification, le remplacement ou le maintien d'une enseigne sur un bâtiment situé sur un terrain désigné comme immeuble significatif.

... s. o. (exceptions)

109. Les travaux visés à l'article 108 doivent respecter les critères énoncés à la présente section en tenant compte des facteurs suivants :

1º le degré d'homogénéité de l'environnement immédiat;

2º l'usage du bâtiment et ses qualités architecturales;

3º l'emplacement du bâtiment sur l'îlot;

4º la contribution du bâtiment au renforcement, au maintien ou à l'évolution du milieu bâti;

5º la prise en considération du caractère du bâtiment à agrandir soit le type, l'expression et les caractéristiques architecturales telles que parements, couronnement et ouvertures;

6º le respect, la mise en valeur ou l'adaptation à l'expression architecturale du bâtiment ou son degré de compatibilité quant à la forme et aux matériaux, en accord avec la valeur architecturale du bâtiment;

7º le niveau de considération du traitement des agrandissements sur un même type de bâtiment quant aux dimensions, à la disposition par rapport au volume principal et aux caractéristiques architecturales propres aux agrandissements;

8º la prise en compte des effets sur le terrain lui-même et sur les constructions voisines de manière à préserver ou mettre en valeur le caractère du terrain et du milieu dans lequel le projet se trouve ou y être compatible, en accord avec leur valeur;

9º la considération du caractère particulier des constructions voisines soit les types de bâtiment, les dimensions, le mode et les taux d'implantation, les parements, les formes de toits, les couronnements, les ouvertures, les niveaux des accès et les saillies;

10º le respect, la mise en valeur ou le niveau d'adaptation du projet aux qualités du terrain et au caractère d'ensemble du milieu ou son degré de compatibilité à celui-ci quant à la forme et aux matériaux, tout en demeurant en accord avec la valeur et l'homogénéité du milieu;

11° la participation à la cohérence de l'îlot, de l'intersection, de la rue ou du milieu, en accord avec son emplacement, sa visibilité et sa signification dans la ville.

118. Sur un terrain où est érigé un bâtiment ou un ensemble de bâtiments désignés comme immeuble significatif, les travaux visés à l'article 108 doivent tendre à respecter les critères suivants :

1º la sauvegarde du caractère unique et distinctif des bâtiments ou du site et la protection de chacune de leurs parties ou de leurs caractéristiques architecturales;

2º le maintien des caractéristiques dominantes du paysage urbain;

3º le respect du mode d'implantation existant;

4º l'atténuation des effets sur le terrain lui-même et sur les constructions voisines de manière à préserver ou mettre en valeur le caractère du terrain et du milieu dans lequel il se trouve ou y être compatible, en accord avec leur valeur;

5º la mise en valeur ou son niveau d'adaptation au paysage, à la végétation et à la topographie du site où il s'implante ou la compatibilité en accord avec leur importance à titre d'éléments représentatifs, intéressants, exceptionnels ou uniques de l'environnement;

6º le respect ou la mise en valeur des vues entre un espace public de l'arrondissement, le fleuve et tout élément naturel ou bâti exceptionnel, en accord avec leur importance à titre de vues caractéristiques ou uniques et en tenant compte de la fréquentation des lieux publics (belvédères, voies publiques axiales, institutions, sentiers) d'où elles sont possibles;

7º la préservation des massifs et des alignements d'arbres présents sur le site tout en considérant le caractère du bâtiment, du terrain, des plantations, des aménagements existants, de la composition des projets d'aménagements originaux sur le site et ceux avoisinants et de leur degré d'intégration avec les composantes du paysage urbain présentant les mêmes caractéristiques.

666. Préalablement à la délivrance d'un permis exigé en vertu du Règlement sur la construction et la transformation de bâtiments (chapitre C-9.2), l'approbation du conseil est requise dans les cas suivants :

1° projet dont le programme de développement a été approuvé conformément à l'article 612a de la Charte de la Ville de Montréal (1959-1960, chapitre 102);

2° projet visé au présent règlement par la procédure d'approbation de plans relatifs à l'implantation et à l'architecture des constructions ou à l'aménagement des terrains et aux travaux qui y sont reliés;

3° n. a. (projets particuliers)

669. Les critères d'aménagement, d'architecture et de design applicables aux fins de la délivrance d'un permis pour un projet visé à l'article 666 sont les suivants :

1° conformité du projet aux orientations, objectifs, plans et politiques municipales en matière d'aménagement, d'architecture et de design;

2° qualités du projet sur le plan architectural;

3° efficacité des éléments à réduire les effets d'ombre et de vent;

4° efficacité et qualités d'intégration des éléments visant à minimiser les impacts sur le milieu d'insertion, au regard de la circulation des véhicules et des piétons;

5° capacité de mettre en valeur les lieux publics et de créer un environnement sécuritaire;

6° capacité de mettre en valeur, de protéger ou d'enrichir le patrimoine architectural, naturel et paysager.

N. B. Les articles 108, 109 et 118 s'appliquent à un « immeuble significatif » alors que l'article 669 s'applique également par le biais du programme de développement (voir l'article 666.1°).

Programme de développement R.V.M. 01-301 (« Règlement sur la construction et sur l'occupation d'un terrain situé dans le quadrilatère délimité par le boulevard Pie-IX, les rues Sherbrooke Est et Viau, et l'avenue Pierre-De Coubertin »).

SECTION IX
CRITÈRES D'AMÉNAGEMENT, D'ARCHITECTURE ET DE DESIGN

19. Aux fins de la délivrance d'un permis de construction ou de modification relatif à une construction autorisée par le présent règlement, en plus des critères prévus à l'article 29 du Règlement sur la procédure d'approbation de projets de construction, de modification ou d'occupation et sur la Commission Jacques-Viger (R.R.V.M., chapitre P-7), les critères suivants s'appliquent :

1º n. a. (secteur A)

2º pour les secteurs **C** et D, la conception des nouveaux pavillons doit, de façon générale :

a) favoriser la mise en valeur des perspectives et des corridors visuels vers le stade et les pyramides olympiques, et assurer la préséance du stade;

b) assurer la continuité du traitement pavillonnaire;

c) favoriser un alignement de construction qui tienne compte de la continuité des voies de circulation piétonnes extérieures;

d) contribuer à la continuité du cadre bâti sur les voies de circulation desservant le site;

e) favoriser un traitement des bâtiments privilégiant l'ouverture des rez-de-chaussée vers les espaces publics extérieurs;

f) favoriser, dans l'aménagement des rez-de-chaussée, l'implantation des services communautaires;

g) préconiser un traitement architectural et une utilisation de matériaux qui, tout en favorisant le caractère distinctif de chaque nouveau pavillon, contribuent à l'harmonisation de l'ensemble des composantes dominantes du site, notamment par la continuité en termes de matériaux, d'ouvertures et de fenestration;

h) contribuer à la continuité du réseau d'espaces publics extérieurs;

i) favoriser le traitement des accès aux aires de stationnement de façon à ce que la circulation piétonnière et véhiculaire soit à la fois fonctionnelle et sécuritaire;

j) assurer la continuité des voies de circulation des piétons et favoriser leur utilisation sécuritaire;

k) assurer la préséance des voies de circulation des piétons sur celles des véhicules;

l) localiser les accès aux aires de stationnement et aux aires de services aux endroits causant le moins d'impacts sur la circulation piétonnière;

m) favoriser une conception privilégiant la localisation des éléments techniques ou mécaniques à l'intérieur des bâtiments et favoriser, le cas échéant, un traitement minimisant leurs impacts visuels;

3º n. a. (secteur B)

4º pour le secteur **C**, la conception des nouveaux pavillons doit, de façon générale :

a) favoriser l'aménagement d'une place sur le parvis du stade;

b) assurer la continuité du cadre bâti autour de la place;

c) favoriser des accès aux bâtiments à partir de la place publique située sur le parvis du stade;

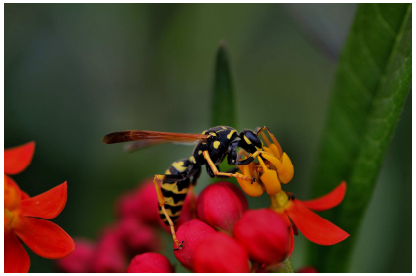
5º n. a. (secteur D)

20. - 21. n. a. (enseignes)

N. b. Les « critères prévus à l'article 29 du Règlement sur la procédure d'approbation de projets de construction, de modification ou d'occupation et sur la Commission Jacques-Viger (R.R.V.M., chapitre P-7) » auxquels fait référence l'article précité ont été substantiellement traduits dans les critères prévus à l'article 669 du Règlement d’urbanisme de Mercier/Hochelaga-Maisonneuve (01-275).

APPENDIX D – INSECTARIUM METAMORPHOSIS
1- PROGRAM AND MUSEOLOGICAL CONCEPT

espace pour la vie insectarium montréal




Metamorphosis Project

Program and museological concept

January 2014

espace pour la vie insectarium montréal

TABLE OF CONTENTS

1. The Montréal Space for Life

The Montréal Space for Life consists of the Montréal Biodôme, Insectarium, Botanical Garden and Rio Tinto Alcan Planetarium, which together create a space **dedicated to both humankind and nature**. By bringing so many committed players together in one place to share their expertise, creativity and innovative ideas, the Space for Life serves as a hub of biodiversity research, conservation, education and outreach.

It is both Canada's largest natural science museum complex and one of the leading tourist sites in Montréal and all of Quebec.

Mission

Through its outreach, conservation, research and educational activities, help people enjoy nature to the fullest.

Science, nature and emotion

The Space for Life is a movement created by a project that is participatory, structural, authentic, inventive, committed and open to the world, one based on citizen participation and co-creation with visitors. Like nature itself, which belongs to everyone, it is a collective movement. The Space for Life wants people to rethink the bonds between humankind and nature, to cultivate a new way of living.

The Space for Life vision reflects a perfect balance between science, nature and emotion, and has three central goals:

- IMPRESS AND THRILL with nature
- EXPLAIN nature
- ENCOURAGE CHANGES IN BEHAVIOUR toward nature

espace pour la vie insectarium montréal

The largest natural science museum complex in Canada

Today the SPACE FOR LIFE is:

1.7 million visitors every year

50,000 young people

40% local and other tourists

22 million Web pages consulted

$642 million in assets

The first space in the world dedicated to humankind and nature

The Space for Life intends to create the first space in the world dedicated to humankind and nature. Quite simply, this is a commitment to nature and biodiversity.

To mark Montréal's 375th anniversary in 2017, the Space for Life has committed to carrying out an ambitious investment plan. This plan is aimed at positioning Montréal as the flagship of a vast global movement for biodiversity, with the goal of inventing new ways of living so as to bring humankind closer to nature. This investment will take the form of projects at its prestigious institutions, true jewels of Montréal's heritage, and will also help to significantly boost attendance figures and self-generated revenue at the Space for Life. Some 2.4 million visitors are expected by 2017, for a 40% increase over 2009, the year in which the business plan was launched.

Following the opening of the Université de Montréal's Biodiversity Centre at the Botanical Garden in March 2011 and the Rio Tinto Alcan Planetarium in April 2013, the Space for Life has launched plans for its three other major projects: the Insectarium's Metamorphosis, the renewal of the Biodôme and the Botanical Garden's Glass Pavilion.

2. THE INSECTARIUM'S METAMORPHOSIS

Dizzying wonders

The Insectarium's expansion is part of this major development at the Space for Life. In keeping with its tradition of innovation – it was the first museum of its kind in North America – the Insectarium is embarking on its Metamorphosis project, which will see it undergo a spectacular transformation.

The Insectarium plans to spread its wings on its current site, almost doubling in size. This will allow it to offer **sensory experiences and unexpected encounters** through bold, disorienting approaches that encourage visitors to see insects from a new perspective. This entirely new approach and form is aimed at bringing humans closer to insects, an essential shift if we are to survive here on Earth. We humans will have to undergo our own metamorphosis in the way we relate to nature.

The passion behind the Insectarium

The Montréal Insectarium was created in 1990 thanks to a Quebec-wide public awareness campaign launched by Georges Brossard, a passionate, self-taught entomologist. The Insectarium proved unexpectedly popular right from the start.

The Montréal Insectarium's success may be attributed to a number of factors, including children's natural interest in and fascination with insects; the public's admiration for the Insectarium's charismatic founder, Georges Brossard; the museum's inviting and visitor-friendly atmosphere; the popularity of its events like Butterflies Go Free; and the visibility the Insectarium has gained through its travelling exhibitions across the province. In addition, the museum has earned recognition in professional circles, among entomologists and museologists, for the important role it plays in demystifying insects, for its innovative museological concept - allying objects, live and naturalized insects and an elegant, efficient design – and for its unusual cultural activities, like its Insect Tastings events, for instance.

The Insectarium: the first North American museum dedicated entirely to insects

Photo : Étienne Boucher-Cazabon

Today the Insectarium is:

350,000 visitors every year

150,000 visitors to Butterflies Go Free

250,000 naturalized specimens from every continent, a collection assembled over the years thanks to such donors as Georges Brossard, Firmin Laliberté and Gilles Delisle

30,000 young people who participate every year in monarch butterfly conservation activities

The Insectarium: making insects better known and appreciated

Photo : André Sarrazin

The Insectarium brings together research, its collections, outreach and education. For instance, under its Monarchs Without Borders program, in connection with Monarch Watch, a University of Kansas research program, it hands out more than 1,000 monarch-raising kits every year. When the 5,000 (or so) butterflies emerge, they are tagged and released, and valuable scientific data is obtained when they are later found. The all-new ebutterfly.ca website allows butterfly enthusiasts and entomologists to share their butterfly sightings and thereby help researchers better understand the impacts of global changes, like climate change, on these insects.

The Insectarium takes visitors on a fabulous voyage that introduces them to more than 3,000 amazing insects, inviting them to find the answer to the question “Why there are so many insects on our planet?”. It also presents Butterflies Go Free, an opportunity for 150,000 visitors to surround themselves with lush greenery in the depths of winter, as close to 1,500 butterflies and moths flutter around them. The Insectarium site is also home to the BuzzGround, a fun and educational playground full of activities and discoveries for children. Finally, it offers a free entomological information and insect identification service.

Photo : Jean-Claude Theyssier

Insect biodiversity

Insects represent:

440 million years of evolution

1/2 the known species on Earth

1 million or so known species

Photo : Jean-Claude Theyssier

Insects produce food, fibre, drugs and countless products, many with economic and cultural value.

80% of plant species depend on bees and other pollinating insects to reproduce

75% of all food crops depend on pollinating insects

35% of global food production depends on insects

1,900 insect species are consumed by humans

3. A GLOBAL PRIORITY: RECONNECTING THE HUMAN AND INSECT WORLDS

Over the past four centuries, industrialization, the exploding world population and overconsumption by its wealthiest members have all combined to place biological diversity at risk, to the point that if we do not soon alter course the survival of humanity will be threatened. Changing our relationship with nature has become a clear and pressing need. We have all the keys to establish a better alliance with nature, and the Insectarium wants to help rekindle this connection.

Biophilia: inspiring the Insectarium's metamorphosis

The Metamorphosis project is inspired by biophilic values in terms of both its underlying meaning and the design of its spaces and experiences. Humans have an innate affinity with nature because of their biological evolution. This affinity translates into a subconscious desire to affiliate with other living organisms. Biophilia is a genetic heritage that calls on us to value nature for the benefits and enjoyment we derive from it. Because it is so deeply anchored in our biology and evolution, biophilia is also an important argument for protecting this nature, so essential to our lives. We feel responsible for it when we realize the extent to which we are connected with nature, and with insects.

The biophilia hypothesis

Photo : André Sarrazin

Edward O. Wilson advances the biophilia hypothesis in 1984;

Stephen R. Kellert develops this hypothesis, leading to various health-related research studies confirming the need to reconnect humans and nature;

Various applications of this concept are introduced by Kellert and his team in the areas of interior design, architecture and landscaping.

Biophilic values

Photo : André Sarrazin

Attraction: Nature is a source of aesthetic moments.
Draw inspiration from insects' beauty

Aversion: Nature gives rise to fears, revulsion and phobias.
Recognize these emotions

Affection: Nature elicits our affection.
Create an attachment

Exploitation: Nature is an economic resource.
Recognize insects' economic importance

Dominion: We master and control nature for our needs.
Admit this reflex, so as to rise above it

Symbolism: Nature nourishes our imaginations.
Create, taking inspiration from insects

Spirituality: Nature inspires reverence and peace.
Become one with a world far greater than ourselves

4. THE GENETIC CODE OF THE METAMORPHOSIS PROJECT

The main objective of the Insectarium's Metamorphosis project is to offer sensory experiences and original encounters that rekindle the connection between humans and insects in order to foster the emotional ties essential to the future of the planet, as well as our own.

4.1 Principles

A number of principles emerged from the living lab and the co-creation process launched for the design of the new museum – they are part of the genetic code of the Metamorphosis project. These principles will guide the overall project, along with the visitor experience and the architecture and life of the Museum.

Genetic code for the project
General principles

Authenticity

Photo : André Sarrazin

The **authenticity** of the encounter with insects, their real presence and awareness of their natural needs all help deepen the experience and the message. This encounter changes the way we see insects: encouraging a shift away from indifference, fear or disgust to surprise or even fascination.

Evolution

It is essential that the Insectarium **constantly evolve** with the seasons and the years. Its infrastructure is flexible enough for this to happen. It presents dynamic programming, with various key events throughout the year. Its spaces are attractive to tourists and other such occasional visitors and also to visitors for whom we are part of their everyday lives, because they regularly join in one of our activities, return often to enjoy new experiences or have become truly and deeply interested in insects.

Collaboration

Collaboration is part of the life of the Insectarium. The project was launched with a living lab, and it continued with a co-design process to define its broad outlines. Some one hundred individuals, both international experts and Space for Life and Insectarium employees, took part in the process, which has continued as an iterative and integrated design process based on collective intelligence. Montrealers and other visitors will be encouraged to contribute their creativity and emotions to the life of the Insectarium.

Porosity – fluidity

Porosity and fluidity between the indoors and outdoors, between the visible and invisible, bring natural processes to life. We want to emphasize the effort made to present live insects. The indoor and outdoor layouts are in harmony. This fluidity is also part of the visitor experience, for in good weather the tour route takes them outdoors in a few places.

Senses and movement

The experience calls on visitors' senses and movement, bringing them closer to the world of insects and highlighting insects' differences from and similarities with humans. Our senses and our entirely animal corporality remain our primary sources of information, much more than our minds. We live and learn mainly through our bodies. Why deny ourselves that?

4.2 Approach

The approach is simultaneously immersive, relationship-based and participatory.

Immersion

Photo : André Sarrazin

Coming face to face with nature and insects allows visitors to be in and with nature, rather than just visiting it. Sensory experiences and original encounters help create emotional bonds that will foster profound, lasting changes in our relationships with insects.

Relationships

Our visitors forge relationships with other visitors, with our activity staff who are passionate about insects and with entomologists. This passion is contagious and remains one of the best ways of communicating and sharing information. It opens doors and touches peoples' hearts and minds.

Participation

Visitor participation, imagination and creativity are all solicited as a way of allowing everyone to work together to rekindle the connection between humans and nature, between humans and insects.

5. THE MUSEOLOGICAL CONCEPT

Even the smallest is much bigger than you think

The Insectarium's Metamorphosis starts with a human metamorphosis, significantly transforming our relationship with the world of insects and nature. It is also an overall experience inviting us to be "in and with" nature rather than simply "visiting" it. The tour route encourages us to become players rather than mere spectators and offers a privileged glimpse of an unsuspected, important, highly varied, complex and splendid world. The Insectarium becomes a place that brings natural processes to life, making us realize that "**even the smallest is much bigger than you think**."

Visitors get closer to the world of insects as they explore using all their senses, their bodies and movement. This helps them perceive the differences from and similarities with humans. The architecture, spaces and museography all play with scale and perspective, "insect time" and natural patterns (like fractals, spirals and natural symmetry). Visitors are ushered into a disorienting world that encourages them to reflect on their own humanity.

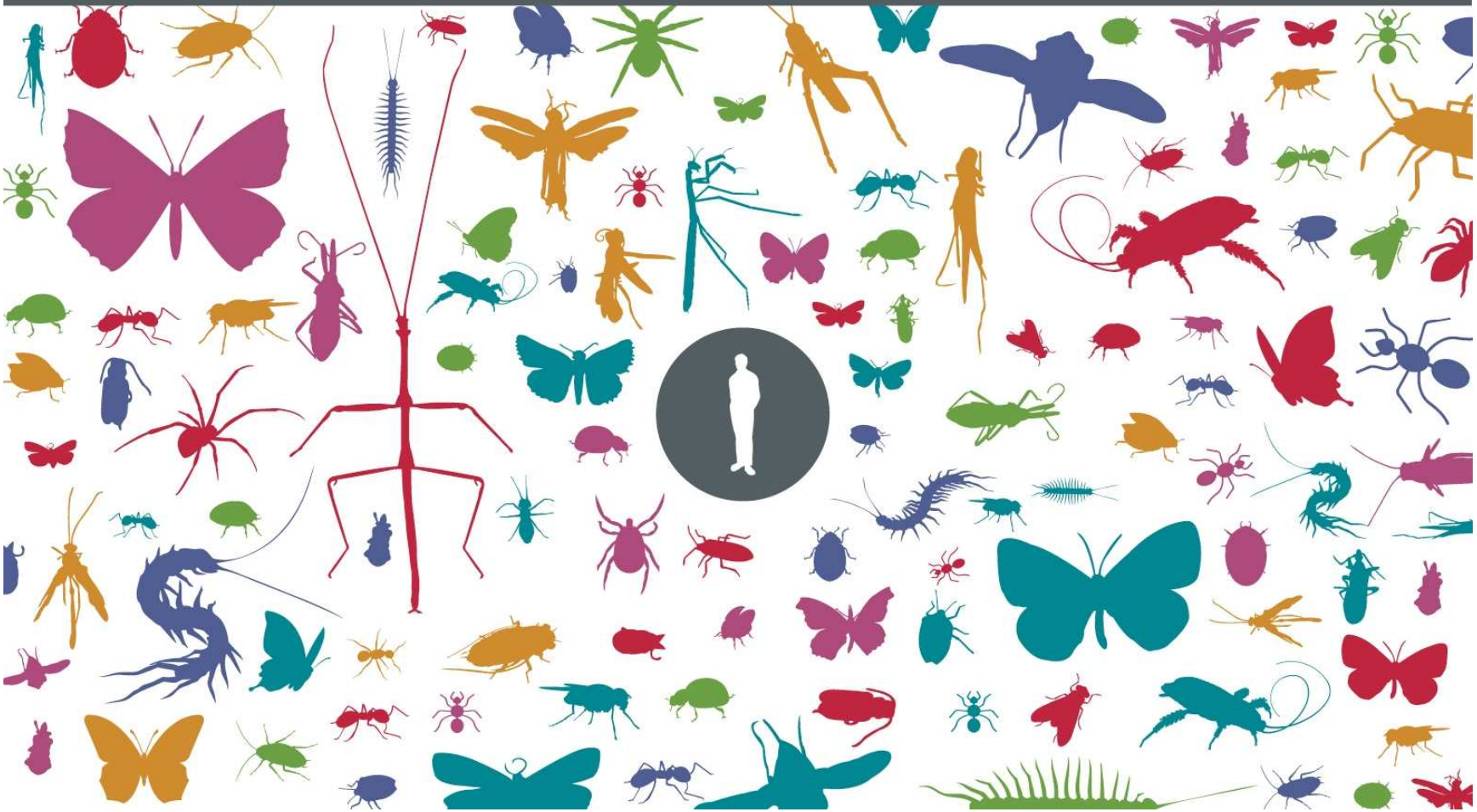
The experiences are authentic encounters with insects and nature. The technology used is like an extension of the senses, allowing visitors to see, hear and experience otherwise inaccessible things as an insect would.

Visitors come to the Insectarium both to take part in everyday activities and for structured tours. Some of these everyday activities are inspired by the world of insects, while others encourage visitors to get closer to insects. The idea is to show people, in a more obvious, acceptable, fun and interesting way, that we share our day-to-day lives with insects, at home, in the city and in nature.

espace pour la vie insectarium montréal

Story line

Even the smallest is much bigger than you think



5.1 Visitor route

The entrance: a sensory reset

A sensory “reset” prepares visitors for what they are about to experience. As soon as they come inside, they enter a disorienting universe, the world of insects. Stepping through the Insectarium’s door is like passing through a looking glass. Beyond this point, everything is experienced at insect scale, in insect time and at insect pace. Visitors shed their technological human skin to prepare themselves to meet insects on their level. The entrance zone plays with scale and perspective as a way of informing visitors that they are crossing a threshold into an unusual world.

The everyday Insectarium

This zone opens onto **welcoming, relaxing spaces** that are part of the experience. In this lounge area, visitors might see their first live insect, bring in insects they’ve found in their own gardens to have them identified, chat with a scientist, meet up with a Friend to share some artwork they made in a creative workshop, or even sample an insect treat. All these activities are designed to remind us that insects really are part of our everyday lives.

A route that appeals to visitors’ bodies, senses and movement

The perceptual experience, which begins right in the entrance zone, imbues all the passages and corridors through the museum. As they move through these areas leading to the immersive space, visitors can admire some of the Insectarium’s collections. These displays, featuring a host of attractive dried and mounted insects, have both esthetic and scientific value. Along with other museographic tools, they show and make visitors feel as though they are moving through insects’ evolutionary time, real time and cyclical time. Different architectural elements suggest sudden shifts in perspective and changes in scale. At times one feels as large as a giant, and at others as small as an insect! Hear ants marching and see through a fly’s eyes. Everything is paradoxical and strange, yet nothing is explicit. As we explore what an insect’s life is like, we naturally compare and contrast it with our own.

Intimate, unusual encounters

Different experiential spaces are dotted along the corridors, offering face-to-face, intimate and individual encounters with insects. Visitors are invited to poke their heads inside a vivarium and to go nose to nose with an insect, or perhaps to hear a mysterious insect song.

Total immersion

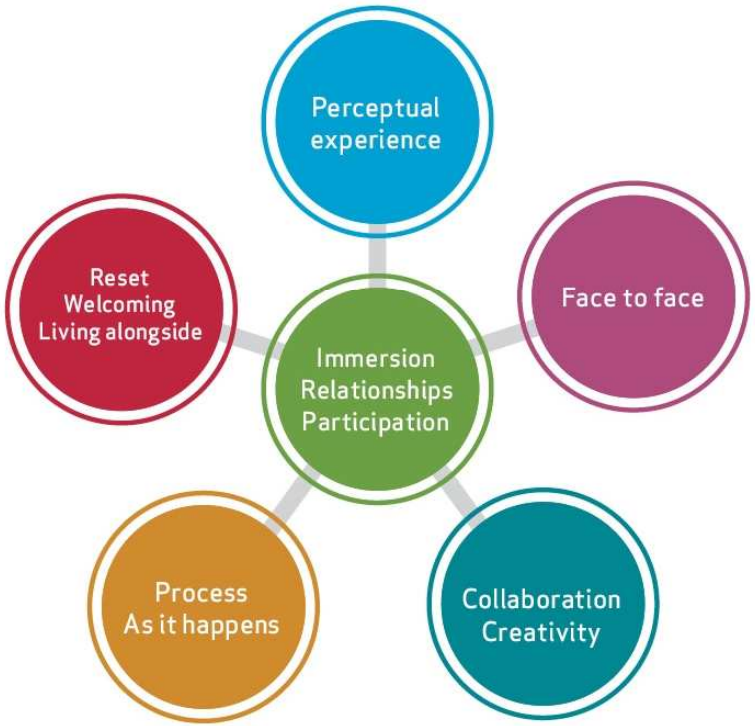
Photo : André Sarrazin

After this strange route that stirs and heightens their senses and emotions, visitors enter a large, bright and plant-filled **immersive space** full of dazzling live insects of every kind. All around them are butterflies flitting about and grazing their shoulders, flower beetles buzzing nearby, large walking stick insects chewing on plant leaves and bees browsing on flowers, much too busy to be disturbed by the humans who have just entered their world. Cutouts offer glimpses of insect breeding rooms and plant greenhouses, revealing the complex hidden processes involved in managing this living world.

Reinventing our connection with nature, with insects

Visitors are then invited to put their creativity to work, to rekindle their connection with nature. **A creative space** is part of the visitor route, or can even be a destination in itself. Here, they can create artwork or build items inspired by insects or designed to help them, like feeders, shelters or vivariums. In some cases, visitors will come up with their own projects, in others, they will respond to a particular challenge. Facilitators and experts (artists and scientists) will be happy to lend a hand.

Typology of experiences



5.2 Experiential zones: pre-concepts, principles and challenges

Immersive space

This space offers visitors direct contact with live insects that are free to move about: butterflies, moths, dragonflies, flower beetles, ants, stick insects, aquatic insects and many others. The plants, chosen to meet the insects' needs, form a lush backdrop, providing shelter and food along with texture and atmosphere. As visitors step into the space, they first get an overall impression. Individual experiential zones and communal areas then offer an invitation to get close to the insects. Visitors can go underground to see everything going on down there, or climb toward the roof to admire the tropical butterfly species that prefer to stay up high. Cutouts opening onto technical spaces show the behind-the-scenes support for the insects' lives. Indoor and outdoor experiences are also juxtaposed. For instance, a view of an outdoor butterfly garden seems to extend the experience in an immersive environment filled with butterflies.

Conceptual principles and strategies

The choice of visitor experiences and layouts is guided by the desire to create an authentic encounter with insects and respect their natural requirements. This assumes that there are no false natural elements (trees, rocks, backdrops) and that the plants and layouts are chosen to meet the needs of the insects to be displayed, rather than the opposite.

As much as possible, the insects should be free-roaming. If any barriers are required, to avoid inter-species predation, for instance, they should be discreet or even invisible.

In keeping with visitors' interests and possibilities in terms of acquiring or rearing insects, and to keep ambient conditions as stable as possible, most of the live specimens in the immersive space are tropical insects. In summer, however, some local insects may be added.

Challenges

The immersive space is the one that presents the greatest challenges in terms of both its design and technical aspects. A balance will have to be found in terms of the overall atmosphere and the pace of the different encounters. There are plenty of technical challenges, from the airlock to temperature and humidity control, restraining nets and natural and artificial lighting. The technology must be just sufficiently visible without interfering with the magic of the space and the stars of the show, the insects.

The immersive experience must be both innovative and different from what one finds at the Biodôme or in butterfly houses around the globe. Insects may be tiny, but they must be visible in this vast space.

More intimate moments and experiences must be planned alongside the global group experience.

High-efficiency airlocks will be required to keep the insects inside the immersive space. Canadian Food Inspection Agency regulations require extreme caution in order to avoid introducing exotic insects into the wild in Quebec. These airlocks could be part of the overall experience, preparing visitors to enter a different world.

The space must be partially adaptable to make it possible to make it possible to vary the programming and the insects presented.

Perceptual experiences

The perceptual experiences convey visitors into the world of insects, where they can live at insects' scale and their pace.

Perceptual experiences – space
Through changes in scale, perspective and form, and through sensory-motor and virtual experiences, the architecture and design of the spaces themselves depict the insect world. Visitors encounter these disorienting features throughout the entire museum, making the Insectarium a physical and sensory experience in and of itself. They are encouraged to use their bodies and their different senses to perceive the world as insects do: edging through a tunnel, climbing high steps and crossing enormous structures as a beetle would walk across a leaf, for instance.

Perceptual experiences – time
After actively passing through space in this way with insects, visitors will be invited to get closer, to slow down, to set their clocks to insects' time, mainly through the Insectarium's fabulous collection. First, to experience their evolutionary time: insect biodiversity is the fruit of 440 million years of evolution here on Earth in response to the tremendous variety of conditions in which they are found. Then, to experience their individual time, to understand insects' cycles and processes: seasonality, many species' brief lives, other species' lengthy larval phases, etc. Finally, in real time, to stay connected to the experiences of the insects displayed elsewhere in the museum, or in the wild.

Conceptual principles and strategies

Insects live in a fascinating, parallel world. They outstrip us – by far – in numbers. Their cycles and processes have an entirely different rhythm than our own. Realizing this fosters respect and encourages us to question our respective roles. Here it is important to provoke sensations that give us access to the world of insects by disorienting us. These sensations may be created by manipulating space and time. It may also be a sensory experience, with different odours, temperatures and textures and altered vision. The Insectarium wants to offer a profound experience and encourage physical participation by visitors.

Challenges

These collective and perceptual experiences must be as accessible as possible. The space must also be adaptable when it comes time to renew our programming.

Face-to-face

Face-to-face experiences will allow visitors to meet insects one on one: to stick their heads or body parts into a vivarium; to hear tiny insects making incredible sounds; to taste some insect candy. Such special opportunities for individual encounters with live insects occur at different points along the route, from the entrance to the exit. These experiences, whether they are individual or collective, do not follow a linear cognitive path, but are designed as zones offering unique adventures.

Conceptual principles and strategies

The point here is to have visitors enjoy a meaningful experience with an insect, to stir their emotions and change their perceptions of insects, from revulsion to attraction or even fascination. These experiences must be unusual and unexpected.

Challenges

The main challenge is to create authentic, truly meaningful, disorienting and actually intimate encounters, inside a very busy institution full of lively youngsters. Such encounters require time, space and a contemplative atmosphere. The individual aspect of the encounters means that only a limited number of visitors can have access to the experience at once. The ethical aspect relating to the insects is important. Despite the close proximity of humans, the insects must be comfortable and they must not be damaged by repeated or clumsy handling. The spaces are also designed to be flexible. The Insectarium hopes to give various artists “carte blanche” for some of these experiential chamber/zones.

Creative space and school workshop

The creative space is intended to allow visitors to participate actively and concretely in their experience. We want to invite them to reinvent their relationship with nature and insects by imagining new ways of seeing, doing things, living their lives or helping insects live theirs! Individual or collective creations, inspired by science, art and nature itself may be designed and produced in 2D, 3D or digitally in a short time … or a longer one.

Facilitators and experts (artists and scientists in residence) are there to support and extend the process. There are even some live insects in the space to speak for their own uniqueness themselves! A visitor might be inspired by the many different shapes of insects' wings to build a flying structure and test it in a wind tunnel. Others might use some simple tools or sophisticated equipment, like the 3D printers available, to make something they dream up or are challenged to create. Considerable emphasis is placed on biomimicry and bionics, because these avenues, which draw on nature itself to find innovative solutions, are infinite sources of new ideas. After all, doesn't nature have 3.8 billion more years of experience than us?

The creative space adjoins a school workshop. The spaces may be linked up during the summer and on weekends to optimize their capacity. The school space also has an outdoor courtyard so that full workshops can be offered, both indoors and outdoors.

Both spaces may have visual openings onto the outdoors.

Conceptual principles and strategies

In keeping with the values and mission of the Montréal Space for Life, the point here is to allow visitors to contribute (with their ideas, their creativity and their involvement) to the life and evolution of the Insectarium, to be more than mere clients or consumers. The visitor participation encouraged in this space will help the institution constantly renew itself. The Insectarium wants to be open to diversity, to its visitors' expectations, and intends to place its faith in them. The constructivism approach fosters visitor engagement and encourages them to think of the institution as their own.

Challenges

Each visit offers a new experience. The creative zone helps anchor the Insectarium in Montréal life. This space makes it possible to reach new audiences. Another major challenge lies in trusting in visitors' contribution while communicating a distinctive institutional message.

The everyday Insectarium: Lobby and welcoming spaces for relaxation

The Lobby opens onto welcoming spaces where visitors can come daily to meet friends or take part in organized events. It contains the ticket counter (with an integrated gift shop counter), a lounge, a display case full of the insects most often spotted in people's homes and gardens, a small lunch room – with vending machines selling insect snacks – opening onto an outdoor patio, and a zone featuring rotating displays of the work of scientists and artists in residence, citizen involvement and work produced in the creative space. It is a space that artists, scientists and visitors can fill and reinvent.

Conceptual principles and strategies

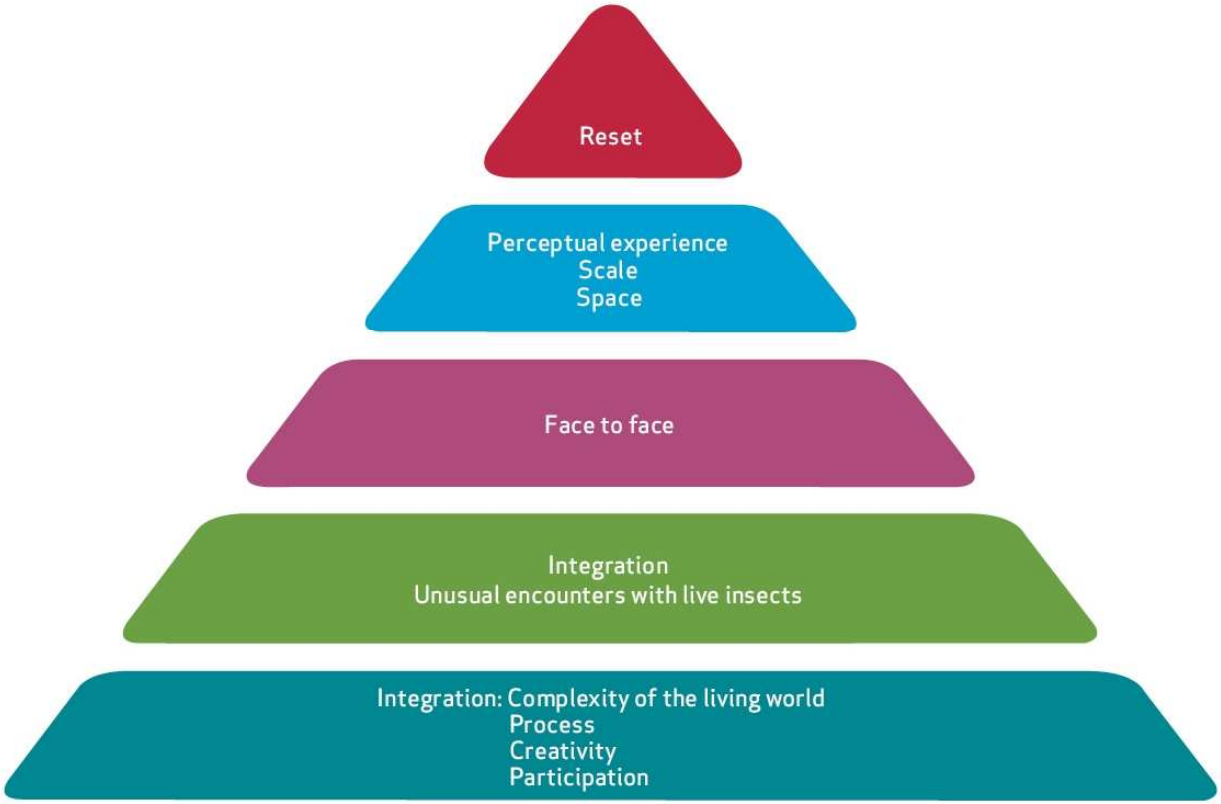
"In your lifetime, you're never going to be more than 5 feet from a spider" (Kellert, Birthright, 2013), and the same is true of insects. These spaces must help dispel myths about insects and make it easier for people to get along with the insects in their daily lives, to make the connection more apparent, acceptable, fun and interesting, in their homes, in the city, in the wild, in the news and on their plates.

The spaces and means used must be flexible so that they can evolve and change.

Challenges

There are a multitude of things going on in this single space: taking an innovative approach, collecting visitor fees and welcoming visitors seamlessly. The aim here is to greet visitors with a multifunctional, experiential approach. The main challenge is to integrate these different standard lobby functions in a small space with an atmosphere and strong signature evoking the world of insects from the outset.

Human metamorphosis

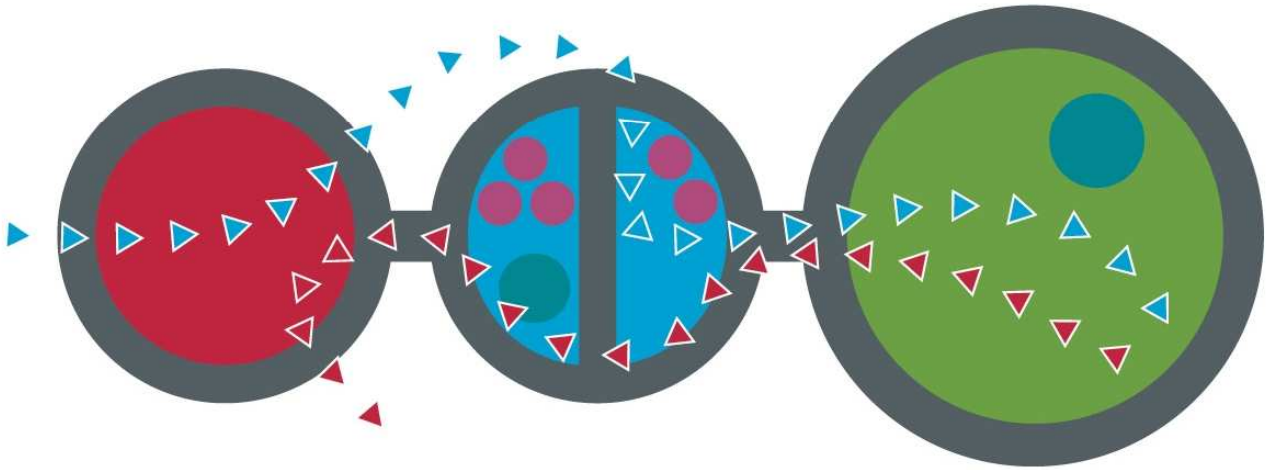


espace pour la vie insectarium montréal

Metamorphosis
Concept

From the outside and the parking lot, visitors are encouraged to leave behind their technological human identity through a series of sensory-motor reprogramming experiences (human reset) that prepare them for an unusual encounter with live insects.

Re-establish the human connection with insects by offering hands-on workshops, access behind the scenes, a look at living processes and the museum itself, and then encourage visitors to take these changes into their everyday lives.



Reset
Welcoming

Perceptual experience
Scale
Space

Face to face

Immersion
Unusual encounters with live insects

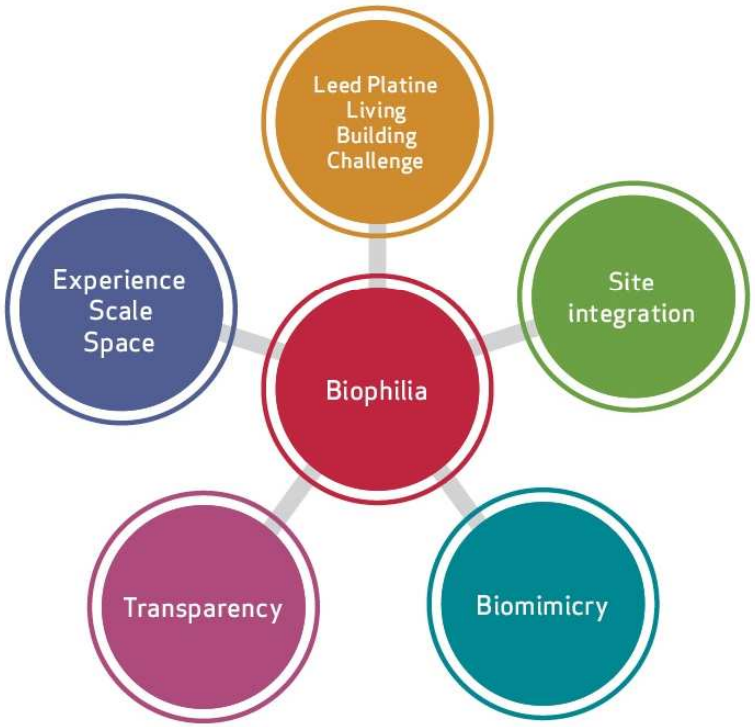
Integration:
Complexity of the living world
Process
Creativity
Participation

6. THE SITE

The new Insectarium will spread its wings on the site of the current building, and incorporate it. The site's showcase architecture adds to the experiences of authentic, meaningful encounters between visitors and insects. First and foremost, the building must be part of the experience. The new spaces will be built on the splendid grounds of the Montréal Botanical Garden. They must have a minimal footprint on the Botanical Garden site and be integrated naturally and optimally with the site. Plant-covered walls and ceilings could be a way of highlighting the many bonds between insects and plants.

A number of bold parameters are of key importance to the visitor experience and must be taken into account in the project's architectural design.

Genetic code for the project
Architectural principles



Architectural parameters

Integration

The Insectarium must be seamlessly integrated into the site, blending into the background - perhaps even to the point where it becomes a non-building - while having its own signature.

Transparency

Transparency will make it possible to see and understand the building's ecological functions: its filter marsh, rainwater recovery, solar panels and other similar features will all be visible. The same is true of the systems and certain spaces used to support the insects' lives. Cutouts will open onto breeding quarters, plant production spaces and some laboratories, and to all the workings of the museum, with respect for people's and workers' privacy. This transparency will help visitors grasp the complexity of natural processes. The building will be a living organism, and the mechanisms that contribute to its life will be visible.

Biophilic design

The space and architecture must help rekindle the connection between humans and insects. **Biophilic** design is central to the building's architecture.

Biomimicry

The spaces could also draw their inspiration and functions from the principles and forms of living organisms, a trend known as **biomimicry**. Imagine a building designed to function as elegantly and efficiently as a flower (an insect!), generating its own energy, with a benign impact on its environment and an inspiring esthetic. Imagine an Insectarium that manages some of its own waste … thanks to insects!

Photo : René Limoge

Biomimicry is:

Transferring and applying remarkable materials, forms, processes and properties observed at different scales in nature to human activities;

Drawing inspiration from nature so that we can emulate nature's solutions and inventions. These are solutions that have evolved over 3.6 billion years

The vector, according to many scientists, for a shift toward a greener, simpler, cleaner, and safer economy and technologies.

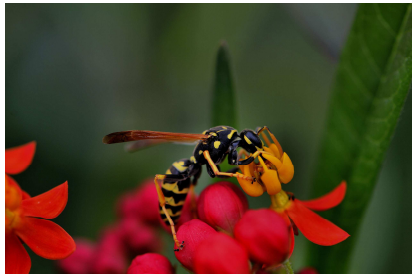
Environmental certification

The Insectarium is aiming to attain the highest environmental standards for its building. Inspired by the Living Building Challenge philosophy, it hopes to attain and even surpass LEED Platinum certification.

The Living Building Challenge wants every new construction to make the world a better place. It is both a philosophy and a certification. Its standards require rigorous design and high construction norms. It aims to create clean and sustainable buildings that operate as efficiently as nature itself. To be certified, projects must meet a series of ambitious requirements, which can even include energy, water and waste management independence. It might be interesting in this regard to use decomposer insects for treating (at least some) waste. Other initial concerns relate to such areas as site selection, building materials, human health, equity and beauty. Certification may be obtained for one or more of these elements.

2- IMAGES FOR INSPIRATION

espace pour la vie insectarium montréal



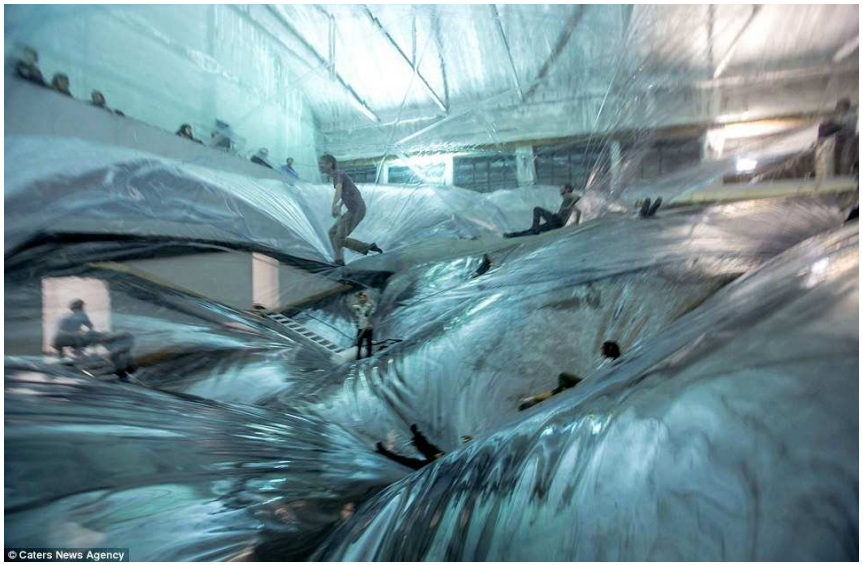

PROJET MÉTAMORPHOSE

Cahier d'inspiration

Novembre 2013

PRINCIPE
Sens et mouvement

Numen, For Use



Tomas Saraceno. On Space Time Foam

PRINCIPE
Sens et mouvement

Stéphanie Marin. Coussins Pierre-Linvingstones

Aarhus Gymnastik-og Motorhikal

PRINCIPE
Sens et mouvement

Helen & Hard. Base Camp

Holger Hoffmann et le département de design digital de l'Université de Trier.
Treehugger pavilion.

PRINCIPE
Porosité - fluidité

Mithun. Federal Way Regional Library

Photo : Luis Gordoa

PRINCIPE
Porosité - fluidité

Lake\Flato. Louisiana State University Hilltop Arboretum

Tezuka. Ring aound a tree

ESPACE
Porosité - fluidité

Iwan Baan

Sou Fujimoto. House NA

ESPACE
Porosité - fluidité

Jenson & Skodvin. Juvet Landscape Hotel

PRINCIPE
Biophilie

GBD et SERA_ Biophilic Oregan Sustainability Center

Paul Cocksedge Studio

PRINCIPE
Biophilie

Nadertehrani

Patrick Wack

EXPÉRIENCES
Tête-à-tête

Metropolis. Installations : Vaughn Bell

EXPÉRIENCES
Tête-à-tête

Ai Hasegawa, The Extreme Environment Love Hotel

Susana Soares, Bee's Project.

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Tadashi Kawamata. Maréchalerie de Versailles. Photo : Jean-Claude Lafarge

Tadashi Kawamata. Cathédrale de chaises

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Steven Holl. Université de New-York

Joel Lamere and Cynthia Gunad. The Overliner

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Helen & Hard. The Geology of Dirt

Shinji Ohmaki. Liminal Air

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Tomas Saraceno. Cloud Cities.

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Suppose-Design-Office

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Ryue Nishisawa, Fukita Pavilion

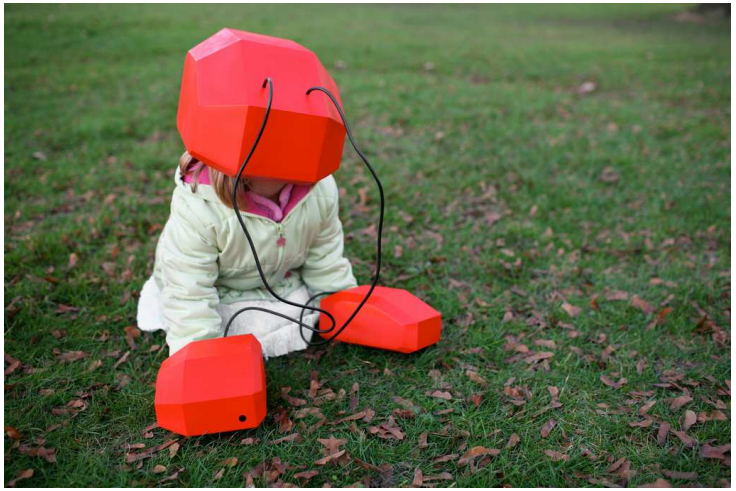
Numen, For Use. Tape.

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Pipilotti Rist . Parasimpatico. Photo : Roberto Marossi

Pipilotti Rist. Eyeball Massage.

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte



Chris Woebken et Kenichi Okada: Animal Superpowers

Illustrations: Insectarium

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Temps-insecte: rendre apparent les battements d'ailes
CINIMOD STUDIO et Dominic Harris, Flutter, Londres

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

Temps-insecte: rendre apparent les trajets
Photo: Yume Cyan, Lucioles photographiées en longue exposition, Nagoya, Japon

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

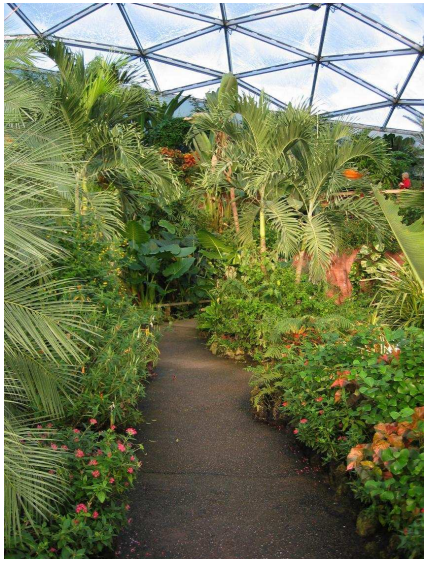
Temps-insecte/évolution: révéler la fabuleuse histoire de la diversité des formes

EXPÉRIENCES PERCEPTUELLES
Espace, échelle, temps-insecte

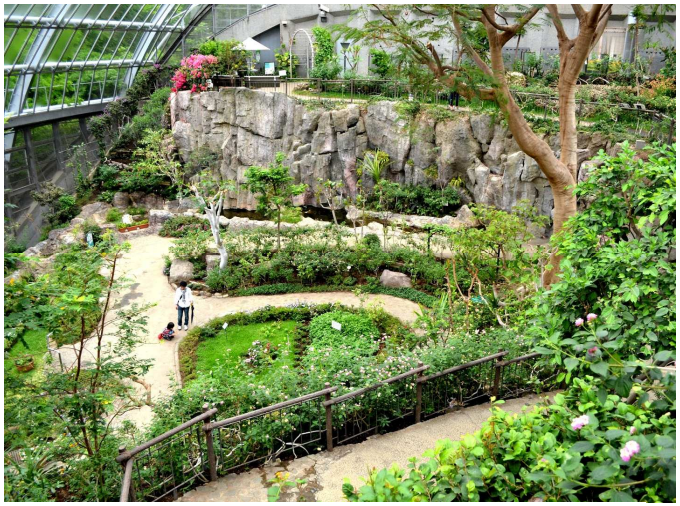
Temps-insecte/évolution, révéler la fabuleuse histoire de la diversité des formes, Photo: Laurent Desaulniers

EXPÉRIENCES
Immersives à dépasser

Papillons en liberté, Insectarium et Jardin botanique, Espace pour la vie, Canada



Papiliorama, Suisse



Tama Zoo Butterfly Garden, Japon

Niagara Butterfly Conservatory, Canada

EXPÉRIENCES
Immersives: insectes vivants

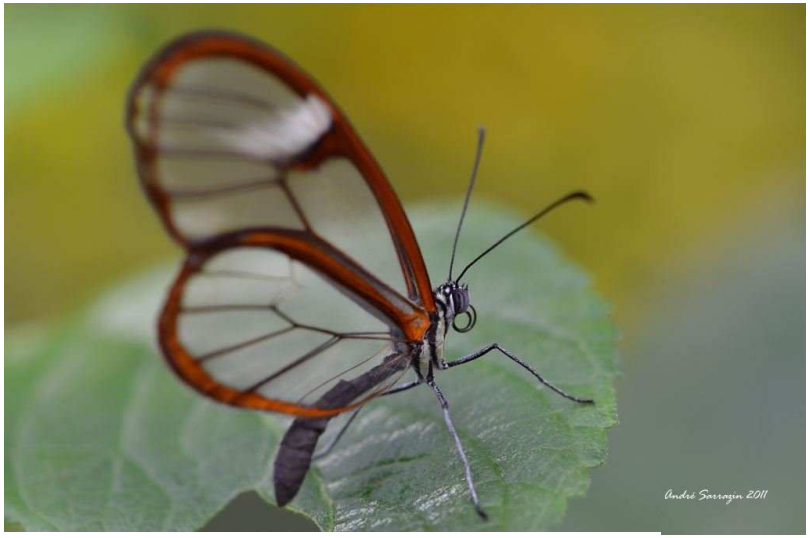


Photo: André Sarrazin


Photo: René Limoges


Photo: René Limoges


Photo: René Limoges


Photo: René Limoges


Fourmis Pot de miel. Photo: Palais de la découverte

EXPÉRIENCES
Espace créatif

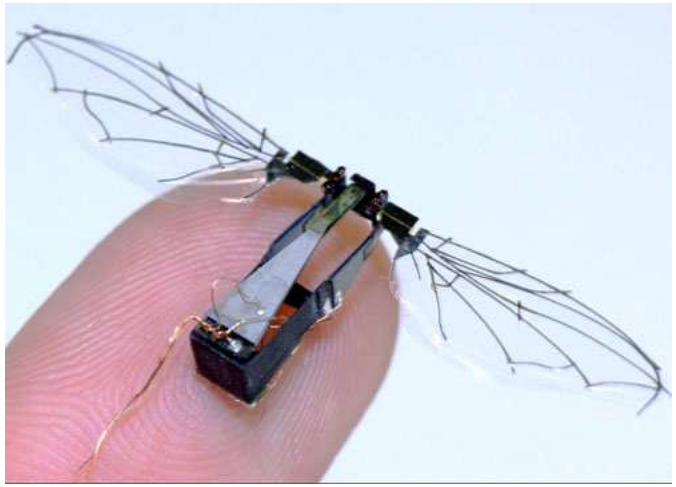
Tinkering Studio, Exploratorium

Atelier à l'Insectarium de Montréal, Photo : Percolab

EXPÉRIENCES
Espace créatif

Tinkering Studio, Exploratorium

EXPÉRIENCES
Espace créatif



Rob Wood, Robotic Fly

David Bowen. Fly Tweet

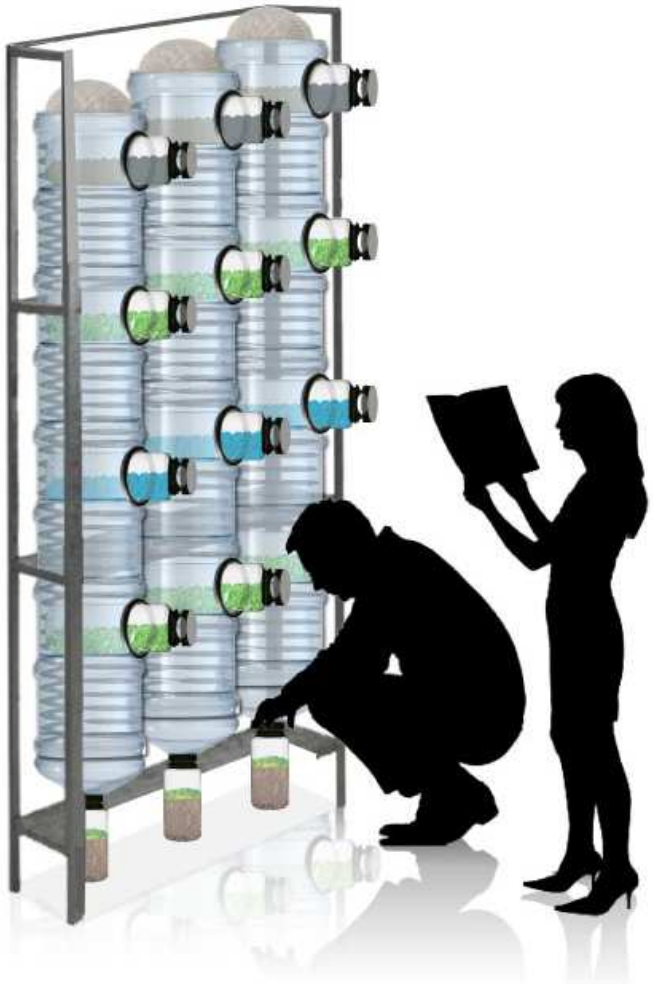
Symbiotic Households. Elliott P. Montgomery

EXPÉRIENCES
Espace créatif

Photo : Paul Keirn, Nature (s)

Œuvre: Mischertraxler, limited-moths

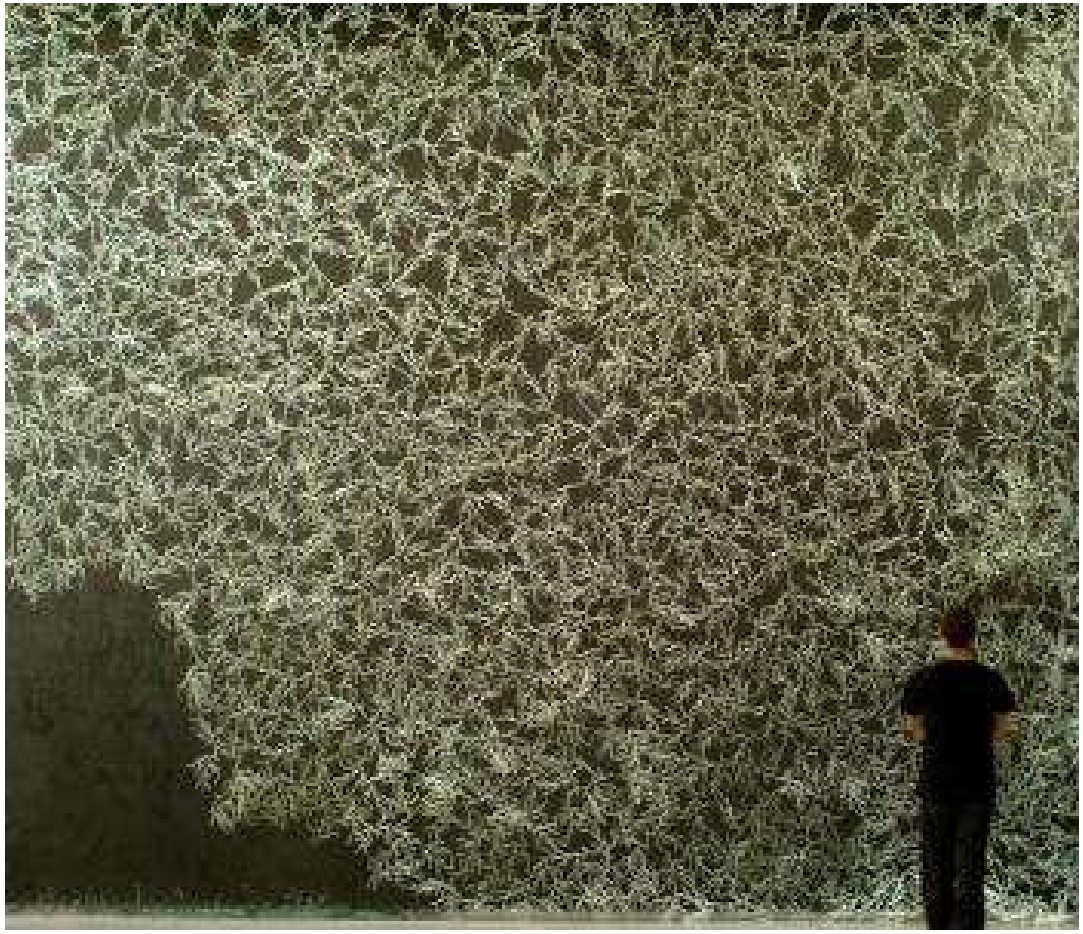
EXPÉRIENCE
Espace créatif



Cricket Reactor, Third Millennium Farming.

Grillons, Cricket Reactor, Jakub Dzamba

EXPÉRIENCES
Espace créatif



Paul Tahon

EXPÉRIENCES
Espace créatif

Bourroulec

Tahon et Bourroulec

EXPÉRIENCE conviviale
Insectes tous les jours

Haiko Cornelissen. PicNYC table.

Asif Khan. Harvest

EXPÉRIENCE conviviale
Insectes tous les jours

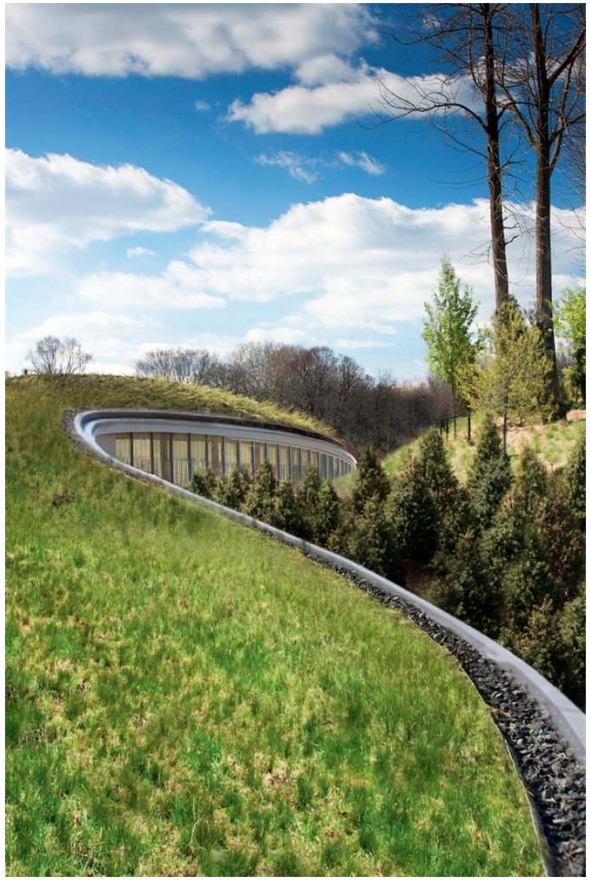
Le « Food Truck » Espace pour la vie offre la pause entomophagique à l'Insectarium

Le « Food Truck » Espace pour la vie offre la pause entomophagique à l'Insectarium

EXPÉRIENCE conviviale
Insectes tous les jours

Sou Fujimoto

ESPACE
Intégration au site

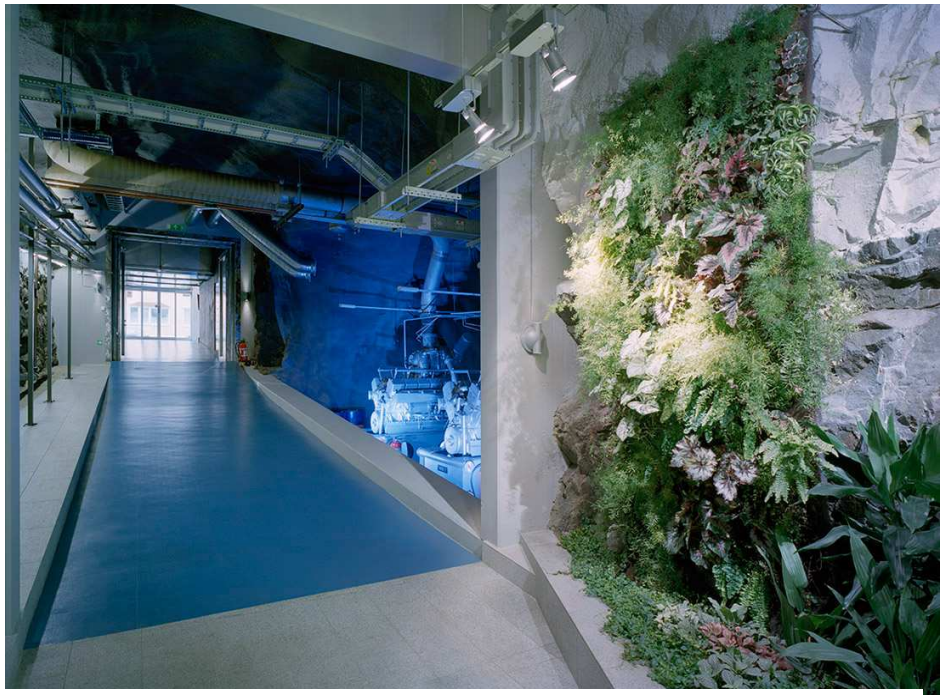


Albert Vecerka/Esto. Jardin botanique de Brooklyn

Masthead Mithun

Hirotaka Kidosaki. Maison à Asayamana

ESPACE Transparence



Albert France-Lanord. Pionen Data Center

BNIM Architects / Omega Center for Sustainable Living

ESPACE
Biomimétisme

Faulders Studio, GEOtube

ESPACE
Biomimétisme

Germany's Akademie der Bildenden Künste. Der Dritte Raum Photo : Oliver Sach

Numen/ For Use. Tape

ESPACE
Biomimétisme

Marco Casagrande . Cicada inteior at night

Nuages modulaire, Bourroulec

ESPACE Biomimétisme

Salone

APPENDIX E – GENERAL INFORMATION

1- EDUCATIONAL ACTIVITIES – SUMMARY TABLE

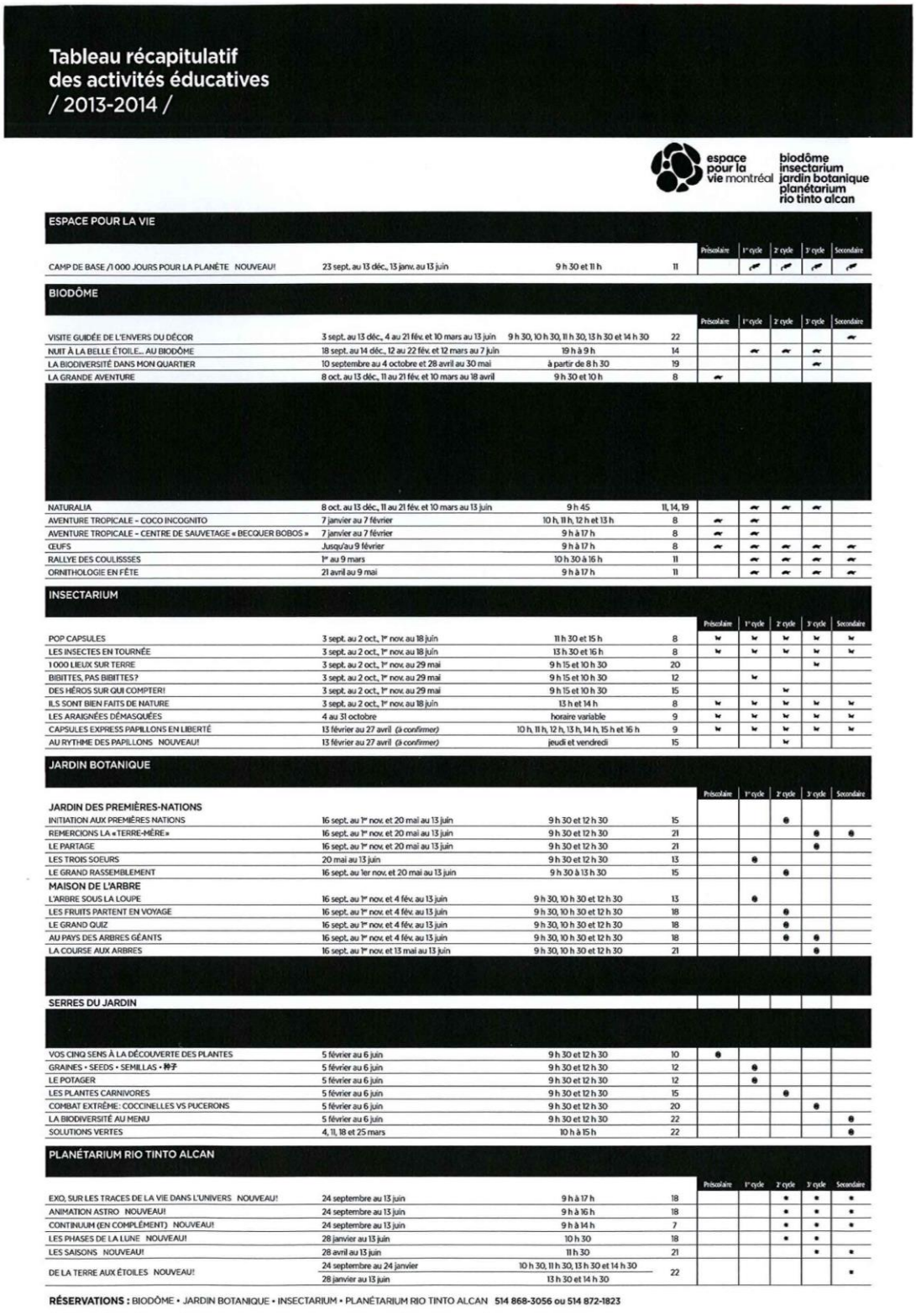


Tableau récapitulatif
des activités éducatives
/ 2013-2014 /

espace pour la vie montréal
biodôme
insectarium
jardin botanique
planétarium
rio tinto alcan

ESPACE POUR LA VIE

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
CAMP DE BASE /1 000 JOURS POUR LA PLANÈTE NOUVEAU!	23 sept. au 13 déc., 13 janv. au 13 juin	9 h 30 et 11 h	11		✓	✓	✓	✓

BIODÔME

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
VISITE GUIDÉE DE L'ENVERS DU DÉCOR	3 sept. au 13 déc., 4 au 21 fév. et 10 mars au 13 juin	9 h 30, 10 h 30, 11 h 30, 13 h 30 et 14 h 30	22					✓
NUIT À LA BELLE ÉTOILE... AU BIODÔME	18 sept. au 14 déc., 12 au 22 fév. et 12 mars au 7 juin	19 h à 9 h	14		✓	✓	✓	
LA BIODIVERSITÉ DANS MON QUARTIER	10 septembre au 4 octobre et 28 avril au 30 mai	à partir de 8 h 30	19				✓	
LA GRANDE AVENTURE	8 oct. au 13 déc., 11 au 21 fév. et 10 mars au 18 avril	9 h 30 et 10 h	8	✓				
NATURALIA	8 oct. au 13 déc., 11 au 21 fév. et 10 mars au 13 juin	9 h 45	11, 14, 19		✓	✓	✓	
AVENTURE TROPICALE – COCO INCOGNITO	7 janvier au 7 février	10 h, 11 h, 12 h et 13 h	8	✓	✓			
AVENTURE TROPICALE – CENTRE DE SAUVETAGE « BECQUER BOBOS »	7 janvier au 7 février	9 h à 17 h	8	✓	✓			
ŒUFS	Jusqu'au 9 février	9 h à 17 h	8	✓	✓	✓	✓	✓
RALLYE DES COULISSSES	1er au 9 mars	10 h 30 à 16 h	11		✓	✓	✓	✓
ORNITHOLOGIE EN FÊTE	21 avril au 9 mai	9 h à 17 h	11		✓	✓	✓	✓

INSECTARIUM

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
POP CAPSULES	3 sept. au 2 oct., 1er nov. au 18 juin	11 h 30 et 15 h	8	✓	✓	✓	✓	✓
LES INSECTES EN TOURNÉE	3 sept. au 2 oct., 1er nov. au 18 juin	13 h 30 et 16 h	8	✓	✓	✓	✓	✓
1 000 LIEUX SUR TERRE	3 sept. au 2 oct., 1er nov. au 29 mai	9 h 15 et 10 h 30	20				✓	
BIBITTES, PAS BIBITTES?	3 sept. au 2 oct., 1er nov. au 29 mai	9 h 15 et 10 h 30	12		✓			
DES HÉROS SUR QUI COMPTER!	3 sept. au 2 oct., 1er nov. au 29 mai	9 h 15 et 10 h 30	15			✓		
ILS SONT BIEN FAITS DE NATURE	3 sept. au 2 oct., 1er nov. au 18 juin	13 h et 14 h	8	✓	✓	✓	✓	✓
LES ARAIGNÉES DÉMASQUÉES	4 au 31 octobre	horaire variable	9	✓	✓	✓	✓	✓
CAPSULES EXPRESS PAPILLONS EN LIBERTÉ	13 février au 27 avril *(à confirmer)*	10 h, 11 h, 12 h, 13 h, 14 h, 15 h et 16 h	9	✓	✓	✓	✓	✓
AU RYTHME DES PAPILLONS NOUVEAU!	13 février au 27 avril *(à confirmer)*	jeudi et vendredi	15			✓		

JARDIN BOTANIQUE

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
JARDIN DES PREMIÈRES-NATIONS								
INITIATION AUX PREMIÈRES NATIONS	16 sept. au 1er nov. et 20 mai au 13 juin	9 h 30 et 12 h 30	15			●		
REMERCIONS LA « TERRE-MÈRE »	16 sept. au 1er nov. et 20 mai au 13 juin	9 h 30 et 12 h 30	21				●	●
LE PARTAGE	16 sept. au 1er nov. et 20 mai au 13 juin	9 h 30 et 12 h 30	21				●	
LES TROIS SOEURS	20 mai au 13 juin	9 h 30 et 12 h 30	13		●			
LE GRAND RASSEMBLEMENT	16 sept. au 1er nov. et 20 mai au 13 juin	9 h 30 à 13 h 30	15			●		
MAISON DE L'ARBRE								
L'ARBRE SOUS LA LOUPE	16 sept. au 1er nov. et 4 fév. au 13 juin	9 h 30, 10 h 30 et 12 h 30	13		●			
LES FRUITS PARTENT EN VOYAGE	16 sept. au 1er nov. et 4 fév. au 13 juin	9 h 30, 10 h 30 et 12 h 30	18			●		
LE GRAND QUIZ	16 sept. au 1er nov. et 4 fév. au 13 juin	9 h 30, 10 h 30 et 12 h 30	18			●		
AU PAYS DES ARBRES GÉANTS	16 sept. au 1er nov. et 4 fév. au 13 juin	9 h 30, 10 h 30 et 12 h 30	18			●	●	
LA COURSE AUX ARBRES	16 sept. au 1er nov. et 13 mai au 13 juin	9 h 30, 10 h 30 et 12 h 30	21				●	

SERRES DU JARDIN

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
VOS CINQ SENS À LA DÉCOUVERTE DES PLANTES	5 février au 6 juin	9 h 30 et 12 h 30	10	●				
GRAINES • SEEDS • SEMILLAS • 种子	5 février au 6 juin	9 h 30 et 12 h 30	12		●			
LE POTAGER	5 février au 6 juin	9 h 30 et 12 h 30	12		●			
LES PLANTES CARNIVORES	5 février au 6 juin	9 h 30 et 12 h 30	15			●		
COMBAT EXTRÊME: COCCINELLES VS PUCERONS	5 février au 6 juin	9 h 30 et 12 h 30	20				●	
LA BIODIVERSITÉ AU MENU	5 février au 6 juin	9 h 30 et 12 h 30	22					●
SOLUTIONS VERTES	4, 11, 18 et 25 mars	10 h à 15 h	22					●

PLANÉTARIUM RIO TINTO ALCAN

				Préscolaire	1er cycle	2e cycle	3e cycle	Secondaire
EXO, SUR LES TRACES DE LA VIE DANS L'UNIVERS NOUVEAU!	24 septembre au 13 juin	9 h à 17 h	18			•	•	•
ANIMATION ASTRO NOUVEAU!	24 septembre au 13 juin	9 h à 16 h	18			•	•	•
CONTINUUM (EN COMPLÉMENT) NOUVEAU!	24 septembre au 13 juin	9 h à 14 h	7			•	•	•
LES PHASES DE LA LUNE NOUVEAU!	28 janvier au 13 juin	10 h 30	18			•	•	
LES SAISONS NOUVEAU!	28 avril au 13 juin	11 h 30	21				•	•
DE LA TERRE AUX ÉTOILES NOUVEAU!	24 septembre au 24 janvier 28 janvier au 13 juin	10 h 30, 11 h 30, 13 h 30 et 14 h 30 13 h 30 et 14 h 30	22					•

RÉSERVATIONS : BIODÔME • JARDIN BOTANIQUE • INSECTARIUM • PLANÉTARIUM RIO TINTO ALCAN **514 868-3056 ou 514 872-1823**

2- PROFILE OF BIODÔME AND BOTANICAL GARDEN VISITORS

Profil des visiteurs du Biodôme et du Jardin botanique

Selon le sondage de PMB (Print Measurement Bureau)

Marché : Montréal RMR

espace pour la vie montréal

Explications sur les données présentées

Qu'est-ce que PMB ?

PMB Print Measurement Bureau est le chef de file canadien de la mesure à frais partagés de données provenant d'une seule source et portant sur le lectorat des médias imprimés, l'exposition aux médias non imprimés, l'utilisation des produits et les styles de vie.
Sa réputation est fondée sur plus de 35 ans de mesure précise et approfondie du comportement des consommateurs canadiens.
PMB est un organisme à but non lucratif, qui représente les intérêts des éditeurs, des agences de publicité, des annonceurs et d'autres entreprises oeuvrant dans l'industrie au Canada.

Comment obtient-on des données sur le profil de nos visiteurs ?

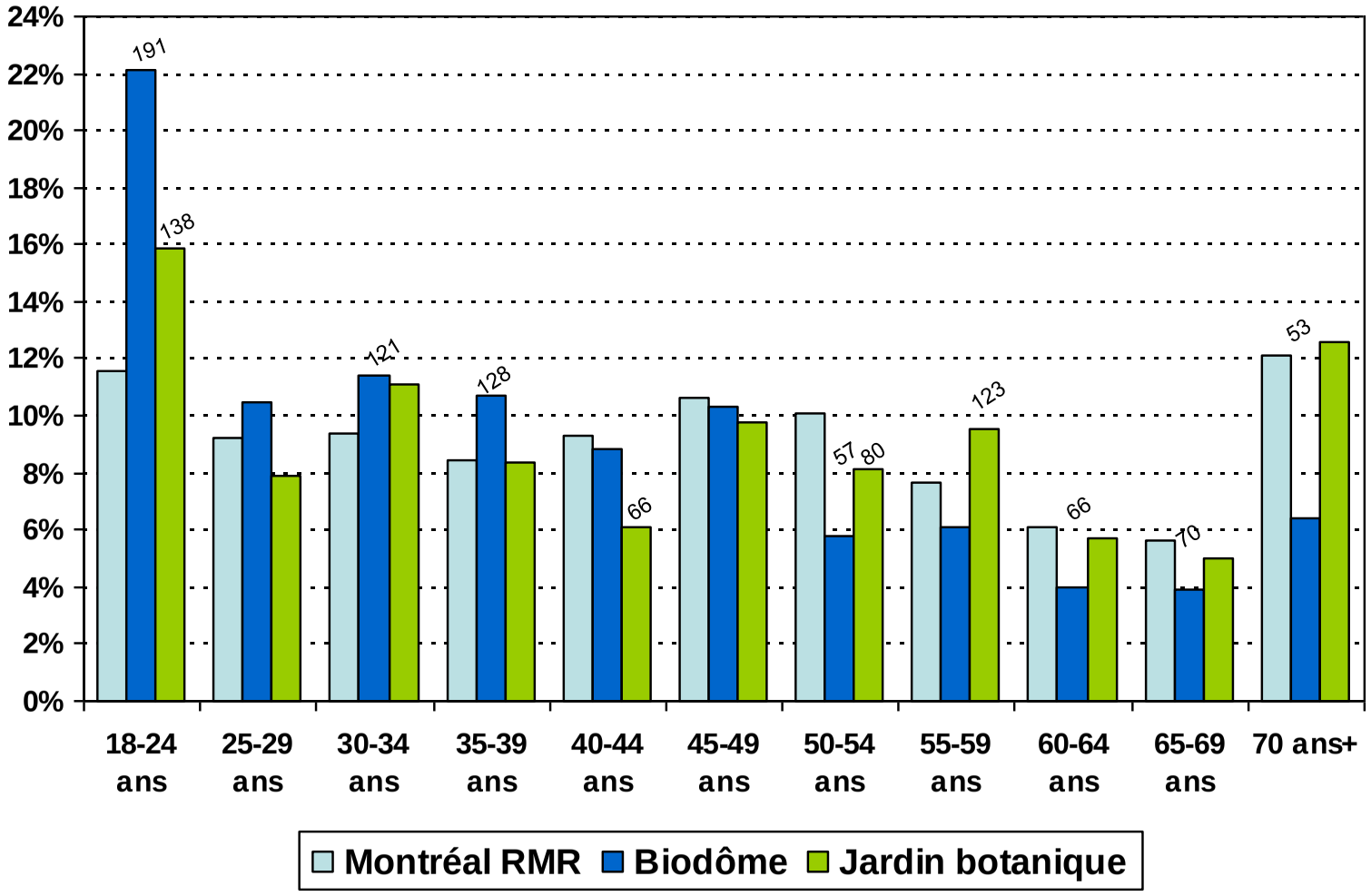
PMB sonde les habitudes des consommateurs en terme d'activités de loisirs et de visite de certains lieux touristiques comme le Biodôme et le Jardin botanique. La question posée est « Avez-vous visité l'institution X dans les 12 derniers mois ? ». Par croisement, on peut donc connaître les habitudes et le profil des gens qui disent avoir visité nos institutions.

Quels sont les chiffres présentés ?

Nous utiliserons ici les données du marché de la région de Montréal.
Les chiffres présentés dans les tableaux qui suivent correspondent au % de personnes qui ont la caractéristique indiquée parmi la population de Montréal et parmi ceux qui disent avoir visité nos institutions. Par exemple 53,7 % des gens qui disent avoir visité le Biodôme sont des hommes.

Un indice permet de comparer la composition de nos visiteurs par rapport à la population en général. Par exemple, si 20% de nos visiteurs présentent une caractéristique et que cette caractéristique correspond à 10% de la population en général, l'indice chez nos visiteurs est de 200. Un indice supérieur à 100 indique donc qu'on est sur-représenté (performant) dans un groupe versus la population moyenne, alors qu'un indice inférieur à 100 signifie qu'on est sous-représenté dans un groupe..

Profil des visiteurs
Âge



Âge moyen

Montréal : 46

Biodôme : 40

Jardin botanique : 45

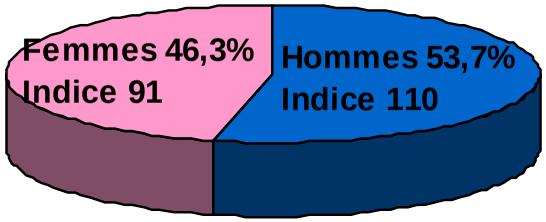
Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

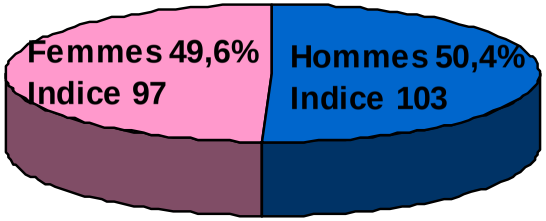
espace pour la vie montréal

Profil des visiteurs
Sexe

Biodôme



Jardin botanique



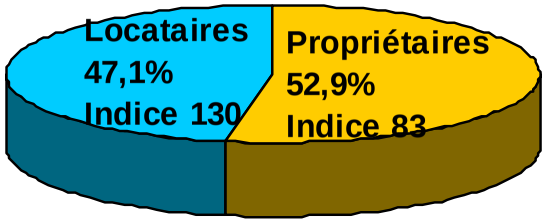
Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

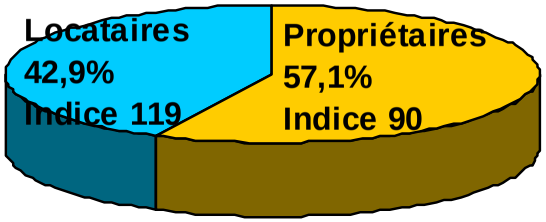
espace pour la vie montréal

Profil des visiteurs
Propriété

Biodôme



Jardin botanique

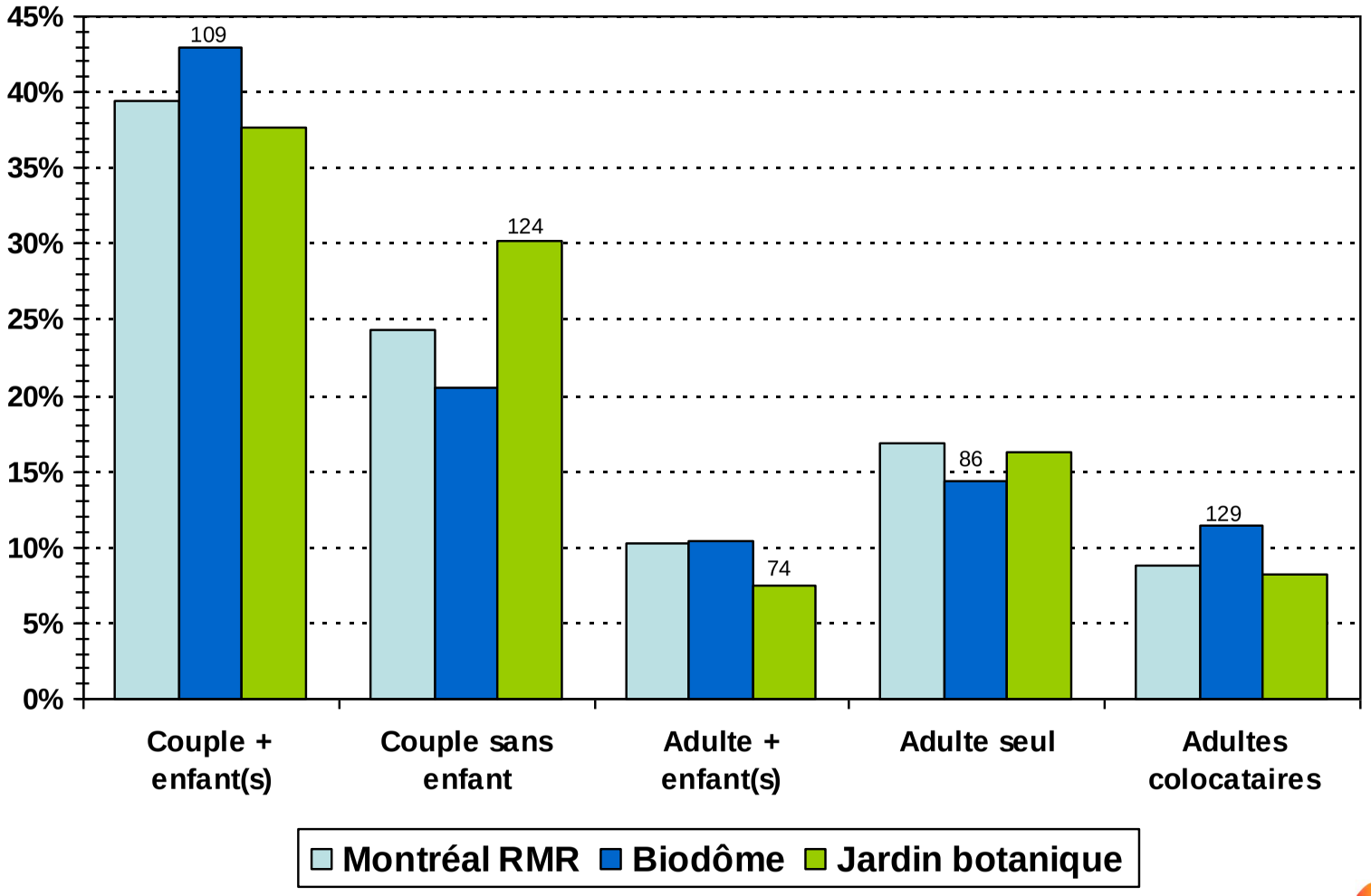


Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

espace pour la vie montréal

Profil des visiteurs
Type de foyer

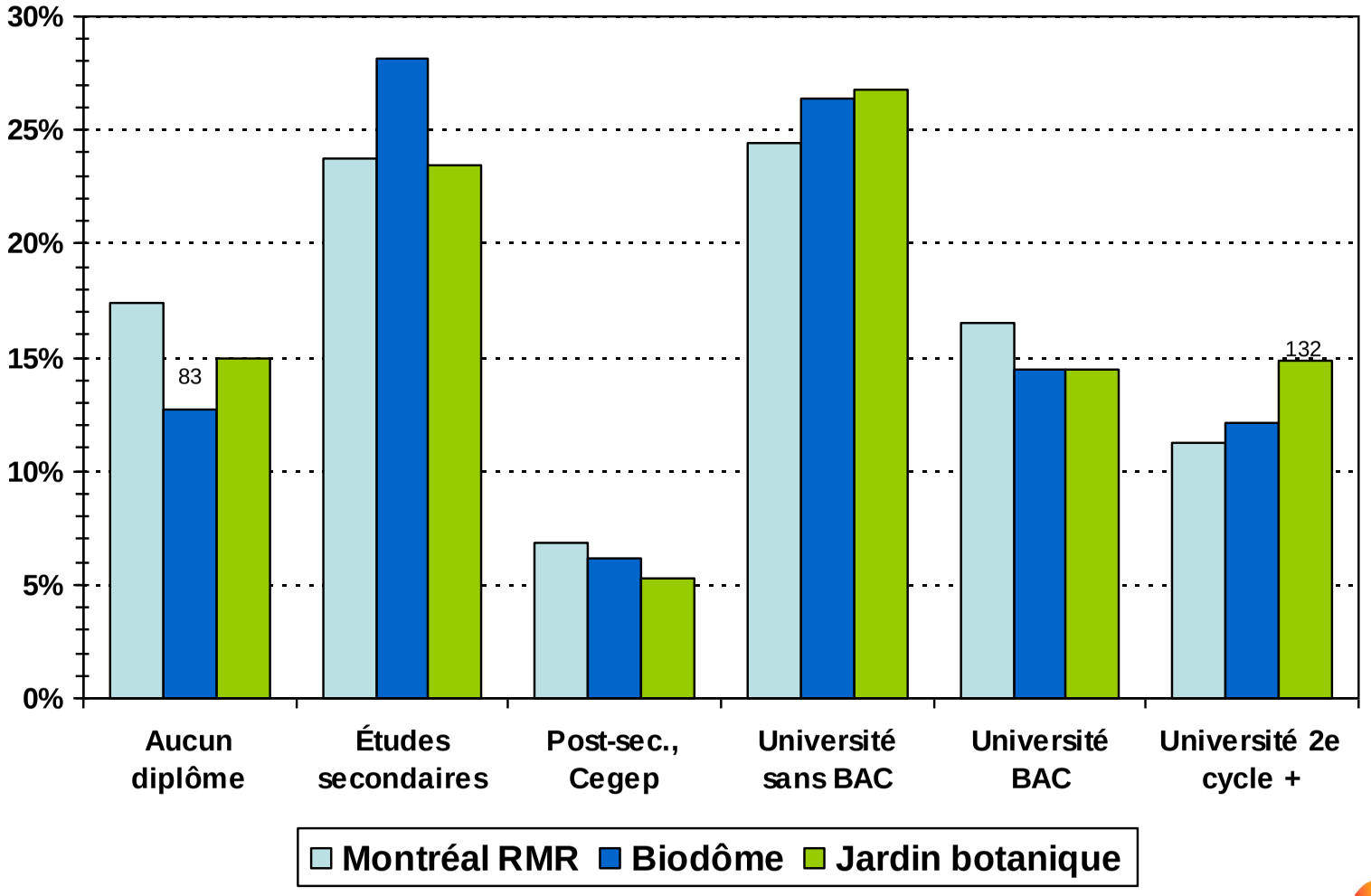


Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

espace pour la vie montréal

Profil des visiteurs
Études

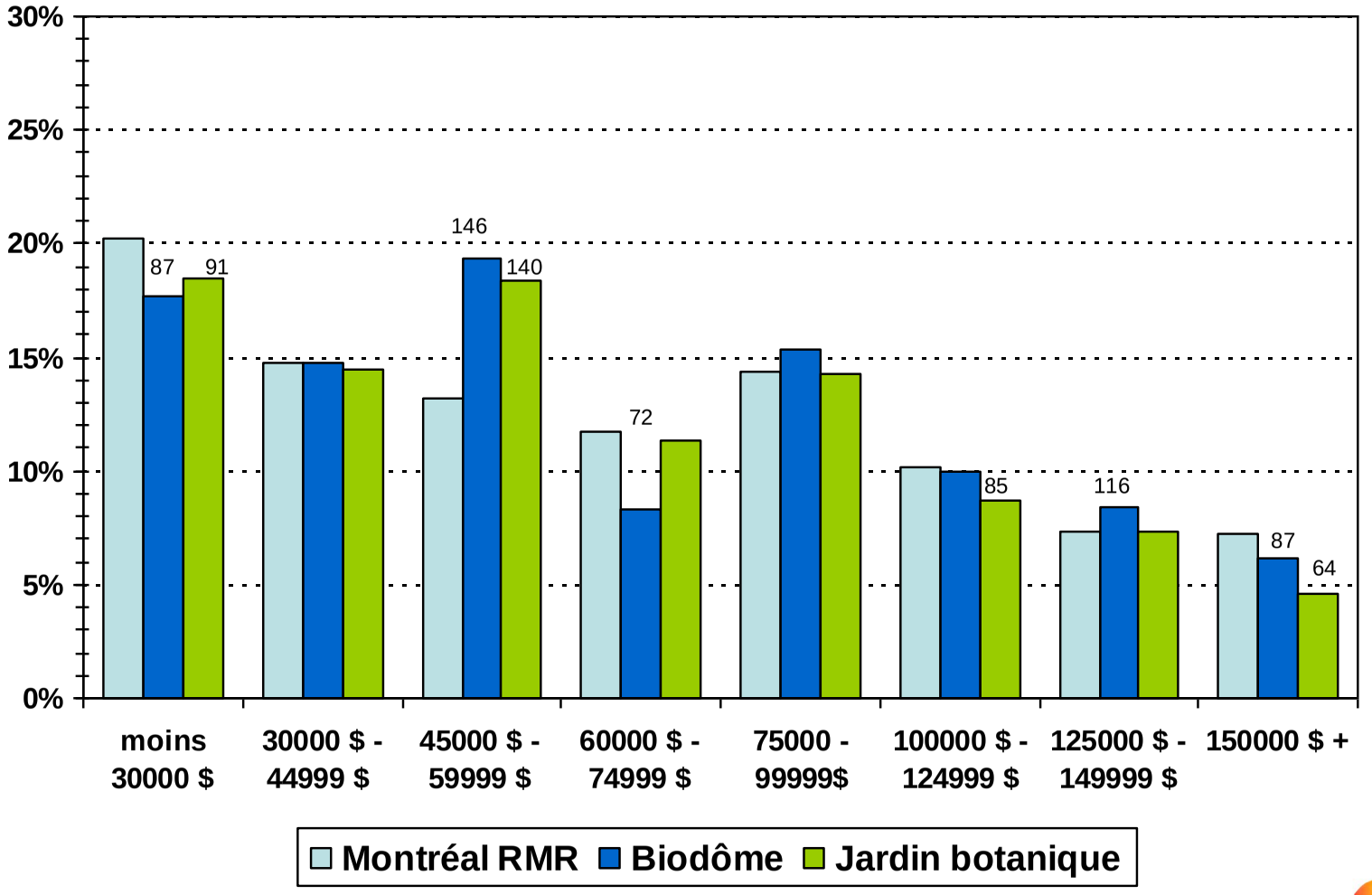


Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

espace pour la vie montréal

Profil des visiteurs
Revenu familial



Revenu familial moyen

Montréal : 72 531 $

Biodôme : 72 635 $

Jardin bot. : 69 113 $

Marché Montréal RMR, A18+, Ont visité dans les 12 derniers mois

Source : PMB 2012 Printemps 2 ans

espace pour la vie montréal

APPENDIX F – AUGMENTED REALITY

Watch the video: WWF – Coca-Cola Arctic Home Campaign – Augmented Reality
http://www.youtube.com/watch?v=h2Jg8ryVk1k

Augmented reality

From Wikipedia, the free encyclopedia

Augmented reality (**AR**) is a live, copy, view of a physical, real-world environment whose elements are *augmented* (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called mediated reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality.[1] By contrast, virtual reality replaces the real world with a simulated one.[2][3] Augmentation is conventionally in real-time and in semantic context with environmental elements, such as sports scores on TV during a match. With the help of advanced AR technology (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Artificial information about the environment and its objects can be overlaid on the real world.[4][5][6][7]

Wikitude World Browser on the iPhone 3GS uses GPS and a solid state compass

Samsung SARI AR SDK markerless tracker used in the *AR EdiBear* game (Android OS)

AR Tower Defense game on the Nokia N95 smartphone (Symbian OS) uses fiduciary markers

Contents

Technology

Hardware

Hardware components for augmented reality are: processor, display, sensors and input devices. Modern mobile computing devices like smartphones and tablet computers contain these elements which often include a camera and MEMS sensors such as accelerometer, GPS, and solid state compass, making them suitable AR platforms.[8]

Display

Various technologies are used in Augmented Reality rendering including optical projection systems, monitors, hand held devices, and display systems worn on one's person.

Head-mounted

A head-mounted display (HMD) is a display device paired to a headset such as a harness or helmet. HMDs place images of both the physical world and virtual objects over the user's field of view. Modern HMDs often employ sensors for six degrees of freedom monitoring that allow the system to align virtual information to the physical world and adjust accordingly with the user's head movements.[9][10][11] HMDs can provide users immersive, mobile and collaborative AR experiences.[12]

Eyeglasses

AR displays can be rendered on devices resembling eyeglasses. Versions include eye wear that employ cameras to intercept the real world view and re-display its augmented view through the eye pieces[13] and devices in which the AR imagery is projected through or reflected off the surfaces of the eye wear lens pieces.[14][15][16] Google Glass is not intended for an AR experience, but third-party developers are pushing the device toward a mainstream AR experience.[17][18] After the debut of Google Glass many other AR devices emerged as alternatives.[19][20][21] Most promising Google Alternatives can be listed as Vuzix M100,[22] Optinvent,[23] Meta Space Glasses,[24] Telepathy,[25] Recon Jet,[26] Glass Up.[27] CrowdOptic, an existing app for

smartphones, applies algorithms and triangulation techniques to photo metadata including GPS position, compass heading, and a time stamp to arrive at a relative significance value for photo objects.[28] CrowdOptic technology can be used by Google Glass users to learn where to look at a given point in time.[29]

Contact lenses

Contact lenses that display AR imaging are in development. These bionic contact lenses might contain the elements for display embedded into the lens including integrated circuitry, LEDs and an antenna for wireless communication.[30][31][32][33] Another version of contact lenses, in development for the U.S. Military, is designed to function with AR spectacles, allowing soldiers to focus on close-to-the-eye AR images on the spectacles and distant real world objects at the same time.[34][35] In 2013, at the Augmented World Expo Conference,[36] a futuristic video named Sight[37] featuring the potential of having augmented reality through contact lenses received the best futuristic augmented reality video award.

Virtual retinal display

A virtual retinal display (VRD) is a personal display device under development at the University of Washington's Human Interface Technology Laboratory. With this technology, a display is scanned directly onto the retina of a viewer's eye. The viewer sees what appears to be a conventional display floating in space in front of them.[38]

EyeTap

The EyeTap (also known as Generation-2 Glass[39]) captures rays of light that would otherwise pass through the center of a lens of an eye of the wearer, and substituted each ray of light for synthetic computer-controlled light. The Generation-4 Glass[39] (Laser EyeTap) is similar to the VRD (i.e. it uses a computer controlled laser light source) except that it also has infinite depth of focus and causes the eye itself to, in effect, function as both a camera and a display, by way of exact alignment with the eye, and resynthesis (in laser light) of rays of light entering the eye.[40]

Handheld

Handheld displays employ a small display that fits in a user's hand. All handheld AR solutions to date opt for video see-through. Initially handheld AR employed fiduciary markers,[41] and later GPS units and MEMS sensors such as digital compasses and six degrees of freedom accelerometer–gyroscope. Today SLAM markerless trackers such as PTAM are starting to come into use. Handheld display AR promises to be the first commercial success for AR technologies. The two main advantages of handheld AR is the portable nature of handheld devices and ubiquitous nature of camera phones. The disadvantages are the physical constraints of the user having to hold the handheld device out in front of them at all times as well as distorting effect of classically wide-angled mobile phone cameras when compared to the real world as viewed through the eye.[42]

Spatial

Spatial Augmented Reality (SAR) augments real world objects and scenes without the use of special displays such as monitors, head mounted displays or hand-held devices. SAR makes use of digital projectors to display graphical information onto physical objects. The key difference in SAR is that the display is separated from the users of the system. Because the displays are not associated with each user, SAR scales naturally up to groups of

users, thus allowing for collocated collaboration between users.

Examples include shader lamps, mobile projectors, virtual tables, and smart projectors. Shader lamps mimic and augment reality by projecting imagery onto neutral objects, providing the opportunity to enhance the object's appearance with materials of a simple unit- a projector, camera, and sensor.

Other applications include table and wall projections. One innovation, the Extended Virtual Table, separates the virtual from the real by including beam-splitter mirrors attached to the ceiling at an adjustable angle.[43] Virtual showcases, which employ beam-splitter mirrors together with multiple graphics displays, provide an interactive means of simultaneously engaging with the virtual and the real. Many more implementations and configurations make spatial augmented reality display an increasingly attractive interactive alternative.

A SAR system can display on any number of surfaces of an indoor setting at once. SAR supports both a graphical visualisation and passive haptic sensation for the end users. Users are able to touch physical objects in a process that provides passive haptic sensation.[7][44][45][46]

Tracking

Modern mobile augmented reality systems use one or more of the following tracking technologies: digital cameras and/or other optical sensors, accelerometers, GPS, gyroscopes, solid state compasses, RFID and wireless sensors. These technologies offer varying levels of accuracy and precision. Most important is the position and orientation of the user's head. Tracking the user's hand(s) or a handheld input device can provide a 6DOF interaction technique.[47]

Input devices

Techniques include speech recognition systems that translate a user's spoken words into computer instructions and gesture recognition systems that can interpret a user's body movements by visual detection or from sensors embedded in a peripheral device such as a wand, stylus, pointer, glove or other body wear.[48][49][50][51]

Computer

The computer analyzes the sensed visual and other data to synthesize and position augmentations.

Software and algorithms

A key measure of AR systems is how realistically they integrate augmentations with the real world. The software must derive real world coordinates, independent from the camera, from camera images. That process is called image registration which uses different methods of computer vision, mostly related to video tracking.[52][53] Many computer vision methods of augmented reality are inherited from visual odometry. Usually those methods consist of two parts.

First detect interest points, or fiduciary markers, or optical flow in the camera images. First stage can use feature detection methods like corner detection, blob detection, edge detection or thresholding and/or other image processing methods.[54][55] The second stage restores a real world coordinate system from the data obtained in the first stage. Some methods assume objects with known geometry (or fiduciary markers) present in the scene. In some of those cases the scene 3D structure should be precalculated beforehand. If part of the scene is unknown simultaneous localization and mapping (SLAM) can map relative positions. If no information about scene geometry is available, structure from motion methods like bundle adjustment are used. Mathematical

methods used in the second stage include projective (epipolar) geometry, geometric algebra, rotation representation with exponential map, kalman and particle filters, nonlinear optimization, robust statistics.

Augmented Reality Markup Language (ARML) is a data standard developed within the Open Geospatial Consortium (OGC),[56] which consists of an XML grammar to describe the location and appearance of virtual objects in the scene, as well as ECMAScript bindings to allow dynamic access to properties of virtual objects.

To enable rapid development of Augmented Reality Application, some software development kits (SDK) have emerged.[57][58] Some of the well known AR SDKs are offered by Metaio,[59] Vuforia,[60] Wikitude[61] and Layar.[62]

Applications

Augmented reality has many applications, and many areas can benefit from the use of AR technology. AR was first used for military, industrial, and medical applications, but was soon applied to commercial and entertainment areas.[63]

Archaeology

AR can be used to aid archaeological research, by augmenting archaeological features onto the modern landscape, enabling archaeologists to formulate conclusions about site placement and configuration.[64]

Another application given to AR in this field is the possibility for users to rebuild ruins, buildings, or even landscapes as they formerly existed.[65]

Architecture

AR can aid in visualizing building projects. Computer-generated images of a structure can be superimposed into a real life local view of a property before the physical building is constructed there. AR can also be employed within an architect's work space, rendering into their view animated 3D visualizations of their 2D drawings. Architecture sight-seeing can be enhanced with AR applications allowing users viewing a building's exterior to virtually see through its walls, viewing its interior objects and layout.[66][67]

Art

AR technology has helped disabled individuals create art by using eye tracking to translate a user's eye movements into drawings on a screen.[68] An item such as a commemorative coin can be designed so that when scanned by an AR-enabled device it displays additional objects and layers of information that were not visible in a real world view of it.[69][70] In 2013, L'Oreal used CrowdOptic technology to create an augmented reality at the seventh annual Luminato Festival in Toronto, Canada.[29]

Commerce

AR can enhance product previews such as allowing a customer to view what's inside a product's packaging without opening it.[71] AR can also be used as an aid in selecting products from a catalog or through a kiosk. Scanned images of products can activate views of additional content such as customization options and additional images of the product in its use.[72][73] AR is used to integrate print and video marketing. Printed

marketing material can be designed with certain "trigger" images that, when scanned by an AR enabled device using image recognition, activate a video version of the promotional material. A major difference between Augmented Reality and straight forward image recognition is that you can overlay multiple media at the same time in the view screen, such as social media share buttons, in-page video even audio and 3D objects. Traditional print only publications are using Augmented Reality to connect many different types of media.[74][75][76][77]

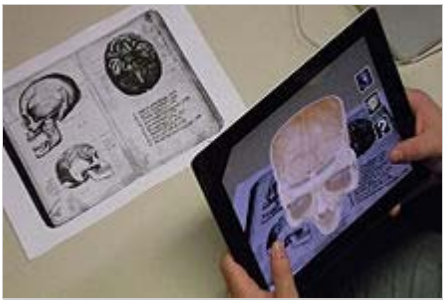
View Description image 1

Construction

With the continual improvements to GPS accuracy, businesses are able to use augmented reality to visualize georeferenced models of construction sites, underground structures, cables and pipes using mobile devices.[78] Following the Christchurch earthquake, the University of Canterbury released, CityViewAR, which enabled city planners and engineers to visualize buildings that were destroyed in the earthquake.[79] Not only did this provide planners with tools to reference the previous cityscape, but it also served as a reminder to the magnitude of the devastation caused, as entire buildings were demolished.

Education

Augmented reality applications can complement a standard curriculum. Text, graphics, video and audio can be superimposed into a student's real time environment. Textbooks, flashcards and other educational reading material can contain embedded "markers" that, when scanned by an AR device, produce supplementary information to the student rendered in a multimedia format.[80][81][82] Students can participate interactively with computer generated simulations of historical events, exploring and learning details of each significant area of the event site.[83] AR can aid students in understanding chemistry by allowing them to visualize the spatial structure of a molecule and interact with a virtual model of it that appears, in a camera image, positioned at a marker held in their hand.[84] Augmented reality technology also permits learning via remote collaboration, in which students and instructors not at the same physical location can share a common virtual learning environment populated by virtual objects and learning materials and interact with another within that setting.[85]



App iSkull (http://www.youtube.com/watch?v=xh_m0M7SAw0), an augmented human skull for education (iOS OS)

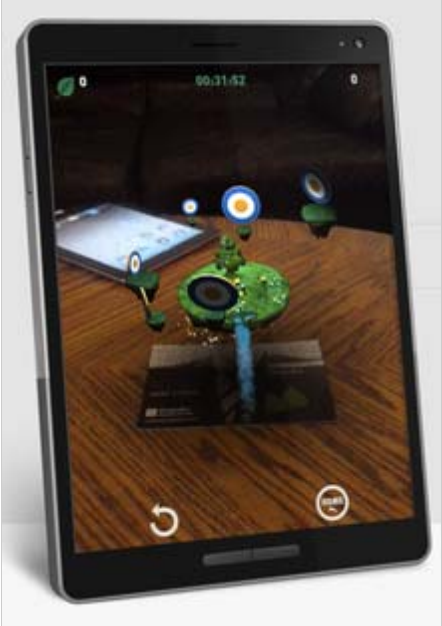
Everyday

Since the 1970s and early 1980s, Steve Mann has been developing technologies meant for everyday use i.e. "horizontal" across all applications rather than a specific "vertical" market. Examples include Mann's "EyeTap Digital Eye Glass", a general-purpose seeing aid that does dynamic-range management (HDR vision) and overlays, underlays, simultaneous augmentation and diminishment (e.g. diminishing the electric arc while looking at a welding torch).[86]

30 years of Augmediated Reality in everyday life.

Gaming

Augmented reality allows gamers to experience digital game play in a real world environment. In the last 10 years there has been a lot of improvements of technology, resulting in better movement detection and the possibility for the Wii to exist, but also direct detection of the player's movements.[87]



Merchlar's mobile game *Get On Target* uses a trigger image as fiduciary marker

Industrial design

AR can help industrial designers experience a product's design and operation before completion. Volkswagen uses AR for comparing calculated and actual crash test imagery.[88] AR can be used to visualize and modify a car body structure and engine layout. AR can also be used to compare digital mock-ups with physical mock-ups for finding discrepancies between them.[89][90]

Medical

Augmented Reality can provide the surgeon with information, which are otherwise hidden, such as showing the heartbeat rate, the blood pressure, the state of the patient’s organ, etc. AR can be used to let a doctor look inside a patient by combining one source of images such as an X-ray with another such as video.

Examples include a virtual X-ray view based on prior tomography or on real time images from ultrasound and confocal microscopy probes[91] or visualizing the position of a tumor in the video of an endoscope.[92] AR can enhance viewing a fetus inside a mother's womb.[93] See also Mixed reality.

Military

In combat, AR can serve as a networked communication system that renders useful battlefield data onto a soldier's goggles in real time. From the soldier's viewpoint, people and various objects can be marked with special indicators to warn of potential dangers. Virtual maps and 360° view camera imaging can also be rendered to aid a soldier's navigation and battlefield perspective, and this can be transmitted to military leaders at a remote command center.[94]

Navigation

AR can augment the effectiveness of navigation devices. Information can be displayed on an automobile's windshield indicating destination directions and meter, weather, terrain, road conditions and traffic information as well as alerts to potential hazards in their path.[95][96][97] Aboard maritime vessels, AR can allow bridge watch-standers to continuously monitor important information such as a ship's heading and speed while moving throughout the bridge or performing other tasks.[98]

Office workplace

AR can help facilitate collaboration among distributed team members in a work force via conferences with real and virtual participants. AR tasks can include brainstorming and discussion meetings utilizing common visualization via touch screen tables, interactive digital whiteboards, shared design spaces, and distributed

control rooms.[99][100][101]

Sports and entertainment

AR has become common in sports telecasting. Sports and entertainment venues are provided with see-through and overlay augmentation through tracked camera feeds for enhanced viewing by the audience. Examples include the yellow "first down" line seen in television broadcasts of American football games showing the line the offensive team must cross to receive a first down. AR is also used in association with football and other sporting events to show commercial advertisements overlaid onto the view of the playing area. Sections of rugby fields and cricket pitches also display sponsored images. Swimming telecasts often add a line across the lanes to indicate the position of the current record holder as a race proceeds to allow viewers to compare the current race to the best performance. Other examples include hockey puck tracking and annotations of racing car performance and snooker ball trajectories.[52][102]

Augmented reality map on iPhone

AR can enhance concert and theater performances. For example, artists can allow listeners to augment their listening experience by adding their performance to that of other bands/groups of users.[103][104][105]

The gaming industry has benefited a lot from the development of this technology. A number of games have been developed for prepared indoor environments. Early AR games also include AR air hockey, collaborative combat against virtual enemies, and an AR-enhanced pool games. A significant number of games incorporate AR in them and the introduction of the smartphone has made a bigger impact.[106][107]

Task support

Complex tasks such as assembly, maintenance, and surgery can be simplified by inserting additional information into the field of view. For example, labels can be displayed on parts of a system to clarify operating instructions for a mechanic who is performing maintenance on the system.[108][109] Assembly lines gain many benefits from the usage of AR. In addition to Boeing, BMW and Volkswagen are known for incorporating this technology in their assembly line to improve their manufacturing and assembly processes.[110][111][112] Big machines are difficult to maintain because of the multiple layers or structures they have. With the use of AR the workers can complete their job in a much easier way because AR permits them to look through the machine as if it was with x-ray, pointing them to the problem right away.[113]

Television

Weather visualizations were the first application of Augmented Reality to television. It has now become common in weathercasting to display full motion video of images captured in real-time from multiple cameras and other imaging devices. Coupled with 3D graphics symbols and mapped to a common virtual geospace model, these animated visualizations constitute the first true application of AR to TV.

Augmented reality has also become common in sports telecasting. Sports and entertainment venues are provided with see-through and overlay augmentation through tracked camera feeds for enhanced viewing by the audience. Examples include the yellow "first down" line seen in television broadcasts of American football games showing the line the offensive team must cross to receive a first down. AR is also used in association with

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Augmented reality is starting to allow Next Generation TV viewers to interact with the programs they are watching. They can place objects into an existing program and interact with these objects, such as moving them around. Avatars of real persons in real time who are also watching the same program.[116]

Tourism and sightseeing

Augmented reality applications can enhance a user's experience when traveling by providing real time informational displays regarding a location and its features, including comments made by previous visitors of the site. AR applications allow tourists to experience simulations of historical events, places and objects by rendering them into their current view of a landscape.[117][118][119] AR applications can also present location information by audio, announcing features of interest at a particular site as they become visible to the user.[120][121]

Translation

AR systems can interpret foreign text on signs and menus and, in a user's augmented view, re-display the text in the user's language. Spoken words of a foreign language can be translated and displayed in a user's view as printed subtitles.[122][123][124]

Notable researchers

- Ivan Sutherland invented the first AR head-mounted display at Harvard University.
- Steven Feiner, Professor at Columbia University, is a leading pioneer of augmented reality, and author of the first paper on an AR system prototype, KARMA (the Knowledge-based Augmented Reality Maintenance Assistant), along with Blair MacIntyre and Doree Seligmann.[125]
- Steve Mann formulated an earlier concept of Mediated reality in the 1970s and 1980s, using cameras, processors, and display systems to modify visual reality to help people see better (dynamic range management), building computerized welding helmets, as well as "Augmediated Reality" vision systems for use in everyday life.[126]
- Louis Rosenberg developed one of the first known AR systems, called Virtual Fixtures, while working at the U.S. Air Force Armstrong Labs in 1991, and published the first study of how an AR system can enhance human performance.[127] Rosenberg's subsequent work at Stanford University in the early 90's, was the first proof that virtual overlays, when registered and presented over a user's direct view of the real physical world, could significantly enhance human performance.[128][129][130]
- Dieter Schmalstieg and Daniel Wagner jump started the field of AR on mobile phones. They developed the first marker tracking systems for mobile phones and PDAs.[131]
- Bruce H. Thomas and Wayne Piekarski develop the Tinmith system in 1998.[132] They along with Steve Feiner with his MARS system pioneer outdoor augmented reality.
- Reinhold Behringer performed important early work in image registration for augmented reality, and prototype wearable testbeds for augmented reality. He also co-organized the First IEEE International Symposium on Augmented Reality in 1998 (IWAR'98), and co-edited one of the first books on augmented

reality.[133][134][135]

History

- 1901: L. Frank Baum, an author, first mentions the idea of an electronic display/spectacles that overlays data onto real life (in this case 'people'), it is named a 'character marker'.[136]
- 1957–62: Morton Heilig, a cinematographer, creates and patents a simulator called Sensorama with visuals, sound, vibration, and smell.[137]
- 1966: Ivan Sutherland invents the head-mounted display and positions it as a window into a virtual world.
- 1975: Myron Krueger creates Videoplace to allow users to interact with virtual objects for the first time.
- 1980: Steve Mann creates the first wearable computer, a computer vision system with text and graphical overlays on a photographically mediated reality, or Augmediated Reality.[138] See EyeTap.
- 1989: Jaron Lanier coins the phrase Virtual Reality and creates the first commercial business around virtual worlds.
- 1990: The term "'Augmented Reality"' is believed to be attributed to Tom Caudell, a former Boeing [139] researcher.[140]
- 1992: Louis Rosenberg develops one of the first functioning AR systems, called Virtual Fixtures, at the U.S. Air Force Research Laboratory—Armstrong, and demonstrates benefits to human performance. [127][130][141]
- 1992: Steven Feiner, Blair MacIntyre and Doree Seligmann present the first major paper on an AR system prototype, KARMA, at the Graphics Interface conference.
- 1993 A widely cited version of the paper above is published in Communications of the ACM – Special issue on computer augmented environments, edited by Pierre Wellner, Wendy Mackay, and Rich Gold.[142]
- 1993: Loral WDL, with sponsorship from STRICOM, performed the first demonstration combining live AR-equipped vehicles and manned simulators. Unpublished paper, J. Barrilleaux, "Experiences and Observations in Applying Augmented Reality to Live Training", 1999.[143]
- 1994: Julie Martin creates first 'Augmented Reality Theater production', Dancing In Cyberspace, funded by the Australia Council for the Arts, features dancers and acrobats manipulating body–sized virtual object in real time, projected into the same physical space and performance plane. The acrobats appeared immersed within the virtual object and environments. The installation used Silicon Graphics computers and Polhemus sensing system.
- 1998: Spatial Augmented Reality introduced at University of North Carolina at Chapel Hill by Ramesh Raskar, Welch, Henry Fuchs.[44]
- 1999: Hirokazu Kato (加藤 博一) created ARToolKit at HITLab, where AR later was further developed by other HITLab scientists, demonstrating it at SIGGRAPH.
- 2000: Bruce H. Thomas develops ARQuake, the first outdoor mobile AR game, demonstrating it in the International Symposium on Wearable Computers.
- 2008: Wikitude AR Travel Guide launches on 20 Oct 2008 with the G1 Android phone.[144]
- 2009: ARToolkit was ported to Adobe Flash (FLARToolkit) by Saqoosha, bringing augmented reality to the web browser.[145]
- 2013: Google announces an open beta test of its Google Glass augmented reality glasses. The glasses reach the Internet through Bluetooth, which connects to the wireless service on a user’s cellphone. The glasses respond when a user speaks, touches the frame or moves the head.[146]

APPENDIX G – INSECTARIUM METAMORPHOSIS

1 – PHOTOS

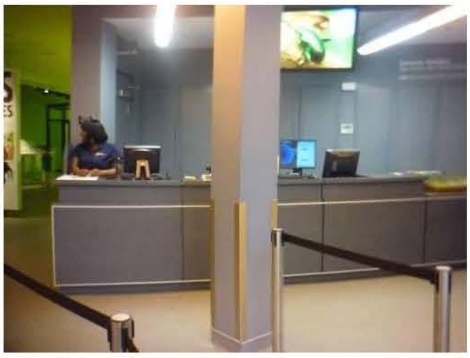



Exhibitions space in the basement


Storage for the laboratories and the animations


Exhibition space



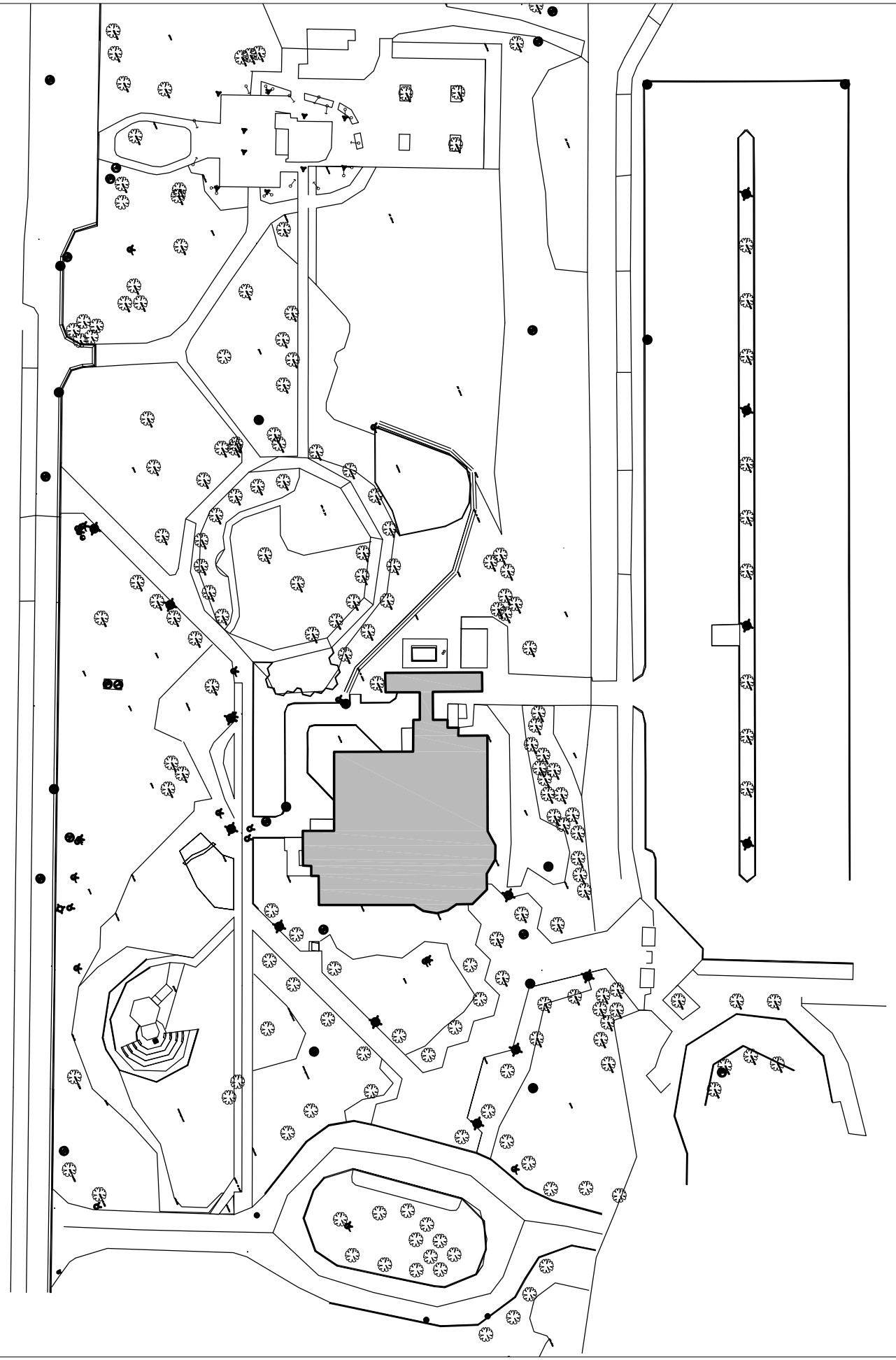



Reception area, lunch room and locker room


Insect yard and playground


Exterior agora and exterior path shared with the Botanical garden

2 – PLANS AND SECTIONS



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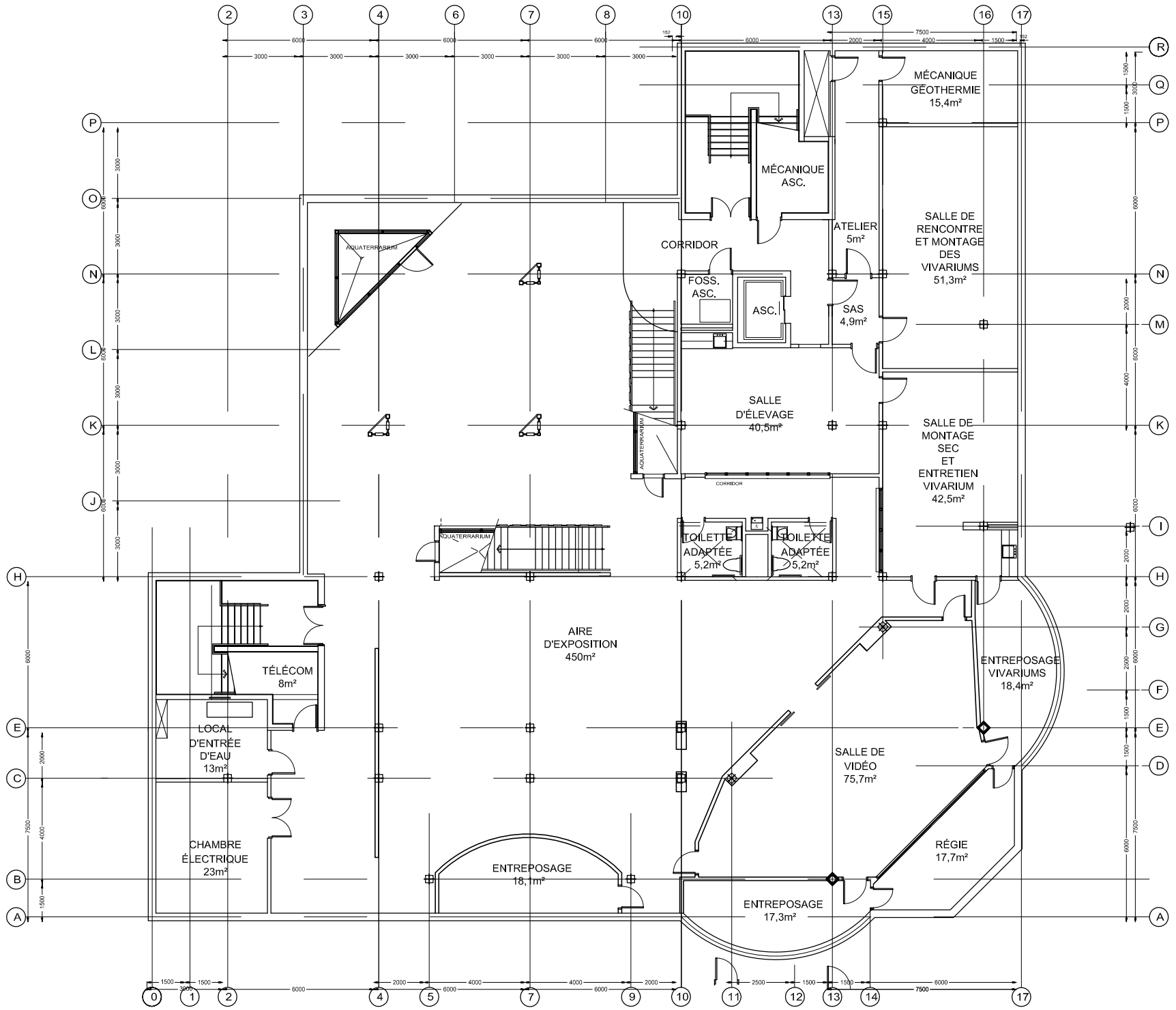

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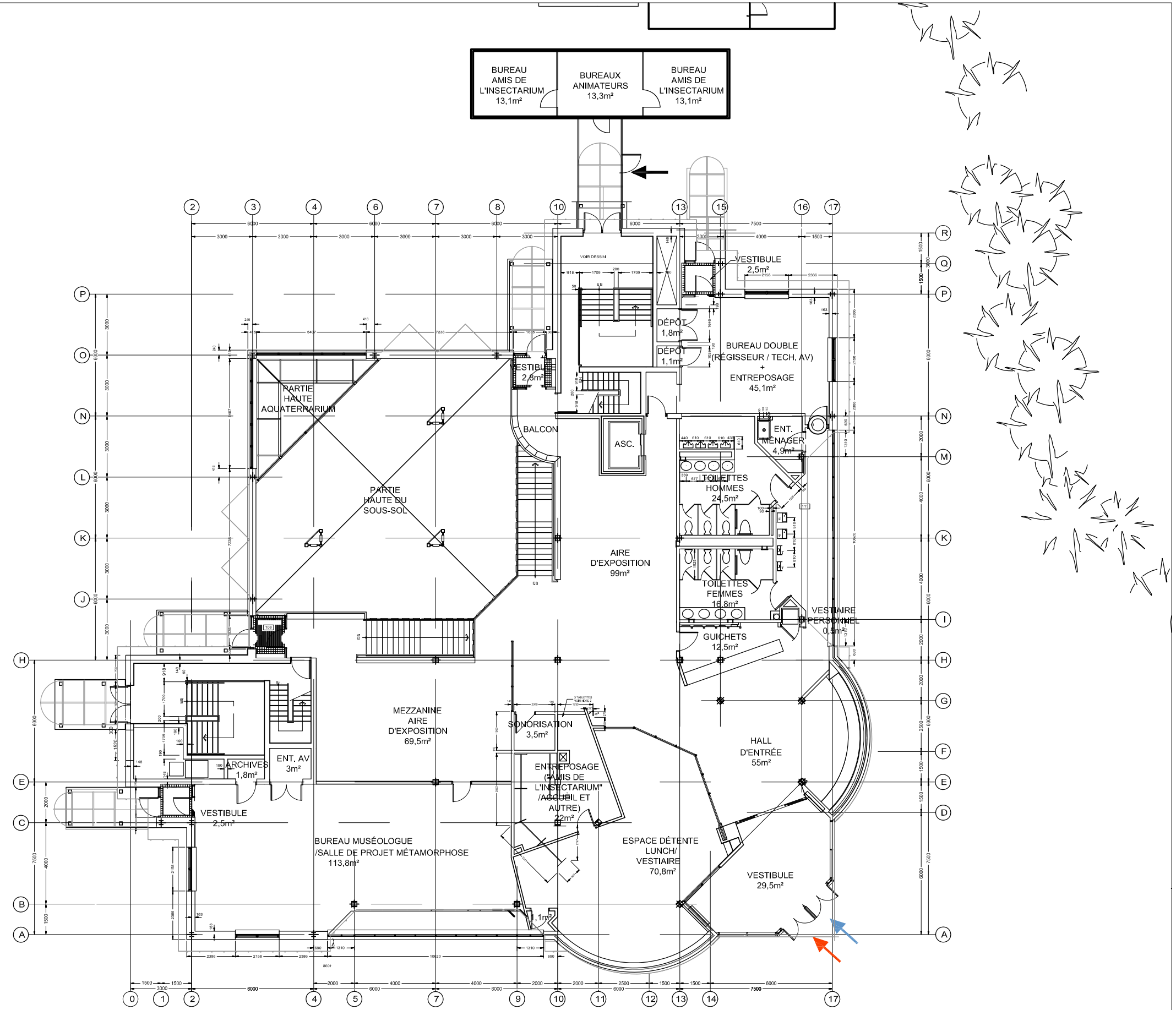

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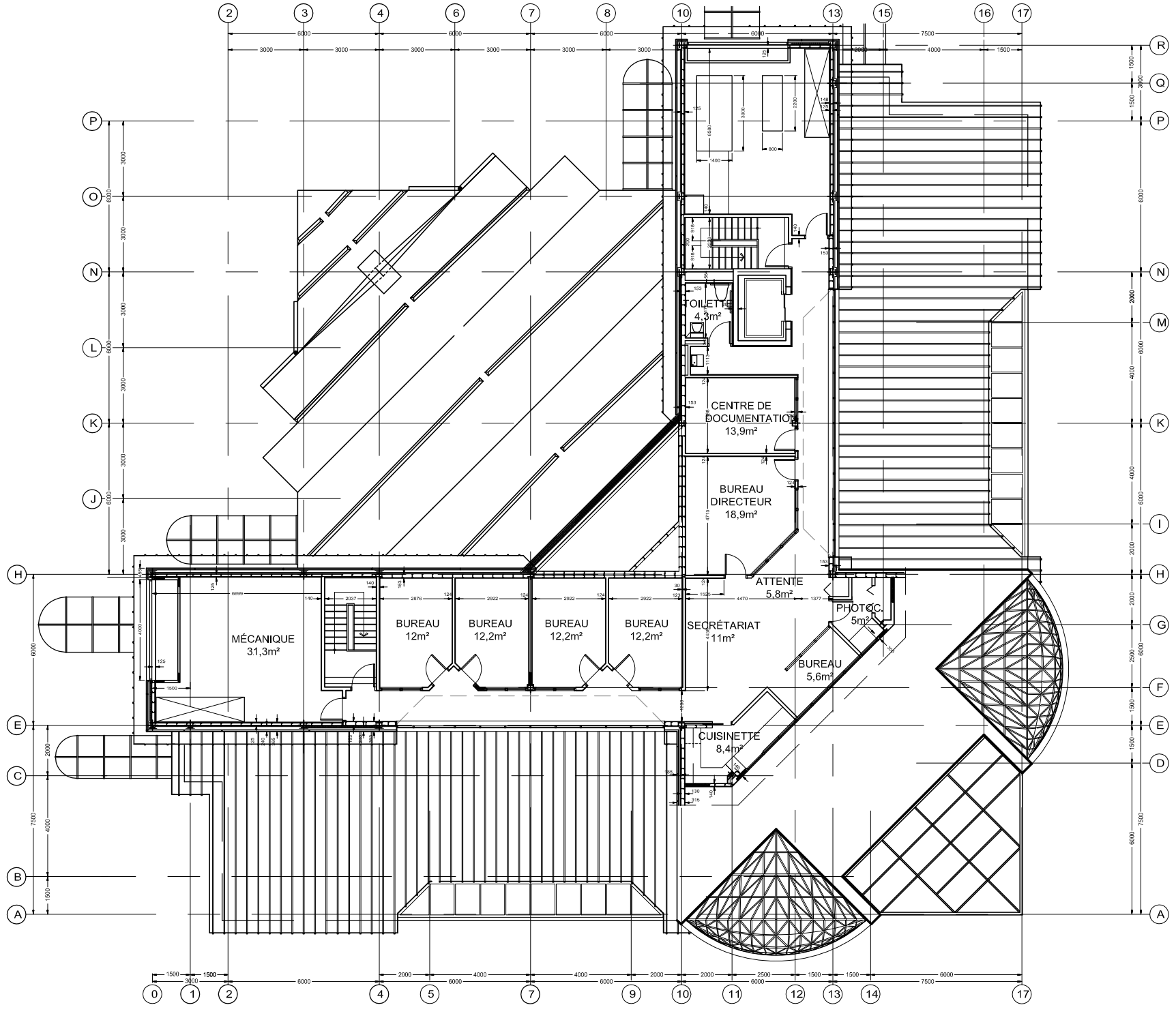

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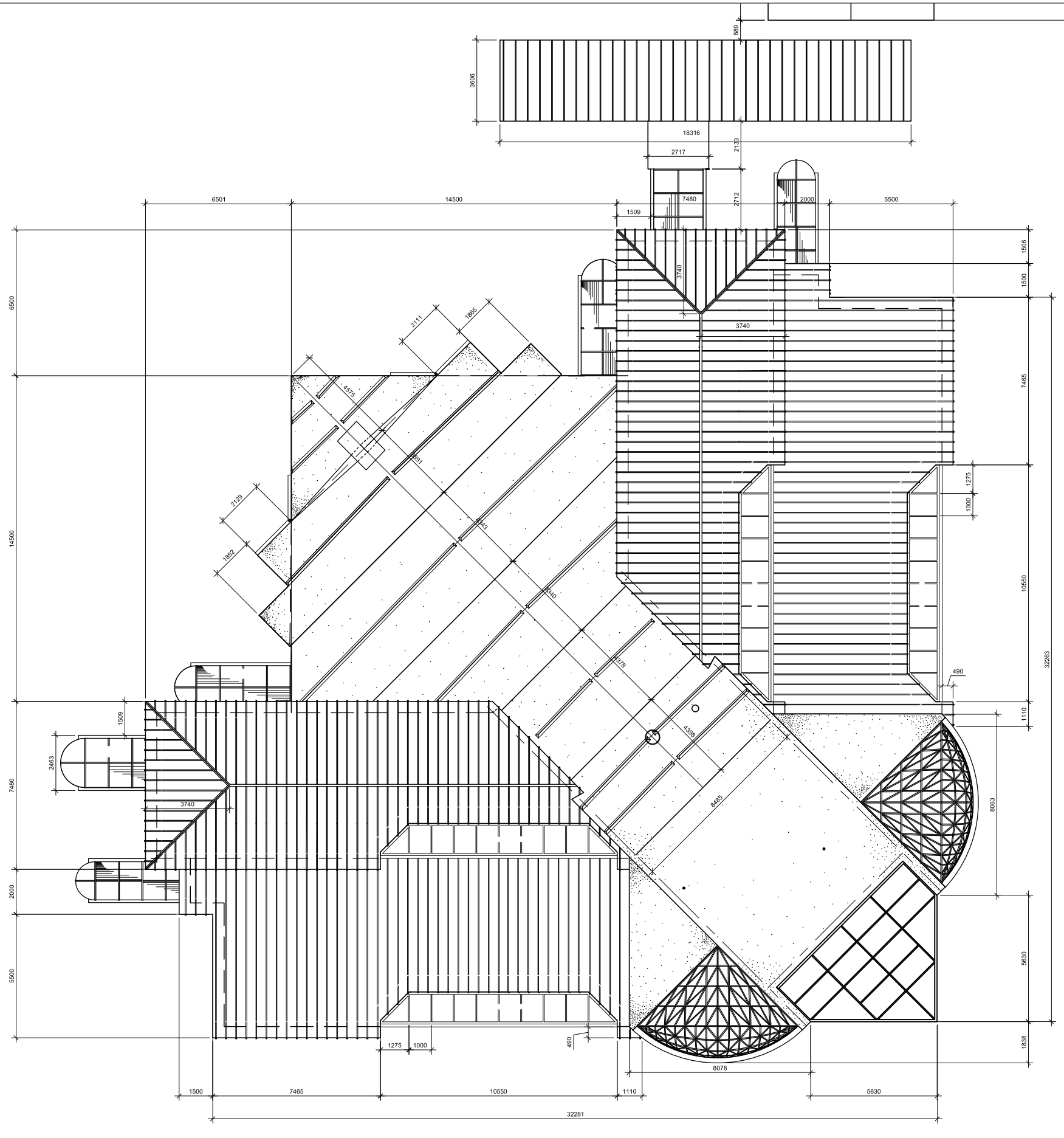

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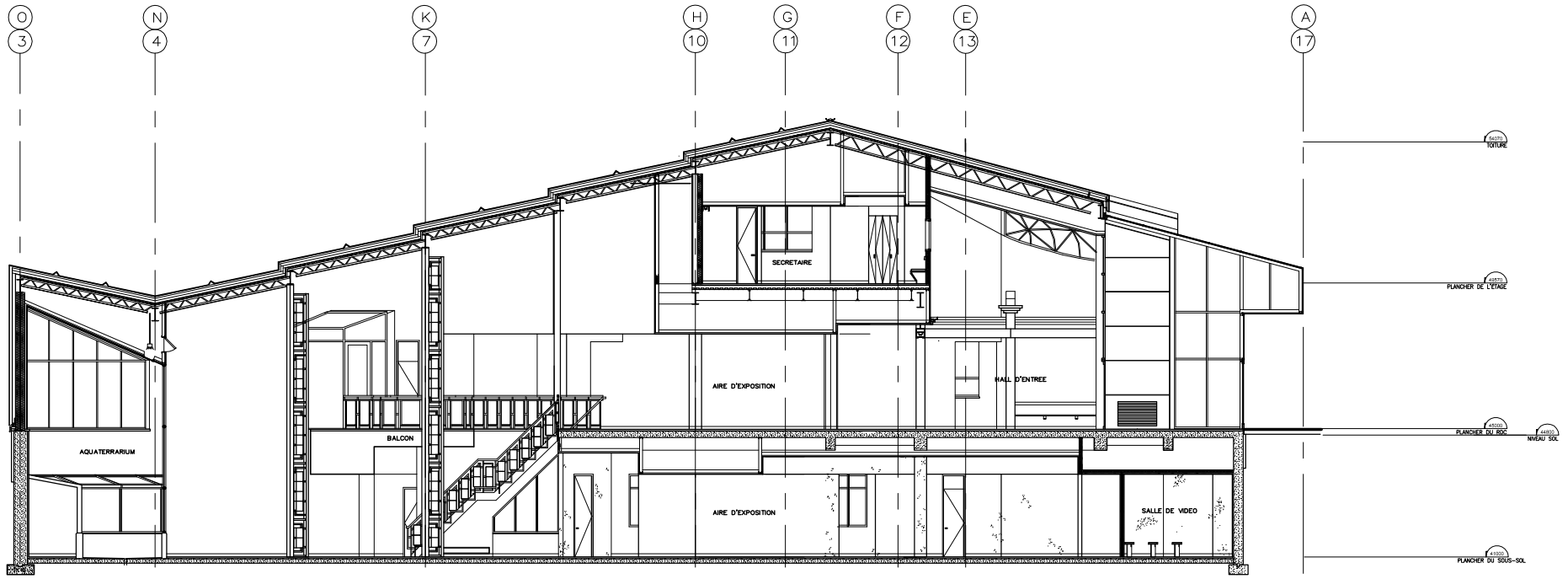

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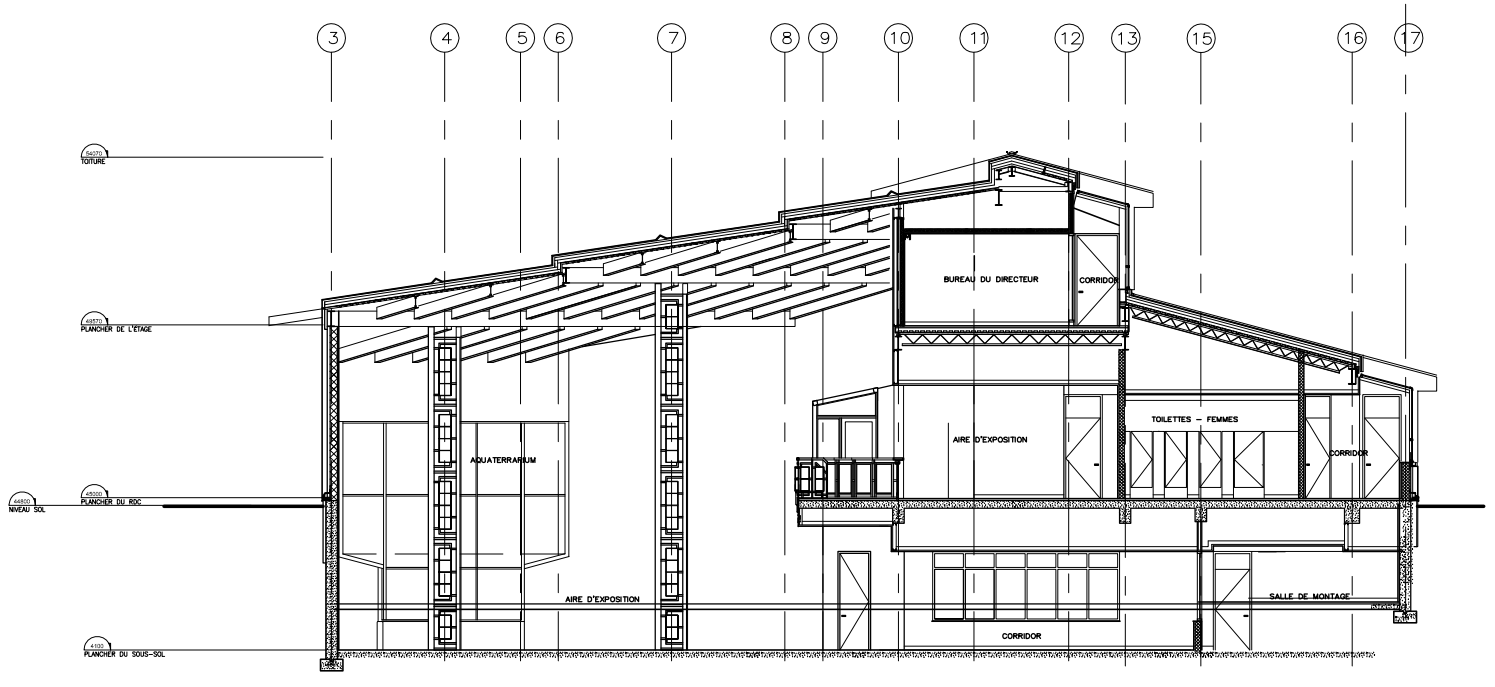

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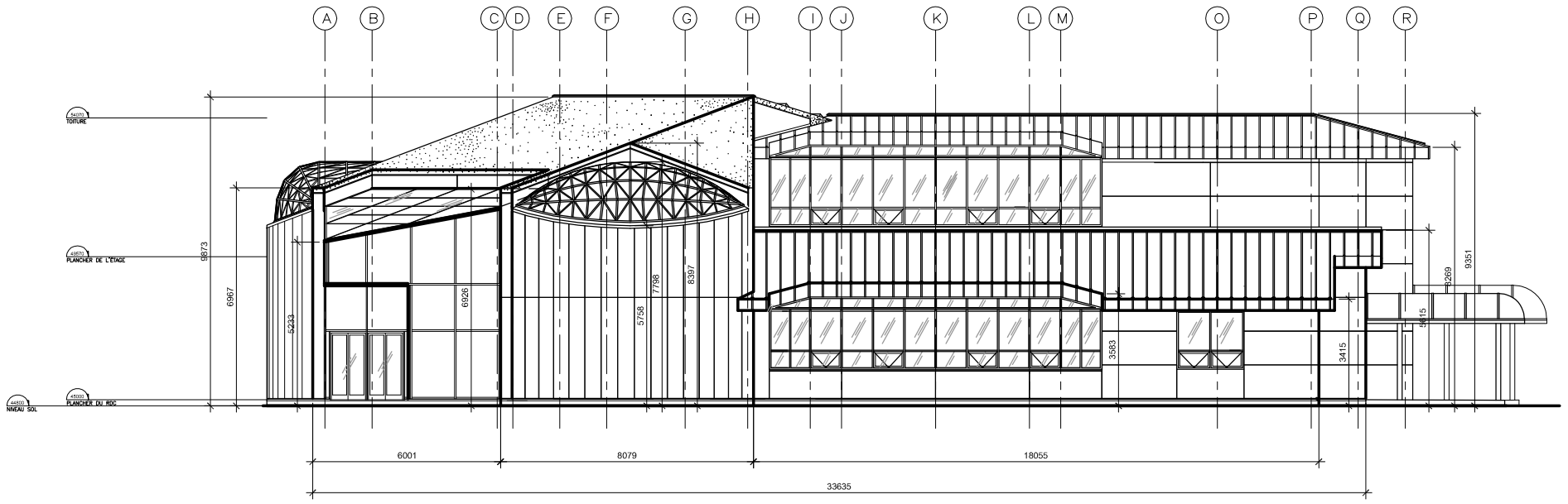

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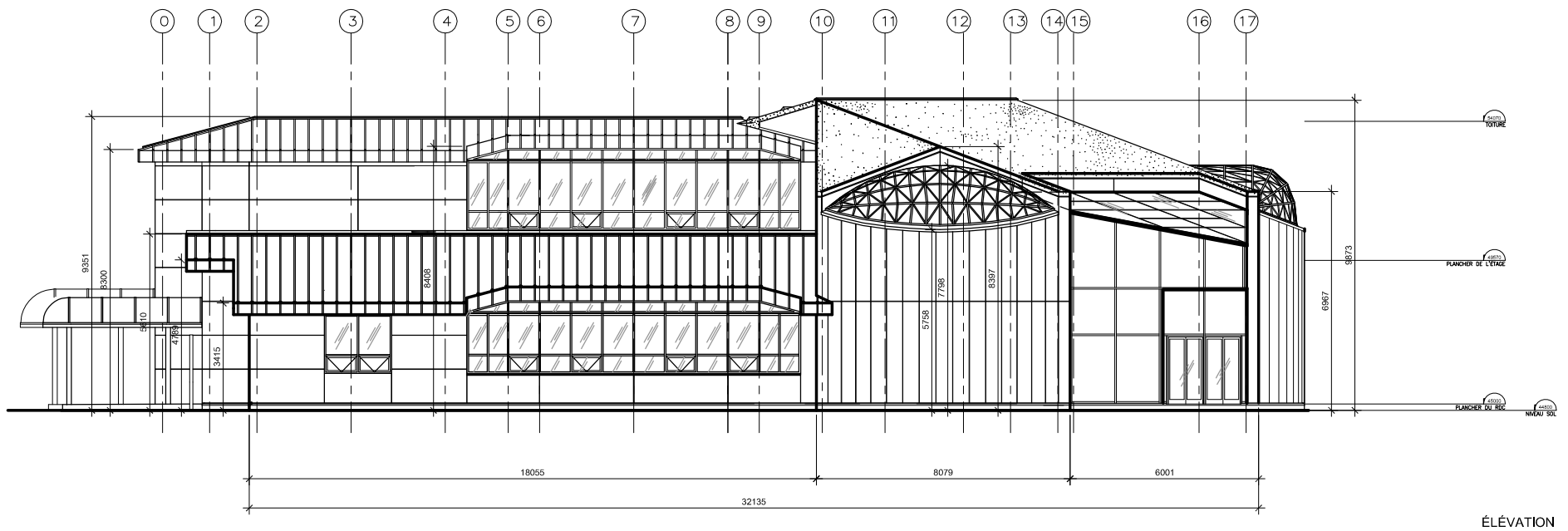

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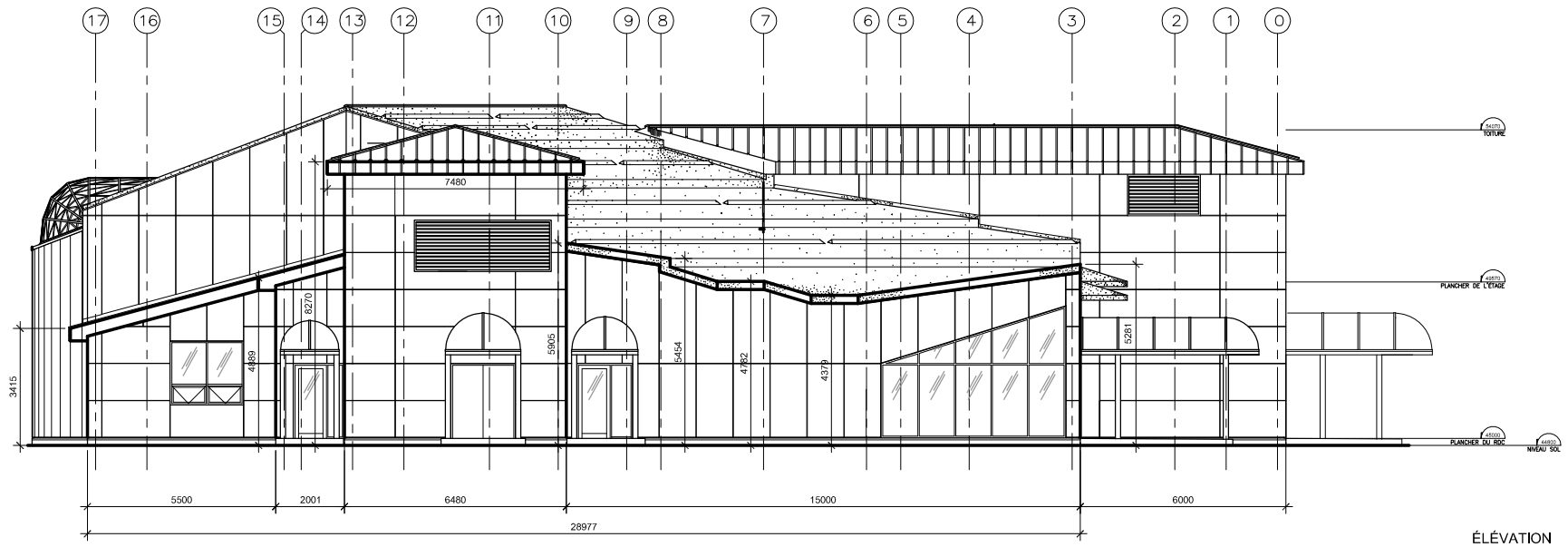

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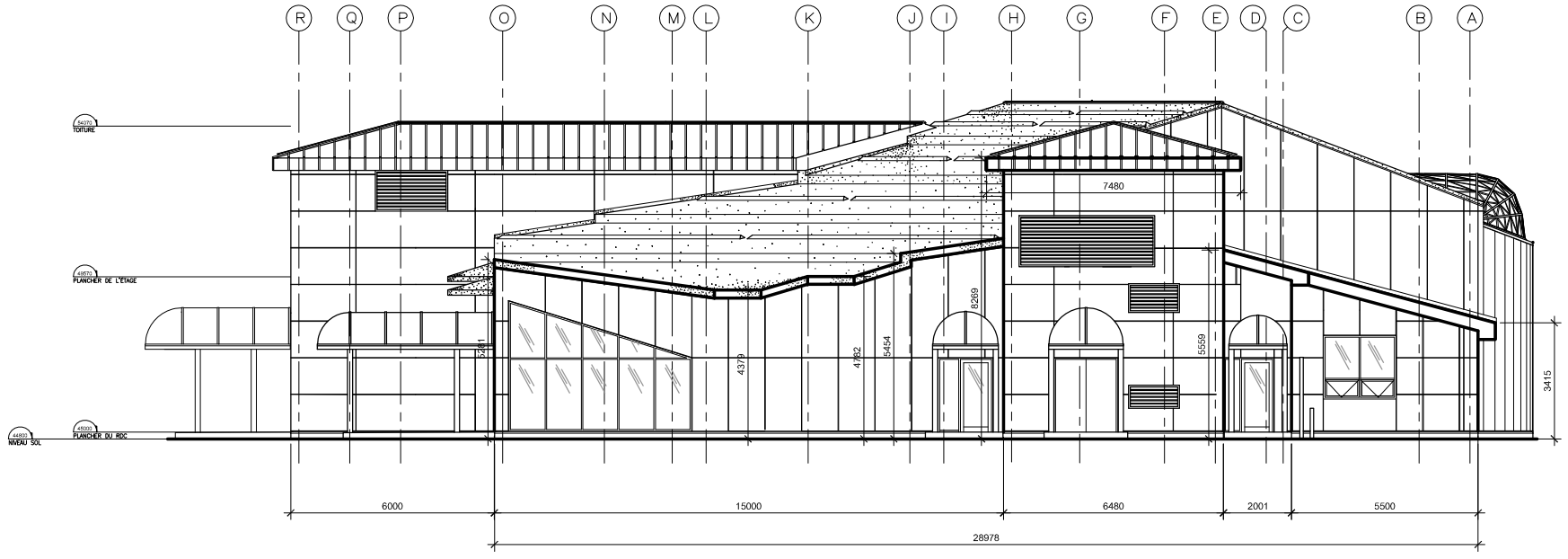

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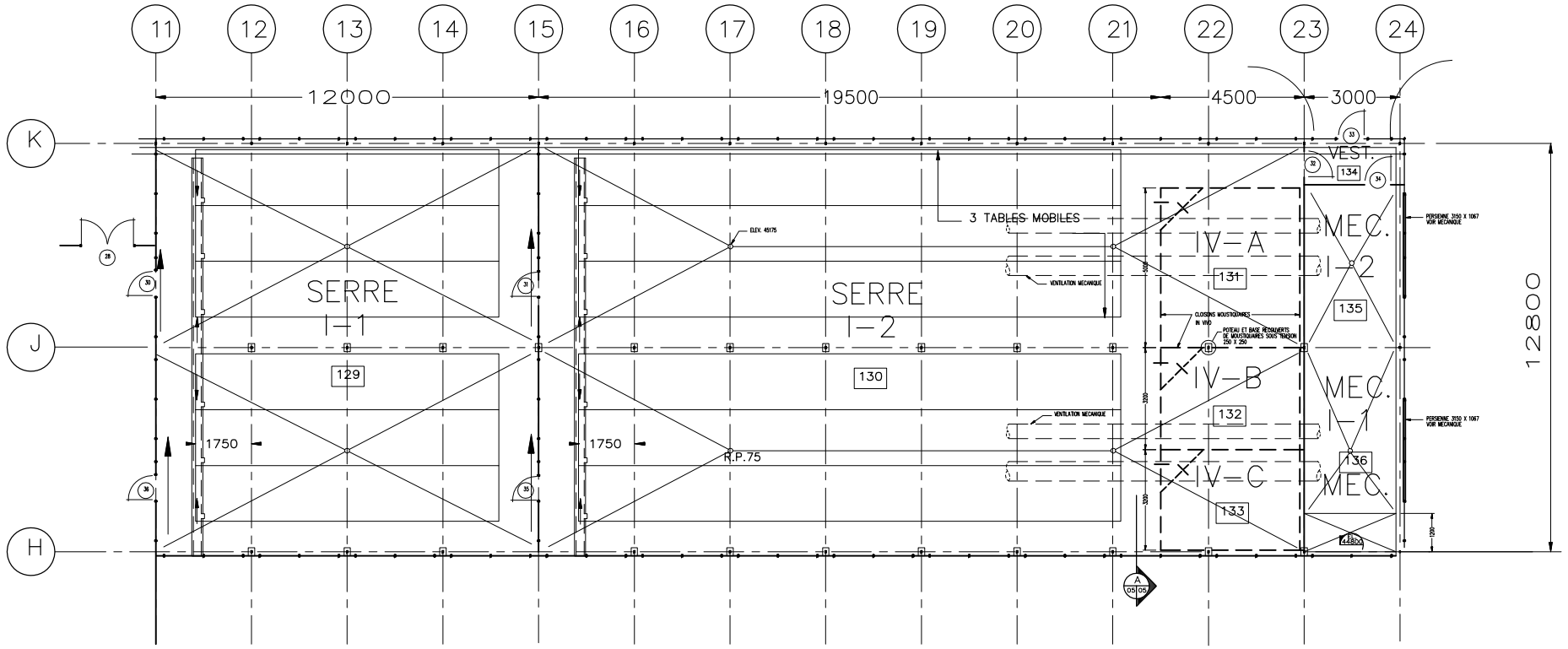
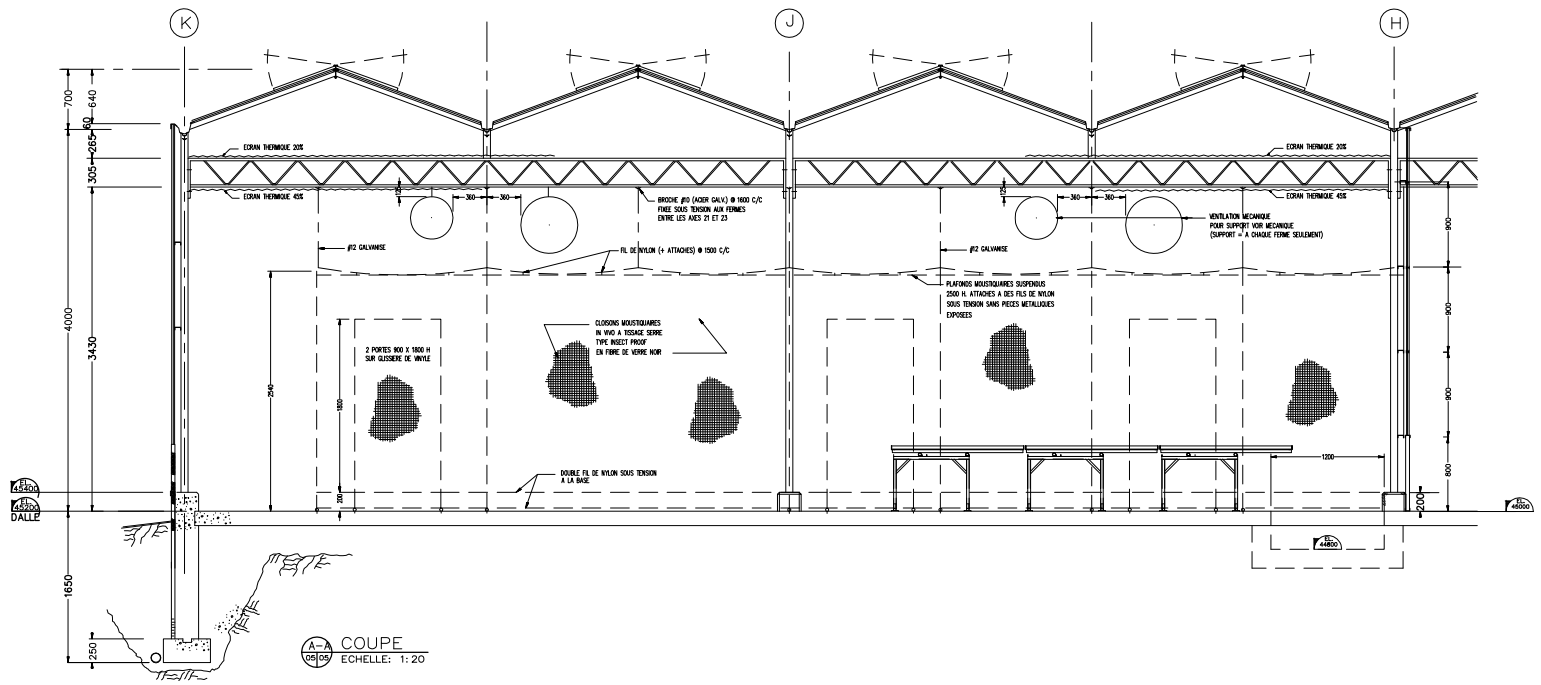


A–A PLAN
ECHELLE: 1:50



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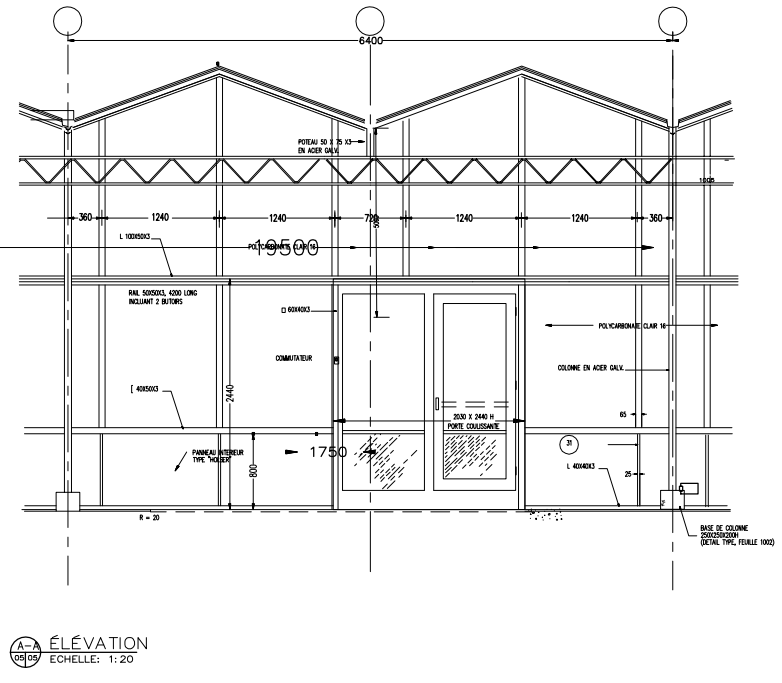


A–A ÉLÉVATION
ECHELLE: 1:20

CCA ARCHITECTES INC.
5605 DE GASPÉ, ESPACE 502, MONTRÉAL (QUÉBEC) H2T 2A4
T 514-277-7876 | F 514-277-1876 | WWW.ARCHI.CA

PAGEAUMOREL

ÉMISSION	APPROBATION	RÉVISION	DATE

PFT MÉTAMORPHOSE
INSECTARIUM

13 157

date 2013-12-09
échelle 1:200
conception
dessin

PLAN SERRE INSECTARIUM
EXISTANT

A0

3 – APPLICATION FOR EVALUATION OF THE HERITAGE VALUE OF A SITE

FORMULAIRE DE DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU
À l'attention de la Direction de la culture et du patrimoine, Division de l'expertise en patrimoine et de la toponymie

DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU

Demandeur	
Service ou arrondissement	Espace pour la vie
Division	Qualité de vie
Responsable du dossier	Pénélope Darcy

Information sur le lieu	
Nom du lieu	Insectarium au Jardin botanique
Adresse(s) / emplacement	4581, rue Sherbrooke Est Montréal (Québec) H1X 2B2
Arrondissement	Rosemont Petite-Patrie
Propriétaire actuel	Ville de Montréal
Fonction actuelle	muséologie

Contexte de la demande
Projet d'agrandissement et de réhabilitation de l'actuel Insectarium. Il s'agit d'un projet pour le legs de la ville de Montréal pour son 375ème anniversaire.

Informations historiques	
Année de construction (si connue)	1990
Concepteur (si connu)	
Propriétaire constructeur (si connu)	
Fonction d'origine	muséologie

Désignation patrimoniale	
Réglementation d'urbanisme	"immeuble significatif" car sur le site du Jardin botanique
Plan d'urbanisme Volet bâti Volet archéologique	Dans "Le patrimoine bâti" : "secteur de valeur exceptionnelle; on l'identifie aussi comme un "site du patrimoine potentiel", car sur le site du Jardin botanique
Loi sur les biens culturels Volet municipal Volet provincial	
Désignation fédérale	

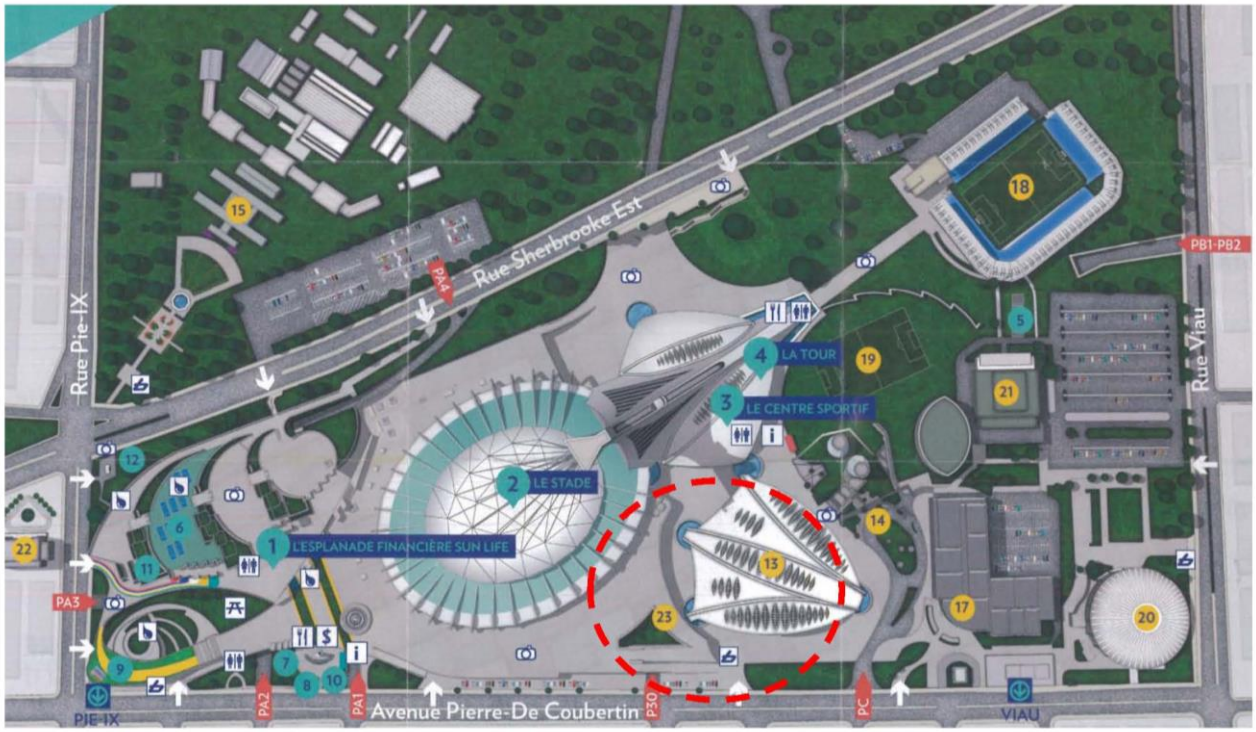
Date	08 Octobre 2013

Veuillez joindre à la demande des photos du lieu ainsi que toutes informations et documentation pertinentes (plans du lieu et de ses composantes, études antérieures, descriptions des travaux antérieurs (permis), etc.).

Formulaire 2012

APPENDIX H – RENEWAL OF THE BIODÔME

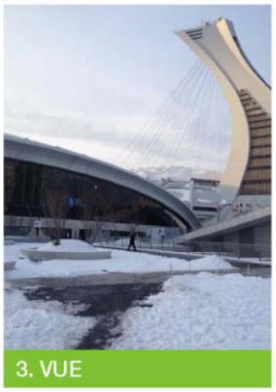
1 – SITE



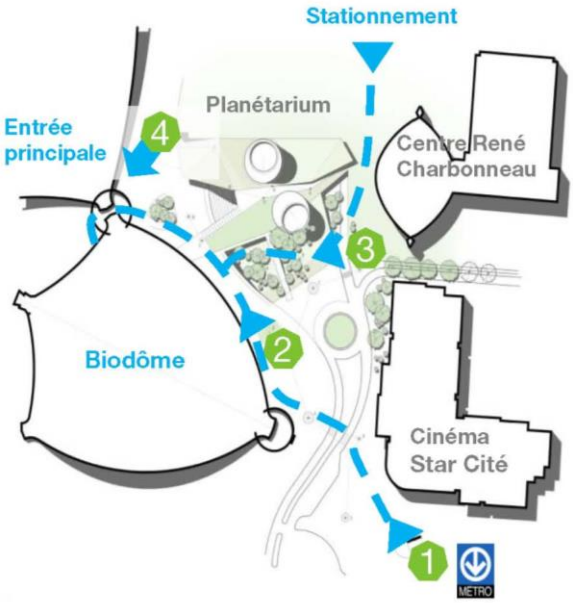
2 – SITE ACCESS AND MAIN ENTRANCE


1. VUE

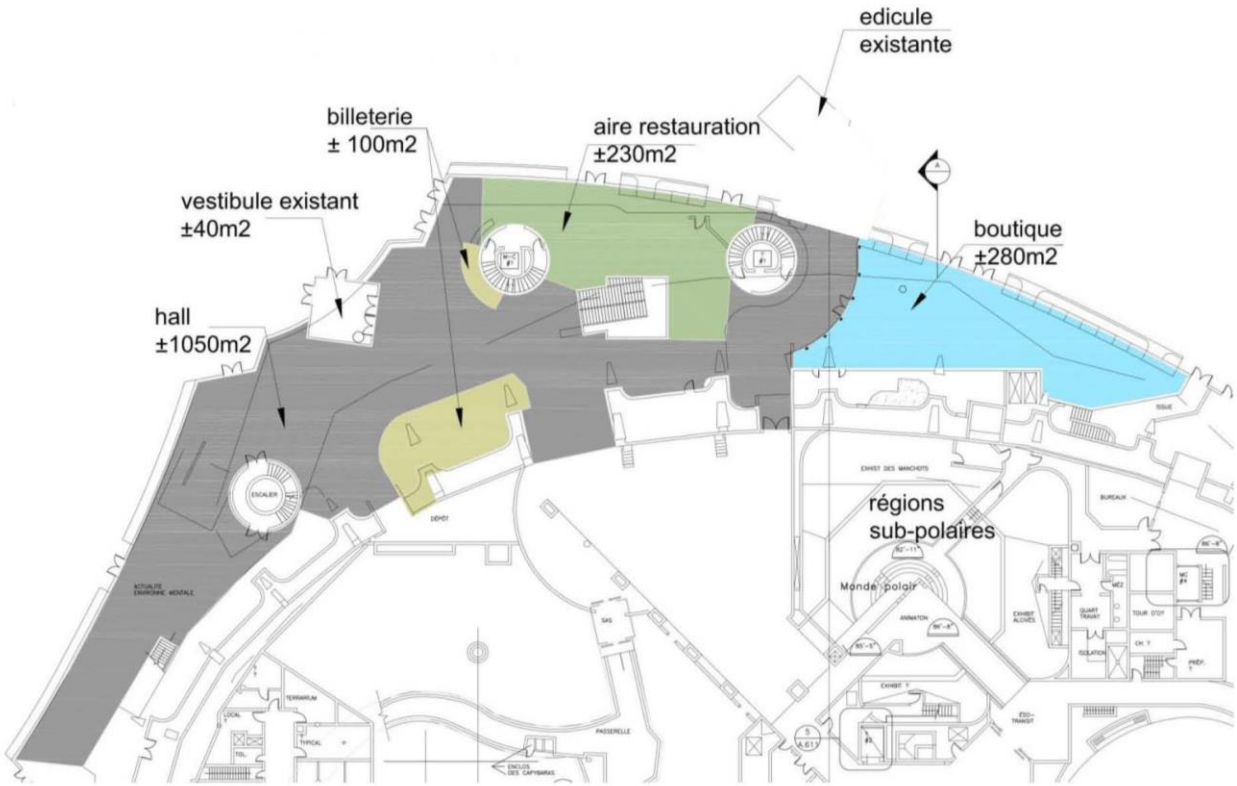

2. VUE


3. VUE

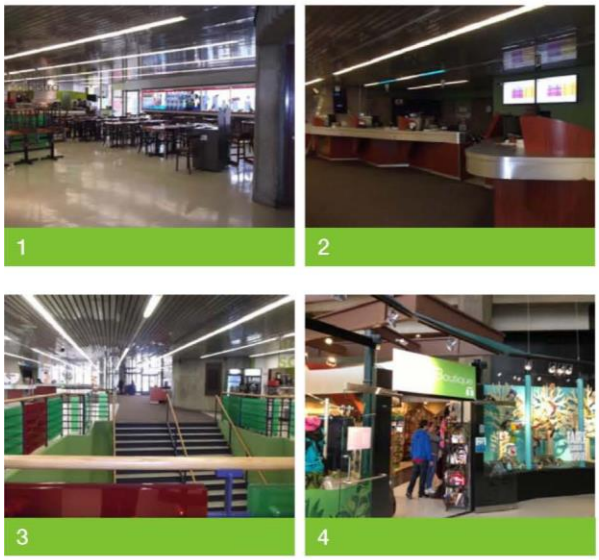

4. VUE

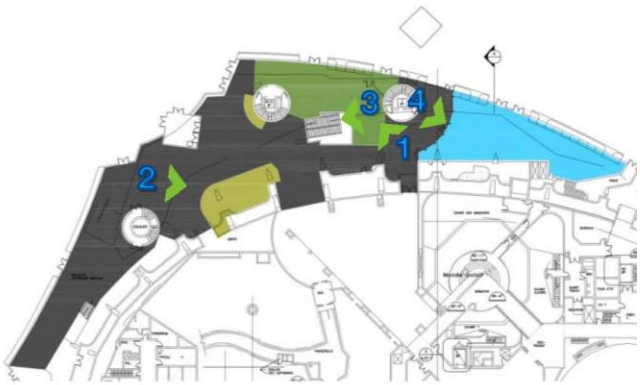


3 – TICKET COUNTERS AND LOBBY

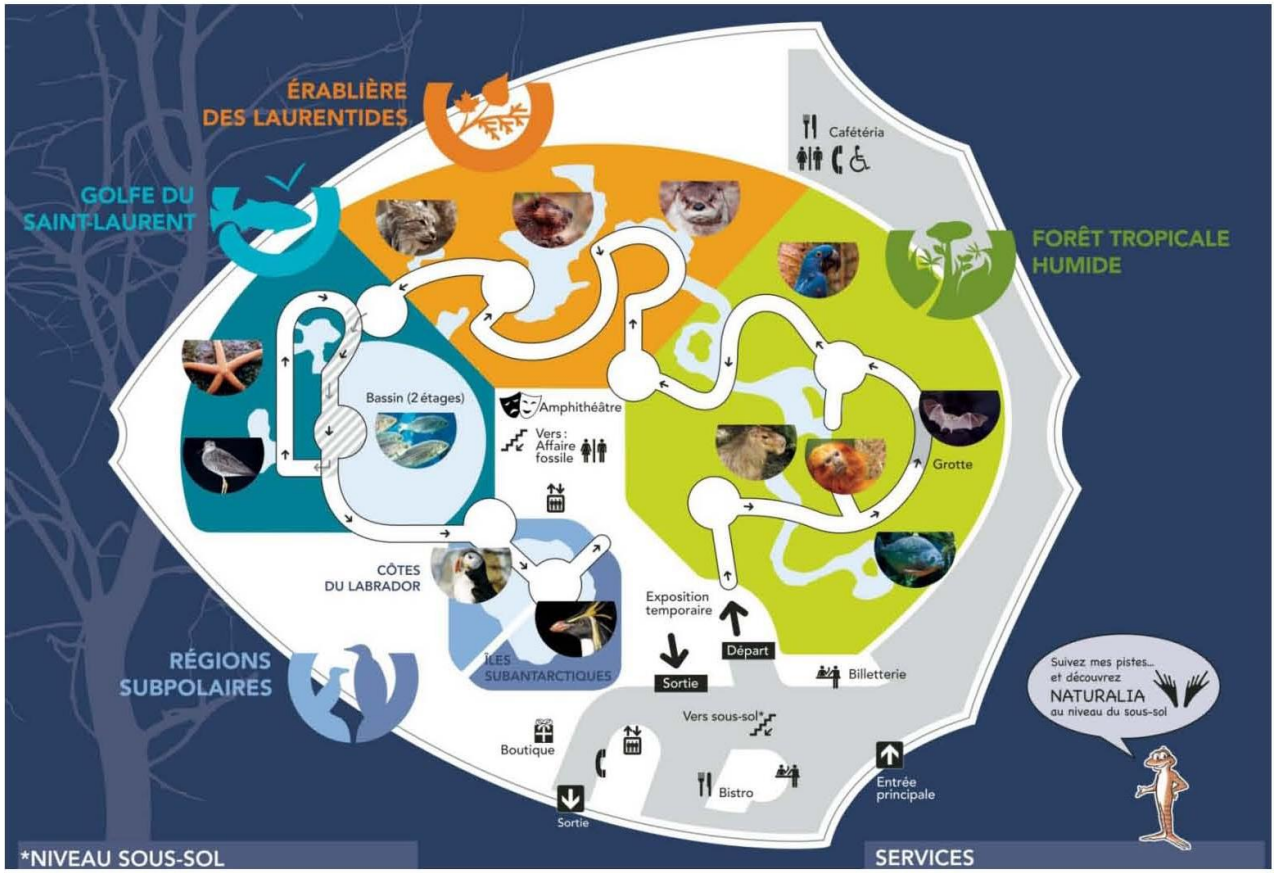


4 – TICKET COUNTERS AND LOBBY



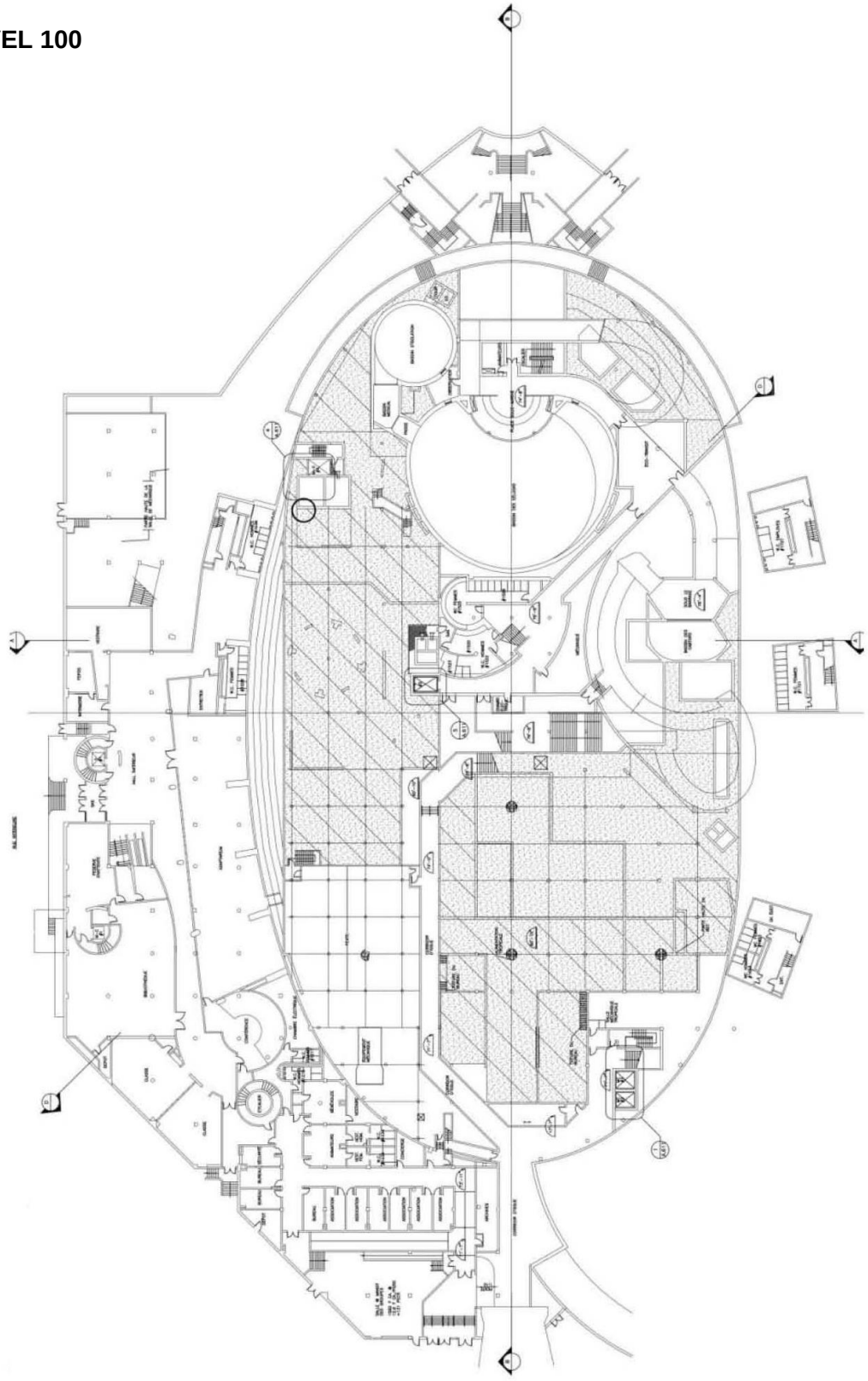


5 – PATHWAY / TICKET COUNTERS AND LOBBY

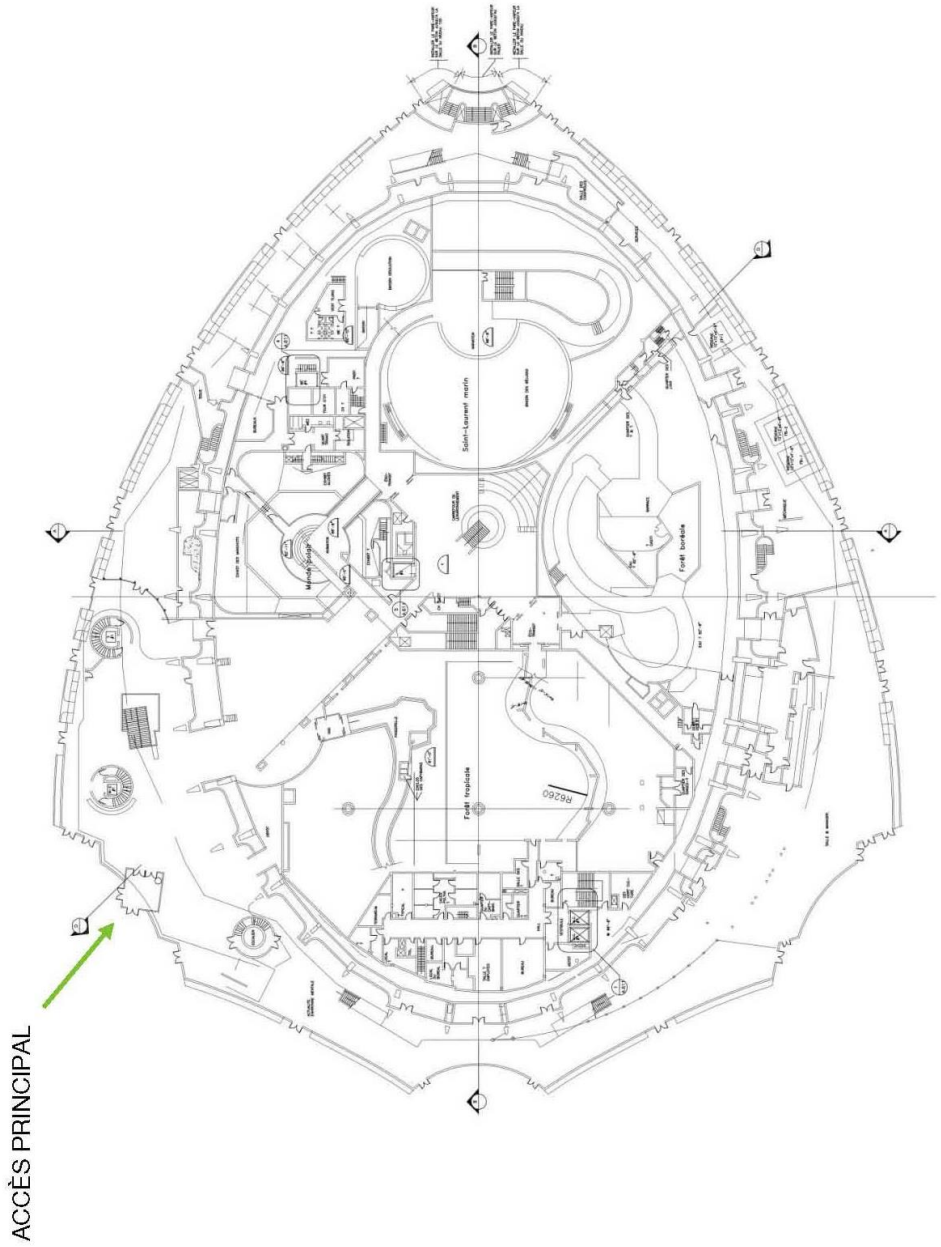


6 – FLOOR PLANS / SECTIONS / 3D MODEL

LEVEL 100



LEVEL 200



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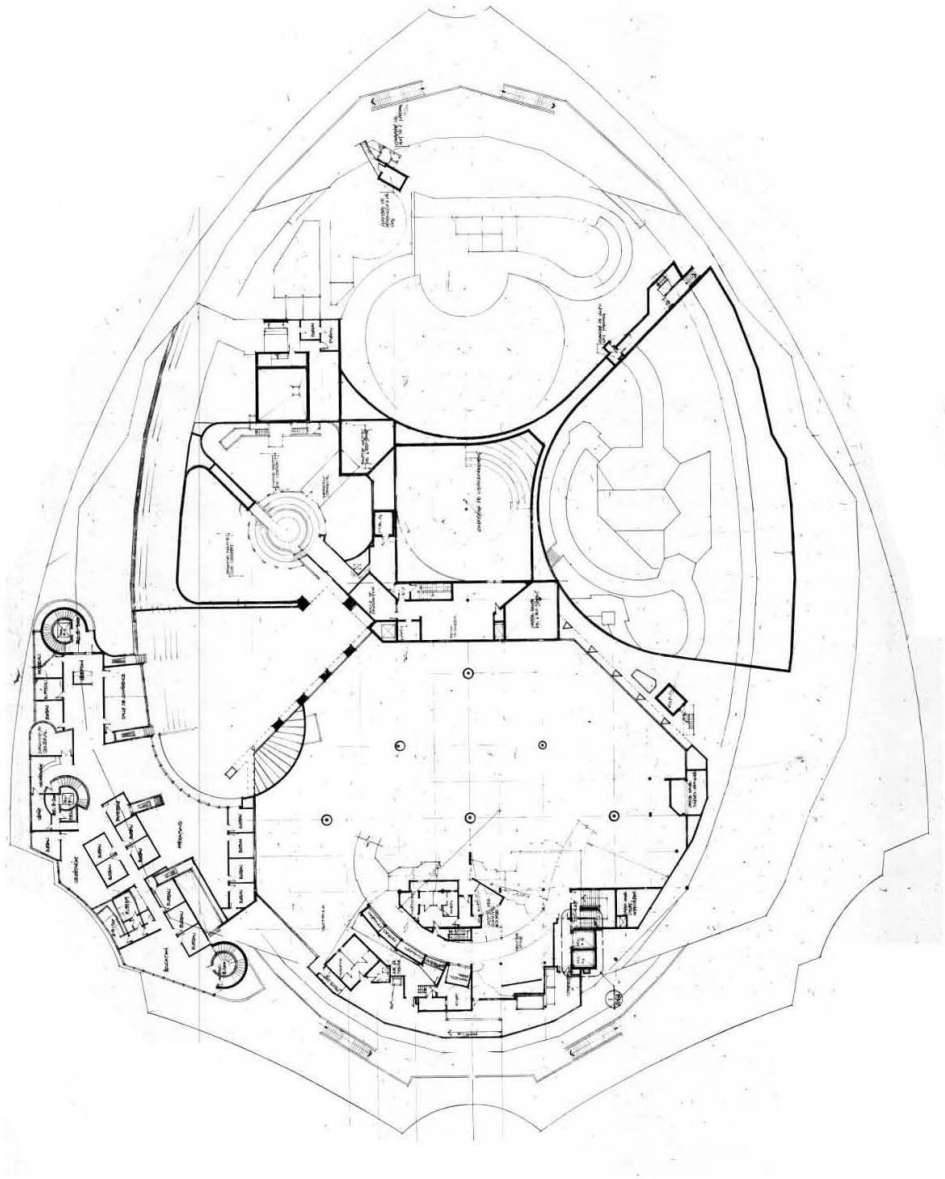
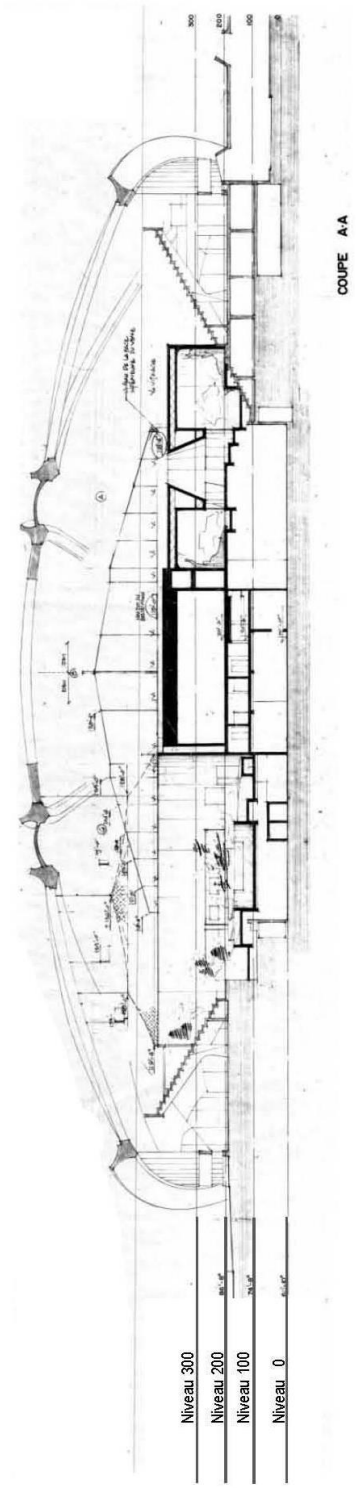
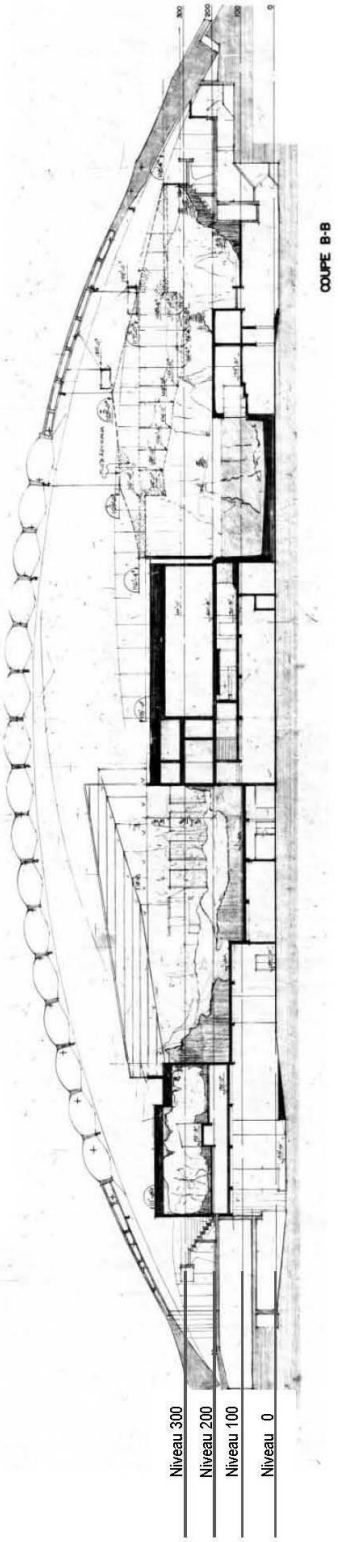
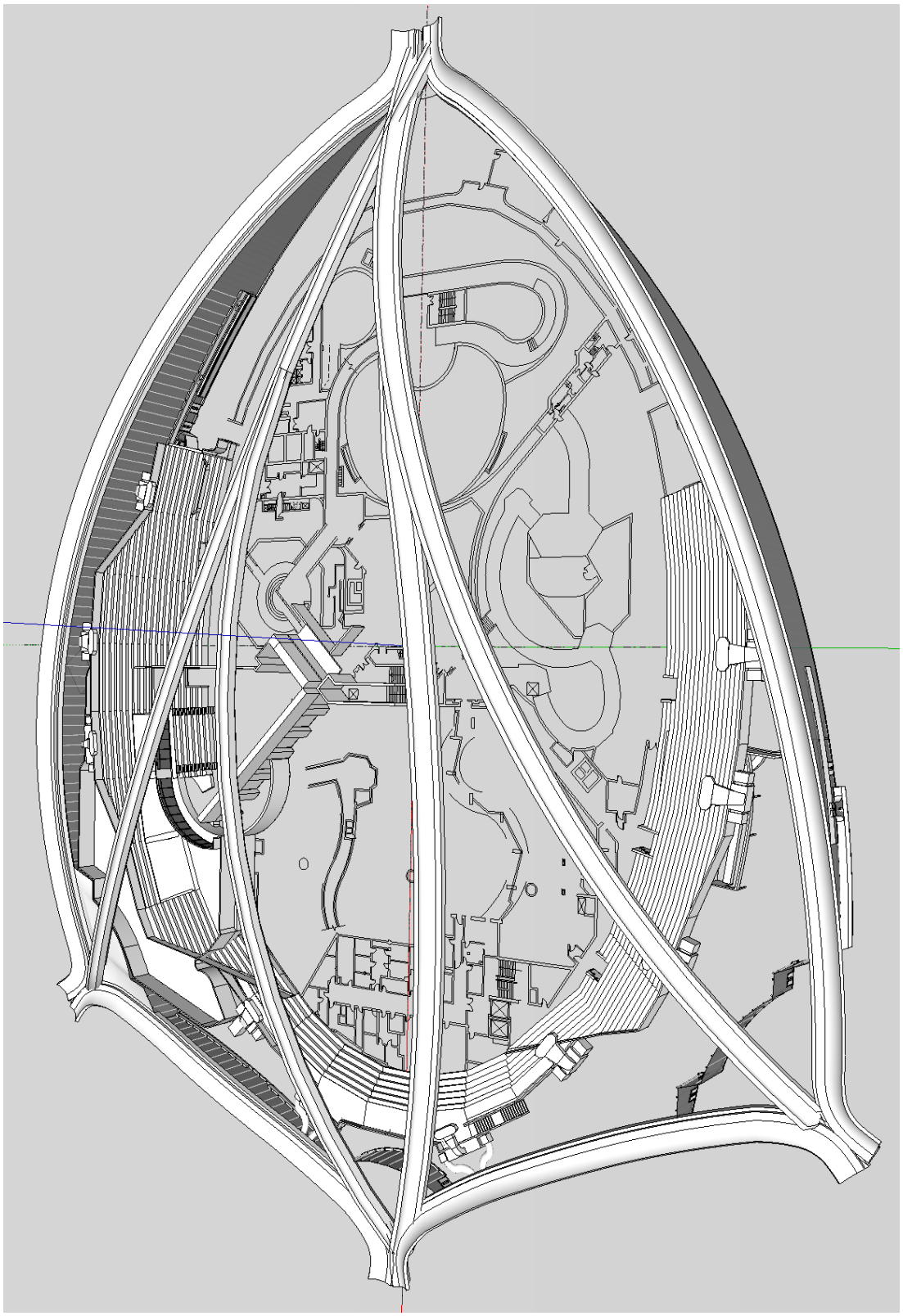


SECTIONS

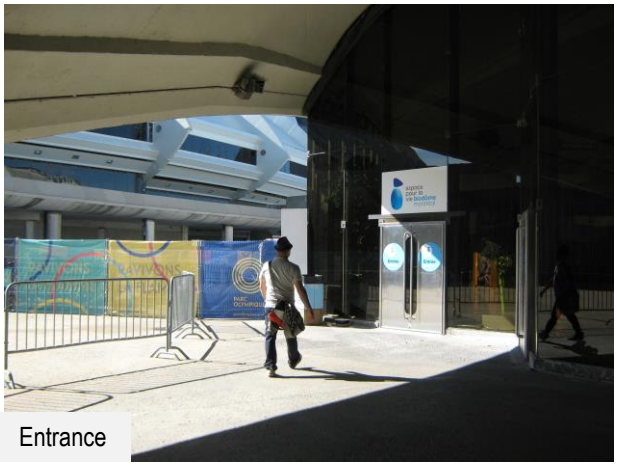

COUPE A-A
Niveau 300
Niveau 200
Niveau 100
Niveau 0


COUPE B-B
Niveau 300
Niveau 200
Niveau 100
Niveau 0

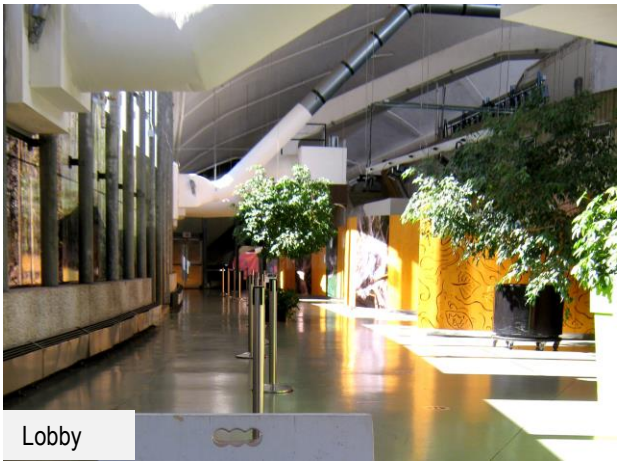
3D MODEL



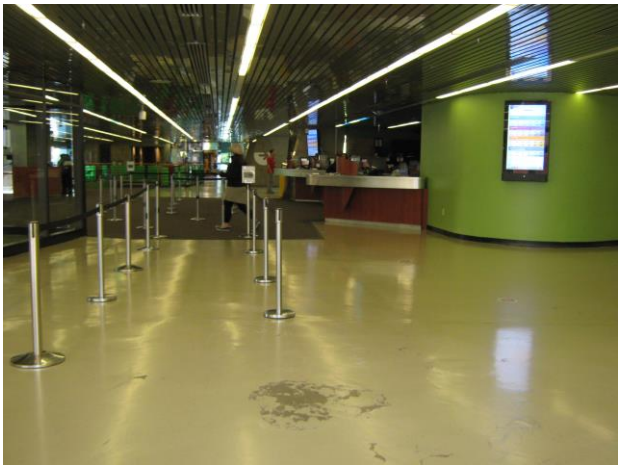
7 – PHOTOS



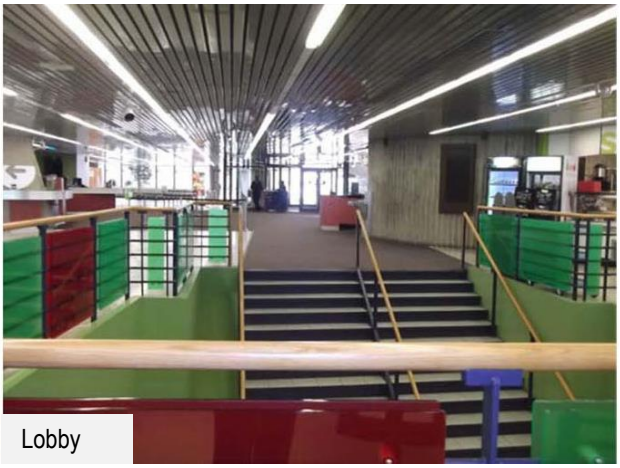
Entrance



Lobby



Lobby

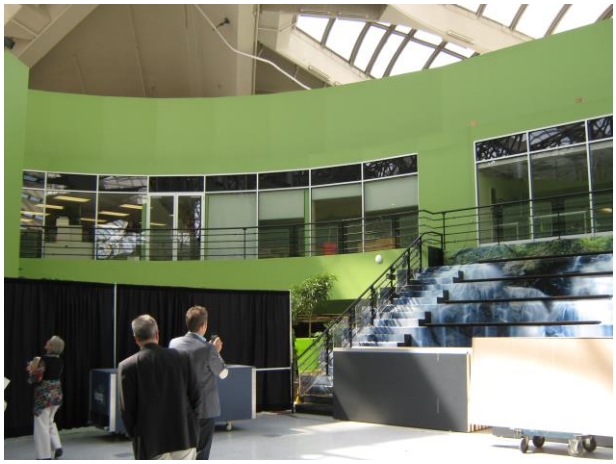


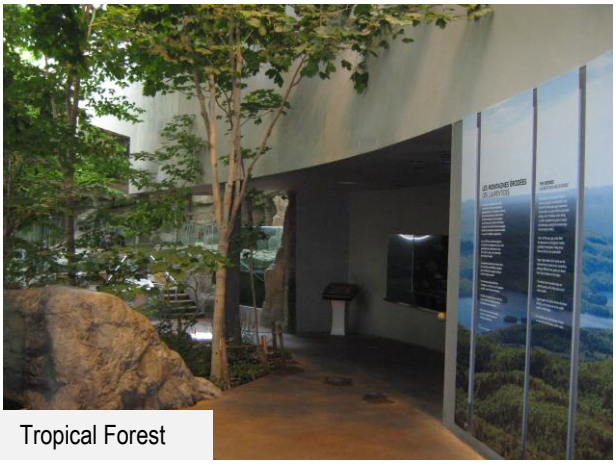
Lobby

Gift shop

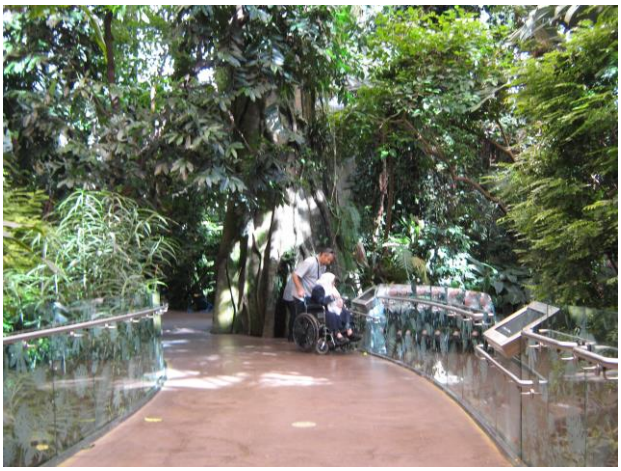
Restaurant

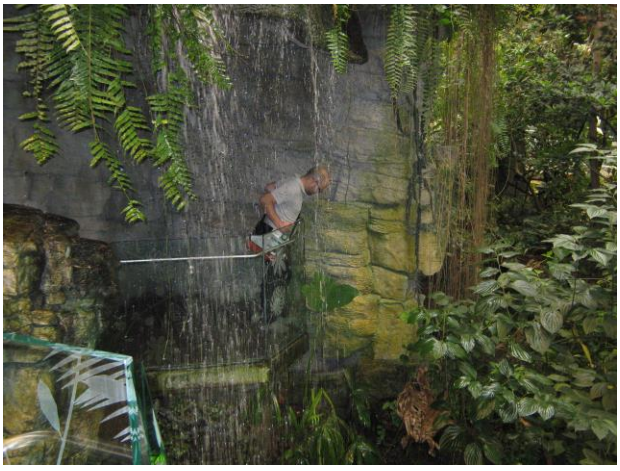
Ecosystems entry





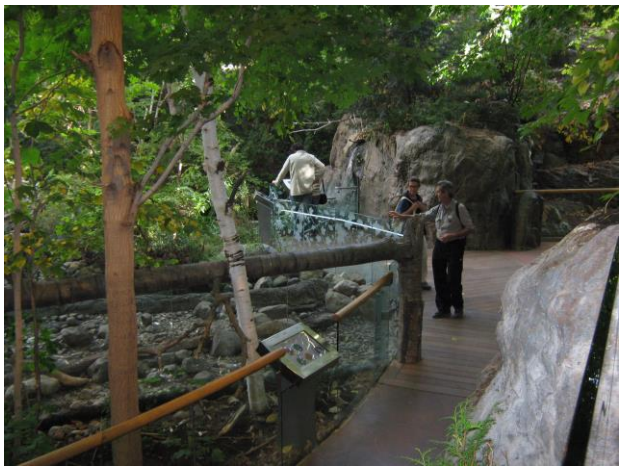
Tropical Forest

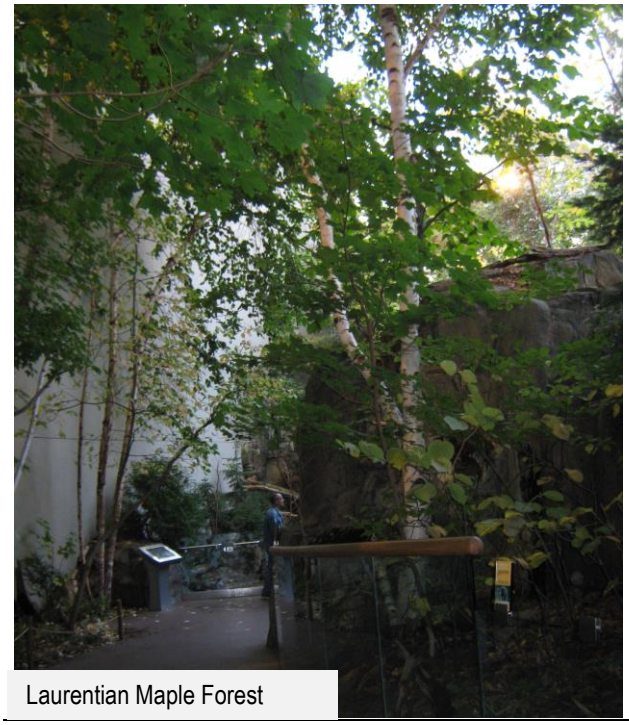




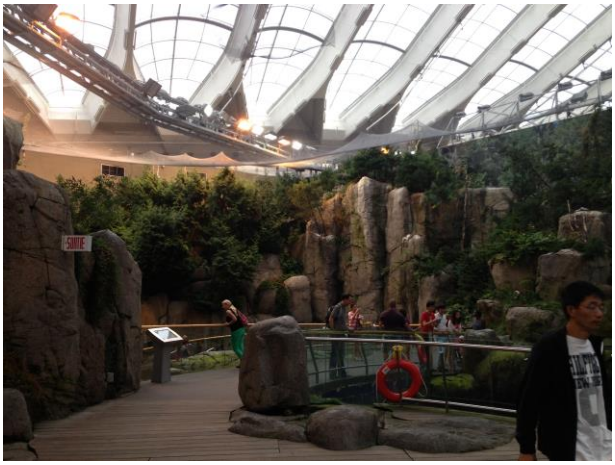

œufs
eggs

Tropical Forest

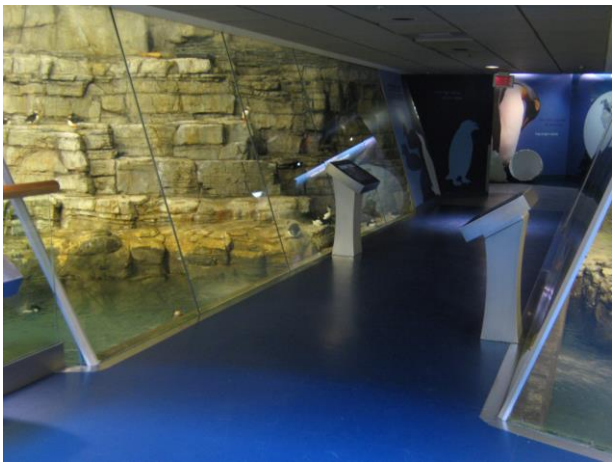




Laurentian Maple Forest

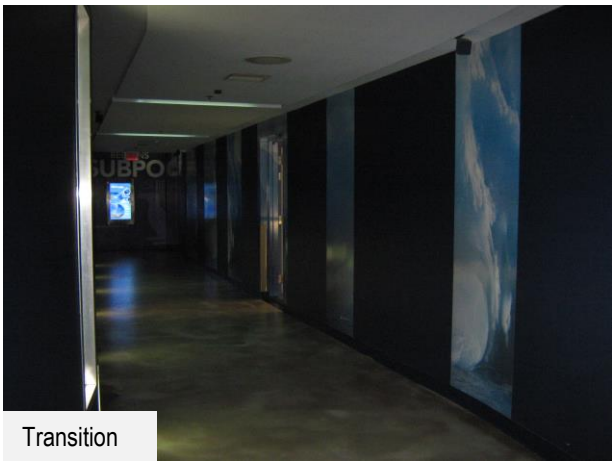


Gulf of St. Lawrence



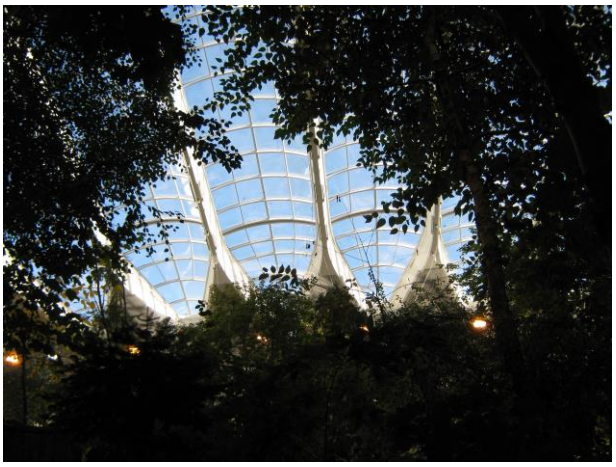
Gulf of St. Lawrence

Sub-Polar Region

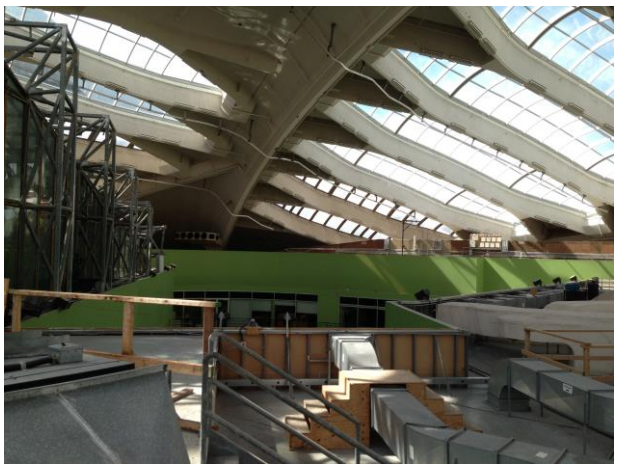


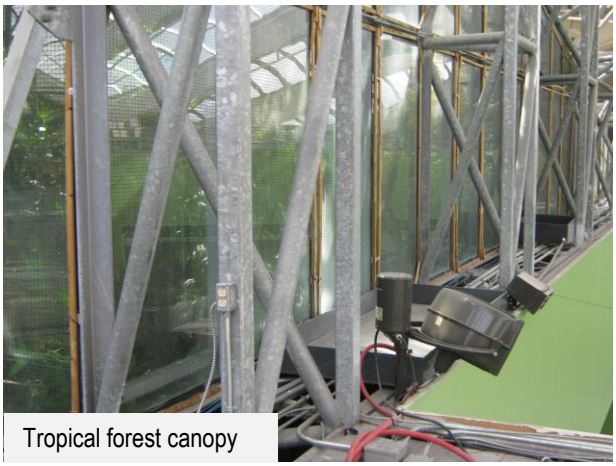
Transition

Transition




FORÊT
TROPICALE
HUMIDE





Tropical forest canopy


Les montagnes colorées de l'automne
Mountains dressed in fall colours
LAURENTIAN
MAPLE FOREST
ÉRABLIÈRE
DES LAURE

8 – APPLICATION FOR EVALUATION OF THE HERITAGE VALUE OF A SITE

FORMULAIRE DE DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU

À l'attention de la Direction de la culture et du patrimoine, Division de l'expertise en patrimoine et de la toponymie

DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU

Demandeur	
Service ou arrondissement	Espace pour la vie
Division	Qualité de vie
Responsable du dossier	Pénélope Darcy

Information sur le lieu	
Nom du lieu	Biodôme
Adresse(s) / emplacement	4777, av. Pierre-De Coubertin, Montréal, Québec, H1V 1B3
Arrondissement	Mercier Hochelaga Maisonneuve
Propriétaire actuel	Ville de Montréal
Fonction actuelle	muséologie

Contexte de la demande
Projet de renouveler l'expérience de visite du Biodôme. L'architecture ne sera pas modifiée, mais sera mise en valeur de l'intérieur. Il s'agit d'un projet pour le legs de la ville de Montréal pour son 375ème anniversaire.

Informations historiques	
Année de construction (si connue)	ancien vélodrome de 1976 - Biodôme en 1992
Concepteur (si connu)	Roger Taillibert, architecte du Complexe olympique
Propriétaire constructeur (si connu)	
Fonction d'origine	vélodrôme

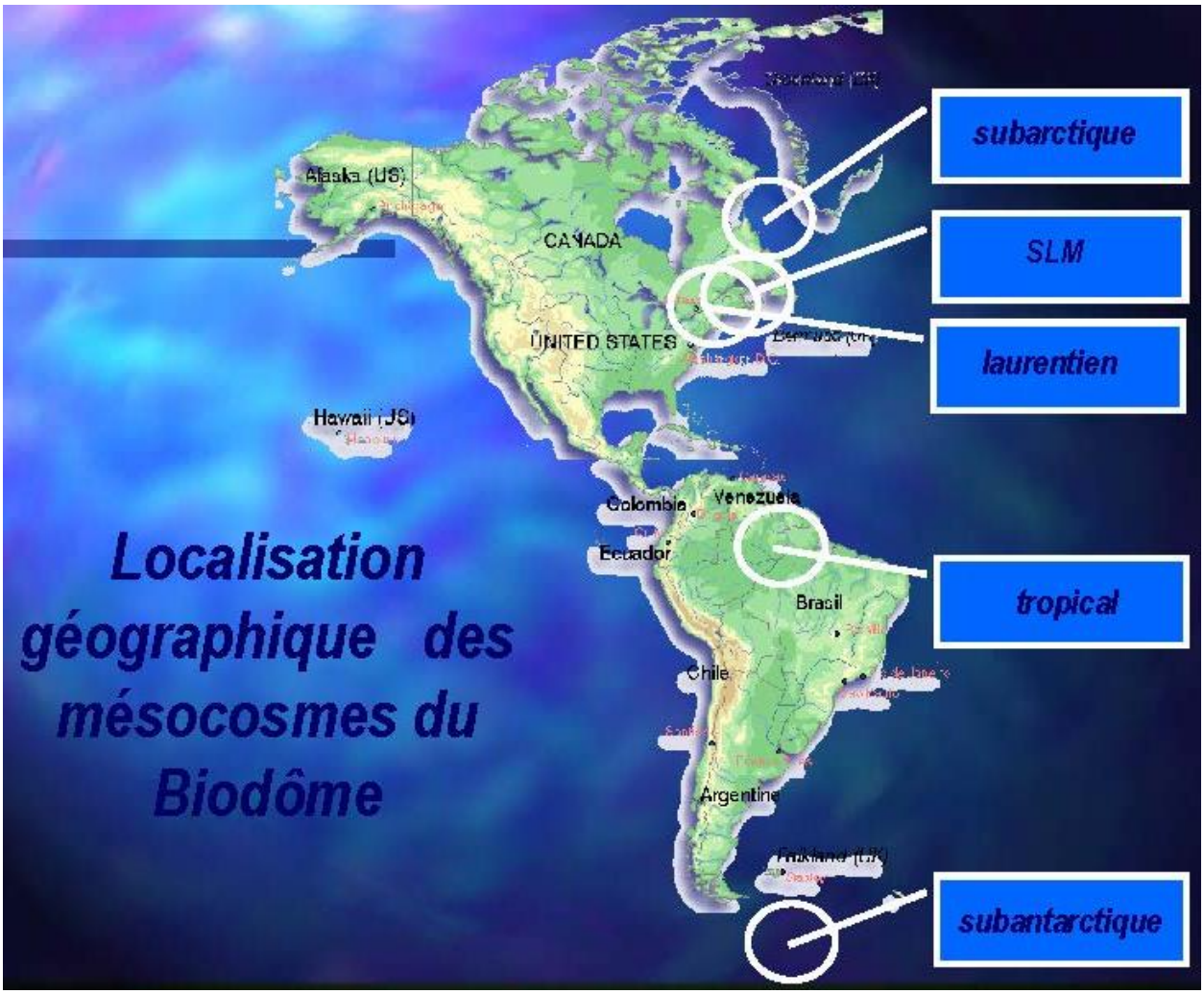
Désignation patrimoniale	
Réglementation d'urbanisme	immeuble significatif
Plan d'urbanisme Volet bâti Volet archéologique	fait l'objet d'un programme de développement (voir mail annexé à la présente demande)
Loi sur les biens culturels Volet municipal Volet provincial	
Désignation fédérale	

Date	08 Octobre 2013

Veuillez joindre à la demande des photos du lieu ainsi que toutes informations et documentation pertinentes (plans du lieu et de ses composantes, études antérieures, descriptions des travaux antérieurs (permis), etc.).

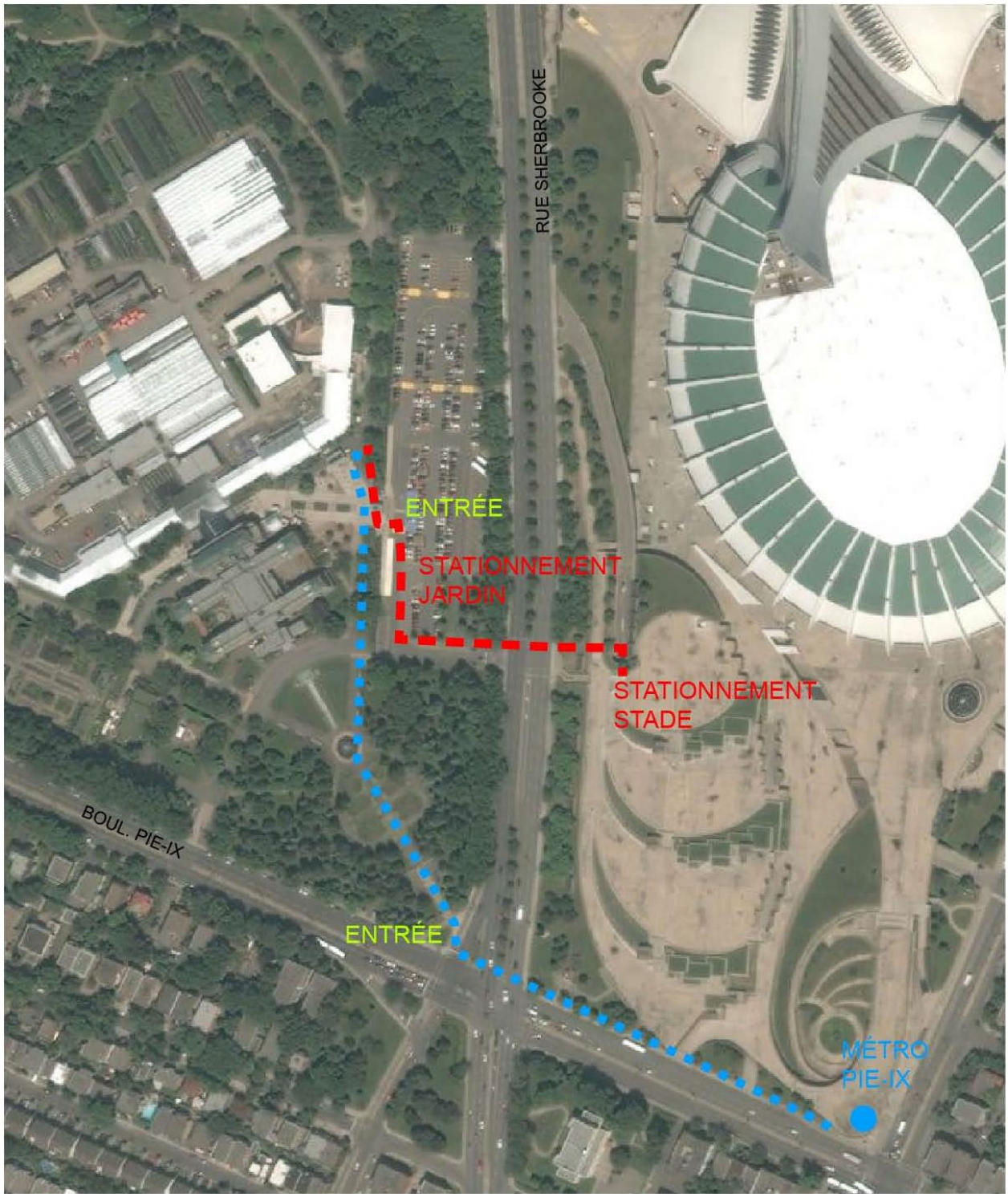
Formulaire 2012

9 – GEOGRAPHIC LOCATION OF THE MESOCOSMS REPRESENTED AT THE BIODÔME



APPENDIX I – GLASS PAVILION AT THE BOTANICAL GARDEN

1 – SITE PLAN



2 – PHOTOS

Biodiversity Centre garden

Project construction site

Biodiversity Centre garden

Physical link between the construction site and the existing Biodiversity Centre outdoor garden

3 – APPLICATION FOR EVALUATION OF THE HERITAGE VALUE OF A SITE

FORMULAIRE DE DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU

À l'attention de la Direction de la culture et du patrimoine, Division de l'expertise en patrimoine et de la toponymie

DEMANDE D'ÉVALUATION DE L'INTÉRÊT PATRIMONIAL D'UN LIEU

Demandeur	
Service ou arrondissement	Espace pour la vie
Division	Qualité de vie
Responsable du dossier	Pénélope Darcy

Information sur le lieu	
Nom du lieu	Jardin botanique
Adresse(s) / emplacement	4101, rue Sherbrooke Est, Montréal, Québec, H1X 2B2
Arrondissement	Rosemont Petite-Patrie
Propriétaire actuel	Ville de Montréal
Fonction actuelle	Jardin botanique de Montréal

Contexte de la demande
Projet de construction d'un Pavillon de verre en continuité du bâtiment du Centre sur la Biodiversité, à l'entrée payante du Jardin, côté accès principal. Il s'agit d'un projet pour le legs de la ville de Montréal pour son 375ème anniversaire.

Informations historiques	
Année de construction (si connue)	fondation en 1931
Concepteur (si connu)	Frère Marie Victorin
Propriétaire constructeur (si connu)	
Fonction d'origine	Jardin botanique

Désignation patrimoniale	
Réglementation d'urbanisme	"immeuble significatif"
Plan d'urbanisme Volet bâti Volet archéologique	Dans "Le patrimoine bâti" : "secteur de valeur exceptionnelle; on l'identifie aussi comme un "site du patrimoine potentiel".
Loi sur les biens culturels Volet municipal Volet provincial	
Désignation fédérale	

Date	08 Octobre 2013

Veuillez joindre à la demande des photos du lieu ainsi que toutes informations et documentation pertinentes (plans du lieu et de ses composantes, études antérieures, descriptions des travaux antérieurs (permis), etc.).