

**Reconnecting with the Sky: A Journey Through Nova Scotia's
Cultural Landscape**

by

Darren Fransen

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ABSTRACT

This thesis challenges our Western understanding of the sky by exploring the ethnoastronomy of the Mi'kmaq, Acadian, and Black Loyalist people of Nova Scotia, located along Canada's Atlantic coast. It proposes four architectural pavilions, with three being located along Nova Scotia's coast in culturally significant locations. As a result of light pollution, a complete understanding of the Mi'kmaq, Acadian, and Black loyalist ethnoastronomy cannot be achieved, resulting in a fourth shared pavilion in the dark sky preserve at Kejimikujik National Park. The construction of these proposed structures relies on traditional construction techniques as a means of knowledge presentation and preservation, to communicate a more complete cultural understanding unachievable with contemporary colonial museological strategies.

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CHAPTER 1: INTRODUCTION

Thesis Question

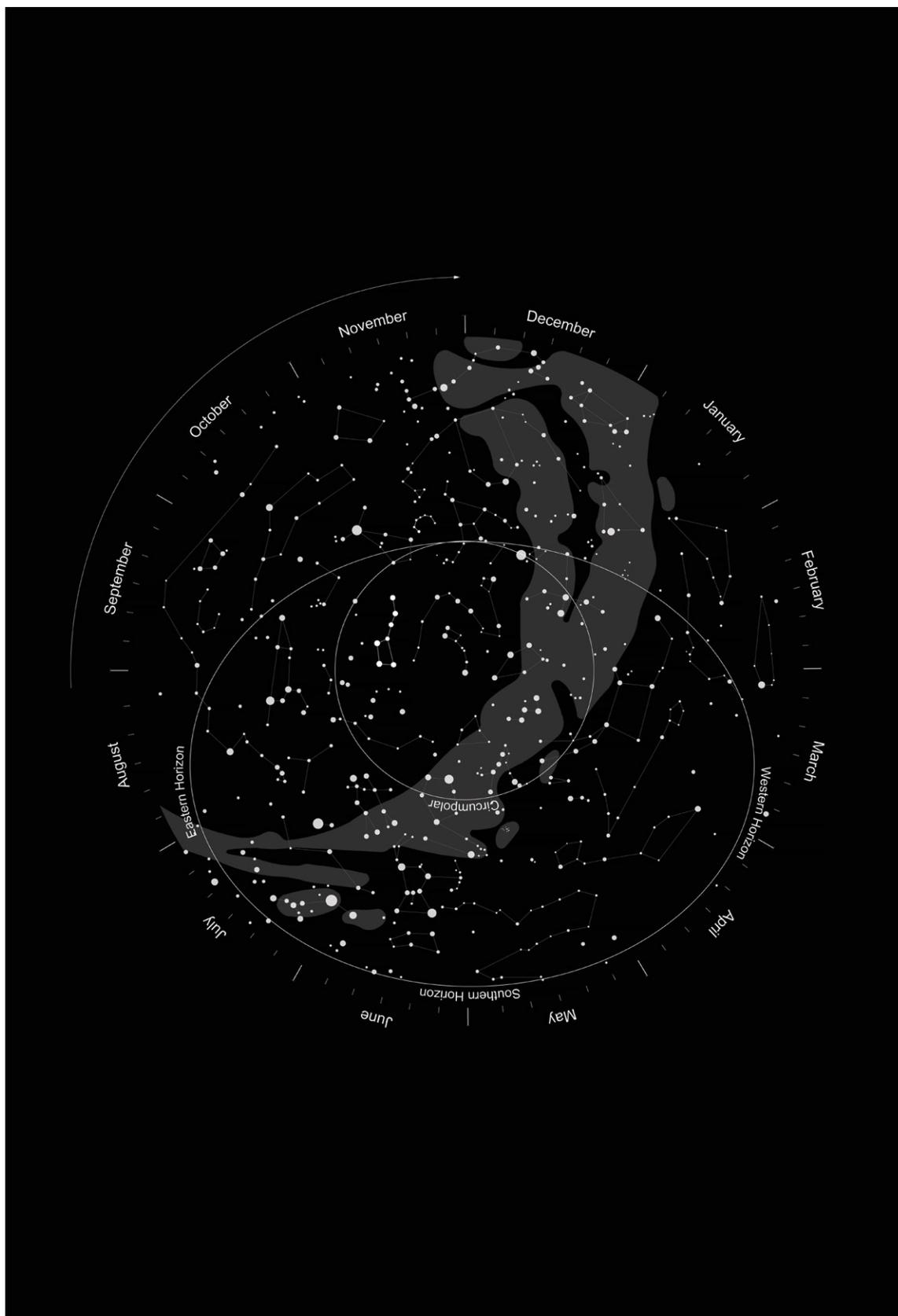
How can the ethnoastronomy of the Mi'kmaq, Acadians, and Black Loyalists be preserved and shared in southern Nova Scotia?

Sky as Archetype

The sky transcends time and place, linking past, present, and future cultures beneath one celestial ceiling. The brilliant, yet elusive qualities of the sky inspired many early sky watchers to study the movement and patterns of the sun, moon, and stars. These patterns were interpreted by various cultures to understand their physical and metaphysical environments and to inform their concepts of spirituality, time and space.

Their diverse celestial stories have since been overshadowed by our contemporary Eurocentric understanding of the sky. The diversity of cultural sky narratives is the product of individual perception and interpretation, which could be manipulated as a source of power, influencing a culture's spirituality, political structure, and environmental understanding.

A viewer's location on Earth affects one's perception of the sky. At the winter solstice in the northern hemisphere, the sun rises to an altitude of approximately 22° in Halifax, Nova Scotia, but remains below the horizon at the North Pole. The North Star, known as Polaris, is a unique stationary star. From Halifax, it is located at an altitude of approximately 44° above the horizon, while at the North Pole it is located at approximately 90° . It disappears as one moves from the northern to the southern hemisphere. Although the North Star seems to disappear, it is still in the same position, hidden by the Earth, but remains part of the archetypal sky.



Northern hemisphere night sky, as viewed from the North Pole

Cultural Astronomy

The term “cultural astronomy” refers to a relatively new multidisciplinary field of study that began in the late 20th century. It brings together astronomical, anthropological, historical, and architectural knowledge to understand “humankind’s perceptions and understanding of astronomical phenomena, throughout human history and across all cultures. Monumental and other human constructions, artifacts, cultural landscapes, historical accounts, and modern indigenous practices all bear witness to the extraordinary diversity of ways in which human communities have comprehended what they perceived in the skies and used or manipulated this knowledge for social ends” (Ruggles 2015, v-vii).

Cultural astronomy is a blanket term that, according to Ruggles, can be divided further into archaeoastronomy and ethnoastronomy, separated only by their historical situation (Ruggles 2015, v-vii). Archaeoastronomy refers to cultures that no longer exist, while ethnoastronomy focuses on cultures that still exist.

Historical Survey

Throughout history, artifacts and buildings were used to manifest and transfer ethnographic knowledge about the sky. Artifacts were used by nomadic cultures, while buildings and landscape constructions were appropriate for more permanent settlements. Both approaches engrained calendric and spiritual knowledge using vernacular construction, as shown in the following images.



Ishango Bone, Uganda/Congo, 18000 BC
Photograph from Swetz 2014



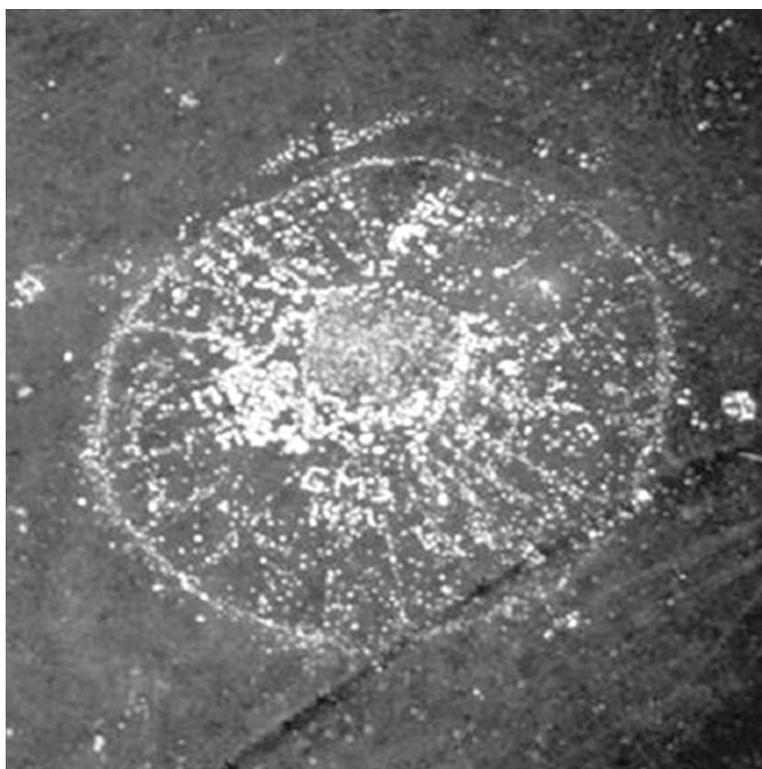
Warren Field, Scotland, 8000 BC
Photograph from Greig 2005



Goseck Circle, Germany, 5000 BC
Photograph from Iven 2016



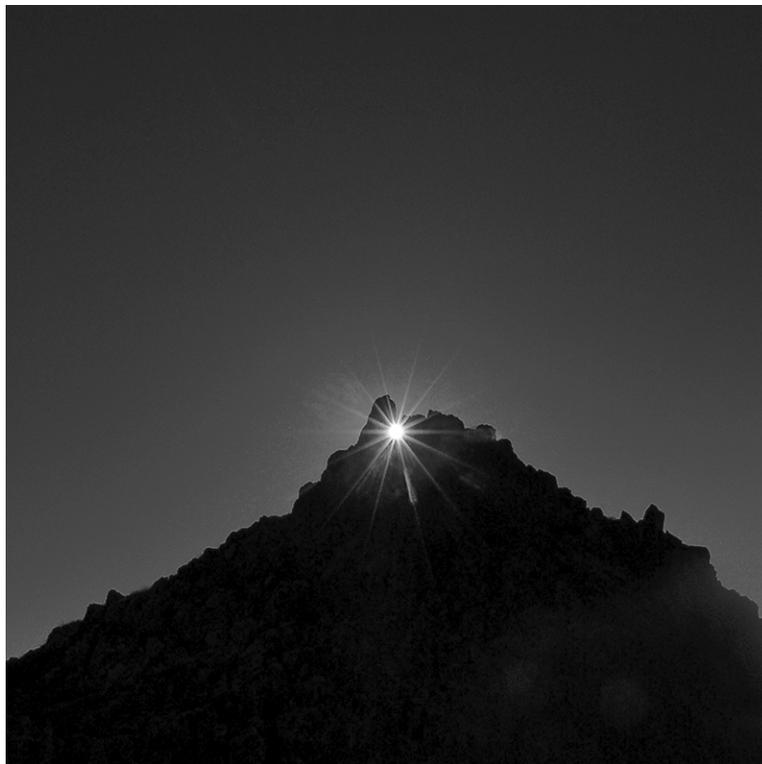
Brù na Bòinne Newgrange, Ireland, 3300 BC
Photograph from Byrne 2008



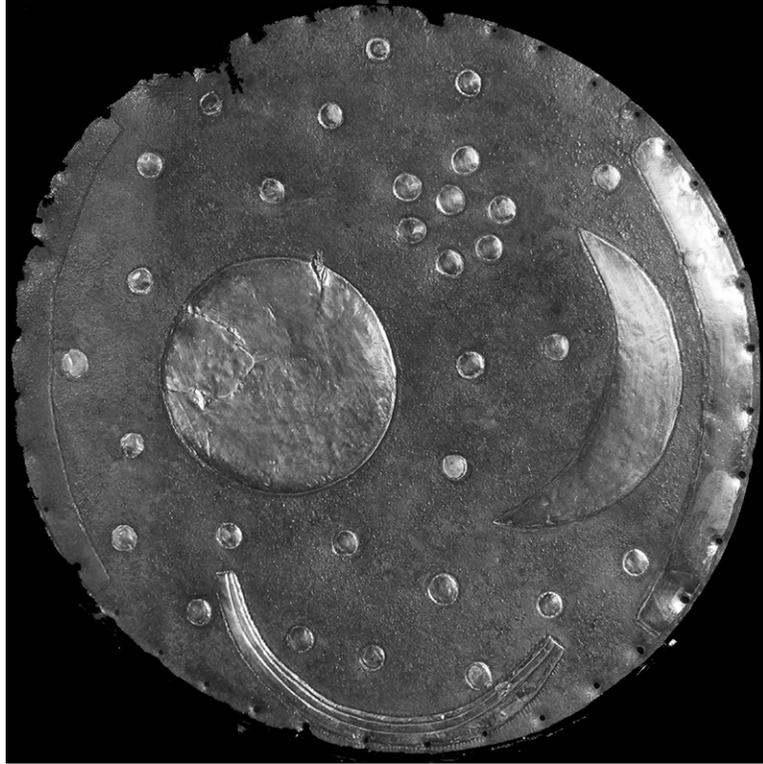
Majorville Cairn (Iniskim Umaapi), Alberta, Canada, 2800 BC
Photograph from Travel Alberta 2019



Stonehenge, England, 2800 BC
Photograph from Time magazine, "Winter Solstice" 2017



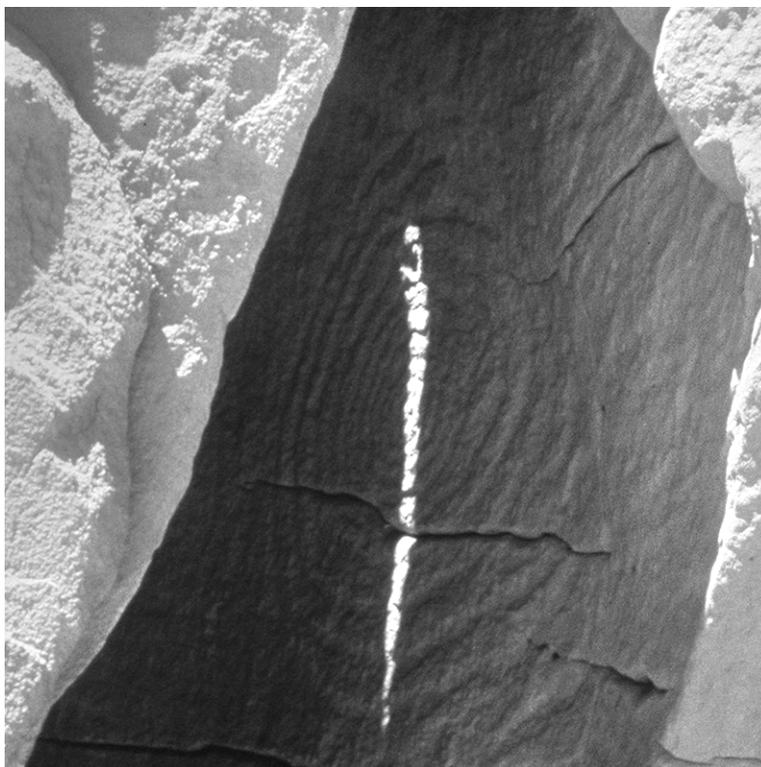
Ancient Megalithic Observatory Kokino, Macedonia, 1900 BC
Photograph from Exploring Macedonia and Cenev 2013



Nebra Sky Disk, Germany, 1600 BC
Photograph from UNESCO 2013b



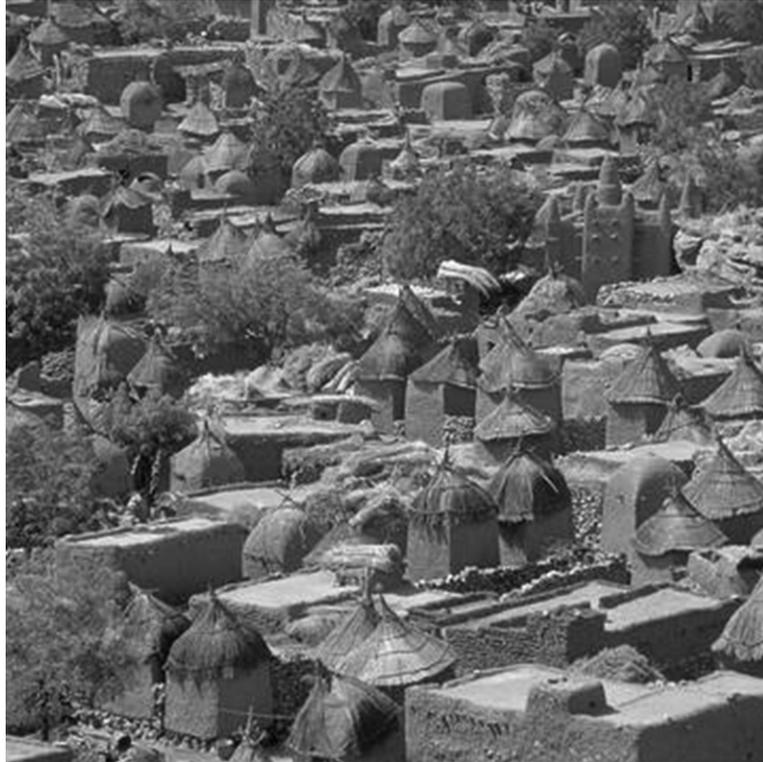
Astronomical observatory Chankillo, Peru, 0300 BC
Photograph from World Monuments Fund 2017



Fajada Butte, Chaco National Park, New Mexico, 0900 AD
Photograph from Stone, Sofaer and Weiner 2016



The Dengfeng Observatory, Gaocheng China, 1276 AD
Photograph from UNESCO 2010a



Cliff of Bandiagara (Land of the Dogons) Mali, 1700 AD
Photograph from UNESCO and Gray 1989



Jantar Mantar Observatory in Jaipur India, 1734 AD
Photograph from UNESCO and Conde 2010b

Calendric Knowledge

The celestial knowledge associated with the case studies responds to the rhythmic and predictable movement of visible celestial objects. Many celestial objects, such as stars, comets, and galaxies, were described by early sky watchers, but by far the most influential were the solar and lunar cycles, which were used to predict the natural seasonal cycles of their environment.

The moon was an obvious focus for early sky watchers because of its large presence in the sky and its regular phase changes, leading many cultures to develop a lunar calendar. Unfortunately, the natural cycles of the moon and the sun are not aligned, causing early lunar calendars to lag behind solar ones. To account for this lunar lag, many early cultures highlighted either the major or minor lunar standstill that occurred once every 18.6 years (McClure 2016), as at the megalithic observatory of Kokino in Macedonia and the stone cairn Iniskim Umaapi in Alberta, Canada. Some sites, such as Warren Field in Scotland, relied on the addition of a solar alignment to reset the lunar calendar and maintain good time.

Although the moon was an important focus, most early sky watchers paid more attention to the sun and its one-year solar cycle, as it was considered more reliable and practical as a time keeper. Many early sky watchers highlighted the solstices and equinoxes: either at their position on the horizon (e.g., Iniskim Umaapi in Alberta, Canada; Stonehenge in England; Brù na Bòinne (Newgrange) in Ireland; Goseck Circle in Germany; and Kokino in Macedonia) or at their maximum or minimum altitudes in line with the meridian (e.g., Fajada Butte in New Mexico, Dengfeng Observatory in Gaocheng China, and Jantar Mantar in India).

Spiritual Knowledge

Early sky watchers used the sky's patterns and movements to develop stories about their spiritual ancestors and surroundings. Constructed artifacts and buildings that were linked to the sky inherited its narratives. As symbols for the spiritual world, they played a central role in ceremonies and rituals.

Stonehenge connected observers to the afterlife by orienting them towards the sunrise

and sunset at the winter solstice, which they experienced during their approach and departure from the monumental funerary site, enclosed by iconic Sarsen stones. The setting and rising sun, symbolizing death and rebirth, had both spiritual and calendric undertones. Kokino in Macedonia had an agricultural ritual in which the ruler sat on a carved throne that was illuminated by the sun at the end of the harvest season. This ritual gave thanks to the sun god for the current harvest and sought to ensure bountiful future harvests.

Vernacular Construction

To manifest their knowledge of the sky, early sky watchers made artifacts, buildings, and landscape constructions with local materials and vernacular construction techniques that were as diverse as the places they inhabited. For Kokino in Macedonia, the technique of carving was used to frame various solar and lunar alignments made possible by the small vertical and horizontal cracks produced by early volcanic activity. For Iniskim Umaapi in Alberta, Canada, stones from the land were stacked to mark waypoints in the landscape for aligning oneself with significant solar and lunar alignments on the horizon. For Goseck Circle in Germany, multiple materials and techniques defined space and highlighted celestial alignments. Two outer rings, a mound and a ditch, were constructed of excavated and piled earth, while two inner rings were constructed of vertical wood slats.

CHAPTER 2: THE SKY IN NOVA SCOTIA

Sky Quality

Modernity and Light Pollution

Light pollution is a contemporary problem due to the artificial illumination of the night sky. According to Paul Bogard, the problem of light pollution began in the 17th century with the flame-based public street lighting adopted by many European cities. Although this public lighting contributed little to our contemporary problems, it was responsible for a cultural shift away from the daily cycle regulated by the sun, giving way to our contemporary 24-hour society. It wasn't until the nineteenth century, however, that the brilliant night sky began to disappear, due to electric lighting that significantly outshone the flame-based public lighting of early European cities (Bogard 2014, 8).

Light Pollution's Effect on the Sky

Light pollution reduces our ability to see even the brightest stars. This disconnection has been most evident in North America and Europe, where only a third of the population experiences true darkness (Bogard 2014, 9). The earlier night sky was brightest during a full moon, with an illumination level of approximately 0.3 Lux. Due to artificial light, the night sky in dense urban environments now has illumination levels of up to 10 Lux, which is equivalent to the normal brightness of the sky at 20 minutes after sunset (Dick 2012, 7-9).

Light Pollution's Effect on People

Light pollution's effect on the land and its inhabitants has been severe, upsetting the natural circadian rhythm that regulates the biochemistry of all living things. The circadian rhythm was an evolutionary response to the dark/light cycle. With light pollution, our biological cycles have been altered, resulting in behavioural changes that affect the health and prosperity of the species. This circadian imbalance, according to Joan Roberts, is a "severe health risk" (Roberts 2012, 11-13). The natural human circadian rhythm is responsible for the regulation of hormones such as serotonin, dopamine and melatonin throughout the day. By altering the natural dark/light cycle, a chemical imbalance affects our body's ability to regulate its biochemistry, which in turn affects our natural sleep/wake cycle, stress, blood pressure, impulse control, anxiety, alertness, metabolism and repro-

duction. The effects of this imbalance have been linked to severe physical and mental disorders such as depression, obesity and cancer (Roberts 2012, 11-13).

Light Pollution and the Natural Environment

The effect of light pollution on the biochemistry of plants is similar to its effect on people. Although daylight is an important part of a plant's photosynthesis, darkness is required to regenerate phytochrome, which orients the plant within the seasonal cycle. The amount of phytochrome produced within the plant corresponds to season-specific flowering, germination and dormitory processes. As the natural dark/light cycle is altered by artificial lighting and light pollution, so are the natural flowering, germination and dormitory processes of the plant, leading to infestation, disease and ill-preparedness for winter (Royal Astronomical Society of Canada 2019b).

Light pollution's effect on animals is similar, changing the natural environment and in turn the behaviours of the animals that rely on darkness. Many foraging and scavenging species use darkness as camouflage to avoid predation. Zooplankton in marine environments adjust their depth in response to light and predatory risk. As darkness falls, the zooplankton ascend to the surface to feed, except during the full moon, which illuminates the environment to an unsafe level. Many migratory birds rely on the darkness of the night sky for contrast when using the stars as navigational markers during migration. With light pollution, these celestial markers are either imperceptible or confused with artificial lights, resulting in disorientation (Dick 2012, 7-9).

Dark Sky Conservation

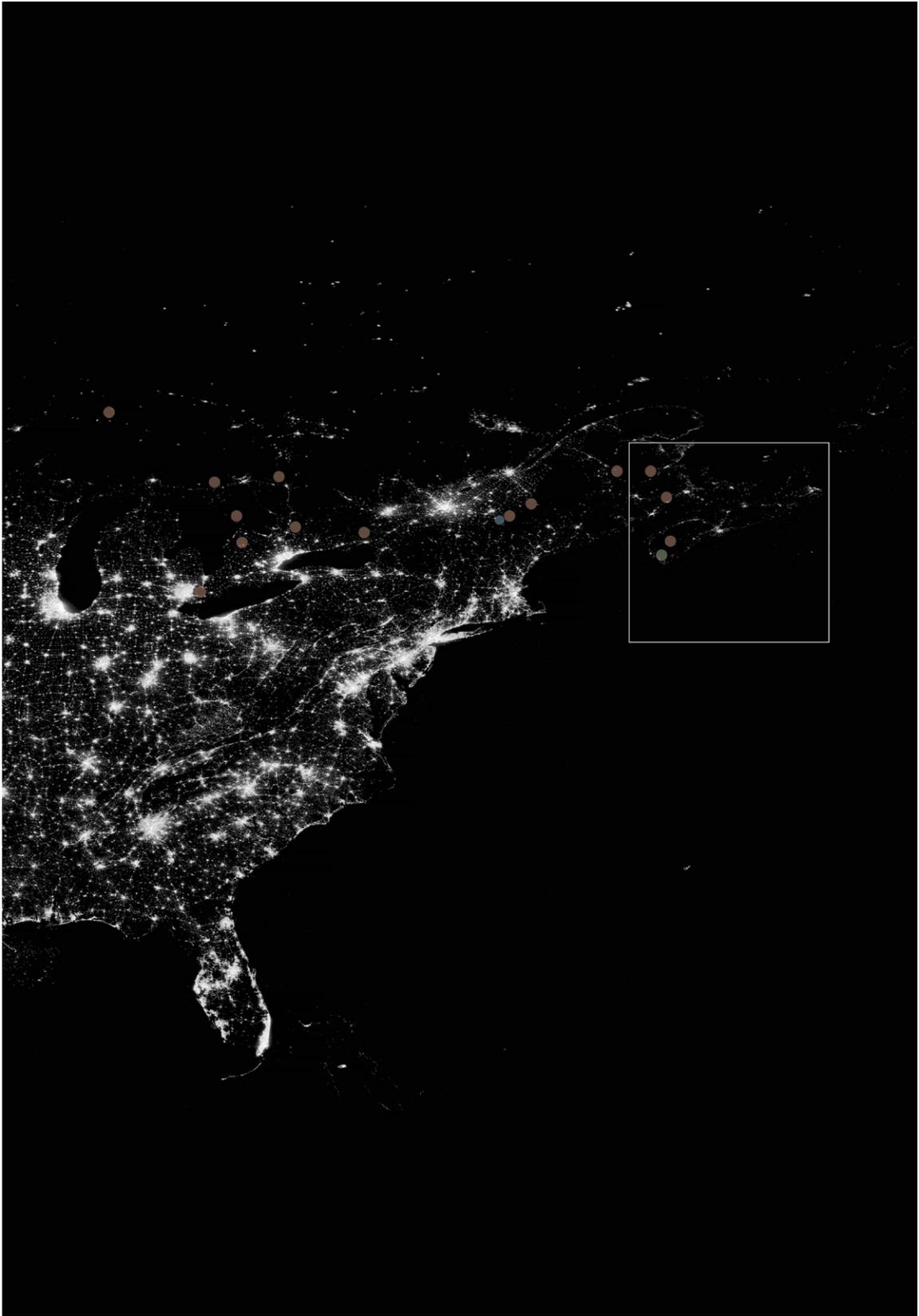
Dark sky conservation is a relatively new practice that responds to the growing concern of light pollution. Organizations such as the UNESCO-supported International Starlight Foundation (ISF), International Dark-Sky Association (IDSA), and the Royal Astronomical Society of Canada (RASC) have made it their mission to conserve the night sky. They rely on public education and land reserves, which the Royal Astronomical Society of Canada calls "dark-sky preserves." Public education is an important part of conservation, with all three organizations emphasizing the reduction of artificial light through design. Excessive artificial lighting at night is evident in parking lots, buildings, and roads. RASC recommends reducing illumination to minimum practical levels, using it only where and when it

is needed, and avoiding blue and white light that is similar to the colour of daylight. When designed and installed properly, light fixtures can reduce light pollution by focusing the minimum amount of light onto the minimum practical area (Dick 2013, 13-24).

All three organizations advocate land reserves for dark sky conservation. To achieve dark sky certification, a site must meet certain requirements. For RASC, the organizing partners (management, local stargazers, astronomers, and neighbouring municipalities) first must define the boundaries of the preserve. Within these boundaries, a core viewing area and buffer zone are established. The buffer zone insulates and protects the core from encroaching development and light pollution. The organizing partners then must meet the requirements for outdoor lighting, accessibility, night sky, and outreach described in RASC's Guidelines for Outdoor Lighting and its Dark-Sky Site Application Requirement Guidelines (Royal Astronomical Society of Canada 2019a).



Artificial lighting world map with dark sky conservation sites, ISF (green), IDSA (blue), RASC (orange); base photograph from NASA 2016



Artificial lighting on east coast of North America with dark sky conservation sites, ISF (green), IDSA (blue), RASC (orange); base photograph from NASA 2016

Nova Scotia Star Gazing

Although Nova Scotia is known as Canada's ocean playground, its stargazing qualities are equally appreciated by the sky watching community and its organizations. The International Starlight Foundation (ISF) recognizes only 13 starlight reserves around the world. The only one in North America is the Acadian Skies and Mi'kmaq Starlight Reserve in southwestern Nova Scotia. This reserve occupies the municipalities of Argyle, Clare and Yarmouth. It includes wilderness areas that extend from the coast to the inland Kejimikujik National Park.

The Royal Astronomical Society of Canada, with more than 4000 active members, is Canada's leading astronomy organization. RASC recognizes 22 dark sky preserves across Canada, with Kejimikujik National Park being the only one in Nova Scotia. Its location in the centre of the province, far from coastal settlements, is responsible for its pristine dark sky conditions.

Cultural Diversity

Mi'kmaq as First Inhabitants

Nova Scotia is known for its cultural diversity, with as many as 100 ethnic groups represented in its contemporary cultural landscape (Nova Scotia Archives 2019c). The first to inhabit Nova Scotia were the Mi'kmaq people, whose origins, according to elders and archeological evidence, can be traced back to the end of the last ice age, approximately 13,000 years ago. Over this time, the Mi'kmaq, known for their semi-nomadic relationship to the land, settled throughout Nova Scotia, with primary locations in Blomidon, Debert, Kejimikujik, and along the Mersey River.

European Exploration and Settlement

The Norse in the tenth century were most likely the first Europeans to explore Atlantic Canada, traveling west from Scandinavia to Greenland, and eventually to "Vinland," which includes Newfoundland, Nova Scotia, and New Brunswick. Norse exploration in this area is supported by both text and archeological evidence. According to the Bjarni sagas, Vinland was discovered by accident when a merchant ship en route from Iceland to Greenland in 986 CE was blown off course. The merchant, named Bjarni, did not recog-

nize the forested landscape on shore, so he sailed north and arrived in Greenland a week later. The archeological evidence of early Norse settlement is the National Historic Site at L'Anse aux Meadows on Newfoundland's northern coast. Archeological exploration has revealed a small settlement with approximately eight small dwellings and various small artifacts (Janzen 2004).

15th-Century Colonial Exploration and Settlement

Although the Norse were most likely the first Europeans to reach North America, it wasn't until the late 15th and early 16th century that the British and Portuguese explored Atlantic Canada in search of resources and settlement opportunities. The first documented exploration was by the British-sponsored explorer Giovanni Cabotto Montecalunya (John Cabot) in 1497. Although his exact route is unknown, historians agree that he landed in either Newfoundland or Cape Breton, Nova Scotia. Shortly after Cabot's voyage to what is today Atlantic Canada, the Portuguese Corte-Real family arrived at the coast of Newfoundland between 1500 and 1503. The last of the three major colonial powers to explore this region were the French, by Giovanni da Verrazzano in 1524 and Jacques Cartier in 1534 and 1541, who, in three separate voyages, successfully navigated around Newfoundland, exploring the Gulf of St. Lawrence, the Strait of Belle Isle, the St. Lawrence River, and the Cabot Strait (Hoffman 1955, 7-42).

Settlement and Conflict

As resource interests became apparent in what is today Nova Scotia, so did the desire to settle and claim the land. The French were the first to claim land, following the Verrazzano and Cartier expeditions in the early 16th century; however, they did not settle here until 1605, when a group including Samuel de Champlain settled at Port Royal, on the Annapolis Basin. In 1621 King James VI of Scotland (James I of England) also laid claim to this region, renaming it Nova Scotia (New Scotland) and yielding it to Sir William Alexander for settlement. The conflicting claims on what is today Nova Scotia resulted in many battles and wars throughout the 17th and 18th centuries, with the British eventually taking control of Nova Scotia (Acadian.org 2019b).

In 1751, two years after the founding of Halifax in 1749, disease and desertion decimated the British population. Fearing that their settlement may appear weak to the French, the

British recruited many different ethnic groups to help settle and fortify Nova Scotia as British land. These groups included Germans, Swiss, Irish, Scottish, and African-Americans. In exchange for their service and expected allegiance, the British offered them food, land, and tools to work the land (Nova Scotia Archives 2019d).

British as Cultural Colonizers

Although some of these settlements were positive and prosperous, the Mi'kmaq, Acadian and African-American populations faced discrimination and hardship. Their traditional values and cultural identities were subject to assimilation by British traditions, as noted in the following examples.

Mi'kmaq

Although the Mi'kmaq built strong relationships with the Acadians (French), their relationship with the British was much different. Historian Daniel Paul described Edward Cornwallis's Scalping Proclamation of 1749 as an attempted genocide of the Mi'kmaq people. Western knowledge later would be forced onto Indigenous people, overshadowing their traditional knowledge of place (Paul 2006, 110-112).

Acadian

The Acadians (French settlers) had settled primarily on the rich agricultural land on the northwest coast of Nova Scotia. In 1755 they were expelled by the British military, fleeing to the deep woods of central Nova Scotia, as well as New Brunswick, Louisiana, France, and even the Falkland Islands. In 1764 the British allowed the Acadians to return in small, isolated groups that would minimize the risk of a French uprising. After returning, they found that their rich farmland had been handed over to British Loyalists. Consequently, those who settled in non-agricultural locations such as Yarmouth had to look to the sea for their livelihood (Acadian Affairs and Francophonie 2019).

Black Loyalists

Although the British offered land to people of African descent (Black Loyalists), along with the opportunity to escape slavery down south, this was not a selfless act but a concession based on military need. Many Black Loyalists were given smaller plots of land than

white European settlers. Their land was also uncleared and not suited to agriculture, so many Black Loyalists became general labourers in Shelburne and earned lower wages than white workers. Racial tension eventually boiled over in 1784, when white labourers and disbanded soldiers drove Black workers from Shelburne in what is considered the first race riot in North America. The discrimination of people of African descent continued, with bylaws prohibiting dancing and loitering (Nova Scotia Archives 2019a).

Mi'kmaq Sky Narratives

Before Western contact and colonization the Mi'kmaq relied heavily on their in-depth understanding of their environment. Much of this knowledge was derived from the sky, which oriented the Mi'kmaq within the natural cycle of the universe, informing their spiritual and environmental understanding of place.

Spirituality

The spirituality of the Mi'kmaq people is heavily influenced by the archetypal sky, with many recalling stories of a sky world, shape shifting, and souls. As shown below, the Mi'kmaq's spiritual relationship with both the sky and surrounding environment are dependent on one another as linked, interconnected, and intertwined.

The belief in a sky world is clearly expressed within the Mi'kmaq spiritual understanding, with many believing that the sky world is a reflection of the physical one, with many of the same characteristics. However, within this sky world there are supernatural beings which are said to have great magical powers (Rand 1894, 160-162). The most important of these sky beings could be what many Mi'kmaq people refer to as the Creator or Great Spirit. According to Hoffman, the Creator or Great Spirit is responsible for the creation of the Universe, supernatural beings (prevalent in Mi'kmaq folklore), and all living things. He/she is said to be an invisible and immaterial being, but at the same time capable of manifesting him/herself as the sun, moon, or sky (Hoffman 1955, 489).

Although it was believed that the sky beings had great magical powers, many believe the Mi'kmaq themselves had supernatural shape shifting powers, enabling them to take the form of things such as animals within the landscape. According to Leland, in the beginning all beings were at first men, but "as they gave themselves up to this and that desire, and

to naught else, they became beasts. But before this came to pass, they could change to one or the other form; yet even as men there was always something which showed what they were" (Leland 1884, 31).

The Mi'kmaq's interaction and relationship with the environment and the above mentioned sky world rely on the concept of souls, which, according to Le Clercq, is engrained within all things within the environment. Examples of these objects include canoes, snowshoes, bows, arrows, animals, trees, and of course people. As a result of the Mi'kmaq's belief in a sky world that was similar to the one they inhabited on earth, the dead were buried with their personal tools, so that they could be used in the "land of the sky" (Rand 1894, 160-162; Le Clercq 1910, 207-214).

The relationship above makes it clear that one of the major themes within the Mi'kmaq culture is the interconnectedness between the natural environment and spirituality. As a result of this interconnected spiritual belief, it is understandable why the Mi'kmaq, like many indigenous groups, treat the landscape with such respect, as expressed in a ceremonial process when an animal's life is taken.

Sky as Environmental Understanding

Beyond spirituality, the moon and the Great Bear constellation, also known as the Big Dipper or Ursa Major, were used to achieve environmental understanding.

The moon has been a source of inspiration and information throughout the Mi'kmaq tradition, with many stories and narratives being derived from the moon. Perhaps the most important narrative associated with the moon is the Mi'kmaq lunar calendar, which conveys environmental understanding. According to Le Clercq, the Mi'kmaq count the years by the winters, the months by the moons, and the days by the nights (Le Clercq 1910, 137-139). In response to a lunar-centric understanding of time, the addition of a moon must be introduced to prevent seasonal lag. According to Le Clercq,

They say that the spring has come when the leaves begin to sprout, when the wild geese appear, when the fawns of moose attain to a certain size in the bellies of their mothers, and when the seals bear their young. They recognize that it is summer when the salmon run up the rivers, and when the wild geese shed their plumage. They recognize that it is the season of autumn when the water fowl return from the north to the south. As for the winter, they mark its approach by the time when the cold becomes intense, when the snows are

abundant upon the ground, and when the bears retire into the hollows of the trees, for which they do not come forth until the spring, according to an account which we shall give thereof later. (Le Clercq 1910, 137-139)

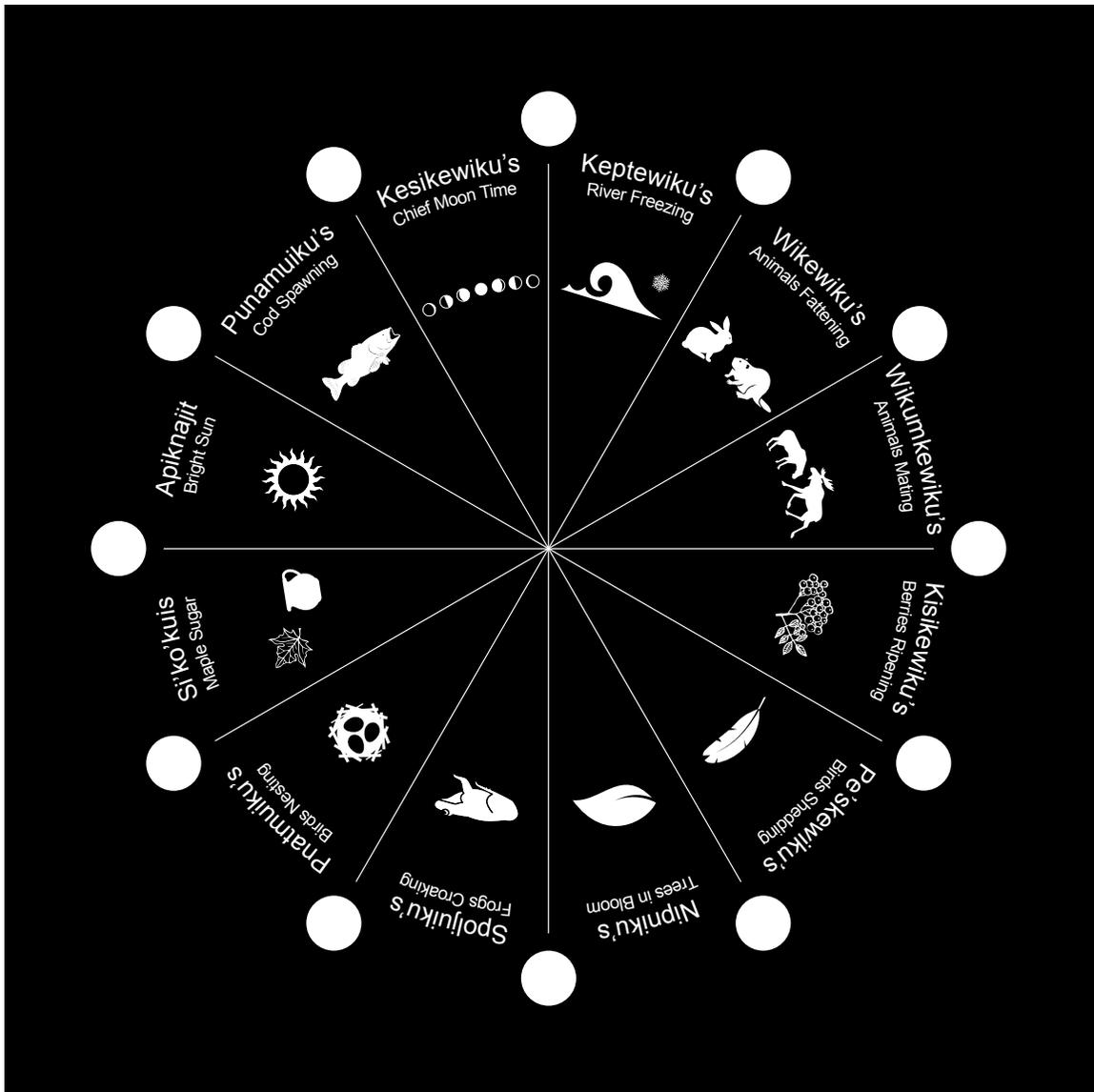
The link between the environment and time, expressed by Le Clercq, is still understood today, with many contemporary Mi'kmaq story tellers linking the natural environment to months within the lunar calendar. Some environmental changes associated with the Mi'kmaq months include the Egg-laying moon (April), Frog-croaking moon (May), Summer moon (June), Feather-shedding moon (July), Fruit and berry-ripening moon (August), Moose-calling moon (September), Animal-fattening moon (October), River-freezing moon (November), The great month (December), Tom cod moon (January), The snow blinder (February), and the Spawning moon (March) (Mi'kmaw Spirit 2016c).

The Great Bear recounted in the story of Muin and the seven bird hunters is one of the most well-known Mi'kmaq legends that relies on the natural movement of the Great Bear (Ursa Major or the Big Dipper) which is visible in the sky throughout the year. This constellation is interpreted by the Mi'kmaq as a celestial bear, which is followed by the seven bird hunters, recounted by Hatcher in the narrative below.

In the spring, Muin emerges from the den, and Jikjaqqwej (Chickadee) is visible behind her. The seven hunters chase Muin all spring and summer. In the autumn, the hunters in the rear start to lose the trail. First Kupkwej (Sawwhet) falls back, being too small to keep up. It is said that if you laugh at Kupkwej for losing the trail, he will descend from the sky and light your clothing with fire from his birch bark torch after you fall asleep. Then Kuku-kwes (Owl) loses the trail because he is too heavy. Tities (Blue Jay) and Ples (Passenger Pigeon) also lose the trail. Then, as Nikjaqqwej (Moosebird) is about to lose the trail in mid-autumn, Muin stands up on her hind legs. This gives Jipjawej (Robin) a clear shot, and he kills Muin with his bow and arrow. Covered with Bear's blood, Jipjawej flies to a maple tree and shakes. The maple tree turns red with Jipjawej's blood, and that is why all maples turn red at this time of year and why the Jipjawej's (Robin's) breast is red. After Jipjawej kills the bear, Jikjaqqwej (Chickadee) arrives with his cooking pot. The two hunters carve off some of the meat and cook it. As they prepare to eat, Nikjaqqwej (Moosebird) shows up for his share. This works so well for him that he continues to show up at the last minute to take food whenever animals are hunted. Thus his Mi'kmaq name is Nikjaqqwej, meaning "He-who-comes-at-the-last-minute." During the winter, the skeleton of Muin lies on her back, and her spirit stays invisible until the spring when a new Muin with the same spirit emerges and the hunt begins again. Thus, organic life begins anew but spirit lives on forever. (Hatcher et al. 2009, 1-2)

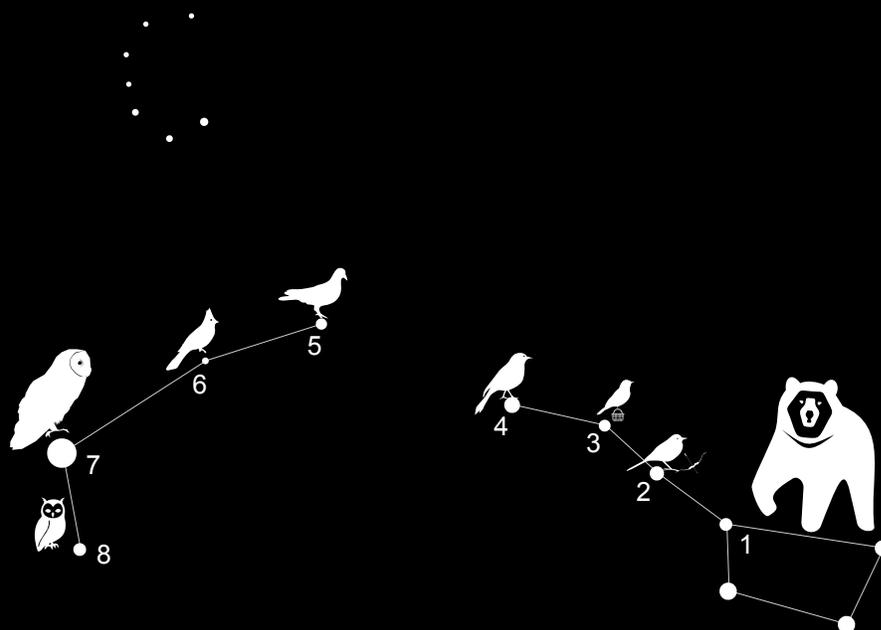
As the celestial bear rotates around the North Star (Polaris) it is perceived as both a calendar and expression of the natural life and death cycle, which the Mi'kmaq used to achieve seasonal understanding and environmental knowledge. In the spring through fall the bear is perceived as running through the sky, chased by the seven bird hunters, until

he is caught in the fall. When the bear is killed by the hunters the blood from the hunt drips onto the earth, transforming the green leaves of trees red, suggesting the changing of the seasons. In the winter the celestial bear is perceived upside down, which is interpreted as either deceased (part of the land of the souls) or hibernating, thus signaling the end of the hunting season. As a result of the Great Bear (Ursa Major), perceived movement in the sky, the cycles begin again in the spring as the bear is reborn, suggesting the continuation of the natural cycle of life.



Mi'kmaq lunar calendar

1. Muin (Black Bear)
2. Jipjawej (Robin)
3. Juki'kes (Chickadee)
4. Nikjako'kej (Grey Jay)
5. Ples (Passenger Pigeon)
6. Tities (Bluejay)
7. Ku'ku'kwes (Barred Owl)
8. Kupkwe'j (Northern Saw-whet Owl)



Polaris (North Star) ●

Muin and the Seven Bird Hunters

From the materials presented above it is clear that the Mi'kmaq relied on the sky as a tool of both physical and metaphysical understanding. This understanding and knowledge were then documented and preserved in oral narratives that expressed the interconnected and intertwined relationship between the land and the sky.

Acadian Sky Narratives

The Acadians, early French settlers, arrived in New France (Nova Scotia) in the early 17th century, with many coming from the areas of Brittany, Poitou, and Normandy (Acadian.org 2019c). The Acadians brought an understanding of agriculture, which resulted in the decision to settle along the agriculturally rich banks of the Bay of Fundy. The importance of the sky in Acadian culture is tied strongly to navigation and calendric understanding of place that enabled early Acadians to thrive within the landscape, until they were expelled by the British.

The Sky as a Tool of Navigation

The Acadians' journey to the new world, like many other early explorers, relied on the star Polaris, known as the "North star, Pole star, Stella Maris, Star of the Sea, and Lodestar" (Paine 2013, 382). To orient themselves within the landscape, early observers would draw an imaginary vertical line from Polaris to the horizon, yielding north, which the explorer could then use to locate east, south, and west. The reason Polaris can be used to accurately locate north is because of its relationship to the earth's North Pole, which, when viewed from the northern hemisphere, appears stationary in the sky, therefore making it a unique and reliable tool of navigation.

Although Polaris was used by the Acadians to navigate their landscape, it was also used as a symbol of hope and guidance into the future, expressed in the Acadian flag that was adopted in 1884. The Acadian flag is a French flag with the addition of a single yellow/gold star in the top left corner of the blue vertical stripe, symbolizing the Virgin Mary's protection over the Acadian people as expressed below.

A yellow/gold star was placed in the upper part of the blue field, to give it the Acadian distinction. The yellow/gold star, our Lady of Assumption, represents the "Stella Maris" (Star of the Sea), seeks the protection of the Blessed Virgin Mary and indicates hope and the guiding light of the future. (Acadian.org 2019a)

The Sky as Environmental Calendric Understanding

In the 17th century, the Acadians relied on the Gregorian calendar, implemented by Pope Gregory XII in the 16th century. Like other calendars the Gregorian calendar relied on the celestial movement of the sun and moon, but unlike other calendars it accounted for the uneven 365.2425 days in a calendar year. The calendar accounted for the partial day, with a “leap year” that integrates an extra day once every four years, making it the most accurate calendar to date.

Although the Gregorian calendar is regarded as the most accurate, its universal approach to time keeping does not account for place or seasonal unpredictability, which was critical for the agriculturally dependent Acadians. To achieve a deeper understanding of place the Acadians drew inspiration from the Mi'kmaq by studying the plants and animals within the natural environment as signs of the upcoming agricultural season. The maple syrup harvest from the maple trees was a sign of the upcoming agricultural season, so if a good crop of maple syrup was collected, the Acadians could expect a favorable yield. If the squirrels were observed to be busier than usual, gathering food for the winter, then a harsh season could be expected (Labelle 1982, 11).

Moon

The Acadians relied on the waxing and waning of the moon to regulate many of their agricultural tasks, including when to clear the land, plant the seeds, and slaughter their livestock. The waxing and waning of the moon are visual representations of the lunar cycle. If the moon is illuminated on the right side it is considered to be waxing and in the first half of the lunar cycle/month. If the moon is illuminated on the left side it is considered to be waning and in the second half of the lunar cycle/month. The transition between waxing and waning happens during the full and new moon. The full moon is the largest and brightest moon, which denotes the midway point of the lunar cycle/month. The new moon is perceived as dark and denotes the beginning of the lunar cycle/month.

According to Labelle, agricultural tasks were regulated by the waxing and waning of the moon. During the waxing of the moon, Acadian farmers were busy planting vegetables that grew above ground and slaughtering living stock. Livestock was slaughtered during this time of the lunar month to yield a higher volume of meat. During the waning of the

moon Acadian farmers were busy clearing the land and planting vegetables that grew below ground. The land was cleared during the waning, to accelerate the natural rotting process of the stumps, yielding land that could be cultivated sooner (Labelle 1982, 11).

Stars

The stars have been used by many cultures in Europe as a calendric understanding of place. Although there is no written Acadian text suggesting the stars were used as a calendric tool, it is plausible that early settlers brought this knowledge from Europe. Some common constellations that have been used to understand the seasonal cycle, and in turn the land, include Ursa Major, the Summer Triangle, Orion, and the star Sirius. Many European cultures have relied on their perception and interpretation of Ursa Major (Big Dipper) to orient themselves within the seasonal cycle. The constellation can be perceived as a vessel that holds water, and in the spring is interpreted upside down, pouring water onto the earth. The Summer Triangle, as the name suggests, denotes the arrival of spring and summer, while the rise of Orion from the horizon suggests the coming of winter. Sirius is understood to be a summer star which denotes agricultural events such as drought or harvest (Cornell Astronomy 2015).

It is clear that the Acadians, like the Mi'kmaq, were deeply tied to the sky. The Acadians relied on the sky as a tool of both navigation and environmental understanding. Although the sky was used to navigate to the new world and orient themselves within the landscape, it was the Acadians' environmental understanding derived from the sun, moon, and stars that enabled a deeper seasonal understanding than the placeless Gregorian calendar. This deeper understanding was used by early settlers to agriculturally thrive and prosper in Atlantic Canada.

Black Loyalist Sky Narratives

As a result of the transatlantic slave trade during the 18th century many people of African descent became disconnected from their traditional understanding of the sky and its associated spiritual and environmental knowledge. As they disembarked in America into a life of slavery many turned to the spirituality and knowledge of the sky to navigate the darkness of slavery between the 17th and 19th century.

Spirituality

Traditionally, spirituality has been an important part of West African culture, with many relying on the archetypal sky as a source of inspiration and knowledge, helping to guide their understanding of the physical and metaphysical environment. As a result of West Africa's diverse cultural landscape and the diverse, poorly documented origins of the slaves, a focused evaluation of place-specific spirituality will not be possible, and as a result will rely on the common thematic narratives of the 'seed', water, and a supreme deity to achieve a spiritual understanding.

Traditional Spiritual themes

The concept and metaphor of the 'Seed' is commonly associated with organicism and growth, which suggests a naturalness of growth and the creation of life. This theme shows up in many West African cultures, including that of the Mande (Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, and Sierra Leone), Dogon (Mali), Bamana (Mali), Malinke (Gambia), and the Fang (Cameroon) (Holbrook 2008, 138-144).

Water, and the concept that the world was created from a Watery Chaos, is another common theme in West African spirituality and cosmology, which draws strong parallels to not only the Baptism rituals of many people of African descent but also our contemporary biological understanding of water and the human body. West African cultures that subscribe to this belief include the Bushango (Democratic Republic of the Congo), Yoruba (Nigeria), and the Krachi (Togo).

A Supreme Deity, similar to that found in Christianity and Islamic beliefs, is another common theme within West African spirituality and cosmology, with many cultural groups believing that their environment originated from the spoken word or thought of a god, goddess, or genderless figure. Cultural groups within West Africa that subscribe to this understanding include the Mbuti (Congo), Temne (Sierra Leone), Fon (Benin), Batamaliba (Togo & Benin), and the Mande (Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, and Sierra Leone) people (Holbrook 2008, 138-144).

Transition to Western Spirituality

As a result of the transatlantic slave trade, many people of African descent adopted Christianity as a source of inspiration and hope, presumably because of its relatable themes of baptism and freedom. This could be interpreted as a connection to both the past and future.

The Christian theme of baptism relates to the passing of water over the body, as a type of spiritual cleansing, which is conveyed in an influential moment in the New Testament when Jesus is baptized. The act of water rushing over the body is something familiar to people of West African descent who have many river and stream rituals in which people would meet, encounter, or be possessed by the spirits in the water. As Africans began to be baptized in America these traditional West African rituals began to assume many of the same qualities of the Christian baptism (Callahan 2007).

Although most early Africans sold into slavery were illiterate, they related to the themes of freedom and equality expressed within the Bible. The Book of Exodus recounts the struggles of the Israelites, who were forced into hard labour by the Egyptian king, until the saviour Moses under the instruction of God led them to the promised land (freedom). The importance of this narrative is expressed in an African American spiritual (song) "Wade in the Water" that Harriet Tubman used to move people along the Underground Railroad north to freedom, with many ending up in Canada.

Chorus: Wade in the Water, wade in the water children.

Wade in the Water. God's gonna trouble the water.
Who are those children all dressed in Red?
God's gonna trouble the water.
Must be the ones that Moses led.
God's gonna trouble the water.

Chorus

Who are those children all dressed in White?
God's gonna trouble the water.
Must be the ones of the Israelites.
God's gonna trouble the water.

Chorus

Who are those children all dressed in Blue?
God's gonna trouble the water.
Must be the ones that made it through.
God's gonna trouble the water.

Chorus

(Harriet Tubman Historical Society 2019)

Environmental Navigation

Although spirituality and its intertwined relation with the sky were used as a source of hope and inspiration to navigate the metaphysical landscape of slavery, the sky was also used to navigate the physical landscape. Therefore, many slaves relied on the sky as both a tool of navigation and a calendric understanding of time.

The “drinking gourd,” a constellation, was used by the enslaved Africans as a way to escape slavery due to its location in the sky. Although the drinking gourd is not aligned perfectly north, its location in the sky does revolve tightly around the North Star (Polaris), with the two outermost portions of the bowl being used to orient one with the North Star (Polaris). The importance of this constellation within the archetypal sky was captured in the spiritual below, which early conductors of the Underground Railroad, such as Harriet Tubman, relied on to evacuate slaves north.

When the Sun comes back
 And the first quail calls
 Follow the Drinking Gourd.
 For the old man is a-waiting for to carry you to freedom
 If you follow the Drinking Gourd.

The riverbank makes a very good road.
 The dead trees will show you the way.
 Left foot, peg foot, traveling on,
 Follow the Drinking Gourd.

The river ends between two hills
 Follow the Drinking Gourd.
 There’s another river on the other side
 Follow the Drinking Gourd.

When the great big river meets the little river
 Follow the Drinking Gourd.
 For the old man is a-waiting for to carry you to freedom
 If you follow the drinking gourd.

(Harriet Tubman Historical Society 2019)

Engrained within this spiritual is the connection between the sky and the land that was interpreted and understood by many African slaves as a road map north away from slavery. The song was used to help fleeing slaves orient themselves within time and space. Not

only is the path of travel along the river expressed, but the ideal time to travel along the river is also expressed, which, according to the spiritual, is spring. Understanding of time is encoded when the spiritual suggests the “Sun comes back” and the “first quail calls” in April. During the day, fleeing African slaves relied on simple cues from the landscape, such as the fact that moss grows on the north side of dead trees, shaded from the sun (Harriet Tubman Historical Society 2019).

Calendric Understanding

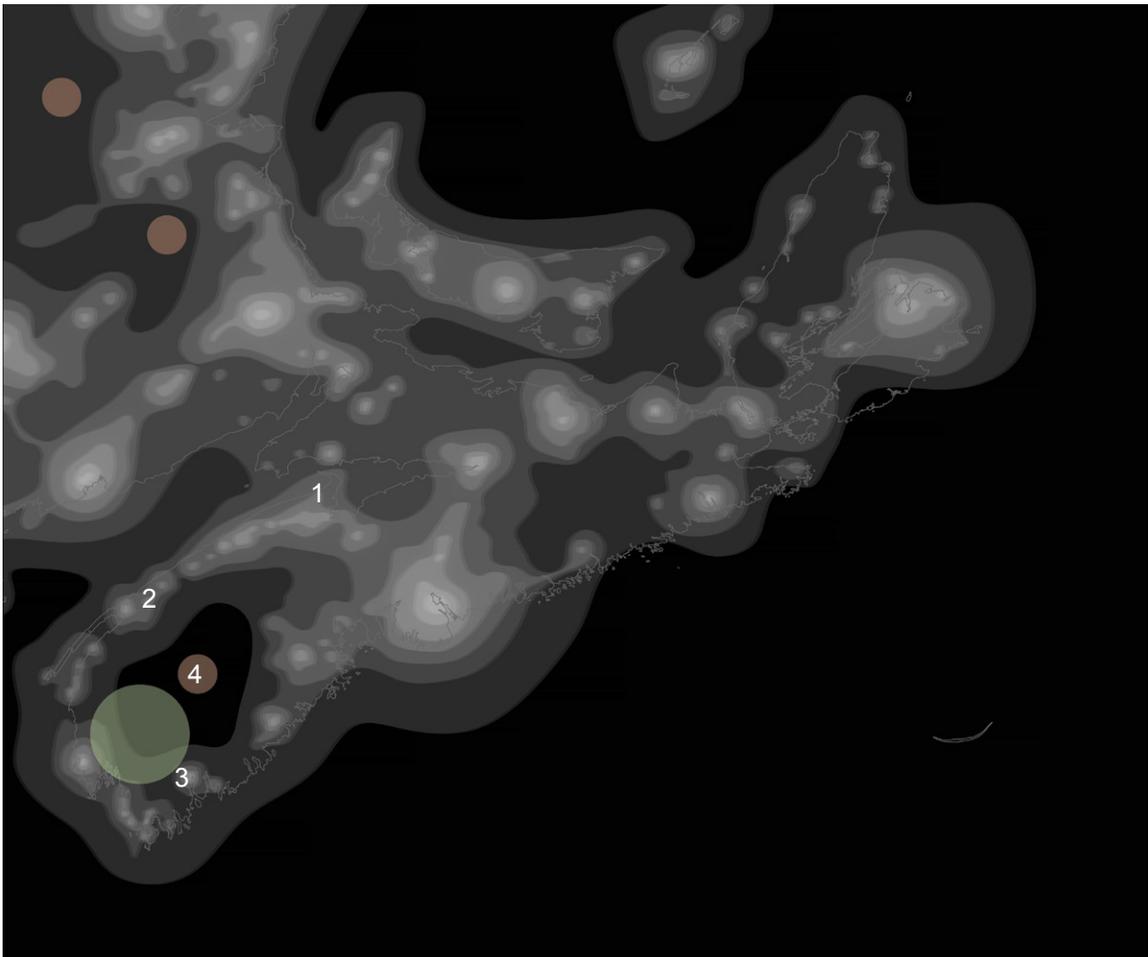
Further evidence of the African slaves’ reliance on the sky was a calendric tool used to orient themselves within time. The natural cycle of the seasons and the changes within nature informed a calendric understanding of time. According to Sobel, in 1768 a runaway named Sandy told the sheriff he had “made two crops for his master” and he had been gone for “two moons,” a means of time telling as expressed in the autobiography of Old Dick, who recalled his birth on a plantation along the Rappahannoc River during “corn pulling time, when Squire Musgrove was Governor of Virginia” (National Park Service U.S. Department of the Interior 2019)

The people of African descent, in both West Africa and America, relied heavily on the sky for spirituality, navigation, and calendric understanding. Eventually it was used by enslaved Africans to flee the American south, with many making their way north to Canada.

CHAPTER 3: ARCHITECTURAL STRATEGIES

Site Strategies

The cultural sky narratives associated with the Mi'kmaq, Acadians, and Black Loyalists are grounded in place and history. Unfortunately, with industrialization, light pollution has disconnected contemporary sky watchers from traditional sky narratives along Nova Scotia's coast. To resolve this conflict, three culturally important sites, as noted below, were conceived as daytime pavilions that express the value of place in the built form, highlighting the relationship between the sky and the land. To communicate the knowledge of the night, the cultural information on the coast is augmented in the Dark Sky Preserve in Kejimikujik National Park, where cultural understandings of the night sky can be experienced together under the archetypal night sky.

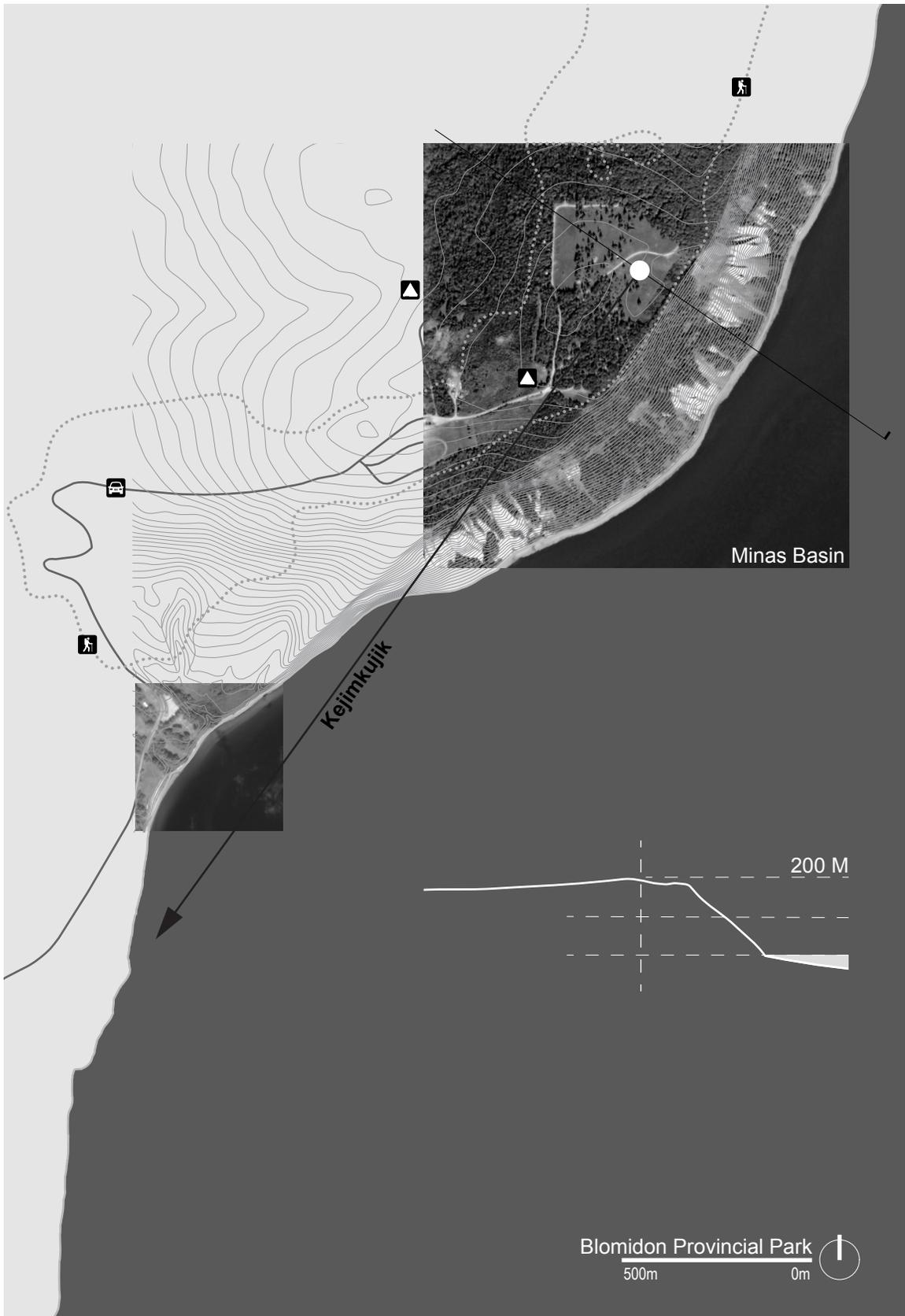


Light pollution, Nova Scotia, Canada with dark sky conservation and culturally significant sites ISF (green), RASC (orange): 1) Blomidon Provincial Park, 2) Melanson Settlement, 3) Birchtown, 4) Kejimikujik National Park. Base photograph from Stare, 2016

Blomidon Provincial Park

Blomidon Provincial Park is located along the north coast of Mi'kma'kia (Nova Scotia) between the Bay of Fundy and Minas Basin. The site was chosen for both its geological features as a natural place of observation and its importance to the Mi'kmaq people as the setting for many cultural stories.

The reddish brown geography of Cape Blomidon is unique, with its cliffs rising approximately 200 meters above the Bay of Fundy and Minas Basin, making it a vantage point towering above the water and adjacent landscapes. On top of the cliffs is a forested provincial park with clearings along the eastern side yielding unobstructed views. From one of the clearings, and the selected site for the project, viewers can track the seasonal changes of the sun as it rises above the horizon, while referencing other culturally important sites, enabling viewers to orient themselves within time and space.



Mi'kmaq culturally significant site, Blomidon Provincial Park

The stories associated with Blomidon Provincial Park and the surrounding area are well documented by both past and present story tellers, such as Gerald Gloade, as well as past European ethnographers such as Leland, Hagar and Rand, as noted in the Hoffman thesis (Hoffman 1955, 241-505). The plethora of stories about the area suggest its importance, with perhaps the most important story of the area being the creation of the folk hero Glooscap.

Glooscap's Creation at Blomidon

Blomidon Provincial Park is located along the coast of Minas Basin. It is known as the place where Glooscap was created by three bolts of lightning in the sand below the cliffs of Cape Blomidon. The first bolt of lightning outlined the shape of Glooscap, the second brought him alive, and the third allowed him to move around (Gloade 2019).

Knappable Materials at Cape d'Or

Cape d'Or, located west of Blomidon along the coastline of the Bay of Fundy, is a resource site used by the Mi'kmaq. At this site, knappable geological resources could be found and shaped into tools. Above the coastline is a site known as Glooscap's garden, which was known for its traditional medicines (Gloade 2019).

Glooscap's Battle with Giant Beaver at Advocate Harbour

Advocate Harbour, also known as driftwood haven, is located west of Blomidon Provincial Park. The beach site is littered with driftwood, which, according to Mi'kmaq stories, is representative of the remnants from Glooscap's Battle with Giant Beaver, who had dammed the Bay of Fundy, creating drought and hardship for the people beyond in Minas Basin (Gloade 2019).

Resources at Arisaig Provincial Park

Arisaig Provincial Park, located east of Blomidon Provincial Park along the Northumberland Strait, was a resource site used by the Mi'kmaq. At this site, knappable geological resources could be found and shaped into tools. The geology of these rocks allowed them to be split into tools such as arrowheads (Gloade 2019).

First Peoples at Debert

Debert, located east of Blomidon Provincial Park at the tip of Minas Basin, is an important archeological site, as it was home to the first peoples of Canada more than 11,000 years ago. The archeological importance of the site is currently being jointly managed by the Mi'kmaq, provincial government, and federal government.

Glooscap and Giant Beaver at Five Islands

Five Islands is located east of Blomidon Provincial Park in Minas Basin. The story recounts another battle between Glooscap and Giant Beaver, in which Glooscap threw giant sods of mud at Giant Beaver to chase him away, resulting in the current islands. The story is one of the most well known as a result of the tourist industry. (Gloade 2019).

Heaven at Partridge Island

Partridge Island, located north of Cape Blomidon Provincial Park along the Minas Basin, is an important resource site that yielded many of the natural resources required by the Mi'kmaq for tools and ceremonial purposes. The place is marked by a natural phenomenon known as “grandmother’s cooking pot,” which is the release of air from porous rocks, yielding a concentration of bubbles. The Mi'kmaq refer to this area as *Wa'so'q*, which means heaven, suggesting the importance of the place in Mi'kmaq culture (Gloade 2019).

Resources and Settlement in Kejimkujik National Park

Kejimkujik National Park is located inland, southwest of Cape Blomidon Provincial Park. Kejimkujik is a place of importance for burial, hunting, and fishing. The complex lake and river systems of the area were used by the Mi'kmaq to navigate not only the area but also across Mi'kma'kia from the north to south coast. The importance of this place is expressed by the many petroglyphs that have been engraved into the rocks (Mi'kmaw Spirit 2016b).

Glooscap's Final Resting Place at Glooscap Mountain

Glooscap Mountain (Kelly's Mountain), located northeast of Blomidon Provincial Park in Cape Breton, is the site of Glooscap's cave, his final resting place before he left the Mi'kmaq people. Today it is known as the centre of their universe. The site is still visited by elders as a place of ceremony (Paul 2019).

Melanson Settlement (National Historic Site)

The mouth of the Annapolis River, in southwestern Nova Scotia, can be considered the place of origin for the Acadian people, with three French/Acadian national historic sites located within a 5km radius. Port Royal and Fort Anne were the first French settlements and the most contested pieces of land in North America; however, the claiming of the land had little relation to the sky. Still, the Melanson Settlement and its agricultural value embody the Acadians' relationship with the sky as a tool for agricultural understanding (Parks Canada 2017a, Parks Canada 2018).

The Melanson Settlement is recognized for its archeological value, revealing a unique agricultural dyke "aboiteau" system that enabled early Acadians to transform salt marshes into cultivatable agricultural land. This approach to agriculture is a response to the tidal conditions of the Bay of Fundy and Annapolis River, which could fluctuate by up to 25 feet. The Melanson Settlement was established in 1664 and lasted until the Acadian deportation in the middle of the 18th century. During the Melansons' inhabitation of the site, they constructed a small family village on an upland plateau that overlooked the agricultural fields and the agriculturally rich lands along the Annapolis River, visually connecting the Settlement with the expansion of Acadian agriculture towards Grand-Pré and the Annapolis Valley (Parks Canada 2017b, Parks Canada 2017c).

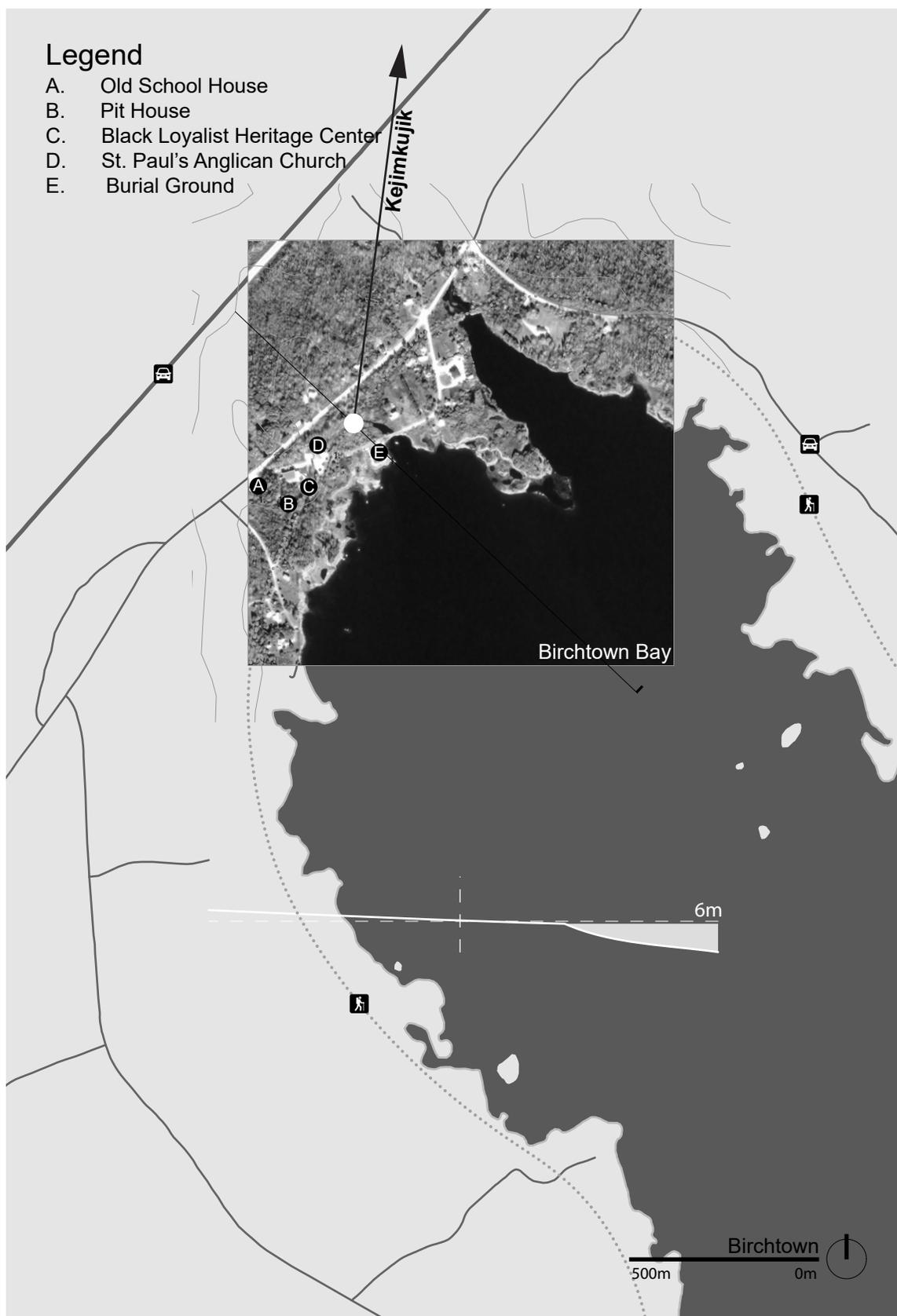


Acadian culturally significant site, Melanson settlement (National Historic Site)

Birchtown (National Historic Site)

Birchtown is generally understood as the origin point for the Black Loyalists, who were offered their freedom and land in return for their loyalty in the American Revolutionary War. After the unsuccessful war, the Black Loyalists were relocated to contemporary New Brunswick and Nova Scotia, with approximately 2500 choosing to settle in Birchtown in 1784. At the time, Birchtown was the largest settlement of freed black slaves in North America, and became a refuge for other African people fleeing slavery. Although the British offered freedom and land, the quality and amount of that land were less than expected, undermining the Black Loyalists' ability to sustain themselves, with many being forced into indentured servitude. As a result of hardship, approximately half of Birchtown's population chose to return to Sierra Leone in 1791 (Black Loyalist Heritage Centre 2019).

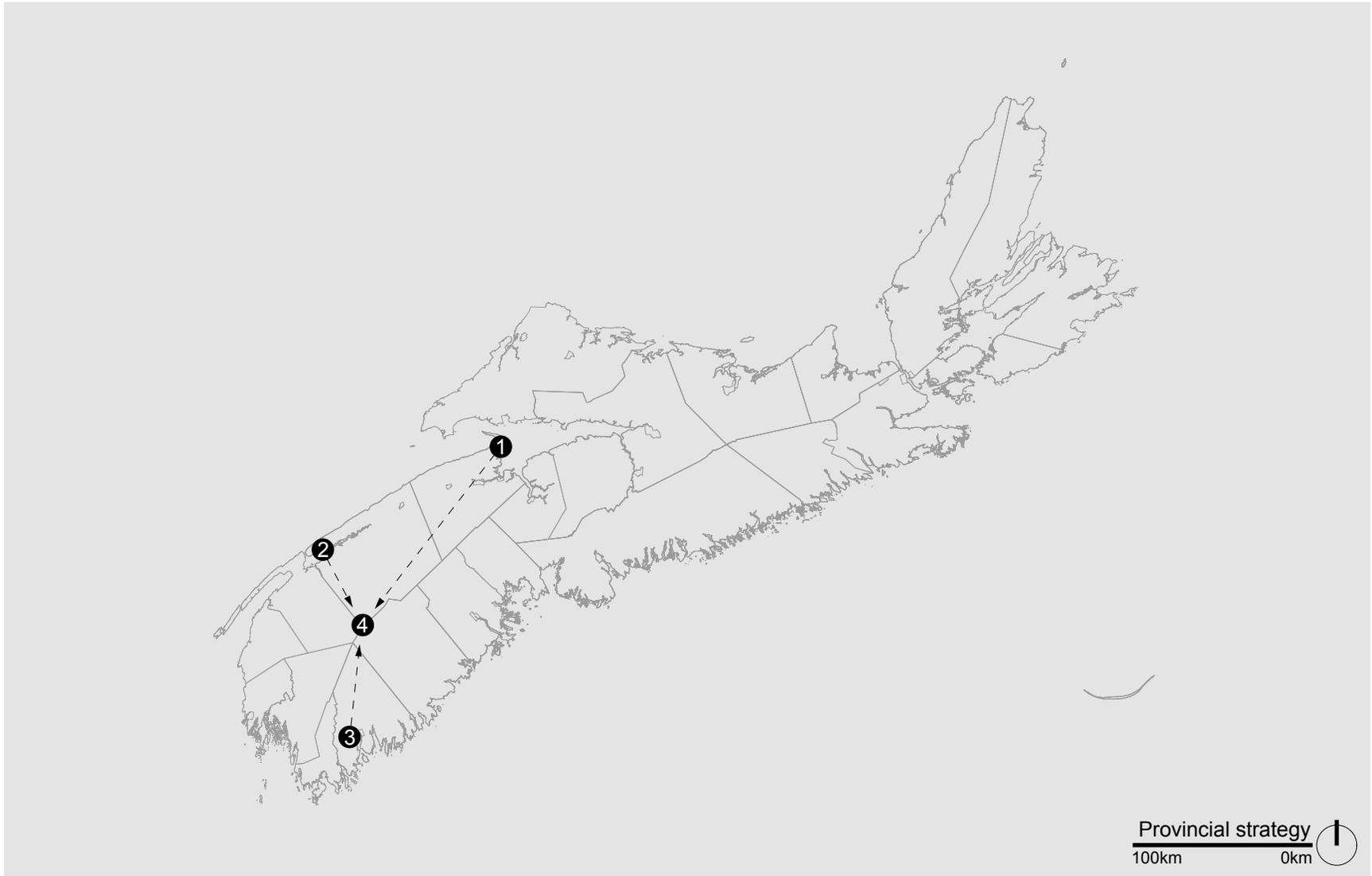
Within the town of Birchtown are four significant structures: a pit house, church, school house, and museum. The pit house is a reconstruction, but is sited on the original pit that was dug by early Black Loyalists in response to the rapidly approaching winter. The form of the pit house was used by the British military as an efficient and temporary shelter. The Black Loyalists would have witnessed this during their time in the British military. The original school house was constructed in 1785, shortly after the Black Loyalists arrived in Birchtown. The speed with which the original school house was constructed suggests the building was a priority, as they were responding to the lack of education they received as slaves in the American South. Although the current school house is not the original building, it is believed to occupy the original school's site. The church has always been an important part of African American faith, with many subscribing to either the Anglican, Methodist, or Baptist version of Christianity. Although Saint Paul's Church wasn't constructed and opened until 1906, it is still considered to be an important monument by the Black Loyalist Society, which purchased the property as a means of preservation. On May 6, 2007 the church was deconsecrated, with its baptismal font, an important part of African American culture, being donated to Christ Church in Shelburne. Today the recently constructed Black Loyalist Heritage Centre, conceived as an interpretive centre, conveys the complex history and narrative of the Black Loyalists (Black Loyalist Heritage Centre 2019).



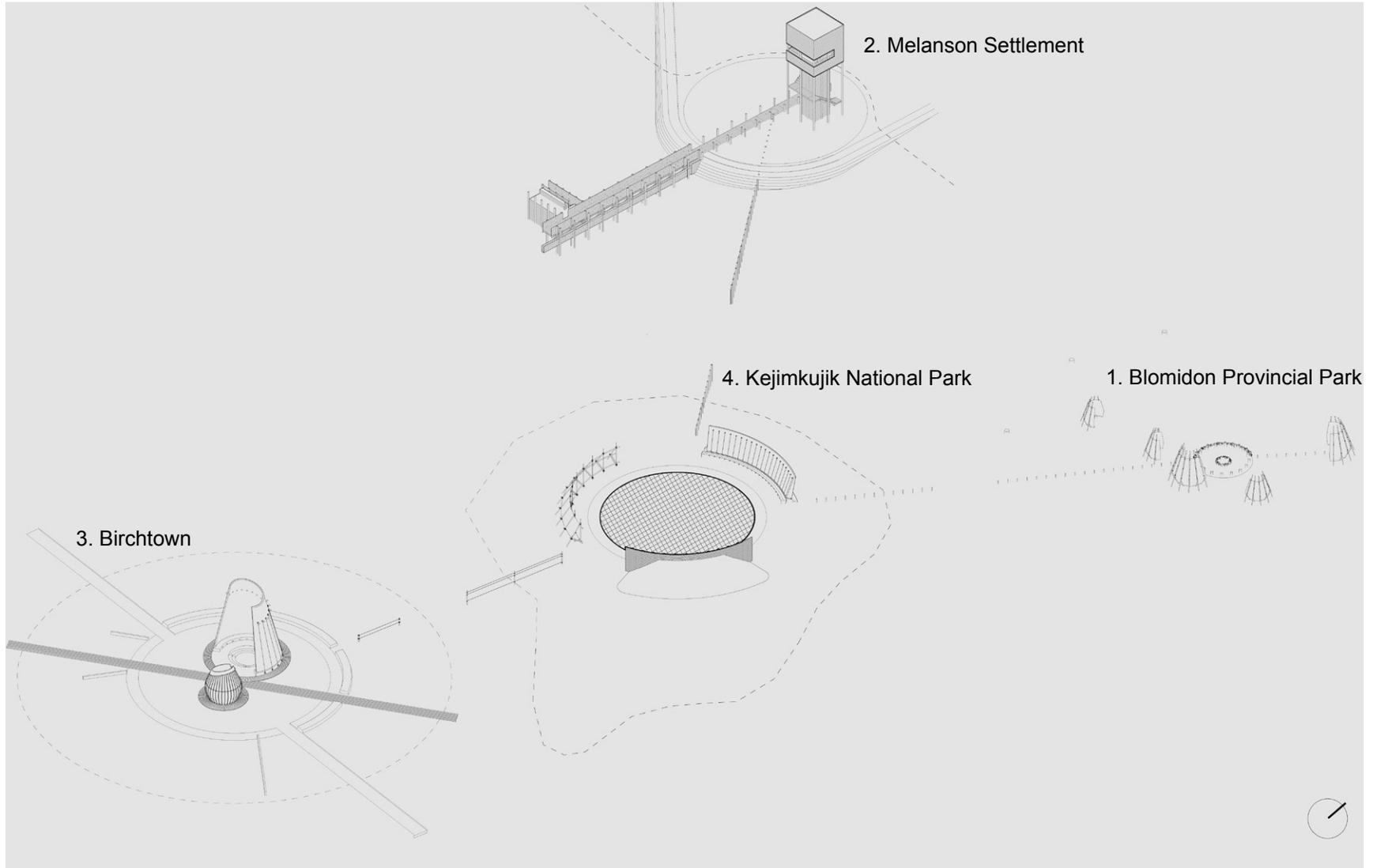
Black Loyalist culturally significant site, Birchtown (National Historic Site)

Kejimkujik National Park (Night)

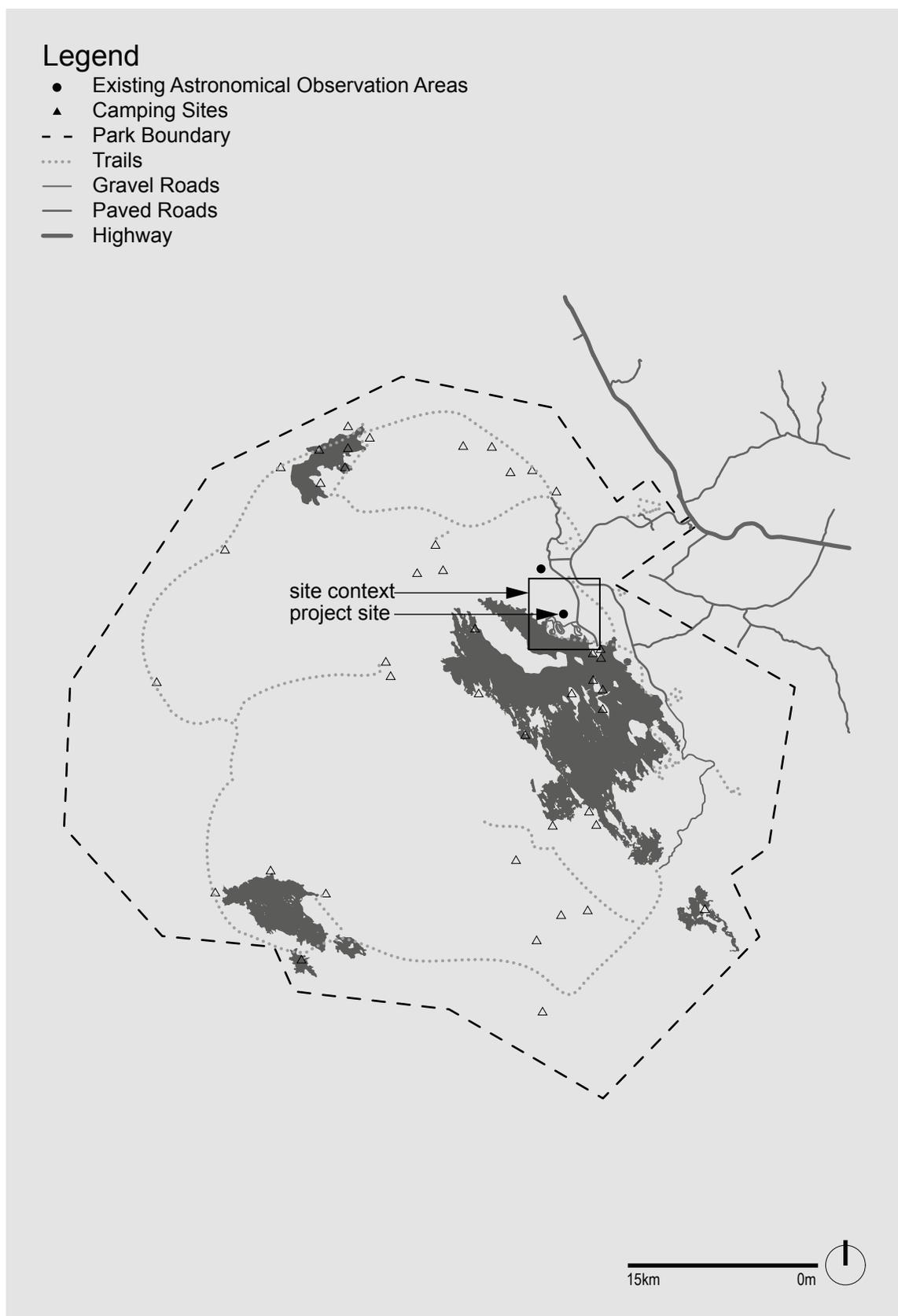
Kejimkujik National Park, as already noted, is a Dark Sky Reserve, with people from around the world coming to experience the purity of the night sky, unaffected by light pollution. For this project, the site is also a central location between the three cultural sites, offering a place for cultural sharing. The location chosen for the architectural observatory was at the existing Kejimkujik Astronomical Site A, located near Kejimkujik Lake and Jeremy's Bay Campground. The reason Astronomical Site A was chosen over Astronomical Site B is because of its relationship with the campground that ensures an evening presence during the camping season.



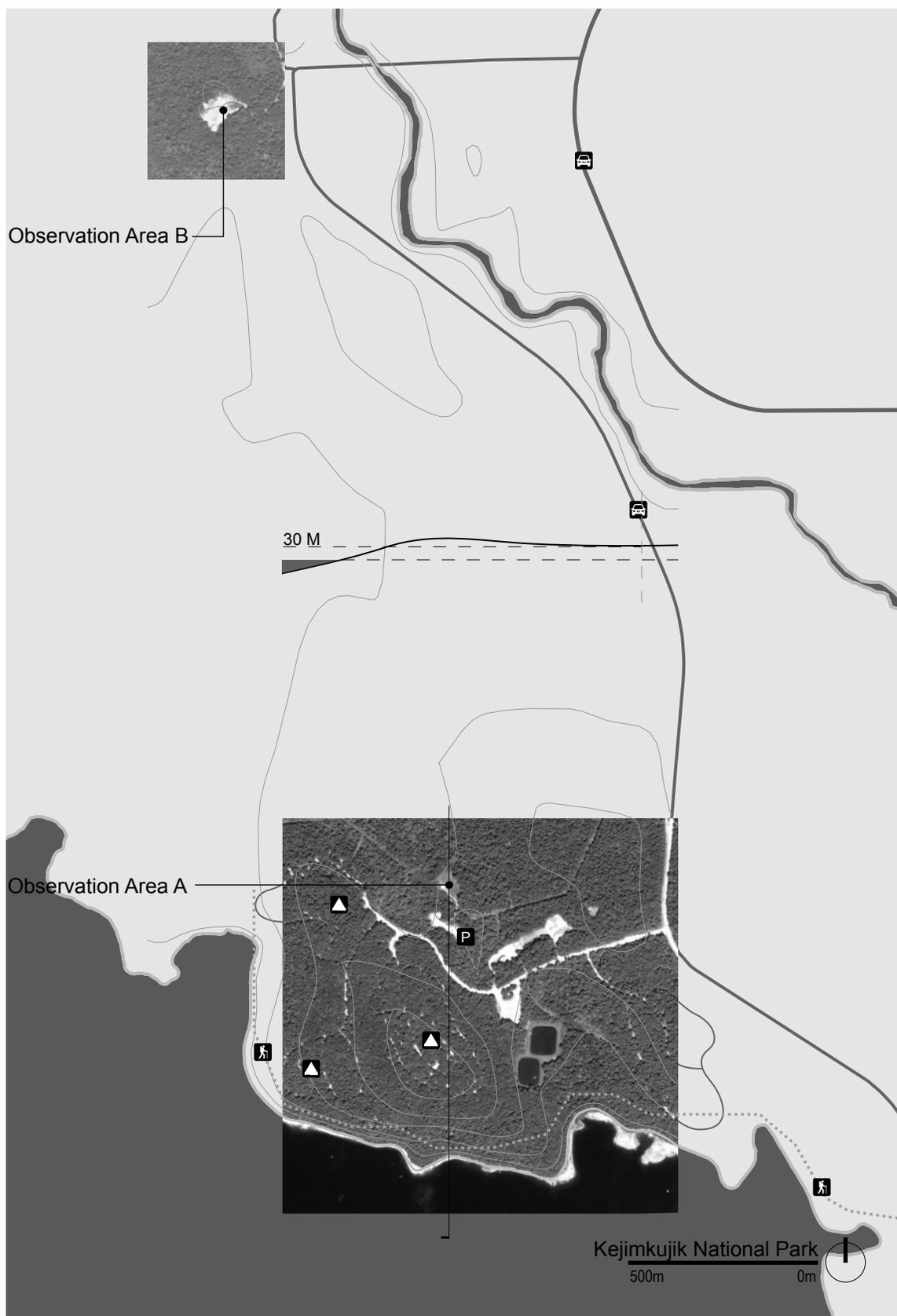
Provincial strategy: 1) Blomidon Provincial Park, 2) Melanson Settlement, 3) Birchtown, 4) Kejimikujik National Park



Provincial strategy: 1) Mi'kmaq pavilion, 2) Acadian pavilion, 3) Black Loyalist pavilion, 4) Shared dark sky pavilion



Kejimikujik National Park map, showing circulation, settlement areas and astronomical sites



Astronomical observation sites, and proposed site at observation area A

Program Strategies

Knowledge Preservation

The preservation of cultural knowledge is encouraged in this project by utilizing traditional construction methods of the Mi'kmaq, Acadians, and Black Loyalists. Making and maintaining the proposed structures would ensure generational knowledge transfer.

Public Understanding

The act of making also is a way to achieve understanding between cultures as an experienced museum, grounded in place. This contrasts most of our contemporary museums, which subscribe to a colonial approach to museology by removing artifacts from their native environment and displaying them with little contextual information, in turn devaluing them as cultural artifacts.

CHAPTER 4: DESIGN

Mi'kmaq Artifacts and Constructions

The proposed Mi'kmaq pavilions at Blomidon respond to the traditional woven basket and fish weir. These two constructed elements were chosen for their importance in Mi'kmaq culture, but also as a method of traditional knowledge retention in both the construction and maintenance of the proposed structures.

Basketry

Basketry has always been an important part of Mi'kmaq culture. Traditionally, the basket was a utilitarian container for people to carry more than their hands could hold, aiding the hunting, gathering, and nomadic activities of the Mi'kmaq people. As Europeans began settling in Mi'kma'kia (Nova Scotia), the woven basket evolved from a tool to a good, with many Acadian (French) farmers using them for harvesting. As the world evolved from an agrarian to a more industrial/global society, the woven basket became obsolete, replaced by more economical and less labour-intensive options such as plastic and metal that could be easily mass produced. This societal and economical change transformed the basket from a functional tool of necessity to an object of ornamentation, which is showcased in the work of Caroline Gould (Barnard 2011).

The construction techniques for basketry relied on knowledge transfer between generations, alongside elders. The skills of basketry include two tasks: the preparation of the material and the weaving of the basket.

The preparation of the basketry material, according to Mi'kmaq basket maker Rita Smith, began with the harvest of a straight 6-foot-high ash tree, which was then cut into small rectangular strips approximately an inch square in cross section. Next, the strip of wood was shaved smooth and pounded with a hammer against a rock, forcing the wood to split along its grain. This produced thin strips approximately 1/16" thick, which were then shaven smooth for the weaving process (CBC 2012).

The weave of a basket varies dramatically and depends on the basket's intended use, its place in time, and the creative influence of the craftsman. The traditional basket re-

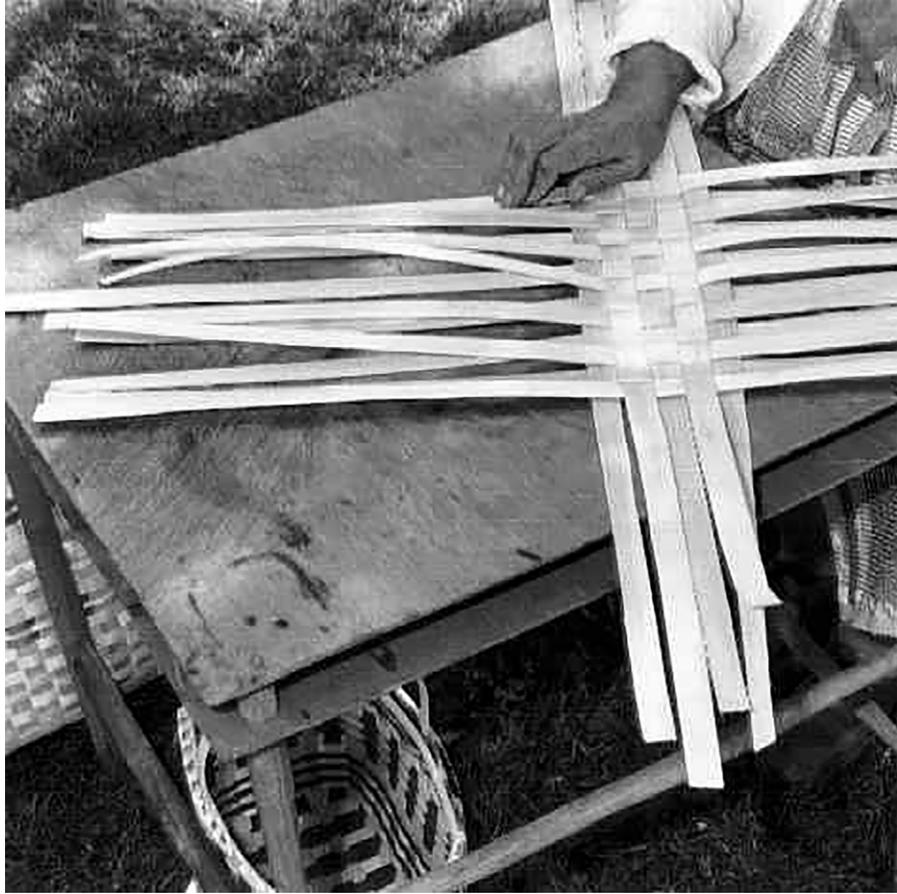
flected its functional purpose, with a simple 1 over, 1 under warp-and-weft cross-hatched pattern that allowed Mi'kmaq people to construct a basket relatively quickly. As the basket transitioned from functionality to ornamentation, "fancy baskets," as they were called by Caroline Gould, began to express the creativity of the basket maker, with the introduction of the twill weave, hexagonal weave, and braiding (Nova Scotia Museums 2019b; Barnard 2011).

Fish Weir

Fishing has always been an important part of Mi'kmaq culture, with as much as 90% of the Mi'kmaq diet coming from the sea. To capture fish the Mi'kmaq used a variety of techniques, including hooked lines, spears, and fish weirs. Although the hooked lines and spears were extremely effective, the fish weir was a design solution that enabled Mi'kmaq fisherman to catch large quantities of fish with little effort after the weir's initial construction (Mi'kmaw Spirit 2016a).

A fish weir is simply a V-shaped line of obstacles that, along with the natural current of the water, forces the fish through a narrow opening where they can be captured with a basket or a net. Weirs can be constructed of many different materials, mainly stone and wood. The type of construction depends on place and availability of materials. In Kejimikujik National Park, for instance, the Mi'kmaq relied on stones because of their abundance and availability, while other locations around Mi'kma'kia (Nova Scotia) relied on wooden posts driven into the ground (Mi'kmaw Spirit 2016a).

As shown in the following artifact images, the Mi'kmaq understanding of the natural forces in nature resulted in thoughtful and intelligent solutions to the needs of the Mi'kmaq people. The forming of materials for baskets relied on an ingenious understanding of wood grain, which would split when struck with a blunt hammer. The weave of the basket was a structural solution that relied on the distribution of force, combined with wood's natural tensile qualities to support relatively heavy items in a graceful way. The fish weirs relied on a similar understanding of the flow of a river, adding objects to narrow the stream and guide the fish to where they could be easily collected.



Mi'kmaq basket making; photo from Nova Scotia Museums 2019c



Ash splint basket; photo from Nova Scotia Museum 2019a



Caroline Gould sewing basket; photograph from Royal Collections Trust 2010



Fish/eel weir; photo from Nova Scotia Museums 2019d



Stone fish weir on the Mersey River; photo from Prosper 2002

Mi'kmaq Design Response

Mi'kmaq Architectural Experience

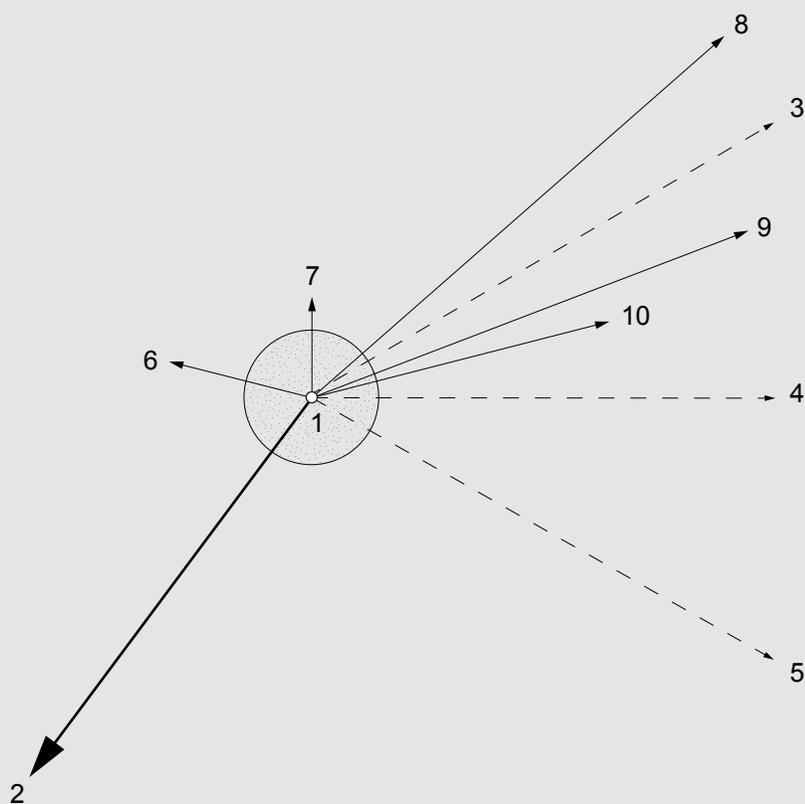
The architectural experience at Blomidon Provincial Park relies on both the architectural organization and traditional details/materials of the pavilion to orient the visitor within the cultural narrative of the Mi'kmaq people. Each proposed pavilion responds to a specific cultural story, designed to orient the elder with the cultural narrative.

Within the enclosed pavilion, people are organized according to their generational hierarchy in a circle around a central artifact plinth associated with the place-specific narrative. The story teller (elder), occupies the largest stool, aligning the story teller with the artifact, central fireplace, and place specific narrative.

Although the architectural organization, traditional details/materials and place specific artifacts suggest a specific narrative, it requires the presence of an elder to convey the engrained cultural narratives, augmenting the museological quality of the space. To make the engrained traditional knowledge more accessible to not only the Mi'kmaq but other visiting cultures, the architecture will rely on text engrained within the architecture, much like a plaque to convey the story associated with the artifact and architectural alignments.

Legend

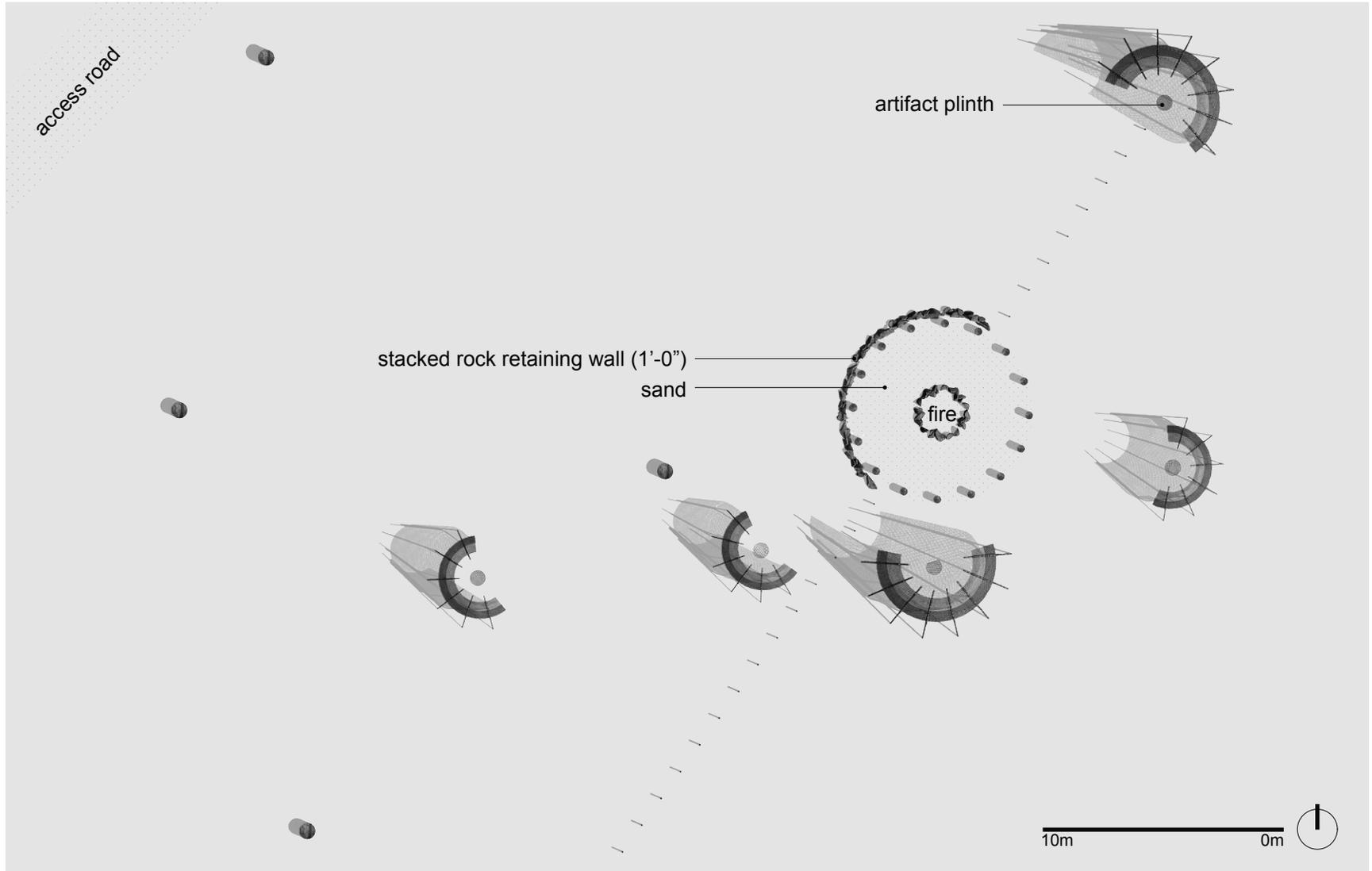
1. Blomidon Provincial Park (creation of Glooscap)
2. Kejimikujik National Park (communal dark sky area)
3. Summer solstice at sun rise
4. Spring + fall equinox
5. Winter solstice at sun rise
6. Cape d'Or + Advocate Harbour (resource and narrative site)
7. Partridge Island (resource site known as Wa'so'q or Heaven)
8. Five Islands (Glooscape vs Giant Beaver)
9. Debert (First People archeological site)
10. Glooscap Mountain, Cape Breton (final resting place)



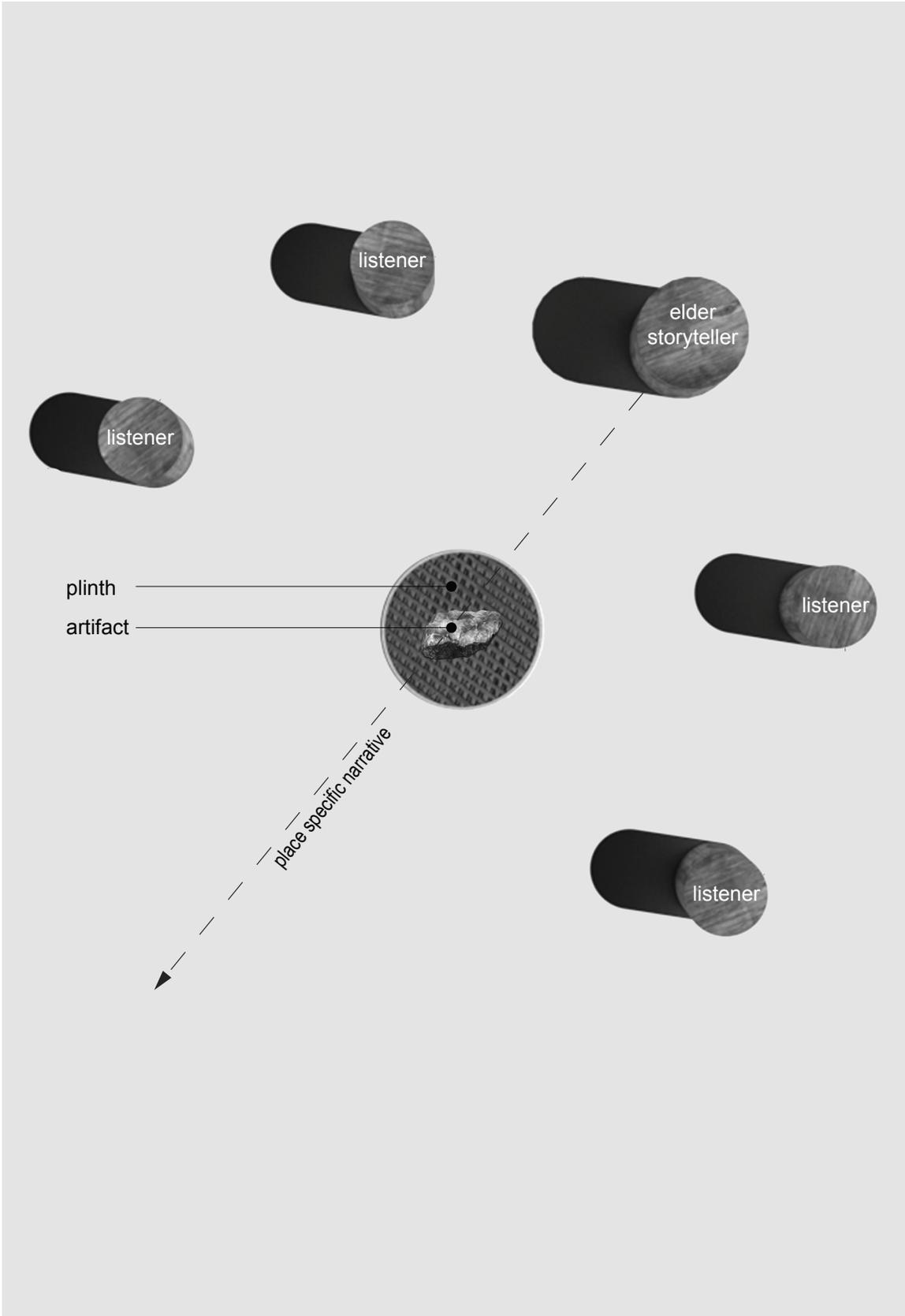
Mi'kmaq place specific narratives from Blomidon Provincial Park



Blomidon eastern perspective, view overlooking Minas Basin (towards sunrise)



Mi'kmaq story telling pavilion plan



Mi'kmaq hierarchical seating within storytelling pavilion



Blomidon perspective, view from Kejmkujik story pavilion

Acadian Artifacts and Construction

The proposed Acadian pavilions respond to the aboiteau dyking system, which was used to reclaim low lying agricultural land from the extreme tidal fluctuations of the Bay of Fundy and the Annapolis River. By embracing traditional construction techniques, the proposed project will retain the traditional knowledge and techniques of early Acadian farmers.

The aboiteau dyking system created earthworks by embedding a wood structure and applying a sod exterior. The embedded wood structure acted as an anchoring system, with vertical posts being driven into the ground. Behind the vertical wood post, horizontal cross members were installed perpendicularly, creating a retaining structure for the earth. Without this structure, the earth would be vulnerable to degradation over time, eroded by the extreme tides of the Bay of Fundy and Annapolis River. The aboiteau was finished with sod (grass) to further prevent erosion, relying on the roots of the sod to help stabilize the earth.

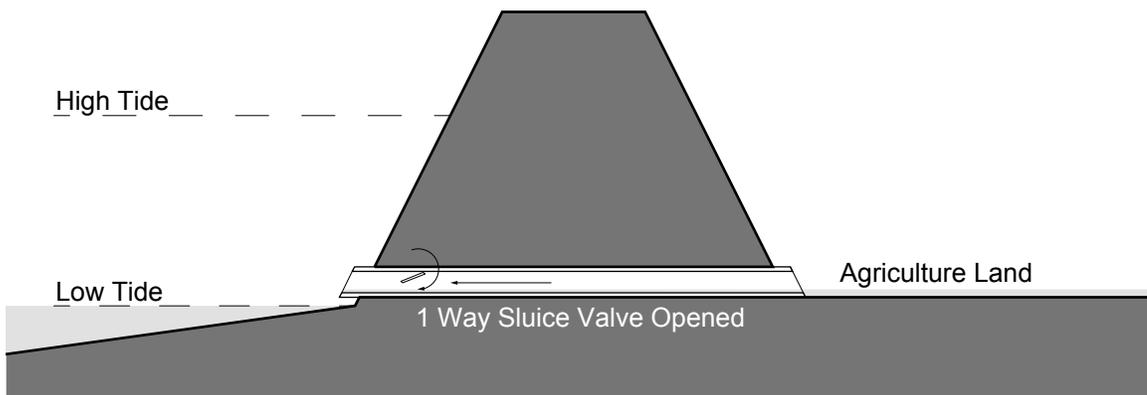
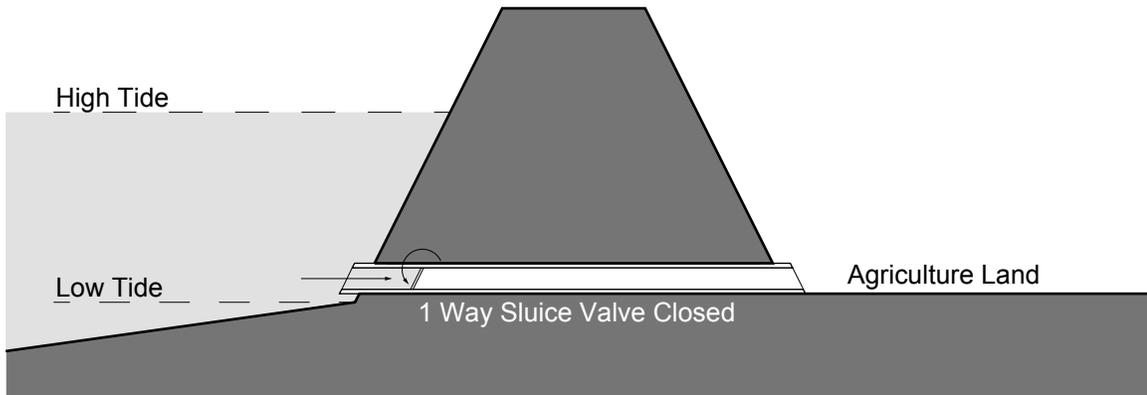
Together, the sluice and valve allow water to drain from the reclaimed agricultural land. The sluice was a wood channel, originally carved from a log. Within the sluice channel, a one-way valve was installed to close automatically at high tide, preventing salt water from entering the agricultural land. At low tide, any water behind the dyke would drain out through the one-way valve. What makes these constructed elements of the landscape successful is their response to gravity and the natural forces of the water.



Aboiteau; photo from The landscape of Grand Pré 2019



Agricultural dyke land artwork; photo from Parks Canada 2017c



Aboiteau cross sectional detail

Acadian Design Response

Acadian Architectural Experience

The experience at the Melanson Settlement, like the Mi'kmaq site, relies on the architectural organization and traditional details/materials to orient the viewer within the place-specific cultural narratives of the Acadian people. The pavilion relies on the relationship between water and land, transforming an existing walking path, with traditional dyke technologies into a reservoir for the historical agricultural fields below.

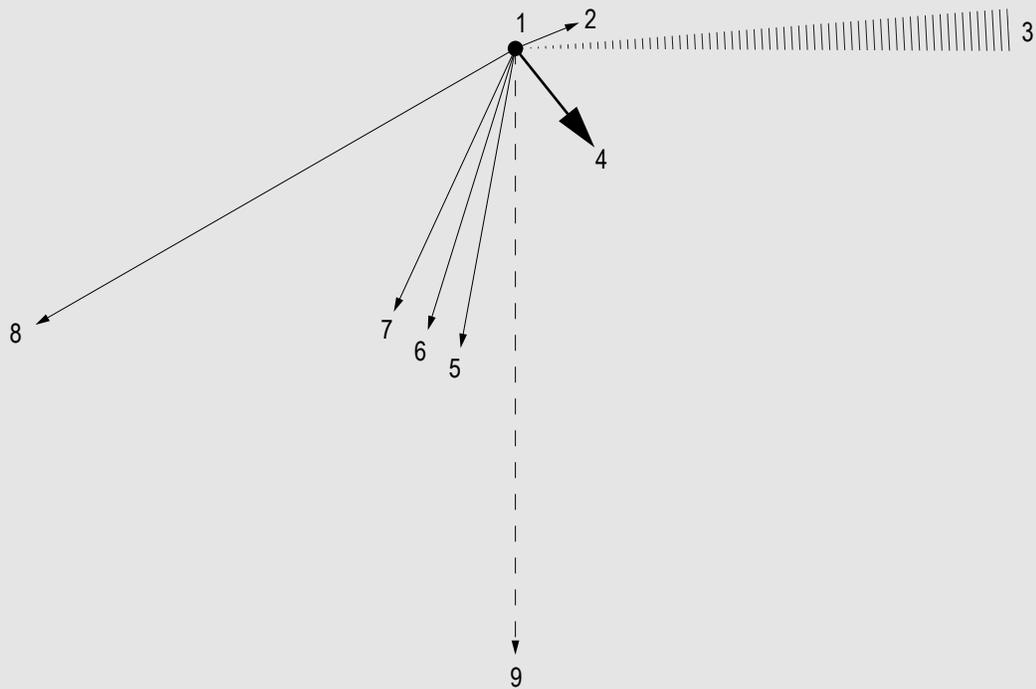
Connecting the reservoir with the historical fields is a long, traditionally constructed boardwalk that orients the visitor with the reclaimed agricultural fields used by the Melanson family, and the Annapolis River along which many Acadians settled. The boardwalk is also used to transport water to the fields below.

At the centre of the circular reservoir, a traditionally constructed wood tower connects visitors with the historical narrative of the Acadians'. The tower highlights the Acadians' origins from France, settlement in Nova Scotia, and escape from Nova Scotia after the British expulsion to places such as New Brunswick and Louisiana.

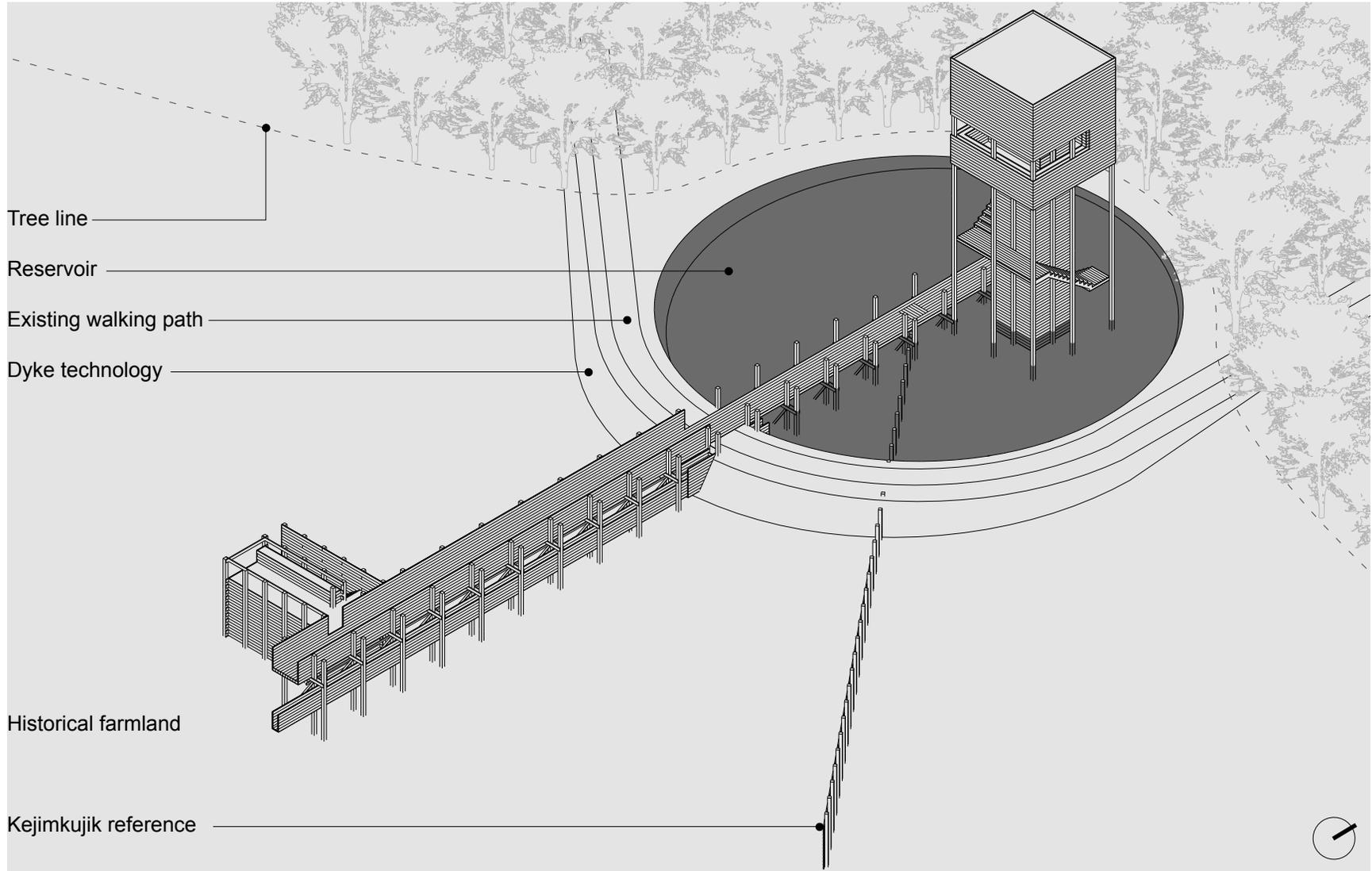
Although the architectural organization and traditional details/materials suggest a specific narrative, it requires the presence of an elder to convey the engrained cultural narratives, augmenting the museological quality of the space. To make the engrained traditional knowledge more accessible to not only the Acadians but other visiting cultures, the architecture relies on text engrained within the architecture to tell the story associated with the architectural alignments.

Legend

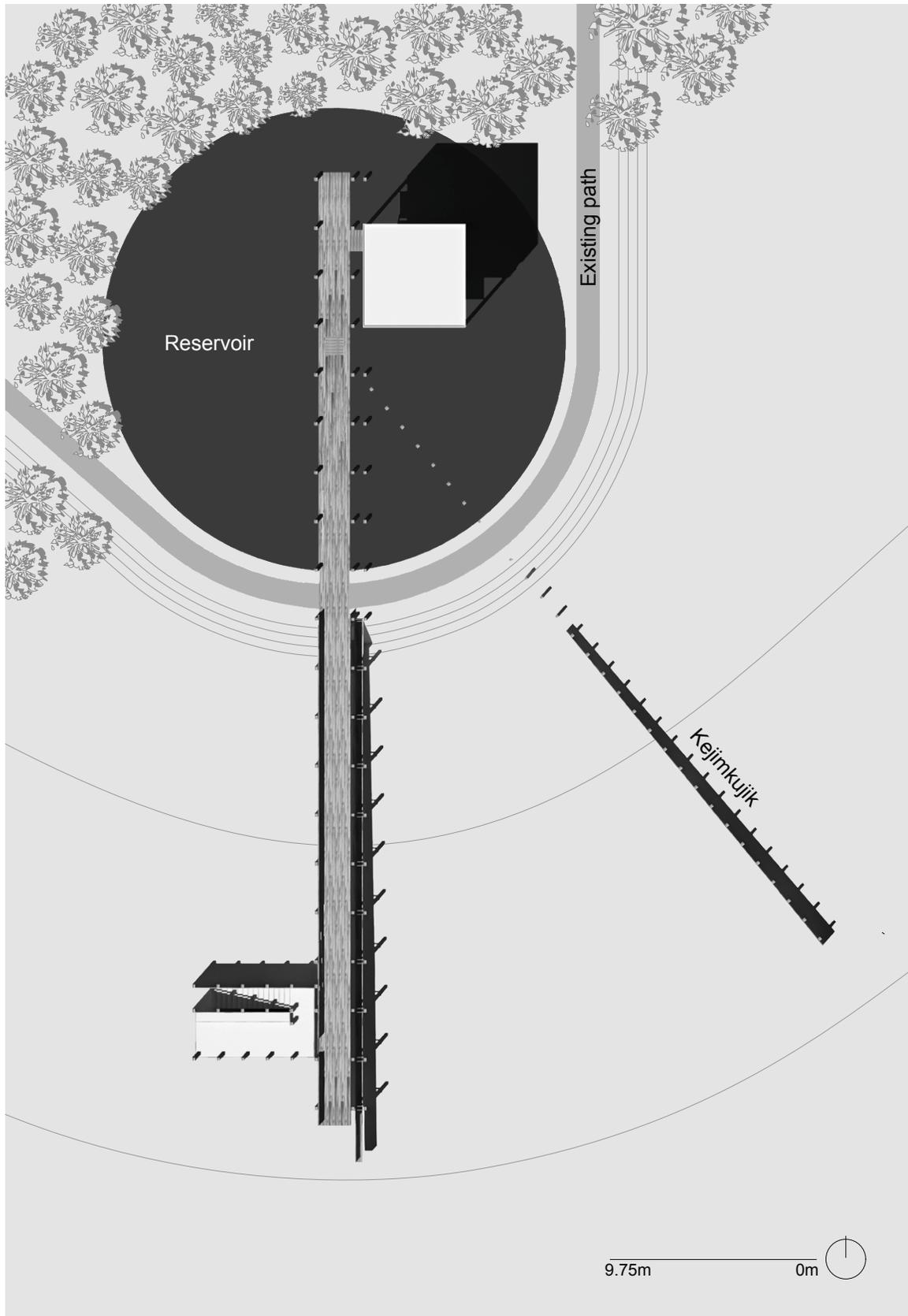
1. Melanson Settlement, Nova Scotia
2. Grand Pré, Nova Scotia
3. France
4. Kejimikujik National Park, Nova Scotia
5. Pubnico, Nova Scotia
6. Wedgeport, Nova Scotia
7. Yarmouth, Nova Scotia
8. Louisiana, United States of America
9. Solar Meridian



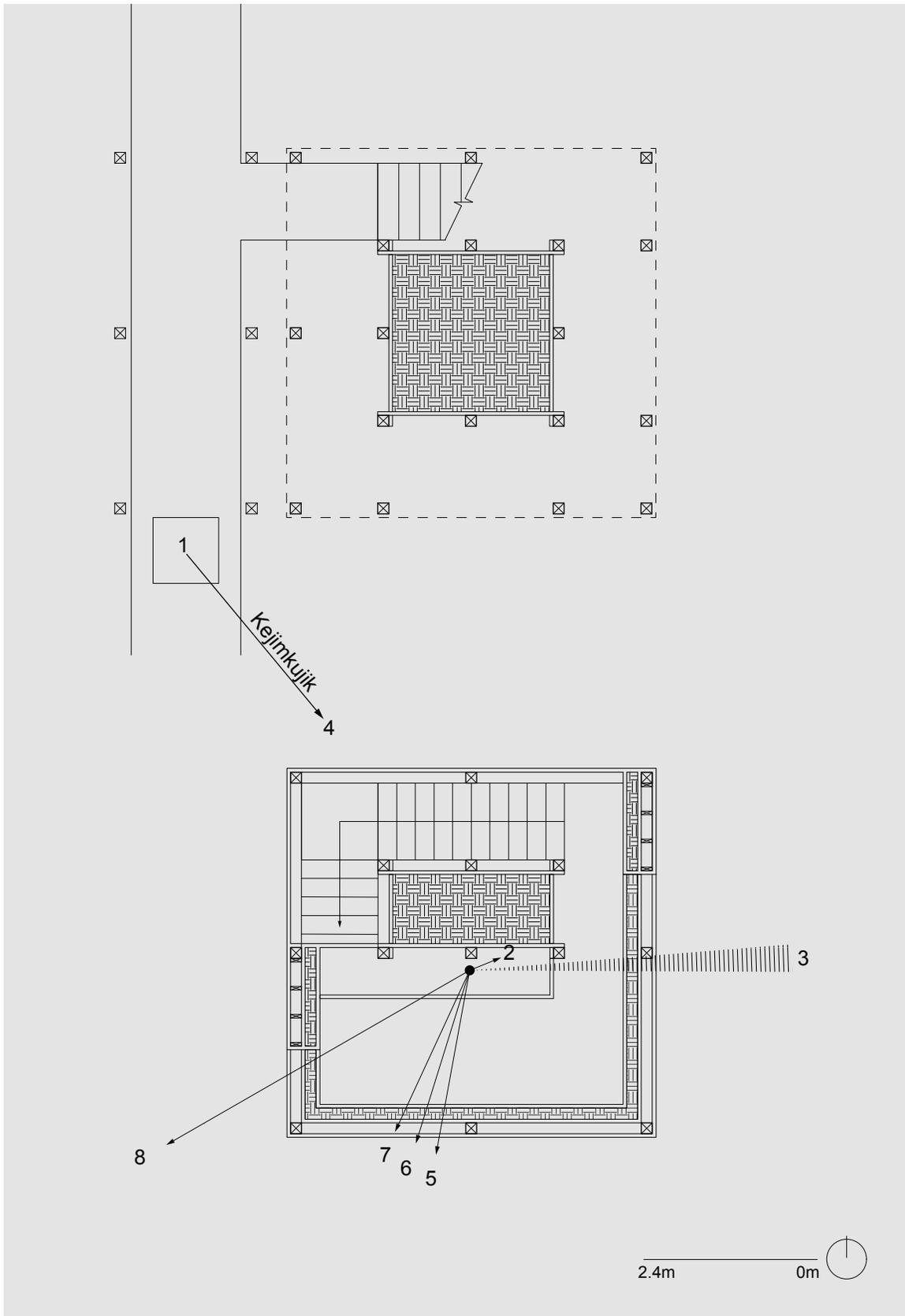
Acadian place-specific narratives from Melanson Settlement



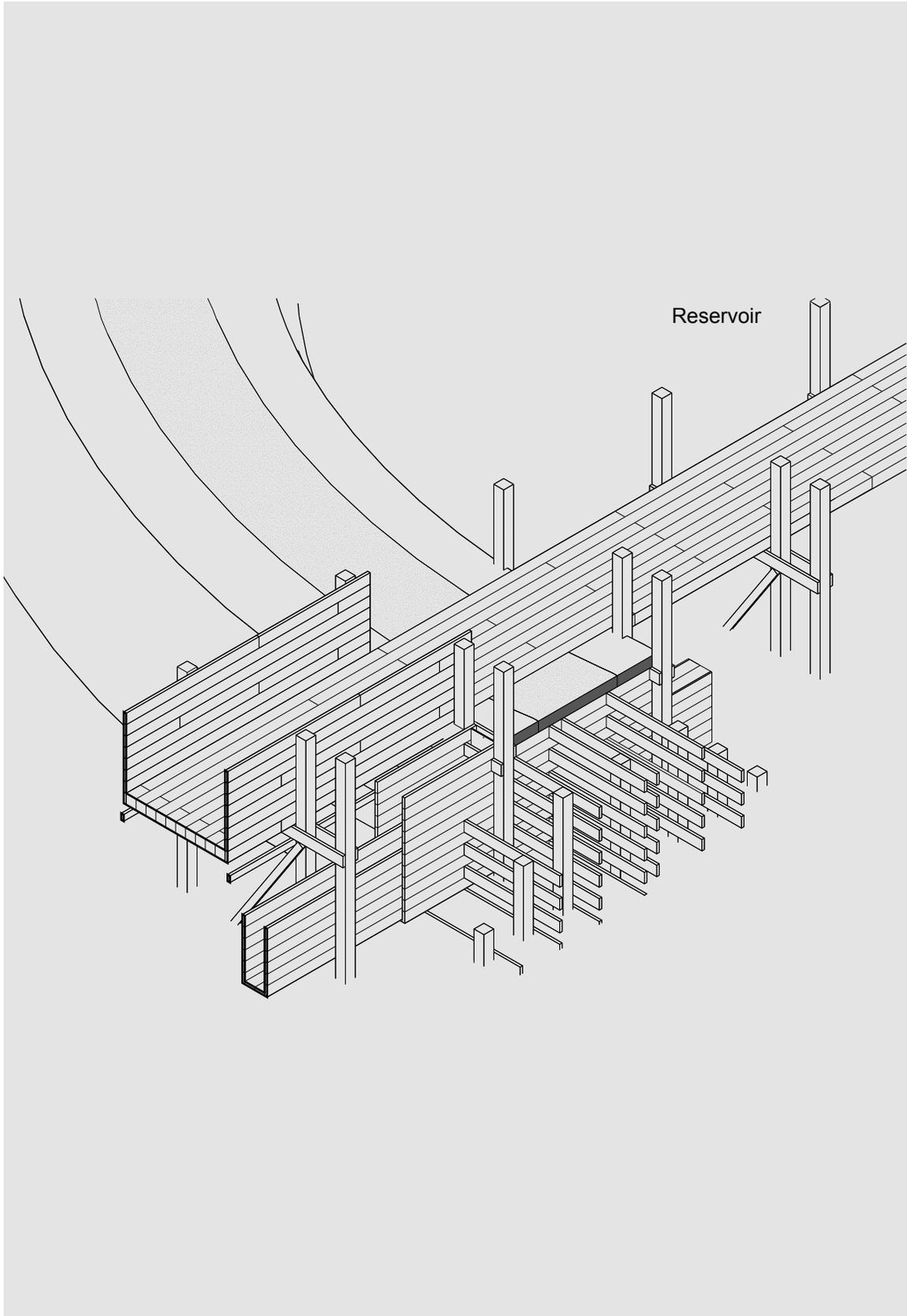
Axonometric view of Acadian pavilion



Acadian pavilion plan



Entrance tower plan (top), Lookout tower plan (bottom)



Dyke and walkway construction



Acadian pavilion perspective: walkway to the historical agricultural fields and Annapolis River



Acadian pavilion perspective: approach



Acadian northern perspective: towards observation tower

Black Loyalist Artifacts and Construction

As an important part of African culture, music was used for knowledge transfer and symbolism by many African Americans during slavery, with many relying on spirituals, call and response, and lyrics to convey information.

Spirituals are esoteric religious songs, designed to hide information from white slave masters. Many of these spirituals were used to guide people of African descent from slavery along what became known as the Underground Railroad.

Call and response was used by enslaved Africans to communicate simple messages such as the end of a work day, attract the attention of a girl, signal hunting dogs, and announce one's presence. The rhythm associated with call and response draws strong parallels to traditional African drumming techniques, which were often accompanied with bodily percussion known as "patting juba," in which a person would tap their toe, slap their thighs, or clap their hands (National Park Service, US Department of the Interior 2019).

Instruments

Instruments such as the drum and the banjo have always been an important part of African culture, expressing social, spiritual, and ethno-anthropological traditions. Many African cultures believe that the voices of their ancestors reverberate through drumming, linking the past and present through music. As people of West African descent disembarked in North America, drumming was outlawed by many slave owners, resulting in a disconnection from cultural traditions. As the people of African descent began to revolt against slavery, the drum transitioned from a simple instrument to a powerful symbol of freedom, with many drumming to celebrate their freedom from the Confederates, as explained by Cudjo Lewis, "After dey free us, you understand me, we so glad, we makee de drum and beat it lak in de Affica soil" (United Nations 2009).

The Banjo is a 4, 5, or 6-stringed instrument that relies on a thin resonating membrane stretched over a rigid frame to achieve a twangy sound. Although we generally associate the banjo with contemporary folk, rock, or country music, its origins are strongly associated with the African community. The banjo was brought to North America by enslaved Africans, probably originating in Senegal and/or Gambia in West Africa (National Park

Service, US Department of the Interior 2019). Traditionally, the banjo was constructed from a gourd and served as a social tool of gathering. The importance of music and song in African American cultures was critical for communication. The artifacts associated with this culture of music became an inspiration for the proposed design. Architectural themes associated with African-inspired instruments include tension, ribbing, and carving.



Kora, bafalon, and drum collage. The traditional west African kora is one of the earliest ancestors of the North American banjo, with similar sonic qualities.



Traditional djembe; photo from Gruber, Santler, and Schmid 2003



Traditional djembe; photo from Adhianto 2018



John Rose, *The Old Plantation* (1785-1790); from Gibbes Museum of Art 2019

Black Loyalist Design Response

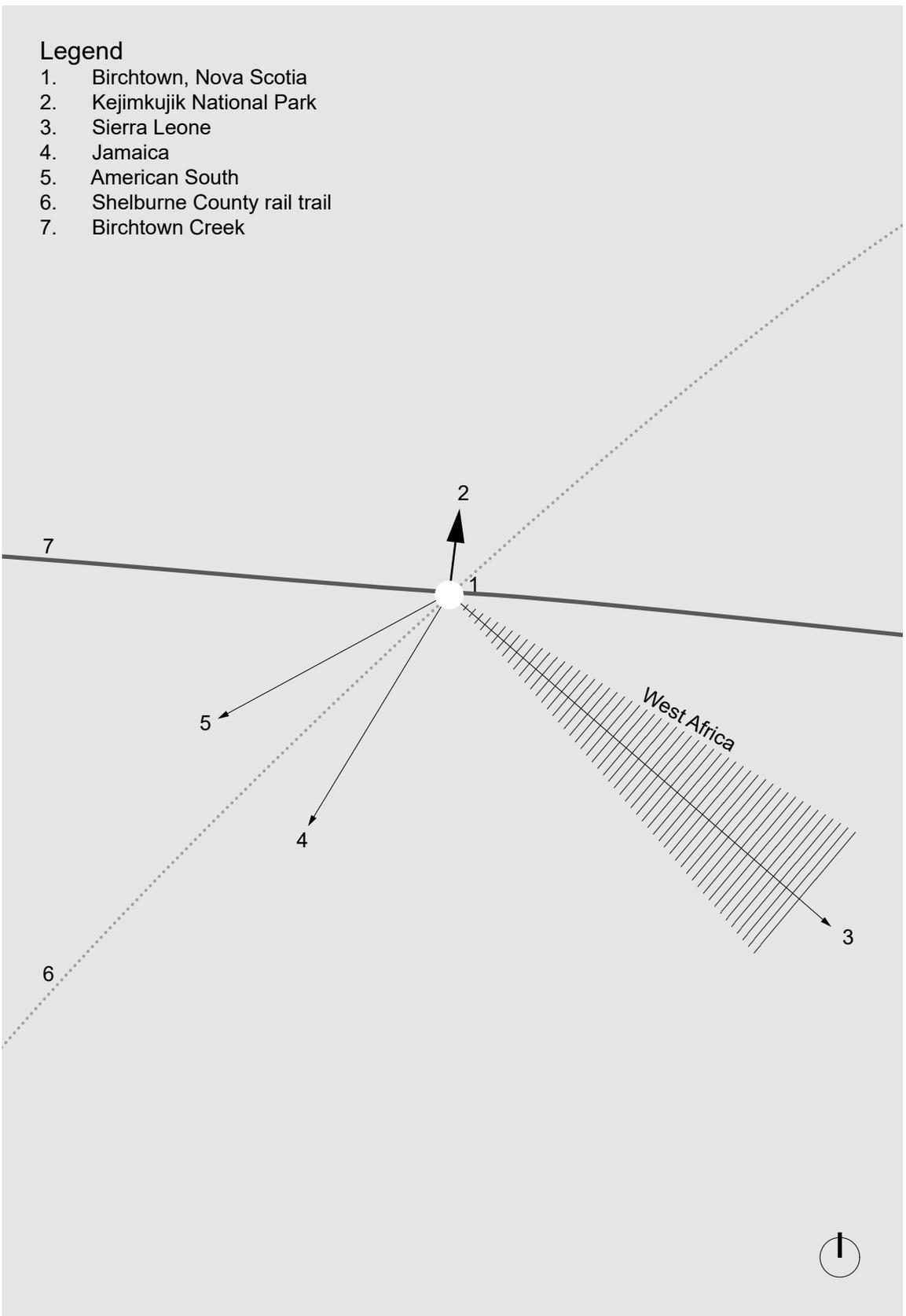
Black Loyalist Architectural Experience

The experience at the proposed Black Loyalist pavilion in Birchtown relies on the architectural organization, traditional details and materials to orient the visitor within the place-specific cultural narratives of the Black Loyalists. The pavilion relies on music and traditional music technologies to connect Black Loyalist descendants and other visitors with the cultural narrative of the Black Loyalist people.

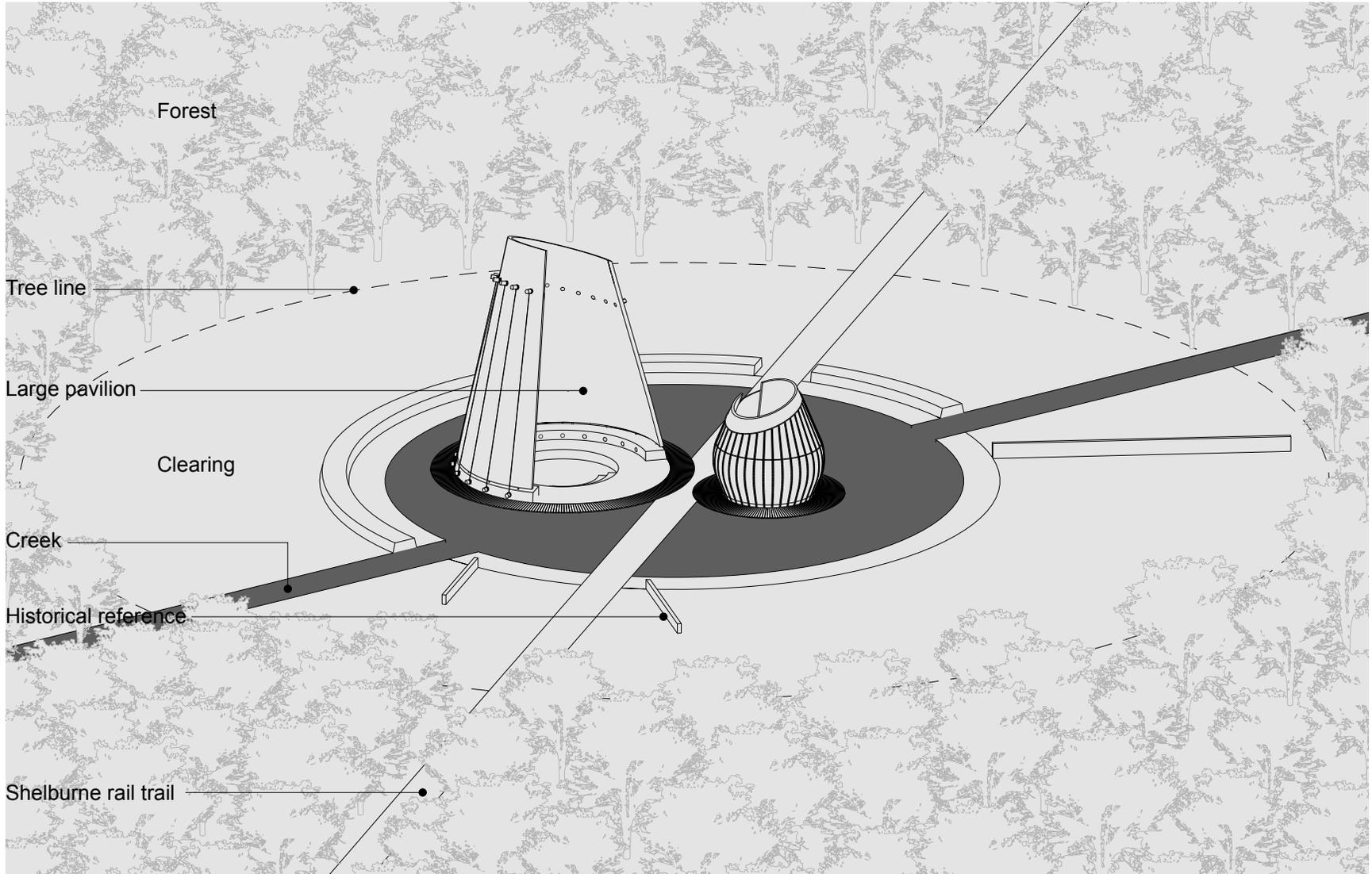
The project is sited at the intersection of the Shelburne County rail trail and the Birchtown Creek in a clearing in the forest. The approach to the site through the forest responds to early enslaved Africans' journey into the forest to what is known as a brush or hush arbour, used by enslaved Africans as a place of knowledge transfer. The intersection with the Birchtown Creek responds to the importance of water within African culture that was used in spiritual ceremonies and the making of instruments.

The two offset pavilions respond to the specific place. The larger one responds to places within the cultural narrative of the Black Loyalists, highlighting Africa's west coast, Sierra Leone, the American South and Jamaica, as an experienced historical timeline. The second pavilion, designed to be dark, responds to the Kejimkujik site and the dark sky narrative of the Black Loyalists.

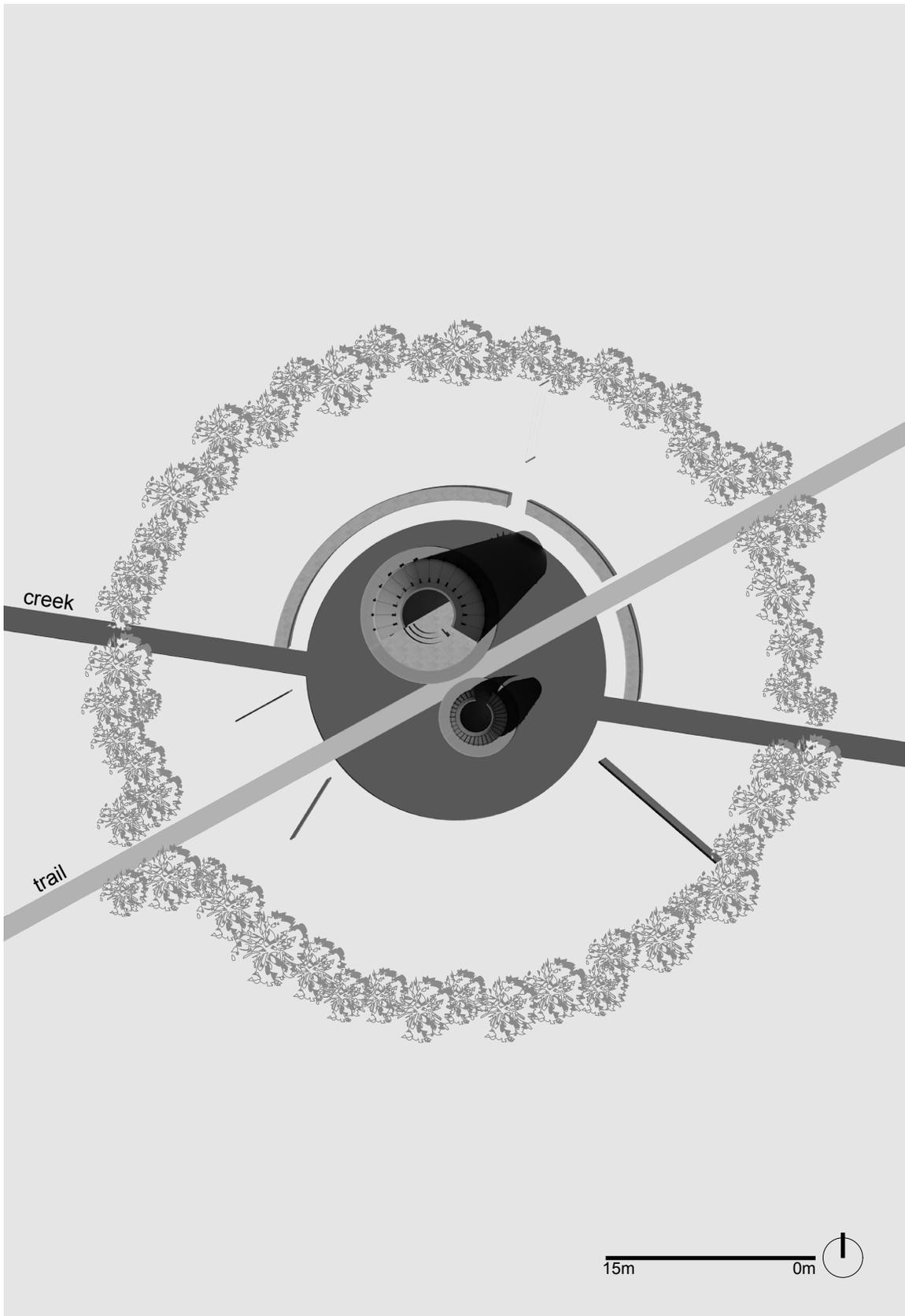
Although the architectural organization, traditional details and materials of the pavilion suggest the musical narrative of the Black Loyalists, it requires the presence of an elder to convey the engrained knowledge, augmenting the museological quality of the space. To make the engrained traditional knowledge more accessible to not only the Black Loyalists but other visiting cultures, the architecture will rely on text engrained within the architecture to tell the stories of place and the alignments.



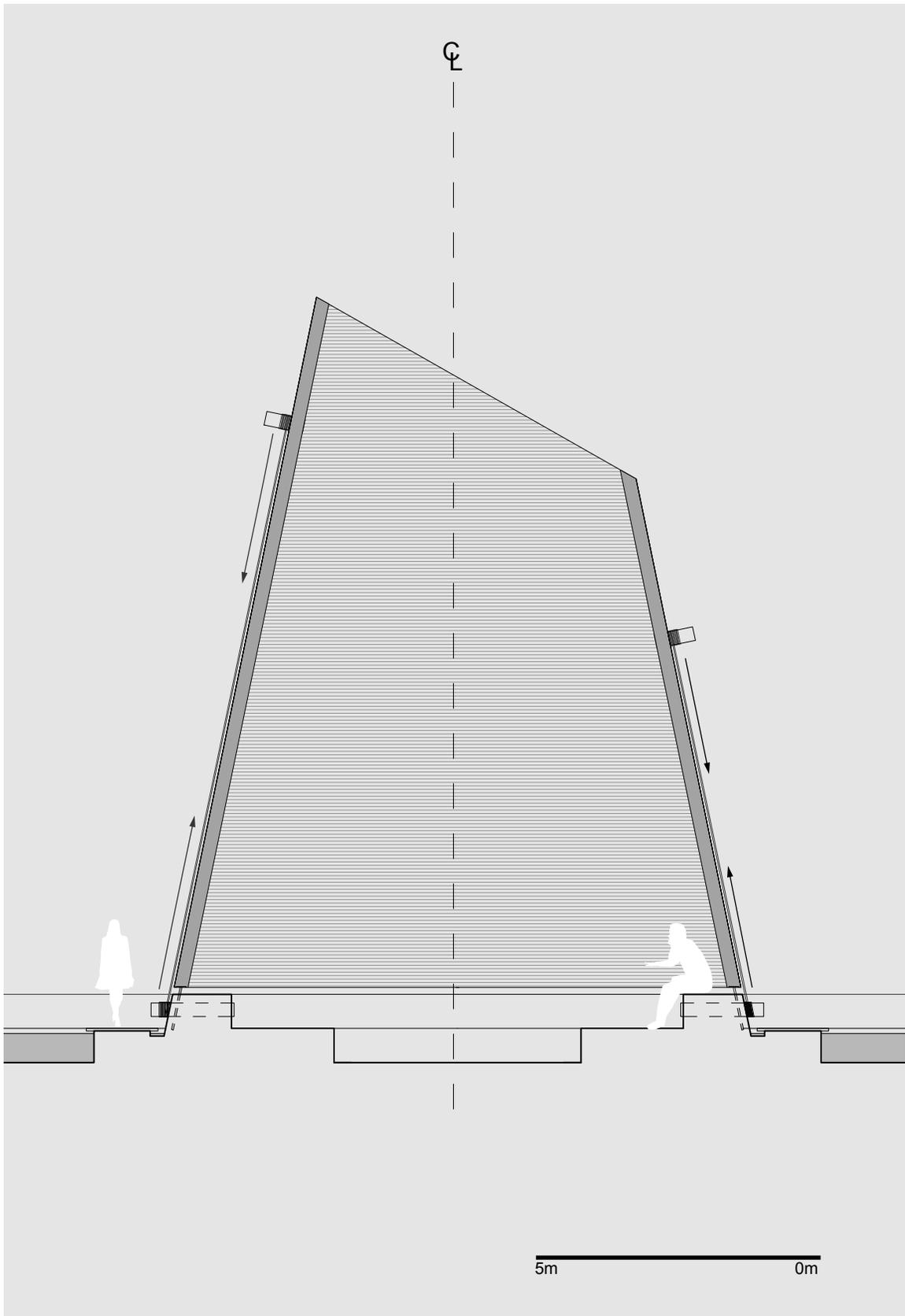
Black Loyalist place-specific narratives from Birchtown, Nova Scotia



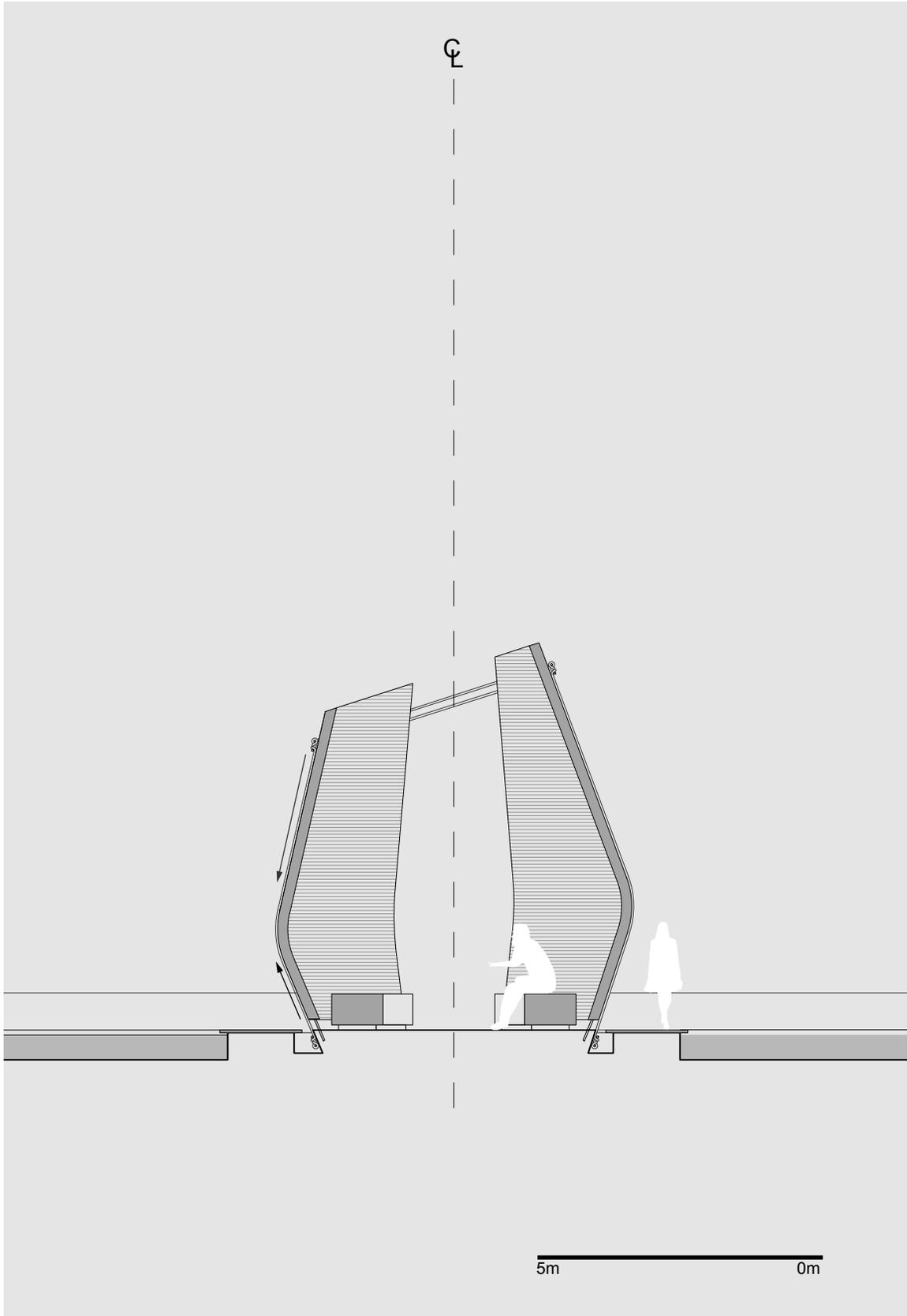
Axonometric view of Black Loyalist pavilion



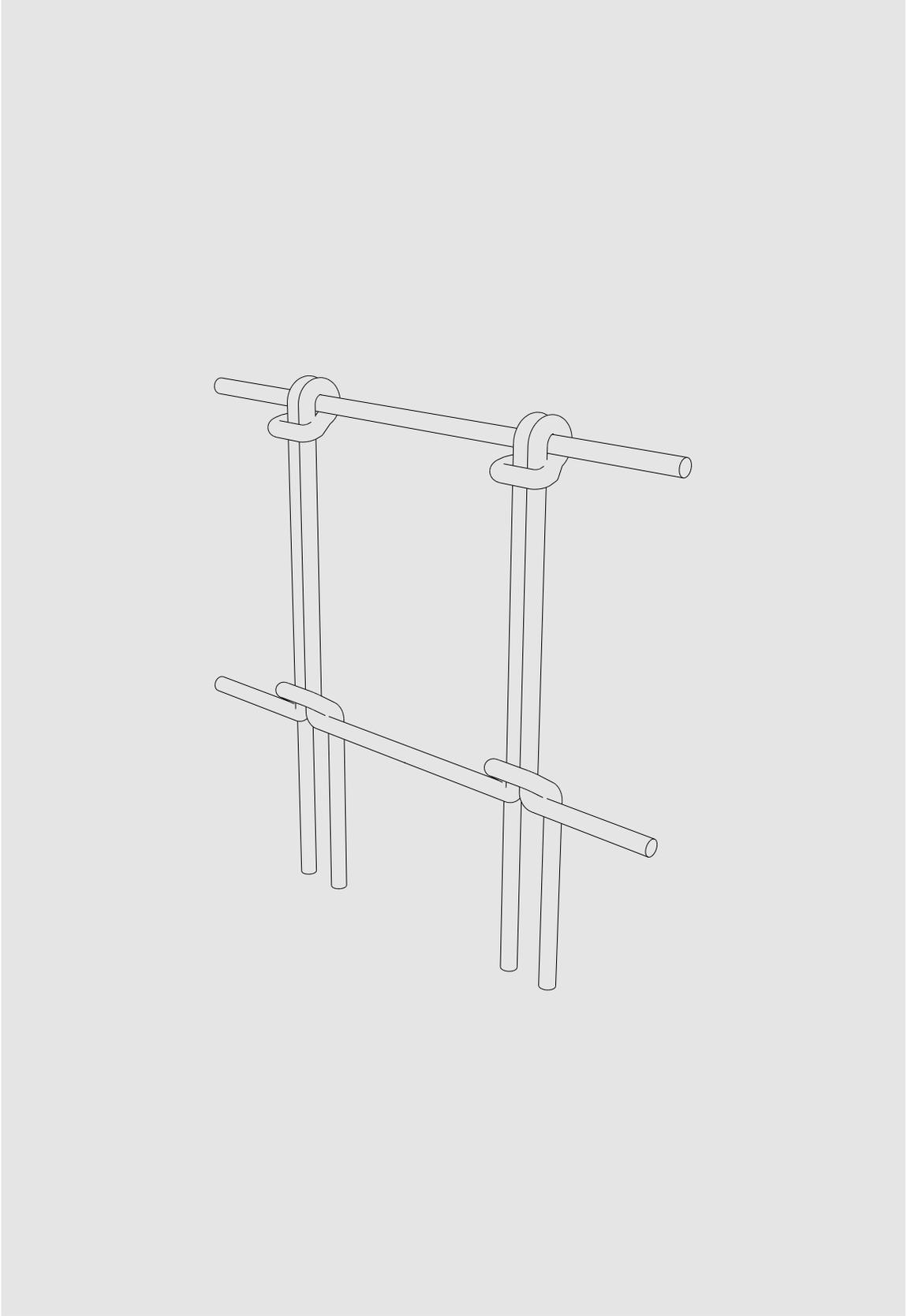
Black Loyalist plan, intersection of Birchtown Creek and Shelburne County rail trail



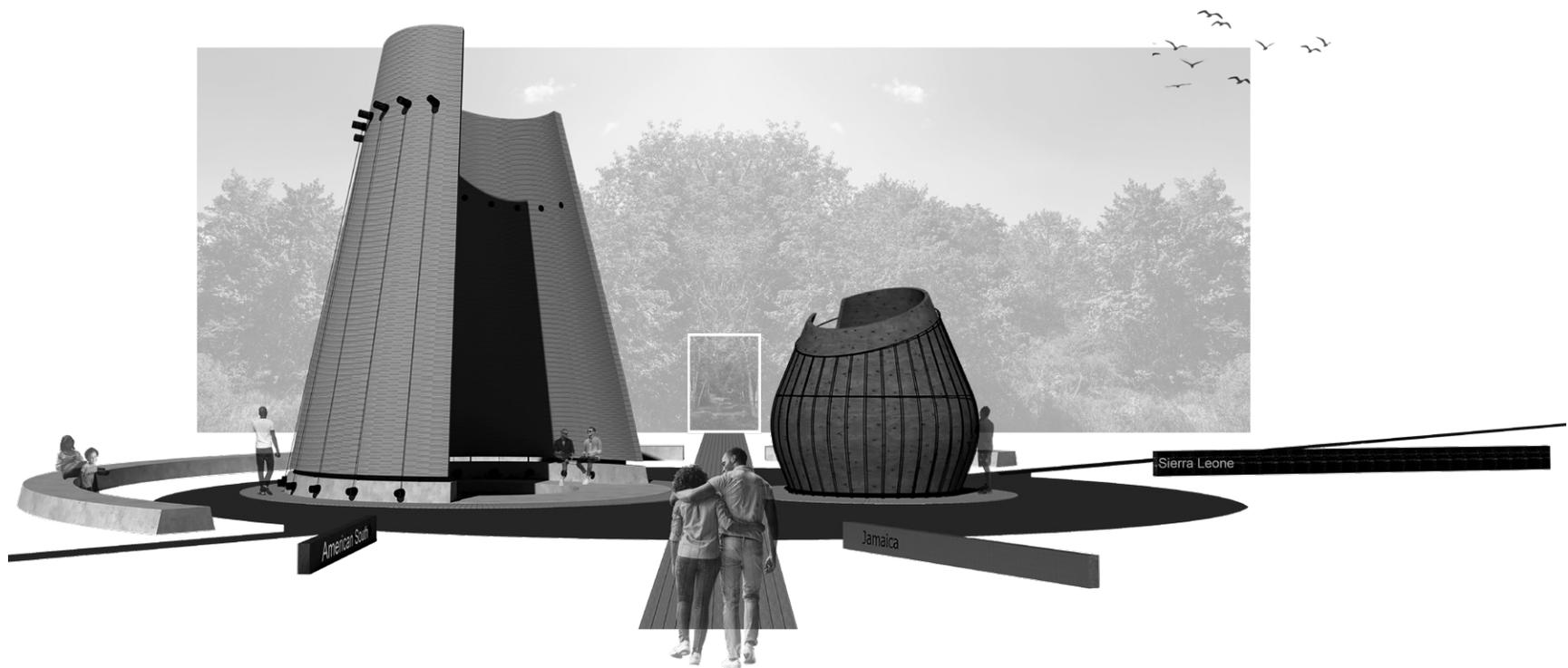
Black Loyalist large pavilion section, showing dowels and tension ropes as structure



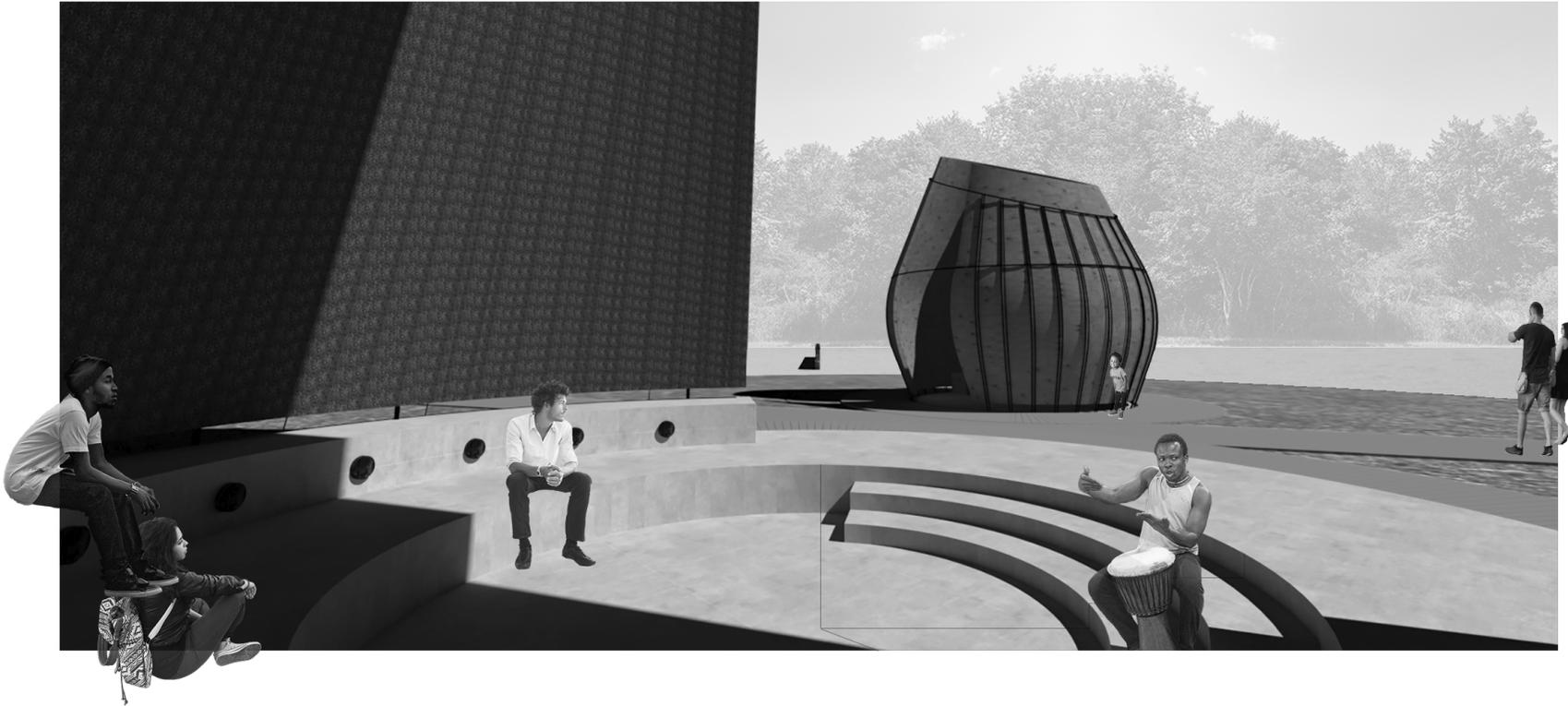
Black Loyalist small pavilion section, showing form as structural anchor



Black Loyalist small pavilion: tensile rope detail



Black Loyalist pavilion perspective: approach from the south/west (Birchtown)



Black Loyalist pavilion perspective: historical experience



Black Loyalist pavilion perspective: orientation to Kejimkujik (dark sky pavilion)

Kejimkujik as Collective

The Kejimkujik site was designed as a collective site. Its location responds to not only the Kejimkujik dark sky preserve, but also its central location, which can symbolize something shared instead of something owned.

The eclectic design of the Kejimkujik sky pavilion responds to the ethnographic research of each culture. Although three cultures are represented in this project, it is expected that others could occupy the space in a similar way.

The design response was conceived in two parts. The first is a central and archetypal space shared by all cultures. The second part is the three cultural pavilions that orbit the central space and refer to their coastal pavilions.

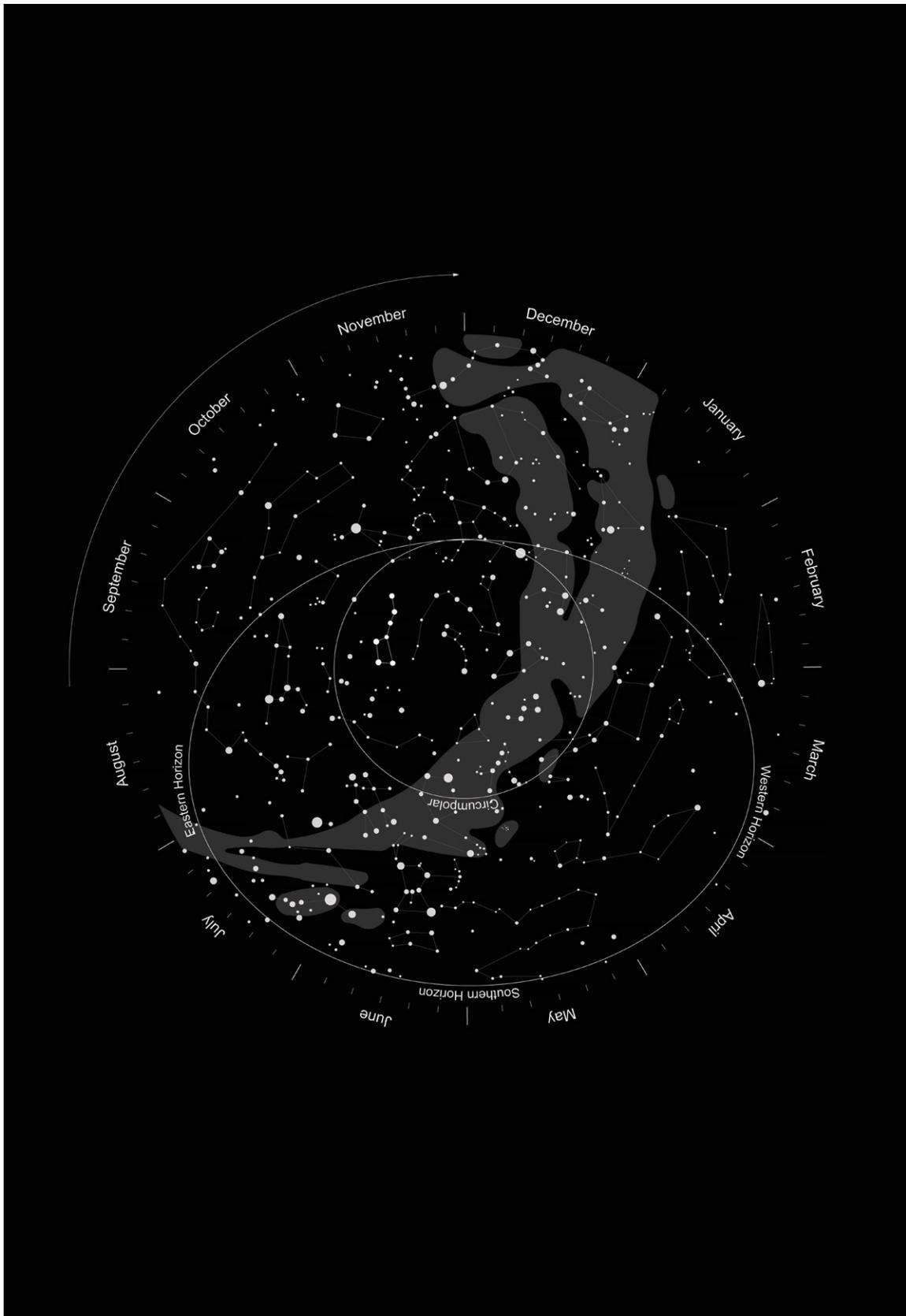
The archetypal central object was conceived as an inverted dome that completes the dome of the sky. A mesh is strung across the dome to place the observer at the centre of the “celestial sphere.”

The three orbiting objects reflect the different perceiving cultures, with their construction and materiality presenting different relationships between the land and sky. These elements “orbit” around the shared space, without any particular culture claiming the sky.

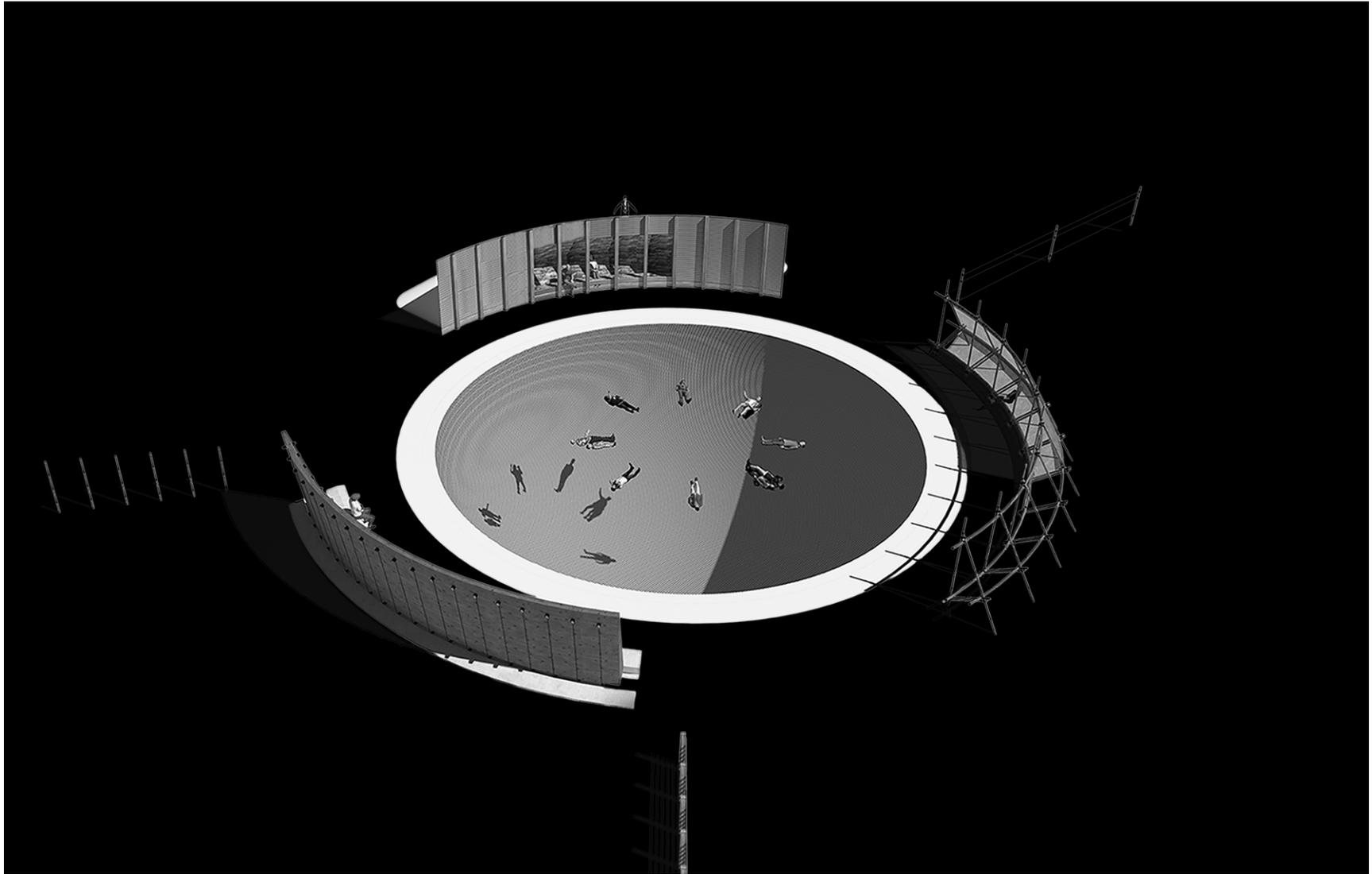
Kejimikujik Design Response



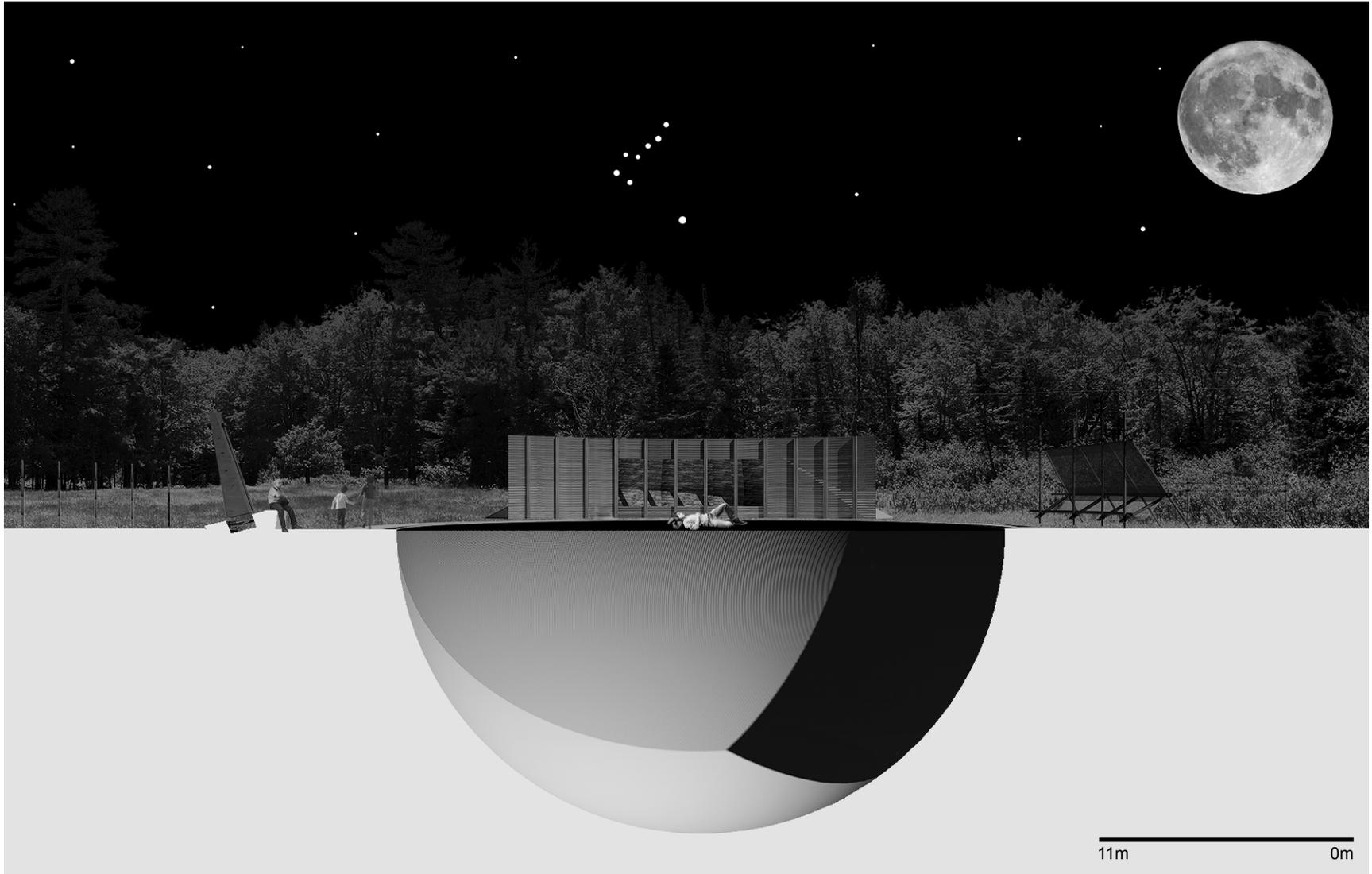
Kejimikujik National Park pavilion, with incoming cultural narratives from coastal sites.



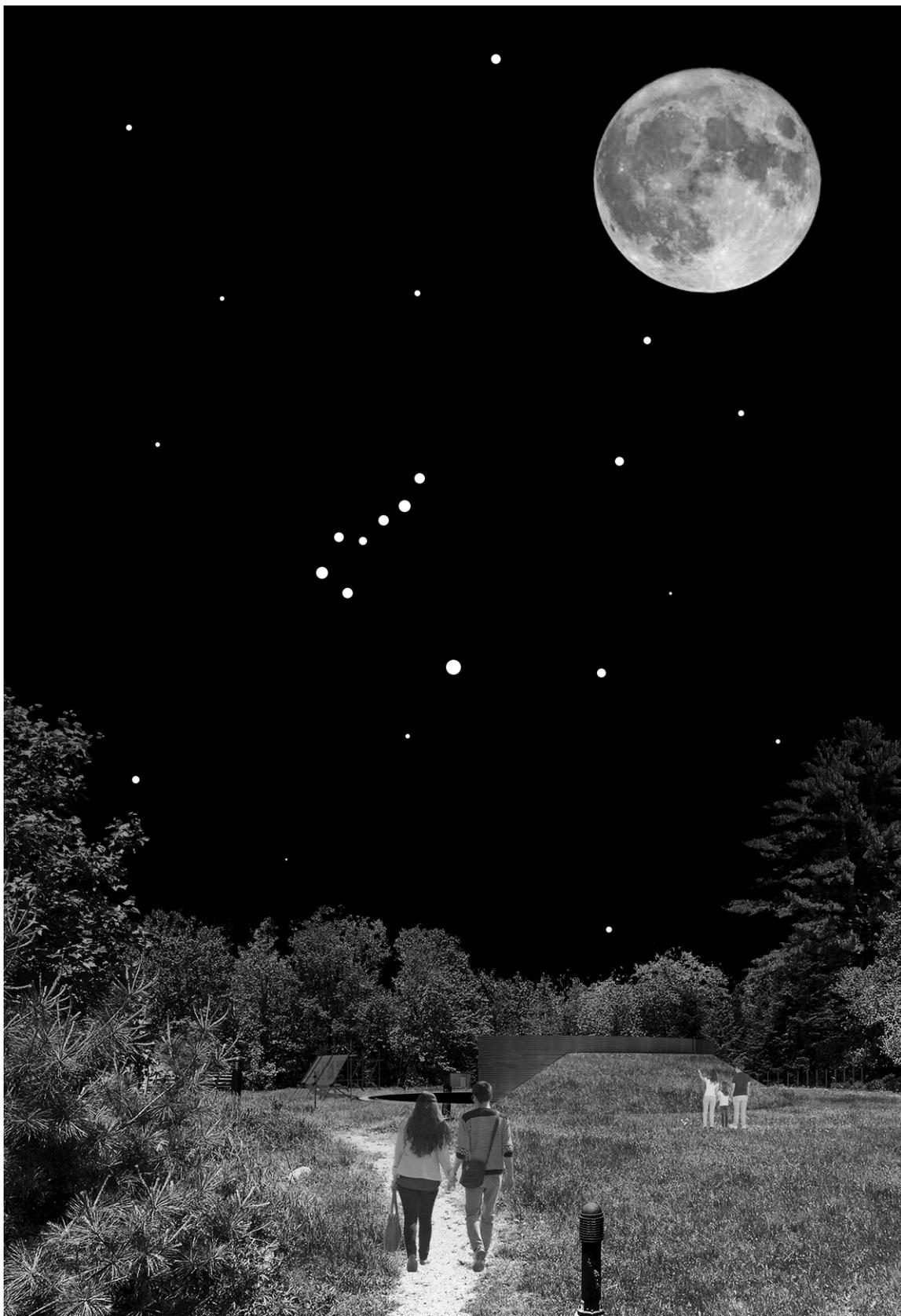
Northern hemisphere night sky, as viewed from the North Pole



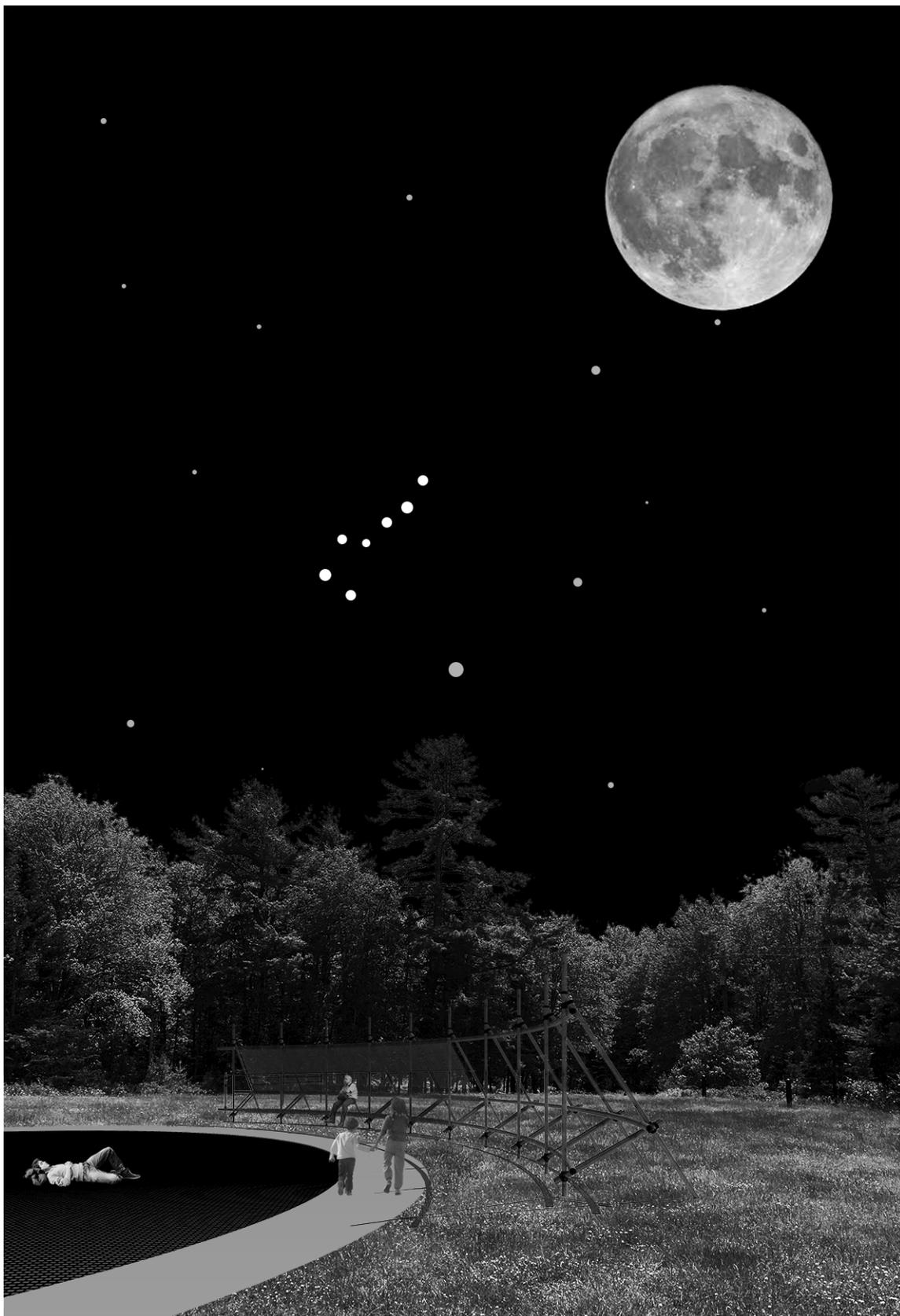
Aerial perspective of inverted dome, Kejimikujik National Park dark sky pavilion



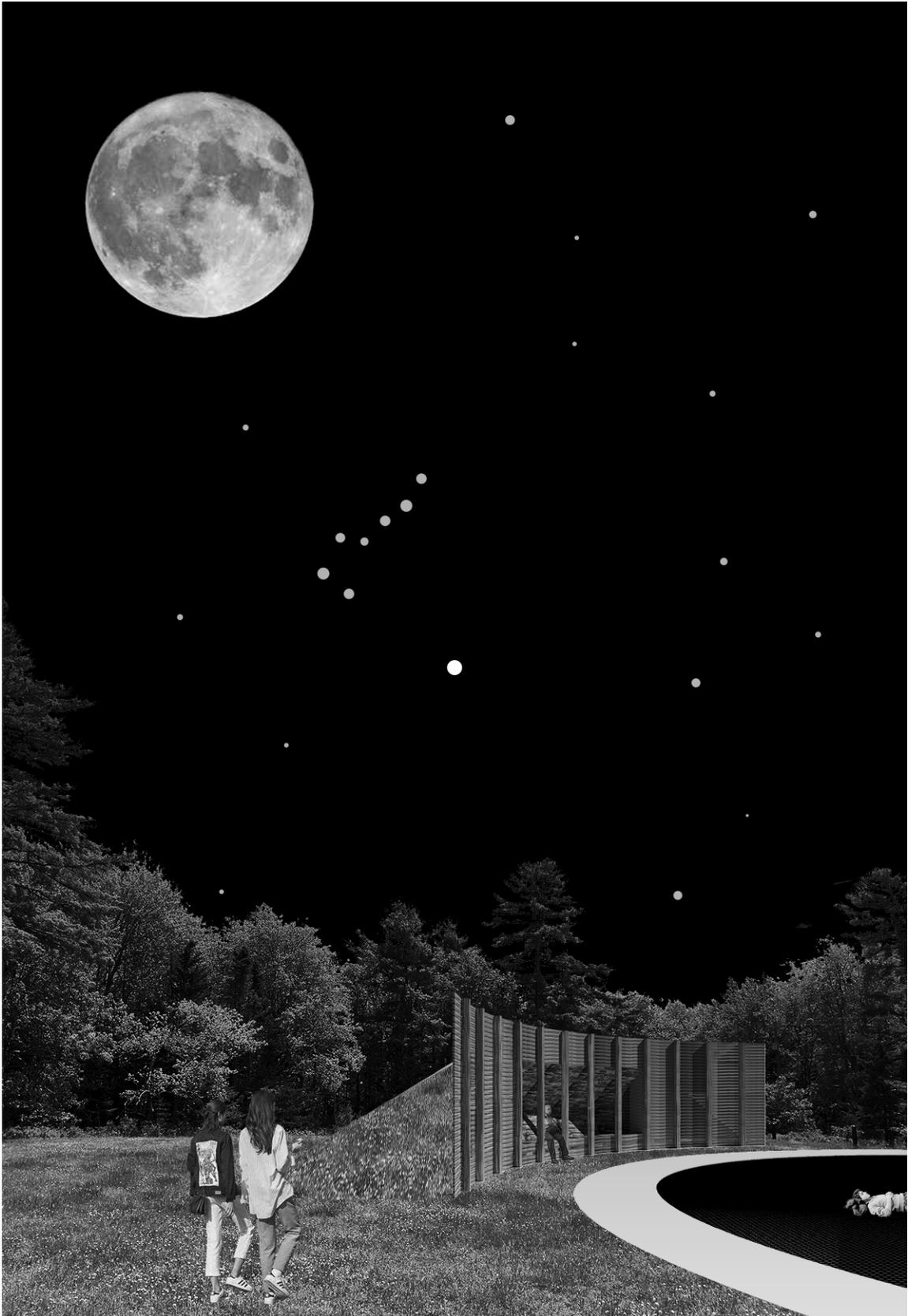
Section through inverted dome, Kejimikujik National Park dark sky pavilion



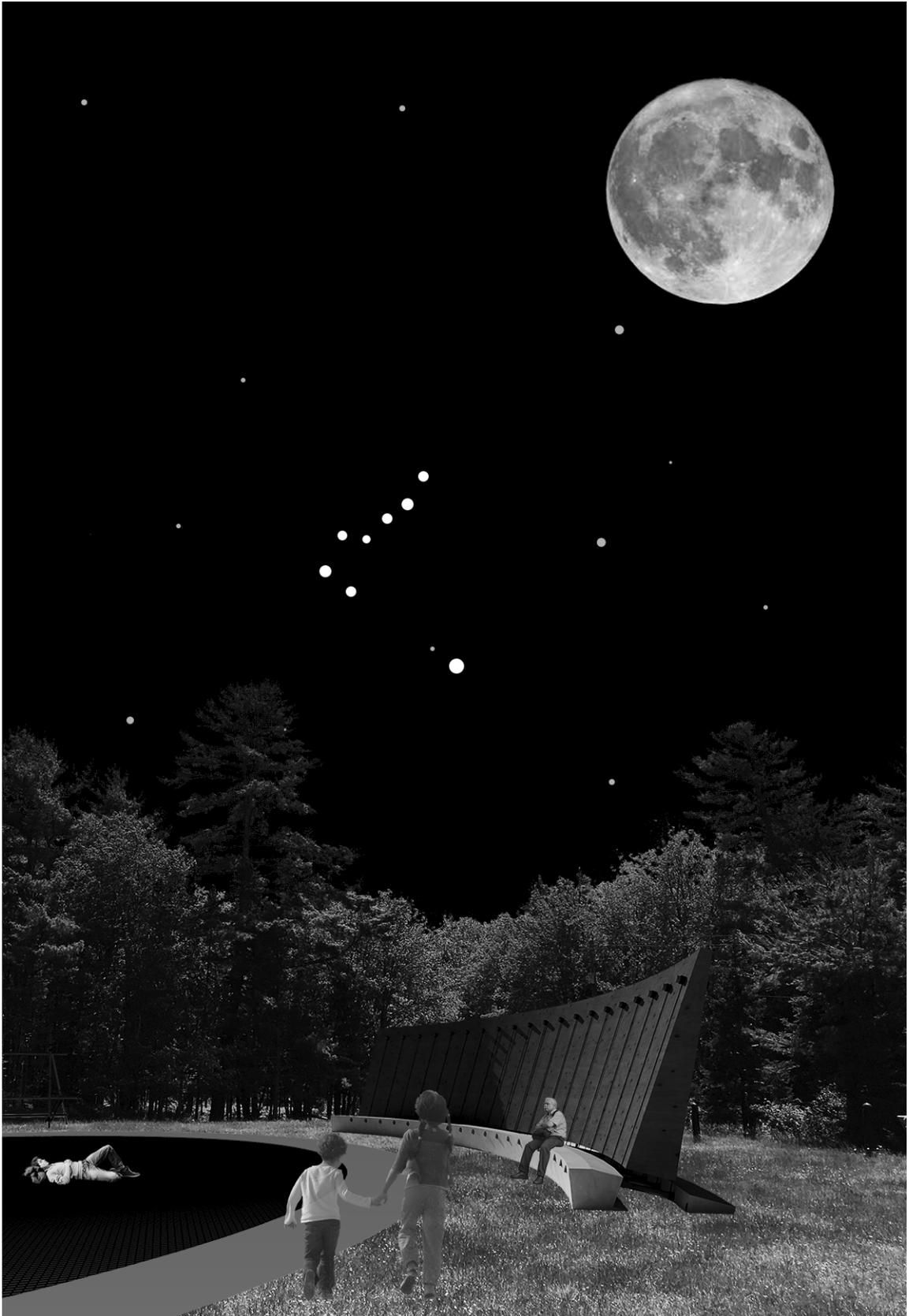
Approach, Kejimikujik National Park dark sky pavilion



Mi'kmaq "orbiting object," Kejimikujik National Park dark sky pavilion



Acadian "orbiting object," Kejimikujik National Park dark sky pavilion



Black Loyalist "orbiting object," Kejimikujik National Park dark sky pavilion

CHAPTER 5: CONCLUSION

The design presented above is a preliminary proposal for preserving and sharing cultural knowledge. The goal of the project is to bring together all people, regardless of ethnicity or culture, beneath one archetypal sky. Visitors can understand not only the different cultural sky narratives but also their place within the larger historical context. Perhaps one of the most challenging parts of this project was its broad scope, which required in-depth research into cultural traditions, celestial knowledge, constructed forms, and relation to place. All of this was crucial to achieve a thoughtful and honest approach to cultural architecture.

Throughout this process, questions have arisen about the role of the architect, the collaborative role of communities or ethnic groups, the design's focus on the Mi'kmaq, Acadians, and Black Loyalists, and the project's potential to evolve and expand in the future.

The Role of the Architect

The author and most architects are of European descent. The whitewashed profession of architecture results from past and present inequality, as well as architecture's historical role in symbolizing power through grand buildings for royalty, government, or the church.

Meanwhile, architecture has been experiencing a shift away from traditional sources of power by addressing the needs of a larger clientele. This is evident, for example, in the designs for both the Halifax Central Library and the Seattle Library, which achieved successful public projects by understanding cultural needs and desires. The role of the architect is expanding from a top-down approach to include what might be described as a bottom-up approach that welcomes meaningful community input. If the present project were to be realized, the architect would frame and focus it to achieve diversity and equality.

Community Collaboration

Community collaboration with the architect would be crucial to achieve a culturally rich piece of architecture that conveys the narratives of the people it represents. The communities would need to be included throughout the project, including the programmatic needs, conceptual design, artifact and material selection, and details to enrich the design with

real documents and knowledge instead of just representations. Constructing and maintaining the pavilions also could be a means of transferring traditional skills from generation to generation.

Expandability

Although the project focuses on Mi'kmaq, Acadians, and Black Loyalists, it was conceived in an open way that could include other groups, especially those whose ethnoastronomy has been obscured by Western concepts. Cultural sky narratives could reinvigorate society's interest in the night sky, and in turn provide additional resources for dark sky reserves.

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