

Project Deliverable C

Introduction

The purpose of this building is to seamlessly blend culture, sustainability and accessibility while simultaneously serving as a versatile workspace. Enclosed in this document is a list of design criteria, technical benchmarking and defined target specification. These steps will help with the development of the project with the clients demands in mind.

Prioritized Design Criteria:

Land: The product has adequate space for a main building and a parking area with room for large vehicles.

Functional Requirements of Land:

- The land/lot is beside the main office
- Enough space for parking of multiple small and large vehicles (1-2 large trucks)
 - Connected to the main road for road access
- Space reserved as a loading bay for trucks
- Storing sheds for ATVs and Snowmobiles
- Adequate lighting in the parking lot and around the building
- Streets lights on the main road
- Suitable for utilities such as electricity, water, and heat
- Secured area

Nonfunctional Requirements of Land:

- Nature reserves, forests, wetlands, and wildlife sanctuaries are close
- Suitable for agriculture
- Nature aesthetic
- Easy access to commercial districts
- Easy access to healthcare services
- Security fencing

Constraints:

- Cost
- Prone to natural disasters
- Rurality
- Nature and wildlife
- Land size

Lab: The product contains a lab that can analyze local wildlife samples, along with a freezer, lab equipment, etc.

Functional Requirements of the Lab:

- Equipment to collect samples of the local wildlife and terrestrial/aquatic environments. [Approx \$600 max]
- Equipment to analyze collected samples and run tests for numerous variables (water acidity, species examination, etc). [Approx \$800 max]
- Computers store large amounts of data from samples that have been analyzed (specs), along with many electrical outlets everywhere for electrical equipment. [[\\$1,200 for good spec computer](#) + [\\$150 for 5TB hard drive for data](#)]
- Grounded workstations like countertops and desks, along with mobile workstations in the form of rolling tables and chairs. [[\\$50 - \\$200 per sqft countertops](#),
- Lab-grade chemical-resistant sink with running water to clean equipment and maintain clean hygiene (in). [[\\$1,100](#)]
- A large freezer (preferably walk-in) to store biological samples collected, along with anything that needs to be frozen (ft) [[\\$18,300 8ft x 8ft walk-in freezer](#)]

- Storage in the form of shelves, cabinets, mason jars, boxes, and freezers. [[\\$2,000 - \\$8,000 depending on the amount of cabinets, shelves, etc.](#)]
- Safety equipment for physical and biohazards which includes first aid kits, extinguishers, lab coats and goggles, specialized storage, etc. [\$500 approx]

Nonfunctional Requirements of the Lab:

- Papers, pencils, pens, highlighters and staplers used to take notes and organize work.
- House plants and Algonquin-inspired artwork to liven up the lab.
- Windows to allow natural light inside for better working conditions.
- Thermostat to change to the temperature of the lab.
- Printer to print physical lab reports and data.
- Coat hangers and storage for personal items/bags.

Constraints:

- Costs (not including building) (\$)
- Building space (sqft) + Ceiling height (ft)
- Wall space for windows, electric outlets, etc (m)
- Pipe locations for running water + gas
- Storage space (m³)

Building: The building is organized in such a way that a lab and office area are available, as well as other necessities such as bathrooms, kitchen, etc.

Functional requirements of the building:

- Space for both the lab and office area.
- Space for bathrooms and a kitchen.
- Access to running water, electricity and heating.
- Boardroom for meetings and presentations.
- Access point for loading area.
- Security
 - Surveillance (Security cameras)
 - Security guards
- Wheelchair accessibility
- Space for a community room/lunch break/lounge room

Nonfunctional Requirements of the building:

- Appearance of the building to represent Algonquins of Pikwàkanagàn.
- Built with the future in mind, to allow for development.
- Corrosion resistance.
- Building life (years)
- Energy consumption
- Windows for natural lighting
- Thermostat to control building temperature
- Air conditioning

Constraints:

- Costs (\$)
- Building size (sqft) & amount of floors
- Zoning permit
- Environmentally lead

Building's cultural elements: The building has to reflect the algonquin culture

Functional requirements of the space:

- Fire pit and with seating
- Museum/exhibition space (display artifacts, artwork and historical items)
- Medicinal plant garden (plants used by algonquin people for healing purpose)
- Artisan workshops (space equipped with tools and materials for traditional crafts such as beadwork)

Nonfunctional requirements of the space:

- Storytelling person
- Use of eco-friendly materials
- Accessible to individuals with disabilities
- Flexibility of the space (movable furniture)
- The architecture should be harmonize with the surrounding nature
- Safety measures such as emergency exits and appropriate lighting of the environment
- Design of the space should respect cultural beliefs, traditions and values of the Algonquin people

Constraints:

- Availability of craft materials and/or artifacts
- Sustainable maintenance practices for the medicinal plant garden and the artifacts in the museum
- Availability of skilled artisans and/or expert in traditional algonquin craft and/or storytelling person

Metrics:

- Costs to build (\$)
- Maintenance cost of the spaces
- Participation rates of each cultural activities
- Visitors feedbacks and review of their experience
- Assessment of negative impacts in the community
- Demographic data on community members with disabilities and the type of disabilities (accessibility)

Community space: The community space is intended to host cultural events for the community and serves as a parking lot for 2 pickup trucks when there are no events taking place.

Functional requirements of the space:

- Cleared of trees, bushes, rocks and other obstacles
- Level and flat ground
- Appropriate space and layout for the maneuvering of the trucks
- 16-20 ft roof
- Removable items for cultural activities (moose hide tanning racks, fish drying racks, seats, etc)
- Outdoor eco-friendly lights

Nonfunctional requirements of the space:

- Carbon monoxide detector (If parking design is non-ventilated space)
- Park benches/storage for cultural activity items
- Garden hose

Constraints:

- Costs (\$)
- Compatibility with loading dock
- Storage space for cultural activity items (m³)
- Land area for community space (m²)
- Unremovable obstacles/terrain (odd terrain, large rocks, swampy areas)

Technical Benchmarking

Land: Comparing different land

	Importance	Algonquin College	University of Ottawa Campus	Abbott Point of Care
Parking space	4	A lot of parking space, able to fit an abundant number cars, and offers limited free parking to students	Limited parking space, does offer any free parking	A lot of parking space, able to fit an abundant number of cars, and offers free parking to all
Utilities	5	Fully suitable for utilities	Fully suitable for utilities	Fully suitable for utilities
Lighting	3	Adequate lighting	Adequate lighting	Adequate lighting
Security	3	Campus (land) is accessible to all	Campus (land) is accessible to all	Limited access, no fence
Lot size	5	92 acres	105 acres	7 acres
Total		53	36	61

Lab: This will compare three labs that I have worked in:

	A	B	C	D	E
1		Importance	Dr. Akimenko's Lab (uOttawa)	Marion Hall 301 Lab (uOttawa)	Bioscience Zebrafish Lab (uOttawa)
2	Size (sqft)	5	~1500 sqft	~10000 sqft (Too large)	~700 sqft
3	Equipment	5	PCR Machine, beakers, measuring tools, tweezers, Petri dishes, fluorescence microscope, gel electrophoresis system, sterilization cabinet, measuring scales etc.	Beakers and graduated cylinders, measuring tools, tweezers, measuring scales, bunsen burners + hot plates, LabQuest equipment.	Beakers, sterilization cabinet, measuring tools, Petri dishes, small fish tanks, nets.
4	Computer	4	Intel i3, Windows 7, 8G RAM.	N/A	N/A
5	Freezer (in)	4	27 in x 55 in x 30 in, two-compartment standing freezer.	55 in x 25 in x 25 in, long horizontal freezer.	25 in x 25 in x 25 in, mini fridge.
6	Storage	5	Grounded countertops, high and low rows of cabinets, freezer, sterilization cabinet, fire cabinets (for flammable chemicals)	Large amounts of grounded countertops, more high and low cabinets, large chemical storage cabinets, multiple freezers in the back, jars and bottles.	Small amount of grounded countertops, high cabinets, shelves, large fish tank room, sterilization cabinet, freezer space.
7	Mobile Workstation	5	Rolling tables and chairs, lab carts (for transferring chemicals and samples)	Lab carts	Rolling tables and chairs, lab carts, portable equipment
8	Safety Equipment	3	First aid kit, medical equipment, rubbing alcohol, fire blanket, extinguisher, special storage.	Mandatory lab coat and goggles, multiple fume hoods for chemicals, fire blanket, extinguisher, special storage, first aid kit.	First aid kit, goggles, safety gloves, fire blanket, extinguisher, rubbing alcohol, special humid environment to prevent contamination.
9	Total		15 + 15 + 8 + 12 + 10 + 10 + 6 = 76	5 + 10 + 4 + 8 + 15 + 5 + 9 = 56	10 + 5 + 4 + 4 + 10 + 15 + 6 = 54

Building: This will compare labs in which my parents and I have worked/studied in:

	Importance	Marine Institute St-Johns Newfoundland	National Research Center Automotive and Surface Transportation	Uottawa STEM building
Size	4	about 1482 square meters, 4 floors	about 15 hectares of land, 6 buildings for labs and offices, each about 2 or 3 floors	about 3528 square meters, 6 floors
Office and lab space	5	Acoustic tanks, agriculture facility, fume tank, food processing, few office spaces	Climate testing, rail vehicle impact ramp, Heavy vehicle tilt multiple office spaces	18 labs for various use
Cost	2	About \$23 million	Approximately \$75 million	Approximately \$128 million
Security	2	secure campus, perimeter access control	Secured campus, controlled perimeter, 24/7 on-site security staff, cameras.	Not much security, cameras and locked access
Accessability	3	Very close water access, mainly marine research	Access to rail lines for railway research projects	Access to required materials for labs
Total		4+5+6+4+9 = 28	12+10+4+6+9 = 41	8+15+2+2+9 = 36

Culture: Comparison between cultural buildings

Cultural Buildings	National Museum of the American Indian	Te Puia	Canadian Museum of History
Specifications	USA	New Zealand	Canada
Location			
Costs (\$)	5	2	4
Accessibility	4	3	5
Negative impacts	3	2	4
Visitor feedbacks	4	5	5
Participation rates	4	4	5
Maintenance costs	5	3	4
Total	25	19	27

Community space: Comparison between similar parking lots

	Importance	Dunlop picnic area	Old Chelsea picnic area	P17 Gatineau Park
Size (m ²)	4	7475	400	2405
Material	3	Dirt	Dirt	Dirt
Roof	5	No	No	No
Lights	3	No	No	No
Total	//	15	27	19

Target Specifications

Land: Here are the ideal and acceptable values for land

Design Specifications	Relation (=, >, or < value)	Value	Units	Verification Method
Functional Requirements				
1 Land is beside main office	=	Yes	N/A	Analysis
2 Enough space for for large and small vehicles	=	130,680	sqft	Test
3 Connected to main road	=	Yes	N/A	Analysis
4 Space for a loading bay	=	43,560	sqft	Test
5 Sheds for ATVs and Snowmobiles	=	Yes	N/A	Test
6 Adequate lighting	=	Yes	N/A	Test
7 Suitable for utilities	=	Yes	N/A	Test
8 Secured area	=	Yes	N/A	Analysis
Nonfunctional Requirements				
1 Nature reserves	=	Yes	N/A	Analysis
2 Suitable for agriculture	=	Yes	N/A	Test
3 Nature aesthetic	=	Yes	N/A	Analysis
4 Easy access to commercial districts	=	Yes	N/A	Test/Observe
5 Easy access to healthcare services	=	Yes	N/A	Test/Observe
6 Security fencing	=	Yes	N/A	Test
Constraints				
1 Cost	>=	5,000,000	\$	Estimate
2 Prone to natural disasters	<	Yes	N/A	Research
3 Rurality	<	Yes	N/A	Analysis
4 Nature and wildlife	<	Yes	N/A	Analysis/Research
5 Land size	=	435,600	sqft	Analysis

Building: Here are the ideal and acceptable value for the building

Design Specifications	Relation (=, >, or < value)	Value	Units	Verification Method
Functional Requirements				
1 Lab space	=	1500	sqft	Analysis
2 Office space	=	1500	sqft	Analysis
3 Water, heating, electricity	=	Yes	N/A	Analysis
4 Boardroom	=	1500	sqft	Analysis
5 Access point for loading area	=	10000	sqft	Analysis
6 Security	=	Yes	N/A	Analysis
7 Wheelchair accessibility	=	Yes	N/A	Analysis
8 Community room	=	1500	sqft	Analysis
Constraints				
1 Cost	>=	50 000 000	\$ CAD	Estimation
2 Zoning permit	=	Yes	N/A	Obtain
3 Overall building space	>=	30 000	sqft	Analysis
4 Environmentally leed	=	Yes	N/A	Test
Non Functional Requirements				
Appearance of the building to represent Algonquins of Pikwakanagan.	=	Yes	N/A	Analysis/Observe
2 Built with the future in mind	=	Yes	N/A	Analysis
3 Windows for natural lighting	=	Yes	N/A	Test
4 Building life	=	100	Years	Estimate
Thermostat to control building temperature	<	Yes	N/A	Test

Cultural space: Here are the ideal and acceptable value for the cultural space

Criteria	Fire pit with seating		Exhibition space		Medicinal plant garden		Artisan Workshops		Method of Estimation
	Ideal Value	Acceptable Value	Ideal Value	Acceptable Value	Ideal Value	Acceptable Value	Ideal Value	Acceptable Value	
Costs (CAD)	1000	1500	50000	100000	3000	5000	1000	3000	Online researches and comparison with other cultural buildings
Accessibility (CAD)	1000	3000	1000	3000	1000	3000	1000	3000	
Negative impacts	0	1	0	1	0	1	0	1	
Visitor satisfaction (%)	100	90	100	90	100	90	100	90	
Participation rates (%)	90	80	90	80	90	80	90	80	
Maintenance costs (CAD/year)	3000	5000	4000	6000	6000	10000	3000	5000	

Reflection on how client meeting impacted the development of our criteria

The client meeting helped with streamlining a multitude of ideas to fit the client's vision for the building. The meeting helped us gain a basic understanding of what the building's main purpose for while also keeping in mind the client's vision. From the meeting we understood that the client wants the building to reflect Algonquin culture while simultaneously being mindful of the building's sustainability and accessibility.

Conclusion

In summary, meeting with the client helped with developing a better understanding of their expectations and needs. This helped us approach the solution of designing a building that integrates culture, sustainability and accessibility while simultaneously serving as a multi-functional workspace.

Lab: Here are the ideal and acceptable values for the lab.

Design Specifications	Relation (=, >, or < value)	Value	Units	Verification Method
Functional Requirements				
1 Sample collecting equipment	=	Yes	N/A	Buy & Test
2 Sample analyzing equipment	=	Yes	N/A	Buy & Test
3 Computers	>	I7, Windows 10, 16G RAM	Specs	Buy & Test Specs
4 Grounded + Mobile workstations	=	Yes	N/A	Buy & Test
5 Lab-grade sink	=	25' x 15' x 18'	in	Buy & Test
6 Large freezer	>	7'4" x 7'4" x 7'6"	ft	Buy & Test
7 Storage cabinets, shelves, etc	=	Yes	N/A	Buy & Test
8 Safety Equipment	=	Yes	N/A	Buy & Test
Design Specifications				
Constraints				
1 Costs	<	30,930	\$ CAD	Estimation (from design criteria), final check
2 Building space	=	1500	sqft	Analysis
3 Wall space	>	50	m^2	Analysis (evenly distributed throughout lab)
4 Ceiling height	=	7.5	ft	Analysis
5 Pipe locations	=	Yes	N/A	Analysis
6 Storage space	>	60	m^3	Buy & Test
Design Specifications				
Non-Functional Requirements				
1 Papers, pencils, pens, highlighters and staplers	=	Yes	N/A	Test
2 House plants and Algonquin-inspired artwork	=	Yes	N/A	Test
3 Windows	=	Yes	N/A	Test
4 Thermostat	=	Yes	N/A	Test Temperature
5 Printers	=	Yes	N/A	Test
6 Coat hangers and bins	=	Yes	N/A	Test

Community space: Ideal values for the community space

Design specifications	Relation (=, >, or < value)	Value	Units	Verification method
Functional requirements				
1 Cleared of trees, bushes, rocks and other obstacles	=	Yes	N/A	Analysis
2 Level and flat ground	=	~0	"	Test
3 Appropriate space and layout for the maneuvering of the trucks	>=	100	m ²	Analysis
4 Roof	=	16 to 20	ft	Analysis
5 Removable items for cultural activities	=	Yes	N/A	Analysis
6 Outdoor eco-friendly lights	=	Yes	N/A	Analysis
Nonfunctional requirements				
1 Carbon monoxide detector (If non-ventilated space)	=	Yes	N/A	Analysis
2 Park benches/storage for cultural activity items	=	Yes	N/A	Analysis
3 Garden hose	=	Yes	N/A	Analysis
Constraints				
1 Costs	>=	12000	\$	Estimate/Analysis
2 Compatibility with loading dock	=	Yes	N/A	Analysis
3 Storage space for cultural activity items	=	Yes	N/A	Analysis
4 Land area for community space	<=	300	m ²	Analysis
5 Uremovable obstacles/terrain	=	No	N/A	Test/Observe