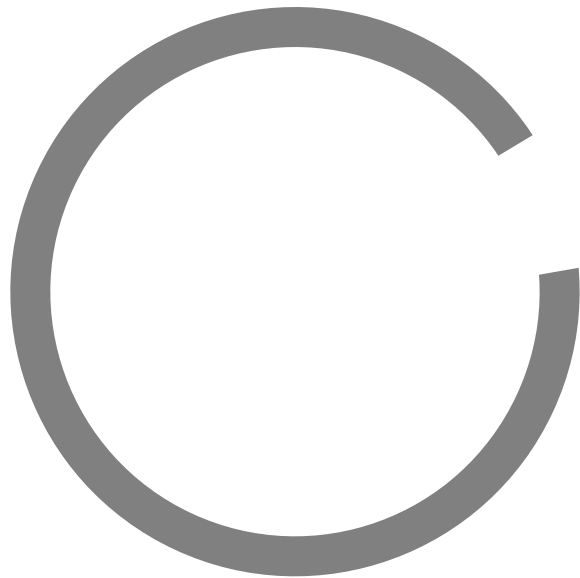


CONTEXTUALLY ADAPTIVE ARCHITECTURE



IMPETUS:

Focussing on a node of critical social engagement the thesis project will explore how architecture can be used as a generator and an incubator to encourage inhabitants to rethink their relationship with the natural environment.

The paradigm will be one in which architecture is not an abstract 'machine for living', but rather, an interactive living machine in which the architecture and the inhabitants engage in a dialogue around systems that sustain life.

A tangible and legible architectural experience is imagined, one that educates and inspires building inhabitants, redefining what a sustainable work of architecture is and can be.

By demonstrating to inhabitants what is possible the thesis project endeavours to establish a new approach to interacting with high performance buildings.

(excerpt from originating thesis proposal)

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	& Demographics				



Figure 1.1 Collage-based graphic explorations.

1.1 DEFINITIONS:

1.1.1 Contextually Adaptive Architecture:

Contextually adaptive architecture is a synthesis of performance-driven design and interactive architecture to inform the design of, dynamic, high performance buildings that interactively mediate evolving environmental demands and user needs in real-time.

Context as expressed herein is a dynamic phenomenon related to variations in the way occupants interact with the building and how the building interacts with the local climate; as opposed to the more traditional static definition which primarily relates to more immediate aesthetic considerations.

1.1.2 Performative Design:

Performative design is a comprehensive approach to design problem solving that places performance goals above formal expression and makes use of digital technology to conduct both quantitative and qualitative performance-based simulations. For the purposes of this exploration this analysis will be limited to maximizing day lighting and natural ventilation.

1.1.3 Interactive Architecture:

Interactive architecture is defined as the capacity of a building to intelligently respond to evolving individual, social and environmental demands. This capacity is achieved through dynamic transformation, articulation or adaptation of building elements, systems and spatial configurations. Interactive elements will be explored and evaluated relative to program and performance with a specific focus on creating opportunities for dynamic interaction between building participants and building systems.

1.2 OBJECTIVE:

1.2.1 General Principles:

The following general principles as expanded upon at length in the research will be observed:

Contextually adaptive architecture intelligently responds to emerging individual, social and environmental demands through dynamic transformation, articulation or adaptation of building elements, systems and spatial configurations.

In contextually adaptive architecture performance supersedes formal expression. Design decisions and formal considerations are guided by program and performance, not by stylistic considerations or a preconceived idea of form.

The intent is to apply the basic principles of contextually adaptive architecture to the design of a building that serves to change the way people think about high performance buildings.

1.3 PROGRAM NARRATIVE:

1.3.1 Client Narrative

The community is committed to exceeding the need to simply provide education and training and to instead create a vibrant participative, culturally aware and economically buoyant human environment through the provision and active promotion of learning opportunities to enhance the potential of all citizens.

They assert that that in an information economy the creation of institutions that impact and maximize human and social capital will determine which communities prosper and which fall into decline. The vision is one of a culture of individually guided lifetime learning as encompassed in a holistic education model that includes: explorative pedagogy; invention and creation; and performance and demonstration.

1.3.2 Building Narrative

The envisioned building will be a collaborative media/technology laboratory that serves as both a supplemental learning environment for local academic institutions and a publicly accessible interactive media collaboration space. The intent is to provide a technology driven experiential non-curricular learning environment for people of all ages and from all walks of life.

The integration of the sustainable and technological features into the building parallels the program. The program includes unique facilities designed to draw the participants into a dialogue so as to allow experimentation, innovation and play to evolve. In addition to being a self-referential technological demonstration the building will be a public interface for participatory engagement in the exploration of new and emerging media and technology.

The chart opposite demonstrates the point-of departure for a program. The spatial generator diagrams represent archetypes for specific types of interactions based on the primary function of each identified function. The primary functions are as follow:

- *A - Administrative*
- *B - Exploration (mediatheque and children's library)*
- *C - Creation (maker space based on Techshop San Francisco)*
- *D - Exhibition (interior/exterior display and performance spaces)*
- *E - Support*

1.3.3 Occupancy and Typology

Spatially the building is a Tulpa, a manifested thought-form, capable of dynamic transformation to suit a variety of potential futurities. It does not fit a typology in any conventional sense. In the absence of a specific typology characteristics of existing civic, institutional and commercial types have been hybridised (and cannibalised) in proxy.

The building is envisioned to share the social characteristics of a community centre with the collaborative environment of a technical school, the experiential/individual learning characteristic of a museum, and spaces for performances and presentation appropriate to a convention centre. The occupancy, therefore, will be primarily comprised of assembly spaces with a population that will vary from 50 to 750 persons.

1.3.4 New Media and Technology


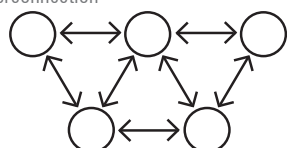
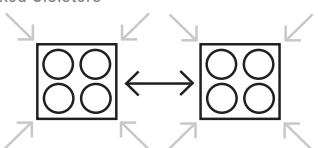
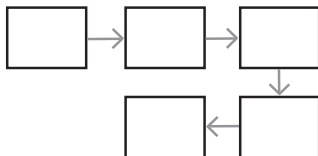

New media has been selected as a program vehicle because it is inherently interconnected with the formative ideas of the thesis. Like contextually adaptive architecture new media is not inherently spatially bounded in any formal sense. It exists (to whatever extent in needs to) in a non-spatial environment, manifesting as required to suit a function (i.e. the process of production, public exhibition, etc.)

Until relatively recently the media landscape was predominantly unidirectional. The means of production were beyond the capacity of the public and there was a separation between media production and media consumption. As the means of production become more ubiquitous and ephemeral, media increasingly is becoming an omnidirectional proposition. Interactivity is the motive force behind new media, just as it is the driving force behind contextually adaptive architecture.

1.3.5 Spatial Requirements

The spatial requirements identified below were informed by an intensive exploration of potential architectural manifestations of performative and adaptive ideas which involved graphic exploration in the form of vignettes and collage. The process of exploration determined that spatial and programmatic variety is necessary to construct a legible experience: one in which building response can be correlated with motive causality. From this five spatial archetypes were established. A program was then derived based on the building narrative, archetype spaces and the client values.

The provisional name for the building is **Quadrant 14** and its purpose will be to serve as a community oriented **innovation centre**.

SPATIAL ARCHETYPE (PROGRAM GENERATOR)		CHARACTERISTICS	PROGRAM COMPOSITION		qt.	a	a.qt	sub.ttl
A	Interface 	A node and a collector with a contrasting mix of public and private spatial experiences.	A Administration:					
			A.1 Entrance and gathering		1	50	50	
			A.2 Reception and processional space		1	250	250	
			A.3 Administration open office		1	100	100	
			A.4 Administration closed offices		2	10	20	
								420 M2
B	Interconnection 	Hierarchies of randomly interconnected reconfigurable spatial experiences.	B Exploration Spaces:					
			B.1 Learning commons		1	300	300	
			B.2 Private study area		1	300	300	
			B.3 Technical service.		2	25	50	
			B.4 A media/technology library		1	400	400	
			B.5 A children's library.		1	400	400	
								1450 M2
C	Linked Cloisters 	A matrix of individual independent spatial experiences.	C Creative Spaces:					
			C.1 Open devices laboratory		1	300	300	
			C.2 Techshop open space		1	900	900	
			C.3 Techshop closed space		1	150	150	
								1,050 M2
D	Exhibition 	Interdependent non-hierarchical interconnected of spatial experiences	D Exhibition Spaces:					
			D.1 Mixed-use theatre (200p/300p=500p).		1	800	800	
			D.2 Gallery/experimental space					
			1. Multimedia/cybernetics		1	150	150	
			2. Public installations		1	300	300	
			3. Project Expo		1	300	300	
			D.3 Restaurant/café.					
			1. Service		1	250	250	
			2. Prep		1	50	50	
								1,450 M2
E	Continuity 	Over-arching spatial organisational structure.	E Support:					
			E.1 General stores.		4.5% GFA		200	
			E.2 Maintenance/janitorial		3.0% GFA		130	
			E.3 Mechanical/electrical/IT		8.0% GFA		350	
			E.4 Shipping and receiving		sum		75	
			E.5 Sanitary facilities		5.0% GFA		225	
			E.6 Circulation (+/-25% gfa)		25% GFA		1100	
								2,080 M2

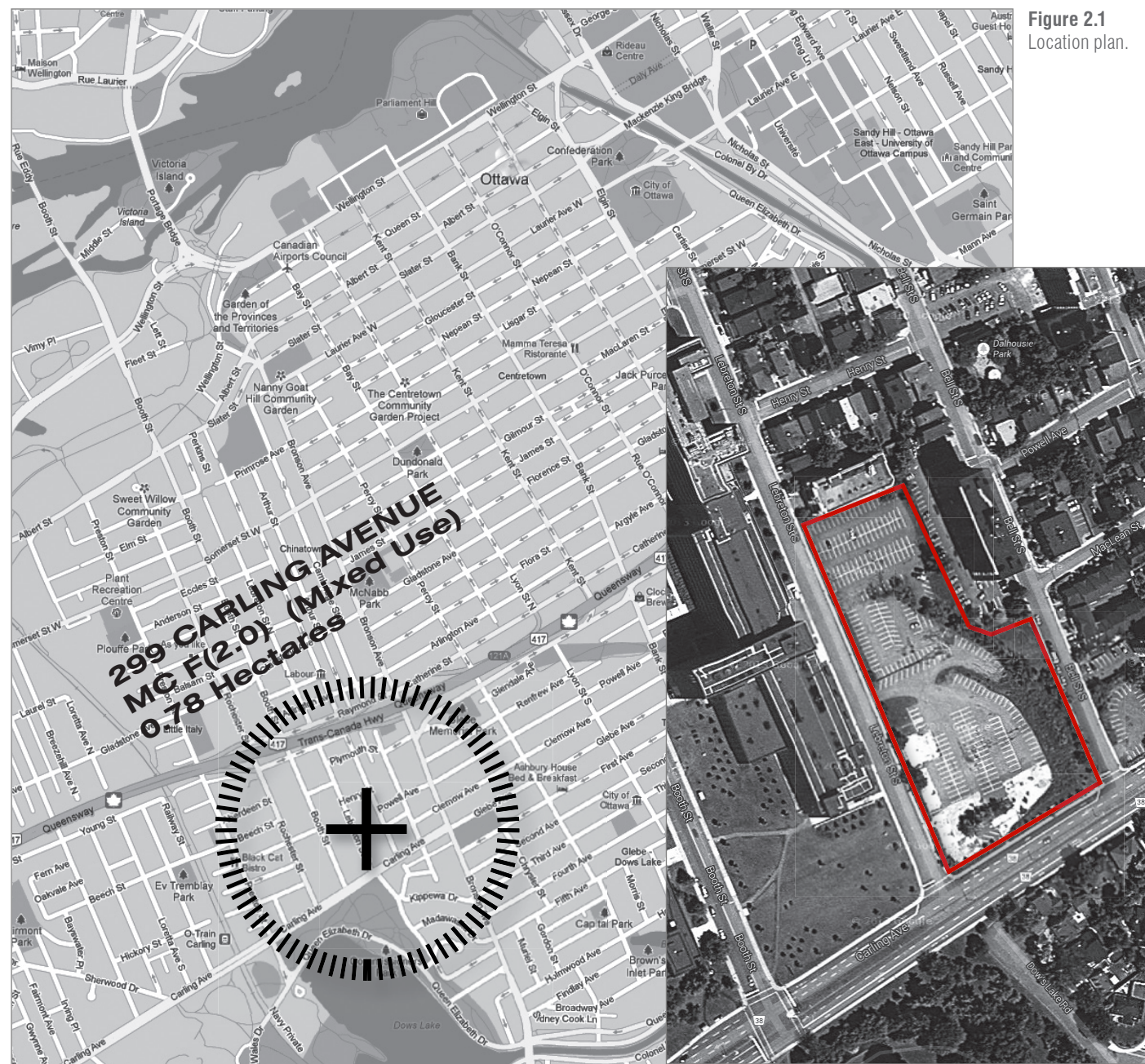


Figure 2.1
Location plan.

2.1 SITE ANALYSIS

2.1.1 Location

The site selected for Quadrant 14 is located in urban core of the City of Ottawa at the intersection of Carling Avenue and Lebreton Street S. The civic address is 299 Carling Avenue. The 0.78 hectares site is owned by NRCan and was formerly occupied by a collection of light industrial one-story brick buildings. In 2007 these buildings were demolished and the sites multiple plateaus linked and paved to serve as temporary parking.

The NRCan complex is presently undergoing a rationalization and reorganization. Operations will be centralized in a new tower located on Booth Street and will render the buildings adjacent to this site obsolete. The annexed area will be redeveloped as a medium density eco-community, extending the existing residential fabric further west and linking it to Preston Street. In addition to providing an important new-economy civic amenity for the existing community the addition of a community oriented innovation centre is envisioned to set the tone for the future development.

The property is federally owned and located within the National Capital Commission's (NCC) green belt, but it is not immediately proximate to land under the jurisdiction of the NCC. The design of Quadrant 14 is therefore not subject to Federal Land Use Design Approval (FLUDA).

2.1.2 Land Use & Zoning

The current land use is parking, which is a permitted use under the MC F(2.0) zoning designation. The MC designation denotes Mixed-Use Centre and permits a broad range of commercial and civic uses as identified in the City of Ottawa Official Plan. Mixed-Use Centres are described as follows:

"The Mixed-Use Centre designation in this Plan applies to areas that have been identified as strategic locations on the rapid-transit network and lie adjacent to major roads. They act as focal points of activity, both within their respective communities and within the larger municipal structure. They are limited in number and represent opportunities for substantial growth. Mixed-Use Centres will ultimately develop as "good places" in their own right as components of complete neighbourhoods. Development at Mixed-Use Centres will take advantage of the opportunities offered by transit for both internal and external commuting and ease of access on foot and by bicycle. By virtue of careful attention to design, orientation and a mix of uses, development in Mixed-Use Centres will contribute to the diversity of land use in the immediate area and foster the creation of vibrant centres of activity."

The proposed Quadrant 14 innovation centre is considered to be a permitted use under this zoning. The anticipated building area is acceptable for the zoning, and generates a requirement for a minimum of 60 parking stalls, two of which must be accessible. Setbacks for the buildable area are identified and have been transcribed to the adjacent plans. In addition there is a future transit corridor right of way offset 22 meters from the centerline of Carling Avenue that has been identified on plans.

The southern portion of the site was formerly listed on the Federal Environmental Site Registry. The available information indicates that remediation has taken place using a mixture of on and off site techniques. For the purposes of this project it is assumed that brown field remediation will not need to be a design consideration.

The watershed and floodplains adjacent to the Rideau Canal fall under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). The development area falls outside the 100 and 200 year flood plains. As a result the RVCA has indicated that they exercise no special restrictions with respect to land use.

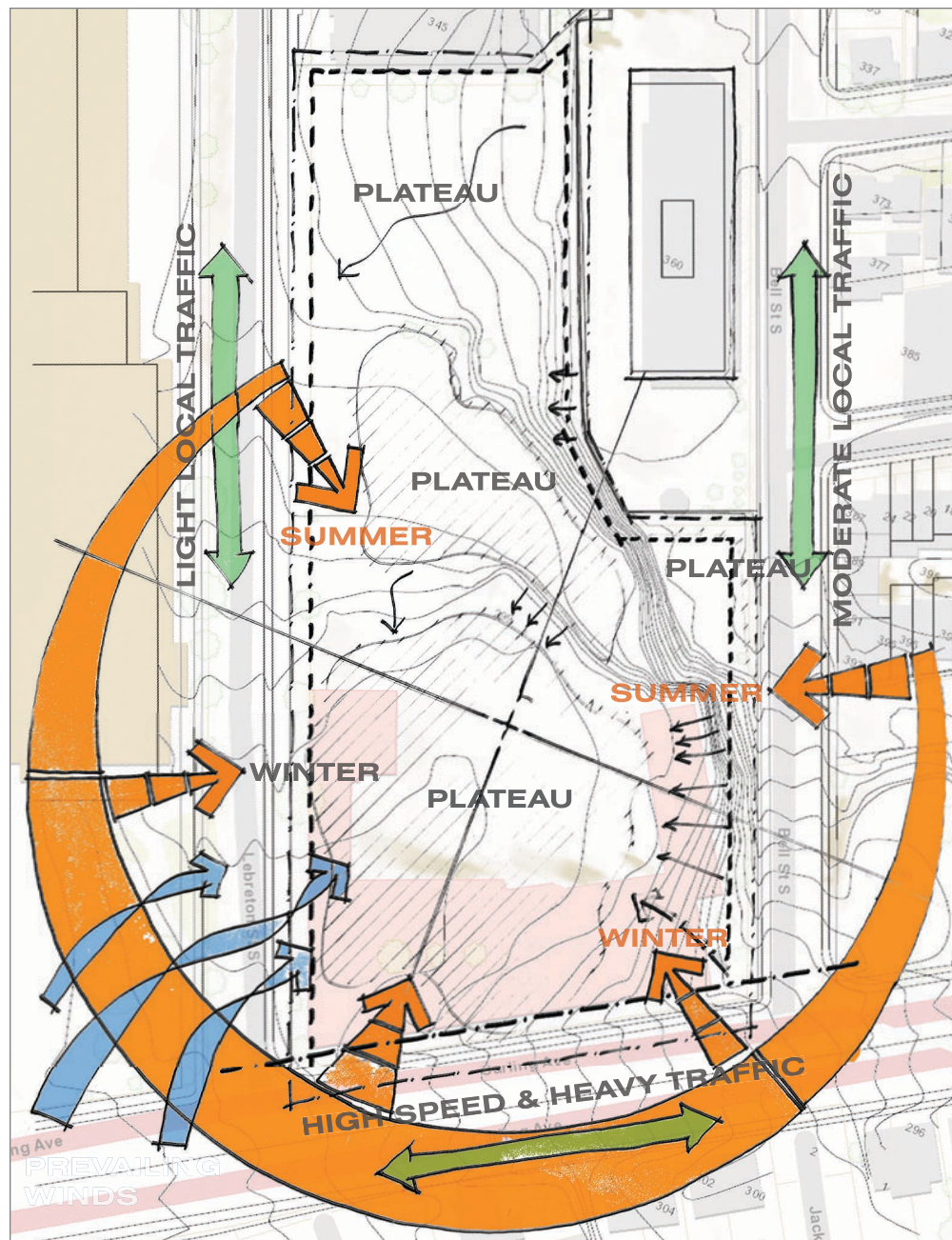


Figure 2.2
Solar orientation, prevailing
winds, circulation, topography
and zoning.

2.2 SITE FEATURES

2.2.1 Topography & Natural Features

At the midpoint the existing site has a full two-story grade differential from east to west, which is comprised of a steep turf embankment and a Cobourg limestone escarpment. From north to south there are three plateaus, which descend from the northern boundary of the site to Carling Avenue. The majority of the surface is asphalt and concrete with the exception of the embankment, which is beginning to naturalise with small trees and shrubberies. The vegetation that exists is unplanned and is only seasonally tended.

2.2.2 Climate & Orientation

The decision to make use of a steeply sloped site with a southwestern exposure was not an arbitrary one. The conventional approach to high performance buildings on sites such as this in the Ottawa region has been to bunker them into the cliff and design a large southwest facing glazed atrium with exotic solar control. The intent for Quadrant 14 is to subvert that paradigm and explore alternatives to conventional approaches to allow a broader range of connectivity to the existing natural topography.

2.2.3 Street Patterns & Circulation

Light local passenger vehicles at moderate to light volume circulates on both Lebreton Street S. and Bell Street S. Carling Avenue is a main arterial route that is divided with a median and handles heavy vehicles, city busses and passenger vehicles with cyclical moderate to high volumes. Carling Avenue is serviced by two City of Ottawa bus routes and by the O-Train two blocks west of the Site at Preston Street. The site is considered to be highly connective by the City of Ottawa.

At present pedestrian traffic on all routes is relatively light as there are a limited number of pedestrian oriented destinations, however there are ample sidewalks and linkages to pedestrian and cycle pathways at Dows Lake. Owing to the steep grade to the east and the presence of densely parked cars during peak weekday hours there are no pedestrian pathways through the site.



Figure 2.3 North view, Carling Avenue at Lebreton Street S.

2.2.4 Neighbourhood Context and Demographics

The site is located at the southwest corner of the Dalhousie South residential district. The neighbourhood demographic is comprised of middle class professionals, working class long term leases, and short-term student renters. The properties to the east, across Bell Street S. are predominantly medium density two to four story residential single-family homes, row homes and small-scale multi-unit residential buildings. On the promontory overlooking the site is a fourteen-story high-density apartment building with underground and surface parking. The building abutting the site to the north is a medium density (six story) apartment complex with underground parking.

The neighbourhood across Carling to the southeast is comprised of one and two story single-family homes, on large suburban scale lots. This is an upper middle class neighbourhood with a large proportion of retirees. Well-treed parkland leading down to Dows Lake is visible southwest of the site across Carling Avenue.

The land to the west of site across Lebreton Street S. is dominated by a 1950's International Style laboratories and offices occupied by Natural Resources Canada (NRCan). The monolithic six-story building has heavy massing comprised of buff brick, flat roofs, punched windows and it occupies all the land to the west for two full blocks. The buildings are set well back from Carling Avenue providing good sightlines and opening the solar orientation.



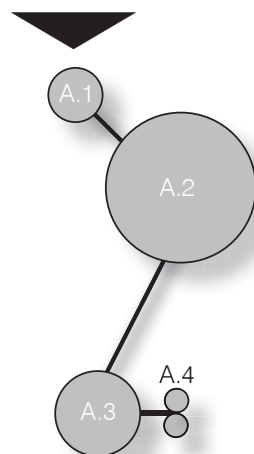
Figure 2.4 Northwest view, Carling Avenue at Bell Street S., NRC facility beyond.



Figure 2.5 North view from mid-site plateau showing upper plateau, embankments and cliffs.



Figure 2.6 South view from cliff top plateau overlooking site.



A {Administrative}

ENTRANCE AND GATHERING SPACE

A.1

PROGRAM DATA			
ZONE:	A - Administrative Spaces.	VERT. ADJACENCIES:	Processional, Circulation.
QUANTITY:	1	HORIZ. ADJACENCIES:	A.2, A.3
AREA EACH:	50 m2	HEIGHT:	Single storey expanding to multiple storey reception.
AREA TOTAL:	50 m2	VOLUMETRICS:	Direct connection to Reception.
OCCUPANCY/LOAD:	Assembly, transitory pick-up and meeting 25 persons max.	SECURITY:	Public - provide monitored access point.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Maximum natural lighting. Glare and direct light tolerable. 300-1000 Lux.	<ul style="list-style-type: none"> - Information and orientation towards larger Reception area. - Acts as a lobby or vestibule - Transition zone, mediating interior and exterior conditions. - Circulation. - Informal meeting. - Arrival Point (first impression). - Pick-up and drop off. Seating area. 	
VENTILATION:	Seasonal exterior fresh air. (SFA 12.5 L/s)		
EXTERIOR ACCESS:	Direct, high profile. Main entry function. Transition Space.		
ACOUSTICS:	Lively.		
ENCLOSURE:	Expanding.		
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	<ul style="list-style-type: none"> - Openings to admit visitors. - Openings to admit natural light and ventilation. 	DAY LIGHTING:	<ul style="list-style-type: none"> - Orientation or reflectors/light shelves. - Skylights or Light Wells
STRUCTURE:	<ul style="list-style-type: none"> - Canopies for shading / weather protection. 	VENTILATION:	<ul style="list-style-type: none"> - A spatial conduit or duct for seasonal fresh air. - Active louvered facade.
SPATIAL:	<ul style="list-style-type: none"> - Incorporation of entry double skin as spatial capture. 	ENERGY:	<ul style="list-style-type: none"> - Double wall facade, vestibule, intermediate environment. - DHW evacuated tube array/pergola.
ELEMENTAL:	<ul style="list-style-type: none"> - Sense of entry, sense of arrival. - make the main doors obvious. 	WATER:	<ul style="list-style-type: none"> - Interior/exterior pools and/or fountains. - Visible roof collectors and leaders. - Vista towards interior amenities.
OTHER:	<ul style="list-style-type: none"> - Vestibule, revolving door, entry sequence. - Obvious elements demarcating entry. 	FOOD:	<ul style="list-style-type: none"> - Proximity to restaurant.
NOTES: <ul style="list-style-type: none"> - Consider the entry sequence experience. - Consider the experience for exiting. 			

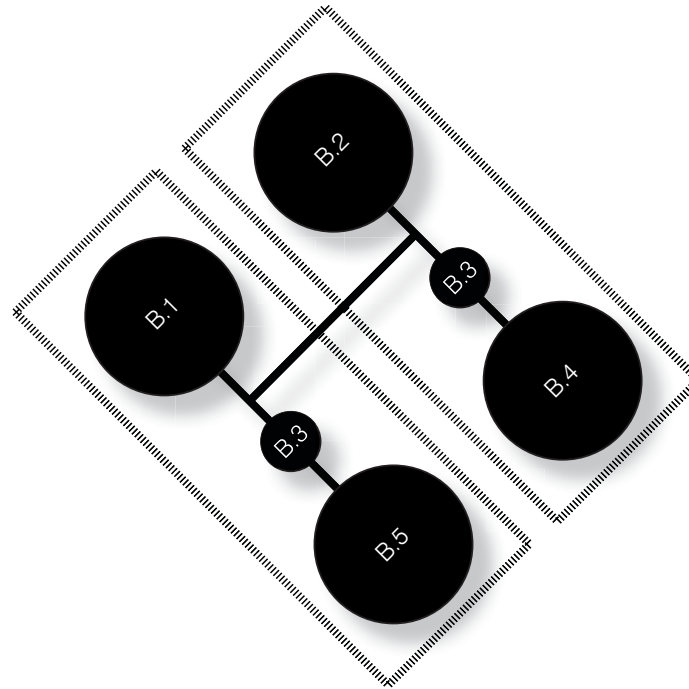
RECEPTION AND PROCESSIONAL SPACE				A.2
PROGRAM DATA				
ZONE:	A - Administrative Spaces.	VERT. ADJACENCIES:	Processional, Circulation.	
QUANTITY:	1	HORIZ. ADJACENCIES:	A.1, A.3, , C.1, D.1, D.3, E.5	
AREA EACH:	250 m2	HEIGHT:	Multiple storey.	
AREA TOTAL:	250 m2	VOLUMETRICS:	Dynamic interconnection of incorporated functions/adjacencies.	
OCCUPANCY/LOAD:	Assembly, 75+ persons (transitory).	SECURITY:	Public past entry controlled access point. Monitored via A.1	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Maximum natural lighting. Glare and direct light to be minimized. 300-1000 Lux.	<ul style="list-style-type: none">- Greeting and orientation.- Crush space for exhibition spaces.- Gateway to activities.- Client services desk/reception. Interpretive.- Setup concourse for smaller scale multi-media events leading into exhibition spaces.- Combined axially with procession and circulation.- Visual access to interior activities.- Break-out and eating areas linked to Exhibition.		
VENTILATION:	Seasonal exterior fresh air. (SFA 62.5 L/s)			
EXTERIOR ACCESS:	Indirect through Entry Procession.			
ACOUSTICS:	Lively.			
ENCLOSURE:	Open. Provide view.			
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	- Maximize light harvesting with visible active elements.	DAY LIGHTING:	<ul style="list-style-type: none">- Orientation or reflectors/light shelves.- Skylights or Light Wells	
STRUCTURE:	- Exposed	VENTILATION:	<ul style="list-style-type: none">- Solar chimney.- Active louvered facade.- Integral to the night flushing system.	
SPATIAL:	<ul style="list-style-type: none">- Expansive with high volumes.- Exploration spaces interconnected through spatial volume.	ENERGY:	<ul style="list-style-type: none">- Radiant heat (panels/floor).	
ELEMENTAL:	- Operable clerestory elements with articulating light shelves.	WATER:	- N/A	
OTHER:	- Vertical circulation.	FOOD:	- Incorporating or flowing into restaurant.	
NOTES:				
<ul style="list-style-type: none">- Imagine the quality of light for the various spaces. Wrap that light in a building.- Consider multi-use spaces and find ways to articulate the building to allow the quality of light for each of those spaces to be expressed ~ opportunities for interactivity may reveal themselves.- This is a point of departure, a place of gathering and a place to loiter.- Food and gathering go together. The restaurant should leak into this spaces.- Recognise that gathering to eat is not always synonymous with commerce - provide public places for people to gather eat box lunches indoors.				

ADMINISTRATION OPEN OFFICES

A.3

PROGRAM DATA			
ZONE:	A - Administrative Spaces.	VERT. ADJACENCIES:	Consider raising above circulation (i.e. Noli private/public separation).
QUANTITY:	1	HORIZ. ADJACENCIES:	A.2, A.4, E.1, E.2, E.4
AREA EACH:	100 m2	HEIGHT:	Single storey.
AREA TOTAL:	100 m2	VOLUMETRICS:	Simple.
OCCUPANCY/LOAD:	Business and Personal Services, 6-10 persons (4 FTE, 4PTE).	SECURITY:	Restricted Access (door required). Window opening to reception/procession.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Day lighting preferred. Diffuse. 500-100 Lux.	<ul style="list-style-type: none">- Day-to-day administration of public facility.- Workstations for up to 8 persons.- Office space with natural lighting.- User controlled environment.- View to interior Reception and Procession required.- Access to functional backhouse including loading dock/storage areas.	
VENTILATION:	Seasonal exterior fresh air. (SFA 20-120 L/s)		
EXTERIOR ACCESS:	Not required.		
ACOUSTICS:	Controlled for concentrative work and privacy.		
ENCLOSURE:	Open office, systems furniture. View not required,		
SITE RELATIONSHIP:	Grade or above.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	- Provide natural light, windows in discrete location, no direct solar exposure.	DAY LIGHTING:	- Clerestory / Light well.
STRUCTURE:	-	VENTILATION:	- User operable on red/green light scenario. - Ventilation opening into vegetated interior space for year-round fresh air.
SPATIAL:	-	ENERGY:	- Maximize comfort, tighter tolerances than the balance of the building.
ELEMENTAL:	- Operable windows.	WATER:	- N/A
OTHER:	- Control over daylight harvesting.	FOOD:	- Kitchenette and proximity to restaurant.
NOTES:			
- Staff is expected to be well versed in building operations and energy management thus this area can tolerate more user control and intervention than other spaces.			

ADMINISTRATION CLOSED OFFICES				A.4
PROGRAM DATA				
ZONE:	A - Administrative Spaces.	VERT. ADJACENCIES:	Consider raising above circulation (i.e. Noli private/public separation).	
QUANTITY:	2	HORIZ. ADJACENCIES:	A.2, A.3	
AREA EACH:	10 m2	HEIGHT:	Single storey.	
AREA TOTAL:	20 m2	VOLUMETRICS:	Simple.	
OCCUPANCY/LOAD:	Business and Personal Services, 1 person ea (2 FTE total).	SECURITY:	Restricted Access (door required).	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Indirect partial day lighting acceptable. Diffuse. 500-1000 Lux.	<ul style="list-style-type: none">- Day-to-day administration of public facility.- User controlled environment.- View to interior Open Office for capturing daylight.		
VENTILATION:	Seasonal exterior fresh air. (SFA 0-10 L/s)			
EXTERIOR ACCESS:	Not required.			
ACOUSTICS:	Controlled for concentrative work and privacy.			
ENCLOSURE:	Cellular with adaptable systems furniture (not partitions). View not required,			
SITE RELATIONSHIP:	Grade or above.			
STRUCTURE:	Expressed or concealed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	- Light harvesting	DAY LIGHTING:	- Clerestory / side light / glazed partition.	
STRUCTURE:	-	VENTILATION:	<ul style="list-style-type: none">- User operable on red/green light scenario.- Ventilation opening into vegetated interior space for year-round fresh air.	
SPATIAL:	-	ENERGY:	- Maximize comfort, tighter tolerances that the balance of the building.	
ELEMENTAL:	- Operable windows.	WATER:	- N/A	
OTHER:	<ul style="list-style-type: none">- Control over daylight harvesting.- Control of systems furniture.	FOOD:	- Kitchenette and proximity to restaurant.	
NOTES:				
<ul style="list-style-type: none">- Staff is expected to be well versed in building operations and energy management thus this area can tolerate more user control and intervention than other spaces.				



B {Exploration}

LEARNING COMMONS

B.1

PROGRAM DATA			
ZONE:	B - Exploration Spaces	VERT. ADJACENCIES:	A.3
QUANTITY:	1	HORIZ. ADJACENCIES:	B.5, B.3
AREA EACH:	300 m2	HEIGHT:	High storey. Consider Mezzanine.
AREA TOTAL:	300 m2	VOLUMETRICS:	Open large volume.
OCCUPANCY/LOAD:	Assembly, 30-60 persons.	SECURITY:	Public.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Maximum natural lighting from atrium. Direct/Indirect. 300-700 Lux.	<ul style="list-style-type: none"> - A space for collaborative exploration and learning in groups of 2-8 persons. - Proximate to the private study area to allow participants to break in and out groups to study alone. - Informal group seating. Formal table seating. Maximum flexibility. - All furnishings are mobile. - Include partitions that can configure to temporarily enclose groups. 	
VENTILATION:	Seasonal exterior fresh air. (SFA 300-500 L/s)		
EXTERIOR ACCESS:	None		
ACOUSTICS:	Semi muted.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Visual through micro-lovered facade.		
STRUCTURE:	Expressed and visible.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	<ul style="list-style-type: none"> - Active Skin and exterior views. - Long views appear and disappear depending on response of micro louvers to solar conditions. 	DAY LIGHTING:	<ul style="list-style-type: none"> - Active skin with allowance for direct light. - Windows with long views. - Light spill over from atrium clerestory.
STRUCTURE:	<ul style="list-style-type: none"> - Exposed primary structure - Umbrella secondary structure for spatial definition. 	VENTILATION:	<ul style="list-style-type: none"> - Displacement ventilation. - Integral to the night flushing system.
SPATIAL:	<ul style="list-style-type: none"> - Open spatial experience. 	ENERGY:	<ul style="list-style-type: none"> - Active LED micro louvered wall.
ELEMENTAL:	<ul style="list-style-type: none"> - Vertical circulation within the exploration group of suites. - Improved visual access to articulated clerestory light shelves in atrium. 	WATER:	-
OTHER:	<ul style="list-style-type: none"> - Furnishings can be reconfigurable 	FOOD:	-
NOTES: - Lounging space, a creative atmosphere.			

PRIVATE STUDY AREA				B.2
PROGRAM DATA				
ZONE:	B - Exploration Spaces	VERT. ADJACENCIES:	A.3	
QUANTITY:	1	HORIZ. ADJACENCIES:	B.4, B.3	
AREA EACH:	300 m2	HEIGHT:	High storey.	
AREA TOTAL:	300 m2	VOLUMETRICS:	Open large volume.	
OCCUPANCY/LOAD:	Assembly, 30-60 persons (transitory).	SECURITY:	Public.	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Controllable indirect day lighting. 500-1000 Lux.	<ul style="list-style-type: none">- A space for independent exploration and learning.- Formal seating in pod-like carols.- Asserts individuality.- Separate from other spaces (not spatially interconnected).		
VENTILATION:	Access to fresh air. (SFA 300-600 L/s)			
EXTERIOR ACCESS:	-			
ACOUSTICS:	Controlled for concentrative work and privacy			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Visual access. Above grade.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	<ul style="list-style-type: none">- Openings that can be individually configured to modulate day light and views.- Openings that can be individually configured for natural ventilation	DAY LIGHTING:	<ul style="list-style-type: none">- Independent control over intensity.- Windows with long views to minimize eyestrain.- Light shelves and louvres.	
STRUCTURE:	<ul style="list-style-type: none">- Exposed.	VENTILATION:	<ul style="list-style-type: none">- Operable ventilation (within limits).- Displacement ventilation.- Integral to the night flushing system.	
SPATIAL:	<ul style="list-style-type: none">- Semi-private enclosures or pods layered to perimeter- Protected from core by resource material shelving.	ENERGY:	<ul style="list-style-type: none">-	
ELEMENTAL:	<ul style="list-style-type: none">- Vertical circulation within the exploration group of suites.	WATER:	<ul style="list-style-type: none">-	
OTHER:	<ul style="list-style-type: none">- Individual workstations.	FOOD:	<ul style="list-style-type: none">-	
NOTES:				
<ul style="list-style-type: none">- Independent study space should be like an iPod you can live in; a world of your own.- A place of intensive concentration therefore limit potential distractions. Muted atmosphere, simple controls for adaptive elements.				

TECHNICAL SERVICES

B.3

PROGRAM DATA			
ZONE:	B - Exploration Spaces	VERT. ADJACENCIES:	A.2
QUANTITY:	2 (one per level located within B.4 and B.5)	HORIZ. ADJACENCIES:	B.1, B.2, B.3, B.4
AREA EACH:	25 m2	HEIGHT:	Single storey.
AREA TOTAL:	50 m2	VOLUMETRICS:	Simple.
OCCUPANCY/LOAD:	Business and personal services. 4 persons (4 FTE, 2 PTE)	SECURITY:	Public. Monitored by staff.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Day lighting preferred. Diffuse. 500-100 Lux.	<ul style="list-style-type: none"> - Provide technical assistance to building participants. - Personnel serve an interpretive function akin to librarian. - View to study areas and proximity to study rooms. - Multifunction printer/output device. 	
VENTILATION:	Seasonal exterior fresh air. (SFA 50-150 L/s)		
EXTERIOR ACCESS:	Not required.		
ACOUSTICS:	Muted.		
ENCLOSURE:	Partially open to adjacencies.		
SITE RELATIONSHIP:	Grade or above.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	- Locate on perimeter wall. Match spatial amenities in B.4 and B.5	DAY LIGHTING:	- Clerestory / Light well.
STRUCTURE:	-	VENTILATION:	- Displacement ventilation. - Integral to the night flushing system.
SPATIAL:	- Match spatial amenities in B.4 and B.5	ENERGY:	-
ELEMENTAL:	- Operable windows where possible.	WATER:	-
OTHER:	- Control over daylight harvesting.	FOOD:	-
NOTES:			
- Staff is expected to be well versed in building operations and energy management thus this area can tolerate more user control and intervention than other spaces.			

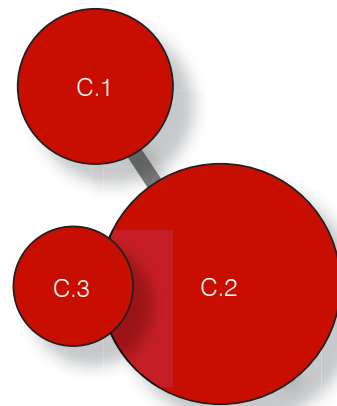
MEDIA/TECHNOLOGY LIBRARY				B.4
PROGRAM DATA				
ZONE:	B - Exploration Spaces		VERT. ADJACENCIES:	-
QUANTITY:	1		HORIZ. ADJACENCIES:	B1, B.4, B.6, B.7
AREA EACH:	400 m2		HEIGHT:	High storey.
AREA TOTAL:	400 m2		VOLUMETRICS:	Dynamic internal interconnection.
OCCUPANCY/LOAD:	Assembly, 60-90 persons (transitory).		SECURITY:	Public.
SPATIAL QUALITIES			INCORPORATED FUNCTIONS	
LIGHTING:	Maximum natural lighting from atrium. Direct/Indirect. 300-700 Lux.		<div>- Collaborative exploration and learning in groups or individually.</div> <div>- Proximate to the private study area to allow participants to break in and out groups to study alone.</div> <div>- Informal group seating. Formal table seating. Maximum flexibility.</div> <div>- All furnishings are mobile.</div> <div>- Include partitions that can configure to temporarily enclose groups.</div>	
VENTILATION:	Seasonal exterior fresh air. (SFA 300-500 L/s)			
EXTERIOR ACCESS:	None			
ACOUSTICS:	Semi muted.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Visual through micro-lovered facade.			
STRUCTURE:	Expressed and visible.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES			OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	<div>- Active Skin and exterior views.</div> <div>- Long views appear and disappear depending on response of micro louvers to solar conditions.</div>		DAY LIGHTING:	<div>- Active skin with allowance for direct light.</div> <div>- Windows with long views.</div> <div>- Light spill over from atrium clerestory.</div>
STRUCTURE:	<div>- Exposed primary structure</div> <div>- Umbrella secondary structure for spatial definition.</div>		VENTILATION:	<div>- Displacement ventilation.</div> <div>- Integral to the night flushing system.</div>
SPATIAL:	<div>- Open spatial experience.</div>		ENERGY:	<div>- Active LED micro louvered wall.</div>
ELEMENTAL:	<div>- Vertical circulation within the exploration group of suites.</div> <div>- Improved visual access to articulated clerestory light shelves in atrium.</div>		WATER:	-
OTHER:	<div>- Furnishings can be reconfigurable</div>		FOOD:	-
NOTES:				
<div>- Lounging space, a creative atmosphere.</div>				

CHILDREN'S LIBRARY

B.5

PROGRAM DATA			
ZONE:	B - Exploration Spaces	VERT. ADJACENCIES:	A.2
QUANTITY:	1	HORIZ. ADJACENCIES:	B.1, B.3, B.5
AREA EACH:	400 m2	HEIGHT:	High storey.
AREA TOTAL:	400 m2	VOLUMETRICS:	Dynamic internal interconnection.
OCCUPANCY/LOAD:	Assembly, 60-90 persons (transitory).	SECURITY:	Controlled access point, configure for parental monitoring from control point.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Diffuse natural lighting. 200-500 Lux.	<ul style="list-style-type: none"> - Visual access to interior space. - Central reading circle. - Protected outdoor area. - Children's stacks. - Children's periodicals - Children's play area. 	
VENTILATION:	Controlled mechanical with natural fresh air. (SFA 450-1000 L/s)		
EXTERIOR ACCESS:	Terrace.		
ACOUSTICS:	Muted.		
ENCLOSURE:	Open space with stacks and A/V Carols.		
SITE RELATIONSHIP:	Provides direct outdoor access to protected area.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	<ul style="list-style-type: none"> - Dynamic view window elements. - Dynamic facade for ventilation. 	DAY LIGHTING:	<ul style="list-style-type: none"> - Tightly controlled uniform diffuse lighting, minimum UV. - Iris-glass light constrictors.
STRUCTURE:	-	VENTILATION:	<ul style="list-style-type: none"> - Fresh air via perimeter glazing. - Part of the night flushing system.
SPATIAL:	-	ENERGY:	- Look to stacks and HD archives for centralized thermal mass.
ELEMENTAL:	- Exterior access/environmental separation.	WATER:	-
OTHER:	- Visual access to (physically inaccessible) robotic automated retrieval.	FOOD:	-
NOTES: <ul style="list-style-type: none"> - The first element of the building a child will learn and must incorporate transferable grammars. - Integral, central and interconnected element within the building. - Windows to interior or exterior spaces that change throughout the day. - Constant visual access to entry and atrium as an orienting element. 			

C {Creative}



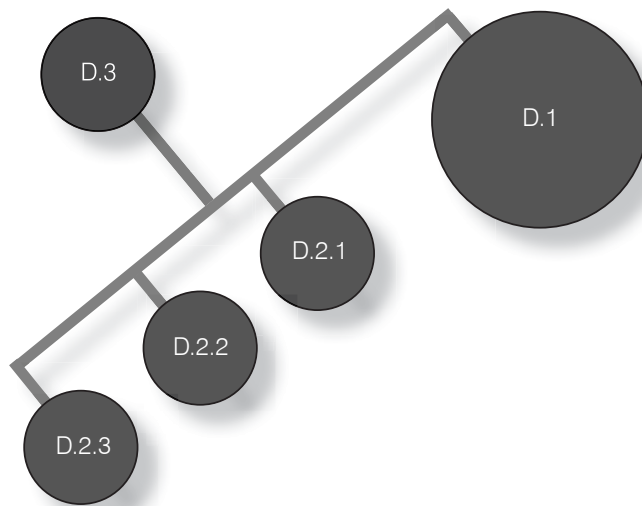
OPEN DEVICES LABORATORY				C.1
PROGRAM DATA				
ZONE:	C - Creation Spaces	VERT. ADJACENCIES:	B1, B4	
QUANTITY:	1	HORIZ. ADJACENCIES:	A.2	
AREA EACH:	300 m2	HEIGHT:	High storey. Consider Mezzanine.	
AREA TOTAL:	300 m2	VOLUMETRICS:	Open large volume.	
OCCUPANCY/LOAD:	Assembly, 30-60 persons.	SECURITY:	Public.	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Maximum natural lighting. Direct/Indirect. 300-700 Lux.	<div>- Innovation hub for testing new peripherals and applications on open devices contained within the Lab.</div> <div>- Tethered mobility.</div> <div>- Includes local cloud server visible from main entry.</div> <div>- Include partitions that can configure to temporarily enclose groups.</div> <div>- Proximate to the private study area to allow participants to break in and out groups to study alone.</div> <div>- Informal group seating. Formal table seating. Maximum flexibility.</div>		
VENTILATION:	Seasonal exterior fresh air. (SFA 300-800 L/s)			
EXTERIOR ACCESS:	Not required.			
ACOUSTICS:	Semi muted.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Visual access.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	<div>- Active Skin and exterior views.</div> <div>- Long views appear and disappear depending on solar conditions (glare).</div>	DAY LIGHTING:	<div>- Active skin with allowance for direct light.</div> <div>- Windows with long views.</div> <div>- Skylight</div>	
STRUCTURE:	<div>- Umbrellas or pods.</div>	VENTILATION:	<div>- Displacement ventilation.</div> <div>- Integral to the night flushing system.</div>	
SPATIAL:	<div>- Semi-private enclosures or pods.</div>	ENERGY:	<div>-</div>	
ELEMENTAL:	<div>- Vertical circulation within the exploration group of suites.</div>	WATER:	<div>- Visual access to exterior reflecting pool. Floor to ceiling glass.</div>	
OTHER:	<div>-</div>	FOOD:	<div>- Proximity to restaurant and eating areas.</div>	
NOTES:				
<div>- Tethered workstations.</div>				

TECHSHOP OPEN SPACE				C.2
PROGRAM DATA				
ZONE:	C - Creation Spaces	VERT. ADJACENCIES:	Exhibition spaces.	
QUANTITY:	1	HORIZ. ADJACENCIES:	C.2, D.2, E.6	
AREA EACH:	900 m2	HEIGHT:	Two storey.	
AREA TOTAL:	900 m2	VOLUMETRICS:	Open	
OCCUPANCY/LOAD:	Assembly, 50 persons ea.	SECURITY:	Public (scheduled controlled access)	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Mixed direct and diffuse natural lighting + task lighting. 500-700 Lux.	Open Workspace to accommodate the following (circulation factored into each area): 330 m2 Open work 100 m2 Machine shop 100 m2 Staff workstations. 70m2 Individual work tables. 60m2 Wood shop 30 m2 3D printing and plotting are. 90 m2 Shopbot CNC, Desktop CNC, Water-jet, cutter stations. 60 m2 Amenity space, meal area, internal conference, member services counter. 30 m2 Open tool storage and bins.		
VENTILATION:	Seasonal exterior fresh air. (SFA 50-500 L/s)			
EXTERIOR ACCESS:	Terrace. Providsional dock for direct loading large projects.			
ACOUSTICS:	Lively.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	- Opening to exterior and transition.	DAY LIGHTING:	- Simple modular dynamic grid.	
STRUCTURE:	-	VENTILATION:	- Simple modular displacement system.	
SPATIAL:	- Pods	ENERGY:	- Generation if possible.	
ELEMENTAL:	- Canted west facing wall with overhang and solar control.	WATER:	-	
OTHER:	- Arrays of sensors on exterior for data gathering and project integration.	FOOD:	- Access to restaurant.	
NOTES: - High visibility on approach to building with a simplified form and articulation for legibility. - High visibility from circulation axis and exhibition spaces. - Maker spaces modelled on the open-source Techshop concept. The design will not get into detailed equipment layouts and traffic flow. - The place of realization for cybernetic explorations.				

TECHSHOP CLOSED SPACE

C.3

PROGRAM DATA			
ZONE:	C - Creation Spaces	VERT. ADJACENCIES:	-
QUANTITY:	3	HORIZ. ADJACENCIES:	C.2
AREA EACH:	50 m2	HEIGHT:	Two storey.
AREA TOTAL:	150 m2	VOLUMETRICS:	Open
OCCUPANCY/LOAD:	Assembly, 30 persons ea.	SECURITY:	Public (scheduled controlled access)
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Roof monitors extened above + task lighting. 500-700 Lux.	Provide a total of 3 enclosed workspaces for following (circulation factored into each area): 40 m2 Soldering and electronics workstations 30 m2 Member project rooms and lockers. 30 m2 Abrasive and Grinding spaces. 50 m2 Hot Shop: Welding, Plasma cutters, laser cutters.	
VENTILATION:	Seasonal exterior fresh air. (SFA 50-500 L/s) Specialized ventilation (exhaust) for soldering and welding.		
EXTERIOR ACCESS:	Direct terrace and access to lawns.		
ACOUSTICS:	Lively.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	- Opening to exterior and transition.	DAY LIGHTING:	- Simple modular dynamic grid.
STRUCTURE:	- Incorporate interior pods to serve as techshop structure.	VENTILATION:	- Simple modular displacement system.
SPATIAL:	-	ENERGY:	- HRV on exhaust ventilation systems.
ELEMENTAL:		WATER:	-
OTHER:	- Arrays of sensors on	FOOD:	-
NOTES: - Articulate enclosed spaces to allow a vew through the techsho to the exterior glazed wall from the interior circulation axis. - Project roofs of enclosed spaces through the main roof of techshop to act as light monitors. - Maker spaces modelled on the open-source Techshop concept. The design will not get into detailed equipment layouts and traffic flow. - The place of realization for cybernetic explorations.			



D {Exhibition}

MIXED-USE THEATER

D.1

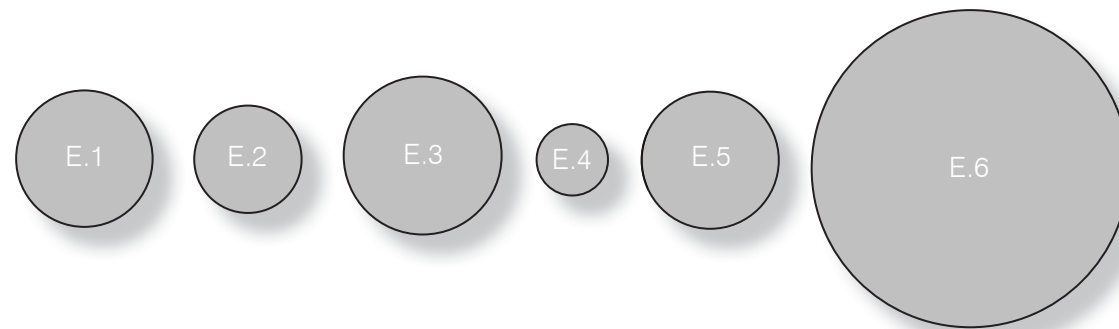
PROGRAM DATA			
ZONE:	D - Exhibition Spaces	VERT. ADJACENCIES:	Creation Spaces.
QUANTITY:	1	HORIZ. ADJACENCIES:	Processional space, Circulation Axis, Gallery/Experimental Spaces
AREA EACH:	800 m2	HEIGHT:	Multiple storey.
AREA TOTAL:	800 m2	VOLUMETRICS:	Program derived.
OCCUPANCY/LOAD:	Assembly, 200p/300p=500p	SECURITY:	Public access (regulated).
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Natural in lobby. Controlled artificial in theatre.	<ul style="list-style-type: none"> - Digital Cinema. - Exhibition of the work created internally. - Community theatre. - Commercial events and promotions. 	
VENTILATION:	HVAC required. (SFA 1000-7000 L/s)		
EXTERIOR ACCESS:	Not indicated.		
ACOUSTICS:	Lively.		
ENCLOSURE:	Open. Laterally divisible.		
SITE RELATIONSHIP:	High visibility from Carling Avenue..		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	- Express interior function and provide privacy as needed.	DAY LIGHTING:	- Limited to lobby.
STRUCTURE:	- Minimize volume when not in use.	VENTILATION:	- Limited to time of use.
SPATIAL:	- Stage and wings.	ENERGY:	- ERV when in use.
ELEMENTAL:	- Provide novel articulated enclosure for Carling view.	WATER:	-
OTHER:	- The curtain.	FOOD:	-
NOTES: - Use slope of site along Carling Avenue to address the stepped seating. - Consider providing articulated facade on Carling Avenue facade that can make the interior transparent or opaque depending on functional need. - Proximate to exterior access and exterior amphitheatre - Ignore historic precedents and look to the present, this is performance space modelled after the YouTube experience. - Lobby and crush space shared with reception and procession as well as circulation. - Proximate to sanitary facilities. - The circus is held in a tent. When there is no circus there is no tent.			

GALLERY / EXPERIMENTAL SPACE				D.2
PROGRAM DATA				
ZONE:	D - Exhibition Spaces	VERT. ADJACENCIES:	Creation Spaces.	
QUANTITY:	3	HORIZ. ADJACENCIES:	Processional space, Circulation Axis	
AREA EACH:	150, 300, 300 m2	HEIGHT:	2 storey min.	
AREA TOTAL:	750 m2	VOLUMETRICS:	Variable.	
OCCUPANCY/LOAD:	Assembly, 150 persons each (including exhibits).	SECURITY:	Public.	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Indirect diffuse day lighting supplemented with artificial. av. 700 Lux.	<div>- Multi-media/Cybernetics.</div> <div>- Public installations.</div> <div>- Project expositions.</div> <div>- Gallery partnerships.</div> <div>- Commercial product expos.</div> <div>- Provide floor depression (aka conversation pit) to serve as lecture space an robot war ring.</div>		
VENTILATION:	Seasonal exterior fresh air from circulation. (SFA 150-5000 L/s ea.)			
EXTERIOR ACCESS:	Direct, high profile. Main entry function. Transition Space.			
ACOUSTICS:	Lively.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Grade related, near exterior access and amenity space, high visibility, access to exterior amenities.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	<div>- Provide large glazed wall on non solar face.</div>	DAY LIGHTING:	<div>- Provide rooftop monitors incorporated into structure.</div>	
STRUCTURE:	<div>- Minimal structure with maximum visual interest.</div> <div>- Gridiron, modular fixing points, scaffold frames.</div>	VENTILATION:	<div>- Incorporate wind cowl.</div> <div>- Natural ventilation from wind cowl with visually identifiable duct runs.</div> <div>- Natural exhaust from leward suction.</div>	
SPATIAL:	<div>- Separate or connected.</div>	ENERGY:	<div>- HRV demonstration on wind cowl.</div>	
ELEMENTAL:	<div>- Living Laboratory</div> <div>- Wind Cowl</div>	WATER:	<div>-</div>	
OTHER:	<div>-</div>	FOOD:	<div>- Proximity to restaurant for catering.</div>	
NOTES:				
<div>- This space should be usable as contemplative space in addition to celebration space. Orders of enclosure to provide a variety of semi-private gathering places within the whole.</div> <div>- Serve event functions on a smaller scale but in the same basic way as the Museum of Civilization Great Hall, the National Gallery of Canada's Atrium.</div> <div>- Incorporate green wall filtration/humidification, demonstration HRV and wind cowl, greywater treatment living laboratory.</div> <div>- Make extensive use of natural light. Imagine the quality of light for the various spaces and then wrap the light in a building.</div>				

RESTAURANT / CAFE

D.3

PROGRAM DATA			
ZONE:	D - Exhibition Spaces	VERT. ADJACENCIES:	Not indicated.
QUANTITY:	1	HORIZ. ADJACENCIES:	A.2, E.4, A.5
AREA EACH:	250 m2 service area; 50 m2 prep area.	HEIGHT:	High storey.
AREA TOTAL:	300 m2	VOLUMETRICS:	Program derived.
OCCUPANCY/LOAD:	Assembly, Up to 100 diners.	SECURITY:	Public.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Maximum natural lighting.	<ul style="list-style-type: none"> - Restaurant kitchen. - Building catering services. - Coffee shop. - Dining lounge for 100 persons. - Reconfigurable for banquets. - Catering for special events in processional space. 	
VENTILATION:	Seasonal exterior fresh air. (SFA 500-2000 L/s)		
EXTERIOR ACCESS:	Direct, high profile. Main entry function. Transition Space.		
ACOUSTICS:	Lively.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.		
STRUCTURE:	Expressed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	-	DAY LIGHTING:	- Light shelves to maintain views.
STRUCTURE:	-	VENTILATION:	- Seasonal displacement ventilation.
SPATIAL:	- Not spatially bounded and expandable to other areas.	ENERGY:	- Lounge area contributes to night flushing.
ELEMENTAL:	-	WATER:	- Connectivity to greywater.
OTHER:	-	FOOD:	- Connectivity to exterior gardens.
NOTES: <ul style="list-style-type: none"> - Consider outdoor dining area situated on plateau overlooking other exterior amenities. - Maximize daylight and views to the landscaped areas of the site. - Food and gathering go together. The restaurant should leak into gathering spaces with dynamic interior elements that open or unfold. - Tracking the day with light necessitates a panoramic southern exposure. - Serve event functions on a smaller scale but in the same basic way as the Museum of Civilization Great Hall, the National Gallery of Canada's Atrium. 			



E {Support}

GENERAL STORES

E.1

PROGRAM DATA			
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	All.
QUANTITY:	1	HORIZ. ADJACENCIES:	All.
AREA EACH:	4.5% GFA	HEIGHT:	Single storey.
AREA TOTAL:	200 m2	VOLUMETRICS:	Program driven.
OCCUPANCY/LOAD:	Assembly, 0 persons (transitory).	SECURITY:	Controlled access point.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Artificial (limited occupancy).	<ul style="list-style-type: none"> - Storage requirements for demountable fittings and furnishings in reconfigurable spaces. - Administrative storage. - IT storage. - Studio space storage. 	
VENTILATION:	Mechanical. (SFA +/- 60 L/s ttl.)		
EXTERIOR ACCESS:	Only when serving exterior zones.		
ACOUSTICS:	From adjacent if storage is noise generating.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Program driven.		
STRUCTURE:	Exposed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	-	DAY LIGHTING:	-
STRUCTURE:	-	VENTILATION:	- Limit to time of use. CO2 sensor.
SPATIAL:	-	ENERGY:	-
ELEMENTAL:	-	WATER:	-
OTHER:	-	FOOD:	-
NOTES: - Predominantly unoccupied therefore does not exhibit features. - Make module and repeat, consistent outward appearance for legibility.			

MAINTENANCE/JANITORIAL				E.2
PROGRAM DATA				
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	All.	
QUANTITY:	As required.	HORIZ. ADJACENCIES:	All.	
AREA EACH:	3.0% GFA	HEIGHT:	Single storey.	
AREA TOTAL:	130 m2	VOLUMETRICS:	Program driven.	
OCCUPANCY/LOAD:	Assembly, 0 persons (transitory).	SECURITY:	Controlled access point.	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Artificial (limited occupancy). 200-300 Lux.	- Janitorial services and supplies.		
VENTILATION:	Mechanical. (SFA +/- 60 L/s ttl.)			
EXTERIOR ACCESS:	Only when serving exterior zones.			
ACOUSTICS:	From adjacent if storage is noise generating.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Program driven.			
STRUCTURE:	Exposed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	-	DAY LIGHTING:	-	
STRUCTURE:	-	VENTILATION:	- Limit to time of use. CO2 sensor.	
SPATIAL:	-	ENERGY:	-	
ELEMENTAL:	-	WATER:	-	
OTHER:	-	FOOD:	-	
NOTES:				
- Predominantly unoccupied therefore does not exhibit features.				
- A standard gross-up space.				
- Make module and repeat, consistent outward appearance for legibility.				

MECHANICAL/ELECTRICAL/IT

E.3

PROGRAM DATA			
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	All.
QUANTITY:	As required.	HORIZ. ADJACENCIES:	All.
AREA EACH:	8.0% GFA	HEIGHT:	High storey.
AREA TOTAL:	350 m2	VOLUMETRICS:	Program driven.
OCCUPANCY/LOAD:	Assembly, 0 persons (transitory).	SECURITY:	Controlled access point.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Artificial (limited occupancy). 200-400 Lux. Natural in offices 300-500 Lux.	<ul style="list-style-type: none"> - Include main mechanical room in high visibility location off circulation axis. - Mechanical space. - Building operations room (O&M, BAS etc.) - Electrical room(s) - IT closets and main LAN room. 	
VENTILATION:	Mechanical. (SFA +/- 750 L/s ttl.)		
EXTERIOR ACCESS:	Only when serving exterior zones.		
ACOUSTICS:	From adjacent if storage is noise generating.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Program driven.		
STRUCTURE:	Exposed.	OPPORTUNITIES FOR PERFORMANCE FEATURES	
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	-	DAY LIGHTING:	- Building operations room.
STRUCTURE:	-	VENTILATION:	- Limit to time of use. CO2 sensor.
SPATIAL:	-	ENERGY:	-
ELEMENTAL:	- Interconnect mechanical functions in high visibility location.	WATER:	-
OTHER:	-	FOOD:	-
NOTES: <ul style="list-style-type: none"> - Mechanical plant and equipment to be identified, colour coded and clearly visible. - Building operations room to maximize technology and automation. - Locate building operations for maximum public visibility. - Connection or proximity to 'living machine' to present complete tableau. 			

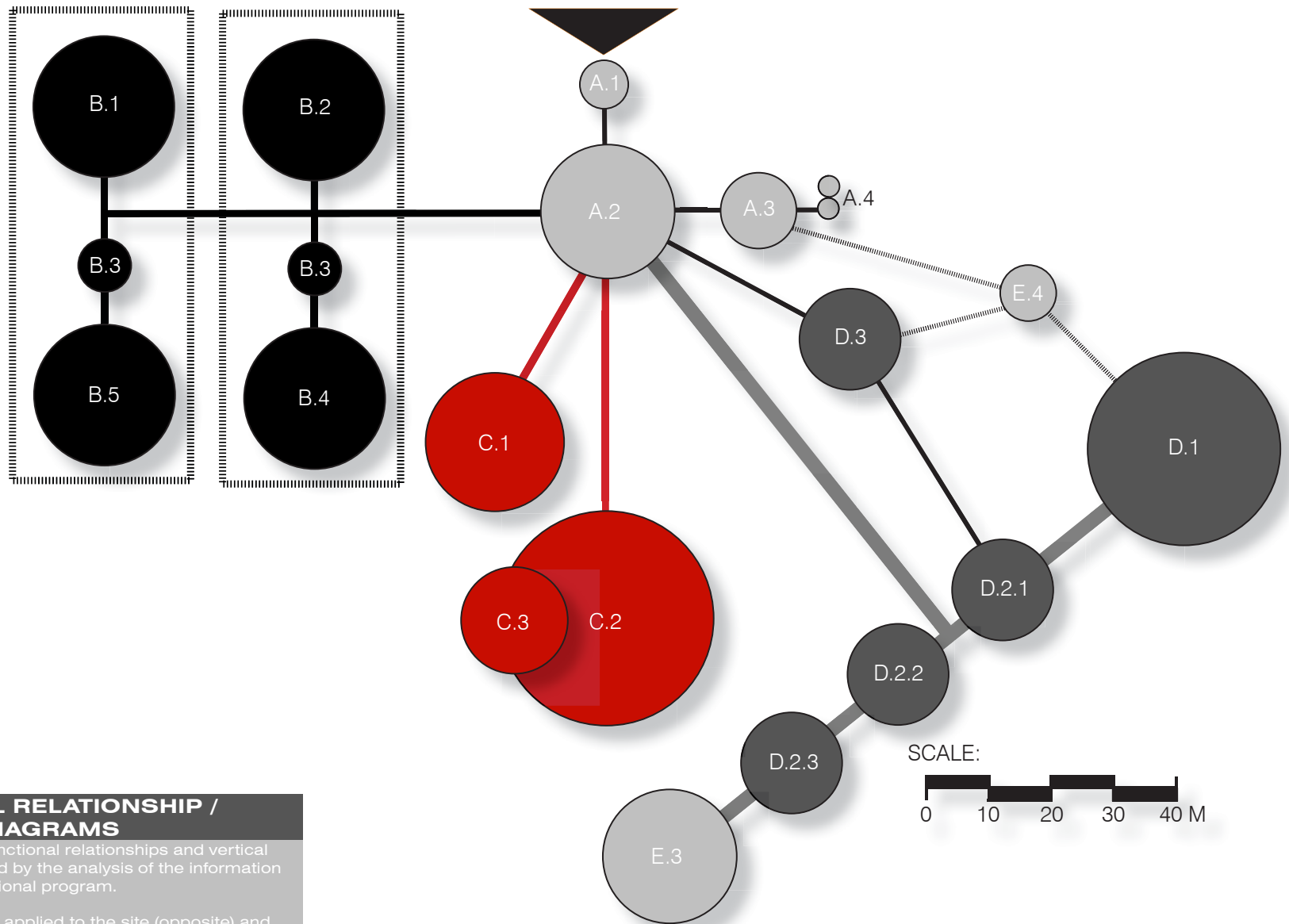
SHIPPING/RECEIVING				E.4
PROGRAM DATA				
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	All.	
QUANTITY:	1	HORIZ. ADJACENCIES:	Main circulation, Maintenance, Mechanical, Restaurant, Theatre.	
AREA EACH:	75 m2	HEIGHT:	High storey.	
AREA TOTAL:	75 m2	VOLUMETRICS:	Program driven.	
OCCUPANCY/LOAD:	Assembly, 0 persons (transitory).	SECURITY:	Controlled access point.	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Artificial (limited occupancy). 200-300 Lux.	<ul style="list-style-type: none"> - Deliveries. - Loading dock. - Productions/Exhibit/Shows. - Recycling. - Compost (refrigerated). - Garbage. 		
VENTILATION:	Mechanical. (SFA +/- 25 L/s ttl.)			
EXTERIOR ACCESS:	Grade level service.			
ACOUSTICS:	From adjacent.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Dock floor 1.2 meters above grade.			
STRUCTURE:	Exposed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	- Opening for deliveries and person door.	DAY LIGHTING:	- Day lighting element (shelf, reflector) as visual screen.	
STRUCTURE:	-	VENTILATION:	- Louvers, wind cowl.	
SPATIAL:	-	ENERGY:	-	
ELEMENTAL:	-	WATER:	-	
OTHER:	- Truck canopy/dock seal.	FOOD:	-	
NOTES: - Incorporate into a compact but functional back house corridor. - Maintain truck path and access out of the way of exterior common spaces. - Visually interesting building element.				

SANITARY FACILITIES

E.5

PROGRAM DATA			
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	All.
QUANTITY:	As required.	HORIZ. ADJACENCIES:	All.
AREA EACH:	5.0% GFA	HEIGHT:	Single storey.
AREA TOTAL:	225 m2	VOLUMETRICS:	Program driven.
OCCUPANCY/LOAD:	Assembly, 0 persons (transitory).	SECURITY:	Controlled access point.
SPATIAL QUALITIES		INCORPORATED FUNCTIONS	
LIGHTING:	Artificial and natural (limited occupancy). 200-300 Lux. (500 Lux at mirrors)	<ul style="list-style-type: none"> - Universally accessible (no separate barrier free). - Baby change facilities. 	
VENTILATION:	Mechanical. (SFA +/- 625 L/s ttl.)		
EXTERIOR ACCESS:	Only when serving exterior zones.		
ACOUSTICS:	From adjacent if storage is noise generating.		
ENCLOSURE:	Open.		
SITE RELATIONSHIP:	Program driven.		
STRUCTURE:	Exposed.		
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES	
ENVELOPE:	-	DAY LIGHTING:	- clerestory and light shelf (on solar faces).
STRUCTURE:	-	VENTILATION:	- BAS control of exhaust relative to occupancy sensor and building timing.
SPATIAL:	-	ENERGY:	-
ELEMENTAL:	-	WATER:	- Grey water reuse.
OTHER:	-	FOOD:	-
NOTES: <ul style="list-style-type: none"> - Located at primary circulation nodes. - Make module and repeat, consistent outward appearance for legibility. - No doors, hands free. 			

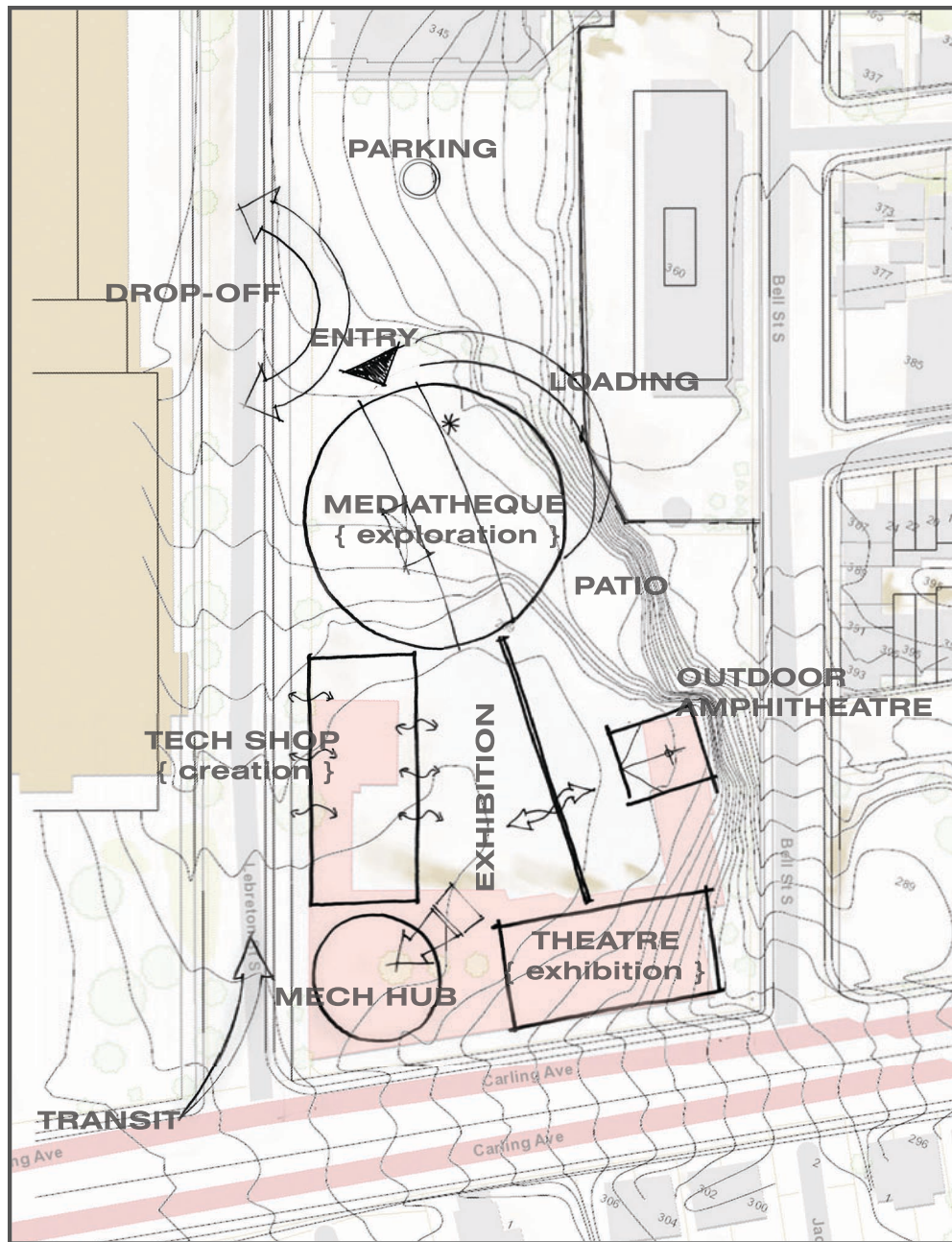
CIRCULATION				E.6
PROGRAM DATA				
ZONE:	E - Support Spaces	VERT. ADJACENCIES:	Creation spaces.	
QUANTITY:	As required.	HORIZ. ADJACENCIES:	Reception, Admini Offices, Sanitary Facilities, Exhibition spaces, Restaurant	
AREA EACH:	25.0% GFA	HEIGHT:	Multiple story	
AREA TOTAL:	1100 m2	VOLUMETRICS:	Dynamic interconnection of incorporated functions/adjacencies.	
OCCUPANCY/LOAD:	Varies.	SECURITY:	Public	
SPATIAL QUALITIES		INCORPORATED FUNCTIONS		
LIGHTING:	Maximum natural lighting. 200-500 Lux. Glare and direct light tolerated.	<ul style="list-style-type: none">- Information and orientation.- Vertical and horizontal transit through the building.- Demonstration of building services that are also in transit through the building.- Double wall facades (internal cores).- Vegetated interior spaces, gardens, similar in experience to Erickson's Bank of Canada.- Back-of-house circulation for deliveries and maintenance.		
VENTILATION:	Seasonal exterior fresh air. (SFA +/- 3000 L/s ttl.)			
EXTERIOR ACCESS:	Direct, high profile. Main entry function. Transition Space.			
ACOUSTICS:	Lively.			
ENCLOSURE:	Open.			
SITE RELATIONSHIP:	Grade related, near parking, high visibility, access to exterior amenities.			
STRUCTURE:	Expressed.			
OPPORTUNITIES FOR DYNAMIC INTERACTIVITY FEATURES		OPPORTUNITIES FOR PERFORMANCE FEATURES		
ENVELOPE:	- Maximize light harvesting with active elements.	DAY LIGHTING:	<ul style="list-style-type: none">- Orientation or reflectors/light shelves.- Skylights or Light Wells	
STRUCTURE:	- Seasonal extension to capture of exterior space	VENTILATION:	<ul style="list-style-type: none">- Solar chimney or wind cowl exhaust air.- Active louvered facade.- Green wall filtration/humidification.- Integral to the night flushing system.	
SPATIAL:	<ul style="list-style-type: none">- Decrease volume when unused to minimize conditioned volume.- Increase volume and/or floor space for events.	ENERGY:	<ul style="list-style-type: none">- Generation.- Demonstration HRV.- Radiant heat (panels/floor).	
ELEMENTAL:	<ul style="list-style-type: none">- Photovoltaics on heliostat.- Wind generation visible through glass ceiling, imposing view.	WATER:	<ul style="list-style-type: none">- Grey water treatment "living machine".- Green wall/irrigation.	
OTHER:	- Vertical circulation.	FOOD:	- Incorporating or flowing into restaurant.	
NOTES: <ul style="list-style-type: none">- Links all elements together and provides the physical manifestation of an intellectual journey.- Maximum potential for demonstration.- Transitional space primarily, but provide points of rest and pause.- Refer to reception and processional space and maintain the light motif throughout.- Every corridor is an opportunity for something greater than simple conveyance.- Pay close attention to exterior and transition zone, mediating interior and exterior conditions.				



FUNCTIONAL RELATIONSHIP / STACKING DIAGRAMS

Basic blocking of functional relationships and vertical stacking as informed by the analysis of the information detailed in the functional program.

The diagram is then applied to the site (opposite) and further planning decisions are made based on site specific considerations.



PROGRAM PLANNING SITE RESPONSE

Capitalizing on the site's natural topography and the capture of natural services were the primary considerations when planning the distribution of program functions on the site.

The planning is organized with the highest element, the three-story drum of the mediatheque, on the mid-level plateau at the center of the site. The area to the north is reserved for parking, drop-off and entry. The grade differential at this location allows for a raised patio at the restaurant, and the transition to the creation and exhibition spaces is made via a long ramp which reinforces the main circulation axis. The axis is flanked by a glazed wall on the protected side of the building forming an outdoor room against the escarpment suitable for the program-driven amenity space and amphitheatre.

The axis and glazed wall are offset by the mass of the Techshop forming a centralized interior volume that is both the primary circulation and primary exhibition space. The slope of the site and the decision to locate lower elements to the south and west maximizes solar exposure and allows the roof over this area to be articulated to include clerestories to maximize day lighting.

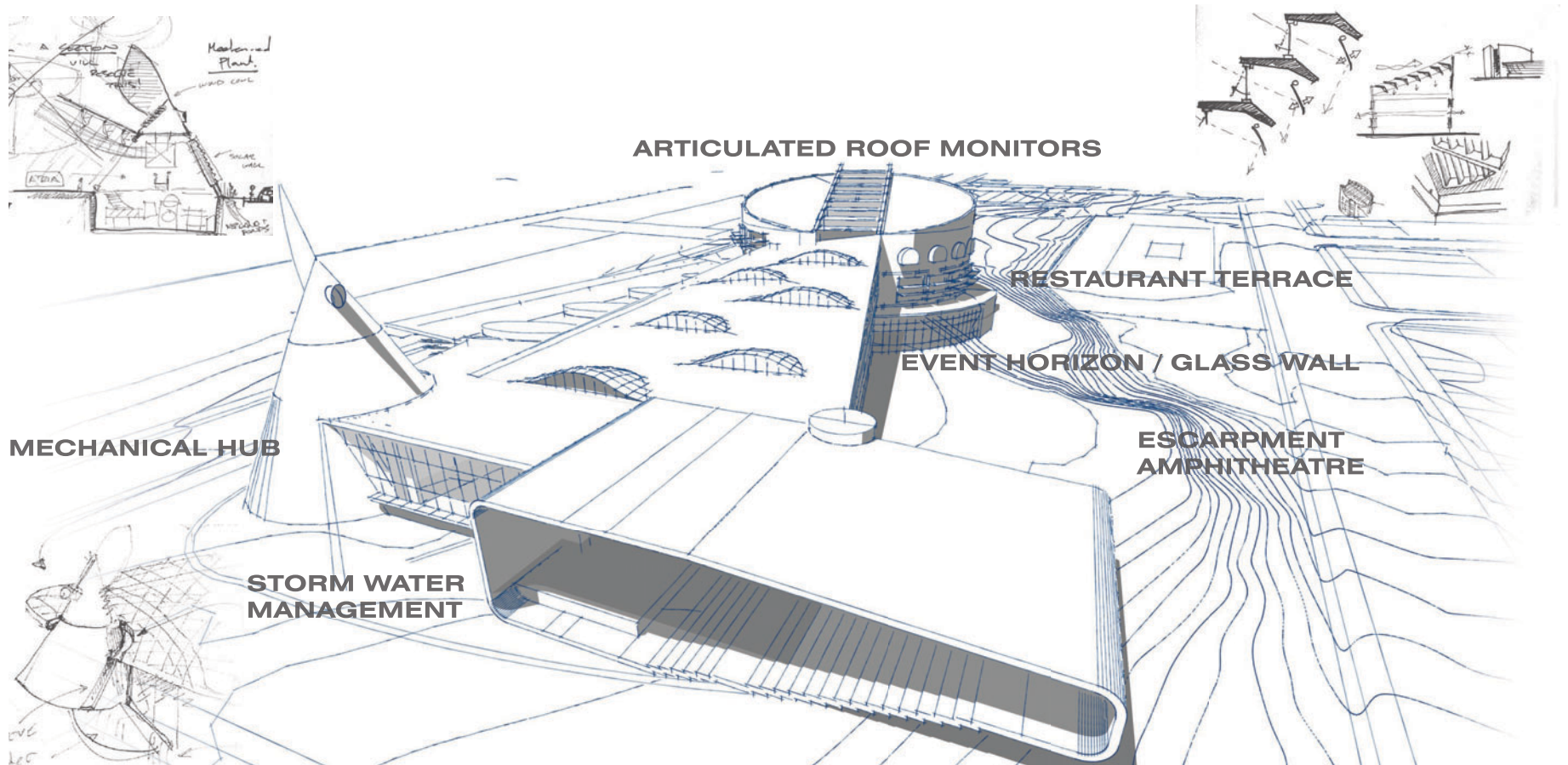
The primary mechanical hub is located on the low plateau at the intersection of Carling Avenue and Lebreton Street S. as this is the optimal location for the capture of radiant solar energy and ventilation air.

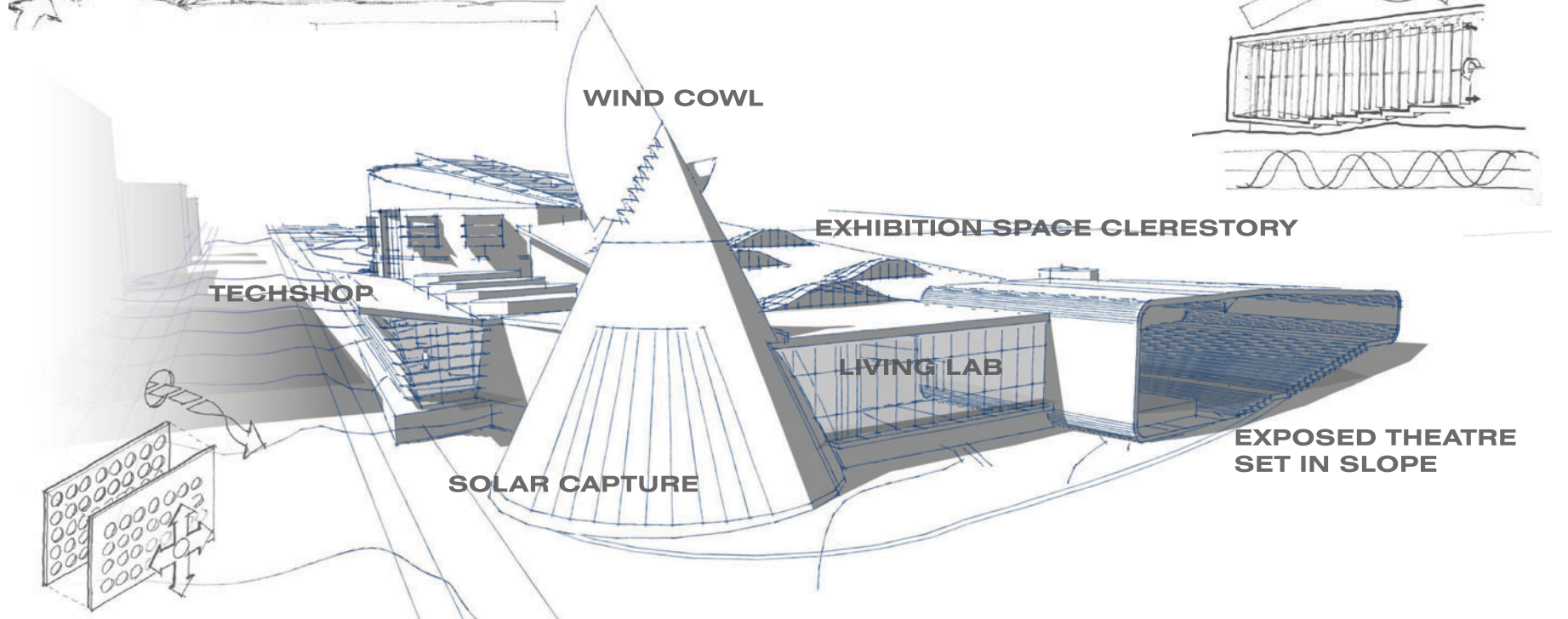
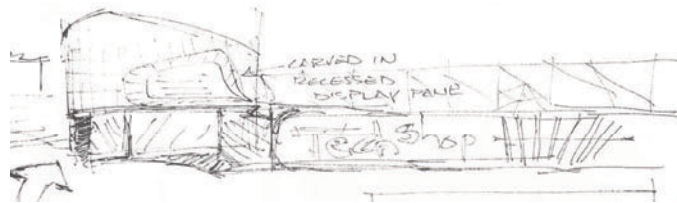
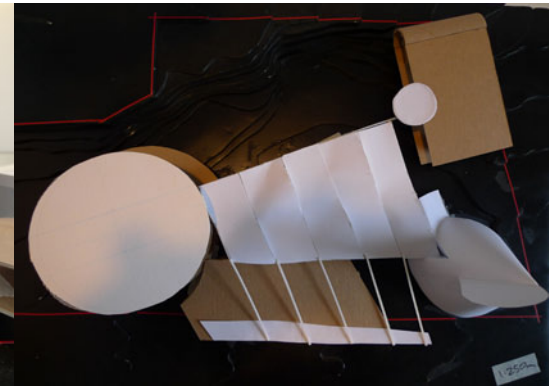
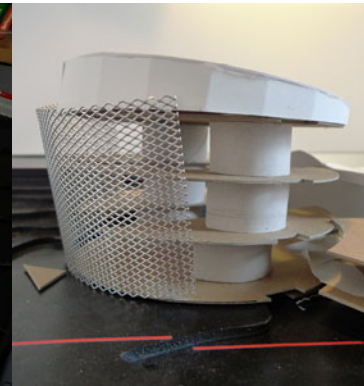
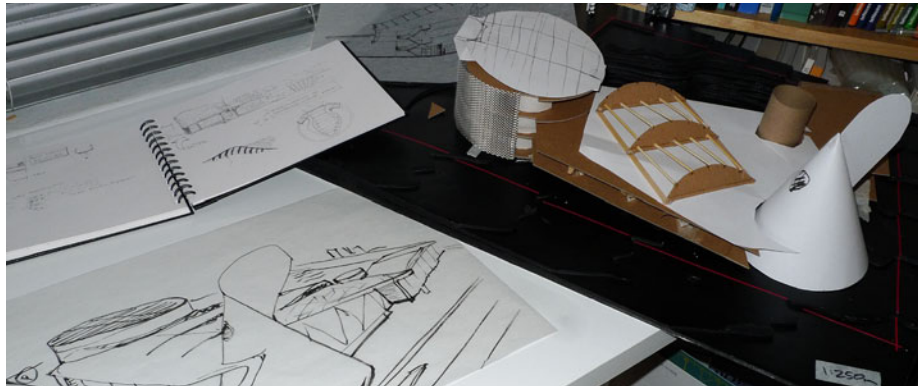
The theatre terminates the axis and is set into the sloping grade along Carling matching the stepped seating.

VOLUMETRIC AND MASSING STUDIES

Volumetric and massing studies involved repeated re-evaluation of the program resulting in a collection of sketch vignettes and loosely constructed physical models. With each iteration in rough form the completed scheme was analysed with respect to the performative and interactive potential.

Through multiple iterations a final formal response to the volumetrics and massing was selected and tested through additional layers of detail. This involved the construction of a digital massing models for evaluation relative to the performative goals and as a tool for visualizing interactive elements.

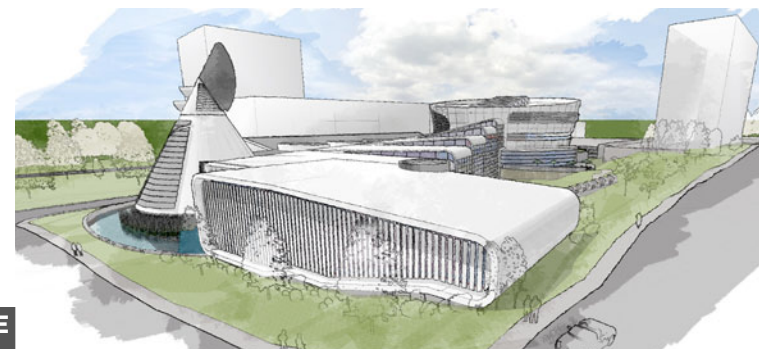
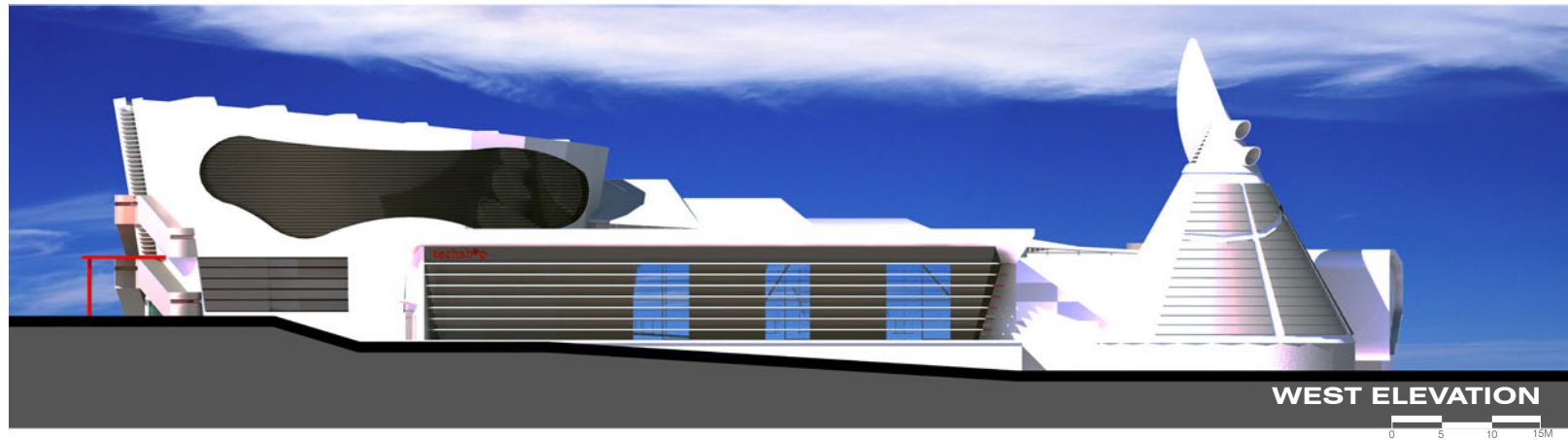
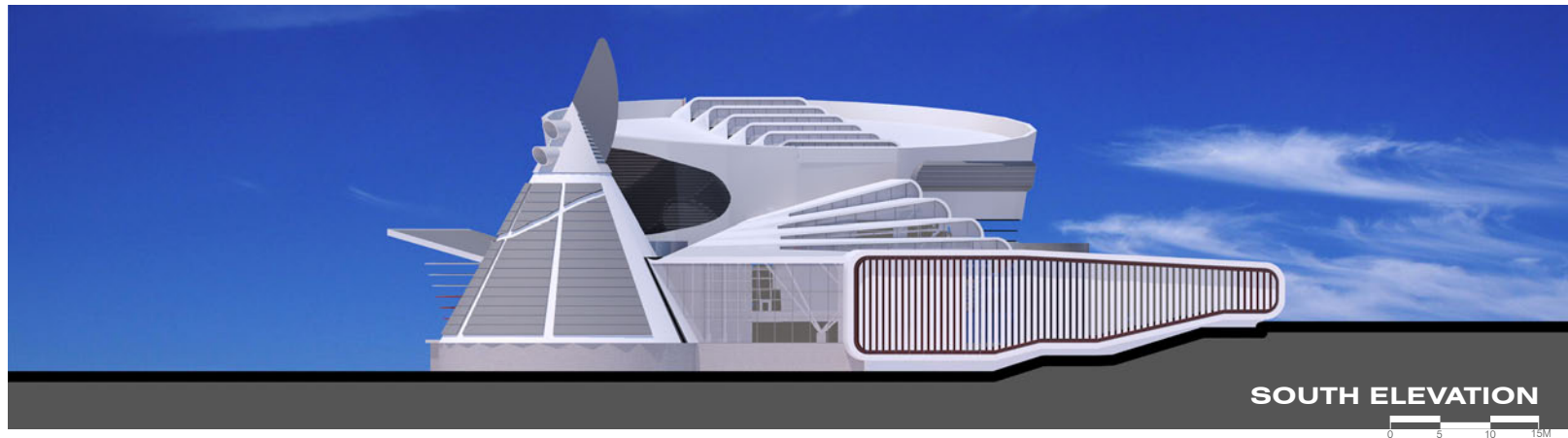






quadrant 14

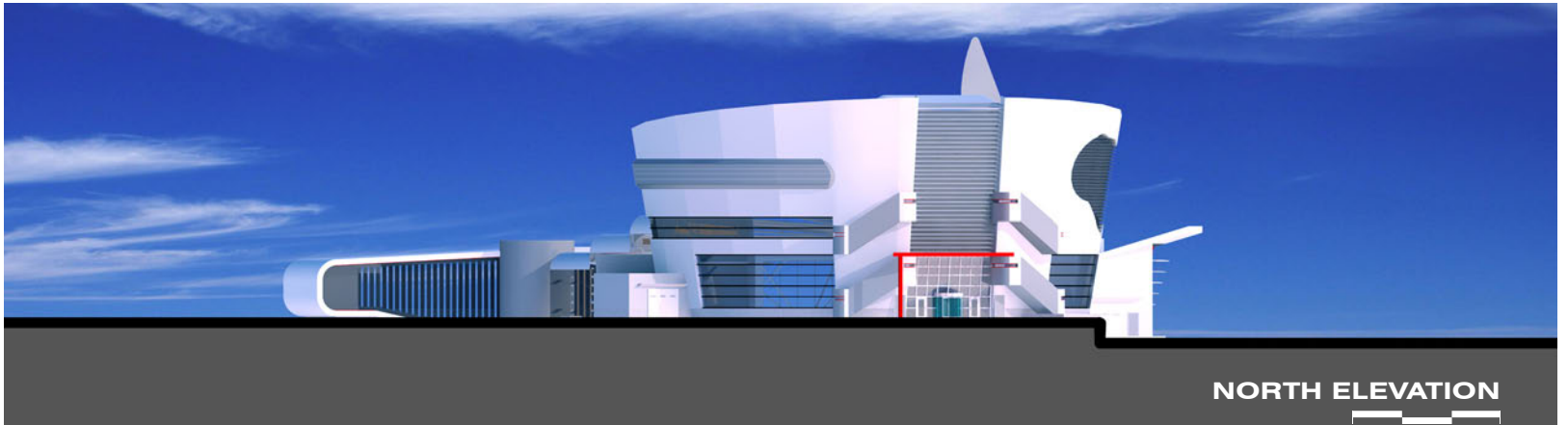
INNOVATION CENTRE



CARLING AVENUE



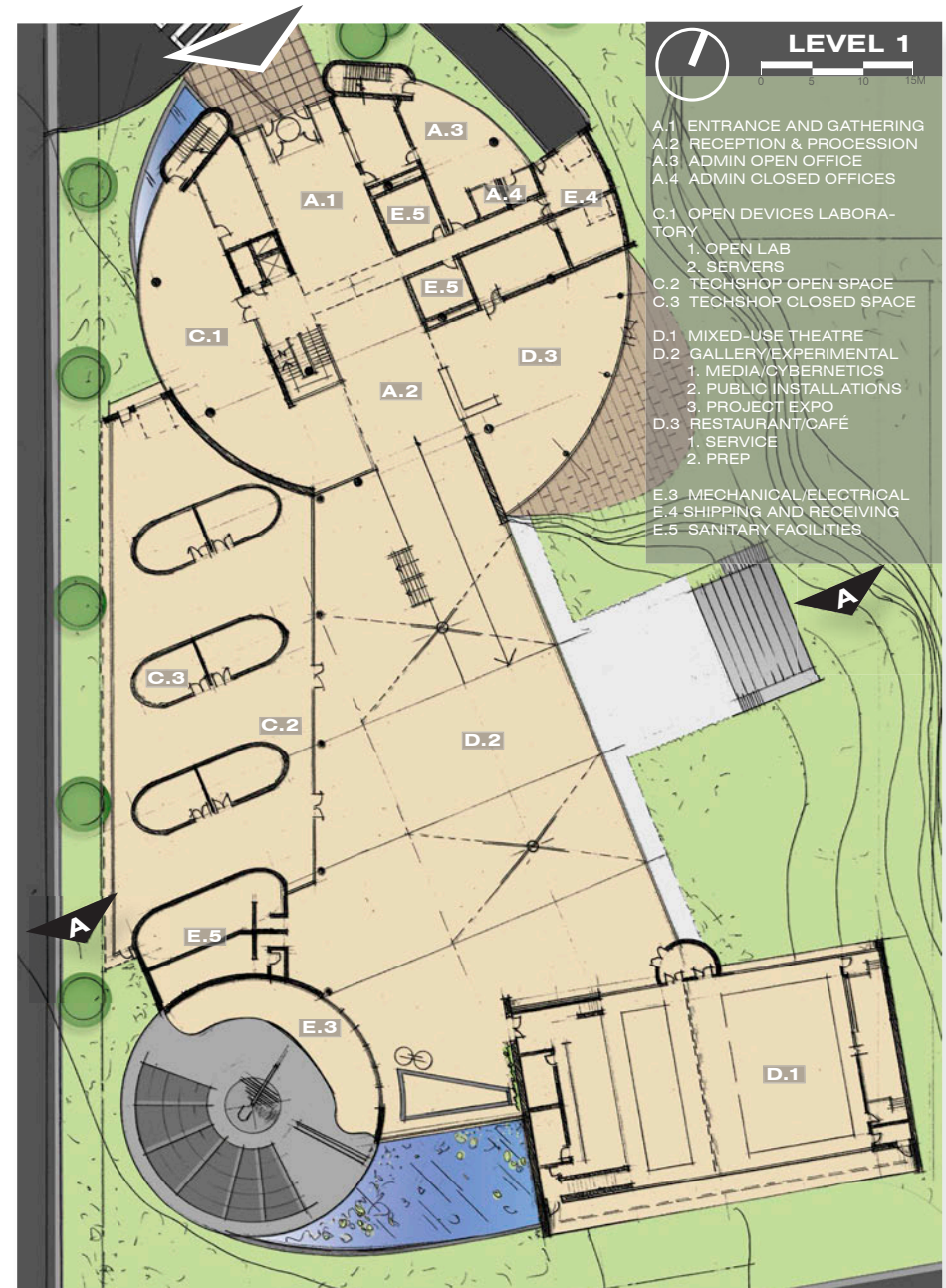
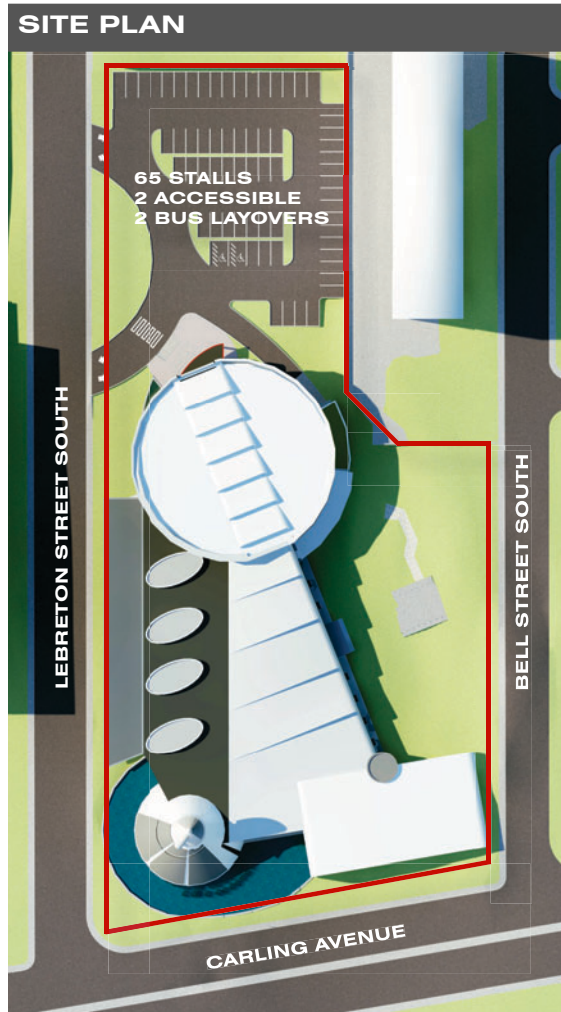
MAIN ENTRY/PARKING

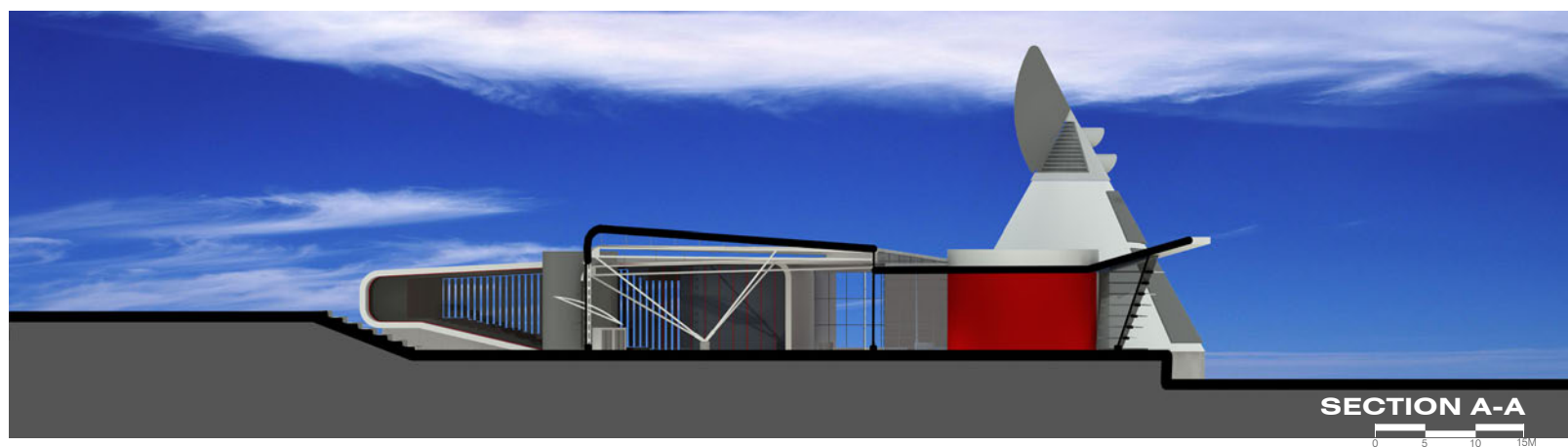
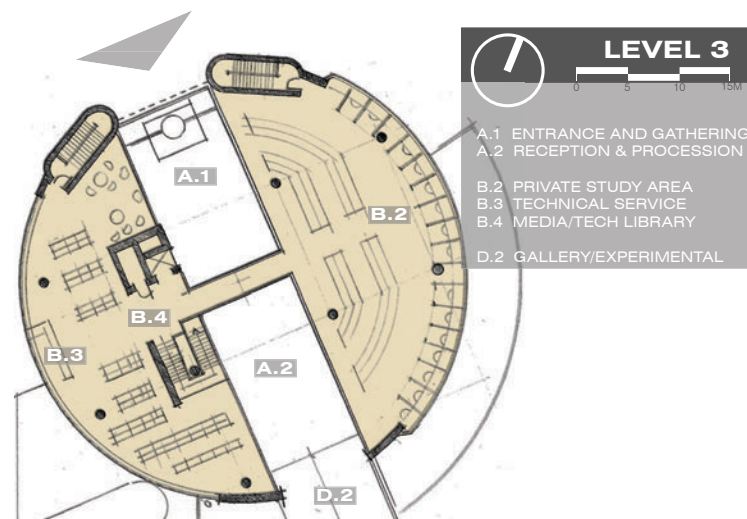
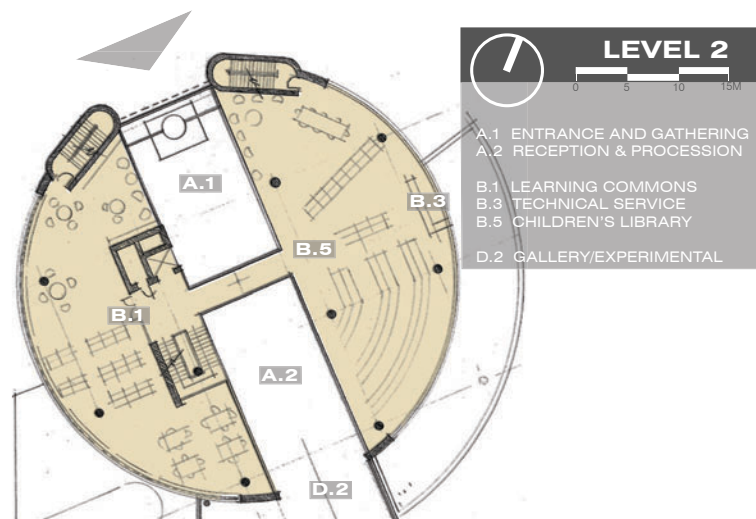


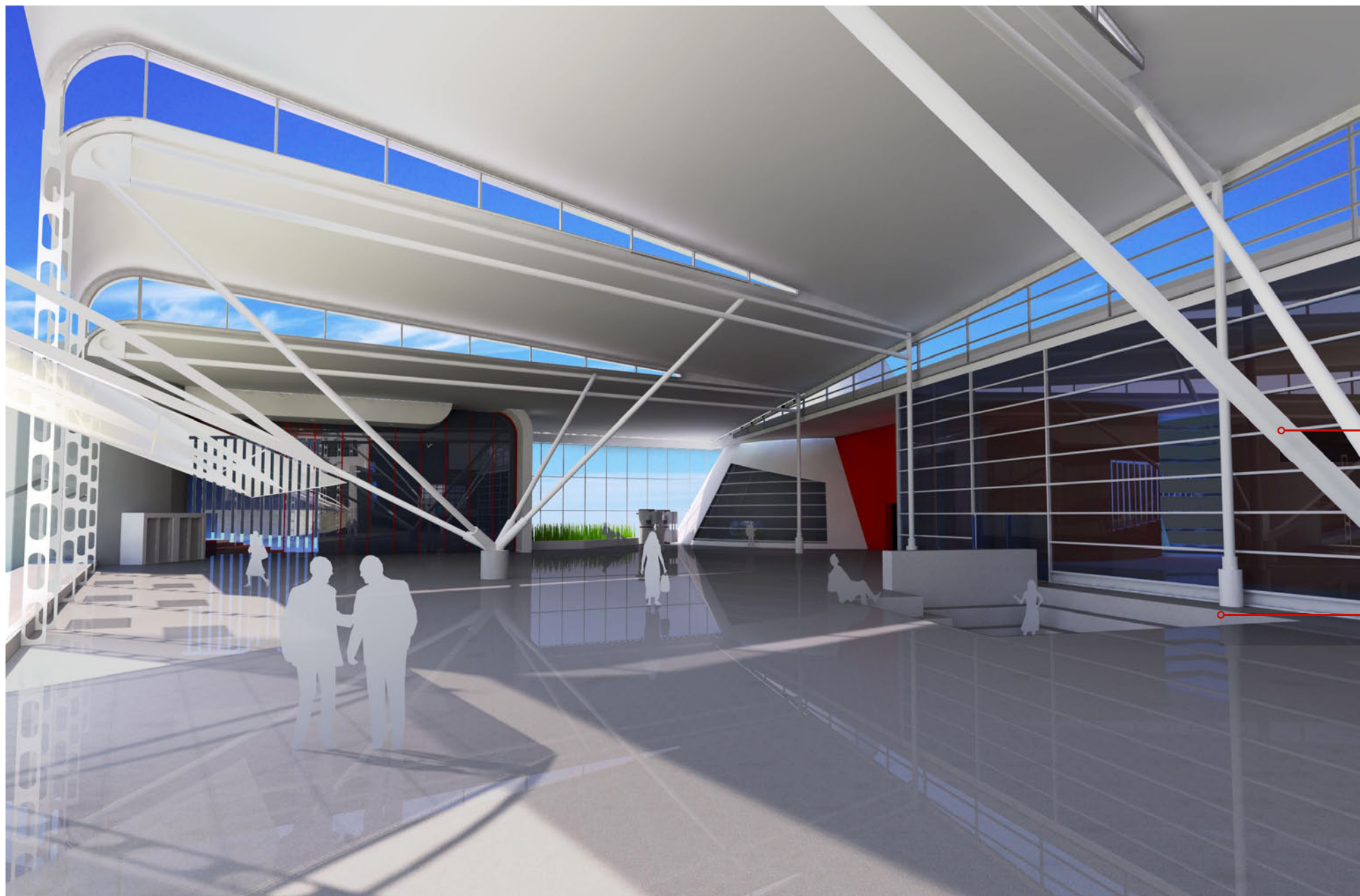
NORTH ELEVATION



EAST ELEVATION







ADAPTIVE SPATIAL CONFIGURATION



Similar in mechanics to an orchestra pit the modular floor can be raised and lowered to adapt to the needs of the building participants, be it lecture space or robot wars.

INDIVIDUAL CONTROL

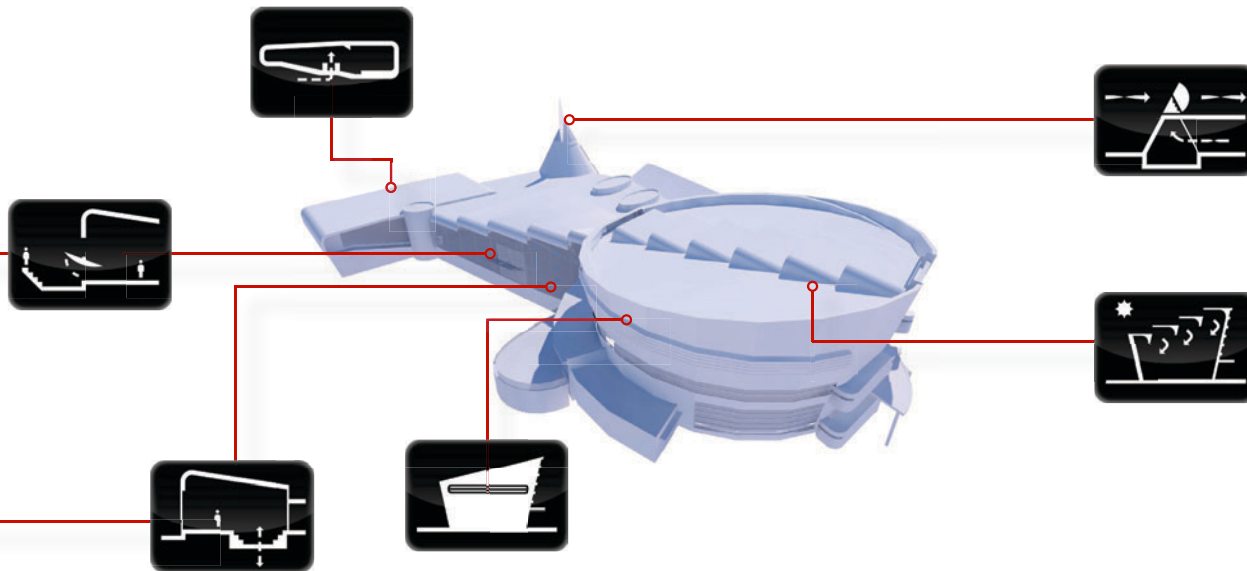


Private cubicles for concentrative work outfitted with personal control infrastructure for day lighting, view and fresh air.

RESPONSIVE ENVIRONMENT



Daylighting of multi-storey space is achieved with roof monitors and automatically actuated solar reflectors.



Rotating glazed assembly to provide indoor and outdoor performance space and outdoor access. Serves amphitheatre and incorporates a projection surface for indoor and outdoor use.



EVENT HORIZON

Integrated mechanical hub and amenity space to engage building participants.



SYSTEM INTEGRATION/ DEMONSTRATION

Iconic wind cowl tracks and visually relays wind direction while providing exhaust and pre treats supply fresh air through and energy recovery ventilator that is prominently featured in the interiors.



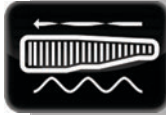
WIND COWL

INFORMATIONAL FAÇADE



Horizontal micro louver array outboard of glazing provides solar shading while allowing direct views. Incorporated diodes act as sensors and form a display matrix for announcing events or communicating building data.

ARTICULATED FAÇADE

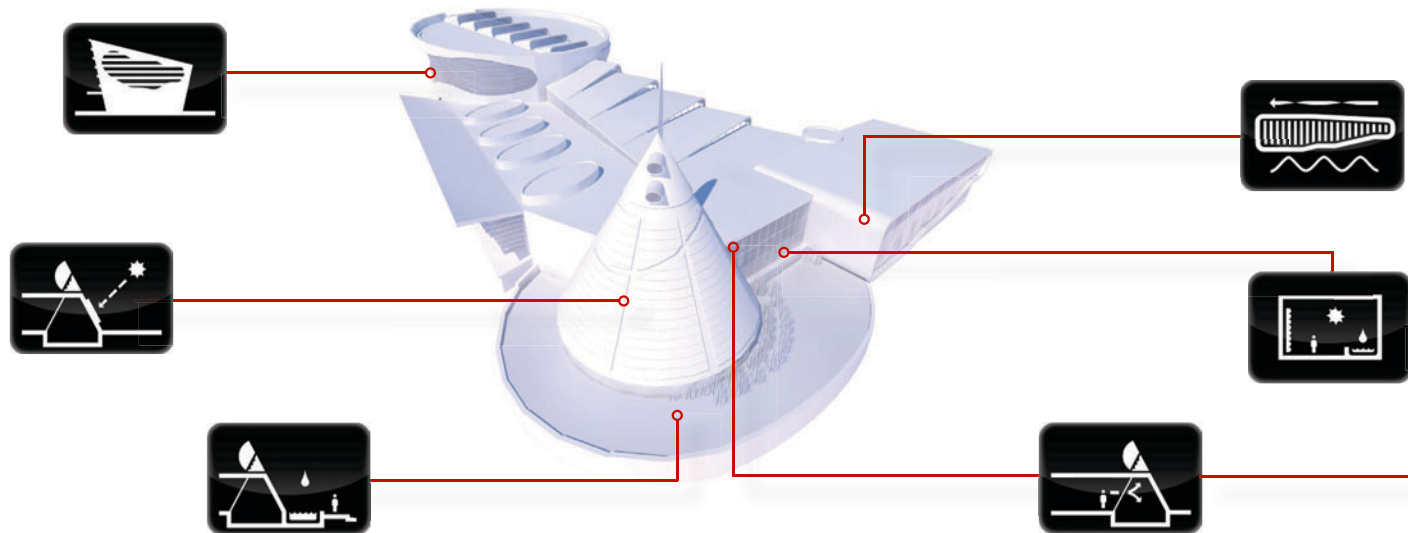


Articulated vertical elements visually relaying information about wind speed.

SPATIAL MANIPULATION



Minimum footprint adaptable theatre provides full service for up to 500 persons, and is reconfigurable to provide facilities for 200 + 300 person.



High visibility hybrid photo voltaic and passive solar ventilation unit incorporating a solar hot water system.



ENERGY CAPTURE FROM NATURAL SERVICES

Incorporated into the mechanical hub amenity space the living machine features solar aquatic grey water treatment tanks and planting beds in addition to a living wall.



LIVING LABORATORY

Pedestrian oriented constructed wetland providing storm water management and street side amenity space while maintaining transit zoning setback.



STORM WATER MANAGEMENT





d9b
Thesis Studio
David McConnachie
ON020017-Ott



CONTEXTUALLY ADAPTIVE ARCHITECTURE

23 NOV 2013

DAVID MCCONNACHIE 01050012-011

PROGRAM & DESIGN DEVELOPMENT

COB