Living with the Volcano: Balancing Culture and Ecological Sensitivity with Tourism on São Miguel Island

by

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Dalhousie University is located in Mi'kmaq'i,
the ancestral and unceded territory of the Mi'kmaq.
We are all Treaty people.

To my dad.

You are architecture.

Contents

Abstract

The weaving of human presence between locals and tourists leaves imprints on the landscape, creating traces that impact the delicate ecological balance. Islands, such as São Miguel, embody fragile environments as their isolation makes them susceptible to ecological degradation and commodification. By analyzing the island's formation and local way of life with the system of extraction and use of local materials, this thesis develops sustainable tourism strategies through architecture around an experiential journey of interconnected paths, weaving moments of living, working, playing, learning, and observing. The architecture of an Interpretive Centre, Water Pavilion, and revitalization of a former Water Bottle Factory, contribute to a sustainable and enriching island experience. By embracing extraction as a symbiotic relationship between land, locals, and tourists, these architectural interventions promote harmonious coexistence. This reciprocity strengthens educational participation, preserves local culture, and creates opportunities for meaningful interaction with the land.

Glossary

Archipelago: A group of islands.

Azorean Diaspora: The dispersion or spread of people from their original homeland in the Azores in hopes of a better way of life.

Caldeira: A large depression formed when the summit of a volcano erupts and collapses. During a volcanic eruption, magma present in the magma chamber underneath the volcano is expelled, often forcefully. When the magma chamber empties, the support that the magma had provided inside the chamber disappears. As a result, the sides and top of the volcano collapse inward. Some caldeiras form a lake as the bowl-shaped depression fills with water.

Conservation: A careful preservation and protection of the island.

Cultural milieu: The setting and environment in which a person lives, including social and cultural aspects of life.

Ecology: The study of the environment and helps us understand how organisms live with each other in unique physical environments.

Eco-tourist: A form of tourism marketed as “responsible” travel to natural areas, conserving the environment, and improving the well-being of the local people.

Endemic: nature or unique plants or animals to the islands that are not found naturally elsewhere.

Extraction: The action of taking something out from a source. The withdrawal of materials from the environment for human use or consumption, such as minerals, natural resources, or raw materials.

Fumaroles: An opening in the Earth’s crust that emits steam and gases.

Fumarole Field: An area of thermal springs and gas vents where shallow magma or hot igneous rocks release gases or interact with groundwater.

Hydrologic Cycle: The process by which vapor in the atmosphere turns into precipitation that falls on land and water bodies and then turns again into vapor through evaporation and transpiration.

Nature Preserve: Area allocated to preserve and protect flora, fauna, and physical features.

Levada: An irrigation channel or aqueduct meaning “to carry”.

Passive: The use of natural processes – for example, to heat and cool buildings to convey water- to perform in a manner comparable to those requiring mechanical.

Pyroclastic: Clastic rocks composed of rock fragments produced and ejected by explosive volcanic eruption.

Reciprocity: The practice of exchanging things with mutual benefit.

Seismicity: The occurrence or frequency of earthquakes in a region.

Stratovolcano: Volcanic landform characterized by a conical shape formed by layers of volcanic material deposited during successive volcanic eruptions. Stratovolcanoes tend to slope gently at the base but rise quickly near the summit to form tall mountain peaks.

Tectonic Plate: Large slabs of rock that divide Earth’s crust, move constantly to reshape the Earth’s landscape.

Trachytic: A type of volcano characterized by the type of magma it produces, which is high in silica content and typically results in thick, viscous lava flows. These volcanoes tend to have steep-sided cones and can exhibit explosive eruptions that are associated with the formation of caldeiras.

Volcanic Activity: Processes and phenomena associated with the eruption of magma, gases, and volcanic materials onto the earth’s surface or within the crust. Eg. hot magma and furmaroles.

Acknowledgements

To Talbot Sweetapple and Michael Faciejew, this thesis would not have reached its strengths without you both.

To Diogo Burnay and Cristina Verissimo for inspiring me to embrace my Portuguese culture.

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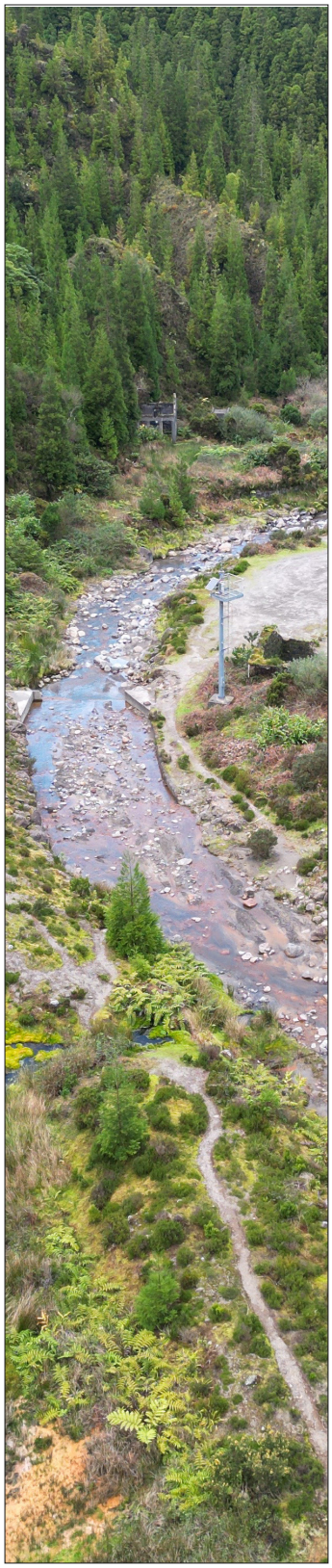
To Hayden, thank you for moving across the country for me. Your encouragement has been my guiding light.

And to my dad, this thesis could not have existed without you. Thank you for being the architecture behind my thesis.



The Valley of Lombadas as the primary focus of this thesis.

Chapter 1: Introduction

Thesis Description

The relationship between the landscape and inhabitants is the basis of Azorean culture. Characterized by reciprocity, this deep-rooted connection between inhabitants and land is intertwined with extraction of natural resources but risks destabilization by an increasing presence of tourism beyond the threshold of sustainability. Despite the tension associating extraction with depletion and exploitation, inhabitants have sustained their way of life by making extraction a fundamental aspect of their culture and livelihood.

Preserving the landscape of São Miguel is of utmost importance to ensure the island's beauty and ecological systems are sustained. As isolation is inherent in island life, a sense of self-sufficiency is ingrained in its people. In this context, São Miguel, notable for its biodiversity associated with the volcanic terrains, the coastline, caldeiras, and agriculture, supports a rich correlation between the culture and land. São Miguel's culture is forged through environmental stewardship and a deeply ingrained connection between the ecological systems that sustain them, encompassing agriculture, fishing, geothermal waters, and culinary practices, which are fundamental aspects of the Azorean livelihood. However, a culture rooted in its distinct volcanic landscape makes it susceptible to the challenges of uncontrolled tourism which poses an imminent threat to the island's ecological balance, community well-being, and natural resources.

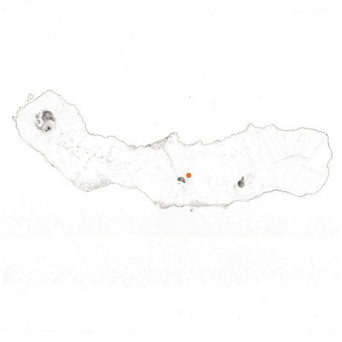
Although in its infancy, São Miguel's tourism industry is emerging at a crucial point of decision-making and

Physical model of the island of São Miguel.

opportunity. Left unchecked, it could irreversibly destroy the natural landscape, resources, and local culture. The commodification of the island to cater to tourist preferences poses a risk of eroding the authenticity of local practices. At the same time, inadequate infrastructure may exacerbate these challenges, impacting ecological and cultural sustainability and potentially leading to landscape degradation. Human presence, articulated by Ingold (2016, 43), imparts reductive traces in the landscape through habitual movements, often unknowingly inscribing marks that carry the potential for detriment and destruction. With the phenomenon of tourism, what was once pristine in both landscape and cultural identity of a place initiates an irreversible unraveling. As the pervasive impacts of tourism impact the island, the ecology risks reaching a point beyond repair.

This thesis looks at themes within architectural theory—ecology, sense of place, the concept of traces, and local materials—to understand the spatial narrative embedded in São Miguel Island. The narrative is intricately woven with the place, establishing a deep inseparable connection between the stories of the people and the physical environment. The theory positions architecture as an integral part of the land, aiming to actively engage, educate, and weave locals and tourists into the medley of the constantly changing landscape.

The intrinsic nature of Azorean local culture with the natural landscape, is revealed through Edward Relph's concept of a sense of place, which can be authentically comprehended and preserved by integrating notions of placeness, threads, traces, and memory. The Azores, surrounded by water, are profoundly shaped by this element, which plays a fundamental role in the lives of its inhabitants and how they



Sketch of the island and an orange dot indicating the Valley of Lombadas.

engage with the natural environment. Incorporating Tim Ingold's (2016, 43), concepts on traces, and embracing architectural theories of ephemeral elements, traces, and scenes, the architecture guides the visitor to consciously interact throughout the land. Additionally, this thesis explores the process of extraction - a tradition and economy deeply embedded in Azorean culture. The extraction of materials is utilized as a method of designing the buildings establishing a sense of place within the Valley of Lombadas. The interplay between extraction, design through local materials, and sense of place, makes the architecture a vital component of the landscape.

The inability of land, locals, and tourists to coexist will lead to the destruction of São Miguel's natural resources, erode the local sense of place and culture, and compromise visitor safety and experience. Through the revitalization of an old water bottle factory that previously extracted carbonated water, this thesis integrates a new sustainable way in which visitors can participate and understand the deep-rooted connection between São Miguel's inhabitants and the land. This involvement extends participation within the larger ecological systems that make up the island's geographical and cultural identity. By analyzing the impacts of uncontrolled tourism, an interconnected path is used as a conservation strategy and as a catalyst for sustainable economic development through activities conducted in harmony with nature (Queiroz et al. 2014). The trajectory of tourism growth requires a strategic vision firmly anchored in the principles of ecological education and sustainability, directing efforts towards attracting eco-tourists rather than mass tourists.

The tension surrounding extraction and its potential negative impacts on natural resources and inhabitants requires an urgent response by fostering a balanced approach to extraction and ensuring the long-term viability of both culture and environment. Additionally, as tourism continues to play a significant role in São Miguel's economy, it is urgent to cultivate a reciprocal relationship between locals, tourists, and the land, promoting responsible tourism practices. By analyzing volcanic land formations, the process of extraction, and ecological systems, this thesis curates a series of interconnected buildings and landscape projects that addresses the imminent threat of unsustainable tourism. Rather than viewing extraction solely through the lens of exploitation, inhabitants embrace a stewardship approach. Instead of passive observers, tourists become active participants within a dynamic ecosystem of culture, ecology, and preservation. Through an experiential journey and a network of buildings - Interpretive Centre, Water Pavilion, Water Brewery, Taproom, and Tasting Pavilions - moments of living, working, playing, learning, and observing are woven together as deliberate responses to foster harmonious coexistence on the island. The successful coexistence of land, local inhabitants, and tourists on São Miguel relies on a reciprocal and intricate relationship, prioritizing the preservation of the island's distinct cultural heritage and ecological systems. As the urgency for resiliency increases, the island becomes a model for sustainability while maintaining the local way of life.

Physical Model (red oak). A close up of the Água de Pau Massif where Fogo Lake and the Valley of Lombadas are located.

How can tourism, local inhabitants, and land coexist on São Miguel Island in a way that fosters a reciprocal relationship to preserve the island's unique cultural heritage and ecological balance?

Personal Basis

As background and context to the thesis exploration, I will describe my own relationship to the work, intertwined with my father's memories.

Roots and Reciprocity

Through my upbringing in a Portuguese household, I found myself immersed in various Portuguese traditions that were deeply rooted in my father's upbringing on São Miguel Island. The preservation of my father's ties to the Azores is intricately woven with the connection I share with him. His relationship with the land is one of deep reciprocity imprinted on him since leaving the island. My father has told many stories of life on the island and the hard work that went into tending to his family's agriculture, climbing steep hills barefoot, and early mornings spent milking cows with his dad and brothers. My father feels a profound sense of nostalgia when he reminisces about life back then, filled with deep emotions. Laughter echoes for the times when his family was together, yet sadness lingers for the people he has lost throughout the years.

The hill overlooking Candelária, my dad's hometown.

My dad exploring his island and reminiscing.

As a family of eight, life on the island wasn't easy. One by one, his family members departed for the United States of America and Canada in pursuit of a better life. This moment marked the last time his family would live together under the same roof. His brother and sister established new roots in Providence, Rhode Island, while he, his other brother, two sisters, and parents put down their roots in Calgary, Alberta.

After getting married, his focus was that of working and establishing a home and family, so visiting his home island was not at the forefront. Thirty years later, my father made

Photos from my dad from life on the island.

a long-awaited return to the island, introducing me to his island, his home, for the first time. Proudly he guided me through the streets of Candelária, his hometown, vividly bringing to life the stories he spent many years sharing with us. Many of the buildings that defined his childhood still remain, his family home, school, and church. Seeing the history of the place embodies memories from his childhood that are now passed on and shared with me. My personal relationship with the island is intrinsically connected through the eyes of my father.

Many Azoreans integrate elements of their emigrant homeland into the landscape of their homes. To this day, my dad continues to be enchanted by his grapevines, vegetable, and flower garden, nurturing a passion for agriculture. Similar to the hydrangeas that cover the countryside and roads of the island, my dad has planted them in our front yard. He actively participates in festas (festivals) in Calgary, a shared community interest celebrated by other Portuguese community members who seek to continue their Azorean ethno-religious identity and traditions. Through this community, I have had the opportunity to celebrate my dad's favorite festas, such as the Festa do Sr. Santo Cristo dos Milagres; the biggest celebration on São Miguel that draws many emigrants back each year. The Azorean culture is kept alive, fueled by emotion, heritage, and traditions, manifested in the language, stories, and food cherished, shared, and yearned for by my father.

São Miguel, my friend.

You are so full of memories!

It's been many years since I left my dog, my friends, my home, my island. I was 14 years old when I got on the plane with my mom to go to a new place I would soon call home. My dad was already in Canada, so was one of my sisters and my oldest brother. I had no idea where I was going, and I don't think I was too worried about it. I remember thinking only that someday I would return, it really didn't bother me. I was going on an adventure. My oldest brother was already in Calgary, my other brother was in Rhode Island, I guess I knew we would be next. My dad had already been in Canada for three, maybe five years, I can't remember.

I remember having to go with my brother to take care of the cows. I hated going, the only part I liked was when I would get to eat my hard boiled egg. My brother would get mad at me if I put the cows in the wrong pasture. How was I supposed to remember? I didn't want to be with the cows. Before, when my dad was in São Miguel, I used to go hang out with him in his little market on the corner. My mom didn't like that he had the market. But I liked this better than the cows. There I would help sell sugar and flour.

I liked school, I didn't mind it. Everyone liked me, everyone wanted to give me a pencil when I needed one.

I liked playing soccer at school, but I didn't like it when the priest took away my ball because it went over the fence when we were playing. The church was next door to the school. My mom had to go get it from him after a year.

I remember being part of a play, I was about 6 or 7 years old. My sister and brother were part of this musical play. I remember singing a song with a girl my age. Today, we laugh together and try to remember the song and who was in that play with us.

Now when I think about it, I know that a lot of things changed, but I didn't realize it then.

Today, when I visit the island and share my stories with my family, I get emotional, but I enjoy every minute that I am there. I have shown my girls where I used to live, my school, my church, and where I used to hang out. It's hard to remember everything because there are lots of changes. This past summer I was able to peak inside what used to be my school (now a daycare) and discovered that the little market by the church is still there. I was hesitant to drive on the Island, but I enjoyed every twist and turn. I discovered things and places I didn't know about my Island. How beautiful it is and I want to go back to explore more.

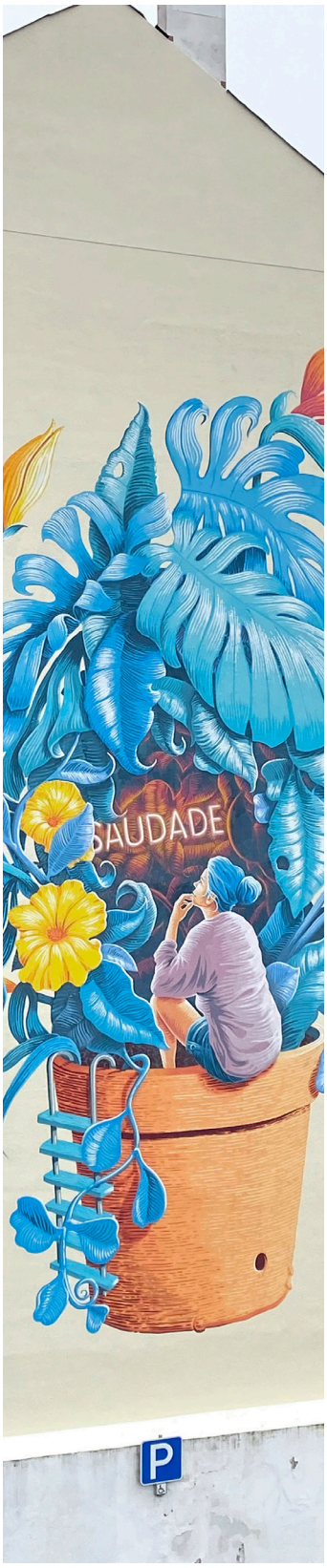
Most of all, my three visits in the last 7 years have been opportunities for me to look back, share my memories

and reconnect with old friends. I have enjoyed every seafood meal I've eaten and every sweet bean "queijada" I could find.

São Miguel, I will see you again!!

Manuel

Letter to the Island. A handwritten letter from my father reminiscing of his time living on the island, his departure, and his return.



“Saudade” mural by Mário Belém (Belém 2021).

Saudade

> This worldview embraces saudade, an attitude of mind deep-seated within the Azorean psyche, which implies a nostalgic longing for supposed better times in the past when families were not separated by great distances. (Forjaz et al. 2016, 175)

That connection to “the nest”—to a home or a homeland—is central in Portuguese culture; saudade, the word used, encompasses this idea. In the heart of Portuguese culture, “saudade” is a complex and beautiful emotion that defies simple translation. It’s more than just missing someone or something; it’s profound longing, it’s a bittersweet ache, and a wave of nostalgia that sweeps over you. It’s the feeling of reminiscing about a place, a person, or a moment that’s dear to your heart, even if it’s far away or a memory of the past. Saudade is a universal sentiment, one that touches us all, regardless of where we’re from. It reminds us that our hearts have the incredible capacity to hold onto memories and cherish them forever. As this thesis embraces the concept of saudade, it celebrates the beauty of nostalgia, the power of memories, and the warmth of the Portuguese soul. This thesis will serve residents and visitors to the island, whether families returning to visit, or newcomers wanting to embrace and understand the place.

A portrait of the land and sea.

Chapter 2: Portrait of the Landscape

Geography that is History

It is impossible to understand the cultural milieu of São Miguel Island and its distinctive landscape, shaped by the combination of natural processes and centuries of human endeavors, without understanding its environmental extremities.

Location

The Azores is situated in the North Atlantic Ocean's Micronesia region, comprised of four archipelagos, off the coast of Africa and Europe. The Azores archipelago, an autonomous region of Portugal, comprises nine oceanic volcanic islands: Corvo, Faial, Flores, Graciosa, Pico, Santa Maria, São Jorge, and São Miguel. The archipelago is situated at the triple junction between the North American, Nubian, and Eurasian tectonic plates (Chester et al. 2022, 31). São Miguel is located on the edge of the tectonic plate junction, where the Eurasian and North American plates converge.

São Miguel's location has influenced the development of distinct cultural traditions and identities, making it an essential point for understanding the broader cultural dynamics of the Atlantic world. The island serves as a crucial maritime link between North America and Europe, facilitating intercontinental connections and supplying mainland Portugal with dairy products, tea, fruits, and wine (Queiroz 2020, 5). Migration has shaped the history and culture of the Azores and with the commodification of transatlantic travel, the Azores witnessed their greatest

São Miguel's central position in the Atlantic Ocean historically made it a crucial point for navigation and exploration during the Age of Discovery. It served as a transatlantic crossroads for ships traveling between Europe, the Americas, and Africa, contributing to global trade and cultural exchange.

waves of emigration to North America. Historically, the island has played a significant role in providing America with workers for whaling, fishing, and agriculture through emigration. However, the island's biggest source of revenue today is through agriculture and tourism.

A Hawaii-sourced olivine basaltic rock that is two years old, highlighting the volcanic landforms that give rise to volcanic islands.

A 200 year old basaltic rock extracted from Iceland.

A collection of pyroclastic, trachyte tuff, pumice, and basalt collected during visit to São Miguel.

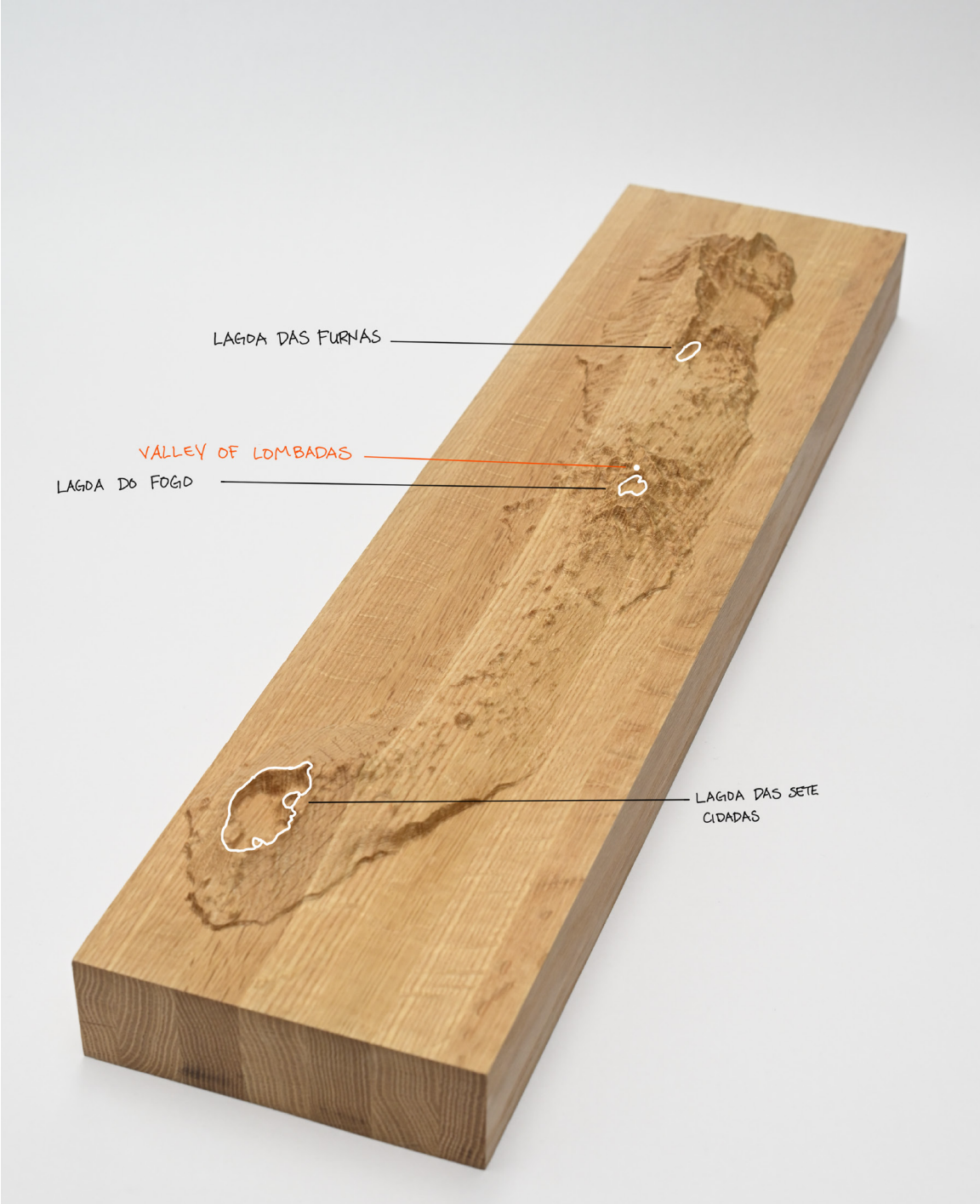
Island Formation

Relying deeply on sustainable self-sufficiency, São Miguel grapples with limited access to mainland resources as it is situated amidst the Atlantic's seismic and volcanic activity. Its striking landscapes, basalt formations, and water-filled caldeiras result from lava solidification and volcanic collapses. The island's volcanic origin is evident in its dramatic coastlines, rugged cliffs, lush greenery, volcanic peaks, and unique rock formations, all contributing to its distinct natural beauty.

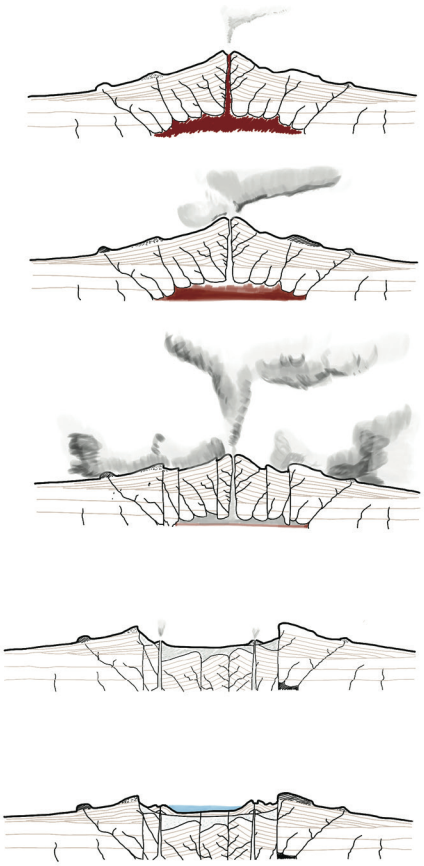
The movement of the three tectonic plates—African, Eurasian, and North American—created the volcanic hotspots comprising the Azores (Chester et al. 2022, 2). According to the research investigated by earth scientists Chester et al. (2022, 2), São Miguel's appearance results from the interplay between these tectonic plates, volcanic activity, and various geological processes that, over time, have shaped the land's identity. The subsequent tectonic activity contributes to the island's geological activity, resulting in heightened geothermal features—such as hot springs and fumaroles and peaks rising 3507 feet (1105 meters) above sea level. (Chester et al. 2022, 2).

São Miguel Island has an area of 744 km2 and comprises three active trachytic central volcanoes with summit caldeiras: Sete Cidades, Fogo, and Furnas which feed the diverse ecological systems.

The coloured zones identify the sequence of the island's formation. The eruption of Picos Fissural volcanic system merged the two islands into the São Miguel island we see today.



Physical model identifying the three caldeiras and the Valley of Lombadas, the project's main site location.



The formation of summit caldeiras with lakes inside. Caldeiras are formed by the subsidence of the volcanic surface along fractures, due to the quick emptying of the magma chamber during explosive eruptions.

Volcanoes

Sete Cidades

Situated at the northwestern end of the island, Sete Cidades emerged above sea level initially as an island of its own. It was subsequently joined by the Picos Fissural Volcanic System to the Fogo volcano, forming São Miguel as seen today (Chester et al. 2022, 39-40). Lagoa das Sete Cidades, translating to the “Lagoon of the Seven Cities,” is located within the crater of a dormant stratovolcano complex.

Sete Cidades is one of the most popular places on the island, renowned for its unequaled beauty. Hydrologically one lake, Lagoa Verde and Lagoa Azul, named based on the two different colors that reflect from either side, is steeped in a famous love legend. A blue-eyed princess and a green-eyed farmer, forbidden to love by the king, wept so profusely that their tears formed the lakes - one with blue

Lagoa das Sete Cidades reflecting the two colours. The Ponte dos Regos bridge runs across the area between the “two” lakes.

Data on natural resource consumption and the island's strive to be more sustainable ("Serviço Regional de Estatística Dos Açores" n.d.).

waters resembling her eyes and another smaller green water mirroring his eyes.

> Everything around them was born spontaneously like the fire of an enormous volcano, now transmitting to this couple's feelings, the force that only nature can impose! (Sousa and Rego 2022)

From this legend of Sete Cidades, nature emerges in all its splendor, authentic and vibrant, mirroring the authenticity of the love shared between the princess and her shepherd.

Água de Pau Massif (Fogo)

Dominating the central part of the island, Água de Pau Massif is a stratovolcano complex and is the largest of the trachytic major volcanoes of São Miguel. (Chester et al. 2022, 69). The collapsed caldeira is the smallest and youngest on the island, with an irregular elliptical shape. Lagoa do Fogo, translated to Fire Lake, rises to an altitude of 1000m, partially occupying the summit caldeira (Gaspar et al. 2015, 105). Surrounding the crater are dense forest productions of Acacia and Japanese cedar trees with a 30-meter-deep lake that partially fills the depression with banks of several pumice beaches.

The Fogo Lake is an important water resource of the island, which feeds various springs located on the slopes of the Água de Pau Massif (Fogo Volcano) that are used for the water supply of the Vila France do Campo, Lagoa, Ponta Delgada and Ribera Grand municipalities. The hydrology of Fogo plays a significant role in shaping the water chemistry of the area through the deep-seated carbon dioxide source and the hydrothermal system beneath the caldeira (Cruz et al. 1999, 1). There are three distinct types of water found in Fogo: hydrothermal, carbonated, and cold waters (Cruz et al. 1999, 1). Cold springs are observed at higher elevations

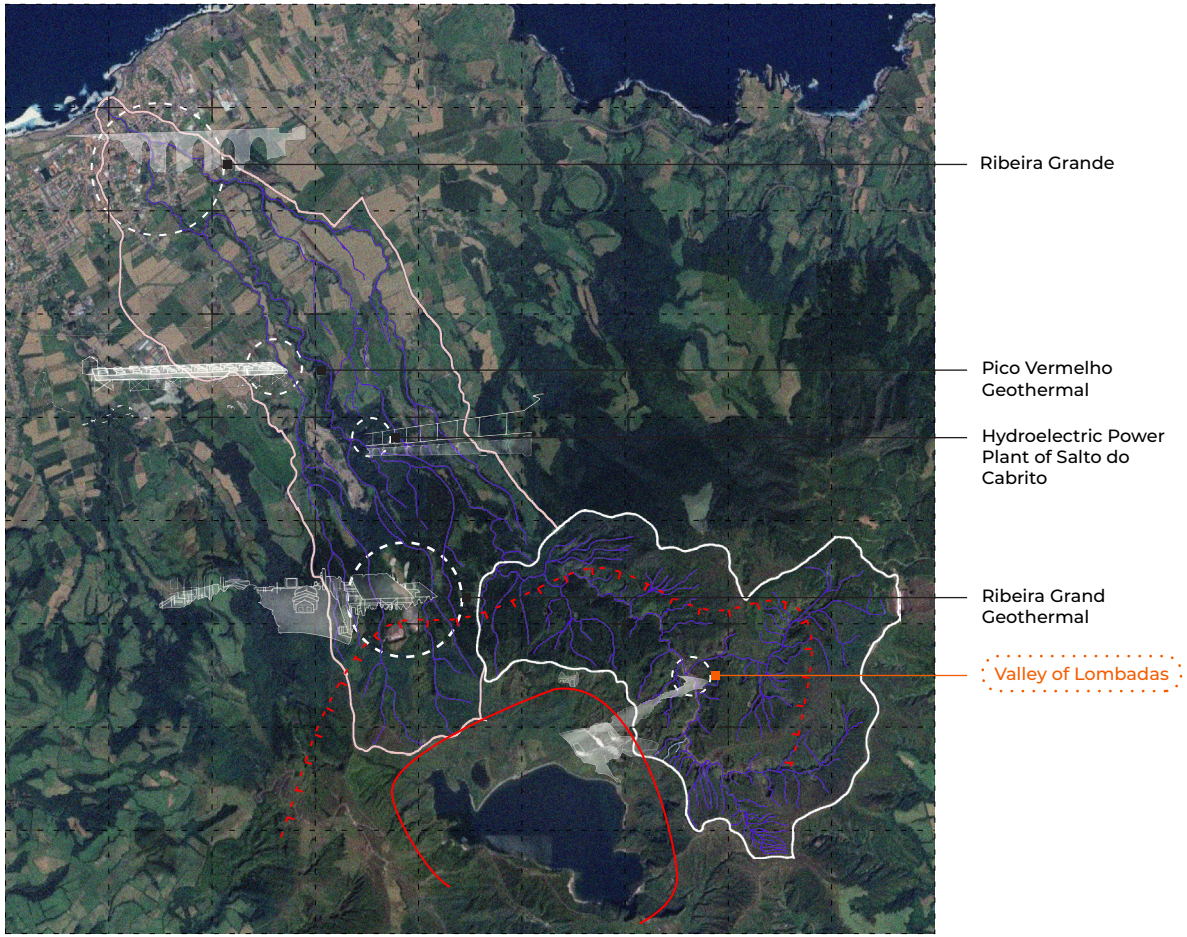


Diagram representing the hydrology of the Lombadas site highlighting its location in the fracture of the volcano, the source of the groundwater and its path for supplying water to the second major city, Ribeira Grande. Data retrieved from: Machado 2015, 31 and Franco 2016, 123.

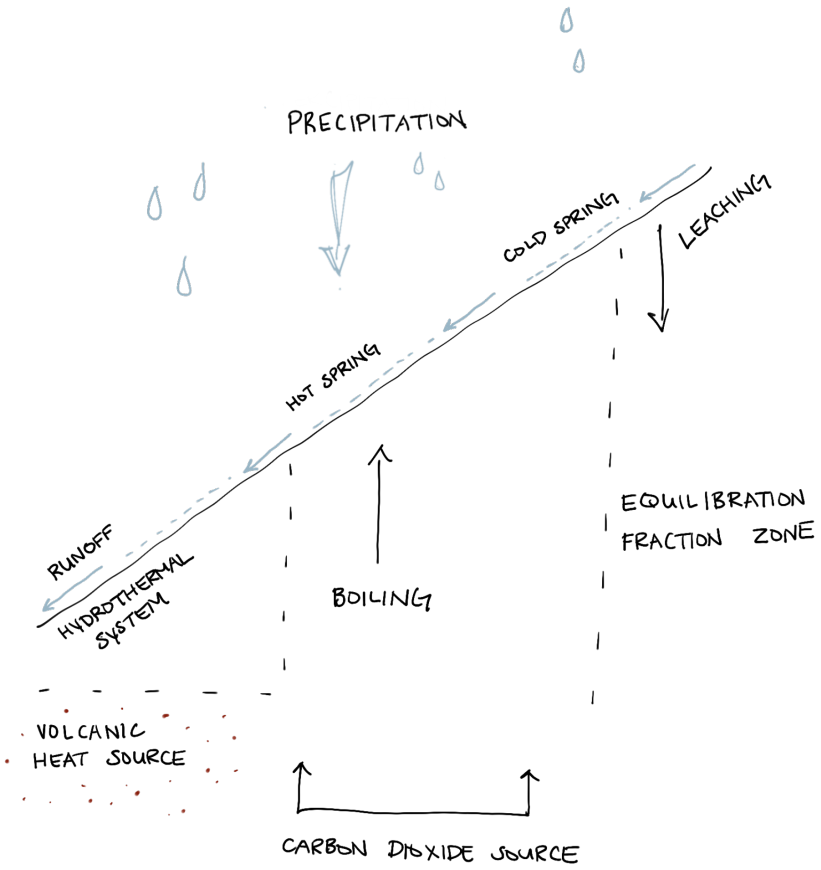


Diagram representing the hydrology on São Miguel emphasizing how cold water is located at higher parts of the volcano and hot water located at lower parts of the volcano due to the location of the volcanic heat sources.

surrounding the caldeira, while carbonated and thermal waters are predominantly in the central and lower regions (Cruz et al. 1999, 4).

The volcano has an active geothermal field on its northern flank which uses this energy to generate electricity from its geothermal power plants. This represents 42% of the electricity needs of the island (Franco and Ponte 2019). The springs of Lombadas provide hydroelectric energy to Ribeira Grande establishing it as an important economic resource. This energy also heats the ground water producing the secondary volcanic features of hot springs, thermal pools, and fumaroles enjoyed at Caldeira Velha, Caldeiras da Ribera Grande, and the Valley of Lombadas (Wallenstein et al. 2007).

The Valley of Lombadas is a nature preserve, containing mineral CO2-enriched natural sparkling water springs, cold springs, hot springs, and luxuriant vegetation. The area

The geothermal system of the Fogo Volcano is located in the Northern flank of the volcano, at 700-800 m depth. It is a layered boiling reservoir with temperatures between 220 and 250°C (Franco and Ponte 2019). The resource is extracted in two power plants for production of electricity, the Ribeira Grande and the Pico Vermelho power plants.

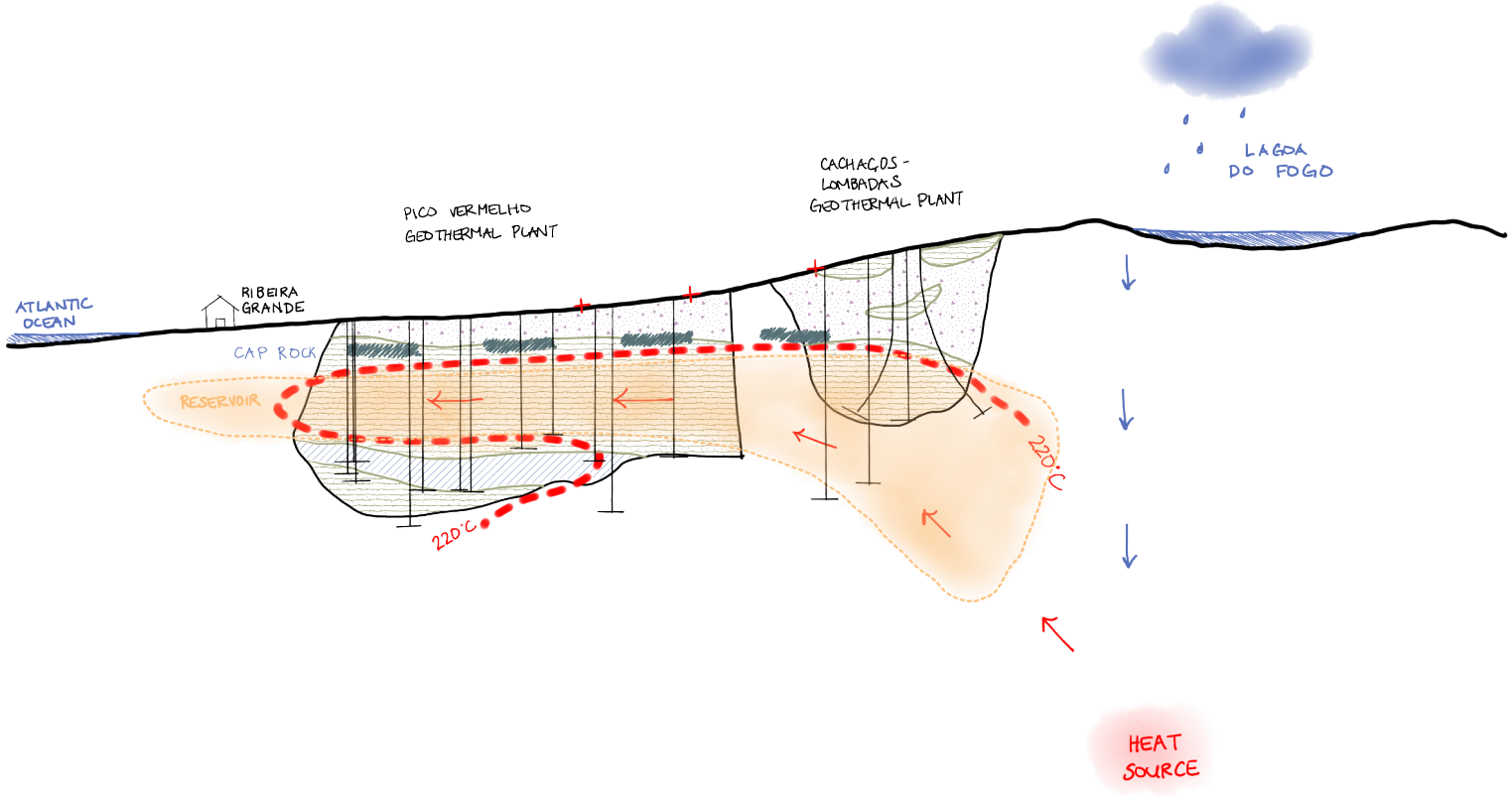


Diagram representing how geothermal energy is extracted from two plants in the Água de Pau Massif. This emphasizes the geothermal potential within the Lombadas area and the reliance on natural resources as a means to survival within the island. Data retrieved from Franco 2016, 123.

provides a naturally carbonated spring with the famous and refreshing mineral water known as “Agua das Lombadas.” The valley is in the fault of the volcano, causing the diffuse emission of carbon dioxide to leak and reveal the cold emissions of CO2 springs (Wallenstein et al. 2007). The carbonated water is slowly and naturally filtered through layers of volcanic rock producing a natural spring of water that is pure and safe to drink. As well, several CO2-rich ‘hot’ springs are located within Lombadas Valley with water temperatures near 100°C indicating that hot rock or magma is shallow in the region (Moore, 1991).

Volcanic Complex of Furnas

The Volcanic Complex of Furnas is located in the east-central end of São Miguel. It continues to be the most active and dangerous volcano of the Archipelago (Guest et al. 1999, 1). The main features of the complex are the caldeira, the southern outer edge of the volcano, and high sea cliffs along the coast (Guest et al. 1999, 4). The Furnas caldeira consists of an elongated depression, which houses the village of Furnas and Furnas Lake. Furnas Lake expresses the geodiversity of Furnas, including several small-sized volcanic landforms, fumarolic fields, and various types of thermal and mineral waters. Several sources of fresh spring water flow throughout the village, each tasting different and believed by the locals to have unique healing properties.

The hydrological distribution of thermal water within the Furnas caldeira is attributed to the influence of the local topography (surface features) and tectonics (the movement of the Earth’s crust). The hydrothermal waters derive from heated shallow aquifers (layers of permeable rock that hold water) on top of the hydrothermal system (Cruz et al.

1999, 15). If a local heat source exists along the pathway of the groundwater flow, water and rock interact, leading to geothermal fluid emerging on the surface as a hot spring (Cruz et al. 1999, 14). The wide range of landforms and peculiar characteristics of fumaroles, lakes, lava fields, and thermal pools draw an increase in visitors who seek the geographical uniqueness of São Miguel.

The Furnas volcanic system contains hot, carbonated waters that derive from steam heating of shallow aquifers overlying the hydrothermal system (Cruz et al. 1999, 15).

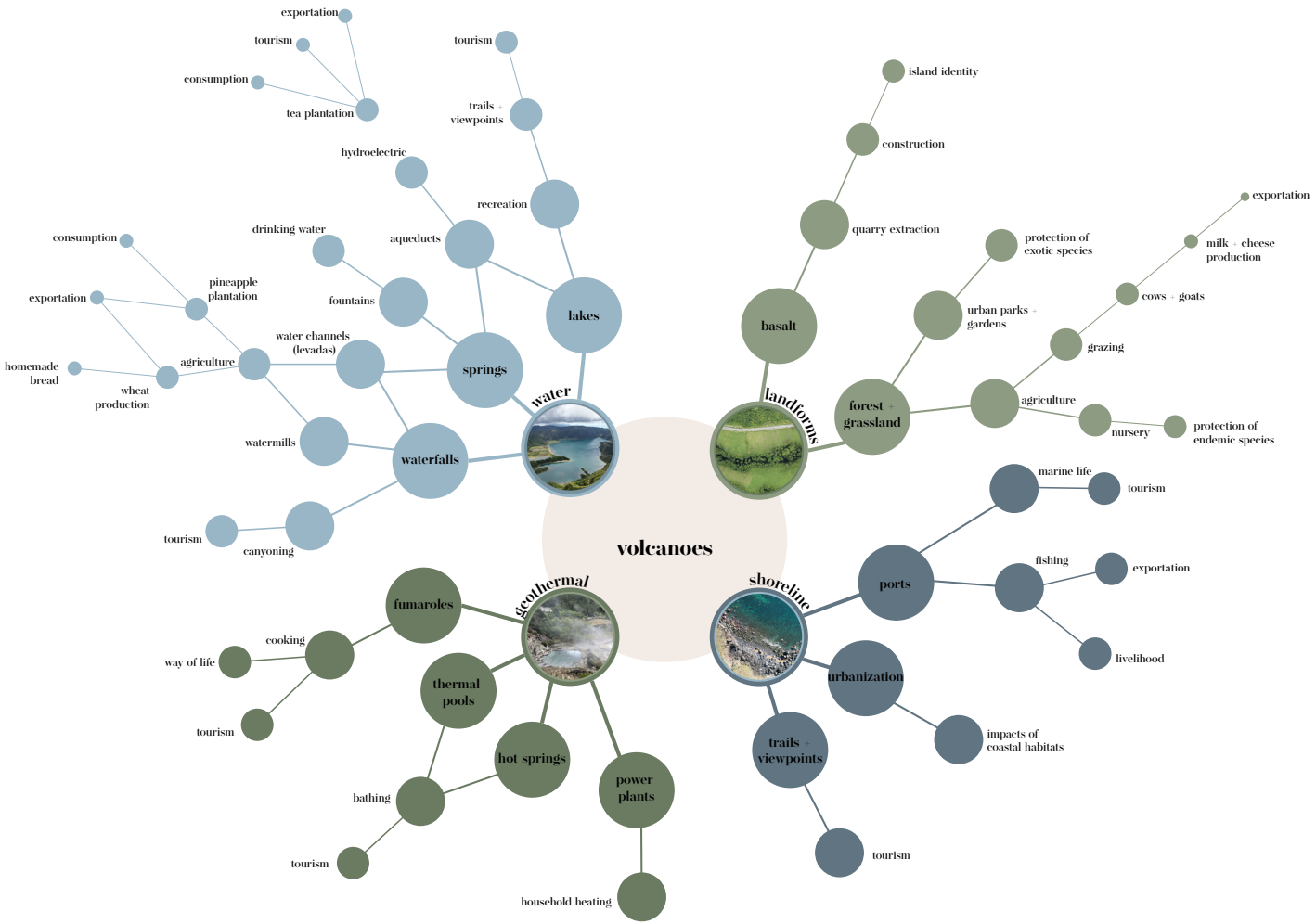


Diagram representing a study of the ecological systems that exist on the island and the volcano being the origin of each system.

Ecological Systems

> The landscape has asked much of the first settlers who had to clear rocks and the tangled growth of hundreds of thousands of years. Self-sufficiency, an intimate relationship with nature, and cohesiveness were born of the isolation in the harsh environment. (Winthrop 2014, 19).

Emphasizing the vital link between architecture and the natural environment requires a need to be sensitive to the landscape and design in a way that respects the island's natural systems. Exploiting natural resources is the primary focus of preservation and ensuring the longevity of the natural beauty that defines the landscape. The diverse ecological systems across the island, emphasized through water, are integral to local activities of living, working, and playing. These systems invite visitors to observe and learn the delicate relationship with the land through the eyes of the locals. This diagram traces the interconnected paths and nodes of the smaller ecosystems that stem from the central nucleus, the volcano. By understanding these connections, the potential to reframe how locals, tourists, and nature interact will prompt an interdisciplinary exploration of the sustainable engagement between ecological and cultural systems.

The island boasts several fountains that are extracted from the earth, each with a distinctive flavor and believed to possess unique therapeutic qualities by the islanders. One such fountain, Água do Padre José, is said to be appropriate in treating cholesterol.

Water

In São Miguel, underground water has been a natural resource of strategic importance and value since the discovery and settlement of the island. "As the livelihood for all ecosystems, water is an essential natural resource for satisfying basic human needs and for developing economic activities (such as agriculture, fishing, energy production, industry, and tourism)" ("Água," n.d.). Central to daily life, water plays an integral role in activities of work, play, and living. Its presence permeates cultural traditions and daily

rituals on the island. Deciphering these intricate relationships highlights how these waters contribute to harmonious, sustainable living. In island regions, water assumes greater relevance due to the vulnerability of aquatic ecosystems and the scarcity of alternative sources" ("Água," n.d.).

Flora

The Laurisilva Forest showing the dense forest and geothermal potential.

The landscape of São Miguel provides an authentic sanctuary of terrestrial and marine biodiversity. The geographic isolation, weather conditions, and volcanic landscape formulate a distinct ecological consciousness that provides diverse habitats and endemic species.

Sao Miguel's landscape encompasses vast meadows, pastures, and dense forests, including the Laurisilva Forest. The Laurisilva Forest, a relic of what remains of the vegetation that dates to the Tertiary Age, has seemingly gone untouched throughout history. A delicate alliance between man and nature, the ancient forest is home to 150 endemic plants, including ferns, moss, and evergreen trees. The moist trade winds help the plants retain water, allowing the forest to survive (Tavares 2019). Forest preservation has been maintained for centuries; however, in the 19th century, wealthy Azorean landowners competed to create elaborate botanical gardens, leading to the importation of thousands of rare trees, plants, and flowers from around the globe (Tavares 2019). The seeds from these non-native plants, carried by the wind and birds, overwhelmed the endemic forest. While the intentions were to showcase the quality of the nutrient-rich soil and unique climate, unintended consequences arose, and many endemic plants died.

As another example of the nutrient-rich soil, hydrangeas have thrived on this island, having first been introduced to

The abundance of hydrangeas within the Azores makes it the national flower of the nine islands.

the region by Portuguese explorers. Initially, they were an invasive species to the island, as they began growing wild, resulting in the devastation of many endemic flora (Tavares 2019). The PH balance in the soil creates variation in the colour of hydrangeas that populate the island, ranging in shades of blue, pink, purple, and white, allowing the plant to flourish across the island. Today, they enchant the island, decorating roadsides and serving as fencing to divide plots of land.

Japanese cedar, scientifically known as Cryptomeria Japonica, was introduced to the island in the 19th century as part of reforestation efforts. The presence of Japanese cedar is a testament to the historical ties between the Azores and Japan. Thriving in their new environment, Japanese cedar trees stand out with their tall, straight trunks and dense foliage, creating a striking visual presence on the island's scenery. Their conical shape and vibrant green coloration enhance the island's natural beauty. Remarkably, these trees now dominate approximately 60% of the total wood-producing forest areas in the Azores, playing a significant role in the island's ecosystem, forestry industry, and construction sector. The preservation of endemic species now makes it illegal to cut down trees that are endemic to the region. This is a significant symbol of the transformation of the relationship between humans and nature, transposing the protection of endemic species to the current culture of foresting the imported Japanese cedar tree for traditional building construction.

Furmarole picnic spot just before the Valley of Lombadas.

Chapter 3: Portrait of the Culture

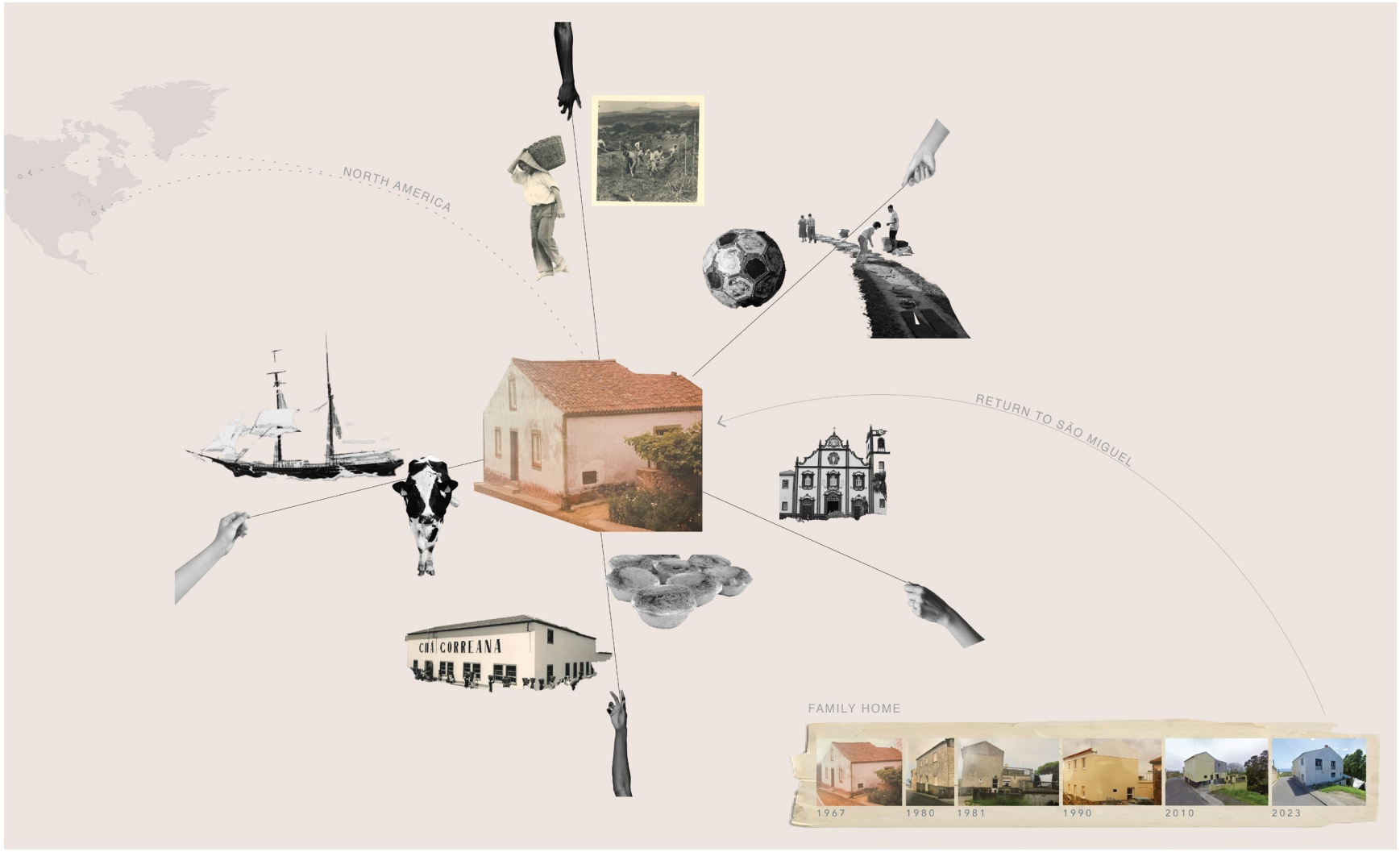
Connection to the Land

In this picturesque landscape, a unique culture of self-sufficiency, an intimate relationship with nature, and community continues.

Azorean Diaspora

At a crossroads during the Age of Exploration, many people found opportunities to cultivate the land as a means of living. They planted orange orchards and tea plantations, excelled at whaling and fishing, and made fine cheeses and wines. Isolation has shaped the relationship between people and their environment, creating a distinctive suite of land mosaics (Chester et al. 2022, 21). These landscapes were crafted by the inhabitants who found opportunities within their surroundings, resulting in the development of distinctive ways of life (Chester et al. 2022, 21). The connection has been integral since 1444, which marks the island's first Portuguese settlement.

Azoreans faced many hardships that led to the emigration from their homeland, including the devastation of volcanic eruptions, the brown soft-scale bug (coccus hesperidum) that killed the citrus plantations, and economic adversity from the decline of these exported goods. The orange gardens and groves became a source of livelihood and pride while offering significant support for the Azorean economy through foreign trade. As the link between the North Atlantic became more vital, more foreign ships stopped in the Azores, giving the opportunity for fruit trade (Queiroz 2020, 5). During the golden age of orange exportation in 1840, England became the largest market for orange purchasing (Queiroz 2020, 5).



The Azorean Diaspora representing the “pull of home” for returning emigrants.

However, by 1846, the first record of the brown soft-scale bug was recorded, causing damage and harm to the production of the orange and lemon trees across the islands (Queiroz 2020, 6). It ultimately destroyed much of the agriculture throughout the island. The economic disadvantage did not allow opportunities for jobs and professional development. It lacked prospects for a better future, leading to the exportation of work to the Americas and families searching for a better way of life and economic opportunity (Rocha, Ferreira and Mendes 2011, 23). However, the love for the island did not die.

The diaspora to the Americas took one in three Azoreans from their homeland, and by the 1960s, there were more Americans of Azorean descent than there were Azoreans (Winthrop 2014, 35). The history and geography of Azorean emigration have woven a cultural heritage where feelings of nostalgia and loss are shared and transfigured and represent a significant portion of returning islanders today.

This cultural identity lives on today, both in the locals on the island and in those who have left. This pull from home contributes significantly to tourism as a means to offer experiences that reconnect those who have left with their memories infused with place. The strong Azorean presence in North America has been an essential factor in developing

The evolution of my father's family home from when he left to how it looks today.

MILLING

FURMAROLE

HOT SPRINGS

DAIRY FARMING

AGRICULTURE

The five pillars of industry that define the way of life for the people of São Miguel.

tourism in the Archipelago. Diaspora communities have maintained strong ties to their Azorean cultural roots, celebrating the culture, traditions, and events they once experienced. This promotion of culture draws interest in those who desire to experience these events firsthand and those who want to evoke memories of these past experiences. This return of emigrants to the island emphasizes the importance of cultural tourism and maintaining a sense of place rooted in the culture and traditions that make up the identity of São Miguel, but at the same time, highlights its fragility.

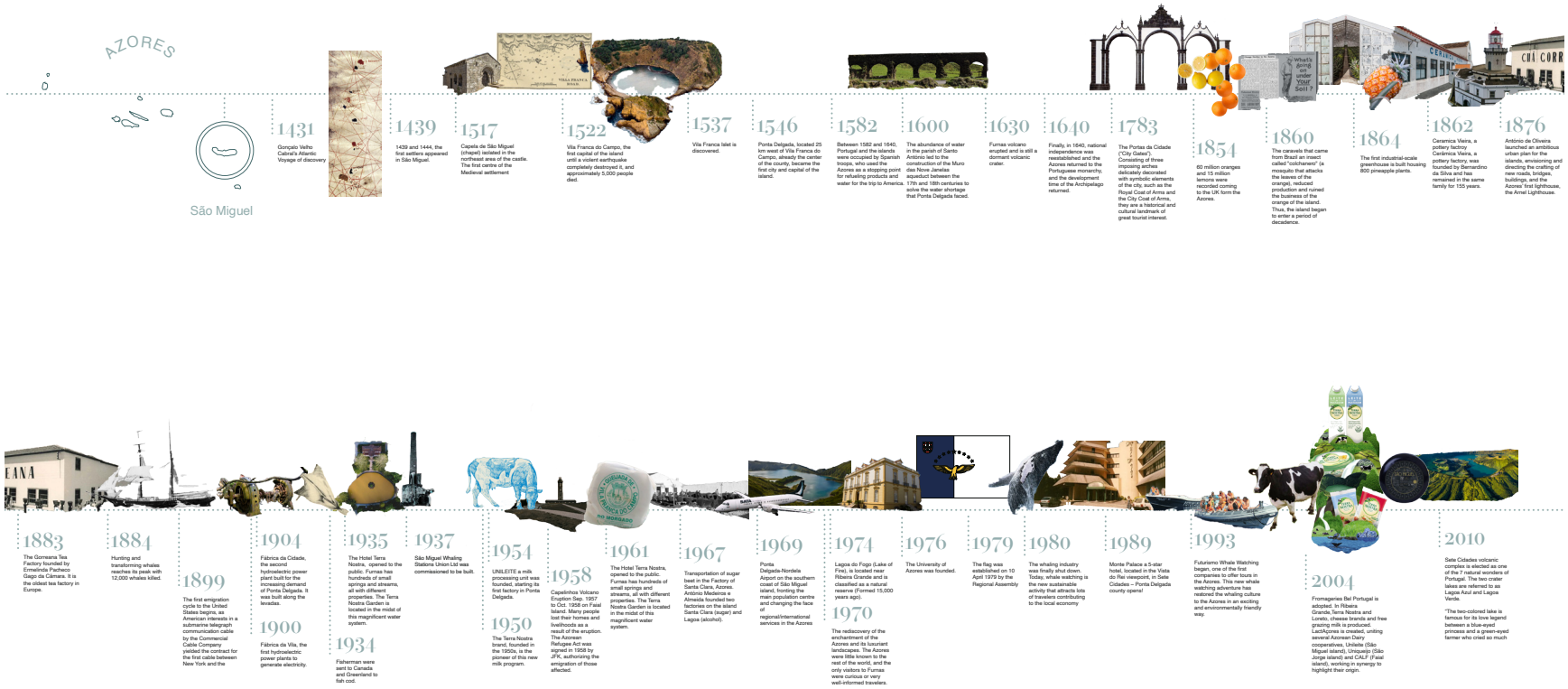
Way of Life

> The geography had shaped the people as much as the people had shaped the land. (Winthrop 2014, 19).

Preserving the identity and memories rooted in the place is crucial for safeguarding the culture and Azorean way of life. The emergence of culture is intricately tied to the traces and marks left behind by human activities, becoming the inherent property of the landscape as habitual movements and the inscribing of cultural identity gradually become interwoven with the fabric of place and its inhabitants.

Milling, fumarole, hot springs/thermal baths, dairy farming, and agriculture are the five pillars of the industry that anchor life with the volcano and act as a draw for tourists to understand and experience the distinct local identity woven into the fabric of its terrain and environment. The land seeks to be discovered and protected. It is challenged by the value and protection required within the landscape, biodiversity, and ecology that make up the island's identity.

In the nineteenth century, the blight, brown soft-scale bug, caused orange plantations to be destroyed, threatening the economy of the Azores. Alternative crops, such as tea,



Timeline of the development on São Miguel highlighting how locals have found opportunity on the island.

After the oranges were attacked by disease, the pineapple was chosen to take the place of the orange becoming the island's main export crop.

The humid and rainy climate and the volcanic soil allowed the cultivation and production of a quality green and black tea.

tobacco, sweet potato, and pineapple that could survive the humid climate were introduced to support local farmers. In 1883, the first and only tea plantation in Europe, the Chá Gorreana Factory, was introduced. The volcanic soil, abundant rain and temperate climate contribute to the distinct taste profile of the Azorean tea. The tea leaves are hand-picked, a labor-intensive method that allows for the finest and freshest tea leaves to be produced. The absence of industrial pollution and the reliance on organic or low-impact cultivation methods help ensure the production of clean and pure teas. A sustainable and clean farming practice that the Azoreans take pride in.

The locals have continued to find opportunities to use the geothermal activity of the fumaroles for cooking. These fumaroles emit steam and heat from underground volcanic activity, creating natural hot springs and geothermal vents. The fumaroles are abundant in the Furnas region of the Island, with a few in Caldeiras da Ribeira Grande on the way to the Valley of Lombadas. Residents utilize the natural steam and heat to prepare traditional dishes such as "Cozido das Furnas," a stew slow-cooked underground in the fumaroles. This traditional cooking method not only imparts a unique flavour to the food, evoking "saudade" in many Azorean diaspora, but also showcases the Island's rich volcanic landscape and cultural heritage deeply intertwined with the presence of water.

When people are a part of something, profound connections and attachments develop which allow roots to be formed that are deeply embedded in a place. This connection arises from an instinctual sense of care and concern for a place (Relph 1986, 37). Local inhabitants inherently share a desire to preserve and protect the island, envisioning a

The walking path along the north coast (“A Walk on the Edge | Walk&Talk” n.d.).

A suitcase with the word familia written on it, Portuguese for family (“A Walk on the Edge | Walk&Talk” n.d.).

space that harnesses its natural resources to promote cultural preservation.

A Walk on the Edge

A Walk on the Edge, a performative experience, and a collective journey in Fenais da Luz, a village on the North coast of São Miguel Island was produced by the Walk & Art Festival and developed by the architect duo Mezzo Atelier, Joana Oliveira, and Giacomo Mezzadri (“A Walk on the Edge | Walk&Talk” n.d.). Starting from an overwhelming idea that “if you live on the edge (the coast), you might lose your belongings overnight” (“A Walk on the Edge | Walk&Talk” n.d.). The journey emphasizes the fragility of ownership, property, society, and time. Throughout history, the locals have found opportunity within a sometimes-harsh landscape, this walk emphasizes the locals’ ability to adapt and overcome while living on the edge of a changing landscape.

In dialogue with the local community, a walk with wooden suitcases was crafted by a local whose family once lost their house to the sea. The people walked the streets with the suitcases, filling the streets with sounds announcing their presence to the inhabitants. Interwoven were questions related to ownership: “What is the most precious thing you own? What is the most precious thing you have lost?” (“A Walk on the Edge | Walk&Talk” n.d.). The journey ended with the suitcases assembled like a puzzle, unveiling the island map with local’s written answers to the question, “What do you most desire?”.

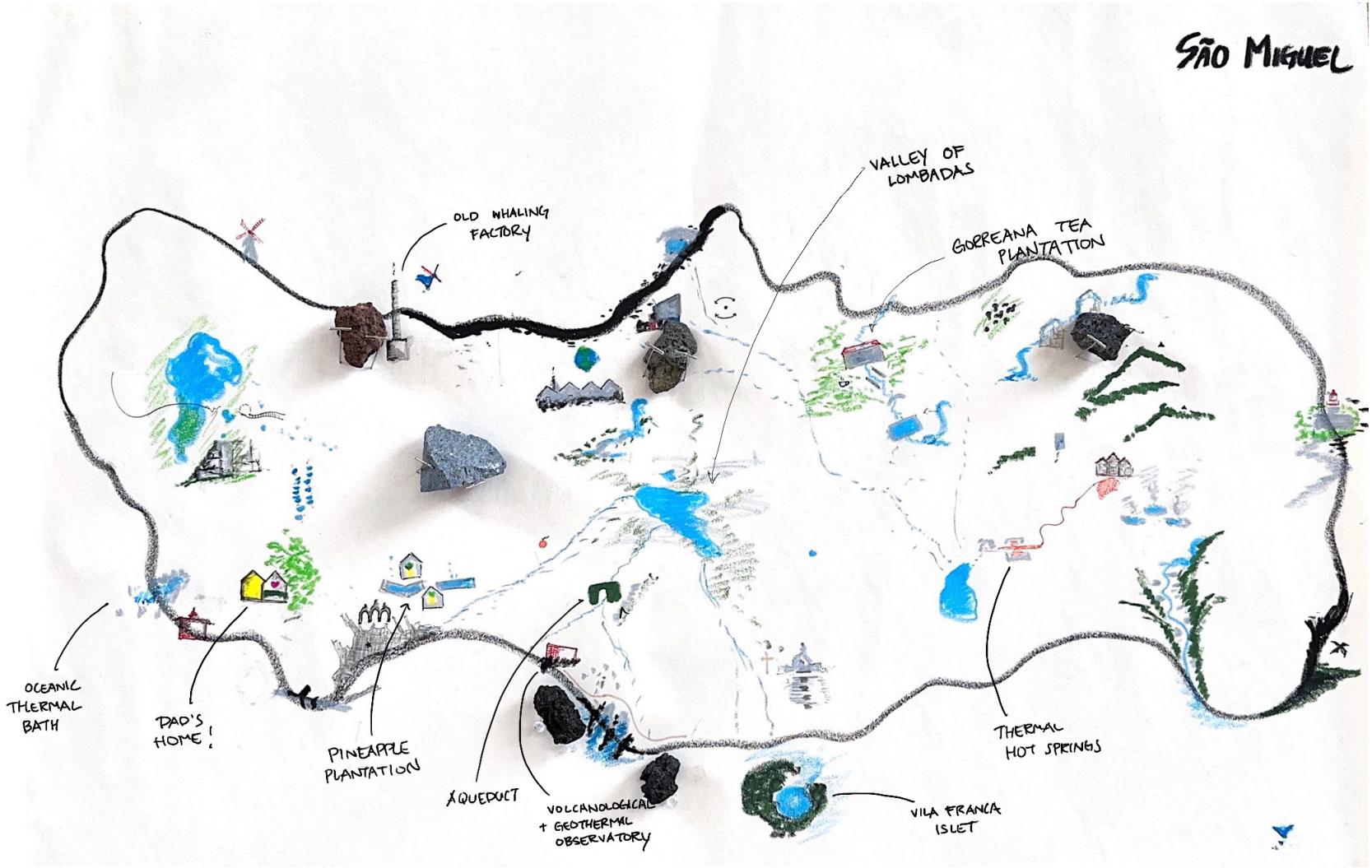
The project delves into the profound connection between the locals and their land, and vulnerability that comes with living on the edge, near the coast, serving as a powerful

metaphor for the fragility of this connection. The performative experience and the communal walk with suitcases became a symbolic act reflecting the delicate balance between the community and its environment.

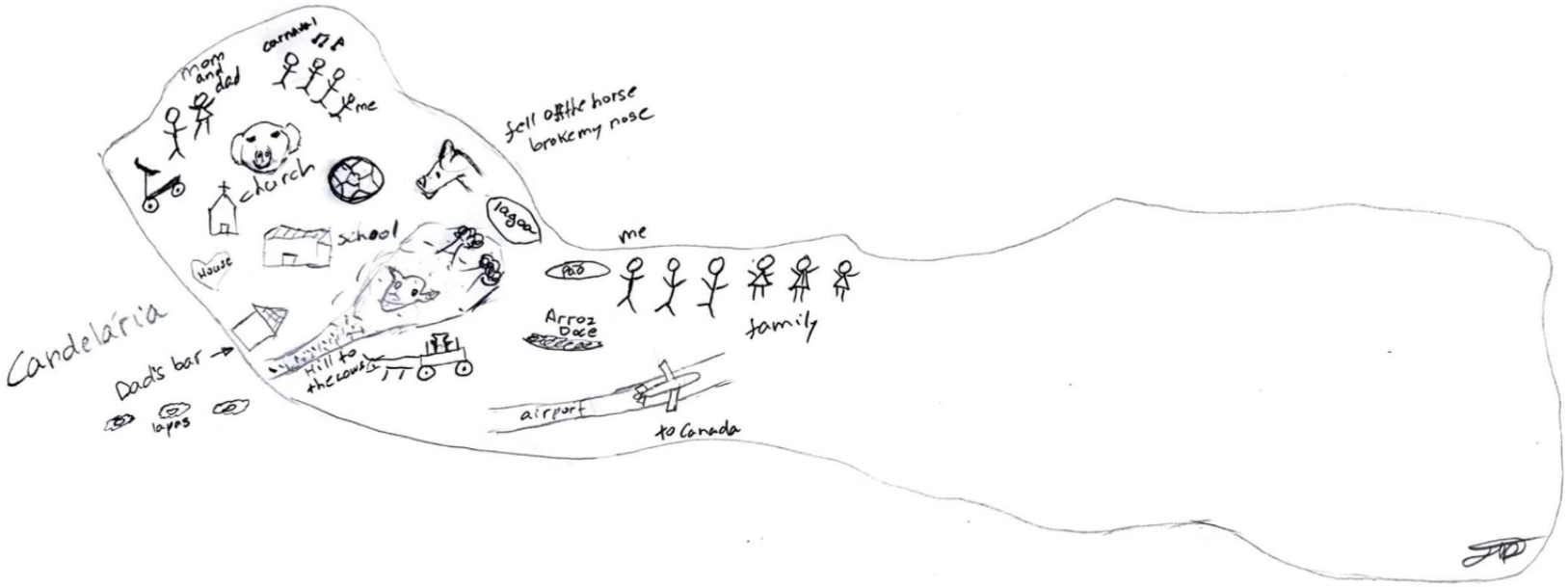
The suitcases forming the map of São Miguel Island (“A Walk on the Edge | Walk&Talk” n.d.).

Cognitive Map

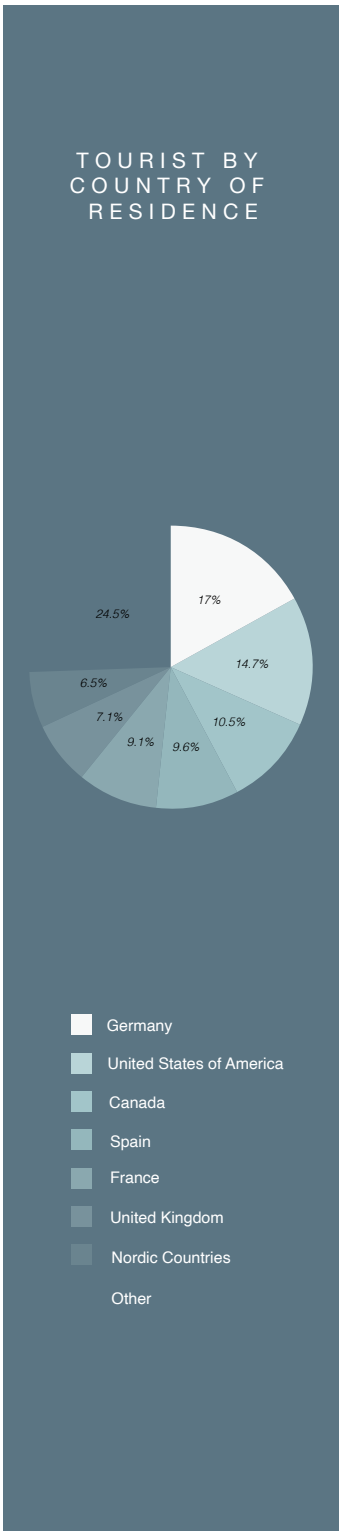
The method of cognitive mapping was used to develop a deeper understanding of the island. The cognitive mapping exercise displaces a fascinating contrast between my personal experience as a tourist on the island and my father’s recollection as a local living on the island during his youth. On my map, a tourist, symbolized a more scattered exploration across the island reflecting a diverse and extensive encounter. In contrast, my father’s map, as a local and lived experience, is centred on a specific area with his memories. The emotional impact conveyed by my father’s map appears concentrated and radiates a sense of nostalgia tied to that specific part of the island, his home. My map, indicative of a tourist’s perspective, carries a more dynamic and disruptive tone, illustrating my experiences and inadvertent impacts of tourism on the island’s natural beauty and local culture.



Map of my experience as a tourist (OR).



A map of a local's experience (my father).



Data on tourists visiting the Azores each year based on their current country of residence ("Serviço Regional de Estatística Dos Açores" n.d.).

Chapter 4: Tourism "Wrinkle"

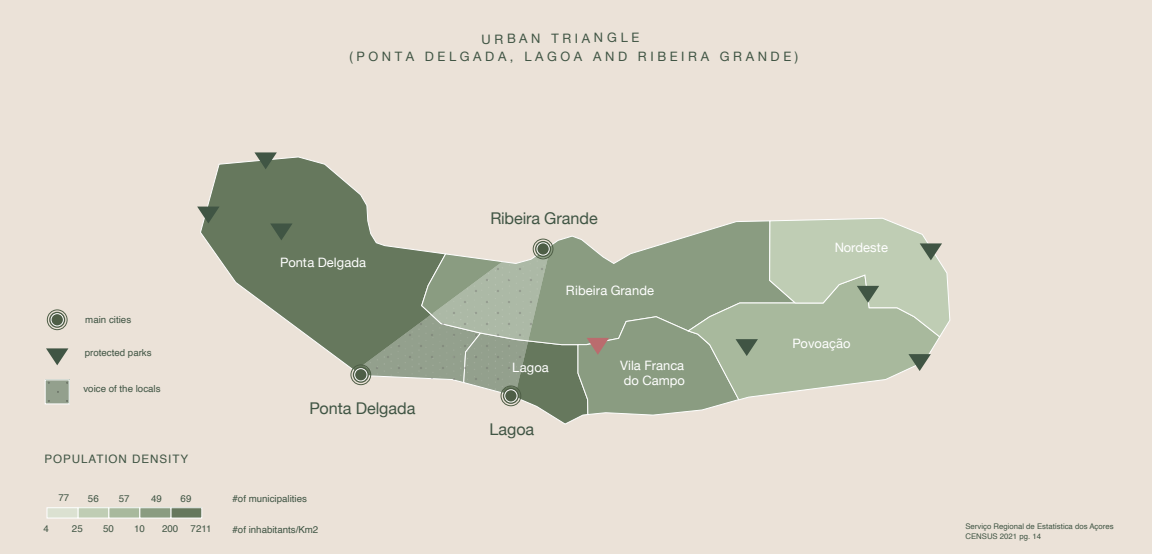
Embracing Tourism

> The Memoirs of a Tourist by Stendhal gives us a way of mapping curiosity and desire onto the human and natural world and being in the world as a tourist. Following the invention of the world tourist, Stendhal described the highest calling of the "tourist" is to actively engage with and learn from the vast array of human differences and experiences encountered while away from home. (MacCannell 2020, 24)

Economics of Tourism

São Miguel has approximately 140,000 inhabitants with 45,000 people residing in Ponta Delgada, the largest municipality and capital city and 32,000 people residing in Ribeira Grande, the second largest municipality. The three main cities in São Miguel Island: Ponta Delgada, Ribeira Grande, and Lagoa are the most population-densified regions making up the urban triangle. Within this triangle, the locals have given voice to where they accept tourism. Areas identified where preservation is essential to the islanders instigate opportunities for total protection or a more sensitive approach to architecture that is vital to ensure tourism treads lightly. The concept of memory for the tourist is different; it is received as an expression of the culture and history experienced and learned, which can be carried and applied in other areas they travel to with sensitive ecosystems.

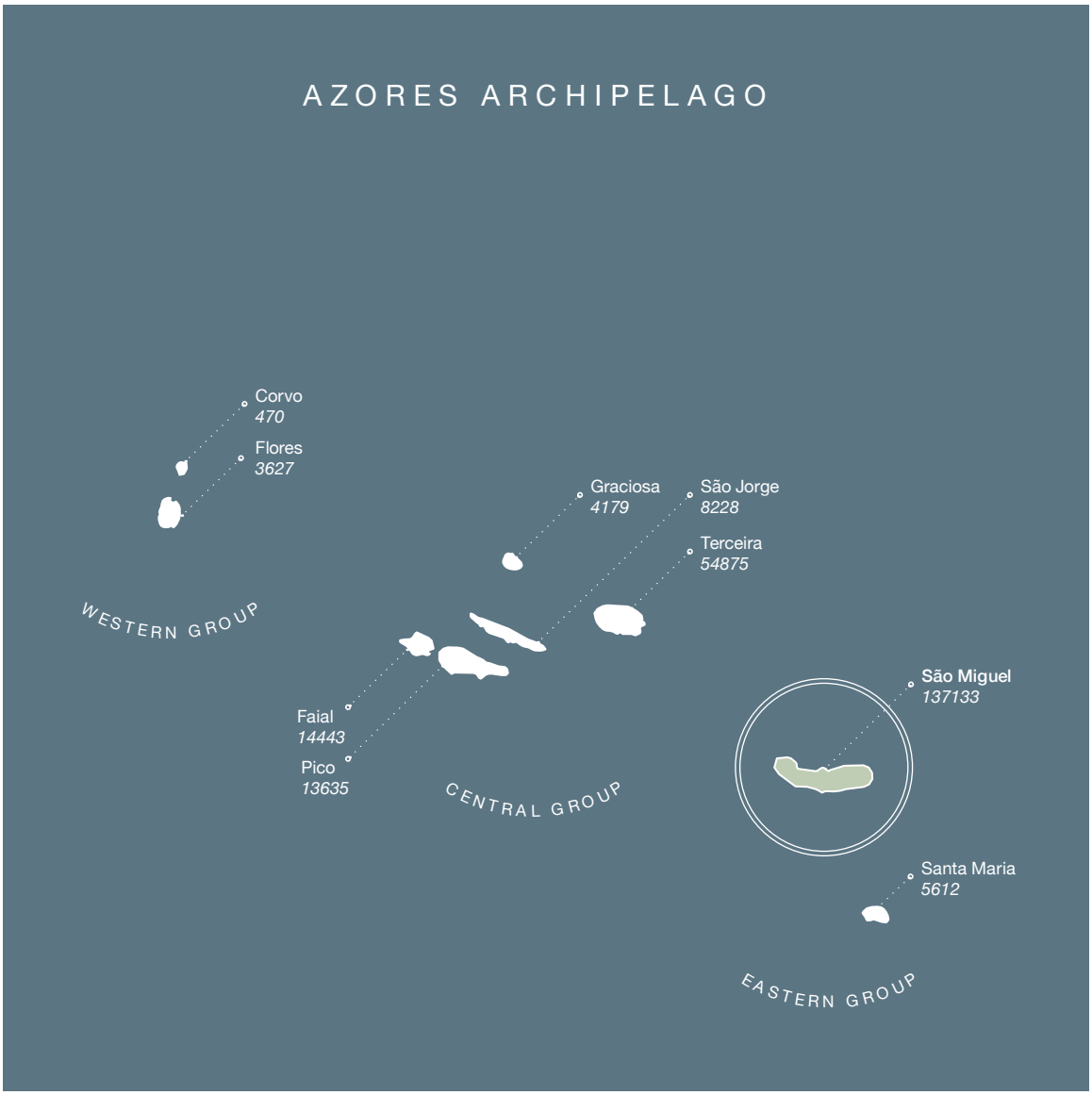
From 2015 to 2022, the number of tourists increased from 309,977 to 646,909, surpassing the island's resident number of approximately 137,200 ("Serviço Regional de Estatística Dos Açores" n.d.). São Miguel is the most visited Azores Island annually and is considered a "oceanic insular biodiversity hotspot" destination for its unique biodiversity and geodiversity (Queiroz, Guerreiro, and Ventura 2014, 1122). Tourism plays a significant role on São Miguel,



The triangle connecting Ribeira Grande, Ponta Delgada and Lagoa form the urban triangle, the area in which locals accept habitation of tourist infrastructure like hotels and resorts.

standing as a crucial sector alongside its primary economic sectors: agriculture, fishing, cattle breeding, and forestry. The island's distinctive landscape is a magnet for tourism, drawing visitors to the same land that sustains the livelihoods of the locals. Tourism is inevitable but striking a balance between tourism and the Azorean way of life is essential for both sectors to coexist harmoniously, allowing them to operate in conjunction with one another.

Canada and the USA make up 25.2% of the countries that visit São Miguel, with the majority of this number comprising Azoreans from the Azorean diaspora or descendants of Azorean Portuguese ("Serviço Regional de Estatística Dos Açores" n.d.). The interest of returning tourists in authentic experiences and rediscovery of their home region is significant. Their return is motivated by memories, celebrating local traditions, festivals, familial connections, and exploration of the land that once provided for their families. The tourist draw from other European countries provides economic benefit for locals reducing



A map of the Azores showcasing São Miguel's population in comparison to the other islands.

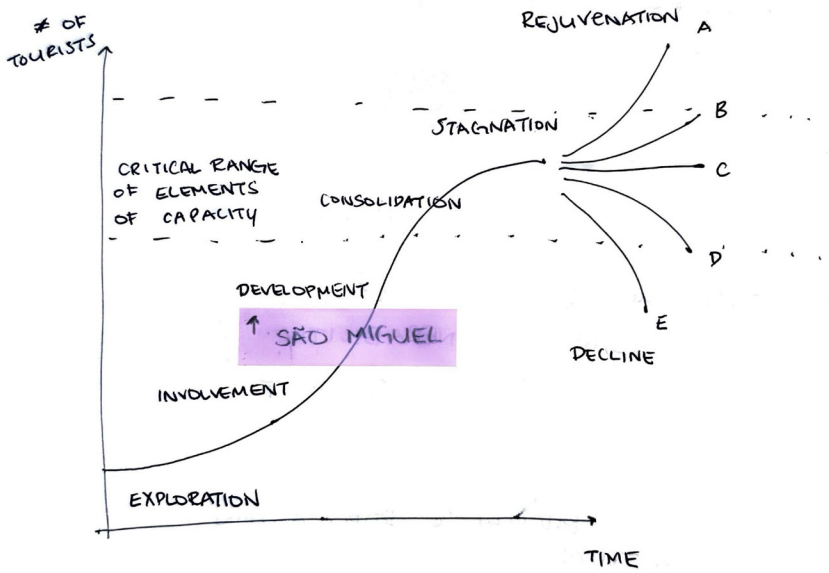
the pressure on agriculture, fishing, cattle breeding, and forestry. However, mass tourism provides destruction to cultural authenticity and damage to the pristine environment through overcrowding, pollution, and strain on local resources. Shifting the profile of tourists visiting the island towards eco-tourists can lead to more positive impacts. The eco-tourist is motivated by a desire to connect with nature, engage in sustainable practices and seeks a unique and environmentally conscious experience. Designing for eco-

tourists can provide opportunities for sustainable practices that can enhance rather than harm the island's ecosystem.

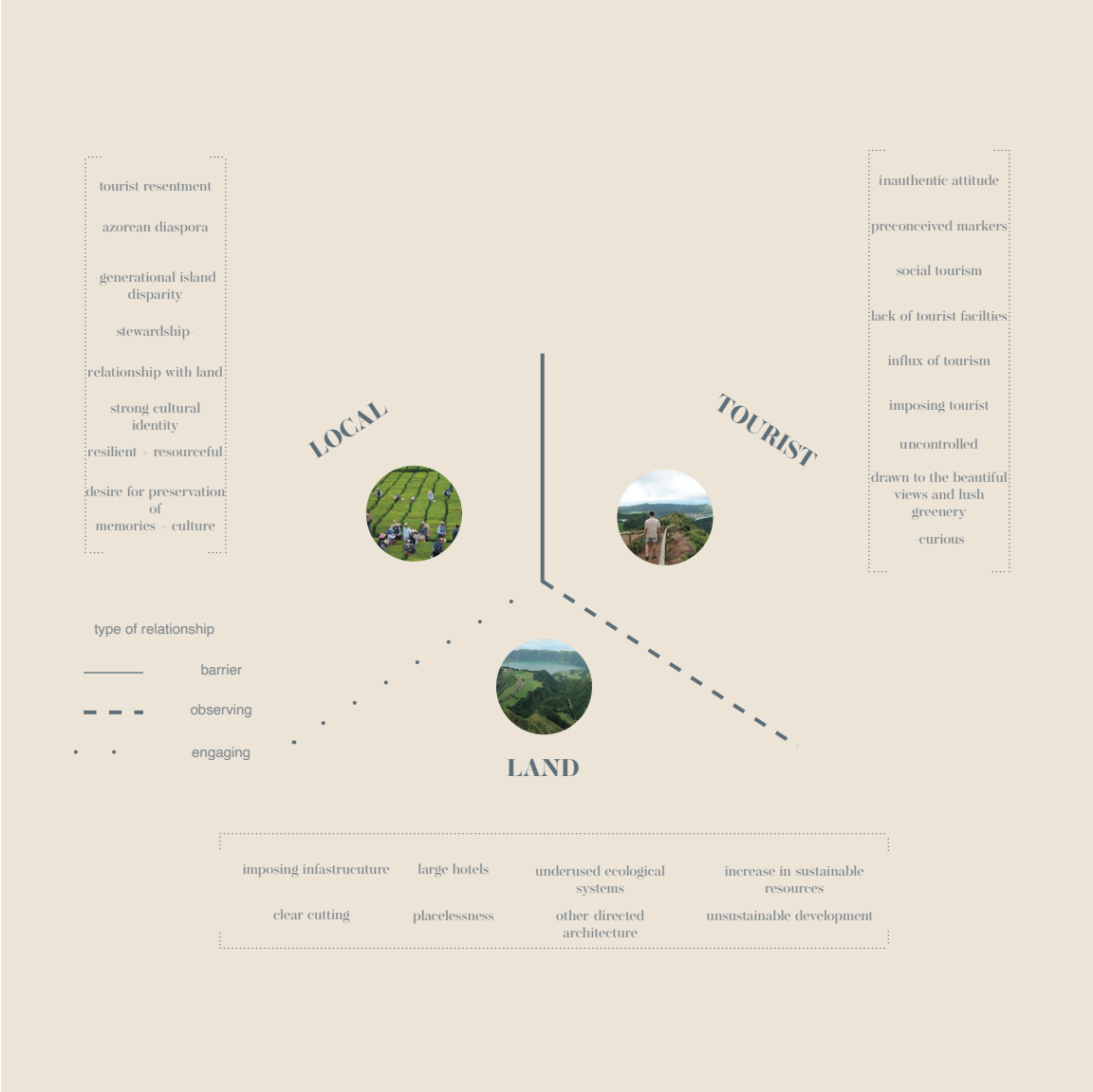
Impacts of Tourism

As humans reshape the land to accommodate mass tourism, what existed before is often forgotten, a phenomenon described by ecologists as "shifting the baseline syndrome" (Tsing et al. 2017, 20). The newly shaped and ruined landscape becomes the new reality, overshadowing the biological entanglements and historical significance of the land (Tsing et al. 2017, 20).

The Butler's Tourist Area Life Cycle (TALC) model is a theoretical framework that describes the evolution of tourist destinations over time (Butler 1980, 1). Proposed by Richard Butler in 1980, the model suggests that tourist destinations go through six stages of development: exploration, involvement, development, consolidation, stagnation, and decline or rejuvenation (Butler 1980, 7-9). According to Butler's TALC model, São Miguel currently



The Butler Tourist Area Life Cycle indicating that São Miguel is in the development phase.



A diagram representing the current relationship between locals, tourists, and nature.

occupies the development stage, signifying a pivotal juncture for implementing sustainable architecture initiatives to enhance the conservation of the island's culture and natural landscape.

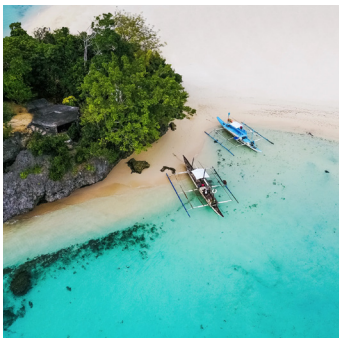
A study focused on the demand for tourists visiting protected areas in small oceanic islands, specifically the Azores (Queiroz, Guerreiro, and Ventura 2014, 1119). The research highlighted the significance of sustainable tourism in protecting natural and cultural attractions. The allure of

natural beauty was a central factor motivating visits to the Azores, with 41.1% of respondents citing nature-based reasons (Queiroz, Guerreiro, and Ventura 2014, 1124-1125).

Although contributing to the economic value of the tertiary sector, the influx of tourism poses an imminent threat to the island's ecological balance, community well-being, and natural resources. As more tourism increases, infrastructure like roads and airport expansions begin to cut across or impose on the landscape rather than develop with it (Relph 1986, 90). The development of these features which allows mass movement of people contributes to a sense of placelessness and inhibits tourists from engaging lightly with nature and authentically with the culture. Placelessness happens when the sense of identity that defines the way of life diminishes to accommodate standardized experiences, or the culture of the place becomes commodified to cater to the tourist demand. Small islands such as São Miguel suffer broader consequences to local identity and sense of place driven by the development of over tourism because of their limited resources, ecologically fragile environments, and deep-rooted connection to the land increasingly becoming geared towards tourists rather than locals (Relph 1986, 90).

Case Study: Boracay, Philippines

Boracay is a small island, considered the jewel of the Philippines and the pride of the country's booming tourism sector (Trousdale 1999, 5). Famous for the white powder sand of Long Beach and the crystal blue waters of the Sibuyan Sea, Boracay has seen intense overdevelopment, mass tourism, and destroyed ecosystems (Trousdale 1999, 5). In 2000, Boracay received 260,000 visitors; by 2018, more than two million people visited the four-square-mile



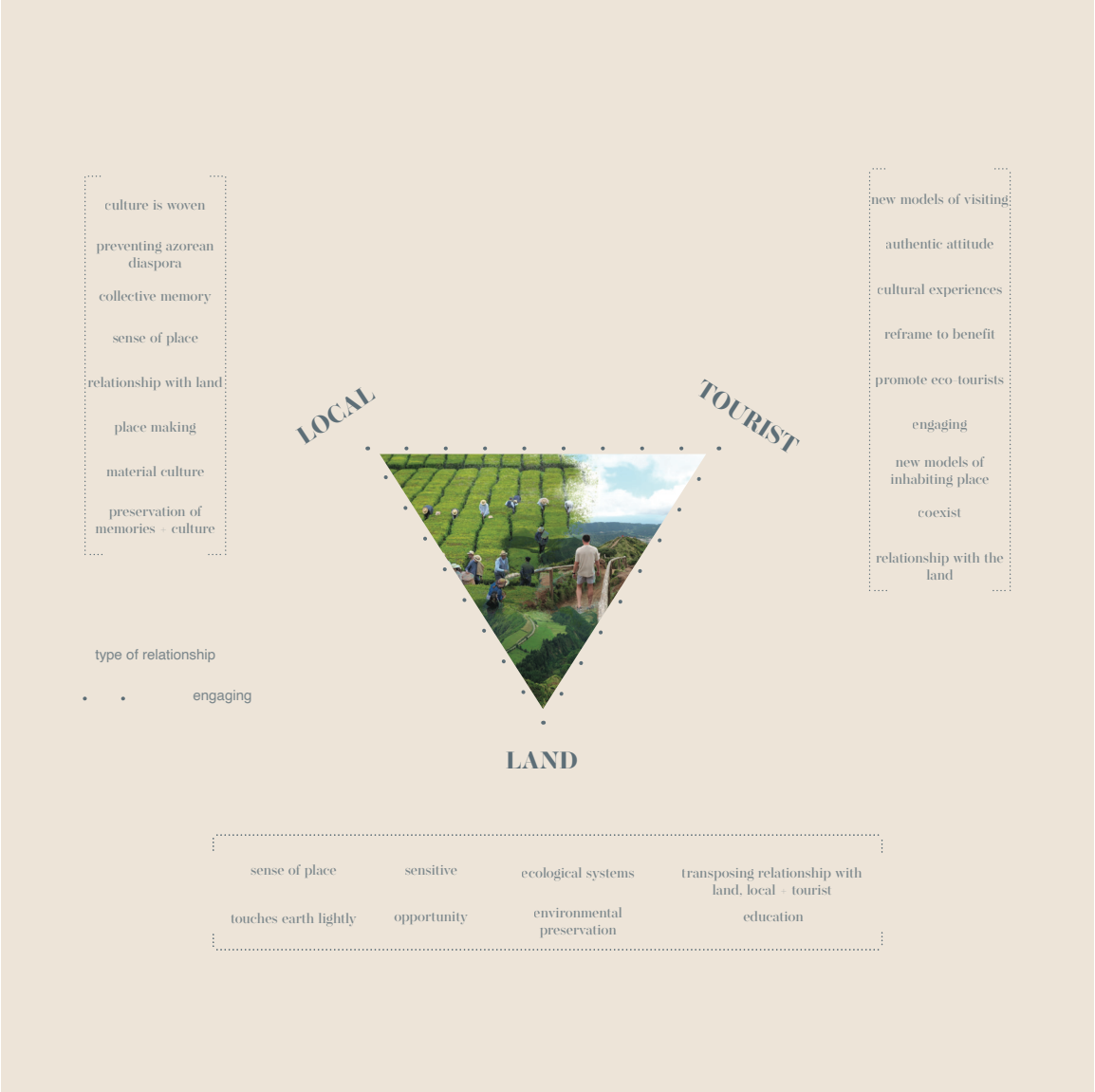
Boracay white sandy beach (Nast 2015). Before tourism, Boracay was a largely subsistent agricultural community, typical of many other parts of the Philippines (Trousdale 1999).

island (Nast 2015). The blue waters were filled with green algae, illegal fishing, pollution, and unmonitored snorkeling resulting in 70-90 percent damage to the coral reefs (Nast 2015). In response to these issues, Boracay underwent a six-month closure in 2018 to alleviate the strain on its fragile environment, rehabilitate the ecosystems, and fix the infrastructure and carrying capacity.

Boracay serves as a cautionary example for sustainable tourism on São Miguel by illustrating the negative consequences of overdevelopment, mass tourism, and environmental degradation. Boracay, despite being initially celebrated for its natural beauty, faced significant challenges due to the unsustainable practices in its tourism sector. Drawing a parallel to São Miguel, this cautionary example showcases that if sustainable practices are not prioritized, similar issues will arise, negatively impacting the local environment. São Miguel does not have the necessary infrastructure to support an influx of tourists, raising concerns about the strain on resources and the impact of movement on the land. It emphasizes the importance of adopting a sustainable approach to tourism on São Miguel to avoid the pitfalls experienced by destinations like Boracay. The mention of Boracay's closure in 2018 serves as a cautionary example, showcasing the need for proactive measures to alleviate strain on fragile environments, rehabilitate ecosystems, and address infrastructure and carrying capacity concerns.

The Modern Tourist

Modern tourism presents challenges and has societal impacts on cultural exploration and environmental integrity. Tourism has become a widely accepted practice of collecting



A diagram representing the desired relationship between locals, tourists, and nature.

sights. This concept of collecting sights has dominated the pattern of travel by shifting away from a more immersive and profound engagement with travel to one that only captures the “fleeting views of spectacular landscapes” (Samson as cited in Macy and Bonnemaison 2003, 102). In contemporary travel, mainly influenced by the omnipresence of social media, there is a notable change towards a surface-level and visually oriented approach. The emphasis lies on capturing “organized fleeting views of spectacular landscape” rather

than genuine exploration and understanding the meaningful connection of the place visited.

Tourism, in certain contexts, may lead to superficial engagement with places, where personal experiences and authentic judgments are compromised in favour of conforming to established opinions or prioritizing the act or means of tourism over an authentic connection with the places visited (Relph 1986, 83). The tourist, while inherently curious about the land, has a desire to explore; however, their inauthentic attitude towards the environment can propel resentment and negative traces within the landscape. These negative traces have the potential to disrupt the harmony between tourists and locals, creating a barrier in their relationship.

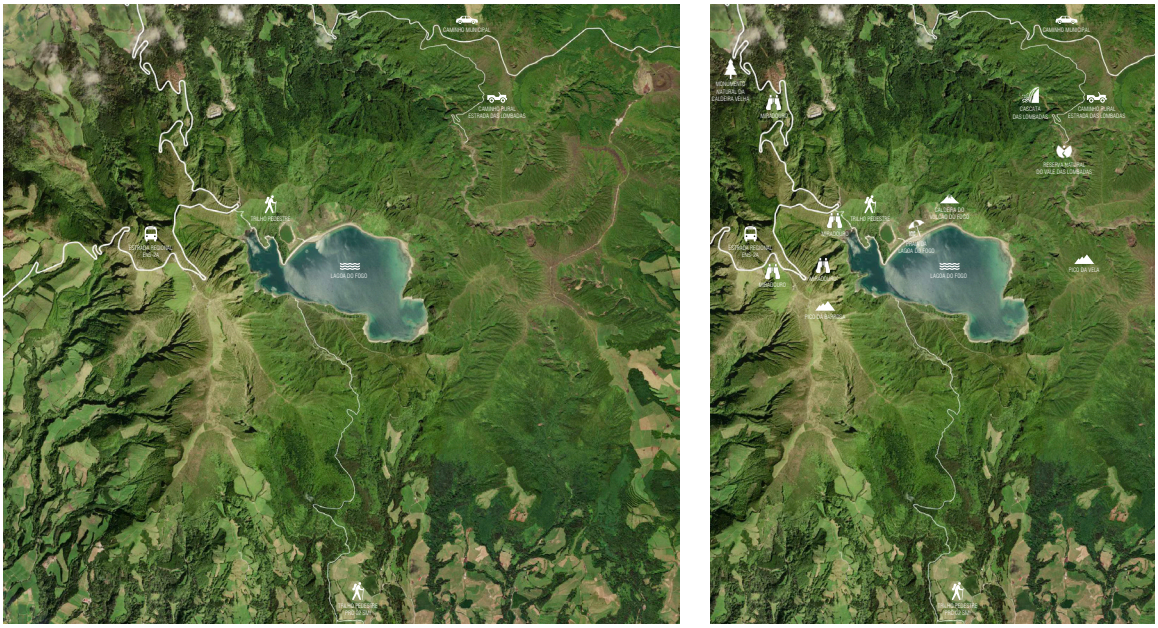
For a significant number of individuals, the motivation behind travel is not to authentically experience unique and diverse places rather the focus is the act of collecting these places through photographs (Relph 1986, 85). This contributes to the trend where tourists increasingly venture to more remote and exotic corners of the earth. Edward Relph (1986, 85) describes this phenomenon as “social tourism,” where the objective of traveling is rooted in social validation from the accumulation of locations rather than the authentic experience. He critiques the tendency of modern tourists to prioritize superficial collection and social expectations over genuine cultural exploration and immersion during travels (Relph 1986, 85).

The Eco-Tourist

The commitment to environmental preservation is deepened between an area’s culture and new models of visiting and inhabiting the place. This intersection between culture and

visitors is important to foster sustainable practices that shape the environment.

The Azorean protected areas are open, and there is no control over the number of visitors, increasing the need to protect these areas and provide facilities that aid in conservation (Queiroz, Guerreiro, and Ventura 2014, 1122). Although islands cover only about 2% of the terrestrial surface, their contribution to global biodiversity is significant (Queiroz, Guerreiro, and Ventura 2014, 1120). Isolated islands require eco-tourism to preserve nature and control visitor numbers due to their inability to accommodate the same influx of people as mainland sites (Queiroz, Guerreiro, and Ventura 2014, 1120). Introducing nature-based tourism that caters to the heterogeneous tourist demand simultaneously offers an enhanced visitor experience but also safeguards the sensitive ecosystem that local communities take pride in, thereby responding to the dichotomy between conservation



The left diagram identifies the tourist path - pedestrian or vehicle. The right diagram identifies tourist points of interest within the Água de Pau Massif (M-arquitectos and Governo dos Açores, 2021).

and public use (Queiroz, Guerreiro, and Ventura 2014, 1121).

In the context of São Miguel, the current relationship presents constraints and asymmetries in the dialogue between locals, nature, and tourists. The local's relationship with nature is porous. Their way of life is embedded in a manner that relies upon and finds opportunity with the land. However, the tourist's relationship with nature is more distant, often with an inauthentic attitude that produces resentment from the locals, enforcing a barrier within their relationship. The desired relationship promotes coexistence between tourism, locals, and nature, aiming to improve the current collision and formulate a reciprocal relationship that fosters learning opportunities. Eco-tourism is seamlessly integrated into the ecological cycle of the island, ensuring a minimal impact on the island's ecological footprint. This is achieved through architecture that enriches the experiences for both returning and new visitors while preserving the island's ecological integrity.

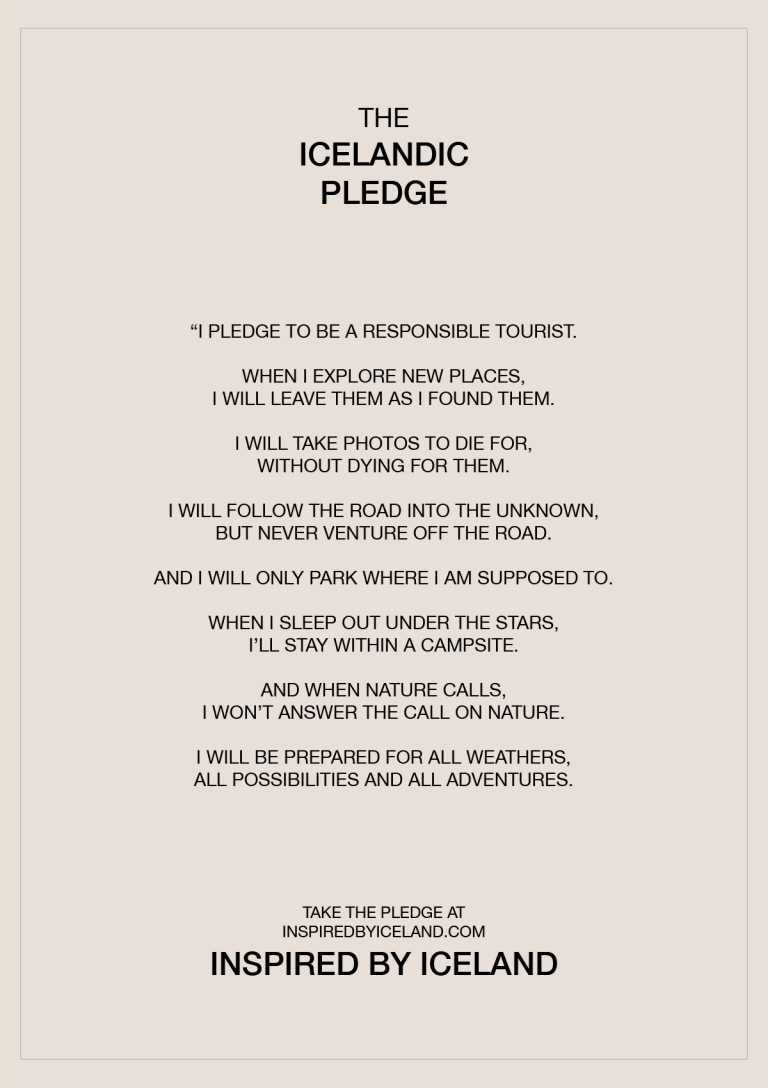
Case Study: Iceland

Iceland is a volcanic island situated on the Mid-Atlantic Ridge. Similar to São Miguel Island, Iceland's nature and communities are fragile. Iceland experiences slow vegetative growth in the summer, and it can take decades for damaged vegetation to recover ("Visit Iceland," n.d.). The rise in tourism poses a potential threat to craters and lava formations, which may never mend. Architecture has been strategically implemented throughout the island to support a balance between promoting tourism to showcase the area's natural beauty and safeguarding the island ("Visit Iceland," n.d.).

The Blue Lagoon introduces a spa, geothermal lagoon, restaurant and hotel drawing its power from earth's geothermal resources (Pintos 2022).

The Golden Circle or Ring Road through Iceland was designed to reduce traffic and showcase and make Iceland's breathtaking landscape and its most famous natural and cultural sites easily accessible ("Visit Iceland," n.d.). The extensive road network passes through dramatic landscapes and gives access to diverse natural attractions and urban settlements. As a precedent for São Miguel Island, Iceland provides an opportunity to learn from successful mitigation practices and implementation strategies for eco-tourism. The retreat at the Blue Lagoon, one of the sites along the Golden Circle, provides a successful model for integrating nature, architecture, and experience to create a place where guests feel connected to the sublime Icelandic nature (Pintos 2022). As São Miguel Island calls for an architecture that is in harmony with nature, the use of the geothermal water, a feature predominantly found in São Miguel Island, creates a public facility for both locals and tourists to interact using geothermal resources as a sustainable method that can be followed.

With tourism being a fast-growing industry in Iceland, sustainable travel is at the forefront of their development ("Visit Iceland," n.d.). The Icelandic landscape has become a tourist "hotspot" and with intervention they have found ways to manage the way tourists interact with their landscape, encouraging longer stays and travels during the off-season in order to reduce impact on nature ("Eleven Sustainability Travel Tips," n.d.). In 2017, the Icelandic Pledge was introduced to encourage visitors to commit to responsible behaviours and travel. The Icelandic Pledge, is a unique 'oath' for tourists, agreeing to respect Iceland's nature and to travel responsibly during their visits.



Iceland put forward an Icelandic Pledge to encourage and inspire visitors to behave better, to respect nature and other people while driving around the country (“The Icelandic Pledge: Visit Iceland” n.d.).

Chapter 5: Methodology

Land, Locals, and Tourists

This research delves into the intricate relationship between nature, locals, and tourists, exploring the potential for a harmonious symbiosis with the landscape through theoretical concepts of ecology, placeness, and traces and translates them into architectural attributes that will be applied to a series of design buildings. The architectural response will be developed based on an experiential journey through a network of interconnected paths, weaving moments of living, working, playing, learning, and observing as a deliberate response to harmonious coexistence on the island.

An existing natural walking path to the famous Sete Cidades viewpoint.

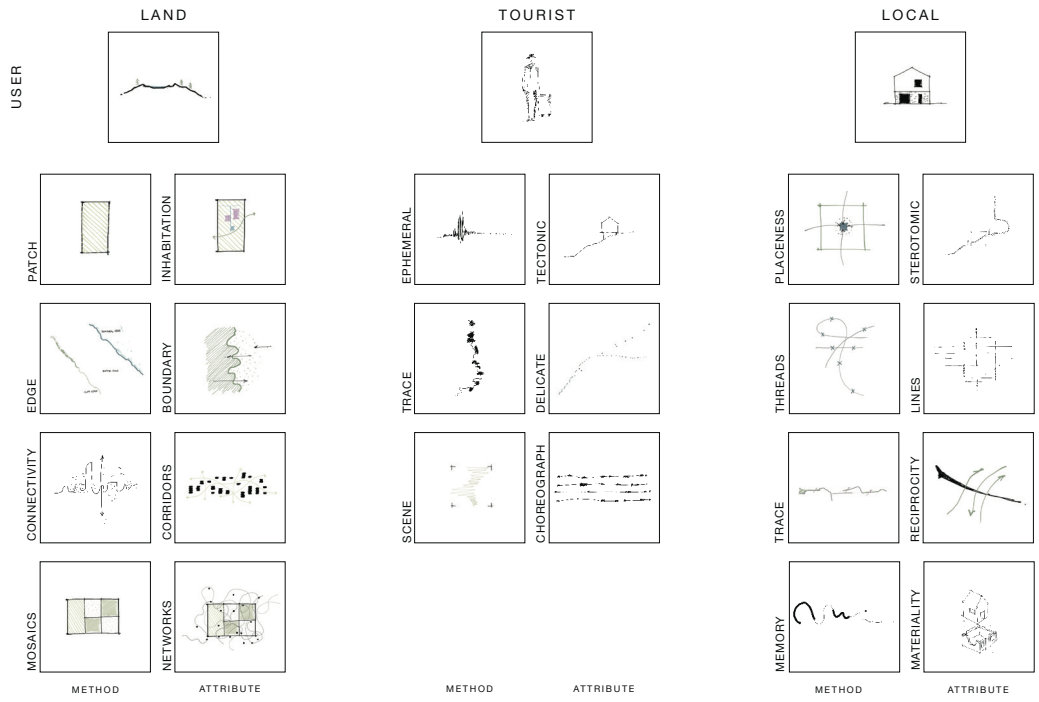
Ecology [Land]

The natural and cultural landscape of São Miguel Island is defined by its rich biodiversity associated with the volcanic terrains, the coastline, and agriculture. Through patches, edges, connectivity, and mosaics, the analysis of the site is considered as part of a larger network of spatial relationships.

Patches [inhabitation]

There are four types of patches defined by (Dramstad, Olson, and Forman 1996): remnants, introduced, disturbance, and environmental resource.

In the context of São Miguel, remnant patches are areas that contain ruins. Ruins serve as memories that contribute to the narrative of São Miguel, providing educational opportunities for both locals and tourists through adaptive reuse and the preservation of local memories.



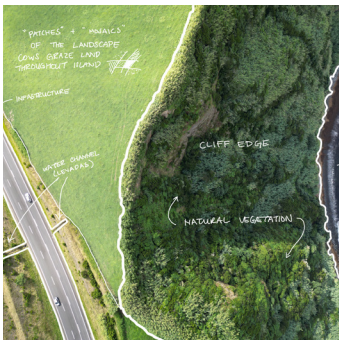
The methodology delineates a framework for the envisioned architecture, transforming theoretical concepts into architectural attributes tailored to three distinct user groups: land, tourist, and locals.

Introduced patches involve architectural interventions designed within agricultural areas, fostering connections between tourists and locals with nature through work, observation, and learning experiences.

Disturbance patches encompass walking paths and hiking trails within the landscape, necessitating architectural intervention to preserve the ecology of their surroundings.

Environmental resource patches are the three lakes: Sete Cidades, Lagoa do Fogo, and Lagoa das Furnas. The three lakes are an essential component of São Miguel's natural environment and identity that require a sensitive approach to architecture for their preservation.

By identifying the patches that exist within São Miguel, an understanding of the diverse ecological systems provides a framework for preservation and intervention in order to promote sustainable tourism and prevent cultural and land degradation.



Studying the existing edges and buffer zones throughout the island.

Edges [buffer]

The sinuous shoreline, configured by the violent cooling of lava flows that deposited a rocky, rugged, and porous massif, lends the patch of land a rare borderline balance between water and land. Through edges, architecture can provide opportunities for locals and tourists to experience the intersection of human-made and natural habitats without destruction. By introducing a distinct path to fragile land like nature preserves, the edge functions as a buffer zone regulating tourist activities and maintaining a distinct area dedicated to protection while introducing opportunities for critical education zones.

As tourism increases and human development expands to further support this, boundaries created between human-made and natural habitats become increasingly critical (Dramstad, Olson, and Forman 1996, 27). In the context of São Miguel, the island's uniqueness lies in the connection to nature and the beauty of the natural environment. The edges and buffer zones become pivotal points where interactions between human activities and nature become integral aspects of balancing the demands of tourism and preserving the island's distinct character.

Connectivity [corridors]

Landscape corridors can act as barriers or filters allowing for seamless and sensitive movement of people. Introducing corridors allows the architecture to be woven into the natural elements allowing the land and water to be omnipresent. The introduction of carefully planned corridors facilitates a more organic and considerate flow of movement and connection between different patches of the landscape. By organizing pathways that are sensitive to the natural surroundings, tourists can navigate consciously, being mindful of the impact their movements may have on the environment.

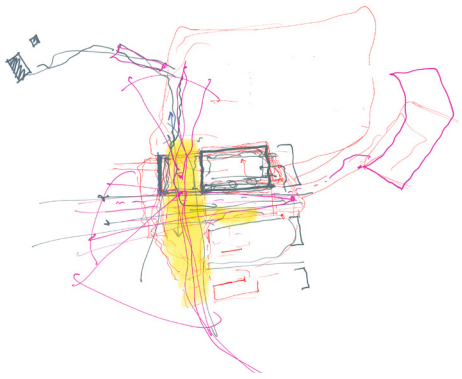


Diagram showing the study of the site and determining the current flow of movement and weaving the visitors through a distinct path that consciously moves them through the site.

Water systems are corridors of exceptional significance on São Miguel through rivers, streams, waterfalls, lakes, hot springs, and the coastline. Maintaining their ecological integrity in the face of intense human use is both a challenge and an architectural opportunity (Dramstad, Olson, and Forman 1996, 35). As these key features increase tourism to São Miguel, they become more susceptible to habitat disruption and ecological degradation. Establishing designated corridors that provide clear paths for visitors to navigate can mitigate the impacts of human activity limiting the disturbance to these features.

Mosaic [networks]

The landscape mosaic of São Miguel has been shaped by the Azorean people, who found agricultural opportunities within the volcanic terrain. This discovery led to distinctive pastures and a local identity intricately woven into the fabric of its terrain and environment. With this mosaic, unique ecological systems thrive, and endemic species flourish. The resilience of this landscape is challenged by habitual movements and land alterations (Dramstad, Olson, and Forman 1996, 41).

Urbanization, agriculture, and infrastructure development result in the fragmentation of natural habitats leading to ecosystem loss and isolation, impacting biodiversity and ecological processes (Dramstad, Olson, and Forman 1996, 41). The delicate ecology and agriculture of the island require a sensitive design to minimize fragmentation and maintain ecological connectivity. By understanding the spatial and temporal scale in which landscapes undergo change, architects can optimize protection while considering the temporality of various interactions of short-term

Diagram exploring the patches, edges, connectivity and mosaics of the Valley.

engagements with tourists versus long-term relationships of locals (Dramstad, Olson, and Forman 1996, 41). A diverse ecosystem can be showcased through interpretive trails and observation points by facilitating interactions between tourists and locals that celebrate the local mosaic of culture and activities—allowing architecture to serve as a tool for education, fostering an understanding and appreciation of the intricate patterns of the land that define the resilience of the people and place.

Placeness [Local]

Places and placelessness offers a framework for understanding people and the environment they inhabit. The significance of place transcends mere physical space. Place is space that can be remembered—that can be held in the mind and considered. It is this idea that allows place to become important both intimately and publicly (Treib 2009, 64-65). The essence of Azorean local culture can be authentically understood and preserved by incorporating concepts of placeness, threads, traces, and memory. Through these, architectural interventions can contribute to the realization and conservation of the cultural identity embedded in the Azores landscape.

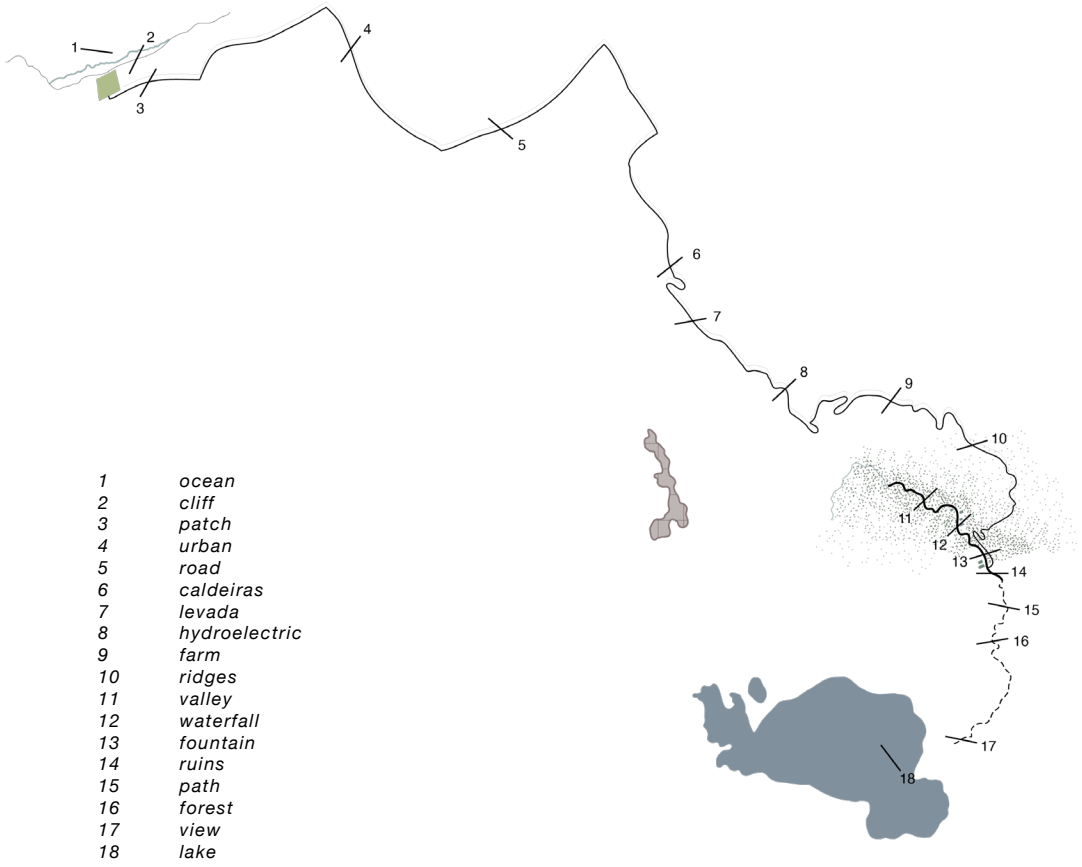
Placeness [stereotomic]

> People are their place and a place is its people. (Relph 1986, 34)

São Miguel is a centre of action, tourism, intention, and Azorean culture. However, the essence of the place lies not just in the physical location but in the unselfconscious intentionality that defines place, where human activity and culture converge (Relph 1986, 42-43). The inherent connection of the land with materials is rooted in a process deeply intertwined with the earth itself. The extracted elements of water, basalt, terracotta, and cobblestone are deeply imprinted in the place. The existing ruins evoke a sense of permanence and timelessness while embodying the essence of the landscape from which they emerge.

Threads [lines]

A thread, as defined by Ingold (2016, 51), is a filament with the potential to entangle with others or suspend between points in three-dimensional space. São Miguel, in essence, is woven with numerous threads—ecological systems binding the island into a cohesive tapestry. This interweaving is evident in the seamless connections among volcanos, nature, community, and agriculture. When examining the



The proposed path as a sequence of lines.

island's overarching system, a singular thread emerges, binding together their diverse elements and telling the story of the people that inhabit the island. "What do walking, weaving, observing, storytelling, singing, drawing and writing have in common? The answer is that they all proceed along lines" (Ingold 2016, 1). Through the lines or threads of São Miguel Island a story unfolds.

Trace [reciprocity]

The island's mosaics bear the imprints of human endeavors, revealing how individuals found opportunity in the land. Through time, the Azoreans have left marks telling stories of daily life, cultural expressions, and the dynamic movement that has shaped and enriched the island. The concept of traces, articulated by Ingold (2016, 43), reflects a reciprocal relationship between land and its inhabitants, each leaving an indelible mark that has defined the identity and touristic allure of the island.

Zumthor, Lending, and Binet (2018, 16) advocate for creating buildings that speak to people and carry the temporal essence of a place; the architecture can give voice to memory and the cultural narratives forged in the land. By drawing inspiration from the stories embedded in the island's mosaics, the architecture can mirror the daily life, cultural expressions, and dynamic movements that have shaped the island, creating structures that tell a visual story of the people and the island.

The interactions between locals and tourists and the cultural exchange contribute to the essence of place. Tourists can leave intangible imprints on the community by engaging with the local culture, traditions, and landscapes. Shared experiences, cultural exchange, and influence by local

customs leave traces and expressions that can be carried home, forming a tangible bridge between the island and its visitors.

Memory [materiality]

> Memory is at work not only in places built for recall, but in the ways that we encounter and experience buildings and spaces in everyday life. (Treib 2009, 64)

It is within the realm of architecture that the memories and stories of the individuals can be respected and accurately represented, forging a more authentic connection between people and the history and experiences of a place (Zumthor, Lending and Binet 2018, 16).

Materiality is a physical support and contact point with the memory and identity of São Miguel. Natural materials, primarily local wood (cryptomeria), terracotta, and basalt, are infused within the architecture and are reminiscent of traditional Azorean motifs and accents. Incorporating elements of collective experiences in formal structures, like ruins, the spaces become memorable and invoke memories of that place (Treib 2009, 65). Using local materials allows the harmonious integration of the buildings in the natural surroundings and morphology of the terrain to minimize the landscape impact and volume of the buildings within the land. The island's territory is its own material precedent, articulating the most representative elements of the region. Drawing inspiration from the island's material, the design is manifested through the sea, the volcanic rocks, and lush vegetation.

Trace [Tourist]

A shift in the nature of tourism to one that is a more comprehensive exploration and understanding of the place,

will allow visitors to establish a more profound connection with the local culture and environment. Embracing architectural theories of ephemeral, traces, and scenes, the way in which tourists interact with the island will be one that is positioned in conscious actions. This approach encourages a more meaningful and sustainable interaction between tourists and the island's unique identity.

Ephemeral [tectonic]

It goes beyond the mere impact of our buildings on the physical landscape—considering not just the extent or way we modify the spaces we occupy but also recognizing the broader implications that our project choices may have on a global scale (Varela 2021, 8). Quiet presence, articulated by Zumthor (2015, 15), details purposeful architecture that does not distract but gives the impression of calm, unobtrusive, and meaningful architecture that reinforces the intended concept or story. The form and function emphasize a harmonious and temporal integration with the land, mirroring the island's ethos to encourage people to tread lightly.

Trace [delicate]

Humans leave reductive traces in the landscape through frequent movement along the same route on foot, horseback, or wheeled vehicles. Some traces neither involve adding or subtracting material, yet the cumulative impact of these traces is evidence of the adverse consequences of human presence in a particular area (Ingold 2016, 43). In his celebrated work 'A Line Made by Walking' (1967), artist Richard Long paced up and down in a field until a line appeared in the grass. Although he did not add or remove physical materials, the line became visible through the alterations of the grass. The

line shows up in the pattern of reflected light from countless grass stems bent underfoot reflecting Long's presence and movement—a visible trace left on the landscape (Ingold 2016, 43). The line depicts how one can unknowingly destroy nature through repetitive movement. As more people walk the same path without the infrastructure to softly intervene and protect the land, intense tourism can lead to imprints on the land that destroy the landscape. The artwork highlights the delicate balance between human interaction and nature, prompting ecotourism practices that minimize the impact on the landscape.

A Line Made By Walking photographed by Richard Long showing a straight line of trampled grass receding towards tall bushes. The photograph is absent of a human figure but it presents a trace of bodily action (Long 1967).

Scene [choreograph]

> There is the common sensation of returning to a familiar place after an absence of several years and feeling that everything has changed even though there have been no important changes in its appearance. (Relph 1986, 31)

Despite the potential for changes in perspective over time, the return of Azorean diaspora tourists to their former homes triggers emotions and feelings of nostalgia. “Whereas before we were involved in the scene, now we are an outsider, an observer, and can recapture the significance of the former place only by some act of memory” (Relph 1986, 31). The built environment orchestrates a narrative that extends beyond its physicality, creating a tapestry of memories and sentiments. The perception of a place is not solely determined by its physical appearance but also by personal experiences, memories, and emotional connections. By choreographing the way in which tourists interact with the island, they will become more conscious of their actions and position within the island while understanding the importance of preservation.

VOLCANIC ROOT	ELEMENT	TRACE	STORY	MATERIAL	CONNECTING	TRANSLATION	DESIGN STRATEGY
Of the Earth — ROCK	BASALT		"Black Gold" Island's treasure forged in lava's fiery embrace shades of pure black and dark blue black sands beneath the azure sky atlantic waves caress volcanic shores Island's identity Basalt		WALL	Building is embedded into the earth emphasizing the connection to the land and water	
	TERRACOTTA		Clay pottery tiles and architectural baked by the artisans hands hearthy hues of red and brown "Santa Catarina" roof tiles natural and ecological Terracotta		ROOF	A cultural node to construction practices that exist throughout the Azores and Portugal	
	COBBLESTONE		Paving stones black and white mosaics nodes to the ocean reminders of maritime's past a pathway of texture lore legacy of artisans Cobblestone		PATH	An intricate path design that guides visitors while a highlighting a piece of Azores	
In the Earth — WATER	IRON		Ferrum a trail of richness in a rusty hue weaving a story beneath the soil tucked amid lush vegetation steamy waters in rivulets, pools, and brooks from the earth's warm cradle Iron		STRUCTURE + PATH	Denotes a moment in time in which it was placed, layering a new story to the site. A clear and precise transition between architecture and nature.	
	GLASS		Valley of Lombadas nature reigns supreme savage and untouched landscapes where mineral waters flow clear, refreshing and pure waiting to be captured Água das Lombadas		FRAMING VISTAS	Transparency to highlight the history and cultural	
On the Earth — LAND	JAPANESE		Cryptomeria japonica evergreen whispers in the air tall and proud against the sky planted alongside native flora conical, dense layered foliage Cultural and natural beauty Japanese Cedar		STRUCTURE + ROOF	A sustainable construction approach found throughout the island.	
	HYDRANGEA		Hortênsia a floral tapestry nature's ode amidst volcanic soil and Atlantic spray azure, pink, and purple hues guardians of hills and pastures a fragrant dance in the thermal air hydrangea		DEFINING SPACE	Highlights gathering spaces and courtyard creating a protective barrier while organizing how a visitor may experience a space.	

The methodology delineates a framework for the envisioned architecture, transforming material culture and poetic narratives of the Azorean way of life into architectural attributes.

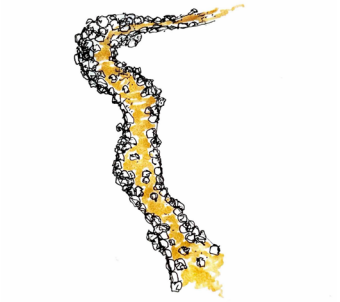
Material Culture

Of the Earth [Rock]

As human and non-human inhabitants require water as a means of survival, the relationship to water in the Azores requires a nuanced understanding of coexistence and survival in an uncertain world. Throughout São Miguel, water is celebrated in many forms: from the ocean supporting fishing, groundwater for drinking and water harnessed for agriculture and hydroelectric power. Water permeates everyday life and is a vital source for sustaining the ecosystem and inhabitants.

Iron

São Miguel's volcanic origins render this island a thermal paradise, featuring steamy, iron-rich pools. The high iron content in the thermal waters makes the water a reddish-orange-brown and often forms a unique natural clay on the rocks of thermal pools. The presence of iron leaves distinctive marks, staining the surroundings and adding a layer of its presence and passage of time as it meanders through the terrain. Iron is translated into the steel used for the structural elements of the design gaining value as it ages through the process of weathering, echoing the Island's geological history. As metals on the site patina, it denotes a moment in time in which it was placed, layering a new story to the site.

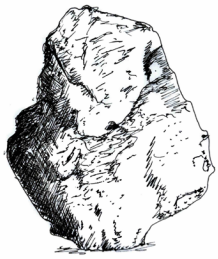


Ferrum
A trail of richness in a rusty hue
Weaving a story beneath the soil
Tucked amid lush vegetation
Steamy waters in rivulets, pools, and brooks
From the earth's warm cradle
Iron

Steel is further used for grates that delicately hover above the landscape allowing a visual connection to the existing landscape and lends itself the opportunity to preserve the landscape without compromising its identity. As an exterior application it fosters a permeable relationship with the

terrain enabling a deeper connection with water and guiding the users to lightly touch the earth.

Basalt



“Black Gold”
Island’s treasure
forged in lava’s fiery embrace
Shades of pure black and dark blue
Black sands beneath the azure sky
Atlantic waves caress volcanic shores
Island’s identity
Basalt

Basalt, an igneous rock formed from the rapid cooling of lava, stands as a stereotomic material rooted in the island’s terrain. The utilization of basalt in Azorean architecture holds profound cultural and historical significance, reflecting the geological history of the island and the resilience of local communities. Integrating vernacular nodes into the design, such as basalt stone—a material intrinsic to the island’s identity—enhances the essence of the place. The traditional use of basalt and modern construction fosters a deeper understanding and appreciation for the distinctive heritage of both locals and tourists.

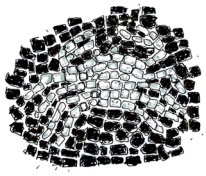
The basalt exhibits a range of hues, transitioning from deep black to dark blue or medium greys, depending on the lighting conditions, treatment, or interaction with water. This distinctive volcanic rock has earned the affectionate moniker “black gold” from locals signifying its importance and versatility for islanders who have creatively utilized it in architecture, jewelry-making, and agricultural practices.

Clay
Pottery, tiles and architectural
Baked by the artisans hands
Hearthy hues of red and brown
“Santa Catarina” roof tiles
Natural and ecological
Terracotta

Terracotta

Although terracotta is utilized in many applications such as pottery dishes and large clay vessels, called *talha*, used in the fermentation process for wine, the most recognized use is the traditional clay roof tiles that are synonymous with Portugal and the Azores. The roof tiles are a traditional building practice that has been used for centuries. The half-tubular shape of the tiles allows water to drain easily and help to cool the building. The warm, earthy tones of

terracotta blend harmoniously with the natural surroundings adding to the picturesque charm of the island. The charming patina of the terracotta as it weathers and matures captures the essence of time and the beauty found in permanence. As the subtle textures and colours change it reflects the influence of environment, climate, and human touch.



Paving stones
Black and white mosaics
Nodes to the ocean
Reminders of maritime's past
Pathway of texture lore
Legacy of artisans
Cobblestone

Cobblestone

Black and white mosaics characterize the streets, plazas, and paths of São Miguel, reminiscent of the maritime heritage of the Azores with motifs of the ocean, fishing, and boats. Handcrafted by skilled artisans, the cobblestone adds a touch of traditional craftsmanship to the island's infrastructure. This meticulous process involves shaping and setting each stone individually, creating intricate patterns and designs. As a tangible link to its rich history, these stones have adorned the island's streets, squares, and pathways for generations.

In the Earth [Water]

Valley of Lombadas
Nature reigns supreme
Savage and untouched landscapes
Where mineral waters flow
Clear, refreshing and pure
Waiting to be captured
Agua das Lombadas

Glass

The Valley of Lombadas showcases various types of water amongst its fascinating, rather savage, and untouched landscape. This is the site of the naturally carbonated spring that provides the famous and refreshing mineral water known as "Agua das Lombadas" which was bottled from 1896 to 1998.

Glass offers the opportunity to reveal history and frame moments within the architecture that tells stories of the past. It embodies the concept of impermanence, being temporary or subject to change, thus allowing the dynamic

landscape and history of the site to be revealed, observed, and appreciated.

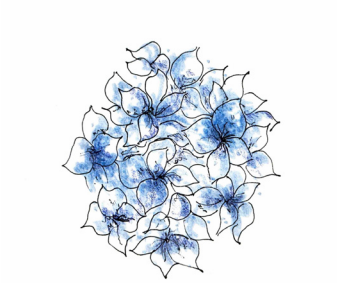
On the Earth [Nature]

There are more than 3,000 species of endemic and imported trees, flowers, ferns, and shrubs in the Terra Nostra Garden. Gardens across the Azores is where nature, history, and culture merge, from public gardens and parks to botanical gardens, private quintas, and monastic courtyards, these spaces hold the beauty of the natural world and the stories of the past, making them valuable knowledge repositories.

Cryptomeria japonica
Evergreen whispers in the air
Tall and proud against the sky
Planted alongside native flora
Conical, dense layered foliage
Cultural and natural beauty
Japanese Cedar

Japanese Cedar

Japanese cedar has been used in traditional Azorean architecture to construct houses, churches, and other buildings. The wood's versatility allows it to be utilized for structural elements such as beams, columns, roofing, and decorative features like doors, window frames, and trim. Additionally, the cultivation of Japanese cedar forests has shaped São Miguel's environmental and economic landscape, providing employment opportunities through forestry and wood-related industries. The Japanese cedar symbolizes São Miguel's identity as its widespread presence across the island's landscapes contributes to the region's scenic beauty, architecture, culture, and sense of place, embodying its blend of natural beauty and human ingenuity.

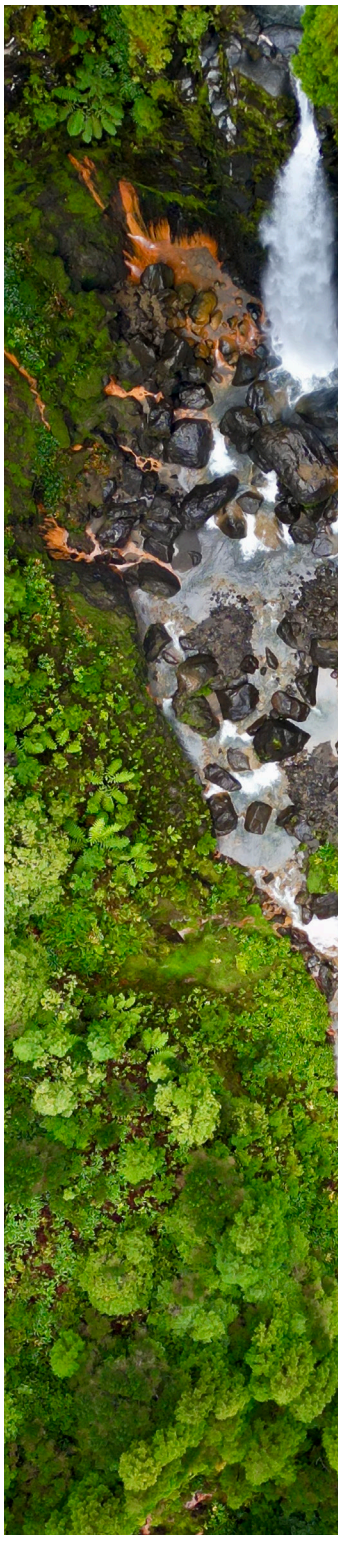


Hortênsia
A floral tapestry nature's ode
Amidst volcanic soil and Atlantic spray
Azure, pink, and purple hues
Guardians of hills and pastures
A fragrant dance in the thermal air
Hydrangea

Hydrangea

São Miguel is renowned for its stunning displays of hydrangeas, which blanket the landscape in vibrant shades of blue, pink, and purple during the blooming season. These flowers create breathtaking vistas and are a defining feature of the island's scenery. A symbol of pride and beauty, the

seeds of the hydrangea flower do not dictate the plant's colour; it is the volcanic soil enriched with nutrients (Tavares 2019). They are often associated with tradition, hospitality, and the island's way of life. Additionally, hydrangeas are used in local festivals, events, and religious celebrations. (Tavares 2019). As one drives through the various countryside towns and villages, green pastures fill with cows grazing on the green grass. At the same time, the fences that divide the plots of land are made of hydrangeas utilizing the beautiful island's natural elements for protection (Tavares 2019).



The valley of Lombadas has a naturally carbonated spring that provides the famous and refreshing mineral water known as “Agua das Lombadas”.

Chapter 6: Design

The Valley of Lombadas

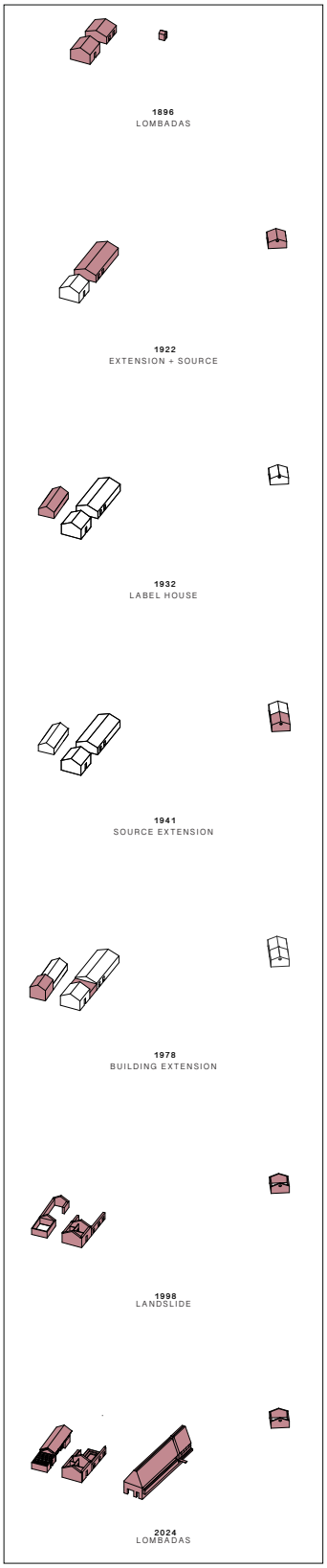
Situated south of the urban district of Ribeira Grande, the Valley of Lombadas emerges as one of São Miguel’s most prominent natural sites. The strategic vision of the tourism growth path needs to be firmly anchored in the principles of ecological education and sustainability to ensure a delicate balance between the Azorean landscape and the Azorean culture. The proposed design aims to engage tourists actively with the intricate mosaic of the landscape, facilitating an opportunity to learn from a diverse array of human differences and experiences encountered that would not be experienced from home.

History

> When the idea of bottled water for current consumption was still unimaginable, the Lombadas mineral water in São Miguel lived up to his reputation. Naturally carbonated, it was compared with some of the national brands, and many considered it to be of very high quality. Translated from (“Os Açores: Revista Ilustrada, A. 1, Nº 3” 1922)

For centuries these waters ran in freedom, and were lost in the ravines, until one day their properties were discovered on the lands. In 1895, a road from Ribeira Grande to the Valley of Lombadas was constructed and in 1896, directors from the exploration company, Meyrelles & Co. established the Fábrica das Lombadas (Lombadas Factory).

The naturally carbonated spring that provides the mineral water known as “Agua das Lombadas” contains calcium, magnesium, sodium, and bicarbonate, making it ready to drink straight from the source. To sell the water, the original spout was not enough, and a new catchment, forty meters away needed to be constructed. By 1922, 2,000 to 2,500



The history and expansion of the Lombadas Valley highlighted in red.

bottles were filled every day, transported by horses to Ribeira Grande. The majority was then shipped in trucks to Ponta Delgada to embark for Lisbon (mainland Portugal), Madeira, Brazil, and Africa (Ávila 2013).

One building was used for staff accommodation and the largest building was the workshop pavilion consisting of two water bottle washing machines, one water filling corner, a bottle capping machine, and a labeling machine. By 1978, expansions on the facility were completed with renovations to include covering the walls in tile and with floor mosaics. With the phase of renovations 10,000 to 30,000 bottles per hour were envisioned. Advertisements in local newspapers coined the carbonated water as “the queen of table water” encouraging residents and visitors to “escape to the Lombadas” to taste the source of “health and life”.

At the peak of the Lombadas, the hope was that the Lombadas water would never stop and would be reflected in the wealth brought to the region - an essential factor for the promotion of the site. However, in 1998, a landslide swept through the valley, destroying the Lombadas Factory, leaving only fragments of its success behind.

The first buildings for the extraction of carbonated water in the Valley of Lombadas printed on a postcard (Franco 2012).

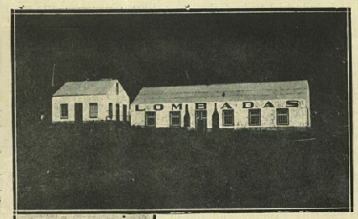
The magazine "OS AÇORES" visits the source of Agua das Combadas

For this beautiful and fertile island of S. Miguel, Nature was so prodigal in wonderful gifts that if we set out to publicize them, only one difficulty has overwhelmed us: that of choice.

The active Delegate of the Empreza da Agua das Lombadas came to meet our desire, providing us with a walk to the source of the magnificent water, so rightly proclaimed - The Queen of Aguas-de-mesa, on one of the last days of this muggy and dusty September.

From Caldeiras da Ribeira Grande, a small but picturesque thermal resort, passing through the refreshing shade of its leafy acacia forests, we follow the narrow path which, eluding the difficulty of the ascent, follows long zigzags, skirting the mountain, leads us to the precious spring.

Once on the mountain, the landscape excites us. The black-green



On the right is the workshop pavilion and on the left is the staff accommodation.

Interior of the workshop pavilion. Part of the staff and some visitors

The heather stretches uninterruptedly around us, covering and flanking the ravines, disguising the abysses... and in the distance the plain where the village's houses are grouped; sowing fields, lush green forests and beyond, the endless blue sea...

The time that until then had remained serene, threatens to change. We hurried on, but not without a naughty little rain surprising us before in one of the last turns of the path we discovered, although still far away, the pavilions, standing out against the green background and where the red stain of the roofs gives pink reverberations...

We finally arrived,

Visiting the East, enjoying the magnificent water, we were served a succulent lunch that, the journey, the pure mountain air and the excellence of the Lombadas water made us more appreciated..

We then witnessed the water being blocked, preparation of lemonades, washing and labeling, etc.; and we are pleased to observe that in all operations

Water bottling at Nascente Clichés José Gomes presided over

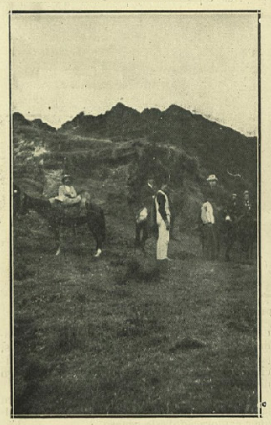
the largest and most scrupulous process, which we are pleased to note.

The Empreza uses only a very small part of the water from the spring, which gushes out a source of more than 17,000 liters per hour. However, around 2,000 to 2,500 bottles go to the deposit every day, the majority of which are then wait in Ponta Delgada to embark for Lisbon, Brazil, Africa, etc., where thousands of consumers eagerly await them. Located east at an altitude of more than 500 meters and far from Vila da Ribeira Gran-

Mr. Manuel Pavão
Delegate of the Company of Aguas das Lembadas

the A group of staff

from where the deposit is currently located, about 11 kilometers, the transport of water is carried out with great difficulties, especially during winter, when frequent rains and fog make crossing the mountain not only more arduous but even dangerous. How many people drink Agua das Lombadas, how many thousands of dyspeptics praise it without caring?

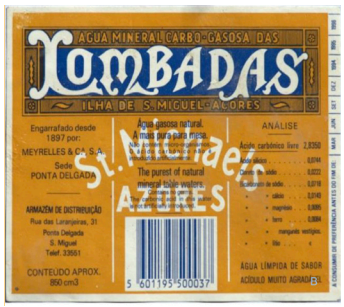


At the top of the mountain

The source Clichés José Gomes

Then, on our way back from Caldeiras to Ponta Delgada, in the comfort of the car that had taken us there, we thought with regret: the idea, however vague, of the island where it springs up perennially and cleanly, a source of health and life, is certain of its existence.

Translated from a 1922 article written for the Os Açores magazine depicting the journey to the Valley of Lombadas to taste the carbonated water produced by mother nature (“Os Açores: Revista Ilustrada, A. 1, Nº 3” 1922, 18).



Label of the original Agua das Lombadas (Machado 2015, 39).

Bottle of the original Agua das Lombadas (Machado 2015, 39).

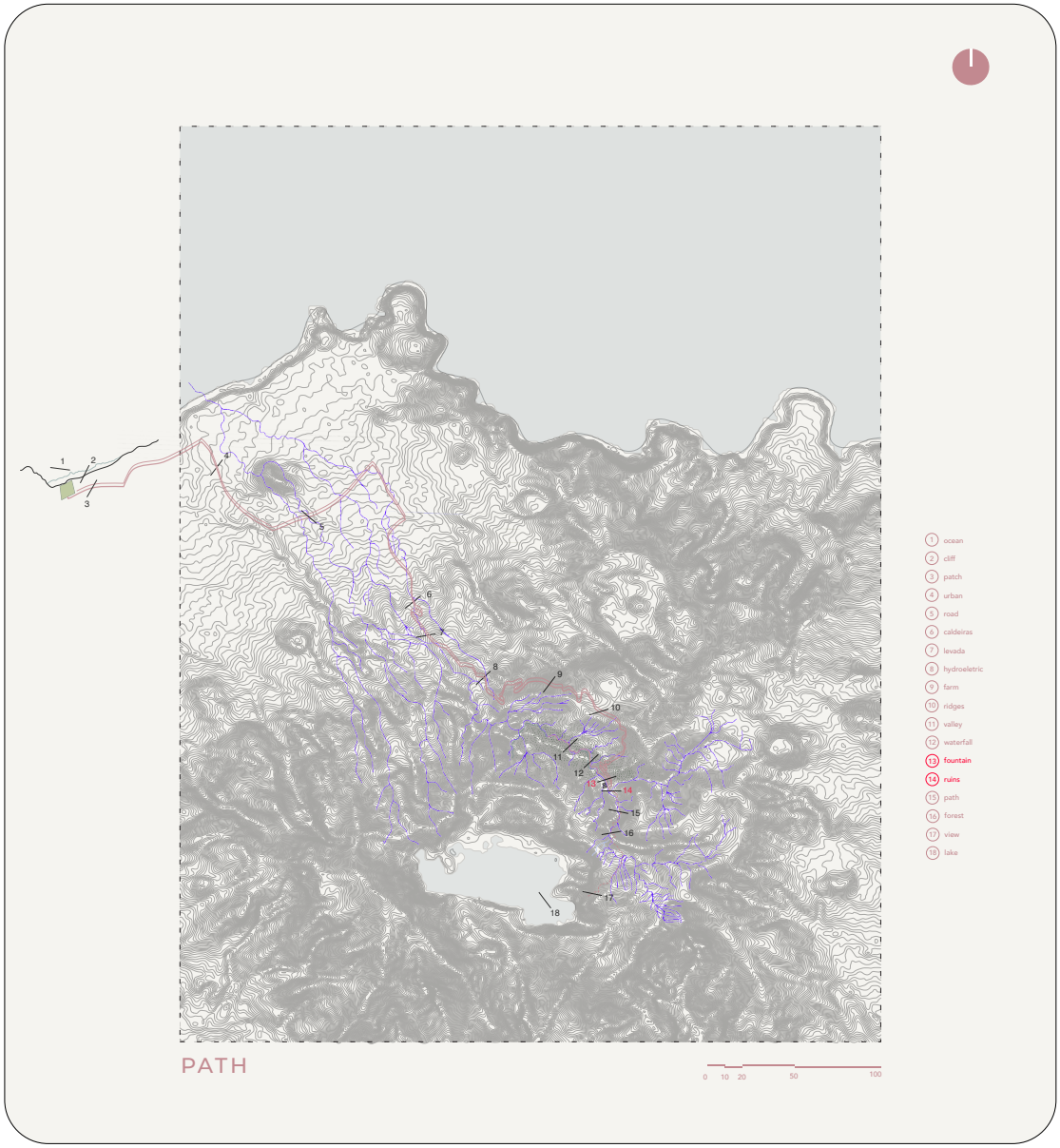
The Path

Locating the project in the Valley of Lombadas, a nature park, allows protective measures to be put in place to preserve the raw and untamed natural landscape. Today, the landscape of the Lombadas Valley is characterized by a captivating, rather savage, and untouched landscape featuring mineral water springs, naturally carbonated water, thermal waters, and luxuriant vegetation that define its geological makeup, still drawing numerous tourists each year.

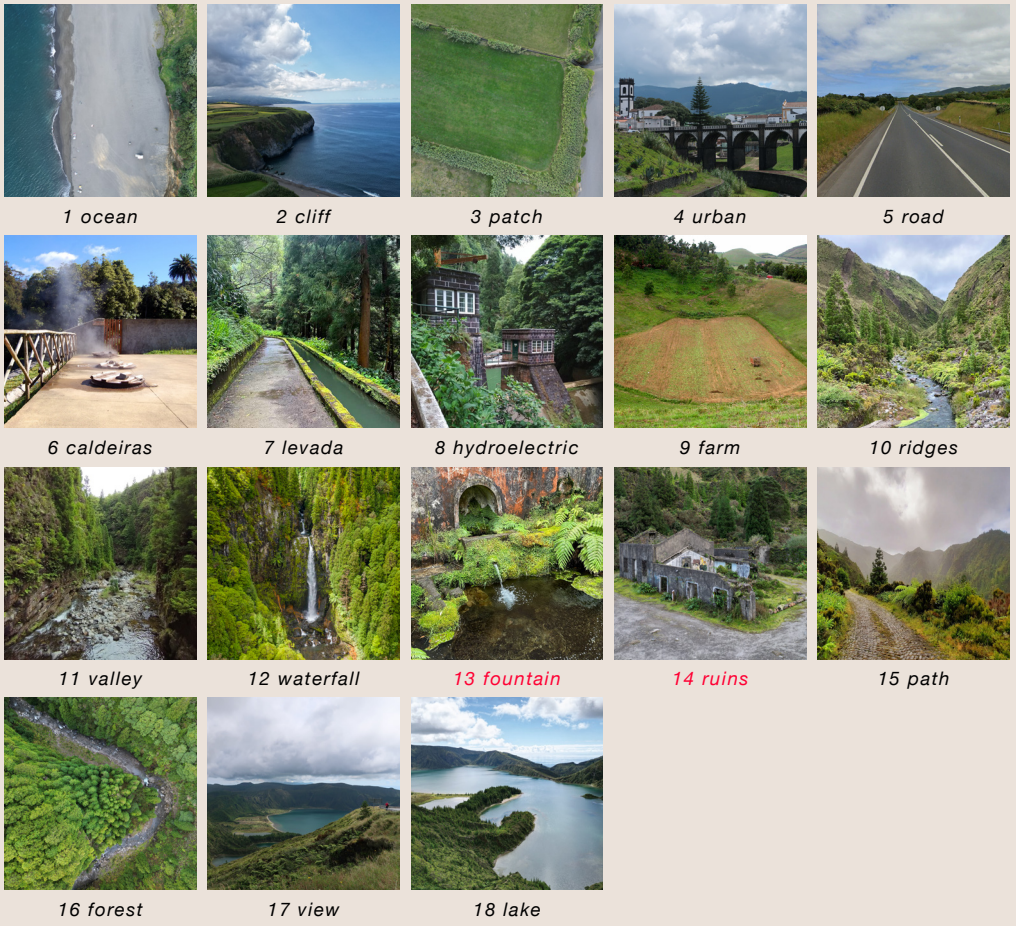
The Valley of Lombadas is accessed along the same scenic road leading to the caldeiras and expansive views of the north coast and the island's western point. Before entering the valley, volcanic activity can be observed from the steam caldeiras, Caldeiras da Ribeira, a small thermal resort and the nearby fumaroles used for cooking in the ground.

As one zigzags through the narrow roads leading to the valley, a beacon of red terracotta tile peaks out against the lush background of acacia and Japanese cedar trees—a place where the magnificent Lombadas water was once extracted. The two gable-end ruins serve a new educational purpose of its past.

Alongside the existing ruins, numerous tourists embark on a 4-hour nature trail through the valley, ascending to the 880-meter peak of Monte Escuro with its abundant endemic vegetation, heading in the opposite direction to enjoy views of Lagoa do Fogo. Along the valley is a cold spring enriched with iron. As one traces the downstream, the cold-water transitions to a waterfall, Cascata das Lombadas, where the water meets a heated aquifer, resulting in a thermal spring at the base of the waterfall highlight the potential for geothermal in the surrounding area. A 30-minute trail to



Master site map representing a larger proposed path with the specific design proposal being narrowed in on 13 fountain and 14 ruins.



Larger path represented through photographs with 13 fountain and 14 ruins highlighted to indicate the focus for the architectural intervention.

The valley.

The ruins.

The Source.

the base of the waterfall guides visitors through sculptural architecture that peaks out from the landscape.

The Site

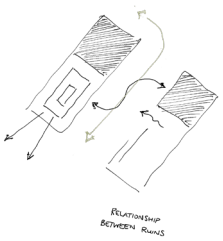
As humans reshape landscapes, the risk of “shifting baseline syndrome” looms large, wherein each alteration to the environment erases previous states, establishing a new, often incomplete reality. The Interpretive Centre and Water Pavilion actively counter this phenomenon by repurposing the ruins while preserving their historical essence, ensuring that visitors engage meaningfully with the island’s past as much as they look toward future endeavours.

Through the design of an Interpretive Centre, Water Pavilion, Water Bottle Brewery, Taproom, Tasting Pavilions, and the “Nest,” which is weaved together by a walking path, the architecture introduces a sustainable approach to exploring the island lightly. The carefully composed walking path is designed with cobblestones and grates that gently guide the tourist through the landscape, bringing the history of the place to life. Choreographed to align with the island’s essence, each building offers a unique perspective on how the island wishes to be viewed and experienced. The use of grates allows the expression of the landscape to be revealed without causing degradation to the existing land. The use of cobblestones forms a stereotomic relationship with the land highlighting key moments for visitors to engage with. This approach introduces the eco-tourist as an integral part of the island’s ecological systems, encouraging active engagement and immersive learning experiences. Locals are given the opportunity to work, explore, and learn about the history of their home. By positioning the locals, tourists, and nature within a reciprocal relationship that fosters learning,

Site plan of Valley of Lombadas highlighting the path and the architectural interventions of the Interpretive Center, Water Pavilion, Water Brewery, Taproom, the Source, Tasting Pavilions, and the Nest.

Section through the Water Bottle Brewery, Water Pavilion and Interpretive Centre.

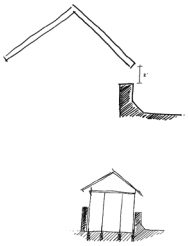
encourages participation, and creates opportunities with the land, the architecture mitigates the existing collusion and encourages authentic participation that contributes to a sustainable and enriching island experience.



Weaving the relationship between the ruins to foster a shared experience.

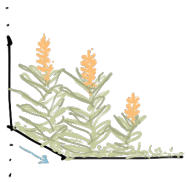
Interpretive Centre [learn]

The Interpretive Centre recognizes education as a vital tool for a deeper understanding of the site. The ruin, as the ghost, transforms into a functional learning space imbued with traces of the past, its objective is to combat “shifting baseline syndrome” by employing Tsing (2017, 20) as a guiding principle, anchoring the intervention in a richer understanding of the past by preserving – encompassing Azorean water bottle culture, geography, and the locals’ passion for sharing their narratives and natural resources.

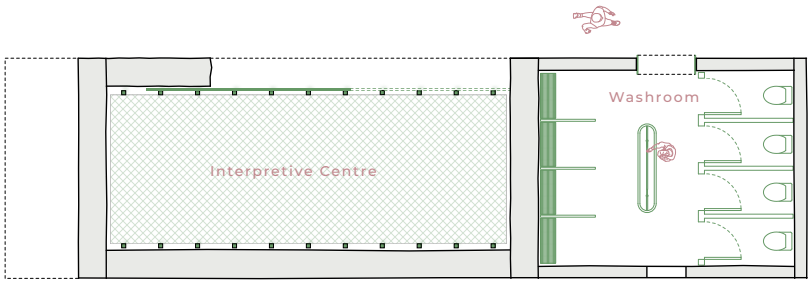


The roof extends two feet above the ruin, ensuring a non-imposing presence and allowing natural light to illuminate the interior.

Through this educational path, a more conscious tourist will walk the island with a newfound awareness of the island’s geography and historical significance. Utilizing the existing ruin, the interior space is crafted with minimal intervention, lending the ruin to express history through what remains from its walls. A steel grate delicately hovers above the ground, creating a sense of protection between the structure and the natural terrain while offering a creative view of the land. Steel columns embedded into the earth support a locally sourced Japanese cedar roof structure that gracefully extends over the ruin’s walls. This approach reflects a design ethos where minimal intervention allows the site’s natural elements to be the leading actors of its story. It embodies the idea that if everything were removed from the site, what remains would harmoniously coexist with nature.

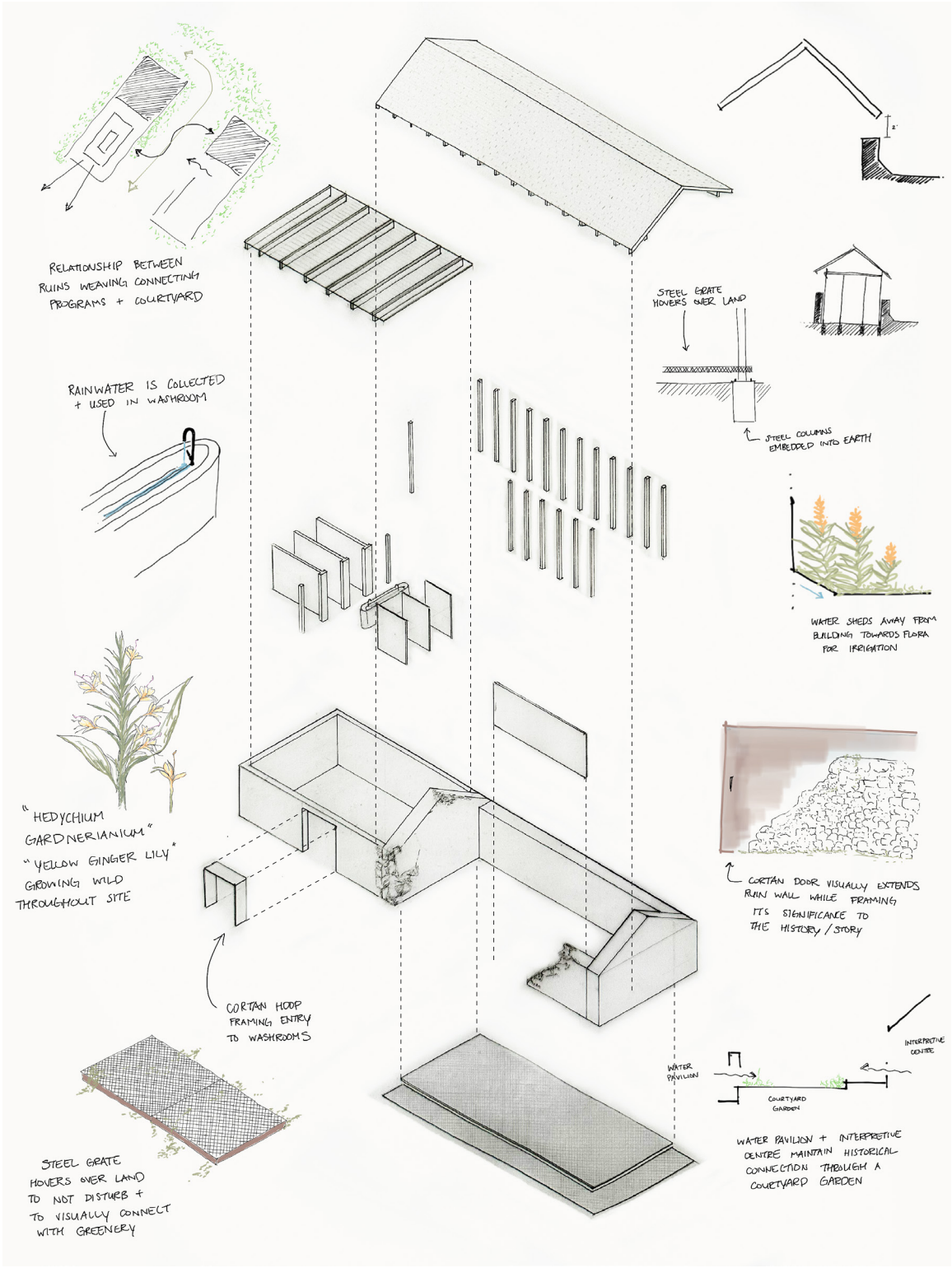


The grade is altered to divert rainwater away from the building, directing it instead to nourish the surrounding flora.



INTERPRETIVE CENTRE 1 : 100

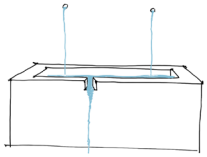
Floor Plan of Interpretive Centre.



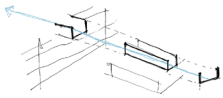
Moments: Interpretive Centre.

“Understanding the Volcano” collage. The Interpretive Centre is the first building on the intended path guiding the visitor through understanding the history of the island’s ecological systems that have shaped the history of the Valley of Lombadas. Here, visitors embark on a journey through time. A light Japanese cedar roof structure hovers above the ruins as an additional layer to the site’s story.

Water Pavilion [observe]



Thermal water is extracted and flows into the basin of the fountain before cascading into the basin of the thermal bath.

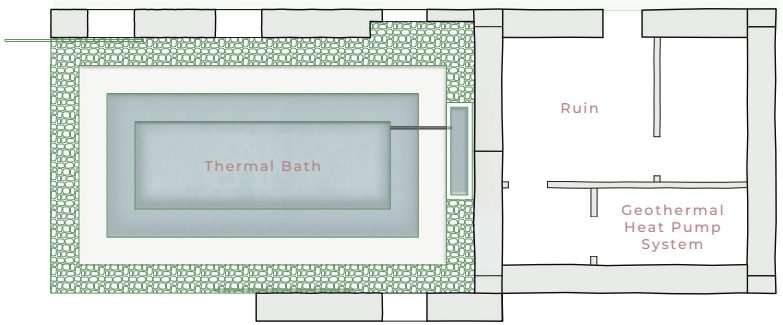


Channels are used to carry water.

Glass extends along the walls of the ruin, emphasizing its significance as an object of observation and learning.

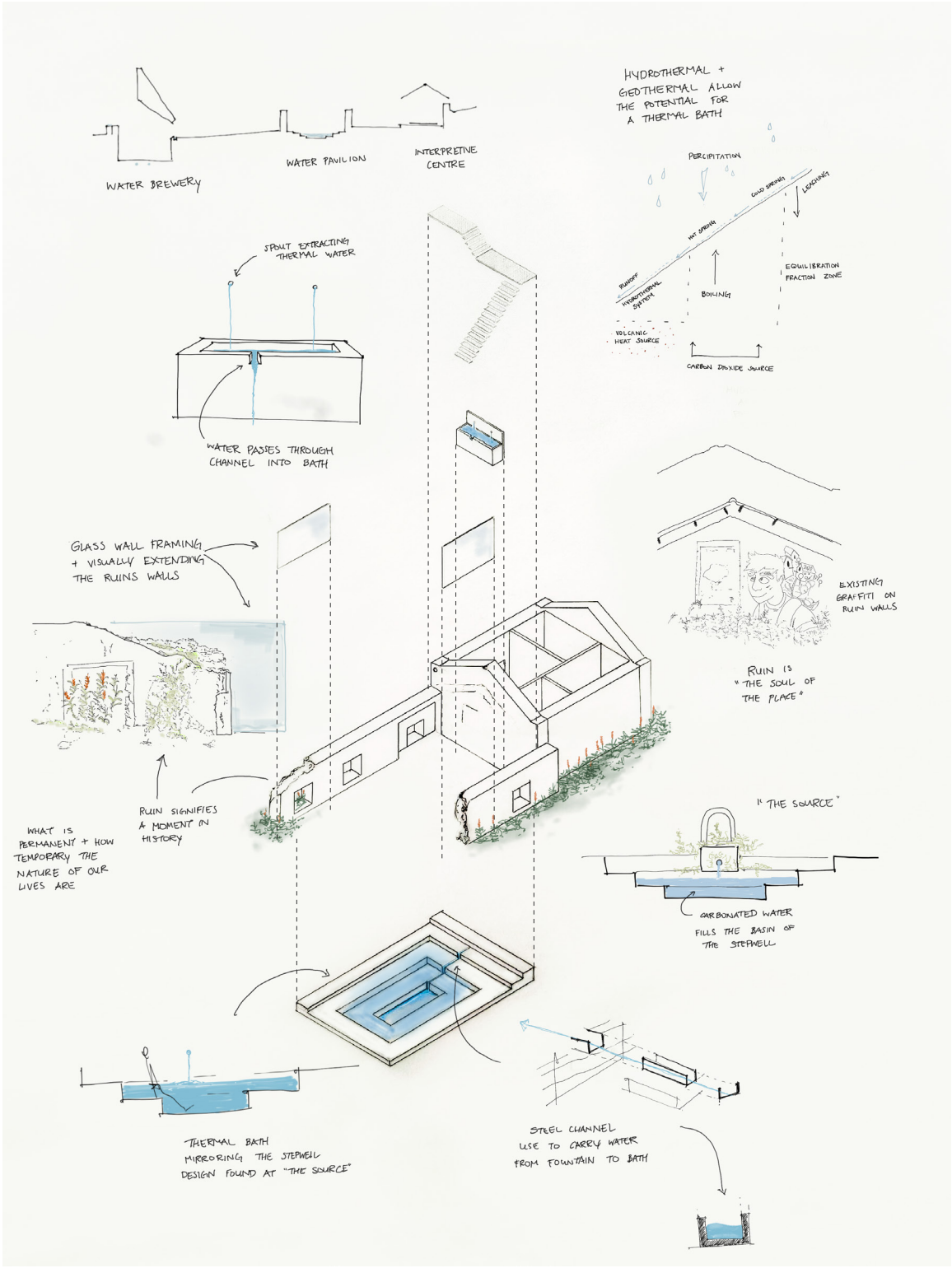
Now a Water Pavilion, the existing ruin served as the working pavilion for the original Lombadas Bottling Factory. The ruins are an integral part of the island's cultural heritage, embodying a dialogue between old and new and preserving the essence of the original structure. Embracing this historical layer, the ruin becomes a tangible reflection of time. Introducing new elements emphasizes a new layer of time being revealed, but the landscape and ruin reveal nature's influence on the site as much of the ruin has been eroded by a landslide. The notion of stepping into a thermal bath symbolizes this transformation, offering a visceral connection to the evolving landscape and the site's geothermal potential. Geothermal waters are extracted from the earth to create a bathing experience. The juxtaposition of the ruin, surrounding overgrowth of nature, and the implantation of new highlights the delicate balance between nature and human intervention, emphasizing the layers of history that have shaped the island's identity.

Initial sketch exploring a proposed intervention for the water pavilion and interpretive center.



WATER PAVILION 1 : 100

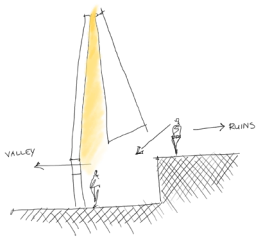
Floor Plan of Water Pavilion.



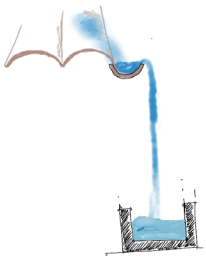
Moments: Water Pavilion.

“Bathing in the Volcano” collage. The Water Pavilion emerges from the mist of hot thermal waters, extracted from earth’s depths into a fountain then bath. The glass visually extends the ruins of the wall while framing a moment in time, capturing the juxtaposition of the old ruins and the new glazing.

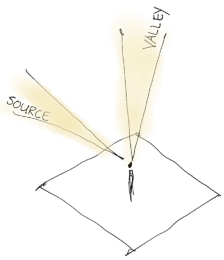
Water Brewery [work]



The light well filters light into the production space. Fenestrations form connections to the ruins and valley.



Water shedding from terracotta tile into levada.

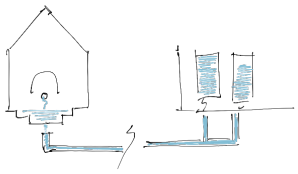


Choreographed views from the taproom position the visitor to look at “the Source” and the valley.

By reintroducing carbonated water, the Lombadas Water Bottle Factory reignites the process of water extraction. Carefully sealed glass bottles filled with carbonated water, preserve the essence of the valley. Each bottle provides a taste of the island and a vessel for storytelling, encapsulating memories of the past and extending them to future generations and visitors to the island. Just as the island’s residents once found opportunity in the convergence of waters, locals once again find prospects in the revitalization of the water brewery, providing employment as a means to sustain tradition, economic growth, and preserve the place they once aspired to share.

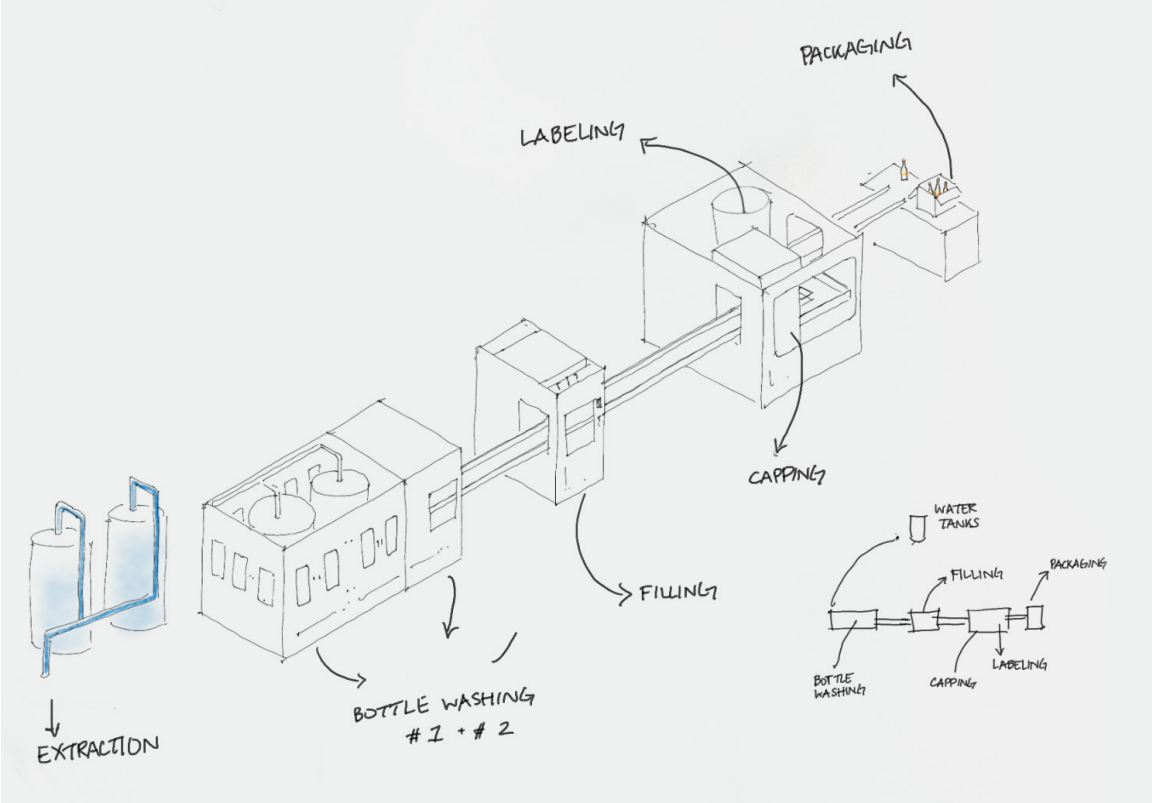
Drawing inspiration from the original water bottle factory’s history, the design is manifested through historical elements and cultural significance of the building’s original character. Local materials extracted from the earth, form the foundation of the structure, grounding it firmly in the valley’s soil. The building is embedded into the earth with the integration of basalt rock emphasizing its connection to land and water. The shape of the roof allows light to filter to the lower level letting natural light softly cascade alongside the production line. The terracotta roof is reminiscent of the original factory’s design that acted as a beacon within the lush surroundings, welcoming visitors to the site. The terracotta tiles function as vessels for capturing rainwater. As the rainwater is collected from the rooftops, it channels into a levada located on the northern side of the brewery. Spanning the length of the building, this collected water is then utilized to generate hydroelectricity, powering the water bottling machinery with sustainable energy. In addition, the brewery embraces

the island's flora, with hydrangeas lining the exterior and defining courtyard spaces.

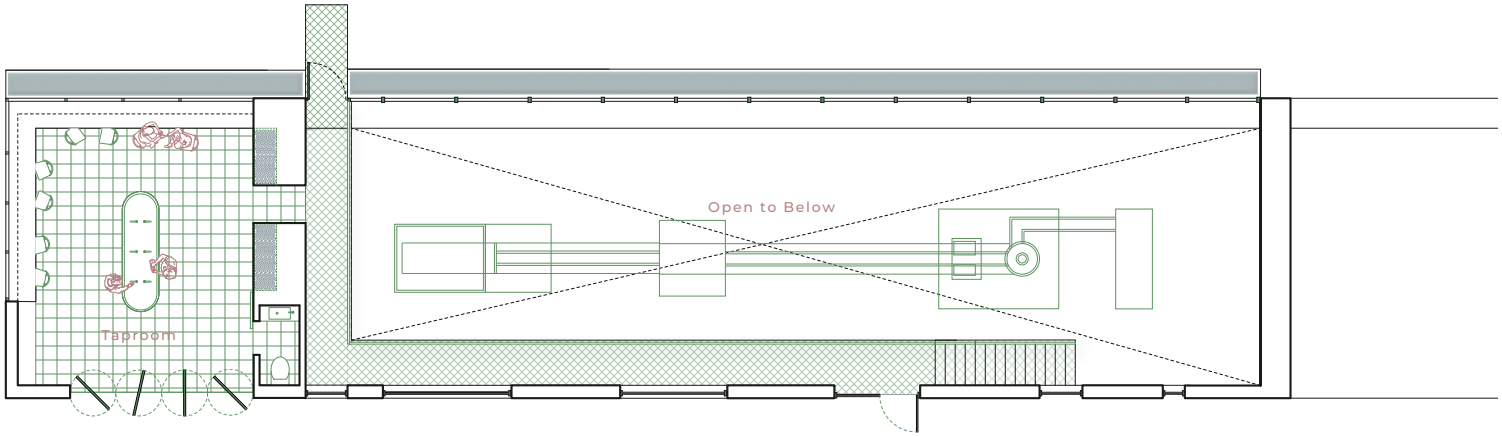


Water is extracted from "the Source" and stored in water tanks in the Water Brewery.

The carbonated water bottling process operates through an assembly line. Initially, water is extracted from its source and stored in water tanks. Before extraction, it naturally undergoes filtration through volcanic rocks. Glass bottles then pass through two washing stations to ensure sanitation. Each bottle is subsequently filled with Lombadas Carbonated Water, capped, and labeled. Finally, the bottles are packaged and prepared for delivery to local grocers throughout the island, as the water is not exported off the island, maintaining its locality.



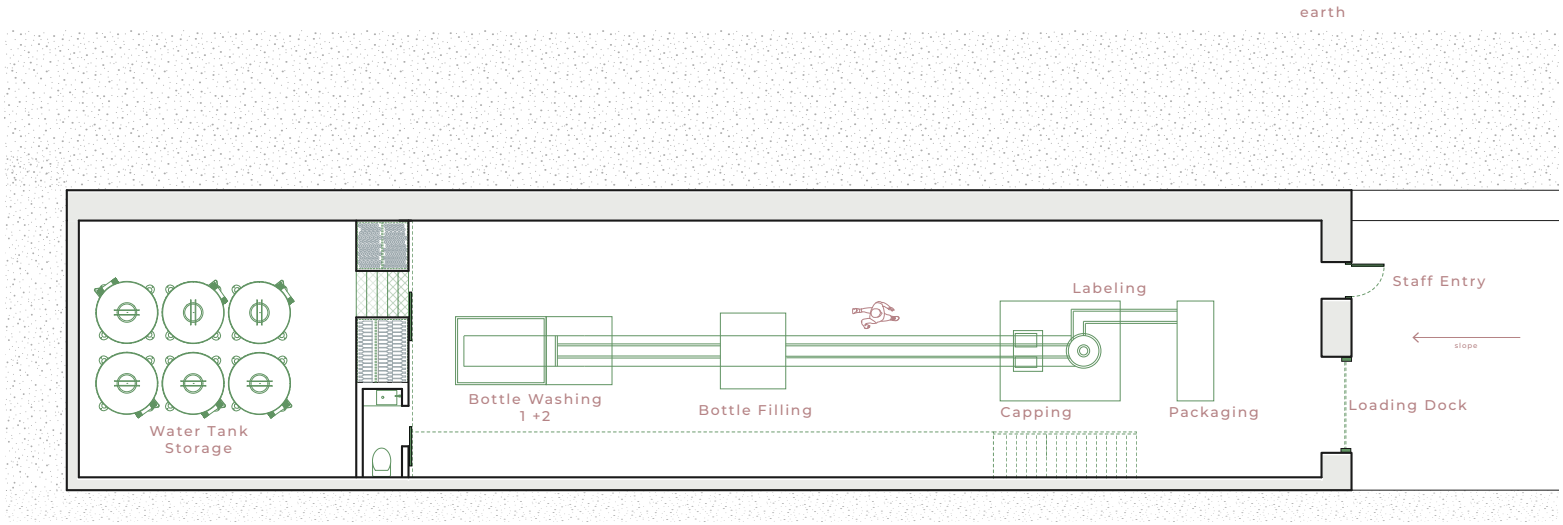
A diagram showing the process of water bottling production and the required assembly line for extracting carbonated water to bottling to packaging to taste.



LEVEL 2: Taproom

WATER BREWERY 1 : 100

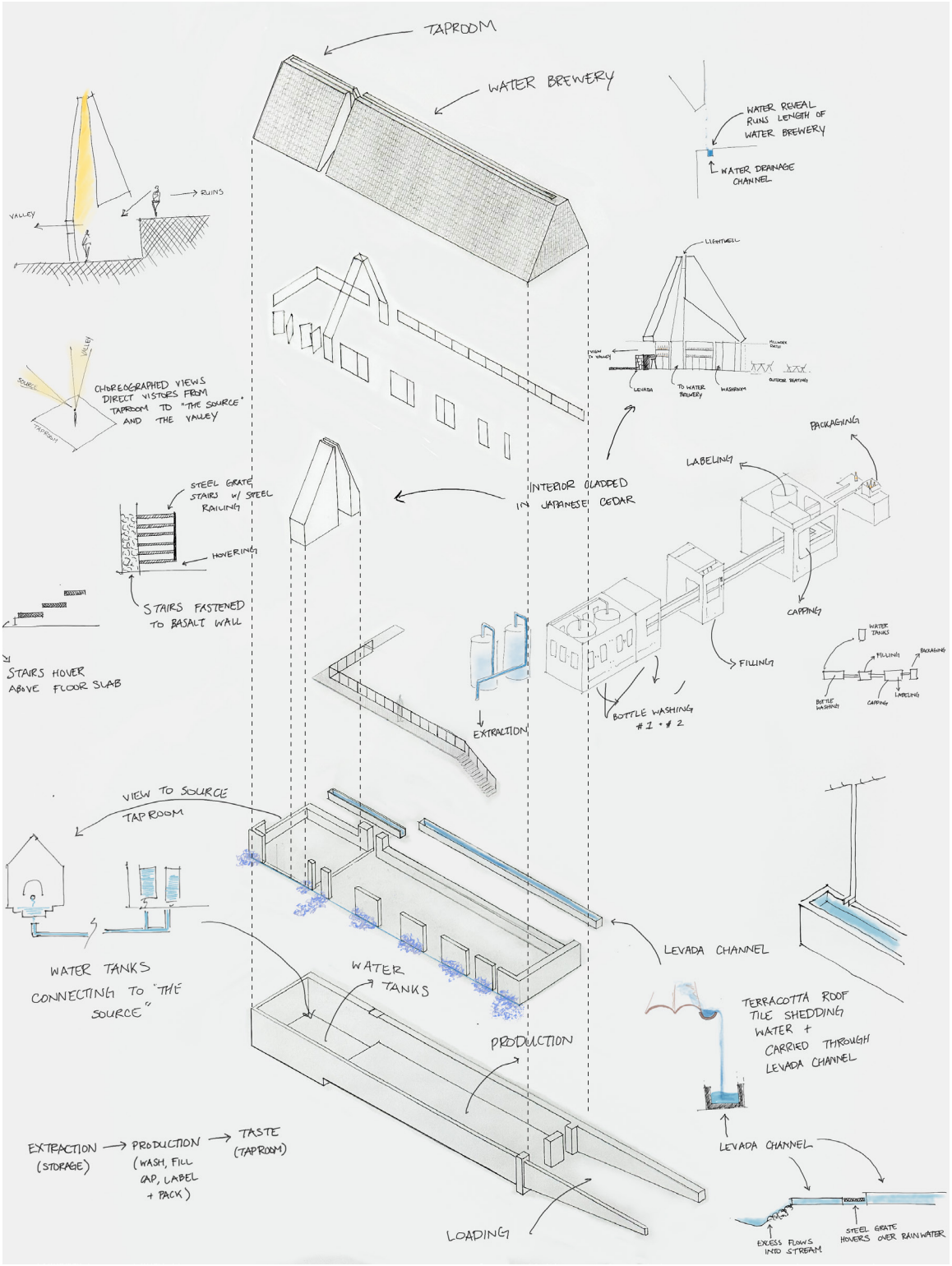
Ground Level Floor Plan of Water Brewery showing the process of production.



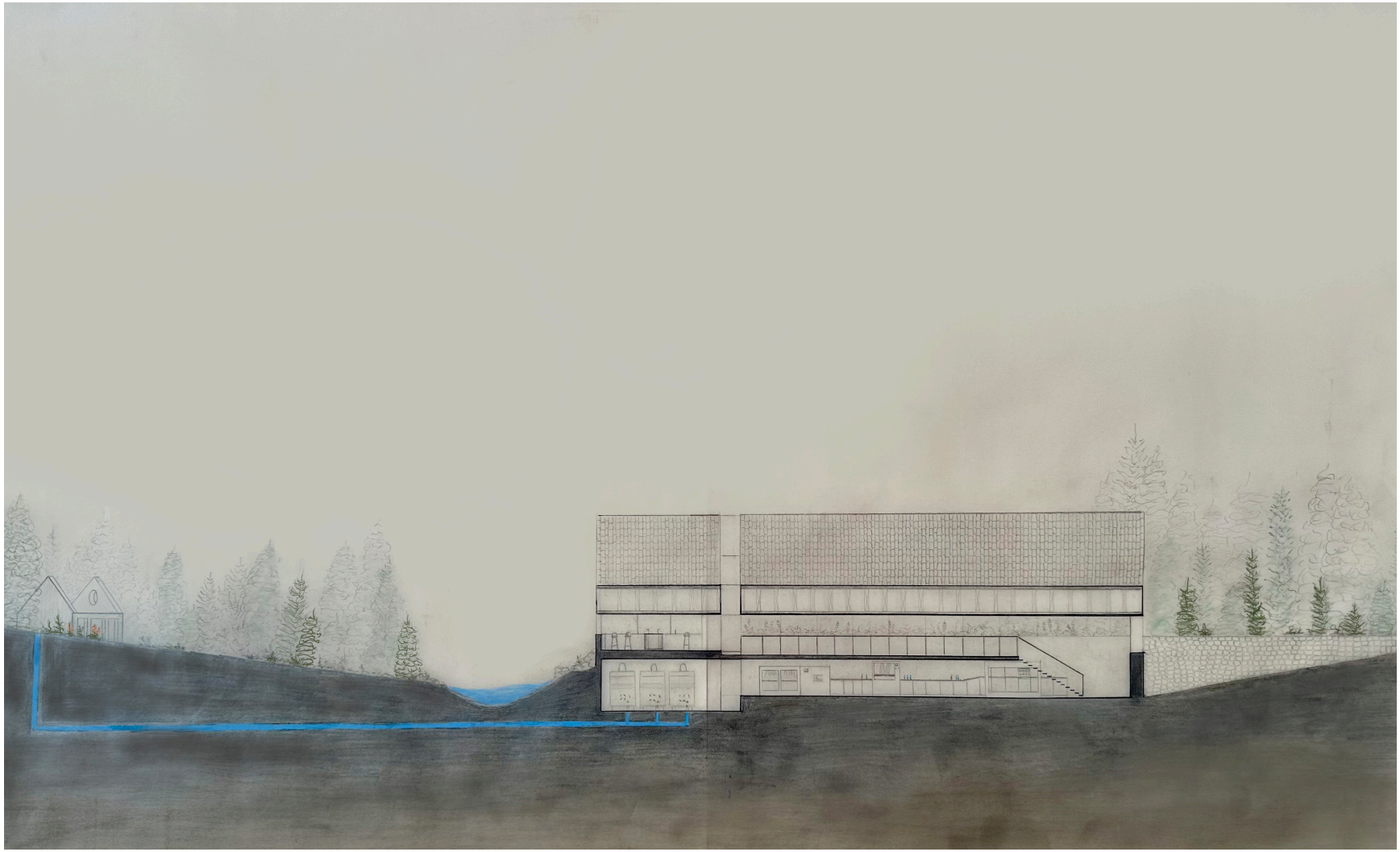
LEVEL 1: Production

WATER BREWERY 1 : 100

Floor Plan of Water Brewery showing the path from the ground level production to the second level Taproom.



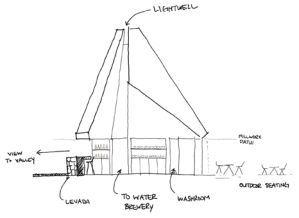
Moments: Water Brewery + Taproom.



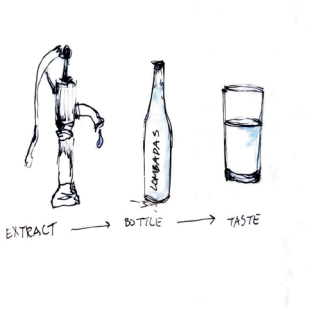
Section through “The Source” of carbonated water and the Water Bottle Brewery emphasizing the extraction of water, production of bottling and tasting.

“Glowing Taproom nestled within the Volcano” collage. The Water Brewery is seen in the valley as light glows from the interior. The terracotta tile acts as a beacon against the lush landscape.

Taproom [play]

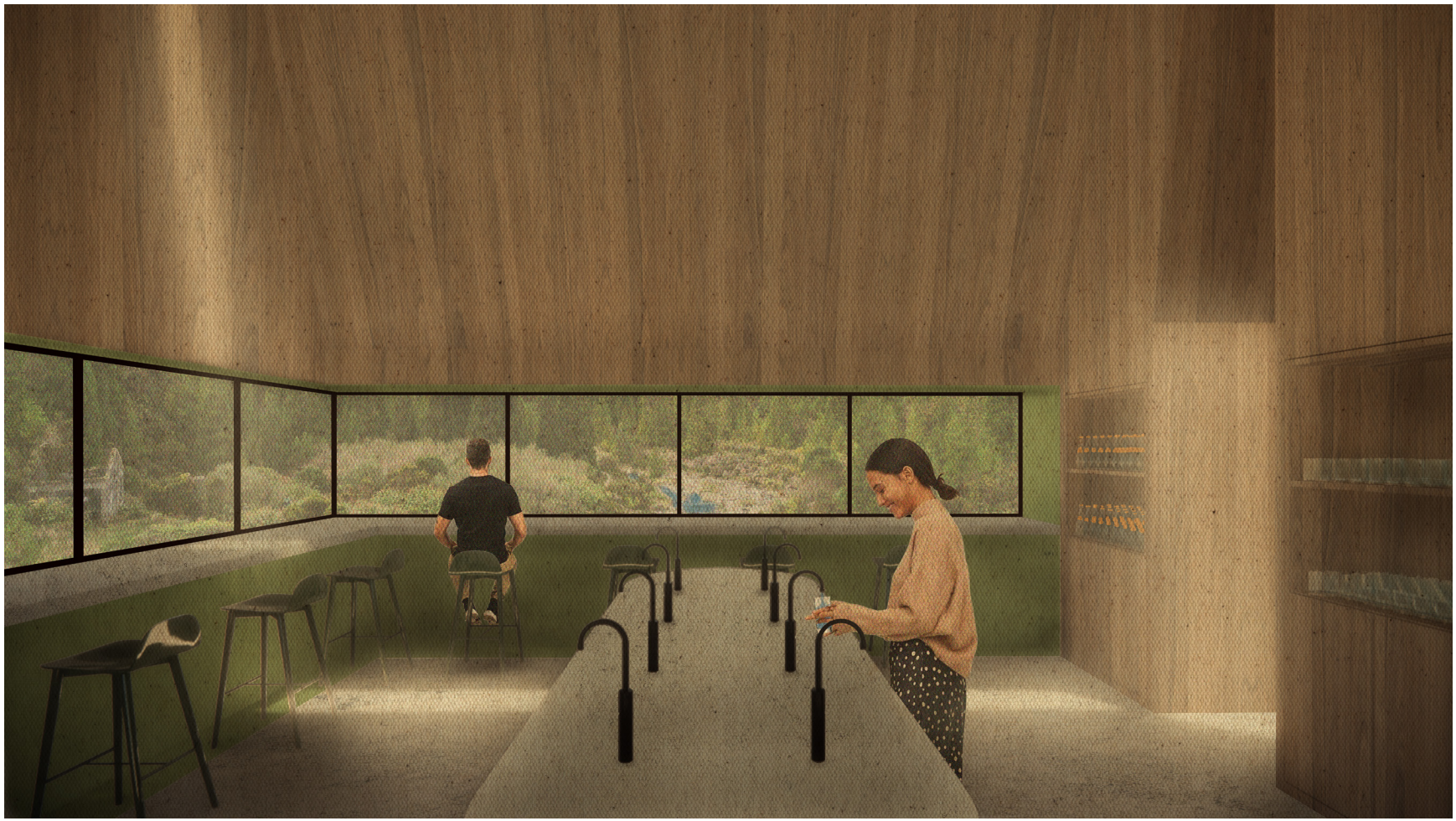


Interior of Taproom cladded in Japanese Cedar.



The process to taste nature.

The Taproom, perched above the water brewery, serves as a symbolic representation of the water extraction process—a tangible connection to the earth from which the water emerges, ready to be savoured. From this vantage point, visitors and residents can immerse themselves in a framed vista of the valley, gesturing visitors to engage with the diverse water sources, from the carbonated water extraction point, the heart of the process, to the meandering stream below. The interior walls that surround the view are painted green to seamlessly aid in blending the visitors with nature. Simultaneously, another perspective frames the ruins – the beginning of the shared journey that binds locals and tourists. A skylight casts a warm, natural glow that bathes the Japanese crafted interior. Positioned strategically to capture a gentle radiance of the afternoon sun, it invites visitors to immerse themselves in a sensory experience. At the room's centre, a sextet of spouts awaits, offering visitors the chance to pour themselves a glass of Lombadas carbonated water directly from the source. Meanwhile, a mixologist showcases the versatility that the valley's water presents, from its pure, unadulterated form to its potential as a catalyst for creativity and innovation in carbonated cocktails. Through the material of water, locals and tourists will have the opportunity to taste nature becoming advocates for preservation and experiencing life on the island through the expression of water.



“Tasting the Volcano” collage. The Taproom offers an immersive experience, connecting visitors directly to the extraction process. Guests can taste the water firsthand and enjoy a choreographed view of “the source,” enhancing their understanding and appreciation of the journey from origin to tap.

The Source [extraction]

The Water Pavilion mirrors the design of the stepwell located at “the source”

“The Source” of carbonated water.

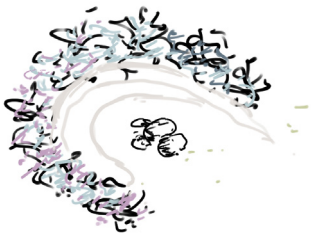
The Valley of the Lombadas is characterized by the natural springs and stream. These water sources originate from the underground aquifers in the area. The heart of the site lies within the carbonated water that is cherished by locals and visitors since its extraction. The source is left untouched by architecture maintaining its authenticity of its original experience of tasting the water directly from its source. The harmonious balance between preservation of history and culture and accessibility to visitors allows locals and visitors to forge a direct connection to the land and the process of extraction. The original design contains a stepwell that captures the water flowing from the spout while flora weaves through the openings of the structure.

“The Source” nestled within the Japanese Cedar trees.

Tasting Pavilion [observe]

A series of benches make up the tasting pavilion and become spaces for meaningful dialogue between tourists, locals, and the land. The benches are strategically placed to choregraph views towards the water brewery, the stream, and the ruins guiding the visitor on the path that looks back at the architecture. Beyond merely sampling carbonated water, it becomes a space where cultural exchange and shared experiences thrive. Each bench is a space for contemplation and connection, inviting visitors to pause and savor the beauty that surrounds them. From here, they can gaze out towards the water brewery, where the carbonated water is extracted and bottled or follow the meandering stream as it winds its way through the landscape. The pavilion provides various basalt-formed benches strategically placed along the path between “the Source” and “the nest” allowing an all-encompassing view of the valley and inviting visitors to immerse themselves fully within nature. The path with basalt benches conditions the visitors to savour the view rather than rush to the destination. The entire path becomes an immersive experience marked by seamless and precise transitions between architecture and the natural landscape.

The “Nest” [observe]



Sketch of the nest.

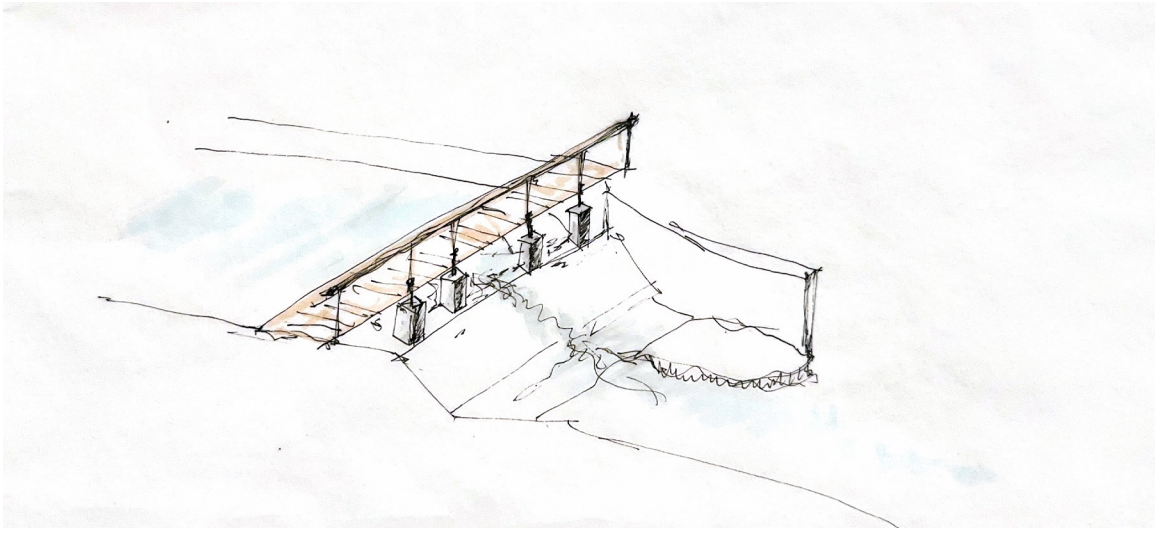
A more intimate seating area, “the nest”, embodies the essence of “saudade”. This area consists of a semi-circular bench made of basalt with a natural backside of hydrangeas placed in a semi-circle to form the “nest.” The ground upon which the bench rests is made of a traditional cobblestone design seen on many of the island’s sidewalks and open spaces. The “nest” encapsulates a sensory experience celebrated in the simplicity of drinking carbonated water and

The hydroelectric dam in the Valley of Lombadas.

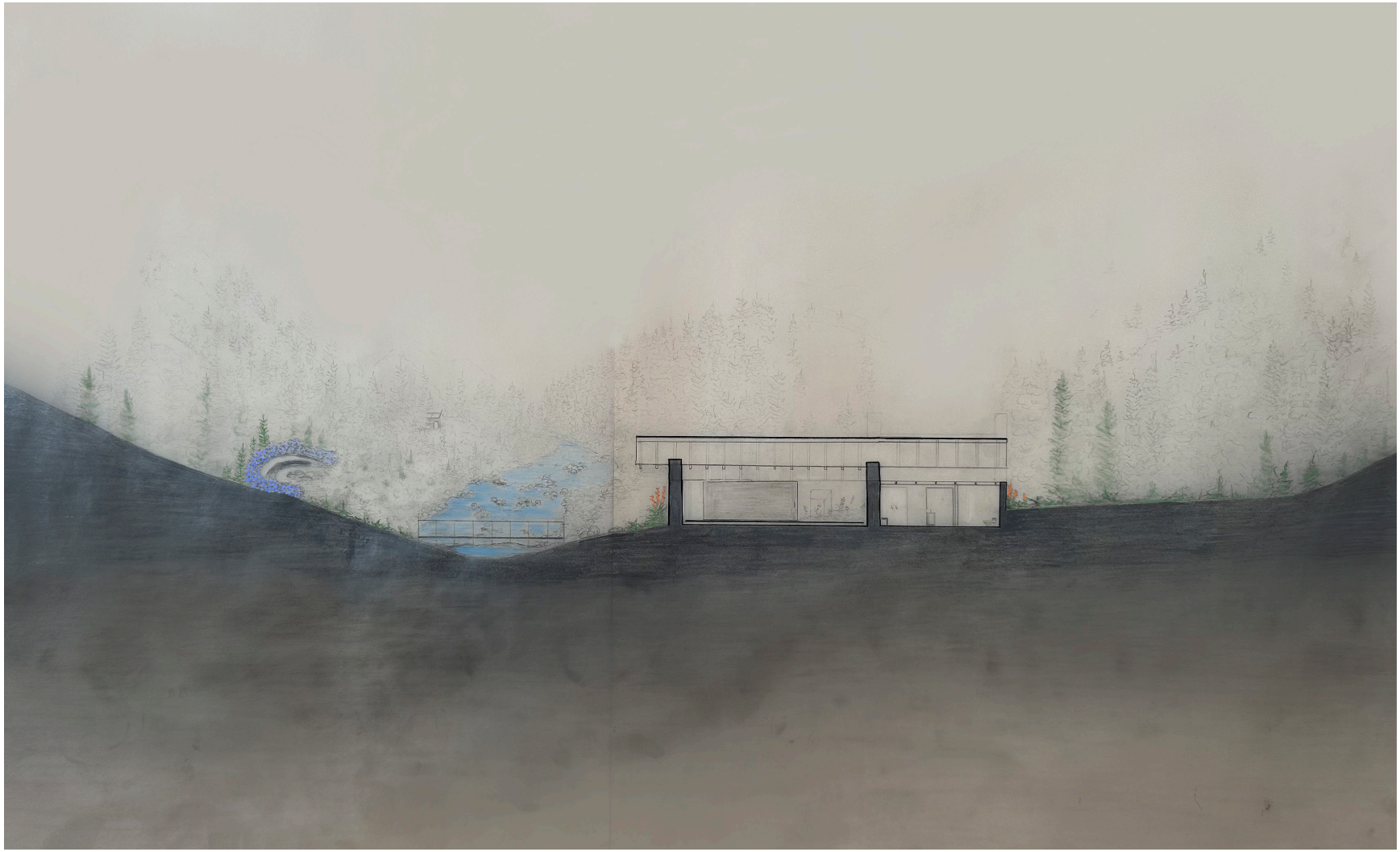
being with nature. This is experienced through the whistling of wind in the trees, the presence of light absorbed by the basalt seats, and the sounds of the flowing stream.

In addition to its sensory allure, “the nest” also serves as a nod to the diaspora—a place designed for those returning to the island, offering them a sacred space to pause, reflect, and reconnect with their roots. From this vantage point, visitors are encouraged to take a step back, to observe the entirety of the site, and to embrace the essence of what was once home. It becomes a sanctuary for reminiscence where memories intertwine with the present moment, and where the longing for what once was finds comfort in the beauty of the present.

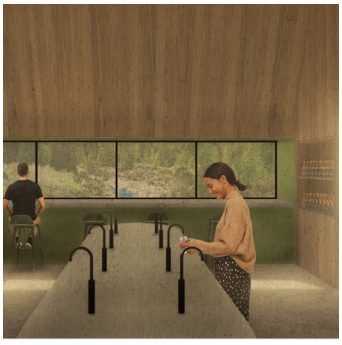
After “the nest” is a bridge that guides the user back to the walking path positioned directly above the hydroelectric dam. The bridge serves as the final space of the path leading visitors to the initial path they used upon entering. The hydroelectric dam marks the beginning of the larger Ribeira Grande hydroelectric system.



Sketch of the bridge over the hydroelectric dam.



Section through the Nest, bridge, and the Interpretive Centre.



Chapter 7: Conclusion

São Miguel Island stands at a critical juncture where the decision to embrace sustainable tourism or succumb to over-tourism will shape its future. By fostering a reciprocal relationship between local, tourist, and land through thoughtful architectural design and embracing sustainable extraction practices, the island emerges as a model for sustainability. The proposed architectural framework balances the needs of land, locals, and tourists, offering a way for the local to share the land and conscious way for the tourist to gain knowledge while preserving the island's cultural identity and ecological resilience. This architecture effortlessly captivates visitors into an understanding of the volcano and water extraction, facilitating recreational and ecological activities. Experienced through a network of interconnected paths with architectural buildings, the journey weaves moments of living, working, playing, learning, and observing. The proposed path enhances the appreciation and utilization of the Valley of Lombadas, reintroducing carbonated water bottling – a practice that excited the locals during its original production. By leveraging the land's potential and safeguarding its cultural identity, the Valley of Lombadas seeks to enrich the local and tourist experience while preserving the sense of place. Embracing extraction as a symbiotic relationship between the land, locals and tourists, São Miguel exemplifies a model of sustainability and cultural resilience exemplified by the shared experiences and cultural exchanges that extraction facilitates. Through active engagement and participation, both locals and tourists are invited to become stewards of the island's natural resources and cultural heritage, ensuring its long-term viability for future generations.

Lombadas Agua Mineral Carbo-Gasosa da Ilha de S. Miguel-Acores reintroduced. The queen of table waters returns connecting with the past and sharing with the future!

References

"Água - Relatório Do Estado Do Ambiente Dos Açores - Direção Regional Do Ambiente e Ação Climática." n.d. Accessed March 24, 2024. https://rea.azores.gov.pt/reaa/54/agua/864/enquadramento.

Ávila, José Gabriel. 2013. "E a água das Lombadas? Que desperdício!" https://escritemdia.blogspot.com/2013/01/e-agua-das-lombadas-que-desperdicio.html.

Belém, Mário. 2021. "Saudade by Mario Belem - Street Art Cities." https://streetartcities.com/markers/32940.

Butler, R.W. 1980. "The Concept of a Tourist Area Cycle of Evoluution: Implications for Managment of Resources." *Canadian Geographies / Géographies Canadiennes* 24, no. 1: 5–12. https://doi.org/10.1111/j.1541-0064.1980.tb00970.x.

Chester, David K., Angus Duncan, Rui Coutinho, and Nicolau Wallenstein. 2022. *Earthquakes and Volcanic Activity on Islands: History and Contemporary Perspectives from the Azores.* Routledge Studies in Hazards, Disaster Risk and Climate Change. Milton Park, Abingdon, Oxon; New York, NY: Routledge.

Cruz, J. Virgílio, Rui M Coutinho, M. Rosário Carvalho, Niels Oskarsson, and Sigurdur R. Gislason. 1999. "Chemistry of Waters from Furnas Volcano, São Miguel, Azores: Fluxes of Volcanic Carbon Dioxide and Leached Material." *Journal of Volcanology and Geothermal Research* 92, no 1-2: 151–67. https://doi.org/10.1016/S0377-0273(99)00073-6.

Dramstad, Wenche E., James D. Olson, and Richard T. T. Forman. 1996. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning.* Washington, DC: Harvard University Graduate School of Design; Island Press; American Society of Landscape Architects.

"Eleven Sustainability Travel Tips." n.d. Visit Iceland. Accessed December 3, 2023. https://www.visiticeland.com/article/eleven-sustainability-travel-tips.

Forjaz, Victor Hugo, Jorge M. Tavares, Eduardo Brito de Azevedo, João Fontiela, Luís Miguel Almeida, João Pedro Barreiros, Rui B. Elias, et al. 2016. *Vulcão das Sete Cidades. Volcano História Natural - Natural History Um Guia - A Guide Açores - Azores.* 1st ed. Ponta Delgada.

Franco, António. 2016. "Subsurface Geology and Hydrothermal Alteration of Cachaços-Lombadas Sector, Ribeira Grande Geothermal Field, São Miguel Island, Azores." *In Geothermal Training in Iceland 2015*, edited by United Nations University ,113–60. Reykjavik: United Nations University.

Franco, António, and Carlos Ponte. 2019. “The Role of Geothermal in the Energy Transition in the Azores, Portugal.” *Eurogeologists* (blog). 2019. https://eurogeologists.eu/franco-the-role-of-geothermal-in-the-energy-transition-in-the-azores-portugal/.

Franco, Filipe. 2012. “A Nascente Da Água Das Lombadas.” Photo. https://www.flickr.com/photos/filipefranco/7413289670/.

Gaspar, J.L., John Guest, A.M. Duncan, F. J. A. S. Barriga, and David K. Chester, eds. 2015. *Volcanic Geology of São Miguel Island (Azores Archipelago)*. Geological Society Memoir, no. 44. London: Geological Society.

Guest, J.E., J.L. Gaspar, P.D. Cole, G. Queiroz, A.M. Duncan, N. Wallenstein, T. Ferreira, and J.-M. Pacheco. 1999. “Volcanic Geology of Furnas Volcano, São Miguel, Azores.” *Journal of Volcanology and Geothermal Research* 92, no. 1–2: 1–29. https://doi.org/10.1016/S0377-0273(99)00064-5.

“The Icelandic Pledge Visit Iceland.” n.d. Visit Iceland. Accessed March 27, 2024. https://pledge.visiticeland.com/.

Ingold, Tim. 2016. *Lines: A Brief History.* London; New York: Routledge.

Long, Richard. 1967. “A Line Made by Walking.” Tate. https://www.tate.org.uk/art/artworks/long-a-line-made-by-walking-ar00142.

MacCannell, Dean. 2020. “The Moral Economy of Tourism.” *Revista Lusófona de Estudos Culturais* 7, no. 1: 21–38. https://doi.org/10.21814/rlec.2211.

Machado, Carla Cacilhas. 2015. “Escoamento de superfície e vulnerabilidade às cheias no concelho da Ribeira Grande (São Miguel, Açores).” Master Thesis. Universidade dos Açores. https://repositorio.uac.pt/handle/10400.3/3471.

Macy, Christine, and Sarah Bonnemaison. 2003. *Architecture and Nature: Creating the American Landscape.* London; New York: Routledge.

M-arquitectos and Governo dos Açores. 2021. “Anteprojeto Miradouro Lagoa do Fogo.” https://portal.azores.gov.pt/documents/2314945/f3a567df-2177-384c-adc0-644b694b2056.

Moore, Richard B. 1986. “Preliminary Geologic Map of Agua de Pau Volcano, Sao Miguel, Azores.” Open-File Report 86–192. Open-File Report. Sao Miguel, Azores. https://pubs.usgs.gov/publication/ofr86192.

Moore, Richard B. 1991. “Geologic Map of São Miguel, Azores.” IMAP. São Miguel, Azores. https://doi.org/10.3133/i2007.

Moore, Richard B. 1991. “Geology of Three Late Quaternary Stratovolcanoes on Sao Miguel, Azores.” Report 1900. Bulletin. USGS Publications Warehouse. https://doi.org/10.3133/b1900.

Nast, Condé. 2015. “15 Beloved Places Struggling With Overtourism.” Condé Nast Traveler. June 19, 2015. https://www.cntraveler.com/galleries/2015-06-19/barcelona-bhutan-places-that-limit-tourist-numbers.

“Os Açores: Revista Ilustrada, A. 1, Nº 3.” 1922. Archive. Azoreana. 1922. https://azoreana.azores.gov.pt/item/0ab6b402-e07a-4539-9c78-c6be672ae8ed.

Pintos, Paula. 2022. “The Retreat at Blue Lagoon Iceland / BASALT Architects.” ArchDaily. July 22, 2022. https://www.archdaily.com/985770/the-retreat-at-blue-lagoon-iceland-basalt-architects.

Queiroz, Ana Isabel. 2020. “An Early Bioinvasion in the Azores. Global Circulation and Local Dynamics (1840s–1860s) in Response to the Brown Soft-Scale Coccus Hesperidum.” *Humanities* 9, no. 3: 78. https://doi.org/10.3390/h9030078.

Queiroz, Rose Emília, José Guerreiro, and Maria Anunciação Ventura. 2014. “Demand of the Tourists Visiting Protected Areas in Small Oceanic Islands: The Azores Case-Study (Portugal).” *Environment, Development and Sustainability* 16, no. 5: 1119–35. https://doi.org/10.1007/s10668-014-9516-y.

Queiroz, Rose Emília, Maria Anunciação Ventura, José Angelo Guerreiro, and Regina Tristão Da Cunha. 2014. “Carrying Capacity of Hiking Trails in Natura 2000 Sites: A Case Study from North Atlantic Islands (Azores, Portugal).” *Revista de Gestão Costeira Integrada* 14, no. 2: 233–42. https://doi.org/10.5894/rgci471.

Relph, Edward. 1986. *Place and Placelessness*. 3. reprint. Research in Planning and Design 1. London: Pion Limited.

Rocha, Gilberta Pavão Nunes, Eduardo Ferreira, and Derrick Mendes. 2011. *Between Two Worlds: Emigration and Return to the Azores.* Ponta Delgada: Government of the Azores, Regional Dept. for the Communities.

“Serviço Regional de Estatística Dos Açores.” n.d. Accessed December 4, 2023. https://srea.azores.gov.pt/conteudos/Relatorios/lista_relatorios.aspx?idc=29&idsc=1123&lang_id=2.

Sousa, Tiago, and Vítor Dias Rego. 2022. “The Sete Cidades Legend: A True Love Story.” *Futurismo Azores Adventures* (blog). January 24. https://futurismo.pt/blog/the-sete-cidades-legend-a-true-love-story/.

Tavares, David Melo. 2019. “The Jaw Dropping ‘Hydrangea Islands’ in the Azores.” Azores Islands Collection (blog). April 23. https://toursofazores.com/2019/04/23/the-jaw-dropping-hydrangea-islands-in-the-azores/.

Treib, Marc, ed. 2009. *Spatial Recall: Memory in Architecture and Landscape.* New York; London: Routledge.

Trousdale, William J. 1999. “Governance in Context: Boracay Island, Philippines.” *Annals of Tourism Research* 26, no. 4: 840–67. https://doi.org/10.1016/S0160-7383(99)00036-5.

Tsing, Anna Lowenhaupt, Nils Bubandt, Elaine Gan, and Heather Anne Swanson, eds. 2017. *Arts of Living on a Damaged Planet.* Minneapolis: University of Minnesota Press.

Varela, Matias Beccar. 2021. *The Reason of the Landscape Conversations with Glenn Murcutt*. General de Ediciones de Arquitectura.

“Visit Iceland.” n.d. Visit Iceland Official Travel Info for Iceland. Accessed March 27, 2024. https://www.visiticeland.com/.

“A Walk on the Edge | Walk&Talk.” n.d. Walk&Talk Azores. Accessed December 3, 2023. https://andafala.org/Walktalkazores/Programa/A_walk_on_the_edge?site=walktalk&origin=Agenda&originvs=8016.6669921875.

Wallenstein, Nicolau, Angus Duncan, David Chester, and Rui Marques. 2007. “Fogo Volcano (São Miguel, Azores): A HazarLdous E Difice.” *Géomorphologie: Relief, Processus, Environnement* 13, no. 3: 259–70. https://doi.org/10.4000/geomorphologie.2853.

Winthrop, Miriam. 2014. *Saudade*. Berkeley: CaliPress.

Zumthor, Peter. 2015. *Thinking Architecture*. Translated by Maureen Oberli-Turner and Catherine Schelbert. Third, Expanded edition. Boston: Birkhäuser.

Zumthor, Peter, Mari Lending, and Hélène Binet. 2018. *A Feeling of History*. 1. Auflage. Zürich: Scheidegger & Spiess.

Appendix: John D. Watson Memorial Scholarship

A Study of São Miguel Island and Madeira Island

São Miguel Island and Madeira Island are isolated in the vastness of the Atlantic Ocean with limited access to mainland resources. This isolation forces both islands to rely deeply on sustainable self-sufficiency which has become a part of their rich cultural identity.

Central to daily life, water plays an integral role in activities of work, play, and living. Its presence permeates cultural traditions and daily rituals on the islands. My research focused on deciphering these intricate relationships revealing how Portuguese waters contribute to harmonious, sustainable living. Although water was the focus of the research, its relation to larger ecological systems also became apparent. The research methodology involved visiting important sites related to Azorean and Madeiran way of life including, cultural, industrial, agricultural, and tourist areas. This was captured through photographs, drawing analysis, and conversation with local practitioners.

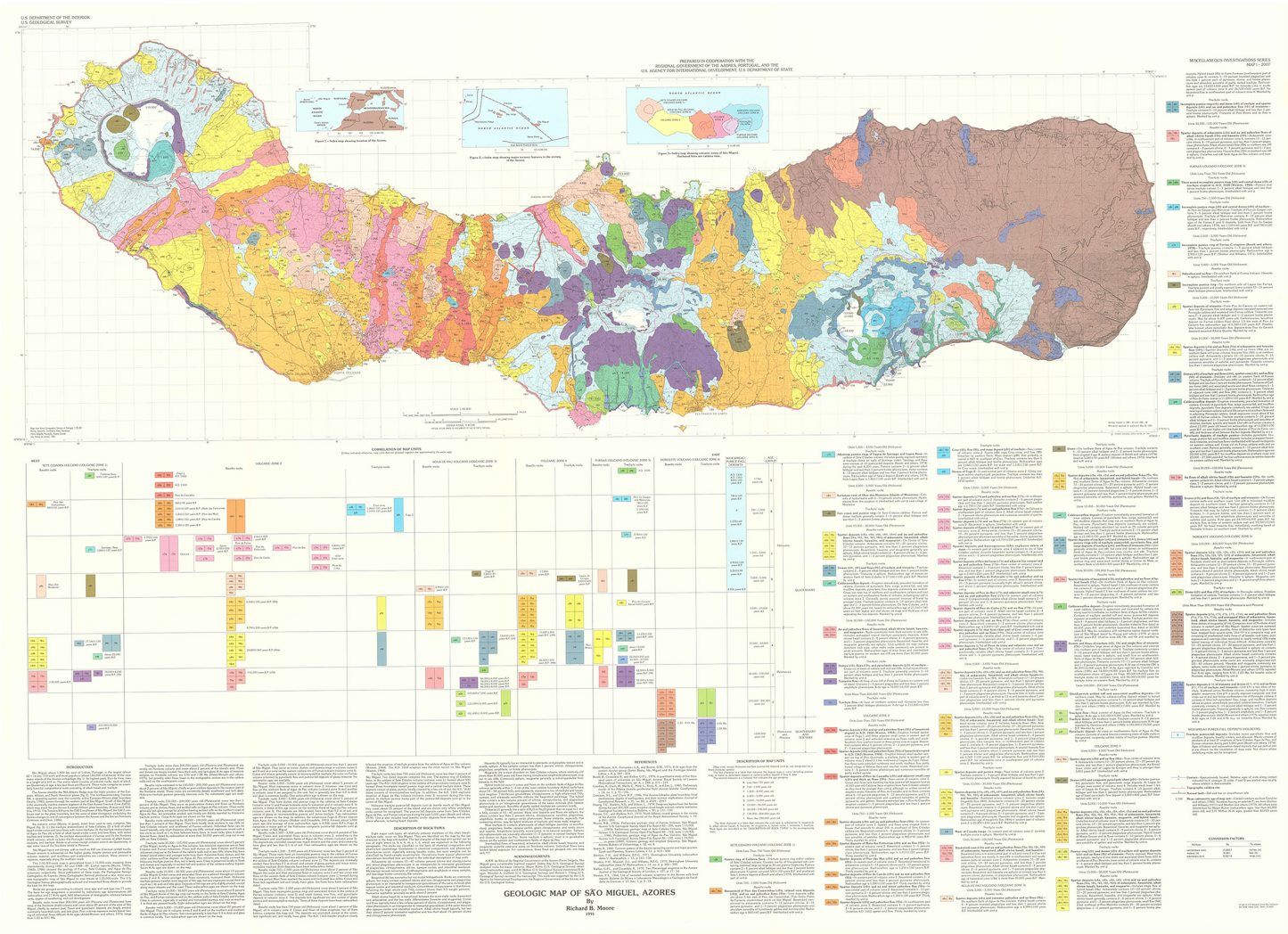
After the fall of the sugarcane production in Madeira, the island pivoted to tourism as its leading economic driver. Despite the ecological degradation caused by the extensive sugarcane production, the island's extensive natural systems of channels, oceanic pools, and rugged coastline facilitated rapid growth of the tourism sector. Paul da Serra, the most extensive plateau in Madeira, known as "the mother of water," was a key component for understanding the point of origin for the system of water channels, called

“levadas” that travel back into the main cities and feed agricultural landscapes. Analyzing the pools at Port Moniz was instrumental in understanding the relationship between natural systems and the island’s inhabitants.

While visiting São Miguel, there arose a desire to preserve the cultural identity and natural landscape to prevent it from the over-tourism and infrastructure impacts observed within Madeira. Both islands face the challenges of unsustainable tourism, which poses significant threats to their islands’ ecology. Investigating their ecological systems offered lessons and precedents for achieving a sustainable and harmonious balance between tourism and island living. Looking at the broader ecological system encompassing both islands allowed me to trace the interconnected paths and origins of the smaller ecosystems.

Compared to Madeira, São Miguel’s tourist industry is still in its infancy. This offers the opportunity to integrate sustainable tourism measures and allow visitors to appreciate the island’s unique ecological, geographical, and cultural identity.

John D. Watson Memorial Scholarship Presentation 2023.



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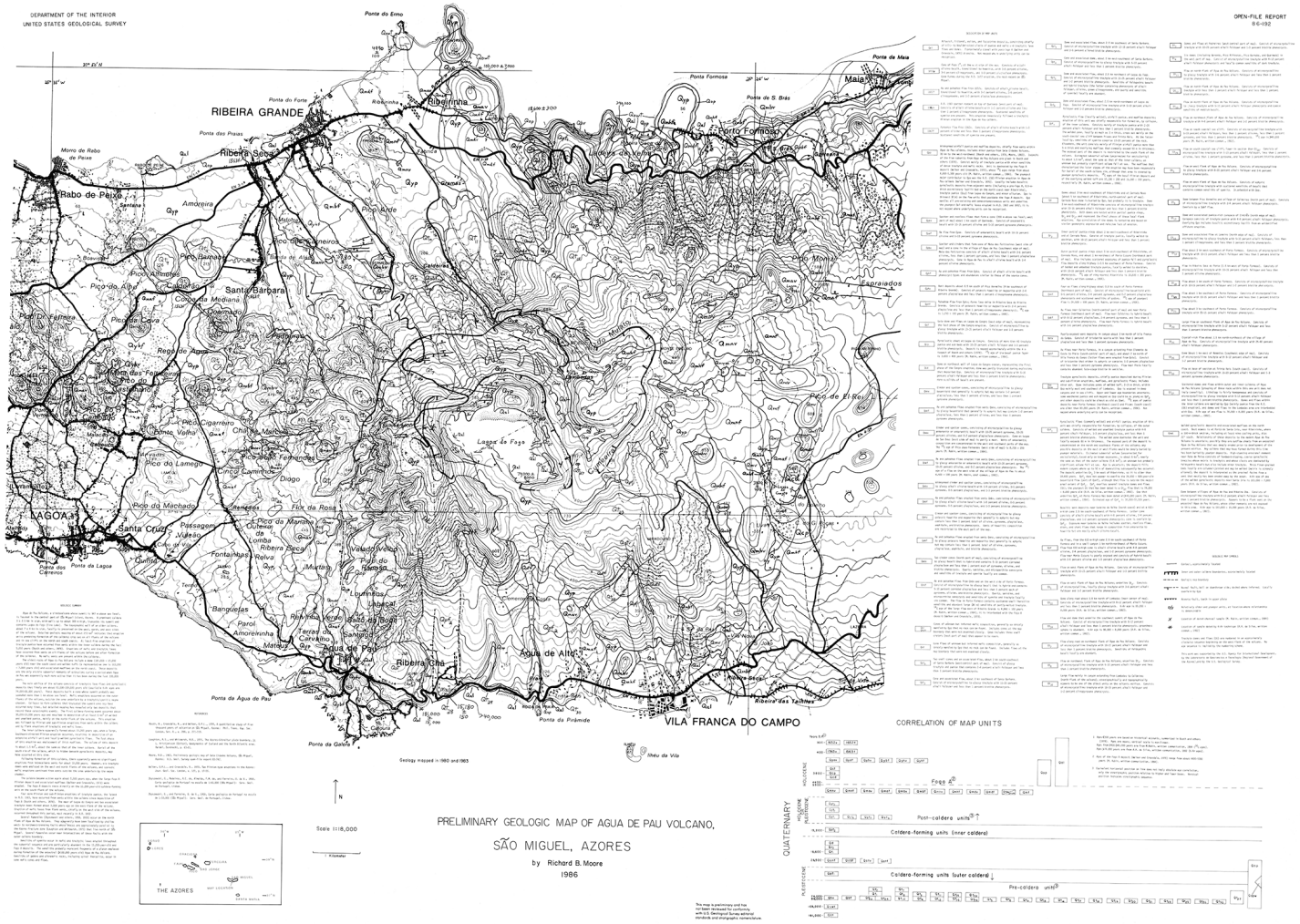

Geological map of Agua de Pau (Moore 1986).