Preferred Spaces

a toolkit from environmental psychology

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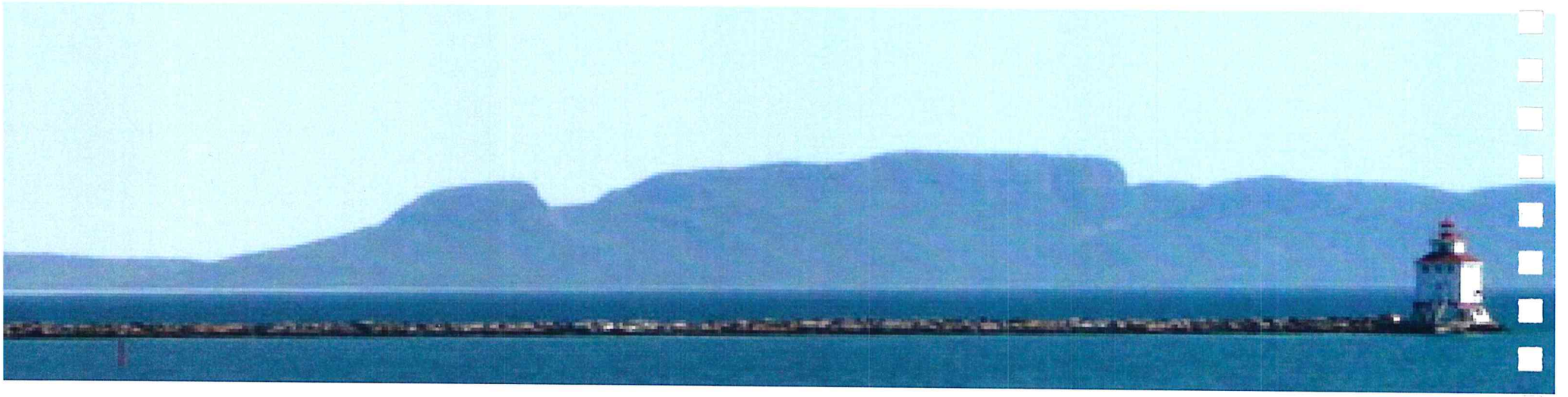
if you just do form, then you are doing sculpture,

but if you look after the interaction between life and form, you are doing architecture

Jan Gehl



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Foundations

The word for building in German is bauen; it shares the same root with the English word "being" (Heathcote, 2012). In philosophical metaphysics, it is said inherent in all 'being' are four aspects, namely unity, goodness, truth, and beauty. These are called 'transcendental' as they transcend the individual appearance and belong to all being.

The theologian and philosopher Hans Urs Von Balthasar, best known for his theological aesthetics, summarized the transcendentals nicely with a phenomenological example that describes the awakening of a child to the love of a mother (1988):

> We exist only in dialogue with the neighbour. The infant is brought to consciousness of himself only by love, by the smile of his mother. In that encounter the horizon of all unlimited being opens itself for him revealing four things to him: 1) that he is one in love with the mother, even in being other than the mother, therefore all being is one; 2) that love is good, therefore all being is good; 3) that love is true, therefore all being is true; 4) that love evokes joy, therefore all being is beautiful (ibid).

These then are fundamental the characteristics of being – unity, truth, goodness, beauty. Von Balthasar used this as the basis for his theological aesthetics. Do the transcendentals have any implications for art and architecture?

According to mimetic theory which originated with the Greeks, art is a 'mimesis', an imitation, of nature or a 'mirror held up to nature'. To phrase it

differently, art is a re-presentation of 'being'. But why make art? It's the human yearning for structured intelligibility that is the 'single chief impetus for the making of art' (Nichols, 2011). Quite simply, art is an expression of the desire to know and to be known, which at its height is the desire to love and be loved. This is to say, art is a trying to make sense of the world by re-presenting it in symbol. As symbols, from a philosophical standpoint, artworks, "function within the analogical network of being… (and so) they also participate in the transcendentals" (Ibid). Art re-presents being; art then re-presents unity, goodness, truth and beauty.

Significantly, just as the mother and the child, present before each other, are awakened to unity, goodness, truth and beauty, the person before a work of art can come to a deeper awareness of being in and through the art. The artist can communicate an understanding of being through their works. But is architecture art?

The question as to whether architecture is art has been a topic of some debate. The issue which keeps 'intruding itself' in the question is the role of function that is fundamental to architecture (Shiner, 2007). If 'form follows function', literally and deterministically, then the architecture is wholly utilitarian, merely functional, and makes no room for artistic expression, symbolic gesture. However:

Adrian Forth has argued (it is) rather the romantic idea of 'organic form' that lay behind Louis Sullivan's 'form follows function' so that his famous phrase

did not mean that form is subordinate to utility but that form grows out of an inner necessity. These broader meanings of 'function' allow us to speak of a work of architecture's 'symbolic function', or even its 'aesthetic function' or 'artistic function' (Ibid).

Most will agree that all building has a utilitarian purpose and an artistic expression. It has a unique place within the arts. Shiner says that, "Batteux's instinct was correct in classifying architecture as a 'mixed art', one whose appreciation requires us to consider how well it serves a practical function", while also considering its quality as art (Ibid)

Moshe Safdie, the architect who gave us among other things Habitat '67, says he is always driven by the symbolic meaning of a project. Peter Zumthor says, "I do not think of it (architecture) as either a message or a symbol, but as an envelope and background for life which goes on in and around it, a sensitive container for the rhythm of footsteps on the floor, for the concentration of work, for the silence of sleep" (2007). While these ideas appear diametrically opposed, they both are an artist's idea; they both express the craft as one of shaping the form intentionally. Whether symbolic meaning or artistic gesture, the architecture is that mirror held up to nature, that reflection of unity, goodness, truth and beauty. And just as art is more successful the more it 'mirrors' nature, so too architecture. Given that fact, understanding more clearly the transcendentals has potential benefit for designers.

Being appears to us first as 'Form' or Gestalt (German). It is aesthetic by definition in that it has to do with the senses. The starting point for experience and for the experience of architecture is the 'thing' before you, the 'built form'. In the field of philosophy, the study of how we experience the world is called phenomenology. In architecture, the consideration of how we experience and interact with built form is called environmental psychology. This

field studies the impact on the psyche and the person by the built environment. 'A Pattern Language', a book by Christopher Alexander, a pioneer in this field, provided patterns, architectural solutions, that impact well on the psyche or, as Zumthor put it, "in which people instinctively feel good" (Ibid). But before we get too far ahead, we need to make a return to the question of the meaning of the transcendentals.

When the form encountered communicates with the viewer, engaging the mind and evoking such experiences as wonder and even 'joy', being is encountered through the transcendental beauty. Beauty is the gateway to the transcendentals as it is the aesthetic dimension of being – its formal presentation (Dubay, 1999). Beauty is encountered when the part played by the higher levels of our sense experience engages the intellect (Ibid).

Art (Architecture) engages us because it is a vehicle of communication addressing us in the desire to know and be known. The artist speaks through beauty. The artist gives material its shape and in the shape one perceives the shaping, that is to say the artists understanding of the world, their hopes, aspirations and ideas. Unpacking 'beauty' is a getting to know the art and by extension the artist and their idea of the world. Beauty classically has been defined as being comprised of three things: clarity (radiance), proportion and integrity (Ibid). This is so because beauty always appears with the other transcendentals. Beauty, then, communicates as it reveals itself to us. In that revealing it speaks its truth and the intellect awakens to this radiance. Beauty also communicates its inner value shaping too; it has a story of a proportion or ordering. It presents, in a moral sense, a value and thus the good is perceived. This presentation of being does not come in fits and starts, piecemeal, but all at once in and through the integrity of the form of which we feel a part of as we behold it. It is therefore 'one' as well.

We can now take these transcendentals understood in relation to form and consider how the architect (artist) gives form its shape. I believe that the solution to an architectural problem succeeds when its purpose, thoroughly understood, gives rise to a unifying concept or parti. This unifying concept, tested and honed through numerous iterations, becomes 'clarified' and 'unified'. This partis is the solution's wholeness, to use Christopher Alexander's term, or unity. The solution to the architectural problem necessarily achieves a formal logic and this logic is its truth. The resulting form is an unveiling of its purpose and intent. The artist speaks through this shaping. Yet the design is not simply an intellectual pursuit. Zumthor says the process is, "based on a constant interplay of feeling and reason....To a large degree, designing is based on understanding and establishing systems of order" (2005).

Essential to the architectural solution, then, is an equally thorough appreciation of the drama, if you will, arising from the combining of materials that will shape this formal logic, its construction, and more profoundly of the human drama that will take place within the form to achieve the purpose or function. This understanding guides a valuing of materials and space in appropriate proportions to achieve the intent. The resulting form of the space can then be said to be good from two perspectives. First, the combining of materials to express the form intended will exhibit a quality of construction that when executed well can be called good. Further, the forming of space under the guidance of the partis with the intent of meeting the functional needs alongside an underlying respect for and value of the life of the user will achieve a measure of the quality of space. The space can then be said to be more or less good depending both on how well it provides for the function and how well it betrays its fondness for the user. So, the architecture can be good in an accidental way and in a more substantive way.

Therefore, in summation, the partis is the solution's wholeness, or unity. Adherence to that idea in the form gives the solution clarity as the idea or partis

speaks. The solution's proportional arranging of space within the 'whole' makes the space good. With its unity, clarity and goodness, the solution can be experienced in and through the form such that when encountered it engages the mind; it is beautiful. As Zumthor put it, "The strength of a good design lies in ourselves and our ability to perceive the world with both emotion and reason. A good architectural design is sensuous. A good architectural design is intelligent" (2005).

With these philosophical musings complete, we can lay the ground for the thesis project. From within the framework developed above, I would like to look more closely at spaces that are typically experienced as delightful or good. These experiences and spaces are what concern the field of environmental psychology. The field evaluates the aesthetic encounter of the person with architecture. Raymond De Young, professor of Environmental Psychology from the University of Michigan says, "Environmental Psychology examines the interrelationships between environments and human behaviour"(2013). De Young mentions 'delight' as one of the key recurrent elements in the research. Environmental Psychology terms these type of environments, "Preferred Environments." De Young shared the following with me via email describing preferred environments in general:

> People tend to seek out places where they feel competent and confident, places where they can make sense of the environment while also being engaged with it. Research has expanded the notion of preference to include coherence (a sense that things in the environment hang together) and legibility (the inference that one can explore and environment without becoming lost) as contributors to environmental comprehension. Being involved and wanting to explore an environment requires that it have complexity (containing enough variety to make it worth learning about) and mystery (the prospect of gaining more information about an environment). Preserving, restoring and creating a preferred envi-

ronment is thought to increase a sense of well being and behavioural effectiveness in humans (Ibid, 14).

To conclude, I would like to explore, apply and document the impact of the application of the principles of environmental psychology in the investigation of an architectural problem and its solution for my thesis year project. The philosophical foundation is intended to both validate and orient the use of environmental psychology as a tool in the solution to an architectural problem.

Precedent

Source: http://gehlpeople.com/

Jan Gehl was part of a revolution in Urban Planning that was the result of focusing on the encounter with design rather than the creation of form in isolation - with people before style. His design was informed by environmental psychology. His designs have been largely successful because of it.

The success of Gehl's design aesthetic starts with observations of encounters within urban space. Gehl proceeds from the identification of beautiful experiences within preferred environments in urban space to then design preferred environments that afford the beautiful experience. As such, he designs for activities, behaviours and ultimately delight through the provision of the preferred environment.

I propose to research the findings of environmental psychology, with a focus on its identification of formal elements of preferred environments, and to explore and apply those findings to the creation of a new building.

Walker Art Centre - Minneapolis MN
Herzog & de Meuron's addition with angular walls and openings is disorienting and disconcerting. Why? Can we do it better? Yes!

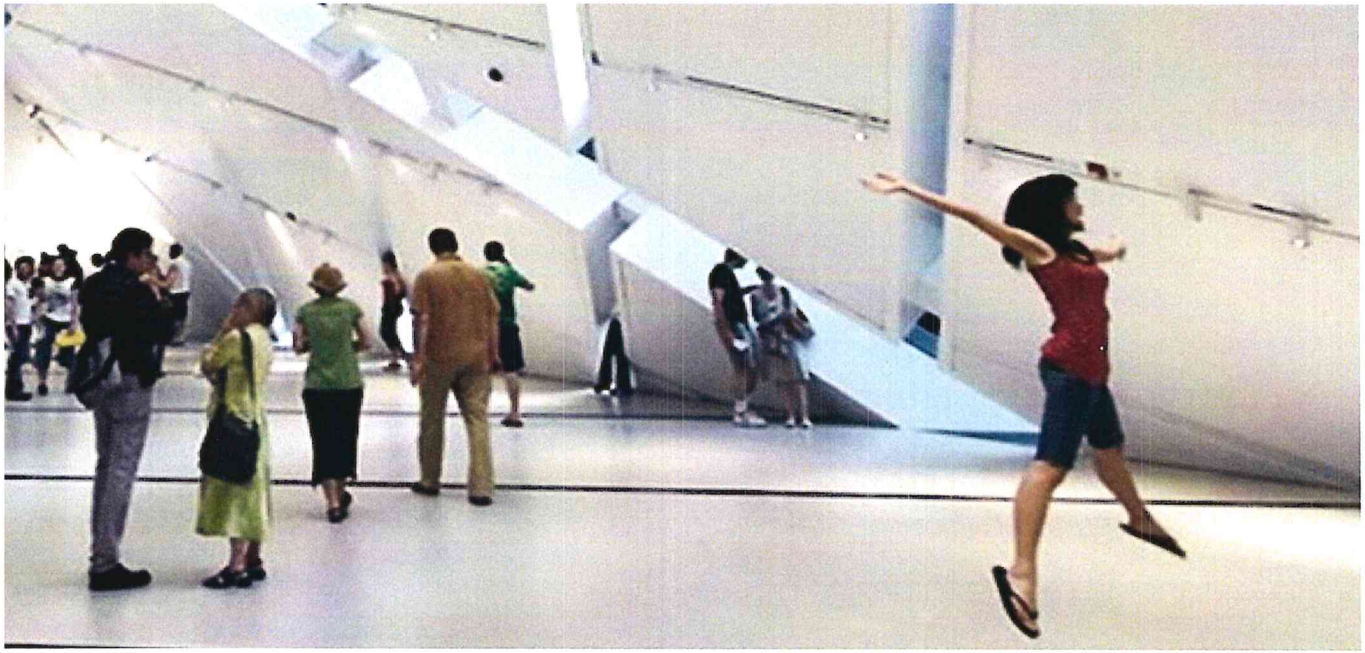
Project Statement

The building type I would like to investigate is the art gallery and is the chosen design problem for this thesis. The theme of an art gallery certainly includes, if it is not central to it, the aesthetic encounter of a visitor with an art collection. This same theme, the aesthetic encounter, is central to environmental psychology as said above, focusing as it does on the encounter of the person with the architecture. This layering of experience, with the architecture and the art, will both present a challenge to the project and serve as an aid to distinguish and underscore the difference. Interestingly, Charles Moore in "Chambers for a Memory Place", looks at the composition of place and its inherent meanings in a dialogue of letters with co-author Donlyn Lyndon. Lyndon says in that book that, 'Axes are, after all, an extension of being face to face (encounter)," and Moore adds, "A building type especially beholden to an understanding of Axes that Reach and Paths that Wander is the museum" (1994).

The architectural problem of this thesis then is the application of environmental psychology to the successful design for an art gallery in all of its facets.

Thesis Statement

You can accurately predict the experience
of built form on users based on
the findings of environmental psychology,
and should therefore design by applying a
performance based toolkit based on those
findings as it will result in spaces in which
people instinctively feel good,
spaces that are experienced as:
secure by coherence and legibility,
functional through conformity to purpose
and
fulfilling by an evocativeness born of
complexity and mystery.



ROM - Toronto
Can architecture make you
jump for joy? Why not!

Methodology

The field of Environmental Psychology has to date provided a beginning sense of preferred environments within built form. Investigating and exploring those principles and findings will form the core of the research. Academic study will provide a collection of experiences within built form that are 'preferred'. This study will be complemented by observations of how space is experienced within a broad spectrum of building types, observations which will include some interviews and a survey of popular public opinion regarding preferred environments. The research will result in a toolkit for application in the design of the architectural problem.

The next or secondary step, following not so much in time but as to process, is the testing and application of the toolkit to the architectural problem at hand. Importantly, it is understood at the outset that designers and stakeholders of art galleries typically pay particular attention to how the form affects the display of art. The integrity of the art is central. That is not the focus here. The focus of this thesis is interaction and experience of people with art in the space taken as a whole. The integrity of the experience is central. This focus will help determine the experience or activity to be designed for and thus the tools to be employed to achieve that experience both in display areas and in other areas of the gallery program.

The success of the thesis project is the resolution of the architectural problem – the design of an art gallery. The research into environmental psychology is meant to provide a knowledge base that will be used to inform the thesis problem without overtaking it. The success of the design should exhibit thoroughness, informativeness and organization on the research side, and synthesis and evocativeness on the design side (Plowright, 2012). Consideration of these factors throughout should provide the necessary critical evaluation of the progress towards successful resolution.

Part II
Preferred Spaces

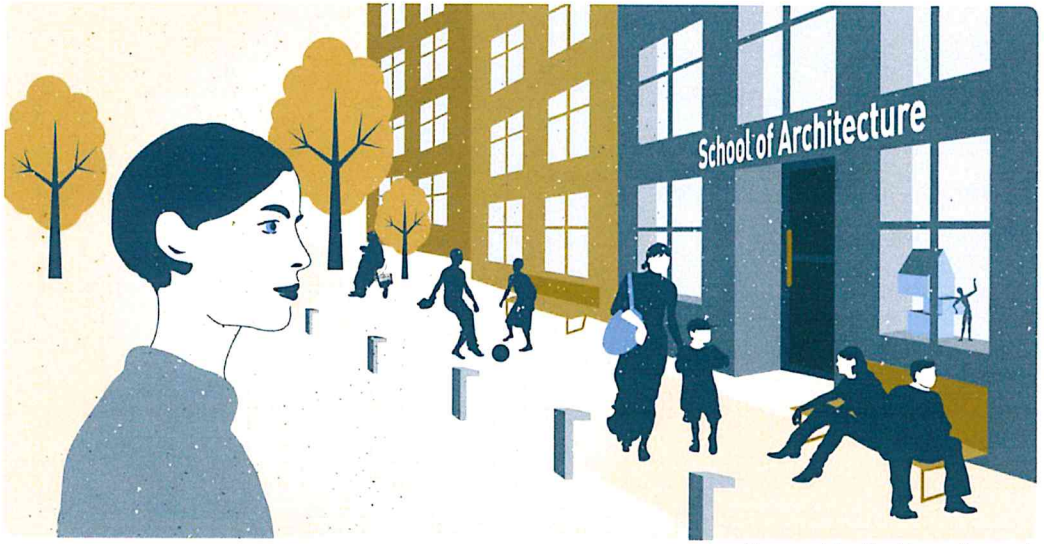
Jan Gehl
Preferred Spaces in Urban Design

The application of environmental psychology to design has a modern precedent in the urban design work of Copenhagen architect, Jan Gehl. He stands of the shoulders of Jane Jacobs and Christopher Alexander who sought to humanize the built environment by acknowledging our fundamental needs, needs that are described in the research findings of environmental psychology. Designing based on an understanding of preferred environments is designing to humanize the environment.

Jan Gehl begins in his designs with people, with their needs and predictable behaviours. Early in his career he made the decision to put people first in his architecture as opposed to the development of any particular design style. With his wife Ingrid, a psychologist, they began looking at how people use urban space, why they go to a place, why they stay here as opposed to there and so on and so forth.

People are the starting point in our work.

Their scale, senses, movements, interests, behavior, and engagement in their surroundings.

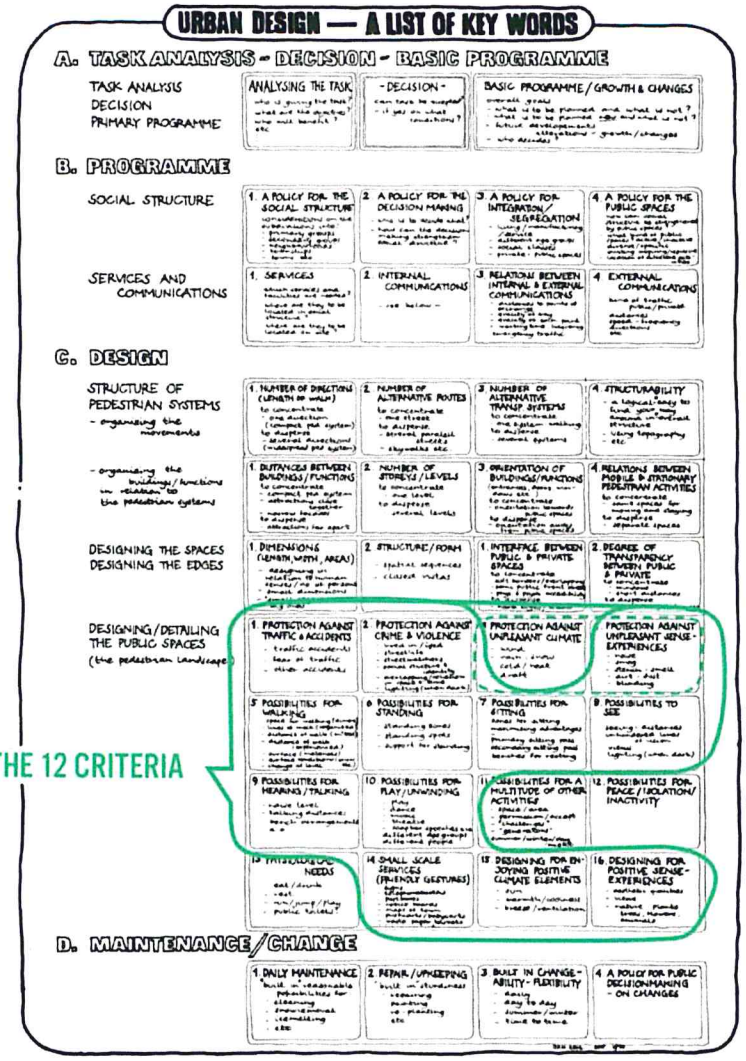


Source: http://gehlpeople.com/

His research results were categorized into a list of key words that described successful urban spaces, that is preferred spaces in urban design (see right).

He would later simplify the list to the essentials for detailing the public spaces by focusing in on key design goals, "The 12 Criteria". These criteria became the framework for a toolkit called "Designing/Detailing the Public Spaces, A Key Word List" (right-most table). Each box of the twelve criteria is numbered, identifying in bold an experience or perception that is preferred. The text below the title outlines environmental factors, or as Christopher Alexander would call them, 'patterns' that can be a means to provide the experience consistent with preferred spaces.

Gehl is adamant that in design, you need to consider first what people will be doing in a space and design for that purpose by the application of the findings of environmental psychology shown to support the intended experience and behavoiur.



Location 2180

Source: Gehl, Jan: How to Study Public Life

DESIGNING / DETAILING THE PUBLIC SPACES
A KEY WORD LIST

PROTECTION

1. Protection against Traffic & Accidents

- traffic accidents
- fear of traffic
- other accidents

2. Protection against crime & violence (feeling of safety)

- lived in / used
- streetlife
- streetwatchers
- overlapping functions - in space & time

3. Protection against unpleasant sense experiences

- wind / draft
- rain / snow
- cold / heat
- polution
- dust, glare, noise

COMFORT

4. Possibilities for WALKING

- room for walking
- untiering layout of streets
- interesting facades
- no obstacles
- good surfaces

5. Possibilities for STANDING / STAYING

- attractive edges »Edgeeffect«
- defined spots for staying
- supports for staying

6. Possibilities for SITTING

- zones for sitting
- maximizing advantages primary and secondary sitting possibilities
- benches for resting

7. Possibilities to SEE

- seeing-distances
- unhindered views
- interesting views
- lighting (when dark)

8. Possibilities for HEARING / TALKING

- low noise level
- bench arrangements »talkscapes«

9. Possibilities for PLAY / UNFOLDING / ACTIVITIES

- invitation to physical activities, play, unfolding & entertainment - day & night and summer & winter

ENJOYMENT

10. Scale

- dimensioning of buildings & spaces in observance of the important human dimensions related to senses, movements, size & behaviour

11. Possibilities for enjoying positive aspects of climate

- sun / shade
- warmth / coolness
- breeze / ventilation

12. Aestetic quality / positive sense-experiences

- good design & good detailing
- views / vistas
- trees, plants, water

"Experiences are created when spaces are designed."

This principle is key: Experiences are created when spaces are designed. Environmental factors can either support the preferred experience or fight against it.

In the 12 criteria for Designing and Detailing Buildings, the toolkit for this thesis, 12 Key Experiences of preferred spaces in buildings are identfied as categories. For each of these category headings, the findings of environmental psychology that support the intended experience will be listed. A mindfulness of preferred space categories and of the way to achieve them in design are the goal of the toolkit.

"We formulate a vision and a program of activities based on the type of life that are inherent in a given area."

"We develop a public space that can support the proposed public life through scale, form and climate."

"We envision how buildings can contribute to our public life aspirations, in terms of height, massing and scale as well as functionality and interaction."

Source: http://gehlpeople.com/

Environmental Psychology
Cognitive Foundations

When we hear 'environment', most think of carbon footprints or air quality. Here the word defines a field of study within psychology.

Raymond De Young says this particular field of study, "examines the interrelationships between environments and human behaviour". The term 'environment' came to use as the study expanded beyond built forms to include, "all that is natural,... social settings,.... learning environments and informational environments." Underscoring its tie to psychology, the field is guided by the, "notion that all environments are patterns of information and that people are fundamentally information processing organisms deeply motivated to remain informationally and thus environmentally competent" (2013). Environmental Psychology, then, finds its grounding in cognitive psychology.

The research method requires, as Gehl's studies did, a focus on the person in context. The interplay of forms and personality traits, of environmental affordances and cognitive inclinations happens outside of a laboratory. Roger Barker, who arrived at the earliest significant findings in the field in the 1950's, encouraged this approach (Wikia, 2016). He developed the idea that social settings influence behavior and as such called these environments 'behavior settings'. Simple examples of behaviour settings are museums, classrooms, and churches; all of these environments influence behaviour.

Research took off in the early 1960's and has grown from there. The Environmental Design Research Association (ERDA), which remains active today, was founded in the 60's. In 1987 the ERDA published an initial compendium of findings in the Handbook of Environmental Psychology. A second updated handbook was released in 2002.

The most notable figure of the field at the time, and perhaps since, is Christopher Alexander. He is best known for his text 'A Pattern Language', mentioned earlier. His own organization, the Centre for Environmental Structure, predates the ERDA. Alexander conducted, in an organized and scientific way, studies of the person in context arriving at design solutions (patterns) to design problems (environments). Consistent with the fields methodology, his was a problem solving and value finding approach (Wiki, 2015).

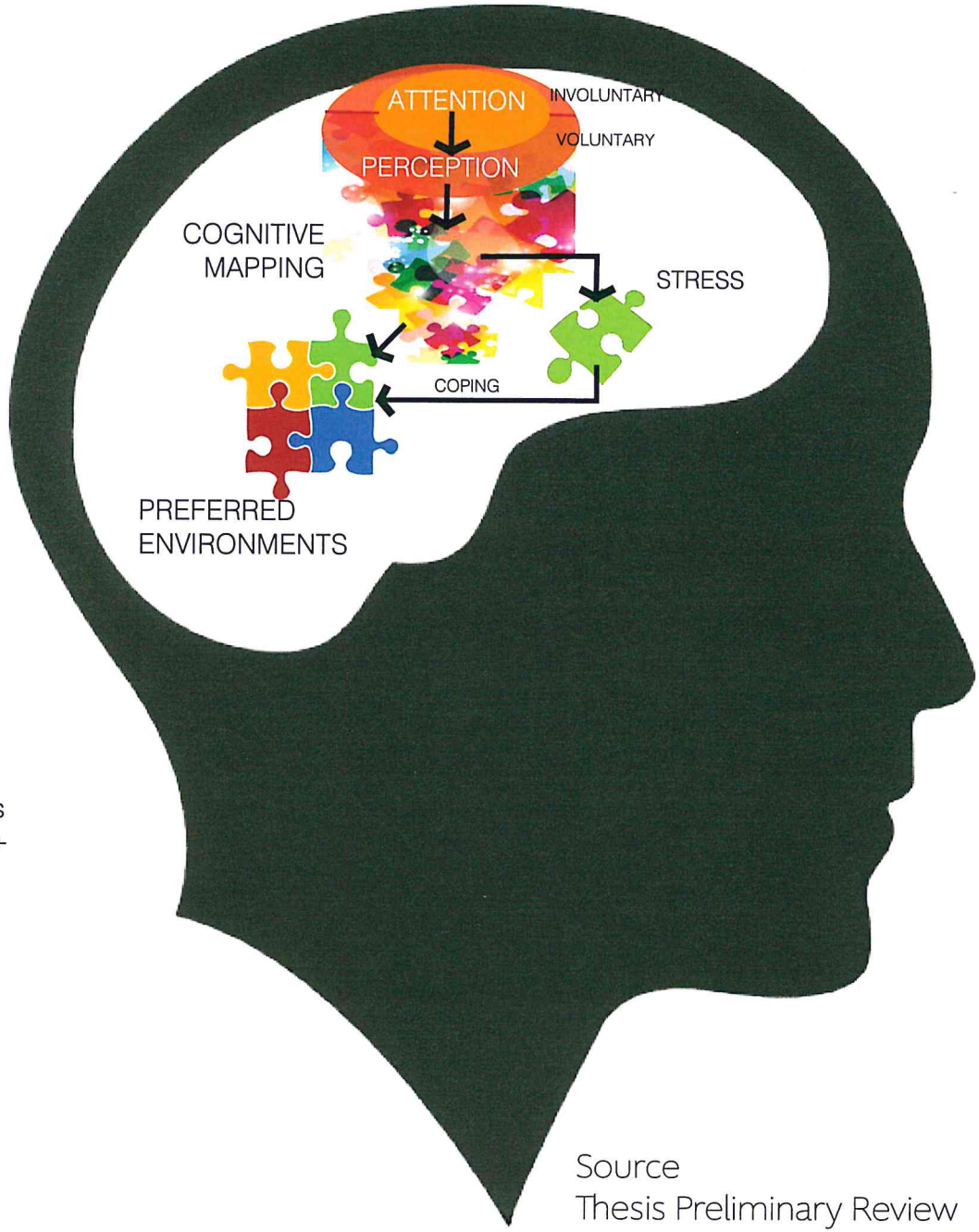
Taking a look at the research literature to date, a number of recurrent elements have been identified by DeYoung and others (2013). The elements are: attention, perception (voluntary or involuntary), cognitive maps, preferred environments, environmental stress and coping.

The recurrent elements underscore the understanding that our interaction with the environment is sensual, cognitive, and psychological at one and the same time.

The relationship of the recurring elements is shown graphically in the flow diagram to the right. The diagram illustrates how the sensing self and the thinking self encounter the world. Importantly, it is at first a sensual encounter. Philosophically, that is to say, it is an aesthetic encounter.

In this aesthetic encounter, we perceive our context either voluntarily or involuntarily, depending on whether our attention is both receiving *and* evaluating or simply receiving. We begin laying down mind maps or cognitive maps that record the space: shape, colour, emotional information, intellectual response, and so on. Some spaces we prefer, others not. While it is clear in the studies that preferred spaces exist, we cannot always identify why we prefer one space over the other. That's the work of environmental psychology.

The goal of environmental psychology is to discover the make up of the preferred environment: the process of its cognitive construct and the psychological roots of preferred spaces. Empowered with this information we can then intend spaces that will be preferred. The result is in an increase in well being first and foremost and of effectiveness.



The Phenomenon of the Perception of our Environment

by Thesis Student David Gillen

Understanding the process aids in creating clarity in the architectural language used.

Source
Thesis Preliminary Review

It is worth restating here from the proposal a description of preferred environments, or as the title says, preferred spaces:

> People tend to seek out places where they feel competent and confident, places where they can make sense of the environment while also be ing engaged with it. Research has expanded the notion of preference to include coherence (a sense that things in the environment hang togeth- er) and legibility, (the inference that one can explore an environment without becoming lost) as contributors to environmental comprehension.
>
> Being involved and wanting to explore an environment requires that it have complexity (containing enough variety to make it worth learning about) and mystery (the prospect of gaining more information about the environment). Preserving, restoring and creating a preferred environ ment is thought to increase the sense of well being and behavioral effectiveness in humans (DeYoung, 1999).

Philosophically, If we consider the transcendentals as outlined by Balthasar's Theological Aesthetics, they align with preferred spaces. Preferred spaces have coherence - or are perceived as 'whole'(one). are legible - they reveal their intent being true, are functional - they are in proportion to purpose or good, and they have a complexity and mystery, a texture that evokes joy - are beautiful, evocative. These aspects, unity, goodness, truth and beauty provide a nuanced appreciation of the findings of Environmental Psychology.

Legible Settings

- a well structured space with distinctive elements so that it is easy both to find one's way within... and to find one's way back to the starting point
(Kaplan, 1989)

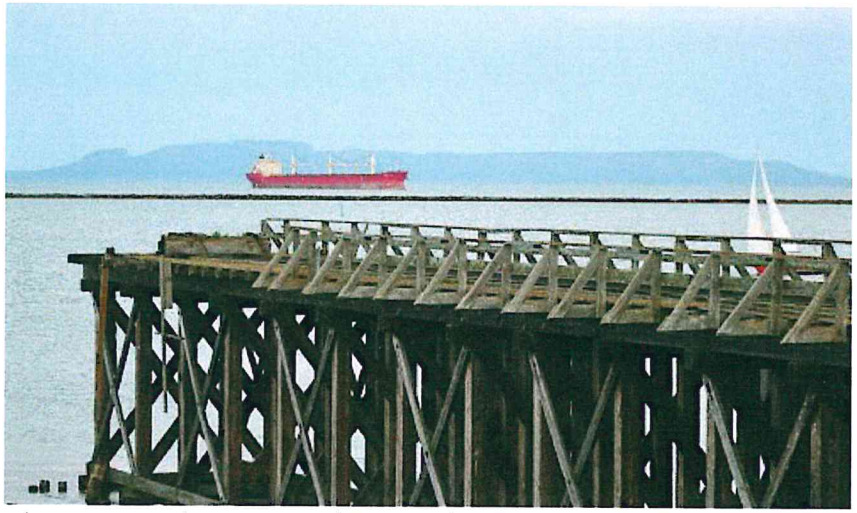
Place Identity - The Sleeping Giant
This Iconic landmark is an image of home to citizen's of Thunder Bay.

Looking closer at the recurrent themes, to begin with, preferred spaces rely in large part on perception and attention. Put another way, preferred spaces foster greater competence by demanding our attention and triggering our memory. With attentiveness, a complex working of past attentiveness, the previously developed cognitive maps we call memory, and present attentiveness create the cognitive map of the environment we are experiencing. Memory colours perception and present attentiveness.

The picture or cognitive map we work from is then at one and the same time more than the environment, with its link to recall with its layers of archetypes, emotions and experiences, and less than the environment in that we truncate our current experience (yet will recall it as whole) according to the degree to which we give it our attention (DeYoung, 1999). That 'more than' is the fact that history and culture colours and grounds our present. The resulting perception enables us to exercise a degree of competence in the space. We can predict, at least in part, what will occur as we interact with and within the space.

Part of designing preferred spaces, or 'place-making' as it has been called, requires accessing local history and culture and triggoring our place-memories (Augustin, 2009). That is to say, designing with the vernacular in mind is more successful than not.

Place-memories include two core concepts: place-identity and place-attachment. Place identity is bound up with place (Wiki, 2014).



Place Attachment - The Pool 6 Docks

Not part of the identity lexicon for the city, it may be an experience element that foster's attachment to place. It is, therefore, significant but less so.

We can easily see this is true by the fact that it is commonplace for us to introduce ourselves by adding where we are from. This does not happen with every place, with places that we have just seen or merely passed through. Place identity means where we live is part of who we are. In environmental psychology, place identity has been the model for identity since the term was introduced (Wiki, 2014).

With place attachment, due to the length of time we spend in a place and the depth of personal experiences we have there, we develop an attachment to a place (Ibid). And while place attachments can be many, place identity is one. The main point is that research shows that place memories, identity and attachment, are highly predictive of preferred spaces.

Preferred spaces also grab our attention. Present attentiveness, as a response to stimuli, is in every case either voluntary or involuntary. Voluntary attention engages the thinking mind which explores the stimuli. Requiring some effort, voluntary attention has a more profound effect on the spatial network. Therefore "restoring or enhancing peoples capacity to voluntarily direct their attention is a major factor" in designing preferred spaces (De Young, 1999).

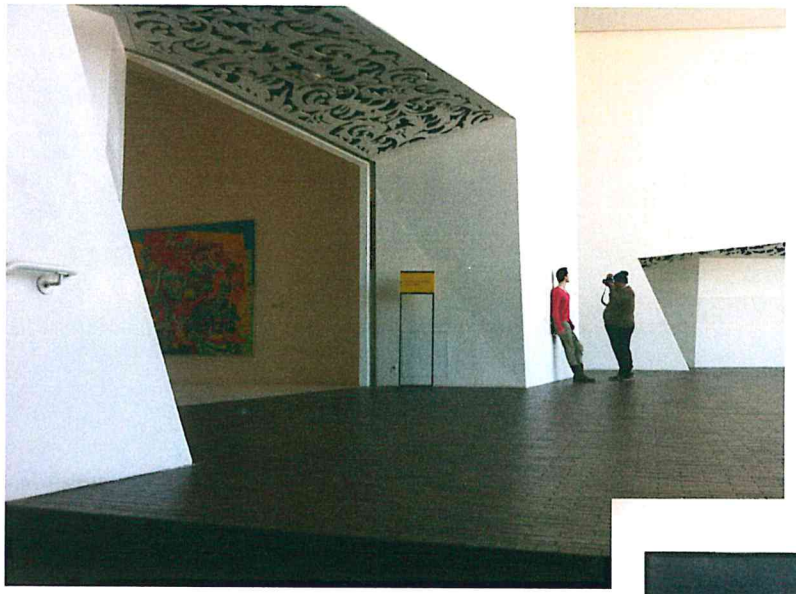
Applied environmental psychology is concerned with 'grabbing your attention'. Emotional and cognitive responses to sensory information form a large part of the research findings in the field. Responses to sensual stimuli have been shown to draw our attention and direct our responses. Sensual stimuli effect us physically by up-regulating or down-regulating our emotions, mindset, and even changing the beat of our hearts. These changes happen in predictable ways and are a powerful tool for designers.

Sensual information is immediate in the aesthetic encounter. Environmental psychology has been able to catalogue emotional and cognitive responses to sensual stimuli; light, colour, smell, sound, touch and taste as well. Making use of those findings in the design of a space to support the activities intended has proven to be a very successful application of environmental psychology. It is readily applied to retail environments in particular (Wikia, 2016). A preferred space needs to grab our attention and free it to process.

As a result, the field has recognized that it is necessary to deal also with the reality of stressful environments. Factors identified as part of stressful environments must be minimized. Our attention can be drawn away from the space and its purpose. A stressful environment can result in the spaces not being preferred. In fact, from the perspective of environmental psychology, stress is the failure of preference (DeYoung, 1999). This occurs with the presence of uncertainty, with lack of predictability, and with stimulus overload. It results in unpleasant consequences such as attention fatigue, helplessness, physical illness and diminished altruism (ibid). The take away: preferred spaces minimize distractions.

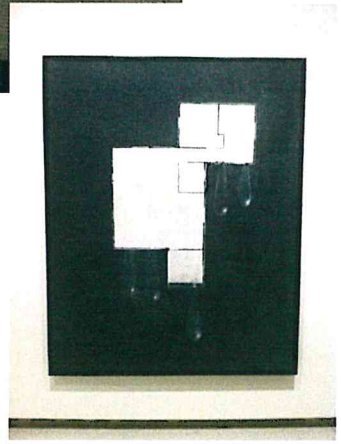
This discussion on these fundamental cognitive elements of environmental psychology, place attachment and identity, attention, cognitive maps, stress and the preferred environment, point to something at work on a deeper level in the encounter of the person with his/her environment.

Preferred Space can be known by their fruits..
Users are comfortable, engaged....



Stressful spaces are empty, or not used for their intent.

This piece of art in the Walker Art Centre seems a comment on the place in which it hangs.

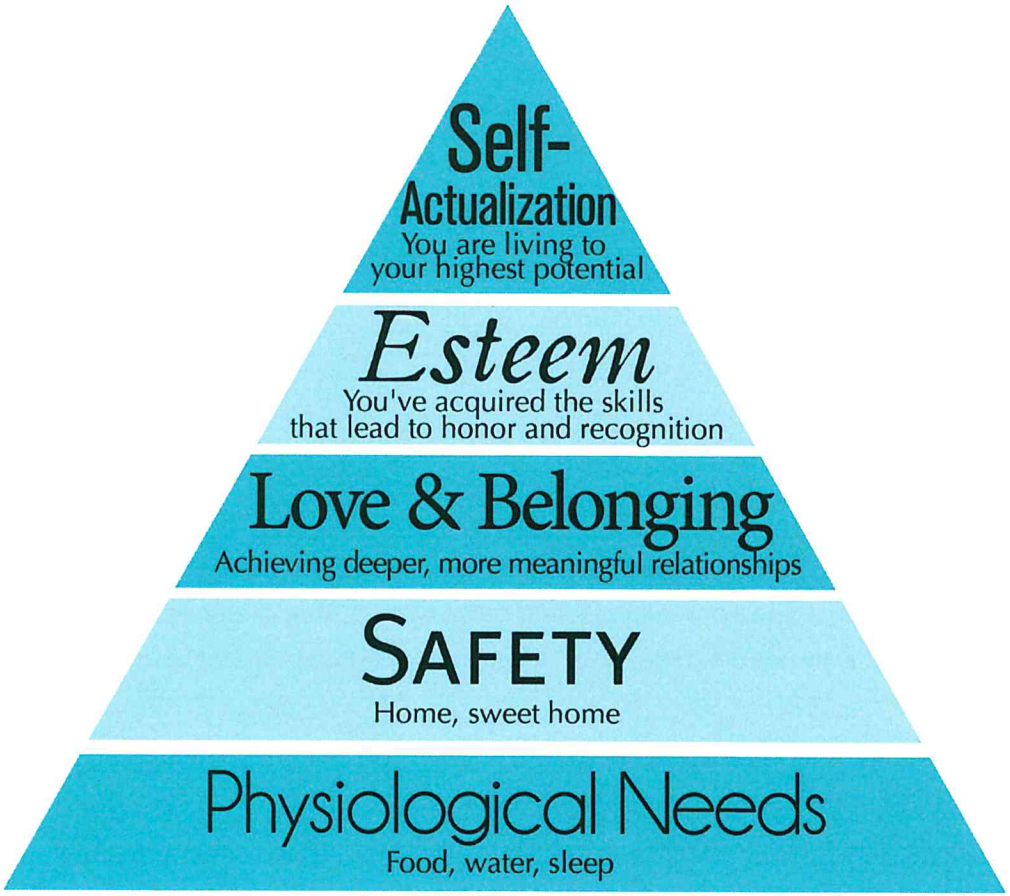


Environmental Psychology
Fundamental Needs

Our psychological needs cover a wide spectrum of physiological, social, spiritual needs. These realities are not just ideas, abstractions that exist in the mind, but genuine human needs seeking to be satisfied in and through our interactions with others in the world around us, in and through the body that is ours. These fundamental needs were outlined by Abraham Maslow in his famous hierarchy of needs. Maslow's hierarchy of needs identifies the wide range of needs we have as persons. While the hierarchical aspect of his ranking has come into question today (Wiki, 2015), the basic needs of human beings listed in that hierarchy remain. Other variations of the same type of categorization of needs exist. Sally Augustin in her book refers to the work of Reiss (2009) who lists 16 different motives from power to independence, tranquility, romance and so on that are part of our psychological needs.

While all these lists are all somewhat comparable, key for environmental psychology is the understanding that these needs come into play in our interaction with others in space. As Augustin says in her text, "All of these motives can be related to physical spaces" (2009).

Spaces can support or conflict with our motives, communicate ideas that echo or clash with our intentions, can influence us and the satisfaction of our needs. Romantic dinners, for instance, are aided by candle-lit quiet corners; cooking in the kitchen benefits from a well lit and highly ordered space; judges augment and express their authority by presiding over courtrooms like priests over the liturgy on raised platforms. Context is not just a back drop; it is a true character in the story.



Maslow's Hierarchy

All of these needs make demands of the space you design.

Image Source: google.ca
Thesis Preliminary Review

The Danish government summed up the essence of good architecture with these words: "Good architecture provides a secure, functional environment for our fulfillment, both as individuals and collectively" (2014). This is an architectural restating of Maslow's hierarchy.

The work of this thesis is to explore the impact of intending spaces to address psycological needs in the design of any one building. Through the use of the findings of environmental psychology, with its acceptance of the broad spectrum of human needs, and its research into how the interaction of the person operating from these needs is affected by the environment, the design solution of an architectural program can be positively effected.

When you begin to appreciate then, that space is experienced more or less positively due in large part to the drive to satisfy fundamental psychological needs, the idea of 'preferred spaces' makes sense. A primary insight into preferred spaces came with the discovery of a direct link between our psychological needs and our environment by test subjects response to landscapes. It is a proven fact that people show a preference for green and lush landscapes over desert landscapes. Preference is expressed by delight in the aesthetic response. The term 'aesthetic' has deep implications. The aesthetic response connects the sensual stimuli of the landscape with the experience of delight linking place to satisfaction of need. Maslow's hierarchy becomes, if you will, a paint by number where enumerated needs are the colours that make up the scene in a preferred landscape.

Central Park, NY City
Source: google.com

Green Space is Like a Glass of Water in the Desert of the Concrete Urban Landscape - it's life blood, hope.

The preferred landscape has been termed the 'Savanna Preference'. The Savanna Preference is a summation of habitat theory acknowledging that people have, "A tendency to prefer savanna-like environments to other types of environments' (Liddwell, 2003). This preference is believed to be based on the fact that a survival advantage existed for those living in such environments, beginning in our ancestral home of east-Africa, over people who lived in other types of environments. We prefer savanna like environments, those with, "depth, openness, uniform grassy coverings, and scattered trees, as opposed to obstructed views, disordered high complexity and rough textures", because we are more likely to survive in them (ibid). This preference is universal.

In a paper entitled Theories of Landscape Aesthetics, Dr. Adrian Lothian summarizes the Savanna Preference and Darwin's theory this way:

> Charles Darwin's theory is set out in his The Origin of Species (1859) and proposes that species develop and evolve through the process of natural selection, the process whereby the variations inherent in all species are favoured or penalized by the environment, enabling those fa voured to be passed on to subsequent generations while those less suited are not perpetuated. "Survival of the fittest", which is often incorrectly taken to mean the strongest winning, actually refers to the fitness of the organism to the prevailing environment, those best suited (fittest), go on and reproduce while those less suited gradually diminish in population (2014).

HABITAT THEORY

Charles Darwin
Ability of Place to Satisfy Human Needs.

Moshe Safdie, Habitat '67
Thesis Preliminary Review

...designed to integrate gardens, fresh air, privacy, and multilevelled environments with the economics and density of a modern urban apartment building (Wiki)... That is, it was to be a place to satisfy Human Needs.

"A preferred space is a subtle happy marriage between the person and their surroundings".

Lothian goes on to explain the implication towards a preferred spaces,

"Applied to aesthetics, and landscape aesthetics in particular, Darwin's theory suggests that the landscapes preferred by humans enhances their survivability and reproducibility; thus landscape preferences are not a superficial whim but rather reflect an innate behaviour which is critical in aiding, albeit ensuring, human survival" (ibid).

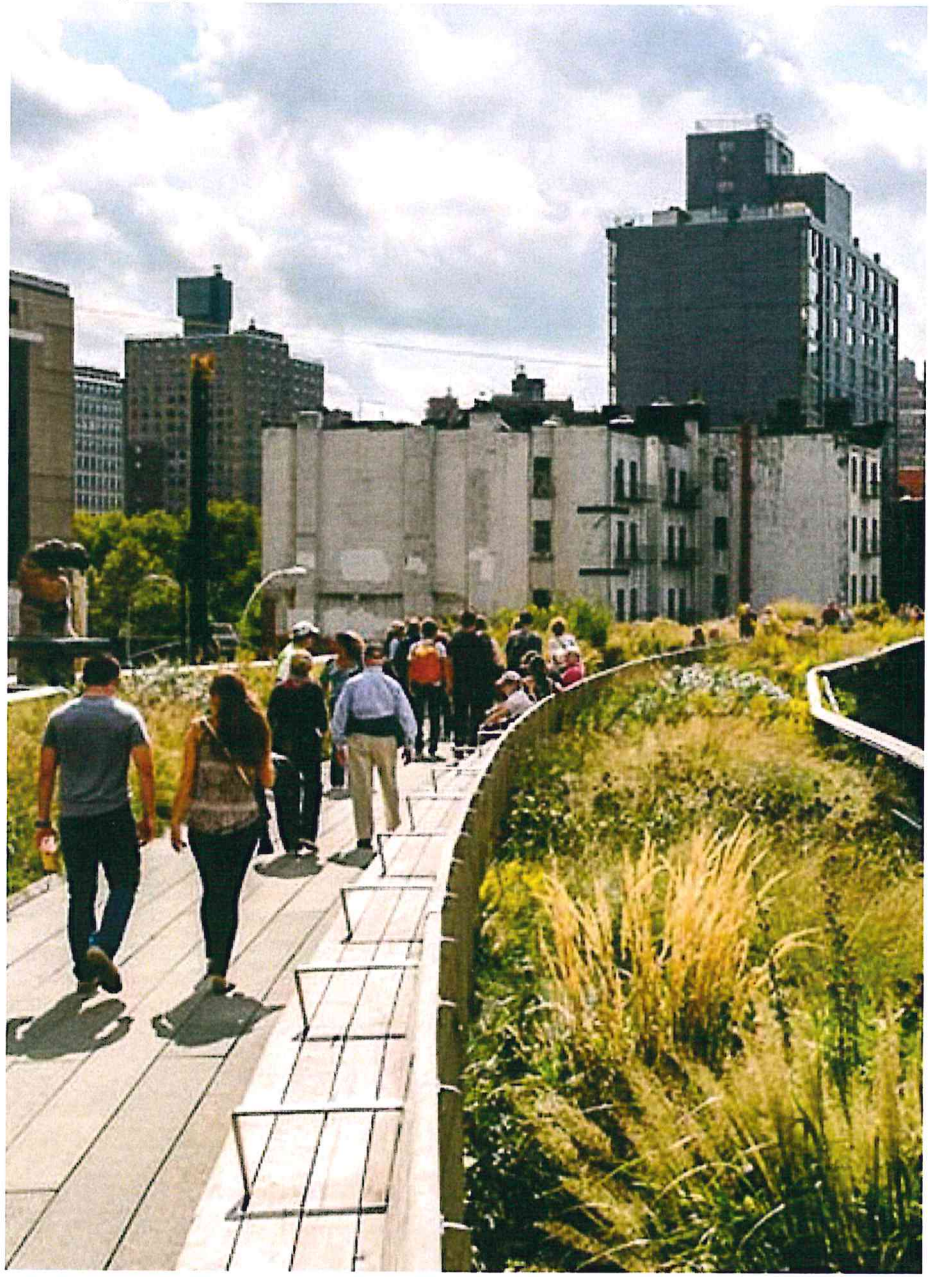
Importantly, a preferred space is a subtle happy marriage between the person and their surroundings.

A crticial implication - a person's need for survival, competence and meaningful existence, all make demands on our surroundings.

A modern retelling of the landscape preference is the fascination with biophillia. Biophillia, literally love of life, is a 'deep seated need of humans to connect with nature' (Ryan, et al, 2014); it is likely an expression of habitat theory or the Savanna Preference.

Prospect-Refuge theory, introduced in 1975 by Jay Appleton, building on habitat theory, is an established theory of interaction in space that begins to explore more extensively the hierarchical satisfaction of needs in the environment. It breaks down preferred spaces into those needs favorable for survival of the species.

New York Highline Park
Source: google.com



Connecting with Nature is
As instinctual as the need to breathe.

Appleton's prospect-refuge theory divides the perceiving of habitat into two components, one driven by our need to 'receive environmental information' (our hunger to know or prospect) and a second driven by our need for safety or concealment (refuge or 'shelter-seeking')(Ramanujam, 2006).

Appleton sees the satisfaction experienced in the contemplation of landscapes stemming from the spontaneous perception of features which, in their shapes, colours, spatial arrangements and other visible attributes, act as stimuli indicative of refuge and prospect determining environmental conditions favourable or unfavaourable to survival (ibid).

Peter Zumthor, Architect
Thesis Preliminary Review

Church's and Monastery's often grace the crown of a hill providing safety and sight.

Jay Appleton
Need to See without Being Seen

Appleton's propspect-refuge theory is the result of breaking down the perceiving of habitat into two components, one driven by our need to 'receive environmental information' (our hunger to know, prospect) and a second driven by our need for safety or concealment (refuge).

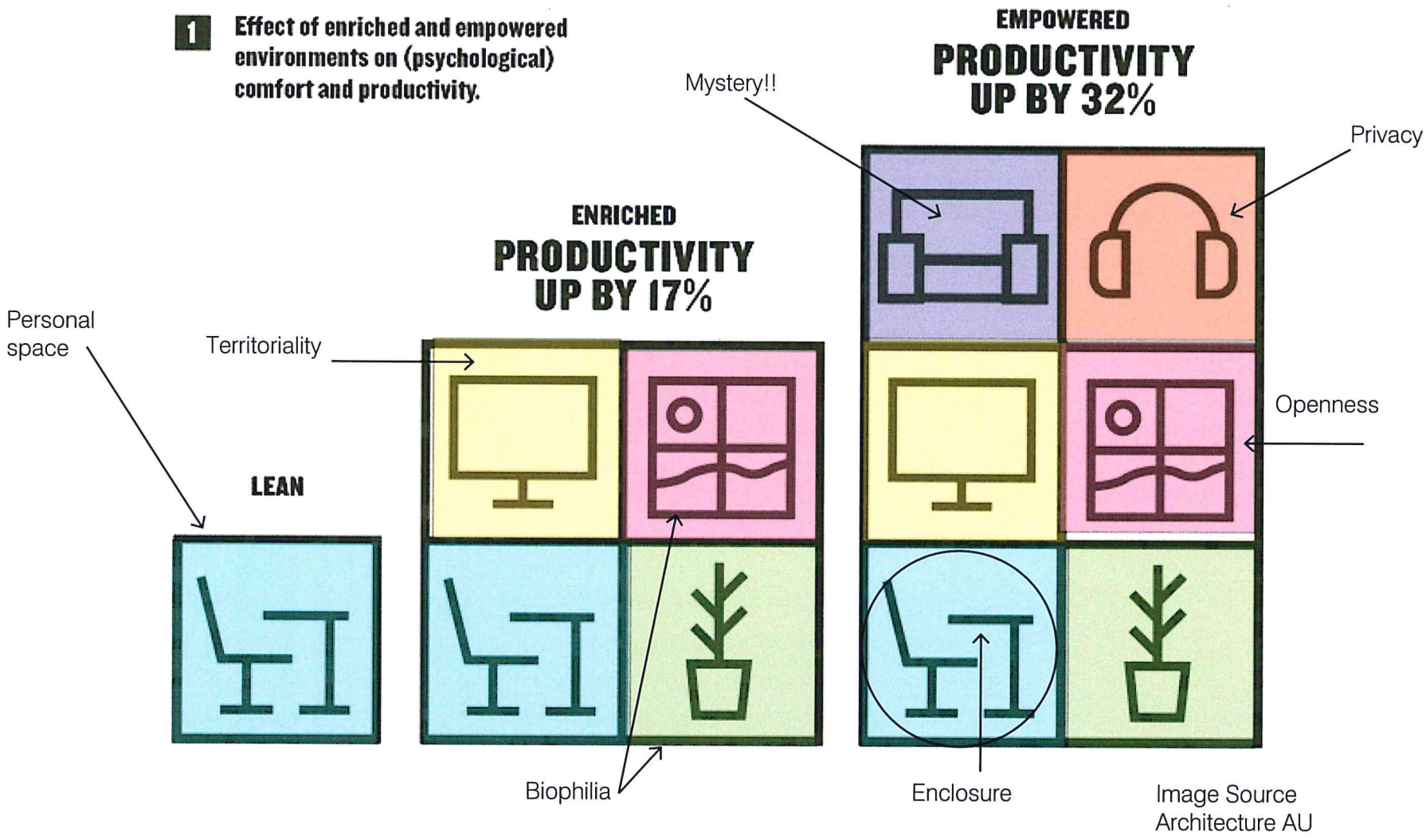
A respected research team in the field, Kaplan and Kaplan, have similiar conclusions. Their information processing theory comes from a different perspective. They suggest that people work from three interrelated informational needs: the need to feel safe, to gain competence in thier environments and the need to undertake meaningful action within them. The parrellels between safety and refuge, competence becoming meaningful action and prospect are clear.

Prospect-refuge theory states that the ability to see (prospect) but not be seen (refuge) is basic to many biological needs (Ramanujam, 2006). The perceived increased safety that comes with an environment that allows us to see without being seen is linked to an increase in the aesthetic pleasure (ibid). Ramanujam points out, "Appleton's evolutionary theory focuses on the primitive origins of contemporary environmental perception and preference" (2010).

He goes on to illustrate the connection of prospect-refuge theory to a number of more specific concepts in environmental psychology. These are elements of preferred spaces. The elements are refuge or safety elements and prospect or information gathering elements towards competence and meaningful action. The elements are:

refuge oriented elements: personal space and proxemics, privacy, crowding, territoriality, and
prospect oriented elements: openness and enclosure, biophilia and mystery.

Environmental Psychology
Prospect and Refuge Elements

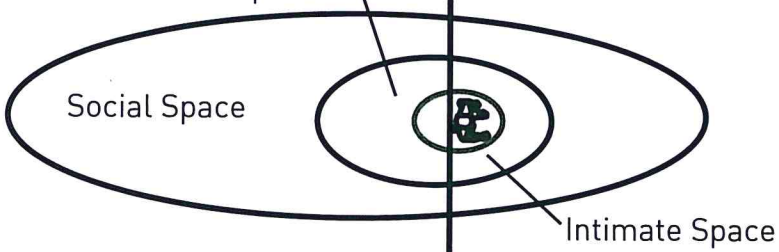


A central concept for environmental psychology was presented by anthropologist Edward Hall at the turn of the last century. He gave us the word "proxemics" and the idea that our ego extends about a foot and half beyond ourselves into space. Space begins to have a language, one Hall would say we are not used to seeing or being aware of but a language nonetheless (1966). He categorized spatial distances into four categories: intimate, personal, social and public (see right).

The edges of these spaces are defined by the extent that certain of our senses are active in them. Simply put, the space between us is gauged by our sense receptors. In the intimate space (0-18") our primary sense is heat, smell, and touch. In the personal space, (18"-4') touch becomes more familiar and friendly, the eyes and ears become primary. With the social distance (4-10') we rely strictly on sight and sound. As we move into the public zone (10' and beyond) we rely no longer on subtleties but rather on what we can see in the distance (ibid). Other factors, due to the complexity of individual psychological make up and variations due culture, exist and influence the spaces. People with anxiety, for example, have larger zones (Augustin 2009).

In a telling recreation of an experiment by Maslow, Jan Stokols in his environmental psychology course has students come to the front of the class and stand before each other. Typically, when he measures the distance between them, it is a surprising and confirming 18 inches, at the outward edge of intimate space. Yet in one case, it was larger, 24 inches. Why? The male student was over six feet tall and the female student was under five feet tall. They instinctively adjusted their distance to account for the need to see each other.

Proxemics
Edward Hall



Public Space

The four spaces and our senses:

CLOSE SENSES - INTENSE EXPERIENCES
active senses: feel, taste, related to skin and muscle, ability to feel cold, pain
Intimate: 0-18in
Personal: 18in-4ft.

DISTANCE SENSES - IMPERSONAL, FORMAL EXPERIENCES
active senses: seeing, hearing, smelling
Social: 4ft-12ft
Public: 12ft and more

Source
Thesis Preliminary Review

Isolation by Jessica
Devianart.com

Privacy
/pri·va·cy/
noun
- a regulatory process by which a person or group makes themselves more or less accessible and open to others (Altman)
- the control of personal space (Hall, 1969), a boundary control mechanism

Source
Thesis Preliminary Review

The senses that are active and determinant of each zone are important to keep in mind. If you design spaces cognizant of these zones, you focus on the senses that are prominant in that zone. Jan Gehl pays particular attention to this in his work.

For Ramanujam, the relationship of proxemics to prospect-refuge is the result of personal space requiring a personal distance (also defined by Hall). Personal distance designates the space consistently separating the members of a species (2006). It expresses our need for safety via spatially expressed refuge.

In this way, proxemics prepares us to understand the psychological need for privacy expressed in space. Privacy expressed three dimensionally is our 'personal space'. Studies which concern architectural privacy confirm a need for personal space (ibid). Privacy is an essential environmental need in design you deny it to your peril. In space, we regulate our need for privacy in space by the use of proxemics, using the four distance zones, to manage our desired level of privacy and intimacy.

Our personal space is not just a distance in front of us but a bubble, extending behind us and also vertically (Augustin, 2009). The personal bubble extends further behind us than in front of us because, quite frankly, we don't have eyes in the back of our heads. This vulnerability explains our preference to have our backs protected. Spatially expressed protection has been termed the edge effect, or niche effect when the edge is recessed. An example of this effect is restaurant seating. Seats with a back against something solid are always the first to be occupied in cafes (Allen et al, 2000).

A lack of privacy or an abundance of it can cause stress, which, as stated previously, is not predictive of preference. In large open spaces, we can experience a lack of privacy if we perceive no clearly defined edge to provide safety. Agoraphobia, as an extreme, is the feeling of exposure because of an abundance of space and a perceived total lack of protective edge. On the other hand, If we have achieved a level of privacy more than that which was desired, we experience stress in the form of isolation (Stokols, 1987).

Stress can also result from a violation of our personal space. When our personal space is violated we can feel our privacy is compromised. Men and women respond to a violation of personal space differently. Men are more concerned when their personal space is invaded from the front, women when invasions happen from the side. Women will therefore respond more positively to someone who sits in front of them, men from someone who sits to their side (Augustin, 2006).

An interesting aspect of a lack of required personal space is the experience of crowding. Crowding is a psychological experience and not a fact of density. We can see this as while a high density is usually necessary for crowding, it does not always produce the negative feeling of crowding. Crowding is a psychological feeling of discomfort that arises from the perception that the amount of space is inadequate for what you want to do (Stokols, 1987). It is a failure to regulate self-other boundaries resulting in unwanted social contact.

A couple of interesting facts about the experience of crowding are worth noting. While density may be neutral, perceived high density can make us prone to feel crowded. People in high rises often feel crowded except, surprisingly, those on higher floors with better views. Floor plans that have shorter corridor lengths decrease perceived density making the potential to feel crowded less likely (Augustin 2009).

Apartment Living in Japan
Source: google.com

Crowding

a feeling of discomfort arising from the perception that the amount of space is inadequate for what you want to do. Density is neutral.

Source
Thesis Preliminary Review

Crowding can be made use of in design. Creating the experience of crowding can move people through a space. Frank Lloyd Wright used to make the ceilings lower in the entryways of his buildings as a low ceiling violates our personal space. This can introduce the psychological experience of crowding or even claustrophobia (a phobia representing the exaggeration of stress due to crowding). This was used by Wright to move people through the entryway into a main or adjacent space. It is, after all, a transition space. Curved walls can have similar effects for similar reasons - though based on the horizontal plane as opposed to the vertical.

You can reduce the probability of the experience of crowding by creating the perception of adequate space: by increasing the ceiling height in a space, by ensuring adequate light, by straight as opposed to curved walls (clear edge), by reduced clutter and by clear escape routes (Augustin 2009). In the Sistine Chapel in Rome, for example visitors will stand nearly shoulder to shoulder but as they look up to Michaelangelo's frescoes rarely complaining of crowding given the ceiling height of roughly sixty eight feet.

Crowding is about perceptions. Lighter and brighter spaces are perceived as less crowded. As such, areas where people may congregate benefit from being painted lighter or by higher illumination, by the presence of mirrors and daylighting (Augustin, 2009). If you cast light onto walls as opposed to the space itself, the environment will be perceived as larger. Also, smaller rooms benefit from proportionally larger windows when the experience of crowding may be present. Crowding is not a characteristic of a preferred environment and can decrease attentiveness and competence in ones environment. It should therefore be avoided unless it can be used, as said above, to accomplish design goals, like keeping exits and entry ways clear.

Another concept closely linked to privacy like crowding is territoriality. It too is part of the control of space first explored in the field of biology and then applied to environmental psychology. Like personal space, territoriality is a self-other boundary-regulation mechanism that involves personalization or making of a place or object ones own and communicating that it is owned by a person or group (Stokols, 1987). It is designed to regulate social interaction and to satisfy social and physical needs (ibid).

Territoriality

a self-other boundary-reg ulation mechanism that involves personalization or making of a place or object ones own and communicating that it s owned by a person or group

Source
Thesis Preliminary Review

Territoriality is a shelter-seeking behaviour tied to Prospect-Refuge theory. Territoriality can be expressed by something as simple as placing your coat on a chair in a public space. These 'traces' are important in our interactions in space with others as they define boundaries; saving seats is a classic example. Soft architecture allows users to put symbols of ownership and expressions of self with ease in the environment. This defining of territory provides the comfort of refuge for an individual or a group. Hard architecture is less easy to manipulate and less preferred.

Territoriality has an important application in the designing for safe neighbourhoods by the creation of defensible spaces. This is important in the design of any building or development. A defensible space has features or symbols of ownership. The three key features of defensible spaces are territoriality, surveillance and symbolic barriers (Liddwell, 2010). Defensible spaces create behaviours both for the group acting within the defensible space and for those outside the space. Those inside have perceived custodial responsibilities. Those outside perceivnig the symbolic barriers are cautioned not to iinvade privacy and or commit crime (Lidwell, 2010).

Environmental Psychology
Preference and Prospect Elements

The dividing line between prospect and refuge is the line between openness and enclosure. Neurophysiology shows that a specific region of the brain responds to the cues of enclosure. Five of those cues are - a proportion covered by walls, a proportion covered by ground, the interplay of light and dark, depth of view and the number of open sides (Ramanujam, 2006). Scenes having natural framing elements (cues to refuge/enclosure) in the foreground are preferred (ibid).

Depending on the symbols, an enclosure can provide feelings of safety linked to refuge or can provide the required feelings of safety that allow for exploration that is typical of prospect spaces. Prospect by way of openness and spaciousness are linked to preference. However, openness without refuge is not preferred (ibid).

Biophilia, mentioned arleady, describes those natural landscape elements that strike the right balance between providing safety and the excitement of exploration or prospect.

Ballyroan Parish Centre in Dublin, Ireland
by Box Architecture

Openness and Enclosure

a preference for environments with openness and enclosure elements is consistent with Prospect-Refuge Theory

Environments that achieve a balance of between prospects and refuges are most preferred. Environments with both prospect and refuge elements are perceived as safe places to explore and dwell.

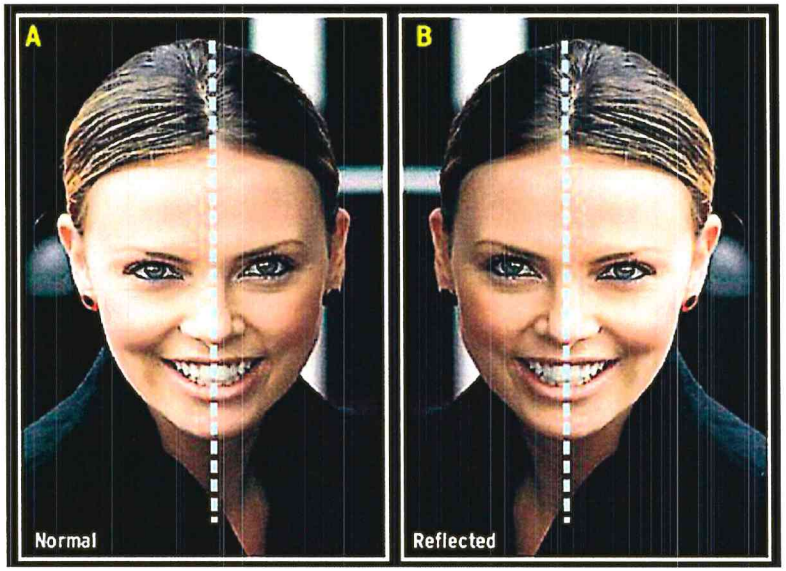
Source
Thesis Preliminary Review

With regard to architectural design, biophilia is important as it provides 'restorative experiences' within built form. Restorative spaces are prospect oriented spaces providing the fascination of another world for a moment that refreshes the self. Restorative spaces reduce stress, foster calm and even aid in the healing process (Augustin, 2009). Preferred spaces often have biophilic patterns or elements.

In a paper published in the International Journal of Architectural Research, the authors identify 14 patterns of biophilic design under 3 categories drawn from empirical evidence and the analysis of more than 500 peer reviewed articles and books (2014). Listed here are the 14 patterns of biophilia under three categories (in some cases a brief explanation is included):

1. Nature in the space - familiar precedents in the design community
    - i). Visual connection with nature (reduces stress),
    - ii). Non-visual connection with nature (auditory, haptic, olfactory etc. - moderate noise can enhance creativity),
    - iii). Non-rythmic sensual stimuli,
    - iv). Access to thermal and airflow variability (increases satisfaction, decreases boredom, increases concentration),
    - v). Presence of Water, (water needs to be perceived as clean - reduces stress),
    - vi). Dynamic and diffuse light and
    - vii). Connection with natural systems.
2. Nature analogues - nature-helath relationships
    - viii).Biomorphic forms and patterns,
    - ix). Material connection with nature,
    - x). Complexity and order. (rich sensory information in a coherent spatial hierarchy, fractal structures and geometries (wood grain, stone).
3. Nature in the spaces - nature-design relationships
    - xi). Prospect (provide views greater than 20 feet to preferably 100ft, design around savanna like ecosystems, limit opaque partitions (hedges) to 42 in),
    - xii) Refuge,
    - xiii) Mystery (anticipation, promise of more information - partially obscured views (especially in the forward plane) anchors).
    - xiv). Risk or Peril.

One prominent nature analogue, the second category, is the pattern we call symmetry. Darwins' Natural Selection is likely at work in our preference for symmetry, a property of 'visual equivalence among elements in a form' (Lidwell, 2010).



An international study comparing the aesthetic tastes of people in First World and developing nations has found a like of symmetrical, even faces to be universal.

Source:
Brisbane Times, 2007

Symmetry has long been associated with human beauty, in particular of the face. This association of beauty is likely due to it being indicative of health and of the potential for reproduction. It is linked to survival, a common pyschological root of preference. Research has shown that people have a preference for symmetry over asymmetry, and for balanced asymmetry over unbalanced symmetry (Augustin, 2009). Symmetries, whether created by reflection, rotation or translation or some combination thereof, can 'create harmonious, interesting and memorable designs' (Lidwell, 2010).

The last concept Ramanujam describes in connection to prospect-refuge theory is mystery. Mystery, according to Kaplan, is an informational factor shown to be a strong and often found predictor of preference (Stokols, 1987). It is defined as an informational factor involving a promise to learn more. Likened to Appleton's secondary prospect, mystery is knowing, 'only suggested and not directly experienced from where the observer is currently standing' (Ram, 2014). Examples of mystery are: a detected vista, or a bending road in the forest and such.

In short, the research and findings of environmental psychology uncover the reasons for some behaviours we exhibit in our transactions with the environment. The hierarchy of Maslow alongside Appleton's Prospect-Refuge theory, helps to explain the nature of the preferred environment as described by DeYoung.

A Key Word List

Gathered here is an exhaustive listing of elements of preferred spaces. Like Jan Gehl, research and discovery into what spaces are experienced as preferred are the foundation for a performance based toolkit for the design of buildings. Not surprisingly, some of the items appear similar to Gehl's toolkit for urban spaces; we don't cease being who we are when we come indoors.

The preliminary categorization is thematic and leans on the discussion regarding prospect-refuge theory and the Toolkit for Urban Spaces.

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

Elements of Preferred Spaces

Protection from Failure, fire, and injury

- visible emergency signage
- legible plan
- visible escape routes (spatial syntax- ie lines of sight predict movement)
- anthropomorphic design
- accessible design
- visible structural integrity
- straight verticals enhance stability

Protection from Crime, violence, cruelty, discomfort

- privacy is central
- attention to proxemics
- manageable territoriality
- overlapping functions
- internal life (eyes on "street")
- wide corridors
- absence of dark corners
- visible security equipment or persons

Protection from Unpleasant Sense Experience

- good indoor air quality (absence of VOC, dust etc)
- appropriate temperature and humidity
- absence of bad odours
- presence of positive odour, aromatherapy
- protection from harsh noises
- protection from intense light and glare (see light from 2 sides)
- walls at 90 from floor
- good level walking surfaces
- dark floor, medium wall, light ceilings

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

A Key Word List

People Prefer Places for Sitting

- zones for sitting conditioned by the intimacy gradient (142)
- restorative spaces
- introverted spaces and extroverted spaces (socio-petal and socio-fugal spaces)
- edge spaces and seats that have protected backs
- built in seats (202)
- create exterior edge depth (160) & gallery surrounds (166)
- maximizing advantages primary and secondary sitting possibilities - eg treat stairs as volume with seating (133)

People Prefer Places for Standing and Staying

- Privacy spaces, individual and group
- standing height places to lean and or rest
- supports for staying
- attractive edges
- children's places (137)
- south face places (161)

People Prefer Possibilities for Walking

- interesting approaches
- presence of covered exterior paths (174)
- interesting interior paths (wayfinding)
- progressive lures
- good surfaces, few obstacles
- good edges
- good spatial sytanx (site lines and desire lines)
- absence of hidden corners, dead ends.

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

Elements of Preferred Spaces

People Prefer Coherence and Legibility of Space

- space that lends itself to mind mapping
- anchored welcoming receptions (149)
- predominantly linear plans (orientation sensitivity) loops and flow through rooms (131)
- Short passages (132)
- legible plans marked by a tapes-try of light (135)
- edge distinction
- rythm that leads
- progressive disclosure
- good wayfinding (orientation cues, clear or minimal route decisions, prog ress cues, destination recognition)
- positive over negative space

People Prefer Environments that decrease Stress

- places with intimacy gradients
- freedom from isolation or crowding
- lack of clutter
- daylight for circadian rhythms
- vital spaces south facing (128)
- choice, yet limited (Hick's Law - as choices increase so does decision time and stress)
- absence of multiple horizontal lines in design (see also Protection)

People Prefer Control over their Space

- soft over hard architecture
- flexible office space (146)
- operable openings
- visual and acoustic privacy control
- manageable natural and artificial lighting
- ability to mark territory (territoriality)
- congruence between person and environment

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

A Key Word List

People Prefer Forms and Spaces

- flat to 4:12 ceilings (on one or both sides(191))
- varied ceiling heights (consider cathedral effect and intimacy)(190)
- square over rectangular spaces
- Golden ratio
- Rooms with doors at corners (196)
- rooms with windows over rooms without
- rooms with light from two sides over rooms with less (159)
- corners to be 90 degree or more, not less
- forms that minimize crowding (larger volumes,hallways with a change in direction over straight, floors above over floors below, straight walls over curved)
- contained entry with good view, ie first impression communicates order of space (refuge) and lures (prospect)
- entry straddles the inside/outside (130)
- thick walls(197)
- traditional over modern spaces

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

Elements of Preferred Spaces

People Prefer
Possibilities to See

- openness and enclosure cues
- progressive disclosure and lures
- interesting views, inside and out
- windows over life (192), Zen views (134)
- areas of depth processing
- balanced with restorative views (views of tended nature or images of same)
- presence of plants or greenery
- views of movement, people, mobiles sculptural elements etc
- richness of natural elements, seasonal changes, aging elements and materials

People Prefer
Possibilities for talking and hearing, for socializing or observing

- talkscapes (sitting circle (185))
- internal third spaces (centres of grouped spaces)
- alcoves and window seats (179,180)
- half open walls (193) (connectivity)
- small work groups (148), half private offices (152)
- extroverted (eye to eye) and introverted (side by side, 45 degree talkscapes)
- good acoustics, light (2 sides)
- music that complies with purpose ie. good sounscaping

People Prefer
Functionally Enhanced Spaces

- good environmental semiotics, ie gradients congruent with use
- Moderately flexible environments (as flexibility increases usability decreases)
- Universal Design
- Affordances
- Proper light for space
- Colour fit, culture fit
- adequate space/acoustics/
- specialized environmental quality

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

A Key Word List

People Prefer
Aesthetic quality

- aesthetic constancy (eg partis)
- MAYA - most advanced yet acceptible, balance of familiarity and discovery, optimal newness
- quality construction and detailing
- less complex spaces overall (Ock ham's Razor)
- a degree of complexity
- yet ordered (protects from stress - hierarchy tames complexity)
- human scale
- anthropomorphic form
- presence of rounded forms (baby face bias)

People Prefer
Aesthetic quality

- Blue effect - most preferred colour
- Gloss effect - most preferred sheen
- Green effect - Biophilia
- symmetry before asymmetry
- balanced asymmetry over unbalanced
- natural materials over manufactured
- areas of dappled light
- dappled light in close proximity to areas of bright light
- water features, light play.
- direct connection to earth (168) (edges)
- tended landscapes, fruit trees and other trees(171)
- local vegetation

People Prefer
Mysterious elements and Surprises

- possibilities for play and unfolding activities
- strong connections to life outside (eg open stairs (158), views, etc)
- breaks from expectation
- novelty (primes curiosity and gives freedom from boredom, awakens openness to play)
- surprise by way of breaks in harmony, hierarchy and other formal elements
- progressive disclosure through spaces
- upregulated spaces
- areas that spill out to other spaces and/or to the outside
- open interior action to pedestrian paths (eg kitchen views)(165)
- fireplaces (182)
- secret place (204)

Note: numbers refer to patterns from Alexander's, A Pattern Language as the direct source.

Toolkit
The 12 Criteria for Designing and Detailing Buildings

Why are there 12 criteria in the Toolkit for Designing and Detailing Buildings that I have designed? It will become much clearer as you read here the research that undergirds the choice but quite simply its scientific, the evidence all points to three underlying categories, these are then broken out further thematically as sub-categories.

In determining the 12 Criteria for Designing and Detailing Buildings, Sally Augustin's insights are helpful. In Place Advantage, Applied Psychology for Interior Architecture, Augusitn says a well designed space is a place that allows people to, "achieve their concrete and psychological goals" (2009). She summarizes the characteristics of preferred spaces under five categories that she says are typical of well designed spaces. These five are:

1. Complying - the space complies with the activity planned, with all the right tools.

2. Communicating - the space gives important information about the people who use them and providing opportunities for people to socialize or not. Providing information about the person/people who uses a spaces is the most important thing a well designed space does.

3. Comforting - the space provides for our needs for perceived control, including for privacy and finding restorative experiences.

4. Challenging - the space challenges people in them to grow and develop as a person and

5. Continuing Across Time - the space evolves and changes as appropriate (that is to say, adaptable).

This categorization is similar to the general categorization of the 12 criteria created by Jan Gehl in his work in urban environments. His general categories are protection, comfort and enjoyment which, in a similar way to the Danish statement on good design, is an architectural restating of Maslow's hierarchy.

The intent of the either categorization, Gehl's or Augustin's, is to provide a mindset for designing of preferred spaces; it is more perscriptive (performance based) than prescriptive.

The mindset begins from a decision to be led by the behaviour desired in the space to design moves or patterns that are supportive. Christopher Alexander used the same approach when he spoke of building as growing from 'centres'. It seemed an elusive concept to me until this research helped me to discover that he meant centres of activity, that is behaviours. Gehl has said: First we need to envision the future life of an area to be able to plan successful spaces (2010).

People can sometimes be forgotten in the design process. Gehl's research was prompted by the loss of the human scale on a planning level; people were being 'eclipsed' - literally. The same oversight can happen inside buildings. Jamie Horwitz suggests that when programming moves to space planning and the application of rules of thumb like 'net to gross', people can get forgotten. He says: It is not that 'net to gross' is so elusive, but I have experienced it as a kind of shadow that is cast over, what I consider to be the most critical social factors in building - the way it connects people, and connects functions" (2005). Connecting functions and people requires attention to the experiences and behaviours being created by spaces and the psychological needs of people acting within them.

What is different with Gehl's approach to architectural design is that he starts design not with a program of spaces but a program of behaviours as a design heuristic. Gehl says:

> I have worked very hard to find out what the life is that goes on inside our buildings and how our buildings influence that life. In fact, I've spent most of my time studying life rather than buildings. And many of my architect colleagues said that I was wasting my time. But recently when I received two different gold medals for architecture, they had to redefine the category "architecture" so that it considered not only the form, but also how it was used and how life is supported by it.

> One of them was from the Royal Danish Academy of Fine Arts where they have a very strict definition of art, but then they decided to redefine it to also encompass what I was doing for mankind in my studies. That was a great moment for everybody because they started to lift their eyes away from form to the interaction between life and form. Because if you just do form, then you are doing sculpture, but if you look after the inter action between life and form, you are doing architecture (2010).

Planners and architects need to design spaces that are inviting for people from day one; doing so requires knowledge of preferred environments. It is about how people use the space and how life is supported by it.

My research into the findings of Environmental Psychology yielded an exhaustive list of environmental elements that create behavior affordances in keeping with user needs. It is clear that the broad categories for the toolkit for buildings is to be three: similar to Gehl's, to the hierarchy of Maslow, and to the findings of Kaplan and Kaplan noted earlier, these are:

the need:

to feel safe or secure,
to gain competence in their environments, for functionality and
to undertake meaningful action within them, for fulfilling spaces.

I have further divided these three into 12 criteria.

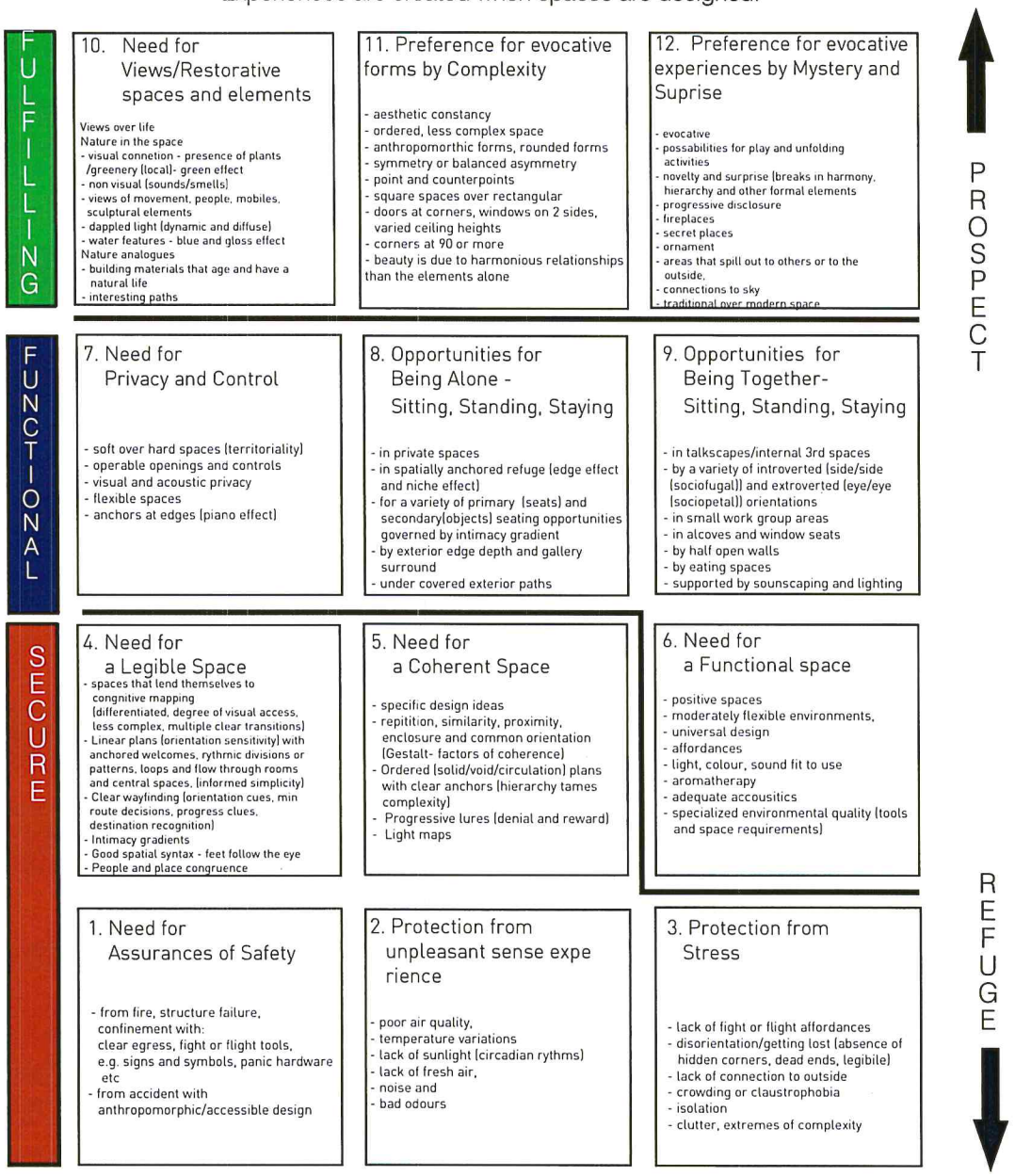
Early attempts proved to be important. Initially, I borrowed from Gehl's toolkit motivated by the realization that in essence we were dealing with categories of need like those defined by Maslow. However, the result was rather forced. By letting the findings speak for themselves, I revisited the sub-categorization and created a much better toolkit that is faithful to the findings and to the preferred spaces that they define.

The number and title of each section or box is a perception or behaviour that is preferred. The text below each heading summarizies the environmental factors based on the research that aid in the achievement of the same towards preferred spaces.

A critical point was reached with the creation of the toolkit, Design and Detailing Buildings!

The 12 Criteria. A toolkit for:
Designing & Detailing Buildings

Experiences are created when spaces are designed.



"Good architecture provides a secure, functional environment for our fulfillment, both as individuals and collectively"

Danish Architectural Policy

Environmental Assessment 1

MONTREAL MUSEUM OF FINE ARTS

An Environmental Assessment is an observation based review of a space to assess how environmental factors affect individual attitudes and behaviours.

It begins with the identification of the purpose of the space and the experience goals intended and moves to assess the environmental factors that support or hinder those goals.

In my assessments, I evaluated the spaces with the toolkit for buildings identifying where environmental factors were supporting the experience or not.

These served to allow for the evaluation of precedent spaces and, more importantly, of the toolkit itself.

Both assessments were presented at the Thesis Preliminary Review.

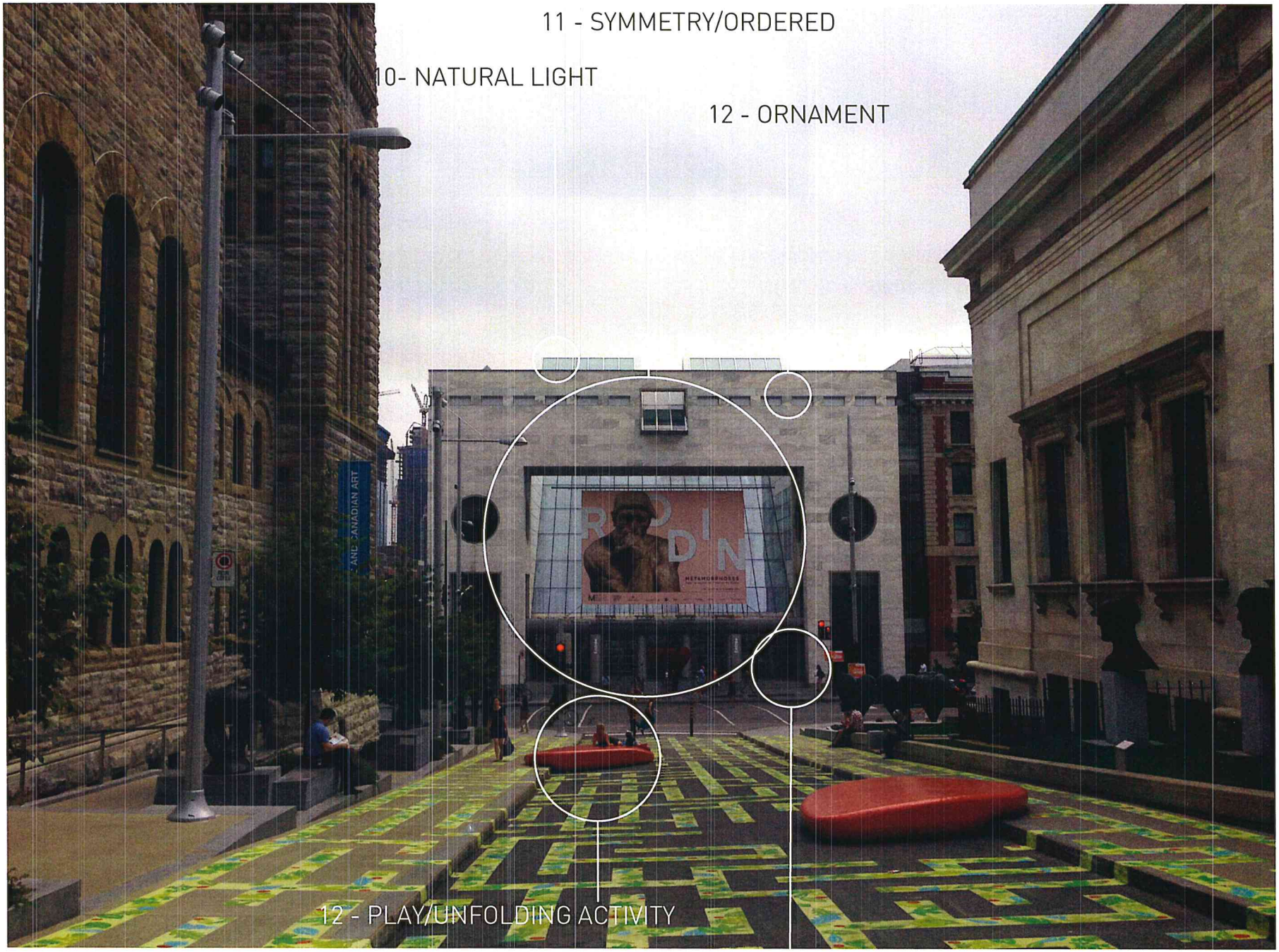
First installed in a building on Phillips Square, the museum moved in 1912 to a new building on Sherbrooke St. West.

Architects Edward and W.S. Maxwell conceived the plan in neoclassical style, much in vogue at that time. In 1976, a new wing by architect Fred Lebensold was opened.

In 1991, the opening of its south pavilion, Jean-Noël Desmarais Pavilion by architect Moshe Safdie added considerable gallery space and educational and support areas to the museum permitting the institution to exhibit more of the permanent collection and providing much-needed space for its temporary exhibitions. The new pavilion houses a boutique as well as a bookstore, a restaurant and a snack bar.

A fourth pavilion, dedicated to Canadian and Québec art opened in 2011 along with a concert hall that houses a rare collection of Tiffany stained glass. That allowed for the museum's collections to be reinstalled in the three other pavilions, which are now dedicated to ancient cultures, European and contemporary art, and decorative arts and design. (Source: thecanadianencyclopedia.ca).

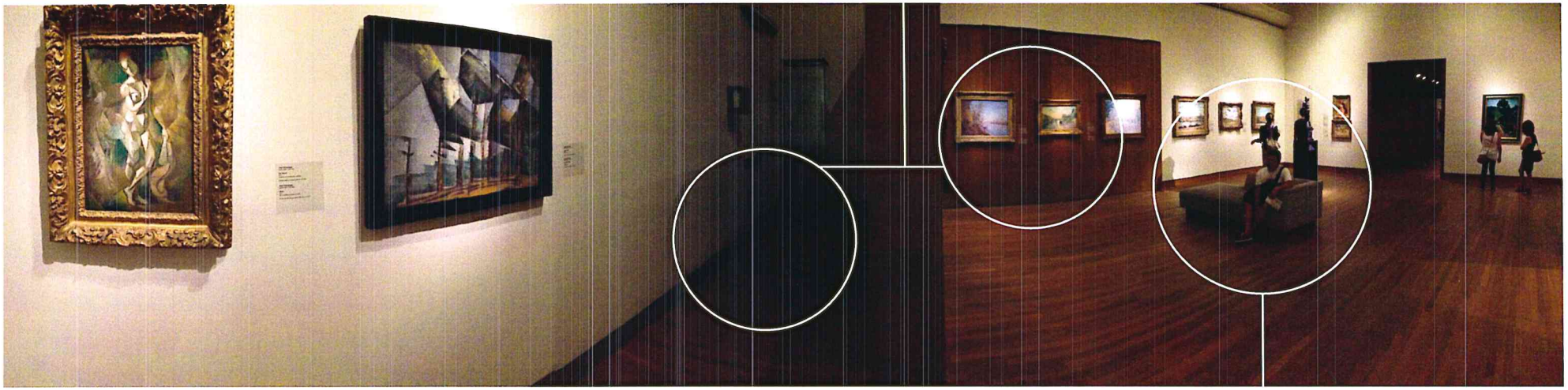
The images on this pages were taken by me during an environmental assessment of the museum in September of 2015 and were presented in the same manner during the thesis. The assessment is based on the criteria of the toolkit for Designing and Detailing Buildings.


11 - SYMMETRY/ORDERED
10- NATURAL LIGHT
12 - ORNAMENT
12 - PLAY/UNFOLDING ACTIVITY
11 - HUMAN SCALE- ANTHROPOMORTHIC


3, 6 GOOD LIGHTING, DAYLIGHTING
1, 5, GOOD SURFACES/
PROGRESSIVE LURES

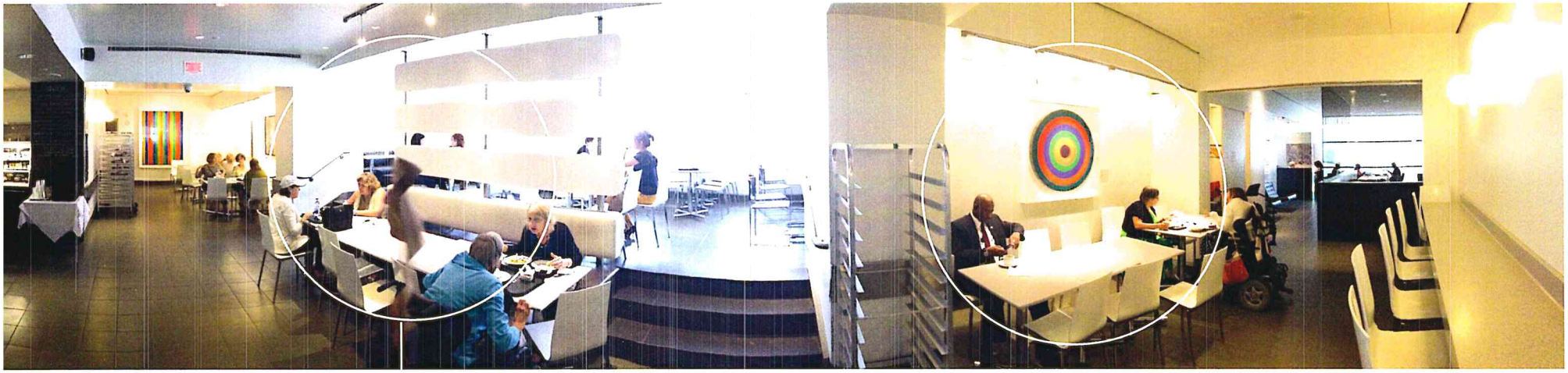

LE BRONZE
1. UNIVERSAL DESIGN
12. SELF-RE-
VEALING/
STORY TELLING

4. PROGRESSIVE LURES
LIGHT MAPPING

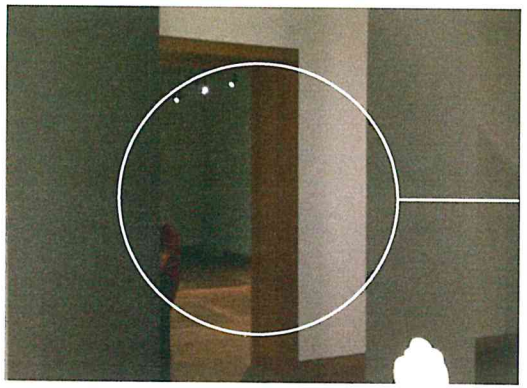


8 PLACES FOR SITTING, STAYING

1 EDGE SEATING



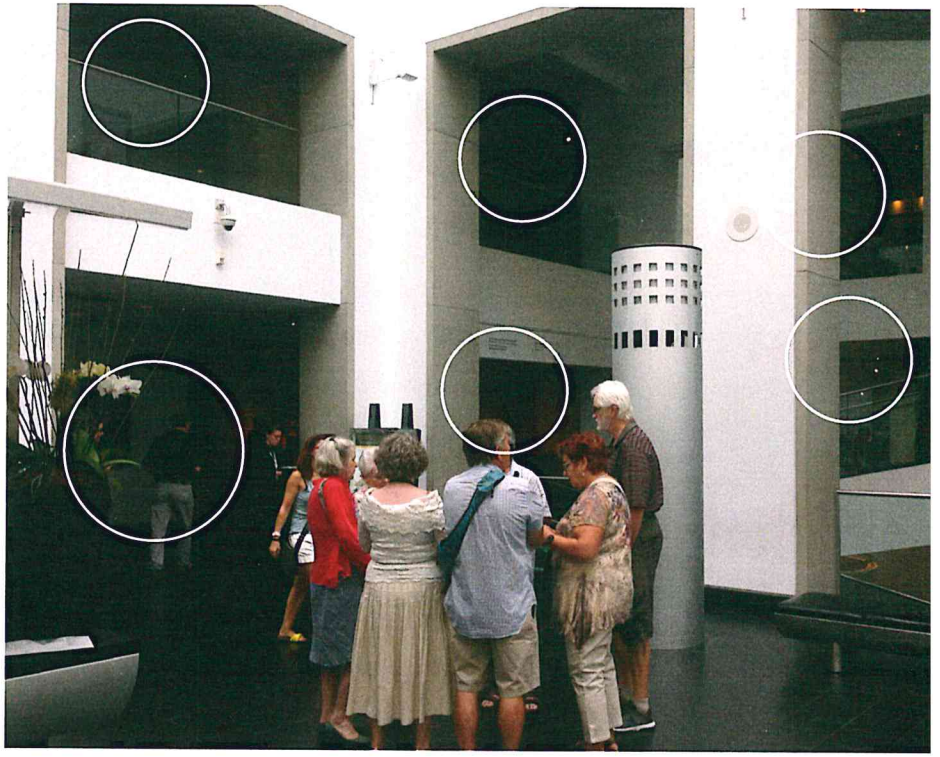
9 PLACES FOR BEING TOGETHER
EATING SPACES
HALF OPEN WALLS



4 SPATIAL SYNTAX

COAT CHECK
4 - WAYFINDING

6 - SPECIALIZED
TOOLS



ENTRY LOBBY
4 - LEGIBLE - GOOD VISUAL ACCESS, GOOD SPATIAL
SYNTAX

Environmental Assessment 2

FRED JONES JR. MUSEUM OF ART, LESTER WING

Conceived as a sequential matrix of nine identical house-like pavilions organized in a square and connected by glazed corridors, a10th pavilion on the wing's central axis, extending from the square, acts as the main entrance and visually establishes the symmetry of the plan (in which four smaller service buildings, also with pyramidal slate roofs, anchor the corners).The ground level of the new wing contains a museum store, an orientation room and freestanding galleries.

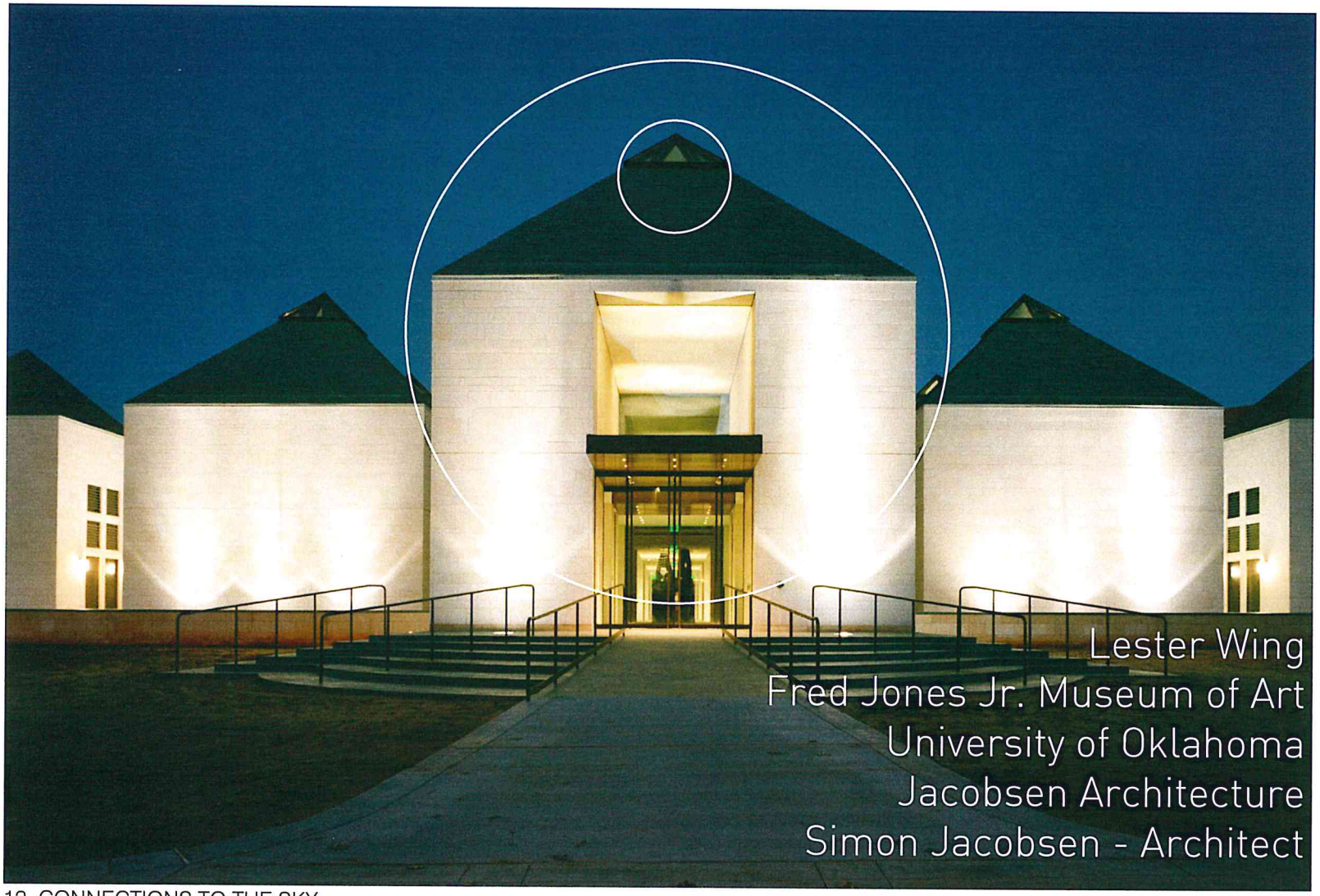
"The building speaks of an awareness of how art can and should be shown," according to the museum director. "It doesn't overwhelm any of the works on view, nor is it anywhere recessively bland." An essential element is the treatment of natural light. "Changing light gives a sense of the present, of real time," says Jacobsen, "When the sun goes behind a cloud, it brings in a quality of illumination you could never get artificially." Skylights, interstitial glass corridors and large square windows bathe the interior and establish a visual link between it and the outside and the outlying pavilions. On the lower level, skylights installed at grade into the formal landscape achieve a similarly stunning effect.

The overall mien of the Lester wing is, however, intimate. Thirty-three masterworks by artists such as Van Gogh, Pissarro, Monet, Degas, Renoir, Vuillard and Gauguin are seen alongside British antiques and Chinese export porcelain (also part of Clara Weitzenhoffer's bequest), just as they were in the philanthropist's Oklahoma City home. And therein lies Jacobsen's muse. "Most art is created within domestic scale and for domestic scale," says the architect. "Everything I did with this museum was with that in mind. The art completes my building."

(Adapted from Architectural Digest; Original text by Therese Bissell, 2006)

FRED JONES JR. MUSEUM OF ART
THE UNIVERSITY of OKLAHOMA

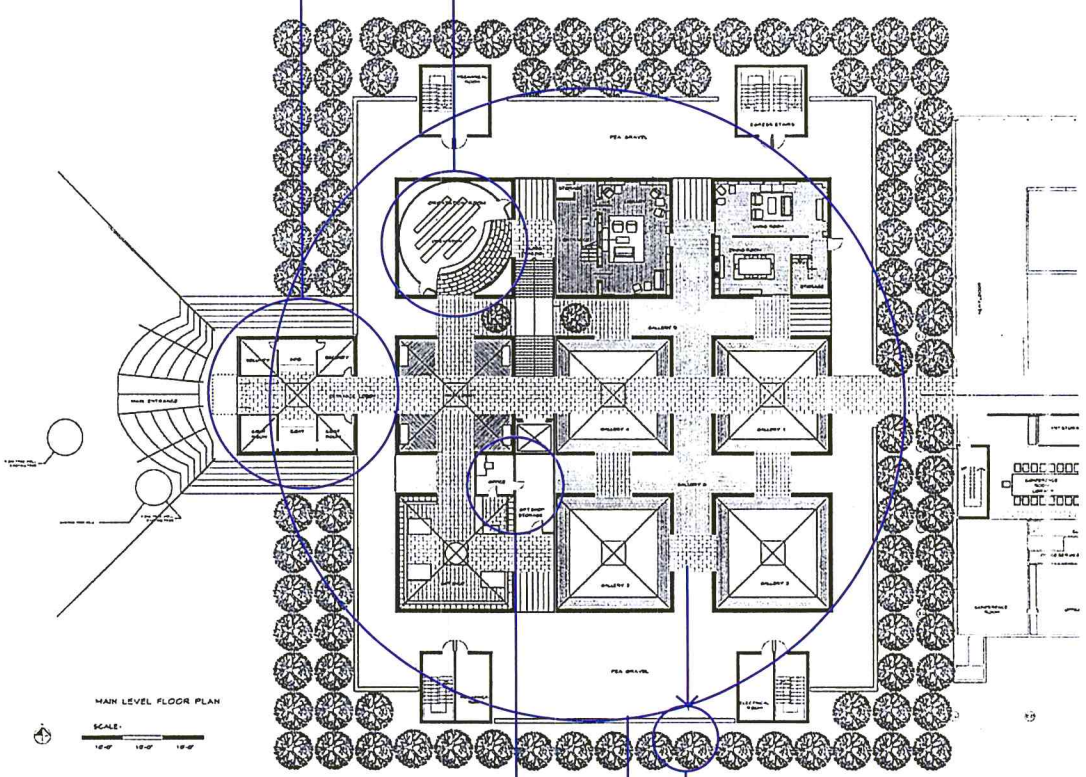
11. SYMMETRY



12. CONNECTIONS TO THE SKY
11. ORDERED, LESS COMPLEX

11. FORMS THAT PLEASE

9. PLACES FOR BEING TOGEHTER

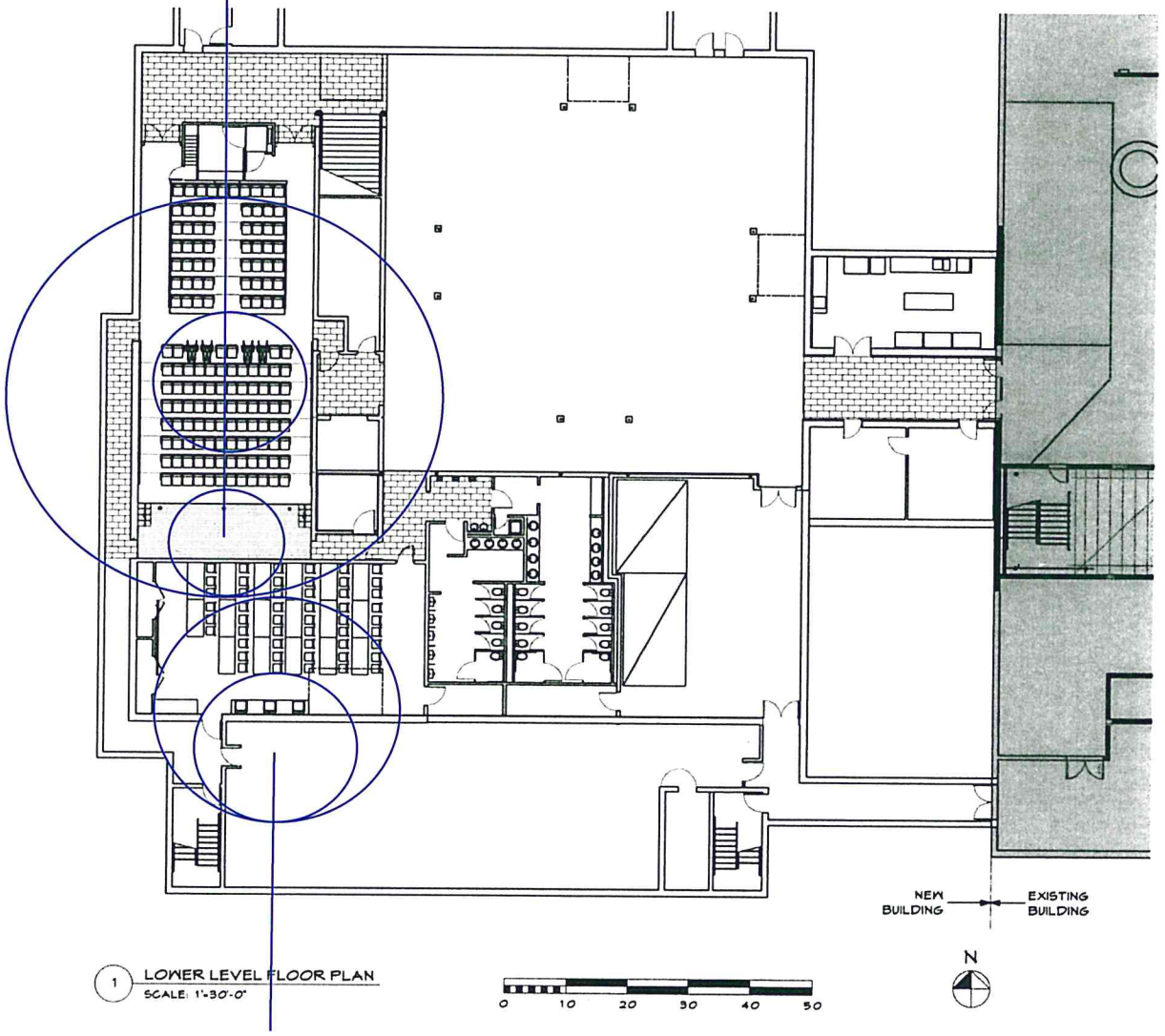


6. FUNCTIONAL SPACE

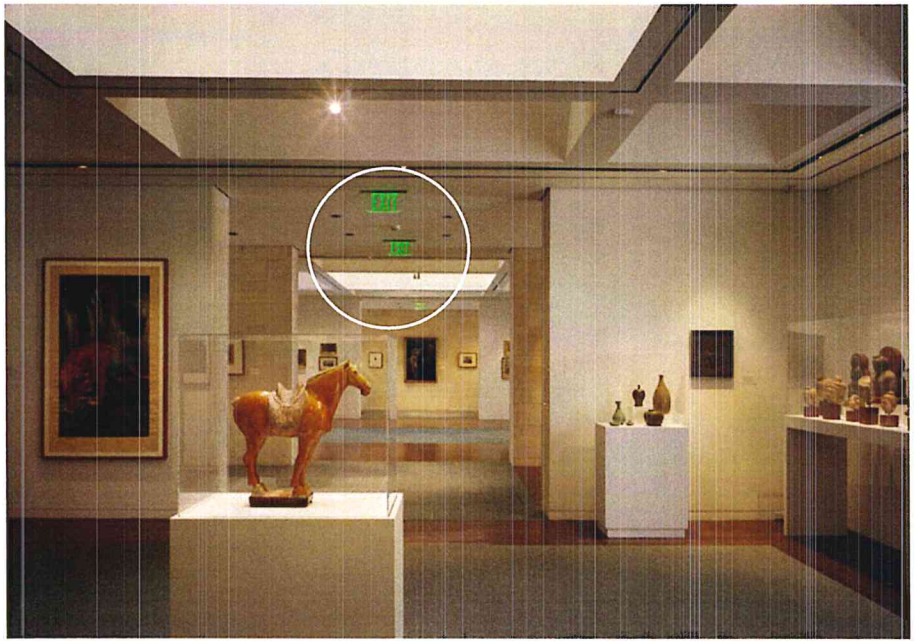
10. RESTORATIVE VIEWS

4. LEGIBLE, LINEAR
5. ORDERED FORMS

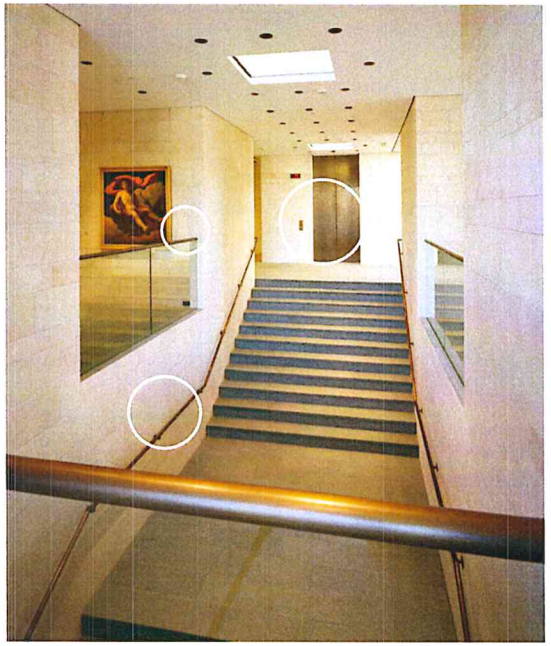
6. FUNCTIONAL SPACES
SPECIALIZE ENVIRONMENTS AND TOOLS



6. FUNCTIONAL SPACES
SPECIALIZE ENVIRONMENTS AND TOOLS



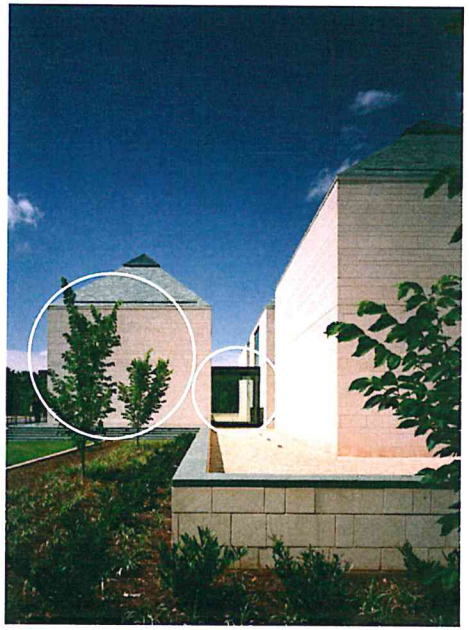
1. SAFETY FROM FIRE
2. PROTECTION FROM DISORIENTATION.



1. PROTECTION FROM ACCIDENT
6. UNIVERSAL DESIGN

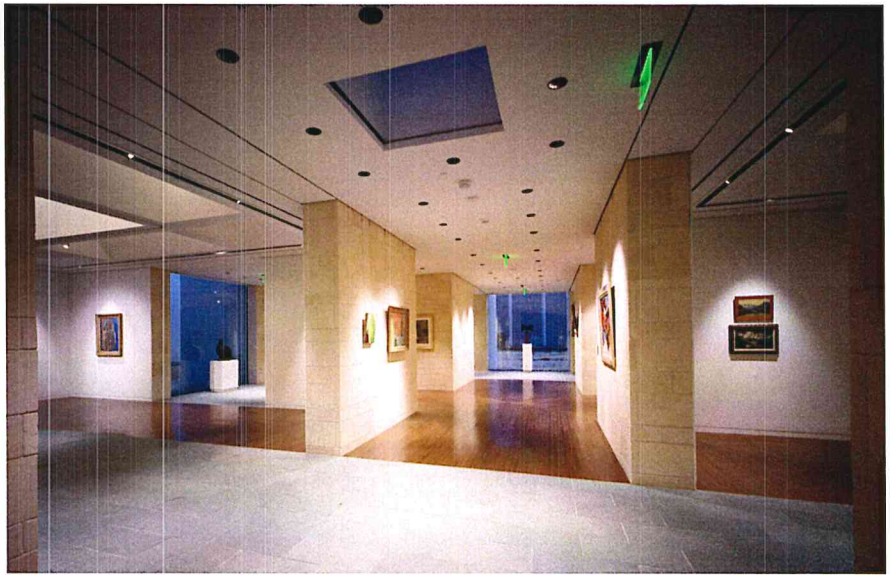
3. DAYLIGHT/STRESS REDUCTION
10. DIFFUSE LIGHT

8. PLACES FOR STAYING, SITTING



10. VIEWS AND RESTORATIVE ELEMENTS

12. MYSTERY-SURPRISE



4. RYTHYM
11. SQUARES OVER RECTANGLES

Part III
Pre-Design

With the toolkit for Designing and Detailing Buildings complete, the task turned to the design of an art gallery as an exploration of the use of the toolkit to aid architectural solutions. In this part, the site and the proposed program are evaluated and interpreted with a view to the toolkit and the underlying research.

Site Context

At the onset of the thesis project, the Thunder Bay Art Gallery (TBAG) had done preliminary studies to consider renovating their current location or building new within the waterfront development. In fact, an RFP had been initiated with a building program and site having been chosen but progress was stalled with the future of the gallery in limbo. Given the thesis project scope and the project concept building type chosen, and the current state of the TBAG process, to aid the thesis project the TBAG program and proposed site were accepted as givens for the thesis project proper - the research, development and application of a toolkit for designing and detailing buildings based on environmental psychology. Nevertheless, reviews of the program and site remained essential to the thesis work as can be seen in the following.

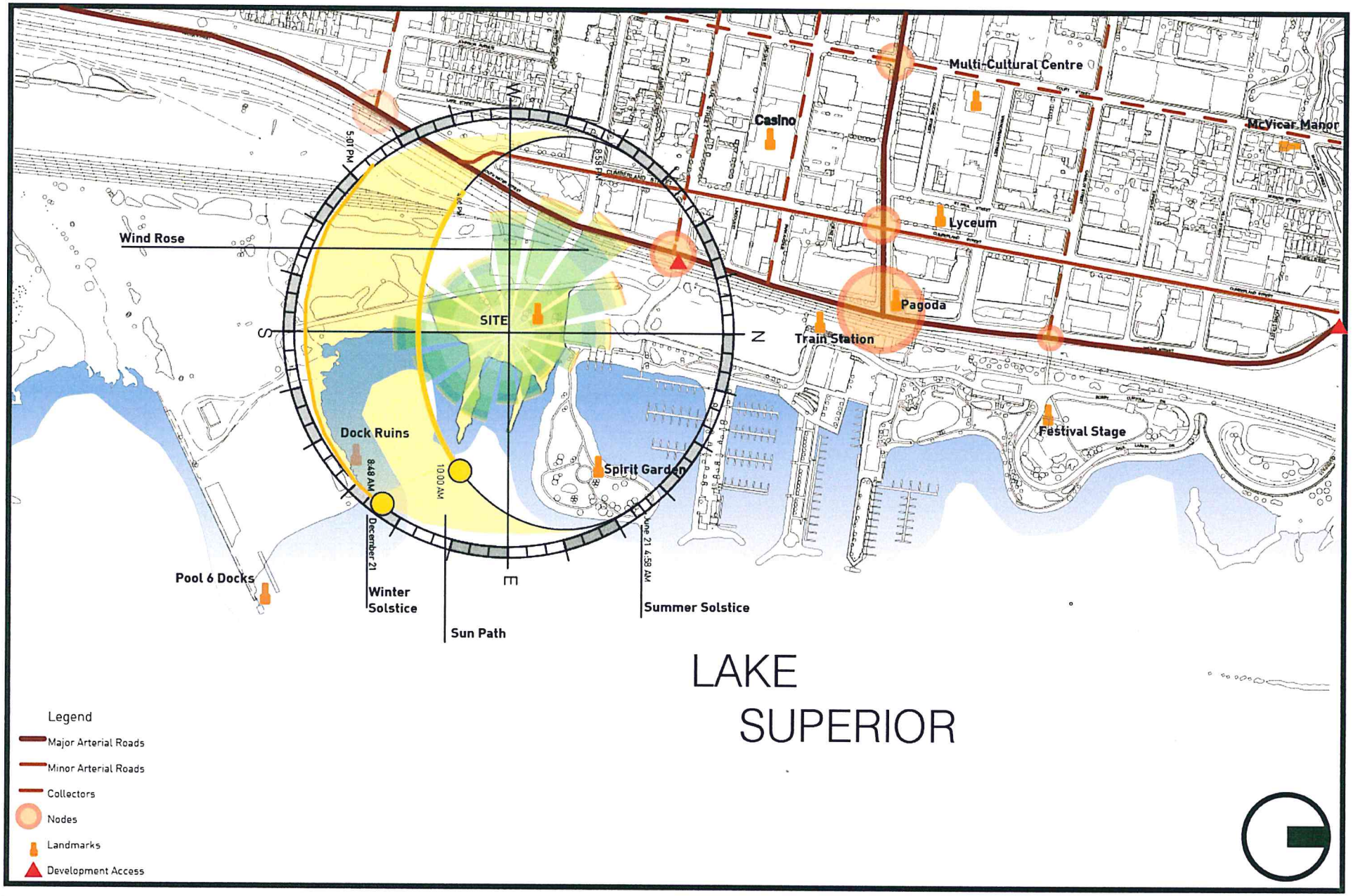
The site as given is located in the north end of Thunder Bay in what was once Port Arthur. Its history is as a transportation centre, a shipping destination and a working waterfront for over a century, focusing on grain, lumber and ship building. Grain and lumber industries remain active in the port.

The site proper is located in Marina Park, once called the Station as it was used as a military staging area. The site is set apart from the city to the west by the train tracks which mark the edge of the marina park development. Prince Arthur's Landing, as it is called, is a name given in 2006 acknowledging the historical fact that prior to its incorporation as Port Arthur, the area had been called Prince Arthur's Landing in honor of Queen Victoria's son. The development is accessed by crossing the tracks at Pearl St. or via the Marina Park Overpass off of North Water St.

Prince Arthur's Landing is "a mixed-used waterfront redevelopment incorporating a marina, parkland and trails, public art, restored heritage buildings and a future hotel. Structures include the Baggage Building Arts Centre public gallery (a restored circa-1900 building), the Water Garden Pavilion, skateboard park, running and cycling trails, as well as public art" (Globe and Mail, 2013).

The eastern edge of the site includes two fingers of historical significance having been created by sunken barges. This edge meets the waters of Lake Superior. It is an edge protected by the breakwater beyond the shore and by the Sleeping Giant on the Sibley Peninsula forming the inlet that harbors the bay.

Just north of the site is a boat launch where the development completed to date ends. To the south is the Pool 6 site, rich in local history and memory. The essential task from an environmental psychology perspective is incorporating place memory into place making.



Source
Thesis Preliminary Review

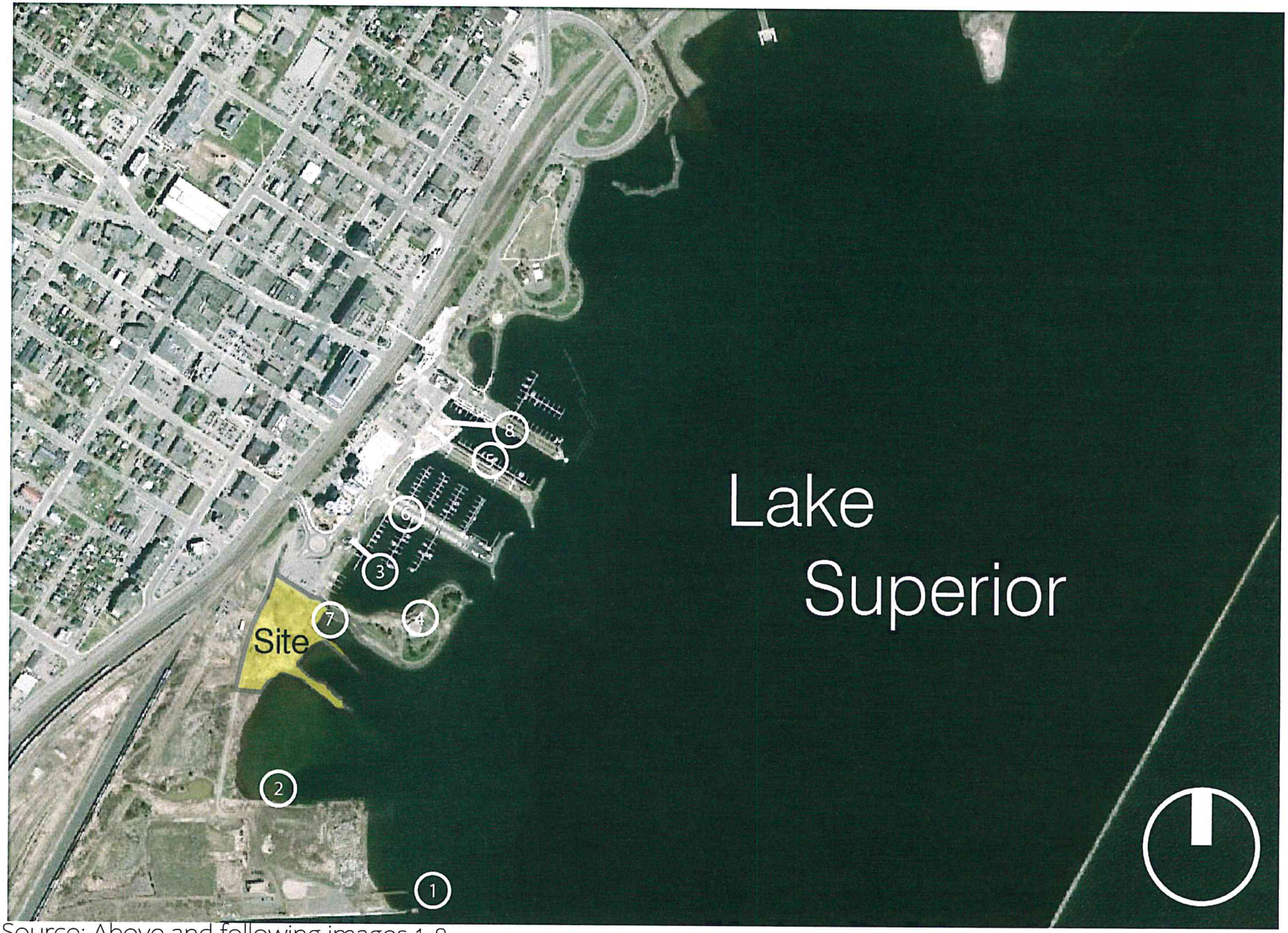
Site - Place Memory

Place Memory is made up of Place Identity and Place Attachment.

Many of the people who will experience the museum will be local; they will identify as people from Thunder Bay. Others, most, will likely be friends or family of them and so may not share that identity but will have an affection for it.

Locals and their family and friends will share attachments to the city and in particular here the marina by the experiences they have in these spaces.

Environmental Psychology invites consideration of these aspects, of historic elements of a location and of its current conditions, the history of its people and the activities that happen there. This has been called the genus loci or sense of place. Respect for these aspects of history and acknowledgment of current context within the new designs can fan proud place identities and create echoes of a persons place attachment and thereby prime the new spaces for the legibility and coherence that are particular to experiences of delight in preferred spaces. Listed here with commentary are some important such place memories and waterfront amenities that can positively influence design.



Source: Above and following images 1-8
Thesis Preliminary Review

1. Pool 6 Railway Trestle Pier

A significant landmark to the south east of the site. Almost proud as it remains ready though no longer in use. It speaks of the efforts of many before. Not simply functional, it has a rugged beauty and invites viewers to connect with it as if to touch the past and to be more confident today.
Similarities in material, rhythmic structure are opportunities to tie into place attachment.

2. Pool 6 Railway Dock Ruins

The concrete bases for the railway dock provide an element of mystery, a puzzle to be solved. The line they follow extending to the lake suggests the mystery has a solution if you follow it.
Similarities are again possible both in the form of the proposed building structure and its landscape forms.

Waterfront Improvements

3. Visitor Centre

Located at the entry point to the south of Prince Arthur's Landing and the Marina development. Designed by Walter Kuch, Fraser and Browne Architects, the shape and roof appears as one sail amidst others.

It suggests the invitation to make use of nature for your enjoyment and play.

This builidng acknowledges a new time has come, one where the water is a playground, the edge a place to be, alone or with others.

Recent Development

4. Spirit Garden

The 'Architecture is animate... as it creates place where we interact imbuing architecture with life' (Ryan Gorrie). Made of spruce trees, bent and strapped to create a truss, the shapes define a circle along with the concrete bases hosting laser cut art from the woodland tradition. Sloped hill rustic seating uses ash trees reclaimed from Vickers Park.

A central tie to the new art gallery needs to be made to this garden. The Art Gallery celebrates Canadian Native Art and in particular Woodlands Art that originated locally. Acknowledging cultural heritage is an essential part of Environmental Psychology.

5. Artist Towers

Pier 2 Pic Nic Docks are meant to appear as lanterns at the edge.

Simple invitations to be in the place and rest with a play of openness and enclosure, are successful.

They are reminders of design necessities celebrating views and providing restorative spaces.

6. Edge Seating at Water

Life grows from the edge. More prospect than refuge, these define the edge rather than provide refuge. The distance from the public path make them more usable.

Design ties to the existing landscape should continue the experience of the waters edge as opposed to disrupting it.

7. Landscape seating

Secondary seating is abundant in the landscape. Primary and secondary seating in the building and at its edges are important needs for users in the environment.

8. Waterfront Plaza - Pedestrian ramp and stair

The site development in the very recent years is successful in its marking out of paths for both functional uses (sailing and the like) and optional uses (visitors for play).

Similar vegetation and pavings are likely wise choices to provide coherence and legibility.

The safety of users calls for similar good surfaces. Other considerations are for wind-blocks and for seasonal design requirements/winter concerns. Limiting stairs in the urban tie is important. People prefer ramps over stairs.

Site - Technical

Superimposed on the aerial image at right is detailed site information including topography, site drainage, utility locates, areas of archaeological significance and the location of possible contaminated areas. Only a minor extension of the infrastructure is required due to the upgrades from the recent developments. Storm water lines can connect to the north and the electrical and sewer can come to the east from their current location.

The City of Thunder Bay has done scientific assessments which unearth a small amount of metal contaminants near the site. The improvements to the site can avoid these areas or involve some remediation which reports suggest would be minimal.

The area is zoned as Open Space. A permitted use is a Cultural Facility so no zoning changes are required, a museum being considered under that umbrella. A maximum height of 15 m poses a constraint for a building that begs for a degree of visibility in the landscape.

Vehicular circulation to the site is limited. Access to the site is limited to two points along Water St, from Pearl St. where you must cross an active railway to enter and off of Cumberland St. where an overpass allows for access even when the rail is active. Coming in off of Cumberland at S Water, you have to pass through the Marina development, a low speed pedestrian rich environment. It has been recommended that improved access can be accomplished by extending the main artery within the Marina Development, Sleeping Giant Parkway, to the Central Avenue overpass to the South. Along with the Cumberland St. entrance to the Marina area, these entry's by way of overpasses would most likely be secondary to the entry off Water at Pearl given its proximity to the site. It should therefore be considered as the main entry route and the primary approach views when making a visit to the new art gallery.

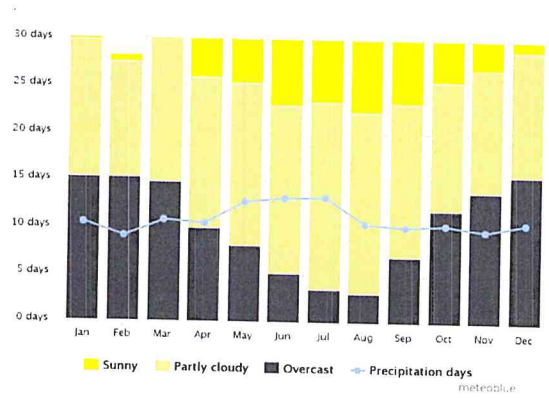
Pedestrian routes to the site include the Pearl St. entry, the Cumberland St. vehicle overpass, the pedestrian overpass from the Prince Arthur Hotel parking lot to the Baggage building and a street level crossing at the Bus Terminal. All these points connect to the path network of the Marina Development.

Source
Thesis Preliminary Review

Site - Climate

Climate is qualitatively described by hours of daylight, wind direction and speed, precipitation and temperature. Climactic factors and their implications for design from the perspective of Environmental Psychology are discussed briefly below.

Sun

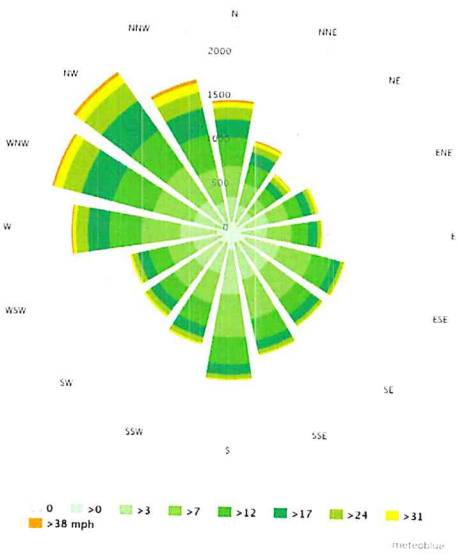


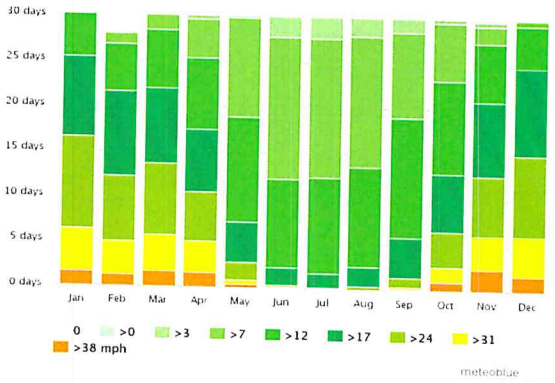
The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days (meteoblue). Thunder Bay is impacted by the hours of daylight that fluctuate dramatically from Winter to Summer (See Site Context Plan)

Protecting the building from high cooling loads due to summer sun and providing for solar heat gain in winter impacts on protection from unpleasant sense experience.

For both interior legibility and restorative experiences, the presence of sunlight is critical. Dappled light is preferred. (ToolKit (TK) - 2.,3.,4., and 10.).

Wind



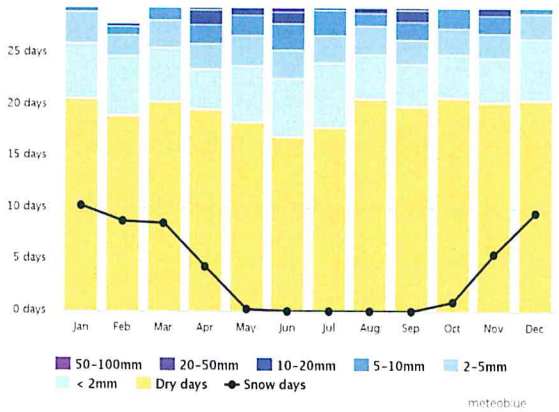


The wind rose for Thunder Bay shows how many hours per year the wind blows from the indicated direction (Top is North). It is also superimposed on the urban context site plan. The bar graph shows how many days within one month can be expected to reach certain wind speeds.

It is clear that the strongest winds come from the North West quadrant during the winter months. Southerly winds are also strong. Given the land forms and built form, the winds from the north west will be somewhat buffered.

Protecting people and the building from the north west winds is wise (TK-2). Making use of the wind for user comfort by way of the cooling effects of cross-breezes in summer and for the restorative effects of biophilia are real potentials (TK 7, 10).

Snow/Rain

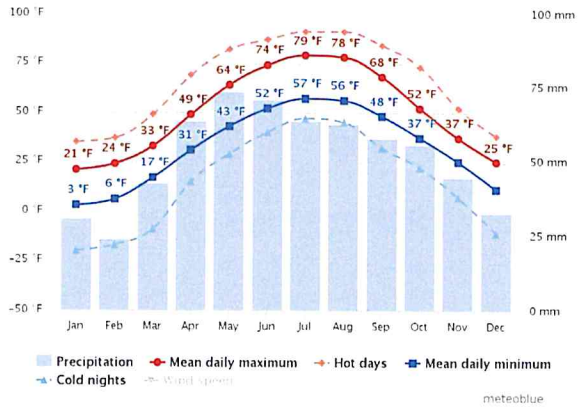


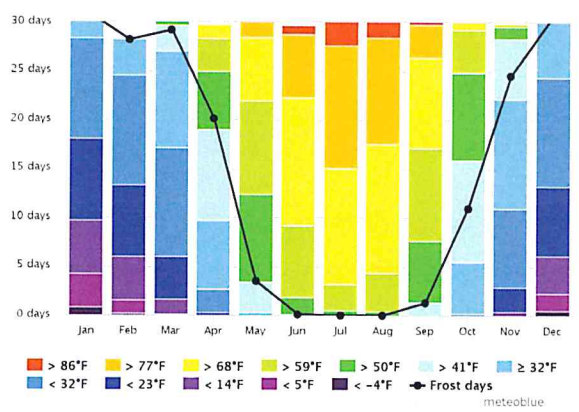
The precipitation bar graph for Thunder Bay shows on how many days per month, certain precipitation amounts are reached. The black line identifies the number of snow days in each month.

Precipitation is highest in May and decreases in general from then.

Preparation for water management and snow management provide protections from unpleasant sense experience (TK 3).

Temperature





The first graph, the “mean daily maximum” (solid red line) shows the maximum temperature of an average day for every month for Thunder Bay. Likewise, “mean daily minimum” (solid blue line) shows the average minimum temperature.

Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.

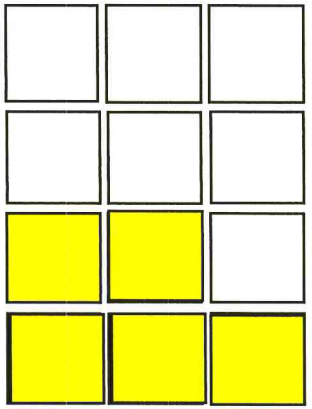
The second graph, The maximum temperature diagram for Thunder Bay, displays how many days per month reach certain temperatures.

Design temperature for the region is -21 degrees C. A properly oriented and well insulated building are recommended in the climate.

Source
Thesis Preliminary Review

Site - Toolkit Preference Goals

Secure



The assurance of safety requires clear signs that the potential problems of accident or injury have been considered even as you approach the site.

Minimizing vehicular traffic and pedestrians crossings and/or sharing is key. Ensuring pedestrians have adequate lighting and are visible to street-watchers from within the building are important.

Access by fire fighting should be visible to the public by way of ensuring adequate road access and by visible hydrants and or siamese connections. Multiple exits have been shown to increase confidence in probability of successful flight from a building and should be considered.

Providing a buffer to the west is advisable as the street and the railway will be a source of unwanted noise. Windows and other openings should have sufficient STC ratings to block noise from the west. Glazing will provide the necessary connection to outside. Protection from the north west winds suggests a wind break of some kind. Existing deciduous trees will provide some wind break but not during the winter when the winds are the strongest. Consider a different windbreak.

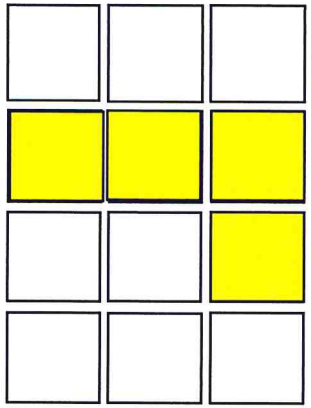
The light of the southern sun should be brought inside each room if possible, including gallery spaces, a significant design challenge.

A legible plan suggests a linear plan or less complex plans.

Site boundaries, slopes and natural axes on the site can provide indicators of possible organizing lines. The view of the existing development is a potential for providing a good orientation cue. The boundaries of the property suggest an axis along the Sleeping Giant Parkway or the logical extension of the pedestrian path. Other axes are possibly extending out to the water in a line similar to the Coal Dock or the Sin-Mac-Jetty or a combination thereof.

Parking lot and pedestrian paths require basic but essential functional design. Universal design is a must. Minimizing stairs and/or providing ramps in lieu of stairs is preferred.

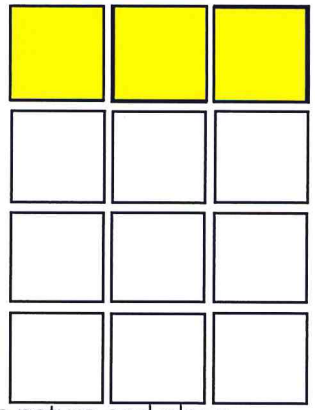
Functional



Opportunities for refuge at the edge of the building and within the site including covered exterior paths should be taken advantage of including with the sculpture gardens typical of today's galleries.

Privacy and autonomy call for variety of ways to approach and navigate the entry to the site and the transition to the building. Primary and secondary seating at the edge or building face, especially where positive views have been identified, is important.

Fulfilling



The element of the site that brings delight arises from nature and place memory primarily.

The built form can bring its own addition to delight from the good ideas that create forms that please or that invite the desire to know to explore and discover.

Built form can also support the natural landscape and place memory by calling attention to it, framing it or imitating it.

In the case of this site, views or built form that tap into place memory have numerous opportunities - Pool 6 docks, the patterned concrete bases, the wooden piles standing in the water, and so on and so forth become a palette of memories. The submerged barges that make up the jetties provide nice occasions for walk-outs to unique views with heritage markers. Nature views can tap into existing trees and the lake with its possible paths for exploration and even its psychological meaning or archetype - a calm lake symbolizing inner piece, a turbulent lake symbolizing life's difficulties.

Program - Preference Goals

Introduction

The building to be designed as an exploration of environmental psychology is an art gallery. The program, like the site, is provided in this thesis from a proposed development in the City of Thunder Bay (see right for program details).

Art is the fruit of leisure, and so too culture. A museum or gallery is a storage place for culture, for art, and the musing of the artist him/herself. A visitor to the museum spends their leisure by exploring the art within the gallery.

A museum visit is an encounter between the visitor and art, and through art, with the artist. Both are changed by the art, the artist in the making, the viewer in the viewing. This aesthetic encounter is the central reason for the museum.

Overview

Applied environmental psychology concerns itself with the intended experiences and then tries to support them through applying proven patterns preferred spaces supportive of the intended experience.

Faced with the mystery of life and of the human person, the only appropriate response is wonder, a wonder which when engaged bears fruit in a renewed enthusiasm for life. This is the main purpose of art, and of the museum, and puts them both at the service of the 'beauty' that 'saves the world.' To consider the program as a collection of experiences, related and layered, is the first task. Next comes the consideration of ways to support this experience based on the toolkit. Cues from the environment and from each other within any space powerfully drive how we feel and what we do (Herman Miller, 2015).

The toolkit for designing and detailing buildings holds true for this typology and the goal

No.	Program Space	Size sqft
1.0	General Public	3000
1.1	Reception/Lobby	800
1.2	Reception/Control	100
1.3	Coat room	150
1.4	Orientation Gallery	750
1.5	Gift Shop	350
1.6	Café Restaurant	1250
1.7	Kitchen and Janitorial	250
1.8	Washrooms	400
1.9	Building Storage	200
2.0	Galleries	
2.1	Main Gallery	4000
2.2	Dedicated Gallery	1500
2.3	Permanent Exhibit	1500
2.4	Lobby Exhibits	300
2.5	Member Lounge	250
2.6	Janitorial	50
3.0	Exhibition Support	
3.1	Collection and storage	2000
3.2	Conservation and archives	500
3.3	Shipping and Receiving	600
3.4	Preparation	500
4	Multi-Purpose	
4.1	Screening/Media	900
4.2	Art Classrooms	1650
4.3	Artist in Residence Studios (2)	280
4.3	Collapsible Wall Storage	100
4.4	Art Class Storage/sinks	200
4.5	Table and Chair Storage	200
4.6	Books/Media/Computer Library	250
4.7	Washrooms, Coat Racks	120
4.8	Janitorial	50
4.0	Administration	
4.1	Executive Offices (2)	300
4.2	Ten Offices	1000
4.3	Small Meeting Room	160
4.4	Copy Room	100
4.5	Servers and Security	100
4.6	Storage	140
4.7	Washrooms	100
4.8	Janitorial	50
	Gross up factors	
	circulation ratio .30	5955
	Grossing allowance .27	5360
	Design enhancement .1	1985
	Total	34450

of all its spaces for safety, functionality and fulfilling spaces. Some specific notes will now be outlined with regard to the environmental psychology in museums as an overview. The best resource for this topic found is from the Handbook of Environmental Psychology (2002). The chapter in that text 'Environmental Psychology in Museums, Zoos and other exhibition centers' by Stephen Bitgood is an excellent survey of the work in the field on the topic and of the conclusions drawn.

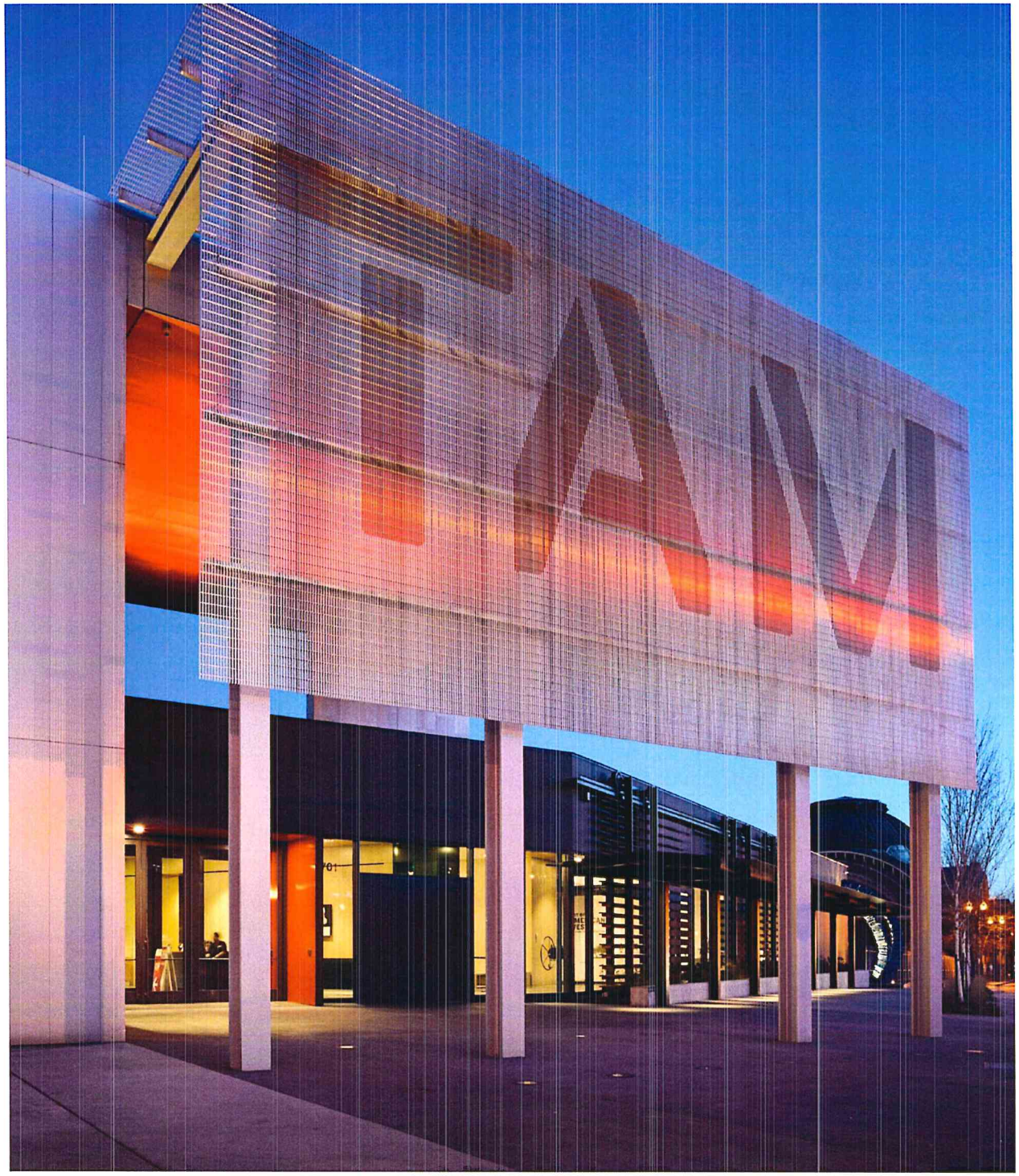
A museum is essentially an exhibition center whose mission is eduction; it is an educational exhibition. And while a museum shares some similarities with formal education with the reliance on materials to deliver the message and so on, the education is largely informal. Informal education is characterized by brief exposure to typically a visual stimuli, the physical environment is usually a stimuli rich environment, behaviours are less prescribed and the visitor is encouraged to make choices. Learning consequences are not so much reward and punishment as in formal education but simply delight. Most importantly, in informal settings, the social contacts are 'sometimes the most important part of the experience" (Bitgood, 2002).

The field of visitor studies is a new and growing field studying visitor experiences in museums as specific environmental assessments of environmental psychology. These are quantitative and qualitative studies including visitor tracking, and time sampling on the quantitative side and focused observation and self-report methods on the qualitative side.

The history of environmental studies in museums began as far back as in the 1920's with the work of Edward Robinson and Arthur Melton at Yale University who studied how the physical design of the museum influences visitor behavior, including circulation and visitor attention. Scattered studies continue today. Visitor studies have become in large part an internal process with the British Museum of Natural History and the Franklin Institute of Science at the forefront.

The studies focus on exhibits at all stages from planning, preparation and installation including remedial or post installation. Conceptual orientation studies are information items related to the museum and exhibitions. Circulation research is related to patterns of movement. This is a key factor in the architectural implications of the findings. A number of variables have been found that influence movement.

A major issue with museums is commonly termed museum fatigue. Resulting from of a series of intense experiences of depth processing and often exacerbated by the stress of wayfinding, museum fatigue needs to be addressed in the architectural solution. A museum, like the Lester Wing at the Fred Jones Museum of Art, deals with this architectural design. First, the solution strives for legible and coherent plans augmented by way-finding signage and tools, reducing the stress of disorientation. Secondly, by the introduction in the path through the building of restorative views it provides a rest from depth processing connected with viewing art.

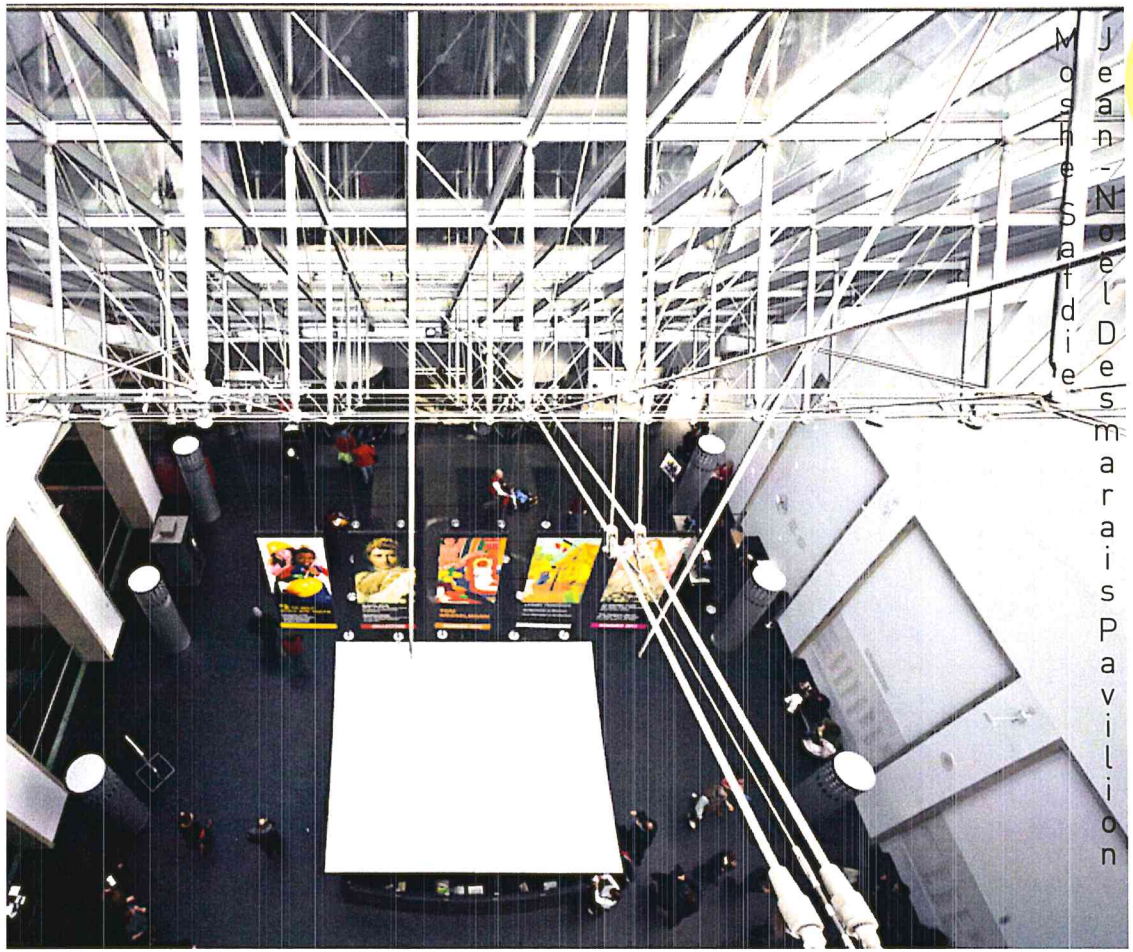


Tacoma Art Museum
Osen and Kundig

Determining adjacencies are a purposeful connecting of experience to achieve an overall experience ensuring the building functions as a whole. The hierarchical proportioning of space in a museum suggests that the art and the viewer share a similar value. The multipurpose area is a subordinate continuation of the exercise of leisure that is the visit to the museum. Multipurpose spaces are a way to connect with the artist, which happens concretely with the artist in residence.

Functionally, the storage areas should have some adjacency with preparatory areas and the gallery spaces themselves, as with shipping and receiving. The office and administration areas need a degree of privacy. These spaces benefit from views and double as a level of safety when views provide eyes on the street or public spaces. The social spaces, or 3rd spaces, provide a way for the community of workers and visitors to live together.

In the following pages, each of the major program divisions is considered from the point of environmental psychology resulting in design goals of preferred spaces as given in the thesis toolkit. All divisions begin with a summary defining the overall experience expected, design criteria from the toolkit, and specific applications from the research. The summary is expanded on for each program category save the support spaces for which the summary suffices.



Montreal Museum of Fine Arts
Highly Ordered with exceptional visual access, the lobby area anchors user mind mapping providing immediate sense of control and hence calm.

Source (image and summary)
Thesis Preliminary Review

1.0 General Public
COMFORT
Summary

Experience

Comfort - Transition and Welcome

Design Criteria

What is important to you when entering a gallery?
You need a sense of the overall space and a beginning idea of where to go to have the gallery experience.

As you begin, surveys of Galleries show that cleanliness and availability of washrooms are important as well. Cafe's can be visible from the outset but should be placed in particular to provide respite from museum fatigue.

Conceptual Orientation - 4, 5
Way-finding - 4
Staying places - 8, 9
Restorative spaces - 10

Specific Applications
Lines of sight to WC, Desk, Gallery Route
Group subsets of space and provide unique ID
Utilize hard architecture for primary way-finding
Provide signage linked to primary ID/landmark
Minimize route changes
Printed guides with slide shows

1.0 General Public

1.1 Reception/Lobby 800 SF

Life

The lobby is of critical importance especially for infrequent visitors or first-time visitors (Bigood, 2002).

Entering a building is making a transition, from outside to inside, from public to semi-public space. The experience you want is a smooth transition, allowing for managing yourself given any weather conditions, and your belongings. The opportunity to ground your need for safety and your need to be oriented are key, known as conceptual orientation and way-finding. The hard architecture, placement of doors, windows, welcome desk, must give cues or underscore those elements. For example, the best way-finding is obvious circulation which is defined by the hard architecture. These are the most welcoming and necessary elements. Distinctions between public and private spaces, public and private workers, etcetera will further help the experience of welcome.

Conceptual orientation is best provided by a visitor guide, orientation signage, or by staff. Leaving it to the staff alone is inadequate as visitor's rarely ask for direction and if they ask it is usually with regard to content (ibid). The combination of guides and slide shows in the lobby appear to provide the best orientation and reduce questions (ibid).

Way-finding, the process of using spatial and environmental information to navigate, is key. Way-finding is a process that is comprised of four stages: orientation, route decision, route monitoring and destination recognition (Lidwell, 2003).

Orientation is improved by grouping spaces and identifying them by landmarks and signages as subsets. Redundant way-finding cues provide a feeling of safety to museum visitors. Linking landmarks to a 'you are here symbol' on a map is useful (Bigood, 2002).

Route decision can be improved greatly by spatial syntax. The basic assumption of spatial syntax is derived from the link between layout and movement. Simply, lines of site guide patterns of movement. The feet follow the eye. Tim Stoner a practitioner of spatial syntax say designers often forget this, thinking that complexity in routes creates interest; its simply not true (Space Syntax, 2015). The simplest route tends to have the fewest changes in direction. Minimizing the number of choices improves route decisions (ibid).

Navigational signage supports decision making. Complex spaces are helped by maps. In museums, visitor guides increase the total time visitors spend in the museum. Museum maps need to be simple enough that visitors can locate where they are at any moment (Bitgood, 2002). Visitors prefer maps to hand held devices (the study presenting this conclusion did not include the use of personal cell phones).

Route Monitoring confirmations tell us that the path choice was correct and is leading to our destination. Paths should help you gauge progress and provide breadcrumbs to the destination (Ibid).

Destination recognition is helped by signage and spatial definition that prohibits movement giving the destination a clear identity.

For an art gallery in particular, lines of site to rest rooms, gift shops, and exhibition entrances are to be provided in the lobby if possible.

The following spaces are particular experiences in the overall welcome experience.

1.2 Reception Control 100 SF

As part of the entry experience, a necessary activity of the exchange of directions and or monies will happen here. The experience is best if not forced.

1.3 Coat Room

Removing a coat marks the transition and a commitment to being in place. As part of the entry transition, the opportunity to leave your coat is a welcome service. Easy, efficient, and safe are essential The location of functions in the lobby should meet visitor expectations - rest rooms, and coat rooms adjacent.

1.4 Orientation Gallery

Not intended as an orientation to the building, this gallery primes users for the upcoming viewing experience as an aid to minimizing museum fatigue.

1.5 Gift Shop

This is a retail experience within the gallery experience. Here people will move around and view products for sale. They will experience the brand and hopefully make a purchase. Purchases extend the experience and lay significant place memories. Studies of galleries show that visitors, especially families, expect to purchase a souvenir. Of the three groups of shoppers, recreational, task and employees, the museum goer is most like a 'recreational' shopper though they are also likely to make a purchase. Task shoppers prefer a less energized environment but the museum goer sees the gift shop experience as part of the whole museum experience and are looking for a more energized unique space (Bitgood, 2002).

Music and colour consistent with the museum experience are key. Positive scents are also valuable. For example, citrus is good for a gift shop, the smell of chocolate chip cookies for the cafe. The gift shop benefits from light mapping where people move from one bright source to another. Physical place design influences what shoppers do (Augustin 209). Sensory design has a significant influence on retailer success (ibid).

1.6 Cafe Restaurant

The opportunity to stop and nourish is a necessity in a building in which people are to spend a significant time. Rest and nourishment are key. And rest of the mind in particular from the depth processing required in the main activities. In an Art Gallery, the experience should be consistent with the primary activity. Most importantly, the cafe should be located to nudge visitors to embrace a break to counteract museum fatigue.

1.7 Kitchen

Occupants may or may not see the kitchen space. If so, it can help to appreciate the cleanliness and safety of the nourishment. A busy kitchen can be disturbing.

The experience of the kitchen from those who work there is an experience of the workplace and goes beyond the confines of the kitchen. To them though, that space needs to function for the purpose of providing a good rest and nourishment experience to the patron. They will want efficiency, safety, the ability to collaborate with other kitchen staff.

1.7 b Janitorial

The patron's experience of this space should only be to 'not notice it'. The staff need a primarily functional space that is safe for them to use.

1.8 Washrooms

Assurance of privacy and the protection against unpleasant sense experiences will be the most important in these spaces. Surveys of galleries confirm that cleanliness and availability are the factors to visitor satisfaction. A lemon scent increases perceptions of cleanliness (Augustin, 2009).

1.9 Building Storage

The patron's experience of this space is likened to the experience of the janitor closet - they should be blissfully unaware.

The space itself will be used to store items not currently in use. Highly organized and ergonomically intuitive are goals for this space.

acobsen's highly ordered plan, trengthened by the hard ar- hitecture and finish elements, nakes way-finding intuitive.

Source (image and summary)
Thesis Preliminary Review

2.0 Gallery Spaces
MYSTERY
Summary

Experience

Mystery - Moving and Viewing

Design Criteria

Have you ever been exhausted by your museum experience? Yes? There is a name for this common phenomenon - Museum Fatigue. To have a good museum experience, an exhibit space has to help capture your attention. The exhibition path has to take you by the art piece which by itself needs to be made easy for your to view and to read supporting text (labels).

As viewing is tiring, places to re-energize are vital. Further, a coherent and legible space throughout reduces stress.

Mystery and surprise - 12
Functional Space - 6
Restorative Spaces - 10
Progressive lures - 5
Protection from unpleasant senses - 2

Specific Applications

Plants, views, mobiles
Seating gradients
Support art with isolation locations, large ground
Right turn bias and exit gradient considerations
Minimize distractions including sound bleed from other exhibits

2.1 Galleries

The primary activity of viewing art involves moving, stopping, standing, looking, reading thinking. It requires orientation, confidence in moving, appropriate seating possibilities to stop and rest. To achieve the level of depth processing patrons need to view suggests little stimulation.

Three principles of attention explain and aid the organization of exhibition spaces based on studies of visitor reactions. Some of what follows applies specifically to the design of exhibitions within the gallery space which is the work of gallery staff and not the architect. However, through an understanding the design goals of exhibits the architectural solution achieves success. The three key factors in exhibit design from environmental assessments of these spaces are:

1. Attention is selective, focused and determined by distinctiveness (salience) and by proximity to the path.
2. Visitors must be motivated to focus by arousal, amount of perceived work and number of distractions.
3. Mental and physical effort depletes the limited resources to focus based on the total amount of effort expended, the amounts of arousal and the duration of time (Bitgood, 2002).

Implications of the first principle are the requirement of capturing attention by legibility born of salience and proximity. Salience is improved by isolation

(free from other distractions), size (larger is better, contrast with setting (minimum background noise), multi-sensory, lighting (overall and spot), and line of sight placement (within view, less than seven feet above the finisher floor). Labels need to be close to the object (other factors are mentioned below).

With circulation, if visitors do not pass by an object, it will not attract attention. "Rarely do visitors pass by all objects in a gallery", (Bitgood, 2002). Circulation is aided by salience, in particular size. Landmarks influence paths. Attraction of open doors; viewers tend to view gallery spaces by entering and moving along the right hand wall (Right turn bias) exiting by the first open door. The arrangement of objects is also a determining factor creating hot and cold spots in part a result of circulation. Myriads of exhibit islands create chaotic traffic flows creating larger hot and cold spots. The goal should be a clear pathway and order of viewing displays. Like in spatial syntax's fundamental finding, people show a tendency to take the shortest route between the entrance and exit following what Melton called the 'exit gradient' (ibid). Architecturally, a crafting of the overall path with a mindfulness of the right turn bias and exit gradient in addition to the toolkit are needed.

The implications of the second principle are aids to getting visitors to decide to view an object. The most challenging task in exhibition design is getting visitors to focus on labels and objects (ibid). To minimize perceived effort which results in decreased motivation, you need to reduce the perceived effort of labels in particular. Breaking labels into chunks, e.g. one long label into three smaller ones, increases reading. Being able to view the object and the label at the same time is also effective. Bullet lists, figure-ground contrast (ibid), reducing sensory overload all help minimize perceived effort.

To create thought provoking interest, a number of things can be done. Labels can pose questions, interesting ones and confront misconceptions identified in front end surveys (Ibid). The writing style can draw analogies, be reader relevant, use a conversational tone, address the reader directly, identify

high interest content and invite metal imagery. Handouts, interestingly, decrease museum fatigue (ibid) which suggests apps for the phone may work best. Hands on flips increase stopping and viewing times. Labels which prompt social interaction (parent to child) are also effective.

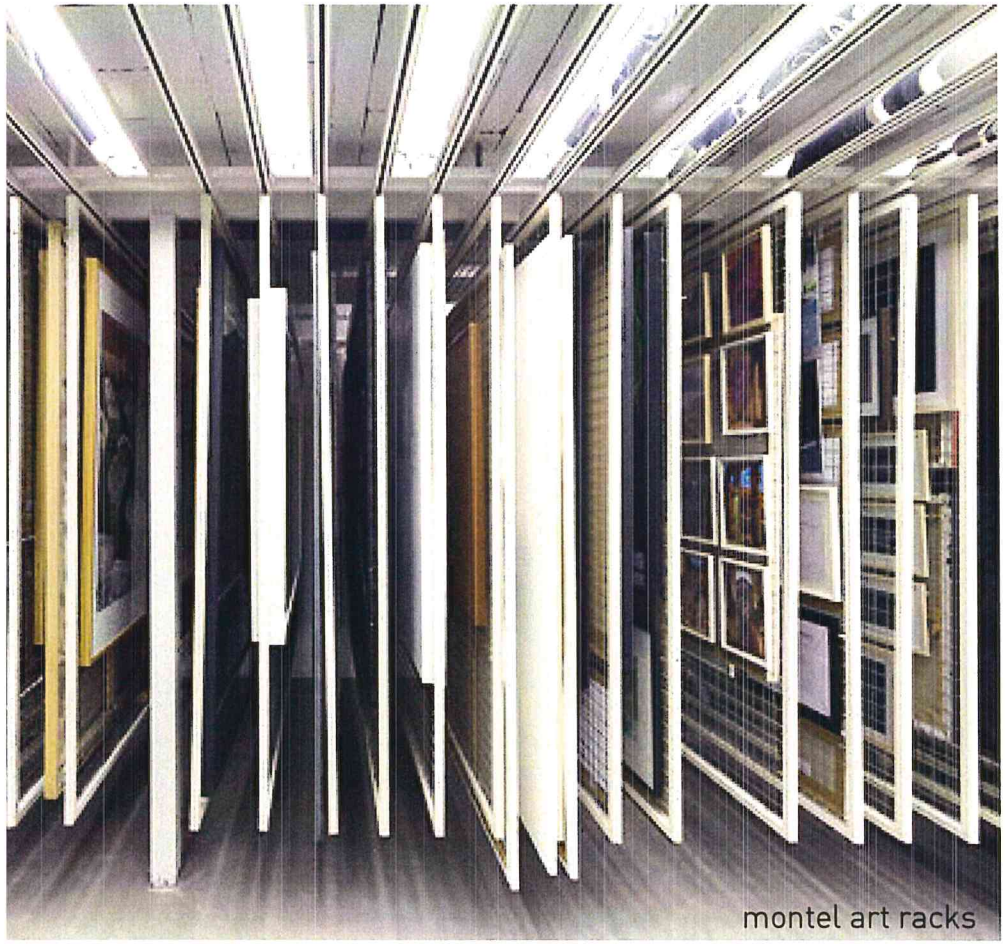
Providing an architectural space with few distractions helps attention focus on the object and label. The presence of sunlight (direct or indirect space depending), visible egress and restorative views before and after art spaces is another essential. Minimizing distractions requires minimizing sound bleed from other exhibits, reducing competition from other exhibit elements, and good way-finding to reduce the stress of orientation loss.

To reduce museum fatigue, further, it is important to consider the rate of depleting mental resources and renewal by designing the displays with a degree of variety with an eye to minimizing mental effort, to peeking interest, and most importantly providing respite by location of biophillic elements and strategic placement of the cafe/restaurant and gift shop. A special exhibit specific gift shop at the end of the exhibit is also useful.

Labels cannot compete with the visual experience but must complement by focusing attention or explaining phenomenon. The style of the educational message requires a number of things - syntactic complexity should be avoided, short, simple sentence. Semantic complexity as well. Vocabulary should be common with a clear and concise simplicity.

Lobby exhibits

The experience is primarily visual but aids in priming and enticing the patron for the art viewing experience similar to the orientation gallery.



This storage specific to the categorized collection of art allows for the storage of a large volume on a small footprint allowing for quick and easy access to the collection.

Source (image and summary)
Thesis Preliminary Review

3.0 Support Spaces
FUNCTION
Summary

Experience

Function - Convenient and Specialized

.

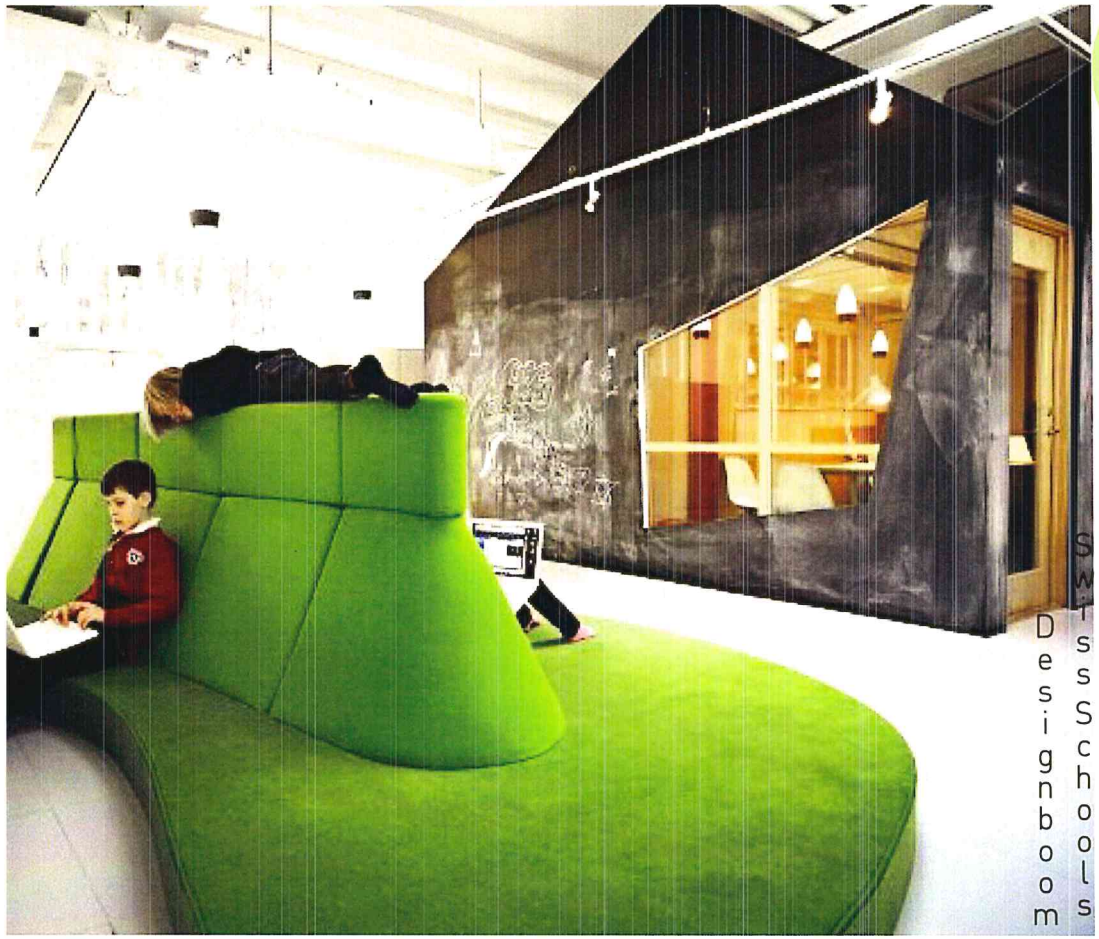
Design Criteria

As the image above would suggest, a functional space with specialized tools or equipment to accomplish the goals of storage, handling, display and archiving are essential. Affordances that encourage correct use of the equipment, circulation within the support space and with key adjacencies encourage the activities foreseen in the spaces. The design of these spaces are central to the success of the whole.

Functional Space - 10
Way-finding - 4
Specialized environmental quality - 10
Places for sitting and standing - 8, 9
Need for Assurances of Safety - 1
Need for Privacy and Control - 7

Specific Applications

Orientation cues
Affordances of circulation and tools



Swiss School Design
Control, or the perception of it, are
undamentally satisfying. Func-
ional with aesthetic elements that
are organic and litterally green
urther gratify.

Source (image and summary)
Thesis Preliminary Review

4.0 COMPETENCE Multipurpose Spaces

Summary

Experience

Competence - Hands on Learning.

Design Criteria

Coming to an art gallery for a classroom event can be an exciting experience of exploration and discovery. An engaging environment is central and most people prefer the learning by doing experience (HM). A comfortable space with limited distractions that encourage interactions are fundamental. An adaptable space that can be a classroom or best a collection of learning studios based on the needs is the goal.

Preference for individual control - 7
Places for being alone, sitting, standing staying - 8
Places for being together - 9
Functional space - 6
Lack of clutter - 3

Specific Applications

Appropriate furnishings
Adaptable furnishings
Good ambient lighting
Universal design
Varied ceiling heights

4.0 Multipurpose

This is the hands on active experience venue. It includes the opportunity for a viewing experience of multimedia presentations - a sitting, seeing and viewing experience. The art classroom is a classroom or learning environment. The artist in residence affords the experience of apprenticeship or expert advice.

Herman Miller conducted studies of learning environments and concluded that four elements or common themes in these types of environments: basic human needs, teaching, learning, and engagement (2008). These four key components reflect again the main components of the toolkit developed for designing and detailing buildings. Well designed spaces provide for our need for safety, comfort and competence, and for meaningful action through functional and engaging spaces. What follows outlines the research conclusions of Herman Miller and others with regard to environmental psychology as applied to the learning environment.

If the success of learning is based on retention and application, these statistics from Herman Miller are evocative:
About 5 % of the information delivered through lecture as restrained... 50% for discussion group and 70% for practice by doing. Even higher, 80 % was retention by students teaching others (ibid).

This fact tells me that one of the most successful models of pedagogy is the, "see one, do one, teach one", method of education. Engaging students is the key. In a recent study by Herman Miller, 64% of students preferred the learning by doing experience. The presence of a studio and an artist in residence is a great design goal for a new art gallery. In fact, the paradigm of a learning studio is precisely what the research into educational environments by Herman Miller suggests educational environments should follow to achieve students engagement (ibid).

Design can aid that engagement. At the heart of this is interactions. Teacher to student to student to teacher. Therefore, "the design of learning spaces should increase levels of engagement, foster active learning and teaching, and support the learning goals"(Herman Miller, 2008). A learning studio should communicate first and foremost that education providers value their students and their accomplishments (Augustin, 2009). Furnishings and the environment of the learning studio should communicate a level of professionalism, trust, and value that traditional classrooms have not. Comfortable classrooms physically and psychologically limit distractions, remove stress, and to allow minds to be engaged. Intimidating or uninviting environments can have a negative impact on the ability to achieve depth processing (Herman Miller, 2008).

Students have dropped classes because their chairs were uncomfortable (Herman Miller, 2011). Comfort and flexibility positively contribute to the learning experience. Adaptability is a component of psychological health from lighting, temperature to controlling the connection to outdoors (biophilia). Adaptability leads to an increase satisfaction as it allows for the exercise of autonomy and management of personal space.

For teachers, a functional space is an adaptable space. An effective teacher is "someone who orchestrates pedagogy, tools, and environment in a way that creates opportunities for students to learn" (ibid).

For todays students, knowing has shifted from being able to repeat information to being able to find it, use it and contextualize it ((ibid). It requires a more active approach to learning. Students are less interested in large lecture halls and prefer informal, small group discussions even by way of text or email to gain understanding. They seek a collaborative space that fosters understanding and learning (HM 2006). Learning studio design elements such as mobile furniture and white-boards provide students and faculty with the ability to change the environment to meet their pedagogical and collaboration needs (ibid).

Findings accumulated as part of the learning space research program provide evidence that flexible and adaptive design supports the core pedagogic constructs of basic human needs, teaching, learning and engagement.

Google Offices Switzerland
While perhaps a bit comic and maybe even excessive, the fundamental need for privacy and for territoriality are addressed.

Source (image and summary)
Thesis Preliminary Review

5.0 Administration Spaces

ESTEEM

Summary

Experience

Esteem - Working and Collaborating.

Design Criteria

What if your employer considered you as a customer and doing so meant providing you with unprecedented value and compelling choices? As an employee, you would shop for the space best suited to your needs. The degree of autonomy would support your need for identity and freedom. The contribution you make will address your creative needs and your sense of participation in the whole.

Office trends are toward IT connectivity, merging of life in and out of office, with increasing opportunity for creativity. Central need is for numerous opportunities for collaboration.

Failures of current designs exist. The lack of privacy, a primary need, and of opportunities to express territoriality result in stressful situations.

Need for Privacy and Control - 7
Places for being together - 9
Places for sitting, standing, staying - 8
Resorative views and elements - 10

Specific Applications

Follow IT - Everything everywhere
Decentralized Collaboration spaces - talkscapes
eating spaces.
Specialized environmental quality - light/IT
Private spaces
Restorative elements

5.0 Administration

The administration program space is comprised of the overall workplace and the individuals workspace. The experiences expected here are many and are part of the typical office life. Just a few of the trends we see today are the connectivity to people and machines, instant access to information and ideas, a merging of life inside and outside the office, and increasing creative and productive capabilities of people (Herman Miller, 2015).

The thesis concept grounds this area of design as well - workers need a sense of security, belonging, autonomy, achievement, status and purpose (ibid). The brand of the firm provides a large part of legibility; who we are. The health of the group depends on how the employers value employees; this is seen above all in how resources are allocated on the needs of the employees, their workplace/spaces. Workers are shown to evaluate their workplace primarily on their workspace (Augustin, 2009).

An interesting approach to the employer/employee dynamic is the suggestion to treat employees as a customers. Employers need to stand out; to do that you need to offer workers value and compelling choices (Herman Miller, 2015). In the design of the workplace then, the goal is to allow workers to shop for the space that best suits their immediate needs. This approach is aided by digital technology. It is true that the workplace today demands

connectivity. The designers of many of Google's interior environments, Stefan Camenzind and Tanya Ruegg take this approach to connectivity: all our projects follow the simple IT principles of everything everywhere, all employees with laptops, soft phones and mobile phones, excellent WiFi bandwidth everywhere, electricity not just on the table but in meeting rooms and in all informal spaces, laptop chargers also provided in all informal and breakout areas, screens to connect to in all informal and break out spaces as well, security settings enable working from anywhere outside the office.

Environmental psychology findings would suggest that this is likely a passing trend and what is most needed is autonomy designed by a workspace with the ability to control the degree of enclosure to achieve privacy and with the ability to control, to a degree, comfort by adjusting temperature, light (artificial and natural) and so on. In fact, the real connectivity required by us is predominantly with the outside by a view, in particular, surprisingly, of a cultivated landscape. If this is not achievable, the presence of indoor plants with smooth leaves is also expressive of this preference. What completes the workspace is functionally; it is essential the workspace be consistent with the most crucial task.

A central goal of administration spaces are effective collaboration spaces. The group space should be in the middle of the administration space, not at an end which typically results in the space being used for independent work (Augustin, 2009). Furniture arrangement affects how a team interacts and collaboration spaces should be easily reconfigurable to support different types of interaction. Central to a collaboration space is a means for sharing ideas, capturing and displaying the information on white-boards or whitewalls. Effective teams, according to research by Herman Miller, are characterized by trust and by collaboration - in that order. The required trust is built through familiarity and individual character; fostering positive interaction and socializing is therefore important. The importance of sharing food and drink and the associated intermingling call for these spaces to be nearby coffee

or vending and the like.

Architecturally and psychologically, the conditions that ground successful interaction and collaboration spaces are proximity, accessibility, privacy, legitimacy and functionality. "The design trick is to provide the correct balance of stimulating interaction spaces versus calm ones to support different personalities and tasks" (Herman Miller, 2015).

A range of collaboration spaces is possible if you pay attention to circulation and the spaces within that where people cross paths. People collaborate at the water cooler or in the hallway just as well as in the boardroom, and at times better. "A balance is required of distributed nodes for spontaneous interaction, local hubs for team collaboration plus central resources for planned (client or team) presentations. And if biology classes taught us anything its that all living things need balance (ibid).

Architectural Partis - Norval Morrisseau's X-Ray

THE BUILDING CONCEPT - X-RAY

The Thunder Bay Art Gallery celebrates First Nations Art from across Canada. If art is a revelation and this house of art under design has a focus on the First Nations People of our country, who they are and what their story is, is fundamental - essential. This question, however intriguing and disturbing, must be considered.

With this question in mind, I came across the Woodland Tradition, the first nations art of our area for which the gallery is to have a particular focus. A central figure of that style is Norval Morrisseau (1932-2007). His iconographic style had a signature feature, the X-RAY. The x-ray is the truth, a revelation of the inner spirit (see left). I saw in this something central to the First Nations People and their story in Canada. The X-ray is a visible vulnerability, a trusting openness. This openness, I realized, is consistent with my experience of first nations people, true of my childhood friend, James, a victim of suicide, and of my experience of first nations people whom I meet on the street or in the doctor's office and so on. Their willingness to engage, the ease at which they laugh; their trusting nature is unique. This is their strength. It has also been their downfall as the history of North America can attest.

In that vulnerability, the X-ray *is* their story. It also has a message of hope. That openness reveals a strength, the bones inside. The message for tomorrow is you can find your strength in the broken areas, at the place of your trust betrayed, and that story can write the future. The architecture must tell this overarching message of who they are and who they can be - open and vulnerable yet finding in that same place of woundedness an unwavering strength - glass counterpointed by the proud resilience of a skeleton made of the trees of the forest that still stand on this ground. That's the story.

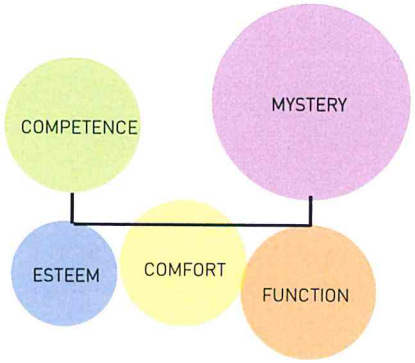
CONCEPT MODELS - COGNITIVE MAP

From the perspective of Environmental Psychology, the approach to schematic design begins with the life inside, the experience of users or 'centres of activity'. The concept model, the partis expressed graphically, becomes at one and the same time a schematic design and an exercise in creating conceptual cognitive maps of the building.

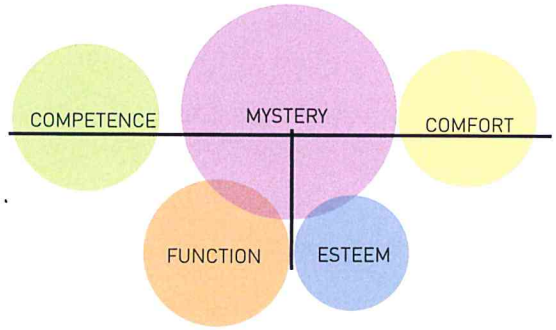
Research shows that the cognitive map we make has a typical form. People universally start with the familiar significant experience in the centre of their map as an anchor and then move out to other experiences. More significant experiences tend to be made as larger geometric forms relative to other experience spaces. These sketched cognitive maps typically include edges, paths and nodes.

The schematic designs to the right make use of circles to convey size and connection. They are similar to drawings of typical cognitive maps.

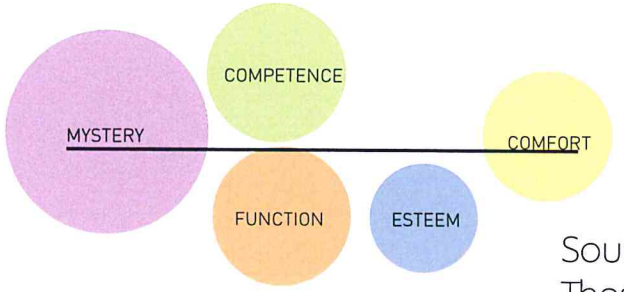
CONCEPT MODEL 1
X-RAY - VISUAL ACCESS



CONCEPT MODEL 2
X-RAY - EXPOSED CORE



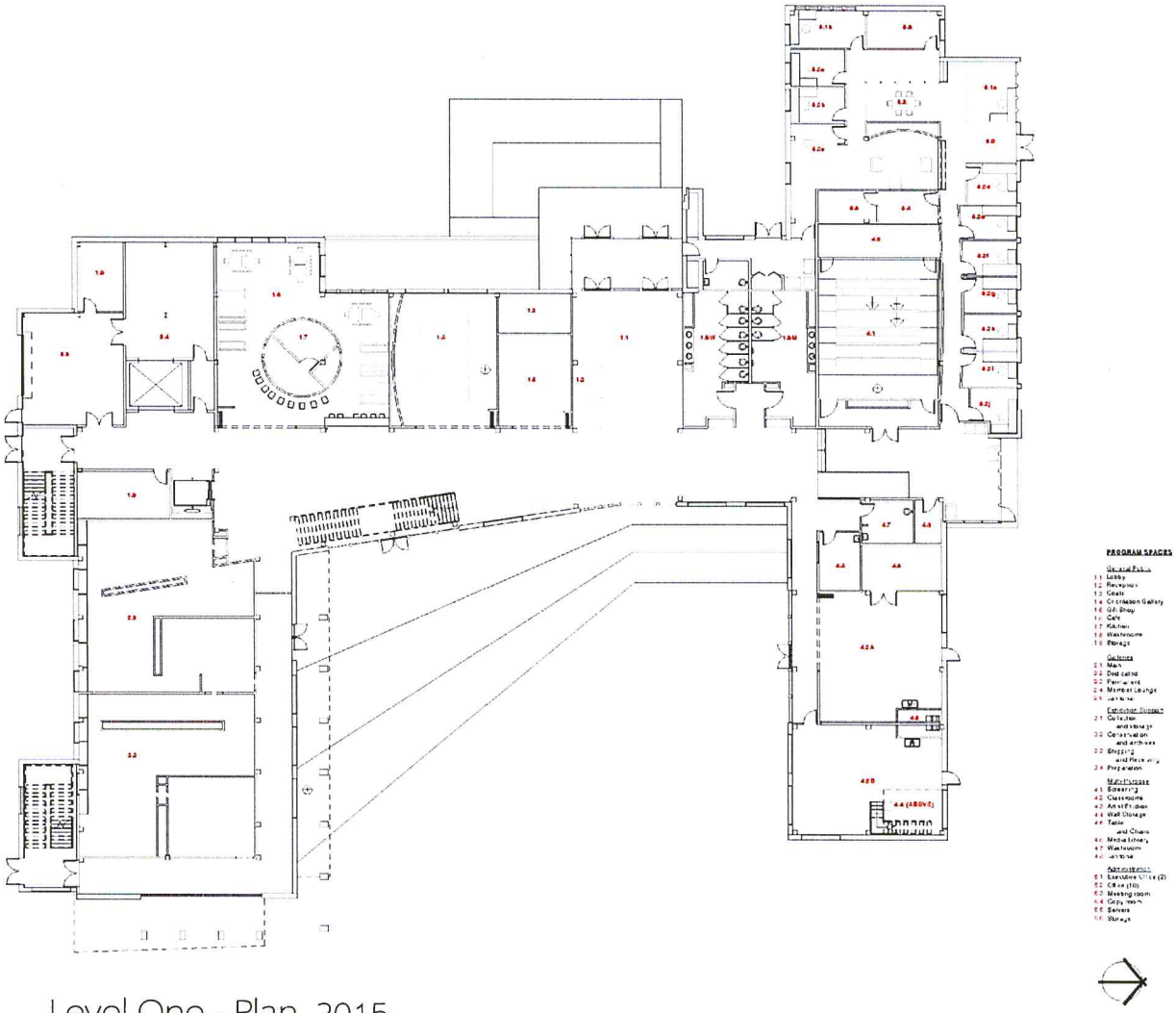
CONCEPT MODEL 3
X-RAY - EXPOSED STRUCTURAL RYTHYM



Source
Thesis Preliminary Review

Part IV
Design

Beginning Design



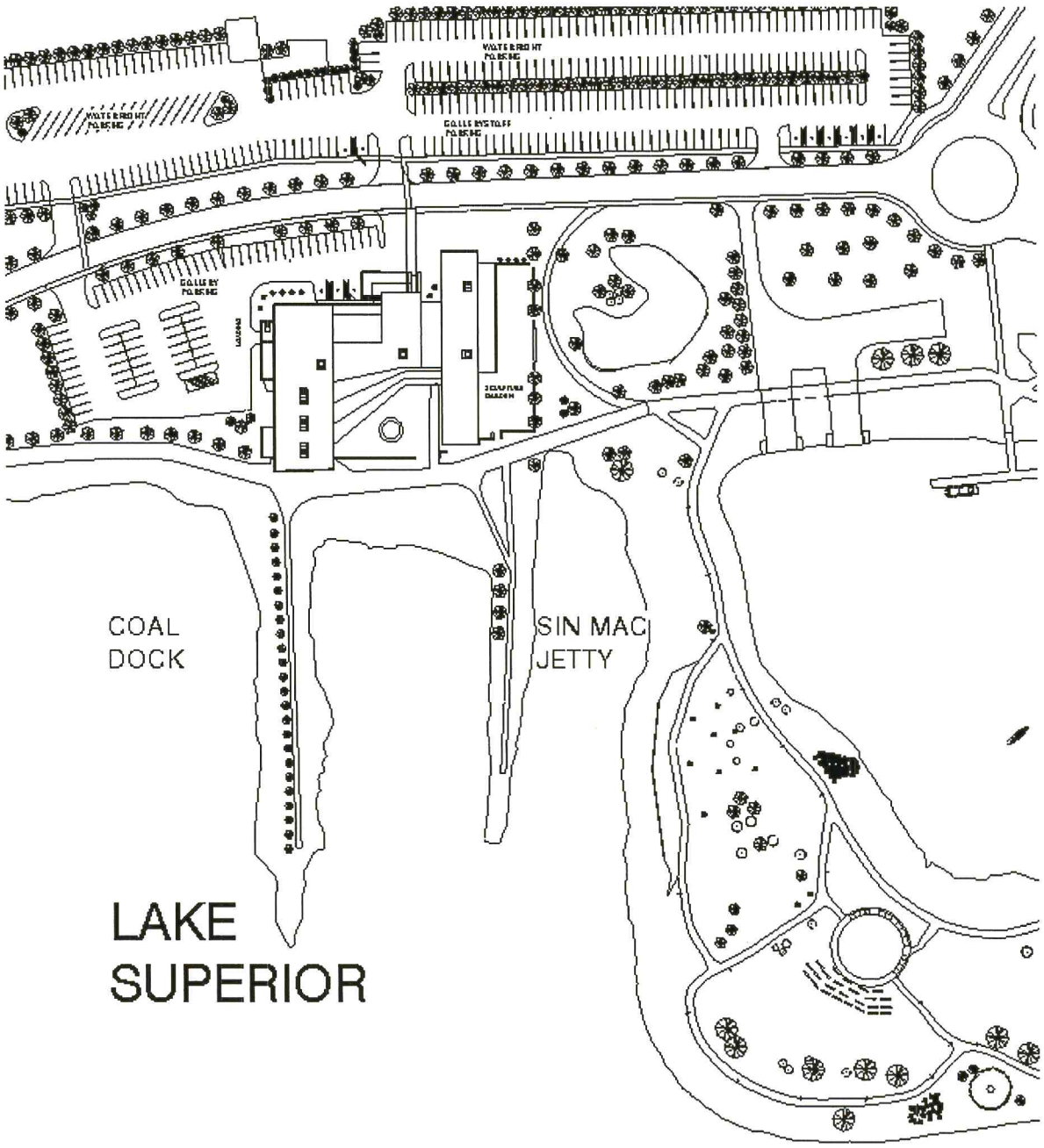
Level One - Plan, 2015
Source
Thesis Intermediate Review

Initial Strokes

The developing design began with the selection of the expression of the partis in concept model no. 1 which highlights the visual access and vulnerability of the X-Ray concept through the creation of a courtyard about the two jetty's. This approach seemed most fitting as it respected the site review and the project concept with the preference for legibility and coherence.

The Intermediate Review highlighted some issues with the application of the toolkit that needed to be addressed in a final design. The use of the toolkit in a prescriptive manner as opposed to a performance based approach as intended resulted in, at times, a piecemeal and forced resolution of the architectural problem. This resulted in a beginning solution that lacked the necessary coherence that is part of preference. In fact, the partis was not easily recognizable. A potential reason for this was a hesitancy to meet the challenge of the partis which resulted in a weakening of the idea. Admittedly a circular form requires caution, even hesitation, but here opting for a series of rectangular forms in a u-pattern rather than the circular form that the partis demanded was the primary reason for the dilution of the strong idea.

3D View From East, 2015
Source
Thesis Intermediate Review



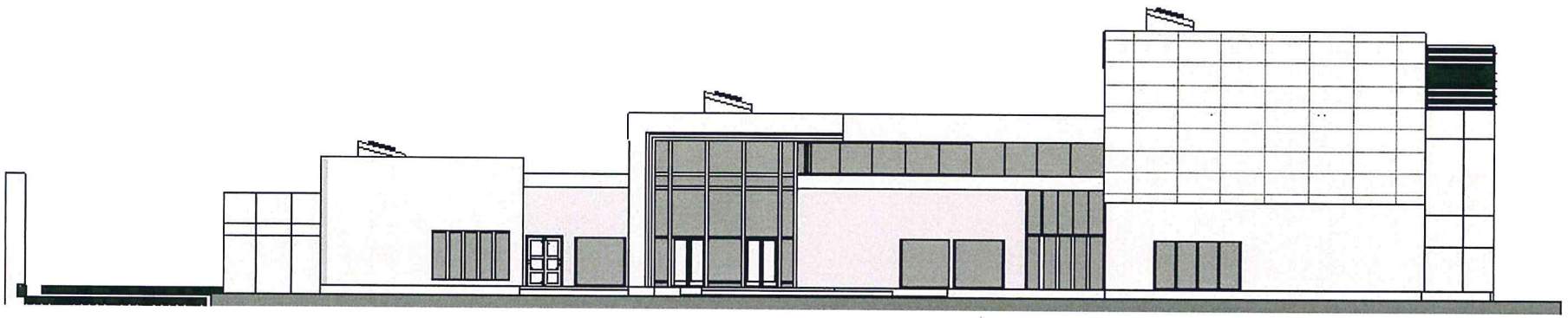
Site, 2015
Source
Thesis Intermediate Review

Some Ideas that were developing, the adjacencies and the logical ordering, were strong but needed to be furthered developed to result in the simplicity born of multiple iterations and a depth of understanding.

The engagement of the site at the intermediate review was only in germ requiring more development. It was admitted that the early design moves, in particular the attention to place memory by using the archaeological jetty's as the axis of the form and thereby creating a semi-private outdoor courtyard at the edge of the public walk cutting across the property at the waters edge was laudable.

The location of the parking was logical. The sculpture garden extending the footprint of the building to align with axis of the jetty was seen to be forced with deeper connections possible. The massing expressed the developing hierarchy but came short of the legibility and coherence demanded by a strong resolution and environmental psychology (See 3D above and West Elevation below).

West Elevation, 2015
Source
Thesis Intermediate Review



Final Design

Evocativeness, Coherence, Legibility and Functionality

In this final chapter of this thesis document, the resolution of the architectural problem with the aid of the Toolkit for Designing and Detailing Buildings will be presented. The intent is not an exhaustive list of the application but an indication of how the toolkit was applied generally.

As a performance based toolkit from environmental psychology, the mindset in approaching the application requires constant confirmation that the design is achieving safety, functionality and fulfillment expectations. More specifically, coherence and legebility are foundational to the experience of security. Functionality is a must as architecture is a functional art supporting competence specific to typology. Ultimately an evocativeness that awakens our better selves and draws users to reach for the same are essential for good architecture. .

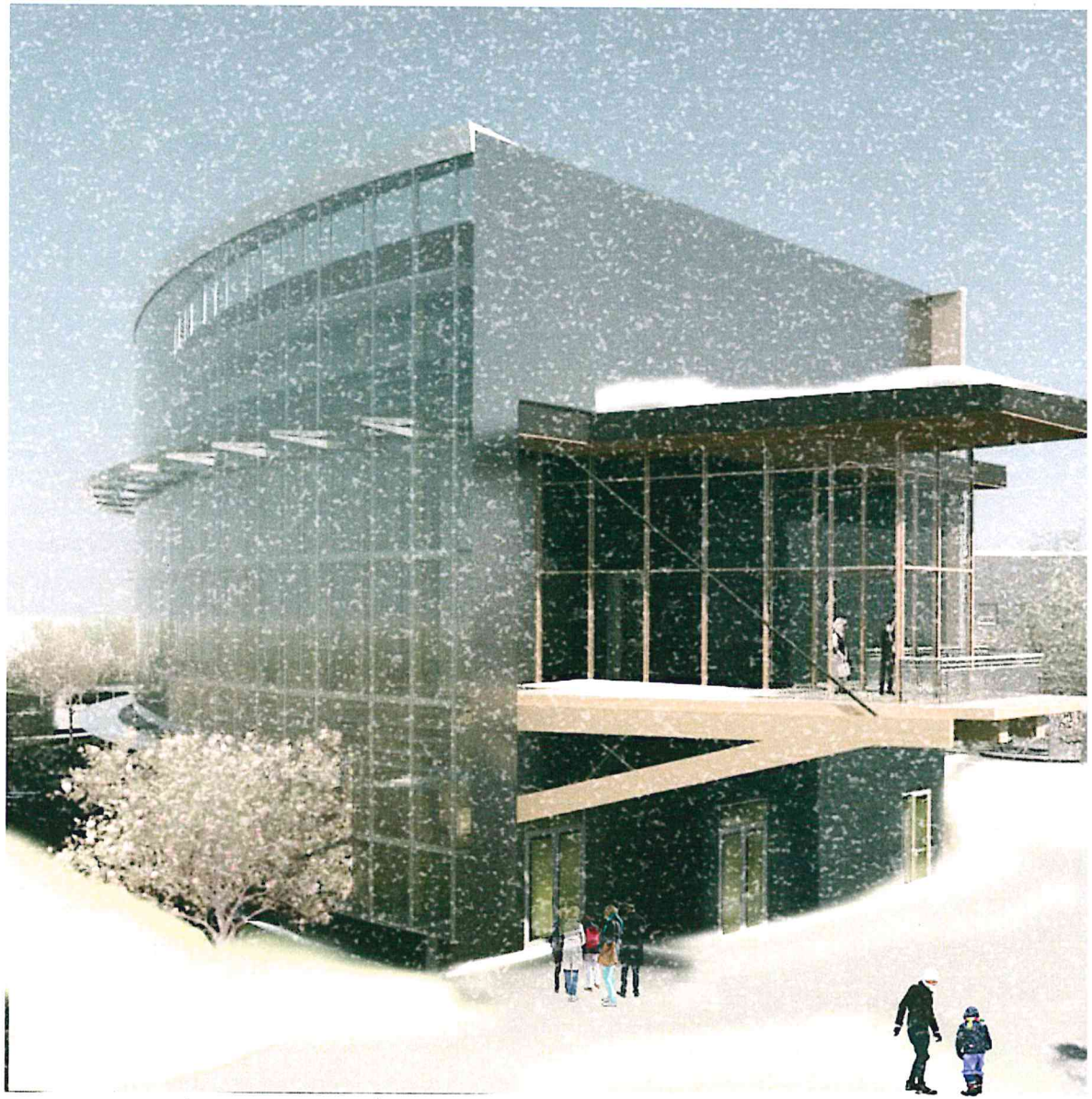
The design is thus presented under the following headings - evocativeness, coherence, legibility, and functionality. To begin:

evocativeness

When our senses encounter the form, the architecture before us, and we comprehend a thoughtful intention that reveals to us a space that is safe, functional and interesting or emotionally engaging, we experience delight. Evocative architecture is a cause for delight.

Our sensual delight of a space is immediate.
Evocative architecture is a result of two factors:
- complexity, a degree of variety in the aesthetic and
- mystery, the prospect of learning more by exploring the space

In the final design, a feature element is the use of a glazed double wall on the south facade with a slight opaqueness that reveals and hides at one and the same time. As a complex of structural framing and shading devices, this facade bathes the interior sculpture gallery corridors and, too, solves the design challenge of bringing reflected light into the rest of the galleries. It is a vulnerability that quietly is a strength like the X-ray. The effect is one of elegant beauty and harmony with nature and purpose. Approaching the museum to the south one wonders; walking within the galleries one understands.



Winter Render, Final Design, South East, 2016
Source
Thesis Final Review

Cedar accents
Vernacular/warmth

Blue Brick
Universal appeal/Vernacular/
Age well

Translucent Glazing
Evoke mystery, Allow in light/
warmth

Blackened Boards
evocative/ has ethereal quality in
snow

Source
Thesis Final Review

An important element of evocative spaces are colours and sounds, scents and textures, in the perceived environment. Colours have meaning universally and culturally as do sounds, scents and taste (Augustin, 2009). These sensual stimulants can and should be understood and applied in a manner that fits the intended design.

The exterior colour and texture pallet for the gallery project have been chosen for precise reasons. The cladding of the building is a combination of blue brick, black stained board and glazed facades of varying degree of translucency. The colour of the brick is the universally preferred colour (Toolkit (TK) 10). It is the familiar colour of the sky and resonates in this manner with the first nations community whose art is to be highlighted in the museum. The translucent glazing evokes the mystery that promotes discovery, an essential aspect of museums. It also allows in sunlight that is key to human comfort and the regulation of the circadian rhythm (TK,2). It becomes part of the mechanical and energy efficient design of the building as well (see Functional - technical). Wood, the blackened boards and the cedar accents, call to mind the wood construction of the area and the preference for materials that age (Agustin, 1999)(TK,10) and are the story of inner strength (see structural). The black board, the blue brick and the translucent glazing are specifically chosen additionally because they look good in the snow and buildings in a land of more months of snow than those without should look good in the snow!

Functional spaces require light, colour and sounds that fit the use (TK, 6). The emotional tone of the space should support its intended use. As central to this building type, gallery spaces in particular have specific requirements for lighting the art and the space. Artificial light highlights art objects which often need to be protected from direct sunlight (FGL). Indirect sunlight is used often in galleries today to provide the comfort that people find from sunlight (TK, 3).

By up or down-regulating
Sensory responses to fit
intended uses
the interior design of a space
serves the experience.

Coming out of the time of the 'white cube', the use of colour on the interior walls of galleries is new. It is a refreshing complexity (TK, 12) reducing museum fatigue. In the other program spaces, similar considerations have been made and are discussed under functionality.

In short, the first experience and lasting impressions come from the sensual nature of the form. The emotional connection that comes from that experience is part of the fulfillment the art of architecture can provide. The potential opportunities to introduce a stimulating complexity and mystery in architecture are many, from the massing of the form itself down to and including the finishes.

TAM Museum, Gallery Space
Direct/indirect sunlight and Artificial light

Thesis Project - Gallery Space
Direct/indirect sunlight at top and bottom of wall and Artificial light

coherence

Good architecture has an integrity born of clear design ideas. Augustin, Alexander and others speak about this when they note that people prefer aesthetic constancy, ordered spaces, symmetry, hierarchy and so on (TK, 5, 11). All of these elements help a design hang together such that the solution is more than the sum of its parts. Hierarchy, in particular, tames the complexity of disassociated parts. The requirement for coherence is an essential element of preferred spaces.

Coherence facilitates the creation of a cognitive map that provides users a sense of control and hence of safety. After the aesthetic encounter, even within it, the perception of coherence is vital.

Coherence results from specific design ideas that engage user identity and by established laws of perception.

Clear design ideas express the intent of the form and the identity of the users who will make use of them (Augustin, 2009). The birds-eye image of the final design at right shows a balanced asymmetry expressive of the hierarchy within. With its strong connection to the land, on overall coherence is realized. Corporate branding and museum typology are expressive of user identity that is part of coherence.

Main Entrance, Final Design, West, 2016
Source
Thesis Final Review

The specific design idea is the X-Ray signature style of Norval Morrisseau. This artistic element is a circular form exposing the inner body of animals in Morrisseau's art. The visual expression of the inner life is done in an earthy incarnate way by revealing the skeletal structure.

The X-ray is expressed in architectural forms and through intended experiences. A specific experience s a story that ends in a sculptural restatement of the partis that concludes the outdoor sculpture gallery experience, and, indeed, the whole gallery visit. After entering the gallery to view through art the inner life of artists, the path encourages visitors, by a strong axis from the entry and through sculpture garden to the final sculpture (see legibility) to complete your journey there. Once there, the circular form with exposed skeleton creates a sitting niche with a view out to the water and asks a question. Stamped into the concrete is the Oji-Cree question, "How is your life buring?", meaning, 'what is the state of your inner life?'. How, the story goes, has your life changed in this meeting through art?

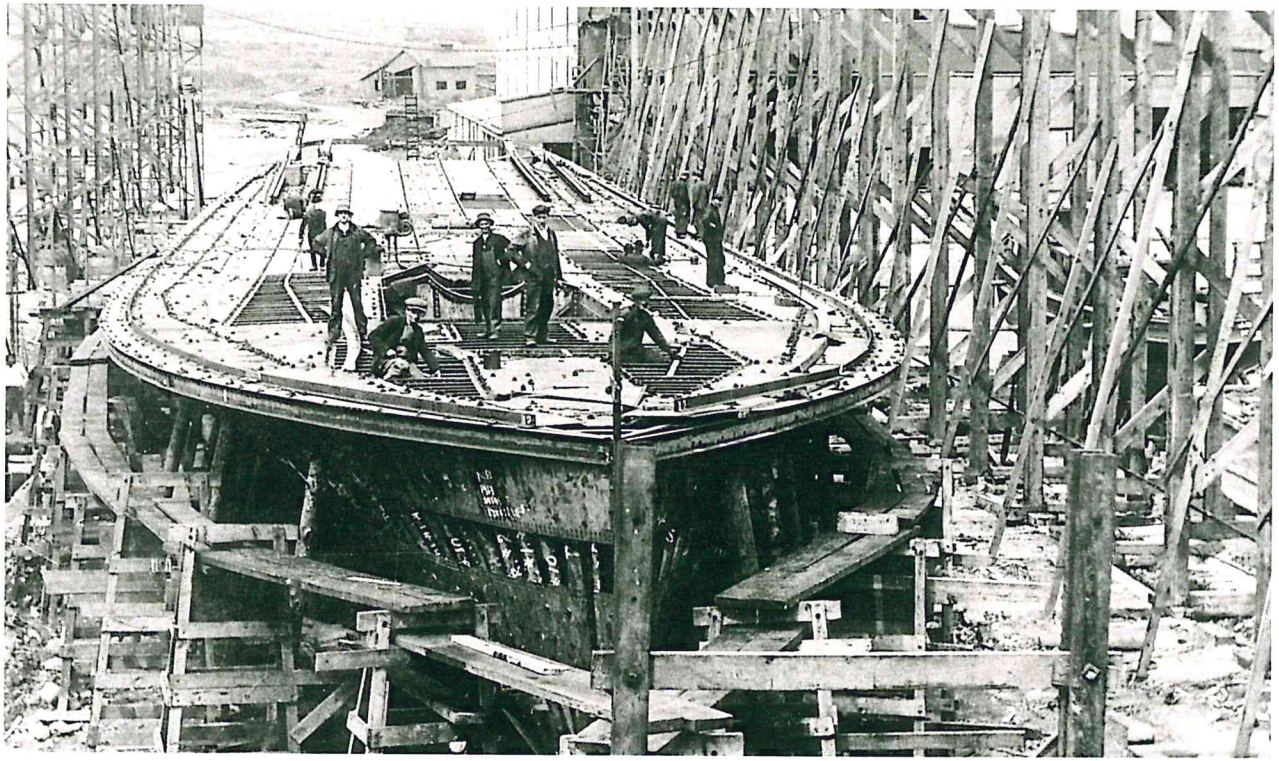
The X-ray is expressed architecturally in three formal elements. First, in the circular form of the building; second, in opening the interior to the outside by expansive glazed facades and third, by exposing the post and beam structural skeleton of the building.

The circular form embraces the land and speaks to the cultural psychology of the first nations people. A vulnerable strength is created by the visual access of the glazing as discussed earlier. The exposed structure, a truth telling in the architecture itself, echoes place memories in the docks fallen into disuse, in the recollection of the ship-building history, and in the proximate presence of the popular iron ore trestle. Most of all, it exhibits a strength that limits and empowers the vulnerability of a people and calls them to draw on that with pride for the future.

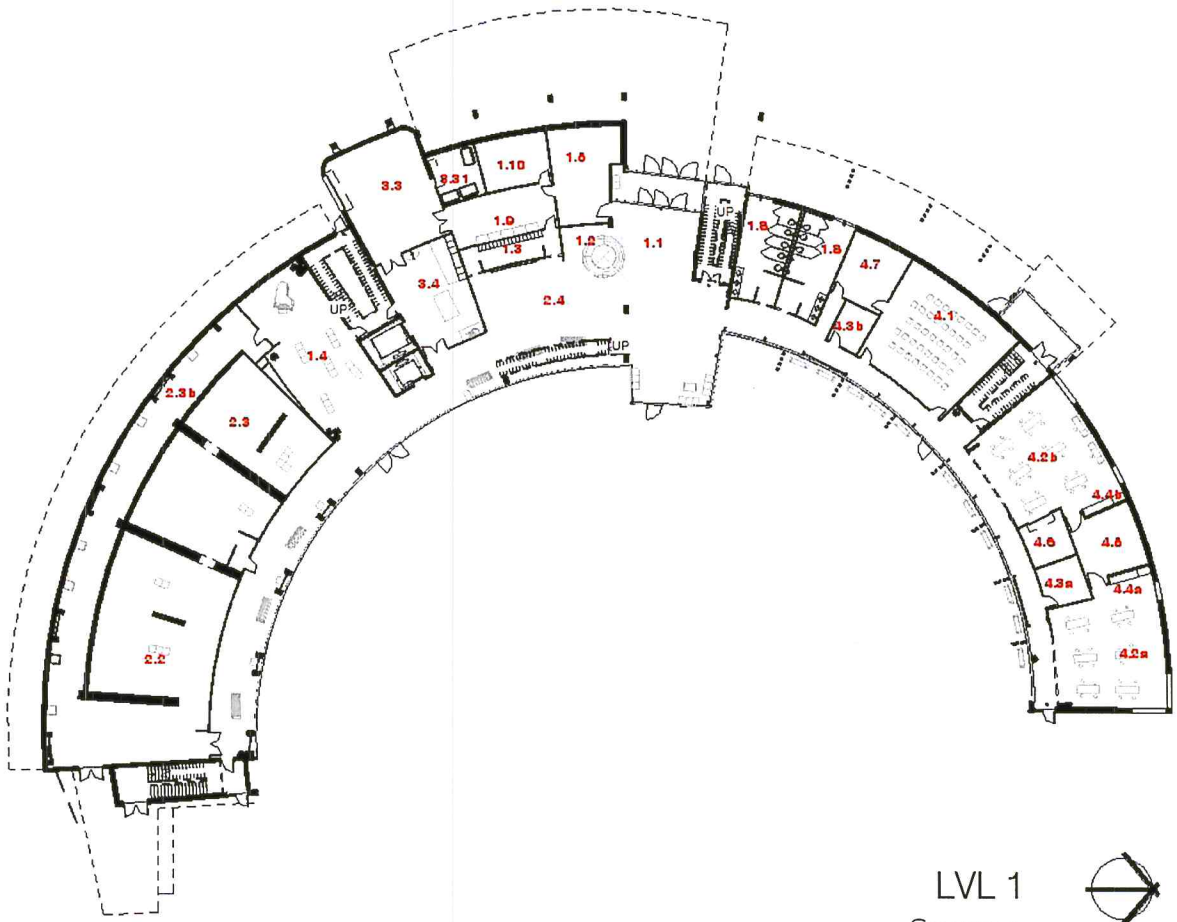
All of these are at play and ordered by the partis.

The expression of user identity is the most important thing a well designed space does.

Psychological comfort is largely a result of ego syn-tonic spaces that is, spaces that are in keeping with one's self-image.



Port Arthur Ship Building
Thunder Bay Museum, Archives
Source
Thesis Final Review



LVL 1
Source
Thesis Final Review

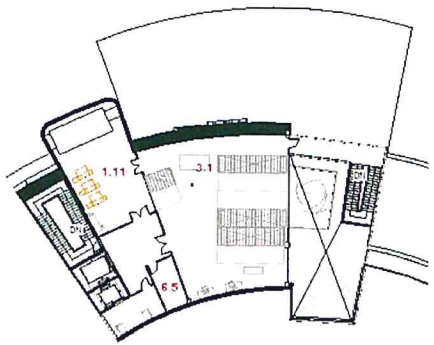
legibility

Guided by the toolkit, the organization of the major program elements are centered around an organizing core (1.1). Two major wings extend out and reach toward the Coal Dock and Sin Mac Jetty in a semi-circular fashion responding to the site and the partis. The Coal Dock Wing to the south houses the gallery spaces on two levels. The Sin Mac Wing to the north contains the multipurpose spaces (LVL 1) and the administration spaces (LVL 2). The central core is a three story volume creating vertically organized public and gallery support spaces. Support spaces for shipping and receiving (3.3) and the preparation of exhibit items (3.4) on the main floor are in close proximity to all gallery spaces and the storage and archival spaces by a dedicated oversized elevator in the core.

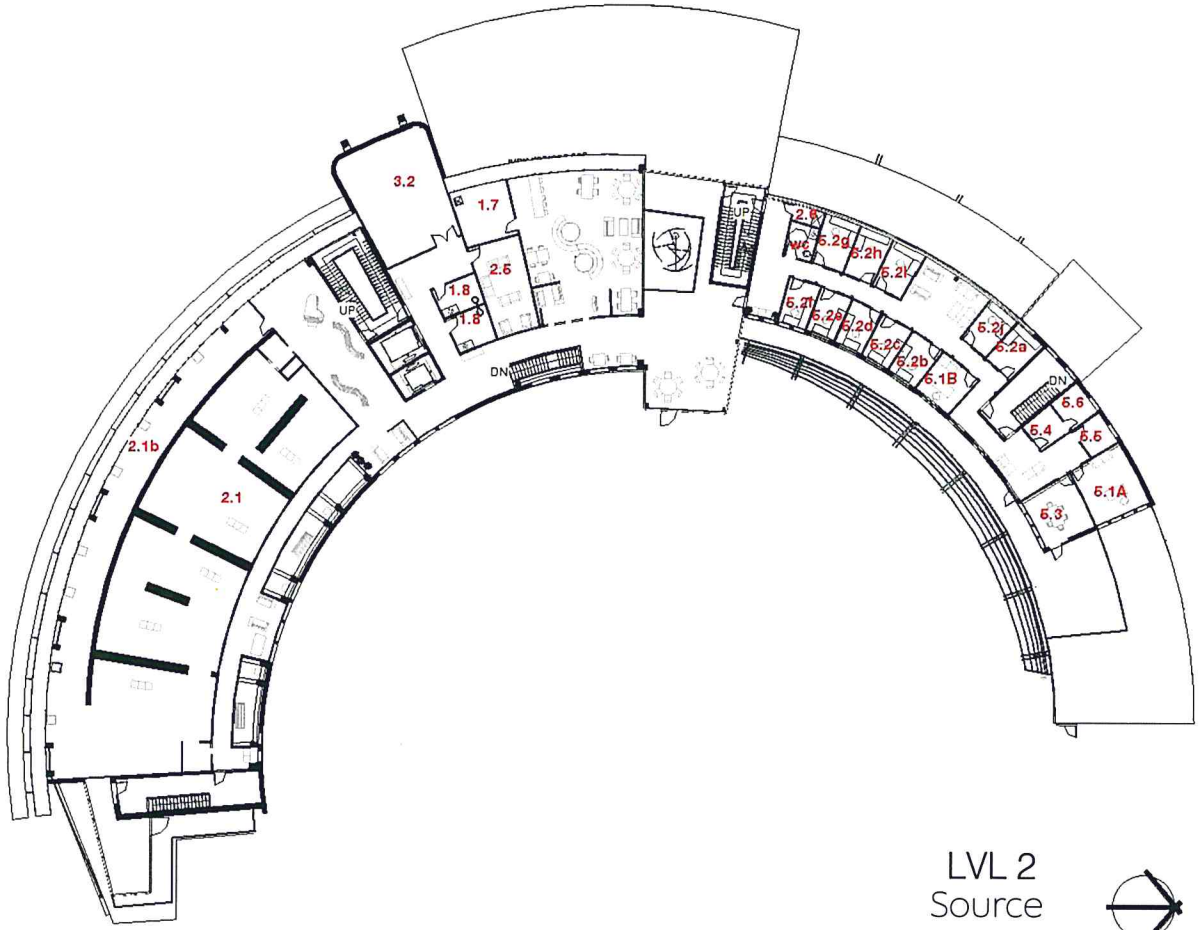
Upon entering, the building is laid out before the visitor from the beginning (TK,4) with excellent visual access. Route decisions are kept to a minimum as primary program spaces are located in two wings. All of these design moves intend an ease of legibility (TK, 5).

Legibility is achieved by two main variables:

1. The logic of the spatial layout in the two dimensional plan, and
2. The prominence of landmarks in the third dimension.



LVL 3
Source
Thesis Final Review



LVL 2
Source
Thesis Final Review

Gallery spaces, by a general progression from small spaces to larger spaces, encourage intended movement as it has been shown that courtyards and gardens arranged in this manner achieve such movement (ibid). The multipurpose spaces located on the north side provide sunlight considered best for art studios. The multi-media space, also on the north side, is placed deliberately in the shadow of the public core to support its need for little light. The public core has a clearly indicated reception, coat room, and washrooms; visitor surveys indicate this visibility of primary importance (Bitgood, 2002). The cafeteria is located on the second level with optimal exterior views to provide the necessary respite to conclude the specific gallery visits. Administration spaces (Sin Mac Jetty Wing, LVL 2) provide both privacy in close-able doors and a connection to the group by way of internal screens that share views and daylight. Administration social space is located tangentially and centrally as it is predictive of intended use (Alexander, 1977).

Atrium Mobile, Looking West, 2016
Source
Thesis Final Review

Three major distinctive elements orient users within. In the atrium space, a large mobile graces the central core and provides a restorative nature analogue through perceived or actual movement of the mobile. Second, one can readily see the prow structure that concludes the gallery path luring visitors to its view.

Finally, from anywhere along the major corridor that frames the courtyard and from the prow, the outdoor sculpture gallery in the water between the two jetties creates a strong axial line orienting and drawing visitors to the expression in story of the partis that underscores the meaning of the whole purpose of the gallery itself - as a meeting between artist and visitor by way of the aritists medium.

Legible settings then, are
well structured spaces with distinctive elements
making it easy to both
find one's way within a space... and
to find one's way back
to the starting point.
(Kaplan,1989)

Partis Sculpture - Sculpture Garden, Eastern Edge, 2016
Source
Thesis Final Review

functionality

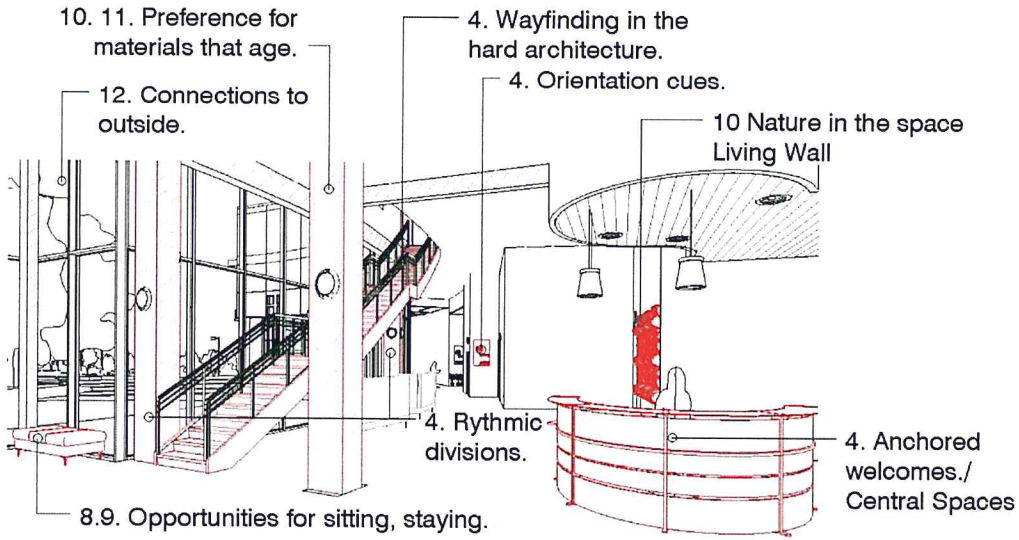
The psychological need to take meaningful action in a space is accomplished in no small part by the design of the space itself.

Functionality results from:
- the design of the physical characteristics of an environment to influence user behaviours in keeping with the intended purpose,
and
- by providing the ability to exercise autonomy in the environment, particularly the ability to regulate ones desired level of privacy.

A space is 'good' if it allows us to accomplish the purpose for which it was intended..

In applying the toolkit to the design of this art gallery,the experience goals for the program spaces have been met through the application of the toolkit. Under each program category, a representative space has been rendered and is accompanied by a highlighted line drawing with references to the toolkit.

Note: All images and line drawings are from the Thesis Final Review.



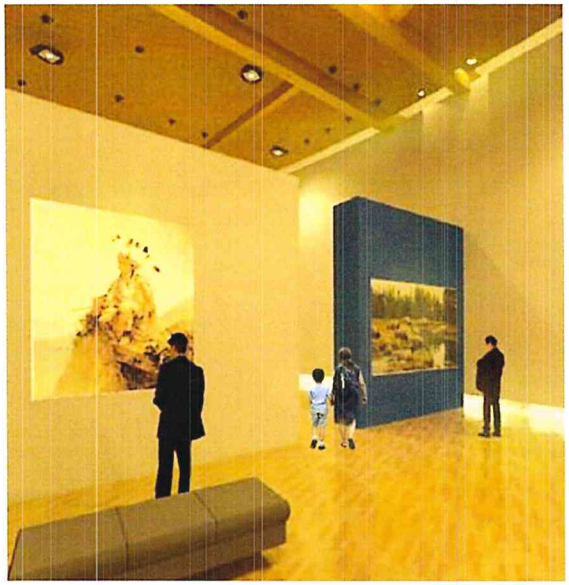
1.0 General Public

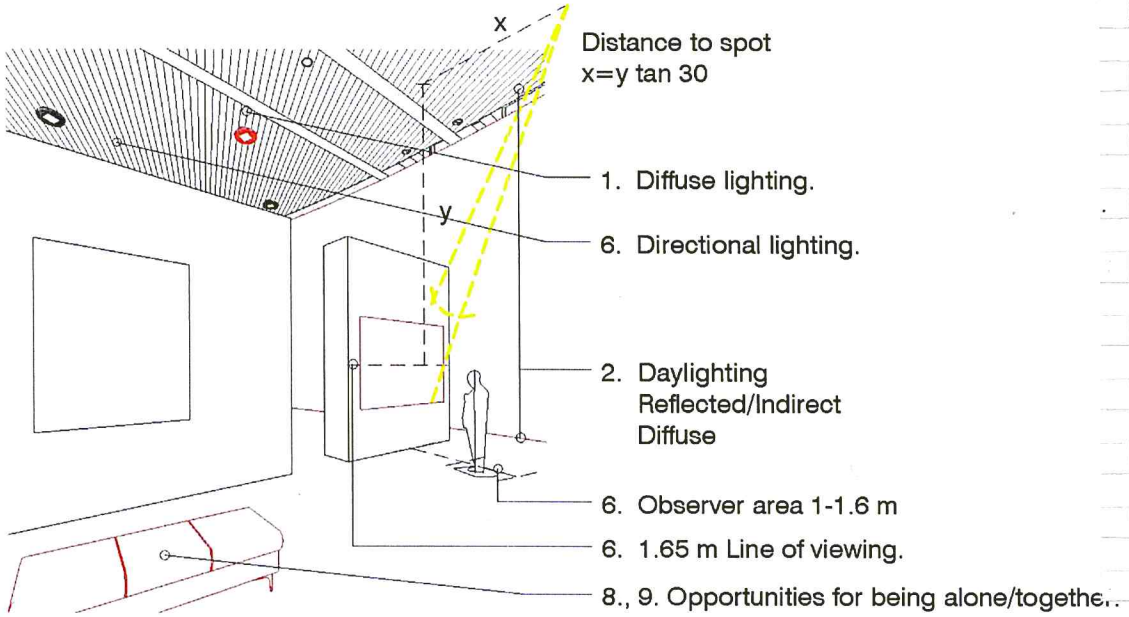
COMFORT

The lobby space is the fundamental orientation space. The space has an anchored welcome with the lobby desk prominently located. Opportunities for sitting and standing are many in this prime public space.

Wayfinding is a particular requirement in a gallery and in any space. Here it is accomplished by a high degree of visual access, by the hard architecture creating good spatial syntax, and by the minimization of route decisions. Wayfinding signage provides route monitoring and destination recognition as well.

Multiple egress routes and exits are present in the lobby (see 'legibility' for plans) for a sense of safety. Connections to the outside are many to reduce stress. The three storey atrium combats feelings of crowding which lobby areas are prone to. The cafe was located on level 2 to serve its primary purpose for restorative experiences in a gallery.



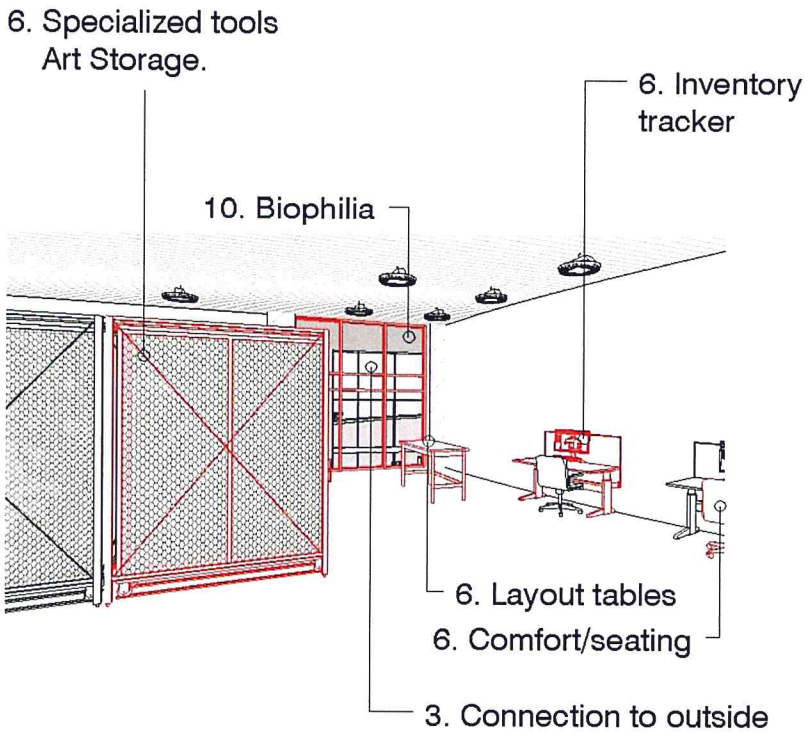


2.0 Gallery Spaces

MYSTERY

In the gallery spaces, the experience results both out of the overall architectural design and the exhibit design. The architectural task is to provide a pleasing and functional space supportive of the exhibits. Reviewing the preference goals, the essential architectural task is to provide a space that provides orientation cues, possibilities for sitting and standing, and restorative elements. As part of the museum experience, evocative architecture is valid expectation given its typology.

The rendered image shows the provision of places for standing and sitting (TK, 8, 9), a moderately stimulating environment (TK, 4), diffuse daylighting (TK,2) and functional lighting (TK, 6). The architectural solution also provides an orientation gallery at the beginning of the gallery experience and restorative viewing places at the conclusion (TK, 10). Notably, the sculpture galleries double as corridors with double glazed walls that provide light both to the sculpture gallery and to all the primary gallery spaces through openings at the base and top of the floating walls (TK, 2,10,5). The exterior double glazed wall that is the source of this natural light has a stimulating complexity in its control of light that works in concert with the mechanical system (TK, 12). As part of the overall partis, the circular form of glazing and exposed structure celebrates the inner life of the museum and in fact of the art itself.

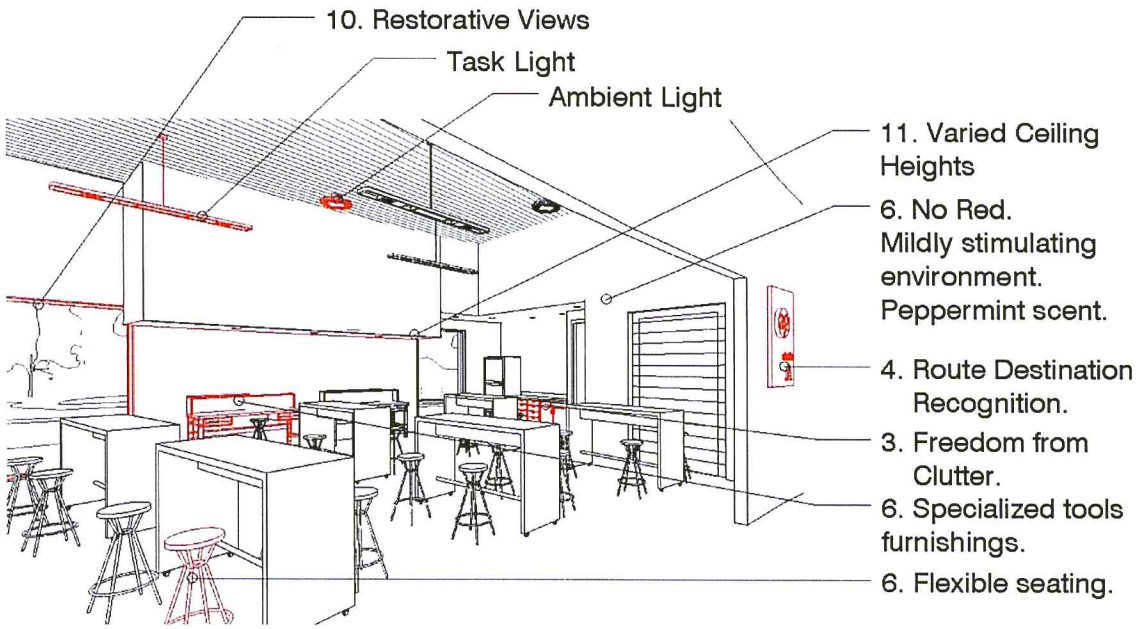


3.0 Support Spaces

FUNCTION

Support spaces need specialized equipment and environments. They need lighting adequate to the task and anthropomorphic and universal design considerations for comfort and safety. A pleasant work environment requires protection from stress with clear egress and protection from extremes of complexity and clutter. All of these were considerations in this space (see toolkit references above).

Adjacencies are especially important in support spaces. The rendered support space shown is storage. Located on its own level, storage is accessible to staff only. It is vertically adjacent to preparation area on the main and the archive on the second and the galleries on both floors. All these spaces are in close proximity to staff and the administration space. Paths from the administration to the support spaces often connect via public spaces to provide connections with others. An interesting feature is the presence of a viewing window into the archive to provide a 'surprise' opportunity to see the inner workings of the gallery.

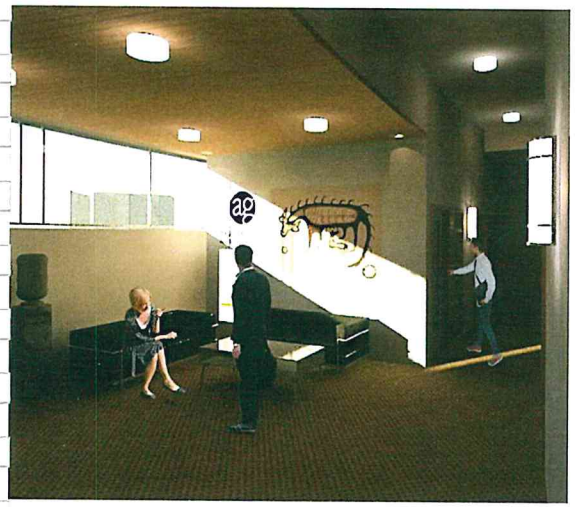


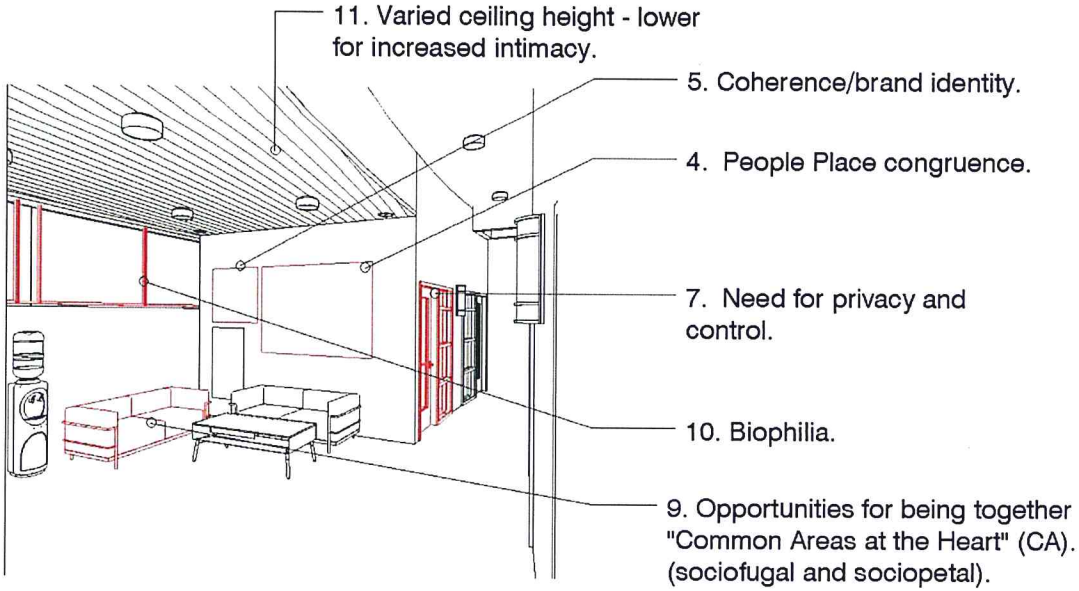
4.0 COMPETENCE Multipurpose Spaces

The ground work for this design was done in the research into education spaces. The fundamental environmental psychology research and the space specific research of Herman Miller from an environmental psychology perspective all informed the program space goals presented earlier and the resulting design. Toolkit references are shown above and mentioned here:

- moderately stimulating environment, colour and aroma,(TK, 6)
- adaptable with flexible seating and furnishings (TK, 6) with an ability to control the environment: lighting, views, furnishing arrangements, and
- a freedom from clutter (TK 3)

All were paramount in the design of the multipurpose spaces.





5.0 ESTEEM

Administration Spaces

Successful administration spaces provide a place to work independently and the ability to work collaboratively. People require a place that fits with their idea of themselves. The work they choose is part of that identity. A must is the autonomy to manage their workspace and the ability to moderate their need for privacy in the workplace. A private workspace is the simplest pattern to solve that environment need.

As part of the need for security and comfort, biophillic elements, and tools to perform the work are all necessary supportive elements psychologically. In the above rendered image and line drawing, the essential collaborative space is central and tangent to workspaces which is, as mentioned before, predictive of intended use. The person/place fit is expressed by the art on the wall and the visible display of the corporate brand.

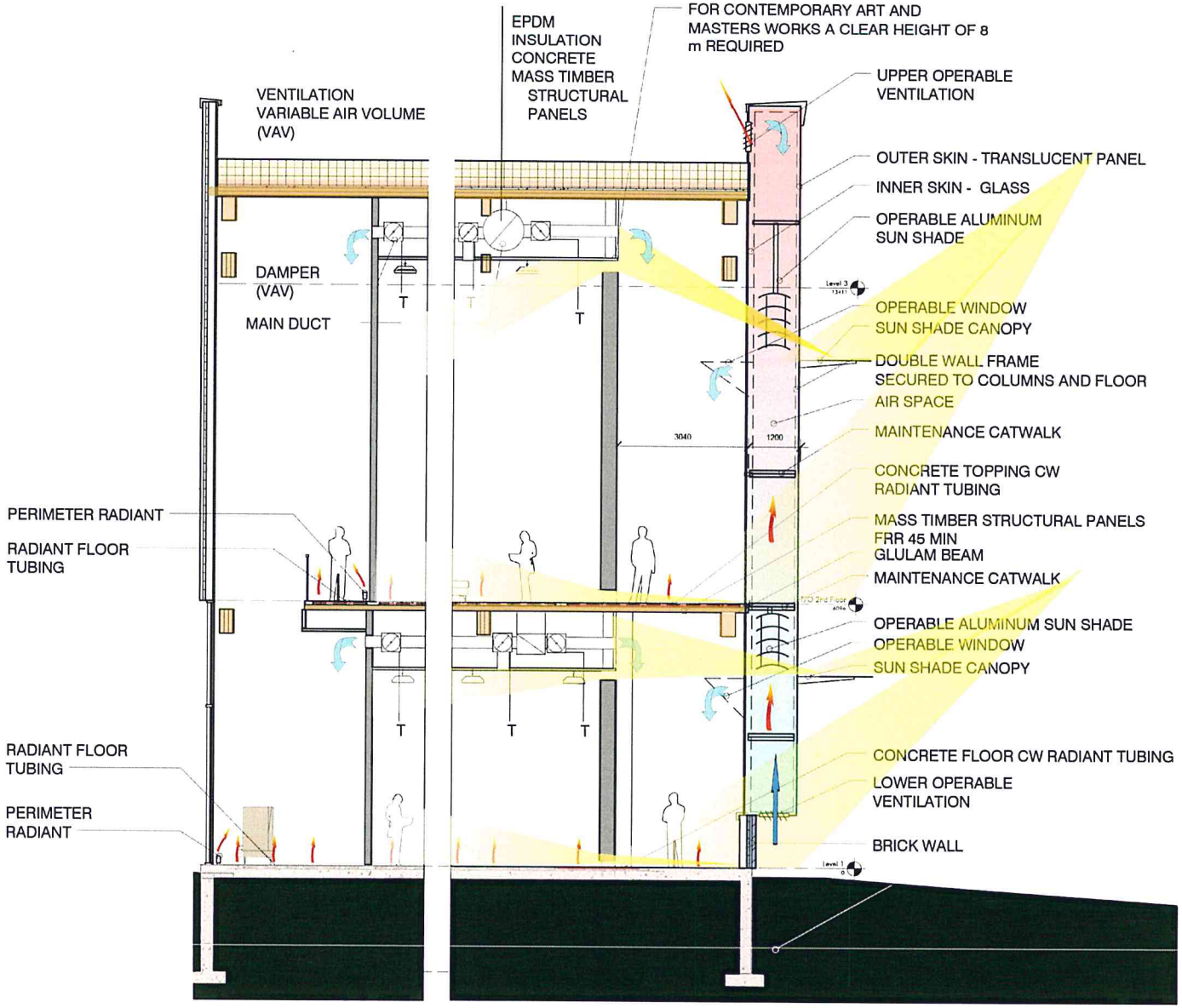
MECHANICAL

The mechanical system is an innovative design that combines time tested passive and active systems.

With a focus on sustainability through a combination of active and passive means of heating and ventilating, an air/water system is used in conjunction with a feature double skin facade.

Sensors and computerized systems are designed to keep the building and in particular the gallery spaces within a narrow range for humidity, temperature and light. A play of natural and artificial light to display and at times imitate the rhythms of the day are integrated in the system as a whole.

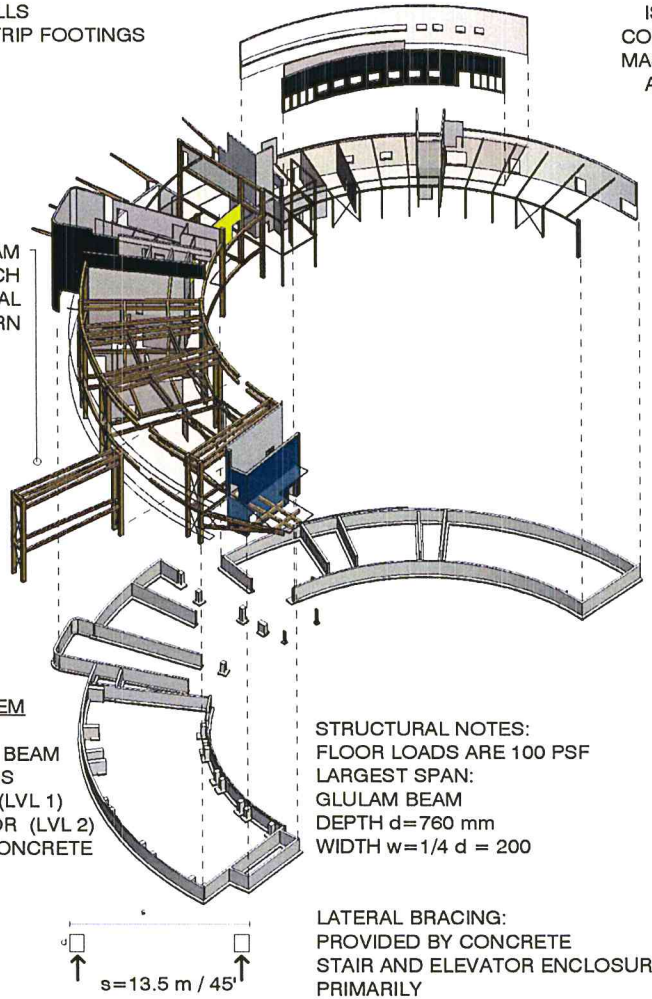
functionality-technical



Source
Thesis Final Review

PUBLIC CORE STRUCTURAL SYSTEM:
COMPRISED OF:
A COMBINATION OF
GLULAM POST AND BEAM
MASS TIMBER WALLS
STRUCTURAL WOOD FLOORS
FOUNDATION WALLS
ISOLATED AND STRIP FOOTINGS

TYP POST AND BEAM FRAME AT EACH BAY IN RADIAL PATTERN



COAL DOCK WING STRUCTURAL SYSTEM
COMPRISED OF:
GLULAM POST AND BEAM
ISOLATED FOOTINGS
CONCRETE FLOOR (LVL 1)
MASS TIMBER FLOOR (LVL 2)
AND ROOF CW CONCRETE TOP

s=13.5 m / 45'

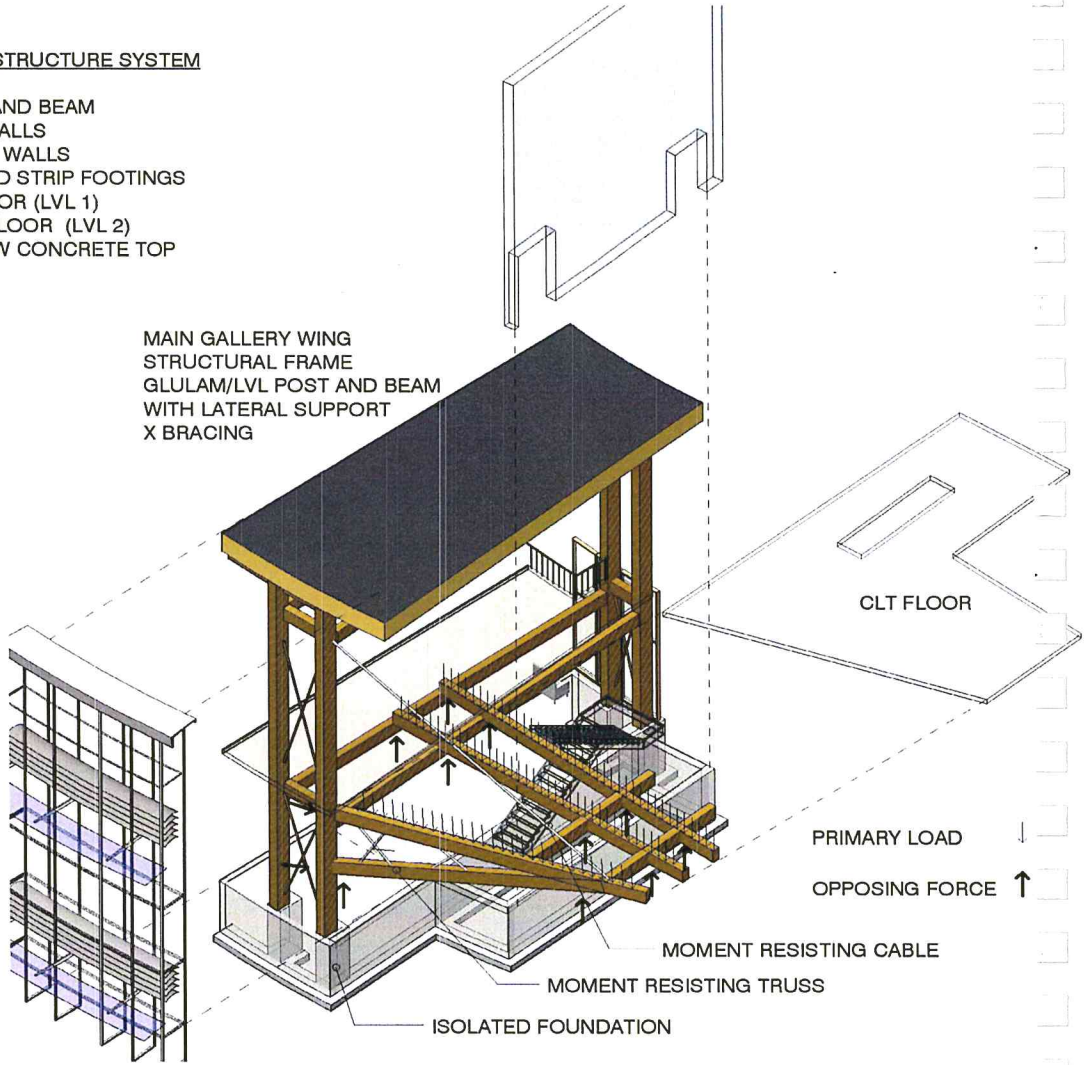
STRUCTURAL NOTES:
FLOOR LOADS ARE 100 PSF
LARGEST SPAN:
GLULAM BEAM
DEPTH d=760 mm
WIDTH w=1/4 d = 200

LATERAL BRACING:
PROVIDED BY CONCRETE
STAIR AND ELEVATOR ENCLOSURES
PRIMARILY

LATERAL X-BRACING IS PROVIDED AT A MINIMUM 25 % OF BAYS AND IS LARGELY REDUNDANT AND EMPLOYED TO EXPRESS
ENVIRONMENTAL PSYCHOLOGY 'PLACE MEMORY'

SIN MAC WING STRUCTURE SYSTEM
COMPRISED OF:
GLULAM POST AND BEAM
STRUCTURAL WALLS
FOUNDATION WALLS
ISOLATED AND STRIP FOOTINGS
CONCRETE FLOOR (LVL 1)
MASS TIMBER FLOOR (LVL 2)
AND ROOF CW CONCRETE TOP

MAIN GALLERY WING
STRUCTURAL FRAME
GLULAM/LVL POST AND BEAM
WITH LATERAL SUPPORT
X BRACING



DOUBLE SKIN FACADE
(SEE MECHANICAL ABOVE)

Source
Thesis Final Review

STRUCTURAL

Wood has been chosen as the main structural element.

From an environmental psychology perspective, it is part of the vernacular, consistent with the cultural identity of the First Nations Peoples who built largely wood structures, and has a universal appeal as it ages well. It was also chosen because it is a sustainable product.

For more description of the structural system, see left.

Part V
Conclusions

Project Review

In the International Journal of Architectural Research, a method was proposed for an objective and qualitative review of architecture as an aid to competitions specifically and to architectural solutions generally. To provide a review and draw conclusions on the overall thesis project. this TIOSE (acronym for: thoroughness, informative, organization, synthesis and evocativeness) qualitative measure for architectural design is employed here as a tool for review.

A brief analysis by way of summary is provided here. As the TIOSE is a qualitative measure for judging success in architectural design, it is fitting that comments be directed toward the architectural project (AP) - the Design of the Art Gallery. However, the Project Concept (PC), the development of the toolkit for Designing and Detailing Buildings from Environmental Psychology as the Thesis project proper, will be evaluated at one and the same time as the thesis statement contends that the toolkit will aid in the successful resolution of architectural projects. Project Concept (PC) specific comments in each section will be mentioned first to highlight the manner in which the toolkit creation and application affected the final outcome of the architectural project as categorized by the TIOSE measure.

Research

Thoroughness
Research and data collection

PC - The research was extensive into environmental psychology from web-based articles and websites to published texts specific to the field. The inclusion of environmental assessments including one conducted by a site visit to a museum in Montreal exhibited both the extent of the research and a willingness to delve into research. I believe my research was thereby thorough.

AP - The above mentioned research included gallery specific research into visitor studies from environmental psychology and applications to traditional considerations (eg site).

Informativeness
Communication of Content

PC - The architectural project provided an excellent ground for the exploration of environmental psychology and specifically the creation and use of a toolkit for buildings.

AP - Early design moves revealed the need to makes use of the findings of environmental psychology as a useful tool and not a prescriptive rule. The graphic communication of the content developed and displayed a growing informativeness.

Organization
Arrangement of Critical Architectural factors and Experiential Intent

PC - The project concept, founded on good research, created a well organized toolkit for buildings.

AP - The gallery project, making use of the toolkit, resulted in a highly organized form with clear experiential intent.

Design

Synthesis
Successful Combination of Disassociated elements

PC - There were struggles to arrange the information and research findings into a strong synthesis to create a toolkit. The precedent Urban Toolkit and the work of Maslow and others gave a clear direction.

AP - The gallery project, I believe, was quite successful in bringing together all of the elements of the gallery into a coherent whole. This synthesis was guided by the need of users for coherence and legibility.

Evocativeness
Or provocative - Creating discussion about larger ideas or issues

PC - Evocativeness is really the resolution, the coming to life of the form as the parts come together artfully to reveal something new in something familiar. I believe the project concept brought this into bold relief as a goal of architecture, which is not to say that the result needs to be ostentatious or a meaningless sculptural construct but rather a beautiful form born of unity, quality and legibility, a familiarity with a surprise

AP - The gallery project had strong elements of evocativeness from its shape to the feature elements that defined the 3-dimensional landmarks and, in particular, the statement of strength within vulnerability. I believe the evocativeness could have been simpler and clearer if the project concept was not wrestling with the architectural project. However, I believe the intended evocative experience in the intended path through the whole, crafted according to the partis, would bring the question about one's inner life and its relation to the inner life and vulnerability of the first nations peoples calling all to find a new strength.

Personal note

When I studied Theology years ago towards my Masters of Divinity, I would read the course texts for each class but I would supplement these studies always with the writings of Hans Urs Von Balthasar, a Swiss Theologian, whose major work was a theological exploration of the transcendentals, that is, of the four universal elements in being: unity, goodness, truth, and beauty.

His theological summa explored the experience of being and ultimately Being itself, or God, through the transcendentals. Being, he would say, appears in epiphanies that are aesthetic (sensible or beautiful) making us marvel. In so appearing, 'being' delivers itself to us; it is good. As well, in that giving itself up 'being' speaks or unveils itself; it is true, in itself and in the other to whom it reveals itself. In receiving it, we see that we are one with it.

As I came to architecture, I was fascinated by this presentation of being and its appearance as the beautiful. And I wondered what it meant for beauty, if anything, considered now in built form and if the transcendentals could inform design in any way. So with that, as I studied the various aspects of built form, the transcendentals always kept intruding themselves into my work - in my thoughts and written in the margins of my text books - the one, good, true, and above all 'the beautiful'. What makes beautiful architecture? I had glimpses of an answer over the years but nothing firm. It is an important question if, as it does, beauty sparks wonder and delight and engenders enthusiasm at the service of humanity. Even crucial.

Approaching my thesis, I wondered if I would get the opportunity to explore beauty in architecture as my formal studies came to a close. A couple of key insights suggested an approach. First, from my architecture studies to this point, with research outside

of the architecture courses themselves based on my personal interest, I came to know architecture as an art form and specifically as 'functional art'. Then, I recalled from philosophy that art is a representation of being, a symbol. As such, it participates in the transcendentals and so can share, as symbol, in unity, goodness, truth and beauty. And hence architecture, as a form of art would exhibit these qualities. Even more, better art will come from attention to them in design. But how, what is unity, goodness, truth and beauty in architecture?

Then came the second point, and this was key. As the epiphany of being in sensible form shows itself in the beautiful (sensible/aesthetic), this 'aesthetic encounter' evokes joy or delight. Delight because we perceive the good and the true and the one along within it. Beauty is the entry point; delight is the response.

All that was needed was a similar entry point in architecture. The turning point occured when I found that point within the field of environmental psychology. In my initial research into that field, which I sought because it was based on and 'aesthetic encounter', I discoverd talk of preferred spaces. These were beautiful spaces. And, these spaces were identified by the exact same response - delight.

This thesis has ultimately resolved a question I had from the beginning of my studies. The transcendentals are instructive of the qualities of successful architecture. Good architecture evokes delight. Delight because in our hunger for structured intelligibility, our hunger to have our psychological needs met in our environment, in some appearances of a built form, at once complex and mysterious, we see something. We see a form that has coherence; it is one. We perceive it as legible; it is true. And we experience it as fit for it's functional purpose; it is good. From Wonder to Enthusiasm!

That's beautiful architecture. Its an experience of a legible and coherent space that is functioned according to its purpose by an architect who has understood the task. What's more, is that coherence, or partis, creates an evocative message proposing a new way forward. Its not just delightful space, its a profoundly delightful one.

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