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Sustainable Aesthetics:

Perspectives from ecotourism design

& Floating Bamboo Ecolodge in Halong Bay, Vietnam

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Sustainable Aesthetics:

Perspectives from ecotourism design

& Floating Bamboo Ecolodge in Halong Bay, Vietnam

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Dedication

This thesis is dedicated to my father, Phong Duc Pham, who has nurtured my aesthetic sensibility of Vietnam's rural landscape through his sincerely poetic paintings, and to my mother, Minh Thi Nguyen, who has cultivated my compassion for my less privileged fellow citizen through her community works.

ABSTRACT

Sustainable Aesthetics:

Perspectives from ecotourism design

& Floating Bamboo Ecolodge in Halong Bay, Vietnam

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Among all contemporary world's discourses that influence environmental design profession, sustainability appears to be a dominant and compelling narrative. The developing trajectory of sustainability in architecture seems to suggest an antinomy paradigm, a contradiction or inconsistency between two apparently reasonable principles or laws i.e. sustainability and aesthetics. As a result, emerging sustainable design requires an accompanying set of aesthetics which serve as design guidance and evaluation tool. Literature review of philosophy and designing profession realize three kinds of alternative aesthetics i.e. environmental, ecological, and performative aesthetics. The thesis argues that this alternative set of sustainable aesthetics provides a theoretical basis for the practical design of a built environment for eco-tourism.

The thesis focuses on analyzing the implication of those aesthetics to sustainability in regards to design of ecolodges. Eco-tourism is one of the emerging pragmatic options of sustainable development and to consume ecotourism is to consume aesthetic experience. By reviewing and analyzing the case studies of ecolodge, this thesis provides the design features and strategies which are argued to integrate beauty and sustainability. The thesis also applies the findings to demonstrate the usefulness of aesthetic approach to sustainable design in one specific design proposal, Floating Bamboo Ecolodge in Halong Bay, Vietnam.

Keywords: aesthetics, sustainable, design, ecotourism, ecolodge, ecological, environmental, performative, Halong Bay.

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I. INTRODUCTION

1. The relevance of sustainable aesthetics discussion

Among all contemporary world's discourses that influence environmental design profession, sustainability appears to be a dominant and compelling narrative. Sustainable design is a concept, a discourse that responds to that epochal calling. It requests a re-imagination to a multitude of human actions: agriculture, forestry, economics, manufacturing, etc. Among those, professions of the built environment (planning, landscape, architecture, and applied design) also aspire to be "sustainable" in its authentic and broad senses. The three-E bottom lines of sustainability: ecology, economy and equity, have been accounted as one holistic approach for the profession.

However, some are arguing that one of the missing E's in that approach is Esthetics (or Aesthetics). Aesthetics is a vital aspect of people's lives and an inherent property of design discipline. The Maslow hierarchy of needs puts on top of its list the need for self-fulfillment which involves human's enjoyment of cognitive learning and aesthetic experience. This satisfaction is partly fulfilled by the experience of the built environment where humans spend most of their time. It is not to argue that aesthetics per se is the most important property of our built environment. Rather, it contends that it is impossible to recognize and evaluate the full potential of the built environment if we work merely with the "sustainability" criteria of ecological performance, economic efficiency and social equity, without engaging aesthetics aspects. In fact, aesthetics itself includes a broad consideration worth investigation: experience, beauty, pleasure, emotion, tactility, etc.

While we might realize the importance of aesthetics in the sustainable design of our built environment, it is problematic that the dominant philosophies of aesthetics do not support the development of sustainable design. Appreciation of nature's beauty which

is one of the reasonable aspects of aesthetics in favor of sustainability was developed significantly by Kant and Hegel in 18th and 19th century. Such aesthetics in the middle of 20th century widely viewed philosophical aesthetics as a philosophy of art and other design. Ironically such art-centered aesthetics adheres to the industrialization and modernization processes that too often head to the environmental degradation. As a result, emerging sustainable design did not find a solid theoretical ground and its aesthetic ground was highly fragmented. New developmental phases of humanity which center on sustainability require an accompanying set of aesthetics which serve as design guidance and evaluation tool.

Humanity is also struggling with the question of finding a pragmatic route of sustainable development. Eco-tourism is one of the emerging options. The topic is highly relevant to the study of the relationship between sustainability and aesthetics. First, ecotourism is in fact a growing sustainable economics for many regions. It provides a viable vehicle to develop local and regional economics, especially ones that lack traditional resource for manufacturing (forestry, fishing, mining, mass agriculture) and ones that are less privileged in terms of technology and production capacity. The economic growth in such regions mostly depends on the foreign influx of capital through tourism (Honey 2008).

Second, the input and output of the ecotourism business is basically zero-waste. The major resource for that economics is renewable natural assets e.g. forest, river, mountain, and cultural assets e.g. people, historical site, local craftsmanship community. The main product of ecotourism is the human aesthetic experience, sensation, and education. To consume ecotourism is to consume experience – authenticity, commodification, image and perception (Sharpley & Stone 2010). The consumable experience can and should be consciously designed to maximize potentials (Frochot & Batat 2013). Still, the ecotourism product which is intangible and zero-waste generates

tangible revenue for the reinvestment on local community and for the enrichment of the natural assets. Some author discusses the planning and design of eco-resort in terms of location, thermal comfort, and economy of material and construction to make a case of appropriate sustainable design for such particular type of project (Zbigniew 2009). However, the connection between aesthetic experience and the design is not yet elaborated.

Therefore, ecotourism is a rich topic to investigate the importance of aesthetics in sustainability. Because ecotourism is a feasible practice of sustainability development and aesthetics is the major production of that practice, it is inevitable that the connection of aesthetics and sustainability should be discussed and elaborated.

2. The thesis statement

An alternative set of sustainable aesthetics provides a theoretical basis for the practical design of a built environment for eco-tourism.

This thesis will explore the implication of alternative aesthetics in eco-tourism. There are three main research questions that I want to answer.

1. How do the alternative aesthetics rationales relate to issues of sustainability?

2. How do such rationales demonstrate in the practical design of ecolodge (eco-resort, recreational community, etc)?

3. Case study – Floating Bamboo Ecolodge, Halong Bay, Vietnam – demonstrates the usefulness of aesthetics rationales.

To answer the first question, the thesis will review the literature relevant to the philosophy of sustainability, philosophy of aesthetics, and current schools of thought of new "sustainable aesthetics". For the second question, the thesis will 1) review built examples of eco-tourism projects – ecolodge, eco-resort, sustainable recreational

community, etc – which are call *ecolodge,* and 2) summarize a set of design trategies. For the third question, the thesis will apply the found strategies (in question 2) and propose a design solution for an aforementioned real case study.

II. LITERATURE REVIEW

1. Relationship of sustainability and aesthetics

A. DEFINING SUSTAINABILITY

The term "sustainability" starts its official international recognition in the Report of the World Commission on Environment and Development: Our Common Future (WCED 1987). The book was an international perspective to sustainable development with an emphasis on systems thinking and the interdependence of sustainability with all aspects of life across the world. The book also made clear that sustainable development was the only acceptable path for the world. A triangulated model of sustainable development emerged from this report and was formulated by Scott Campbell. In this model, sustainable development can only be achieved when the conflicts of interest among three critical factors: economy, environment and equity are balanced (Campbell 1996). Translating from that three-E concept into field of architecture, sustainability is understood either in economic terms (energy and material efficiency and conservation), in environmental terms (protecting ecological integrity and preserving natural resource), or in equity term (equitable physical accommodation, maintaining social linkage) (Fig II.1.a.1)

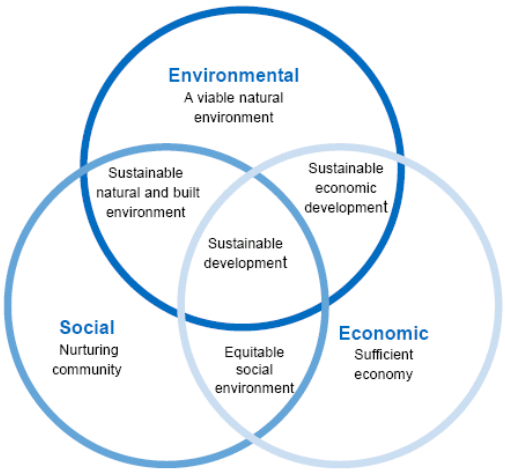


Fig II.1.a.1: Three bottom line model of sustainable development

Sustainability can be understood in another way as a contemporary evolving *narrative or storyline* - not a scientific condition or concept - where social discourses about multiplicity of alternative practices for a common better future take place. In that sense, sustainable condition shows up not because the citizens have rigorously followed an abstract map or idealized model of sustainable development. Rather, they "have historically engaged in public talk related to political, environmental and technological conditions" (Moore 2007). While this standpoint does not necessarily contradict the three-E models, Moore emphasizes that sustainability is context dependent and there should not be any single abstract model or universal checklist.

One attempt at conceptualizing, or rather categorizing sustainability concept is from Paul Thompson that is useful for this particular thesis where he classifies sustainability into three dominant meanings. The first, resource sufficiency, points toward an interpretation of sustainability as a measure of the duration of practice that produce well-being. The second, functional integrity, describes the mechanism that allows the whole system to renew itself over time. The first two models are considered empirical and called the *"substantive sustainability"*. The third, "*non-substantive sustainability"* is an overarching idea that serves to motivate and mobilize publics in pursuit of important social goals. This third model lacks empirical content in judging whether one practice is truly "sustainable" or not (Thompson 2010). However, along with other empirical model of sustainability, non-substantive sustainability complements a holistic approach to sustainability.

B. DEFINING AESTHETICS

Role of aesthetics

The vital role of aesthetics in well-being was widely recognized by classic literature. Normally, aesthetic satisfaction is put on top of the ladder of personal and

social progression. The society, especially affluent Westerners, is pursuing a personal, social and intergenerational progression from the overwhelming concern with the standard of living to the later concern for quality of the environment and, finally, quality of life. This is a movement from "having" (the accumulation of tangible things), through "doing" (the pleasure of productive, creative labor process), to "being" (sophisticated, qualitative enjoyment of aesthetic intangible things) (Porteous 1996) (Fig II.1.b.1). Moreover, the well-known Maslow hierarchy also suggests a framework of human needs ranging from immediate and basic to the ultimate and sophisticated. In this framework, the very top of the hierarchy is the need for self-fulfillment which involves human's enjoyment of cognitive learning and aesthetic experience (Maslow 1954) (Fig II.1.b.2)

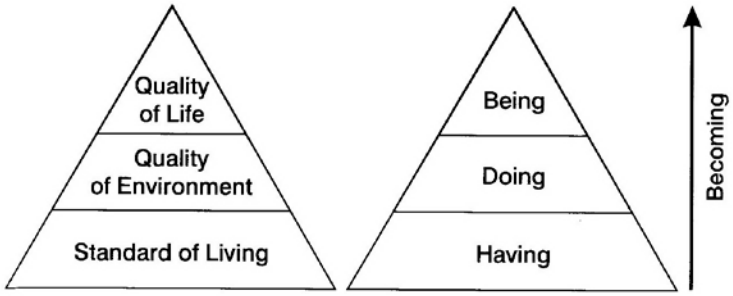


Fig II.1.b.1: Model of becoming movement. Source: Porteous 1996

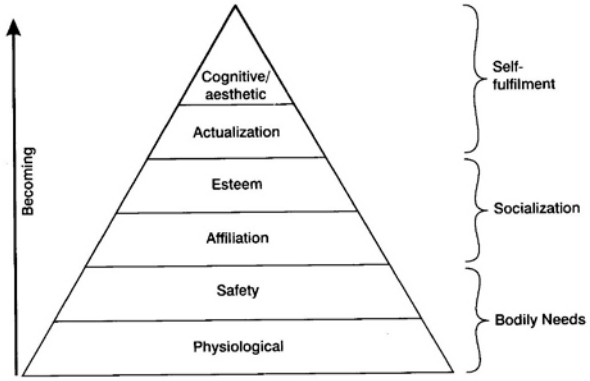


Fig II.1.b.2: Hierarchy of human needs. Source: Maslow 1954

However, this allocation of aesthetics as the final attribute to human lives is increasingly questioned. Aesthetics need is not just relevant after all other needs are satisfied; on the contrary, it is an integrated part of all other needs (Lawrence 2001). This idea has big implication to the issue of sustainability. Human environmental satisfaction is a major component of sustainability because the ultimate, intrinsic goal of a sustainability agenda is arguably to lengthen the human survival and well-being. Then if aesthetics is part of all human activities, we have to take aesthetics in account from the first moment when discussing and making any human environment.

The important effects of aesthetics on well-being and health have been discussed by many authors (Cold, ed. 2001). No matter what the origin of aesthetics preferences, aesthetics experience and knowledge have their roots in sensory perception. The aesthetic perception begins with a sensory stimulus, is emotionally recognized and cognitively processed either as a phenomenon which fits in with categories already recognized as beautiful or as a new category that should be created. In any case, beauty can be found everywhere. The transition from aesthetic perception to well-being is not linearly established, but their connections clearly exist.

We can situate *Aesthetics* alongside other critically important human intangibles including *Attachment, Ethics, and Spirituality*. Those intangibles depend upon the four supports of ethics (mind), attachment (heart), spirituality (soul), and aesthetics (gates of body). Aesthetics or sensation is understood in a wide scope, including sensing of appearance, smell, touch, sound, etc (Porteous 1996) (Fig II.1.b.3).

Fig II.1.b.3: Model of human connection to the environment. Source: Porteous 1996

There are two main implications from this theory of human connection to the environment. First, the notion of *place* / *being* plays vital role in all discussions of metaphysical phenomena. To originate from, to appreciate, and to celebrate local elements is widely practiced as the way to create a *sense of place*. Second, drawing attention to the context of aesthetics to other intangibles is important because the *four intangibles* are by no means exclusive. For example, a breath-taking scene of stormy ocean can bring forth both aesthetics sensation as well spiritual feeling of the heavenly natural forces of water. I do not attempt to collapse every human intangible feeling into the label of aesthetic one. However, we need to look at the issue of aesthetics in its constant relation to other human intangibles as stated.

However, because aesthetics is virtually only channels that the action of design can make to affect human's intangible connection with a place I will not discuss ethics, attachment and spirituality in regards to design. Similarly, the only relevant metaphysical aspect that relates to sustainable design this thesis will discuss is aesthetics. That is the reason why this thesis chooses the topic of aesthetics as the lens to investigate the intangible side of design.

Brief review of aesthetics definitions

The modern aesthetics, which was coined by Alexander Gottlieb Baumgarten, started to take on the form of science and knowledge of human sensory. He described aesthetics as a form of knowledge that is gained from senses. Accordingly, the exterior of one object that we sense and perceive is the manifestation of the invisible or intangible qualities of the interior. Therefore, it provides us a certain kind of knowledge of the exterior-interior connection (Baumgarten 1734). For Immanuel Kant the aesthetic experience of beauty is a judgment of a subjective and thus beauty itself cannot be reduced to any more basic set of features. Yet, it is similar to human truth since all people generally have an agreement on some universal type of beauty (Kant 1790).

The post-modern aesthetics expands the standard occupation of aesthetics from mere notions of knowledge of sensing beauty into its relation to society. Theodor Adorno postulates that modern art's freedom from such restrictions in previous eras has led to art's expanded critical capacity and increased formal autonomy. Aesthetics locates truth-content within the art object, rather than in the perception of the subject. And art's increased responsibility for societal commentary arrives with this expanded autonomy (Adorno 1997). In a criticism of Kantian aesthetics, Bourdieu argues that no judgment of taste is innocent and disinterested. They are all socially constructed when one class of society chooses one type of aesthetics as a way to bolster their own social class and to present aversion to the preferences and behaviors of the other classes (Bourdieu 1984).

Recently, a new strand of aesthetics theory has emerged to advocate that aesthetics perception can be scientifically mapped, explained, and predicted. In one view, aesthetic taste is an evolutionary trait which is shaped by the natural selection, the human appreciation for art is innate, and certain artistic values are universal across cultures (Dutton 2009). On another view, a new scientific branch, "neuro-aesthetics", attempts to

define the neurological stages of the aesthetic experience and locate the pathways in the brain when we make a judgment of beauty (Ledder 1994, Skov 2009).

C. CURRENT GAP BETWEEN SUSTAINABLE DESIGN AND AESTHETICS

The developing trajectory of sustainability in architecture seems to suggest an antinomy paradigm, a contradiction or inconsistency between two apparently reasonable principles or laws i.e. sustainability and aesthetics. The overall assumption is that those two camps reside the opposing realms: science - art, performance - appearance, substance - superficial, or intelligence - intuition. In fact, in both literature and practice, the reconciliation of sustainable design and aesthetically expressive design is not frequently implemented and articulated. The technical reasons are the shortage of the integrated design case studies and trade-off thinking between beauty and performance (McLennan 2004, Hosey 2012). The social reasons are the perceived need among theorists and practitioners to defend against co-operation in order to retain their own symbolic standing within each sub-field of architecture (Owen & Dovey, 2008). In professional term, many "basic design" books and environmental design literature still deal with visual principles such as unity and balance as the primary "form making" principles and many designers continue to employ those formal, object-centered principles because they find those principles useful to their profession. Reigning aesthetic theories do not offer a basis for prescriptive principles of inclusive and dynamic design which environmental designers can use as guides to their design process (Koh, 1988).

This gap calls for a formulation of new kind of aesthetics that would guide the sustainable environmental design. The next part will introduce several new concepts of such new aesthetics including *Environmental Aesthetics, Ecological Aesthetics, and Performative Aesthetics*. In the framework of this thesis I generally label them as "*sustainable aesthetics*" with the only purpose of referring to all new kinds of aesthetics that promote sustainable design.

2. Alternative aesthetics - "Sustainable aesthetics"

Each type of aesthetics in question – *environmental aesthetics, ecological aesthetics, and performative aesthetics* – is equivalent to a slice through the whole body of the positive aesthetics for sustainability. This way of differentiation has three grounds. First, in terms of terminology, different names of aesthetics come from the various literature sources where the authors use various terms to define types of aesthetics they want to discuss. The choice of terms is mostly dependent on the original premise of an aesthetics branch – be it the idea of environment, ecology or performance.

Second, I differentiate three kinds of aesthetics based on what kind of approach they denote and what kind of core principle they adhere with. Environmental aesthetics concerns with the *type / scale* / *location* of the matter of aesthetic appreciation. It shifts from the traditional look at particular object (art, object, buildings) to the experiencing of the whole environment (world, natural, and human habitat). Ecological aesthetics concerns with the *system / process / change* of the matter of appreciation. It views the matter of aesthetic appreciation not as an autonomous and fixed entity but rather as a cohesive ecosystem, an ongoing process in the interdependent relationships to context. At last, performative aesthetics is a contemporary with the *performance / function / efficiency* of the matter of appreciation. It attempts to eliminate the conventional distinction between the visual appearance and the function, efficiency and economy of designed object, building and environment.

Third, due to their core principles, environmental aesthetics, ecological aesthetics, and green aesthetics find supporting literature and application in three main professional design domains which are respectively environmental preservation, landscape design, and architectural design.

The table below describes the differences among three categories of aesthetics in question. It is followed by more detailed literature review.

	Environmental Aesthetics	**Ecological Aesthetics**	**Performative Aesthetics**
Original idea	Environment	Ecology	Performance
Basic question	What to appreciate?	How to appreciate?	Why to appreciate?
Matter of aesthetics	Type, Scale, Location	System, Process, Change	Effect, Function, Efficiency
Dominant operating field	Environment preservation	Landscape design	Architectural design

Table 2.1: Differentiation of alternative aesthetics

It should be noted that the discussed analytical slices through literature about alternative aesthetics are not entirely exclusive to each other. In fact, there are some overlaps between them although they are labeled with different names. Hence, while the designation of three kinds of aesthetics has a definite basis in the literature, it may well be regarded as a heuristic device for the reader to better understand of what should be a holistic package of aesthetics theory. Following is the general explanation of three kinds of "sustainable aesthetics".

A. ENVIRONMENTAL AESTHETICS

Environmental aesthetics focuses on philosophical issues concerning appreciation of the world at large as it is constituted not simply by particular objects but also by environments themselves. In this way environmental aesthetics goes beyond the appreciation of art to the aesthetic appreciation of both natural and human environments. Its development has been influenced by eighteenth-century landscape aesthetics as well as by two recent factors: the exclusive focus of twentieth-century philosophical aesthetics on art, and the public concern for the aesthetic condition of environments that developed in the second half of that century.

The contemporary positions in environmental aesthetics are frequently divided into two camps, alternatively labeled cognitive and non-cognitive, conceptual and non-conceptual, or narrative and ambient.

Cognitive (conceptual or narrative) positions in environmental aesthetics state that knowledge and information about the essence of the object of appreciation is central to its aesthetic appreciation of nature. One cognitive approach to nature appreciation, *natural environmental model* (Carlson 1979) or *scientific cognitivism* (Parsons 2002) holds that while appropriate aesthetic appreciation of art requires knowledge of art history and art criticism, such aesthetic appreciation of nature requires knowledge of natural sciences such as geology, biology, and ecology. Several other cognitive approaches emphasize different kinds of information of various cultural and historical traditions. Local and regional narratives, folklore, and even mythological stories about nature are endorsed either as complementary with or as alternative to scientific knowledge (Sepänmaa 1993, Saito 1998, Heyd 2001). Some quasi-cognitive approach strongly supports the idea that nature must be appreciated "as nature" but rejects the idea that scientific knowledge about nature can reveal the actual aesthetic qualities of natural objects and environments, because many of the most significant aesthetic qualities are extremely relative to conditions of observation (Budd 2002).

Non-cognitive (non-conceptual or ambient) approaches hold that something other than a cognitive component, i.e. other than scientific knowledge and cultural tradition, is the central feature of the aesthetic appreciation of environments. The leading non-cognitive approach, often called the *aesthetics of engagement*, argues that disinterested appreciation of nature is out of place in the aesthetic experience, for it wrongly abstracts both natural objects and appreciators from the environments in which they properly belong to and in which appropriate appreciation is achieved. Thus, the aesthetics of engagement stresses the contextual dimensions of nature and our multi-sensory

experience of it. Appropriate aesthetic experience involves the total immersion of the appreciator in the object of appreciation (Berleant 1992, 1997). The arousal model holds that we may appreciate nature simply by opening ourselves to it and being emotionally aroused by it (Carroll 1993). The mystery model, contends that appropriate experience of nature incorporates a sense of being separate from nature and of not belonging to it—a sense of mystery involving a state of appreciative incomprehension (Godlovitch 1994). A fourth non-cognitive approach attempts to balance engagement and the traditional idea of disinterestedness, while giving center stage to imagination. This position distinguishes a number of different kinds of imagination—associative, metaphorical, exploratory, projective, ampliative, and revelatory (Brady 1998).

Environmental aesthetics can be situated in the context of human well-being and health. The ultimate, intrinsic goal of sustainability agenda is arguably to lengthen the human survival and well-being. Green building standards such as LEED or BREAM bring health into one of its key rating components which are represented in forms of air quality and thermal comfort. Pallasmaa points out that the traditional Western approach to aesthetics that focuses solely on visual aspects has ignored other aspects of perception and therefore has underestimated the human aesthetic experiencing capacity (Pallasmaa 1996). Several authors make the case of how aesthetics is directly related to human well-being because it is integrated in all we experience (Birgit Cold ed. 2001). The mainstream (air and temperature) parameter of human comfort could not fully account to what make human feel fulfilled.

Some authors from the fields of architecture and landscape design articulate the environmental aesthetics through the lens of their profession. One position argues that aesthetics of the built environment should be studied in a more holistic broader scale of "megaform" which is defined (as opposed to object-form) as a complex one that extends horizontally rather than vertically, not a freestanding but rather as a continuation of

surround topography and it is oriented toward the densification of urban fabric. The understanding of aesthetics as a property of individual object-form with the advocacy of shape as an end to itself should be replaced with the aesthetics of "megaform" that lies in the inter-relation with context (Frampton 2011). Another position delineates specifically four types of aesthetics-oriented prototypes of future sustainable landscape in a human-dominating world: traditional cultural landscape, spontaneous landscape, urban-industrial landscape, and rural functional landscape. These prototypes respectively respond to four aesthetic perceptual categories i.e. the beautiful, the new sublime, the interesting, and the plain (Nohl 2001).

B. ECOLOGICAL AESTHETICS

This group of positions is based on the premise that aesthetics is analogical to ecology in terms of how they operate. If aesthetics concerns perception and response through the senses encompassing all various modes of being, and if ecology is the inter-dependent network of actors, then aesthetics and ecology is similar in the essence of the exchange of elements. Both of them are the constant give and take amongst all beings (Erzen 2004). As a result, this aesthetic preference is highly influenced by the rhetoric and principles of ecology concerning interdependence, dynamics and process.

There are two approaches to ecological aesthetics, formalistic and process-oriented. The formalistic ecological aesthetics focus on visual expression that reflects the perceived notions of inherent nature's formal quality, either in rhetoric or in literal organic form. One position proposes three principles of formality - *inclusive unity, dynamic balance, and complementarity* - as an ecological paradigm of aesthetics (Koh 1988). Another position states that if a building intends to act differently and sustainably, its formal expression should also act differently – it should look "green" no matter how rigorous or successful the architecture pursues its "green" agenda. Often times, the

architect's chosen architectural language is organic, curving, free-form shapes which are alien from conventional architectural typologies (Yeang 2006).

The process-oriented study sees the purpose of aesthetics appreciation is to gain the in-depth knowledge of the underlying ecological patterns and processes of object / phenomenon being observed. The aesthetics of modernization and industrialization fuels the perpetual seeking of appearance novelty, over-consumption, and environmental destruction. Thus one position suggests that authentic aesthetics of sustainability should be the "subverting aesthetics" which is able to reveal and respond to the actual processes of both previous unsustainable practice and the potential positive practice. It focuses on depicting relationship of elements rather than the normative beauty as an end goal (Hill 2011)

C. PERFORMATIVE AESTHETICS

The major proposition of this group of ideas is that aesthetics of the "objects" in question is inherent to its own internal function and operation. Its aesthetics closely relates to its purpose and its context. Therefore, if something yields an aesthetic quality of sustainability, its formal expression should be perceivable and understandable that its serves and fits such function and purpose of being sustained. For example, a green building should have the appearance relating to "green" strategy instead of producing a conventional form that is indistinguishable from other unsustainable types.

There are multiple positions and practices that reflect this kind of aesthetics. Generally they can be categorized into two main approaches: designed performative aesthetics and natural derivative aesthetics

The designed aesthetics approach puts primacy on the human creative capacity to generate formalistic solution that performs well based on the scientific study and simulation. Hosey draws from multiple scientific researches where forms can enhance

conservation, comfort, and efficiency at every scales of design, from products to buildings to cities. Aesthetic attraction isn't a superficial concern because there is no distinction between how things look and work (Hosey 2012). Similarly, particularly in the architecture field, there is inversion sustainability model, a paradigm that pays primacy to form rather than additive systems. In this model, forms affect the thermodynamic behavior in a fundamental way. In contrast, in the conventional additive paradigm, performance is achieved by putting more active strategies upon the passive system and architecture form. This inversion paradigm implicates that building's appearance could overcome its superficiality toward a more performative quality (Abalos 2009).

The second approach, the natural derivative aesthetics, depends on nature models and precedents to generate formalistic solution which is also supported with the scientific validation. The connection between function and appearance is based on the fact that natural apparatus can provide the effective guideline for humans to create their own built environment. Such idea conveys the implicit universal aesthetics - the superior beauty of nature. One field of nature study that is largely applied to human use is bio-mimicry. Biomimicry studies nature's best ideas - photosynthesis, brain power, and shells - and informs our revolution to harness energy and repair the environment (Benyus 2002). Likewise, the solar geometry can advise the production of natural forms that not only satisfies incidence and thermal performance but also engages in dialogue with nature in terms of shapes, rhythm and beauty (Knowles 2011).

3. Eco-tourism:

A. DEFINING SUSTAINABLE TOURISM

The principles of sustainability can be applied to any type of tourism – mass tourism or specialty; city, beach, or wilderness; large or small. They also can be applied to all sectors of the tourist industry: lodging, tours, agencies, ground operators, guiding, and transport. However, the degree of success in applying those principle varies between one tourism activities from the others.

There are several official yet similar definitions of sustainable tourism. According to *Agenda 21 for the Travel & Tourism Industry*, "Sustainable tourism products are products which operate in harmony with local environment, community, and cultures, so that these become the permanent beneficiaries" (Mohonk Agreement, 2000). The World Tourism Organization (WTO) declared that sustainable tourism is "envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems." (WTO 1988).

Specifically, in "Making Tourism More Sustainable: A Guide for Policy Makers" (United Nations Environment Program – World Tourist Organization, 2005), twelve aims for making tourism sustainable are delineated as economic viability, local prosperity, employment quality, social equity, visitor fulfillment, local control, community wellbeing, cultural richness, physical integrity, biological diversity, resource efficiency, and environment purity. Among those aims, some directly relate to the thesis topic of sustainable aesthetics (visitor fulfillment) and others are partly implicated (biological diversity, cultural richness, physical integrity, environment purity).

B. DEFINING ECOTOURISM

Ecotourism is a sector of sustainable tourism, based on “nature travel” and including the principles of sustainability. It is most succinctly defined as "responsible travel to natural areas that conserves the environment and improves the welfare of local people” (International Ecotourism Society 1991). Whatever definition is used, ecotourism should have positive impacts on both natural areas and the local community.

Ecotourism has the following seven characteristics:

- Involves travel to natural destination: These destination area often remote areas, whether inhabited or uninhabited, and are usually under some kind of environmental protection at the national, international, communal, or private level.

- Minimize impact: Ecotourism strives to minimize the adverse effects of hotel, trails, and other infrastructure by using local material, renewable energy, recycling waste, environmentally and cultural sensitive architecture design, responsible visitor behavior,…

- Builds environmental awareness: Ecotourism means education, for both tourists and residents of nearby communities.

- Provides direct financial benefits for conservation: Ecotourism helps raise funds for environmental protection, research, education.

- Provides financial benefits and empowerment for local people: The local communities must be involved with and receive income and their tangible benefits from the conservation area with tourist facilities.

- Respect local culture: Ecotourism is less culturally intrusive and exploitative than conventional tourism. Responsible ecotourists should learn about local customs, respecting dress code and other social norms.

- Support human right and democratic movement: Ecotourism contribute to international understanding, peace, prosperity, and universal respect for and observation of human rights and other fundamental freedom.

(Honey 2008)

C. CURRENT DEVELOPMENT OF ECOTOURISM:

Light green vs. dark green tourism

There is a considerable debate over the meaning of sustainability (and sustainable tourism in particular). A widely accepted and detailed model of sustainable tourism will likely never appear. Therefore, it is necessary to avoid the banal rhetoric of “balance” and theoretical construct of such concept. Different sustainable tourism pathways are described: light green (LG) and dark green (DG). A range of attitudinal tendencies with respect to tourism and environment, a summary of two variants of sustainable tourism is shown in in the following table (Hunter 2002)

Light green tendencies	Dark green tendencies
Advocate and strongly pro-adaptancy	Cautionary and knowledge-based
Benefits of tourism assumed	Benefits of tourism must be demonstrated
Previous view of tourism as a sector and sectorial self-interest dominates	Tourism need not necessarily be a component of sustainable development. Sectorial integration required
Maintain tourism activities in existing destinations and expand into new ones	Widen economic base if high dependency on tourism and engage in full proactive assessment of new tourism development
Tourism products must be maintained and evolve according to market need, with nature as a commodity	Natural resource must be maintained and impacts minimized with products tailored accordingly
Environmental action only when required and beneficial	Environmental impacts always considered as a matter of routine
Narrow scope and geographical scale of environmental concern	Wide range of potential and actual impacts considered beyond immediate geographical settings
Disperse and dilute activities	Focus and concentrate activities
Industry self-regulation as dominant management approach	Wide range of management approaches and instruments required
Introspective focus on tourism research	More likely to reinvent the wheel
Likely to have a direct involvement in the industry	Likely to have training in an environment-type academic discipline

Table 2.2: Comparison between light and dark green tourism

The risk of "green-wash" tourism

While in the 2000s there has been considerable progress in deepening the practice of ecotourism, expanding its breadth, “greening” mainstream tourism, and setting solid standards, “light green” tourism still remains far too uncertified. Much of what is marketed as ecotourism is simply conventional mass tourism wrapped in a thin veneer of superficial “green”. A sizable segment of the traveling public wants this light type of

tourism. In recent years, there has been a gradual trend for many travelers to go to ecotourism destinations to be, unfortunately, less intellectually curious, socially responsible, environmentally concerned, and politically aware in the past. Therefore, being poorly planned, unregulated and overhyped, "light green" tourism can bring only marginal financial benefits but serious environmental and social consequence for the target destination.

The travel industry's efforts to water down ecotourism, to sell "light green" tourism in exchange for short-term profits, led some travel experts to drop the word ecotourism as dismissing the concept as a fad. Yet to abandon the concept because of its misuse or confusion is a bad treatment of a practice that is still in its infancy. What is important is to view ecotourism as a set of principles and to monitor and measure them in practice. Identifying what is "light green" tourism and determining where genuine ecotourism is being practiced today help us to come up with a broad set of principles and practices that transforms the way we travel (Honey 2008).

The intention of this thesis is similar to Honey's claim. Studying aesthetics in authentic ecotourism cases is one way to criticize the superficial, appearance-based aesthetics and to identify the correct and deep notion of beauty, one loaded with structures, information, meanings, and purposes. And hopefully, knowledge gained from ecotourism design can help us to set up broader principles for designing a sustainable environment and transform the way we perceive that environment.

Ecolodge

According to The Ecotravel Center, a service of the Conservation International Foundation, the term ecolodge can be defined as "an industry label used to identify a nature-dependent tourist lodge that meets the philosophy and principles of ecotourism."

Ecolodge is the label to call any type of tourism accommodatin facility – *ecolodge, eco-resort, eco-village, eco-camp, sustainable recreational community, etc.*

According to The International Ecotourism Society (TIES), an ecolodge should do the following (but not limited to):

- Provide comfortable rooms and common areas that reflect the designs and heritage of the local culture
- Offer a natural setting that has been carefully preserved and contains local plant life
- Use locally harvested and sustainable and/or recyclable building materials
- Purchase food from local farmers
- Use environmentally-friendly energy, water and waste systems
- Offer opportunities for interaction with local owners, managers, staff and guides

  (Source: https://www.ecotourism.org/)

According to Mehta, an eco-designer, with his extensive visits to multiple ecotourism destination and facilities, ecolodge could be defined as following:

> "a two-to-seventy five-room, low –impact, nature-based, financially sustainable accommodation facility that helps protect neighboring areas; involves and helps benefit local communities; offers tourists an interpretive and interactive participatory experience; provides a spiritual communion with nature and culture, and is planned, designed, constructed, and operated in an environmentally and socially sensitive manner." (Mehta 2010)

He then develops the criteria for evaluate the sustainability of an ecolodge, including three main principles as following.

- Nature must be protected and conserved
- Local community must benefit through community outreach program and education program

- Interpretive programs must be offered to educate both tourists and employees about the surrounding natural and cultural environments.

Other additional criteria of ecolodge according to him are:

- Use alternative and sustainable means of water acquisition and at the same time reduce overall water consumption
- Meet its energy needs through passive design and renewable sources
- Provide for careful handling (reduce, refuse, recycle, reuse) and disposal of solid waste.
- Use environmentally friendly sewage treatment systems
- Fit into its specific physical and cultural contexts through careful attention to form, landscaping, and color as well as through use of vernacular architecture
- Use environmentally friendly building and furnishing materials
- Have minimal impact on the natural surroundings and utilize traditional building technique during construction
- Endeavor to work with the local community, including community members, wherever possible, in the initial physical planning and design stage of construction

(Mehta 2010)

III. METHODOLOGY:

My ontological position in this research is constructivist in which there are multiple socially constructed realities. There is not a specific abstract meaning of sustainability or aesthetics that we can total have consensus on. Instead, in the case of this research, each sample of unit of analysis, i.e. designers and theorists, has his own assumption and framing of the topic depending on their social standing, experience and knowledge. Therefore, the connection between sustainability and aesthetics in architecture, if there is any, would be in plural form.

My epistemological position is an interpretive in which the findings are created by the researcher's understanding of the units of analysis while he attempts to make sense and organize the studied ideas. In other words, as a researcher I stay within the ideology, or frame of interpretation, of people operating in the architectural discipline. This still holds true when I may succeed to remove my own biases formed by my precedent education and professional practicing as an architect while investigating the topic.

1. A priori analytical framework:

It is important to note that sustainability / sustainable architecture is not a rigid concept but rather a continued "social construct" (Moore 2011, Guy & Farmer 2001). Likewise, the complexity arising from the fluidity of meaning combined with difference of uses in multiple disciplines leads to enormously wide definitions of aesthetics (Lee 2011). After all, they are buzzwords of which concrete definitions are not always helpful for us to understand and apply. Therefore, similar to thousands-years-old concepts such as "truth" and "love", rather than to define each concept alone, we should let their meanings emerge out of surrounding related concepts (Benedikt, 2011) as well from the dialectical relationship between them when we investigate closely.

I utilize the category of concepts of sustainability from Paul Thompson (see "Defining Sustainability" part) and category of concepts of aesthetics from Allen Carlson (see part II.2.a). They both use the binary framework to organize the discourse and they can be useful to study the relationship between two concepts concurrently – sustainability and aesthetics.

I hypothesize that those two concepts can be categorized into two main positions: *positivist / objective and constructivist / subjective position*. Sustainability could be either substantive, empirically evidenced one or non-substantive, social, and political one. Aesthetics can be perceived as cognitive, conceptual, knowledge-based beauty or as non-cognitive, experiential, emotive beauty. Two concepts along with two major positions for each concept, they form a 2x2 matrix of "frames" (Table 3.1). The goal of setting up this framework is not to label one particular position into one of the frame in a fixed way. Rather, this framework serves as a heuristic device for analysis, for breaking down the meanings in investigated positions.

Analytical framework	**Positivist frame**	**Constructivist frame**
Sustainability	Substantive	Non-substantive
Aesthetics	Cognitive	Non-Cognitive

Table 3.1: A priori analytical framework of relationship between aesthetics and sustainability

2. Research structure and methods

There are three components that are subjected to analysis in regards to their cross-relationships: a priori analytical framework, literature about sustainable aesthetics, and

practical examples of ecolodge design. Each of these components emerges from different grounds. The first component, a priori analytical framework, is set up based on the general observation of theories of sustainability and aesthetics. It is established as dialectical model: cognitive vs. non-cognitive aesthetics, and substantive and non-substantive sustainability. The second component, literature review, as discussed briefly in previous section, derive from and synthesize the writings of several major authors who discussed specifically about the alternative aesthetics. The third component, design examples, is the collection of real practical cases of ecolodge that I analyze in several aspects.

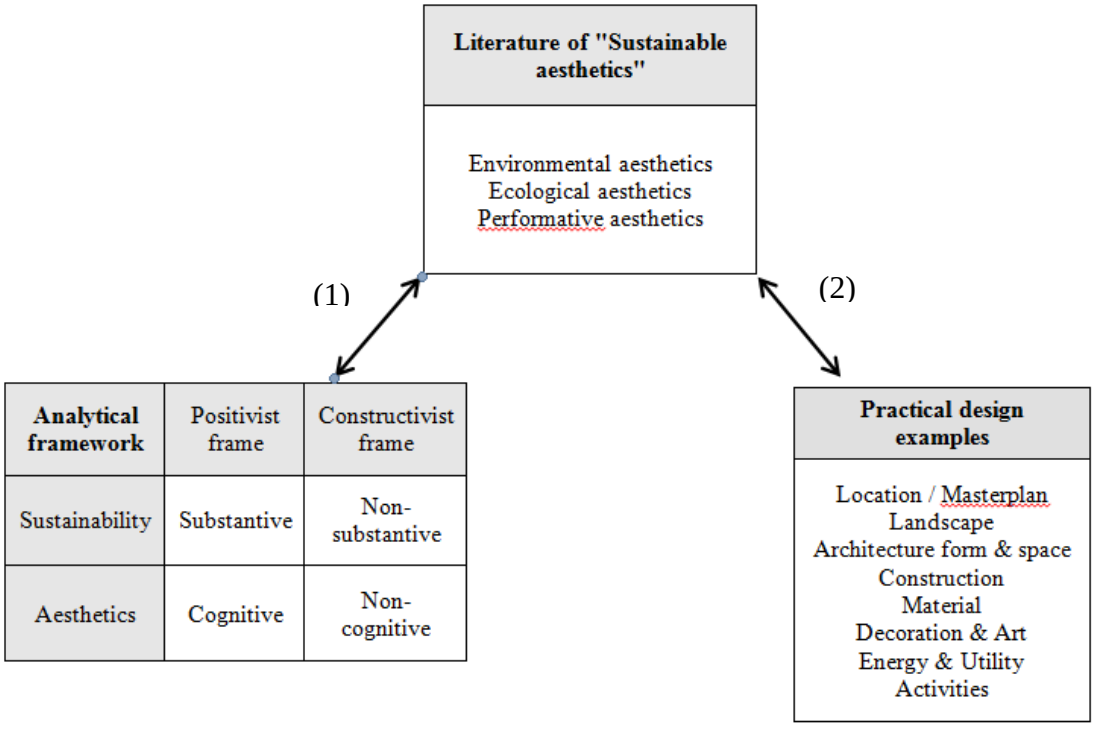


Fig III.2.1.1: Research method diagram

The research structure is presented in the diagram (Fig III.2.1). The two arrows represent the first two main research questions (see part I). For the first question, the thesis reviews and synthesizes the writings of authors who discussed about the alternative aesthetics, and analyze implication of those aesthetics in relation to sustainability. For the

second question, the thesis uses the found and analyzed theories of alternative aesthetics as lens through which the examples / precedents of ecolodge design are gathered and organized in a cohesive manner.

My main methods of inquiry are literature review and logical interpretation. Literature review aims to identify the sources of existing literature and precedents, to summarize their facts and ideas, to critically evaluate and compare them in the relations to other sources, and to enframe them into themes and organizational structure. I use logical interpretation to translate either the explicitly articulated ideas pertaining to aesthetics and sustainability in design, or implicitly stated ones that does not necessarily speak directly with concepts of aesthetics and sustainability per se. In all, the literature review and the researcher's interpretation are simultaneously utilized in the process of synthesizing theoretical and real-case sources.

It is also important to note that, while the overall methodological structure might stay the same, each component can be updated overtime based on the development of the study. More authors would explore new aspect and branches of sustainable aesthetics; more projects, not restricted to ecolodge, will be successfully designed and built. But such development, I argue, could only further reinforce the close interconnection of aesthetics and sustainability, in theory and practice. The proposed methods then should be considered to be basis for future similar analysis.

Literature theories of aesthetics are gathered from the articles and books in the relevant design and aesthetics philosophy. Such documents can be retrieved from books and periodicals collection of university's library, from specialized search engine such as Avery Architectural Index, and from the Internet sources.

Besides, the ecolodge examples presented in this thesis are gathered from the following types of sources: design books and magazines, Ecotravel guidebook and

magazines, Internet sources, the researcher actual visit of the project, the researcher's work as a fellow in Hart Howerton Partners, NY.

The examples are founded in project-basis, but then for the purpose of the deep and systemic analysis, they are deconstructed into several main design aspects: location / masterplan, landscape, architecture form & space, construction & material, energy & utility. This method is also useful for the potential development of the thesis into an ecolodge guidebook / catalogue which could serve as a starting point for anyone interested in design an aesthetically sustainable place. However, this method by no means implies that those design aspects are entirely separated and each aspect can be considered exclusively in the process of design. In fact, design is not less than a synthesizing practice and this potential proposed guidebook format does not attempt to discount that premise.

3. Other assumptions

First, I assume that architectural designers and theorists are reliable and representative sources of knowledge when it comes to assess the architecture in terms of aesthetics and sustainability considerations. This assumption omits the knowledge that emerges from other important social groups who also take part in constructing our built environment and judging the architectural works. Public may not understand aesthetics and sustainability sides of architecture in the same way that practitioner and scholars presents in the process of research and designing. Rather, they have their own way to understand in the process of building real things, real-world perception and getting directly affected by architectural works.

Second, the method that I conduct my research is deductive “a priori” in which I initially formulate a frame of analysis and then interpret the data within such guiding frame. While this method can produce findings with significant degree of generalization,

it might miss out some information that is not "fit" within such frame. However, as mentioned in previous research method section, this framework only means to serve as a heuristic device for analysis, for breaking down the meanings in investigated positions.

Third, I assume that the success of ecotourism projects in large part is attributed to their aesthetic quality: experience, service, visuals, etc. Most of the ecotourism projects that I discuss are considered successful in terms of financial health, market appealing, and professionally recognized. However, although there are many literature and arguments that draw connection of aesthetics to ecotourism success, there is not a quantitative, measurable analysis of to what degree the aesthetics contribute to the resulting success.

IV. ANALYSIS & DISCUSSION:

1. Analysis of sustainable aesthetics:

In this section, I analyze current literature on several discussed branches of aesthetics theory to surface their implications, both explicit and implicit ones, to issue of sustainability in general. Other words, here I expand answer to the first research question: *How do the alternative aesthetics rationales relate to issues of sustainability?*

A. ENVIRONMENTAL AESTHETICS

Douglas Porteous: Aesthetics of historical and cultural settings

Porteous are active in researching on environmental aesthetics and specifically aesthetics of nature. He proposes his own diagram of four approaches to understanding aesthetics of the environment, including Humanist, Activist, Experimentalist, and Planner (Portetous 1982). The approach pursues major philosophical goals: rigor (whereby scientists have attempted to emulate as closely as possible to their positivist, natural science colleague) and relevance (pursued by those concerned with applicability and policy-making). Using two criteria as axes on the graph, four distinct but interconnected approaches to the investigation of environmental aesthetics are located relatively to the axes. Accordingly, activists and experimentalists often times find themselves at the either end of criteria, while humanists and planners are at more intermediate location; yet, the balance of extreme rigor and relevance is still non-existent.

He argues that "quantitative and applied pursue of experimentalists (positivist researchers), activists and planners are inextricably grounded in the ideas generated by humanists' works" (Portetous 1996, p.47). The humanist approach is non-positivist, hermeneutic, idiographic and sometime phenomenological. The activists and planners approach is action-based and evidence-based. In other words, rationalization that gives ground for human action actually links closely with his aesthetic perception. This

observation reinforces the thesis's idea that in order for sustainable practice (mostly activism, design and planning) to take place, aesthetic perception of sustainability needs to be promoted as well.

Specially, Porteous believes in the role of the collective cultural precedence to inform an environmental aesthetics. He argues that social consciousness takes precedence over individual conspicuousness; "beauty is in the eye of the beholder" does not apply. This position is justified by his study of cultural roots of aesthetics behavior which traces the historic trend in natural landscape taste. Then he suggests that human collectively appreciates the landscape because of the essential temporality of "currents of taste", such as the rise and fall of Western appreciation of mountain and wilderness. This observation of environmental aesthetics can be questioned given its hedonistic standing. It leads to the exclusivity of exceptional or intact landscape in human nature appreciation and leaves out other more "banal" environments that in fact require more attention of sustainable repairing.

However, from historical and cultural standpoint, this observation of human collectivity would seem to correctly suggest the approach to sustainability. Behavior towards sustainability requires the collective human action, not separated effort, and to mobilize such human collective force through aesthetics impulse (among other social, political and economic impulse), we need an aesthetic consensus. It is general consensus of kind of action or environment which is voluntarily agreed upon to have value based on people's collective aesthetic perception. For example, if the sprawling suburban may be seen as unbearably "ugly" by citizens, that perception makes way for their transition of behavior and their effort to put pressure on policy maker to revitalize the area or to re-conceptualize future urban development plan. Collective aesthetics has a cultural and historical root. For example, Traditional Neighborhood Development - TND - gained momentum and justifies itself as an alternative sustainable model. It is not because of its

theoretically proven efficiency (like Transit Oriented Development - TOD), but rather mostly because of the society's surviving aesthetic attachment to the beauty of traditional, small-scale, humane townscape (Bressi 2002). Many other position of regionalism, of the notion of locality responds nicely with Porteous's pro-culture position.

In short, his theory of aesthetics has the following main implications for issue of sustainable design. First, he stresses the importance of non-cognitive aesthetics consensus in allowing sustainable product to work in reality. Second, sustainable design should ground on historical, cultural, and even religious traces if it is to be aesthetically accepted in the society at large.

Arnold Berleant: Aesthetics of engagement

Arnold premiers one of the leading non-cognitive approaches called the *aesthetics of engagement*. He argues that the theory of disinterestedness involves a mistaken analysis of aesthetic concept and that this is most evident in the aesthetic experience of natural environments. To his observation, disinterested appreciation, with its isolating, distancing, and objectifying gaze, is out of place in the aesthetic experience of nature, for it wrongly abstracts both natural objects and appreciators from the environments to which they properly belong and in which appropriate appreciation is achieved. Instead, the aesthetics of engagement stresses the contextual dimensions of nature and our multi-sensory experience of it. To view the environment as a seamless unity of elements is to challenges the importance of traditional dichotomies, such as that between subject and object. The aesthetics of engagement beckons appreciators to immerse themselves in the natural environment and to reduce to as small as possible the distance between themselves and the natural world. In short, appropriate aesthetic experience is held to involve the total immersion of the appreciator in the "object" of appreciation (Berleant 1992 1997 2005).

He vividly describes what it is to experience the environment aesthetically, which is foremost the quality of engagement, in the following texts:

> "The aesthetic environment is not merely a pleasing scene that lies before me as a distant view or an object framed in binoculars or bordered by the parapet of a viewing platform. It is everywhere, all about me. It includes not only what lies before my eyes but what is behind my back, beneath my feet, above my head. The aesthetic environment is not constituted primarily of visual objects: It is sensed through my feet, in the kinesthetic sensations of my moving body, in the feel of the sun and the wind on my skin, in the tug of branches in my clothing, and the sounds from every direction that attract my attention. The aesthetic environment is not merely a generalized sort of perceptual awareness… Out of these perceptual encounters emerges a rich understanding of interconnectedness; no, more than this, a living sense of the actual continuities that bind my conscious body to the places I inhabit, even if briefly. This is aesthetic engagement, and the environmental perception can exemplify such experience clearly and forcefully." (Berleant 1992, p.27, 28)

The most important implication of Berleant's aesthetics of engagement to the issue of sustainability is the concept of connectedness to a place. On one hand, engagement to an environment is critical to develop one's sense of connection to a place, whether it is a beautiful natural scene or a degraded suburban forest. Aesthetics of engagement get away from the normative notion of aesthetics as pleasurable beautifulness and advocate a holistic and truthful beauty of human interaction with his environment. On the other hand, sense of place or attachment to an environment is argued to support sustainability. For example, valuing a place can help us to create an intentional community of people dedicated to that place as an extension of theirs, and that community effectively practices a kind of secular environmentalism that protect not only the natural resources but also the everyday way of life (Light 2010). Valuing a place is also meaningful in the place-based education which explores and fosters the local cultural and geographical knowledge as the foundation for sustainable actions (Semken 2010). In short, the aesthetics of engagement promote the sustainable behavior through connectedness to place and education of local place’s values.

Another implication of Berleant theory of aesthetics is about human interaction with the surroundings according to his perception of what kind of condition that happen around him. Instead of about emotion and moral people's link to the environment (connectedness), because there is a direct and immediate impact of environment on human body due to high quality of engagement, he is incentivized to respond reflectively and actively to the changing condition of the environment. That reflexive and responsive human behavior is one of the factors that make a place sustainable. The assumption is that the modern automation has decoupled humans from their immediate environment by multiple devices: air conditioning, artificial lighting, etc. However, to maintain such autonomy, the artificial systems need to feed on large amount of energy and resource (mostly not renewable) for their continuous operation. The result is the perpetuation the human's dependency on his system and declination of natural asset, which is without doubt unsustainable. An active role of human on changing its own environment through the feed-back interactive mechanism can help to divert the vicious cycle of human atomization and environmental degradation. For example, when the sun light penetrates house's windows if a house, the tactile feel of the solar heat on the body, besides its aesthetic effect, also acts as a signal of rising temperature and inform the body to respond by adjust the shading louver, dimming the light, or open the windows for ventilation.

In short, there are two main implications for sustainability from Berleant's literature. The aesthetics of engagement could encourage the responsible behavior through human direct reaction to environment changes. It also could activate the people's commitment to protect the place due to their connectedness to it and to assist the education of local place’s values which inform an appropriate approach to sustainability.

Allen Carlson: Natural environmental model

Allen Carlson does one of the most comprehensive literature reviews of environmental aesthetics. His position regarding this topic is a cognitive approach called

natural environmental model. This model holds that just as serious, appropriate aesthetic appreciation of art requires knowledge of art history and art criticism, such aesthetic appreciation of nature requires knowledge of natural history—the knowledge provided by the natural sciences and especially sciences such as geology, biology, and ecology. The idea is that scientific knowledge about nature can reveal the actual aesthetic qualities of natural objects and environments in the way in which knowledge about art history and art criticism can for works of art. In short, to appreciate appropriately and aesthetically nature "on its own terms" is to appreciate it as it is characterized by natural science (Carlson 1979, 2000, 2007).

This model, though falls into the category of environmental aesthetics, is in direct opposition to *mystery model, engagement model or arousal model*. These opposed model emphasizes the automatic aesthetic effect of nature upon our perception and our metaphysical incomprehension of nature as the authentic source for appreciation. In contrast, the natural environmental model states that the development of the aesthetic appreciation of nature has been closely intertwined with the growth of the natural science. In the same time, the issue of sustainability, either substantive or non-substantive approach, always links to the notion of the continuation of physicality, not the perpetuation of metaphysical or mythological state. Then it would be logical that, in order to draw connection from aesthetics of the environment to sustainability issue, aesthetics should inevitably deal with the physicality of object of appreciation. Natural environmental model is an approach to address this logic.

Natural environmental model essentially asks us to inspect and appreciate the environment in an active manner. The engagement or arousal model requires us to immerse ourselves into the setting and let our senses work and evokes the aesthetic emotion. In other words, environmental elements are perceived inattentively as background ambience as. Instead, Carlson argues for a mode of perceiving environmental

elements as a foreground, since we cannot take in everything in the same moment. And by attentively select elements to investigate and appreciate, specific knowledge about the objects is crucial to fully enjoy them. For example, in order to appreciate pastoral scenery, we need to distinguish the cloud from the house's smoke, the smell of the hay from smell of pesticide, the sound of the wind from the car noise, etc.

One implication of Carlson's cognitive model of environmental aesthetics is applied aesthetics. One example is the aesthetics of positive pristine scenery. On one hand, nature in its pristine state is an aesthetic ideal that appeals to people in their most common sense. On another hand, as science increasingly finds some positive characteristics of nature like unity, order, harmony, the nature itself in light of such scientific knowledge appears even more beautiful. Thus, at some point of human understanding of nature, the balance between aesthetics of intuition and common sense and aesthetics of understanding and knowledge would appear. This kind of aesthetics turns away from the irrelevant preconceptions and towards the real content of objects of appreciation. It is similar to the fact that sustainability agenda calls to come back to the essence of many regards, such as a return to a productive "real" economic, rather than cycles of economic bubble (Foster & Magdoff 2009).

Another implication of the natural environmental model is directly environmentalism. Environmentalism is often condemned to be anthropocentric, as not only anti-natural but also or disdainful of environments that do not conform to artistic and cultural ideas. Those environments could be a brown field, a grey field, and an urban slum. Since the model bases its aesthetic appreciation on scientific views, it helps environmentalism with a degree of objectivity and it repels aforementioned criticism. Those seemingly disdainful environments deserve to receive more attention for reevaluation and revitalization instead of being abandoned for good. Moreover, in a world increasingly engaged in environmental assessment that is critically responsible for

accounting natural resource and regulating the voracious natural exploitation process (Therivel 2013), an objective model of environmental aesthetics is even more relevant.

B. ECOLOGICAL AESTHETICS

Ken Yeang: Tropical ecodesign aesthetics

Yeang is interested in searching for eco-aesthetics. He is influenced by the Kenneth Frampton's ideas of "critical regionalism", whereby architecture arises naturally out of a singular place and time in coalesce with technological advancement. Climate, topography, latitude, ecology and prevailing weather conditions will force a particular design approach which will inevitably guide the aesthetics of a building down a particular regional path. However more than that, he is determined to celebrate the ecological credentials of his buildings - if a building intends to act differently, it should look different. And no matter how green or technological the building is, that difference begins to shape aesthetics on their own. In the case of most of his works, that aesthetics is closely related to the organic forms and presentation of ecosystem (water, vegetation, fauna …). He celebrates the organic gesture (curving, complex and asymmetrical geometry, permeability and fuzziness of mass and surface) which does not necessarily originate from ecological requirement. He also introduces a kind of tropically induced lyricism, with vegetation and water "parasites" to the building (Fig IV.1.b.1).

Fig IV.1.b.1: Tropical ecological aesthetics in Yeang's works. Source: Hart 2011

The implication of this aesthetic philosophy of ecodesign is apparently connected to sustainability. Most of his architecture language, but not all, is the result of performative consideration. For example, a curving internal street or light well inside the building acts as a wind-tunnel that induces natural ventilation and evaporation; the presence of vegetation inside the building helps improving the thermal comfort, either in terms of latent cooling with trees evaporation, or in psychological term by creating pleasant verdant scenery among “cold-stone” structure.

His belief in this type of aesthetics is also based on the prevalent premise of the role of the economic force and ethical power for the growth of ecodesign. He is comfortable with the idea that green architecture is something which has to be paid for, which can accrue value and which, ultimately, depends on the commitment and moral backbone of the developer (Hart 2011). Moreover, besides the role of the developers and the client who have the agency for major buildings, the user also plays important role in changing toward the alternative course. Culture of excessive consumption in developed countries is responsible for the state of ecological damage on the planet; therefore, changing lifestyle is the most effective way to reduce environmental impact. It is critical to produce environmentally friendly products that are so attractive that people want to use them. Sustainable architecture delivers the message of "changes we can believe in". While some changes are quantifiable for us to be compelled, most of criteria of determining whether a change of environment is worth living in or not are left to experiencing the appropriate and positive architectural language (form, proportion, material, color) (Sauerbruch 2011).

However, this approach to ecological aesthetics can be criticized to fall into the trap of the previous modernist architecture – the objectification of architecture piece. It is true that the eco-aesthetics that Yeang envisions celebrates a lot of natural elements and inspiration, but its ultimate goal of such integration between natural entities and the built

entities is still embracing individual architecture piece. The best example is the brand that Yeang has earned as the world's innovative designer of eco-skyscraper. Despite his rhetoric of a tower ecologically integrated to the ecosphere, it is still hard to argue for the authentic effect that series of green wall or sky-court trees and garden can have on the actual thermal and air quality and biodiversity of the tower. Eco-skyscraper itself becomes objectified, a celebration of human novelty, less than the integral piece of the ecosystem. Some might even go further to point out that such artificial innovation is also a green-washing device that perpetuates the symbol of corporation and human dominance – tower building.

Jusuck Koh: Three principles of ecological aesthetics

He criticizes much of the basic design literature for still dealing with such principles as unity and balance as primary forming principles. He agrees that phenomenological aesthetics correctly regards such approach as object-centered, appearance-oriented and that the very nature of aesthetics quality lies not in the objects itself but in the totality of human experience of the objects. To advocate for a kind of ecological aesthetics that can explain both artistic and natural beauty, he proposes three principles: *inclusive unity*, *dynamic balance, and complementarity*. The advantage of using these principles is twofold. First, they are linked to traditional aesthetics and design principles of unity, balance and contrast. Second, they relate to contemporary scientific theories of the forming principles of nature – it is not as much on the form and structure of objects or environments per se as on their interrelation, the design of human-environment systems. (Koh 1988)

These three design principles are different from the traditional notions of unity and balance. Inclusive unity denies the distance and duality between the subject and the object, between humans and nature, between order and disorder. In the past, exclusive unity has been a useful design principle to create such qualities of form and structure as

proportion, symmetry, vividness, organic wholeness, intent without purpose, and pervasiveness, as well as theme and variation. Inclusive unity of built structure with people and place explains these same qualities and, furthermore, reflects contextual harmony and empathy. Balance in the traditional sense refers to the static balance of form, to equilibrium in the development of a system; it is static in that it implies the desirability of maintaining an existing state. But there is a different kind of balance: a dynamic, qualitative, balance between opposing principles and qualities. This differs from the static, asymmetric balance of form in that it is a dynamic asymmetry of process. The last and the newly added principle – complementarity, speaks about the fusion between form and content, appearance and meanings, body and sense, etc.

This set of three design principles are linked to topic of sustainability in three major aspects. First, it explicitly considers the harmony between built and natural environment as the everlasting methodological approach for sustainable development. Second, it escapes the object-oriented thinking of design as fixed solution into a process-oriented approach that can adapt for constant change, an approach that is more suitable for dealing with a rapid changing and degrading environment. Third, it realize the aesthetics perception and cognition no longer a deterministic one-way process of stimulus – response, but as an active process of assimilation and accommodation, an interaction process that is fruitful for a responsible human behavior in regards to environmental changes.

Kongjian Yu & Herman Prigann: Aesthetics of process

Kongjian Yu, considered as the first Chinese ecological landscape architect, has a distinctive thought of how landscape aesthetics should be. First, he is anti-ornamental, anti-aesthete; he separates landscape beautification and truly aesthetic celebration of the land. He says about true beauty: "Beauty comes from the satisfaction of need. Culture is adaptation to nature. The sustainable solution becomes culture" (Yu 2013, p.9). In other

words, the true beauty is not found in the high-art for elites, e.g. Chinese small-foot, scenic paintings, and rockery garden. Rather, it is in the functional, productive, practical process in which normal people adapt to the nature for mutual human - natural benefits e.g. vernacular houses, paddy rice field. He calls that beauty is “big foot” aesthetic. (In imperial China, the women in cities were only considered beautiful and high-class if they have very small feet, and lots of them had to make their feet smaller in a very painful procedure. In contrast, rural women were not judged by that dogma). That kind of aesthetics, which was traditionally neglected in normative literature and social awareness, should be realized as the authentic and lasting beauty.

He does not believe in simple ecological preservation which ought to be ultimate natural ecology, leaving no carbon and by definition maintenance free. It is because the nature has changed – wilderness now failed to address human need, and because beauty lies in the sensitive work of human, a cultural response to nature, rather than simple preservation that is invisible to human perception. For example, the park along the Yonging River, China, has two layers: a natural matrix that overlaps with human matrix, the “floating garden”. The natural matrix is designed to receive flood water and provide wildlife habitat. The human matrix floats on top, providing amenities for public use. The goal is to develop an alternative flood control and management while still functioning as a park even in high water condition (Fig IV.1.b.2). In this case, the aesthetics is achieved due to the manageable change of water condition and intentional encouragement for human interaction with that ecological process.

Fig IV.1.b.2: Flood control park along Yongning River Park. Source: Saunders 2013.

C. PERFORMATIVE AESTHETICS

The implication of performative aesthetics to sustainability is self-explaining. It is a type of aesthetics that is based on practical data, study, and simulation to verify the positive implication of forms to performances, both in terms of function, construction, resiliency, efficiency, and economy. Following is the several examples of authors and designers that explore this notion of performative aesthetics.

Design aesthetics:

Functional aesthetics is a branch of aesthetic philosophy which places a central role to function. In this theory, Parson and Carlson distinguish between "beauty that emerges from function" (function is internal and part of beauty) and "beauty that is functional" (function is an external constraint; beauty contributes to its innate function). The authors adopt the *former* explanation, "beauty that emerges from function", stating that aesthetics should be a cognitively rich one, that there is a logical and internal process of translation from the function of the object of appreciation to the perceived aesthetics of that object. And this principle applies to both nature and artifact (Parson & Carlson 2008). The implication of this theory is that the only aesthetics that place the central role to function (utility, comfort, efficiency, etc) can be perpetually appropriate. Therefore, functional beauty ties very closely to performative aesthetics.

Forms now plays important role in determining long-term energy performance of a building. Architecture design in regards to its performance tends to fall into two kinds of paradigm: conventional additive and future inversion paradigm. *Additive paradigm* says that active system is added on top of passive system and initial architectural form. *Inversion paradigm* says the opposite - the architectural form determines the most significant part of building overall performance while the passive design implements the form and the active design is added at last to optimize the final result and provide greater flexibility and convenience. The premise of the inversion paradigm is that the form, the typology, and spatial configuration are the most lasting components of architecture and most effective to the structure performance, therefore it should be given the primacy in designing process (Abalos 2009) (Fig IV.1.c.1). In other words, performative architecture actually goes back to the "long life, loose fit" mantra. Inversion paradigm can truly integrate the formal aesthetics with the energy performance and it does so on the basis of different durability of different structure's members.

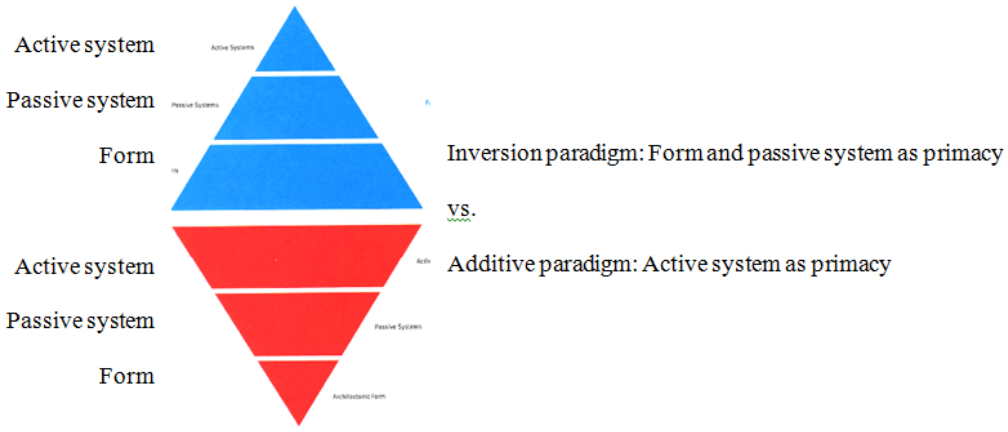


Fig IV.1.c.1: 2 paradigm of sustainable architecture. Source: Abalos 2009

Design of eco-skyscraper is a good example of this paradigm. In his design of Singapore National library, the floor plans shape is designed to respond to the solar geometry. Singapore is at the equator, thus the sun path is almost in the east-west

direction, and the north and south face is equally favorable. The floor plan is divided into two thinner planes orienting their long side to north and south direction. Solar diagram study calls to locate service functions (equipment, storage, elevator, restrooms …) to the west to screen the sun heat, leaving main space occupied by users such as reading room and public space open toward north and south. System of louvers are also on the east and west side to filter and reflect sun light. The simple yet carefully considered solution help the building drastically offset its energy used for lighting and air-conditioning (Fig IV.1.c.1).

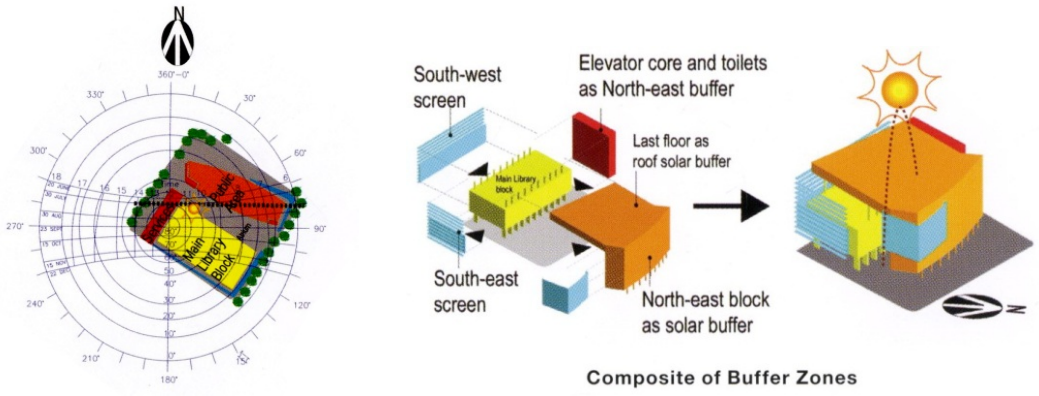


Fig IV.1.c.1: Sun analysis for Singapore National Library project. Source: Hart 2011

Other examples of designed performative aesthetics can be widely found in the 1930s-1960s movement of thin shell building with form-resistant structure. Several well-known architects and builders involved with that movement are Felix Candela (with concrete shell buildings) (Fig IV.1.c.2) and Eladio Dieste (with reinforced brick vaults) (Fig IV.1.c.3). Form-resistant structure is the structure structural quality of which is less dependent on material quantity but more accorded to the shape itself. For example, the catenary (hyperbolic cosine) vault found in concrete shell or catenary cable found in tensile bridge structure in theory requires the minimal material quantity because its components only resist one single type of force - compress or tensile force – and it is

evenly distribute along the force transferring path. In other words, the shape can make the structure span a great distance with a very thin and economic amount of material. It is the structure's geometry, not sheer material, that decide the structural quality. Other geometries following this approach include conoid, hyperboloid, hypars, "Gaussian" vault, etc.

Fig IV.1.c.2: L'Oceanografic by Felix Candela, Valencia, Spain

Fig IV.1.c.3: "Seagull" canopy structure by Eladio Dieste, Uruguay

Nature derivative aesthetics:

Bio-mimicry is the innovation inspired by nature. Bio-mimic study nature's best ideas: photosynthesis, brain power, and shells – and adapt them for human use. They are revolutionizing how we invent, compute, heal ourselves, harness energy, repair the environment, and feed the world (Benyus 2002). Scientist stir vats of proteins to unleash their computing power; analyze how electrons zipping around a leaf cell convert sunlight into fuel in trillionths of a second; discover miracle drugs by watching what chimps eat when they're sick; study the hardy prairie as a model for low-maintenance agriculture; and more.

Architecture is a new front of bio-mimicry in which it deploys thermodynamic strategy or efficient structure analogous to natural system. One example is the Melbourne

Council House 2 (CH2) designed by DesignInc Architects. Multiple passive design strategies are established based on the ventilation scheme of termite mount in the same time with boasting distinctive formal feature. Five lightweight fabric “shower towers” were placed on CH2′s south façade. They induce air movement and cooling through a shower of water that falls from the top of the tower, pulling air in and cooling it in the process. The cold air at the bottom of the towers are then flooded into the first floor of the building. (Fig IV.1.c.4)

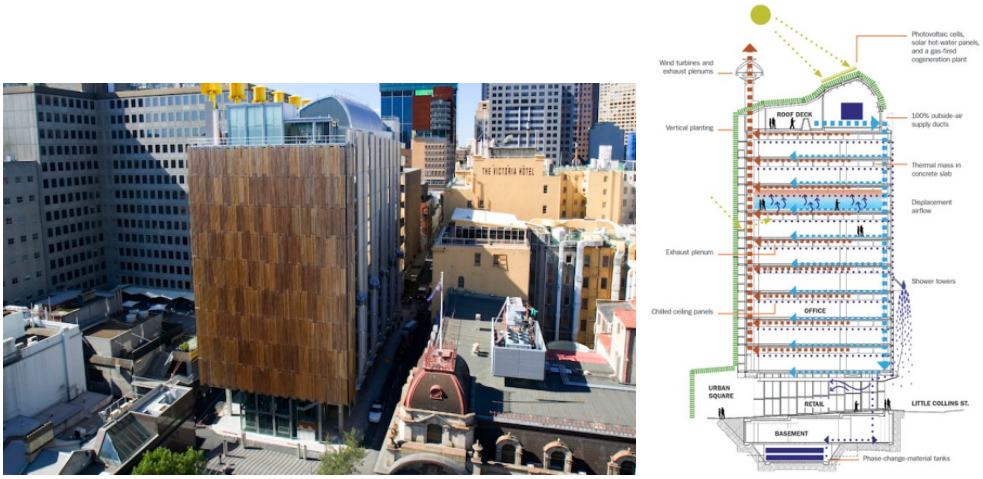


Fig IV.1.c.4: CH2 building: image and operation scheme. Source: Internet

Likewise, solar cycles and geometry can inform the production of natural forms that not only satisfies incidence and thermal performance but also engage in dialogue with nature in terms of shapes and rhythm (Knowles 2011). His idea of solar aesthetics from its inception has produced two major studies: the first one conducted at Auburn University in 1962, concerning with illustrating the force effects of sunlight and gravity on forms and the second conducted at USC concerned with the aesthetics consequences of generating uniquely adaptive forms by following the sun’s path. Solar cycles has shaped human civilization and its rituals for millennia with its specific formal quality (massing, orientation, shading) that still valuable nowadays, then designing around these

solar cycles and rhythm is one way to produce architecture that is engaged with nature in an everlasting aesthetics.

D. SUMMARY

	Non-cognitive aesthetics	Cognitive aesthetics
Substantive sustainability	Yeang Koh	Parson & Carlson Yeang Yu Knowles Benyus
Non-substantive sustainability	Porteous Berleant	Carlson Prigann

Table 4.1: Summary of authors on sustainable aesthetics.

Using the analytical aesthetics / sustainability framework (see Part III.1), this chart summarizes all reviewed authors in four main sections regarding their positions of aesthetics and their implication. Though the study of those authors is not exhausted and more research is needed. But some initial observation could be made as following.

First, the literature and practice that manifest the connection between sustainability and aesthetics in the most prolific and persuasive manner is currently the Cognitive aesthetics - Substantive sustainability. This result is not surprising. Cognitive aesthetics position is based on empirical knowledge and therefore opens the large door for the implementation in sustainability field. Moreover, the present rhetoric and power engine of sustainability agenda very much rely on quantitative criteria e.g. energy efficiency, economic turnover, marketability.

Second, there is fortunate cross-pollination between different sections, both vertically and horizontally. The practitioner and theorist Ken Yeang explore both ideas of cognitive and non-cognitive aesthetics in his notion of tropical ecodesign. The aesthetics philosopher Allen Carlson operates his notion of cognitive aesthetic model in both substantive and non-substantive sustainability. It is because most useful theory to support

the appreciation and protection of all kinds of environments are those that depend not simply on any one particular model of aesthetic experience. It rather attempts to constructively bring together the resources of several different positions (Carlson 2010). The pluralist trend of combination of different positions into a more synthetic approach is critical for future development in literature and practice.

2. Analysis of case studies:

In the previous section, I have reviewed some of the most prevalent and well-received theory and practice of the alternative aesthetics and their various implications to the issue of sustainability. In this section, using that literature analysis as a guiding lens, I make an in-depth analysis of current practice of ecolodge design. Other words, here I expand the answer to second research question: *How do alternative aesthetics rationales demonstrate in the practical design of ecolodge (eco-resort, recreational community, etc)?*

The examples presented in the following are founded in project-basis, but then for the purpose of the deep and systemic analysis, they are deconstructed into several main design aspects: *Location / Masterplan, Landscape, Architecture form & space, Construction, Material, Energy & Utility*. In each design aspect, I will interpret them in lights of three: environmental, ecological, and performative aesthetics (Fig 4.2.1).

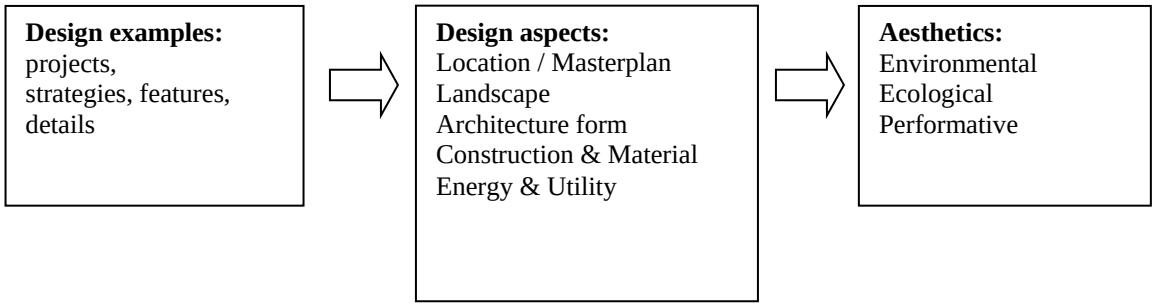


Fig 4.2.1: Diagram of ecolodge analysis

The following chart summarizes all major interpretation of design feature in relation to three discussed type of aesthetics. The detailed explanation, critique, and examples of each interpretation are articulated after the chart.

Aspects of design	Environmental aesthetics	Ecological aesthetics	Performative aesthetics
Location & Master-planning	- Consider view of, proximity to, and immersion in environmental - Utilize local cosmological ideology: feng shui, community	- Base on study of watershed, topography, biosphere…	- Base on basic climate data: solar geometry, wind, precipitation,…
Landscape	- Maintain the pristine nature - Touch the earth lightly when needed - Preserve the historical traces	- Preserve the site's ecological services: stream, soil, flora, fauna, - Celebrate natural process: rain, fire, storm, erosion,…	- Design productive landscape when intervention needed
Architecture form	- Positive visual impact on the environment, - Informed by cultural influence and landscape significance	- Expose elements to experience: temperature, lighting, humidity, …	- Utilize principles of aerodynamics, thermodynamics,…
Construction & Material	- Use indigenous technique and labor, local resource	- Expose construction tectonics and stereotomics - Reveal the process of construction - Recycle material in previous structure	- Optimal structure that suits the function: - Use material by efficient and optimal quality
Energy & Utility	- Encourage visitors to operate the utility, to engage in energy making process	- Use locally sourced energy: solar, wind, bio-gas,… - Reuse / recycle / renew resource: water, waste,…	

Table 4.2: Summary of design feature in ecolodge

A. LOCATION & MASTERPLAN

Environmental aesthetics

Location is the vital and almost starting point of any ecolodges project. One of the seven characteristics defining ecotourism is to travel to natural destinations. Often times it is the factor that tourists consider the most when planning to go to a remote region and

they want to make sure the location is worth their long travel. These destination area often remote areas, whether inhabited or uninhabited, and are usually under some kind of environmental protection at the national, international, communal, or private level. (See part II.3.b). Location is therefore one of the most treasure asset of any ecolodges. Site's location provides the project multiple tourist advantages: unobstructed and unspoiled view to natural landscape (in some cases to man-made cultural landscape), the proximity to contact with such landscape, the tourists' sense of freshness and adventure to exotic places, and the tourists' feeling of being isolated from everyday environment.

View is the major source to bring about aesthetic experience of the destination to the tourists. Ecolodges are often located in the position of the site to get as much view to the surroundings as possible, forming an ambient collection of diverse views to showcase the diversity and characters of the site. Ecolodges can also intentionally frame the view to the most significant part of the environment to accentuate the quality of the site's landmark as well as to minimize the unfavorable visual effects of disruptive elements of the site to tourists' perception. To achieve an ambient or focused visual perception of the site is dependent on specific location, the design intention and the developer's marketing sensitivity.

The strategies for providing visual experience of the site are various. Ecolodges can be located on high elevation, looking down adjacent landscape and scenery in the distance. Kasbah Du Toubkal mountain retreat is one example. It is perched in the High Atlas and at the base of 4,165 m (13,665ft) Jbel Toubkal, North Africa's highest mountain. The sweeping views of the surrounding landscape – reddish brown mountains lush with green walnut groves and, in the distance, the rising snowcapped peaks of Mount Toubkal – are considered the best in North Africa. Besides those natural wonders, the local Morocco village which spreads amidst the valley is also respected and observable from the resort which underline nature and human harmony (Fig IV.2.a.1). Ecolodges can

also be strategically located in a very close correspondence with one or several site's significant elements by taking advantage of the land form, water body, vegetation group, etc. For example, Kapawi Ecolodge is designed as series of pavilion lining the edge of the forest and looking out into the open area of a shallow swamp. The swamp becomes the focal point amidst the vast expanse of lust tropical forest. It defines the site's identity as well as the major source of visual appreciation (Fig IV.2.a.2).

Fig IV.2.a.1: Kasbah Du Toubkal mountain retreat and view from the resort to the adjacent local village. Source: http://www.kasbahdutoubkal.com/

Fig IV.2.a.2: Bird view of Kanawi ecolodge. Source: Mehta 2010

In addition to views, ecolodges also provide tourists with immersive experience in the site, regarding the aesthetics of engagement. This sense of immersion distinguishes ecolodges from other conventional high quality resorts which merely focus on the quality

view. The venue needs to be where tourists' direct interaction with site's elements can be encouraged. The aforementioned Kanawi Ecolodge is one example where the complex is built deep into the Amazon forest. Another example is Chumbe Island ecolodge which is located in Chumbe Island Coral Park, a remote coral-fringed getaway off the east coast of Africa, thousands of miles from the Great Barrier Reef (Fig IV.2.a.3). The common strategies for achieving that immersive effect include exotic location, preserving existing landscape, building to small sizes, dispersed building structures, etc.

Fig IV.2.a.3: Bird view of Chumbe Island Ecolodge. Source: Mehta 2010

The sense of immersion is realized not only by the tangible surrounding of natural settings but also by the intangible sphere of cultural influence of the site, such as local cosmological ideology, religious belief, or collective lifestyle. For example, the Crosswater Ecolodge is built on fundamental feng shui principles – the ideas of directing and absorbing the *qi* (the natural "energy" flow) - by designing the symmetrical plan juxtaposition and using creek in the front, mountain in the back and high ground on two sides as *qi* optimal regulating devices. As the result, the overall space organization is distinctively Chinese even though the architecture is utterly innovative and has little direct resemblance of vernacular architecture (Fig IV.2.a.4). On another example, in Jalman Meadows Ger Camp in Mongolia's Khan Khenti Protected Area, camp plan is

organized according to traditional plan of nomadic Mongolian. Though being displaced periodically, the way the masterplan always embraces a communal open central space to the south and allows each tent to have adequate sun light at low angle. This organization reflects the sense of collective, inter-dependent Mongolian lifestyle which is historically essential for the human survival in this vast landscape. In same time of provoking cultural meaning, this masterplan creates a distinctive aesthetic effect – a sweeping array of white camps echoing with the waving mountain range afar (Fig IV.2.a.5).

Fig IV.2.a.4: Crosswater Ecolodge masterplan and view of main symmetrical entry. Source: http://www.crosswaters.net.cn/

Fig IV.2.a.5: Jalman Meadows Ger Camp plan. Source: Mehta 2010, http://nomadicjourneys.com/jalman-meadows/

Ecological Aesthetics & Performative Aesthetics

The ecolodge design of masterplan should be based on the empirical study of ecological patterns and processes: hydrology (watershed, water flow, ocean tide), climate (temperature, precipitation, humidity, sun, and wind), topography (soil, elevation, slope, and aspects), and biosphere (fauna and flora). While all these measures are widely recognized in terms of environmental preservation and engineering, their inherent aesthetics effect is often neglected or underestimated. In fact, natural phenomena have existed for millennia due to its innate logic of harmony – unity, balance and complementariness. Therefore, design according to such given natural patterns and processes could likely to produce an aesthetic outcome that as harmonious as the nature itself. Still, this aesthetics quality is linked to the correct understanding of ecological local elements. For example, if the ecolodge is organized along the topographic elevation line, besides due to practical reason e.g. easy construction and avoidance of landslide, the natural curvy contour lends the artificial juxtaposition an innate quality of softness and harmony with landscape. The study and masterplan of Pearl Island resort, Panama, designed by Hart Howerton & Partners, is one good example of this approach which can achieve environmental and aesthetic quality in the same time. Extensive analysis with the assistance of Geographic Information System (GIS) software – existing biosphere, topography elevation, slope analysis, view shed, watershed, etc – is conducted prior to the decision of strategic masterplan design. Therefore, the design can fulfill multiple objectives simultaneously such as minimization of land impact, view provision, efficient construction, etc (Fig IV.2.a.6).

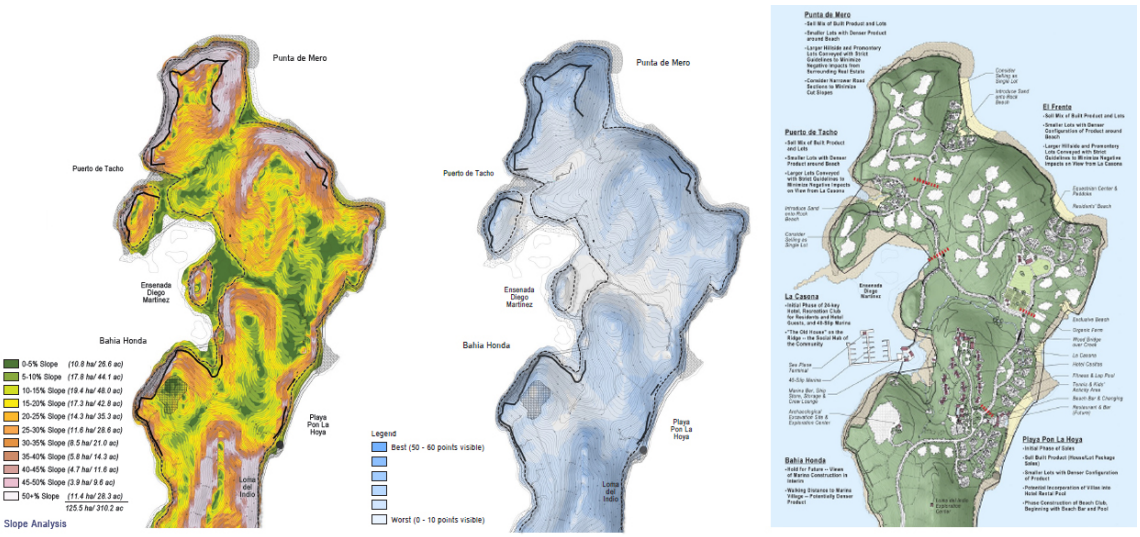


Fig IV.2.a.6: Project Pearl Island, Panama: workflow from analysis to masterplan.
Source: Hart Howerton Partners

Besides knowledge of natural conditions, study of labor access, resources, and cultural influences from on-site and adjacent location is important. Exotic places might be appealing for tourist for providing a total isolative experience. However, ecolodge does not appear out of the thin air; it requires the process of human labor. Very exotic location is not very advantageous for building not only in practical terms – transportation, labor and material for construction, security, and investment, but also in term cultural and social terms – the connection to cultural elements and the inspiration to create ecolodge's identity. This cultural and social influence originating from local human elements (village, town, group of indigenous people) is the factor that brings forth the aesthetic value to the project. It is the value of appreciating the underlying process of constructing the place by the hand and knowledge of local people. Therefore, the decision for an ecolodge's location should not solely based on the positive, pristine quality of natural landscape; it should also consider the proximity to existing cultural influences as critical assets. In some cases, this decision fosters the local ownership, authentically contributing the sustainable local economic development.

B. LANDSCAPE

Environmental aesthetics

Ecolodge landscape aims to preserve the existing condition as much as possible as a way to provide an authentic aesthetics of engagement. In the most extreme case, it manages to maintain the very pristine nature of the landscape condition before the appearance of the settlement. No matter the state of the existing landscape, either being very comfortable, beautiful or being "degraded" (in conventional notion), it should be preserved in that exact condition by following the lasses-faire principle. The "designed" landscape derives not from the addition of human action, but rather from the deliberate repurpose of natural elements or the changing attitude and perception towards them.

One common design strategy is to use existing natural element e.g. trees, rock or ravine to define a new type of space with minimal or without any artificial modification. For example, in the ecolodge in Chaa Creek, Belize, the path leading guests from the main house to the Macal River canoe dock is planned to go amidst the bamboo forest in the way that avoids cutting down the trees and form a natural "arched walkway". The bamboos look like purposefully designed while in fact they are just sensitively organized to be revealed to the tourists (Fig IV.2.b.1). Another similar example, in the Ranweili holiday village, Sri Lanka, one natural expanse of voided area among mangroves and screw pines is left intact and intended to spatially define an outdoor "living room" (Fig IV.2.b.2).

Fig IV.2.b.1: Left:Path in the lodge at Chaa Creek.

Fig IV.2.b.2: Right: Outdoor living room in Ranweili holiday village. Source: Mehta 2010.

In less extreme approach, when additional human action is needed to provide more acceptable comfort for tourists, ecolodge landscape design tries to touch the earth lightly. In Azulik ecoresort, Mexico, the raised walkway connecting the guesthouses and the main house consists simply of large wood planks sitting on top of small piers made from unprocessed tree branches. This walkway leaves the ground surface and critical tree's root not hammered by human footsteps. Bathtub troughs are carved into the rock where needed and the rest of the coastal rock formation is kept intact (Fig IV.2.b.2)

Fig IV.2.b.3: Raised walkway and bathtub troughs in the Azulik eco-resort. Source: Kunz & Masso 2006.

The principle of minimal alteration or careful repurpose is also applied to cultural elements. Historical remnants such as destructed wall and bare house foundation, though not having any actual function at the current time, tell the tourist something about the history of a place and therefore contribute to the holistic environmental experience. For example, in Guludo Beach Lodge, Mozambique, pieces of abandoned Portuguese port on the island is kept intact. (Fig IV.2.b.4).

Fig IV.2.b.4: Portuguese port remnant in Guludo beach lodge. Source: Mehta 2010.

Ecological Aesthetic

Ecolodge can also design landscape as a way to preserve, reveal, and celebrate the site's ecological service such as stream, soil, biosphere as well as the relevant natural processes such as rain, storm, rock erosion, vegetation decomposition. The resulting aesthetic experience could be the either the cognitive appreciation of nature's phenomena or the non-cognitive emotion of nature's overwhelming power. For example, in Phinda Forest lodge, South Africa, the huge trunk of a falling tree is left untouched for being subjected to natural transforming process. The rotting tree might not be a beautiful one in the normative categorization of landscaping, yet in this case it boasts a particular sensational aesthetics that celebrate the sublime power of nature and the nutrient cycle (Fig IV.2.b.3).

Some natural processes may need to be controlled, due to safety requirement, but supposedly in a subtle way. In Ninh Van Bay ecoresort, Vietnam, the natural chaotic rockery is kept intact wherever it is stable enough. The rocks that are dangerously instable are bolstered with minimum engineering action (concrete filling, jamming). Yet the visual effect is stunning as if the process of powerful land transformation is snapped it its dramatic moment for human to appreciate.

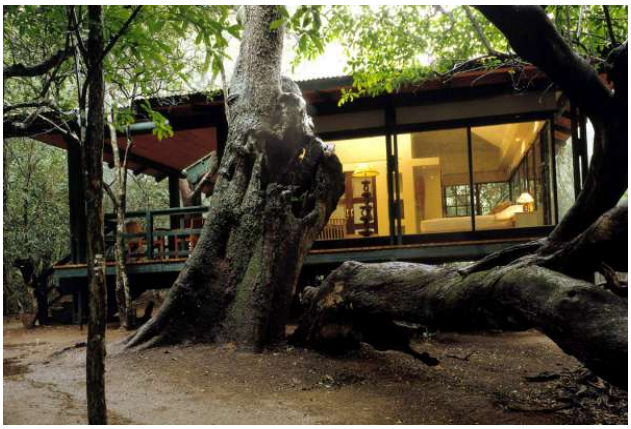


Fig IV.2.b.5: Preserved falling tree in Phinda Forest lodge. Source: http://www.corporatewildman.co.za/listing/phinda-forest-lodge/

Fig IV.2.b.6: Perching stone in Ninh Van Bay resort. Source: http://www.sixsenses.com/resorts/ninh-van-bay/destination

One of the ecological field that ecotourism has not touched on is the revitalization of brownfield. Because such former industrial site is a manifestation of historical human interaction with natural condition with forces, if revitalized properly, it will have a unconventional aesthetic quality. While the ecological value of post-industrial revitalization is enormous, the normative notion of beauty which heavily relies on the positive appearance rather the re-constructive transformation of land has hindered the exploration with that unique environment. Therefore future research and experiment with brownfield environment is encouraged.

Performative Aesthetics

Some traditional forms of landscape already have some performative implication. For example, retaining pond can serve as rain water reservoir, as thermal mass, and as source of evaporation cooling when receiving dry wind. Vegetation can serve as wind directing devices or sun filtering devices according to their designed density and height.

Some forms of ecolodge landscape can have productive capacity when purposefully designed with consideration of its ecological services. When existing landscape does little or no service to the settlement because of previous environmental disturbance, constructive human alteration of landscape is justly needed. The services produced by landscape could be water cleaning, soil de-toxication, and agriculture. For example, in the Coconur Lagoon ecolodge, India, water sourcing is a critical mission. Waste water is recycled through a system artificial canals where a reverse osmosis river channels 2,000 liter per hour and filters 50,000,000 liter of rainwater per year. The processed water is stored in a pond. The canals crisscrossing with the lodges and footbridges create a serene and rustic landscape (Fig IV.2.b.6). Knapdale Ecolodge, New Zealand, is an example of restoration of degraded native forest. It is sustainably managed to be a semi-permacultural operation with a variety of sustainable agro-forestry practices. The profit from the ecolodge is invested in replanting the area which in turn elevates the experiential and aesthetic value of the site and thus the tourist revenue of the facility (Fig IV.2.b.8).

Fig IV.2.b.7: Canal system in Coconut Lagoon ecolodge.

Fig IV.2.b.8: Agriculture site planning in Knapdale Ecolodge, New Zealand.

C. ARCHITECTURE FORM

Environmental aesthetics

There is a dilemma between the attempt to preserve the total integrity of the land before the appearance of the lodge and need to set up some artificial element to accommodate tourists' needs. The main issue is to design the built environment to blend in and celebrate the nature, rather than the way around. Therefore, visual impact of architecture piece to the whole environment plays vital role in determining tourist's aesthetic perception of the land.

The most common architecture strategy is to recreate the vernacular architecture that is found in the same geographic area. The premise is that vernacular building has existed in the land for century and standing the test of time – it is integral to the nature. We can find numerous examples of ecolodge that is built according to traditional architecture around the world. One exemplary case is the Adrere Amellal resort. The resort house is built after the ancient Egyptian domestic house with mud brick wall, flat roof, rectangular windows, arches and protruding wood beam. The mixed texture of sand, pebble, and straw in mud wall, the picturesque composition of small house blocks, the

scattered contrast of shadow and light, all of those aesthetic characteristics of vernacular architecture make the whole complex blend effortlessly into the natural landscape (Fig IV.2.c.1).

Fig IV.2.c.1: Adrere Amellal resort. Source: http://adrereamellal.net/

In other cases, the architecture does not entirely copy the local building forms but rather is inspired by them to produce a novel form without losing its subtle connection to the place. This approach requires high degree of creative interpretation, abstraction and synthesis. One example of architecture re-interpretation of indigenous building is lodges in Chumbe Island Ecolodge. The indigenous building is normally made from two large thatch shed roof which are joined on top and form an A-shaped form-resistant stable structure. The guesthouses in this example revise the shape of shed so that it has smaller foot and larger overhangs, making a V-shape side elevation and producing a dramatic boat like gesture. Especially, the main house is consisted of six smaller A-shaped roofs, forming a complex roof structure yet still referring to indigenous architectural language (Fig IV.2.c.2). In another example, the lodges in Mowani Mountain Camp, Namibia take spherical form of Himba mud house and replace it with thatch roof on stilts. The aesthetic effect remains the same where the roof scape echoes with the landscape of earth color and the round rocks (Fig IV.2.c.3).

Fig IV.2.c.2: Bungalows and main pavilion in Chumbe Island Ecolodge. Source: http://www.chumbeisland.com/

Fig IV.2.c.3: Himba house and Mowani Mountain camp lodge. Source: Kunz 2006

Ecolodge can not only interpret the local architecture language but also reinvent the building typology that is specifically distinctive in that place. While various types of vernacular house (tropical thatch house, colonial courtyard house, cob house, etc) can be identified in virtually all places, some building typologies other than house are unique in one particular place, such as coastal light house, bridge pagoda, and tree house. In Crosswater Ecolodge, China, the designer reinvents the bridge-pagoda typology to serve as the entry gate to the complex (Fig IV.2.c.4). In another example, Daintree Ecolodge reintroduces the tree-house typology to provide the tourists an entirely new perception of the rain forest canopy (Fig IV.2.c.5). The tourists to Kerala River in India can experience

the traditional artifact, *kettuvallam* boat (tying country boat) in a whole fresh perspective – they can travel and live in it. While not a literal translation of kettuvallam, the boat houses are mainly constructed out of Anjali wood and coir ropes. The transformation from simple structure to floating and relatively luxury lodge not only preserves the local cultural identity but also brings about a brand new nomadic aesthetic experience of being immersed in the river setting (Fig IV.2.c.6).

Fig IV.2.c.4: Traditional bridge house and the entry bridge in Crosswater Ecolodge. Source: http://www.crosswaters.net.cn/

Fig IV.2.c.5: Daintree Ecolodge & Spa, Australia. Source: http://www.daintree-ecolodge.com.au/

Fig IV.2.c.6: Kettuvallam travel boat. Source: http://kettuvallam.com/

Ecological Aesthetic

The ecological aesthetics can be achieved by the exposure and revealing of natural phenomena to tourist's perception when they are staying in lodges. In benign tropical climate, this can be easily obtained by permeability (open plans, natural ventilation and light, porous material) (Fig IV.2.c.7).

Fig IV.2.c.7: Common permeability in architecture in tropical climate. Projects: Daintree ecolodge, Chumbe Island, Adrere Amellal

Yet with a harsher climate, such exposure could not always be feasible to ensure certain level of comfort. For example, in desert climate, building tends to limit openings to maintain it ambient interior temperature. In that kind of less favorable condition, we need to rethink the design and to incorporate the micro-climate requirement with the need to present / expose exterior nature in an appropriate way. One good ancient example is the Arab nomadic tent. The tent is made of natural cotton that can "breath" and draw hot air out; its loose fabric filter the sunlight into ambient light inside the tent; the fabric can swell and then become waterproof when getting wet by rain. In that example, the tent itself protect human but also respond to the natural processes and people fully acknowledge the weather change – sun, cloud, temperature, precipitation via the change of the architectural physical manifestation. There are some attempts for the aforementioned notion of a structure that protects humans from the elements and reveals

them in the same time. In one example, the high-tech camp of Voyages Longitude 131, Australia, is situated to face directly the famous Ayers Rock and has 15 luxury mobile tents. High insulation glass provide panorama views and protect tourist from desert cold at night while the tensile roof structure provide large shade from the harsh sun during the day (Fig IV.2.c.8).

Fig IV.2.c.8: Tents of Voyages Longitude 131. Source: http://longitude131.com.au/

Performative Aesthetics

Some vernacular architecture form has already possesses inherent performative quality such as thermodynamics and aerodynamics efficiency. For example, hip roof does not only resists heavy rain and strong wind effectively but also induces interior hot air to rise and escape at the top. Thick mud wall in the Egyptian house does not only provide shade for recessed windows but also acts as the thermal mass to dampen the temperature fluctuation through the day and night. Therefore, using appropriate vernacular form of architecture already embrace the aesthetics of function and efficiency.

However, new architecture form of ecolodges can learn from those century-old design lessons without necessarily having to imitate candidly. For example, Las Torres EcoCamp, Chile, is designed based on the geodesic form that native people of Patagonia construct their huts. In traditional way, they bend branches to create basic frame structure

and cover it with guanaco and sea lion skins. With the modern day rendition of these traditional huts, each igloo is made from lightweight prefabricated galvanized iron forming a dome and is covered with canvas coating and synthetic insulation. The sphere geometry helps to disperse the snow weight and wind pressure; it allows minimized exterior surface and therefore less exchange of temperature and retains the warmth (which is modestly generated by human's body heat and other devices) inside efficiently (Fig IV.2.c.9).

Fig IV.2.c.9: Las Torres EcoCamp. Source: http://www.ecocamp.travel/

D. CONSTRUCTION AND MATERIAL

Environmental aesthetics

Many ecolodge constructions focus on indigenous building techniques and craftsmanship, local labor, and local material sourcing. This is a logical step from the approach that takes precedent the local architecture forms (see previous section) because architectural form, construction and material are inherently connected. For example, in Feynan Ecolodge, Jordan, the Bedoin construction method, local labor, and local material blend. While the form is accorded to traditional house, the true aesthetics of the lodges come from how they are executed. The walls are made of hollow block, straw bale, and finishing mud color gradient of which mirrors the hue of the surroundings. The terraces are covered with stones from the desert floor. One interesting use of local material is the detail of

stone plates which are stick into the mud wall in series of horizontal rows, providing additional shade on the wall and creative rhythm of staggered shadows (Fig IV.2.d.1).

Fig IV.2.d.1: Wall detail in Feynan Ecolodge. Source: http://www.feynan.com/

In other cases, the design can still use local labor and material without resorting to conventional precedents. Series of Water & Wind bamboo cafés (Vietnam) and Simon Velez's bamboo architecture (Colombia) are good examples where the architects devise innovative ways of using bamboo and give instruction to local workers to build. Bamboo structural strength (especially bending and stretching) is put into the maximum potential when it is capable of producing expansive space without losing its inherent delicate aesthetics. With Water & Bamboo series, the large canopies contrast with the seemingly fragile and elegant curving post (Fig IV.2.d.2). With Canalete Ranch water temple by Velez, a cathedral-like tri-arch space is reproduced using bamboo lattice structure (Fig IV.2.d.3).

Fig IV.2.d.2: Wind & Water café by VTN Architects.

Fig IV.2.d.3: Canatale Ranch temple by Simon Velez.

Ecological Aesthetic

Construction of ecolodge should follow the ecological aesthetics of revealing the structure and material. This logic dictates the action of exposing the structural essence of tectonics (framing/ bracing structure) or stereotomics (gravity-dependent structure) and being honest to the surface quality of material (minimal cosmetic treatment or cover-up). Accordingly, the tourist can authentically learn the method to build the structure and appreciate the intensity and amount of labor put into the building process. In other words, the construction can tell its story by its own means and, for tourists, “listening” to that story by visual and tactile perception is a crucial aesthetic experience. Truthful, uncovered tectonic expression is found in most eco-lodge using low-tech construction method (Fig IV.2.d.3). The exposure of bamboo tectonic in previous cases (p.71) is one manifest of that experience. Moreover, the presentation of rope tying in kettuvallam boathouse hull informs that the boat itself is built without using nails (see Part IV.2.c). The alternative presentation of wall surface – hollow brick wall, rough pebble aggregate, and smooth mud finish – reveals the order of applying various materials in the building process of a finished tradition wall (See part IV.2.d).

The process of construction and material can also be expressed via the material recycling. Sometimes, the old material possesses a unique and desirable aesthetic patina quality because of the weathering process while newly added material does not deliver that type of effect. In that case, recycling old material in new construction is appropriate. For example, in the Crosswater Ecolodge, Beijing, the boardwalks are made of abandoned railroad ties and roof tiles are made from previously demolished buildings in the nearby Shangping village and installed on newly harvested bamboo frames (Fig IV.2.d.4).

Fig IV.2.d.3: Roof frame in Shompole Ecolodge, Great Lift Valley, Kenia. Source: Kunz 2006

Fig IV.2.d.4: Terracota recycled roof in Crosswater Ecolodge, Beijing, China. Source: http://www.edsaplan.com/en/node/651

Performative Aesthetics

Performative aesthetics in material is reflected by the practice of choosing the right material to build in regards to the availability and its effectiveness in respected construction. Therefore, one material could be considered optimal in one situation can be absolutely unsuitable in others. For example, in a typical ecolodge in tropical coastal area, the main material for roofing is thatch roof because of the high availability of palm trees and alike. However, in the case of Bay of Fires Ecolodge, Tasmania, Australia, much of the land is home to sacred Aboriginal sites, on-site harvesting is forbidden, and therefore the designers decided that building material were to be transported by helicopter. The chosen material, e.g. laminated beams, glass louvers, timber out decks, are high performance material to make sure they are durable, given that dim chance to maintain the lodge too often (Fig IV.2.d.5).

Fig IV.2.d.5: Bay of Fires Ecolodge, Tasmania, Australia. Source: http://www.bayoffires.com.au/

E. ENERGY AND UTILITY

Environmental aesthetics

The immersive quality of aesthetics into the local environment in terms of energy and utility depends on the way guests and staffs directly and actively engage with the utility and energy system that is appropriate to the local condition. The local people can have their own way of garner and using energy, and it is appropriate to adopt that practice if necessary or if modern alternatives prove difficult and expensive because they need to be transport and imported from somewhere else. Moreover, adoption of local energy practice also has educational purpose. The system teaches the staying guests about the true efficiency of utility technology – it should be constructed by local capacity, it should depend on the available resources and it should align well with the distinctive culture of the place. At last, besides using and learning about the local utility, guest should engage directly with using that system for themselves for a full, complete experience of the place in terms of operation. Often times it requires guest to manually operate the utility mechanism by themselves while cooking, washing, and showering, etc.

One typical utility component of the appreciation of the environmental beauty is how to use water in low-cost manner. Water is known as the essential elements to all kinds of human activity e.g. eating, sanitation, cooling, etc. Because of that multiple purpose of water, it requires being clean, and therefore it is harder have clean water available all the time. Conservation and collection of clean water is critical. Guests of ecolodge need to get rid of the mentality of modern infrastructure that water is a given condition. In fact, water is a treasured gift that needs to be used respectively and carefully. Vernacular lifestyle separate very clearly different types of water for different daily purpose and use it accordingly. For example, water from wells is considered the cleanest and used strictly for cooking and showering. Water in on-site pond (resulting from rain water) is next to sanitation rank, and therefore used for cleaning house, washing

clothes, and feeding domestic animals. Water from stream, channel, because of some level of sediments and organic pollution along its flow, is used for irrigation. Guests in ecolodge must understand and conform to the principles of using water to not be wasteful.

Besides being conservative in using water, the way guests use water to serve themselves should be appropriate techniques and highly interactive. For example, in Guludo Beach Lodge, Mozambique, there is a an innovative yet entirely manual way to shower, using mechanism of wooden frame, pulley, and bucket (Fig IV.2.e.1). Guest adjust the force apply on the pulley to control the water flow according to their showering needs. In Mosetlha Bush Camp, South Africa, to have hot water, guests need to fill the donkey boiler manually with cold water before taking a shower (Fig IV.2.e.2). Those manual and interactive methods enrich the experience and portfolio of activities in ecolodges.

Fig IV.2.e.1: Guludo Beach Lodge, Quirimbas National Park, Mozambique.

Fig IV.2.e.2: Mosetlha Bush Camp, Madikwe Game reserve, South Africa. Source: Mehta 2010.

Ecological Aesthetic

The ecological aesthetics of energy and utilities is to understand, design, and operate the system in which energy and resource should form a close ecosystem loop - the waste of one system can be the resource for the others. The energy and material loop needs to be sustained as much as possible within the boundary, small or large, of the project or adjacent areas. It is the process of getting, delivering and using energy in an organic circle, even though messy and complex, that matter, rather than the cleanness of the system that modern people tend to take for granted. This thinking requires close examination and analysis of life cycle of many, if not all, energy elements involved in serving people in the ecolodge facilities.

One example is about the relationship between waste and fuel production. Many villagers living in rural area build composting vault underground to store organic waste, e.g. domestic animal's feces, unused and leftover food. This vault produces safe methane gas that is in turn used for cooking fire. The solid waste after one or two years collected to fertilize nearby garden's soil (Fig IV.2.e.3). For ecolodge located in agricultural land, adopting this energy producing practice can be effective and low-cost. Moreover, this practice adoption also demonstrates the process-oriented thinking about energy. All products can and should be the both the output and input of other process which forms a loop of crater-to-crater generation.

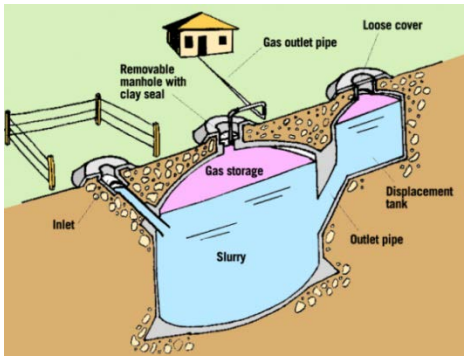


Fig IV.2.e.3: Diagram of typical biogas system in a farm. Source: www.practicalaction.org.

Chumbe Island Ecolodge presents a very practical design for water conservation and treatment in remote resort. The cross section of a typical 2-stories bungalow demonstrates how the water system works (Fig IV.2.e.4). It uses dry composting toilets to conserve water and plant beds that utilize gray water. Composting toilet prevents sewage from seeping into the reef sanctuary. What is also important is that the water-related solution is integrated smoothly into the aesthetics of architecture design itself. It takes advantage of the two stories structure and the large roof surface. Rain water is captured from the bungalow's roof top. The wind-powered vent pipes (for ventilation) and gradient storage (to provide adequate water pressure) replicate the experience of using regular toilet.

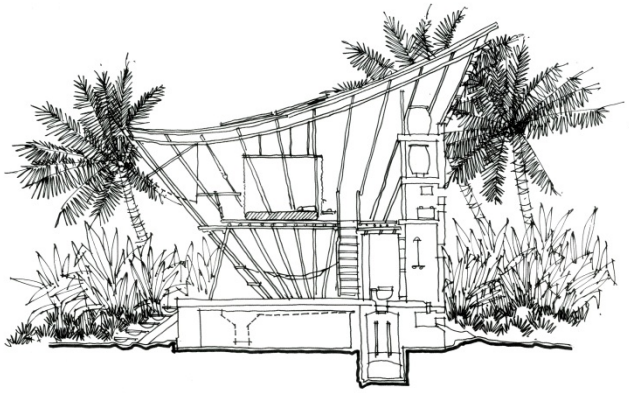


Fig IV.2.e.4: Cross section of a guest bungalow, Chumbe Island Ecolodge. Source: Mehta 2010

Alila Uluwatu Resort, Bali, Indonesia is another example of how water system is integrated closely to the architecture and landscape features. The water-related environmental implementations which have been made include: rainwater collection and water recycling in retention ponds, aquifer recharging through soaks, swales and rain gardens, direction of all wastewater to grey water systems for water plants and toilet flushing, treatment of all sewerage and sewerage water recycling into the grey water system, usage of saltwater pools rather than chlorinated one, and usage of dry-climate vegetation to save water. What is prominent of this project is that, because water

component are very critical to the operation of the resort, the project chooses to make water and the treatment process of that element highly visible to the audience. This revealing changes the normative perception of water from what is hidden behind plumping and faucets into what can be interacted in its various phases (potable water, clean water, saltwater, water during treating process)

Fig IV.2.e.5: Water borne landscape in Alila Uluwatu Resort, Bali, Indonesia. Source: http://www.designboom.com/architecture/sustainable-hotel-by-woha-esd-alila-villas-uluwatu/

V. DEMONSTRATIVE DESIGN PROPOSAL:

1. Ha Long Bay – A natural and cultural analysis:

Ha Long Bay is located in northeastern Vietnam, from E106°56' to E107°37' and from N20°43' to N21°09'. Ha Long Bay is a UNESCO World Heritage Site, and a popular travel destination, located in Quang Ninh Province, Vietnam. Ha Long Bay is a center of a larger zone which includes Bai Tu Long bay to the north-east and Cat Ba Island to the southwest (Fig V.1). These larger zones share similar topography, climate, and ecology.

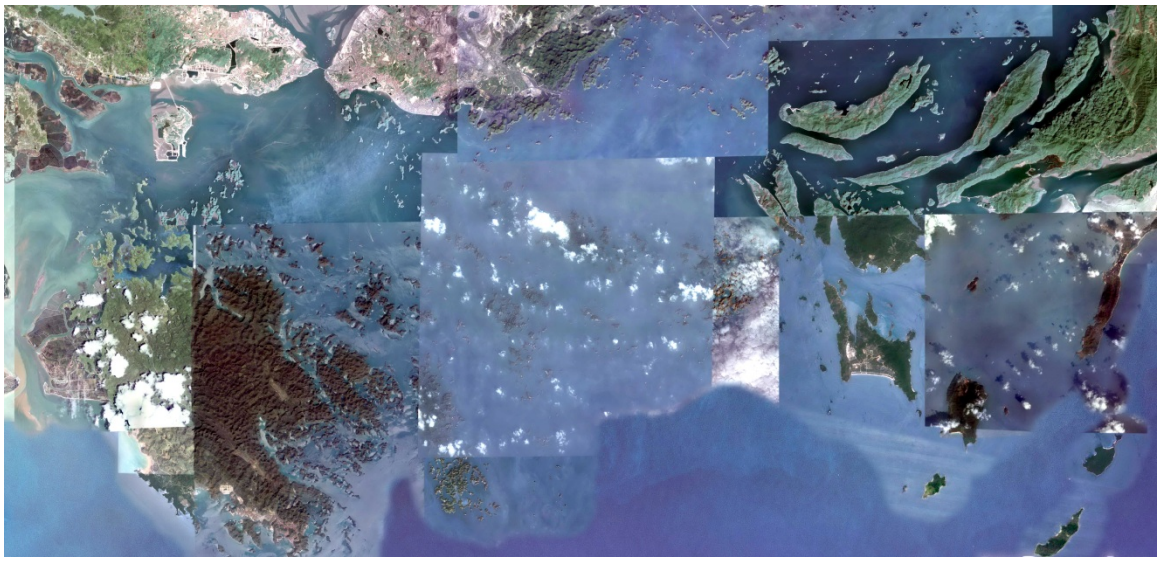


Fig V.1: Location of Ha Long Bay in relation to mainland & other islands.

A. NATURAL CONDITION

Topography

Ha Long Bay has experienced at least 500 million years in various geological states of orogeny, marine transgression & regression. In Ordovician and Silurian periods (500-410 million years ago), Hạ Long Bay was a deep sea. During the Carboniferous and Permian periods (340-250 million years ago), Hạ Long Bay was at shallow sea level. The dominated uplift movement of neo-tectonic and recent tectonic influenced deeply on topography of this area, and the present landscape of sea-islands

was formed around 7 or 8 thousand years ago by the sea invasion during Holocene transgression begun at about 17-18 thousand years ago. Particularly from the Holocene time, from about 11,000 years ago Cat Ba - Hạ Long area has much archaeological evidence connecting variations in sea levels with the development of ancient cultures such as the Soi Nhu and Ha Long cultures

Hạ Long Bay has an area of ~1,553 km2, including 1,960–2,000 monolithic islands (or islets or karst), most of which are made of limestone and topped with thick tropical vegetation. Several of the islands are hollow, with enormous caves. There are two bigger islands, Tuan Chau and Cat Ba, which have permanent inhabitants, as well as tourist facilities including hotels and beaches. Almost all these islands are as individual towers from 50m to 100m (or 150ft to 300ft), and height/width ratios of up to about 6. Those densely populated limestone “towers” create a rockery-garden-like landscape of dramatic limestone walls and expansive water table. There are a number of beautiful beaches on the smaller islands (Fig V.1.a.1&2).

The core of the bay has an area of 334 km2 with a high density of 775 islets (Fig V.1.a.3). This is where the most vibrant tourist and livelihood activities take place, and also where the design proposal would be located.

Fig V.1.a.1&2: Typical images of limestone islands in Halong Bay

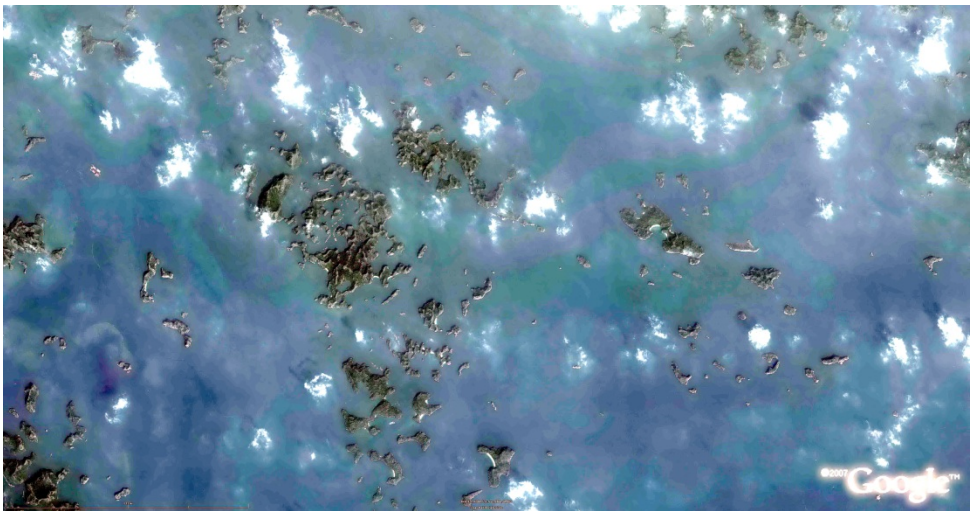


Fig V.1.a.3: Aerial image of central islands cluster in the bay

Halong Bay has the typical diurnal tide system (ranging from 3.5-4m, or 11- 13ft). The tidal range can be seen by the interface between karst and the water, where the dissolution process of sea water acting on the limestone and erosion by waves create notches at the base of the karst (Fig V.1.a.4). The salinity is from 31 to 34.5MT in the dry season and is lower in the rainy season.

Fig V.1.a.4: The typical erosion at the base of the limestone islands

Climate

The climate of the bay is tropical, wet, sea-islands, with two seasons: hot and humid summer, and cool and (still) humid winter. The average temperature is from 18°C-28°C (64°F - 82°F). The relative humidity remains high throughout the year, ranging

between 70 – 100 % (Fig V.1.a.5). This combination of difference in temperature in summer and winter and yet the consistence in relative humidity creates a very characteristic climatic coastal condition. Humidity is a major issue for thermal comfort. In the summer, the high humidity makes vaporization difficult and therefore creates a sweaty feeling; in the winter, the high humidity makes people feel colder because of high water content in the air. Therefore, while high dry-bulb temperature might not pose a serious problem to thermal comfort especially when having effective ventilation, humidity actually is. Humidity is even more problematic because the site is in fact surrounded by water surface which ensures the high water content mixed in the air by wave movement and wind.

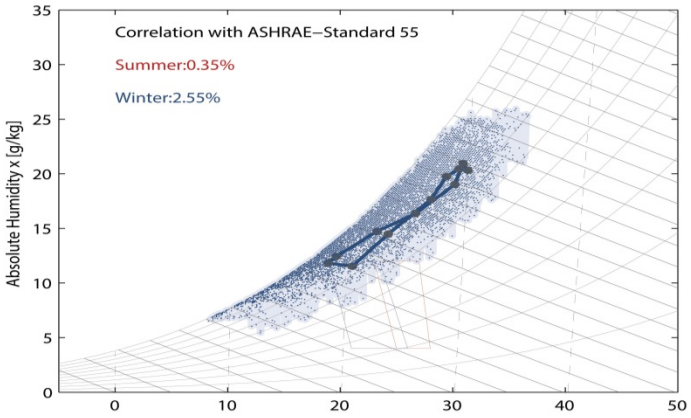


Fig V.1.a.5: The psychrometric chart in Ha Long bay. Source: ClimateTools

Precipitation is high; the annual rainfall is between 2000 - 2200 mm (or 78 – 86 inches) (Fig V.1.a.6). This is because the area receives constant moist air blowing from South China Sea in the summer and from East China Sea in the winter. Accordingly, there are two prevailing wind: from South and South East in the summer, and from North and North East in the winter (Fig V.1.a.7). Summer prevailing brings cool air from southern sea while winter prevailing wind moves cold air from the China mainland. This

observation suggests the design to take advantage of the summer wind and to minimize exposure to the winter wind.

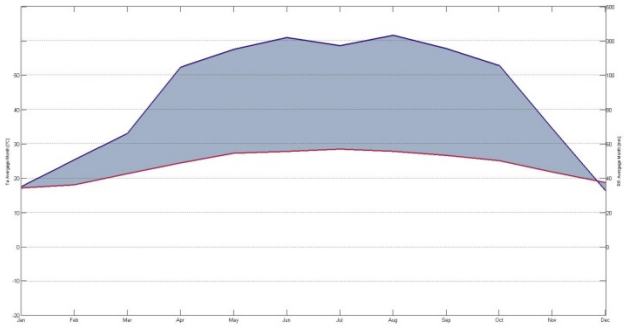


Fig V.1.a.6: Diagram of monthly average temperature and monthly precipitation. Source: ClimateTools

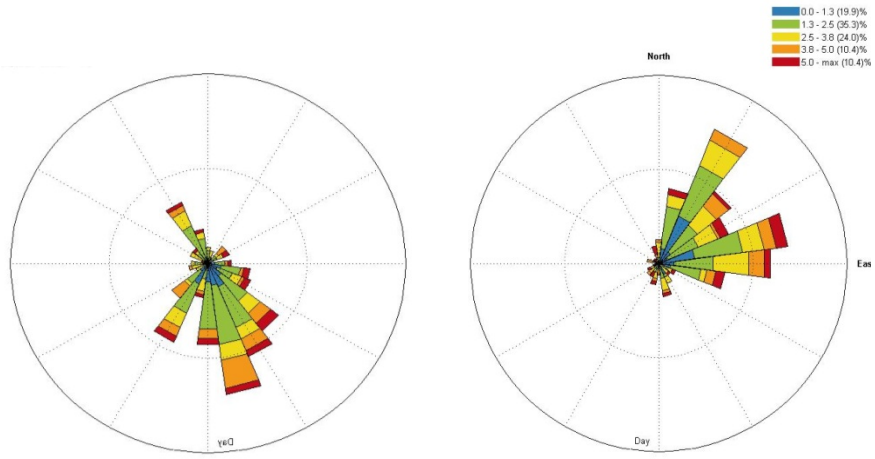


Fig V.1.a.7: Wind rose: in June, and in December. Source: ClimateTools

There is a great difference in global radiation in summer and winter. In the summer, although the east and west surfaces have slightly more sunlight, the daily radiation of all direction is relatively comparable. In the winter, the south surface receives the most solar radiation; however, the total global radiation is reduced significantly compared to the summer. Therefore, the orientation of building is less important when regarding solely the solar heat gain.

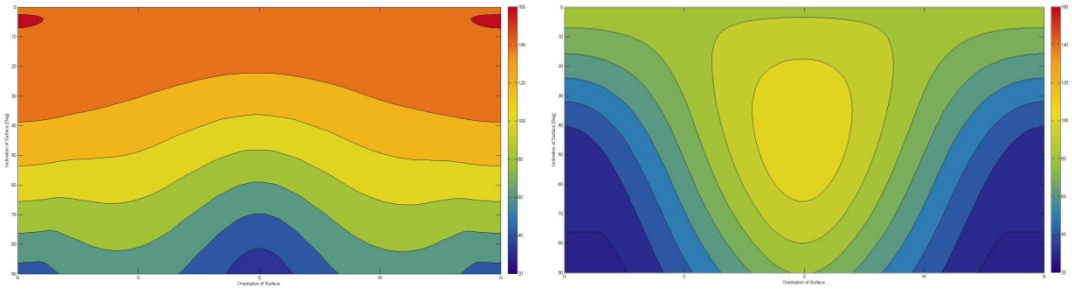


Fig V.1.a.8: Surface radiation: in June and in December. Source: ClimateTools

Environment & Ecology

The geo-diversity of the environment in the area has created biodiversity including two ecosystems: a tropical, humid, evergreen rainforest ecosystem; and a marine / coastal ecosystem. Ha Long Bay is home to 14 endemic floral species and 60 endemic faunal species. The bay's area of shallow waters host 200 species of fish and 450 different kinds of mollusks. Birds and animals including bantams, antelopes, monkeys, and lizards also live on some of the islands

Recently, its environment has been being under the strong pressures from human activities and unusually natural changes in situ, catchments and even sea-territories. The pressures include urbanization and population increase, development of industry, mining, port –water way, fishing, aquaculture and seafood production processes, tourism and service, climate change and sea level rise. Particularly, with increased tourist activities, mangroves and sea-grass beds have been cleared and jetties and wharves have been built for tourist boats. Game fishing, often near coral reefs, is threatening many endangered species of fish. Habitat losses lead to the decrease of fishery resources and biodiversity. Beside the principal resolutions to the bay's environment protection, it needs to paid an attention to locally special problems such as pollution from coal mining and process, coastal filing for land use, water navigation, shipping anchorage, floating fishery villages and restaurants, oil spills and accidents by whirlwinds and typhoons in the bay.

B. CULTURE

Ethnicity and Nationality

The earliest people that is known to start inhabiting the area are of two ancient cultures: Soi Nhu culture (16,000 – 5000BC) and Cai Beo culture (5000 – 3000BC). There are many archeological sites in the bay where food remnants (fish, shell, fruits) and rudimentary labor tools are found.

The ethnicity in Vietnam's north region in general and in the bay area in particular was the result of the prehistory mix between two major societies, the Viet and the Lac. The Lac is the society which inhabits the Vietnam's north region long before the Viet arrival. The Viet is one branch of Chinese society in southern modern China which invaded and colonized the region around 3 BC. However, the Viet was easily incorporated in to the preexisting Lac culture, which creates the modern North Vietnam culture a continuous cultural mix of indigenous Lac and immigrating Chinese culture. The Vietnam nationality was formed officially after series of independence wars around 10^{th} century. In fact, there are many similarities in culture between Vietnam and south China; for example, Lunar New Year, male-dominated family hierarchy, reverence to ancestor, and other cultural norms and rituals

However, the notion of Viet nationality was more and more profound through-out the colonization of the surrounding land (including the bay area) and the long lasting fight for independence from Chinese and Mongolian feudal authority until 18th century. The fight made the national boundary blurred for centuries, but Halong Bay area is considered one of the most stable and symbolic location that define the Vietnam national territory. Van Don in the bay was the first international seaport in Vietnam and developed into vibrant commercial city during Vietnamese feudal period. Local people also take pride on the fact that the bay is where multiple victories against strong foreign invasions

take place. The location's importance in trade activities and defiance of foreign dominance makes Ha Long bay highly symbolic in marking the identity of the nation.

Mythology & Folklore

According to local legend, when Vietnam had just started to develop into a country, they had to fight against invaders. To assist the Vietnamese in defending their country, the gods sent a family of dragons as protectors. This family of dragons began spitting out jewels and jade. These jewels turned into the islands and islets dotting the bay, linking together to form a great wall against the invaders. Under magic, numerous rock mountains abruptly appeared on the sea, ahead of invaders' ships; the forward ships struck the rocks and each other. After winning the battle, the dragons were interested in peaceful sightseeing of the Earth, and then decided to live in this bay

Though the bay is basically a sea, local residents do not tend to see it that way in daily life. Many of the islands have acquired their names that are related to mainland as a result of interpretation of their unusual shapes. Such names include Voi Islet (elephant), Ga Choi Islet (fighting cock), Khi Islet (monkey), and Mai Nha Islet (roof). 989 of the islands have been given names. The naming of islands explains the perception of local fishermen of the bay – it is no longer a water-filled and wild landscape, but somehow is conceptually transformed into a terrestrial / amphibious landscape where its elements are linked to the vernacular objects found in mainland, e.g. trees, animals, and houses. This phenomenon reflects the intimate connection between the fishermen and their origin of land-based agriculture. In fact, they transfer some of the land-based lifestyle into the remote sea-life.

Livelihood

A community of around 1,600 people lives on Hạ Long Bay in four fishing villages: Cua Van, Ba Hang, Cong Tau and Vong Vieng. They live on floating houses

and are sustained through fishing and marine aquaculture. Nowadays they mostly rely on marine aquaculture – raising fishes, crabs and shells in enclosed net – because of the realized economic benefit and the minimized risk of that practice, which is superior to remote ocean fishing. The villages were established in the small area which is enclosed by high karsts serving as wind and current barriers. There, the relatively shallow water body (~20ft) and the steady and gentle flow of nutrients prove aquaculture productive and reliable. They constantly trade with the mainland residents with seafood for fresh water, vegetable, rice, fuel, constructing material, etc. Therefore, though located relatively remote out in the bay, those floating village are tightly connected in terms of livelihood to the people on main land.

The houses are arranged in a rural market-like pattern. They are erected next to each other along two side of a “water way”, an equivalence of traditional village’s main lane. This central spine serves as the place for moving boats and goods, for interaction and trading (Fig V.1.b.1). This arrangement signifies the sense of community among fishermen as well as their lingering concept of a land-based settlement which is yet replicated in totally new sea-based settings. The inter-dependence regarding livelihood and the settlement structural similarity between bay’s fishermen and land farmer almost create a social “eco-system” – it is impossible to observe and analyze those floating villages in detachment from their counterparts on land.

Fig V.1.b.1: One floating village in the bay: image and aerial plan

Building Culture:

As aforementioned, the culture and lifestyle of remote floating village should not be concerned in isolation from that of mainland. Studying building culture of mainland would help understanding sea settlement in two ways. First, the fishermen bring with them the way of life that is similar to that of mainland counterpart which physically reflect in the building orientation and function arrangement. Second, the vernacular technics of construction and typical material are also applied to floating construction, given that lack of resource in remote sea.

The traditional house in North Vietnam has the following characters. First, regarding the orientation, the main house mostly faces south, towards a central courtyard which is flanked by other smaller house units. This orientation minimizes solar heat gain, accepts cool winds from south or south east, and blocks the cold wind from north or north east. The courtyard has several purposes such as garden or crafting place, depending on the family's main profession (Fig V.1.b.2). The house has big openings (door, windows) in the front and small apertures high in the rear for effective natural ventilation. The veranda in front of the house acts as a buffer zone between inside and outside and mediates the temperature difference and direct solar radiation. The utilities unit such as kitchen and toilet are always put at the rear or the west to avoid smoke or odor to be blown towards the main house. The size and building material depends on the wealth of the owners: stucco brick wall, tiled roof, and wooden frame for affluent family; straw or mud wall, thatch roof, and bamboo frame for poor peasants. But in any case, the basic composition stays the same as described. Moreover, regarding landscape and plantation, the house often has small pond for retaining rain water and feeding fish; thin and high trees e.g. areca palm are planted in the rear to allow void for natural ventilation; thick and low trees e.g. banana and orchard are put in the rear to deflect cold winds.

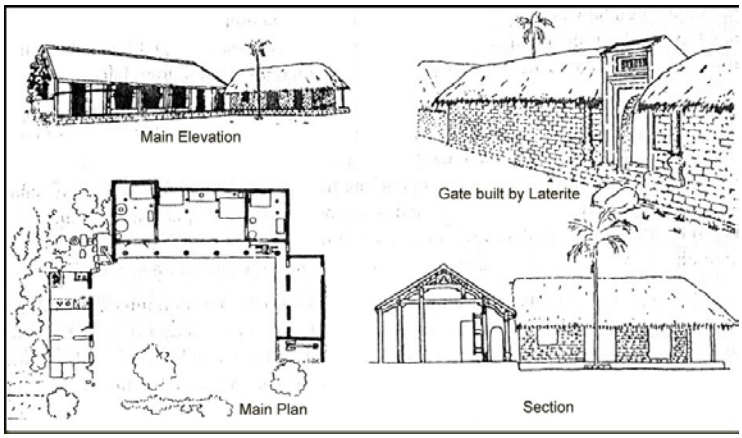


Fig V.1.b.2: Typical house plan in North Vietnam. Source: http://dalatarchi-trchoa.blogspot.com/2012/12/ac-trung-kien-truc-nha-vuon-truyen.html

Fig V.1.b.3: Typical current houses in Cua Van floating village.

The houses in floating villages have the similar typology with the traditional houses on land. The house's front has big openings on wall, a full-length veranda, and a "working courtyard" which in this case the underwater netted enclosure for aquaculture. Other similarities are the hip roof (though can be cladded with modern corrugated sheet), toilets and kitchen area to the rear. The house is built on top of a floating platform which is made of wooden planks resting on empty plastic or metal barrels.

However, this apparent transferring of the house topology from land to the sea condition does not yield the best result in terms of structure and micro-climatic condition. Here, problematization is needed. Since the wind at sea is much more violent (due to the lack of ground obstacles) and more unpredictable (because of the surrounding karst

producing turbulence), the hip roof structure and the flimsy veranda does not help much to hold the structure together. The conventional and rigid house's wood frame and flat platform do not effectively withstand the up-n-down and twisting wave movement, especially during sea storm. As the result, the frame is subjected to distortion, cracking, and breakdown over time. This structural risk requires hardwood as the main building material. However, wood is expensive, hard to be transport to site, and heavy. It intensifies the building effort for the community which is already economically vulnerable. This observation exemplifies a case where applying building type, though vernacular, into unsuitable condition is ineffective.

Bamboo Culture:

The conflict between vernacular typologies and specific sea condition I aforementioned suggests that, in order to really uncover the effective local solution, we need to look at building culture in different lens, away from the matter of "type" to that of underlying "techniques". Then I look at the bamboo building culture.

Like many countries in the South and East Asia, people in Vietnam have long history of "know-how" knowledge and practice in building with bamboo. Bamboo is considered one of the most sustainable material because of its wide global spread, its rapid biomass production, its high structural strength relatively to their mass, and arrays of other environmental benefits such as reduction of soil erosion, CO2 sequestration, and micro-climate improvement (Minke 2012). Though, different types of bamboo in each region, varying in size, strength, and durability, condition slightly different building techniques. The bamboo type most commonly used for construction in North Vietnam is Bambusa. It is relatively flexible and small in diameter, therefore more tolerant to bending and striping. Its versatile nature makes it an ideal material used for house construction, working tools and decoration. There are many types of bamboo tools of fishing with variety of form and weaving techniques, depending on the type of fishing

water e.g. channels, stream, river, and see (Fig V.1.b.4). Bamboo can also be found in structures like house and fishing hut (Fig V.1.b.5).

Fig V.1.b.4: Traditional bamboo tools for fishing

Fig V.1.b.5: Traditional bamboo structure: house and fishing hut

One of the most prominent uses of bamboo as constructing material is to make bamboo boat. The highly malleable and tensile properties of bamboo allow building boats of varying sizes (length ranging 1.5 – 10m, or 5 – 30ft), carrying capacities (300 – 7000 kg, or 600 - 15000 lbs), forms (“leaf” or “basket” boat, see Fig V.1.b.6) and purposes (trading or remotely fishing). The boat making process is mostly manual, craft intensive with several careful stages (more details in section V.2.B, architecture section) (Fig V.1.b.7). A good boat can operate at sea for more than a decade. There are several on-land villages, especially Hung Hoc village, which is famous of making traditional boats

for multi-generations, supplying not only for Ha Long Bay fishermen but also for workers in other adjacent regions. Even with the growing availability of industrially produced types of boat such as metal or plastic boat, traditional bamboo boat is still considered more economic, more durable and lighter, and therefore it still has its substantial market niche. To fishermen, boats are present in every aspects of life – transporting, fishing, trading, and even living. In short, through the practice of making and using boats, bamboo plays not only economic but also metaphysical meanings in local people's lives. It is the symbol of connecting making and using artifacts, and connecting people inland and at sea.

Fig V.1.b.6: Bamboo boat types: leaf and basket boat

Fig V.1.b.7: Bamboo boat construction: hull weaving and water proofing

Tourism activities

Since recognized as one of the most unique tourist destinations in Vietnam for 30 years, tourist activities increase in scope and types. The recent 2012 award by New Seven wonders Foundation as one of the New Seven Natural Wonders of the world

(http://www.new7wonders.com/) gives Halong Bay better global tourism exposure and, yet, intensify the tourist activities not all of which is responsible and sustainable. The current most dominant form of tourism in the bay area is sight-seeing in cruisers, including visiting limestone karsts, caves, and beaches. Setting aside the issue of ownership of those tours, their substance of engaging to the place, their economic profit margin, and their social positive impacts are very limited. The bay is swamped with cruiser ships especially in summer peak season, polluting the bay with fuel and garbage and disturbing the ecosystem. Some of cruising trips combine with more lucrative and meaningful activities such as on-board overnight staying and trading visit to the local fishing villages. However, the prevailing tourism practice is merely focusing on "low-lying fruit": many short visual-oriented trips.

Fig V.1.b.8: Several tourist activities: sight-seeing cruising and local village visiting.

2. Project: Floating Bamboo Ecolodge

A. INTRODUCTION

Project inception

Several floating villages in Ha Long Bay will be relocated to the mainland in near future. The region's long-term policy is to provide better livelihood for the remote fishermen when relocated, to conserve the natural environment of the bay, and to preserve the characteristic remote sea-based lifestyle and aquaculture for tourism and educational purposes.

This lodge aims to demonstrate a case where those objectives confluence. This is planned to be a model of sustainable, compact and unique floating resort facility. It presents a totally new mode of tourism consumption, differently from the currently dominating, transient mode of tourism based on cruising. Here the tourists stay in the bay, have the authentic and reflective experiences of the site and the local building culture and activities, yet leaving minimal ecological and visual impact on the site.

This lodge could also be testing case for the "sustainable aesthetics" in question because of the bay's crossover of sensitive ecological, cultural and tourist value – how the achieved aesthetic quality that makes the tourist facility marketable, desirable, and economical can contribute to the substance of the resort.

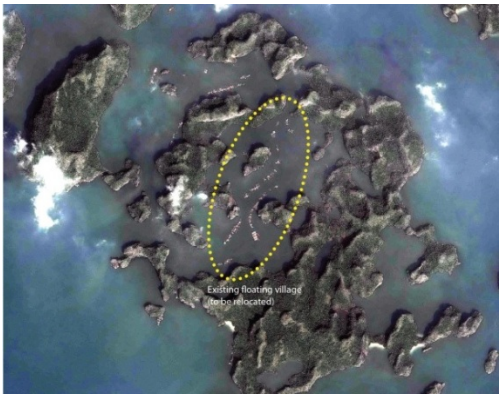


Fig V.2.a.1: Location of the existing village and new ecolodge

Program

- Entrance Pier: The main pier is where guest arrive the resort, preferably by light boats. There is also another small service pier that goes to the back of house.
- Reception Pavilion (1800 sqft): The reception desk will function to allow guests to check in and out and also function as an information center, concierge desk, and lobby lounge.
- Administration (1200 sqft): This area should include a Park Manager office and a general office with management desk cubicles.
- Restaurant & Bar (3000 sqft): The restaurant should be accessed from the reception area and should include a foyer and private restrooms. The restaurant should include private dining for 60. The restaurant will feature local menus, especially fresh seafood that is grown on site. The resort provides chartered boat to venture to adjacent floating village to dine with local fishermen.
- Kitchen (800 sqft): The kitchen area includes an outdoor service pier, garbage storage and compost area. Indoor areas include dry food storage, cold storage areas, food prep areas, cooking and grilling areas, beverage and service lines, dishwashing areas.
- Service and Utility (2000 sqft): Mechanical, Toilets, Storage, Water treatment plant
- Staff room (900 sqft): where the lodge's staffs stay on the site for immediate need. It can host 24 people. Other staffs that are local can stay in adjacent floating villages.
- Miscellaneous Outdoor Areas: Veranda, floating deck, sea water swimming area, fresh water swimming pool.

- Accommodation lodges / boats: There are two types of lodge: standard (180sqft each) and Special lodge (300 sqft each). There is private bath in each unit and several common toilets room.

Principal goals

The normative goals of this ecolodge include:

- Aesthetic / Experiential goals: the lodge will provide a unique but locally inspired imageries and experiential qualities that complement the natural environmental settings as well as attract savvy tourists.

- Environmental goals: the existing beautiful landscape and the environmental and ecological aesthetic mindset will condition the tourist practice which is low-impact and preserving the previous natural assets of the bay.

- Economic goals: Given the ecolodge's exceptional aesthetic quality and its inherent economical building / operating cost, it will demonstrate one model of low-impact, profitable ecotourism hospitality business which attracts knowledgeable investors.

- Social goals: The ecolodge will take the opportunities of the relocation of existing fishermen village to a more suitable inland settlement to form a sustainable business that in turn benefits the local community in terms of new investment flow, sustainable service-based labor demand, and promotion of local craftsmanship-based business.

B. ANALYSIS AND DESIGN

This section talks about the specific design of the ecolodge project in question, the Floating Bamboo Ecolodge. Specific design will be approached and detailed mostly with its formalistic attributes which are argued to be based on the set of "sustainable aesthetics" previously proposed (See part IV.1, "Analysis of sustainable aesthetics") and to be able to produce other relevant aesthetic qualities (engagement, meaning, experience, etc.). In short, the attitude or method to design is largely *form-oriented*. However, it does not suggest that this method is universally appropriate or applicable. For the purpose of this specific thesis, this only means a demonstration of one type of design method effectiveness of which is left to criticism.

The chart below, in the similar manner as the analysis of case studies section (See part IV.2, "Analysis of sustainable aesthetics"), summarizes all major interpretation of design feature in relation to three discussed type of aesthetics. The detailed rationales and demonstration (diagram, maps, plans, drawings, renderings, etc) of each interpretation are articulated in details after the chart.

Aspects of design	Environmental aesthetics	Ecological aesthetics	Performative aesthetics
Location / Master-planning	- The ecolodge is located in lieu of the floating village which is subsidized to move inland - Retain small part of village in place - Reinsert the similar spinal organizing structure like the relocated village	- Changes of shadow of karst through-out the year inform the solar-based optimal locations - Flow of daily tide and stream decide the organizing spine - Different aero-dynamic conditions affected by seasonal winds and topography inform optimal wind protection and exposure	- The spinal organization along the stream direction minimize inflicting forces of water flow and stabilize the structure - Orientation of the spine SW-NE allow exposure to summer SE wind and minimal impact by winter NE wind
Landscape	- Structures are entirely floating to avoid any intervention to the karst - Entry to the ecolodge is where tourists pass by the remaining floating village before entering.	- Structure is put close up to karsts to reveal the erosion effect of millennium tide on their rock base - Floating structures themselves form the flexible and ever-changing man-made landscape	
Architecture form	- Transparent and low-profiled form minimizes visual impact on natural landscape - Architectural form is informed by basic vernacular form: boats, fishing tools. - Undulating form blends / mimics with iconographic image of bay's karst	- Airy and open forms allow guest's interaction with changing heat, light, and wind - Form of covering membrane is flexible in response to weather condition or storms	- Forms follow logic of structural integrity and efficiency - Dome-like boat hull withstand buoyancy - Triangulated deck frame resist internal stress generated by shifting parts - Bended bamboo cane into circle or catenary shape resists gravity force with minimal mass - Covering membrane is curved to withstand / divert wind load
Construction Material	- Bamboo usage is supportive to local economic - Construction is adapted from local craftsmanship	- Bamboo construction frame and joint detail is exposed - Reveal the process of bamboo crafting: cutting, lathing, striping, etc.	- Bamboo is used because it is locally grown, rapidly matured, lightweight (suitable for floating structure) - Bended (rather straighten) bamboo is used to maximize bamboo structural properties - Cotton fabric is used for covering membrane because it "breathes" yet waterproofed after weathering process
Energy / Utility	- Guests themselves manually operate utilities: shower, compost toilet, recycle water, waste collection, etc.	- Display of utilities function: tidal stream power generator, solar panel installation.	- Upside-down funnel-shaped membrane allow harvesting rain water

Table 5.1: Summary of design features in Floating Bamboo Eolodge in Halong Bay.

Location / Masterplan

Environmental aesthetics

Several floating villages in Ha Long Bay will be relocated to the mainland in near future. One of them (Fig V.2.b.1) is hypothetically chosen to be the location for the substitute ecolodge. The aesthetic rationale lies on the intention to provide the tourists who stay in the lodge the experience of the same natural setting as the fishermen have witnessed for the last couple hundred years. Therefore, they will observe and understand how and why this mini-bay in history was wisely picked by the local people to serve as naturally formed shield to protect them from sea storms and aggressive waves. In the same time, the environmentalist rationale lies in the necessity to minimized human "footprint" – to inhabit on previously exploited area rather than to intrude into new pristine area.

One small portion of fishing village in the adjacent area, I recommend, to remain in place, reasonably with better financial support from the ecolodge's revenue. This part makes up one component of the total environmental experience – the presence of actual human livelihood organically linked with nature.

The new ecolodge's built "buildings" are organized along a spine in the similar manner with relocated village. As putting in the analysis part of cultural context, the houses are arranged in a market-like manner. They are erected next to each other along two side of a "water way". This organization more or less reminds the guests about the overall village's structure and circulation.

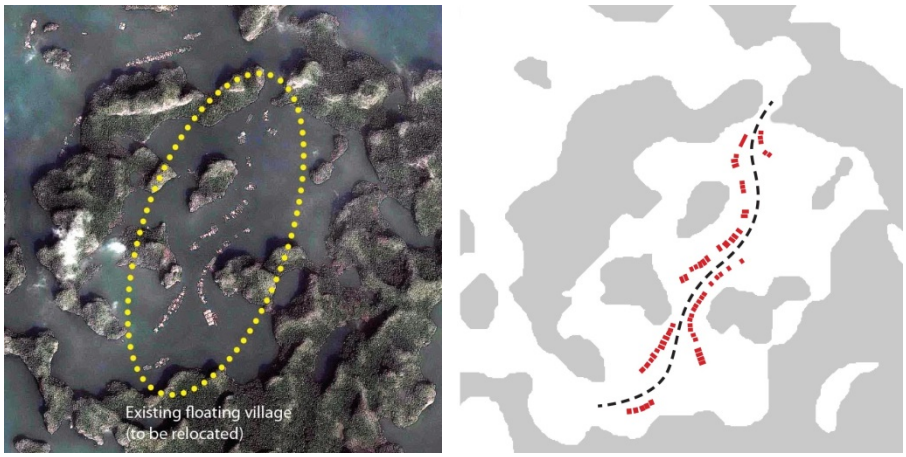


Fig V.2.b.1: Left: Aerial map of existing village. Right: Diagram of village organization.

Ecological aesthetics

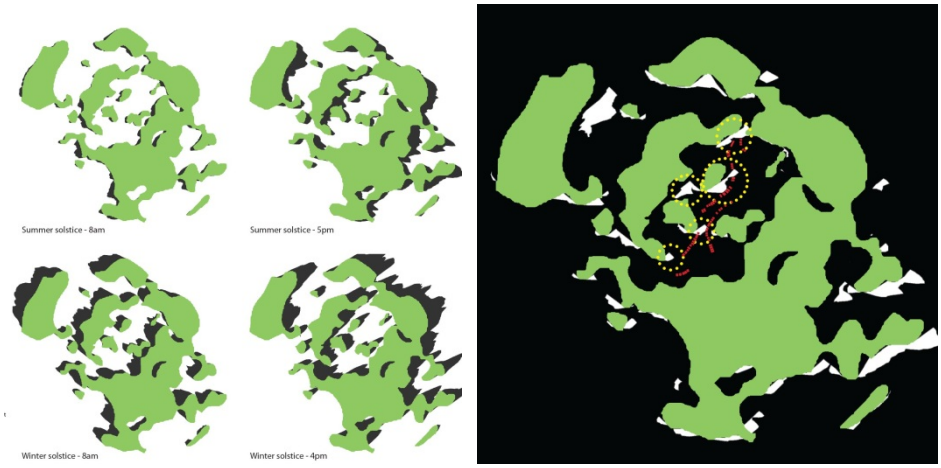


Fig V.2.b.2: Left: from top-left to bottom-right, shadow map in critical yearly time: summer solstice 8am and 5pm, winter solstice 8am and 4pm.
Right: Composited shadow map. White area show optimal locations which is exposed to winter sun and is protected from summer sun

The solar geometry analysis is critical to this project masterplan and to making of the environmental beauty. The signature landscape of this bay is series of 150ft to 300ft high limestone karst rising above relatively still water. There is not any view from the site to the remote ocean outside the karst “walls”. Therefore, the movement of the sun observed in relation to the karst and their resulting shadows casted on the water table are the most prominent indicators of daily natural process. The shadow map analysis lets us

know the most optimal zone for shading in summer and for sun exposure in winter (Fig.V.2.b.2). These zones are where thermal comfort is more likely to be achieved with minimum effort, therefore suitable for major, highly used buildings (lobby, restaurant, swimming ring). They are scattered in several places along the bay and serve as armatures for future building.

Hydrology knowledge also plays important role in design decision of the masterplan. There is a prevailing tide movement from the site to inland, resulting two tide gates in north and south. The north one is where tide stream come during the day and the south one during night. Between these two tides gate is a relatively constant tidal stream which is strongest at the gate entries. This fact suggests that in order to be less affected by the stream, the structure needs to be organized parallel to it and to be away from the gate's entry (Fig.V.2.b.3). This observation further supports the choice of linear organization which also strongly correlates to the relocated village's linear plan.

The masterplan also considers wind pattern for its optimal form. Although the climate is relatively benign, there are still needs to avoid cold winter wind and to accept cool summer wind. The topography of karsts interacts with prevailing seasonal winds to create wind shadow / turbulence zone and wind funneling draft zone. Accordingly, in winter it is ideal to avoid draft area and seek shelter in wind shadow, and vice versa in summer (Fig.V.2.b.4). For example, in order for sea swimming to be comfortable, it needs to be prioritized to be shielded from winter wind. Restaurant in contrary is more important to be exposed to cool wind.

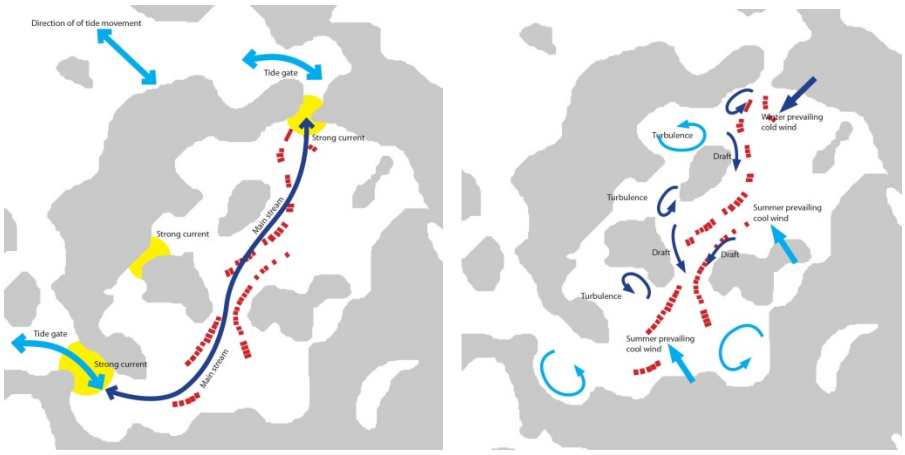


Fig V.2.b.3: Hydrology diagram

Fig V.2.b.4: Wind diagram

Performative aesthetics

Regarding the specific consideration of sun, wind, and water elements in masterplan, the performative aesthetics is overlapped with the ecological aesthetics. Ecological mindset basically says that those natural element patterns and flows need to be revealed and expressed via the tangible expression. Performative mindset takes that knowledge of natural elements and rationalizes it in terms of optimal thermal comfort to come up with design decision. In other words, performative mindset decides which element matters the most to human comfort and perception and how it is prioritized. In this case, different functions are located in place which has the mist suitable thermal condition to that function. For example, swimming area needs sunlight all year; restaurant needs good shading, breeze; sleeping lodges need private views. The rationalized allocation of function in turn determines the shape of the master plan. In other words, the masterplan does not derive from the preconceived aesthetic idea of composition but rather from the logical requirement of function in compatibility with ecological elements.

The following masterplan is one proposed version that applies the discussed rationales, yet by no mean the only correct one. The organization is flexible to adapt to growing demands or any unexpected environmental changes.

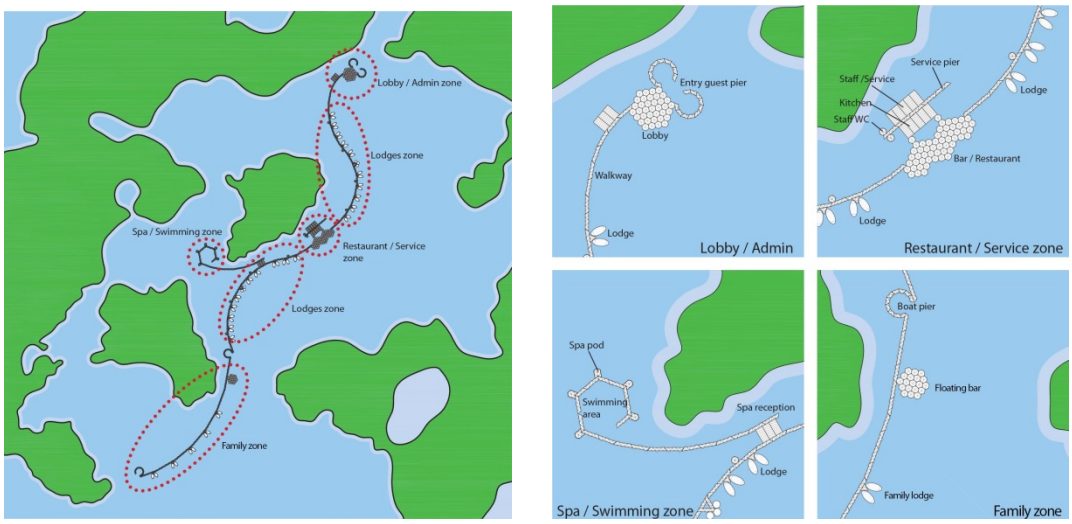


Fig V.2.b.5:
Left: Complete masterplan
Right: Blow-up zones: Lobby / Admin, Restaurant / Service, Spa / Swimming pool, Family zone

Landscape

Environmental aesthetics

All buildings are floating ones to avoid any intervention to the existing karsts or sea bed. Minor supporting anchors for the floating structures are needed but they do not pose big negative effect on the sea bed ecozone. This practice continues the tradition of floating lifestyle.

The entry arrangement to the ecolodge is important to form the guest's perception of the place. As mentioned before, there are two tide gates leading to the mini-bay where the complex resides in. If entering from the south gate, the guest would not encounter any fishermen settlement on the way, while if entering from the north one, they will pass by one portion of the previous settlement. I suggest that the latter is more suitable to pursue

a holistic experience of the place, because it reflects the place as historically inhabited, not a total pristine, uninhabited one. Understanding that there is dynamics between human and nature in this poetic place is argued to make the guests appreciate it more.

Ecological + Performative aesthetics

Since this is sea-based setting, the floating buildings themselves are the man-made landscape. In the environment of ever-changing condition of natural flows, the "landscape" needs to express that transient nature. The whole complex is made of series of separate floating components which is tied and braced together to form a larger whole. Those components include lounge, walkway, pier, swimming ring, restaurant, sleeping lodge, service (Fig V.2.b.6). Yet each component can be detached, fixed, or replaced individually. The beauty of this landscape lies in the continuous build-and-rebuild process during its lifetime as long as it is sustained by human. The practical perspective of this flexible design is the fact that only small component can be handled effectively given the limit of aquatic construction site and logistics (material is mostly transported by available small boats). Moreover, on the site, because there is no solid ground, the precise allocation of construction reference point proves difficult. Rather than a predetermined and top-down plan, a bottom-up approach in which building are put together in piecemeal, immediate demand-responding manners is more practical. Moreover, group of component together respond more effectively to natural elements than a separate component. For example, a grid of interconnected platform is more stable than single platform.

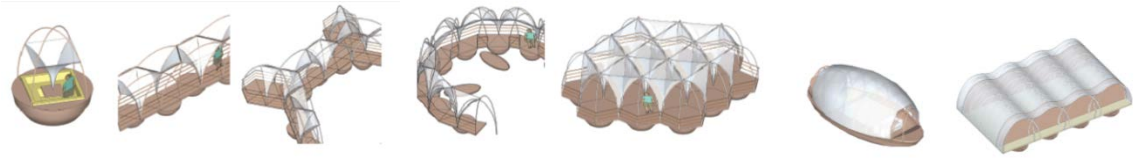


Fig V.2.b.6: Collection of component type that make the whole complex: lounge, walkway, pier, swimming ring, restaurant, sleeping lodge, service.

Architecture form

Environmental aesthetics

The overall architectural common features of components are transparence, undulation and low-profile. The purpose is to either minimize the visual impact on the site or complement the landscape features. Low-profile keeps the structure silhouette parallel to the water surface and not interfering with view to karsts. Undulating structure's profile imitates the silhouette of the uneven, rounded karst formation – an iconographic image of the bay – and thus blends into the landscape background (Fig V.2.b.7). In other words, the structure does not mean to camouflage / disappear but rather express its presence as a humble response to the more dominating natural settings.

Fig V.2.b.7: Correlation between landscape iconography and basic structure form

The profile undulation of the structure does not only result from the need to submit to the landscape image but also from the basic vernacular forms. They include the signature forms of basket boat and leaf boat which are used daily by fishermen to traveling and fishing. They also include the shape of several other fishing tools on the inland river, e.g. fish trap made of crossed bamboo frames, fish basket weaved from bamboo belts (Fig V.2.b.8).

Fig V.2.b.8: Vernacular forms of fishing boat and tools

Ecological aesthetics

The air and open forms allows guests to interact directly and tactilely with changing natural elements – light, heat, and wind. The purpose is to reveal the process of nature phenomenon to guest's bodily perception. This interaction, though does not conform to the urban notion of constant state of human comfort, is encouraged as long the as the elements are controlled within certain threshold to avoid unbearable discomfort. The controlling factors include careful allocation of function based on natural context (see previous location / masterplan section), the basic sheltering devices e.g. sunshade, and necessary solution of protection from severe weather conditions e.g. fully enclosed sleeping cocoon-like lodge boat.

The lounge pavilion and the restaurant are specific example of adaptable and kinetic structure that maximizes direct guest's interaction with nature. With the small lounge pavilion, the seating platform is sunk inside the hull. Therefore the line of sight is lower to almost the same level of outside water surface, which provide an unusual but interesting experience almost equivalent to being immerse in the water. The mushroom-like membrane hung onto bended bamboo frame provides basic sun shade in normal time.

Yet in case of storm, the membrane can flip upside down – the below tip is raised and the edge is pull downward with low-tech pulley mechanism – and cover the boat from heavy rain (Fig V.2.b.9). With the large restaurant, the extensive shading system is composed of series of smaller component which can be adjusted from total shading (during the day) to fully retracted (at night or in storms). Differently from the lounge boat, the restaurant deck drains water directly to beneath (Fig V.2.b.10).

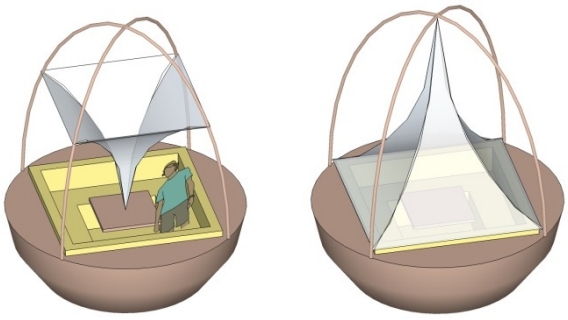


Fig V.2.b.9: Lounge pavilion boat: open and enclosed modes

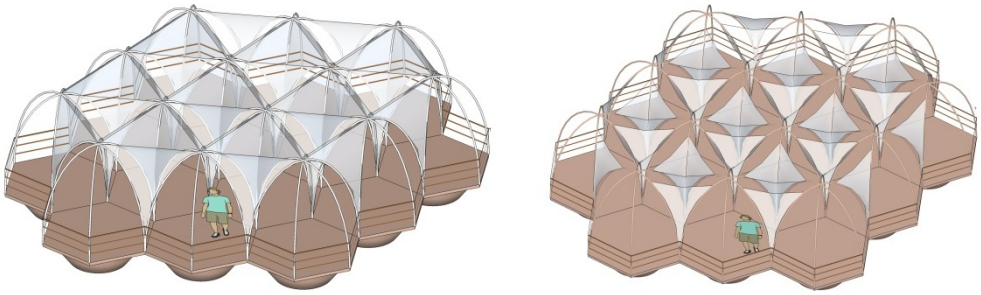


Fig V.2.b.10: Restaurant: full shading and partially retracting modes

Performative aesthetics

The curving structure's forms follow the logic of structural integrity and efficiency. Each component - lounge, walkway, pier, swimming ring, restaurant, sleeping lodge, service – is broken down into 4 types of major structural elements i.e. the hull, the deck, superstructure frame, and the covering membrane. Each element, while being

interconnected to make a stronger whole, generates its form from its structural necessity (Fig V.2.b.11). Therefore it only requires the efficient and minimum amount of material, especially given the sea environment – the less material is weighted, the smaller structure is needed to make it float, which in turn requires less material mass, and so on.

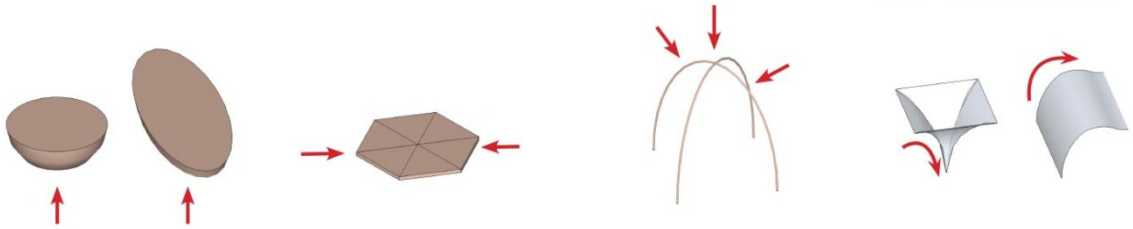


Fig V.2.b.11: Different structural elements: the hull, the deck, superstructure frame, and the covering membrane.

Bamboo hull is made from dome-like woven bamboo and with the same technique to make traditional basket and leaf boat. The hull withstands the buoyancy force of the water. The two dimensioned curve surface distribute that force equality and bring it to the outer hull edge which is reinforced by layered bamboo lath. This hull is used as the underwater base foundation for other structural elements.

The framed deck is a triangulated grid of bamboo canes. The frame rigidifies the hull beneath; it resists the horizontal external force caused by wave and the internal stress caused by shifting of parts under influence of wave movement. This frame is used as the supporting structure for the flat deck or platform.

The bamboo frame is the superstructure elements which connect the different elements vertically. The bamboo cane is bended using simple wetting and heating technique. The bamboo is bended to semicircle or catenary shape – the shape that can resist gravity force with minimum mass. The frame is continuous from the hull interior surface to the top to ensure the gravity forced is distributed directly to the hull. Strength of the frame is bolstered when canes are bundles or cross-braced.

The covering membrane is curved surface to withstand the aerodynamic horizontal wind load. It is tied to the bottom and top for stability. The curvature is one dimensioned so it is easy to produce. Depending on the function of the component, the membrane is made of cotton fabric or fully waterproof poly-carbonate sheet (see next Construction and Material part)

Construction and Material

Environmental aesthetics

The main material used for this ecolodge is locally grown bamboo. The environmental beauty of bamboo is beyond the boundary of the ecolodge – it is about perpetuate and promote the bamboo building culture of the bay's region as a whole. Bamboo culture is an un-detachable part of what make Ha Long bay unique and complete as a human inhabited "land" and therefore need to be celebrated. Technique of bamboo construction in the lodge is adapted from local craftsmanship which has been developing through hundreds of year and over multiple generations. Gradually, bamboo craftsmanship is one important local business sector of the region. Choosing to build with bamboo and working with local people well verse with bamboo building is critical to support the local economic development in the face of industrialization and reduction of labor compensation.

Ecological aesthetics

The process of building and the truthful expression of that process are more important than the polished final images of the product. The process is represented by the exposure of the bamboo frame and joint detail. The tectonics of bamboo frame is argued to have its own aesthetics. For example, in the sleeping lodge, while the exterior is almost

covered given the functional and privacy necessities, the constructing criss-crossing frame of bamboo canes is exposed from the interior space (Fig V.2.b.12).

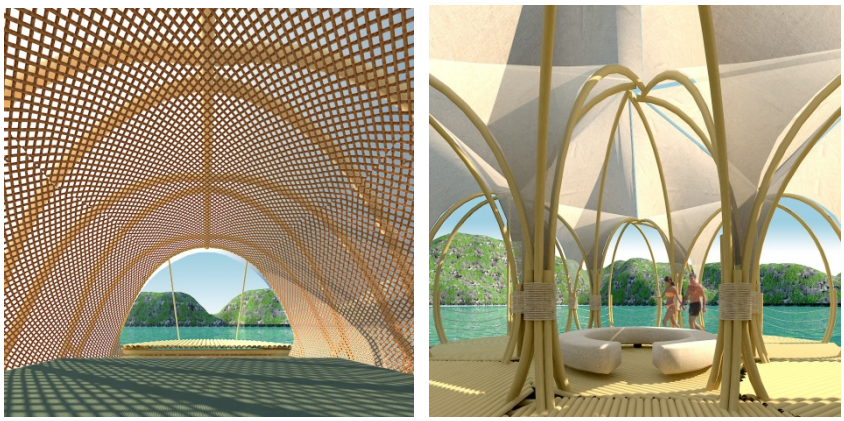
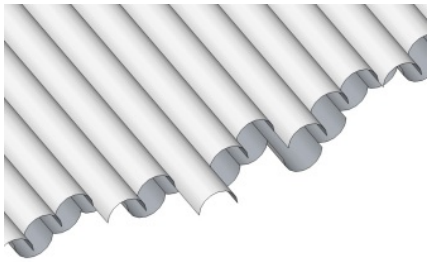


Fig V.2.b.12: View of bamboo frame revealed from building interior

The process of the bamboo crafting is also expressed in details. For example, the deck is made from bamboo cane that is split into halves along the length, removed off the node diaphragms, and installed in “tongue-n-groove” fashion. Yet the length of the canes do not need to be uniform but rather can be random depending on available bamboo pieces. The result appears natural and improvising (Fig V.2.b.13). The most important aspect of bamboo construction is the formation of joints that transfer forces from one element to another. The chosen method of connecting is bindings. The natural fibers is dampened and tied; it is tighten when it dries, and it is left to be displayed without covering layer (Fig V.2.b.14).



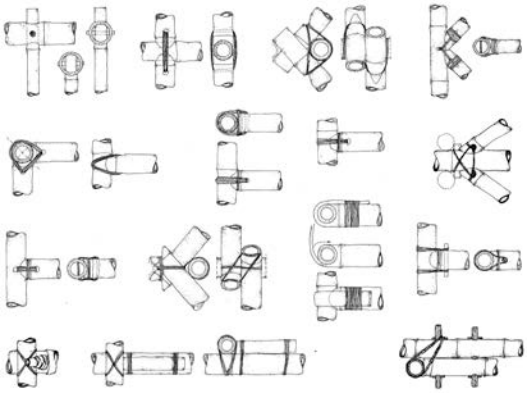


Fig V.2.b.13: Deck made from split bamboo cane.

Fig V.2.b.14: Bamboo tying techniques. Source: Minke 2012

Performative aesthetics

Bamboo is considered one of the most sustainable materials because of its wide global spread, its rapid biomass production, its high structural strength relatively to their mass, and arrays of other environmental benefits such as reduction of soil erosion, CO2 sequestration, and micro-climate improvement. Those performative properties make bamboo a suitable material to build. Moreover, because of its structural properties (e.g. stronger along the grain than across the grain, vulnerable to bending yet easy to be proactively bended with heat), bamboo produce a distinctive aesthetics when used properly. For example, bended curving cane is stronger and in the same time produces a gentler and "feminist" image than segmented straight canes.

Choosing membrane, rather than rigid one or thatch roof, as covering material is also a rationalized act. The foremost reason is because of the weight. Two types of membrane are used: the cotton fabric and the polycarbonate sheet. The cotton fabric is used for shading and light rain shelter for open structure such as restaurant, walkway or lounge boat. The fabric can "breath"; it allows hot air to pass through and avoid accumulated heat on the fabric's surface. However, when having enough of "weathering", the fabric is also water proof when dampened. The second type of

membrane, the polycarbonate translucent sheet, is used for more enclosed components such as sleeping lodge and service component. It is fully water-proof to protect more sensitive and less flexible functions. It is translucent to provide ambient lighting in more enclosed spaces.

Energy and Utility

Environmental aesthetics

The guests manually operate the utilities system in order to fully immerse themselves into the low-tech nearly zero-electric lifestyle. For example, when taking a shower, they use a pumping system which is entirely manual. It includes a below the shower deck water tank, a showerhead on top, the small rubber chamber that is connected between the tank and the showerhead. To run the water, guests step on the chamber alternatively with two feet to create a constant pressure within. The generated pressure pushed water from the tank to the showerhead. The water pressure coming out depends on stepping speed.

It is necessary for guests to learn about ways to operate other system such compost toilet, water recycling and waste collection before checking-in. In the case of this ecolodge, the educational purpose and the evocation of environmental active responsibility prevails the intention to provide conventional yet passive hospitality services.

Ecological aesthetics

The tide pattern with high amplitude provides opportunities for tidal stream power generator. There are types of power generator that is entirely floated, therefore not intruding the hardscape. The optimal location for such generator is at the tide gate where the stream is strongest. Also, this location also allows the generator to be displayed

clearly to the incoming guests and to deliver the message about new sustainable electric harvester. Accordingly, the beauty of such system is the literal imagery but rather its underlying purpose.

It is similar to solar water heating and photovoltaic system. The shadow map can inform the location where sun light is available all year round and where water heating pods and photovoltaic stations can be placed. Water heater pod is a floating bamboo structure; it is wrapped by a continuous black flexible pipe that runs spirally from the base to the tank on top. Throughout the day, the water in the tank will be gradually heated up and ready to use at night. Photovoltaic panel can be integrated to that pod for aesthetic purpose.

The ecological mindset is also expressed in the operation of the ecolodge in relationships to other environmental, economic and social factors in proximity and farther. The lodge is supposed to be sustainable not only because of its high degree of self-sufficiency and resiliency (appropriate construction, efficient and responsible usage of water and energy, sensitive treatment of waste, etc) but also because of its tight connections to external elements which make the ecolodge part of a greater environmental and socio-economic ecology. The principle is to operate within limited local resource, to limit externalized waste, to import only what is lack and necessitated. For example, the existing pattern of daily commuting between the mainland and the fishing floating villages is maintained through which commodities, consumables, resource, waste, labor, and guests are transported. The lodge is supposed to continue the practice of aquaculture to provide onsite seafood and to trade with mainland. Some elements critical in the context of ecotourism is alien investment, alien tourist revenue and other external expertise which provide appropriate scientific knowledge and technological solution (Fig V.2.b.15).

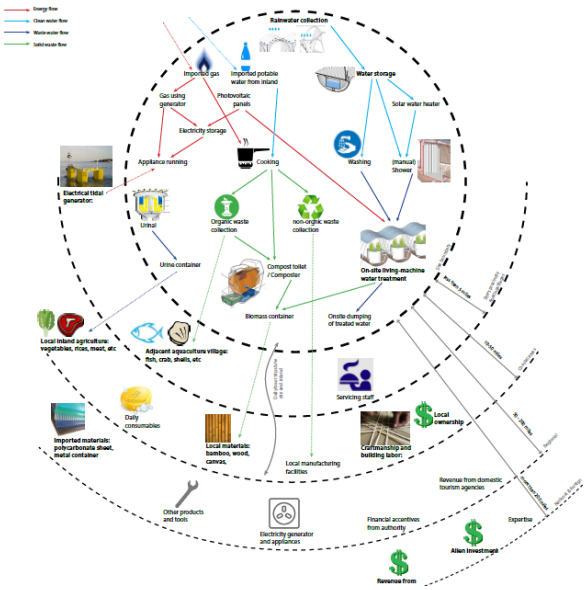


Fig V.2.b.15: Operative diagram in the ecolodge in its relationship to internal processes and other external factors.

Performative aesthetics

The curving form of roof membrane, besides delivering the performative aesthetics in terms of structure and aerodynamic quality, also serves an utility purpose: rain water harvesting. The upside-down funnel-shaped membranes on walkway channel rain water into the chamber inside the bamboo hull underneath the walkway's deck (Fig V.2.b.16). Accordingly, the entire walkway spine serve as one integrating *infrastructure system* – circulation, running electrical cables, collecting and storing fresh water. Because the walkway is of the great length all along the eco-lodge complex and the precipitation rate is high, it hypothetically stores enough water to use during interval between rain events. The services building with its undulating roof can also collect water in its valley and channel it directly to use for back-of-house: kitchen, laundry, and cleaning. Collecting rain water and recycle grey water onsite eliminate the substantially need to transport fresh water daily from inland to the site, saving money and focus on potable water and other off-site consumables.

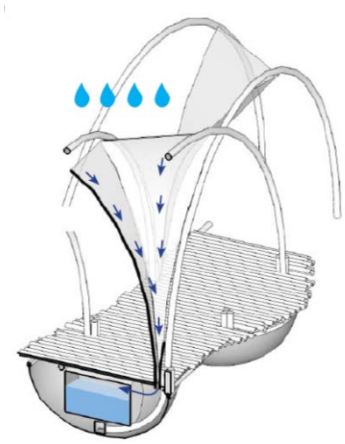


Fig V.2.b.16: Mechanism of rain water collection in walkway components

Besides rain water, one major mechanism the undulating form of the building is calibration of micro climate. This calibration is achieved by using the double skin strategies. Take the sleeping boat as the example. The boat is covered with an exterior layer of polycarbonate sheet, and is clad in the interior a layer of woven bamboo matt. The exterior layer is translucent and impermeable, therefore provides protection from rain and wind and allows diffuse sunlight, but it is vulnerable to overheating from radiation. The interior bamboo matt is essentially opaque; however it has tiny gaps on the surface because of the method of weaving bamboo strips, therefore allows slow circulation between 2 sides of the matt. Working together, the permeable cover and the bamboo matt create a double-skin cooling and heating mechanism respectively in the summer and winter. For example, in the summer, the cavity in the skin absorbs the incoming solar radiation, heats up, and gets exhausted to the outside through open side vents. In the same time, hot air inside the living space rise and escape into the cavity through matt's tiny gaps; cool air which is closer to the water surface and shaded from the sun is drawn in to the cavity to replace the heated air. In the winter, the cavity air is similarly heated, yet trapped within the cavity (because the side vents are closed) and slowly radiates warmth into the living space below. Overall, the double skin acts as a temperature buffer and

calibrating device of micro climate within the boat. But it is only possible because of the boat's form, structure, and material.

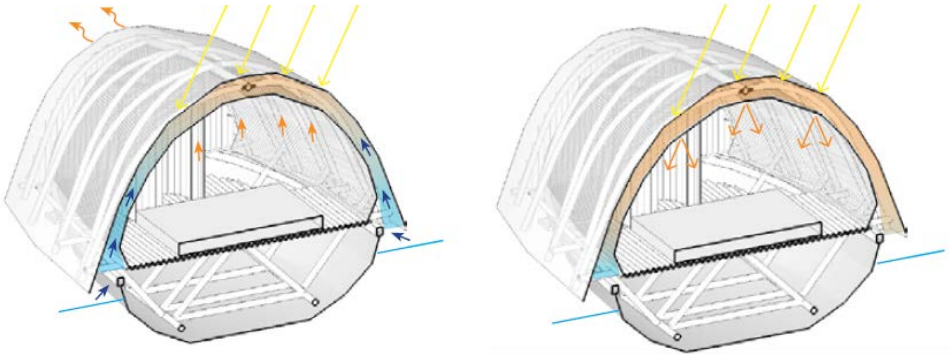


Fig V.2.b.17: Mechanism of double skin in sleeping component

C. DESIGN PROPOSAL CRITIQUE

Above I explain in detail the rationales, solutions, and explanations of several design aspects in Bamboo Floating Eco-lodge project. Those writings focus on the positive advocation of how understanding of "sustainable aesthetics" can proactively inform the design decision through rationalization process and as the result contribute to the substance, rather the superficiality, of beauty. Beauty, if consciously pondered and made of appropriate rationale, can have the real effect on the sustainability practice.

However, I do not intend to argue that this discussed aesthetics-based approach to design in general and to ecotourism design in particular can effectively bring about the holistic sustainable solution (as I can reasonably say the same with any other design approach). Inter-discipline and synthesizing mindset is always critical to design, given the breadth and complexity of the sustainability issues. In the following I will elaborate on several critiques of this ecolodge case study.

There is question of the substance of sustainability in physical design solution (material and construction) in comparison with other operational aspects of the project e.g. energy, utility. One can argue that the substance lies in the process of operating a project rather than the initial condition. While I agree that making and operating is of equal importance in general, in this particular case study, I would contend in favor of construction part. Here because the need for electricity and water is reasonably much lowered than conventional hospitality project, the largest portion of cost is the initial construction and subsequent structural maintenance cost. Therefore, the construction method itself determines the sustainability value. And with rational and efficient design, smaller portion of cost comes to material, while bigger portion belongs to labor cost of skilled workers. A sustainable building culture, as any other sector of economy, should focus on the intangible values rather than physical value.

Moreover, one might raise the question of the lack of social equality in this type of tourist business and the question of how the generation of “sustainable beauty” does little to the social components of sustainability. A humanitarian perspective would condemn the ecotourism industry as displacing the local people in advantageous location to appropriate the value of natural assets and “sell” back to alien tourists. This condemnation is reasonable, and it is true to many ecotourism businesses, especially in developing world (see part II.3.c – Current development of ecotourism). However, I would argue that this phenomenon is not inherent to the model of ecotourism. One of the cruxes of ecotourism in poor countries that even the humanist / environmentalist do not have the other practical answer is the issue of development. Growth is an absolute requirement – it would be anti-humanitarian to perpetuate the state of low level standard living of local people no matter how the environment is well preserved or how the social equality is ensured. Accordingly, ecotourism remains one of most viable devices to develop the economy sustainably. The question remains how this kind of business should develop and how designers should involve in meaningful way.

I contend that the proposal design here offers one answer to the ecotourism conundrum. The project realizes the core of solution is to find an appropriate mean of construction and aestheticize it. The specification of lodge to be built with bamboo has given the local people – professional craftsmen or fishermen – the agency to determine the social outcome of this tourist project. In other words, when local people are the only ones to have the knowledge to build, they have the innate right to negotiate with investors or developers about terms – how to build, how much to pay, conditions and others. The job of a responsible designer is not only to fulfill the project investors’ requirements but also set the conditions for the less privileged stakeholders to have better standing.

Then it comes back to the question of the role of the so-called “sustainable aesthetics”. Some would point out it is more a “product” for sale that is served solely for

privileged people than an equally distributed intangible “asset”. Along this line of reasoning, one can go further to say “sustainable aesthetics” is a “green-wash” device. I would agree that this kind of beauty of a very unique kind of “product” which is meant for consumption, yet in a positive connotation. If we consider laws of economy, a “product” has two kind of value: value “in use” and value “in exchange”. Value “in exchange” is not the same universally – each context, each people perceive it differently. “Sustainable beauty” has very high value “in exchange” to alien tourists – they are willing to pay for it, while is almost non-existent to local people. Without ecotourism, there is not exchange and thus the local economy would not acquire that value “in exchange”. However, despite any exchange, the value “in use” remains unchanged as long as sustainability effort is pursued. In other words, the local economy does not lose any real value of the “aesthetic asset”.

Applying understanding of “sustainable aesthetics” into the design and operation of ecotourism would magnify the value “in exchange” and benefit the local development. No matter how attractive and profitable an ecotourist project can be, if environmental and social components are ignored, it is not ultimately sustainable. Similarly, no matter how appropriate one project could be in terms of ecology and social equality, if it is not beautiful and attractive in reasonable way, there will not be revenue to maintain that desirable state. In short, “sustainable aesthetics” advocates for the latter.

VI. CONCLUSION:

There are three parts to my thesis findings. First, I synthesize three new kinds of aesthetics and logically argue that they are positively connected to sustainability, through the different categories of marriages between aesthetics and sustainability. Three kinds of alternative aesthetics are environmental, ecological, and performative aesthetics. Second, I collect series of precedents and examples of ecolodge, systematically analyze their designs and summarize the strategies that are responsive to the new kind of aesthetics and fulfilling of ecotourism criteria. And third, I apply those strategies in one specific design case study, the Floating Bamboo Ecolodge in Halong Bay, Vietnam. This case study serves as a detail examination and critique of the strategies' practical usefulness.

Through these findings, I argue that the new set of aesthetics can be (1) theoretically correct to promote sustainable design and (2) serves as guiding and evaluation tool to make ecotousim design aesthetically appealing, sustainably economical, and socially beneficial. Also, I find that the most persuasive and effective design strategy, through the lens of aesthetics discussion, is the synergy of three kinds of aesthetics: environmental, ecological, and performative. It is when one strategy or design feature can fulfill several objectives and criteria in the same time, and therefore considered an elegant, efficient, and economic solution.

Moreover, the sustainable design is different from the conventional philosophy of aesthetics in one critical point – the purpose of the aesthetics. Normative aesthetics sees beauty, however defined, as the ultimate goal, as the objective by itself, and as the truth begging for approval through philosophical rationalization. In other words, it is goal-oriented. In contrast, the new set of aesthetics considers aesthetic thoughts only as means and tools towards the other economic, social and environmental goals. In other words, it is effect-oriented. Therefore, to achieve the sustainable beauty in any case of design is not

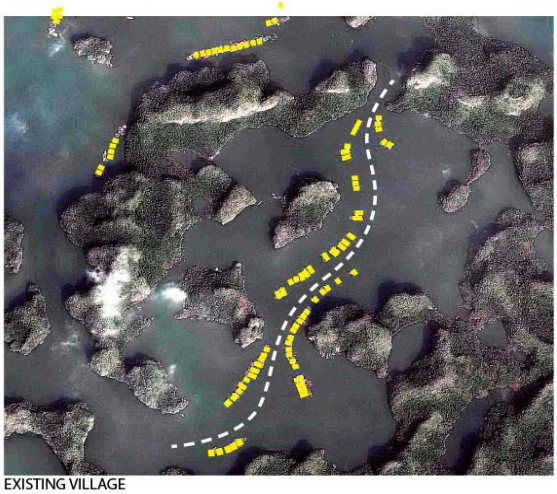
supposed to be an explicit statement, but rather a ground, an attitude, and a rationale with which other meaningful effects are obtained.

After the analysis of the case study and one demonstrative project, I full acknowledge that this aesthetics-based approach is not the sole appropriate approach to sustainable design. The aesthetics rationales and the demonstration of design process that originates from those rationales presented in this thesis is one way to frame the design issues, and in the specific context of ecotourism. Moreover, some design problems – economic ethics, social equality, community engagement, etc - are not fully addressed within the presented framework of sustainable aesthetics. It is because of the morphological nature of this framework. For a holistic design, social components with its specialized set of social science tools need to be integrated. Still, the morphological design grounded by aesthetics rationales serves as the physical "springboard" for extended discussion to happen.

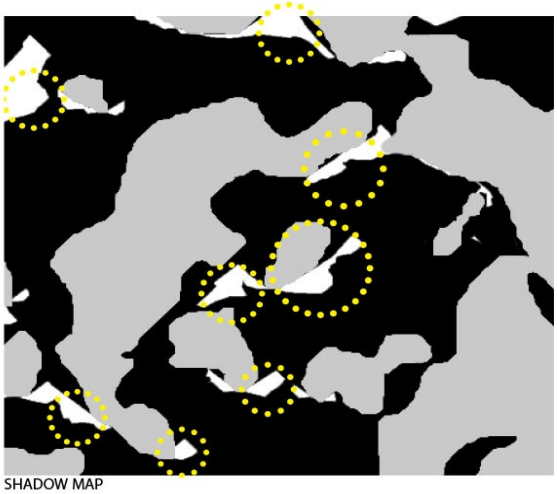
I have no intention to resolve the binary of my established framework: cognitive / non-cognitive aesthetics, and substantive / non-substantive sustainability. I do not attempt to reduce the discussion into either extreme - that authentic investigation of aesthetics should ground on positivist, mechanistic rationales or that true sustainable system should be based on real perpetuation of material provision. Such reduction would not do justice to the phenomenological, experiential, social account of aesthetics as well as sustainability. In the contrary, I suggest to keep both sides of this binary discussion alive. It is the tension and the complexity that is produced by this dialogue that keep the society progress in its route of finding a future that fulfill our demand for both our bodily survival and our sensuous experiencing.

Appendices: Design proposal

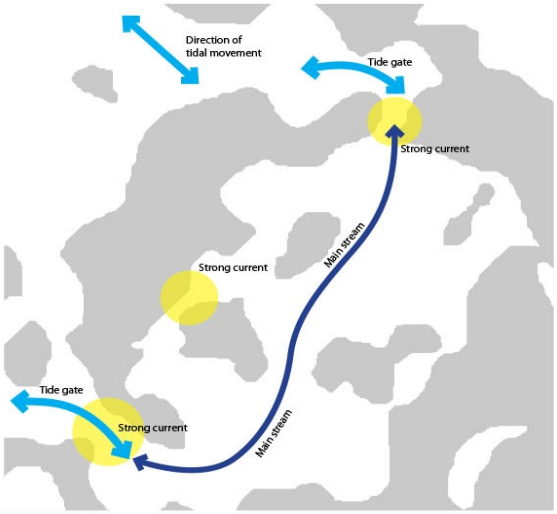
SITE ANALYSIS



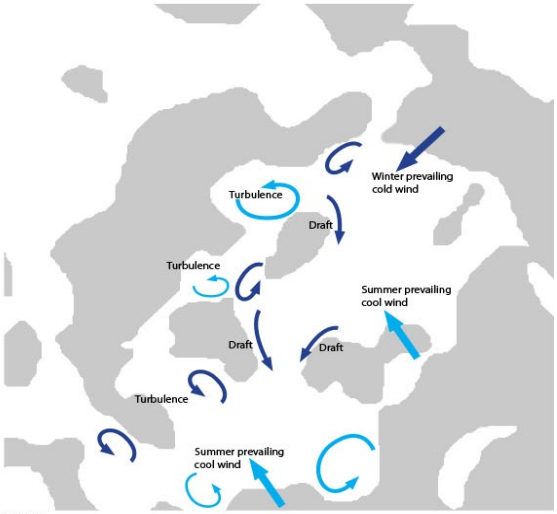
EXISTING VILLAGE



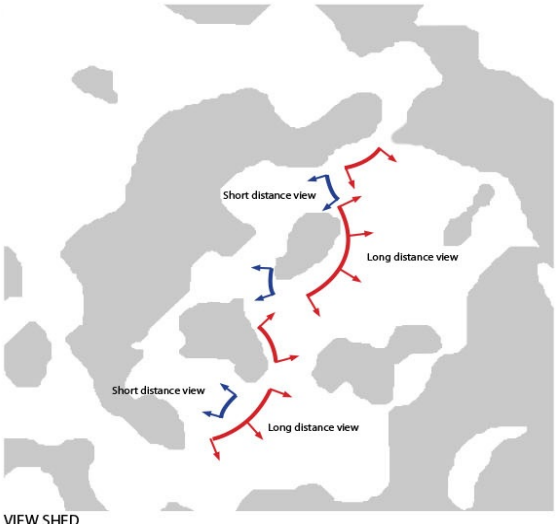
SHADOW MAP



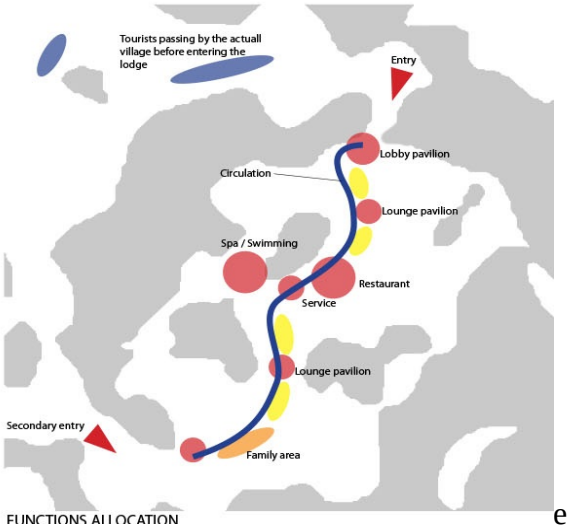
HYDROLOGY



WIND



VIEW SHED



FUNCTIONS ALLOCATION

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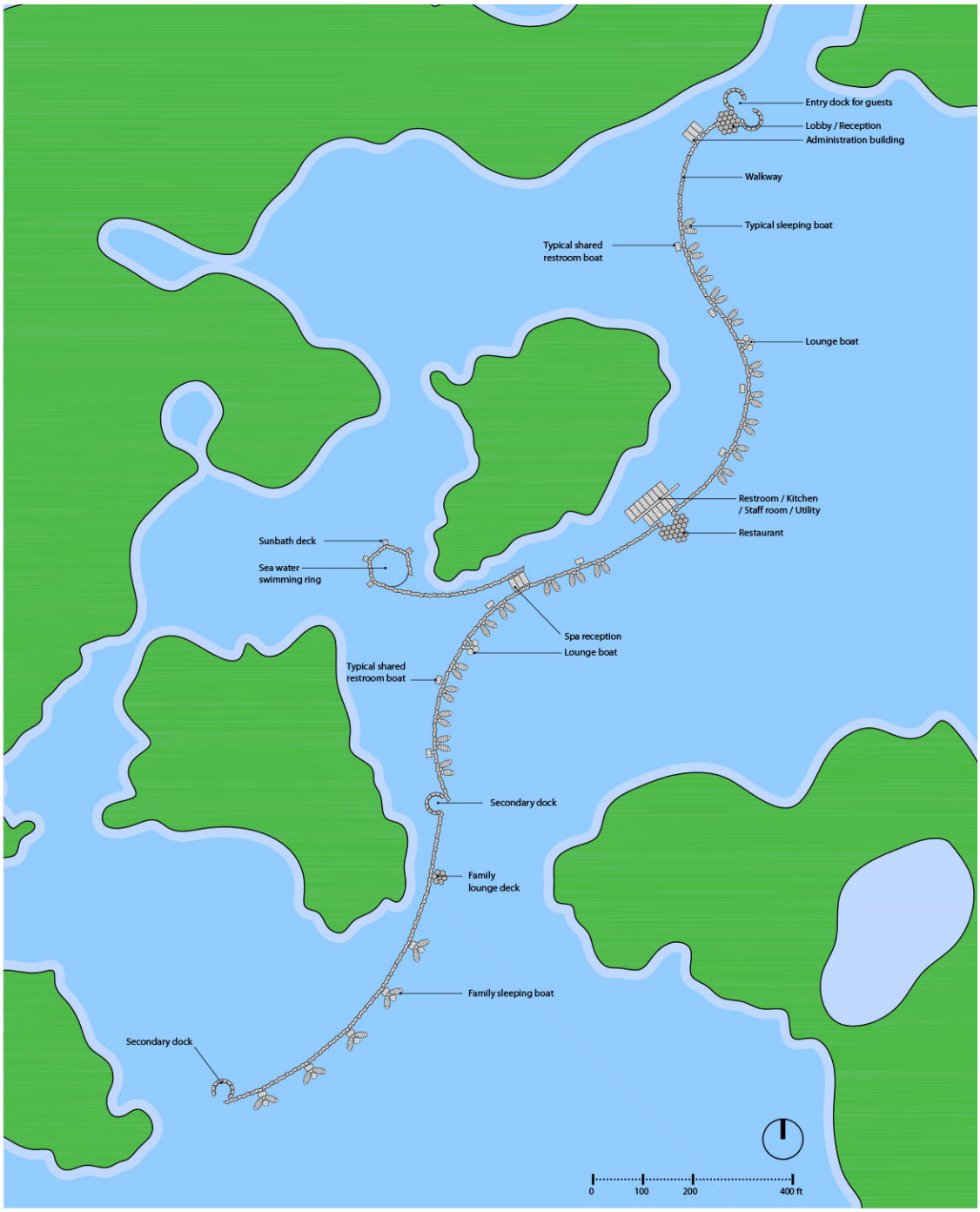
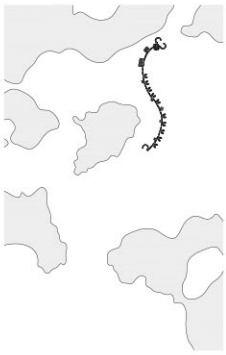
MASTERPLAN


Entry dock for guests
Lobby / Reception
Administration building
Walkway
Typical sleeping boat
Typical shared restroom boat
Lounge boat
Restroom / Kitchen / Staff room / Utility
Restaurant
Sunbath deck
Sea water swimming ring
Spa reception
Lounge boat
Typical shared restroom boat
Secondary dock
Family lounge deck
Family sleeping boat
Secondary dock
0
100
200
400 ft

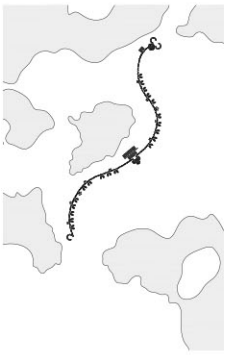
PROJECT PHASING



PHASE 1:
EXPERIMENTAL

Capacity:
- 20 guests
- 8 staff people

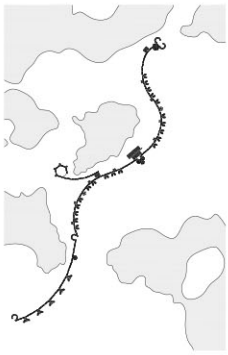
Buildings:
- Dock
- Lobby / Dining
- Service building
- Admin + staff rooms
- 10 sleeping boats
- Common restroom boats
- Lounge boats



PHASE 2:
DEVELOPING

Capacity:
- 40 guest
- 12 staff people

Buildings:
- Dock
- Lobby
- Admin. building
- Restaurant
- Service building
- Staff rooms
- Water treatment plant
- 16 sleeping boats
- 2 family sleeing boats
- Common restroom boats
- Lounge boats



PHASE 3:
COMPLETE BUSINESS

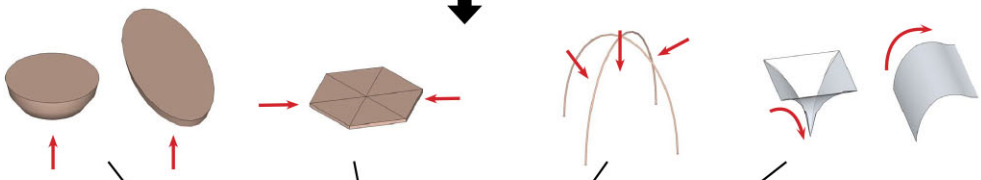
Capacity:
- 60 guests
- 12 staff people

Buildings:
- Dock
- Lobby
- Admin. building
- Restaurant
- Expanded service building
- Expanded staff rooms
- Water treatment plant
- Swimming ring and spa
- 20 sleeping boats
- 5 family sleeing boats
- Common restroom boats
- Lounge boats

TYPOLOGY

VERNACULAR PRECEDENTS

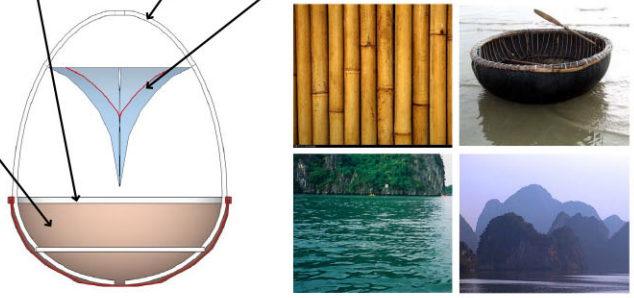
STRUCTURAL LOGICS



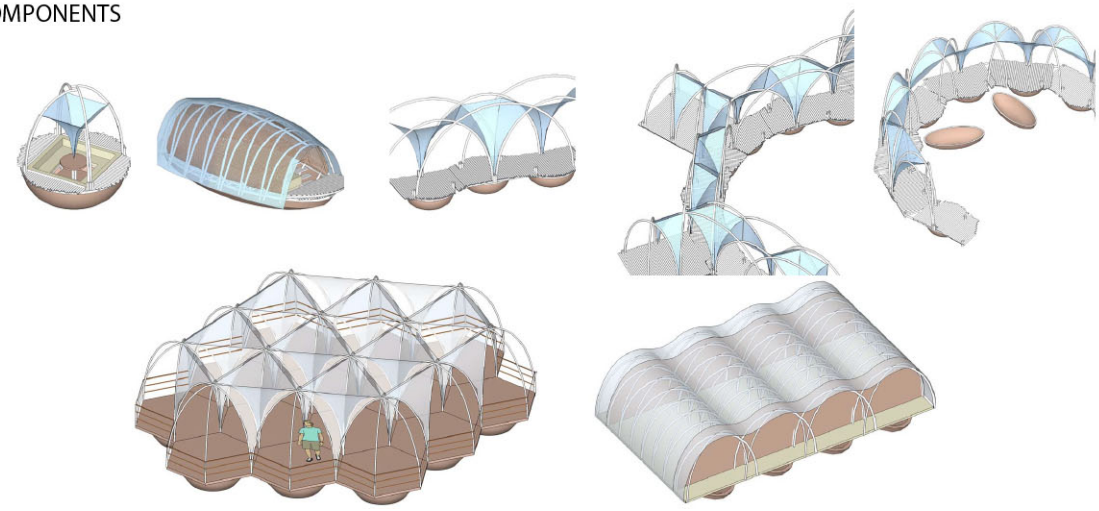
BASIC FORM

This basic form is the result of four major elements. It reflects the structural quality of bamboo material, the shape of vernacular fishing device, the flexible nature of water, and the iconographic image of Halong Bay

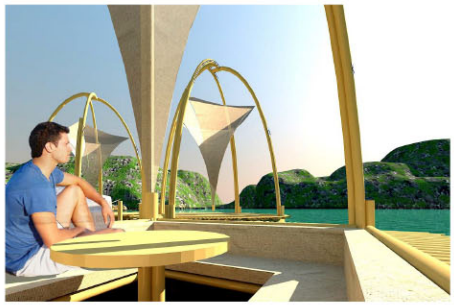
From this basic form, series of modular components are developed. They are connected in-situ, repaired and replaced over time, to form a ever-changing man-made landscape

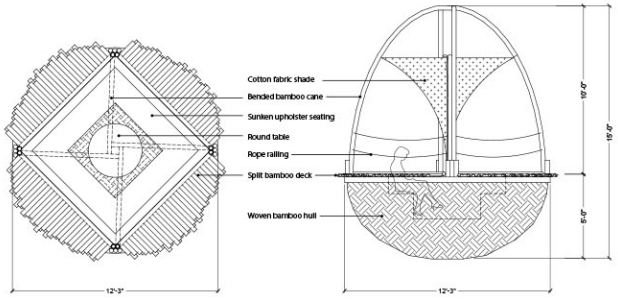


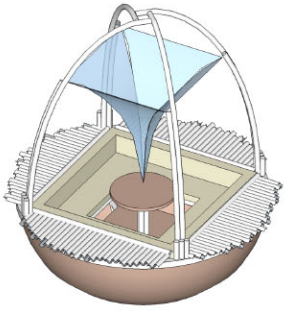
COMPONENTS

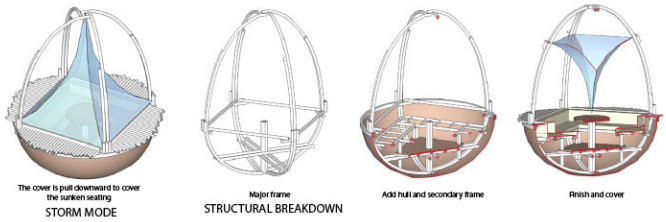


LOUNGE PAVILION BOAT

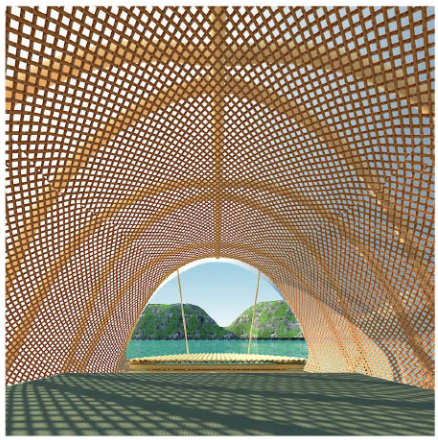


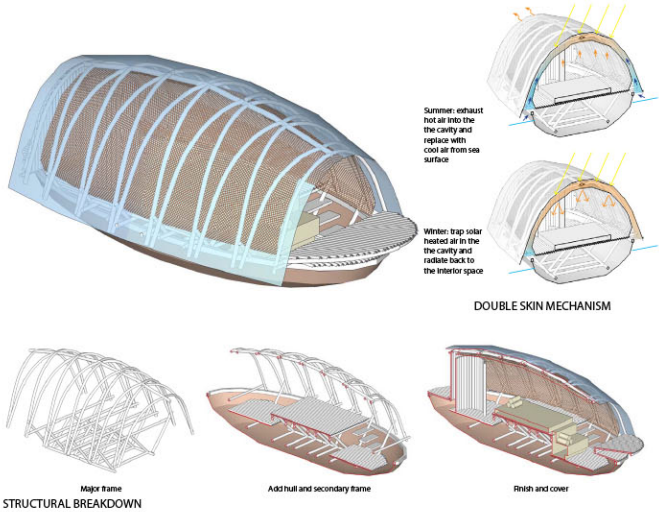


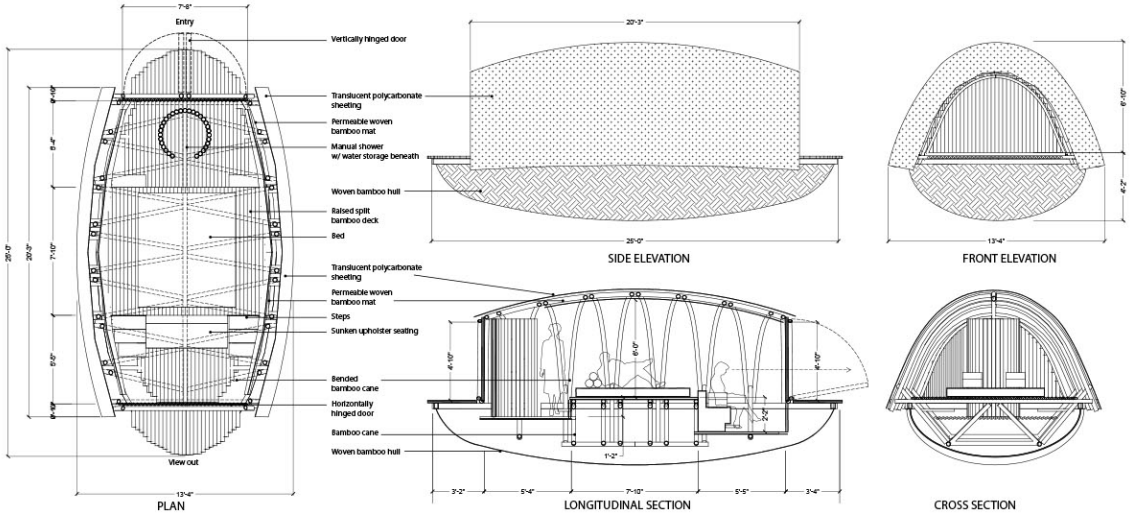




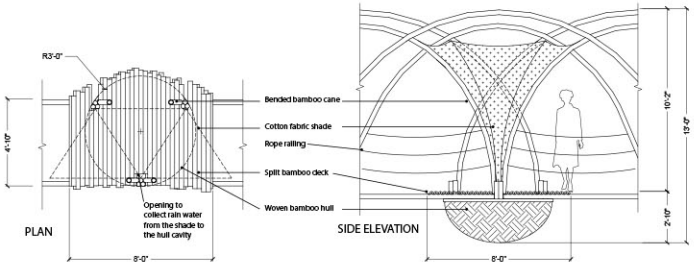
SLEEPING BOAT

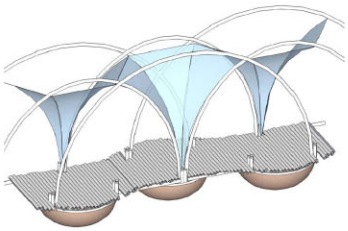




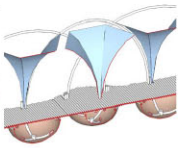


WALKWAY



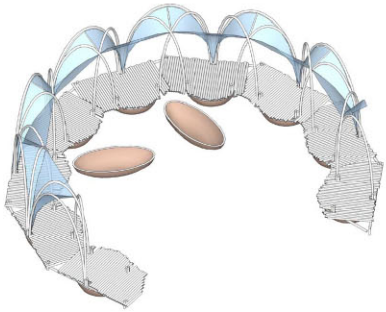


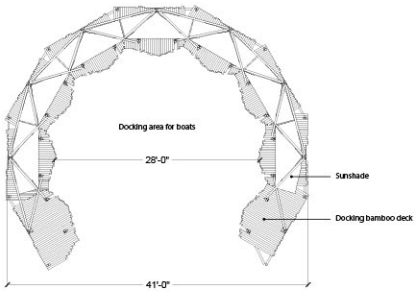
RAINWATER COLLECTION



STRUCTURAL BREAKDOWN

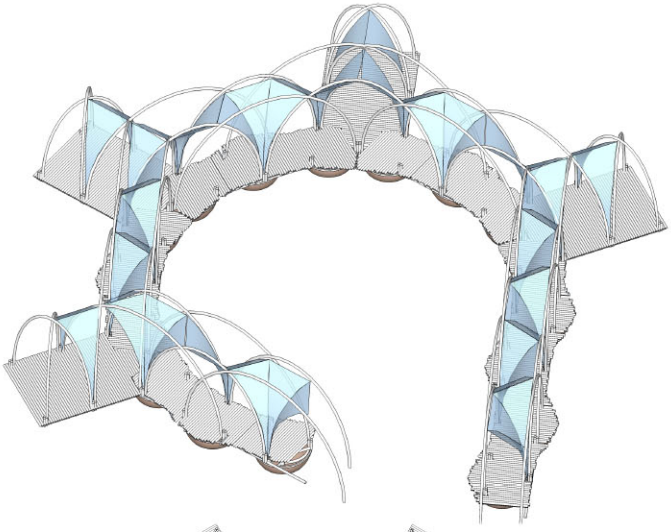
DOCK

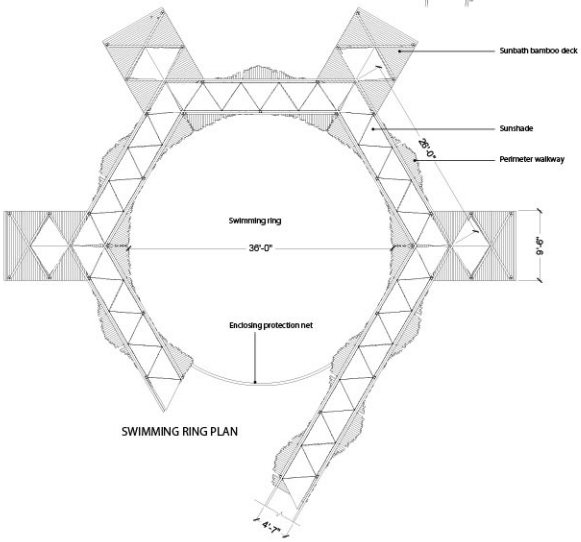




DOCKING PIER

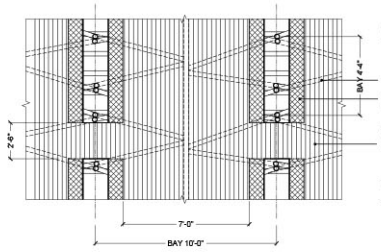
SEA WATER SWIMMING RING



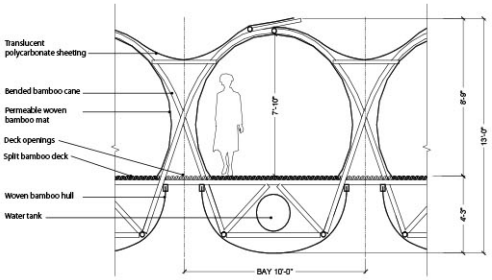


SWIMMING RING PLAN

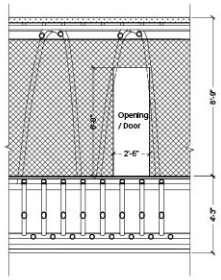
SERVICES / UTILITIES MODULE



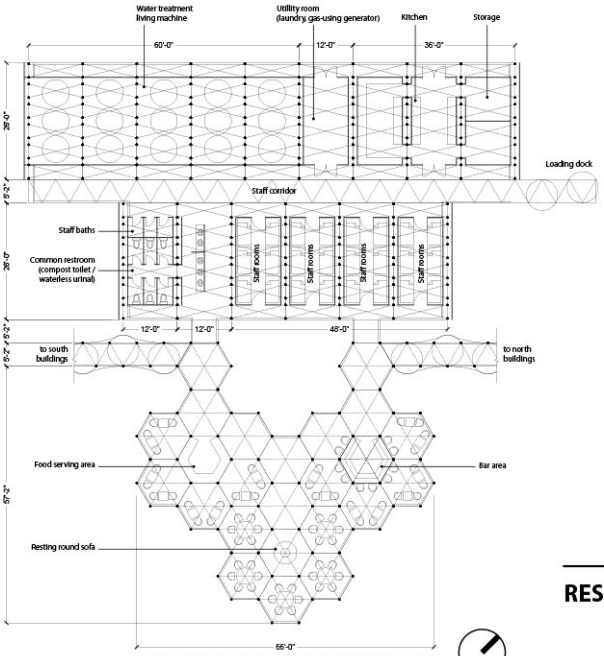
TYPICAL MODULE PLAN



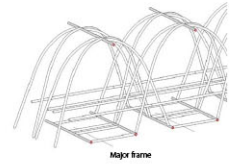
TYPICAL MODULE CROSS SECTION

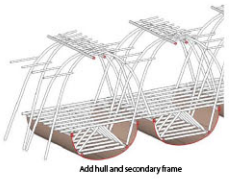


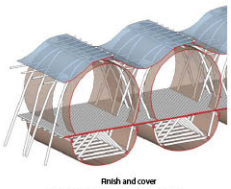
TYPICAL MODULE LONGITUDINAL SECTION



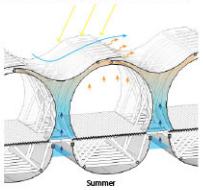
PROPOSED PLAN OF RESTAURANT AND SERVICE AREA

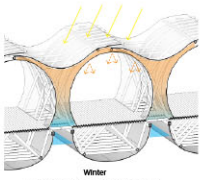






STRUCTURAL BREAKDOWN

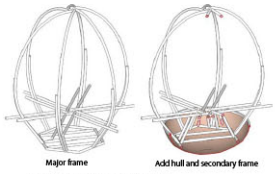


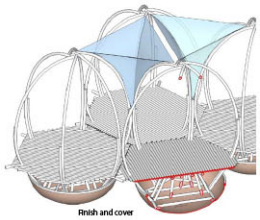


DOUBLE SKIN MECHANISM

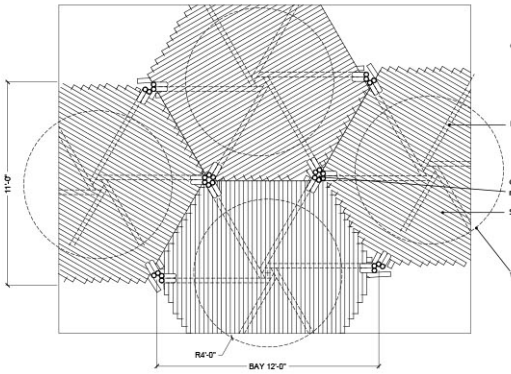
RAIN WATER COLLECTION

RESTAURANT / LOBBY MODULE

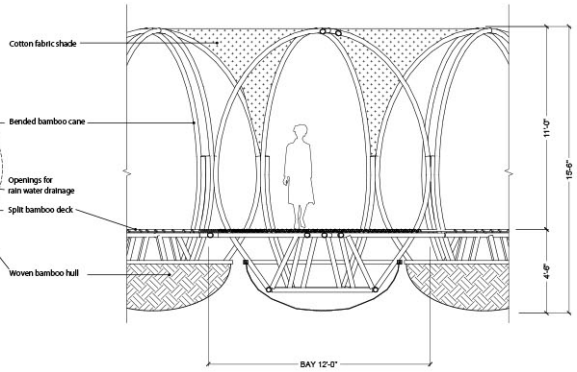




STRUCTURAL BREAKDOWN



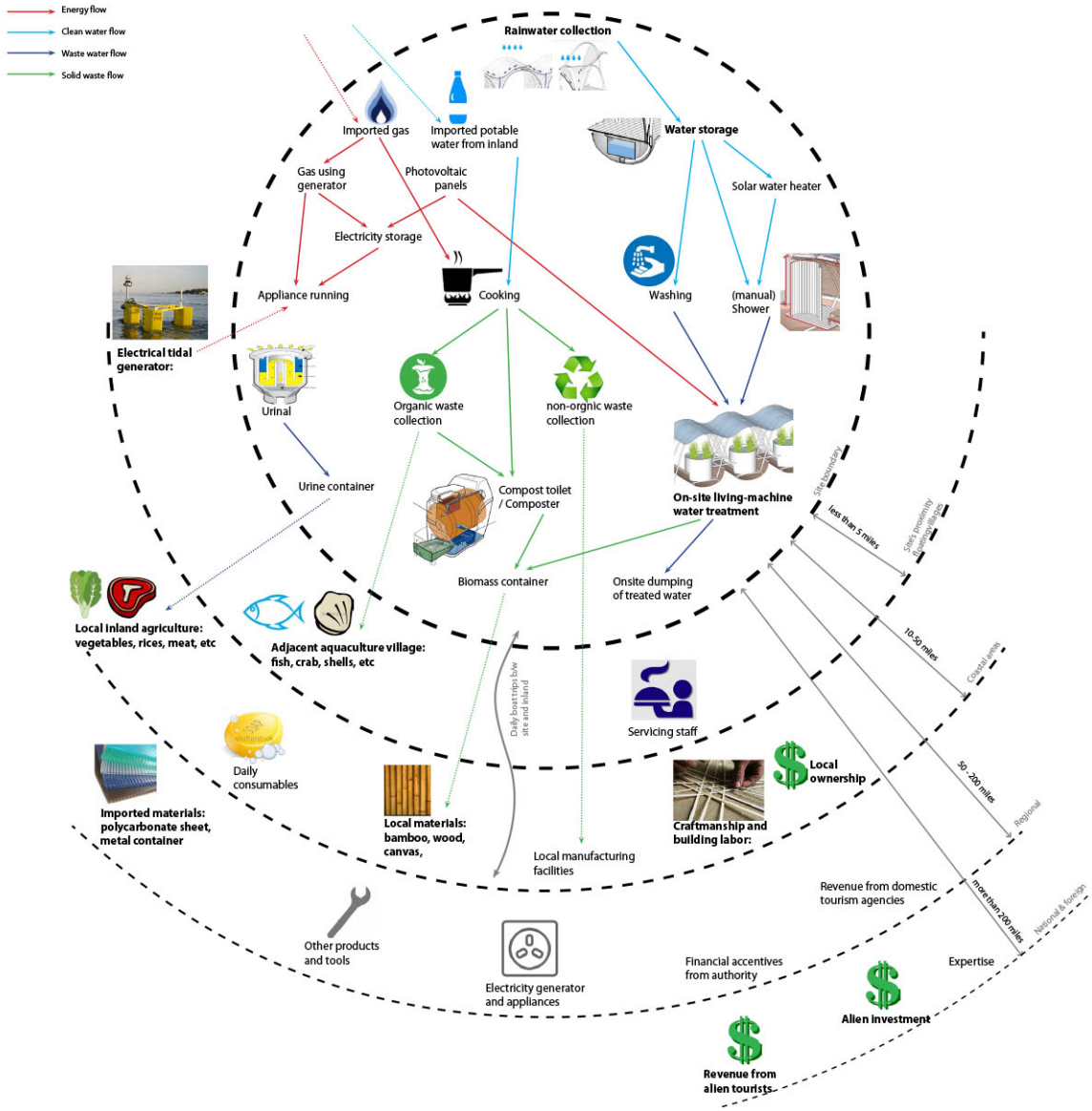
TYPICAL MODULE PLAN



TYPICAL MODULE SECTION

RESTAURANT RENDER

OPERATIONAL SYSTEM



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