Preserving Paradise/ Sustainable Ecotourism: Defining, Measuring, & Modeling

Cameron Reese

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Submitted in partial fulfillment of the

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Gundula Proksch

Rob Peña

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Abstract

Preserving Paradise/ Sustainable Ecotourism: Defining, Measuring, & Modeling

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Preserving Paradise / Sustainable Ecotourism: Defining, Measuring, & Modeling is a final year Master of Architecture thesis exploring the potential of tourism to act as a driver for ecological and cultural preservation and regeneration by developing a framework and model for sustainable ecotourism. Grounded in the principles of responsible travel, the study emphasizes conservation, the utilization of sustainable practices, and an enhancing of the socio-economic well-being of local communities while minimizing the environmental and cultural impacts of tourism.

The research begins by defining ecotourism, distinguishing it from other forms of nature based tourism, and outlining its theoretical foundations. It then addresses the challenge of evaluating eco-resorts to distinguish greenwashing and true sustainability. Through a proposed framework that is performance based rather than prescriptive, It will provide a model that can certify resorts as truly being “eco” or not.

Finally, the thesis culminates in the design of a hypothetical ecotourism resort that synthesizes all these elements. This design exercise demonstrates how sustainability can be achieved in site planning, construction, and long-term operations while maintaining luxury and cultural sensitivity. The outcome is a proof of concept project that shows how following the ecotourism framework results in eco-resorts that balance hospitality, environmental stewardship, and socio-economic contributions.

Ultimately, this study provides practical guidance for architects, developers, and policymakers seeking to ensure that ecotourism contributes to genuine ecological and cultural preservation rather than serving solely as a marketing tool.

PRESERVING PARADISE

SUSTAINABLE ECO-TOURISM: DEFINING, MEASURING, & MODELING

CAMERON REESE



PRESERVING PARADISE

SUSTAINABLE ECOTOURISM: DEFINING, MEASURING, & MODELING

A THESIS SUBMITTED BY **CAMERON REESE** IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARCHITECTURE AT THE UNIVERSITY OF WASHINGTON 2025

COMMITTEE:

GUNDULA PROKSCH
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PROGRAM AUTHORIZED TO OFFER DEGREE:

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INTRODUCTION

Chapter 1 begins by looking at the growing misuse of the term “ecotourism” and the uncertainty around what actually qualifies as an environmentally friendly destination. From there, I introduce the main research question and the goal of this thesis, which focus on defining what true ecotourism looks like and how it can be measured in a meaningful way. I’ll also give some background on what ecotourism is, how it differs from nature tourism, adventure tourism, and mass tourism, and why those differences matter. The chapter ends by outlining some of the major challenges the industry faces today and the role ecotourism can play as a sustainable model in the future of hospitality.

1



(“FIND YOURSELF AT ONE OF THE FOUR CORNERS OF THE EARTH,” N.D.)

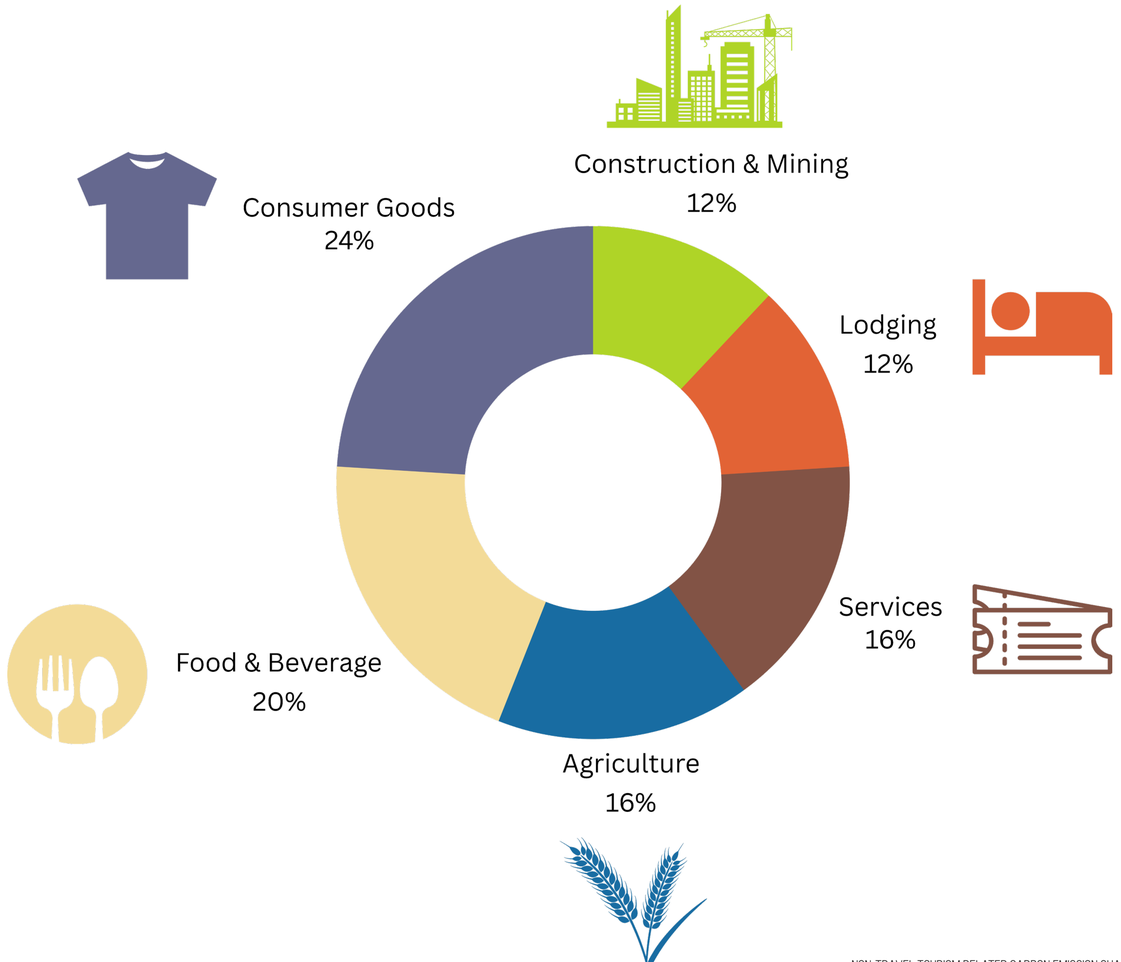
THE PROBLEM: CLIMATE CHANGE, TOURISM, & THE RISE OF SUSTAINABLE TRAVEL

In 2023, travel & tourism (including its direct, indirect, and induced impacts) accounted for ***10.5% of global jobs*** (334 million) and ***10.4% of global GDP*** (US$ 10.3 trillion), making the tourism industry is ***the 10th largest industry world-wide.*** ("Travel & Tourism Economic Impact | World Travel & Tourism Council (WTTC)," n.d.). Along with this market share comes big impact. Sustainable Travel international states that ***4% of global CO2 emissions are a result of the tourism industry, with that number jumping to 8% if you account for tourism related travel*** ("Combat Climate Change - Sustainable Travel International," n.d.). With tourism becoming more and more popular, changes need to be made soon or the carbon impact of this industry will continue to rise. The impacts of climate change have already taken root and as a result, ***the earth is warming at a rate 10 times faster*** than any period in the past 65 million years (Intergovernmental Panel on Climate Change 2023). Since 1880, ***global temperatures have risen by 1.2°C (2.2°F), and we are on track to exceed 1.5°C*** within the next two decades without drastic action ("Evidence - NASA Science" 2022). In addition, ***more than 1 million species are at risk of extinction*** due to climate change and habitat destruction (arghamanyan 2019).

Carbon emissions are not the only negative impact of the tourism industry as well. While ***Indigenous people only make up 5% of the worlds population, they inhabit 80% of its land.*** This makes these communities especially vulnerable to increased flooding, droughts, and other natural disasters. In the words of Sustainable Travel International, "as the environment around them changes it can considerably affect their economic, physical, and cultural well-being" ("Combat Climate Change - Sustainable Travel International," n.d.).

The good news is that the global ecotourism market has seen explosive growth. The desire to travel more sustainably is on the rise amongst consumers, according to the Ecotourism Global Market Report, "The ***ecotourism market size*** has grown rapidly in recent years. It ***will grow from $246.99 billion in 2024 to $279.41 billion in 2025 at a compound annual growth rate (CAGR) of 13.1%.***" ("Ecotourism Market Report 2025 - Ecotourism Industry Share And Size," n.d.). Moreover, ***66% of travelers expressed a desire for authentic travel experiences*** that reflect local cultures and communities (Piva 2024).

Yet, this growing demand has exposed significant gaps in the ecotourism sector. Many initiatives labeled as "eco-friendly" fail to deliver tangible benefits, and the lack of standardized sustainability metrics makes it difficult for travelers to distinguish genuine efforts from superficial ones. These gaps highlight the need for innovative approaches that integrate environmental, social, and economic sustainability into a cohesive framework.



NON-TRAVEL TOURISM RELATED CARBON EMISSION SHARES

THE PROBLEM: GREENWASHING

Ecotourism's rapid growth could be related to the fact that, ***A sizable 83% of travelers said that traveling more sustainably is important to them*** ("Latest Booking.Com Sustainable Travel Data Reveals Ongoing Challenges for Consumers & Highlights a Heightened Opportunity for Cross-Industry Collaboration," n.d.). Additionally, ***45% of travelers say that a hotel with a sustainability certificate would be more attractive*** to them when booking accommodation and 75% of travelers said they plan to travel more sustainably in 2024 (Stefi 2024).

This increased demand puts eco-resorts at increased risk of greenwashing or false advertising. While The International Ecotourism Society is the oldest recognized ecotourism organization in the world, it has only been around since 1990. It has no certification programs available that can prove whether or not any given resort is complying will any of the existing ecotourism principles. This can make ecotourism an easy target for greenwashing. ***Greenwashing is, "the act of making false or misleading statements about the environmental benefits of a product or practice. It can be a way for companies to continue or expand their polluting as well as related harmful behaviors, all while gaming the system or profiting off well-intentioned, sustainably minded consumers"*** ("What Is Greenwashing?" 2023). Justin Francis is the co-founder and CEO of Responsibletravel.com states, "***Some hotels will say we are certified as environmentally responsible, But that wording is intentionally misleading*** (Marcus 2021). Francis then goes on to talk about a hotel in Las Vegas, Nevada that retains their sustainability certification despite it being covered in hundreds of thousands of light-bulbs which remain on 24 hours a day, 7 days a week, and 365 days per year.

In an article published by the Natural Resources Defense Council, the author shares a story of an environmentalist and student Jay Westerveld. During a visit to a hotel in Fiji, he noticed that it asked guests to reuse towels for the planet's sake, a request that would also conveniently save the hotel money. Meanwhile, the hotel, located near sensitive island ecosystems, was in the middle of an expansion that had no sustainable goals or merit whatsoever ("What Is Greenwashing?" 2023). Authors Robin M. Self, Donald R. Self , and Janel Bell-Haynes state their concerns on this topic in their published journal article Marketing Tourism In The Galapagos Islands: Ecotourism or Greenwashing?. They stated, ***"This increase in ecofriendly travel has some organizations worrying that the meaning of "ecotourism" is being watered down and is simply used as a marketing tool to take advantage of increased demand in order to boost revenue" (***"(PDF) Marketing Tourism In The Galapagos Islands: Ecotourism Or Greenwashing?" 2024)

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Your eco-friendly hotel might not be so green after all

By Lilit Marcus, CNN
7 minute read · Updated 11:55 PM EDT, Tue March 30, 2021



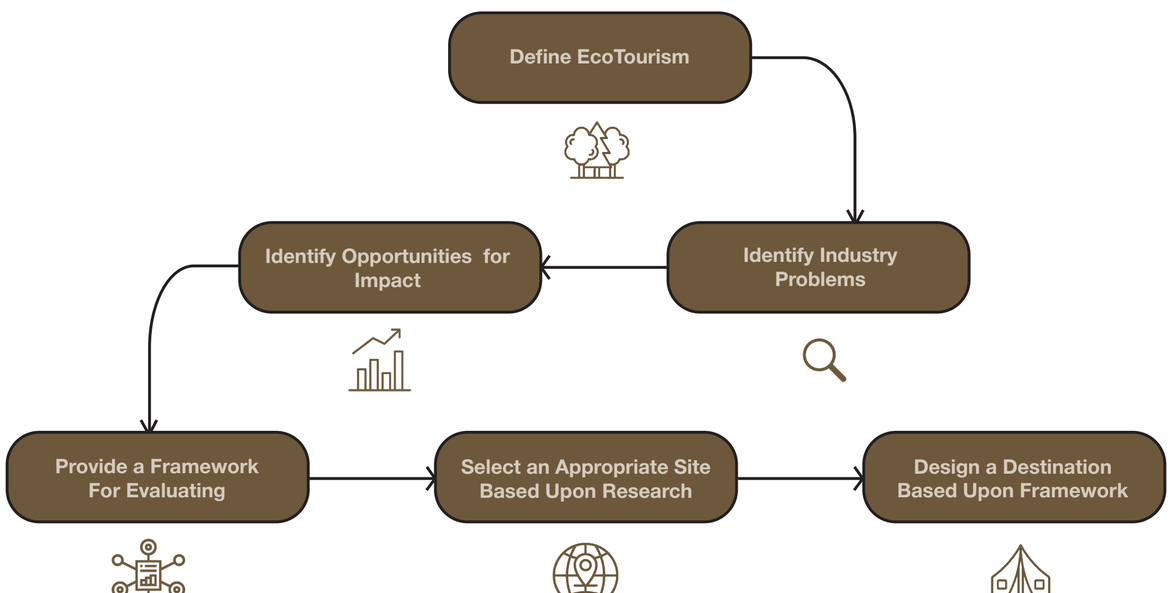
(MARCUS 2021)



("SHEBARA RESORT | ECO-LUXURY HAVEN ON THE RED SEA," N.D.)

THE QUESTION: WHAT ARE WE TRYING TO LEARN?

At the heart of this research is a central question: ***What defines true ecotourism, and how can its physical, economic, and educational impacts be effectively measured to certify eco-conscious destinations and distinguish them from greenwashing?*** This question addresses the ongoing confusion surrounding what ecotourism actually entails, especially as the term is frequently used without accountability or consistent standards. While many tourism operations market themselves as "eco," their claims often lack depth or verification. This research aims to move beyond surface-level sustainability by developing a clear definition of ecotourism and creating measurable criteria that reflect real environmental responsibility, economic benefit to local communities, and educational value for visitors. It also explores whether these criteria can form the basis for a practical certification framework, offering tools that help travelers, designers, policymakers, and industry professionals identify and support genuinely sustainable tourism.





("BIOSPHERE," N.D.)

THE GOAL: WHAT ARE WE TRYING TO DO?

This thesis aims to define what truly sustainable ecotourism is and how it can be distinguished from greenwashing. To achieve this, it develops a certification framework that measures ecotourism projects based on environmental, economic, and educational impacts. This framework is then applied to site selection and a design proposal to demonstrate how these criteria can guide real-world outcomes. ***Ultimately, the goal is to provide practical guidance that supports meaningful progress in the development of sustainable tourism destinations.***

The research also explores how tourism can balance environmental responsibility with hospitality and luxury. It proposes a model for eco-resorts that not only minimizes ecological impact but also contributes to the health of surrounding natural and cultural landscapes. Special attention is given to the challenges of remote or ecologically sensitive locations, where limited infrastructure requires site-specific solutions that respond to both opportunities and constraints.

Ecotourism is at a critical point. While its growing popularity presents an opportunity to reshape how tourism interacts with the environment, many current approaches focus on isolated sustainability features without addressing the broader context. This thesis argues for a more holistic approach. One that integrates environmental, economic, and social dimensions across the entire life cycle of a project, from design and construction through long-term operations.

Through an analysis of existing certifications, which will be discussed in detail later, the research identifies best practices and highlights gaps in current systems. These findings inform the creation of a more comprehensive model, tested through a hypothetical design project. This project acts as a proof of concept, illustrating how sustainability can be embedded into all aspects of an eco-resort, including site selection, construction methods, operational strategies, and guest experience.

By providing a clear and actionable framework, this thesis has the possibility to influence industry standards and shift consumer expectations. ***It offers a road-map for designers, developers, policymakers, and communities to collaborate on tourism projects that prioritize long-term ecological health and cultural preservation.***

ECOTOURISM: WHAT IS IT?

Ecotourism is defined as responsible travel to natural areas that conserves the environment, supports the well-being of local communities, and includes interpretation and education (“What Is Ecotourism,” n.d.). The International Ecotourism Society (TIES) emphasizes that education should extend to both guests and staff, reinforcing the idea that ecotourism is not only about the destination but also about the experience and its broader impact. TIES outlines a set of principles intended to guide those who implement, participate in, or promote ecotourism activities. These include the following...

- Minimizing physical and social impact
- building environmental and cultural awareness
- creating positive experiences for both visitors and hosts
- supporting conservation through financial contributions
- generating income for local communities
- designing and operating low-impact facilities
- recognizing the rights and cultural beliefs of Indigenous Peoples.

Applying these principles in practice, however, can be complex. For instance, minimizing physical impact involves detailed decisions about construction and land use. How buildings meet the ground, whether through heavy concrete slabs or lighter pier foundations, can significantly affect the ecological footprint of a resort. In fragile environments, even trail networks and footpaths must be carefully planned to avoid disrupting native ecosystems. Overuse of land and mismanagement of resources, particularly in high-traffic resorts, can create long-term damage that contradicts the core values of ecotourism.

Social impacts are equally important. A truly eco-conscious resort should contribute to the local economy, creating jobs and opportunities for nearby communities. If a project depends heavily on specialized labor from outside the region, it may burden local housing markets and supply chains while offering limited benefits to residents. Similarly, if the resort displaces or overshadows local businesses, it can weaken rather than support the surrounding economy. These considerations must be addressed early in the planning and design process.

Building awareness and respect is a central tenet of ecotourism and one of the key ways it differs from other forms of travel. This principle applies equally to guests and staff. Cultural experiences led by local community members, interpretive signage, educational programs, and ongoing staff training can help create an environment where both hosts and visitors are engaged in the preservation of the region’s ecological and cultural resources. Ideally, guests leave not only with lasting memories, but also with a clearer understanding of the importance of conservation and local culture.



(“LUXURY FIVE-STAR HOTEL & RESORT IN UTAH, USA - AMANGIRI,” N.D.)

ECOTOURISM: HOW IS IT DIFFERENT?

One important thing to understand is that ecotourism is a unique subcategory of tourism. It has a large umbrella of goals and can often be misunderstood. This thesis will focus on ecotourism. The other subcategories of tourism that often get confused as ecotourism are nature tourism, mass tourism, and adventure tourism. The following table offers the main objectives, strategies (what it looks like), and ecological impact of each of these different types of tourism.

Tourism Type	Main Objective	What It Looks Like	Ecological Impact	Source
Ecotourism 	Conservation of natural areas through tourism, education, and community support.	Small-scale, sustainable activities; eco-friendly accommodations; support for local communities.	Preserves ecosystems, fosters cultural respect, educates visitors.	(“Home,” n.d.)
Nature Tourism 	To travel to a beautiful location with a pure of experiencing the place.	The segment in the tourism market in which people travel with the primary purpose of visiting a natural destination, Sustainability is not a focus.	Potential harm to locations without regulations.	(Kuenzi and Mcneely 2008)
Mass Tourism 	Maximize profits through high visitor volume.	Large-scale development, standardized experiences, little consideration for sustainability.	Environmental degradation, over-tourism, minimal local benefits.	(Naumov and Green 2016)
Adventure Tourism 	Provide thrilling, nature-based activities for physical and emotional engagement.	Nature tourism with a kick –a degree of risk taking and physical endurance; focus on experiences rather than sustainability.	Potential harm to fragile ecosystems (e.g., trail erosion), limited community engagement.	(Kuenzi and Mcneely 2008)



("OLSON KUNDIG — SIMPLY SHENANDOAH," N.D.).

THE IMPORTANCE: WHY DOES THIS EVEN MATTER?

Ecotourism plays a critical role in addressing the environmental and social impacts of global tourism. As the climate crisis accelerates, organizations like the United Nations Tourism Agency have called for a shift toward sustainable development. They define this as tourism that supports ecological health, cultural preservation, and long-term economic stability. These goals directly align with the core principles of ecotourism, which emphasize responsible resource use, community engagement, and cultural respect.

All that said, the importance of ecotourism goes beyond its ethical considerations. As reported earlier, consumer demand for more sustainable travel experiences is growing rapidly. Industry reports project the ecotourism market to reach $249.16 billion in 2024 and $428.97 billion by 2028, reflecting a shift in public values and expectations ("Ecotourism Market Report 2025 - Ecotourism Industry Share And Size," n.d.). ***This growth represents both a business opportunity and a responsibility: to ensure that eco-resorts are genuinely sustainable and not merely leveraging greenwashing to attract customers.***

This research is essential in guiding the industry toward measurable and meaningful sustainability. ***Without clear standards, the term "eco" risks losing its credibility.***

CASE STUDIES, CERTIFICATIONS, & FRAMEWORK

Chapter Two outlines the research foundation for this project. It begins with five case studies of resorts that align with ecotourism principles to varying degrees. These examples are all from diverse geographic and ecological contexts, from tropical islands to arid deserts and remote northern regions. They were chosen to demonstrate that ecotourism can take shape in a wide range of environments. Each case is analyzed to better understand how location, design, and operations are addressing elements of ecotourism.

The chapter then turns to an evaluation of existing certification systems within both the hospitality and building industries. Their strengths, limitations, and alignment with ecotourism values are assessed to identify shortcomings and opportunities. Building on this analysis, the chapter introduces a new certification framework developed specifically for ecotourism. The structure, purpose, and application of this framework are explained, along with how it differs from current industry certifications. Finally, the chapter applies elements of this framework back onto the case studies, offering a preview of how it can be used to assess and guide real-world projects.

2



("KOKOMO PRIVATE ISLAND," N.D.)

CASE STUDIES: AMANGIRI

The Amangiri Resort, designed by Studio Rick Joy, Wendell Burnette Architects, and Marwan Al-Sayed, was completed in 2009 and is located in Canyon Point, Utah, USA. Situated within the country's largest Native American reservation, the resort offers access to landmarks such as the Grand Staircase-Escalante National Monument, five national parks, and the Navajo Nation Reservation. Occupying 600 acres, Amangiri includes 34 guest rooms and suites, 10 tented pavilions, and extensive amenities such as a 25,000-square-foot spa and a restaurant.

Its low-profile design follows the natural topography, using earth-toned concrete that blends with the desert's mesas and rock formations. Inspired by Native American Navajo and Pueblo architecture, the resort's clean lines and native landscaping minimize visual and ecological impact. The clustering of buildings reduces the overall footprint, while the strategic use of large glass walls and courtyards immerses guests in the surrounding landscape.

Amangiri employs a range of sustainable strategies, including the use of local minerals and recycled fly ash in its concrete construction. The resort adheres to International Dark-Sky Association guidelines, using dimmed, downward-directed lighting to minimize light pollution. It generates electricity through a solar field and utilizes a fleet of electric BMW vehicles to pick up guests from the nearby airport. Conservation efforts extend to eliminating single-use plastics, recycling aluminum and cardboard, and donating food waste to local wildlife organizations ("Sustainability at Amangiri - Aman," n.d.). Hiking trails are designed to respect native wildlife and soil, while the resort's landscaping incorporates native vegetation to reduce water usage.

Apart from physical measures, Amangiri fosters deep ties with local Native American communities, offering cultural programs that preserve and promote heritage. Guests participate in curated experiences, including stargazing sessions, art workshops, and traditional storytelling. The resort also supports indigenous schools through material and monetary donations. Aside from this, Amangiri creates significant economic opportunities by employing 240 staff members diversifying the job market, and generating jobs in the hospitality industry. The resort enhances interaction with the environment through private terraces, outdoor courtyards, and immersive hiking trails that follow "Leave No Trace" principles. Adventure trips to nearby national parks and cultural programs educate guests while promoting conservation awareness.



IMAGES: ("LUXURY FIVE-STAR HOTEL & RESORT IN UTAH, USA - AMANGIRI," N.D.).



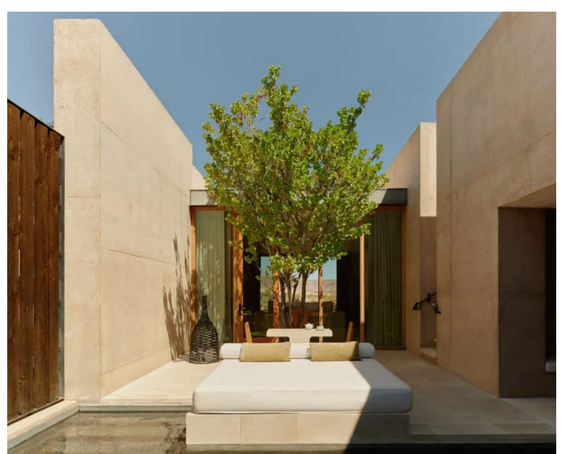












CASE STUDIES: THE FOGO ISLAND INN

The case study that has the most similarities to ecotourism is the Fogo Island Inn. This project, completed in 2013 and designed by Saunders Architecture, is situated on Fogo Island in Newfoundland, Canada. This remote location, known for its fishing heritage, dramatic Atlantic Ocean views, and natural beauty, faced significant challenges of economic decline and outmigration. The inn spans 4,000 square meters and offers 29 guest rooms, all with ocean views. Its amenities include a spa, sauna, library, art gallery, cinema, restaurant, bars, and outdoor spaces.

The inn's design is conscious of its surroundings, elevating the structure on stilts to preserve the natural terrain and provide unobstructed ocean views. Locally sourced wood and stone were used in construction, drawing inspiration from the island's traditional fishing structures. The project emphasizes sustainability with features such as non-destructive, low-impact foundations, renewable energy systems including hydro-power and thermal panels, and triple-glazed windows to enhance energy efficiency. Rainwater collection and greywater reuse systems reduce water waste, while local vegetation was restored after construction to maintain the ecological health ("Find Yourself at One of the Four Corners of the Earth," n.d.). The inn also minimizes light pollution and preserves ancient footpaths, offering only 29 rooms to avoid over-tourism.

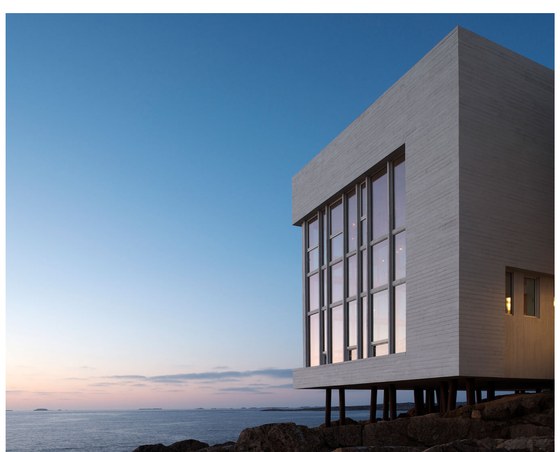
Construction posed significant challenges due to the island's remote location, requiring materials and equipment to be transported by boat or ferry. However, the project prioritized the use of local materials and labor, contributing directly to the community's economy. Guests are encouraged to connect with the landscape through activities such as hiking, fishing, and snowshoeing. Acoustics within the inn allow the sounds of nature to filter through, creating a serene environment while mitigating room to room sound transmittance. The Fogo Island Inn has a profound community impact, contributing 54% of its income back into the Fogo Island community and retaining 96% of its income in Canada. Only 4% of their income goes international ("Find Yourself at One of the Four Corners of the Earth," n.d.). Local artisans contributed furniture, textiles, and art to the project, ensuring cultural authenticity while supporting the economy. Operated by a charity, the inn supports education, conservation, and community programs, aligning with its mission to integrate environmental and social sustainability.



IMAGES: ("FIND YOURSELF AT ONE OF THE FOUR CORNERS OF THE EARTH," N.D.)















CASE STUDIES: KOKOMO PRIVATE ISLAND

Kokomo Private Island, located in Fiji's Mamanuca Archipelago, is a luxury resort completed in 2017. Designed by Keith Lambert of Walker Group and Conway Architects, the resort spans 140 acres and features 21 villas and 5 residences. The project emphasizes sustainability and minimal environmental impact, blending the resort with the island's tropical landscape, lush vegetation, and coral reefs.

The resort's design integrates passive strategies to maximize natural ventilation and lighting, reducing energy consumption. Solar panels provide renewable energy, while a solar powered seawater desalination plant supplies clean water and produces sea salt. This sea salt is used in the restaurant, but it is also used to create a chlorine free brine used in the resorts swimming pools. Storm-water and greywater recycling systems reuse 80% of processed water for irrigation. Locally sourced materials, such as hardwood cinnamon and mahogany, and traditional Fijian construction techniques are used throughout the resort tying it into the islands cultural authenticity.

Kokomo Private Island is actively involved in conservation efforts, including the Mangrove Reforestation Project and the Coral Restoration Project. Over 2,000 heat-resilient corals have been transplanted to the house reef, and guests are encouraged to participate in coral planting and mangrove restoration activities ("Kokomo Private Island Fiji – Exclusive Luxury Resorts & Villas," n.d.). These initiatives not only protect the environment but also enhance guest engagement with the island's ecosystem.

The resort's construction prioritized local labor and materials to maintain authenticity as well as reducing reliance on long distance supply chains. The design enhances guest interaction with the environment through open-plan layouts, expansive windows, and direct access to coral reefs and lagoons. Educational programs, such as guided tours of the mangrove nursery and coral restoration workshops, raise awareness about conservation.

Kokomo Private Island also benefits local communities by employing Fijian staff and sourcing food locally from a 5-acre farm and through local fishing. Over 100 jobs have been created, and the resort sponsors ecological programs like the Kokomo Manta Conservation Project, which focuses on manta ray protection within the region.



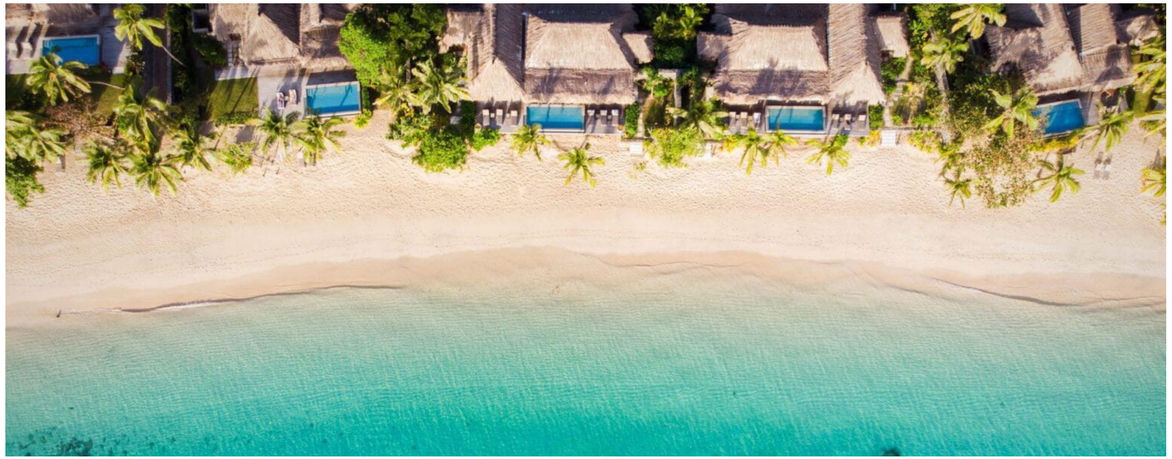
IMAGES: ("KOKOMO PRIVATE ISLAND," N.D.)



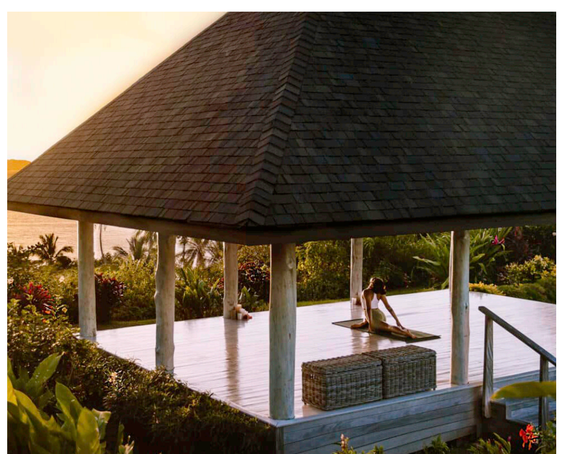












CASE STUDIES: SHEBARA

The Shebara Hotel, designed by Killa Design and completed in 2024, is located on Sheybarah Island, Saudi Arabia. This uninhabited island features mangroves, desert flora, and pristine coral reefs, offering a unique responsibility of the conservation of a vast ecosystem. The hotel spans 457 acres and includes 73 villas with various amenities, such as a spa, gym, restaurants, and aquatic expeditions.

Operated with a staff of 260 people, the resort integrates cutting-edge sustainability and design features. The Shebara Hotel has made an extreme commitment to preserving and enhancing the island's natural ecosystem. Red Sea Global, the owner of the Shebara, has planted over 600,000 native mangrove seedlings and has relocated 98,000 corals as a tool to regenerate the islands ecosystems and enhance native biodiversity. This is a part of their mission to sequester carbon and restore the islands that have fallen to desertification ("Environmental Regeneration - Red Sea Global," n.d.). Over-water villas are cantilevered above coral reefs, supported by single columns to minimize site impact. Constructed with reflective stainless steel, these structures blend into the environment while reducing 99% solar heat absorption ("Sheybarah Resort by Killa Design" 2021). The resort operates entirely off-grid, utilizing renewable energy sources, such as a centralized solar farm, and features a solar-powered desalination plant. Additional efforts include mangrove regeneration, coral preservation and relocation, and waste recycling.

The project has achieved LEED Platinum certification and scored 91/100 on the GRESB ESG assessment ("Shebara Resort | Eco-Luxury Haven on the Red Sea," n.d.). It aims for net-zero operations by 2030 and plans to achieve a 30% net conservation benefit by 2040. Given its remote location, all buildings were prefabricated by Grankraft Industries in the UAE and shipped to the site. Using barges and cranes, the villas were installed with minimal environmental disruption, resulting in a minimally invasive construction processes. Shebara Hotel enhances the guest experience by providing direct interaction with the island's pristine ecosystems.

Over-water villas offer views of vibrant coral reefs, while beach-front accommodations integrate native vegetation. Activities like snorkeling, kayaking, and eco-tours foster a deeper connection to the environment. The resort also emphasizes education through initiatives such as mangrove planting and coral preservation programs. The project contributes to local community development through job creation, training programs, and scholarship opportunities. It is expected to generate 120,000 jobs and contribute SAR 22 billion annually to Saudi Arabia's GDP, supporting the nation's Vision 2030 economic diversification goals.

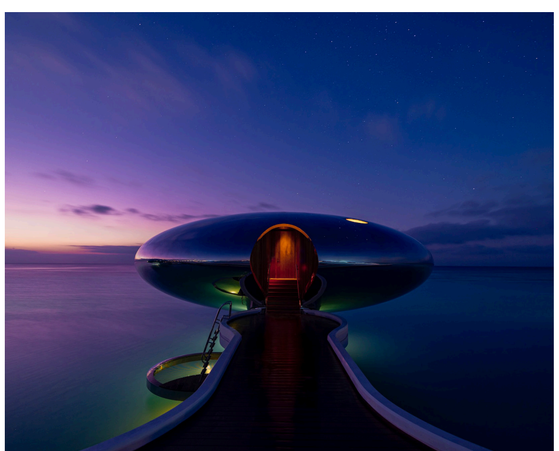


IMAGES: ("SHEYBARAH RESORT BY KILLA DESIGN" 2021)

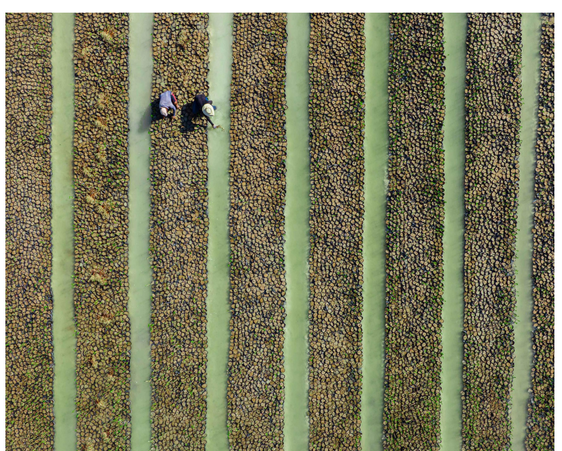














CASE STUDIES: SIMPLY SHENANDOAH

The Simply Shenandoah project is located in Tannery, Virginia, within the scenic Shenandoah Valley, a region full of breathtaking natural landscapes, rolling hills, and rich biodiversity. The project, designed by Olson Kundig and expected to be completed in 2026, spans a site area of 640 acres and will feature 118 guest rooms and four tree houses. Its design harmonizes with the valley's topography, utilizing natural contours to minimize site disturbance and avoiding the need to cut down existing mature trees. Buildings are positioned to maximize views of the Blue Ridge Mountains, integrating mature trees and native vegetation into the design to preserve biodiversity. The resort also incorporates sustainability measures, such as bioswales, permeable surfaces, storm-water retention systems, solar panels, and passive design strategies, while utilizing locally sourced materials. Seeking LEED accreditation, Simply Shenandoah is striving to be environmentally conscious development that supports the wellness of guests.

Besides implementing high tech systems Olson Kundig has utilized simple solutions that not only reduce energy needs, but also engage guests with the landscape and promote wellness. They have implemented things like operable windows, ceiling fans, thermal mass, and other low tech strategies that do more than just reduce energy needs. Operable windows allow guests not only to experience views with their eyes but also feel the air, hear the sounds, and smell the trees of the surrounding forest.

Guest interaction with the environment is central to the design, with expansive (and often operable) windows, private terraces, communal fire pits, and walking trails providing immersive experiences in the surrounding landscape. Amenities such as yoga decks and outdoor seating areas further enhance the connection between guests and nature. The project also includes wellness programs and partnerships with local universities to foster sustainable career opportunities and economic benefits for the community. Simply Shenandoah plans to create over 300 jobs, co-promote local attractions, and support regional agriculture by sourcing 80% of its food locally. The resort's emphasis on education and conservation includes initiatives such as a 50-year natural resource management plan and regenerative agriculture practices ("Nature Retreat | Wellness Resort | Simply Shenandoah," n.d.).



IMAGES: ("OLSON KUNDIG — SIMPLY SHENANDOAH," N.D.)















CERTIFICATION: HOW MANY ARE THERE? WHAT ARE THEIR FOCUSES?

"You are awarded if you make a small improvement in a number of criteria, not that you've achieved any level of sustainability, in other words, Get rid of one or two of those energy-hogging bulbs, and you're doing better than you were last year." (Marcus 2021)

The growing demand for environmentally friendly travel has led to the development of a wide variety of "eco" or sustainability certifications worldwide, each claiming to validate the environmental and/or social responsibility of tourism enterprises. However, the sheer number of certifications and their varying scopes have created confusion and inconsistency in defining what constitutes genuine ecotourism. According to the article Marketing Tourism In The Galapagos Islands: Ecotourism Or Greenwashing, In the International Business & Economics Research Journal, ***"The tourism industry has tried to address these certification concerns; over 100 certification or "eco" labeling programs exist with different standards and criteria"*** ("(PDF) Marketing Tourism In The Galapagos Islands: Ecotourism Or Greenwashing?," n.d.).

Recognizing the need for clarity, the Mohonk Agreement was established in 2000 to outline core principles that ecotourism certifications should address, such as environmental conservation, community involvement, and cultural preservation (Medina 2005). Despite this effort, t***he recommendations of the Mohonk Agreement are not required and twenty-five years later there is still no gold standard or ecotourism certification.*** Resorts often select certifications that align with their goals or marketing strategies, enabling them to brand themselves as eco-resorts even if they fail to fully adhere to all ecotourism principles. As stated in the Marketing Tourism article, ***"many ecotours are just ordinary operations that "greenwash" themselves by embracing the tourism label while doing little to act in an environmentally responsible manner"*** ("(PDF) Marketing Tourism In The Galapagos Islands: Ecotourism Or Greenwashing?," n.d.).

Among the various certifications, a few stand out as the most prominent and recognized: ***the Global Sustainable Tourism Council Certification (GSTC), Green Globe Certification, EarthCheck Certification, The Living Building Challenge, and LEED Certification.*** Each of these certifications has its own criteria, strengths, and weaknesses, making them valuable but incomplete tools for assessing the sustainability of ecotourism ventures. Some, like GSTC, focus specifically on tourism operations but overlook the design and construction process, while others, such as LEED, prioritize sustainable building practices without addressing the broader social, economic, and operational aspects of tourism. ***This lack of comprehensiveness reveals gaps in these certifications when compared to the holistic principles of ecotourism.***

LIVING BUILDING CHALLENGE

LEED

GSTC®

Global Sustainable Tourism Council

GREEN GLOBE CERTIFIED

EARTHCHECK

BIOSPHERE



CERTIFICATION: THE MOHONK AGREEMENT

The Mohonk Agreement, developed in 2000, sought to establish a unified framework for evaluating ecotourism and its certification systems. Recognizing the rapid growth of ecotourism and the proliferation of certifications with inconsistent standards, the agreement aimed to define the essential principles that any credible ecotourism certification system should encompass. This effort was spearheaded by a group of industry experts at an international workshop on Ecotourism and Sustainable Tourism Certification (Medina 2005). The agreement is a two-tiered outline of core elements that ecotourism certifications should address, including:("(PDF) Marketing Tourism In The Galapagos Islands: Ecotourism Or Greenwashing?," n.d.).

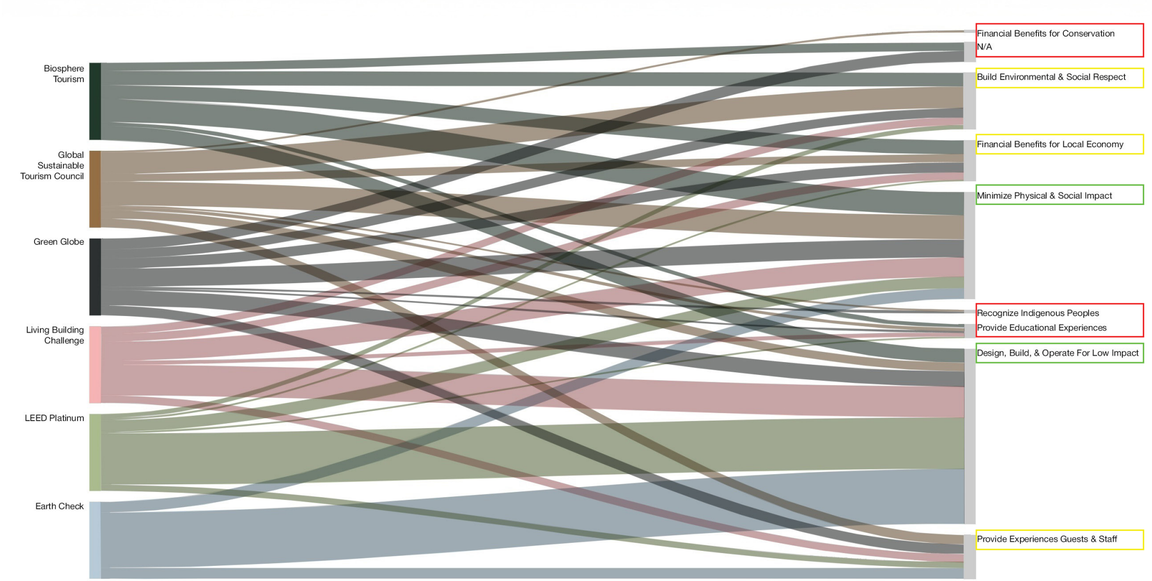
- Focus on personal experiences of nature to lead to a greater understanding and appreciation
- Interpretation and environmental awareness of nature, local society and culture
- Positive and active contributions to conservation of natural areas or biodiversity
- Economic, social, and cultural benefits for local communities
- Fostering of community involvement, where appropriate
- Locally appropriate scale and design for lodging, tours and attractions
- Minimal impact on and presentation of local (indigenous) culture

While the Mohonk Agreement offered a needed foundation for ecotourism certification systems, it did not establish a single gold standard certification or governing body to enforce these principles. 25 years later a certification for ecotourism has still not emerged. Instead, the Mohonk Agreement serves as a guideline for organizations to develop their own certifications. The result being, the global ecotourism industry remains fragmented, with many certifications adopting only select elements of the Mohonk framework.

One of the agreement's key shortcomings is its lack of emphasis on the design and construction phases of tourism infrastructure. While it emphasizes environmental sustainability and community involvement, it does not provide detailed criteria for evaluating the ecological and cultural impacts of building resorts or the sourcing of construction materials ("Definition and Key Concepts – GEN – Global Ecotourism Network," n.d.). ***Furthermore, the agreement's voluntary nature leaves room for interpretation and selective implementation.***

Selected Sustainability Certificates
And Their Required Criteria

Percentage Of Criteria That Aligns
With The Mohonk Agreement



CERTIFICATION EVALUATION: METHODOLOGY

To better understand how existing certification systems align with ecotourism values, I conducted a comparative analysis of six widely recognized sustainability certifications: the Living Building Challenge, LEED, the Global Sustainable Tourism Council (GSTC), EarthCheck, Biosphere Tourism, and Green Globe. The goal of this analysis was to evaluate how well each system reflects the principles outlined in the Mohonk Agreement.

The process began with a review of each certification, focusing specifically on their required criteria. I cataloged these criteria into a single matrix to compare their core values and areas of emphasis. Once this list was complete, ***I cross-referenced each certification's criteria with the ecotourism principles defined by the Mohonk Agreement***: such as environmental conservation, cultural sensitivity, community involvement, and educational experiences.

To visualize the results, I used Sankey diagrams and pie charts to identify patterns and gaps. These visual tools helped illustrate where each certification placed its emphasis, whether on environmental impact, economic benefit, cultural engagement, or other factors. However, the visualizations alone presented an incomplete picture.

One limitation of this approach is that it does not account for the rigor of each certification. While some systems, such as the Living Building Challenge, require verifiable performance and third-party audits, others operate more like honor-based checklists. ***Many are prescriptive in nature, rewarding incremental improvements rather than demanding specific performance thresholds.*** As a result, it became clear that the presence of certain criteria did not always guarantee a project that is truly sustainable.

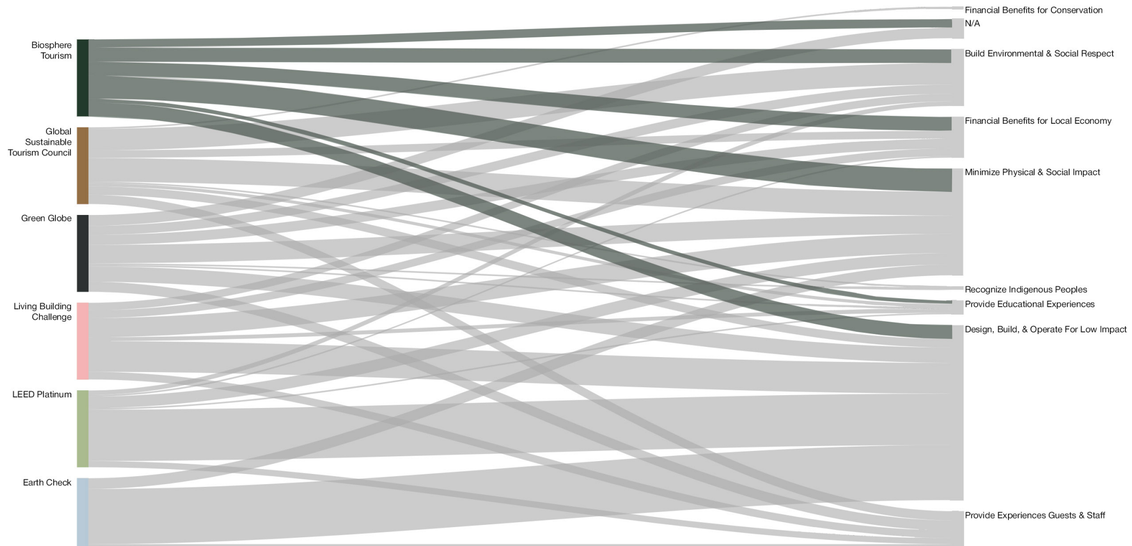
The analysis revealed that although several certifications address some elements of ecotourism, none of them fully integrate all of the Mohonk Agreement's principles. ***These insights helped identify the need for a more comprehensive, ecotourism-specific certification framework***, one that goes beyond checklists to address the full life-cycle of a resort, from site selection and design through long-term operations.

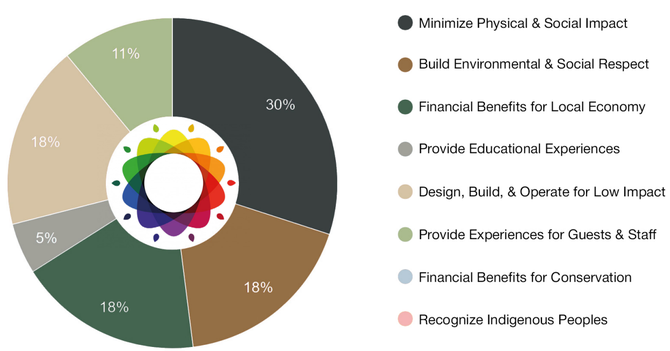
CERTIFICATION EVALUATION: BIOSPHERE TOURISM

Biosphere Tourism Certification is built around the promotion of sustainable tourism practices that align with the United Nations' Sustainable Development Goals (SDGs). According to their own materials, "The Biosphere methodology standard is the only one created as a result of the four Summits sponsored by UNESCO and UNWTO during the International Year of Sustainable Tourism, to work on the basis of the 17 Sustainable Development Goals of the United Nations" ("Meet Biosphere Sustainable," n.d.).

What sets Biosphere Tourism apart is its entirely self-guided, on-line certification process. Businesses begin with a self-audit and choose which of the 17 SDGs they want to focus on. ***Certification is awarded based on progress made toward selected goals, rather than full completion or overall sustainability performance. This gradual, goal-specific approach allows for flexibility, but also presents serious concerns about accountability.***

Because there is no requirement to meet all sustainability goals, and no third-party audit is conducted, the system lacks the rigor found in more performance-based certifications. ***It is largely self-governed, making it ideal for businesses that may not be able, or willing, to meet high standards of sustainability.*** While this can help encourage participation from a wide range of tourism operators, it also opens the door for superficial compliance. Businesses can receive certification simply for making incremental changes, regardless of the depth or impact of those efforts.





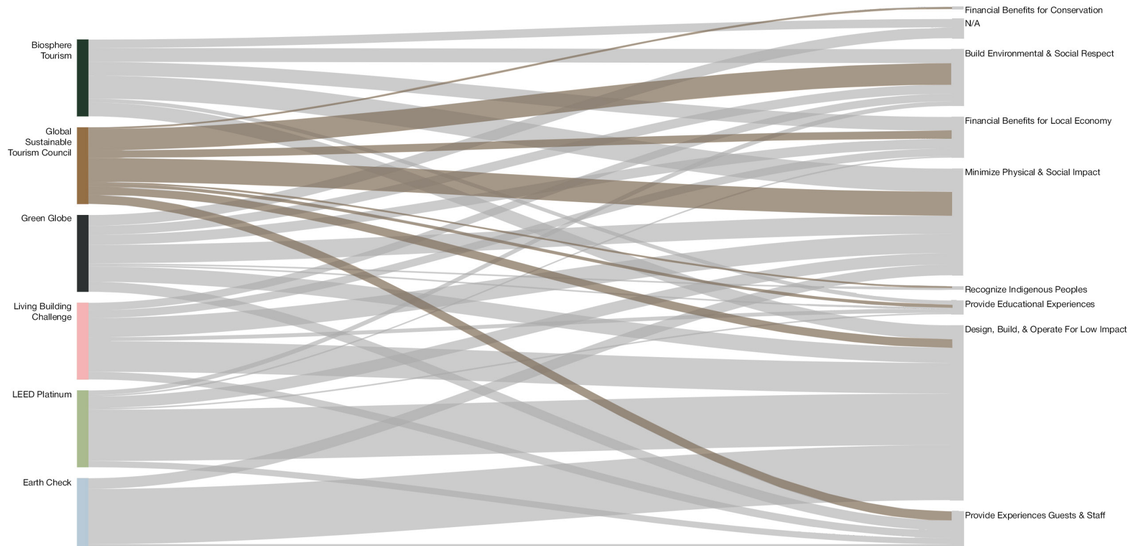
CERTIFICATION EVALUATION: GLOBAL SUSTAINABLE TOURISM COUNCIL (GSTC)

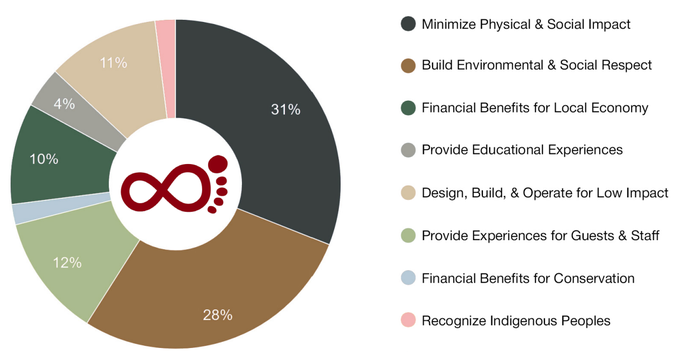
The Global Sustainable Tourism Council (GSTC) provides one of the most widely recognized certifications for sustainable tourism. Its certification is built around four main pillars: effective sustainable management; maximizing social and economic benefits to local communities; preserving cultural heritage; and minimizing environmental impact. Tourism businesses are assessed by an accredited GSTC auditor based on how well they meet specific criteria within these categories.

While the GSTC covers many important aspects of ecotourism, especially in terms of operational practices and community engagement, ***it falls short in addressing the design and construction of tourism infrastructure.*** The language around these issues is vague, stating only that projects should “use locally appropriate and sustainable practices and materials.” This leaves the criteria open to interpretation and offers little guidance for how to evaluate or improve the physical development of tourism projects.

Like LEED, the GSTC also relies on a prescriptive checklist. It emphasizes compliance with listed criteria rather than encouraging integrated, site-specific strategies or measuring actual performance. This structure limits innovation and can result in projects that technically meet the certification while still lacking depth in their sustainability efforts.

Another shortcoming is the lack of transparency and consistency in the auditing process. There is little publicly available information on how GSTC audits are conducted, and much of the evaluation is left to the judgment of individual auditors. Without clear, measurable benchmarks, this subjectivity can lead to inconsistent assessments and reduce the credibility of the certification. Overall, while GSTC offers a helpful operational framework, it does not provide the comprehensive or objective structure needed to fully align with ecotourism principles.



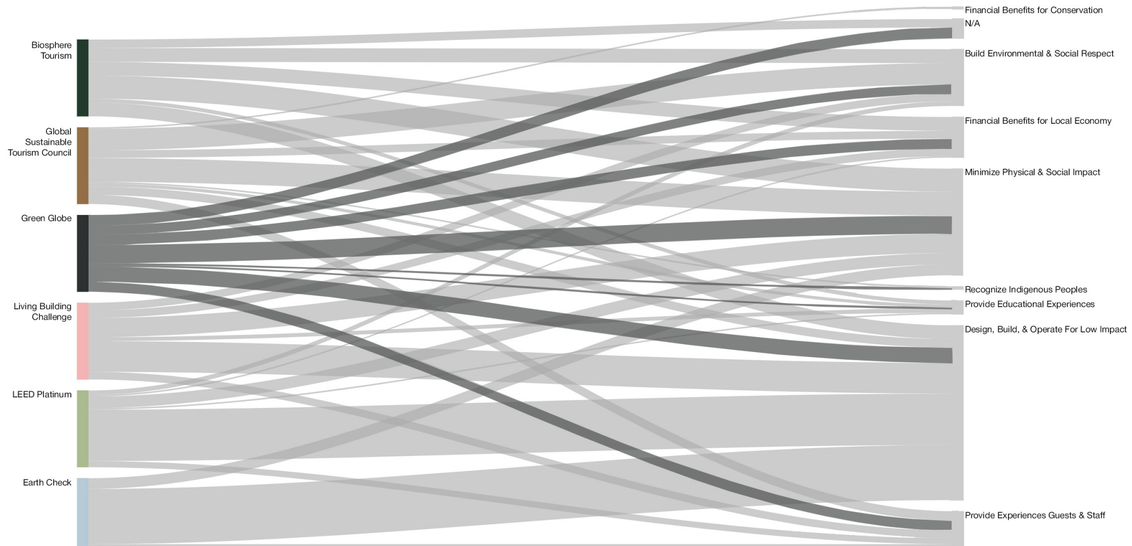


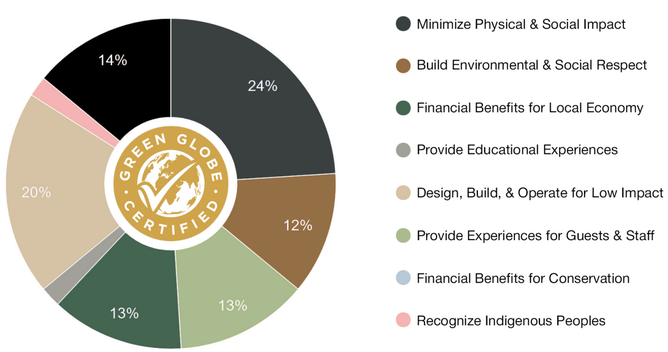
CERTIFICATION EVALUATION: GREEN GLOBE

Green Globe Certification evaluates tourism businesses across four main categories: sustainable management, socio-economic impact, cultural heritage preservation, and environmental conservation. It provides a structured operational framework aligned with international sustainability standards. Certification is based on 44 key performance indicators (KPIs), each scored as compliant (1), non-compliant (0), or not applicable (N/A). The process begins with self-assessment and is followed by a third-party audit.

While this approach may appear comprehensive, ***the binary scoring system is overly simplistic.*** A project is marked as compliant regardless of the degree to which it fulfills a KPI. For example, if a resort uses recycled water, it receives full credit; whether it uses 5% or 100% recycled water, whether it's used only for landscaping or throughout the facility. ***This lack of nuance makes it difficult to evaluate how thoroughly a project addresses sustainability goals. The checklist nature of the certification rewards minimal compliance rather than meaningful progress.***

Moreover, Green Globe places limited emphasis on sustainable design and construction. Only one of the 44 KPIs touches on construction. Even then, its focus is more on cultural sensitivity in design than ecological impact. Key considerations such as site disturbance, material sourcing, energy performance, and construction methods are largely absent. As a result, while Green Globe may support better tourism operations, ***it does not fully address the broader sustainability challenges that ecotourism seeks to confront.***



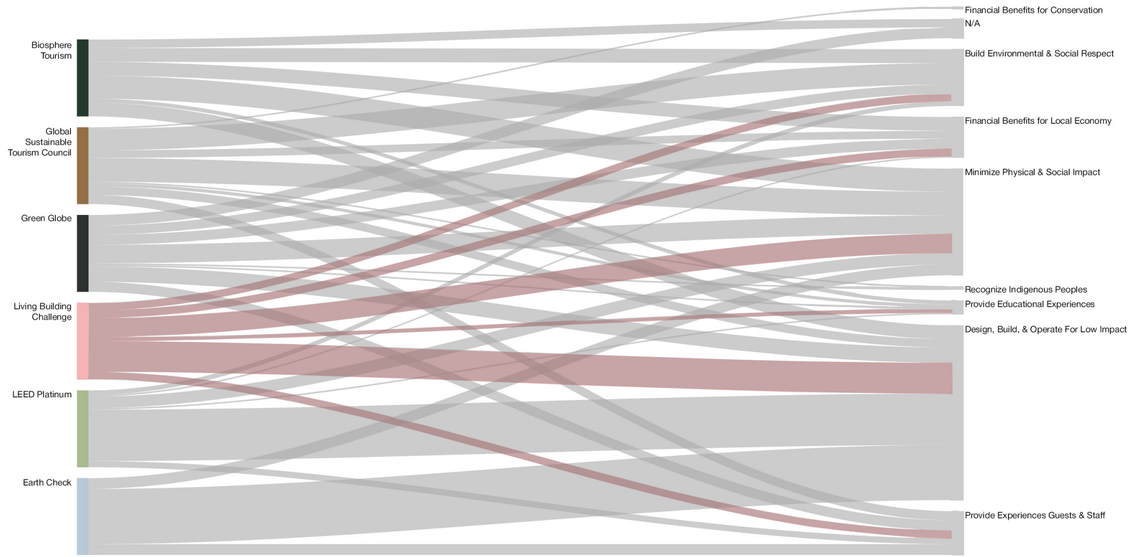


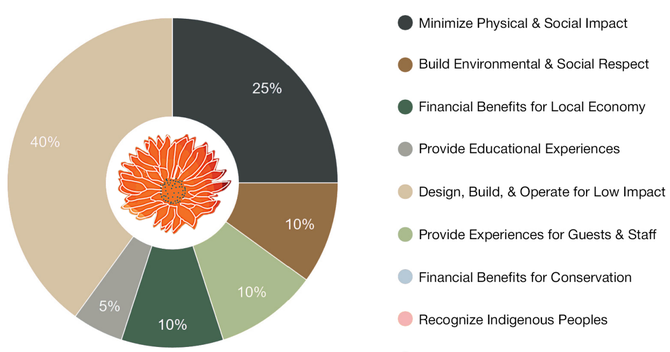
CERTIFICATION EVALUATION: THE LIVING BUILDING CHALLENGE

The Living Building Challenge (LBC) is one of the most rigorous sustainability certifications available within the architecture and construction industry. It has a strong emphasis on environmental performance, equity, and regenerative design. It stands apart from other systems by requiring projects to prove actual outcomes, not just intentions. Certification is awarded only after a building operates successfully for 12 continuous months, meeting strict performance goals across energy, water, materials, and more. Unlike many other certifications, LBC is based on the actual, measured performance of a project over 12 consecutive months of operation, ensuring it delivers tangible environmental and social benefits (“Living Building Challenge Basics - Living Future” 2022).

The system is organized into seven “petals”: Place, Water, Energy, Health + Happiness, Materials, Equity, and Beauty. Each petal has specific imperatives that must be met. These include requirements for net-positive energy and water, the use of non-toxic and locally sourced materials, and commitments to both social equity and ecological restoration. It encourages buildings that don’t just reduce harm but actively give back to their environments and communities.

While the LBC aligns well with many of the values central to ecotourism, particularly in the design and construction phases, it lacks a strong focus on long-term operations. Because the LBC does not touch all of the aspects of ecotourism and its more focused on the actual buildings of these enterprises, it offers little guidance for how a hospitality project should continue to support ecological, cultural, or social well-being once it’s up and running. This limits its ability to fully address the ongoing responsibilities of a tourism enterprise, such as community engagement, education, or the cultural impact of daily resort operations.



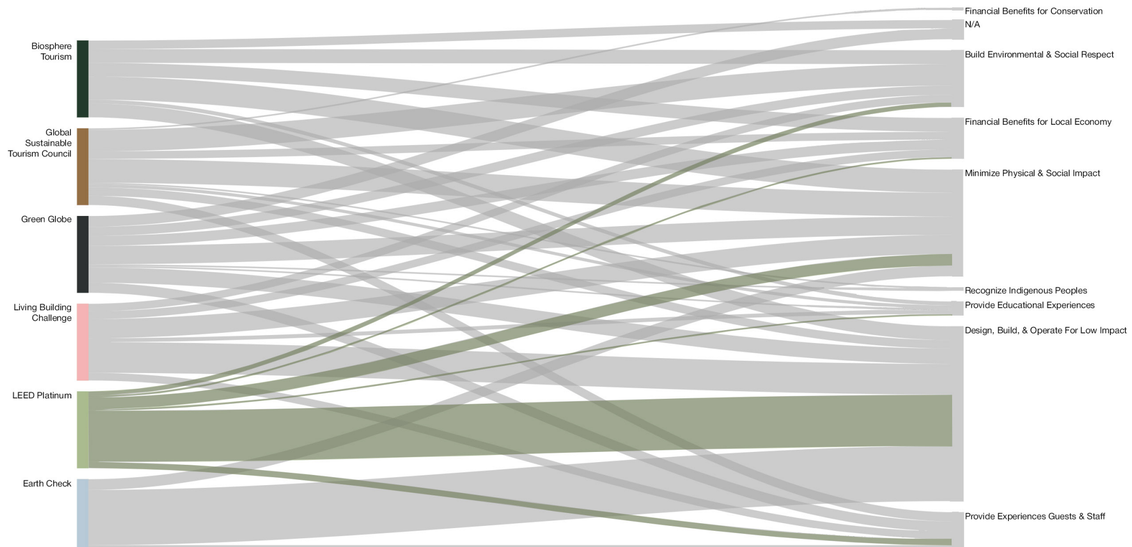


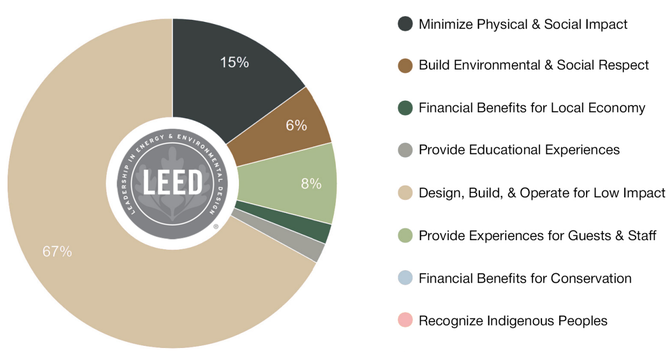
CERTIFICATION EVALUATION: LEED

LEED (Leadership in Energy and Environmental Design), developed by the U.S. Green Building Council, is one of the most widely recognized certifications for sustainable building. It awards projects points based on a checklist of environmental performance criteria, such as energy efficiency, water use, materials selection, and indoor environmental quality. Depending on how many points are earned, projects can achieve Certified, Silver, Gold, or Platinum status.

While LEED has contributed to improving environmental standards in construction, it has significant limitations when applied to ecotourism. First, ***it is a highly prescriptive system that rewards incremental improvements rather than meaningful, measurable outcomes.*** A project can achieve certification by completing enough checklist items, even if its actual environmental or social impact remains limited. Second, ***the checklist structure leaves little room for site-specific strategies.*** It encourages uniform moves across all projects regardless of climate, location, ecological sensitivity, or community context. This can lead to solutions that are technically compliant but poorly suited to the unique challenges and opportunities of a given place.

Additionally, LEED focuses almost entirely on buildings. ***It does not address long-term operational practices, community involvement, or cultural preservation which are core elements of ecotourism***. As a result, a LEED-certified resort may perform well in terms of energy use or water conservation but still fall short of the broader goals of sustainability. While it can support better construction practices, LEED alone is not sufficient to guide truly holistic, ecotourism-aligned development.





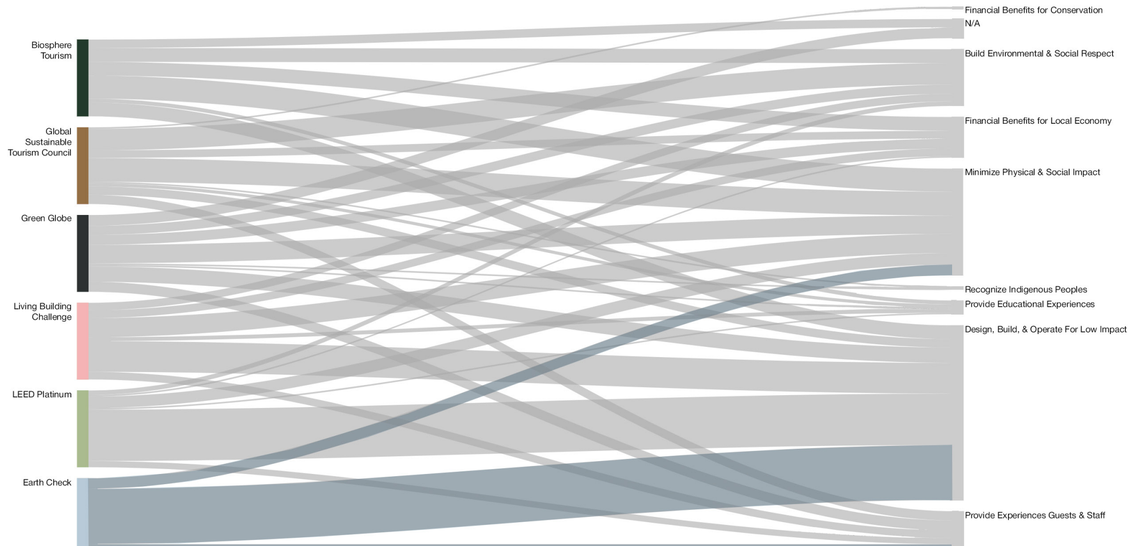
CERTIFICATION EVALUATION: EARTH CHECK CERTIFICATION

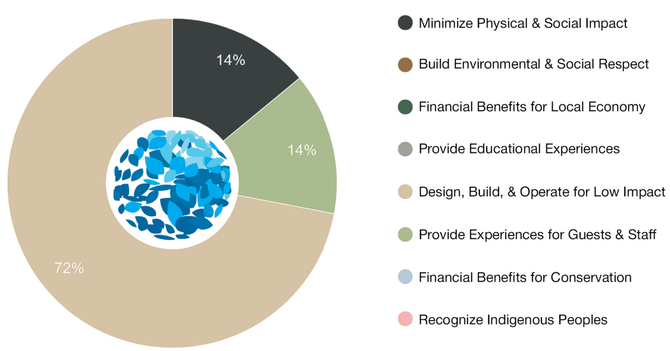
EarthCheck Certification positions itself as a science-based benchmarking system for sustainability in tourism and hospitality. It focuses on quantifiable indicators such as energy consumption, water usage, carbon emissions, chemical use, waste, paper consumption, and impacts on community and employees. It also allows businesses to add custom indicators based on their specific operations (“EarthCheck Certified,” n.d.).

At its core, EarthCheck values data-driven accountability, which is a strength in tracking operational performance over time. Regular audits are conducted to ensure compliance with performance benchmarks, providing a sense of oversight that some other certifications lack. However, this focus on hard data also reveals a major limitation: ***EarthCheck falls short in areas that are more difficult to measure, such as cultural preservation, community integration, and long-term social impact***.

A more significant concern is the flexibility businesses have in choosing which indicators to measure. This pick-and-choose approach enables companies to bypass areas where they may be under-performing, undermining the credibility of the certification. Additionally, the benchmarks themselves are vaguely defined and inconsistently explained. There is little clarity on what constitutes success, how deeply indicators must be addressed, or what the broader environmental or social impact actually is.

In practice, EarthCheck can feel more like a branding tool than a real standard. While the program likely began with good intentions, its vague criteria and customizable structure make it easy for tourism businesses to appear sustainable without making meaningful changes. This opens the door to greenwashing, where resorts meet superficial benchmarks and are awarded certification without actually aligning with the comprehensive and holistic goals of ecotourism.





Ecotourism Evaluation Framework

Intent, Requirements, and Implementation

Industry Criteria Inspired by Existing Sustainability Certifications

1. GSTC Industry Criteria Version 3

2. Living Building Challenge V4.1

3. LEED V5

4. Green Globe Standard – Hotels & Resorts V1.7

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A) Local Food, Capital Goods, and Consumer Goods
B) Local and Environmentally Preferable Materials
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A) Staff Engagement
B) Education and Interpretation
C) Immersive Stewardship
D) Recognition of Indigenous Peoples

THE FRAMEWORK: WHERE THE OPPORTUNITY LIES

The existing sustainability certifications are not designed specifically for ecotourism. Programs like LEED and EarthCheck are built around general industry or hospitality models and often miss key areas such as long-term cultural impact, community involvement, and environmental education. Even tourism-focused systems like GSTC or Green Globe do not fully address the distinct goals of ecotourism. ***This leaves a gap in the market and highlights the need for a framework that speaks directly to ecotourism's core values.***

This proposed framework fills that gap by combining physical, economic, and educational criteria into one system. It includes site planning, low-impact design, and efficient operations, alongside local hiring, conservation contributions, and guest engagement through interpretation and cultural exchange. These elements are evaluated together rather than in isolation.

Unlike many certifications that aim to reduce harm, ***this system focuses on regeneration and thinking about returning more than is taken.*** It promotes strategies like net-positive energy and water use, ecological restoration, and increased community benefit. ***It also moves away from rigid checklists and instead offers performance-based targets that can be adapted to different sites, goals, and limitations.***

Selective compliance and unclear audit processes are common issues in current systems. This framework addresses those problems by requiring full life-cycle evaluation, from early planning to long-term operations, and regular third-party audits. It combines both quantitative and qualitative metrics, while also including community and cultural outcomes.

By incorporating the most effective elements of existing programs and correcting for their gaps, this certification introduces a new structure for ecotourism and built around performance. It aims to support projects that reflect ecotourism principles in both practice and outcome.

1. PHYSICAL METRICS

CONSIDERATIONS

- Project Site Impact
- Design
- Construction
- Operations
- Experience







2. ECONOMIC METRICS

CONSIDERATIONS

- Benefit for Local Economy
- Benefits for Conservation
- Local Community Engagement







3. EDUCATIONAL METRICS

CONSIDERATIONS

- Environmental Respect
- Educational Experiences
- Recognition of Indigenous Peoples







THE FRAMEWORK: HOW TO USE IT

This framework is intended as a practical guide for developers, operators, designers, and builders of ecotourism resorts. It is not a prescriptive checklist but a flexible tool to help shape decisions throughout the life-cycle of a project—from site selection and design through construction and long-term operations. While the structure draws on principles from established sustainability certifications such as the Living Building Challenge, LEED, the Global Sustainable Tourism Council (GSTC), and Green Globe, the criteria have been adapted specifically to address the needs and values of ecotourism.

Each criterion within the framework is organized around five components:

- ***Intent:*** Describes the main goal of the criterion—what it is trying to achieve or prevent.
- ***Strategies:*** Offers a range of approaches or design decisions that can help meet the intent. These are not exhaustive or mandatory but are meant to inspire project-specific solutions.
- ***Evaluation Mechanisms:*** Provides options for how teams can track, measure, or verify their efforts. These include both quantitative and qualitative methods, recognizing the complexity of ecotourism work.
- ***Influencing Certifications:*** Lists the certification programs that informed the criterion. This offers context and shows how this framework aligns with or expands upon existing standards.
- ***Alignment with UN Sustainable Development Goals (SDGs):*** Identifies which global sustainability objectives are supported by the criterion, linking the framework to broader international goals.

Because every ecotourism project is different in regards to geographical location, culture, and financial investment, the framework allows for adaptability. The strategies presented are starting points, not fixed rules. Users are encouraged to interpret the intent in a way that responds to their specific context while still striving to meet the overall goals of sustainability, regeneration, and cultural responsibility.

To qualify as an Eco Resort or Ecotourism Destination, a project must implement a minimum of one meaningful long term strategy for each criterion. If none of the suggested strategies are suitable, the project team must develop an alternative strategy that meets the intent of the criterion. Any alternative approaches must be measurable or evaluable to ensure accountability and impact.

Best Practices: While meeting the minimum requirement is essential, the ideal approach is to maximize the number of strategies implemented within each criterion whenever possible.

The following pages highlight selected criteria from the proposed ecotourism certification framework. While the full framework is included in the appendix, this section focuses on a few key examples to show how these criteria translate into real-world applications. Drawing from the earlier case studies, each example demonstrates how specific strategies can be implemented, how performance is measured, and the level of impact that should be targeted. ***This section is intended to show the practical use of the framework and the standard of impact it encourages.***

FRAMEWORK: HOW IT LOOKS IN PRACTICE

A. *Restoration and Enhancement of Ecosystems*

Intent: To ensure that the project site is enhanced or restored to its proper ecological condition, and that it continues to improve during the projects Operation
Strategies: - The project must restore or enhance the local ecosystem by integrating site-specific ecological improvements. - Restoration efforts should prioritize native vegetation, habitat creation, and soil or waterway rehabilitation. - Strategies must support long-term biodiversity and ecosystem health.
Measurement Mechanisms: - Conduct a pre-project ecological assessment to document site conditions. - Provide a restoration plan with clear objectives and implementation steps. - Monitor biodiversity and ecological improvements over time.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 43-78) LEED-V5-BDC-New-Construction (Pages 34-35)
UN Sustainable Development Goals: Goal 14: Life Below Water / Goal 15: Life on Land

CASE STUDY: SHEBARA (KILLA DESIGN)

Red Sea Global, the owner of the Shebara Resort located in Saudi Arabia, has planted over 600,000 native mangrove seedlings and has relocated 98,000 corals as a tool to regenerate the islands ecosystems and enhance native biodiversity. This is a part of their mission to sequester carbon and restore the islands that have fallen to desertification (“Environmental Regeneration - Red Sea Global,” n.d.).





F. *Net Positive & Responsible Water Use*

Intent: To emphasize water as a precious resource by minimizing potable water waste, preventing downstream pollution, and ensuring that water use and reintegration align with the site's natural hydrology.
Strategies: - Implement onsite water capture systems (e.g., rainwater harvesting or closed-loop systems). - Use methods for onsite drinking water treatment without harmful chemicals. - Treat and reintegrate greywater and black water with biosolids into the ecosystem, aligning with natural hydrology.
Measurement Mechanisms: - Monitor water capture and storage volumes to ensure efficient use of collected water. - Track water treatment processes and assess water quality regularly. - Measure the reuse of greywater and black water, and ensure biosolid treatment aligns with environmental standards.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 147-196)
UN Sustainable Development Goals: Goal 6: Clean Water and Sanitation / Goal 12: Responsible Consumption and Production



CASE STUDY: KOKOMO PRIVATE ISLAND (KEITH LAMBERT)

Kokomo Private Island located in Fiji, has a solar powered desalination plant which serves multiple purposes. It provides fresh clean water, sea salt for its restaurants, and brine for its pools which allows for pools without the use of harmful and toxic chemicals. Additionally they have on site rainwater collection and storage that provides all the water for their pools, gardens, and farms. Grey water is also collected and used for irrigation. 80% of the islands water is recycled while the remaining 20% is lost on drying beds ("Seawater Desalination – Kokomo Private Island Fiji," n.d.)



FRAMEWORK: HOW IT LOOKS IN PRACTICE

G. *Energy Use and Carbon Reduction*

Intent: To minimize energy-related carbon emissions, transition to renewable energy sources, and design buildings that eliminate onsite fossil fuel dependency, improving air quality while aligning with decarbonizing grids.
Strategies: - Prioritize renewable energy sources (e.g., solar, wind) for all energy needs, including power generation and heating. - Design buildings and systems to be fully electrified, avoiding the use of fossil fuels for heating, cooling, or energy production. - Implement energy efficiency measures to reduce overall energy consumption and ensure energy use is as close to carbon neutral as possible.
Measurement Mechanisms: - Monitor the percentage of energy usage derived from renewable sources and track overall energy consumption reductions. - Track carbon emissions reductions from eliminated fossil fuel use, including avoided emissions from onsite fuel combustion. - Measure energy efficiency improvements through regular audits and energy use assessments, ensuring a continued reduction in overall carbon footprint.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 200-264) LEED-V5-BDC-New-Construction (Pages 74-75)
UN Sustainable Development Goals: Goal 7: Affordable and Clean Energy / Goal 12: Responsible Consumption and Production / Goal 13: Climate Action / Goal 15: Life on Land



CASE STUDY: SIMPLY SHENANDOAH (OLSON KUNDIG)

Simply Shenandoah located in Virginia, implements high tech systems in hand with passive strategies such as optimal solar orientation in order to cut down energy. Additionally, the project uses a solar micro-grid design, shared geothermal loops, and electric kitchens and fixtures to create a 100% renewable and fossil fuel free destination ("Olson Kundig — Simply Shenandoah," n.d.).



B. *Local and Environmentally Preferable Materials*

Intent: To prioritize local materials in construction and strengthen relationships with local communities and businesses by supporting their economic health through responsible sourcing.
Strategies: - Source construction materials and goods from local suppliers to reduce transportation emissions and support the regional economy. - Establish partnerships with local businesses and artisans to integrate locally made products into the project's operations and supply chains.
Measurement Mechanisms: - Track the percentage of materials and goods sourced from local suppliers. - Evaluate the economic contributions to the local community through purchasing records and partnerships with local businesses.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 7) Living Building Challenge 4.1 Program Manual – October 2024_en (pages 322-349, 407-414)
UN Sustainable Development Goals: Goal 9: Industry, Innovation, and Infrastructure / Goal 12: Responsible Consumption and Production /

CASE STUDY: FOGO ISLAND INN (SAUNDERS ARCHITECTURE)

The Fogo Island Inn located on Fogo Island in northern Canada, has made a massive investment in its community. The furniture, textiles, art, materials, and 80% of the food used in its restaurant come from craftsmen, artists, and farmers from the island. The inn contributes 54% of its income goes back into the Fogo Island community while 96% of its income stays in Canada and only 4% goes international ("Find Yourself at One of the Four Corners of the Earth," n.d.).



Economic Nutrition℠

Fogo Island Inn
Community Enterprise

Where does the money go?

Fogo Island	**54%**	**Rest of Canada**	**26%**
Newfoundland	**16%**	**International**	**4%**

What does the money pay for?

Salaries, Wages	**53%**
Food, Room Supplies	**12%**
Business Operations	**15%**
Building Costs	**10%**
Insurance	**3%**
Sales, Marketing	**4%**
COVID-19 Debt Service	**3%**

* Values are calculated retrospectively and updated when changes are material. Figures shown are for illustrative purposes.

Economic Nutrition℠ is a certification trademark of Shorefast, used under license by Fogo Island Inn.



FRAMEWORK: HOW IT LOOKS IN PRACTICE

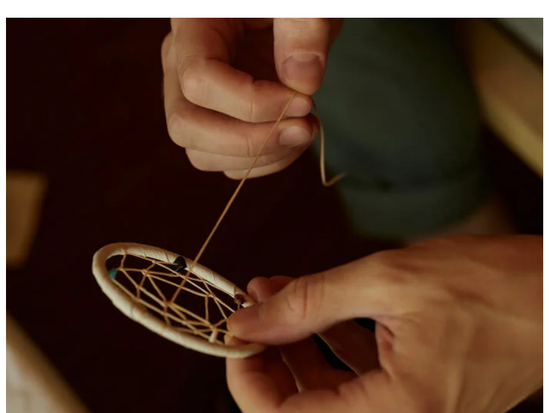
D. *Recognition of Indigenous Peoples*

Intent: To honor and integrate Indigenous culture and traditions into the project's design, operations, and guest experiences while fostering meaningful engagement between visitors and Indigenous communities.
Strategies: - Collaborate with Indigenous groups to incorporate cultural heritage, traditional knowledge, and design elements into the project. - Provide opportunities for guests to engage with Indigenous culture through storytelling, guided experiences, and artisan markets. - Ensure Indigenous voices are included in decision-making processes related to site operations and programming.
Measurement Mechanisms: - Track partnerships and collaborations with Indigenous communities in design, operations, and guest experiences. - Assess guest participation in Indigenous-led activities and cultural programs.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (pages 10)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 17: Partnerships for the Goals

CASE STUDY: AMANGIRI (STUDIO RICK JOY, WENDELL BURNETTE ARCHITECTS, MARWAN AL-SAYED)

Amangiri, a resort located in the desert of Southern Utah, invites the native tribes that inhabit the surrounding land to come do workshops at the resort where guests can learn about the culture of these tribes and their beliefs. Amangiri of course compensates the tribes in return but also donates a portion of their profits to better the local community. Additionally, Amangiri provides aid for scholarships, education funding, supply purchasing, and more ("Luxury Five-Star Hotel & Resort in Utah, USA - Amangiri," n.d.).





SITE SELECTION

Ecotourism’s success is directly tied to location. For the purposes of this thesis and its associated design study, selecting a site that was both realistic and locally accessible was essential. Many eco-resorts are situated near the equator, where abundant sunshine, access to freshwater, and favorable weather conditions make sustainable operations more feasible. However, this project aims to demonstrate that ecotourism is also viable in less conventional regions, such as the rainy Pacific Northwest, if the site is chosen with care.

3



SITE SELECTION: EVALUATION MATRIX

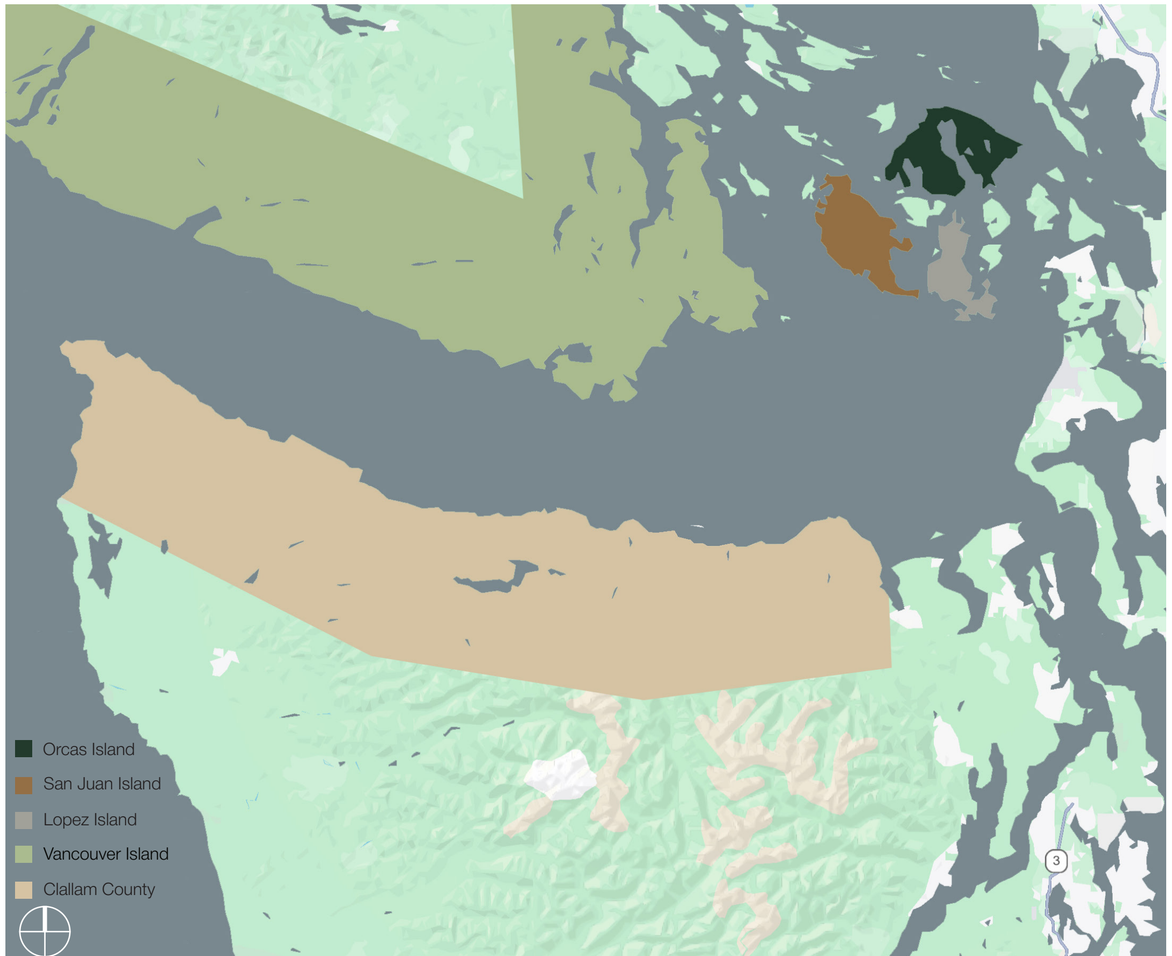
To ground this project in reality and maintain a level of personal accessibility for site visits and research, I focused on the surrounding region. ***The goal was to find a location that not only offered ecological value but also held real potential for tourism development.*** To guide this process, I developed a matrix based on ten key variables critical to ecotourism site suitability:

- Land Availability
- Environmental Sensitivity
- Proximity to Wildlife/Ecosystems
- Exclusivity/Isolation
- Exposure to Extreme Weather
- Accessibility
- Regulatory Constraints
- Existing Infrastructure
- Potential for Local Economic Impact
- Tourism Potential

Using this matrix, I evaluated five regional locations:

1) Clallam County, Wa
2) San Juan Island, Wa
3) Lopez Island, Wa
4) Orcas Island, Wa
5) Vancouver Island, BC

Each location was assessed against the given matrix variables to identify the most appropriate and impactful site for the proposed ecotourism resort. The following pages will walk through how I evaluated each criteria. All criteria where rated on a scale of 0-5 with 0 being the lowest possible score and 5 being the highest. The site with the highest total score at the end of the evaluation matrix was selected.



SITE SELECTION: LAND AVAILABILITY

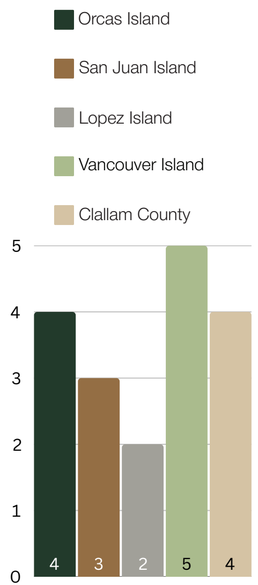
DEFINITION:
The amount of land available for development that meets the project needs without significant limitations.

CRITERIA:
Score based on the proportion of usable land, zoning compatibility, and surrounding land uses.

1: Land is limited, fragmented, or unsuitable.
5: Ample land ideal for development.

METHODOLOGY:
To assess Land Availability, I analyzed local government zoning maps and land use plans to determine areas where development is permissible. In addition, I reviewed real estate listings and property records to quantify the number of available plots within each potential site.

To standardize comparisons, I assigned a rudimentary scoring system from 1 to 5, with a score of 5 given to the location with the highest number of available properties. Other locations were scored relative to this benchmark.



Orcas Island



San Juan Island



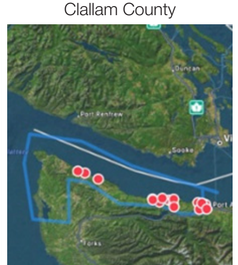
Lopez Island



Vancouver Island



Clallam County



Property Listings

SITE SELECTION: ENVIRONMENTAL SENSITIVITY

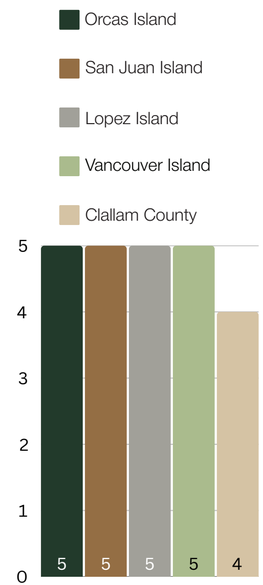
DEFINITION:
The degree to which the site has protected ecosystems or habitats that could be disturbed or enhanced by development.

CRITERIA:
Score based on the presence of protected species, wetlands, forests, and overall biodiversity.

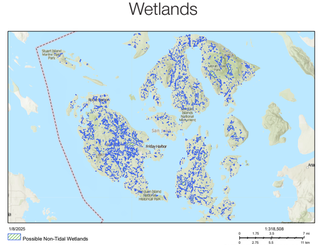
1: The site houses sensitive habitats/endangered species.
5: Minimal environmental sensitivity.

METHODOLOGY:
To evaluate environmental sensitivity, I analyzed various ecological factors, including the presence of wetlands, forests, and overall biodiversity. Using environmental impact assessments (EIA), reports from environmental agencies (such as the EPA and local equivalents), and conservation databases (IUCN, NatureServe), I identified sensitive habitats that could be affected by development..

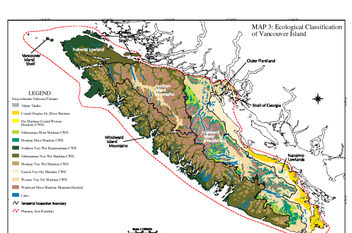
Each site was assigned a score from 1 to 5, with a score of 1 indicating high environmental sensitivity and a score of 5 indicating minimal environmental sensitivity.



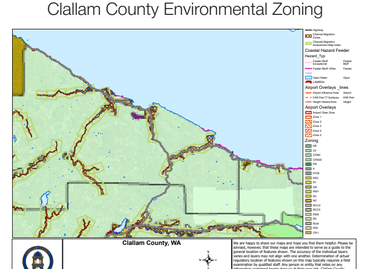
San Juan Islands Non Tidal Wetlands



Vancouver Island Ecological Classifications



Clallam County Environmental Zoning



Environmental Maps

SITE SELECTION: PROXIMITY TO ECOSYSTEMS

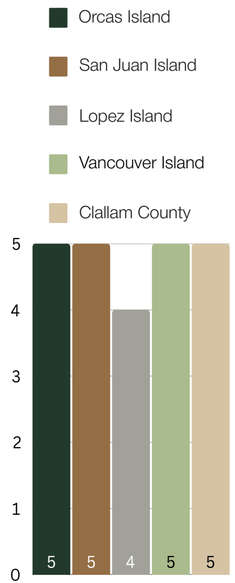
DEFINITION:
How close the site is to wildlife and ecosystems such as forests, lakes, beaches).

CRITERIA:
Criteria: Score based on nearby ecosystems' richness and potential integration into the project.

1: No significant ecosystems nearby.
5: Diverse ecosystems within the immediate vicinity.

METHODOLOGY:
To evaluate proximity to ecosystems, I analyzed various maps, including the presence of protected species and other natural resources. I referenced wildlife mapping tools (iNaturalist, USGS), and Google Maps to identify protected species, number of species, and protected land.

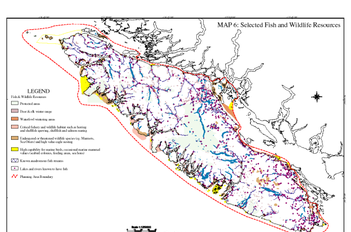
Each site was assigned a score from 1 to 5, with a score of 1 indicating a high presence of species and habitats and a score of 5 indicating minimal presence. (e.g., previously disturbed land with low ecological impact potential).



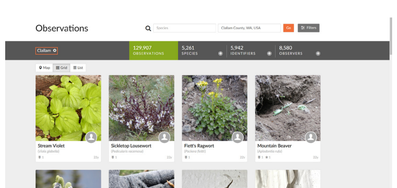
San Juan Island Fish Habitats



Vancouver Island Fish & Wildlife Map



Clallam County Sensitive Habits



Ecological Reports

SITE SELECTION: EXCLUSIVITY/ISOLATION

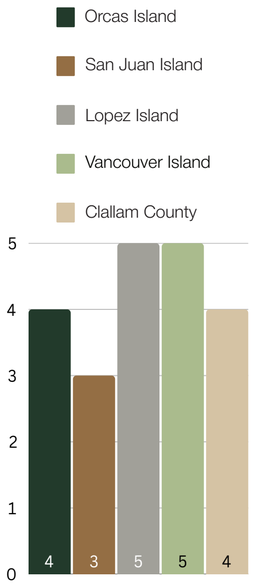
DEFINITION:
The site's ability to provide a secluded and private experience for guests.

CRITERIA:
Criteria: Score based on distance from population centers, noise levels, and lack of nearby developments.

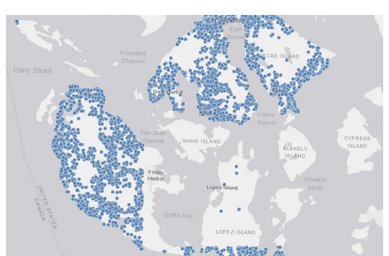
1: The site is overcrowded or lacks privacy.
5: Complete isolation with no disturbances.

METHODOLOGY:
To assess Exclusivity/Isolation, I evaluated each site's ability to provide guests a secluded and private experience by analyzing distance from population centers and proximity to existing developments. Using GIS tools for population density and Google Maps to find the proximity of nearby developments, I attempted to quantify the level of isolation for each location.

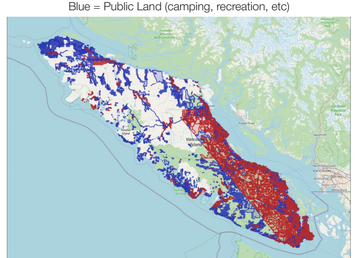
Each site was assigned a score from 1 to 5, with a score of 1 indicating low exclusivity, and a score of 5 indicating isolation.



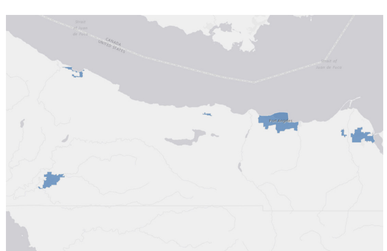
San Juan Islands Reported Addresses



Vancouver Island Parcel Map
Red = Privately Owned Land,
Blue = Public Land (camping, recreation, etc)



Clallam Urban Centers



Population Maps

SITE SELECTION: EXTREME WEATHER

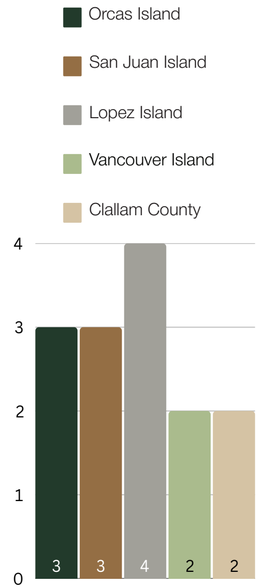
DEFINITION:
The likelihood and severity of adverse weather events at the site.

CRITERIA:
Criteria: Score based on climate stability, disaster risks, and comfort levels for guests.

1: Frequent extreme weather events (e.g., flooding, wildfires).
5: Predictable weather events.

METHODOLOGY:
To evaluate Extreme Weather Conditions, I analyzed each site's climate and disaster risks using NOAA Climate Data, FEMA disaster maps, and historical event reports. The assessment considered the frequency and severity of potential extreme weather events, such as flooding, wildfires, storms, and temperature extremes.

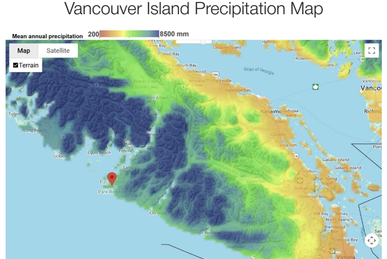
Each site was assigned a score from 1 to 5, with a score of 1 indicating high exposure to extreme weather events and a score of 5 representing a stable and predictable climate with minimal risks.



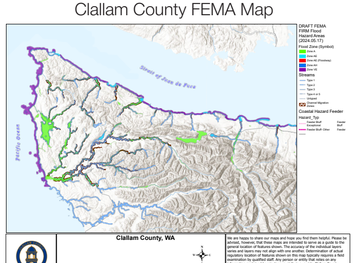
San Juan Islands Flood Zones



Vancouver Island Precipitation Map



Clallam County FEMA Map



Climate Maps

SITE SELECTION: ACCESSIBILITY

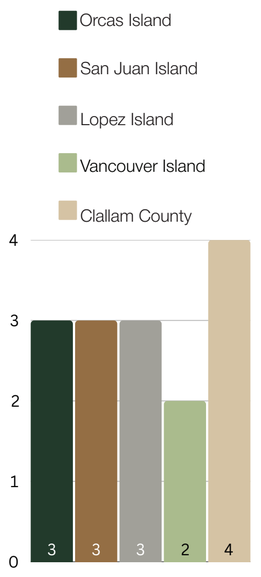
DEFINITION:
The ease of reaching the site (in terms of guests, and construction teams/ materials) via major transportation hubs.

CRITERIA:
Score based on proximity to airports, highways, and public transportation.

1: Remote with no access.
5: Conveniently located near major hubs.

METHODOLOGY:
To evaluate Site Accessibility, I analyzed each site's proximity to major transportation hubs, including airports, highways, and public transit, using Google Maps, local transportation data, and travel time estimates from major cities. The assessment considered ease of access for both guests and construction logistics.

Each site was assigned a score from 1 to 5, with 1 indicating remote locations with limited or no access and 5 representing convenient access near major transportation hubs.



Orcas Islands Accessible Roadways



Vancouver Island Ferries and Roadways



Clallam County Roadways and Traffic



Roadway Maps

SITE SELECTION: REGULATORY CONSTRAINTS

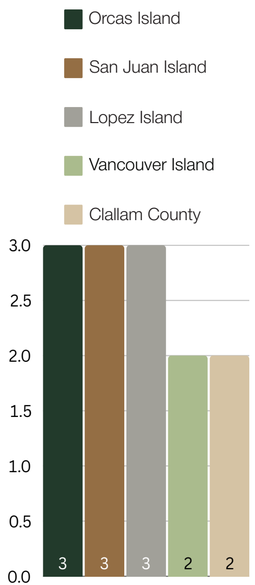
DEFINITION:
Legal or bureaucratic hurdles affecting development.

CRITERIA:
Score based on zoning restrictions, permits required, and approval time frames.

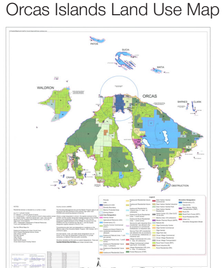
1: Highly restrictive with significant challenges.
5: Minimal or no restrictions.

METHODOLOGY:
To evaluate Regulatory Constraints, I reviewed local land-use regulations, zoning restrictions, and permitting requirements. The assessment considered the complexity of approval processes and potential legal hurdles affecting development.

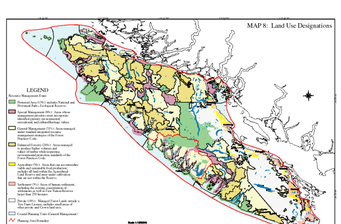
Each site was assigned a score from 1 to 5, with 1 indicating highly restrictive regulations and lengthy approval processes and 5 representing minimal restrictions with straightforward permitting.



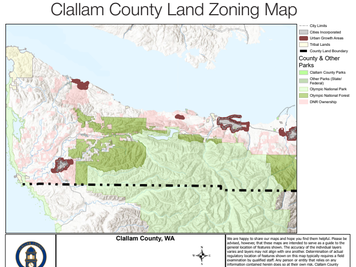
Orcas Islands Land Use Map



Vancouver Island Land Use Map



Clallam County Land Zoning Map



Zoning Maps

SITE SELECTION: AVAILABLE INFRASTRUCTURE

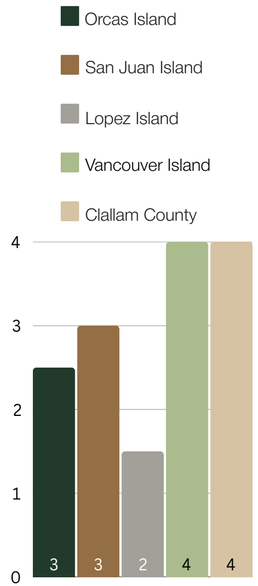
DEFINITION:
Existing physical and social infrastructure such as local labor, water treatment, transportation, guest amenities, and other services near the site.

CRITERIA:
Score based on availability of utilities (water, electricity), workforce, and cultural offerings.

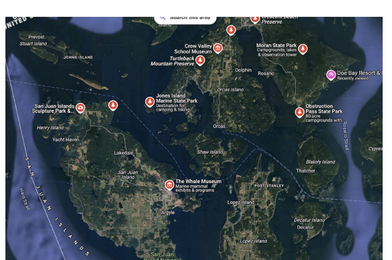
1: No infrastructure or amenities nearby.
5: Well-developed with diverse options.

METHODOLOGY:
To evaluate Available Infrastructure, I analyzed the presence of essential utilities, workforce availability, and nearby amenities using municipal infrastructure information and Google Maps. The assessment considered access to water, electricity, roads, and other supporting services.

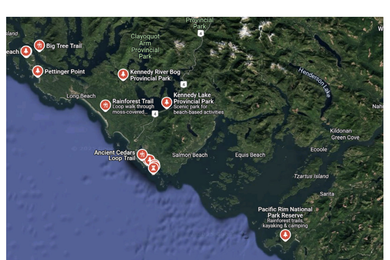
Each site was assigned a score from 1 to 5, with 1 indicating little to no existing infrastructure and 5 representing a well-developed area with necessary utilities and amenities readily available.



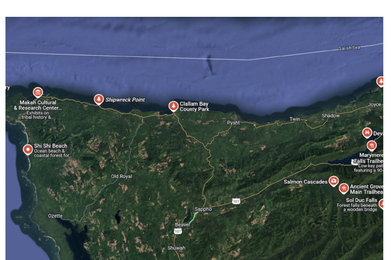
Cultural Amenities San Juan Island



Cultural Amenities Vancouver Island



Cultural Amenities Clallam County



Google Maps

SITE SELECTION: LOCAL ECONOMIC IMPACT

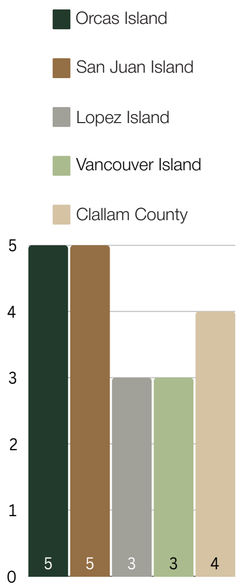
DEFINITION:
The potential to boost the local economy through jobs, tourism, and investments.

CRITERIA:
Score is based on the locations ability to be supported by the local community while providing to the economy.

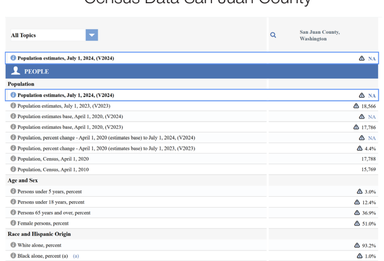
1: Minimal economic impact.
5: Significant positive impact expected.

METHODOLOGY:
To evaluate Local Economic Impact Potential, I analyzed population size, the percentage of permanent residents, and the presence of economic drivers such as restaurants, wineries, museums, and other attractions. This was done using census data and local business directories.

Each site was assigned a score from 1 to 5, with 1 indicating minimal expected economic benefit and 5 representing a strong potential to support and enhance the local economy through job creation, tourism spending, and investment opportunities.



Census Data San Juan County

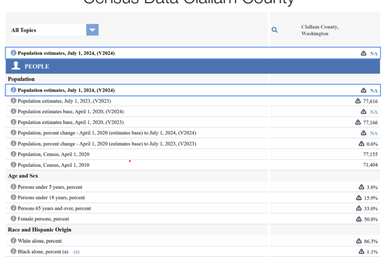


All Topics	San Juan County, Washington
Population estimates, July 1, 2024, (V2024)	N/A
PEOPLE	
Population	
Population estimates, July 1, 2024, (V2024)	N/A
Population estimates, July 1, 2025, (V2025)	18,566
Population estimates base, April 1, 2020, (V2024)	N/A
Population estimates base, April 1, 2020, (V2025)	17,786
Population, percent change - April 1, 2020 (estimates base) to July 1, 2024, (V2024)	N/A
Population, percent change - April 1, 2020 (estimates base) to July 1, 2025, (V2025)	4.4%
Population, Census, April 1, 2020	17,788
Population, Census, April 1, 2010	15,769
Age and Sex	
Persons under 5 years, percent	3.0%
Persons under 18 years, percent	12.4%
Persons 65 years and over, percent	36.9%
Female persons, percent	51.0%
Race and Hispanic Origin	
White alone, percent	93.2%
Black alone, percent (a)	1.0%
American Indian and Alaska Native alone, percent (a)	1.1%

Census Data Vancouver Island

Characteristic	Counts		
	Total	Men +	Women +
Population and dwellings			
Population, 2021 1	25,786	...	...
Population, 2016 1	24,669	...	...
Population percentage change, 2016 to 2021	4.5	...	...
Total private dwellings 2	12,682	...	...
Private dwellings occupied by usual residents 2	11,714	...	...
Population density per square kilometre	15.8	...	...
Land area in square kilometres	1,633.13	...	...
Age characteristics			
Total - Age groups of the population - 100% data	25,785	12,690	13,095
0 to 14 years	3,595	1,780	1,815
0 to 4 years	1,000	515	490
5 to 9 years	1,270	615	650
10 to 14 years	1,330	650	675

Census Data Clallam County



All Topics	Clallam County, Washington
Population estimates, July 1, 2024, (V2024)	N/A
PEOPLE	
Population	
Population estimates, July 1, 2024, (V2024)	N/A
Population estimates, July 1, 2025, (V2025)	77,616
Population estimates base, April 1, 2020, (V2024)	N/A
Population estimates base, April 1, 2020, (V2025)	77,166
Population, percent change - April 1, 2020 (estimates base) to July 1, 2024, (V2024)	N/A
Population, percent change - April 1, 2020 (estimates base) to July 1, 2025, (V2025)	0.6%
Population, Census, April 1, 2020	77,153
Population, Census, April 1, 2010	71,404
Age and Sex	
Persons under 5 years, percent	3.8%
Persons under 18 years, percent	15.9%
Persons 65 years and over, percent	33.0%
Female persons, percent	50.8%
Race and Hispanic Origin	
White alone, percent	86.3%
Black alone, percent (a)	1.1%
American Indian and Alaska Native alone, percent (a)	5.7%

Census Data

SITE SELECTION: TOURISM POTENTIAL

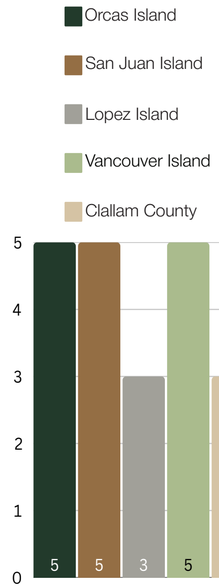
DEFINITION:
The site's ability to attract visitors due to its natural or cultural appeal as well as accessibility and supporting infrastructure.

CRITERIA:
Score based on existing tourism trends, nearby attractions, and marketing.

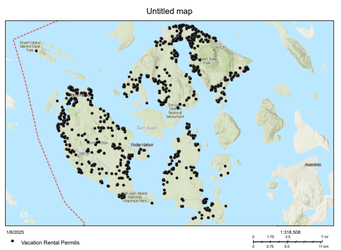
1: Low tourism interest in the area.
5: High appeal with existing demand.

METHODOLOGY:
To evaluate Tourism Potential, I analyzed regional tourism statistics and the presence of nearby attractions using travel reports and destination marketing data. Additionally, I reviewed on-line travel platforms (such as TripAdvisor, Reddit, and Google Reviews) to gauge visitor interest.

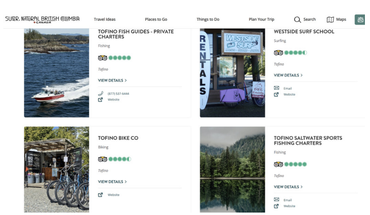
Each site was assigned a score from 1 to 5, with 1 indicating low tourism interest and 5 representing a high level of appeal with strong existing demand.



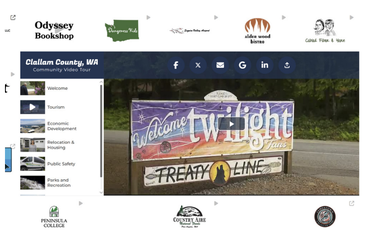
Vacation Rental San Juan Islands



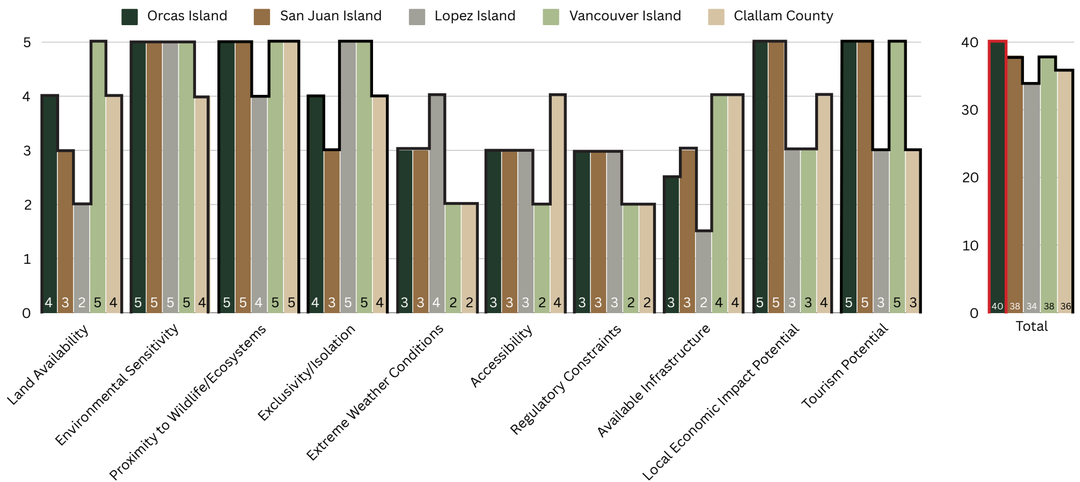
Vancouver (Pacific Rim) Island Tourism Website

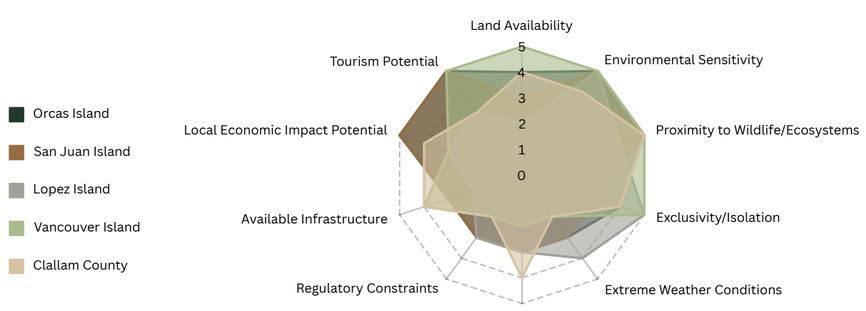


Clallam County Tourism Video



Tourism Info





Based on the findings from my research and the results of the site selection matrix, Orcas Island stood out as the most appropriate location for the design project. Outside of the numbers, it was the island's unique character, its combination of remoteness, biodiversity, and deep-rooted community values, that made it an ideal fit for an ecotourism project.

In addition to scoring well in the matrix, the selected site had to meet a series of specific criteria: it needed direct access to the water, unique and diverse land formations, close proximity to protected lands like state or national parks, and the ability to accommodate low-impact infrastructure. It also required strong solar orientation, adequate road access, and, of course, stunning views. After narrowing down potential parcels and visiting the island for a site scouting exercise, one site in particular stood out. A 22-acre property adjacent to Obstruction Pass State Park on the southeast tip of the island. Valued at approximately $4.69 million USD, this parcel not only met all of the technical requirements, but also offered a rare opportunity to design a resort that could directly engage with the surrounding recreational landscape. This site became the foundation for the next stage of the thesis, where the proposed ecotourism framework was tested through the design of a model eco-resort.

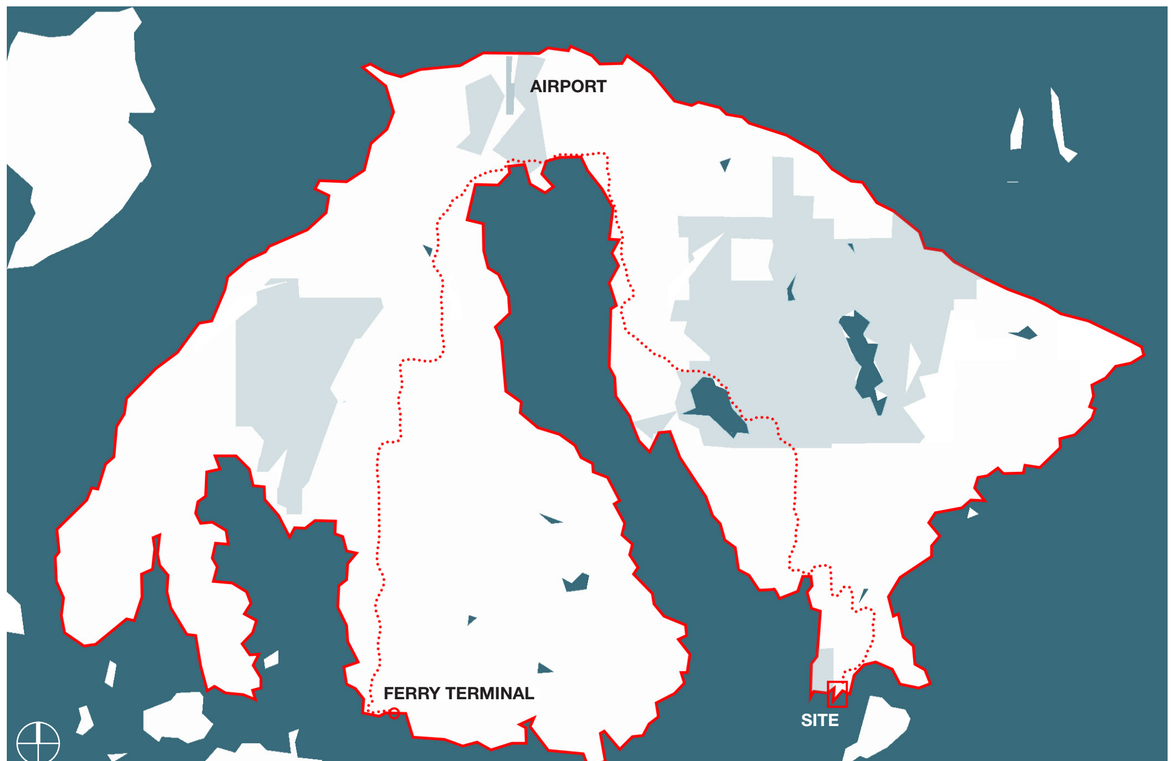
SITE ANALYSIS: ACCESS

Orcas Island, the largest of Washington State's San Juan Islands, is located in San Juan County and offers a mix of forested mountains, rocky coastline, and protected coves. The island lies within USDA Plant Hardiness Zone 7b and experiences a mild Mediterranean climate for much of the year, marked by cool, wet winters and dry, temperate summers. Situated in the rain shadow of the Olympic Mountains, Orcas receives significantly more sun than the surrounding region, about 100 more sunny days per year than nearby Seattle, making it ideal for passive solar design and regenerative landscape strategies. The island's climate and biodiversity support a wide range of outdoor recreation, wildlife observation, and ecological programming that align closely with the goals of ecotourism. The selected project site sits near the southeastern edge of the island, adjacent to Obstruction Pass State Park, and offers striking views, ecological richness, and a quiet sense of isolation that is ideal for a low-impact resort.

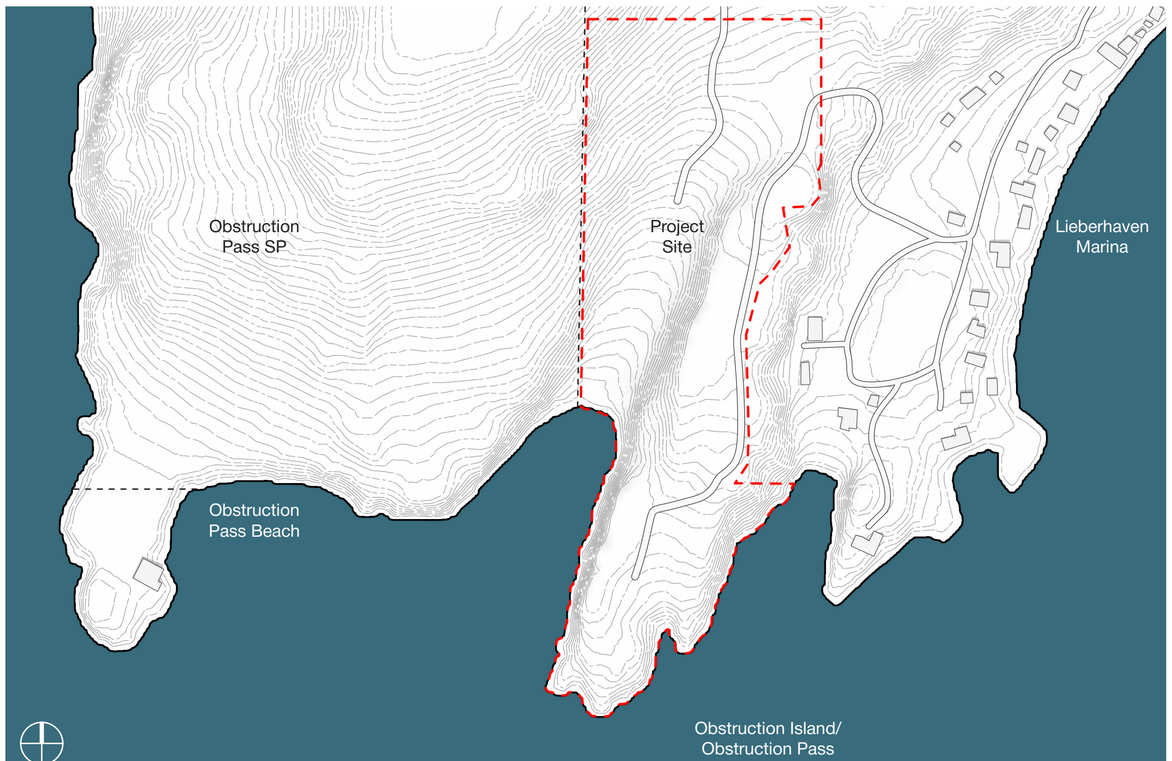
Access to Orcas Island is primarily through the Washington State Ferry system, with departures from Anacortes, WA. Anacortes is a roughly two-hour drive from both Seattle and Vancouver, making the island relatively accessible while still feeling remote. Because the ferries run on a fixed schedule and are part of an existing transportation network, they represent the lowest-impact transit option and are highly encouraged for guest travel. From the Orcas Island ferry terminal, a 35-minute drive through the island's winding roads and scenic terrain delivers guests to the resort site. This gradual transition from mainland to island is an intentional part of the guest experience, building a sense of anticipation and appreciation for place. To reduce carbon and promote equity in access, a fleet of electric vehicles operated by the resort will transport guests and staff between ferry terminals, airports, and the resort site. While limited parking is available for guests, it is reserved only for clean electric vehicles. Resort employees will also rely on the electric fleet, ensuring that transportation barriers do not prevent island residents from working at the resort. Although Orcas Island does have a small airport, private air travel is highly discouraged due to its disproportionate environmental impact. A more detailed breakdown of transit routes and site orientation is provided in the following pages.



SITE ANALYSIS: ACCESS



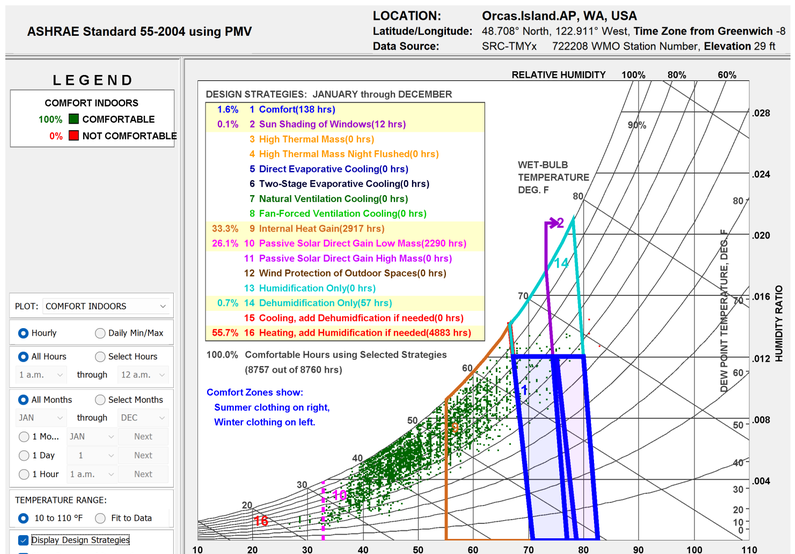
SITE ANALYSIS: CONTEXT



Location: Orcas Island, Wa
48.7* Lat
Site Boundary:
State Bark Boundary:
5'-0" Topography Line:

SITE ANALYSIS: CLIMATE

Psychrometric Chart



Location: Orcas Island, Wa 48.7* Lat

Sun Data:

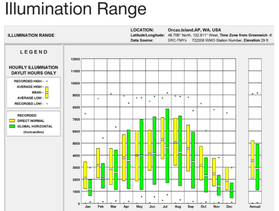
Winter Sol 12/21: Solar Noon Altitude= 18*
Sunrise= 8:00am Sunset= 4:15pm
Spring Sol 3/20 : Solar Noon Altitude= 42*
Sunrise= 7:10am Sunset= 7:20pm
Summer Sol 6/21 : Solar Noon Altitude= 65*
Sunrise= 5:15am Sunset= 9:15pm
Fall Sol 9/22: Solar Noon Altitude= 42*
Sunrise= 6:55am Sunset= 7:10pm

Temperature Data:

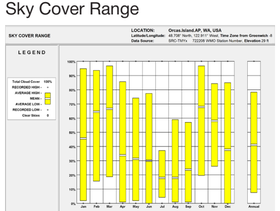
Winter: Avg High= 44*-48* Avg Low= 34*-38*
Avg Rel Hum=85*-90*
Spring: Avg High= 53*-60* Avg Low= 39*-45*
Avg Rel Hum=75*-85*
Summer: Avg High= 66*-72* Avg Low= 50*-55*
Avg Rel Hum=65*-75*
Fall: Avg High= 55*-65* Avg Low= 40*-50*
Avg Rel Hum=80*-90*

Prevailing Winds Summer: South West
Prevailing Winds Winter: South/ South East

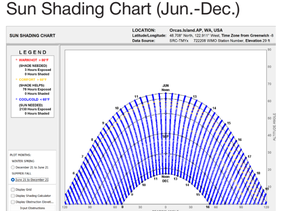
Illumination Range



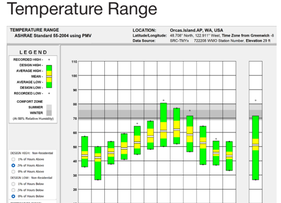
Sky Cover Range



Sun Shading Chart (Jun.-Dec.)



Temperature Range



SITE ANALYSIS: SITE PHOTOGRAPHS

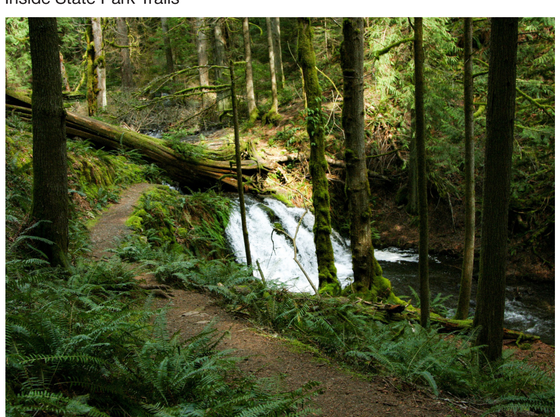
Obstruction Pass State Beach



Site Peninsula



Inside State Park Trails



Inside Site Forest



SITE ANALYSIS: LOCAL ATTRACTIONS

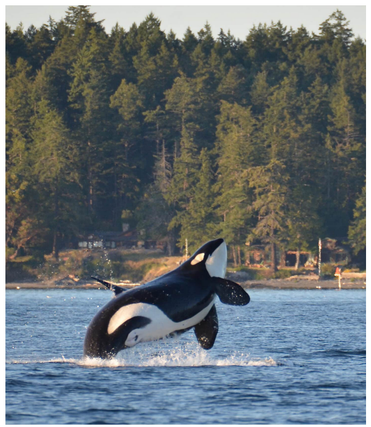
Orcas Island offers guests a deeply local, place-based experience rooted in the land, culture, history, and community of the San Juan Islands. Rather than isolating visitors in a bubble of resort luxury, the project invites them to engage with the island life. From the trails of Moran State Park, Obstruction Pass State Park, and Turtleback Mountain Preserve to the waters of Cascade Lake and the Salish Sea, guests are encouraged to explore and connect with this region's distinctive ecology. The San Juans are home to an extraordinary range of wildlife, including resident and transient orcas, humpback whales, porpoises, seals, sea lions, river otters, and over 200 species of birds, including bald eagles. Guided tours, offered through local operators, give guests the opportunity to witness and learn about these species in their natural habitats.

Just as important is the human context. Towns like Eastsound, Doe Bay, and Deer Harbor are home to a rich network of artists, craftspeople, farmers, and chefs whose work reflects the culture of the islands. Guests can take part in pottery classes, visit local farms, taste wines at the island's only vineyard, and explore the stories and histories that shape this place. Access to the surrounding islands, via Washington State Ferries or the resort's private electric boat, opens up even more opportunities for discovery. All excursions and activities are operated in collaboration with existing island businesses, ensuring that the resort actively supports the local economy rather than replacing it.

This integrated model also extends to food. Rather than centralizing all meals in the resort's restaurant, guests are encouraged to eat locally through a partner program with independent restaurants across the island. Whether out hiking, exploring, or spending time in nearby communities, guests can enjoy flexible, meaningful interactions with the place they're visiting. This approach to tourism is about more than just environmental sustainability, but is about the longevity and success of the local economy.

SITE ANALYSIS: LOCAL ATTRACTIONS

Whale Watching



Hiking



Vineyard / Winery Tours



Kayaking



Pottery / Art Studio Visits and Classes



Visits to East Sound / Doe Bay / Deer Harbor



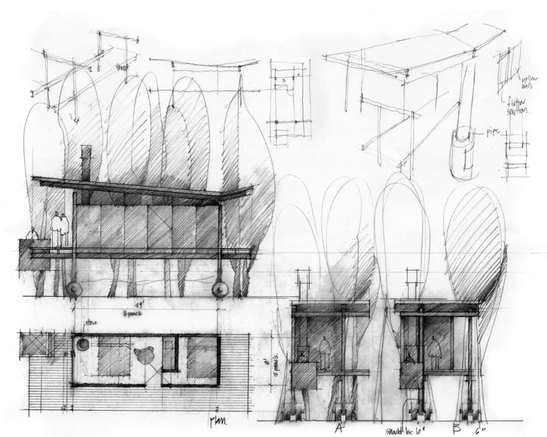
PRE-DESIGN INTERVIEWS: METHODOLOGY

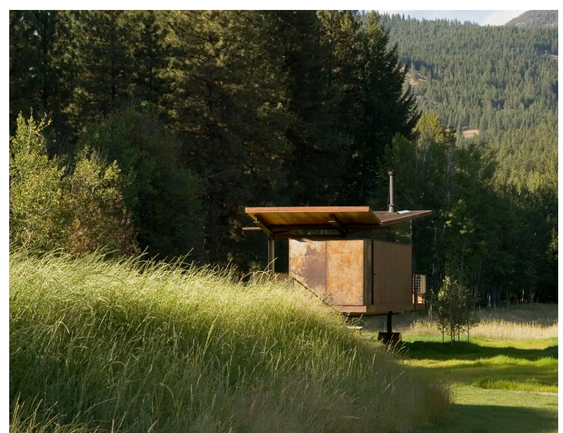
The next phase of my research involved conducting a series of pre-design interviews with architects and industry experts to better understand how experienced professionals approach ecotourism developments. As a student, I wanted to learn directly from people working in the field. What questions they ask at the outset of a project, which priorities guide their decisions, and what key considerations they keep front of mind throughout the process. I intentionally sought out a diverse range of perspectives.

First, I spoke with two acclaimed design firms known for their work on eco-resorts: Olson Kundig and DUST Architects. I then turned to experts in building performance and sustainability certification, interviewing Jason F. McLennan, founder of the Living Building Challenge and principal at McLennan Design, and Rives Taylor, Climate & Resilience Principal at Gensler and a long-time educator at Rice University. Lastly, I had the opportunity to speak with Free Borsey of the Lummi Nation, a 2024 Bullitt Prize winner, about how designers and developers can respectfully engage with Indigenous communities and seek their guidance and support. These conversations were intentionally informal and exploratory; they were not formal case studies but rather educational dialogues intended to deepen my understanding of the values, strategies, and responsibilities embedded in projects like this one.

PRE-DESIGN INTERVIEWS: OLSON KUNDIG

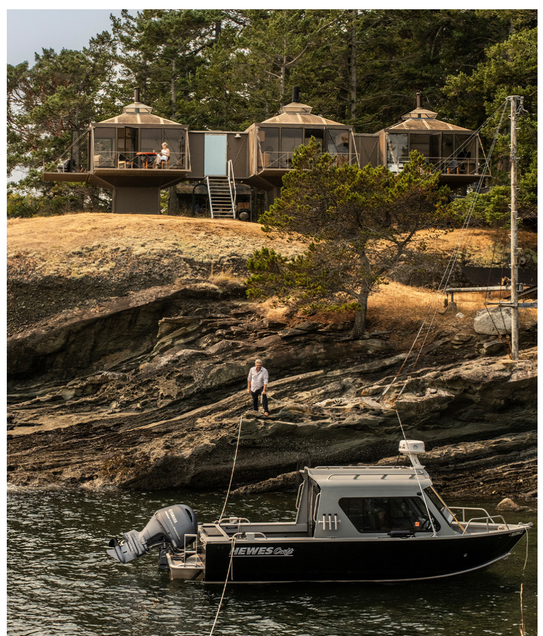
In my conversation with Scott Goodner, Vikram Sami, and John Riordan of Olson Kundig, several key ideas emerged around how to thoughtfully design ecotourism destinations. They emphasized that ***the greatest luxury a resort can offer is immersion in nature itself***. Architecture should not dominate the landscape but instead draw guests into it, physically, emotionally, and sensorially. This means ***designing spaces that engage all five senses***: hearing birdsong, smelling the forest, feeling the breeze, and even tasting the salt in the air. They also spoke about the importance of “prospect and refuge” and ***balancing expansive views and open spaces (prospect) with moments of shelter, intimacy, and comfort (refuge)***. Finally, they encouraged the idea of ***giving guests a degree of manual control over their environment***, whether through operable windows, adjustable shades, or pathways that invite exploration, allowing for a more active, personal connection to place.





PRE-DESIGN INTERVIEWS: JASON MCLENNAN

I had the opportunity to speak with Jason McLennan, architect and founder of the Living Building Challenge, about the values and considerations behind sustainable destination design. Though our conversation was brief, we discussed his own experience restoring his personal home on the San Juan Islands and ***the importance of working within existing carbon chains***. Particularly by prioritizing transportation methods like the Washington State Ferries, which are already operating and therefore more carbon-efficient than introducing new private travel options. He also emphasized the value of healthy, non-toxic materials in construction and design, pointing out that at its core, ***a resort like this should help people relax and connect with nature. The architecture should support and enhance that experience, not distract from it.***





PRE-DESIGN INTERVIEWS: DUST ARCHITECTS

I also had the chance to speak with Natalia Zieman Hayes of DUST Architects, who shared thoughtful insights on how material honesty, spatial awareness, and regional sensitivity shape their approach to design. ***She described luxury not as excess, but as a sensory richness that comes from using real, unprocessed materials*** that reflect the environment they come from. A stone wall, for example, should be built from actual stone, not just concrete dressed to look like it. ***These choices influence the acoustics, touch, smell, and atmosphere of a space.*** Natalia also emphasized the importance of ***learning from historical building methods, not to replicate them, but to understand how they responded to climate and culture.*** Her approach raised important questions: How will guests move through a place? Where should spaces remain open, and where is shelter needed? These considerations help create architecture that feels deeply connected to its location and its users.





PRE-DESIGN INTERVIEWS: RIVES TAYLOR

Another expert I had the opportunity to speak with was Rives Taylor, Sustainability and Research Principal at Gensler, as well as an educator and architect. Our conversation covered a lot of ground, but a few ideas really stood out. One was ***the importance of designing projects that serve the community beyond just financial gain.*** Could the resort offer education programs? ***Could it act as a resilience hub, providing access to power, water, or food in the event of a disaster?*** He also emphasized the value of multi-functionality in building design. ***Can a roof do more than just keep out the rain***, can it produce energy, collect water, or support local ecology? His insights reminded me that sustainability isn't just about checking boxes, it's about ***building systems that work hard for both the planet as well as the people it serves.***



3 Ways Gensler Is Designing for a Zero-Carbon Future

The most successful buildings of the future will contribute to the well-being of the environment while bringing their carbon emissions to zero.

January 16, 2025 | By Rives Taylor and Jacob Plotkin



Now Is the Time to Reinvest in Local Materials

COVID-19 could force us to improve construction's supply chain impact.

October 26, 2021 | By Rives Taylor

PRE-DESIGN INTERVIEWS: FREE BORSEY

Finally, I had the opportunity to speak with Free Borsy of the Lummi Nation, recipient of the 2024 Bullitt Prize. Free shared invaluable insight into how a project like an eco-resort can respectfully approach Indigenous communities and consider the inclusion of Native culture and heritage. He emphasized that even something as seemingly simple as a land acknowledgment can be complicated, especially in regions like Orcas Island, where the land is contested and multiple tribes consider it ancestral. Every tribe holds different values and philosophies, so ***it's essential to approach any conversation with humility and a willingness to listen.*** What matters most, he explained, is ***honoring the art, stories, and culture of Indigenous people.*** Across the Pacific Northwest, ***healthy land, water, and ecosystems are deeply intertwined with Indigenous identity and tradition, something any project in this region must recognize and respect.***



Free Borsey and Raven Borsey, Lummi Nation
2024 Bullitt Prize winners



THE ORCAS ISLAND INN

This chapter introduces The Orcas Island Inn, the hypothetical design project developed as part of this thesis. The goal of this project was never to produce a fully resolved architectural proposal, but instead to explore and visualize the ideas that emerged from my research.

The project was designed over the course of roughly 5.5 weeks, which meant there wasn't time to produce detailed floor plans or construction documents. Instead, the design is communicated through renderings, perspective sections, and a series of diagrams. These visuals are meant to convey the overall atmosphere of the resort and to illustrate how specific strategies, many drawn directly from the framework, were applied.

The design process began with the development of the program, which turned out to be more complex than anticipated. The resort needed to be large enough to have measurable impact, but not so large that it overwhelmed the site or felt unrealistic. To establish the program, I studied a range of comparable eco-resorts and averaged their key metrics: square footage, number of rooms, amenities, and service offerings.

Although I won't dive into the full design process here, sketches and models created along the way are included in the appendix. The focus of this chapter will be on the final design and, more importantly, how its components were shaped by the framework. Where it's relevant, I'll briefly explain how specific spaces or ideas were developed, but this chapter is ultimately about the concept over craft.

4



ORCAS ISLAND INN: THE PROGRAM

The Orcas Island Inn is a 45,000-square-foot ecotourism destination located on Orcas Island in San Juan County, Washington, United States. As the largest of the San Juan Islands, Orcas Island offers a mix of forested terrain and coastal exposure.

The main Inn building 1 comprises 35,000 square feet and includes a mix of traditional hospitality spaces including a guest lobby, reception, offices, back-of-house support/service areas, and hotel rooms. In addition, the Inn hosts a full-service wellness spa, a restaurant, café, fitness space, and a cultural gallery dedicated to showcasing Co-Salish art and educational programming. The building is designed for optimal guest comfort through a combination of high-tech systems, passive strategies, and healthy materials.

Complementing the main structure are ***five 1,000-square-foot tree houses*** 2 and ***five 1,000-square-foot beach houses*** 3, which offer guests immersive experiences in two distinct ecological settings. The first, being nestled within the forest canopy, and the second, being positioned along the coastal bluff. All buildings are connected by elevated walkways that minimize site disturbance and encourage exploration of the natural landscape.

The Orcas Island Inn is designed as a destination but also as a model for ecologically and culturally sensitive tourism. It integrates sustainable building practices, regional materials, and educational engagement to create a restorative and immersive experience that celebrates both place and people.



ORCAS ISLAND INN: THE PROGRAM

The Orcas Island Inn is a 45,000-square-foot resort project sited on 22.1 acres of coastal terrain, with a resulting FAR of 0.046.

Accommodations (35 total):

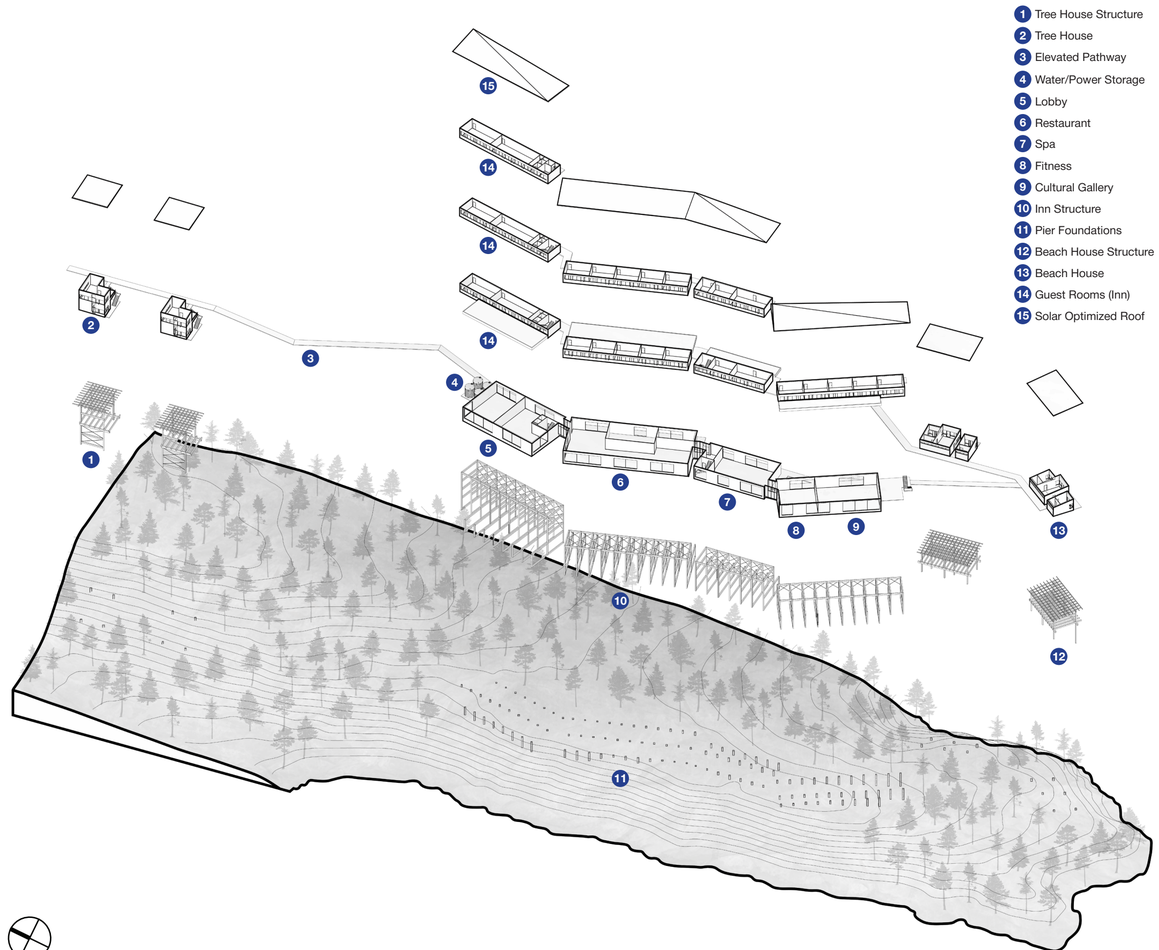
- ***17 Single Rooms*** – 400 SF each (King Bed, full bath, sitting area)
- ***5 Double Rooms*** – 600 SF each (Two beds, shared bath)
- ***3 Suites*** – 800 SF each (King Bed + Loft, expanded living area)
- ***Tree House Cabins (5 total) –*** 1,000 SF each, Located in elevated forest conditions for immersion in tree canopy
- ***Beach House Cabins (5 total)*** – 1,000 SF each, Positioned directly along the cove edge for ocean views

Core Amenity Spaces

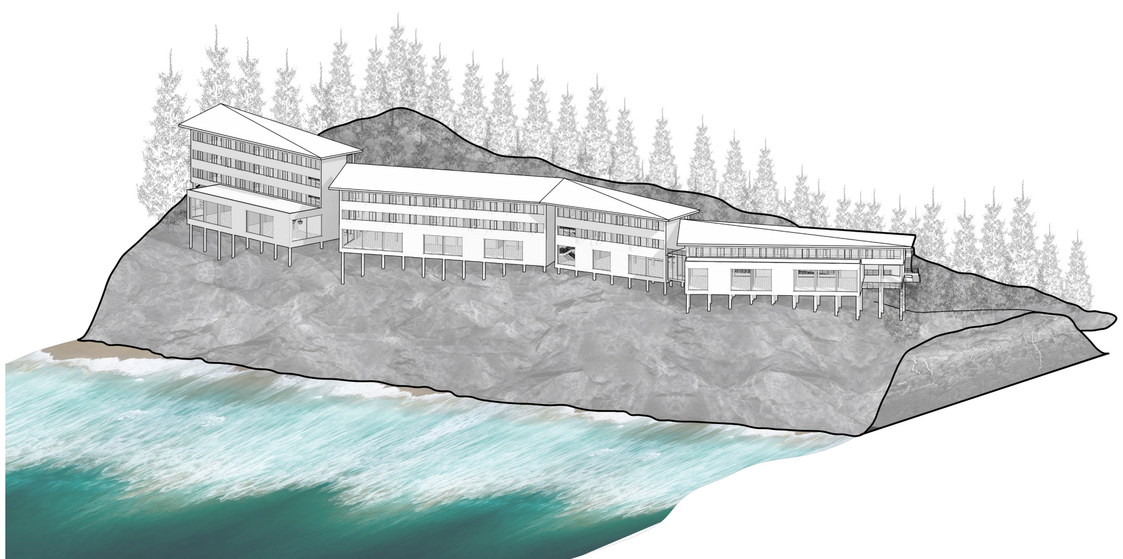
- ***Lobby & Gathering Hall*** – 2,500 SF entry and informal lounge with seating, curated library, and small retail
- ***Restaurant*** – 2,000 SF Dining + 1,800 SF Kitchen, 60-seat dining room offering locally sourced Pacific Northwest cuisine, large windows face the coast, open kitchen
- ***Spa at the Inn*** – ~6,200 SF total, A wellness-focused retreat offering: 6 Treatment Rooms (4 singles, 2 doubles), Spa Lounge + Reception, Hot tub, cold plunge, sauna, steam room, and Men's & Women's locker rooms
- ***Cultural Gallery*** – 1,500 SF Rotating exhibitions of local and Indigenous art, designed to host small educational events, storytelling evenings, and art workshops. Acts as the cultural spine of the project.
- ***Fitness Center*** – 1,500 SF A modest gym space supporting yoga, cardio, and light weight training.

Back-of-House & Infrastructure (BOH)

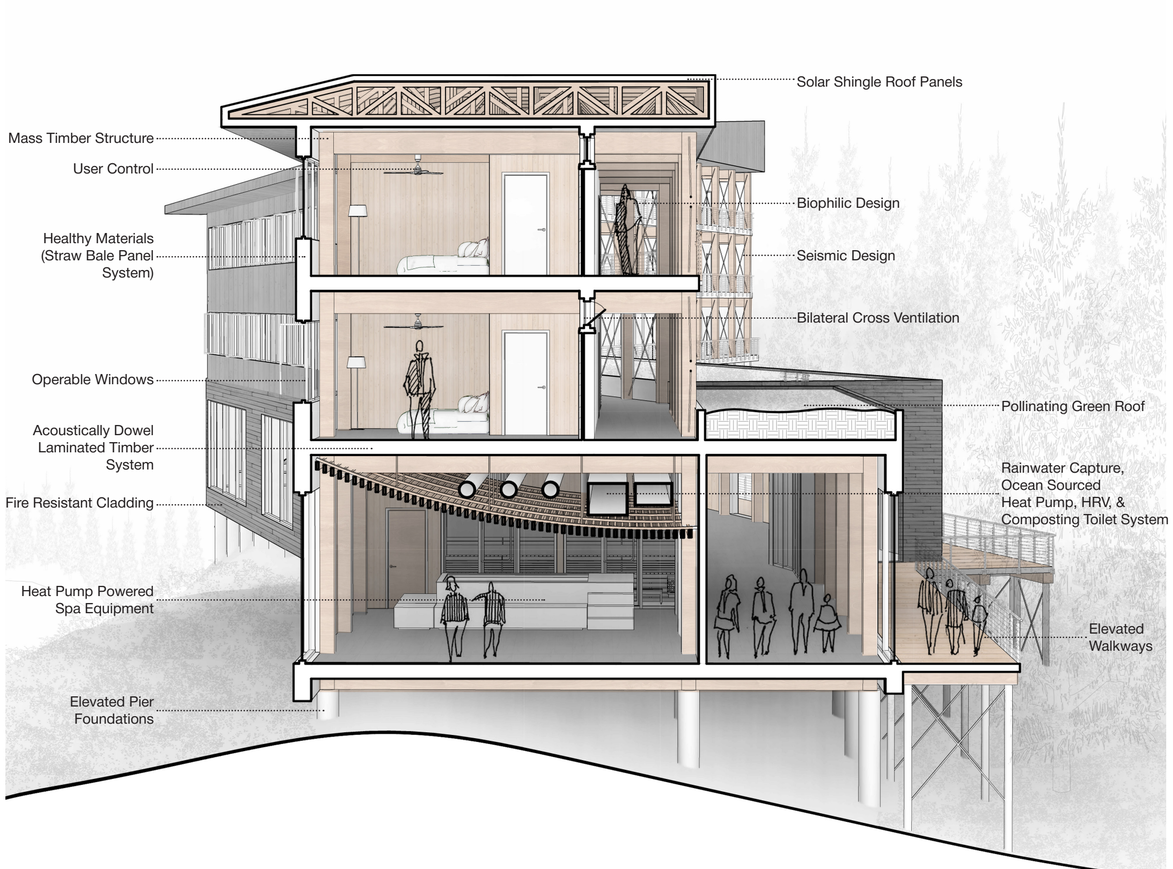
- Spaces for essential operations, staff use, and systems infrastructure:
- Administrative offices (x3)
- Staff break room
- Housekeeping and janitorial storage
- Mechanical and utility spaces (water, energy, waste)
- Gear garage for bicycles, kayaks, and outdoor equipment
- EV vehicle storage and limited guest parking
- Water treatment and waste management systems



The Inn sits prominently on what I have referred to as the Bluff. The Bluff is a rugged, western-facing slate cliff-side at the edge of the peninsula. Designed as a series of modest, rectangular volumes, the building steps with the natural slope of the land, minimizing disruption while maintaining alignment with the site's existing tree-line. Its massing is carefully composed to be seen as a series of buildings and to remain low-profile, in an attempt to ensure the structure recedes into the landscape rather than dominating it as a monolith. Dark exterior cladding and reflective glazing mimic the tones of the surrounding rock, sky, and water, helping the Inn blend smoothly into its context. Inside, the palette shifts to warm, natural materials that soften the experience and bring a sense of comfort, drawing focus to framed views of the forest and the ocean beyond.



ORCAS ISLAND INN: THE INN





FOLLOWING THE TREE LINE

The Massing steps with the slope, reducing height to stay below the tree line as an effort to blend with the forest backdrop rather than dominate it.

ORCAS ISLAND INN: THE INN



DARK MATERIALS

The use of Dark cladding (Green Basalt Stone and Burnt Cedar also know as Shou Sugi Ban) and reflective glass echo the slate cliff side and mirror the surrounding sky, forest, and water.



HUMBLE FORM

A humble composition of staggered rectangular volumes follows the topography, and breaks the massing into a series of buildings rather than a single monolith. This gives the Inn presence without dominating the landscape which is the focus.

ORCAS ISLAND INN: THE INN

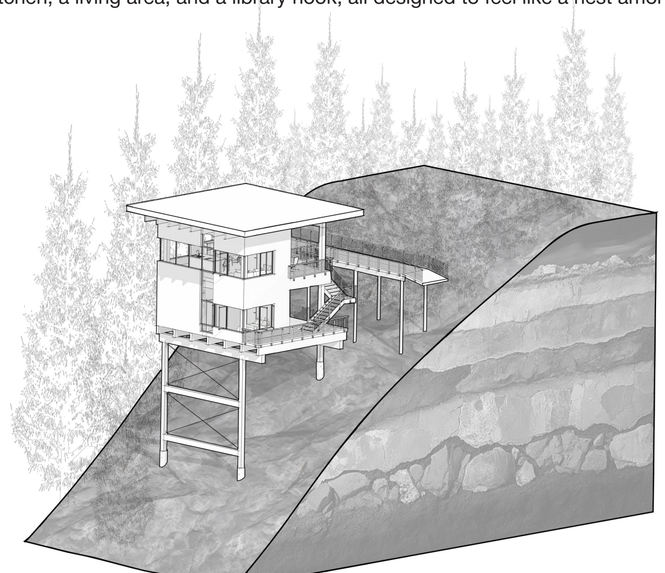


WARM MATERIALS

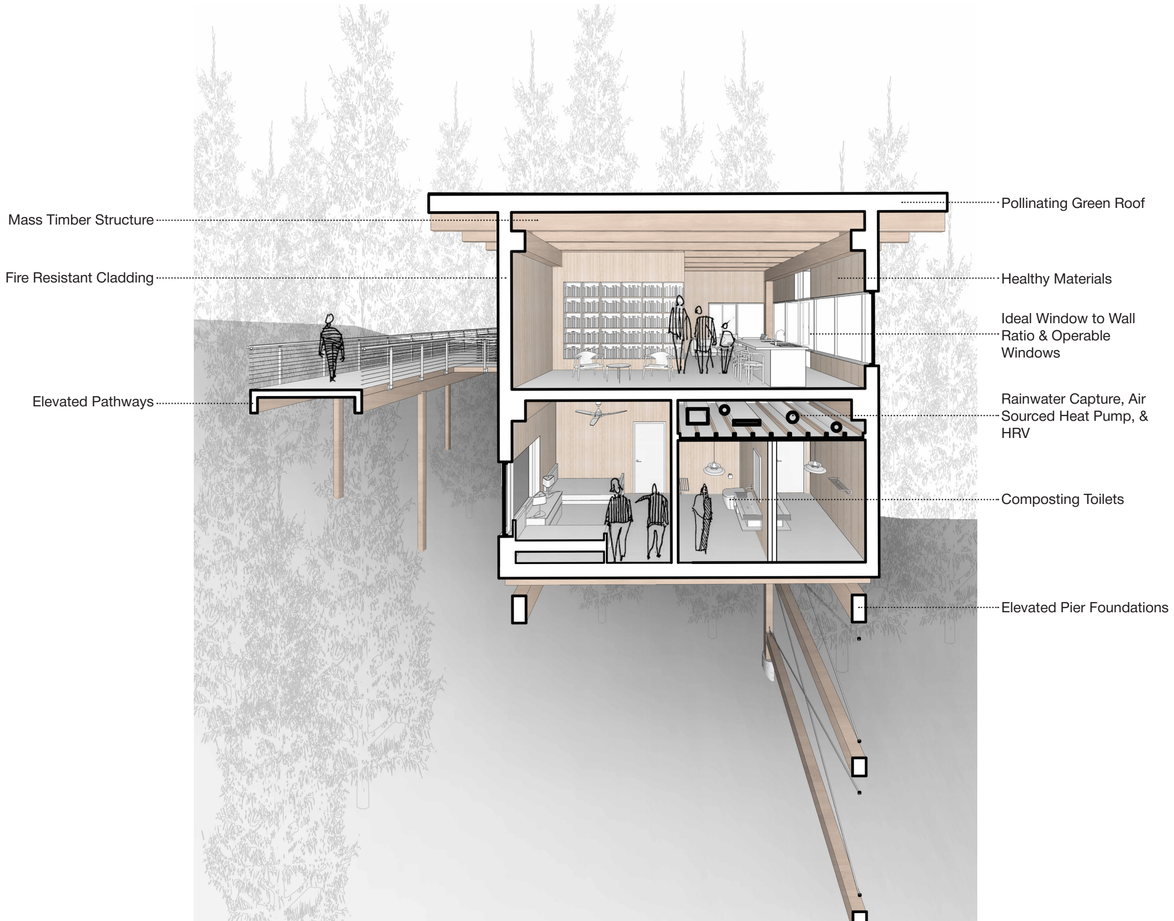
In contrast, the interior features warm, natural materials (Western Red Cedar wall cladding, Slate flooring, Douglas Fir structural columns, beams, and ceiling, Wool furniture, and more) This creates a sense of warmth and comfort while framing views of ocean and forest.

The Tree Houses are perched in what I call the Ravine. The Ravine is a steep, forested slope that descends into a low tree density valley. Unlike traditional cabins that sit on the forest floor, these structures are elevated into the canopy, taking advantage of the site's verticality. The slope and sparse understory of the ravine allow the tree houses to hover above the ground while remaining enveloped in vegetation. From this height, guests are offered framed views toward Obstruction Pass State Park.

Each two-story cabin is accessed via elevated walkways that weave through the trees, preserving the forest floor and allowing wildlife to move undisturbed below. The architecture embraces the vertical nature of the forest, it is tall, slender, and quiet. Long ribbon windows wrap around each unit, drawing in dappled light and providing continuous visual connection to the trees. Clad in charred Shou Sugi Ban timber, the cabins blend into the woodland, both visually and materially. Inside, they offer two bedrooms, two bathrooms, a small kitchen, a living area, and a library nook, all designed to feel like a nest among the branches.



ORCAS ISLAND INN: THE TREE HOUSE





SURROUNDED BY NATURE

The Tree Houses are immersed in the canopy of trees and embrace verticality to create a unique guest experience of being a part of the forest.

ORCAS ISLAND INN: THE TREE HOUSE



RIBBON WINDOWS

Ribbon windows with an occasional vertical section allow for a direct visual connection with the forest surroundings.



ELEVATED PATHWAYS

All of the buildings on the site are connected by elevated pathways helping guests to feel fully immersed in the natural environment that surrounds them. The forest floor is allowed to flow beneath them as they walk within the tree canopy. Because this journey is integral to the guest experience, signs displaying the resorts sustainability metrics are posted along the walkways engaging with and educating guests.

ORCAS ISLAND INN: THE TREE HOUSE

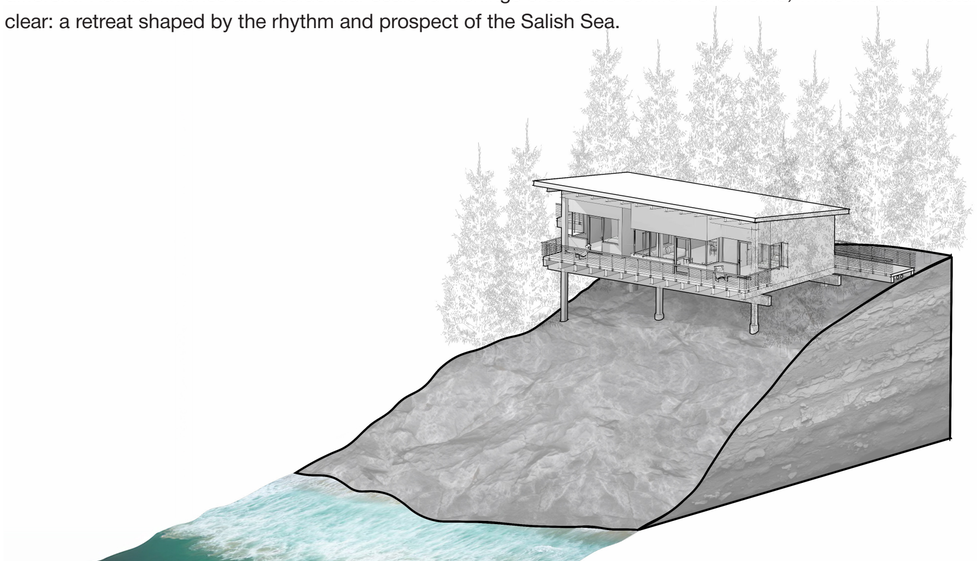


WITHIN THE CANOPY

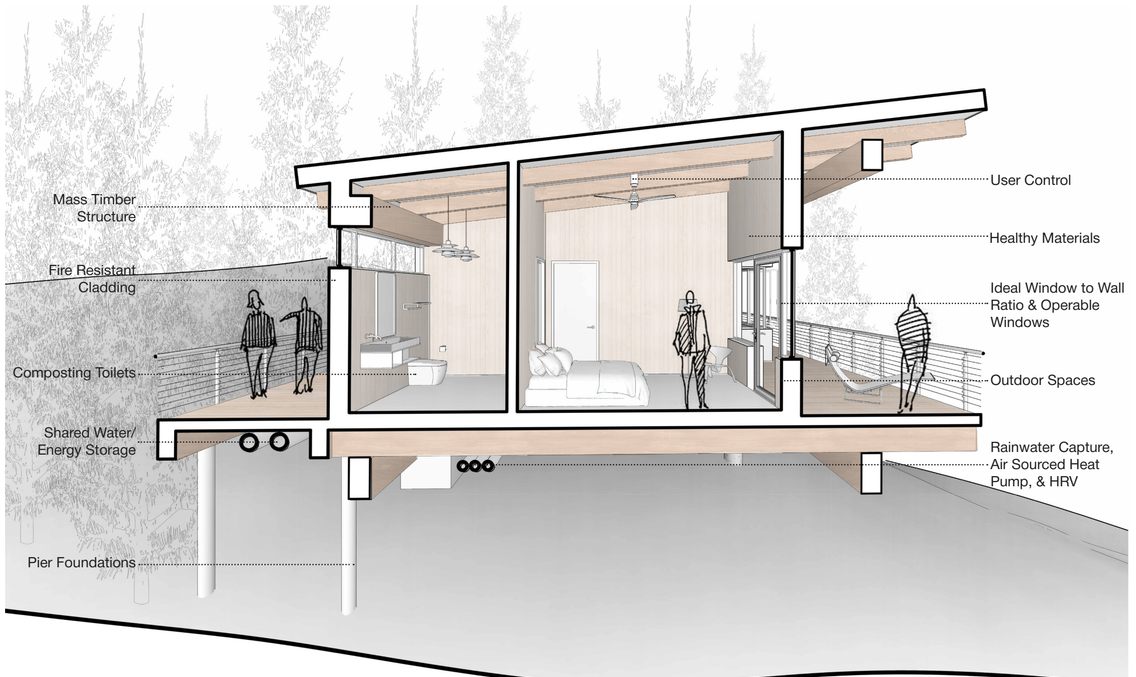
Because the Tree Houses are elevated, guests are able sleep in the tree canopy with views to Obstruction Pass State Park beyond.

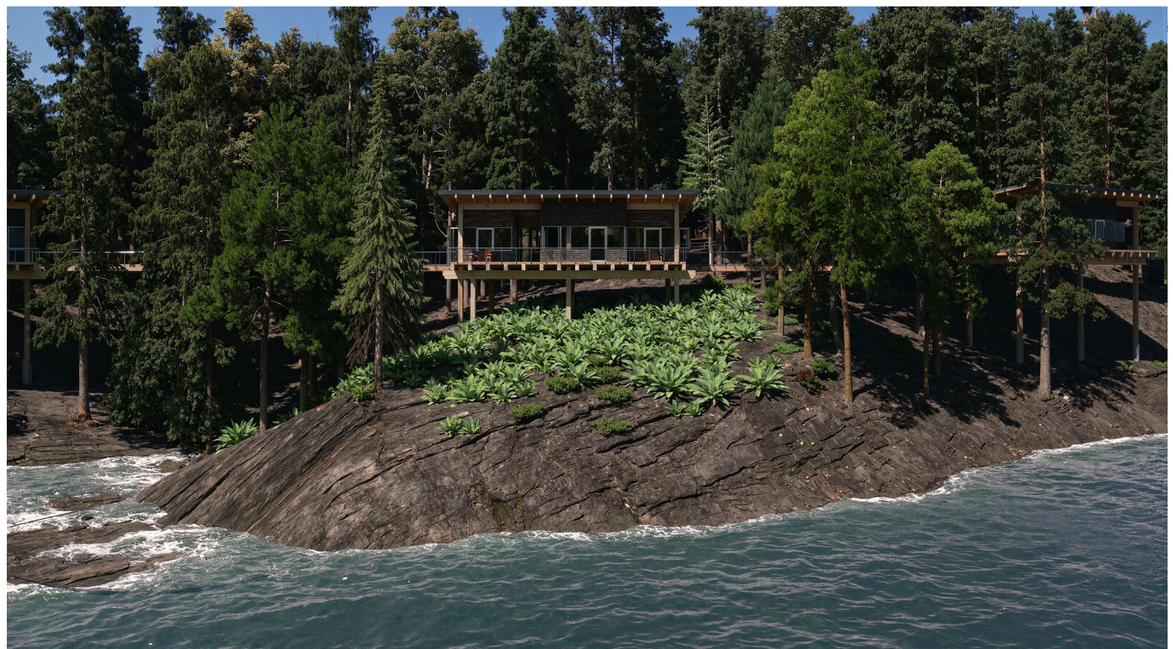
The Beach Houses work as a coastal counterpart to the forested Tree Houses. While they are equally equipped, they pose a fundamentally different spatial experience. Situated along the exposed shoreline, these single-story cabins prioritize the horizon. Their long, low forms stretch laterally across the coast, embracing the vast openness of the sea and sky. Where the Tree Houses rise into the canopy, the Beach Houses settle into the land, quietly framing expansive views of water, distant islands, and shifting weather.

The buildings are clad in green basalt, the same stone used at the Inn's base, rooting them materially in the slate rock they rest on. Pier foundations lift them lightly off the ground, minimizing site disturbance while floating the accommodations into the forest. Large glass openings and generous patios invite guests to step into the sea air and linger outside. Inside, the layout mirrors that of the Tree Houses, two bedrooms, two bathrooms, a kitchen, living room, and reading nook. However, the atmosphere is different. Natural finishes and residential-scale furnishings create the comfort of a home, while the architectural focus remains clear: a retreat shaped by the rhythm and prospect of the Salish Sea.



ORCAS ISLAND INN: THE BEACH HOUSE





BLENDING IN

Dark Materials and pier foundations allow the cabins to blend into the forest. Basalt cladding is used to relate to the slate coastline below.

ORCAS ISLAND INN: THE BEACH HOUSE



FOCUS ON THE HORIZON

Unlike the Tree Houses, the Beach Houses embrace the horizon of the coast. The prospect of the Beach Cabins in the horizon and the sea but the dwellings themselves serve as a refuge and place of comfort.



OUTDOOR SPACES

Large glass windows and doors open to generous patios inviting guests to step into the sea air and linger outside.

ORCAS ISLAND INN: THE BEACH HOUSE



COMFORTABLE SPACES

While this is a hotel, the comfortable furnishings and natural finishes give the feeling of being in a home rather than just a room.

ORCAS ISLAND INN: FRAMEWORK STRATEGIES

As this is an architectural thesis, not every aspect of the framework could be fully tested within the scope of this hypothetical resort. Limitations in modeling, prediction, and the speculative nature of certain social and operational components meant that some criteria could not be evaluated. However, the following points represent the areas of the framework that this study is able to directly address.

Ecosystems:

- Restoration & Enhancement of Ecosystems (Framework pg. 8)
- Allocation of Land for Ecosystems (Framework pg. 9)

Water:

- Net Positive & Responsible Water Use (Framework pg. 13)
- Net Positive Waste (Framework pg. 17)

Energy:

- Energy Use and Carbon Reduction (Framework pg. 14)
- Reduce Resource Loads (Framework pg. 19)

Materials & Resources:

- Healthy Interiors & Non-Toxic Materials (Framework pg. 15)
- Local and Environmentally Preferable Materials (Framework pg. 23)
- Sustainable Materials & Embodied Carbon Reduction (Framework pg. 16)

Resilience:

- Climate Resilient Design (Framework pg. 18)
- Community Support (Framework pg. 28)

Biophilia & Passive Design:

- Reduce Resource Loads (Framework pg. 19)
- Biophilic Design, Access to Nature, & Well-Being (Framework pg. 20)

Community Benefit:

- Local Food, Capital Goods, & Consumer Goods (Framework pg. 22)
- Local Entrepreneurs (Framework pg. 25)
- Food Access (Framework pg. 29)

Education & Culture:

- Education & Interpretation (Framework pg. 32)
- Immersive Stewardship (Framework pg. 33)
- Recognition of Indigenous Peoples (Framework pg. 34)



PART OF THE LANDSCAPE

Especially visible in a stormy context, the Inn Seems to be a part of the bluff and forest beyond.

FRAMEWORK STRATEGIES: ECOSYSTEMS

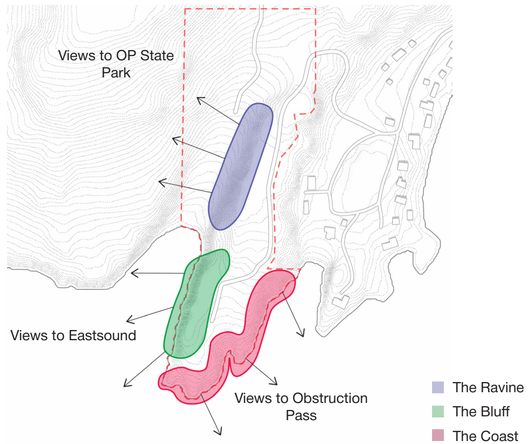
When approaching the site design for the Orcas Island Inn, ecological preservation was front of mind. The first step in programming the landscape involved identifying the distinct geological and ecological zones across the property. Three major zones emerged: ***the Ravine***, a heavily forested slope with a low-density valley floor and framed views toward Obstruction Pass State Park; ***the Bluff***, a western-facing cliff side with elevated views of Eastsound; and ***the Coastal Edge***, a descending shoreline with exposure to Obstruction Island and the Salish Sea. Understanding these zones was critical for matching architecture with ecological context.

Next, I analyzed existing tree density across the 22-acre site. This mapping allowed me to locate areas with sparse vegetation or natural clearings, places where structures could be placed with the least ecological disruption. Additionally, it could serve as a map for opportunities for landscape designers to work on re-wilding the site and reintroducing native vegetation. After identifying these areas, I layered the site's topography to find contour lines that closely followed the edge of the tree line. These contour lines became my guide for building placement, allowing the design to integrate into the terrain while avoiding the most ecologically sensitive areas.

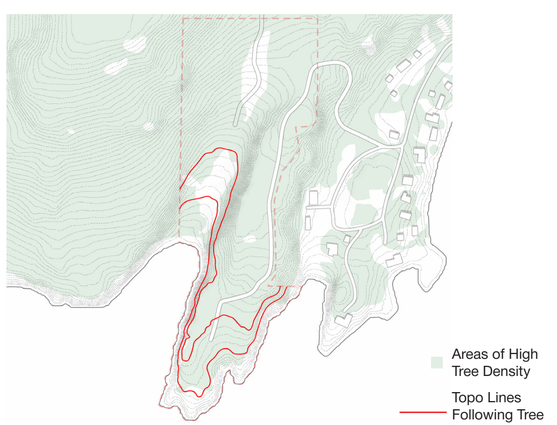
By aligning the massing with topography and low-density tree zones, ***the design strategy was able to preserve over 95.4% of the site's existing forest.*** While this resulted in a larger building footprint for the main lodge, it significantly reduced the number of necessary ground-level interventions. I explored the idea of scattering smaller buildings across the property; however, this would have required far more tree removal, disturbed more wildlife habitat, and introduced more infrastructure, including service paths, plumbing, and electrical routes, across the landscape. ***Paradoxically, a larger, consolidated massing proved to be the more sustainable and responsible solution***. Fewer physical touch-points means less ecological disturbance.

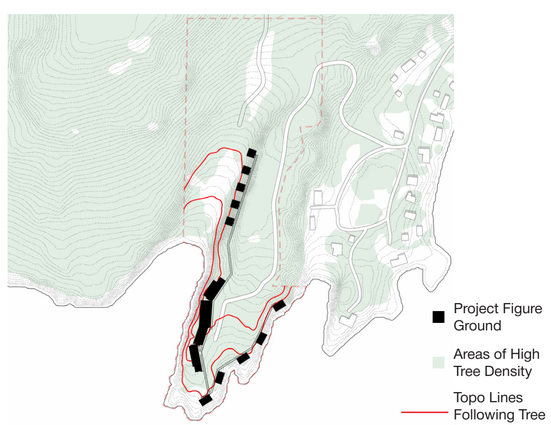
All primary structures are built on piered foundations, lifting the buildings off the ground and minimizing disruption to the forest floor, root systems, and surface water flow. This approach also allows for wildlife to continue moving freely beneath the built environment. Additionally, elevated walkways connect the buildings, eliminating the need for paved paths or clear-cut routes. These walkways allow guests to engage with the landscape in a more immersive and respectful way, floating through the forest canopy rather than treading over it.

FRAMEWORK STRATEGIES: ECOSYSTEMS









FRAMEWORK STRATEGIES: WATER

Water conservation and regenerative water use are central to the design and operation of the Orcas Island Inn. The project utilizes a combination of rainwater harvesting, greywater reuse, high-efficiency fixtures, and composting systems to dramatically reduce its demand on local freshwater sources.

The Inn features 16,450 square feet of sloped roof, collecting rainwater at a 90% efficiency rate, and an additional 7,673 square feet of green roof, which captures rain at a 60% efficiency rate. Based on Orcas Island's typical annual rainfall, this system ***provides an estimated 683,280 gallons of fresh water annually, covering approximately 74% of the project's total water needs.***

Demand is further reduced through aggressive conservation measures. ***Water use is cut by 60%,*** reducing annual demand from 2,300,000 gallons to 920,000 gallons, through a combination of composting toilets, high-efficiency plumbing fixtures, and an integrated greywater system. ***Treated greywater is reused for laundry, composting, and landscape irrigation, saving an additional 102,000 gallons per year***, which equates to just 9.3 gallons of water used per guest per day for these systems.

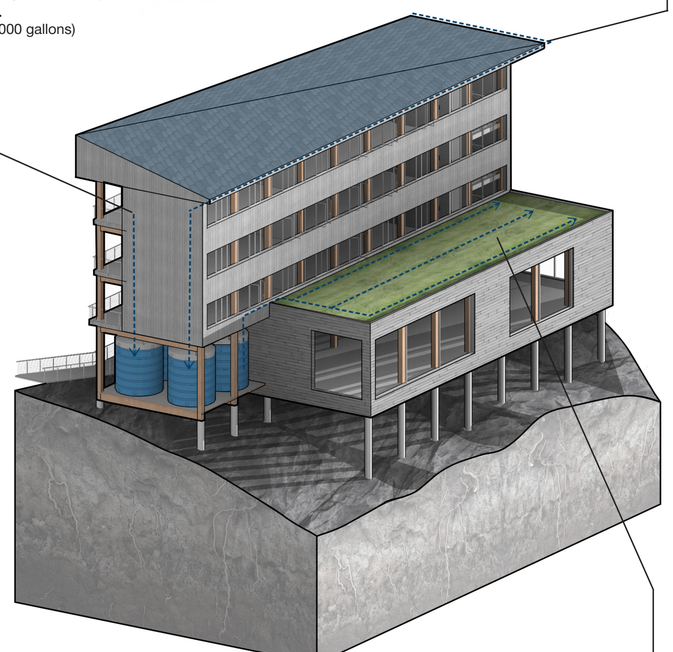
Any remaining potable water required for the Inn is sourced from an existing on-site well. To handle wastewater responsibly, the site includes on-site blackwater treatment, ensuring no contamination of local waterways. These systems not only reduce operational impact but also serve as an educational model for how water can be treated as a shared, finite resource, collected, recycled, and returned to the ecosystem responsibly.

FRAMEWORK STRATEGIES: WATER



683,280 GALLONS OF RAINWATER COLLECTED ANNUALLY
16,450 sf of sloped roof @ 90% collection rate & 7,673 sf of green roof @ 60% collection rate.
(74% of projects total water needs)

60% WATER REDUCTION
Through composting toilets, high efficiency fixtures, and greywater reuse.
(2,300,000 gallons reduced to 920,000 gallons)



102,000 GALLONS OF GREYWATER RECYCLED ANNUALLY
Used for the washing of laundry, composting, and irrigation for green roofs and landscape.
(Equates to 9.3 gallons of water per guest per day)

FRAMEWORK STRATEGIES: ENERGY

The Orcas Island Inn employs a range of energy strategies that integrate passive design, high-performance systems, and on-site renewable generation to drastically reduce its carbon footprint and operational energy demands.

Energy Use Intensity ***(EUI) is reduced by 52%, from 146.7 to 68.9 kBtu/sf/year,*** primarily through a closed-loop ocean-sourced heat pump system paired with heat recovery ventilators (HRVs). This reduction translates to a savings of 291 metric tons of CO_2 annually, equivalent to the annual energy use of 47 single-family homes.

The ***closed-loop ocean-sourced heat pump system leverages the relatively stable temperature of the ocean*** to provide highly efficient heating and cooling. In this system, a closed loop of pipes filled with a working fluid (typically a water/glycol mixture) runs between the building and submerged coils in the ocean. The system extracts or rejects heat via a heat exchanger, depending on buildings need to cool or heat itself. This approach reduces reliance on fossil fuels and conventional HVAC systems by using the ocean itself as a thermal reservoir.

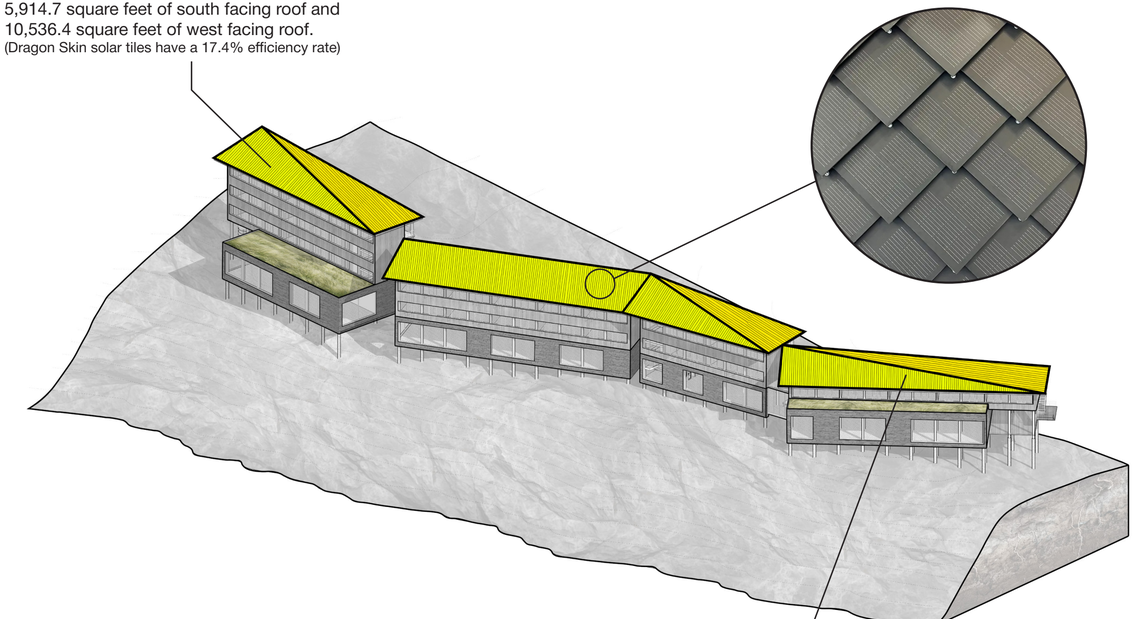
To complement this, 16,551 square feet of solar shingles are installed across the building's south- and west-facing roofs (5,914.7 sf south, 10,536.4 sf west). These shingles, operating at a 17.4% efficiency rate, ***generate 18.4 kBtu/sf/year, totaling enough energy to offset 77.8 metric tons of CO_2 per year***, the equivalent of powering 12.6 single-family homes annually.

A 42% window-to-wall ratio (12,334 square feet of glazing to 28,807 square feet of solid wall) balances energy conservation with access to daylight and views. All guest rooms are equipped with a minimum of three operable windows, enabling bilateral cross ventilation and passive cooling. These openings allow guests to experience the sights, sounds, and breezes of the island while reducing dependence on mechanical ventilation systems.

FRAMEWORK STRATEGIES: ENERGY

16,551 SQUARE FEET OF SOLAR SHINGLES
5,914.7 square feet of south facing roof and
10,536.4 square feet of west facing roof.
(Dragon Skin solar tiles have a 17.4% efficiency rate)

DRAGON SKIN SOLAR SHINGLES

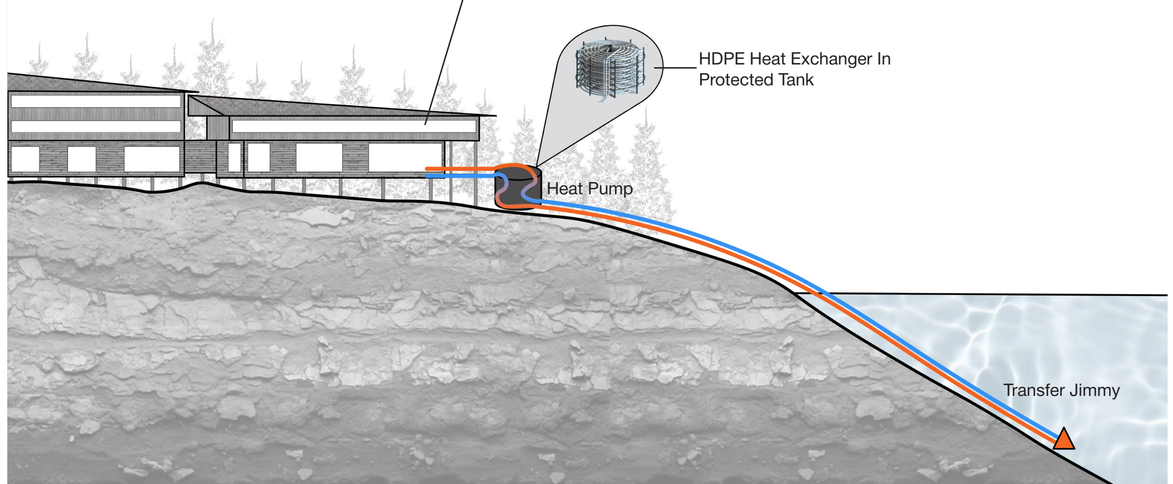


18.4 KBTU/SF/YEAR GENERATED FROM PROJECT SOLAR ARRAY
This energy production offsets 77.8 metric tons of carbon per year.
(Produces the equivalent energy needed to power 12.6 single family homes for an entire year.)

52% ENERGY REDUCTION THROUGH A CLOSED LOOP WATER SOURCED HEAT PUMP AND HEAT RECOVERY VENTILATOR

EUI Reduction from 146.7 kBtu/sf to 68.9 kBtu/sf

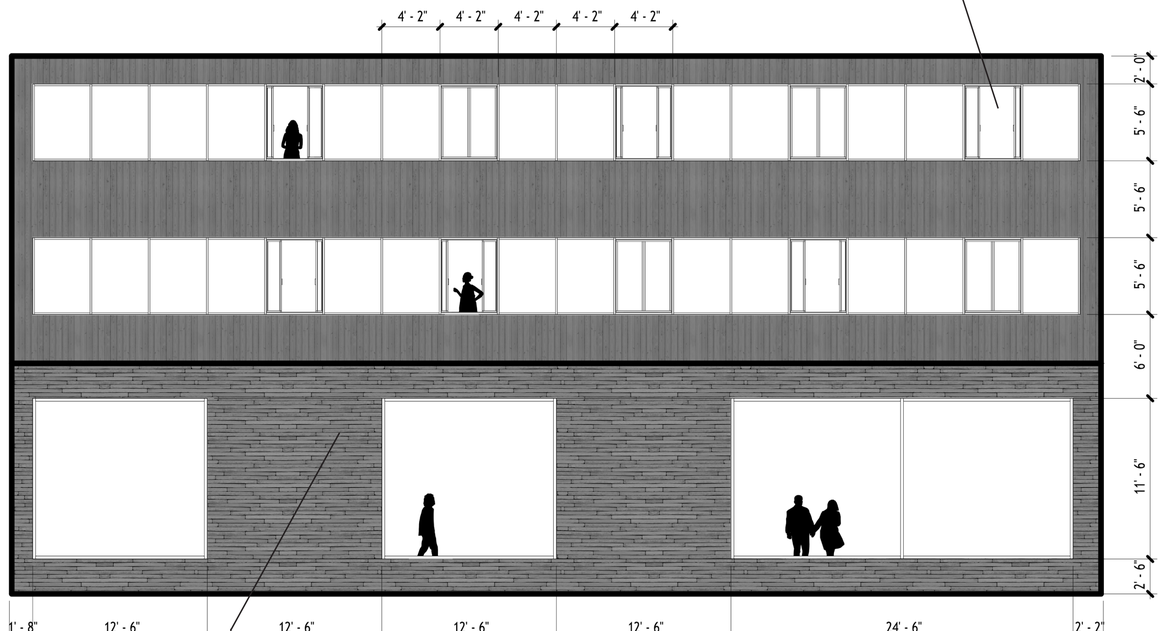
(This energy reduction equates to 291 metric tons of carbon per year or the equivalent of the energy needs of 47 single family homes for an entire year.)



OPERABLE WINDOWS AND BILATERAL VENTILATION

Operable windows connect guests with the sights, sounds and smells of the island and the sea.

(All guests rooms have a minimum of 3 operable windows)



42% WINDOW TO WALL RATIO

This value finds a balance between energy efficiency, daylighting, and views to nature.

(12,334 sf of windows to 28,807 sf of solid wall)

FRAMEWORK STRATEGIES: MATERIALS & RESOURCES

The Orcas Island Inn prioritizes low-impact construction by using regionally sourced, low-embodied carbon materials and systems that extend resource stewardship well beyond the construction phase. This approach aligns with the project's broader ecological framework and reinforces its closed-loop sustainability ethos.

A mass timber structural system forms the backbone of the Inn, ***resulting in a 66% reduction in embodied carbon*** compared to traditional steel and concrete construction. This translates to 1,500 tons of embodied carbon for the mass timber system versus 4,500 tons for a conventional approach. The structure makes extensive use of FSC-certified Douglas Fir and Western Red Cedar, both sourced from Bellingham, Washington, minimizing transportation emissions while supporting sustainable forestry practices.

Straw-insulated wall panels, provided by the EcoCocon prefab panel system, ***deliver an R-33 thermal rating*** using entirely natural, ***VOC-free materials***. These panels, fabricated at a micro-factory in Washington State, drastically reduce construction waste and time while improving indoor air quality and overall energy performance. The use of locally sourced straw from Sherman Farms on nearby Whidbey Island further enhances the material's sustainability profile.

Exterior cladding and finishes reflect regional geology and vernacular aesthetics. The Inn's base level is wrapped in green basalt, a durable and locally appropriate material sourced from the Columbia River. Select finishes include lime plaster from Roche Harbor Lime & Cement on San Juan Island, as well as charred Shou Sugi Ban cedar, sourced from Maple Valley, Washington.

These materials model a circular material economy where sourcing, use, and reuse are front of mind.

FRAMEWORK STRATEGIES: MATERIALS & RESOURCES

1



2



3



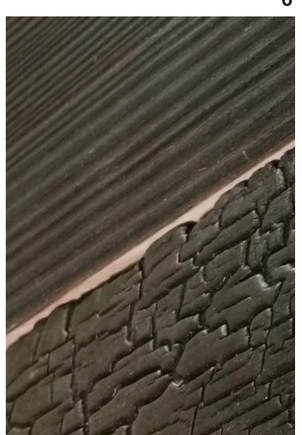
4



5



6



1. FSC Douglas Fir
Sourced: Bellingham Washington

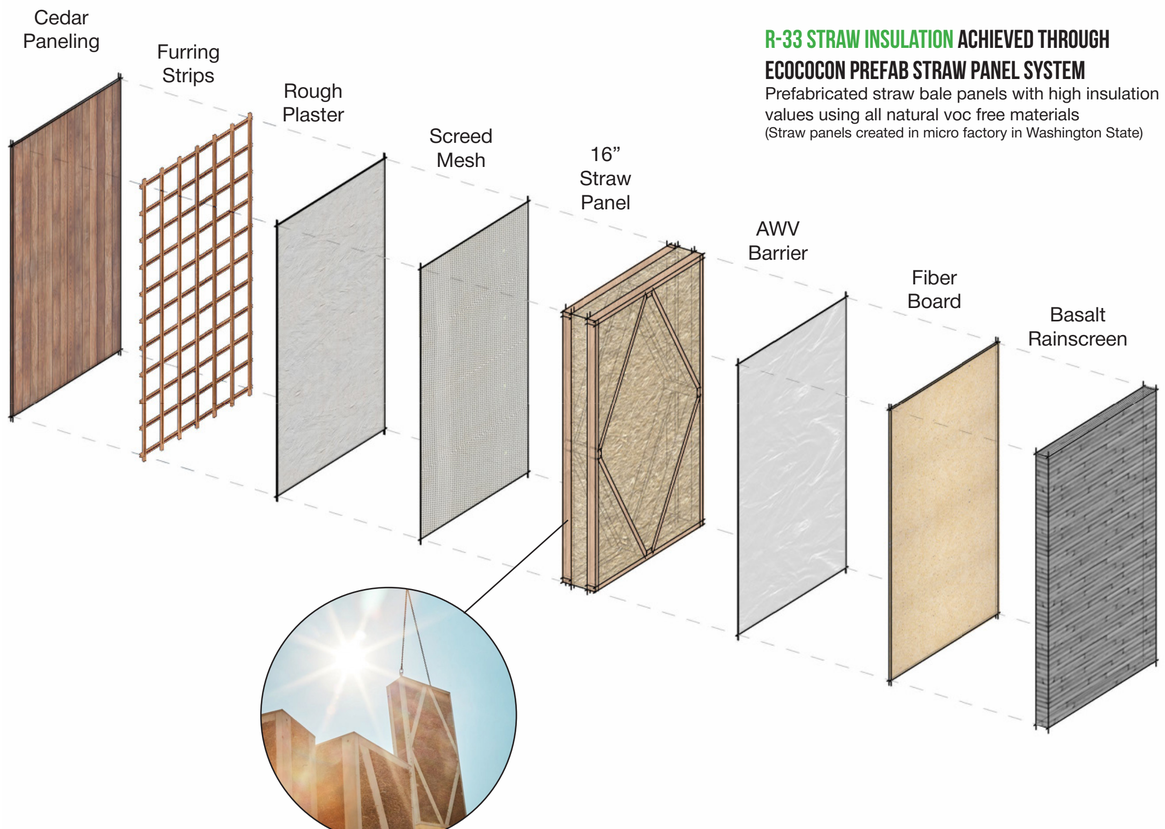
2. FSC Western Red Cedar
Sourced: Bellingham Washington

3. Green Basalt
Sourced: Columbia River Basalt Group

4. Lime Plaster
Sourced: Roche Harbor Lime & Cement (San Juan Island)

5. Straw Insulation
Sourced: Sherman Farms (Whidbey Island)

6. FSC Cedar Shou Sugi Ban
Sourced: Maple Valley Washington



R-33 STRAW INSULATION ACHIEVED THROUGH ECOCOCON PREFAB STRAW PANEL SYSTEM

Prefabricated straw bale panels with high insulation values using all natural voc free materials
(Straw panels created in micro factory in Washington State)

FRAMEWORK STRATEGIES: MATERIALS & RESOURCES

THE SPA



66% LESS OF EMBODIED CARBON THROUGH A MASS TIMBER STRUCTURE

A mass timber structural system used throughout the project and made from local Dogulas Fir, results in a 66% reduction in embodied carbon compared to traditional steel and concrete construction. This translates to 1,500 tons of embodied carbon for the mass timber system versus 4,500 tons for a conventional approach.

FRAMEWORK STRATEGIES: RESILIENCE

The Orcas Island Inn is designed with long-term adaptability and climate resilience. Anticipating a range of future environmental challenges, from sea-level rise and extreme weather to wildfire and resource scarcity, the project incorporates multiple overlapping systems to safeguard both the built environment and its surrounding community.

All structures are elevated a minimum of 37 feet above median high tide, placing them safely above projected sea-level rise and worst-case tsunami storm surge scenarios. Current models estimate that tsunami surges in the region could reach between 20 and 30 feet above median high tide, making this elevation a key protective measure against coastal flooding, extreme storm events, and potential seismic wave action.

Fire-resistant exterior cladding, including Columbia River green basalt and locally sourced Shou Sugi Ban cedar, offers passive defense against wildfire. These durable, non-combustible materials provide protection while visually integrating with the landscape, particularly along exposed bluffs and forested areas.

To further support resilience and emergency preparedness, the Inn includes renewable backup energy and water systems. A network of ***78 long-term storage batteries stores 1,551 kWh of electricity***, captured from the on-site solar array, supplying at least 7 days of emergency power. Alongside this, ***20,000 gallons of potable water are stored in four 5,000-gallon tanks***, ensuring a one-week supply of clean water for both guests and nearby residents during emergencies.

FRAMEWORK STRATEGIES: RESILIENCE

20,000 GALLONS OF WATER STORED IN 4 5,000 GALLON TANKS

Enough Water reserves to Support the Community for a Minimum of 7 Days in Case of Emergency
(Potable Water Reserves to be stored and restored annually)



1,551 KWH OF ENERGY STORED IN 78 LONG TERM STORAGE BATTERIES

Enough energy reserve to support the community for a minimum of 7 days in case of emergency
(Energy to be stored from solar production during summer months)



ALL PROJECT STRUCTURES ELEVATED OVER FLOOD, TSUNAMI, AND SEA LEVEL RISE PROJECTIONS

Buildings are elevated at a minimum of 37 feet above the median high tide meeting the predicted requirements of Tsunami storm surges and floods.
(Worst Case Scenario tsunami surges are predicted at 20-30 feet above current median high tide)



THE INN



FIRE RESISTANT EXTERIOR CLADDING ON ALL FACADES

Fire-resistant exterior cladding, including Columbia River green basalt and locally sourced Shou Sugi Ban cedar, offers passive defense against wildfire. These durable, non-combustible materials provide protection while visually integrating with the landscape, particularly along exposed bluffs and forested areas.

FRAMEWORK STRATEGIES: RESILIENCE

THE BEACH HOUSE



ALL PROJECT STRUCTURES ELEVATED OVER FLOOD, TSUNAMI, AND SEA LEVEL RISE PROJECTIONS

Buildings are elevated at a minimum of 37 feet above the median high tide meeting the predicted requirements of Tsunami storm surges and floods.

FRAMEWORK STRATEGIES: BIOPHILIA & PASSIVE DESIGN

The Orcas Island Inn integrates nature directly into the guest experience through a biophilic approach to architecture. Every element of the design trys to strengthen the relationship between people and the natural environment, physically, emotionally, and sensorially. By embedding the built environment within the island's forests, coastlines, and viewsheds, the project cultivates a sense of immersion and belonging in the landscape.

Natural materials such as cedar, basalt, and Douglas fir are left exposed and tactile, in an effort to ensure that the interiors are in the character of the surrounding landscape. Textures, scents, and colors drawn from the site reinforce a constant visual and sensory connection with the land. Acoustic-treated dowel-laminated timber (DLT) improves interior comfort by softening sound, contributing to an acoustically healthy atmosphere.

Passive design systems allow guests to interact with natural conditions rather than be insulated from them. Operable windows provide cross ventilation, bringing in fresh ocean air, the scent of forest, and the ambient sounds of the island. In-floor radiant heating and ceiling fans offer intuitive thermal comfort, allowing bodies to adjust gently to seasonal shifts without the overt need for other mechanical systems.

Lighting is designed with low-energy fixtures that minimize light pollution, preserving the island's dark skies. Elevated walkways and exposed exterior circulation encourage movement through the trees, turning the journey through the buildings into a wildlife encounter. Meanwhile, the on-site spa draws on heat pump systems and natural materials to create a serene, regenerative environment.

FRAMEWORK STRATEGIES: BIOPHILIA & PASSIVE DESIGN

GUEST ROOMS



PASSIVE STRATEGIES, BIOPHILIC MATERIALS, & BREATH TAKING VIEWS

Natural materials such as cedar, basalt, and Douglas fir are left exposed and tactile. Acoustic-treated dowel-laminated timber (DLT) improves interior comfort. Passive design systems allow guests to interact with natural conditions rather than be insulated from them. Lighting is designed with low-energy fixtures that minimize light pollution, preserving the island's dark skies.

INN CIRCULATION



EXTERIOR CIRCULATION

Elevated walkways and exposed exterior circulation encourage movement through the trees, turning the journey through the buildings into a wildlife encounter.

FRAMEWORK STRATEGIES: BIOPHILIA & PASSIVE DESIGN

ELEVATED WALKWAYS



It ***creates year-round jobs in hospitality, food service, wellness, and cultural programming, helping provide more stability on an island where many jobs are seasonal.*** Most materials and labor for the project were sourced from the region, supporting local trades and reducing the need for long-distance transport.

Food is a central part of the Inn's approach. ***About 80% of ingredients come from nearby farms, ranches, and fisheries.*** Meals reflect what's in season locally, and any ***surplus food is donated to the Orcas Island Food Bank.*** This approach supports the local food economy and reduces waste.

The cultural hall at the Inn ***hosts events and exhibitions led by Indigenous artists and educators.*** It's a space for storytelling, art, and learning, and helps connect guests to the deeper history and culture of the region.

The Inn also commits 5% of its profits to local conservation organizations, helping protect the land and ecosystems that make this place what it is. By sharing energy and water systems across buildings, the Inn lowers its environmental impact and operational costs.

FRAMEWORK STRATEGIES: COMMUNITY BENEFIT

THE RESTAURANT



LOCALLY SOURCED

Food is a central part of the Inn's approach. About 80% of ingredients come from nearby farms, ranches, and fisheries. Meals reflect what's in season locally, and any surplus food is donated to the Orcas Island Food Bank. This approach supports the local food economy and reduces waste.

Education is built into the design and experience of the Inn. Elevated walkways throughout the site include signs that explain the Inn's sustainable systems, from how rainwater is harvested to how energy is produced and conserved. These signs help guests understand not just what the systems are, but why they matter here. Surveys are planned to help assess whether this information actually deepens visitors' understanding of the land and how it's being cared for.

The on-site cultural gallery is focused on honoring and sharing Coast Salish history. Through rotating exhibits, live performances, and hands-on workshops in traditional crafts and music, the space invites guests to engage with the culture of the region directly and respectfully. Additionally, it will be home to a rotating collection of Salish art and sculpture.

If future relationships with local tribes support it, there's opportunity to go even further, incorporating Indigenous forest products into material sourcing, or integrating traditional flavors and food into the restaurant menu. These ideas aren't fully realized yet, but they point toward the project's longer-term goals: to build deeper connections with the people and culture of this place, and to make learning part of the guest experience, not just a gimmick.

FRAMEWORK STRATEGIES: EDUCATION & CULTURE

THE CULTURAL GALLERY



CULTURAL GALLERY HOUSES LOCAL INDIGENOUS ART

Food is a central part of the Inn's approach. About 80% of ingredients come from nearby farms, ranches, and fisheries. Meals reflect what's in season locally, and any surplus food is donated to the Orcas Island Food Bank. This approach supports the local food economy and reduces waste.

FINDINGS AND CONCLUSIONS

This chapter outlines the core insights gained through the development of this thesis. It distills complex research and design work into a set of clear takeaways about what matters most in ecotourism architecture. Certification must be both measurable and adaptable. Luxury should mean connection, not excess. Small design decisions, repeated across a project, have outsized impact. And while carbon matters, it's not the whole story. These findings offer a practical foundation for future projects aiming to build responsibly in sensitive and extraordinary environments.

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Ecotourism "Nutrition" Facts

Orcas Island Inn
Ecotourism Destination

What is being done?

Ecosystems	**Forest Preserved**	**95.4%**
Water	**Rainwater Harvested**	**683,280 Gal.**
	Water Reduction	**60%**
	Greywater Recycled	**102,000 Gal.**
Energy	**Solar Energy**	**18.4 kBtu/sf/yr**
	EUI Reduction	**52%**
	Carbon Offset	**368.8 Metric Tons**
Materials	**Carbon Reduction**	**66%**
	VOC materials	**0**
	Supply Radius	**300 Miles**
Resilience	**Emergency Water**	**20,000 Gal.**
	Emergency Power	**1,551 kWh**
	Storm Protection Level	**36'**
Biophilia	**Operable Guest Windows**	**100%**
	Circulation	**Exterior**
Community	**Local Food**	**80%**
	Food Excess Donated	**100%**
	Profits to Conservation	**5%**
Culture	**Art Displayed**	**Co-Salish**
	Guest Education	**Embedded**



ECOTOURISM MUST GO BEYOND “LESS HARM”

True ecotourism should actively benefit the places it inhabits: conserving natural environments, demonstrating how to live with fewer resources, and offering immersive experiences that reconnect people with the beauty of the natural world.



CERTIFICATION SYSTEMS MUST BE FLEXIBLE AND MEASURABLE

Every project comes with its own constraints, opportunities, and context. Certification must allow for adaptation while remaining rigorous. Without measurable criteria, greenwashing becomes too easy and that compromises trust and progress.



("SAN JUAN VINEYARD," N.D.)

LUXURY SHOULD MEAN DEEPER CONNECTION

In the context of ecotourism, luxury is not excess. Rather it is immersion in nature, local culture, and conservation. A true eco-resort must connect people with place. Without that connection, the experience falls short of its mission.



("ORCAS – TRAVEL GUIDE AT WIKIVOYAGE," N.D.)

DESIGN DECISIONS MATTER & SMALL CHOICES ADD UP

Every detail and decision in a project, from material selection to mechanical control systems to window orientation, contributes to the whole. Thoughtful, and even modest decisions, when multiplied across a project, create meaningful and tangible impacts.



("AS WASHINGTON'S FERRY FLEET AGES, WHY AREN'T WE BUILDING NEW BOATS?" 2023)

CARBON ISN'T EVERYTHING

When it comes to ecotourism, sustainability isn't just about carbon. It is also about the community, place, and people who surround a project. It's about changing the hearts and the minds of visitors by designing places that make people want preserve this paradise.



LEARN FROM THE LAND

The most successful ecotourism projects learn from the land itself. Letting the landscape, climate, and culture lead design decisions creates places that feel authentic, respectful, and meaningful. The site is not just where we build, but it's also where we learn if we are willing to listen.

GLOSSARY, APPENDIX, AND SOURCES

This final chapter includes supporting content referenced throughout the thesis. It begins with a glossary of terms related to ecotourism and sustainability that may be unfamiliar to some readers. Following that is the appendix, which includes the design framework developed through this research, along with sketches, models, and additional imagery from the design process that supplement the main text. The chapter concludes with a list of sources cited throughout the project.

6

GLOSSARY

Ecotourism:
A form of tourism that emphasizes responsible travel to natural areas, conserving the environment, and improving the well-being of local communities. Ecotourism aims to minimize the negative impact of tourism while promoting environmental education and sustainable practices.

Sustainable:
Referring to practices, processes, or developments that meet the needs of the present without compromising the ability of future generations to meet their own needs.

Conservation:
The careful management and preservation of natural resources, ecosystems, and wildlife to prevent depletion or degradation.

Natural Capital:
The world's stocks of natural assets, including geology, soil, air, water, and all living things. These assets provide ecosystem services that support human life, such as clean water, pollination of crops, and carbon sequestration, and are vital to sustainable development.

Blue Carbon:
The carbon captured by oceanic and coastal ecosystems, such as mangroves, seagrasses, and salt marshes. These ecosystems act as carbon sinks, absorbing and storing carbon dioxide, which helps mitigate climate change.

Tourism:
The activity of traveling for leisure or recreation, often involving staying at hotels, resorts, or other accommodations.

Resort:
A facility or complex designed for leisure and relaxation, typically in scenic or natural environments.

Ecology:
The scientific study of interactions between living organisms and their environment.

GLOSSARY

Prefabrication:
The practice of assembling components of a structure in a factory before transporting them to the construction site for final assembly. This method often reduces waste, improves construction efficiency, and minimizes environmental disruption.

Preservation:
The protection and maintenance of natural or cultural resources in their original state, preventing alteration or degradation.

Regulation:
Rules or laws set by authorities to control or guide activities such as construction, land use, and environmental protection. In sustainable resort development, regulations often aim to ensure that projects meet environmental, social, and safety standards.

Infrastructure:
The foundational facilities and systems needed for a resort or community to function, including transportation, utilities (water, electricity, sewage), and communication networks. Sustainable infrastructure supports long-term environmental stewardship and resource efficiency.

Ecosystem:
A community of living organisms interacting with one another and their physical environment.

Aesthetic:
The design principles that focus on the visual appeal, harmony, and experience of a space.

Feasibility:
The assessment of the practicality and viability of a proposed project.

Renewable:
Referring to resources that are naturally replenished on a human timescale, such as solar energy, wind power, and geothermal energy.

Greenwashing:
Greenwashing is the act of making false or misleading statements about the environmental benefits of a product or practice.

GLOSSARY

Biophilia:
In architecture and design, biophilic strategies aim to improve well-being by integrating natural elements like daylight, ventilation, views, and materials.

Embodied Carbon:
The total greenhouse gas emissions associated with the production, transportation, installation, and disposal of building materials.

Operational Carbon:
Carbon emissions generated from the day-to-day use of a building, primarily from heating, cooling, lighting, and equipment.

Heat Recovery Ventilator (HRV)
A mechanical system that improves indoor air quality and energy efficiency by exchanging stale indoor air with fresh outdoor air while transferring heat between them to reduce energy loss.

Closed-Loop System
A system designed to recycle resources (such as water or energy) rather than discarding them. In architecture, this often refers to systems that reuse greywater or produce net-zero energy.

Passive Design
An architectural approach that uses building orientation, insulation, natural ventilation, daylight, and thermal mass to reduce or eliminate the need for mechanical heating and cooling.

Carbon Sequestration
The process by which carbon dioxide is captured and stored in natural systems such as forests, soils, and oceans, helping to reduce greenhouse gas concentrations in the atmosphere.

Life Cycle Assessment (LCA)
A method of evaluating the environmental impact of a product or system throughout its entire lifespan, from raw material extraction through manufacturing, use, and disposal.

Ecotourism Evaluation Framework

Intent, Requirements, and Implementation



Industry Criteria Inspired by Existing Sustainability Certifications

1. GSTC Industry Criteria Version 3

2. Living Building Challenge V4.1

3. LEED V5

4. Green Globe Standard – Hotels & Resorts V1.7

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APPENDIX: FRAMEWORK

Introduction

This framework was developed as part of a Master of Architecture thesis exploring ecotourism and sustainability. The goal of this thesis is to define what truly sustainable ecotourism is and distinguish it from greenwashing. To achieve this, the thesis developed an ecotourism evaluation framework that evaluates ecotourism projects based on their physical, economic, and educational impacts. **Ultimately, this framework serves as a resource that provides meaningful guidance for ecotourism development.**

According to The International Ecotourism Society, ecotourism is defined as:
"Responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education.

The principles of ecotourism include:

- **Minimizing physical and social impact**
- **Building environmental and societal respect**
- **Generating financial benefits for the local economy**
- **Providing educational experiences for guests**
- **Designing, building, and operating low-impact facilities**
- **Creating meaningful experiences for guests and staff**
- **Generating financial benefits for conservation**
- **Recognizing and supporting Indigenous peoples**

This framework is designed as a guide and source of inspiration for developers, operators, designers, and builders of ecotourism resorts. It draws from established sustainability certifications such as the **Living Building Challenge, Green Globe Certification, Global Sustainable Tourism Council Certification,** and **LEED**. While many of the criteria in this framework are inspired by these certifications, they have been adapted specifically for ecotourism.

Each criterion in this framework includes:

- **Intent:** The overarching goal and purpose of the criterion.
- **Strategies:** A set of potential approaches to achieve the intent.
- **Evaluation Mechanisms:** Ways to track, measure, or verify the success of the strategies.

- **Influencing Certifications:** Recognized sustainability frameworks that informed the criterion.
- **Alignment with UN Sustainable Development Goals:** Global sustainability objectives that connect to the criterion.

These criteria are meant to serve as general guidance, not rigid requirements. The provided strategies are starting points, every ecotourism project has unique conditions, goals, and limitations. Users are encouraged to develop site-specific solutions that align with the framework's intent.

How To Use

To qualify as an **Eco Resort or Ecotourism Destination**, a project must implement at least **one strategy** from each criterion. If none of the suggested strategies are suitable, the project team must develop an **alternative strategy** that meets the intent of the criterion. Any alternative approach must be **measurable or evaluable** to ensure accountability and impact. As a result no less than 25 unique and measurable strategies should be implement into the project for it to be considered a true ecotourism destination.

Best Practices: While meeting the minimum requirement is essential, the ideal approach is to maximize the number of strategies implemented within each criterion whenever possible. This will help create a more comprehensive and impactful ecotourism development.

By following this framework, ecotourism projects can ensure they operate in a way that truly benefits the environment, local communities, and visitors.

NOTE: All strategies underlined in red are strategies that will be implemented into the hypothetical design project portion of the thesis where an ecotourism development will be designed on Orcas Island, Washington. This is a developing project and framework and should still be considered under review and edit.

APPENDIX: FRAMEWORK

1 Physical Metrics







A. *Restoration and Enhancement of Ecosystems*

Intent: To ensure that the project site is enhanced or restored to its proper ecological condition, and that it continues to improve during the projects Operation
Strategies: - The project must restore or enhance the local ecosystem by integrating site-specific ecological improvements. - Restoration efforts should prioritize native vegetation, habitat creation, and soil or waterway rehabilitation. - Strategies must support long-term biodiversity and ecosystem health.
Measurement Mechanisms: - Conduct a pre-project ecological assessment to document site conditions. - Provide a restoration plan with clear objectives and implementation steps. - Monitor biodiversity and ecological improvements over time.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 43-78) LEED-V5-BDC-New-Construction (Pages 34-35)
UN Sustainable Development Goals: Goal 14: Life Below Water / Goal 15: Life on Land

B. *Allocation of Land for Ecosystems*

Intent: to protect the land for other species as more and more land is taken for human use.
Strategies: - Designate and protect a portion of the site exclusively for natural ecosystems and wildlife habitat. - Design the project in a manner that creates minimal human impact in protected areas to allow ecosystems to thrive.
Measurement Mechanisms: - Map and document the percentage of land set aside for conservation. - Conduct periodic ecological assessments to monitor habitat health and species presence.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 101-112) LEED-V5-BDC-New-Construction (Pages 34-35)
UN Sustainable Development Goals: Goal 15: Life on Land

C. *Wildlife Interaction*

Intent: To protect wildlife and guests.
Strategies: - Design infrastructure and operations to avoid disrupting wildlife behavior, nesting, and migration. - Educate guests on responsible wildlife interactions to ensure safety and ecological respect.
Measurement Mechanisms: - Conduct a wildlife impact assessment to identify potential risks and mitigation strategies. - Develop and enforce guidelines for guest behavior and staff training on wildlife interactions. - Monitor and document wildlife activity and incidents to adapt management practices as needed.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Pages 13-14)
UN Sustainable Development Goals: Goal 14: Life Below Water / Goal 15: Life on Land

APPENDIX: FRAMEWORK

D. *Responsible Landscaping*

Intent: To keep the natural surroundings wild, healthy, and in harmony with native and local species while reducing the need for irrigation and maintenance.
Strategies: - Use native plants and vegetation that are suited to the local climate and ecosystem. - Avoid the use of invasive species that could harm local biodiversity. - Implement sustainable landscaping practices that conserve water, reduce erosion, and minimize the use of chemicals.
Measurement Mechanisms: - Regular assessments of plant health and removal of invasive species. - Monitor water usage and soil quality.
Inspiration Certification / Source: Green Globe Certification Standard – Hotels & Resorts V.1.7 LEED-V5-BDC-New-Construction (Pages 34-35)
UN Sustainable Development Goals: Goal 14: Life Below Water / Goal 15: Life on Land

E. *Design for Transit*

Intent: To contribute to the creation of a reduced fossil fuel-based transportation chain
Strategies: - Provide infrastructure and support for fossil fuel based travel
Measurement Mechanisms: - Install EV charging stations for cars, boats, and other vehicles. - Create bike storage and pedestrian paths. - Provide fuel free cars, boats, or bicycles for guest use.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 113-142)
UN Sustainable Development Goals: Goal 13: Climate Action

F. *Net Positive & Responsible Water Use*

Intent: To emphasize water as a precious resource by minimizing potable water waste, preventing downstream pollution, and ensuring that water use and reintegration align with the site's natural hydrology.
Strategies: - Implement onsite water capture systems (e.g., rainwater harvesting or closed-loop systems). - Use methods for onsite drinking water treatment without harmful chemicals. - Treat and reintegrate greywater and black water with biosolids into the ecosystem, aligning with natural hydrology.
Measurement Mechanisms: - Monitor water capture and storage volumes to ensure efficient use of collected water. - Track water treatment processes and assess water quality regularly. - Measure the reuse of greywater and black water, and ensure biosolid treatment aligns with environmental standards.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 147-196)
UN Sustainable Development Goals: Goal 6: Clean Water and Sanitation / Goal 12: Responsible Consumption and Production

G. *Energy Use and Carbon Reduction*

Intent: To minimize energy-related carbon emissions, transition to renewable energy sources, and design buildings that eliminate onsite fossil fuel dependency, improving air quality while aligning with decarbonizing grids.
Strategies: - Prioritize renewable energy sources (e.g., solar, wind) for all energy needs, including power generation and heating. - Design buildings and systems to be fully electrified, avoiding the use of fossil fuels for heating, cooling, or energy production. - Implement energy efficiency measures to reduce overall energy consumption and ensure energy use is as close to carbon neutral as possible.
Measurement Mechanisms: - Monitor the percentage of energy usage derived from renewable sources and track overall energy consumption reductions. - Track carbon emissions reductions from eliminated fossil fuel use, including avoided emissions from onsite fuel combustion. - Measure energy efficiency improvements through regular audits and energy use assessments, ensuring a continued reduction in overall carbon footprint.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 200-264) LEED-V5-BDC-New-Construction (Pages 74-75)
UN Sustainable Development Goals: Goal 7: Affordable and Clean Energy / Goal 12: Responsible Consumption and Production / Goal 13: Climate Action / Goal 15: Life on Land

APPENDIX: FRAMEWORK

H. *Healthy Interiors and Non-Toxic Materials*

Intent: To create high-quality indoor environments with healthy air and materials, promoting a transparent material economy free of toxic or harmful chemicals.
Strategies: - Use materials and finishes that ensure high indoor air quality, free from VOCs and harmful chemicals. - Avoid the use of Red List materials (substances identified as toxic or harmful to health and the environment). - Prioritize natural, non-toxic, and sustainably sourced materials for all interior finishes and furnishings.
Measurement Mechanisms: - Conduct indoor air quality assessments to ensure compliance with low-VOC and toxin-free standards. - Maintain a materials inventory to track compliance with Red List material avoidance and identify any harmful chemicals. - Regularly assess the sourcing and certification of materials to confirm their sustainability and health standards.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 288-308, 351 - 388)
UN Sustainable Development Goals: Goal 3: Good Health and Well-Being / Goal 12: Responsible Consumption and Production

I. *Sustainable Materials and Embodied Carbon Reduction*

Intent: To promote transparency in material sourcing, support sustainable extraction practices, reduce embodied carbon, and keep materials in a circular economy through reuse, while identifying and mitigating the carbon impacts of building structure and design.
Strategies: - Use responsibly sourced or on-site materials, prioritize local industry, and support sustainable extraction to minimize environmental impact. - Incorporate reused materials in the design, reducing demand for virgin resources and contributing to material circularity. - Assess and quantify the embodied carbon of structure, enclosure, and hardscape components to identify opportunities for carbon reduction.
Measurement Mechanisms: - Track material sourcing and certification to ensure transparency, sustainability, and minimal environmental impact. - Monitor the percentage of reused and recycled materials incorporated into the project design. - Conduct an embodied carbon cradle-to-gate assessment of the project, measuring the carbon footprint of materials and identifying key areas for reduction.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 322-349, 416-429) LEED-V5-BDC-New-Construction (Pages 101-105)
UN Sustainable Development Goals: Goal 3: Good Health and Well-Being / Goal 9: Industry, Innovation, and Infrastructure / Goal 12: Responsible Consumption and Production / Goal 13: Climate Action / Goal 15: Life on Land

J. *Net Positive Waste*

Intent: to integrate waste reduction, recycling, and composting into all phases of the project.
Strategies: - Implement waste reduction strategies during design, construction, and operation phases to minimize overall waste generation. - Set up comprehensive recycling and composting programs for both construction debris and operational waste. - Ensure that all materials are properly sorted and diverted from landfills, with a focus on achieving a net positive waste outcome (e.g., diverting more waste than generated).
Measurement Mechanisms: - Track total waste generated, recycled, and composted throughout the project lifecycle, aiming for a reduction in overall waste sent to landfills.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 416-429)
UN Sustainable Development Goals: Goal 9: Industry, Innovation, and Infrastructure / Goal 12: Responsible Consumption and Production

K. *Climate Resilient Design*

Intent: To reduce the risk of impacts from natural and climate events on-site through resilient design and construction.
Strategies: - Design structures to withstand extreme weather events, such as fires, floods, earthquakes, sea rise, and heatwaves. - Incorporate natural features like vegetation and water management systems to enhance site resilience to flooding, erosion, and other climate-related stresses. - Provide storage of power, water, and food for emergency events.
Measurement Mechanisms: - Assess the climate resilience of designs through simulations or modeling of extreme weather events. - Monitor the effectiveness of water management and landscaping systems in mitigating flood risks and soil erosion. - Evaluate the long-term performance of materials and systems in withstanding stress, tracking maintenance needs and durability over time.
Inspiration Certification / Source: LEED-V5_BDC-New-Construction (pages 42-44)
UN Sustainable Development Goals: Goal 12: Responsible Consumption and Production / Goal 13: Climate Action / Goal 15: Life on Land

APPENDIX: FRAMEWORK

L. *Reduce Resource Loads*

Intent: To minimize the demand for resources like water and electricity needed for lighting, thermal comfort, and water use by using high efficiency systems, passive design strategies, and by giving guests and staff the ability to toggle mechanical and passive controls.
Strategies: - Integrate high-efficiency systems for lighting, heating, cooling, and water use to reduce energy and water consumption. - Utilize passive design strategies, such as natural ventilation, passive solar heating, and shading, to reduce reliance on mechanical systems. - Allow guests and staff to control mechanical systems (e.g., HVAC, lighting) and passive systems (e.g., windows, shades) to optimize resource use based on occupancy and needs.
Measurement Mechanisms: - Track energy and water consumption and compare with baseline usage to measure reductions in resource loads. - Monitor the use of mechanical systems and the effectiveness of passive strategies through sensors or usage data. - Survey guest and staff behavior to assess engagement with resource-saving controls and strategies.
Inspiration Certification / Source: LEED-V5_BDC-New-Construction (pages 76-79)
UN Sustainable Development Goals: Goal 12: Responsible Consumption and Production / Goal 13: Climate Action / Goal 15: Life on Land

M. *Biophilic Design, Access to Nature, and Well-Being*

Intent: To create environments that connect occupants to nature through sensory experiences, access to views, natural light, sound quality, and fresh air, while ensuring high indoor air quality and overall well-being.
Strategies: - Design spaces with ample natural light, operable windows, good acoustics, and ventilation systems to enhance indoor quality and comfort. - Integrate biophilic elements such as natural materials, indoor greenery, water features, and multi-sensory experiences (e.g., natural sounds, scents, and textures). - Ensure access to views of nature in most spaces including BOH staff space.
Measurement Mechanisms: - Assess daylight penetration, air quality, and ventilation effectiveness through predictive analysis systems. - Conduct occupant surveys to measure perceived well-being, comfort, and connection to nature.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (Pages 268-286, 310-317, 468-480) LEED-V5-BDC-New-Construction (Pages 132-137)
UN Sustainable Development Goals: Goal 3: Health and Well-Being

2 Economic Metrics







A. *Local Food, Capital Goods, and Consumer Goods*

Intent: To ensure sustainable acquisition of capital goods, consumer goods, food, beverages, and materials by prioritizing local sourcing, recyclable/reusable goods, and environmentally responsible products.
Strategies: - Prioritize locally sourced products and food to reduce transportation emissions and support local economies. - Purchase goods made from recyclable, reusable, or compostable materials to reduce waste and encourage material circularity. - Ensure that products meet recognized sustainability standards or certifications, such as fair trade, energy-efficient, or low-carbon footprint labels.
Measurement Mechanisms: - Track the percentage of locally sourced goods and services compared to non-local alternatives. - Measure the proportion of purchases made from recyclable, reusable, or compostable materials. - Monitor the number of products purchased with sustainability certifications or standards, ensuring alignment with eco-friendly purchasing goals.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 11)
UN Sustainable Development Goals: Goal 2: Zero Hunger / Goal 8: Decent Work and Economic Growth / Goal 12: Responsible Consumption and Production

APPENDIX: FRAMEWORK

B. *Local and Environmentally Preferable Materials*

Intent: To prioritize local materials in construction and strengthen relationships with local communities and businesses by supporting their economic health through responsible sourcing.
Strategies: - Source construction materials and goods from local suppliers to reduce transportation emissions and support the regional economy. - Establish partnerships with local businesses and artisans to integrate locally made products into the project's operations and supply chains.
Measurement Mechanisms: - Track the percentage of materials and goods sourced from local suppliers. - Evaluate the economic contributions to the local community through purchasing records and partnerships with local businesses.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 7) Living Building Challenge 4.1 Program Manual – October 2024_en (pages 322-349, 407-414)
UN Sustainable Development Goals: Goal 9: Industry, Innovation, and Infrastructure / Goal 12: Responsible Consumption and Production /

C. *Local Employment*

Intent: To create stable, safe, and well-paid jobs for local community members while supporting diverse businesses through hiring, purchasing, and workforce development, fostering economic growth and industry diversification.
Strategies: - Prioritize hiring local workers and collaborating with diverse, community-based businesses. - Develop workforce training programs to build skills and create long-term employment opportunities. - Ensure fair wages, safe working conditions, and inclusive hiring practices that benefit the local community.
Measurement Mechanisms: - Track the percentage of local hires and contracts awarded to local or diverse businesses. - Monitor participation in workforce training and professional development programs. - Assess wages, job stability, and working conditions to ensure fair employment practices.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 7) Living Building Challenge 4.1 Program Manual – October 2024_en (pages 446-464)
UN Sustainable Development Goals: Goal 8: Decent Work and Economic Growth / Goal 10: Reduced Inequalities

D. *Local Entrepreneurs*

Intent: To strengthen the local economy by supporting small businesses, including tourism operators, restaurants, food vendors, and entertainment providers, ensuring they benefit from the project's presence.
Strategies: - Prioritize partnerships with local entrepreneurs for tourism activities, dining, and entertainment offerings. - Provide opportunities for local vendors to sell goods and services within or alongside the project. - Promote local businesses to visitors through recommendations, signage, and collaborative marketing efforts.
Measurement Mechanisms: - Track the number and percentage of partnerships with local businesses. - Monitor revenue generated for local entrepreneurs through direct engagement with the project.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 8)
UN Sustainable Development Goals: Goal 8: Decent Work and Economic Growth / Goal 10: Reduced Inequalities

E. *Conservation Funding*

Intent: To protect and enhance biodiversity within the project site and surrounding areas by providing meaningful financial support to regional conservation initiatives.
Strategies: - Allocate a meaningful portion of project revenue or operational budget to fund local conservation efforts. - Partner with regional conservation organizations to support habitat restoration, wildlife protection, and ecosystem preservation. - Establish a transparent system to track and report financial contributions and their impact on biodiversity.
Measurement Mechanisms: - Track the percentage of revenue or total financial contributions allocated to conservation initiatives. - Monitor conservation project outcomes, such as habitat restoration progress or species protection efforts.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 13-14)
UN Sustainable Development Goals: Goal 14: Life Below Water / Goal 15: Life on Land

APPENDIX: FRAMEWORK

F. *Cultural Heritage Funding*

Intent: To protect and support local culture and Indigenous communities through meaningful financial contributions and ongoing engagement.
Strategies: - Allocate funding to local cultural preservation initiatives, including Indigenous-led programs, heritage sites, and traditional arts. - Partner with local cultural and Indigenous organizations to support education, storytelling, and the protection of cultural practices. - Ensure transparent reporting on financial contributions and their impact on cultural heritage preservation.
Measurement Mechanisms: - Track the percentage of project revenue or funds allocated to cultural heritage initiatives. - Monitor the impact of funding on cultural preservation efforts, such as restored sites, supported artisans, or educational programs.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (Page 10)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 11: Sustainable Cities and Communities

G. *Community Support*

Intent: To understand the local community's identity, needs, and assets while ensuring that the project positively contributes to its well-being. This includes engaging stakeholders in decision-making, supporting local initiatives, and considering the project's role in resilience and disaster support.
Strategies: - Actively involve local stakeholders in the planning and decision-making process to assess community needs and concerns. - Invest in local initiatives, such as education, infrastructure, or social programs, to create lasting benefits for the community. - Design the project to serve as a resource hub for food, water, and power in times of crisis or disaster.
Measurement Mechanisms: - Track the number of stakeholder engagements, including meetings, surveys, and partnerships. - Monitor financial and operational contributions to local initiatives, educational programs, or community support efforts. - Assess the project's capacity to provide emergency support, such as access to water, energy, or shelter during disasters.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2024_en (pages 58-78) GSTC Industry Criteria Version 3 W/ performance Indicators for Hotels & Accommodations (page 7)
UN Sustainable Development Goals: Goal 3: Good Health and Well Being / Goal 4: Quality Education / Goal 9: Industry, Innovation, and Infrastructure / Goal 11: Sustainable Cities and Communities / Goal 17: Partnership for the Goals

H. ***Food Access***

Intent: To create opportunities for guests and the local community to access fresh, locally grown food while minimizing food waste and supporting local farmers, restaurants, and food entrepreneurs.
Strategies: - Integrate on-site agriculture, edible landscapes, or community gardens to provide fresh food. - Establish partnerships with local farmers, restaurants, and food vendors to supply and serve locally sourced meals. - Implement food waste reduction initiatives, such as donating surplus food to the community or composting programs.
Measurement Mechanisms: - Track the percentage of food sourced locally or grown on-site. - Monitor food waste diversion efforts, including donation programs and composting success.
Inspiration Certification / Source: Living Building Challenge 4.1 Program Manual – October 2023_en (pages 80-89)
UN Sustainable Development Goals: Goal 2: Zero Hunger / Goal 3: Good Health and Well Being / Goal 9: Industry, Innovation, and Infrastructure / Goal 11: Sustainable Cities and Communities / Goal 17: Partnership for the Goals

3 Educational Metrics







APPENDIX: FRAMEWORK

A. ***Staff Engagement***

Intent: To equip staff with the training, resources, and opportunities needed to actively participate in professional development and support sustainability initiatives within the project.
Strategies: - Provide comprehensive personal development and sustainability training for staff, covering energy efficiency, waste reduction, and environmental best practices. - Foster staff involvement in personal development and sustainability initiatives through leadership roles, feedback opportunities, and hands-on participation. - Ensure ongoing access to resources, guidelines, and professional development related to self development and sustainability practices.
Measurement Mechanisms: - Track staff participation in training programs and sustainability initiatives. - Conduct surveys or feedback sessions to assess staff awareness, engagement, and confidence in implementing sustainable practices. - Monitor the effectiveness of sustainability initiatives led or influenced by staff contributions.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (page 4)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 17: Partnerships for the Goals

B. ***Education and Interpretation***

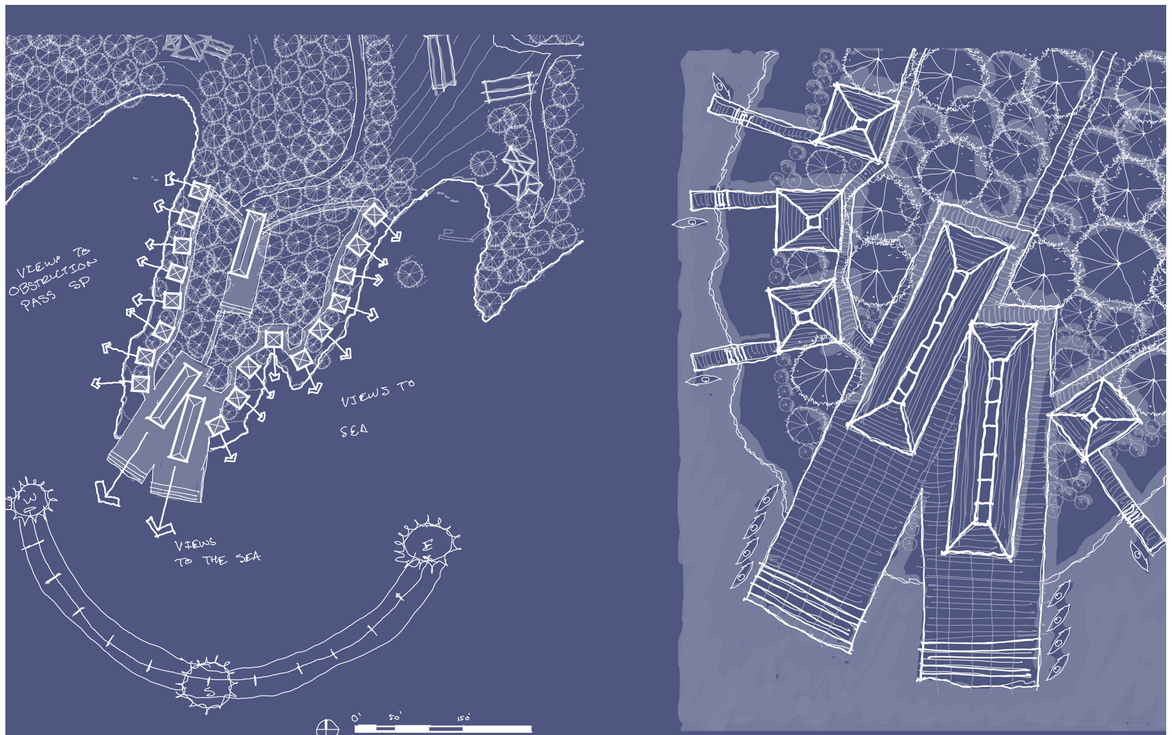
Intent: To provide clear, honest communication about environmental strategies, operational performance, and local context, ensuring that guests and staff are informed, inspired, and encouraged to adopt sustainable behaviors.
Strategies: - Present sustainability initiatives and environmental claims transparently through accurate signage, digital platforms, and guided experiences. - Develop educational programs and materials that explain the project's sustainability efforts, local ecology, and cultural significance. - Encourage responsible visitor behavior by providing interpretation on environmental and cultural sensitivities related to the site.
Measurement Mechanisms: - Present sustainability initiatives and environmental claims transparently through accurate signage, digital platforms, and guided experiences. - Develop educational programs and materials that explain the project's sustainability efforts, local ecology, and cultural significance. - Encourage responsible visitor behavior by providing interpretation on environmental and cultural sensitivities related to the site.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (pages 4, 6) Living Building Challenge 4.1 Program Manual – October 2023_en (pages 481-490)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 17: Partnerships for the Goals

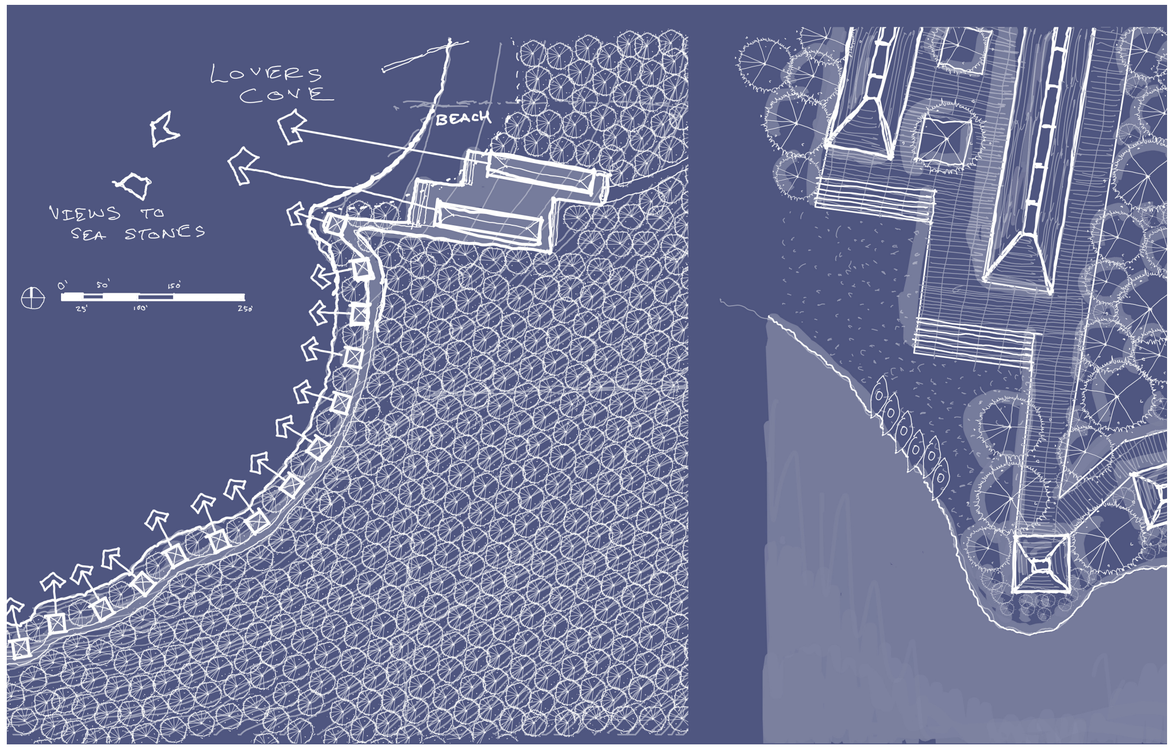
C. ***Immersive Stewardship***

Intent: To engage guests in meaningful, hands-on experiences that deepen their understanding of sustainability, site restoration, and local ecology through direct participation in conservation and stewardship activities.
Strategies: - Offer interactive programs where guests actively contribute to environmental restoration or sustainability efforts. - Design experiences that connect participants to local ecology and culture, reinforcing responsible stewardship.
Measurement Mechanisms: - Track guest participation rates in sustainability and restoration activities. - Collect feedback through surveys to assess learning outcomes and engagement levels. - Monitor the tangible environmental impact of guest-led initiatives, such as the number of trees planted or waste collected.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (pages 4, 6) Living Building Challenge 4.1 Program Manual – October 2023_en (pages 481-490)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 17: Partnerships for the Goals

D. ***Recognition of Indigenous Peoples***

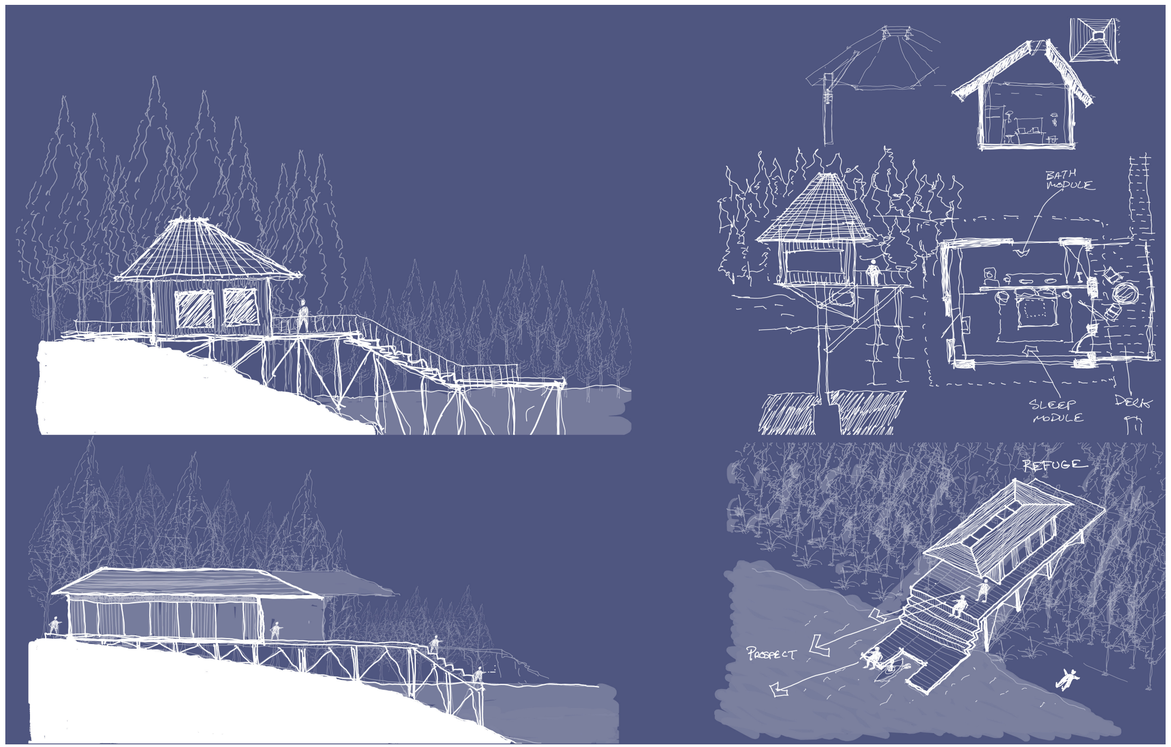
Intent: To honor and integrate Indigenous culture and traditions into the project's design, operations, and guest experiences while fostering meaningful engagement between visitors and Indigenous communities.
Strategies: - Collaborate with Indigenous groups to incorporate cultural heritage, traditional knowledge, and design elements into the project. - Provide opportunities for guests to engage with Indigenous culture through storytelling, guided experiences, and artisan markets. - Ensure Indigenous voices are included in decision-making processes related to site operations and programming.
Measurement Mechanisms: - Track partnerships and collaborations with Indigenous communities in design, operations, and guest experiences. - Assess guest participation in Indigenous-led activities and cultural programs.
Inspiration Certification / Source: GSTC Industry Criteria Version 3 W/ Performance Indicators for Hotels & Accommodations (pages 10)
UN Sustainable Development Goals: Goal 4: Quality Education / Goal 17: Partnerships for the Goals





APPENDIX: SELECTED SKETCHES





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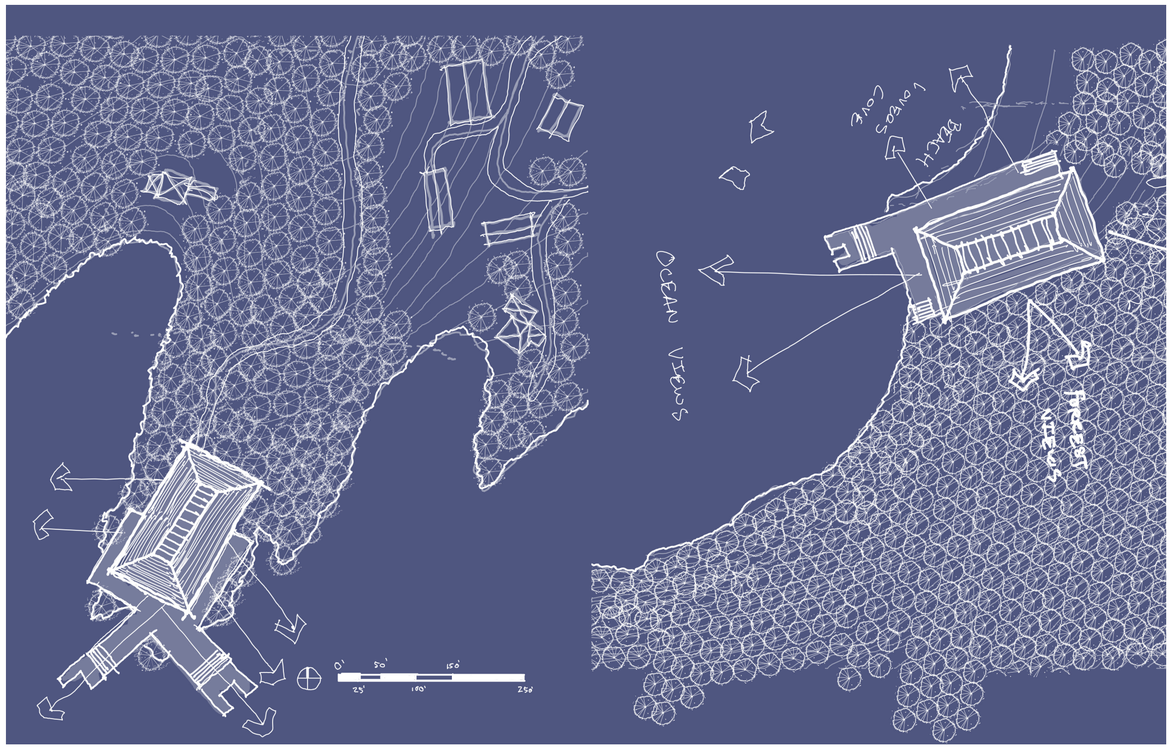

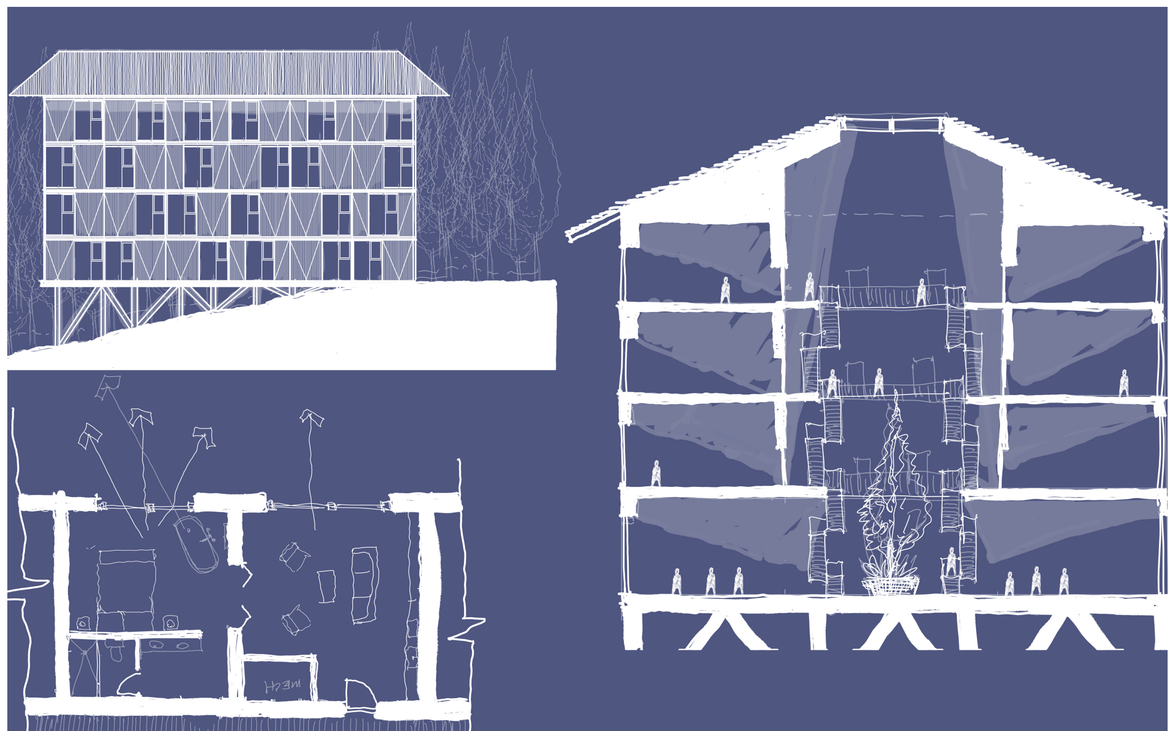

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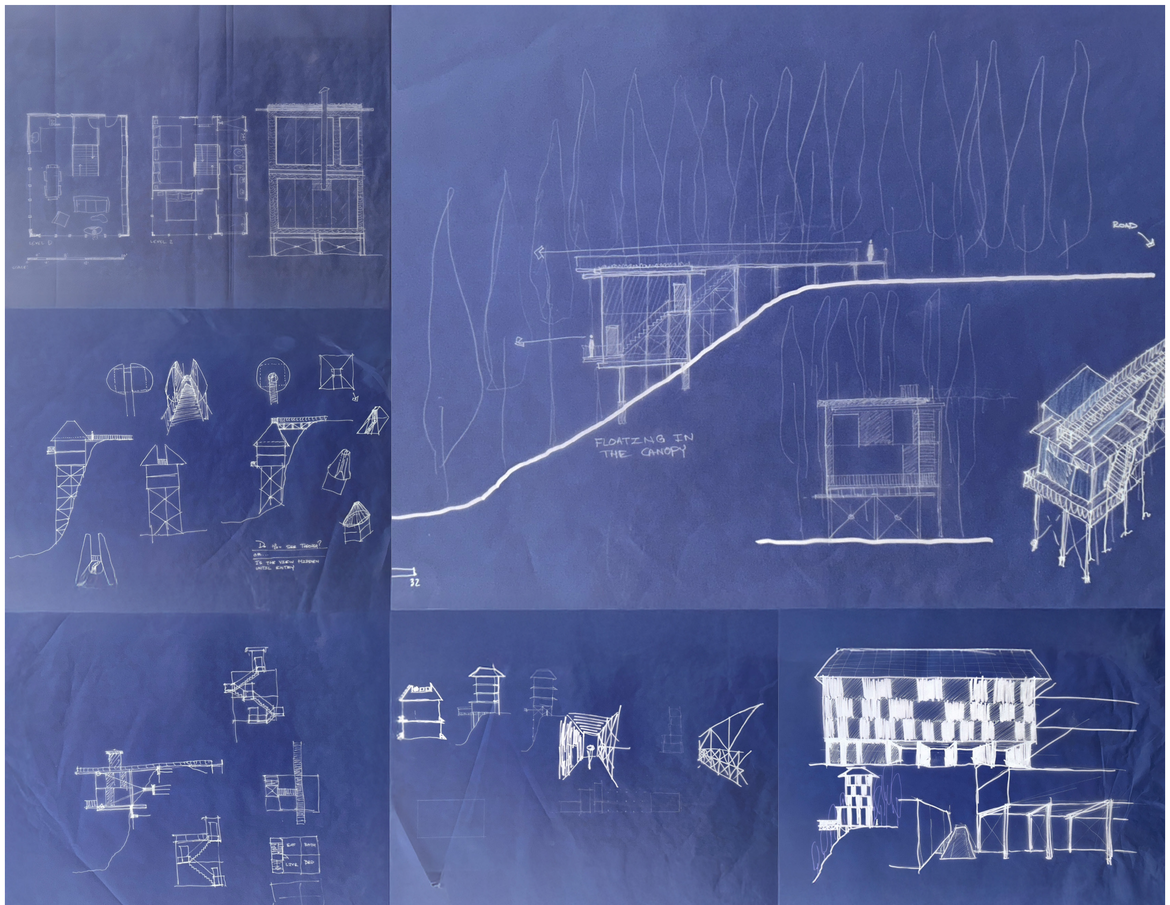
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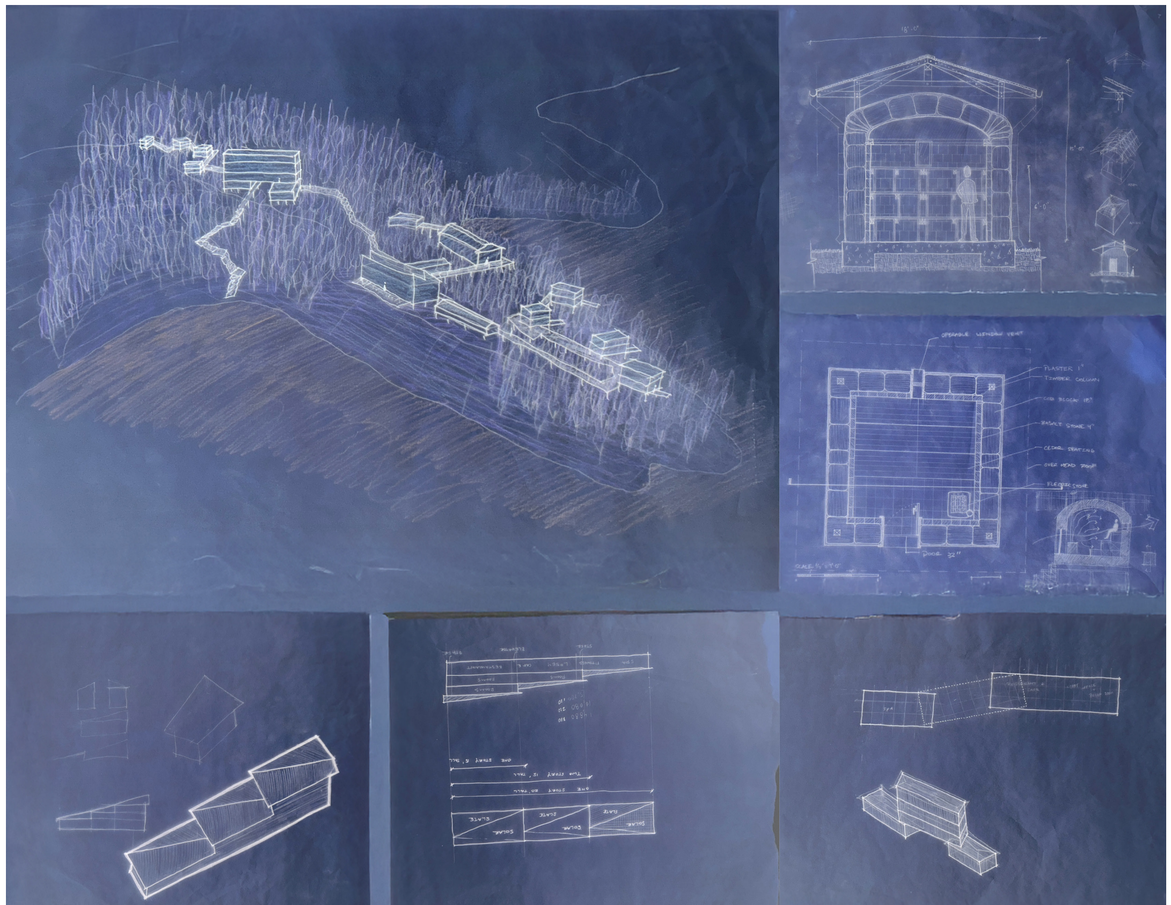

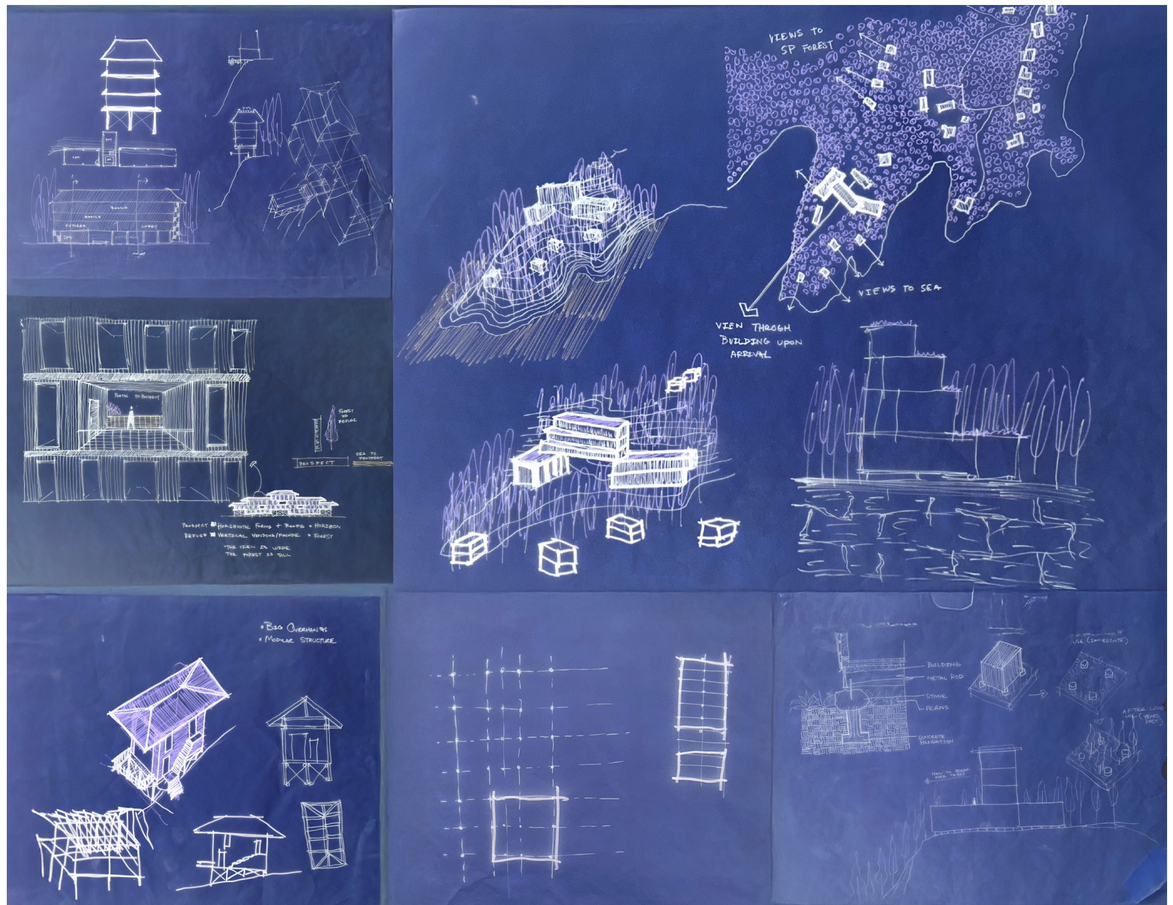

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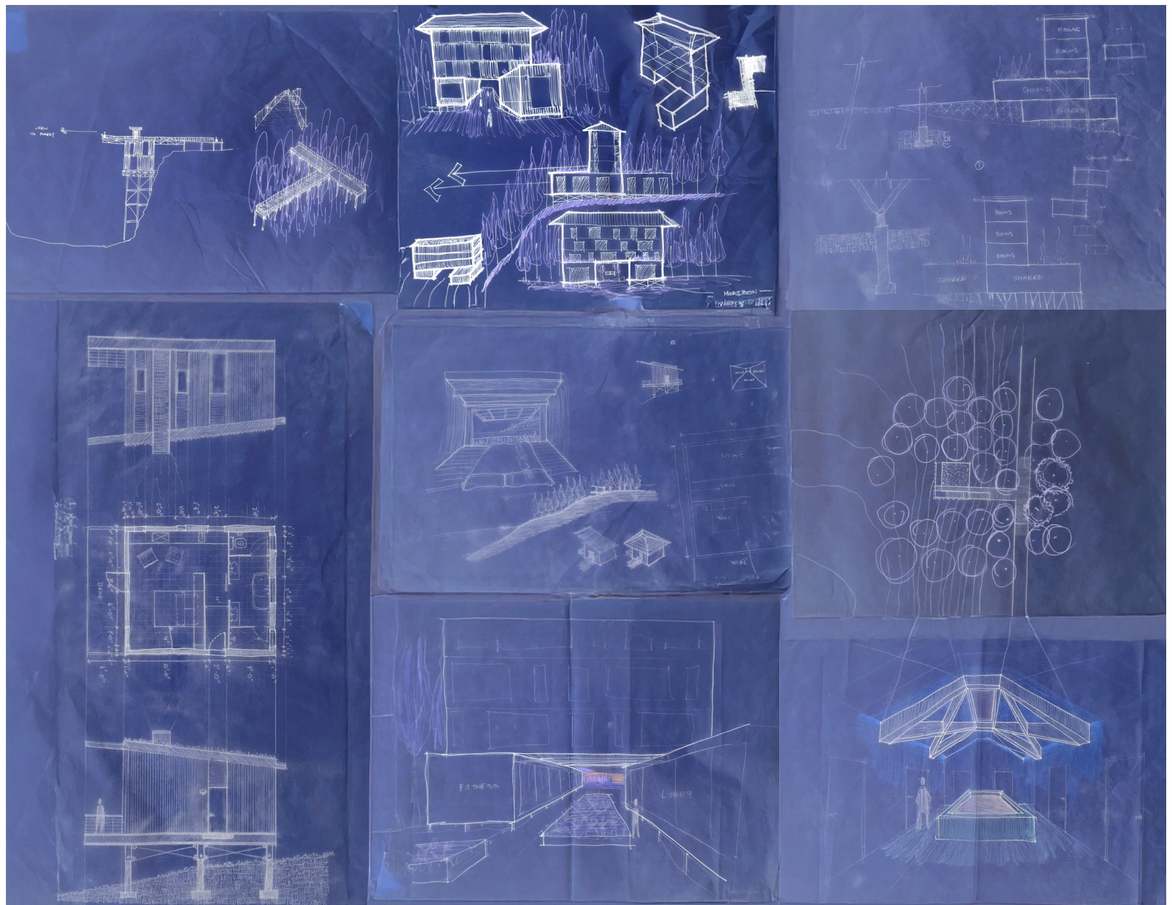

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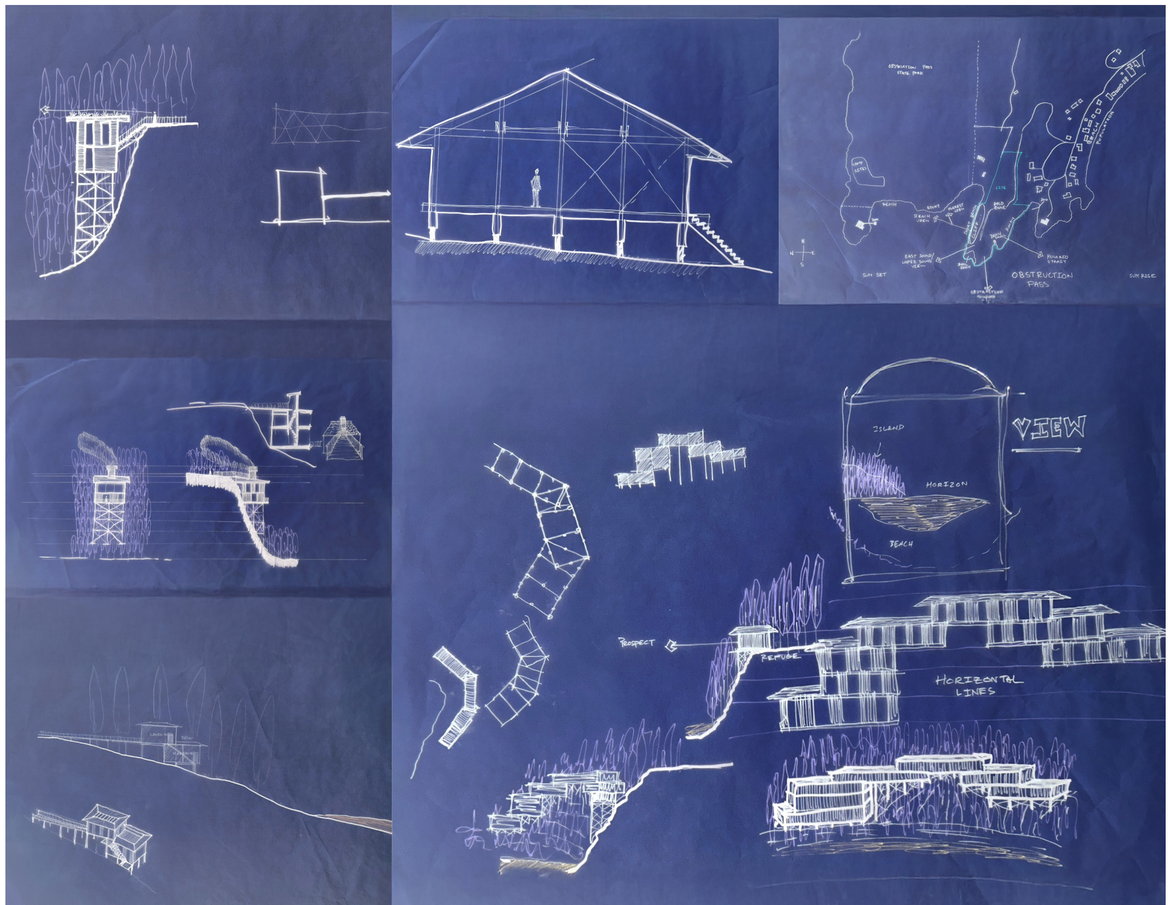

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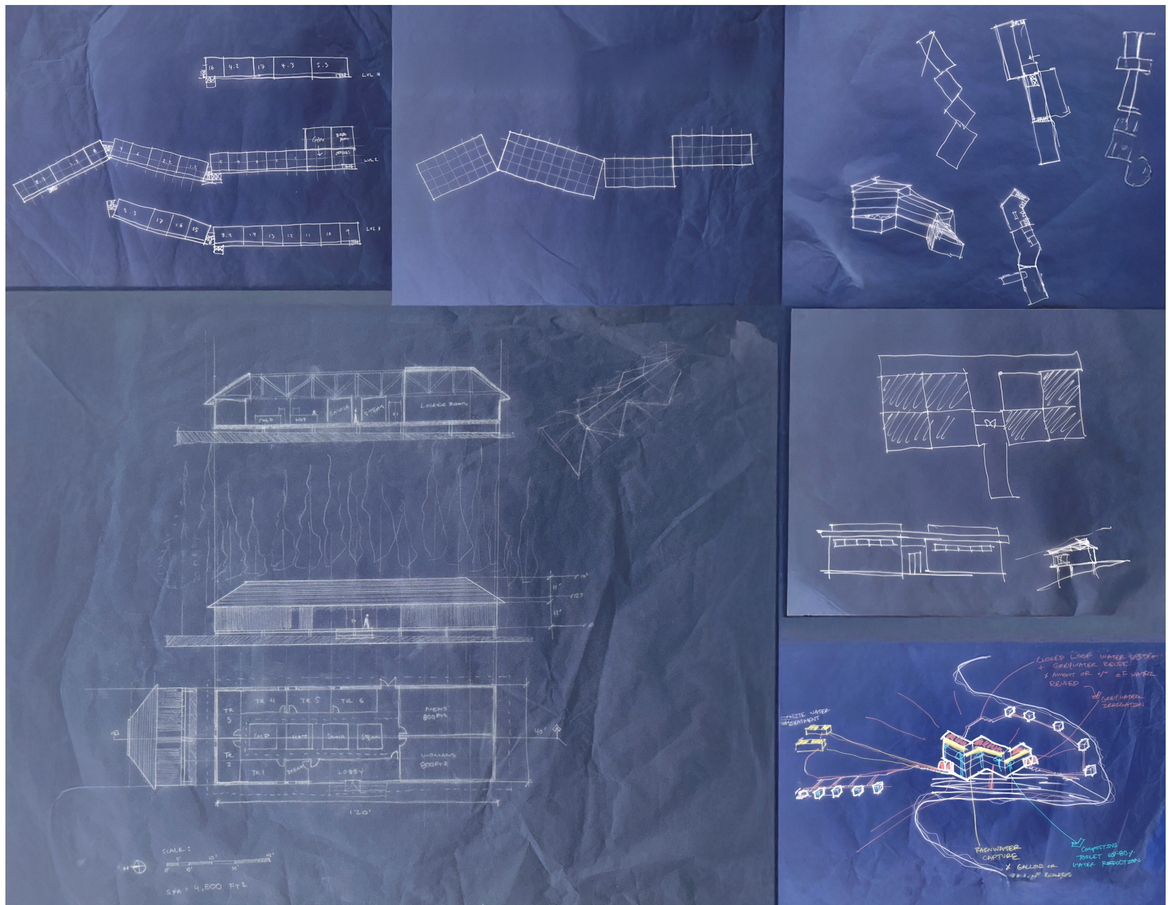

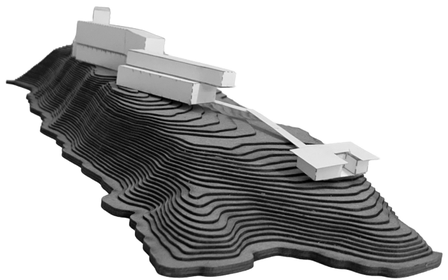

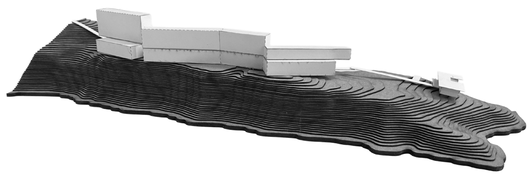

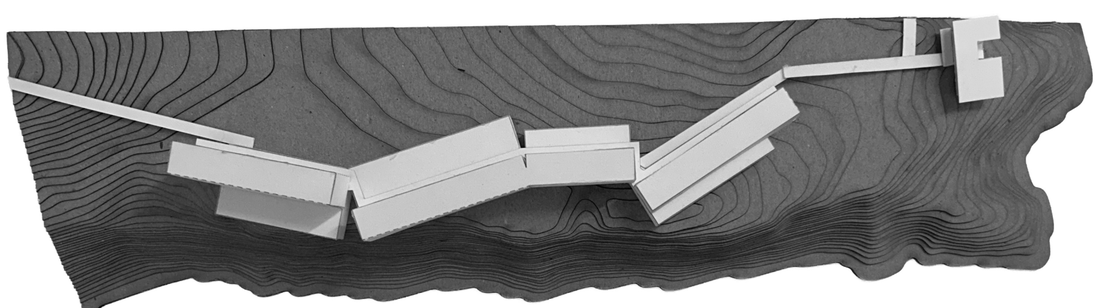

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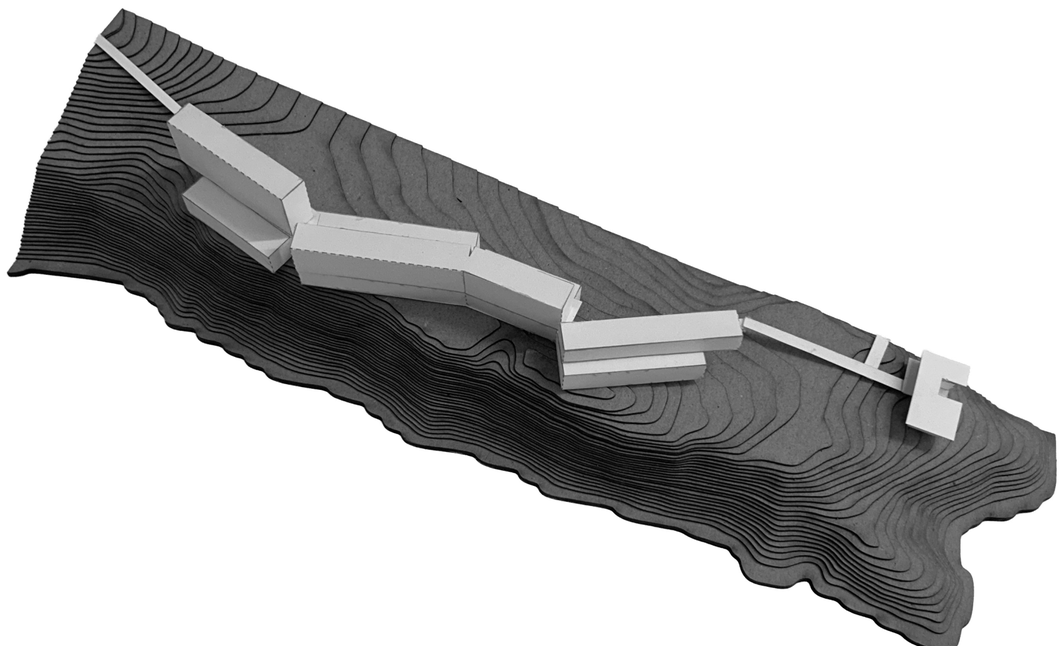

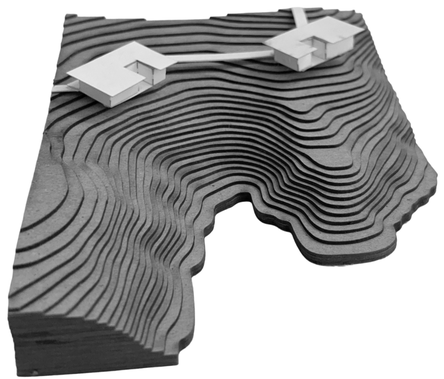

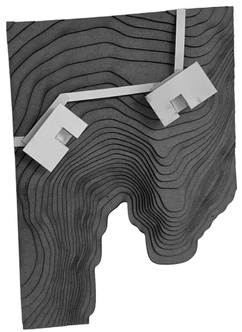

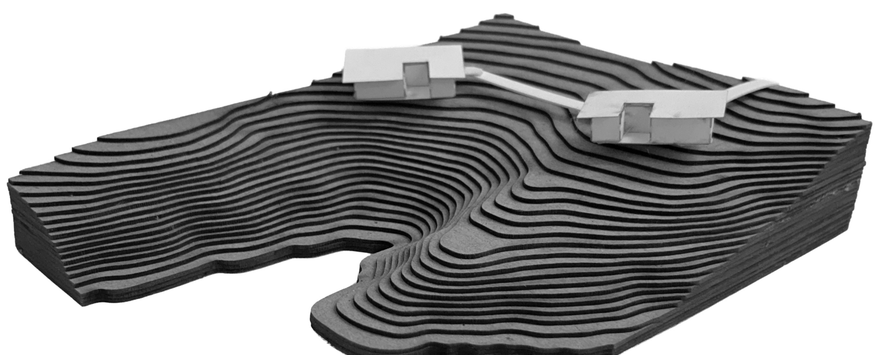

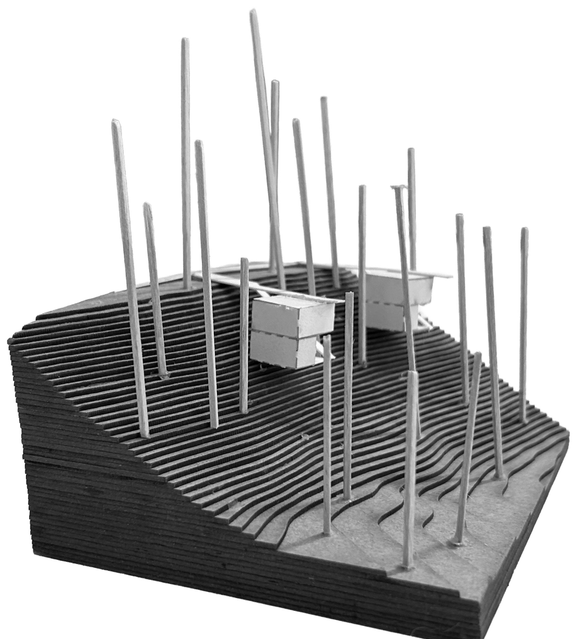

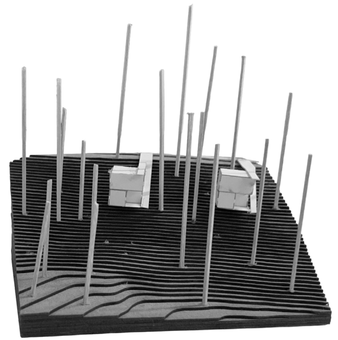

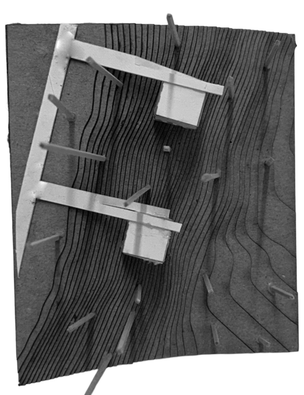

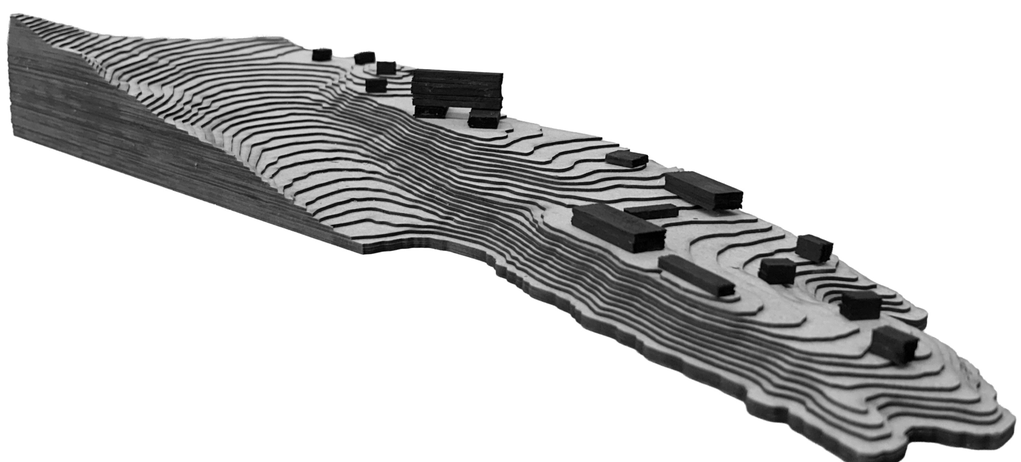



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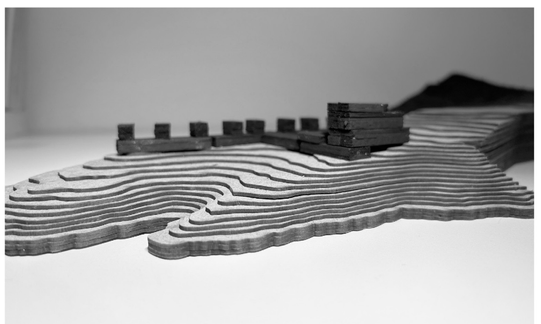

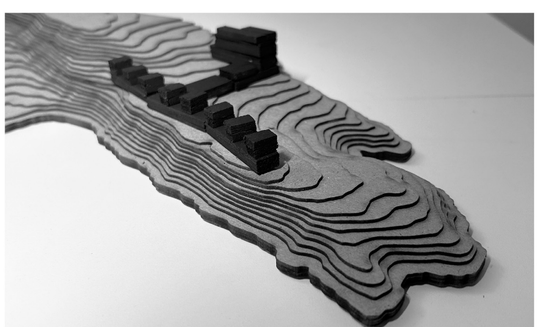



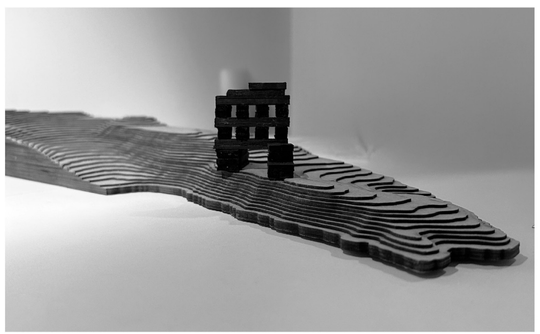

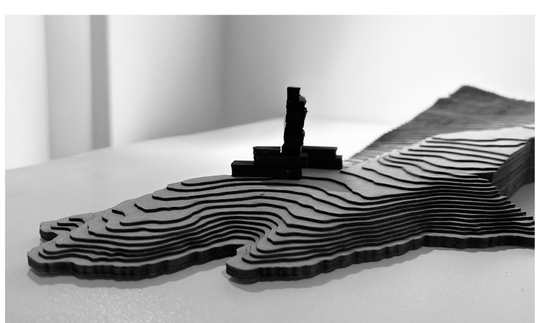

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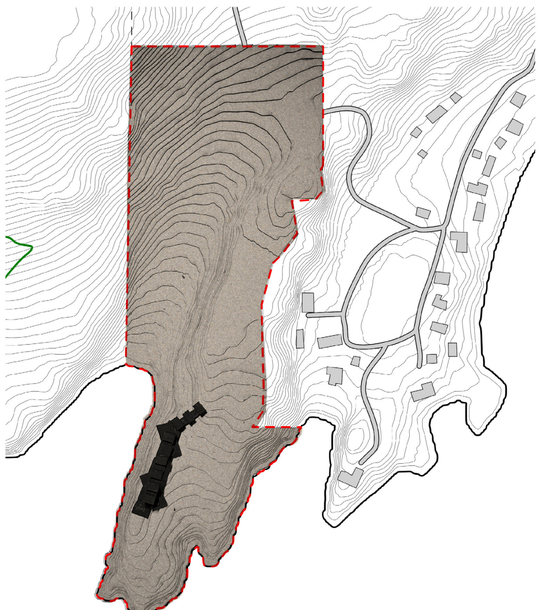

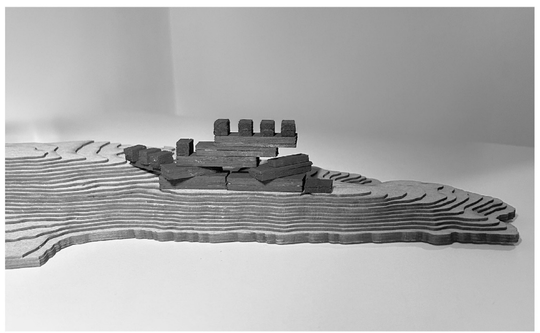



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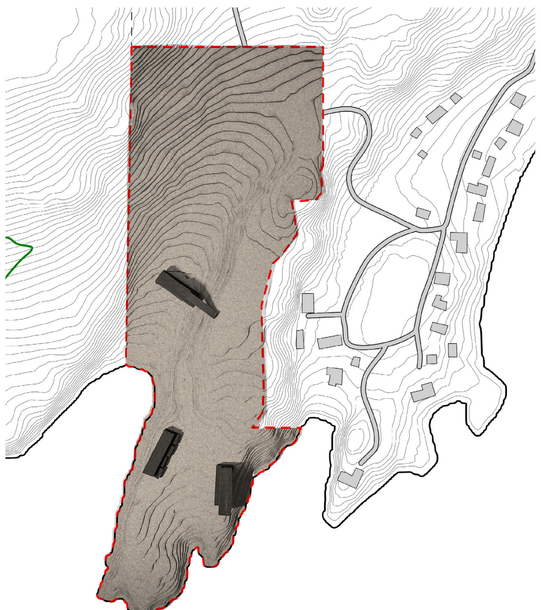

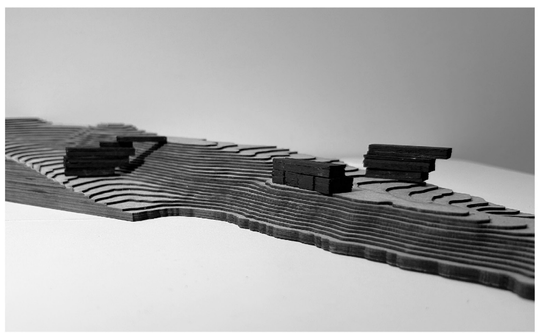

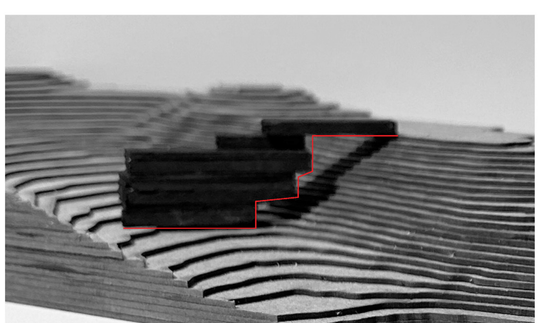

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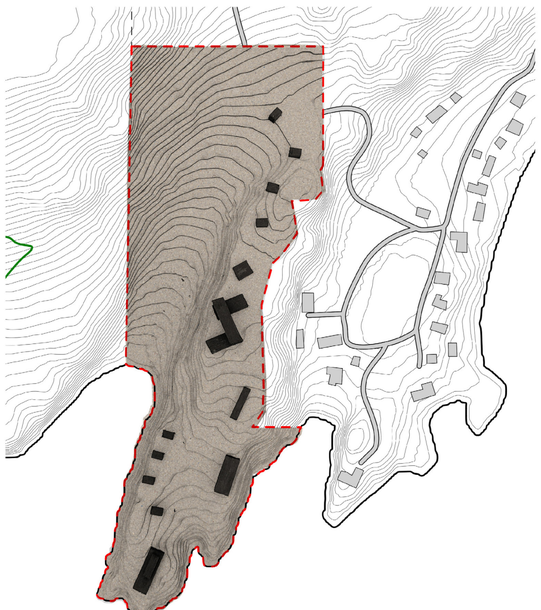

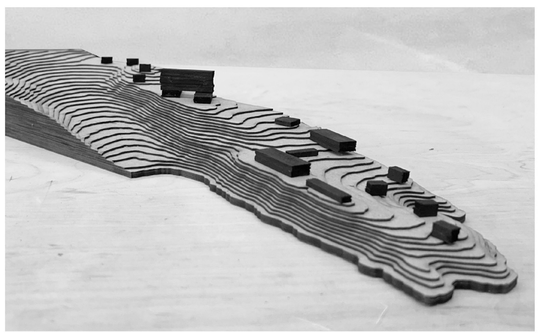

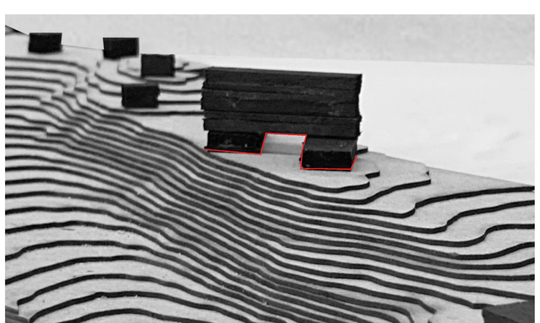

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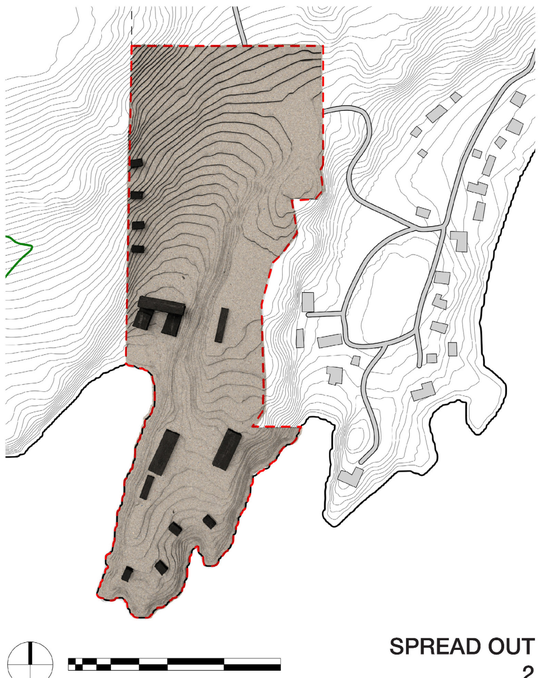



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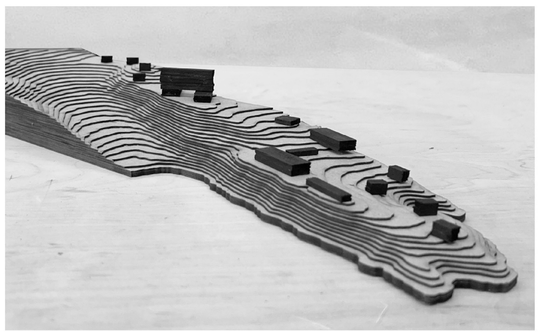

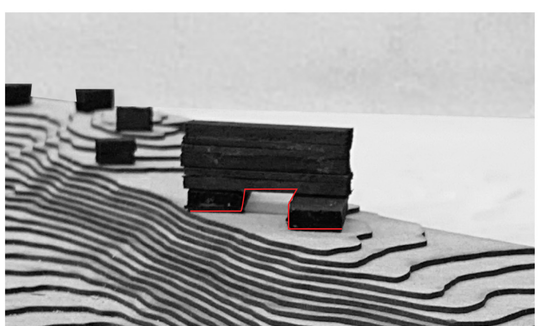

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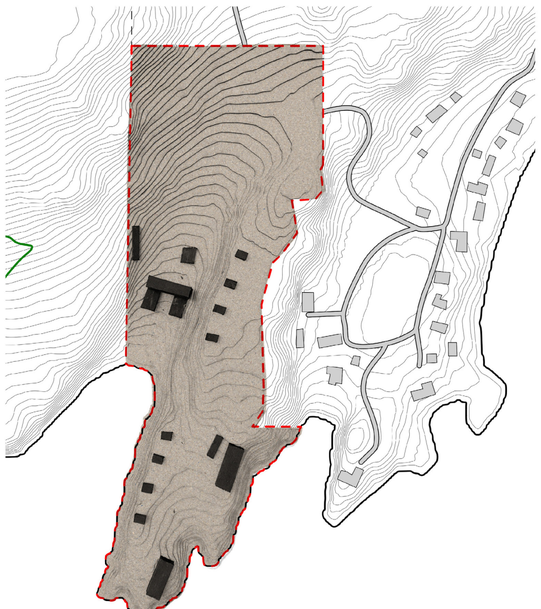



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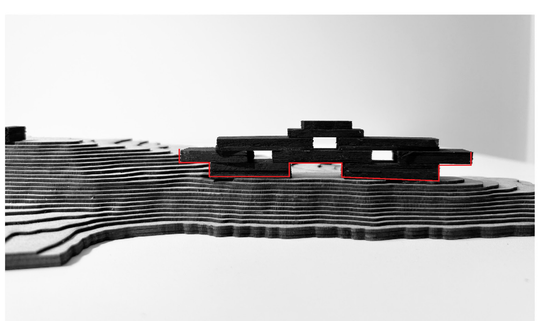

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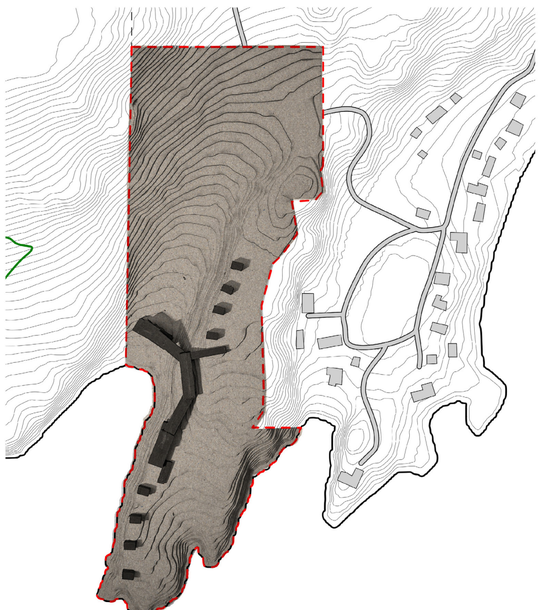

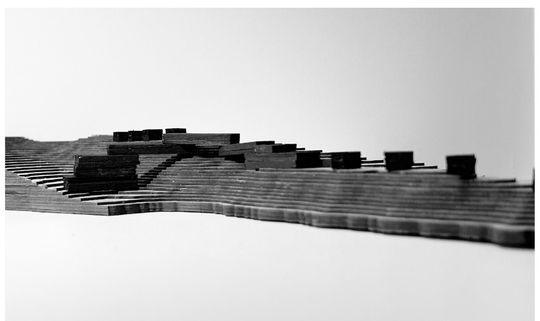

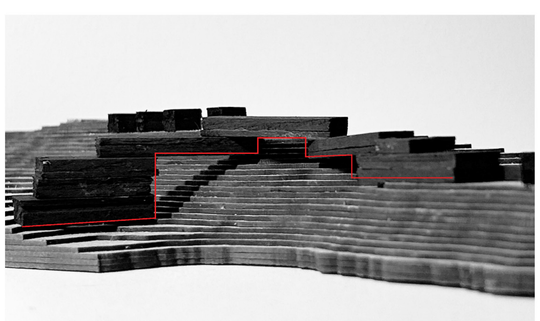

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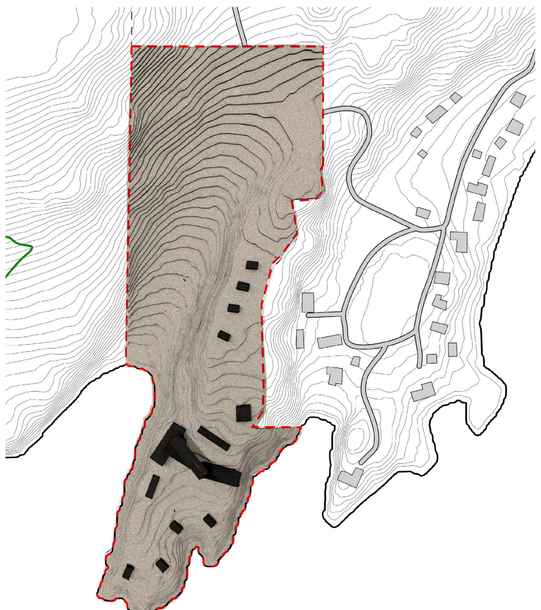



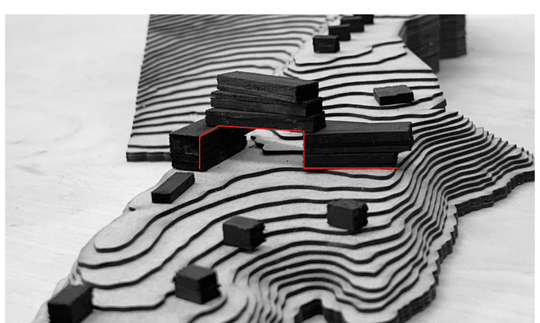

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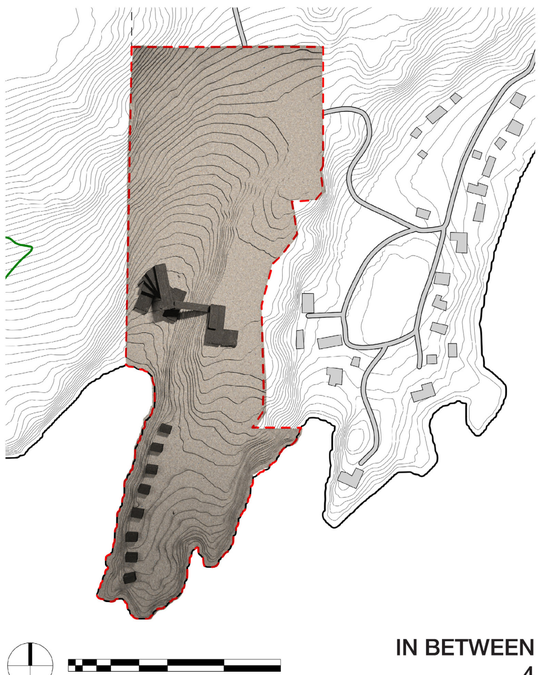

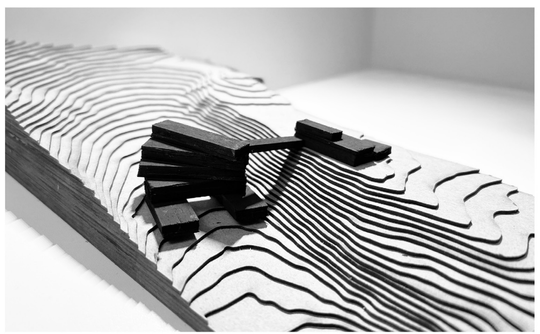

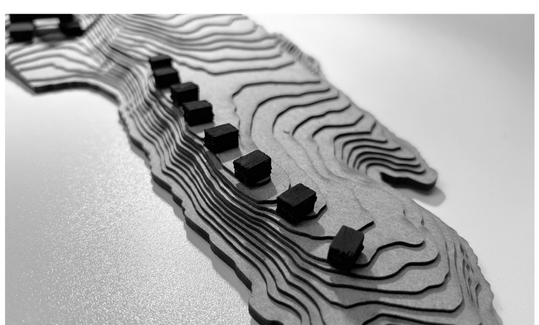

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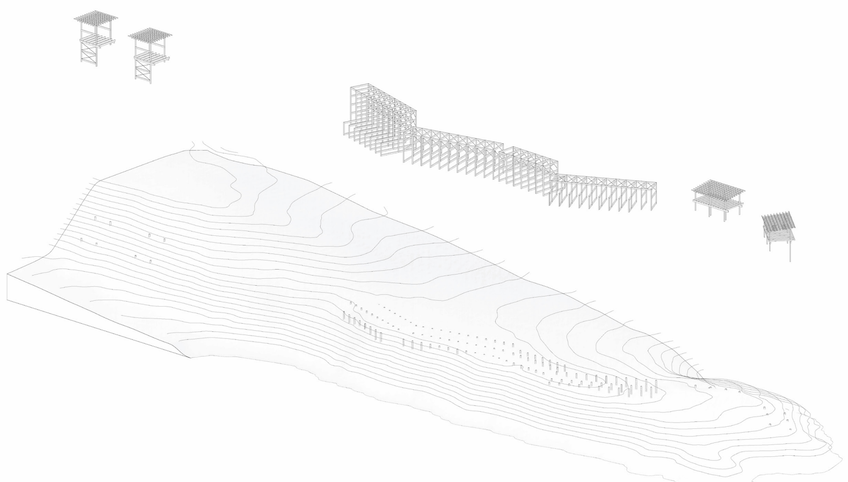

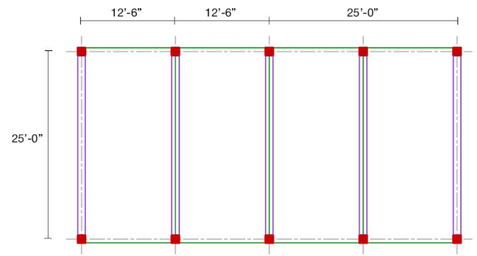

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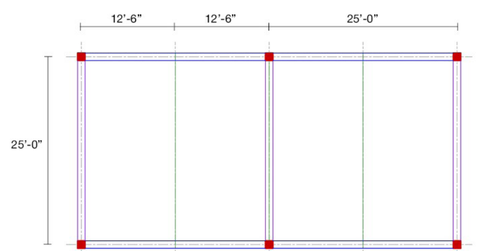
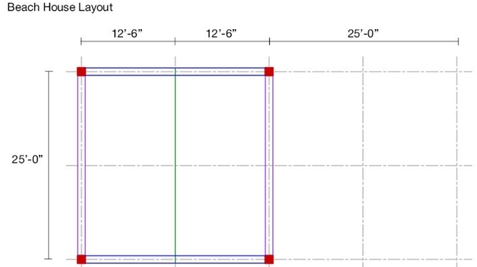
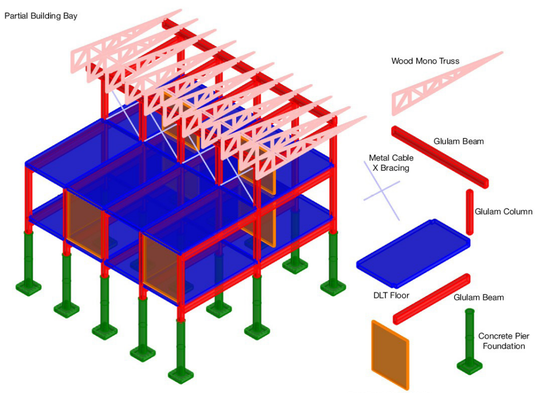


Beach House Layout



Tree House Layout



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THANK YOU

