KAIOQLAQ

NUNAVUT INUIT HERITAGE CENTRE

FINDING OUR WAY HOME

The Prevailing wind is the most reliable source of spatial orientation for Inuit travellers when navigating on land. The prevailing wind causes consistent shapes and patterns in the snowdrifts. Kalutoqaniq. When a blizzard or other weather conditions obscures landmarks or other features in the landscape, Kalutoqaniq forms a natural wayfinding system for the Inuit to travel for miles over the vast tundra. Subsequent winds erode kalutoqaniq into small ripples,- tumarinyiq and large sculpturings,- Kaioqlaq.
Knowledge and culture grew from the land and will show us the way forward.

The survival of any organism depends on its ability to understand and adapt to its environment. Few human beings have managed this better than the indigenous peoples of the Arctic region. For thousands of years, they have mastered not only surviving in one of the harshest places in the world but also thriving despite scarce resources, freezing temperatures, extreme winds, snow, and ice as a foundation for their lives. Long nomads, the culture of the Inuit people in Nunavut have developed over centuries in the vast, treeless tundra landscapes. Intimate knowledge of the land and sea, advanced skills, values and tradition were passed through generations by listening to and observing skilled elders.

The impact of colonisation with forced relocation, rupture of families, undermining of culture, practices and values have been devastating for the Inuit culture and created an intergenerational trauma in dire need of mending. Without action, the knowledge and extremely specialised skills of the Inuit people are fading. There is an urgent need to reconnect and engage with tradition cultural practices to ensure the continuity of Inuit culture; to give the youth a foundation from where they can navigate their identity and place in this world. The Nunavut Inuit Heritage Centre echoes this sentiment and offers a new narrative that seeks to reconnect the Inuit people to each other and their collective past. It forms a bridge between generations, between traditional ways and modern life to find a new path forward. Here, we can tell the stories passed through generations, provide a space for Inuit culture and identity to flourish, and shape a framework to discover a stronger sense of identity and belonging.

THE SITE

Defined by rolling hills of tundra, glaciers, mountains, wide seas, and rivers, the strikingly varied Nunavut landscape holds thousands of years of human history. The territorial capital Iqaluit lies at the innermost part of Frobisher Bay and is characterised by its striking location in the midst of vast stretches of arctic wilderness – endless views of rocky, treeless terrain for miles and miles. Bright, colourful structures and simple, functional buildings are spread out on the rugged terrain with no roads connecting Iqaluit to the rest of the world.
The site for the new Nunavut Inuit Heritage Centre sits at the northern edge of the city on an elevated rocky outcrop with uninterrupted views towards the town, Frobisher Bay, and the Sylvia Grinnell Territorial park.

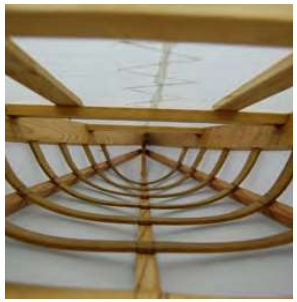
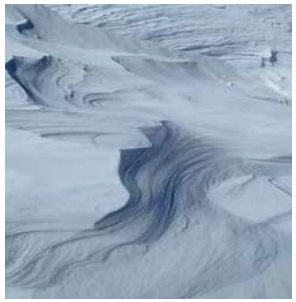
Site plan 1:1000

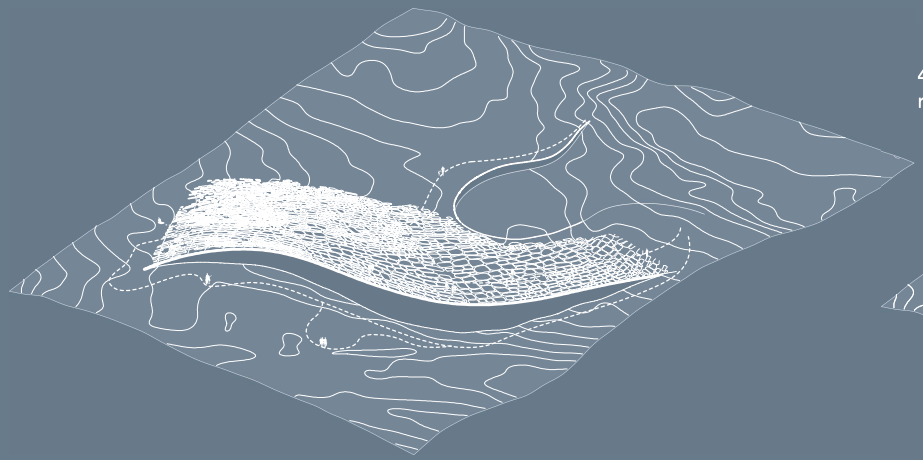
ARCHITECTURAL CONCEPT

The outline and location of the building is determined by the topology of the landscape and the movement of the snow and the wind. With its subtle organic shape, the building follows the topographic curves, and distinct longitudinal features of the land, parallel to the prevailing north-western winds.
Partly subterranean, set into the gently sloping hillsides overviewing the town, the building is incised into the rocky slope with a large roof continuing the lines of the landscape and forming a shelter over the interior spaces. Covered in rock and turf, the roof continues the landscape, and creates a new natural public space and viewing platform from where visitors can overview Frobisher Bay and take in the almost infinite horizon of the land towards the west and southwest. The building is becoming one with the land.
The space beneath the crust of the hill, is taking advantage of the highly protective rock, embracing the sensitive collections and exhibits, while the open slit is exploiting the daylight and generous view towards the south-west, for all the different activities and gatherings taking place in the NIHC. The building is not unlike a Qarmaq, a semi-subterranean stone construction, embedded in a slope, using the natural protection of the solid rock, and the material that is available on site.
What the building takes away from the land, is returned as a new natural outdoor gathering space on the roof, that offers spectacular views, and ensures continuous movement across the land.

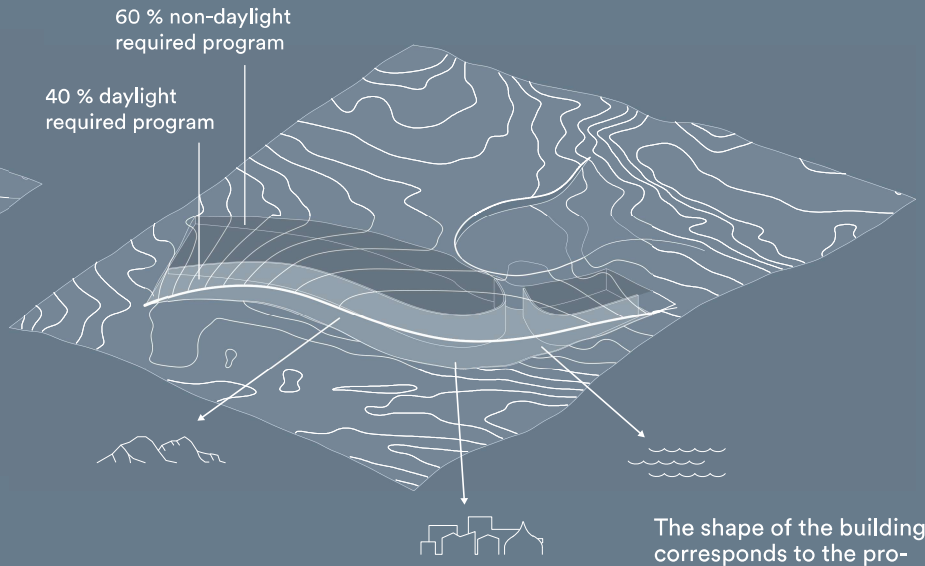
The Nunavut Inuit Heritage Centre is designed to accommodate several diverse activities; it is a dynamic learning and exhibition space as well as a gathering place for Inuit culture and heritage that forms an all-encompassing framework, partly inside and partly outside, in which culture and traditional knowledge will be celebrated and brought into the future.

To the southwest, the facade opens seamless toward the bay where a large outdoor area offers space for various activities, such as carving, skin preparation, kayak building, and tool making, an area for canvas tents in the summer and iglu building in winter. The berry picking areas of the site will be preserved, and different food preparation facilities as dry screens can be placed permanently or temporary on the site.



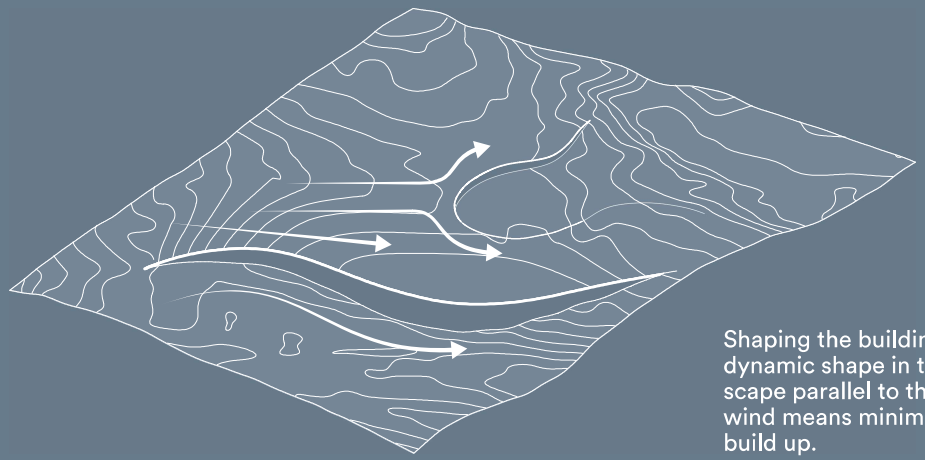
The roof continues the landscape and gives back the land.



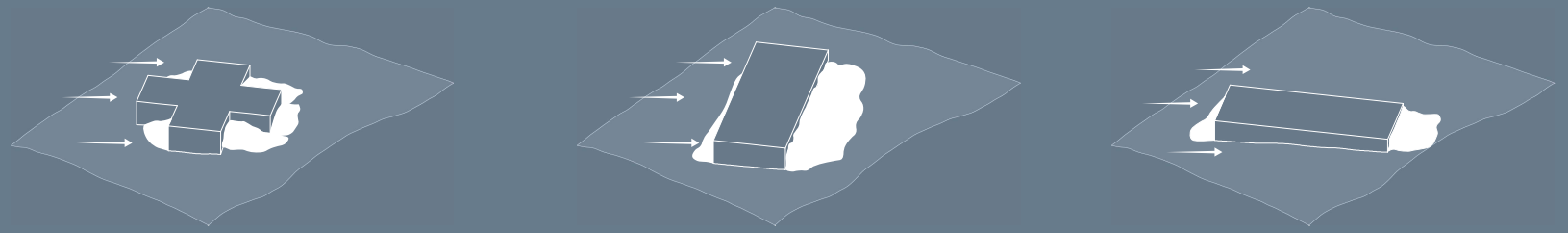
The shape of the building corresponds to the program, with high amount of non-daylight spaces.

WIND AND SNOW

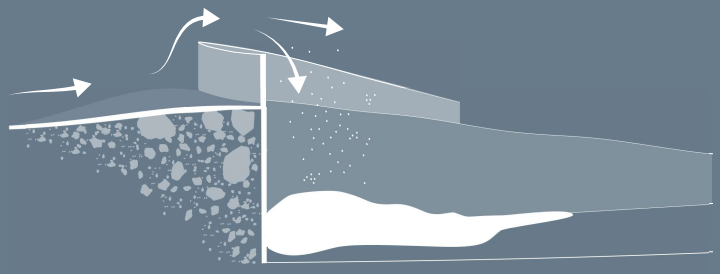
The aerodynamic shape and placement of the building ensures that in winter, the prevailing winds and hereby the snowdrift will flow over the roof and along the facade, with a minimum of snow build-up. The high stone railing lining the circular entrance plaza is placed perpendicular to the prevailing winds and is designed to work as a deflector leading the wind around the plaza and keeping the area with a minimum of snow build up.



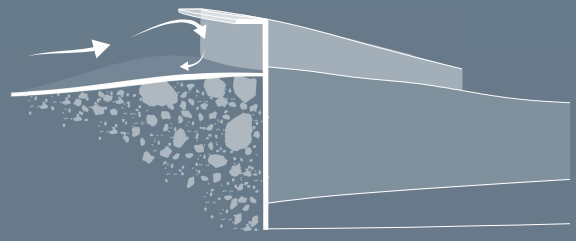
Shaping the building as a aerodynamic shape in the landscape parallel to the prevailing wind means minimal snow build up.



Snow build up will occur on the lee side of a building.



When the wind meets a closed railing it is pushed upwards, looses speed and falls down, creating snow build up on the lee side.



An L-shaped railing prevents the wind from moving upwards and redirects it horisontally around the railing as a deflector.

FUNCTIONAL DISPOSITION

ARRIVAL

Arriving to the centre on the eastern side of the building, the visitor is met by the circular welcoming plaza that as a singular geometric shape is incised into the landscape. In summer the plaza functions as a multipurpose lee surface, large enough to host different activities simultaneously. The workshops can work on larger projects, dance and performance groups can practise, and spontaneous outdoor activities and games take place. All entrances are placed in connection with the plaza, facilitating informal meetings, and making wayfinding easy. Here is a drop-off for taxis and busses and day-care parents. The hostel and loading bay are in connection to the plaza, allowing easy access for all.

MAIN ENTRANCE

The main entrance is located centrally at the crescent facade.

Entering the generous vestibule, the visitor sees through the building towards the spectacular view.

Visitors are naturally guided from the vestibule through the curved lobby, towards the reception desk. The space opens up towards the open view. Although the hight of the space is generous, there is a notion of arriving at the warmth of an intimate, protected area defined by curved timber frames, reminiscent of the whale bones of a Qarmaq or the skeletal wooden structure of the qajaq, creating a contrast to the vast landscape outside.

In the lobby the visitor is greeted by the Nattinnak, which exhibits art pieces from changing, local artists.

Changing exhibits can be staged hanging from the ceiling or along the walls as well as standing on the floor. Adjacent to the reception desk, there is toilets and wardrobe/lockers for visitors with drying cabinets for drying wet cloth. As one approaches the glass facade the lobby extends into the café and shop along the facade.

There is direct access to the theatre from the lobby, as well as entrances to the exhibit, making the lobby and café very flexible, allowing audiences to spill out before and after a show, openings, or other events.

The Carvers studio and the dirty workshop is placed in the lobby towards the plaza, separated by a glasswall to enable visitors to follow the work going on in the studios.

The clean workshop is placed in connection with the lobby, the future IQ lab and the visible storage, that again connects to the permanent exhibition, creating a natural flow between all facilities. The reception desk is placed to allow visual contact to all activities in relationship to the lobby, making it possible for a single person to address visitors even at less active periods.

EXHIBITIONS, VISUAL STORAGE, FUTURE IQ LAB, CLEAN WORKSHOP

The visitor can access the permanent or the temporary exhibition from the lobby. The exhibition spaces is without daylight, to create the best conditions for displaying sensitive artifacts and for creating digital representation.

The temporary exhibition space can be separated from the flow, when creating new exhibitions. From the permanent exhibition space the visitor enters the visual storage that will have changing content relating to themes in the exhibition, the workshops og seminars. From the visual storage, the visitor passes the Future IQ Lab, and the clean workshop, ending the visit in the shop and the café.

DAYCARE

The day-care is placed as a separate unit, but in proximity to the entrance area of the heritage centre, which allow different opening hours, but enables collaboration and daily contact. The day-care spans the width of the building, having its own entrance from the plaza and access to the playground on the southern side of the building.

NON-PUBLIC FUNCTIONS

The non-public functions of the heritage centre are placed in the northern part of the building, with office space and conservation lab along the facade and larger storage rooms and technical areas in the non-daylit, areas. A wide corridor leads from the loading bay on the east side to all storage rooms and exhibition spaces.

The hostel is placed on the first floor above the day-care with a separate entrance from the plaza.


Archives storage
HVAC UNITS
Frozen storage
Dry storage
ERV room
Main storage
Equipment storage
Boiler room
Collections prep space office
Large objects storage
Kitchen
Offices
Terrace
Collections cool space / reception
Cloak room
Conservation lab
Visible storage
Qarmaq
Computerised history
Story telling
Clean workshop
Long-term exhibition gallery
Temporary/travelling exhibitions
Shop storage
Exit
Shop
Loading
Fire pump
Dirty workshop
Entrance to basement
Entrance to daycare
Generator
Daycare wardrobe
Storage
Main electrical room
Nappy changing
Nap room
Kitchen
Daycare wardrobe
Pre-school
Main entrance
Carvers studio
Theatre changing room
Back office
Children's discovery gallery
Entrance from playground
Visitors' wardrobe
Theatre
Reception
Entrance
Kitchen
Café
Playground
Terrace
N

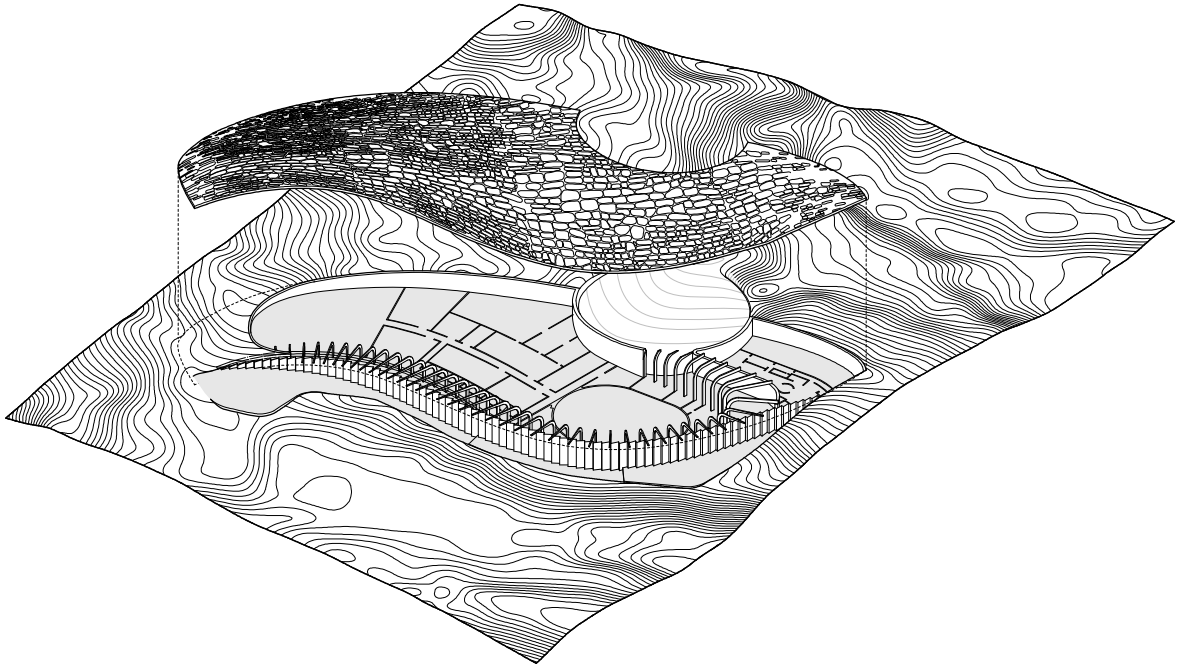
Plan 1:600

MATERIALS

The NIHC is built with mainly natural materials with a minimal or negative up-front carbon footprint. We suggest only using concrete and steel, when necessary, as in foundation piles and ground floor slab to avoid any risk of cold bridge and moist problems in constructions. The main expression of the exterior is that of the landscape rough and untreated natural stone and turf. The interior flooring is granite with inlay of wood flooring where needed for comfort or flexibility. The daylit rooms are clad with wood with acoustic dampener behind, to ensure a comfortable acoustic environment. The lobby wall towards the day-care, are designed in dimension granite. We suggest to let an Inuit artist design the reception desk with different Nunavut natural stones, since there is a very rich variety of stones in Nunavut that deserves exposure, from granites and marbles to Labradorite and lapis lazuli. The facade is designed with glulam columns and beams. The 3 layer insulation glass is mounted in wood frames.

The preparation of the site, embedding the building into the rock, presents an opportunity to quarry granite on site, and using it in the building as loadbearing dimension stones as well as cladding.
The site granite has a rich and warm colouring, and very varied expression depending on treatment. Unnecessary transportation of materials and disposing of excess site material can be avoided.
Using what is there and leave the land as untouched as possible.

We suggest establishing a quarry on site with a mobile quarry trim wire saw or drig rill. Since the area around Iqaluit has potential for quarrying natural stone in smaller quarries, this could be a learning opportunity for small scale quarrying that could eventually create new permanent workplaces.



Lobby, reception and Nattinnak

LANDSCAPE

The landscape design unfolds naturally with the existing topology and minimal intervention, leaving the landscape open for traditional practices like berry picking, iglu building, skin preparation and tool making taking place directly on terrain. Narrow paths leading through the landscape connect these activities and guides the visitors around the building and up on the roof top to the splendid views.

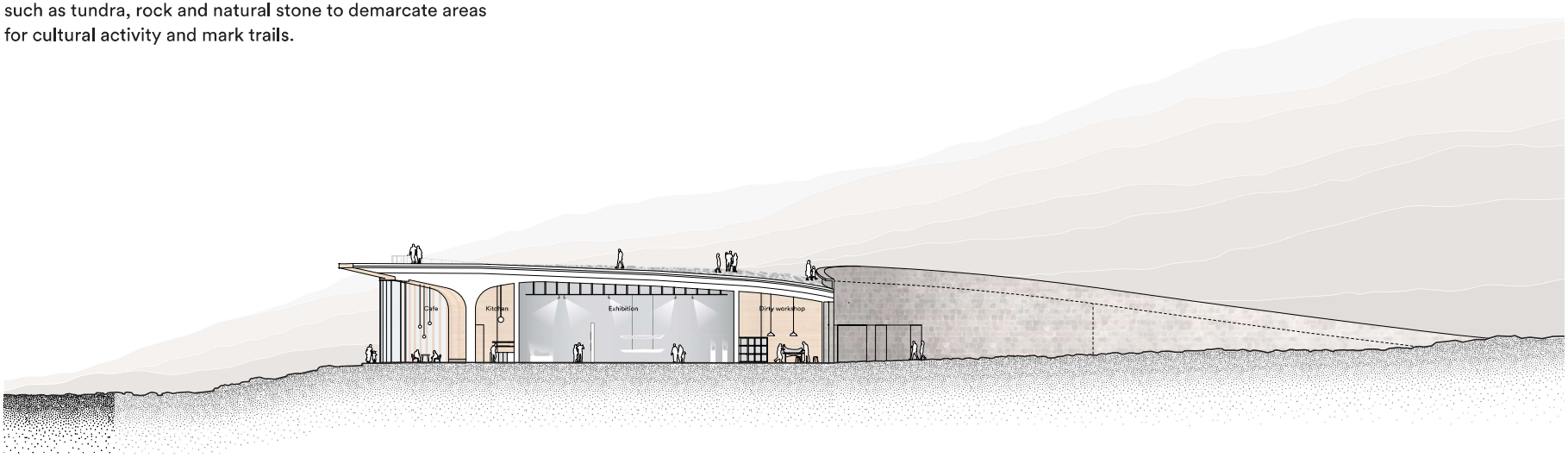
Following the sloping landscape is an amphitheatre that offers a diverse outdoor space for concerts, plays, or community gatherings. Located in proximity to the indoor theatre, with indoor/outdoor relationship it becomes an organic, flexible space with local stone seating, built into the existing contours of the site.
The playground is located adjacent to the day-care in the sloping terrain, which creates opportunities for children to climb, run and explore. It will contain natural play features representative of Inuit culture, built in materials that complement the building and cultural themes.

The design will emphasise on using natural, local materials such as tundra, rock and natural stone to demarcate areas for cultural activity and mark trails.

STRUCTURE

SUBSTRUCTURE
The substructure for the proposed building will consists of rock-socketed pile foundations. This type of foundation is a typical construction for buildings in Iqaluit. The pile cut-off will be a minimum of 200mm above the rock surface.

SUPERSTRUCTURE
The main floor structure will consist of concrete on composite steel deck and be supported by structural steel beams and joists. The steel beams will be supported on the pile foundations.
The superstructure above the main floor will consist of a wood construction. The roof structure will consist of 64mm thick tongue and groove wood decking on glulam purlins and spanning to glulam beams. The glulam beams will be spaced at 3m on centre at the curved glass façade and will be spaced up to 9m on centre in the remainder of the building. The columns will be constructed using glulam members.
The lateral force resisting system for this building will consist of cross laminated timber (CLT) shear walls.



Section 1:500

Elevation 1:500

SUSTAINABILITY

The Nunavut Inuit Heritage Centre is shaped by its surrounding context – the land, the environment, the culture. Throughout the design we have a profound focus on working responsible with the environment and construct the building as sensitively as possible. We will evaluate every material using digital Life Cycle Assessment tools to achieve the lowest possible carbon footprint. We will work with the material on site, and timber as structure. Cladding and flooring is local granite and wood to achieve a minimal or negative up-front carbon footprint. For the outer cladding on the roof structure we intend to work with local granite.

The project must achieve a LEED® Silver target and Zero Carbon Building Certification. The proposed concepts focus on reducing: water consumption, energy use, and GHG emissions. Strategies are also put forth to provide the users with enhanced air quality, thermal and acoustic comfort, and long-term preservation for the artefacts.

The following strategies will be proposed to achieve sustainable design certifications:

- Use of energy sources compatible with the net zero carbon design approach
- Onsite combustion to reduce GHG emissions and peak demand (using exemption for islanded grids)
- Advanced energy metering to track largest energy consumer (outdoor air, fans, pumps, etc.)
- Airside energy recovery between outdoor air and exhaust air by a dedicated outdoor air unit.
- Use of heat pumps to recover heat produced by the various cold rooms and the excess heat produced by the airside energy recovery unit when the outside air temperature is above -18
- Variable frequency drives on pumps and for air handling units
- Demand control ventilation (CO_2 based) to limit the amount of outdoor air.
- Flow rates in piping will be reduced by using a high ΔT between the supply and return fluid to achieve the required load
- Advanced control strategies will be implemented in order to maximize energy efficiency on all system supported by a detailed energy modelling
- MERV 8 and MERV 13 or better filtration provided in all ventilation systems
- Advanced air quality monitoring;
- Air quality assessment and flush out periods will be planned before move-in of the occupants
- Use of low-flow plumbing fixtures
- Installing meters to track and disclose annual potable and non-potable water usage

Exhibition space

MECHANICAL

Given the challenges of building and operating mechanical systems in the North, the design will focus on providing the Nunavut Inuit Heritage Center with the most resilient and robust system mechanical systems as possible. Ease of maintenance, reliability, redundancy and energy conservation are key objectives considered by the design team.

Interior design parameters will be carefully planned with the conservators, as this will be key to a successful design for these climate-controlled rooms: main storage cool room, large object cool storage, dry storage, frozen storage, butchering / skins.

The building plumbing services will be connected to the City of Iqaluit service utilidor. A 150 mm combined water main with a 50 mm recirculation pipe will assure both the domestic and fire protection needs. The main heating energy source for the center will be fuel oil. A double wall tank will be provided to supply both the heating boilers and emergency generator.

The climate-controlled storage rooms will be equipped with water-cooled DX equipment, allowing heat recovery of the excess heat. In addition, all building internal heat gains (lighting, occupants, equipment and electrical transformers) will be recovered using water-to-water heat pumps connected to the low-temperature water loop.
The dual core regenerative heat recovery system will provide the outdoor air to all rooms and different usage in the building. Outdoor air quantity supplied to each sub-system will be modulated using CO_2 sensors. A centralized direct digital control (DDC) system and an operator workstation will be provided to control all mechanical systems. Energy and water metering will be provided. A dashboard will display the building energy consumption and innovative conservation energy measures.
A wet-pipe sprinkler system will be provided throughout the spaces. All systems will be designed following NFPA 13. A single interlock pre-action system will be provided for the conservation rooms. A fire pump will be provided since the water supply pressure will most likely not be sufficient to meet the sprinkler system demand. Finally, hybrid and mist systems will be proposed for the collections areas.

ELECTRICAL

Considering the special requirements and challenge of construction and maintenance in remote northern areas like the Nunavut Inuit Heritage Center, the electrical system design is centered on providing a reliable, redundant and ease of maintenance installation. The electrical systems shall meet Good Building Practices Guidelines of Nunavut, National Building Code, Electrical code and all other applicable standards.
The electrical service entrance will be installed inside the building brought from an outside aerial distribution line. Main distribution panel: 347/600V, 3Ph, 4W switchboard type with a draw out main breaker and moulded case circuit breakers for branch circuits distribution. A fire pump will be fed from normal and emergency power with an independent circuit in compliance with the National Building Code and NFPA.

High efficiency LED fixtures will be used for all areas. For the collection area, the lighting fixtures will be LED with a color rendering index of 90 and a low ultraviolet emission. Lighting fixtures will be adapted to the ceiling in rooms with direct /indirect lighting to avoid glare.
Access control and security system will be provided throughout the building. A surveillance system composed by high-definition cameras and associated recording equipment will also be provided. Modern IT infrastructure that adheres to the latest standards will also be provided.

A standby diesel generator that complies with CSA 282 will be installed for all emergency loads, including life safety and other systems such as the mechanical equipment, security systems, telecommunications systems, energy monitoring, control system, sump pumps, etc.

A photovoltaic system will be proposed, integrated to the architecture, as a complementary energy source. The system will be connected to the electrical distribution of the building and supply energy when sunlight is available.

IQ lab and clean workshop

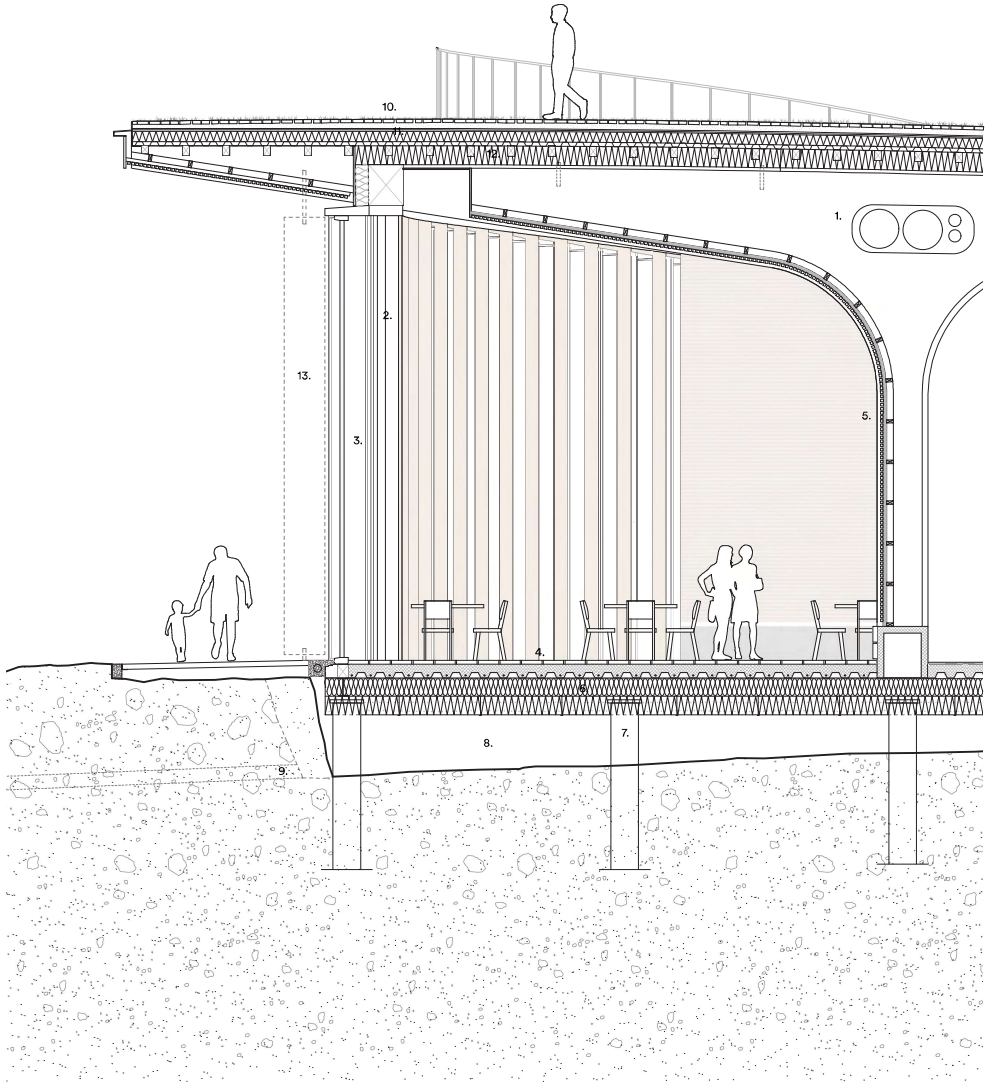
NIHC CIVIL DESIGN CONCEPT

The civil engineering design will be consistent with sustainable and resilient practices for piped Arctic water and sewer systems. The design will incorporate insulated water and sewer, and recirculating water systems for freeze protection, and a depth of bury below the active layer to protect the installations from climate change related stresses.

A preliminary layout for the extension of the existing water and sewer system to the site has been developed with the extension of all services from the existing end of servicing near the Aqsarniit Hotel & Conference Centre. The watermain is a 500 m looped extension, and the sewer is 500 m gravity sewer extension. Access to the system will consist of six Access Vaults (AVs), which share the water and sewer, spaced at 120 m apart. The pipe materials will be urethane foam insulated, High Density Polyethylene (HDPE) pipe. The service connection to the NIHC will use a 150 mm diameter gravity sanitary lateral, and a 150 mm diameter water supply, complete with a 50 mm diameter recirculation line. The service connections will be installed within a common trench and connected to the last AV of the water and sewer extension.

Granular structures for the 500 m access road (maximum slope of 8 percent), and parking areas will consist 500 mm of granular material placed above a prepared subgrade. To protect the underlying permafrost, excavations into the native soils will be minimized. The drainage management will consist of swales and ditches to convey the runoff away from the site, roads and parking towards the existing City of Iqaluit drainage system. The roadside ditches will also serve to convey subsurface drainage in the area by providing an outlet for the subsurface water. Site grading will consist of a minimum 3 percent slope away from the building foundations.

1. Glulam structure
2. Wood columns along facade
3. Glass facade
4. Stone flooring
5. Wooden wall cladding with acoustical fabric
6. Steel structure with insulation
7. Steel piles
8. Air space
9. Drainage
10. Stone/sod roof cladding
11. Membrane
12. Wood structure with insulation
13. Possible solar screens



Section 1:100

Lead Design architect: Dorte Mandrup Arkitekter
Architect of record: Guy Architects
Landscape architect: LEES + associates
Indigenous consultants: Kirt Ejesiak, Alexander Flaherty
Structural engineer: Adjeleian Allen Rubeli
Civil engineer: EXP
Mechanical & Electrical : Pageau Morel
Cost consultant: Altus Group