Merging Landscapes: Finding an Equilibrium Between Built and Natural Through Materiality

Stephen Frederick Roth
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To the Graduate School:

This thesis entitled “Merging Landscapes: Finding an Equilibrium Between Built and Natural Through Materiality” and prepared by Stephen Frederick Roth, is presented to the Graduate School of Clemson University. We recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture.

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MERGING LANDSCAPES: FINDING AN EQUILIBRIUM BETWEEN BUILT AND NATURAL THROUGH MATERIALITY

A thesis presented to the Graduate School of Clemson University in partial fulfillment of the requirements for the professional degree, Master of Architecture.

Stephen F Roth

May 2006
THESIS POSITION

With the continued development of the built environment, contemporary architecture has become 'site-less', losing its relationship with its specific environmental conditions, and neglecting its opportunity to act as a vehicle of transference between situation and user, ultimately failing to generate an awareness of its immediate surroundings. Is there a way in which an architecture can exist interdependently with its environment, becoming a performative and responsive element within a dynamic natural circumstance? Through the implementation of existing and introduced materials and the harnessing of natural processes, architecture can be an agent in which one gains a heightened awareness of the multiple circumstances of a site.
ABSTRACT

As humans we live and function simultaneously within the polarities of natural and artificial landscapes. The natural life-cycle and the necessity of living fuse together; their distinctions and boundaries are left as arbitrary thresholds.

Our natural landscape with its continuous migratory nature of development becomes depleted and degraded thus editing ideas about boundary, space, time, utility, and presence. The present day role and attitude of architectural design tends to be rather selfish and disconnected toward its natural environment. Architectural realizations do not interact or react with their specific ecosystem in layered and complex ways. These realizations occur on different timelines and cycles than their natural settings. However, the two directly affect each other in the process. With the introduction of a built structure into a landscape the ecosystem is adversely affected in multiple ways although the ecosystem aids in the respective deterioration of the built form as well.
A more dynamic state of change between two different environments can be achieved through the exploration and implementation of materiality. Materiality is not only the physical makeup or aesthetic of an object, but also the effects of time and elements on that object, illustrating the abstraction of time and the presence of the elements as materials in themselves. For a more restrictive and localized investigation, one must conceptualize the role of organic materials in an environment, the introduction of fabricated materials, along with the commingling of the two. The implementation of methods and considerations involved with ecological design construct a platform to generate this interdependency.

To concisely understand the idea of environment and its manipulations there must be a way to make a landscape in its entirety more readable. Fluidity and harmony between the built and natural world may exist with the study of these materials simply by deciphering how materials directly affect human interaction, the environment, and the perception of space.
DEDICATION

To Dad
ACKNOWLEDGEMENTS

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Figure 1. *Thesis Diagram.* Site derives and informs the architecture; in turn, acting on the user, the user, through perception, gains an awareness of the site.
LANDSCAPE: NATURAL, MAN-MADE?

In terms of classifying the physical landscape as either ‘natural’ or ‘man-made’ what are we exactly trying to define? Is ‘natural’ synonymous with ‘organic’? Or does this term pertain to our external environment in its entirety? If something is ‘man-made’, it is manufactured, created, or constructed by human beings. We believe this to be inorganic. A building is man-made, thus it is inorganic but not ‘artificial’. The Anasazi Indians, ancient Mesa Verde cliff-dwellers, constructed their adobe villages both from and into the faces of cliffs, carving out structures and voids; ultimately creating architecture of and from the Earth. We never claim a building to be artificial, even though in the realm of nature it may or may not be constructed of organic materials. Is it truly organic in nature if it has been manipulated by the hands of man? These questions of organics and artifice are prevalent in our built world. The constant interaction with the ‘natural’ and ‘man-made’ realms of our physical construct merges and blurs together eliminating the most definitive distinctions between.

Presently, as we live and function simultaneously within both a natural and artificial world our physical world is blurred by the migratory development of cities and towns.
Our ideas and distinctions between natural and man-made are becoming less and less pronounced through development, technological advancements, and our growing necessities of living. Nature and the importance of the natural landscape are being overtaken by the progressive act of acquiring space and material, thus editing the ideas of boundary, space, time, utility, and presence. For example, aerial views of farmland from the mid-west with its individual parcels of land are defined, divided up by the act of utility and function. Natural space is declared through acreage and ownership, while the architecture is allotted by geographical importance and convenience. In contrast, the metropolis of New York City is an exercise of urban infill acting on a gridded network of streets and boulevards, allowing for minimal green space. The vast ‘natural’ void of central park is merely residual space defined by urban growth and the original geology of Manhattan Island. These definitions of landscape may be juxtaposed with one another, creating the distinct idea of the roles of organics and artifice in the contemporary landscape.
THE ENVIRONMENT AND THE ENVIRON

In order to justly understand and define a landscape as either natural or man-made, one must understand the meaning of the term environment, along with their personal role and existence within a specific environment. An environment is the term given by humans describing certain circumstances, objects, or conditions in which one is surrounded. The environment is this condition given to the environs that may influence or act on a specific object or community. In this respect, to environ is to be around or within, cluster or surround an object, condition or atmosphere (McFalls, 1).

An environment has the ability to influence one’s survival and position within. Whereas, the environ may form enclosing limitations in which they may exist. In turn, to environ means to have the ability to directly affect and manipulate an environment. When humans build or construct we are in fact destroying one environment, and simultaneously replacing it with another environment. In short, any action of construction is also an act of destruction. This continuous cycle of construction and destruction defines and redefines the language of an environment. It is here where we have the ability to
understand and connect with an environment. Through the understanding of the environment we can start to manipulate and characterize the role of the environ towards its environment. “Flowers are marvels of adaptation. Some lie dormant through the harshest of winters only to emerge each spring. Others stay rooted year-round, opening and closing in response to changing conditions. Like buildings, they are rooted in place, able to draw resources only from the earth and sky that they inhabit” (McLennan, 26).

ECOLOGICAL DESIGN

“Our architecture is largely an ‘artificial environs’, isolated from the natural forces of the sun, air, earth, and water. These in-situ energies are largely ignored in concept, planning, and design, except as to exclude them from the architectural equation” (Crowther, 3). An ecological context embodies not only that of nature, but ourselves as well. Our present day technological artificial environments act counter to nature. Our impact upon and mutilation of natures ecosystems has been an affair of unconstrained rapid attrition.
“Environmental problems can be broadly defined as the changes in ecosystem conditions that arise from the stresses caused by a human action or activity” (Yeang, 187). Many designers these days tend to wrongly conceive the environment and its state as simply a physical and spatial zone on which the structure or design is erected. They aren’t necessarily fully aware of the sites’ ecological and biological conditions. Even such buildings that are labeled as “green” buildings don’t possess a thorough understanding of the specific sites’ ecosystem. “In most building projects, we often find that the architect or the designer has completely omitted any consideration of the biological components of the project sites’ ecosystem” (Yeang, 4). As Yeang terms it, this “project site” has to be seen as more than just a spatial consideration, rather as a living organism whose components need to be considered holistically along with the interactions of all its processes. This means that all components of a specific site, including human interaction, must be considered and examined in order to gain a concise understanding of a site and its acquired design. There must no longer be buildings that are placed arbitrarily, with little to no valid connection with their site and its resources.
In 1901 Ebenezer Howard designed what we refer to as the “Garden City”. This plan was an effort to design a complete functioning landscape that housed urban, suburban, and rural typologies, each defined within their own constraints, but blended together holistically through the means of natural binders. Despite the short-lived popularity of Howard’s cities, the design proved to be a successful early implementation of ecological design at a large-scale culturally, sociologically, and agriculturally.

THE BUILT ENVIRONMENT AND NATURE

“All built environments have a continuously changing state of interaction between people and built systems; between built systems and their infrastructures; between these infrastructures and the ecosystems of the site; and between these ecosystems and other surrounding ecosystems” (Yeang,16). No building realized is an immutable structure to a site. Immediately after a built structure is sited, it will continue to interact and act on its environment for its entire life span.
In the installation entitled *Dissipate (Deteriorate)*, Michael Heizer set pieces of wood into the flat bottom of a dried up lake. Heizers’ intention was to gradually transform the piece by deterioration throughout time as the natural environment reclaimed and virtually erased the intervention. Directly after a building is conceived it begins its deterioration, continuing to affect its natural setting in the process. All built structures, have an immediate impact on its siting by virtue of its spatial displacement and its addition into the ecosystem. There must be a way in which a built form, along with its life process, can interact with its environment in a positive manner, either by regeneration of the once degraded ecosystem, or possibly through a metamorphic transition throughout space and time. For example, Alan Sonfist created an intervention in 1975 on a chemical waste dumping ground. He filled a focused plot of land with fresh soil to catch blowing seeds from the air with the goal of reclaiming the desecrated landscape with the rebirth of forest and growth.
MATERIALITY

The relationship between architecture and materials was straightforward until the industrial revolution. Materials were selected for their utility, availability, or formally for their appearance. Generally, materials were not standardized and forced builders and architects to rely on selection through and extrinsic understanding of their individual properties and performance. With the technology and innovation of modern construction, materials can be part of a vast design palette from which they can be selected and applied as structural, compositional and visual surfaces. The recent development of what we term ‘smart materials’, has had a dramatic and influential affect on modern day methods of design and construction. These new innovations have catapulted architectural material selection into a new realm of performance and responsiveness towards environmental conditions and human interaction through materiality. Despite the intense fervor and encouraged attitudes of these advancements, the attention towards these material applications has resulted in a neglect for a structures engagement with its’ environment. “Architects today don’t make space, they make surfaces...We see materials as a spatial envelope behaving like a boundary. We consider the envelope to demarcate and separate
the exterior environment from the interior environment” (Addington, Schodek, 6). Through a study of materials and their spatial abilities, a meaningful dialogue between the built world and natural world may culminate. Architecture might be a form of energy and materiality in which the earths’ energies and materials are commingled temporarily, demolished at the expiration of its use, or the materials are recycled within the built environment and assimilated throughout time into the natural environment. The building does not start its deterioration once it has been conceived. Rather, it begins to age as a system in which the buildings’ deterioration is a functional aspect of the design in order to reach a harmonious stasis with its environment. In short, the building may transform through time and space in order to earn a coexistence with nature.

MARSHLAND ECOSYSTEMS

The estuaries of the southeast are dominated by large strands of salt marsh (spartina, spartina alterniflora), occupying 90% of the inter-tidal area. These wetland areas are recognized to be one of the most productive ecosystems in the world. The salt marsh
system supports a wide variety of plant life and wildlife, as well as, performs valuable hydrological functions, contributing to groundwater recharge and the improvement of water quality.

HUMAN EFFECTS ON ESTUARINE ECOSYSTEMS

Because of the industrialized, agricultural and urbanized development of estuaries, sooner or later these environments will receive much of the waste discharged by man. "Everything is interlinked...especially as many users and uses occur at the same time. Many activities change the structure of the estuary and add materials into the system. Any disruption to the estuarine hydrographic pattern can have an affect on the substratum and estuarine shape, and then to the structure and functioning of the biological system" (McLusky, Elliott, 92). Pollution and contamination of these ecosystems can be broken down into three categories.

Figure 13. Stormwater Output. Impervious surfaces create massive amounts of storm runoff, delivering pollutants into nearby bodies of water.
Recent developments are situated in coastal conditions, aiding in the destruction of these valuable natural ecosystems.

The primary source of pollution is generated by the input of materials into the wetlands and water column. At a minute scale these inputs may be small particles or soluble materials which absorb other particles. Inputs may also be at a scale of infrastructural bridges and other structures.

A second classification of man's pollution of estuaries may be the removal of available resources. First, along with the action of inputting polluting materials, comes the removal of a healthy water column. Salt may be removed from the water column for uses of irrigation and power stations. Space may be removed in areas lost from land-claim and new development. Materials may be removed as well. Biological materials such as sea grass may be removed for fertilizer along with the removal of fish and shellfish for food. The estuarine bed may be removed by a system of dredging to clear for navigational or drainage systems.
Third, from these actions of deterioration and contamination, most of the issues concerning estuarine ecosystems are a direct result of infrastructure. Cities tend to develop on estuaries for their role as a natural transportation system linking river and sea traffic. To date, over 1/3 of the U.S. population either lives or works close to estuaries. In the modern age of sea trade, ships have become increasingly larger causing pressures on estuaries. Movement of harbors has already occurred with modernized harbors and shipyards being located on the sea. Along with this movement comes the re-appropriation of land by housing and commercial developments.

PROGRAMMING STRATEGIES: Creation of a ‘sited’ architecture.

In the case of finding an architecture with a direct relation to its natural landscape, a devised program must be imbedded within the actuality of the architecture itself. The siting and introduction of an architecture into a specific site, along with its material implementation houses a program of perceptual awareness. The action and influence of
time and human interaction are seen to hold the ability to activate and generate the primary program of the architecture.

For example, the Amsterdam Bos, a project for a public park in Amsterdam, "...the idea of process derives its meaning specifically as it relates to production. Thus, whereas time and process are often involved as aesthetic dimensions of landscape in contemporary practice, they were more technical, and material dimensions of landscape at the Bos Park. Process at the Bos Park was understood as technique, as a way of understanding and articulating a project in terms of its material determinants" (Berrizbeita, 199). Here, the work and design is concerned with form as it represents ecological processes and their connections with human involvement. By blending and revealing ecological significance and human activity, place and site generated material selection.
ARCHITECTURE OF PLACE

“IT is necessary to understand the context, to observe it from within, and to grasp the potential of the places on which to base the process of transformation. It is important to comprehend the nature of these places, peoples’ experience of them, and their relations with the context” (Cannavo, 40).

Not only should the architecture have an interdependent relationship with its environment, but it should also reference and present a cultural and regional significance. The program should be specific for its site, just as the site should be specific for the architecture. Meaning, *this site for this marshland*, not just *a site in a marshland*. *This program for this site*, not just *a site for a program*. “Above all, it is important to be aware that any intervention in a given environment leaves a new sign. Because of such constant change in the urban landscape, the project must therefore be tackled with an approach that considers it as a *process* rather than a *product*” (Cannavo, 38).
Figure 18. Tidal Cycle. Highlighting natural effects, material fluctuations, movement, direction, and time-scale.
TIME

The architecture will also naturally transition through the effects of time, continuously adapting, redefining its stasis within its transforming landscape. "Thinking about time can help redefine the territorial occupations of doing and using. The design and production of the building up to realization, constitutes only a small part of a time. Instead we should consider architectural time as encompassing the use, re-use, destruction and decay of spaces and building components" (Rendell, 232). The transformative states of the architecture throughout time should not be considered a constant deterioration and destruction of integrity, but rather an evolving coherence of relationships in program, function, and siting.

TIME-SCALE

The realizations of the architectural interventions are supported by an imbedded scale of measure which situates the structures within the natural cycle of the ecosystem. This time-scale allows for the architecture to acquire a more performative role and
responsiveness towards its acting conditions. The architecture serves to highlight certain scales dealing with geological, biological, and seasonal change throughout a suggested period of time. For instance, the user and spectator of the space have different notions of how we gauge physical change in nature. We may notice a seasonal change with the blooming of a flower or the sprouting of grass. Whereas at a much larger measured increment of time, we notice a geological shift occurred through erosion of a coast. Both physical states are distinct in their morphology, but occur at such subtle increments that their change is virtually imperceptible by the eye. It is only through the passing of time in which we can understand such altered states. Thus, we understand the change from winter to spring, or the shifting of sand dunes on a shoreline, and relate them to certain suggested periods of time.
Figure 20. *Time-Scale*. Diagram highlighting different notions of *time* and their effects and perceptions.
“Architecture frequently operates as a kind of social mirror, forming a kind of ‘other’s look,’ the user self-checking their identity and validity against a building or boundary. For its part, modern architectural space in particular tends to ignore the space of the body” (Borden, 205).

The architecture is cognizant of the existence and interactions of humans within both its defined and peripheral spaces. Humans should have the ability to activate and redefine the programs and functions of the architecture by the introduction of their interactions. “Long after the building has been realized, the non-architects continuously do architecture. When we, as non-architects occupy a space, when we start to use it, we start to do-it-ourselves” (Rendell, 232). By this, one has the ability to personally transform architectural space, while directly gaining an interactive awareness of the architectures’ programs and functions.
SITING

In selection of a focus area for research and implementation, a landscape was chosen for its strong qualities of topology, materiality, and cultural and regional significance. Located in the Carolinian eco-region, Charleston is home to many estuarine habitats. These wetlands, dominated by salt marsh, claim 90% of the intercoastal waterway, and prove to be one of the most productive and valuable ecosystems in the continent. These salt marshes lining the coast of Charleston are continuously impacted with tidal floods and storm surges, adding to the coast's vulnerability to erosion and transformation. Aside from natural destruction, the most significant damage is directly from human settlement. These environments are the locations for future urban expansion and development. They are also susceptible to deterioration through dredging of waterways and runoff from roadways and other developed impervious surfaces. The issues introduced to this vulnerable landscape present an opportunity for a strategic architectural implementation carefully responding to specific site conditions, and geared towards a performative and responsive awareness. The salt marshes of Charleston, important natural ecosystems with cultural identities, possess many characteristic issues dealing
with the modern city and its urban landscape. They are vulnerable environments as they are considered prime real-estate for future urban expansion and development.

The selected landscape lies along the coastal condition of Charleston’s Brittle Bank Park, located on the western coast of the peninsula along the Ashley River. The site is predominantly salt marsh wetlands transitioning from dry ‘highland’ into the estuarine environment of the river. This strong transition occurs as the urban fabric of the city dissipates into the natural landscape, blending topologies both visually and functionally. Because of this defined sectional transition of the landscape, continuous climactic and urbanistic conditions impact the site, creating an ever-changing landscape. This unique fluctuation presents an opportunity to intervene and interact with the landscape with an architecture of constant flux and impact. Contrasting the natural landscape, the site is located directly adjacent to the Citadel Military College and the termination of Lockwood Boulevard running along much of the coast. This area has seen many recent commercial and housing developments in the past ten years, directly affecting the site’s natural
ecosystem by displacement of existing habitats and the addition of pollutant impervious surface. These harsh contrasts in landscape and form diagram the issues of this ‘site-less’ notion of development and its degradation of the natural landscape.

Figure 25. Contrasting Vistas. Panoramic views Southeast towards Ashley River Bridge, and Northwest towards salt marsh.
Figure 26. The Peninsula of Charleston. Highlighting Brittle Bank Park and surrounding areas.
Figure 27. Brittle Bank Park. The extensive system of salt marsh is clearly evident.
PROGRAM

Realization of the architecture will be comprised of these issues of place, time, and interaction by a sequential transition through space and time. The sequence will navigate and narrate ones' movement through the distinct differential topological conditions within the landscape. Movement and action along this transition will be driven by two nodes of corresponding programs located at the far extents of the sequence. These nodes will function simultaneously through time as services for the park, both re-defining program in accordance with time and tidal flux. Both nodes will act as entrance to the corresponding installations, from land to water, and water to land dependent on time and water condition, fluctuating from functional programmatic space to occupiable space simultaneously. Land intervention as being bait and fishing supply for river fishing, and water intervention as fishing stage and harbor. As one transitions from one to the other, their movement, involvement, and perceptions of the ambient landscape through the architecture will become more apparent and interactive. "Experience is viewed and understood not only via objects, yet space is only perceived when a subject describes it. As the subject occupies a particular time, space is thus linked to a perceived duration.
Perception and cognition balance the volumetrics of architectural spaces with the understanding of time itself” (Holl, 13).

The process of regeneration will be in a state of reformation of the immediate estuarine condition, and reproduction of the declining indigenous Red Drum sporting fish. The performative and transformative reactions of the architecture will harness the power of the Ashley River, and the effects of time, capturing river flow, watershed from dry land, sedimentation, tidal flooding, and growth.

INTEGRATED HATCHERY

An integrated hatchery is a system with the intent for the natural environment to drive the adaptation and fitness of a composite population of fish that spawns both in a confined hatchery and in the wild. This system is associated with a specified natural population from which gene flow occurs. The goal of the hatchery is to demographically increase
the abundance of fish representing a natural population. \( \text{(two environments, one gene pool)} \)

In South Carolina, the \textit{Red Drum} is an important recreational and commercial species which has been fished into a state of decline. The proposed hatchery program situated in the Ashley River supports in the reproduction of the decreasing population of the Red Drum fish species. The Red Drum or 'Channel Bass' has interesting patterns of movement and feeding that is related to tidal cycles. When the incoming tide reaches the cord grass, the fish move into the grass for feeding. As the tide ebbs, the fish move off the marsh surface into shallow waters adjacent to the marsh. Their activity and movements are generated solely by seasonal and tidal fluctuations.
Figure 29. Indigenous Program. A program is introduced into its landscape, blending and accompanying its indigenous ecosystem.
SUPPLY

In the case of the supply station, a completely subterranean structure utilizes the subtraction of earthen mass by the introduction of an occupiable volume. This volume changes its state by the inverse presence of flood occurrence and human activity. This flood occurrence is the act of taking away what we consider occupiable dry land surface. Ones' perception and connection with the dry land surface can be affected by the timescale of a flood surge, infilling the formal structure and altering the allowable occupied surface. In turn, the program’s relation to human interaction is extruded from its initial state and reclaimed by a natural phenomenological event. This occurrence of water addition also carries the ability to be translated through the architecture structurally by the raising and lowering of the supply façade surface, in turn celebrating the actions of simultaneous occupancy. The notion of the field as one continuous surface is as well altered by the action of subtracting structural substrate. This bend of surface while manipulated in elevation is still a continuous applied material. The idea of sequential movement is of a gradual depression of terrestrial ground plane. One’s movement along
this descent allows for an immediate transformation of perception. The connection between terrestrial surface and subterranean space is acquired by this subtle descent.

Figure 30. Supply. The introduction of one volume displacing another volume, its function and occupancy.
Figure 31. The In-between. Capturing durations and pauses of time and recollection. Movements through and perceptions of different spatial conditions.

Figure 32. Enclosure. Model representing a glass enclosure inserted into its respective landscape.

TRANSITIONAL SPINE  [highland-transition-high marsh-low marsh-tidal flat-water]

The spine which spans and engages the topological transitional conditions of the specific estuarine environment consists of a series of thresholds plugged into a continuous static path. The thresholds are treated as glass volumetric enclosures varying in section due to their specific relation with the landscape. Each enclosure is strategically placed at the obscure line of each topological transition. The threshold captures the significance of the adjacencies and distinctions between each condition, by highlighting certain classifications, isolating them and their roles from their environmental surrounds. The formalities of the volumes act in a responsiveness both to their corresponding topologies and their perceptive functions.
The path functions as an activator for an undisturbed movement in-between and through each threshold. Moments of pause and duration are found along the path as one enters an enclosure and continues on into the open spaces in-between. The issues of time and duration of movement and inhabitance are celebrated by the opening and closing of spatial situations along the path. The path and its enclosures are situated in a curvilinear motion across the landscape derived from a calculated geometry by wave refraction of river current. One's visual perception of the path is altered depending upon movement from land to water or vice versa, as well as the occurrence of wave action. The slight curve in plan and bend in elevation, allows the user's view of the path beyond to dissipate out of sight. This illusion allows for the thresholds beyond to be read as disconnected objects set within the landscape. Transparency and blending of the path with its immediate surroundings fluctuates by the actions of erosion and sedimentation occurring in different intensities from wave and current actions. In this way, the path is a narrative of the role of a solid mass, being acted on by a continuous force, dependent upon condition and location, thus changing its physical state.
HARBOR

Continuing the program cycle is the location of the harbor and fishing platform. The placement of these programs is along a pattern of movement interacting with the landscape in multiple states. Movement between programs is contained in a glass container housing a pivoting ramp, allowing for a seamless transition between elevational states. This ramp is in direct correspondence with the tidal cycle, and connected to the harbor platform as the only instance where form accepts natural fluctuation. The fishing platform is an extension of the continuous path sequence. The termination of the path is at a continuous state as well. By terminating the path into the water, the affects of tidal flux and allowable occupancy are always in relation to time and natural tidal patterns. The harbor is also the location in which the transitional sequence and hatchery blend in program, formal tangents and motions. Visual and spatial blend occurs by the overlap of layered programs and natural surfaces. This juxtaposition of occupied space redirects the sequential movement of the cycle, lending visual and physical movement towards the hatchery cycle.
Figure 34. Harbor. The integration of programs in a layered and tangential manner. Architectural form reacting with natural fluctuations.
HATCHERY

The formal resolution of the hatchery cycle was derived from the natural developmental migration pattern of the species. The required programmatic stages of the hatchery are placed along the path in the form of chambers. Chambers are placed in defined incremental distances generated by the individual time-scales of the species development. In this case, time duration generates distance relationships.

*Migratory Stages, Time Duration*

- Spawning, 1 month (carried by currents to estuarine nursery)
- Larvae, 18-25 hours (development)
- Juvenile, 3-6 weeks (estuarine nursery)
- Sexually mature, 3-6 years
- Adult (migration from estuary)

The chambers are connected by a sub-aquatic tubular system of migration links. These links are constructed of steel c-shaped frames banded together by cables, and skinned in a
permeable mesh membrane. Membrane permeability varies, becoming more and more porous, as the species migration progresses, and natural systems become more essential. This system of chambers and links possess a unique structural system relating to the properties of the river movement. The structural frames are situated in a manner in which the force of the current is able to both permeate the membrane skin and expand its form allowing for the occupation of migratory fish. The chambers are grounded into the river bed by structural posts, while the intermediate links are held in place and structured by the combination of tethered cables anchored to the river bed, buoyant elements, and the force of currents acting upon each other simultaneously. Because of the sub-aquatic nature of the hatchery, a visual recording and narration of the migration is needed to be perceived by the terrestrial habitants. As migration ensues from one stage to another, the structural frame of the chambers unfold and extend above surface water in celebration of movement initiation. In the instance when the Red Drum are occupying the stage located in the tangent of hatchery and harbor, the blend is celebrated through visual connection and spatial occupancies at both terrestrial and sub-aquatic levels.
Figure 35. The Integrated Hatchery. Diagram showing chambers and linkages, and their abilities to transform and structure themselves with the action of tidal currents.
PROGRAM BREAKDOWN

-Supply

Supply store (approx. 375 sq.ft.)

Entrance slope

-Transitional Spine

(5) Integrated thresholds

Continuous connection pathway (span approx. 330 ft.)

-Harbor

Fishing platform (1100 sq.ft.)

Harbor platform (3500 sq.ft.) (docking capabilities, 6-8, 15 ft. boats)

Movement Chamber (ramp flux capabilities 6 ft.)

-Integrated hatchery

Integrated Red Drum hatchery (1 acre equivalent, approx. 10,000 fish)

Sub-aquatic chambers: Storage and supply

-Spawning
-Larvae
-Juvenile
-Adult
CONCLUSION

With the increasing development of the built environment, contemporary architecture has become ‘site-less’, losing its relationship with its specific environmental conditions, neglecting its opportunity to generate an awareness of its immediate surroundings. Within the proposed site of Charleston’s’ Brittle Bank Park, the architecture has taken an ecological approach towards design, meticulously positioning itself within the specific estuarine ecosystem. By studying materialities through interactive installations, the architectural intervention is derived dealing with the notions of place, time, and interaction. Through this strategic implementation, specific transformative and responsive qualities heighten the connection and awareness of the architecture and its site.
APPENDIX A: INSTALLATIONS

Figure 36. Light Line Installation. The perceptions of the installation vary depending on the interactions of time, movement, orientation, and light. At one instance the physicality of the object is questionable, while at another occurrence the object possesses the ability to virtually overpower its surrounding environment.
Figure 37. *Activating Topography.* Gaining an awareness of topographic conditions through movement and direct interaction with the landscape. The installation presents the ability to map topography by the process of subtraction. (Completely level surface/ Natural topography)
Figure 38. *False Reality.* Reflective surfaces allow for the occurrence of new realities according to their positioning relative to the surroundings, while heightening and mimicking certain environmental conditions.
Figure 39. *Floating Landscape.* Redefining distinctions of materiality, and questioning the clarity of artifice by addressing the fluid nature of a landscape, its visuality and its functioning role.
Figure 40. Blending/Mapping. The blending of the earth and the sky, landscape, and environment. (Mirror composition) The mapping and narrating of topographic conditions. (Flexible grid)
Figure 41. *Enclosure.* The installation captures a specific condition, heightening one's perception of its effects of light, movement, and reflection, dealing with understanding the depth of volume, and the displacement of mass and space.
APPENDIX B: SITING CONSIDERATIONS

Figure 42. Marsh Land Systems as Natural Binders. The prominent salt marsh environments situated on both western and eastern coasts of the peninsula are cut, splitting the bind, revealing specificities of function, place, and adjacency.
Figure 43. Sectional Comparison. Tidal flux vs. material flux. Fluctuation of perception, surface, texture, and occupancy.

Figure 44. Revealed Runoff. Diagram showing area marsh lands extruded from their sites, revealing destructive pollution and land reformation caused by runoff.
Figure 45. Red Drum Cycle. Diagram highlighting the migration of the Red Drum species as a movement of mass.
APPENDIX C: PHENOMENOLOGICAL ISSUES

Figure 46. Phenomena (tidal fluctuation).

Figure 47. Magnification Device. A view port of each phenomena was constructed in which the virtually hidden condition is magnified, bringing a relative understanding towards each situation.
Figure 48. *Phenomena (topological transition from land to water).*

Figure 49. *Phenomena (fluctuating occupancy).*
Figure 50. Site Model. The continuous fluctuation of occupiable surface, and volume addition and subtraction.
APPENDIX D: DESIGN CONSIDERATIONS

Figure 51. Site Plan A xo. Drawing making connections between Red Drum migratory stages, transitional topographic conditions, and the introduction of distinct Time-Scales.
Figure 52. Program Cycle. Diagramming the interdependencies of both the existing natural cycles, and the introduced program cycle.
Figure 53. Dissipating Path. Rendering of the visual disappearance of the continuous path, leaving the thresholds as objects within the landscape. As one continues along the sequence, the path is slowly revealed.
APPENDIX E: PERFORMATIVE THRESHOLDS

Figure 54. Elevations A&B. Elevations are linked with the renderings of the individual thresholds. Each highlighting and capturing times within the two high tides and two low tides over the duration of a day.
Figure 55. Threshold A. The increase/decrease of water volume introduced into the chamber displaces air volume.

Figure 56. Threshold B. The threshold is inserted into the tidal flat. Its reaction with the humidity and saturation of the mud allows for condensation to transform the transparency, and reflectivity of the thresholds enclosure.
Figure 57. Elevations C&D.
Figure 58. Threshold C. The threshold deals with the fluctuation of surface pattern and texture by flood occurrence. As one pattern is transformed, another is maintained.

Figure 59. Threshold D. Dealing with the perception of enclosure and grounding of the user. One is visually returned to the ground surface by the action of reflecting surface pattern on a reflective enclosure plane above.
Figure 60. Elevation E.
Figure 61. Threshold E. Capturing the notion of erosion of a solid. The subtraction of mass with the addition of another volume, and the addition of water as an infill of mass.
Figure 62. Plan sequence. A layered diagram of the transitional spine with programs of supply, thresholds, harbor, and integrated hatchery located at the extremes of the span. Plan 1, showing the minimal grounding of the structure. Plan 2, the allowable human occupancy of the intervention. Plan 3, a comprehensive whole.
FIGURES CITED

1. Thesis Diagram, diagram, author
4. Central Park, photo, wwwarpa.org
5. One in Landscape, photo, author
6. Human Environmental Boundaries, image, Occupying Architecture
7. A Beaten Path, photo, Land and Environmental Art
8. True Ecological Design, diagram, Ecologic Architecture
10. Dissipate (Deteriorate), installation, Land and Environmental Art
11. Virgin Pool, installation, Land and Environmental Art
12. Light/Line, installation, author
13. Storm Water Output, photo, author
14. Development, photo, author
15. Amsterdam Bos Park, plan, Recovering Landscapes
16. Stairway/Salita, photo, *author*
17. Floating landscape, installation, *author*
18. Tidal Cycle, montage, *author*
19. Piazza, photo, *author*
20. Time-Scale, diagram, *author*
21. Humans’ Imprint within the Landscape, diagram, *author*
22. Human Interaction Cycle, montage, *author*
23. Ashley River Estuarine System, photo, *author*
24. Sectional Comparison, section diagram, *author*
25. Contrasting Vistas, photos, *author*
26. The Peninsula of Charleston, aerial photo, *Charleston County GIS*
27. Brittle Bank Park, aerial photo, *Charleston County GIS*
28. Topological Transition, diagram, *author*
29. Indigenous Program, diagram, *author*
30. Supply, diagram, *author*
31. The In-between, diagram, author
32. Enclosure, model, author
33. Blended Path, diagram, author
34. Harbor, diagram, author
35. The Integrated Hatchery, diagram, author
36. Light/Line Installation, installation, author
37. Activating Topography, installation, author
38. False Reality, installation, author
39. Floating Landscape Installation, installation, author
40. Blending/Mapping, installation, author
41. Enclosure Installation, installation, author
42. Marsh Land Systems as Natural Binders, diagram, author
43. Sectional Comparison, section diagram, author
44. Revealed Runoff, diagram, author
45. Red Drum Cycle, montage, author
46. Phenomena (tidal fluctuation), montage, *author*

47. Magnification Device, instrument, *author*

48. Phenomena (topological transition from land to water), montage, *author*

49. Phenomena (fluctuation occupancy), montage, *author*

50. Site model, model, *author*

51. Site Plan Axo, axon, *author*

52. Program Cycle, diagram, *author*

53. Dissipating Path, diagram, *author*

54. Elevations A&B, renderings, *author*

55. Threshold A, rendering, *author*

56. Threshold B, rendering, *author*

57. Elevations C&D, renderings, *author*

58. Threshold C, rendering, *author*

59. Threshold D, rendering, *author*

60. Elevation E, rendering *author*
61. Threshold E, rendering, *author*

62. Plan Sequence, plans, *author*
WORKS CITED


A documentation of recent developments and technologies of materials in the realm of architecture and design. These new material advancements aim to create an interaction between human and surface, surface and nature, and the perception of both the natural and material environment.


This section takes account of the Amsterdam Bos public park. The concept of the park stands far from traditional theories and planning in urban park design. The designers of the park adopted a program of "productivism" proposing the landscape design as technique rather than an aesthetic creation. The idea of process defines its meaning as it relates to the production of the park. The functions and aesthetics of the Bos Park are understood as a vehicle to understand and articulate the design in terms of its materialities. The park and its derived forms and aesthetics are designed in such a manner that there is a public interaction with its ecological processes.

Seeing, viewing, shaping... Visualization makes it possible for one to gather ideas of the transformation of objects and spatial situations. Visualization has the ability to transform the natural living-space into a perceived artificially structured environment. These perceptions can also begin to be carried out through design, both artistically and cognitively. It is through the simultaneous stages of encounter and seeing, interpreting, and shaping in which a visual account or record may be captured and defined.

Investigates the formal relationships of architecture in the environment. Form in nature is a direct effect of evolution, whether coherence, gravity, growth, resistance, or even erosion. Since there are no natural conditions that are ever completely and identically duplicated, the originality of these expressions offer the inspiration and creativity to create unique conditions.


Before we design environments, we must understand how meanings operate. Three types of how meanings may derive from perception. These types of meaning are: The signal, in which an action is triggered by the perceiver, basically telling us to do something. Next, the symbol, representing something else and stands in place of something else. Thirdly, the expression, revealing something about the expresser. The links of these meanings to perception are through convention, association, and spontaneity. So, in-short, the role and occurrence of one within a space, and their direct perception of that space is derived from a system of typological meanings.


Steven Holl explores edge conditions and urban periphery strategies in six noted projects. He first states that a common strategy to counter the action of sprawl is the formation of spaces, rather than the formation of objects. The continuous
expanding nature of the contemporary city is in the attitude of fragmentation, in which development has no significant or integral connection to existing organization. He describes the edge of a city as a philosophical area, in which the city and the natural landscape overlap in existence with no choice or expectation. This edge condition is seen as a region of opportunity to create a situational transition from the urban to the rural, as well as possessing a consideration of the natural landscape. With the study of the six differentiated projects presented, Holl brings forth investigations of urban planning and organization. As well as the importance of materiality, site, and the roles of the part to the whole.


Aristotle stated that, "architecture imitates action and life..." Can a building not also be understood apart from ourselves and its use, irrespective of programmatic requirements, individual desires, and cultural expectations? Also, can a building function and live in complete harmony with its respective site? A building is
experienced in its perceptions. Win the realm of performance architecture, architecture unfolds within a milieu that is not of the buildings making. This is termed as topography, indicating neither the built nor the unbuilt, but rather both. In modernist theories, space had been presented as the all-embracing framework of every circumstance. In general, landscapes contain unforeseen potentials, and show these potentials in the various ways they offer themselves towards perception. The issues and systems of biotechniques, and form derivation.


Beginning to approach art in a more scientific manner, the text thoroughly takes a look at the science of vision, stating that the sense of vision is achieved through a process of receiving and interpreting light reflected from objects. Keeping this in mind, we may begin to clarify and conceptualize the many intentions of art. When light falls on an object, some is absorbed and some is reflected. The light that is reflected is the light we see. The effects of light on and from an object are virtually limitless when incorporating the effects of natural and artificial light. Our interpretation of color is a direct result of the influences of light. Taking the roles and effects of light, and studying ways in which they can be manipulated,
may result in certain design strategies relating an object to its context directly or inadvertently.


Within this thesis manuscript there is the discussion of what an environment is termed to be, and what is the role of the environ within this environment. We as humans are continuously building and constructing our built environment. While at the same time this development continues the deterioration and degradation of the natural environment. We are constantly trying to build and rebuild, place and replace our built and natural systems in which we exist.


A concise publication of estuarine and other wetland ecosystems, describing their natural designs, functions, and sustaining techniques. Issues of contamination due to human interaction, pollutants, urban development, and re-formation of land are
recorded, as well as, the ecological threats of the specific environment and techniques of management.


A compilation of artistic works displayed in an exhibition at the Kunsthaus Graz... The exhibition was unique in that it dealt strictly with the topic of perception. All 40 positions and works focused on the idea that perception is not so much reflected upon but rather exposed to direct experimentation. The concepts of the exhibition start to deal with sensory perception and its distortions, confusions and manipulations, along with the processes of reduction, fragmentation and shifting in order to find ways in which our perception can be divided into multiple aspects, and in turn, how they can be combined.


Touches the issues of human influence on natural ecosystems, and our constant degradation of the natural world. Humans have begun to sacrifice the health and function of all natural things. We are exhausting the abilities of the natural systems which sustain our lives. Problems such as water and land contamination are noted with strategic implementations of regenerative processes.


Focused readings within this text were dealing with the characteristics and energies of places. Walter talks about certain methods and citing of the finding of a place. For instance, Mark Boyle made a series of random studies in London, in which the installations were reproduced as frozen images of reality, in particular the ground. These likenesses were fragments of streets, yards, alleys consisting of asphalt, paint, cobble stones, cigarette butts, and gravel. The intention was to create a system of mapping in which the specific individuality of the maps were directly informing the site in which they were conceived. Walter states that places are locations of experience. This experience meaning perceiving, doing, thinking, and feeling. These experiences are not usually located geographically or oriented in a certain realm of space. Rather they are located by place, and by time. The aspect of memory is very important in defining place. It begins to delineate certain traits of an occurrence in time or in a specific space.


A detailed account of the ecologically dense environment of estuarine systems, concentrating on individual life forms and their functions within the landscape as a whole.


This text examines and encompasses the system and criteria for ecologically-based design. It begins to discuss the effects of the human on an environment, and the built objects and structures which we create. It further investigates the role of the built environment and its juxtaposition with its natural counterparts.