



*A Revelatory Landscape:
Wind Through the Senses*

Catherine Annalisa Miller

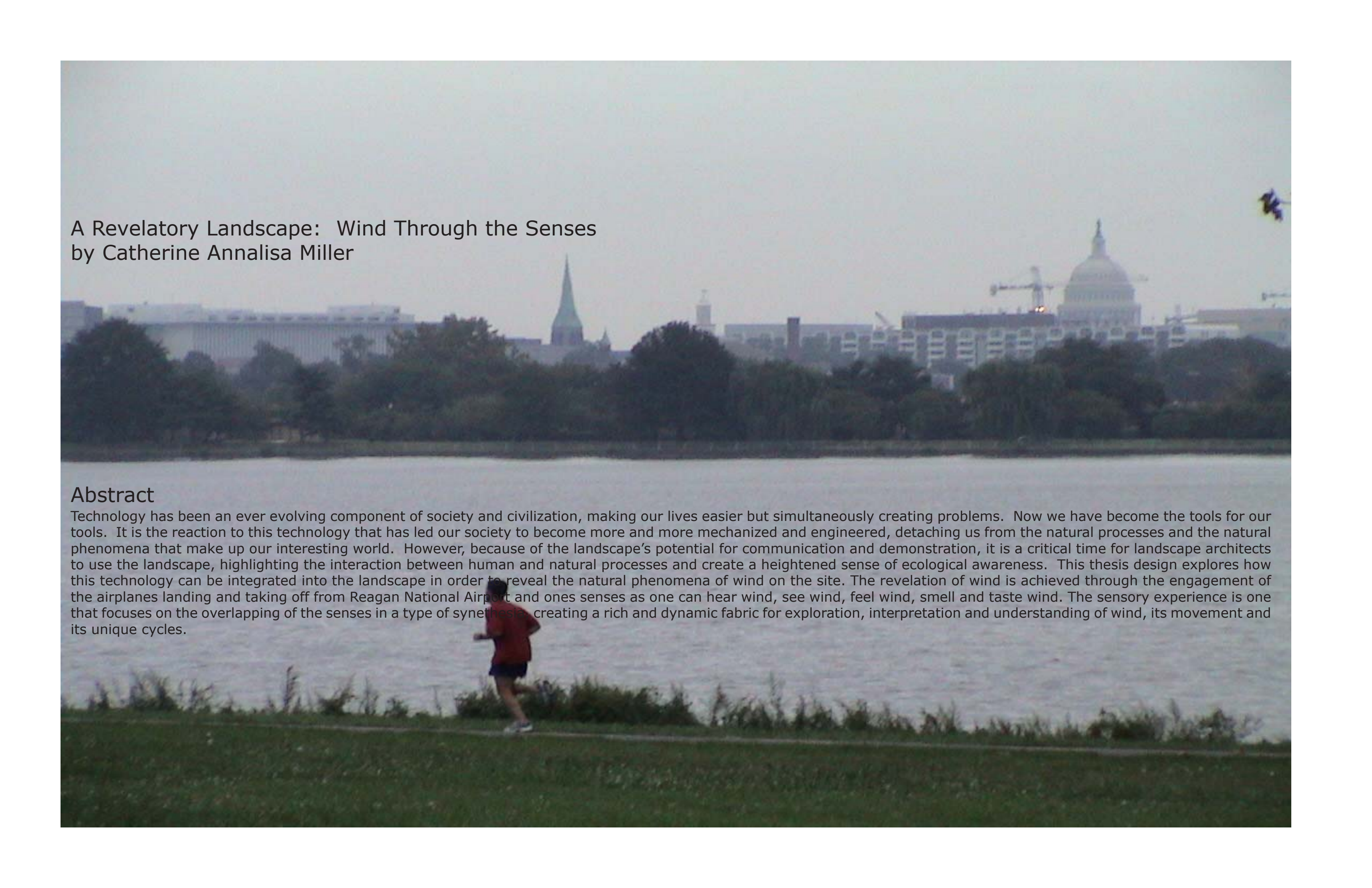
Virginia Polytechnic Institute
and State University
Master of Landscape Architecture
Alexandria, VA
April 22, 2005

Committee:

Ben Johnson: Chair
Caren Yglesias Ph. D.
Dean Bork

*Key words: revelatory landscapes,
wind, sensory experience,
Gravelly Point*

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A photograph of a person in a red shirt and dark shorts running on a paved path along a grassy bank next to a large body of water. In the background, a city skyline is visible across the water, featuring a prominent white domed building (the Wisconsin State Capitol) and other structures. The sky is overcast and grey.

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Abstract

Technology has been an ever evolving component of society and civilization, making our lives easier but simultaneously creating problems. Now we have become the tools for our tools. It is the reaction to this technology that has led our society to become more and more mechanized and engineered, detaching us from the natural processes and the natural phenomena that make up our interesting world. However, because of the landscape's potential for communication and demonstration, it is a critical time for landscape architects to use the landscape, highlighting the interaction between human and natural processes and create a heightened sense of ecological awareness. This thesis design explores how this technology can be integrated into the landscape in order to reveal the natural phenomena of wind on the site. The revelation of wind is achieved through the engagement of the airplanes landing and taking off from Reagan National Airport and ones senses as one can hear wind, see wind, feel wind, smell and taste wind. The sensory experience is one that focuses on the overlapping of the senses in a type of synesthesia, creating a rich and dynamic fabric for exploration, interpretation and understanding of wind, its movement and its unique cycles.



Acknowledgements

By mid-November my thesis felt like a huge barrier I could not see the top of, did not know how wide it was or how I would ever overcome it and reach the other side. So I told myself to just work and work and keep on working and someday I would be on the other side. I would have never reached the other side if it weren't for everyone who listened to me ramble endlessly about only my thesis, gave me encouraging words to keep me going and gave me the necessary redirection and reality check when needed. First and foremost, I would like to thank Ben Johnson for all his wonderful direction, patience with my design process and for always giving me 125%. Your stories and endless knowledge on all the small details of life and design will not be forgotten. Ata boy! Caren, thanks for your energy and driving force to get me through this year alive...and done. I appreciated your viewpoints and perspectives that enriched my knowledge about design. Dean, thanks for your frankness and tough critique about my designs throughout the entire three years and for your confidence and dedication to our future.

Thanks to all those in the Burg, especially my qualifying class, that made my time there full of fun and enjoyable moments. I truly enjoyed learning and growing as designers with you all. Thanks to all those in Alexandria that aided me and supported me in this exciting journey called thesis.

Thanks to my family and close friends for their understanding that I really couldn't think or talk about anything but my thesis the few months before my defense. Thanks for caring what I was doing and unconditional support throughout the endless journey of decisions!!

Thanks to the one little guy who was truly with me through this entire experience, Oliver. I would have probably lost my mind more often if you didn't make me take you to the dog park all the time and take you for all your walks. Your cute self and adorable love were my best companions throughout this year.

Thanks to Linda Ashby and April Miller for proofreading this document. I really appreciate it.



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Part I

C 1: Thesis Position

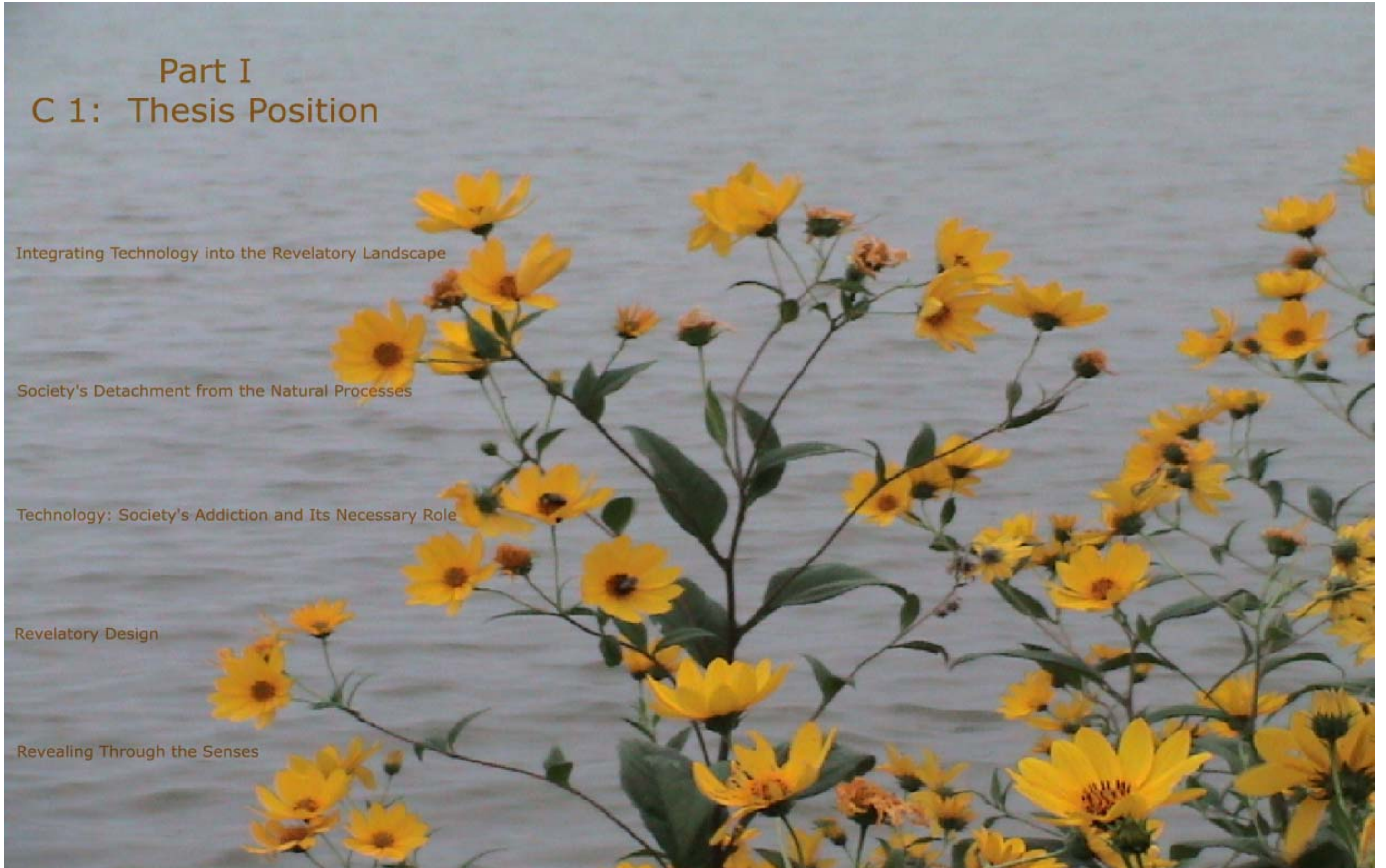
Integrating Technology into the Revelatory Landscape

Society's Detachment from the Natural Processes

Technology: Society's Addiction and Its Necessary Role

Revelatory Design

Revealing Through the Senses



Integrating Technology into the Revelatory Landscape

"Art is the science of feeling. Science is the art of knowing. We must know to be able to do. But we must feel to know what to do."
—(Robert France 2003)



water color painting: nature's natural form evolving into its technological form

Since the beginning of civilization technological discovery has molded societies and cultures in its continual quest for creating an ideal society. In many circumstances technological advancements have allowed humans to live a more "luxurious" lifestyle. The automobile, the train, the ship and the airplane provide a means for global mobility allowing one to travel to "far off lands" that one only saw or read about in National Geographic. One of the most revolutionary machines in our lifetime, the computer, has facilitated daily tasks and communication as well as increased our understanding of the world we live in. Communication, written and visual information, can be transmitted and received half way around the world within a mere fraction of a second. Computers can calculate, identify, process and generate highly sophisticated data and procedures at enormous speeds that previously took days or even months for humans to produce. We can analyze diseases and genetics more precisely. Researched data, such as the Virginia Gap Analysis Program (GAP), a series of Geographical Information Systems (GIS) layers analyzing specific vegetative covers and animals habitats and migration patterns, serves to educate and inform various levels of professionals, so that site suitability studies can be performed and environmentally friendly decisions can be made. Each generation has achieved new heights, been in awe of the succeeding generation, seen how "easy" the new generation has it and has realized the effects its decisions have had over the long run.

Fundamental changes of attitudes and ways in which we live have caused inevitable reactions due to such powerful tools furthering our society. One of the most notable consequences of technology is the disconnection from the natural processes. For example, the majority of the American population lives in the urban environment. Services and vital necessities such as food and water are delivered right into our houses or are available just a few miles from our front doors. Because of such accessibility and availability, these natural resources "apparently" have endless quantities. Rarely do we see where they come from nor where they go, resulting in societies being largely estranged from the dynamic interconnectedness and cyclical patterns that exist in and among living and non-living things on earth, (including ourselves). The Indian Ocean Tsunami killed over 288,000 people, giving little to no apparent warning of its destructive arrival (Sydney Morning Herald 2005). However, primitive indigenous communities off of the coast of India are believed to have minimized their losses because of their

significant technological advancements that have affected the built world



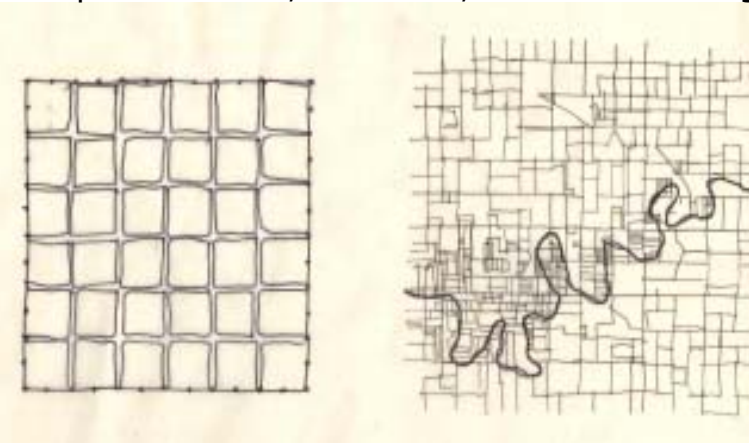
electricity elevators telephone central air steel

ancient knowledge of the wind, sea and birds (Misras 2005). "They can smell the wind. They can gauge the depth of the sea with the sound of their oars. They have a sixth sense which we don't possess," commented an environmentalist who protects these tribes, preventing contact with the outside world (Misra 2005). These tribes are more in tune with the natural processes taking place around them, understanding the earth's subtle clues about what is to come. In our civilized society few citizens understand the clues animals give us about weather or understand the subtle intricacies of the natural processes occurring in the urban environment. We no longer fetch water, grow our own food or directly dispose of our own waste, to mention a few (Moorish 1995) (Poole 1998b) (Thayer 1998). Observing the amount of trash one person produces in a year would shock anyone because after setting the trash out on trash day, we never see it again. While civic services, such as those mentioned, are vital to a sanitary and civilized society, technology used for infrastructure has mainly been used to physically conceal and cover-up the landscape, denying society the ability to engage and understand the wonders that lie beneath the surface.

Besides needing to maintain a civilized and sanitary society another major factor in the disconnection from the natural processes is the need for standardization and control. An illustration for the need to standardize nature was well illustrated by James Corner in his book, Taking Measures Across the American Landscape (1996), in which he goes into great detail about how traditional measurements, those that were concrete to everyday human experiences, such as "hands high" a "field's day of work" or a "stone's throw away", strongly connected humans to nature. These types of measurements have now been replaced by modern measurements, an acre, miles, pints and ounces, and it was then that:

The potential for interrelatedness between diverse things was broken (or suppressed) and is marked today in a number of incommensurate situations, such as the polarity between the 'rationalism' of the engineer and the 'sensitivity' of artist, between the instrumentality of technology and phenomenology of dwelling, or between the life of the universe and the life of the individual," (Corner 1996, p.28).

The National Land Survey's thirty-six square mile grid for cities was originally designed to ensure efficiency and equity so every man could own and farm on his own piece of land, however, it failed to recognize differing topographies,



Left: square grid plan laid over the land

Right: square grid after parcels have been divided over years

ecosystems and productive and unfertile soils of each parcel. Some parcels were too steep to farm on while others would not bear crops due to infertile conditions (Corner 1996). Because of such ability to measure and the need to be exact to accommodate strict laws and codes, "the modern production of environments by engineering and landscape-architectural professionals is becoming increasingly standardized owing to the capacity of computers to store and manipulate all the 'determinant variables' and 'prototypical solutions' for a given situation," (Corner 1996, p. 32). Standardization and codification were established to ensure public safety and health, yet overall it has led to a "ubiquitous and standardized built environment," and to the degradation of biodiversity and animal habitats as well as a loss of regionality and local character (Corner 1996, p. 32).

Fortunately we, as landscape architects, deal with various layers and issues found within society as well as each individual site, and we have opportunities to help bridge such gaps. Recognizing critical issues as more technological advancements are made and discovering ways to incorporate the landscape's demonstrative voice is vital in order to reconnect humans to the natural processes. The landscape is a powerful tool for communication. It reveals past events to us, and "is loud with dialogues, with story lines that connect a place and its dwellers," (Sprin 1998, p. 17). Landscapes make visible the natural forces- volcanoes, mountains, floods, glaciers, etc- and human forces that have acted upon it (Sprin 1998). The vernacular and designed landscapes demonstrate the interactions humans have with the earth and her resources. Materials used on a site tell a story about resources available and construction technologies available at a specific moment in time. Road layouts give clues to the type of settlers and time period



stone building at
Niagra on the Lake



brick church and window
pane



design around the automobile

they were constructed, as well as the traveling speed of the transportation mode. Massive concrete culverts responsible for channeling ten-year flood quantities, carry water out of site and swiftly out of mind to a "far off" destination such as the local river or bay. The effects of these culverts and similar applications of technology is frequently invisible damage done to local habitats, beginning near where the first foot of the concrete culvert was laid and past the miles and miles downstream where the waters converged. Houses, especially in the extreme temperature climates such as the deep South or northern states would orient their houses to either capture the winds or protect the houses from them. This provided regional architecture and uniqueness, unlike today's situation in which our

houses are oriented to whichever direction and one style of house in Georgia can be built in New York due to air conditioners and heaters. Such interactions between humans and the earth's resources reveal how technology has empowered humans to manipulate nature in order to provide certain luxuries and advancements for mankind, and although technological advancements are necessary for a civilized and sanitary society, in many circumstances only one component is factored in: efficiency.



typical high-rise



development that can be found
anywhere in the US



unique details



vernacular home
in SC

Society would not experience the comforts and quality of life it does if it were not for technology; but, in an equal response we must be using this technology to "seek the use of ecological features, functions and characteristics of the landscape to benefit both society and natural systems," (Moorish & Brown 1995, p. 52). We as landscape architects should be narrating these "untold stories" of the urban infrastructure, designing healthier ecosystems, bringing about an environmental awareness, and reconnecting and educating society about the natural phenomena. "We design landscape form and function. We design the experience. We direct the vision and the movement. We emphasize, accentuate, and reveal," (Brown 1998c, p. xi) and because of these influential powers we have an obligation, not only to the environment, but likewise to society and its understanding of it. Through integration of new technological advancements, we as landscape architects have the potential to establish innovative connections and enigmatic revelations for humans and relate them directly to their impact on earth, arousing an ecological awareness. Through revelatory landscapes, revealing the natural processes and natural phenomena taking place in, around, above, and below, can demonstrate the successes and failures of the interdependent relationship between humans and nature. We can integrate technology into the revelatory landscape and reestablish a responsible and more harmonious relationship between humans and the earth, not in past typical contexts, but in a modern and progressive context, relating to modern societies' interests, needs and social patterns.

The first part of this paper explores the reasons why society has become removed from the everyday natural processes. In the second major component I discuss society's addiction to technology and how technological advancements should be used to reestablish a harmonious relationship between the human-made environment and natural ecosystems amongst it. The last section of this paper will discuss revelatory design, the issues it is currently dealing with and various ways to achieve specific social and environmental goals.

Society's Detachment from Natural Processes

Movement to the City

Society's initial detachment from the natural processes began to take place as large populations began moving from the countryside to the city during the Industrial Revolution (Hough 1995). Cities grew and grew, replacing the rural life, heightening the physical and psychological separation between nature and society (Hough 1995). Having eliminated or built over the "natural" ecosystems, such as forests, marshes and streams, made it easy to understand the mental disassociation that took place in the urban cities (Hough 1995). There was less "obvious" dependence on the land and less in-depth comprehension of these ecosystems' form and function. The hydrological cycle is never taken into consideration when the water faucet is turned on. Urban parks' turf grass appearance is maintained to look like a billiard table, decreasing the biodiversity of plants and reducing the variety of wildlife habitats. Regulated air-conditioned and central-heated buildings exist everywhere culminating in a distinct isolation from the outdoors and natural processes that take place and support human life.



rain falls on rooftops and is drained through the rain gutters on a building



water from streets and rooftops flows into the storm drain where it goes underground and invisible



water travels underground and is concealed until it is emptied out into a larger body of water

Dealing with the Filth

Cities became denser, more congested, more polluted with stench-filled air, creating an unpleasant and unhealthy environment for its citizens. In Boston, where the sewer wastes go into the Back Bay, residents, understandably, were disturbed by the stench that was filling their city as is seen written in this letter sent to the *Daily Advertiser* in 1814:

Citizens of Boston! Have you ever visited the Mall! Have you ever inhaled the Western breeze, fragrant with perfume, refreshing every sense and invigorating every nerve? What think you of converting the beautiful sheet of water which skirts the Common into an empty mud-basin, reeking of filth, abhorrent to the smell, and disgusting to the eye? By every god of sea, lake, or fountain, it is incredible! (Spirn 1984, p. 22).

In the 1880s and 1890s Boston decided to deal with the problem and worked with landscape architect Frederick Law Olmstead to reduce the stench and sewage problems. His idea was to construct a wetland, transforming the riverway from a sewage and industrial effluence polluted floodplain into an area that contributed to cleansing the water the water and protected the adjacent land and that downstream from flooding (Spirn 1998). Olmstead redesigned the land so that it would evolve and mature into what appeared to be "natural scenery" for the urban citizens to enjoy and appreciate. Olmstead created similar landscapes in many other US cities that were successful like the Fens in Boston. However, a problem arises with the current day situation: "these works are widely, and falsely, assumed to be preserved bits of nature in the city, not the designed and built places they really are, daring experiments of engineering, ecology, landscape design, and city planning," (Spirn 1998, p. 70).

In Boston's Riverway, along London's Thames River and other growing cities, the filth amongst these industrial cities and the increased contamination in well-drawn water demanded a sanitary reformation (Spirn 1984). These cities experienced a massive investment in civic infrastructure leading to the trenching of streets in order to lay water and sewer lines, and the building of parks in order to create a healthier, safer and more livable place for its urban residents (Spirn 1984). At the time of these civic infrastructure movements it was the best way to deal with the inhabitable conditions that were arising in the cities; however, they too often focused on the superficial aspects of nature and denied opportunities to reveal the natural processes (Spirn 1984).

Incorporating Infrastructure: failures and successes

The civic infrastructure implemented into the city fabric was designed “to conceal the processes that sustain life and which contributed, possibly more than any other factor, to the acute sensory impoverishment of our living environment” (Hough 1995, p. 30). The city’s common utilities were too important to be left unorganized, therefore, they needed to be “unified, centrally administrated, and funded by local government,” which lead to the “mechanization of infrastructure,” (Poole 1998b, p. 129). The city was now viewed as a “physical container to be organized in order to provide efficient delivery of services and disposal of wastes,” (Poole 1998b, p. 129). Because of the government’s need to be as efficient with funds as possible:

The technical criteria became the social and aesthetic criteria... and the degree to which the machine metaphor has been exercised has resulted in the removal of any associations other than the functional from much infrastructure...In their construction to efficiently serve, the networks contain little civic significance; they remain only abstract services that we all pay fees and taxes to support-but little more (Poole 1998b, p. 131).

Many cities failed to utilize landscape architects, urban designers or ecologists in the problem solving process for orderly growth of their communities, leaving society with over-designed mundane projects that served no aesthetic, ecological or civic purpose (Poole 1998b). Drainage pipes were and still are designed to accommodate significantly larger volumes of water than needed to prevent flooding and erosion. Unfortunately, these lifeless streams further impair water quality, carry away the water that would otherwise recharge local groundwater and streams, and result in significant problems downstream that those residents upstream see no direct connection to (Hough 1995). By making the urban infrastructure identifiable in strategic locations, a new civic and social place can be created (Poole 1998b), a heightened sense of place designed (Moorish & Brown 1995) and ecosystems can be reestablished that help to educate society (Hough 1995).

Kathy Poole is a Virginia landscape architect who has participated and written extensively on revealing the natural processes and creating multi-functional landscapes (Poole 1998b). She commented on the French Director of Parks in Paris, Jean Adolphe Alband, along with two other French engineers and Napoleon III who used the technology in the mid 1800’s to:

Safely administer disposal of the putrid physical pollution of waste and the clandestine sedition of political revolutionaries (for the lower and middle classes)... and helped to restore public order and to link all Parisians

in a new social consciousness. They also combined concerns of efficiency, function, and economics with humanistic values that addressed citizens’ imaginations and their feelings for the art-not only the efficiency-of living among its citizenry (Poole 1998b, p. 132).

These men made parks with artificial lakes, grottoes, waterfalls, greenhouses and zoological gardens, tree-lined promenades bustling with people and encouraged social interaction (Poole 1998b). On the ecological side these men integrated the physical wonders and recognized the natural topography of the city (Poole 1998b). The French’s approach and philosophy for dealing with ecological and social issues within the urban infrastructure should still be a model for urban design today.

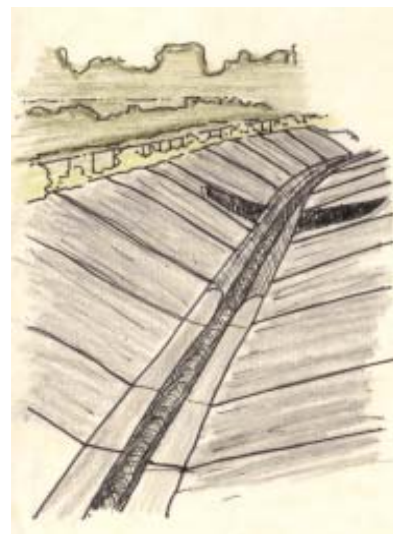
Current Situation with Urban Infrastructure and Revealing the Natural Processes

Two important designers that deal with the revelation of the urban infrastructure are William Moorish and Catherine Brown who practice at the Design Center for American Urban Landscape at the University of Minnesota (Poole 1998). Their philosophy constitutes a landscape that:

Advocates conjoining natural and municipal infrastructure as a way of formulating an alternative urban design scenario that values natural elements in the formation of design...They also emphasize how the natural features form the character of a city and how a natural structure such as a watershed can become an entity used to structure a city’s new growth (Poole 1998b, p 138).

In addition they believe that the infrastructure can serve three functions: “providing a repository for a collective memory, to establish an orientation and a path finding framework and to provide a curriculum of civic instruction on how to use and value this investment,” (Moorish & Brown 1995, p 52). In Phoenix, Arizona projects are beginning to incorporate these ideas by creating suitable sites along highways that help orient the people in their cities and surroundings. These unique spaces establish landmarks and incorporate places like the garbage-transfer station into a civic space and educational center (Moorish & Brown 1995).

A landscape architect in Australia incorporated wind socks into the movement of the highway in order to demonstrate how the wind is “synomonous with natural heritage and reflective of the dynamic culture basis” in this portion of Victoria (Slee 2004, p. 38). He derived his concept of incorporating the natural phenomena into the visible landscape from an artist from the Bronx, Alan Sonfist, who believed, “the content of the public monument was not just a record of significant human events (such as wars and important dates) but, equally important, such things as the life and death of rivers, previous geology, even a museum of air. This provides a critique of what a city (in his situation, New York) tends to control, smother or ignore,” (Slee 2004, p. 38). The wind socks along the highway serve to bring about an awareness of the wind and the effects wind has on the land and culture.



Technology: Society's Addiction and Its Necessary Role

Society's Advancements and Technology

To understand how present day societies have achieved their technological heights it is important to look back at our ancestors' development and ecological behaviors. As far back as 2,500,000 years "our ancestral societies developed tools and fire... and accumulated and transmitted knowledge much faster than other non-human primates," (Southwick 1996, p. 127). The majority of the information conveyed dealt with their survival such as how to locate food and water (Southwick 1996). They understood which plants could be used for medicinal purposes, ornamentation, and construction, each of which was vital to their survival as a civilization (Southwick 1996). These early civilizations, many of which were nomadic hunter-gatherers, knew a great deal about the environment; however, that did not "necessarily mean that early humans were great conservationist... They were persistent foragers and relentless hunters," requiring that they frequently move once they depleted their local resources (Southwick 1996). These hunters and gatherers did exist in small numbers; therefore, the earth had great potential to replenish itself (Southwick 1996).

One of the most significant technological factors that has altered the land and fostered population growth is agriculture (Southwick 1996). It is because of abundant food production around 8000 B.C. that societies began to settle down establishing permanent villages and developing better communication skills and other jobs (Southwick 1996). New jobs, such as a potter, weaver and other trades, did not require ecological knowledge (Southwick 1996). With permanent villages, land was cleared and resources were manipulated and utilized and, in some cases, civilizations disappeared most likely because the resources in that area were depleted.

Improvement in agricultural technologies has bolstered the world's population which has continued increasing at enormous rates, raising fears that current and future resources will not be able to sustain such a population. Currently "humans extract about 15 billion tons of raw material- that is 30 trillion pounds- from the earth each year," which demonstrates the demands on the earth (Amato 1997, p. 2). It is with the furthering of technology and a greater understanding of earth's limitations that our generation and generations to come will need to deal with. Developing new strategies for working with recycled materials, inventing new products that do not put such a demand on the earth's resources, harnessing our usage of natural resources and educating humans about environmental decisions are steps that will have to be taken.



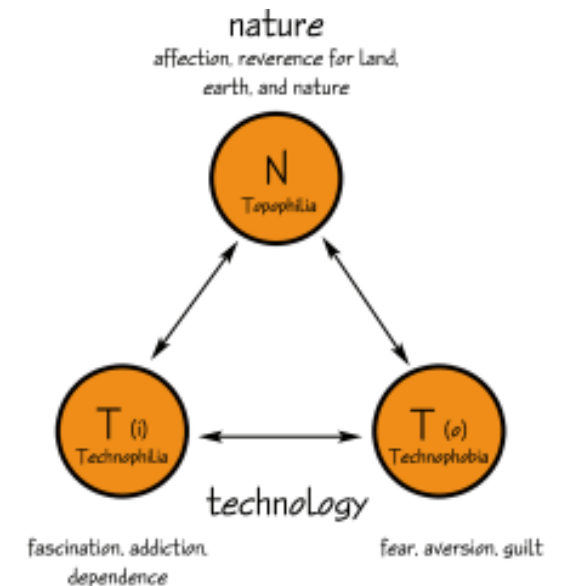
the size of our trash can vs. the size of our recycling bin

Society's Addiction to Technology

Technology has continually improved making our lives "easier" and more mobile. The wheel made us more mobile, the ax allowed us to chip away and separate hard objects we could not do with our bare hand, the plow allowed us to work faster and spend time working on other farm projects. Today we stay connected in our ever-so-mobile lifestyle using the cell phone, laptop computers and the numerous other gadgets we all own. In his book *Gray World, Green Heart*, Robert Thayer goes into depth about how we as humans have become addicted to technology and "how Americans remain ever so faithful to the god of technological invention," (Thayer 1994, p. 32). The American landscape is designed based on the technologies of the past:

Although the original fabric of our landscape dates back to more elementary causes such as the location of the frontier settlements, river ports, wagon roads, early surveyor's grids, and the railroad, the modern landscape in which we now live owes its form primarily to the automobile (Thayer 1994, p. 34).

Design requirements of streets and traffic signs are determined by the speed of the vehicle, the turning radius on corners is determined by the width of the car, and we all know the list goes on. How can we change the way technology affects the landscape? Thayer's diagram, showing the triangle of conflict demonstrates how "American's affection for land and nature collide with a love-hate relationship towards technology," (Thayer 1994, p 49). The current American society has been so used to the "technological acceleration" and the easy ability to consume and create wastes that we have created an incomprehensible dependence on the land for life, and are yet revolted by the destruction we have done to it (Thayer 1994). We have become the "tools for our tools" and the "urgency of the nature/technology conflict has made the movement towards a sustainable landscape both inevitable and necessary," (Thayer 1994, p. 196). "Our lives are like the plants hanging from wires at Epcot, roots exposed, dependent upon technologies, which should they fail, will spell disaster," explained by Anne Whiston Spirn on how we take technology for granted, and in many circumstances we don't know how to deal or take care of a situation without it (Spirn 1998, p. 25). An example of technology failing was the blackout of 2003 that affected New York City and the surrounding states. Without electricity people could not cook, do things around their house, work or use many of their technological devices, leading to an economic standstill and short-term panic.



Robert Thayer's triangle of conflict in the American landscape

Technology benefits us tremendously, and society would not have it any other way. However, it becomes a problem when people depend on it so much that they are not able to function without it. Landscape architects should be using technology as an aid to enhance the functionality and form of the site. The designs should be taking advantage of the landscape's communicative power, demonstrating through the usage of technology, a responsible relationship between nature and culture, nonhuman and human, organic and inorganic and form and function (Thayer 1998). We as landscape architects should be "the leader" at the discussion table, seizing this opportunity instead of allowing others to constantly make strictly technical decisions.

Technology's New Role

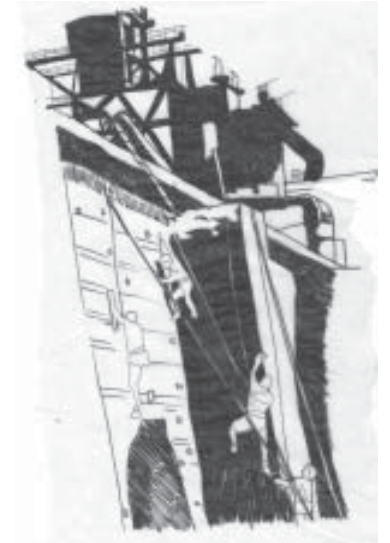
Although past technology reasoned the concealment of the infrastructure, design today should embrace the new technological advancements and philosophies that promote the revelation of the landscape. Technology is a means to recovering, renewing and creating new metaphors, telling new stories and we must learn to read and think of the world not as individual components but as dynamic relationships of complex living systems and design accordingly (Bateson 1979).

Ecosystems can be rehabilitated, and society can begin to develop land stewardship that encourages more respect for the land through sustainable design. In the design profession sustainable design is defined by the Council of Educators in Landscape Architecture as:

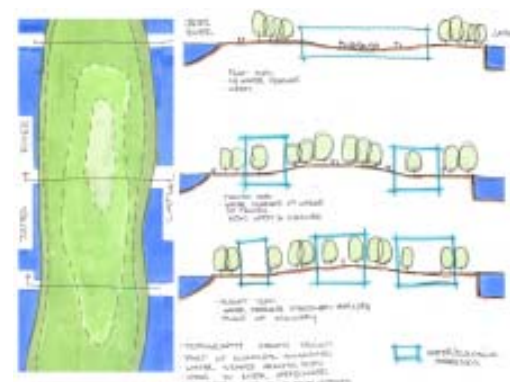
"Those (landscapes) that contribute to human well-being and at the same time are in harmony with the natural environment. They do not deplete or damage other eco-systems. While human activity will have altered native patterns, a sustainable landscape will work with native conditions in its structure and functions. Valuable resources will be conserved and a diversity of species will be maintained or increased (France 2003, p. 32).

Projects such as those in Pittsburgh and Duisburg Nord, Germany where vegetation is helping remediate the toxic land, and at the same time providing a multi-functional landscape is necessary in today's society where we create larger demands on the land (Leccese 2001) (Steinglass 2000). Much research has been undertaken in water quality and quantity measures in order to help restore wetlands and reduce pollution that is dumped in water bodies (Metropolitan Council 2003). Low Impact Development (LID) communities are more common, best management practices (BMP) are being required in new and retro-fitted developments, Leadership in Energy and Environmental Design (LEED) buildings are being built more often, more efficient automobiles are being designed and laws, regulations and tax incentives are helping make some progress by encouraging companies and society to make more environmentally friendly decisions (Metropolitan Council 2003). Rooftop gardens and connected greenway systems help increase wildlife diversity through improved habitats and reduce water run-off and create a place for humans to enjoy and learn about their surroundings (McDonough & Braungart 2002).

Sustainable design strategies emphasize keeping healthy sites healthy and healing injured sites, favor living adaptable materials, protect the water, minimize paved surface, utilizing materials that can be reused in their afterlife and respect cost and efficiency over time (McDonough & Braungart 2002) (France 2003). Buildings are being designed to utilize features of natural ventilation and lighting like the proposed building on the site of the previous World Trade Towers designed by Daniel Libeskin. The technological advancements are being made, research is being conducted and we as landscape architects should encourage and engage in such research to enhance the ability to design for both humans and non-human environments and further our knowledge on how to integrate the two.



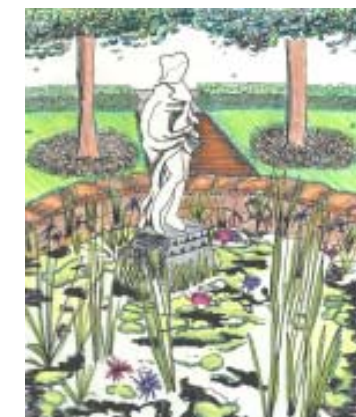
along river's edge hike and bike trail set within dense vegetation



usage of flexible earthforms on a river to demonstrate and work with various flood levels



daylighting a stream and creating an outdoor classroom for ecological awareness



usage of formal ponds for water retention

Revelatory Design

Landscape architecture and architecture are similar in many ways, however, the landscape involves organic materials which are subject to significant change (Betsky 2001). Architecture does work with materials that wear over time and may experience failure, but a landscape has a cyclical and linear pattern to it as each species in the garden will grow, reach its peak maturity and then decline and die. Through this natural cycle, the landscapes evolve and change over time, most likely into something completely different from when they were first installed. Along



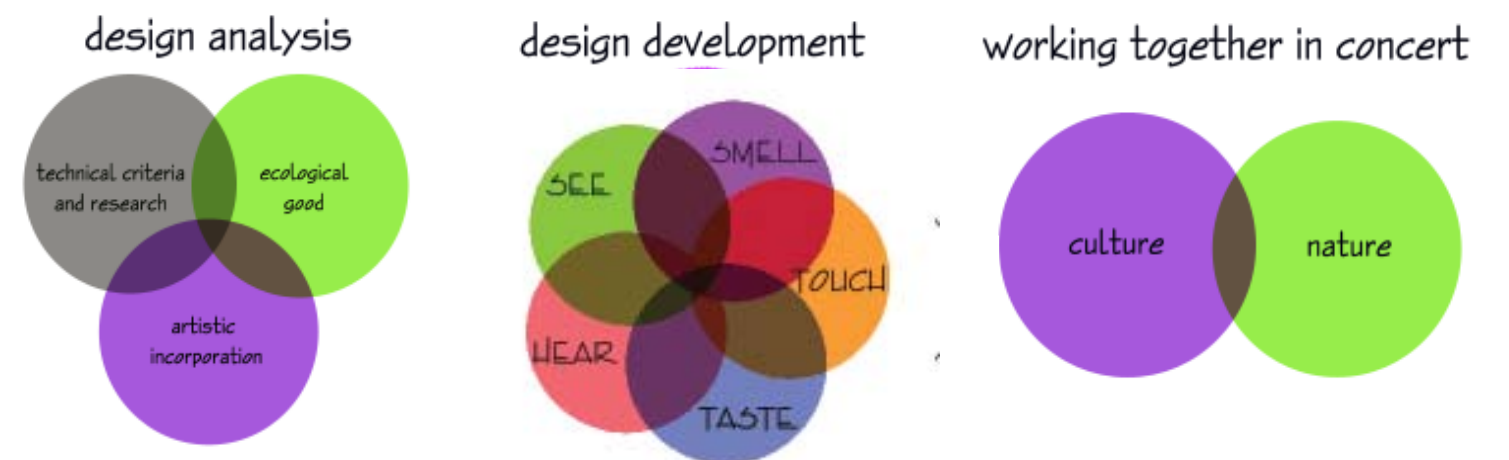
with the natural layers, exist the social layers consisting of land use, cultural deposits and emotional attachments, and each layer is "always in a dynamic state of erasure and deposition of meaning," (Vacarino 1995, p. 90). Like in archeology, landscape architects are in many ways following similar steps to the digging process as they uncover and discover the uniqueness of the site. Each layer and each fragment of each layer lends itself to its own contribution and place in the composition, constructing an overall understanding of the site. The site's layers and fragments might be buried, invisible, unheard, intentionally left alone, partially or completely obvious and it is up to the landscape architect to determine which type of revelation will serve the community in the best possible way. This quote from Aaron Betsky discusses this relationship:

There is a dual romanticism in this practice: one emanating from the love of that which is past and ruined or unused and that emanating from the belief that we can make a better place. The art here is never a true revelation of what exists, but an invention that resides in the manner of cutting or opening, the choice of what to reveal, and the designers' reactions to the results in built or shaped form. It glorifies what is no longer useful and is hopeful about what might take place in the future while realizing the act of the artist in a thoroughly contingent but self-effacing manner," (Betsky 2001, p. 16).

As landscape architects we decide which parts of history are written and erased. Obviously some artifacts and layers are more pertinent and interesting than others, but we decide what to reveal, how it should be done and construct the viewpoints from which they are understood. It is in this moment of such significant decision making that landscape architects take on their largest responsibilities and the revelatory aspect of the landscape becomes critical to the larger body of work.

So what is revelatory design?

Revelatory design is an approach attempting to explore the various layers and aspects of a site. It strives to "uncover vestiges of a hidden history, culture, or physical attribute- the stuff of our collective memory," (Betsky 2001, p. 7). These landscapes seek out narratives that discuss the human social histories, recreating "the meeting place of order" and seeking ways of restoring or recreating "visible geological constructs, climate patterns, and ecosystems," (Betsky 2001, p 10). They tell a story of what is there, visibly and invisibly, symbolically and realistically and provoke us, "in subtle and memorable ways" to reflect on contemporary society. They provide opportunities for developing a new framework for perceptions of the world in which we live and how it influences us and vice versa (Betsky 2001). Revelatory landscapes take in visitors from their busy paced world, provide unique pauses, observation lookouts and places for contemplation in order to ask larger questions "about where we are and how we might understand our place in the physical world," (Betsky 2001, p 7). The landscape's focus is not on aesthetics and imposing on the landscape a formal design, as traditionally it was in landscape architecture (Betsky 2001). It is not to only "make visible what is already there, but act to open up and let us experience what is not there until we actually participate in the act of making," (Betsky 2001, p 14). It is through this experience of the site, the intimate interaction with its elements and the unveiling of events to someone, that this revelation takes place and allows him to truly interpret and understand what actually exists on the site. Revelatory designs also seek to educate and illuminate, convey knowledge through direct experience as well as by interpretation, punctuate and enrich our environment and sensitize us to nature's complexities and represent this information in a creative realm (Brown 1998b). It attempts to not only reveal the natural processes, but also to do so in a creative and artistically intellectual language that reaches out to a variety of user groups.



why and how to create a meaningful and lasting experience in the landscape

The history of revelatory landscapes has some of its roots in the earthworks movement, created by postwar artists who sought to “expose what exists on a site, reveal its essential nature, and make visible typically unseen landscape zones,” (Betsky 2001, p. 7). The most famous of all, Robert Smithson, who created the spiral jetty was attempting to make form on the land, “abstracting it while making it more present and visceral,” (Betsky 2001, p. 7). The water moves in and out of the rock, crystal and earth spiral jetty sculpture, making observers more aware of a dynamic relationship between water and land (Betsky 2001). It is this transformation of the usually invisible into visible and into a more engaging script that brings about a heightened awareness of what is going on around us, whether or not we usually pay attention. Orchestrating these unique experiential moments in the landscape are stepping stones to a greater ecological awareness. The spiral jetty, like revelatory landscapes, accentuates the manmade structure in order to distinguish it from the real, further propagating thought about how we as humans interact with our environment and what potential there is for enhancing the interaction between the two.

One factor that enables revelatory design’s success is the ability to incorporate into the design moments that take notice of a gap, or juxtaposition between two objects, two realms and realities that speak out to where we currently are and where absolute potential lies. This gap, a separation between what is and what is not real can be difficult to understand; however, Aaron Betsky, author of *Revelatory Landscapes*, articulates his understanding of this notion and provides examples for better understanding it:

In the case of nature, it is the gap that separates the person from the real of nature that can never be constructed or symbolically represented. The gap between the person and the real is the space of all design, and of landscape architecture understood in a conventional sense. Throughout its history landscape architecture has tried to fill this gap with pseudo nature or with cultural artifice. The historic goal has been to close the wound, to heal it with design that either mystifies the possibility of being at one with nature or attempts to subdue nature by making it conform to abstract geometric principles...We as humans can never be in or out of nature or culture.



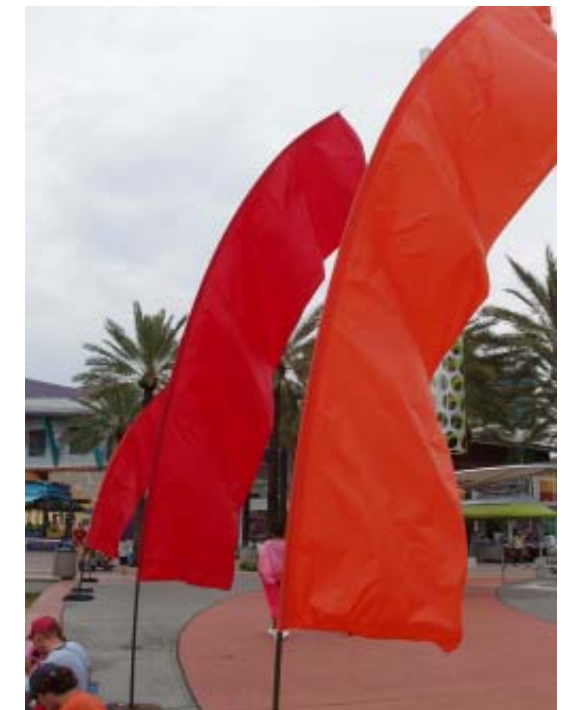
Smithson’s spiral jetty covered in salt is now visible after being submerged in the lake.
Copyright of Stephen Gooding

Rather than articulating a pretense that there is no gap, the space between the human and the real is revealed. Something like this sensibility is evident in Kathryn Gustafson’s plan to put up a line of Mylar spinners that follows the contours of her San Francisco site for this exhibition. There is no effort to be like nature. The piece is inserted between nature and the experience of wind, calling attention to the separation of nature from experience. It is the spirit of nature, not nature itself, that is mirrored. This is revelatory landscape in a radical sense. By celebrating the gap, rather than pretending that it doesn’t exist, it opens the possibility that we might attempt to reduce the distance separating ourselves from the real by attempting to get closer to the wind (Betsky 2001, p. 24-25).

Therefore, by celebrating this space, highlighting the gap, making it apparent, we acknowledge rather than deny a societal problem or situation. By revealing the movement, the “spirit” of the wind, the visitors will not merely pass through the windy site, reacting to its force by constantly pulling their hair out of their faces, but hopefully engage their bodies and minds in a deeper exploration. As they notice the Mylar spinners they will not only realize the direction of the wind, but thrust their faces and bodies into it, feel it caressing their faces, as it glides by and over them, refreshing their spirits and bodies. This simple experience with the wind, or another one at a different time of the day or year can begin to reveal the wind’s movement and cycles as it varies throughout the different times of the day and year. A simple seed being planting during one’s experience of a revelatory landscape can set in motion a series of environmentally conscientious decisions to be made: orientation of one’s house, natural ventilation to help cool and freshen up the house, recognition of weather patterns tied to the wind, and how the simple blowing of the wind effects our bodies, mind and health (Rosen 1996).



left: NYC’s Gates designed by Jeanne-Claude and Christo demonstrating the wind’s movement in Central Park



right: decorative flags flapping in the wind at Universal Studios

How do you construct/design a revelatory landscape?

One of the main purposes of a revelatory landscape is to reveal a specific component that asks questions about ourselves and “produces a heightened consciousness of the environment,” (Diamond 2002, p. 214). It is important to choose elements that will be noticed, contrast their surroundings and, “rise out of space rather than blend into it. This may require the juxtaposition of materials with context-colors, textures or forms that play against the borrowed background. The scale must be amplified to the point where the installation has a definite presence, can be read as human intervention, as art,” (Diamond 2002, p. 218). Elements should correspond in heaviness, visual density, range of tones and sizes to their specific gesture and purpose within a site,” (Diamond 2002, p. 218). The appropriate scale for the site and statement being made will lead to adequate readability, prevent tangled portions, confusion, distortion and misrepresentation within the site and the narrative being told (Diamond 2002, p. 218). In some instances the design might better be served by “defamiliarizing the landscape” which “enhances possibilities for amplified perceptions” conjuring up an experience or reaction that strongly questions society’s decisions and our role within it (Vaccarino 1995, p. 89). The overall design demands a “structural framework to pull together disjointed gestures into an interrelated, interactive, and intertextual experience of place,” which will ensure the intended message reaches the visitors to a site (Diamond 2002, p. 218). “A combination of methods calling the work from its context and then shaping it (emotionally, psychologically, in other words, physically) as a compelling interpretation of place,” will allow each visitor to learn from and incorporate his own narratives into the overall experience (Diamond 2002, p. 218).

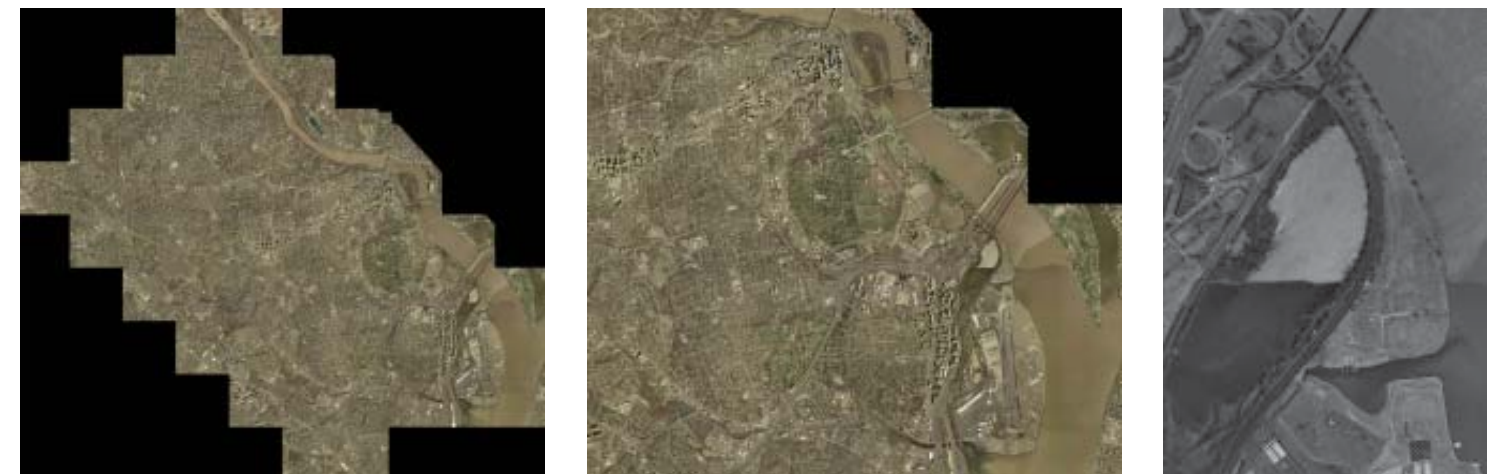
Legibility and Site Scale

In a revelatory design it is important that the design be legible. Many times we as designers see the world through very different eyes: we notice the placement of landscape elements, we observe how people use space and hopefully have some in-depth knowledge about reading and understanding the various layers of the landscape. Do we as designers design for the other designers and critiques and not for the users (Thayer 1998)? Thayer explores the aspect of revealing an ecology and if the people do not understand the design is that ecology revealed? (Thayer 1998). If one of our main objectives is to educate and/or evoke specific feelings about the environment, yet the majority of the population does not understand the design or have the knowledge to understand what aspect of ecology it is trying to reveal, has the design failed? Has it failed if it has achieved its ecological goals? Should legibility prevail over functionality or vice versa? Thayer explores the reasons revelatory designs face challenges with legibility:

Ecosystem structures and functions, like technologies, can be partly visible and understandable. Most often, however, ecosystems’ complexity is like the tip of the iceberg: what we are able to see and understand about the workings of an ecosystem is but a fraction of what we think we know, or expect to one day know (Thayer 1998, p. 122).

Bringing about simple demonstrations that are legible and explicit, integrated with a deeper level of knowledge can allow new revelations each visit and encourage an intellectual dialogue between those with all different levels of knowledge. Designs need to incorporate various layers, obvious and abstract, in order to communicate and demonstrate the specific goals and messages for each project. Depending on the location, including signage or a brochure to explain the design, goals and underlying features can be extremely beneficial to the users. Similar to an experience through a museum, although the landscape is not a museum, the small explanations and small details about the items are extremely beneficial to those exploring. These strategies can be applied to certain designs where specific information must be conveyed to the visitor in order to understand the site.

The idea of legibility leads to another question dealing with the scale of the site. How can a designer demonstrate the effects one stream has on an entire watershed, and how can one begin to reveal the intricate workings of a watershed through one site along the stream? How can one begin to understand earth’s wind patterns by experiencing the wind of one site? Is it always necessary to make the whole completely comprehensible? The understanding of one small component, part of the larger whole, can be equally beneficial to the revelatory and educational process that the holistic understanding provides. In attempting to reveal the natural processes, the issue of scale is one that should be kept in mind.



zoomed in views of Potomac River moving through Arlington, Alexandria and Washington, D.C.

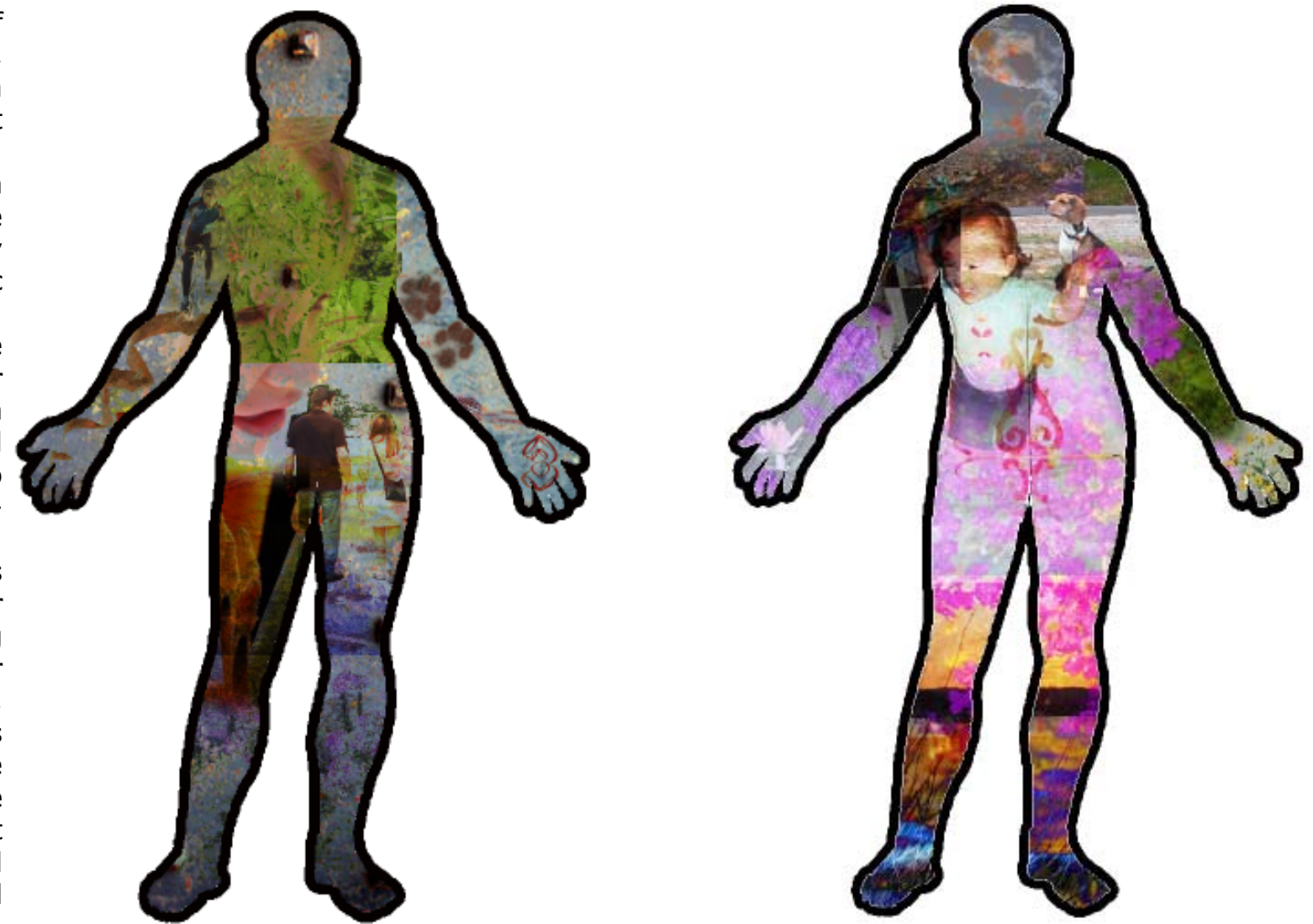
(images from Arlington County)

The Experience

Smithson's statement, "One's mind and the earth are in constant state of erosion, mental rivers wear abstract banks, brain waves undermine cliffs of thought, ideas decompose into stones of unknowing," forges the idea that the perceptual qualities of experience-how one thinks of a place-is a vital aspect to be incorporated into revelatory designs (Vaccarino 1995, p. 88). The revelatory experience is one of the main components to the overall effect and understanding of the design's intent. Each individual design will tweak the elements dealing with the site's seasonality, the bodily interactions and extensions within the site, that compose the lyrics, poetry or music of the revelation. Natural phenomena such as wind, light and water movement all have different characteristics throughout the year and often times in smaller cycles. Water movement in a stream might be turbulent and swift at certain times of the year and slower and maybe frozen during colder moments of the year. Wind moves differently throughout the different times of the day and year and also depends on the geographic location. In its larger cycle, during the cooler months, the prevailing wind comes from the northwest and in the warmer months it comes from the south. The day's cycle is affected by sunlight and the cooling off at nighttime as the early morning winds are sporadic and light. As the air heats up through convection, the wind speed increases in the afternoon and begins to blow stronger from one direction. As one experiences these phenomena, interacts and reacts to them, it allows for "extroversions of bodily sensory perceptions," and for one to take in the experience in a more dynamic way.

The designer has the potential to bring out specific moments, and the "sensitivity of the design towards the environment sets in com-motion the inner sensitivity of the perceiver," (Vaccarino 1995, p. 88). By acknowledging the notion that perception contributes significantly to our understanding of the world and how it works, revealing the landscape in more than one faculty allows one to understand the phenomenon in greater depth. "The inner dimensions are unearthed when exposing the body to the site's phenomena," (Vaccarino 1995, p. 88). When being exposed to the wind on Kathryn Gustafson's site, the visitors not only see the spinners spinning, but merge together the effects it has on their entire bodies. Wind passes by their ears, muffling the sounds that are being carried in the currents; sparkling glimpses of the spinners simultaneously flutter with their rickety to smooth-paced to sporadic spin. The Mylar spinners dance, swishing and swaying back and forth around their sticks as the clothing visitors are wearing flaps, twists and undulates around their bodies. "Wind and body are fused as one ephemeral phenomenon in motion," (Vaccarino 1995, p. 88). One can see waves of wind move over the water, land and the spinners, smell the salt water being lifted off the bay mixing with grass and feel the wind push and pull at our movement. The experience, the scents, and the feelings can be connected to other situations or events in their lives, creating a burbling up of strong emotions that increase the possibility of a lasting impression. The connection to these other aspects of one's life with the experience he is currently having is a fundamental aspect

to learning, as one relates, compares, informs, contemplates, interprets and integrates old and new information. A scent might trigger an emotion from a special time in one's life and allow for a fundamental understanding of the two times to take place. The dampness of a shady place might transport him to a place where a special event happened, and these emotions influence the current experience. The way the light reflects on an object might forge a connection between the materials of different places and deepen one's understanding of the past place as well as the current one. It is through this multi-sensory experience that we can gain a better understanding of our past, present and future. Multi-sensory perceptions fuse the overall experience and "celebrate the site's ephemeral qualities and the existential condition of the body," (Vaccarino 1995, p. 88).



The idea of unearthing one's inner dimensions, or getting at the core of who we are and how our past, present and future influences our experiences and understanding, set up the opportunity for a strong connection between one's sensory inputs, emotions and physical interactions.

Candlestick Point Urban Park and Cultural Center located right on the San Francisco Bay was designed by Mark Mack, Doug Hollis and George Hargreaves and incorporates the wind into the site and recognizes the tidal action of the bay. It is an 18-acre landfill, surrounded by Candlestick Stadium, Candlestick Point State Recreation Park and Rubble Art Park (Frey 1987). The park utilizes the prevailing winds with landscape components such as sand dunes, the wind gate and the terracing planes that slope towards the bay and interact with the tidal action. This integration of the natural phenomena focuses on the experience over aesthetics and, "they have made the landscape more inhabitable. By practicing sensorial imagination and articulating a poetic inside/outside dialogue they have deconstructed a pictorial frame of detachment. By concentrating or amplifying the often subtle and ephemeral connotations of the phenomenal landscape, they have made its temporal dimensions more explicit," (Frey 1987, p. 92). The art and science are brought together in this design, integrating the ecological information and technical knowledge, weaving the art of designing the sensory experience which truly demonstrates "creating of a place for nature and culture to act in concert," (Frey 1987, pg. 53).

The experience of Candlestick Point Park focuses not on the designers contriving the experience to a specific set or sequence of experiences, but of an experience that allows the "visitor to be coauthor of the score who improvises the music rather than give it its true expression," (Vaccarino 1995, p. 90). The foundation is laid out for the visitor to engage himself in certain experiential points, where during each visit he can further explore or contemplate the elements and change the "music" to the mood of the day or himself. The idea of a band here seeks to further this understanding of improvisation in the landscape. As a band plays and engages the crowd, the musicians receive energy from the crowd. On a certain night one type of improvisation will be added to the show and excite the audience even more, while on another night, they might attempt improvising another piece. In this park and in revelatory landscapes the visitors are the ones who can determine their journey and determine what they want to experience from the setting. Allowing them to "stand back, listen, read, react, and respond to, not dominate a site," allows them to create connections to the larger, cultural and physical environment (Frey 1987, p. 53). Frey explains how this is achieved at Candlestick Point Park:

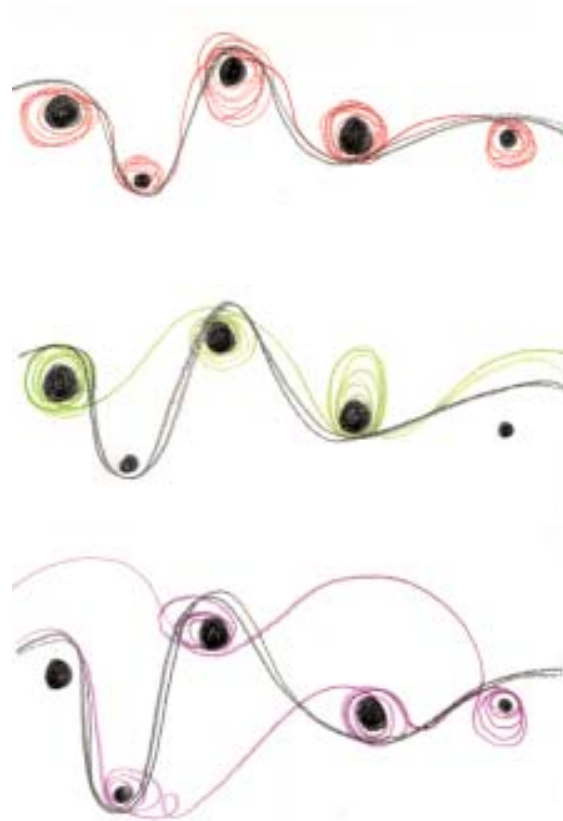











diagram of improvisation

This park is at the same time profoundly physical and metaphorical. It suggests a self-motivated way of looking through the thing. You give yourself a tour based on what draws your attention. The circulation offers no short cut, yet the perceptual byways to environmental cognition are everywhere present, making it possible to extend oneself in many directions at the same time," (Frey 1987, p. 59).

The meanings and intentions of the design will ring out continually through the site and the experience because the structure of the design will set up different experiences, overlapping them and connecting the entire experience. Similar to the idea of teaching, presenting new material and allowing it to be understood and examined from various directions and viewpoints, can be achieved in the landscape. One's experience and meaning, derived from the landscape will be, "made of points of differences in a constant echoing of associations," (Vaccarino 1995, p. 89). By chaining together a cluster of associations that spring from a nonlinear, stratified or unexpected set of relationships, a lyric poem, not a narrative, is being composed. The experience and design is "not about preoccupying the site with itself, but creating spaces conducive for people to reach a level of transcendence," (Frey 1987, p. 59). This transcendence is what the designers of revelatory design strive for: for the visitors to the site to have special moments that transform their experience and understanding. The small seeds, environmental awareness moments, that we plant within the design hope to engage the visitors in a site, furthering their understanding of their world and the place we have within it.

-  flying a kite when young
-  riding a bike on a windy day
-  seeing a wheat field and the wind blowing through it
-  experiencing a wind park
-  awareness of wind throughout the day
-  awareness of wind throughout the year
-  connection of wind to other aspects of life: history, health, technology
-  housing: usage of natural ventilation and orientation of buildings
-  better environmental decision making throughout other parts of one's life

example of how ideas and experiences in the landscape can influence future decisions

Aesthetics, Education and Community Involvement

“We shape our dwellings and afterwards our dwellings shape us,” was quoted by Winston Churchill, putting a high value on the spaces that we as landscape architects design (Motive 2005). Landscape architects have great influence over how people understand and experience their surroundings. Motivating the population, in small and in large numbers, and engaging them in stimulating experiences are a few steps towards arousing an ecological awareness (France 2003). A descriptive walk through a wetland, subtle clues about the ecological and social evolution of a river, or a group gathering for the installation of native plants are all ways to one-on-one educate and excite the population. Throughout the literature a strong connection between the aesthetics of a place the affection and pride developed for a place, and the functionality have emerged as critical components for revelatory designs (Eaton 1998) (France 2003) (Thayer 1998). “Neither art and design nor science or engineering alone have much to instill love of and motivate action for the natural world,” (France 2003, p. 36). The integration of both elements is critical because often “their (ecological sites) frequent aesthetic insensitivity sends viewers fleeing to nearest Italian Garden,” (France 2003, p. 36) and many times people do not want to see a completely wild landscape because it appears unmaintained even though it might be healthier than the more manicured landscapes. The average person does not have the knowledge to determine the dynamics of the natural phenomena and ecosystems, and are therefore judged based on appearance.

Places that are aesthetically pleasing to the users, filled with meaning and interpretation, will inherently create a stronger tie to the place and enhance the pride that one feels towards the space. Maria Muelder Eaton, a professor in the Department of Philosophy at the University of Minnesota delves deeply into how humans perceive a space, how their knowledge influences their experience in the space, and arrives at the conclusion that one of our most difficult challenges is to develop ways to creatively engage humans in the landscape and through this engagement, develop an understanding of nature which strengthens attitudes and demonstrates affection towards the environment (Eaton 1998). What critical elements of the revelatory landscape will create these strong preferences for more healthy landscapes and in effect bring about awareness in all parts of their lives? Simply showing that a hand is involved in the design or putting a border around a more naturalistic planting bed are a few ways to begin to have healthy landscapes with an aesthetic quality. Painting concrete columns with historical stories underneath the highway can tell critical facts about a culture or history one might not know exists, providing not only a pedestrian pathway but an educational journey as well.



left: usage of urban infrastructure under raised highways to create pedestrian friendly and educational spaces

right: present conditions under raised highway

Eaton also claims that we rarely experience anything as purely aesthetically, ethically, religiously or scientifically, but that we perceive things holistically (Eaton 1998). Therefore, in a revelatory design it is important to incorporate an experience that not only engages the science or the art alone, but engages a variety of experiences providing a richly layered experience. There should be a simple meaning to the landscape as well as complex meaning. Simple clean objects that clearly represent an aspect or learning component can be one of many interpretations available on the site. Complex meanings refer to the overall concept of the design and interpretation being presented. For example, when trying to create a wind park, it might be the usage of musical instruments to convey the simple meaning, but the overall patterns of their interaction with the wind throughout the year that convey the complexity of the phenomenon of wind and how it influences fundamental aspects of our lives. Creating landscapes for various levels of interpretations, engaging the different senses, providing different intellectual experiences and understandings of the landscape, allowing different emotions and feelings to surface, as well as invoking images and statements through the design are vital to revelatory designs.



plantings in a plaza that appear unmaintained



naturalistic plantings with jogging trail incorporated



preservation of previous vegetation within new development



Revealing through the senses

We all move through similar spaces, yet our experience can be fundamentally different. Our companion might notice the colors more, or someone the textures. Someone might hone in on the historical story or explore the resemblance of a space to another one. No matter what we are exploring or where we are, no two humans perceive the world the same (Tuan 1974). We all have different backgrounds, insight into different areas of knowledge, and various emotional states at the time of our exploration. How we experience a place is derived from the information our senses gather, and although we all have the same sense organs, each individual's senses vary and the pieces of this gathered information everyone utilizes is different. How is it that each individual's senses influence the way in which one experiences a place? How is it that even though we experience and perceive a place differently some places still evoke similar feelings or reactions?

As humans our bodies and minds are fairly adaptable which enables our environment to shape which senses we rely more heavily on. Our sensory usages change throughout the various seasons and times of day. Some cultures, such as Eskimos, who live in complete darkness throughout the winter months, rely more heavily on their sense of smell and feel as they navigate throughout the darkness (Tuan 1974). For those who live in more equal light and darkness distributions, they still adjust the usage of their senses throughout the different times of the day. For example, during the day we rely more heavily on sight because we can see almost everything, however, like the Eskimos, we are required to utilize more of our hearing and feeling in order to compensate for our lack of sight during the darker hours. The culture and society in which we live also influences which senses we rely more heavily on. In our media-driven society the senses that are most often stimulated are sight and auditory because currently those are the senses that we use to watch TV, listen to our iPods or have fun on the computer. We might better utilize our noses if these technologies could create scents. In other cultures where the technology and media do not play such a strong role in shaping our lives they might rely more on their tactile or olfactory abilities.

Although we use our eyes as our main source for gathering information, many of the other senses are the ones that engrave more lasting memories and evoke the strongest of emotions (Tuan 1974). We may see a picture of our childhood, but it is a smell from that time in our lives that triggers a much stronger memory that can transport us more quickly to that time and situation. We hear a song that takes us back to "that time in our lives" and how easily it is for us to conjure up feelings and emotions that we had at that time.

How do the senses integrate and process the information that they receive? The senses are constantly working together in an overlapping manner, confirming what one sense identifies. When we feel cozy in a room, is it the warmth of the air, the light that touches our eyes in the right way and caresses our skin, or is it the colors and tones that are actually themselves warm tones? Some senses are more dominant than others in certain situations and sometimes the order in which they are perceived changes due to our environment or the event.

Seeing an orange, smelling the citrus aroma that entices our taste buds, feeling its peel and the texture of the meat inside, tasting and hearing the squirts of citrus is an experience of how all our senses receive and give feedback to each other. If the citrus taste is a bit off, our taste has detected something wrong and then we use our eyes and touch to further detect the orange to determine its state. When it comes to experiencing a place this sensory experience, the seeing of the shadows and light, the sound of your feet whisking through the grass, the breezes getting tangled up in your hair and the scents of the wildflowers swirling around are how we truly come to understand and know the essential character of a place. Heidegger explains how the "thing" is revealed:

"In what the senses of sight, hearing, and touch convey, in the sensations of color, sound, roughness, hardness, things move us bodily in the literal sense. The thing is the aistheton, that which is perceptible by sensations in the senses belonging to sensibility. Hence the concept later becomes a commonplace according to which a thing is nothing but the unity of a manifold of what is given in the senses," (Heidegger 1971, p. 25).

We cannot separate our senses and their interaction, and it is through this synthesis that we understand our world in depth.

As designers it is important for us to realize the ways our senses obtain information and influence our behavior. The senses draw us through the spaces as they spark our curiosity, intrigue our ears, entice our noses and entertain feeling receptors. When taking into account the sensory experience, multiple layers for exploration, interpretation, and connection can be tapped into and make a more interesting and engaging space for all its visitors.



mainly visual experience



mainly hearing experience of plane landing



tactile experience



kinesthetic experience



olfactory experience

Perceiving

Without much effort or obvious thought we take in our world. We see striations in the stone, geometrical shapes, lines and patterns of paving materials, shadows contrasting with squares of sunlight and a constant movement of people. We hear a quite hush-hush murmur drifting above the soft clip-clop of shoes on marble. We look over a brochure describing the current exhibits and our fingers slide back and forth over the slick paper. We move our heads back and forth trying to connect the map to our personal orientation in the building. The smell is so subtle, a little of vegetation from the atrium and maybe a whiff escaping from the cafeteria, but for the most part our noses can take a break. We cannot stop our senses from perceiving the world. We can cover our eyes, ears, or hold our noses, but that only temporarily or slightly denies our brain of the sensory inputs. Perceiving our world seems like such a simple act, however, its simplicity is veiled by the fact that perception is an extremely sophisticated process in the brain (Coren 1978). The ability to perceive one's world requires the ability to locate stores of memory data. Subtle classifications, comparisons and the myriad decisions are necessary before any of the information becomes part of our conscious awareness of what is out there (Coren 1978). The brain's complex system, sensory input and previous experiences help provide us with feedback through which we perceive, make sense of and construct our world (Coren 1978).



closeness to event



season, time of day and weather



view point



geometrical shapes
and forms

Spatial Orientation

How we perceive, move and explore our world has been influenced by the human anatomy. Our bodies are mostly symmetrical. We have two arms, two legs, two feet and two hands. The majority of our body's make-up consists of two almost identical sides that mirror each other along a vertical line. We have two eyes and two ears; one on each side of the body, almost in the same place. We have one nose with two nostrils, and one mouth, both centered right down the vertical middle line of our bodies. We center ourselves due to our bodily positions. The saying "follow your nose," used to tell someone the easiest way to find their way after getting lost demonstrates how we live around the centering of our bodies (Tuan 1974, p. 27). Having the sensing organs equally divided allows us to perceive both sides of our environment equally, unless, for example, we are blind in one eye or deaf in one ear. The sense organs are also located near the front portion of the body due to the fact that one usually moves in a forward motion and the need to perceive what is taking place ahead is greater than what is taking place behind.

We have a front and a back to our bodies which is another factor that heavily influences how we move and perceive the world. It is easier for us to move forward than backwards. Looking forward is always a positive thing while looking back or turning back can carry nostalgic or negative connotations (Tuan 1974). Things that lie in front of us, or objects that are at the front of some place are more important and valuable. Places or items located in the back of something are not so highly valued (Tuan 1974). If something encloses us we feel secure, a sense of coziness and privacy. If it is open we feel free, adventuresome and grand. The idea of a city has the feelings of both open and closed. It has the feeling of cozy and grandness and intimate and public life (Tuan 1974). As Bachelard explores the parts of the house in his book *Poetics of Space*, there are the public and private spaces, cozy and open spaces, scary and dreamy places (Bachelard 1964). Each room creates a certain feeling and sensation, and inside each house we can find a space that fits our present needs.

The organization of the spaces and the objects within them also affect our perception, physically and symbolically. Yi-Fu Tuan discusses how vertical elements give a sense of transcendence, defiance of gravity and sense of striving. The Washington Monument reaches high above all the built environment of Washington, DC as do the Petronas Towers in Kuala Lumpur. The World Trade Towers in New York City, before their fall, also rose up into the sky. On a smaller scale, the tall ceilings inside a cathedral evoke this feeling of transcendence, heavenliness, and personal spirituality. According to Morse Peckman, "Architectural spaces evoke certain types of emotions. We tend to associate closed solids and shallow plasticity with the feeling of fixity and inhibitions; open pavilions and deep plasticity with the feeling of flexibility and expansion; deep axis with energy release and shallow axis with energy conservation," (Tuan 1974, p. 29). All these understandings and sensations we have are derived from how they interact with the human body, its scale and its spatial orientation.

Individual Senses

Vision

This is the faculty that humans depend on most heavily. Yi-Fu Tuan comments on how a "larger world is open to him, and far more information reaches him through the eyes than through the sensory systems of hearing, smell, taste and touch," (Tuan 1974, p. 6). Humans' eyes have evolved to discern between minute changes in color gradation and to perceive our world in three-dimension (Tuan 1974). Because our eyes are so important, the amount of time they need for development takes place over several months to a year. Babies cannot walk until an older age giving them time for adequate development of their depth perception and three-dimensionality which reduces their chances of injury and increases survival. Because we use color and three-dimension to navigate through our world, light is an important factor in our environment and, therefore, at night we use artificial light to compensate. Sight is vital to our survival because it warns us of danger, aids in selecting a mating partner, and constantly gives us feedback about our environment and its changes and how to adapt to these changes.



touch materials



use sight for navigation and safety



paving materials and interaction with sound



smells of a forest



fragrances in the landscape



sound of waves and water

Touch

The faculty of touch, the haptic sense, is probably the next most important sense that we use. Our hands' ability to manipulate objects with great detail and fine motor dexterity demonstrates the importance touch has to humans' survival (Tuan 1974). Yi-Fu Tuan makes a statement that "without site a person can still operate with a high degree of efficiency in the world, but without the tactile sense it is doubtful that he can survive," and demonstrates that through these two faculties we as humans gather the vast amount of our information about the world we live in (Tuan 1974, p. 7). Blind people can still navigate through their world feeling objects and identifying their location with a stick. They can gather information and communicate through the use of Braille which is all derived from the ability to feel and distinguish between different surfaces and bumps. It is through touch that humans understand hard and soft, sticky and smooth, sharp and dull and all aspects of our environment that give us feedback and confirm what is around us.

Smell

The ability to smell is probably the most neglected faculty, but one that is highly proficient in gathering information. We usually use our sense of smell to confirm what we see. We smell a liquid to determine which of our visual guesses are right, water, turpentine, or vodka. We smell meat to make sure it is okay to eat. Although we rely on smell less than the other faculties it is one of the most emotionally powerful senses. It only takes a subtle scent to emotionally transport us back to that spring morning, remember the music we were listening to and to feel the breeze coming through the window. It is through the sense of smell that we conjure up specific memories very quickly and very powerfully. Scents trigger such emotional responses because "the cortex with its vast memory store evolved from the part of the brain originally concerned with smell. Another reason being, that as children, not only were our noses more sensitive but they were closer to the earth, to flower beds, tall grass, and the damp soil that give off odors," (Tuan 1974, p. 10). Another factor is that what we see and how we see things is selective and changes over time as we grow taller and the scenery itself changes, however, the smells of a place usually stay the same (Tuan 1974).

Hearing

Humans' ability to hear is much less impressive when compared to that of other animals such as cats or bats. Humans hearing ranges from 12 to 20,000 cycles per second compared to bats who hear up to 50,000 to 120,000 cycles per second (Tuan 1974). However, it is the ears that can leave extremely influential and emotionally lasting impressions. "The sound of rain pelting against leaves, the roll of thunder, the whistling of wind in the tall grass, and the anguished cry excite us to a degree that visual imagery can seldom match. Music is for most people a stronger emotional experience than looking at pictures of scenery," (Tuan 1974, p. 10). We can choose to close our eyes, but we can not choose to close our ears unless we are prepared with earplugs. It is through our hearing that the rhythms and melodies of what we see are experienced. When you watch the wave crash onto shore, it is the actual sound of the wave crashing that you hone in on. The sloshing noise of the water gives form and liveliness to the visual movement of the water. The sound confirms what our eyes are observing, and what we see confirms what our ears are witnessing. This overlapping of senses makes the experience more memorable and understood.

Senses in the landscape

So why is it important to understand how the different senses work when it comes to experiencing a landscape? We as humans all perceive the world differently, and even more noticeably when we cross cultural barriers. Because our eyes obtain so much information from our surroundings we “abstract from it (our visual field) certain objects, points of focus, perspectives,” and therefore our world is more abstract (Tuan 1974). It is not uncommon that two people who are watching the same movie or sports game take in completely different events. Because of our eyes’ ability to see much farther than we can feel, smell, taste and often hear, many of the objects we see are “distant objects” far from us and create less of an emotional response within us (Tuan 1974).

Some senses are more dominant than others in certain situations and sometimes the order in which they are perceived changes due to our environment. For example, if we hear a plane coming, but there is a tall wall in front of us, we use our hearing to detect that something is coming our way. Once the plane passes over the wall, our eyes confirm what we heard. If the wall is not present and we see the plane from a distance, the noise does not confirm that it is a plane. Our vision already did that. But the noise heightens our experience, and makes the sensory experience complete. Our senses constantly overlap, providing us with information and confirming what one sense is experiencing. We only use a small amount of the information that our senses put out there for us and through culture and our own specializations in life, we hone in on certain senses more than others. A chef will obviously have a more developed palate and scent receptors. An engineer might have the visual acuity to perceive slight differences in laser beam intensities. Our environment impacts the degree to which we utilize our senses, and Yi-Fu Tuan tells this story about Aivilik Eskimos on Southampton Island who use natural phenomena and the information their senses gather for them in order to function during the wintertime when there is no sunlight:

Under such conditions the Eskimo cannot rely on the points of reference given by permanent landmarks; he must depend on the shifting relationships of snow contours, on the types of snow wind, salt air and ice crack. The direction and smell of the wind is a guide, together with the feel of ice and snow under his feet. The invisible wind plays a large part in the life of the Aivilik Eskimo. His language includes at least twelve terms for various winds. He learns to orient himself by them. On horizonless days he lives in an acoustic-olfactory space (Tuan 1974, p. 11).

Like the Eskimos, people of all cultures adapt in order to survive in their environments, and this means relying on certain senses more heavily throughout life and during different times of the year. But it is through this assimilation of the senses, the hearing, smelling, feeling, seeing and tasting of our environment that truly begins to reveal the essence and unique characteristics of our world and intimate surroundings.

So in understanding the ways in which humans’ sensory faculties affect our perceptions of the world and the influence they have on behavior and memory it is obvious that multi-sensory elements should be incorporated in order to truly reveal a landscape. Not all visitors to the site will have prior knowledge about what is being revealed and in order to engage the visitors on different intellectual levels it seems crucial to incorporate landscape elements that stimulate the various senses. Through the various senses people learn about the world around them. They can understand the type and variations of vegetation through different textures of bark and foliage. They can trace over the raised letters or shapes on three dimensional objects, engraving them in their memories. One can feel the different speeds and movement of wind making him aware of the direction the wind is blowing from and its connection to the clouds in the sky. The weaving together of sensory experiences will create a dynamic and rich fabric for the visitors to learn from and create an in-depth perspective of the place and the phenomena that is being revealed.

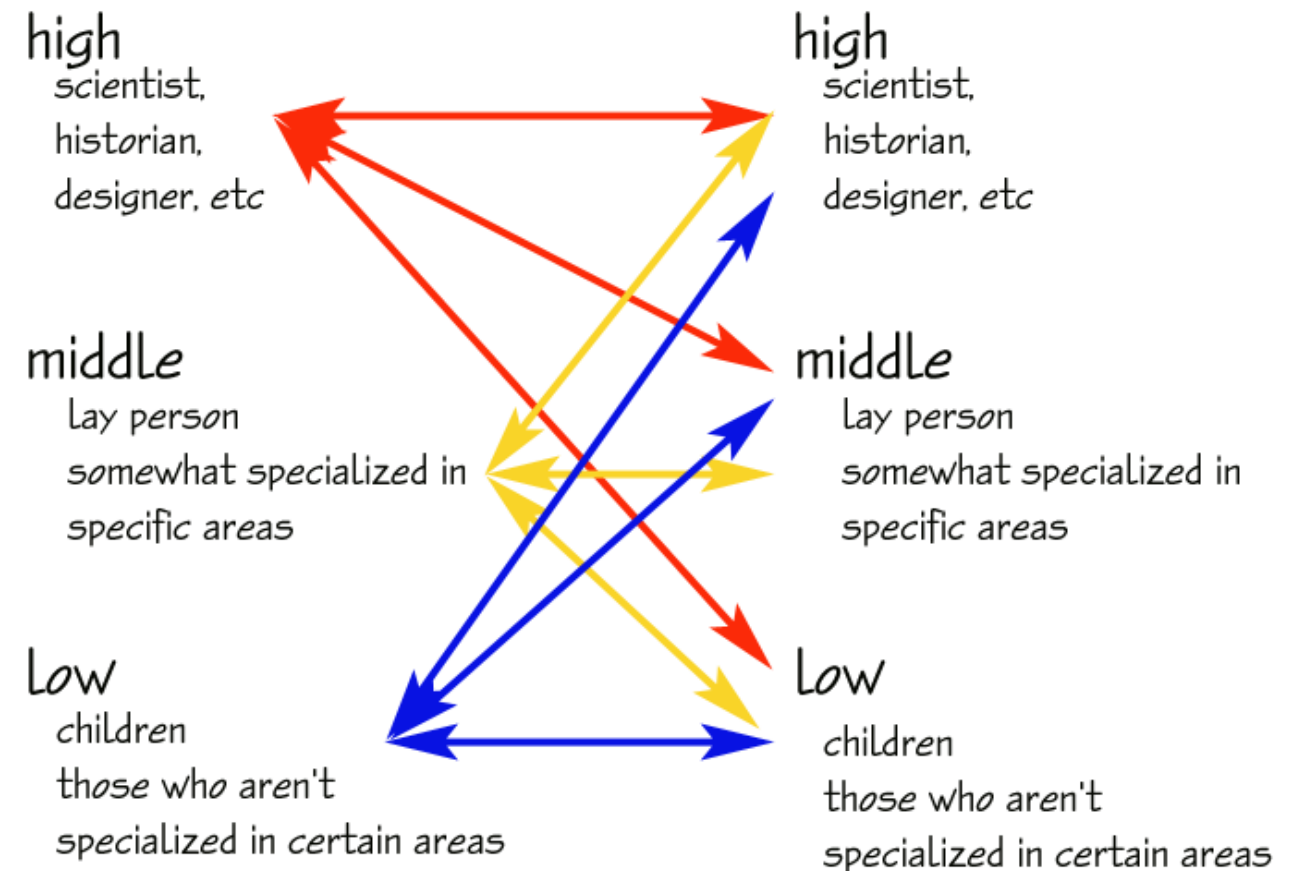


diagram of conversations between people of different levels of knowledge and how it can encourage learning for all visitors

Material usage for regional and cultural needs and significance

In the landscape the materials and natural phenomena of the site are what arouses the different senses. Anne Winston Spirn poetically describes how the materials and the landscape components stimulate the various senses:

“Gravel crunches underfoot, grass swishes, a wooden bridge thumps hollow. In some times and places, sense of sound seems heightened, discrete sounds amplified: when air carries sound farther at night and in the early mornings; where ambient noise is low, in a quiet cloister, where sounds bounce off the walls... Airborne water and dust reveal the colors of light’s spectrum in rainbows, sunsets and haloes. Walled gardens and marrow, shady streets aligned to capture cool evening breezes are typical of old districts in desert cities like Jeddah,” (Spirn 1998, p. 97).

She continues on to describe how the senses are engaged continuously throughout the landscape and vary during the different seasons (Spirn 1998). The feelings that are evoked through one’s sensory experience, trigger their memory which is something, sensual, personal, and place-specific, allowing the user to connect other experiences with the one they are currently having (Spirn 1998).

Materials can also take on symbolic connotations as well as create a sense of place establishing a specific identity. It is important that they be used and chosen appropriately because as Spirn explains, it can destroy the meaning of the design:

Materials arouse senses, carry meaning and pose limits. Deployed deliberately, to modify process and form and extend their meanings, materials furnish precision and nuance. Used in ways which contradict intended meaning, they may undermine and obscure it. Ignorance of craft, of materials, their properties, and performance in context can lead to unintended irony and to failure: when the stone facing of a monument or a plantation of trees, meant to endure, disintegrates or dies (Spirn 1998, p. 101).

Materials can imply a certain time period and distinguish a certain geographical region and its resources. Specific stone from local quarries will most likely weather the best and be easily incorporated into the landscape. Various brick paving patterns and brick wall patterns can give cultural and societal clues. Materials can leave impressions on the visitors, leaving them with memories that allow them to identify and reflect on past, present and future experiences.



coquina shells used for paving and building materials in St. Augustine, FL



Arlington Cemetery gravestones demonstrate numbers of those who have sacrificed their lives



hierarchy of materials for Lincoln Memorial



modest materials for affordable house by Frank Lloyd Wright



Charleston, SC heavily shaded parks



Spanish-influenced architecture in St. Augustine, FL



setting for Washington Monument



Chinese architecture and setting

Conclusion

Landscape architects are experiencing a critical time for the profession's direction due to an overall increased awareness of what we do, the recognition that we can improve the quality of life and our opportunity to integrate nature and her processes and phenomena into all aspects of design. Because of the new facets emerging and the myriad options and projects now available to the profession, it is necessary that we seize these opportunities. The landscape has a demonstrative voice, providing moments and experiences of contemplation, reflection, provocation and realization, punctuating where we as humans and a society have come from and accentuating where we are headed. Lives of those living in a first world society have experienced continuous advancements towards a more "luxurious" lifestyle, perpetuated by technological inventions that have fundamentally changed the attitudes and ways we live and interact with nature. Most people are disconnected from the natural processes, do not understand how they work or even contemplate how they affect one's life. We merely react to them when they inconvenience us.

In the past, much of the city's design for services and urban infrastructure has tried to achieve the goal of efficiency and denied the natural processes from being incorporated, leading to a monotonous and standardized world. It is now that landscape architects are being incorporated into this process because cities are realizing that spaces can be multi-functional, and by exposing one to the natural processes and intricate phenomena that exist around us, whether or not we notice, we can create a greater ecological awareness. By allowing people to experience the flux of a stream over time, by understanding the lengthy process water undergoes in order to be purified or designing a place where people can experience wind on a cyclical basis are the steps that we should be taking as a profession. Integrating the natural processes and phenomena into the built world is a challenge we face; however, if we continue to conceal this separation and create pseudonaturalistic landscapes, we are doing more harm than if we accentuate the gap between the two and highlight the potential that truly exists. Designing revelatory landscapes that reveal the natural processes in subtle and significant ways, evoking thoughts and a better understanding of them will engender an affection and appreciation for the landscape and nature. This is where we as landscape architects have the greatest influence. We are writing the stories about the land and its interactions with humans as well as the histories, cultures and events that make it what it is today. Through revelatory landscapes we are digging up, exposing and celebrating the site's seasonality and uniqueness and creating purposeful, didactic spaces that encourage continual improvisation within the landscape. Engaging one's senses, fusing together the entire experience by way of a rich fabric for one to explore and learn from and "unearthing" the inner dimensions of the visitors can create lasting and impactful memories. It is in these moments and lingering impressions that we, as landscape architects, hope the visitors will create distinct connections with past events and future decisions, arousing an ecological awareness and respectful behaviors towards nature.



Part II: Investigation

C 2: Site Analysis

C 3: Research and Discovery

C 4: Research Conclusions and Design Criteria



landing



After experiencing the shear on the site I began this collage. As the plane goes over, the shear comes off of both sides of the plane. The people serve as an audience to the plane, pilot and passengers.

Landing is the first act of site acknowledgement, and it marks the beginning of the odyssey of the project. Landing usually invokes displacement and change of speed (as in arrival), but it also conveys the idea of touching ground and reaching for the confines of an unknown world. It describes the specific moment when a designer still does not know anything about a place and yet is prepared to embark on a lengthy process of discovery. Landing, therefore, invokes the passage from the unknown to the known, from the vastness of the outside world to the more exact boundaries of a specific project.

Landing thus requires a particular state of mind, one where intuitions and impressions prevail, where one feels before one thinks, where one moves across and stalks around before seeking full disclosure and understanding...Initial landing provokes impressions and insights that often last through the entire design process.

—Christopher Girot

Wind and shear. Slashing and ripping. It was a sunny September evening and I was picking up my roommate at Reagan National Airport. Her plane was late so I decided that instead of circling around the airport for an unknown amount of time, I would drive northward on the George Washington Parkway and wait at a park called Gravelly Point. I had only known that this was the park where high school kids hangout at night to watch the planes take off and land and other unmentionables. But there was still sunlight and there were a good number of people out and about, so I decided to walk around. What draws people to this place I wondered? It wasn't but a few more minutes that I pondered that thought and then a jet flew over so closely I thought I could reach out and touch it. Seconds after the jet flew over a shearing noise cut and sliced through the air. It ripped and spun out for a few seconds overhead and then on the ground small vortices, dust devils, lifted up loose dirt. It was this shear and this initial impression of the planes flying over that has stayed with me throughout the entire design process. A few more planes flew over and I relished in this exhilarating experience of loud engines, flying metal and the shear factor after they passed by. Although I knew I wanted to do revelatory design, I did not know what was going to be revealed on this site, but it was at this initial moment, in these initial experiences with the planes and the shear that I claimed Gravelly Point as my thesis site.

grounding

Grounding is the second step in landscape discovery and understanding. Grounding has to do with orientation and rootedness, both in the literal and figurative sense of the word. The difference between landing and grounding is essentially linked to time and moment. Landing only happens once, at the beginning, immediate and distinct, whereas grounding reoccurs indefinitely. Grounding is more about reading and understanding a site through repeated visits and studies. The site contains both a residue and a promise; its surrounding context, its soil, climate, water, ecology, and history are unique and special. Thus, grounding has less to do with the individual imagination than with careful research and analysis.

Grounding is a process implying successive layers, both visible and invisible. Sometimes the most important aspect of a given site is almost intangible. It is not necessarily what remains visible to the eye that matters most, but those forces and events that undergrid the evolution of place. —Christopher Girot

Gravelly Point is located on the George Washington Parkway in Arlington County. The peninsula-looking piece of land lies just due north of Reagan National Airport and its runways. The Potomac River runs along the site’s eastern shore, Roach’s Run Waterfowl Sanctuary is to the west and the George Washington Parkway runs between the two. The channel that allows tidal fluctuation in the waterfowl sanctuary flows on the southern shore of the site. There is a portion of the site located on the most southeastern tip of the land that belongs to FAA. Only after 9/11 did this portion of the site become off-limits to the general public.

I defined the site boundaries to reach all the way north up to the Long Bridge which the local trains use to cross the Potomac into DC. The southern and eastern boundaries are the Potomac and the channel leading to the waterfowl sanctuary and the Parkway forms the western boundary. From the site looking northwards you can see the Washington Monument, Jefferson Memorial, the Old Post Office Tower, and the Nation’s Capitol. Views towards the south are composed of the convergence of the Anacostia and Potomac and the entire Reagan National Airport. To the east one can view Crystal City and Pentagon City.

SITE CONTEXT



north



northeast



south



southwest

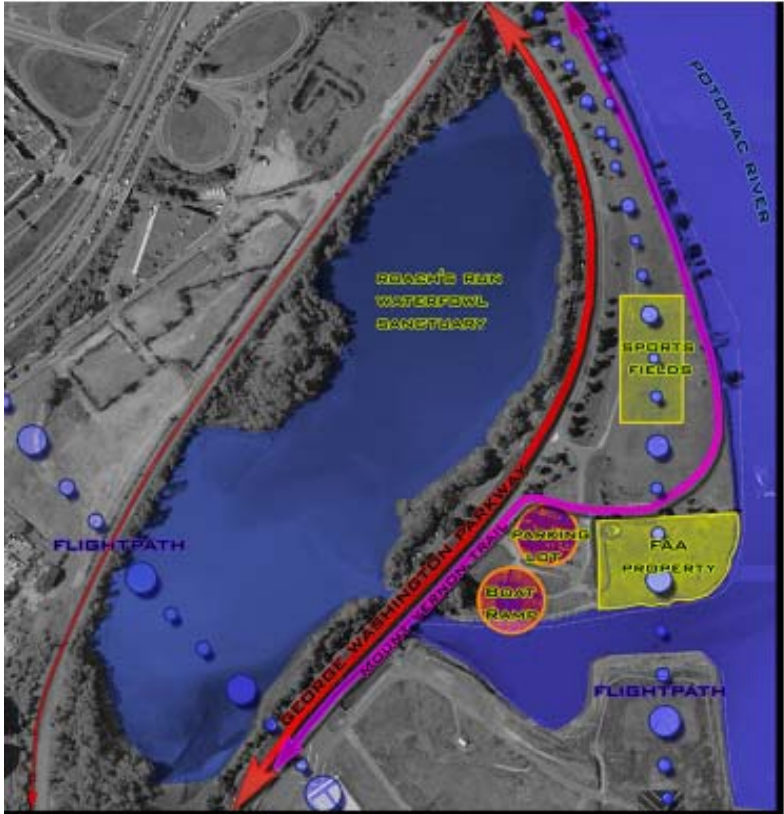


southeast



fill

SITE ANALYSIS



(aerial photo provided by Arlington County)

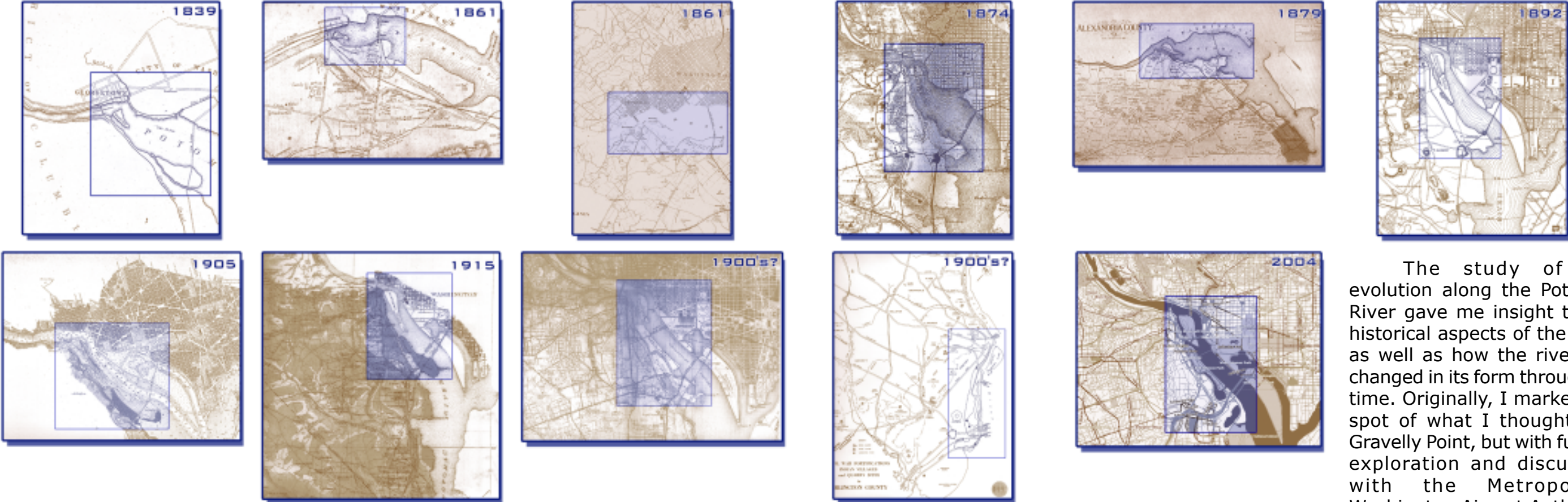
The site was previously water, belonging to the Potomac, however, during the time of the 1960's and 1970's the site was formed with fill. According to aerial photos seen at the Old Terminal of Reagan, by 1974 the present landform had taken place. If one looks closely at the site you can identify pieces of metal, bricks and concrete with aggregate that have been buried or used along the shoreline to help control erosion.

There is a large amount of flat land, no more than 18 feet of elevation change, and on the northern central portion of the site a rugby field is used by local teams for practice and games. When elevation change is significant it is along the river's edge and the FAA property line. Near the boat ramp there is a somewhat significant grade change to allow for the boats to enter into the channel safely. The hike and bike trail weaves itself through the site, emerging from the southern edge along the northwest/southeast runway, moving along the parking lot, crossing the only vehicular entrance, following the ridgeline along the FAA property and then onto the river's edge where it follows it northward until it passes under the Long Bridge, the Metro Bridge and 14th Street Bridge.

There is a good bit of vegetation throughout the site. The land located along the parkway conforms to the naturalistic/scenic vegetation that fits within the overall experience of the parkway. This feeling is also present along the hike and bike trail once it encounters the river's edge. In the middle portion of the site it is mainly turf grass and then further south on the site, right north of the FAA property line, there are groupings of evergreens and some scrubby vegetation along the chain link fence that identify this boundary. South of the parking lot, on both sides of the boat launch, there are several picnic tables with crapemyrtles and other shade trees.



Evolution: the Potomac and Gravelly Point



The study of the evolution along the Potomac River gave me insight to the historical aspects of the land, as well as how the river has changed in its form throughout time. Originally, I marked the spot of what I thought was Gravelly Point, but with further exploration and discussion with the Metropolitan Washington Airport Authority, I came to realize that the actual Gravelly Point was originally a point on an extensive alluvial deposit (not where it is currently). Before the airport site was selected, Smoot Sand and Gravel had turned a significant portion of the old point into a gravel extraction pit. Reagan Airport was built on Gravelly Point and during the end of the 1960's and beginning of the 1970's Gravelly Point took on its current day form.



Figure 93 Dredge pumping (H) for Columbia Basin from bed of Potomac River, south of R&P railroad bridge, 1930 (Lee, "Final Report for the Construction of the Mount Vernon Memorial Highway")

Image showing the Potomac and future site of Gravelly Point. (Image provided by George Washington Memorial Parkway)



Figure 88 Proposed route of Mount Vernon Memorial Highway in Gravelly Point/Columbia Basin area; beginning of hydraulic (H) operation (Mount Vernon Memorial Highway File, BG-30-N, NARA)

Aerial view looking north over future Gravelly Point. The George Washington Parkway was not yet built. (Image provided by George Washington Memorial Parkway)



Figure 46 Roadside improvement cartoon reprinted in American Civic Annual, 1929

A comic about what they did not want to happen to the Parkway. As a result, signage is at a minimum along the Parkway and can often times lead to confusion for those who aren't familiar with it. (Image provided by George Washington Memorial Parkway)

SEQUENCE AND EXPERIENCE ALONG THE GEORGE WASHINGTON PARKWAY

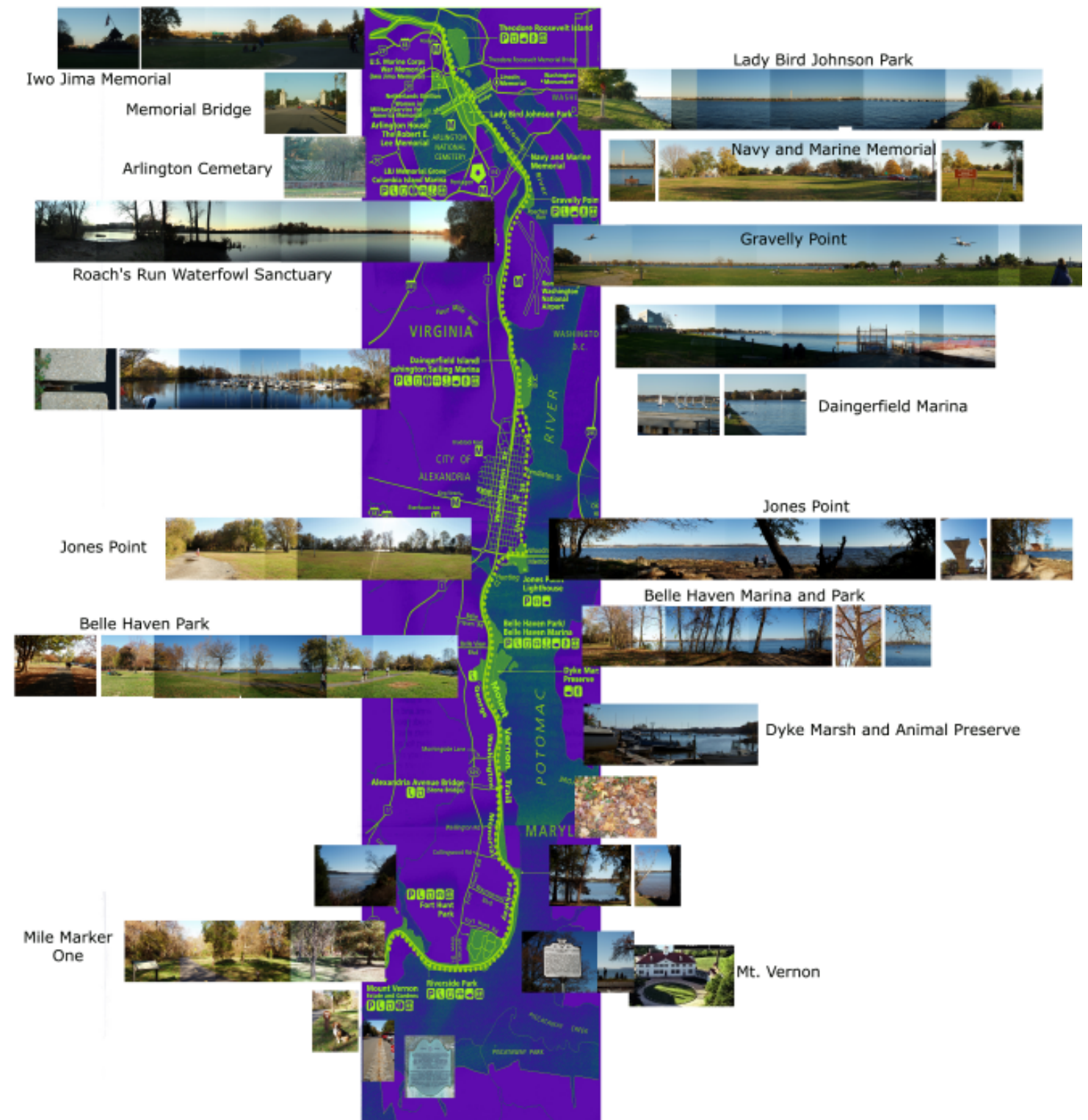
In order to better understand my site, I made a journey from the start of the parkway, George Washington's home, Mt. Vernon, to the northern portion of the George Washington Parkway. Throughout my journey I was searching for answers to the following questions:

- Where does Gravelly Point fit into the experience of the George Washington Parkway?
- Are there different experiences at different sections?
- What role does it play?
- Are there missing pieces to the Parkway that could make the experience more complete?
- Can Gravelly Point fulfill these missing pieces?
- What can be added to the Parkway experience to enhance it?

There were two significant conclusions I drew from my journey: Gravelly Point is where the experience changes along the parkway and it is very different from all the other places along the Parkway due to Reagan Airport. First off, Gravelly Point is located along the major bend in the Potomac, which could be insignificant except for the fact that the George Washington Parkway is a road that not only connects Washington's home to the Nation's capitol, but it displays the Nation's monuments as one moves along the Potomac. Throughout the beginning of the journey, moving northbound, the Parkway's edge is densely vegetated and your views are mainly confined forward, except for a few vistas of the river. It is mainly residential and commercial in the core of Alexandria. Once you take the bend at Gravelly Point, in car or on bike, the Parkway opens up, providing continuous views of the river and all the monuments. The view of the monuments and the change of experience on my site was something that I continuously worked with in the design process.

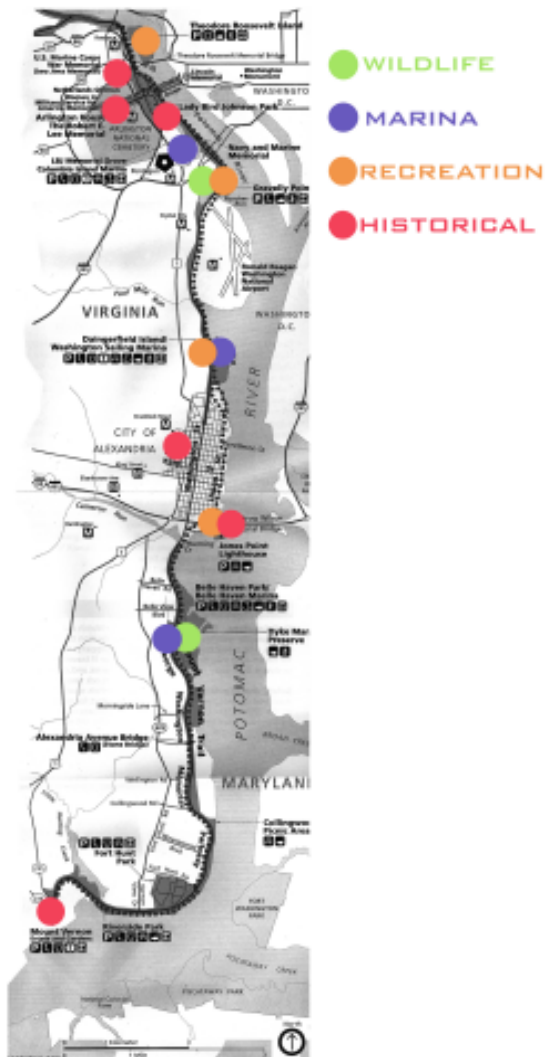
The location of Gravelly Point and its juxtaposition to Reagan National Airport lends itself to a dramatic setting that is not present on any of the other locations along the parkway. Many of the other parks include nature areas, marinas and historical monuments. Gravelly Point has a boat launch, picnic areas, wide open fields for running and playing sports, a significant parking lot for those wishing to start their exercise at this point, and a perfect venue for watching the airplanes land and take off. The airplanes are probably the largest attraction for Gravelly Point and on the weekends during the warm months, this place is packed.

Thinking further for the design and what could make Gravelly Point a unique place, I thought I should further enhance the experience of the planes and still blend the site into the overall context of the Parkway. Maintaining the naturalistic and pastoral aspects to the vegetation along the Parkway would be a necessary component to the design and overall experience. Views through the vegetation towards the river and monuments would also be incorporated in the design.

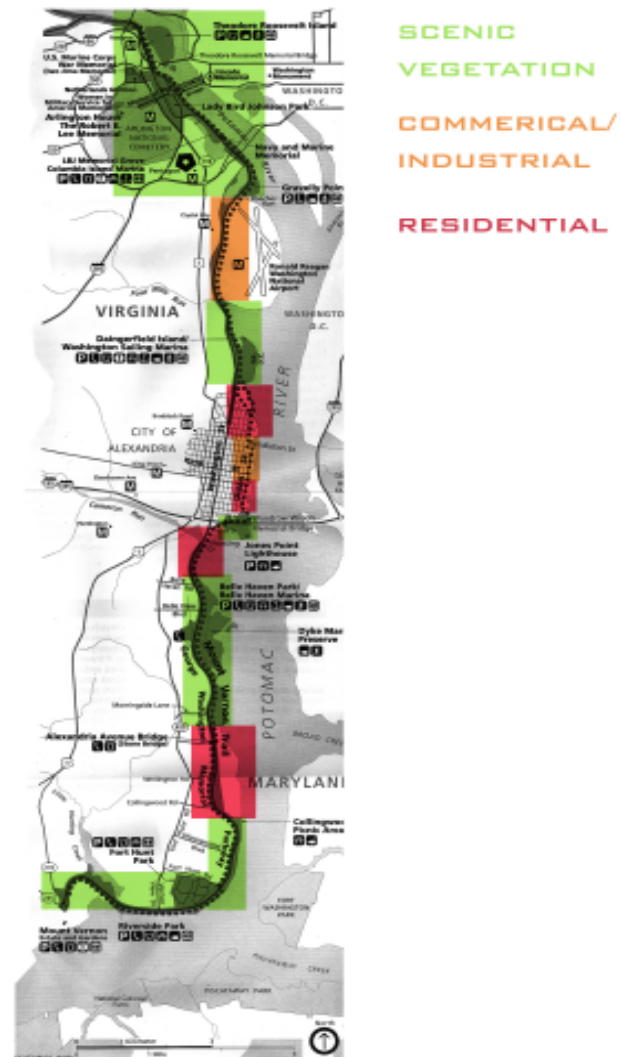


map provided by NPS

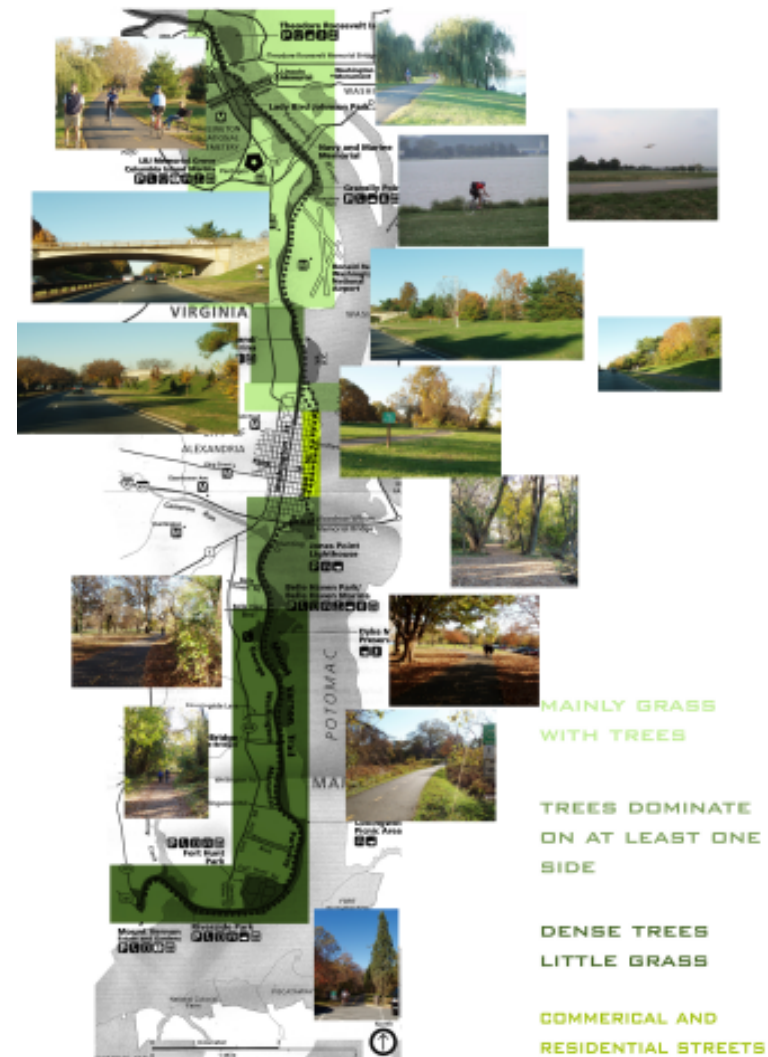
HIGHLIGHTS ALONG THE GEORGE WASHINGTON PARKWAY



SURROUNDING AREAS ALONG THE GEORGE WASHINGTON PARKWAY



VEGETATION ALONG THE MOUNT VERNON HIKE AND BIKE TRAIL



AIRPLANE HEIGHTS ALONG THE PARKWAY



map provided by NPS

finding

Finding entails the act and process of searching as well as the outcome, the thing discovered. It is both an activity and an insight. What is found can result from either a surprise discovery or some painstaking, methodical quest...What is found is the je ne sais quois ingredient that conveys a distinct quality to a place. As such, findings escape design invention and import; they are something unique (though hidden) that definitely belong to a place and contributes to its identity.

The act of finding is also something that can be performed and experienced by everybody discovering a site for the first time. What people actually find can be an integral part of the landscape structure, like a breach in a forest, a fault on the side of a hill, a spring surging from the foot of a wall, a narrow street plunging down toward the sea. But finding is not limited to the discovery of objects; it also includes the experience of relating and associating ideas, places and themes.

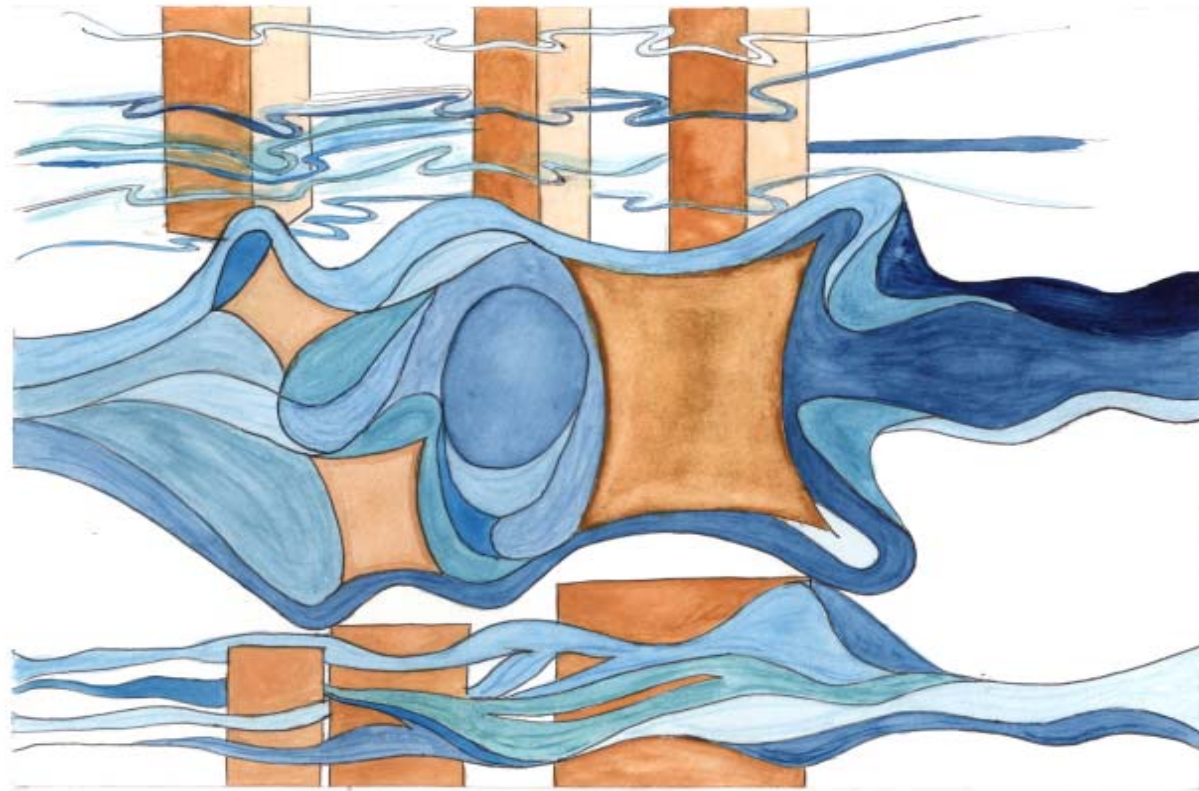
Finding usually discloses the evidence to support initial intuitions about a place. —Christopher Girot

Wind. As I began to think about the phenomena that I could not see, except in the trees' moving leaves, the flapping of a flag and the movement of the clouds, I began to dream about its movement. How did the wind move over a slightly undulated surface? How did it interact with other wind currents and objects that it must move around? How has it affected my life and interacted with me? I wanted to explore my understanding of wind through the usage of watercolors. I chose watercolors because of their transparency and the ability to layer on the same color but change the shade. The first set of paintings, which follows here, I completed before I began my technical research into wind. The second set consists of paintings that furthered my technical understanding of wind and its unique features. I wanted to preserve my original intuitions about wind and my organic thoughts about how it moves. It was also important to be able to take the sensual aspects from my intuitions and combine them later on with the technical aspects to make a complete and holistic design. By doing this, it also ensured that I would not get too wrapped up in all the technical aspects and not incorporate the artistic ones. These paintings later on, when I began the design process, aided me in form finding and movement on the site.



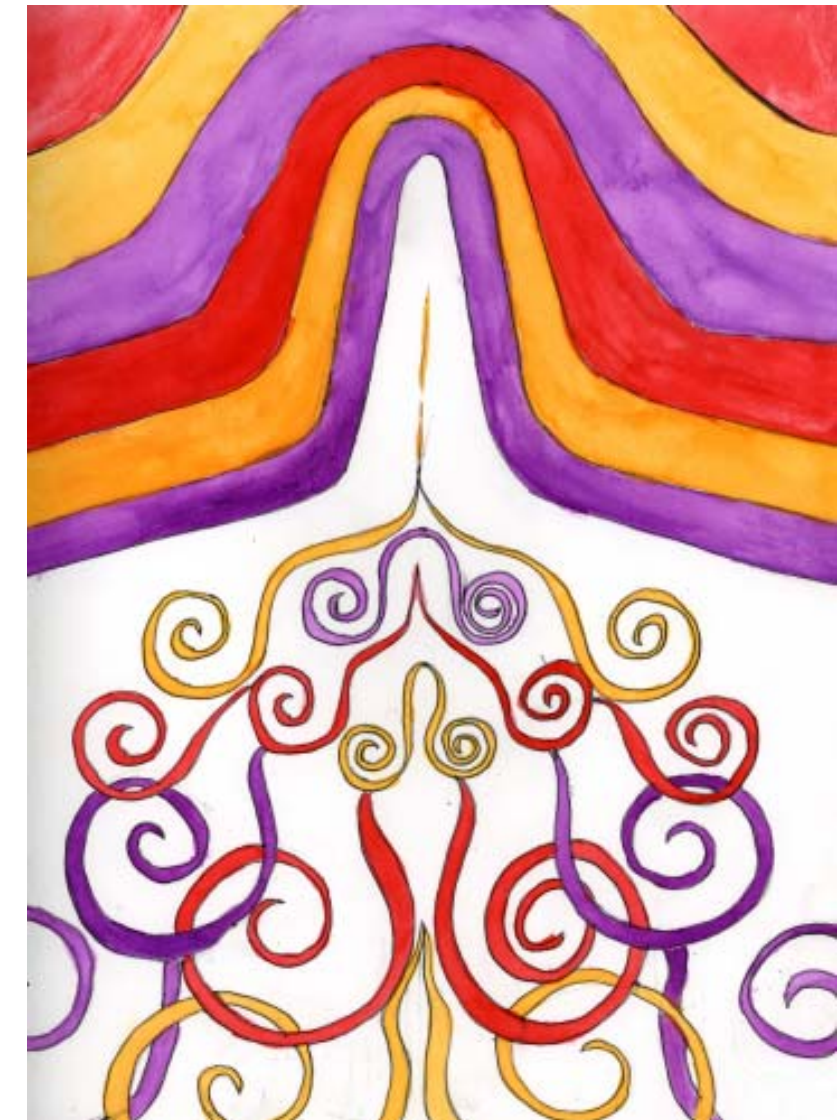
wind one

This painting was the first painting I did. For some reason the color pink was stuck in my mind and every time I thought about wind it always appeared pink. Maybe because pink is usually a warm, but fresh color and a fresh breeze would feel nice as it glides and passes over my body. In this painting I thought about wind like strands of hair that are flowing over the land. Some are thicker and more voluminous and other are smaller but still intermingle with the rest of the currents. When they encounter an obstacle they gracefully move over it, skimming the ground, mixing with other wind currents, curling and spiraling as they are forever being blown somewhere new. I imagine the wind as it passes over a hill or a mountain to have miniature spirals that form on the backside of the obstacle and then as the new currents move in they are smoothed out and pushed onwards.



wind two

In this study of wind I explored how wind moves around fixed objects. I planted three posts in my images so that I could think of how these posts interacted with wind. Would wind hide behind the post or get pushed away from them as other currents hugged its side? How would small whirlwinds form as they moved in between the posts? In the first two paintings I also explored what the wind looked like in perspective, plan and section. This enabled me to think about wind not only in a two dimensional sense but three dimensional, taking on specific shapes and volumes. When envisioning wind in this painting I thought about specific areas within the individual currents that have different intensities and reactions to the entire windscape.



wind three

The planes flying overhead were the source of inspiration for this series of paintings. My first initial reaction to the site was to the shear and wind vortices that one encounters on my site. At this point in my exploration I had not yet discovered wake turbulence, but imagined this turbulence to be in series of spirals that came off of the wings of the planes. I imagined them to be symmetrical because the plane would cut the wind with its nose and the air would move on both sides of the plane. The spirals would get larger as they spun out farther away from the plane's body.



wind four

This painting was a revised version to painting three. I wasn't very happy with three so I tried to make the spirals tighter and show how the planes diverted the wind. This painting is in plan view of what might be happening as the planes pass through the air. I imagined two layers of wind; those affected by the plane in a sense of pushing down and getting it out of the way and those that passed closely to the plane and experienced the spiraling and spinning effect. The painting shows how I think the air is energized by the planes, creating vortices and how they move like a tornado away from the plane in a vertical position.



wind five

I did one more addition and revision to this series of paintings. I continued working with how I envisioned the air moving around the planes. Finally in this painting with the overlay of the wind's section of movement on the entire painting I was able to make the invisible visible in my painting. This was what I was trying to do on my site and I made the wind visible to the viewers. It felt like this was a breakthrough painting. Painting each layer so that it made it darker and made it stand out more, allowed my section of the wind's movement to sit right on top of the plan view. Some layers were made darker as I thought they might have different intensities and move at different speeds or directions.

reactions

Painting wind was a fundamental step to contemplating and thinking about my design. One of the most obvious components to the ways I thought about wind was the curvilinear features and characteristics that it takes on. I think of wind moving through space, but gliding and streaming by, around and through objects, conforming to the spaces and obstacles that are in its path. The wind is something so adaptable that it can expand and contract, can change from a poetic to a technical form, and can be convinced into swishing and swaying and appear to lose complete control as it is seduced by an air vortex.

The wind is also a natural phenomena that is definitely experienced in three dimensions. There is no way that wind can only be experienced in two dimensions as one notices the wind moving over objects and one can see the winds swishing and swaying as it sequentially and sporadically touches all parts of the landscape. To understand wind one must see the section, plan and perspective of the phenomena and that was what my paintings were trying to achieve. I wanted to understand not only the movement of wind in a horizontal plane, but also how it interacted with other wind currents and objects in a vertical plane.

Another aspect that my paintings brought out was this idea of seasons and how the wind would be different through the different seasons. Although there is not one specific painting that shows how the winds feel throughout the different seasons, I explore this notion in the color choice for the paintings. The first painting is pink and I chose pink because it is a refreshing but warm color. The wind in the summer months is warmer, but it is also refreshing and relaxing. The hypnotic breeze's rhythm and pattern provide a white noise to the mind and body. The blue painting I was thinking of cooler breezes that might chill our bodies and make us want to seek refuge. This wind is more biting and not as inviting to us. The following series of spirals off of the airplanes were colors that mixed cool and warm colors as the technology brings into the natural phenomena new factors that create a new integrated wind. Therefore, the colors chosen engage ideas of technology as well as seasonality.

Overall my paintings began my exploration of wind and how I thought of it. As my design began to evolve, these paintings themselves began to inform my design more than I imagined. The idea of the spiral and curvilinear lines, the notion of warm and cold breezes, and the vibrancy against the naturalistic colors became significant design guidelines. I really wanted to do these paintings before I began my technical investigation because I did not want my newly acquired knowledge to influence my paintings and I wanted to see how much of my intuition about wind was actually correct.



wind six

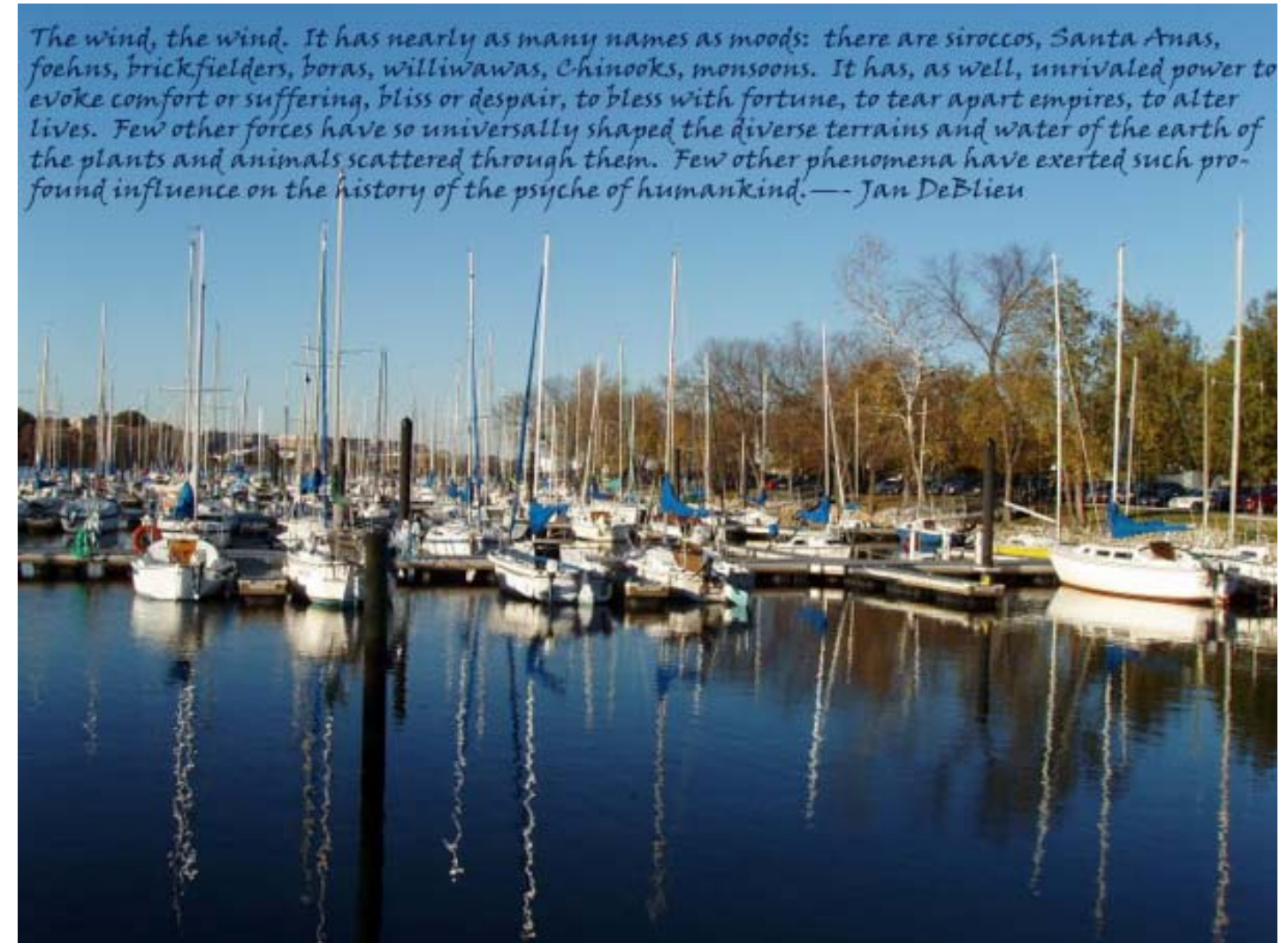
Overlapping and interaction, mixing and mashing of the wind currents was what I was thinking of when I was working on this painting. There are some currents that are dominant and dictate the movement and speed of others and sometimes become part of the larger current and vice versa. This painting is in plan view and shows how the inside of a vortice might look. I tried to emphasize through the layering of the watercolor how these winds are transparent, but can be a heavier shade with the overlapping of the various currents.

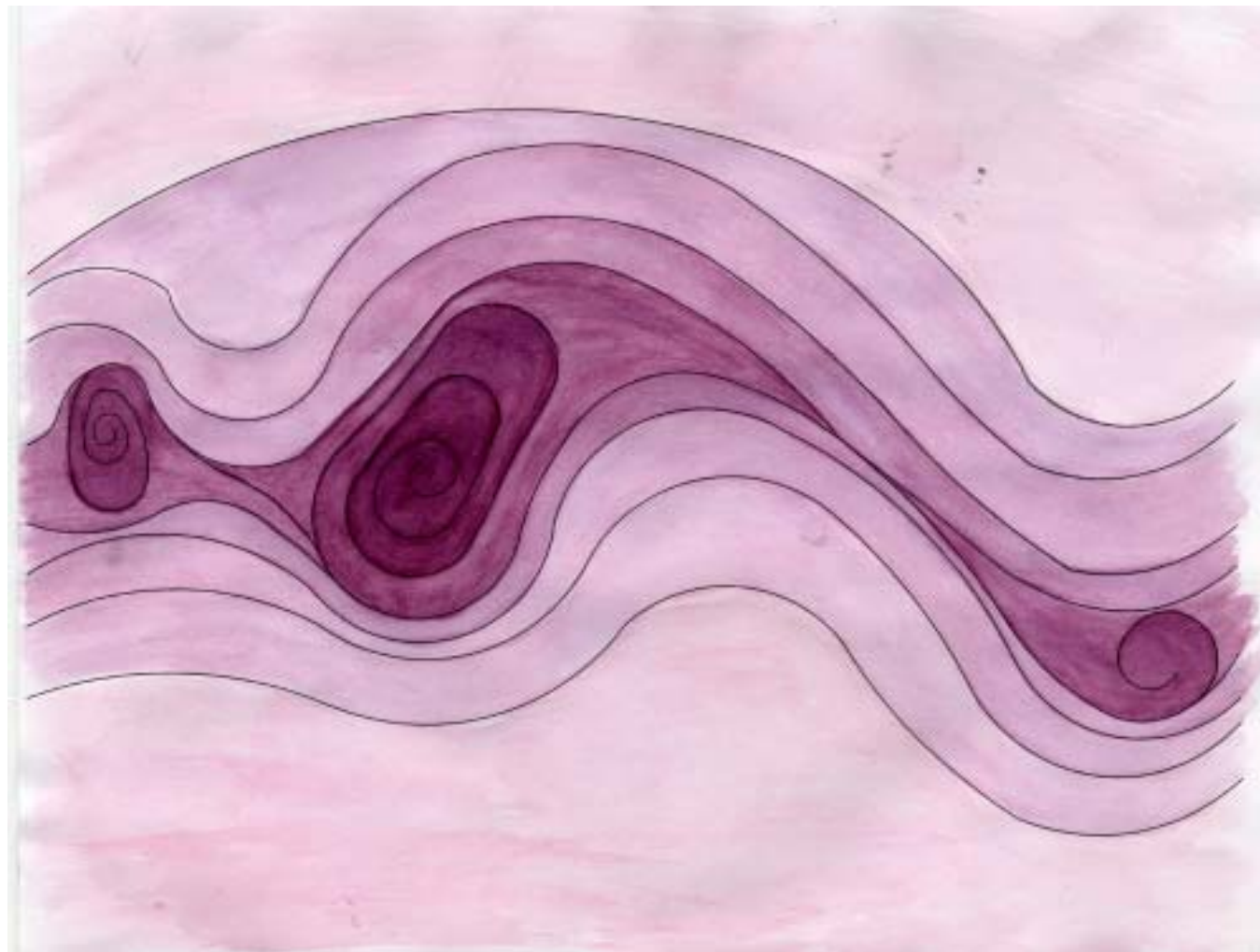
my technical investigation

My inquiries into wind began with a journey to the public library to search out any materials about wind I could get my hands on. I brought home stacks of books on climate, clouds, wind energy, airplanes, airports, and some historical accounts about wind. As I began to peruse the stacks over, there was one specific book that I picked up and didn't put down until I was done with it. It turned out to be one of, if not, the most influential book I read the entire year. Written by Jan DeBlieu, Wind How the Flow of Air Has Shaped Myth, Life and the Land poetically described so many intriguing aspects and facts about wind. She opened my eyes to how big of a phenomena I was dealing with. I was beginning to understand the importance wind has in so many aspects of humans' as well as all living animals' lives. It determined civilizations, where they were and who discovered them. It helped in war times, in small and significant ways. She explained how animals use wind to migrate and when and how they use it according to their needs and physical characteristics. Her book was a great source of information that was reflected through my technical paintings.

I also did a study of wind roses on my site throughout the different times of day and months of the year. This was one of the most valuable studies I did because it made concrete my anecdotal observations about the wind and its interactions with the planes. It was also from this point of discovery that I was able to fundamentally design the spaces according to the winds. Some of my technical wind paintings came from information about the wind movement and speeds that I used from the National Oceanic and Atmospheric Administration (NOAA) website. These studies allowed me to understand how wind moves and behaves at different altitudes, which also influences aviation.

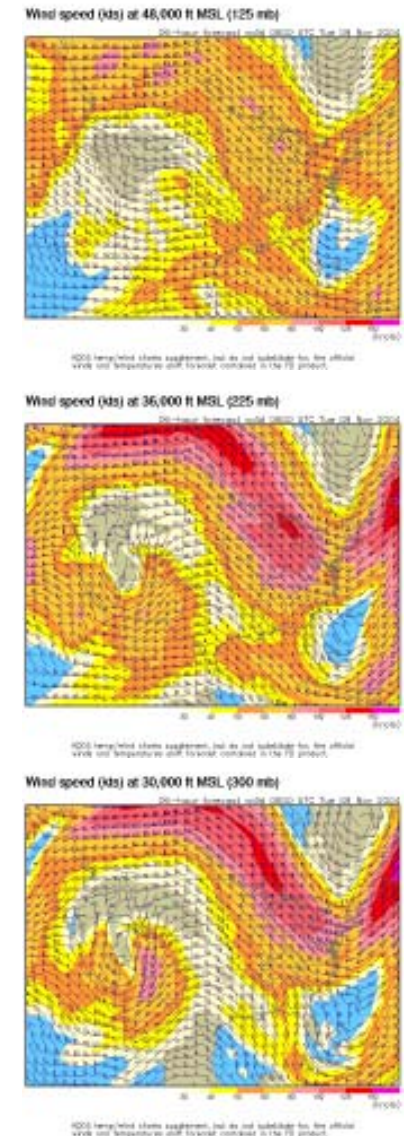
Along with my research about wind, I also investigated airplanes, how they take off, the technical aspects to flight and the wake turbulence which originally sparked my interest in wind. These areas of wind were all integrated into the technical wind paintings that I did in order to inform my design and overall knowledge on wind.



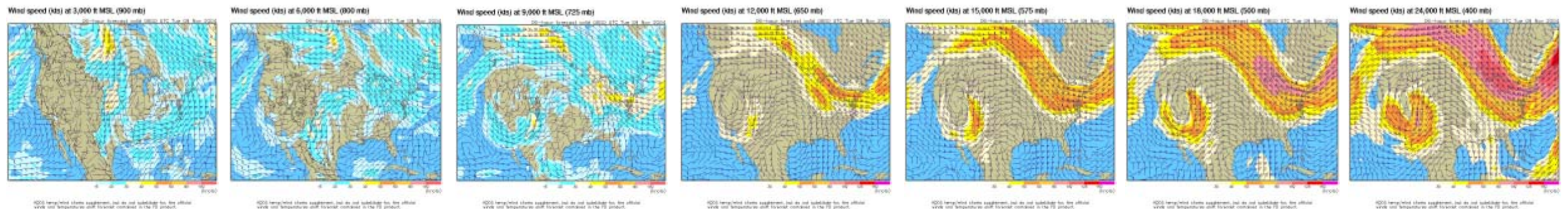


I wanted to understand how wind moved and the speeds at which it moved throughout the different layers of the atmosphere and stratosphere. Since National Oceanic and Atmospheric Administration (NOAA) has detailed maps and charts showing these changes during the different times of days as well as altitudes, I began my search with them. Once I acquired maps from the various elevations, 3,000 ft up to 48,000 ft up, it was very easy to see the patterns and connections between wind speed and altitude. The winds closer to the earth's surface move in more detailed movement; through, around and over obstacles, like buildings, valleys and mountain ranges. Winds higher up in the atmosphere move at much greater speeds and in more subtle directional changes. Some of the winds at lower altitudes merge and diverge into and from certain wind currents, much like the movement of traffic along a highway.

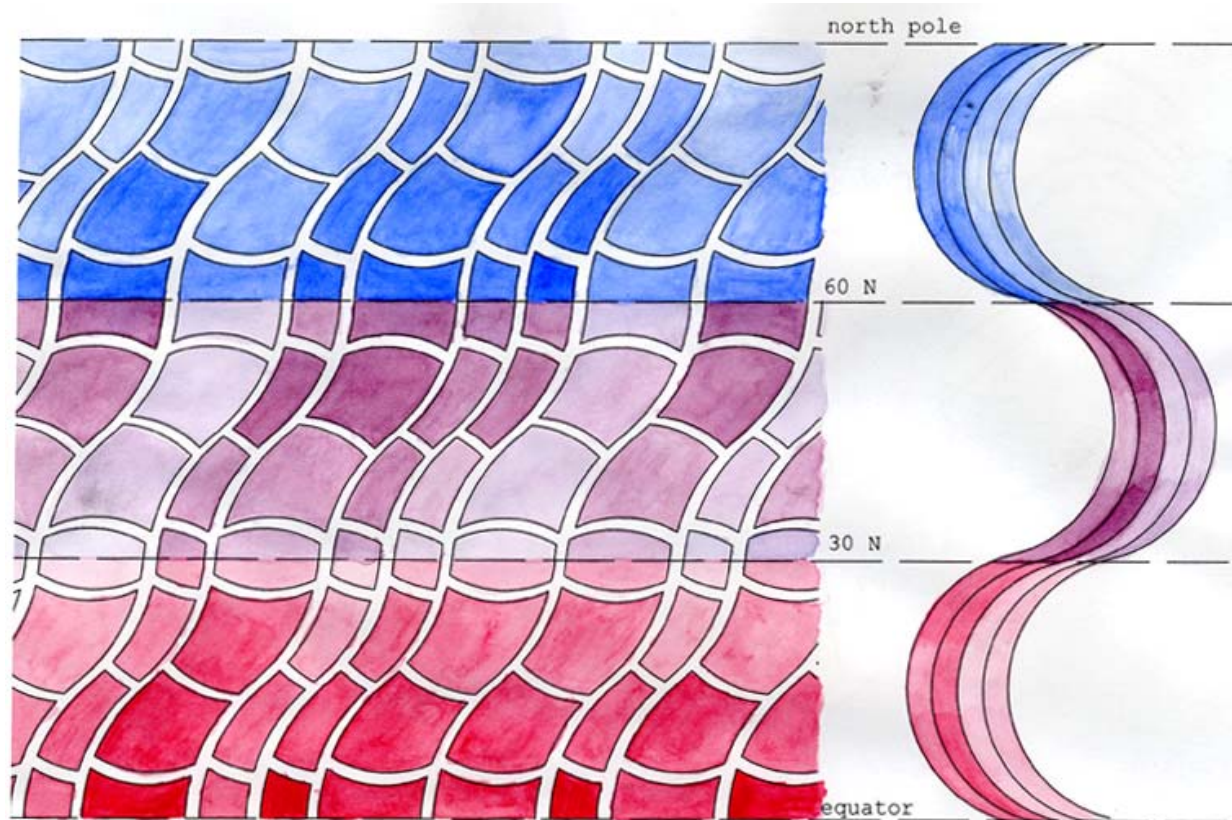
In my painting I was trying to take what I had observed from the maps and demonstrate that in an abstract way. The darker colors within the painting belong to all of the lighter colored layers. The lighter colored layers are the ones that are higher up and so within each lighter/higher layer there are many groups of wind currents. I also thought of these wind layers similar to the way we classify species. There is a Kingdom, Phylum, Class, Order, Family, Genus and Species and each individual species belongs to a larger group. I was thinking of wind in these terms as the winds closer to the earth's surface are influenced by the major winds or jet streams higher up and belong to a large complex system of wind.



wind speeds and altitude



images from NOAA (National Oceanic and Atmospheric Administration)

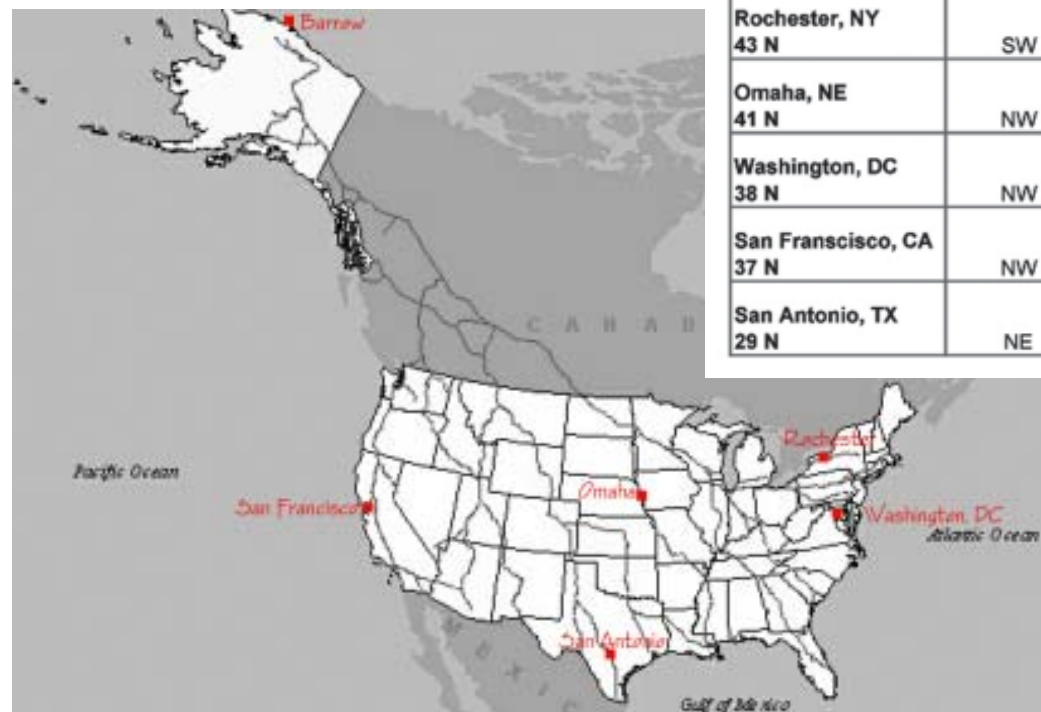


world wind patterns

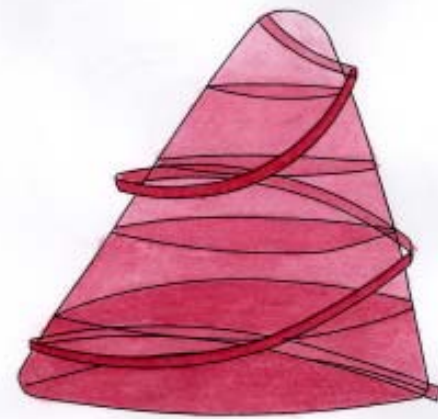
These patterned movements of air fasten into place the bands of wind and calm that girdle our small globe. A belt of constant low pressure rings the earth's middle, a weather equator that creates a strip of general breezelessness popularly known as the doldrums. To the north and south the moist breath of the trade winds stirs the atmospheric stew. The pleasant trade regions are bounded by the northern and southern hemispheres by the comparatively stagnant zones know as the horse latitudes-so named, legend holds, because calm air within them slowed the sailing ships of early explorers and forced crews to conserve water by throwing horses overboard. A significant portion of the world's deserts lie within the horse latitudes. Above and below 35 degrees, in the two breezy zones that encompass most of North America, Europe, China, Argentina, Chile and New Zealand, prevailing westerlies revive the flow. These give way to bands of light easterlies that encircle the farthest, coldest reaches of the earth. —(Jan De Blieu 1998, p. 3-4)

In all historical periods, as explorers fanned out across the oceans in search of new lands, they generally sailed easily from east to the west in tropical latitudes. But when they tried to retrace their routes, their progress was labored. Spanish explorers venturing westward from Mexico and Central America made quick passage to the Philippines-eight to ten weeks- but were unable to return. Those who tried to find counter wind on the edge of the trades spent weeks marooned in the horse latitudes, or doldrums. The only way to get back to the New World, it seemed, was to circumnavigate the globe and again approach it from the east. --(Jan DeBlieu 1998, p. 50)

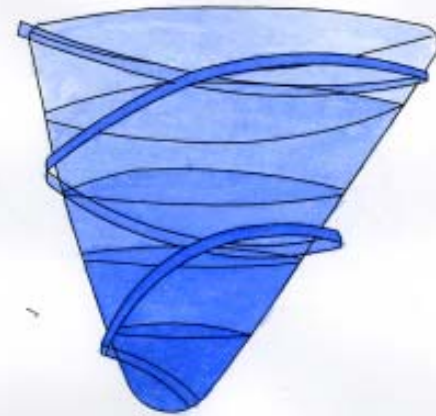
city and latitude	dec-feb	mar-may	june-aug	sept-nov
Barrow Alaska 71 N	NE	E	E	NE
Rochester, NY 43 N	SW	SW	SW	SW
Omaha, NE 41 N	NW	SE	SE	S
Washington, DC 38 N	NW	NW	S	S
San Francisco, CA 37 N	NW	NW	NW	W
San Antonio, TX 29 N	NE	SE	S	SE



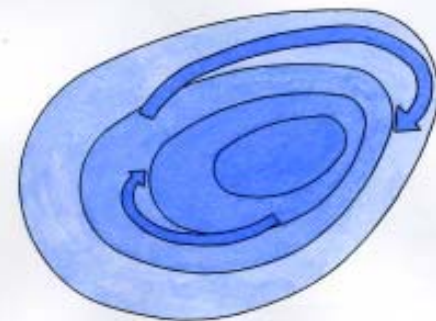
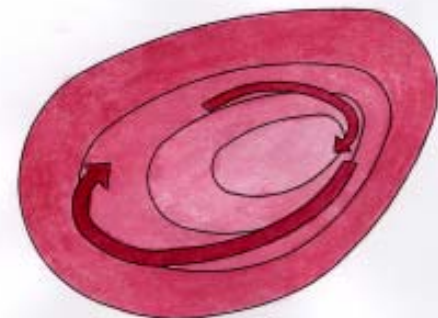
I conducted wind studies for different US cities at different latitudes to see which direction the winds usually blew from during the different seasons.



warm air rising



cold air descending



high and low pressures

On the margins of the jet streams are extreme wind shears where the speed flow changes abruptly within a few feet. These can create a violent roiling of currents known as clear-air turbulence. Closer to the ground, where deserts and fields and cities concentrate heat, convection sends geysers of air shooting upward, past the invisible skin of the boundary layer. The smooth flow that early meteorologists envisioned for the upper atmosphere does not exist. Instead the air above us is filled with waves and crashing breakers, their crests sometimes marked by the formation of small clouds; with wide, smooth currents that stretch sheets of clouds into rippled ridges; with layers of air flowing in different directions that pull the vapors from plummeting ice crystals to form mare's tails. Watch the clouds; they are evidence of our atmosphere's complex restlessness. They are all that can be seen of earth's invisible foamless sea. —(Jan De Blieu 1998, p. 65)



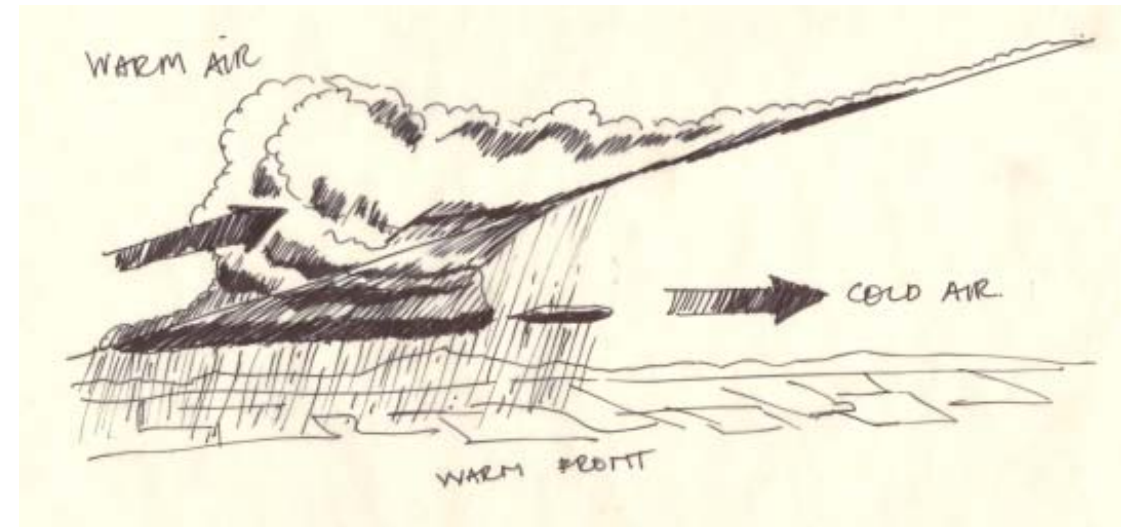
Clouds 1



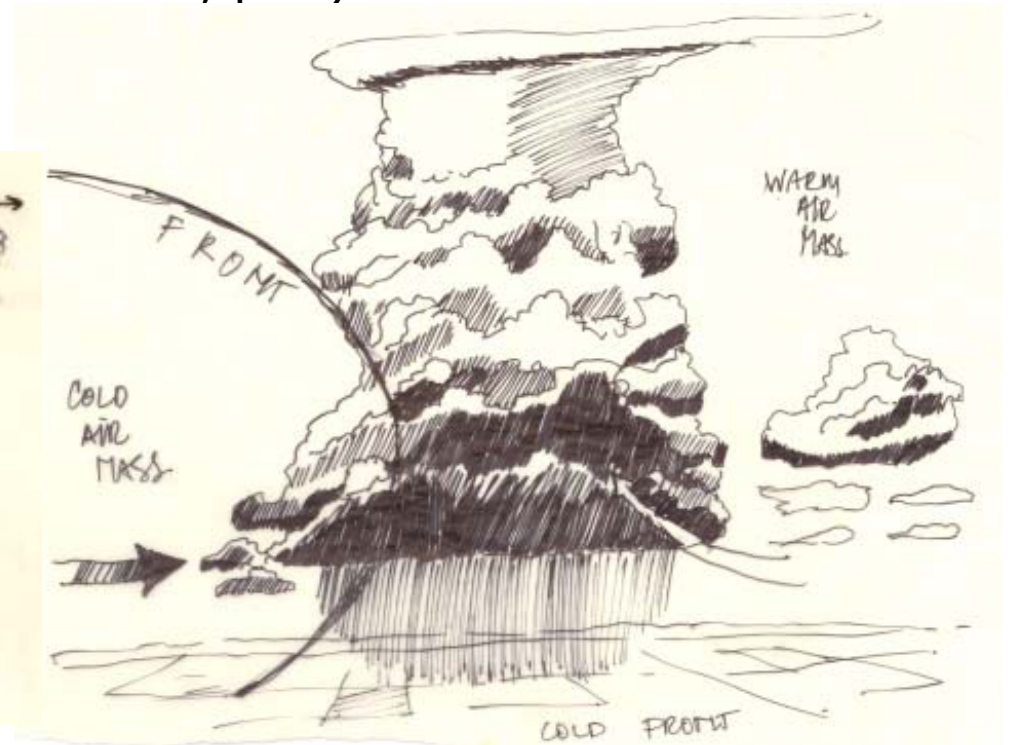
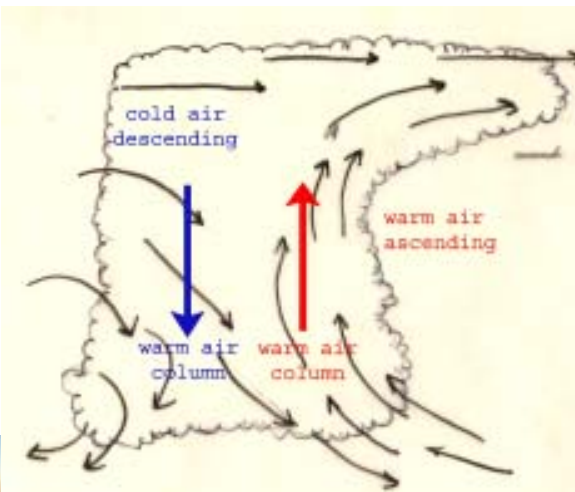
Clouds 2

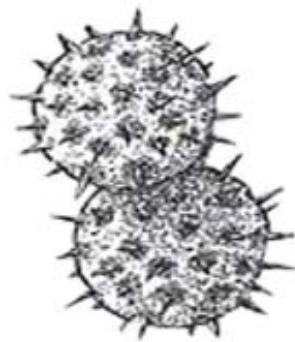
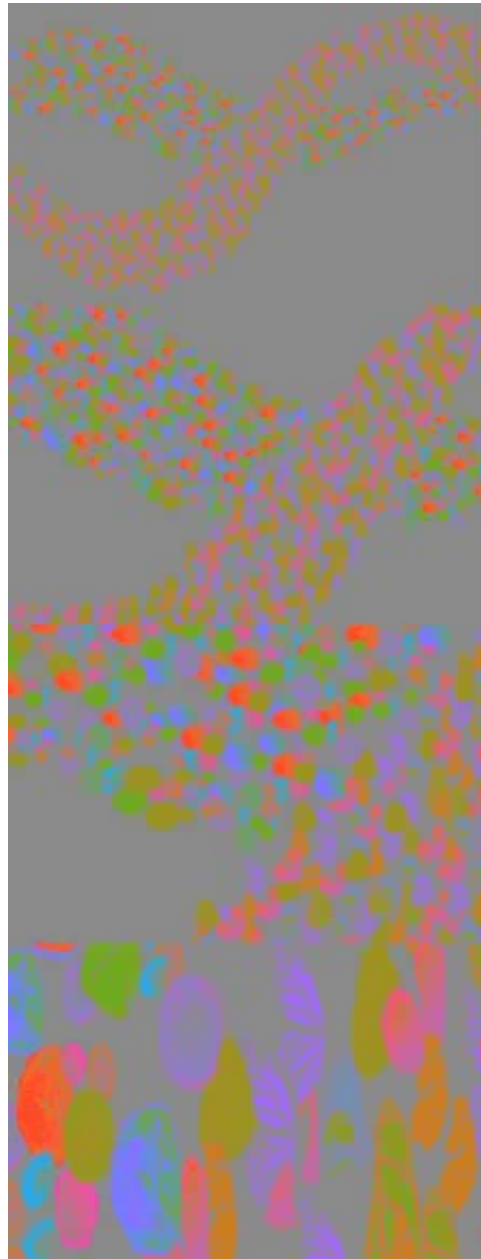
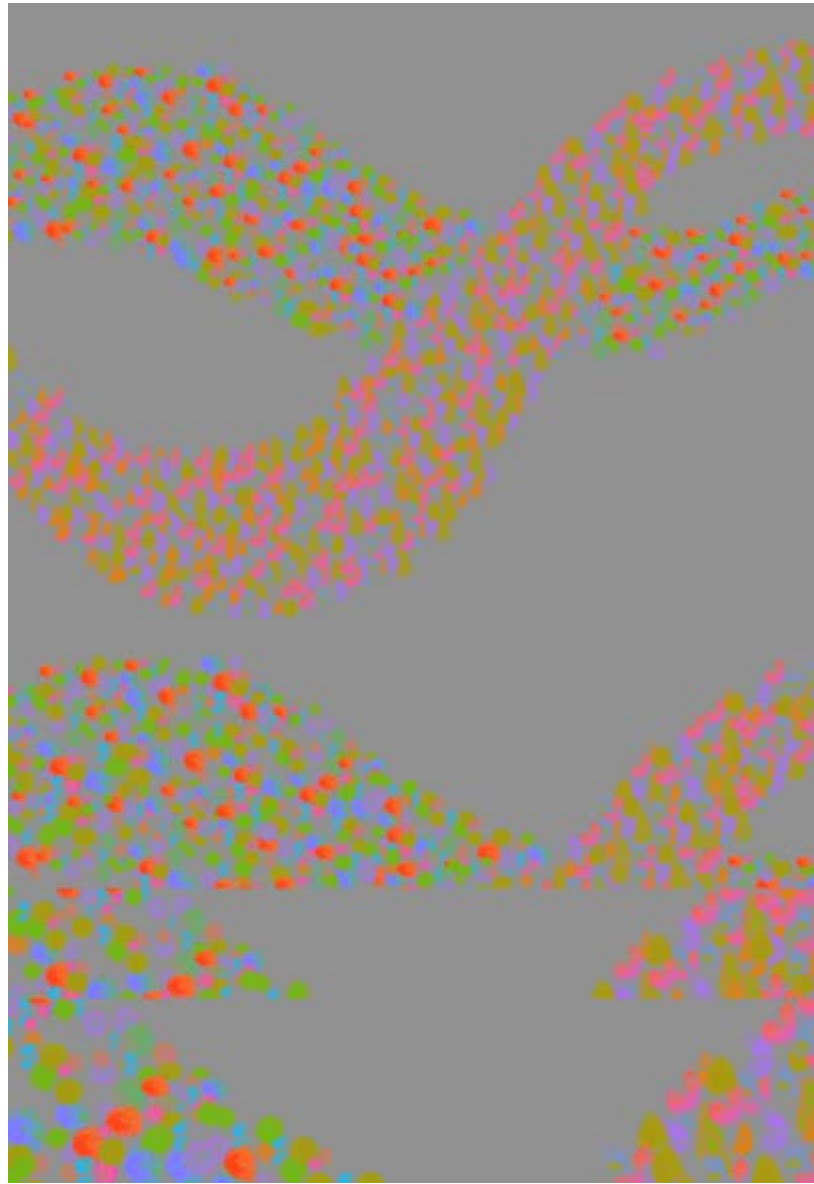


Clouds 3



In strict scientific terms wind is scarcely more than a clockwork made up of gaseous components. The heat of the sun and the rotation of the earth set the system ticking and keep it wound. The gears are simply air's inherent tendency to rise when heated and fall when cooled. --(Jan De Blieu 1998, p. 3)





I like to think of the air that envelopes and sustains us as being woven with shifting boulevards and tendril streets. I like to imagine an atmosphere of routes that remain invisible and largely ignored by people, but on which a host of creatures depend for transportation, for food, for signals, about where to hunt or to hide from the hunter, where to seek shelter, where to woo and be wooed. These notions of mine are in no way farfetched. —(Jan De Blieu 1998, 72)

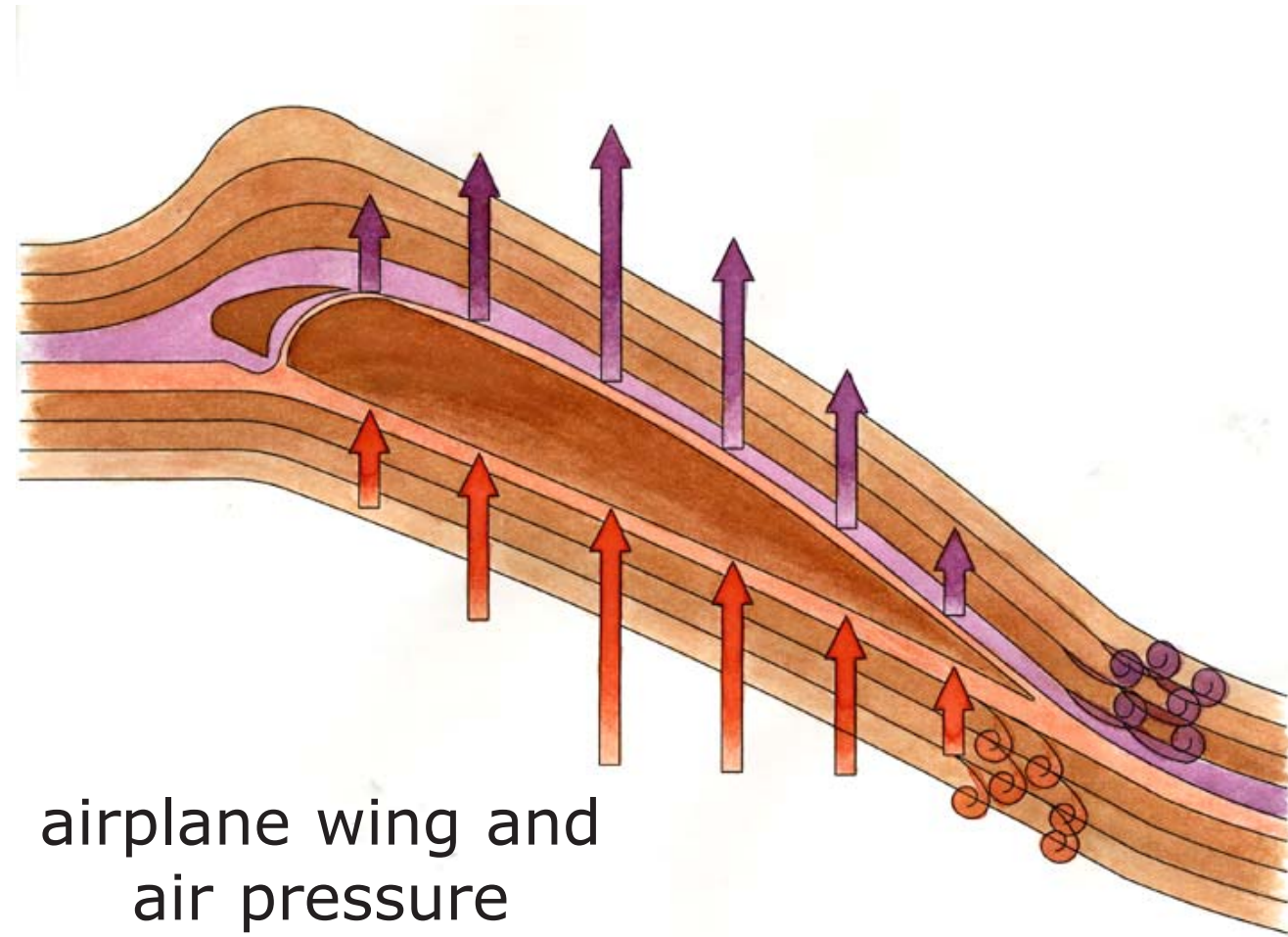
To animals, especially birds and flying insects, wind is a chariot to be ridden, a compass to be read. It is a source of knowledge, not only about present conditions but about weather soon to come. —(Jan De Blieu 1998, p. 73)

Of the many ways animals react to wind, none is so well studied or so perplexing as the phenomenon of avian migration. Scientists know that prevailing wind patterns have helped shape major migratory flyways worldwide and that extreme winds can carry small species thousands of miles outside their normal range. After strong westerlies, North America butterflies, insects and songbirds frequently show up in numbers on the British Isles. Beyond that, however, knowledge of the way birds move in wind is surprisingly scant. —(Jan De Blieu 1998, p. 76)

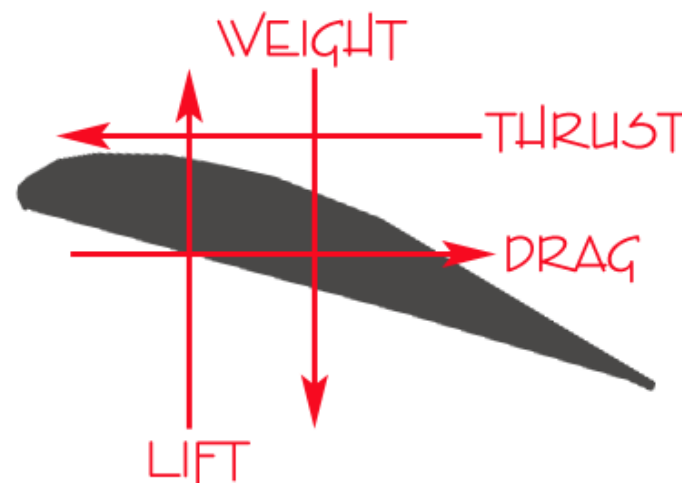
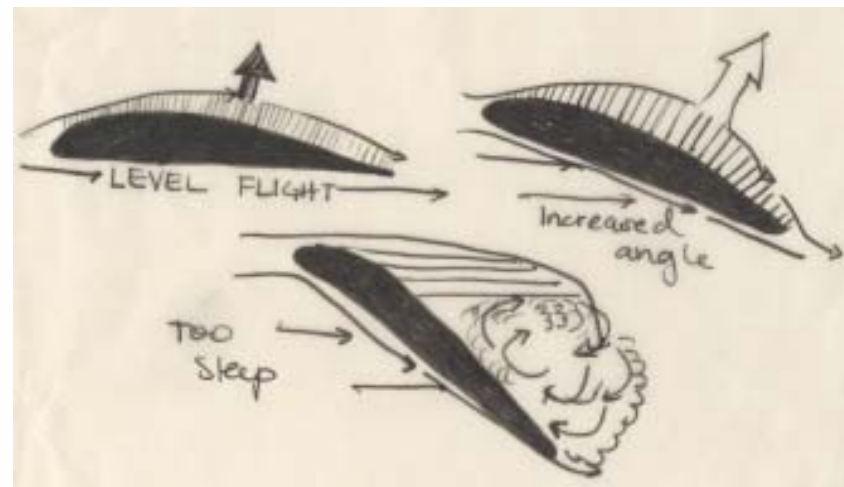
In general birds will wait to embark on a migration until they can fly with the tailwind and minimize the energy they must expend. This is especially true of small species, which can easily be drifted off course by wind and those that must travel over large bodies of water or great deserts. Since birds can sense minute barometric changes through the pressure in their ears, they have a natural device for tracking weather systems and perhaps for figuring the direction of the winds. —(Jan De Blieu 1998, p. 77)

invisible super highways

It is marvelous to imagine the life that might be floating in any cubic yard of air, life that owes its continued existence to the drafts stirred up by sunlight. Spiders, butterflies, beetles, aphids; all ride currents of air from their places of hatching to suitable niches nearby or far. They embark not on brisk winds but on lazy upwellings that push like bubbling creeks into the air up to two hundred feet and sometimes higher. —(Jan De Blieu 1998, P.82)



airplane wing and
air pressure



Liftoff

Have you ever paused to consider just how an aircraft weighing hundreds of tons gets itself into the air—and stays there? In this column, I will try to give you a short (and, by necessity, incomplete) answer. There are four aerodynamic forces acting upon an airplane in flight: drag (air resistance or backwards force), thrust (the forward force), weight (also known as gravity; the downward force), and lift (the upwards force). In order for a plane to take off, its thrust and lift have to overcome its weight and drag. Of these four forces, lift—the force that contradicts gravity and lifts the plane skyward—is the hardest to describe without using a lot of words, diagrams, and a fair amount of math. But I’ll give it a shot.

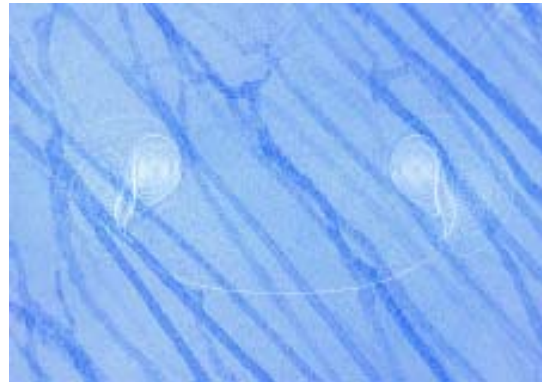
The first thing I should point out, as strange as it sounds, is that air is a fluid. Like all gases, from a physical and mathematical perspective, the air outside your plane behaves just like water—or maple syrup, for that matter. In fact, aerodynamics tests are sometimes performed underwater.

The shape of the aircraft wing, working in combination with the fluid motion of the air, creates most of the lift needed to get a plane in the air and keep it there. Here’s how: the upper surfaces of the wing are generally curved, while the lower surfaces are much flatter. As a wing moves through the air, propelled by thrust created by the engines, some air flows over its top and some flows underneath. The air flowing over the curved top is accelerated, which causes the pressure on the top of the wing to drop. The relatively high pressure on the bottom of the wing—caused by the fact that the air on the bottom doesn’t have to travel as fast as the air on the top to meet up again at the back of the wing—forces the wind into the region of reduced air pressure. We owe our understanding of this phenomenon to an 18th-century mathematician named Daniel Bernoulli, whose “Bernoulli principle” states that as the speed of a moving fluid increases, the pressure within the fluid decreases. Because lift depends on the motion of the air, it increases as the speed of the air increases. It can also be increased (or decreased, as appropriate) by changing the angle of attack, which is the angle the wings make with the airflow, or by just making the wing thicker at its chord. Of course, that increases drag, which is why really fast fighter jets have really thin wings.

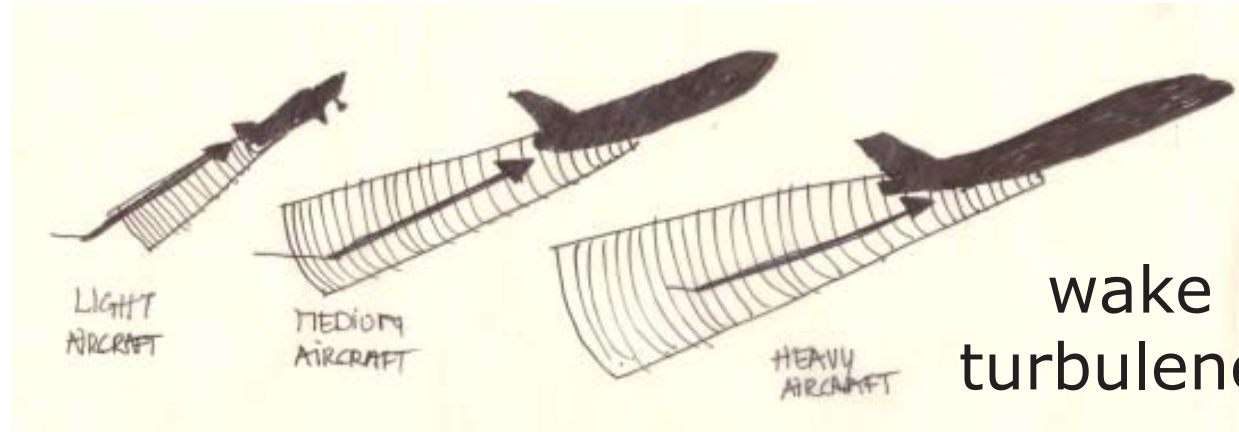
Gerard J Arpey
Chairman and CEO
American Airlines
American Way May 2005



wake 1



wake 5



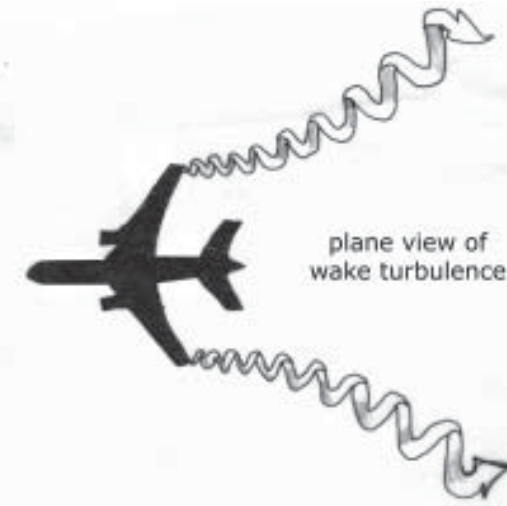
wake turbulence



wake 2



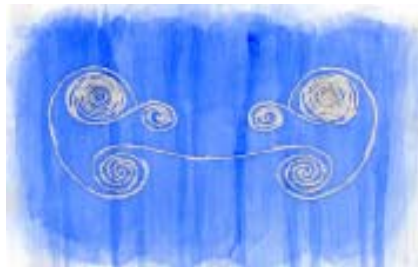
wake 6



Wake turbulence was the original reason my site intrigued me. The air vortices raising fine loose dirt off of the ground and hearing the shear rip through the air was thrilling to me. Unfortunately, it took me some time to find the right word for this phenomenon. When I did discover it, it opened up a whole new world to me. Some of my initial feelings about the wake turbulence were close, and after discovering how it occurs and influences aviation I realized there were many ways to incorporate it into the design. The symmetrical aspect and spiral motion were form driving components through the entire design, especially in the amphitheatre space.



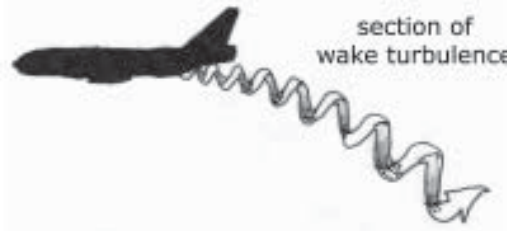
Copyright EJ van Koningsveld



wake 3



wake 7



The series of wake turbulence paintings were of eight different stages, looking at the wake in section. You can see how the air spirals and then uncoils itself and creates what appears to be a tornado. In a vertical section they drop off of the back, at an angle towards the earth, and in plan view they make the edges of an isosceles triangle with the plane being the top tip. Larger aircraft create larger wakes and have been know for causing accidents to smaller aircrafts that follow too closely and enter their wakes. This was the case with the airplane that went down in Queens, NY shortly after the 9/11 attacks.



Copyright Peter Steehouwer



wake 4



wake 8



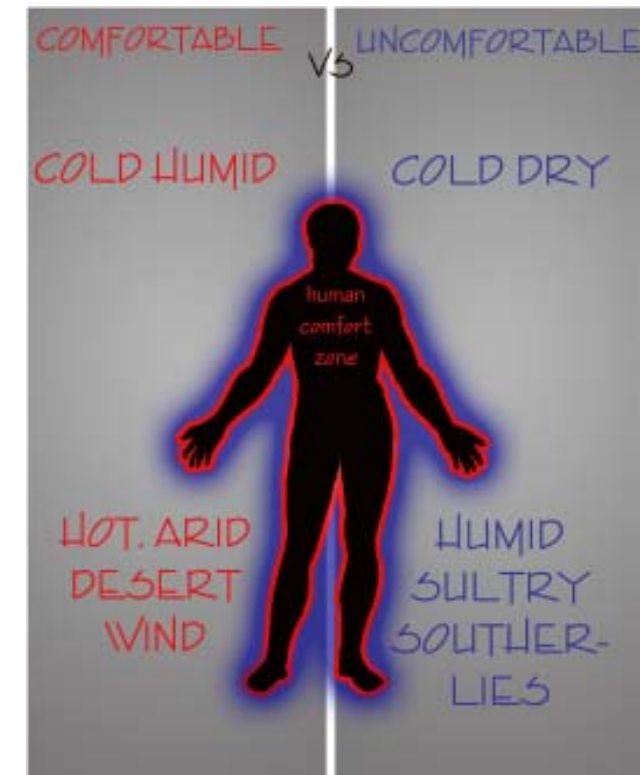
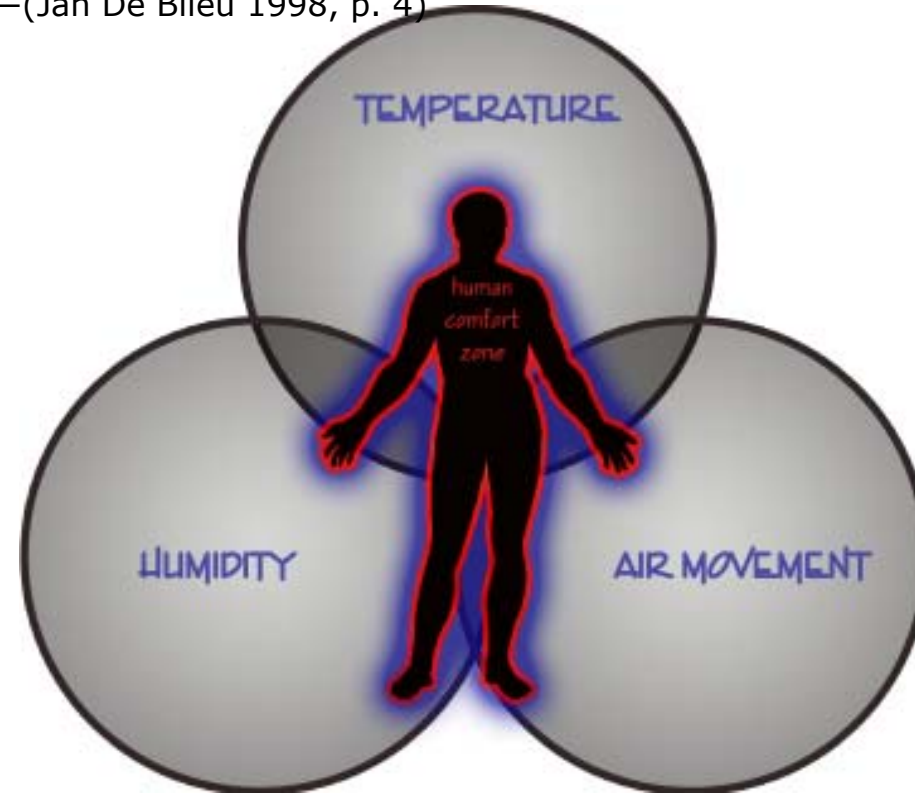
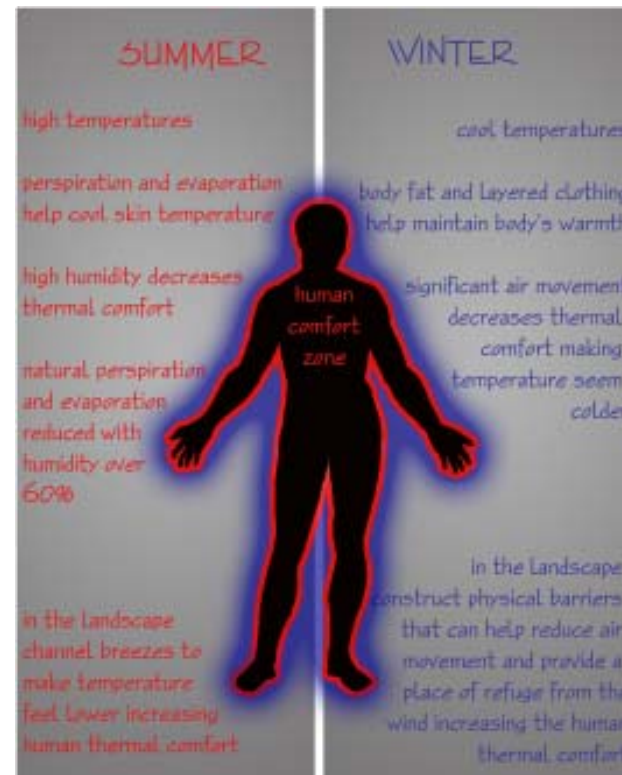
The majority of the time you are unable to see the wake turbulence, unless there is significant precipitation in the air, but I wanted to reveal through the design this interesting phenomenon. The ways of making the wake turbulence visible were endless, ranging from features in the water being activated by its force to making musical instruments play different songs when influenced by these invisible eddies.



human thermal comfort zone

The two contrasting faces of the wind-its predictability and its moodiness-imbue it with the qualities of an animate being. Like the human body, wind is much more than the simple sum of its parts. Cool, gentle breezes seem peculiarly designed to nurture and heal, while storms strike us as personifications of the wrath of God. "This is the disintegrating power of the great wind: it isolates one from one's kind," Joseph Conrad wrote in *Typhoon*. "An earthquake, a landslip, and avalanche, overtake a man incidentally, as it were-without passion. A furious gale attacks him like a personal enemy, tries to grasp his limbs, fastens upon his mind, seeks to route his very spirit out of him." —(Jan De Blieu 1998, p. 4)

Since the velocity of wind rises with height, not all parts of the human body feel it in equal measure. The same wind brings roughly double the stimulation to exposed skin on the face than and on the knees. In addition, the pressure of wind increases exponentially with speed. When a breeze of ten miles an hour picks up to twenty, it exerts not just twice as much stress on the body (or anything else it hits) but four times as much. —(Jan De Blieu 1998, p. 174)

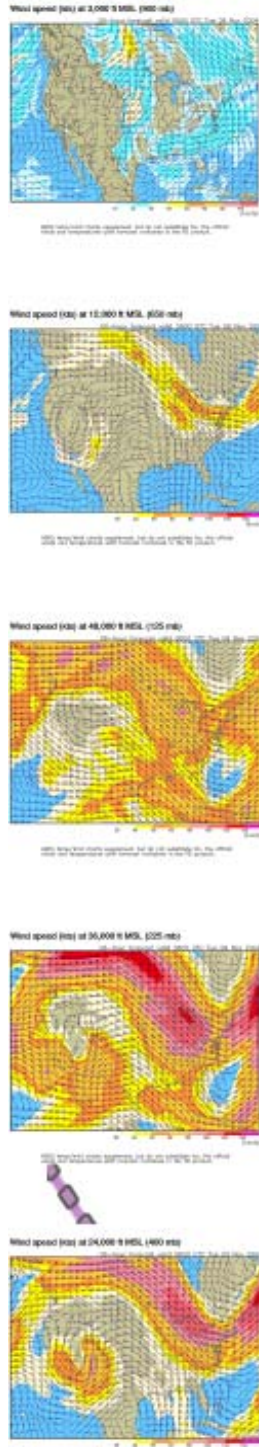


It is difficult to separate physical reactions to wind from emotional ones, since our physical condition is so strongly interlaced with our mental well-being. A summer day at the seashore with a light ocean breeze makes most people feel renewed, in part because of the pleasant scenery, the warmth of the sun, the sensation of water on one's skin, and the rhythmic sound of the ocean waves. All of these are psychologically soothing, but there is a medical benefit as well. The moist, aerosols whipped up by wind help open the bronchial tubes and are therapeutic for people with respiratory difficulties. Indeed, they make breathing easier for us all. —(Jan De Blieu 1998, p. 175)

Physicians now know that the human body is encased in a thin layer of air that acts as insulation but that can be penetrated by wind. In a calm atmosphere this layer varies in thickness from four to eight millimeters- a sixth to a third of an inch, but it quickly thins in even a light breeze. Wind acts on humans in two ways; it alters the exchange of heat between the body and the surrounding air, and it increases evaporation from exposed skin, cooling it. Because of our complex systems of thermoregulation, winds that are cold and dry are more uncomfortable than those that are cold and wet; and humid, sultry winds, like the southwesterlies of the Outer Banks, cause more physical distress than hot, arid desert winds. —(Jan De Blieu 1998, p. 173)

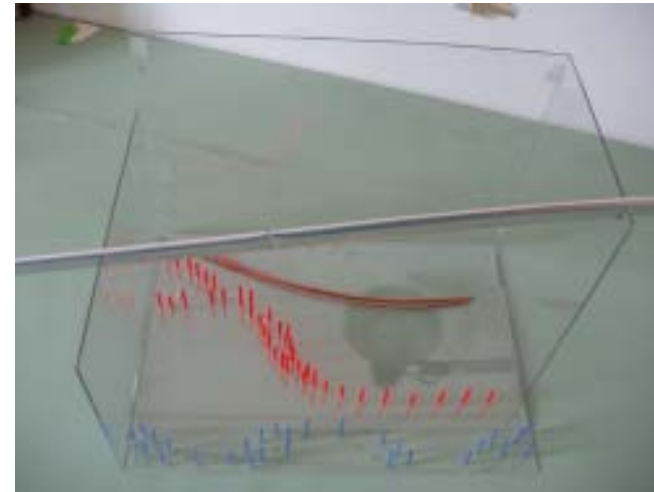
Throughout the world there are winds known for their poison and those known for their powers to heal. Wind can imbue us with physical vigor and clarity of mind or bring on an intractable muddleheadedness and a thirst that cannot be slaked. It can make us jumpy as cats one day and unflappable the next. Winds are said to affect the rate of heart attacks and suicides in a community, the incidence of crime. And these are merely the winds we encounter from day to day. The scars left by a catastrophic windstorm, a gale or hurricane or tornado, may alter one's entire life. —(Jan De Blieu 1998, p. 172)

s p e e d

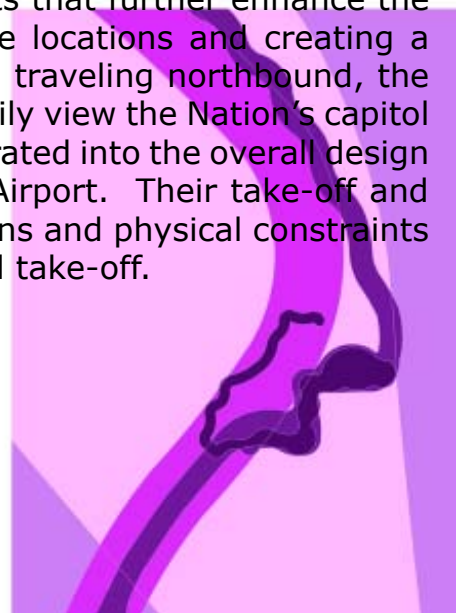
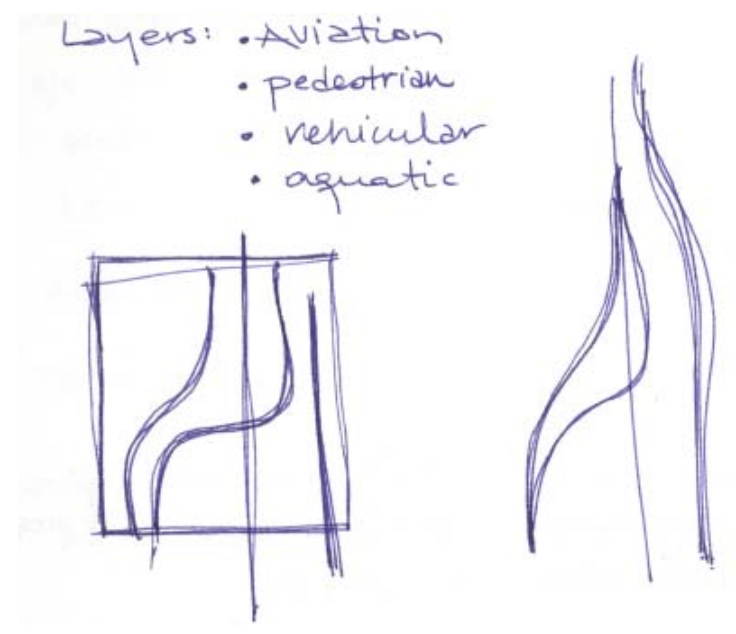
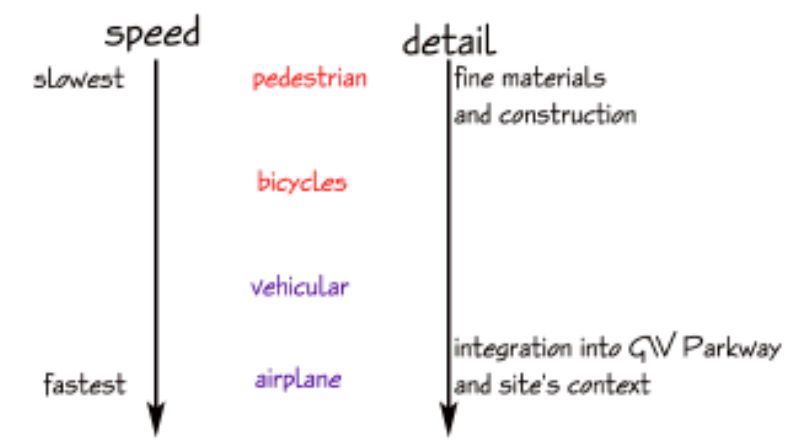
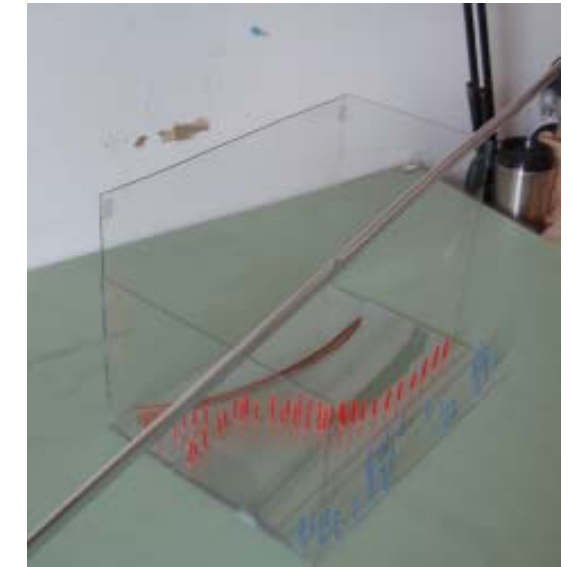


images from NOAA

The earth's atmosphere is made up of different layers. The speed and detail of the wind's movement is much like that of driving a vehicle. The faster the automobile goes the less sudden turns it is capable of making. At slower speeds it is able to turn tight radii and perform specific maneuvers. Winds closest to the earth's surface move the slowest and with the greatest amount of detail, encountering and moving around many obstacles. As the elevation increases so does the speed of the wind, and the amount of deviation from the original flow of the wind decreases because there are fewer or no obstacles. This notion of detail and speed at different levels is incorporated into the site's pathway design. Pedestrians on the site will encounter pathways with many meanders and details within the materials selected. This experience is one of many routes and opportunities for continuous variation. The Mt. Vernon hike and bike trail is the next fastest pathway that will react off of the pedestrian trail, much like the winds interact at different elevations. The hierarchy of materials will step down one level in order to accommodate the faster speed at which people will travel. Less detail is necessary because the speed inhibits one's ability to perceive it. The George Washington Parkway runs north and south along the western side of Gravelly Point and the vehicular speed increases once again and detail decreases. The vehicular pathway focuses more on the experience as one moves through the entire site and its sequence as a whole instead of individual parts. The drivers' experience focuses on landscape components that further enhance the journey along the Parkway, accentuating the unique locations and creating a collective experience. As one passes Gravelly Point, traveling northbound, the experience changes as one can, for the first time, easily view the Nation's capitol and monuments. Lastly, the fastest pathway incorporated into the overall design is that of the airplanes landing at Reagan National Airport. Their take-off and landing pathways are dictated by strict FAA regulations and physical constraints that pilots must adhere to in order to safely land and take-off.



model of site's layers

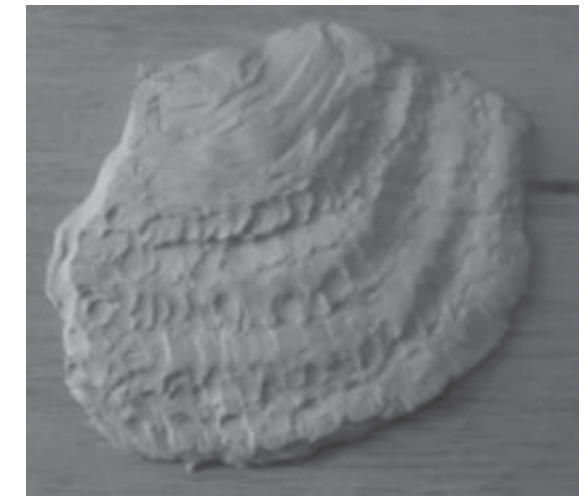




The idea for the design of the gathering spaces came from the diagram of high and low pressures. The idea of a mound and a nest-like form were both appropriate for dealing with the spaces and their seasonal characteristics. The high pressure mound demonstrates the effect of cold air descending. The low pressure nest demonstrates the warm air rising. Although the high pressure deals with the cold air, the design uses mounds in the gathering area designed mainly around the summer activities and with the idea of creating an amphitheatre like space for the watching of the planes. The mounds will allow one to stand on top and feel the breezes. The vegetation around the mounds will help to channel the breezes and reduce the apparent temperature. The human comfort zone is incorporated into these ideas as well in order to provide more ideal climatic conditions during the year. In the cold months the wind is blocked in order to maintain a warmer overall temperature, however, it is opposite in the warmer months when the breeze is channeled, bringing down the apparent temperature so people are more comfortable.



two symmetrical mounds



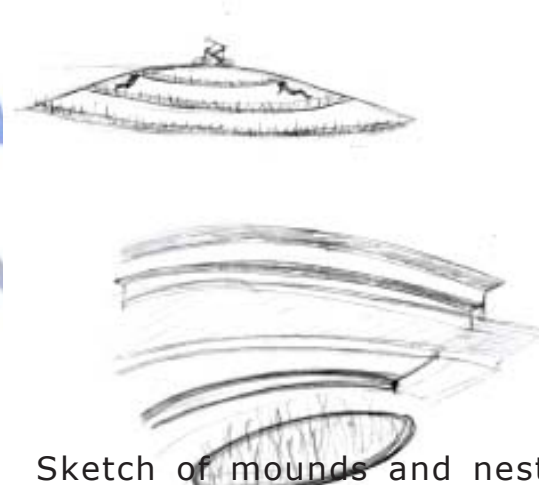
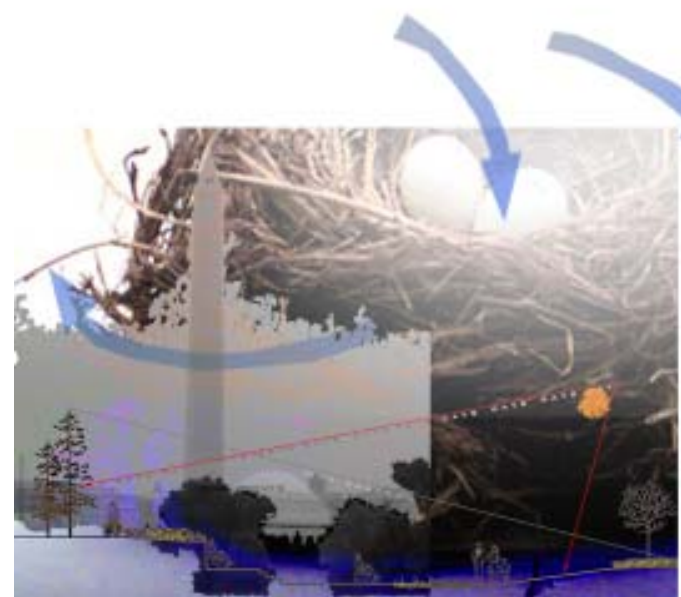
one symmetrical mound



one straight ledge



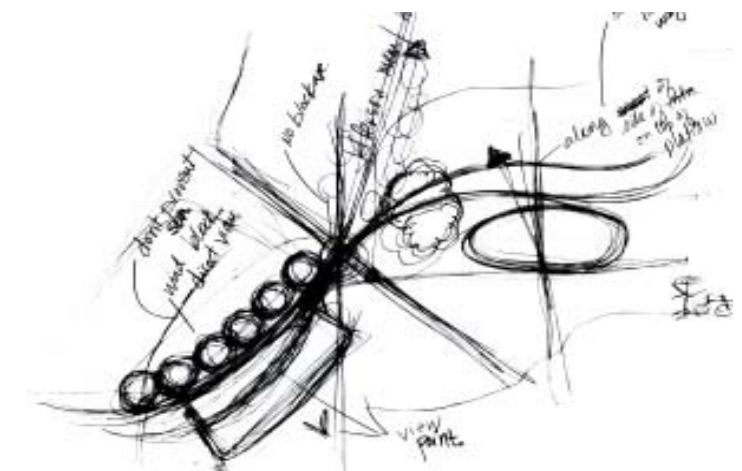
one steep slope



Sketch of mounds and nest. The mounds are to be symmetrical and places for viewing. The nest will be a place of warmth and refuge.

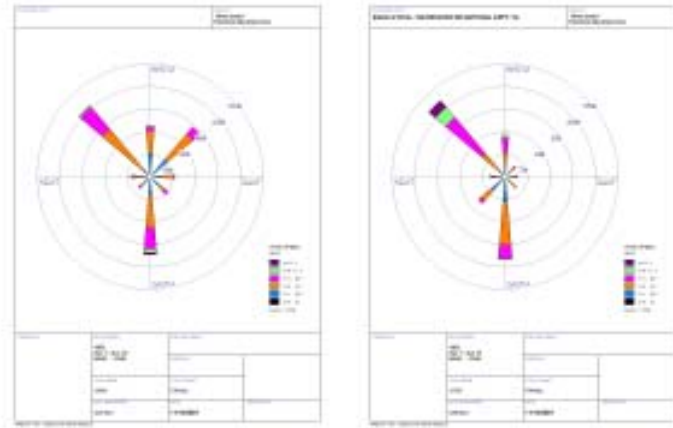


Initial sketch of nest area and its constating flowy perimeters.



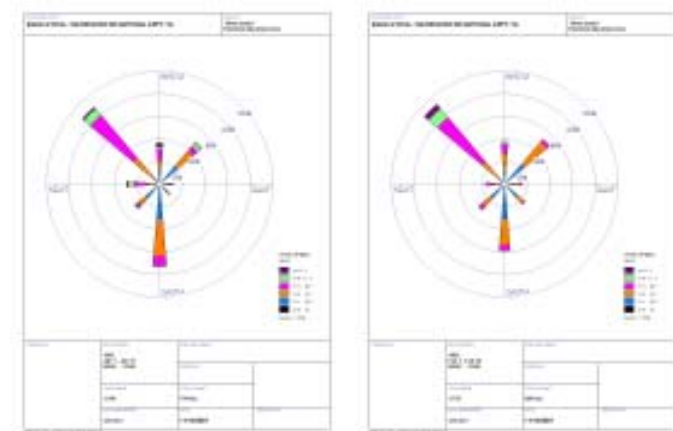
Beginnings of nest-like space and connections between spaces

cooler months



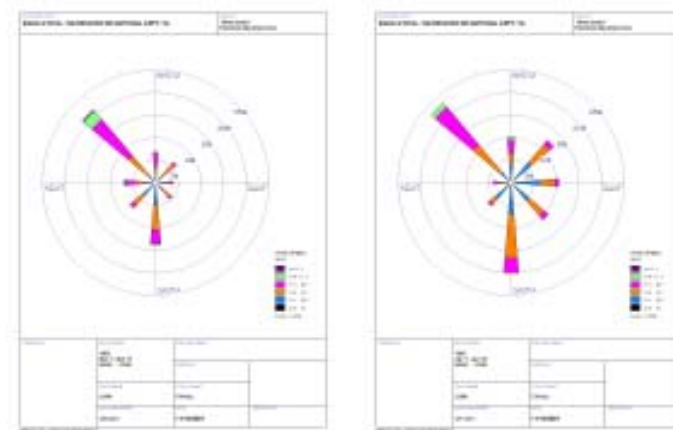
november

december



january

february



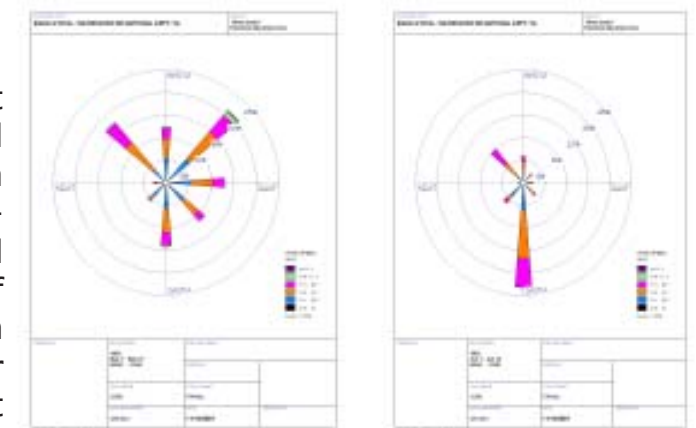
march

april

direction

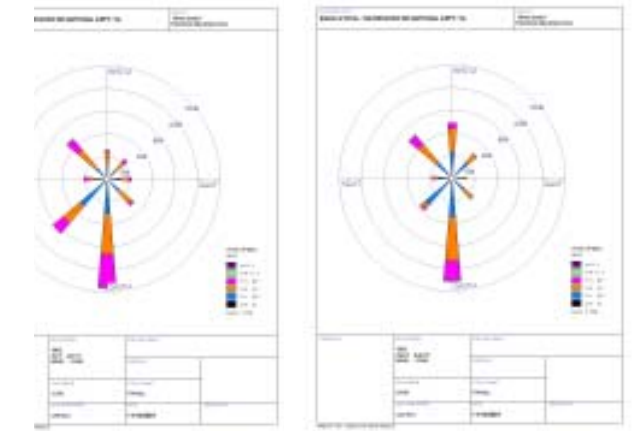
A study of wind roses was conducted in order to determine the wind's direction throughout various times and seasons of the year. After analyzing the data two predominate wind directions emerged; a northwestern wind during the cooler months of the year and a southern wind during the warmer months of the year. The northwestern wind is predominant from November until April. The month of May is the only month that does not fall into either category because the wind blows in from the northeast, due to a change of seasons and wind direction. From June until October the predominant wind blows from the south bringing warm air. The cold winds are always moving towards the warmer winds, due to the interaction between the high and low pressure systems. Therefore, it makes sense that during the colder months, the cold arctic winds from the northeast are searching out their warmer air further south.

warmer months



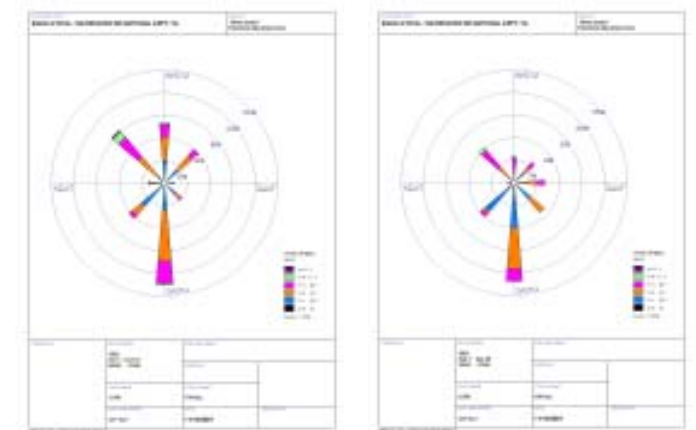
may

june



july

august



september

october

cold northwestern wind
is the prevailing wind during the winter months
to work with the human comfort zone we will want to cast wind shadows and reduce the wind in order to make the body feel warmer
design elements will work to reduce these chilling winds



warm southern wind
is the prevailing wind during the summer months
to work with the human comfort zone we will want to capture and use these winds to make the body feel cooler
design elements will work to channel these winds and create fluttery breezes

The airplanes are directly tied to the wind's direction, always needing to fly into the wind to enhance the lift and in order to slow the plane down during landing. Therefore, when the southern wind is blowing, the airplanes take off towards the south. When the northwestern winds blow, the planes take off and land towards the north. The predominant directions of the seasonal winds were utilized to design activities and spaces within the site. The site's current activities function well on the site so no major reform on the site's activities were changed, however, their location and form has been modified. The hike and bike trail's pathway has been changed to accentuate the experience of the wind as a headwind, tailwind and crosswind. Gathering spaces are oriented in the appropriate direction most suitable for specific activities. The main gathering space for the cooler months is oriented towards the northwest so that a wind break can be designed to reduce the wind speed. The gathering space for the warmer months is oriented towards north/south to receive the breeze in the summer months and be on axis with the airplanes coming in for landing. A migratory bird watch is oriented towards the northwest, although the birds migrate throughout the spring, summer and fall months. The recreational fields are oriented in a north/south fashion for the soccer and rugby that will be played in the summer and fall months.

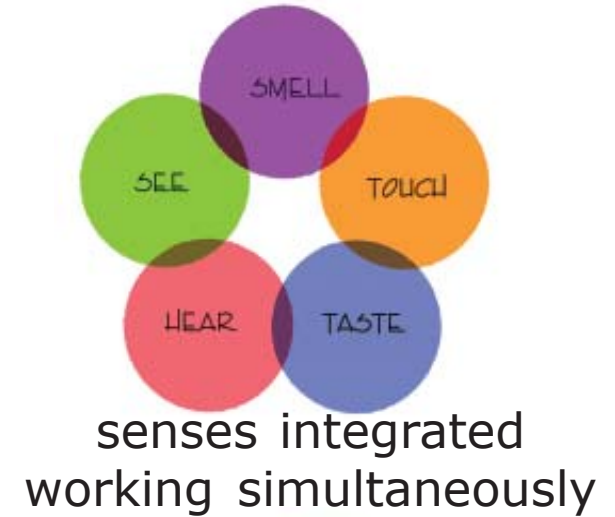
data and software for wind roses was provided by Lakes Environmental



“Initial landing provokes impressions and insights that often last through the entire design process,” was stated by Christopher Girot when describing the different stages of design development. It was on my “landing” or first encounter, with Gravelly Point when I became fascinated with the airplanes and the natural force of wind so directly connected to them. The exhilarating feeling of planes taking off and landing only 200 feet overhead provides the visitors with a unique experience. You don’t see the wind, but you can hear the shear coming off of the planes after they have passed over. You can see the dust swept up and whirled around as the wake turbulence touches the ground and finally loses complete momentum.

Wind. It is invisible. It is perceivable. It can be revealed. The design at Gravelly Point will attempt at revealing the invisible, not only making the invisible visible, but understood and engaged by one’s entire sensory capacity. Wind can be felt gliding over your skin or slicing through your body. You can hear the wind rustling the leaves of fall, carrying the sounds of migrating birds and shear as the airplanes fly through the air. Fragrant scents from blooming trees and vegetation float along on the fresh spring breezes and are heated up in the warm summer air.

Although we as humans rely most heavily on our sight for perception and understanding of the world, it is the combination of various senses that leave some of the most lasting and easily retrievable memories. It is through the other senses that inquiries are provoked about the world we live in. Throughout the site one will be able to experience the different ways that wind influences our body and everyday life. It is the curiosity to learn more about the invisible that will engage the visitors on the site and invite them back time and time again. It is a natural force that changes throughout the day and night, seasons of the year and yet has a consistent nature over decades, centuries and millennia. It shapes our world, lives and culture and this can be revealed through the landscape.



examples

- | | |
|-------------|------------------|
| feel noise | feel vibrations |
| hear noise | hear vibrations |
| see noise | see vibrations |
| smell noise | smell vibrations |
| taste noise | taste vibrations |



Summer space: Amphitheatre

The summer space was designed completely around the activity of watching the planes and utilizing the technical aspects of aviation. When the warm wind blows in from the south, the planes will fly directly overhead passing a mere few hundred feet above the visitors. Many people solely come to Gravelly Point to watch the planes land and I wanted to further enhance this experience. This space I named the amphitheatre because people would be watching the planes land; the planes are the actors and the visitors are the audience.

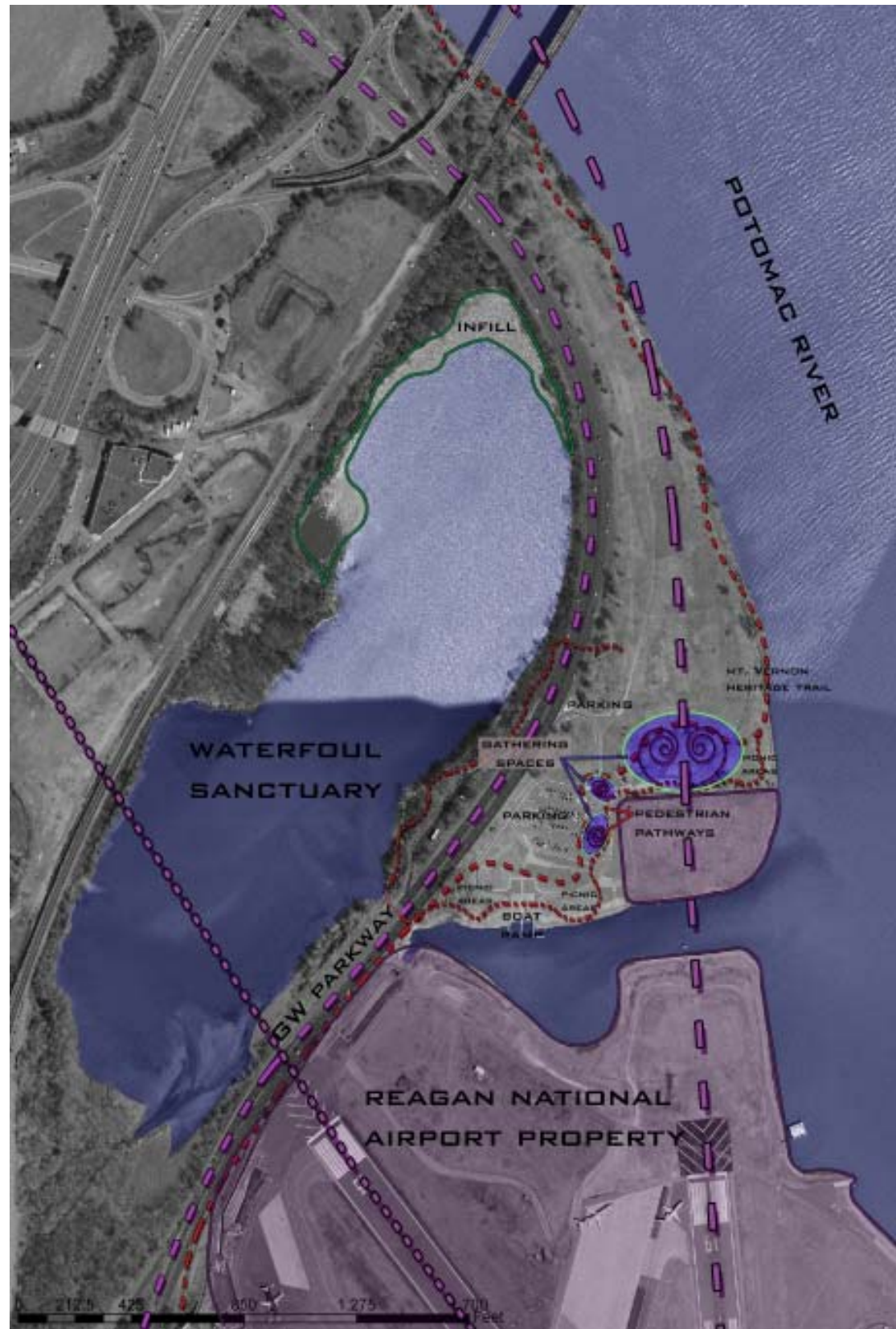
The technical aspects incorporated into the summer space are the idea of wake turbulence being symmetrical and the straight flight path axis serving as the midline for this portion of the site. I was fascinated with wake turbulence and appreciated its movement and spiraling action. The wake turbulence is invisible, however, you can see the wake turbulence as it creates small dust devils on the ground.



Winter space: Nest

The idea of creating a winter space set the foundation for one of the two anchors for the design. This space I began to call the nest would be a place of refuge and warmth. The space would be sunken into the ground and oriented towards the northwestern wind. By orienting it towards the wind I could utilize the trees to cast a wind shadow over the site and make the space a comfortable place to be in during the cool months of the year. The vegetation inside the nest would be vegetation that reaches its blooming season during the cooler months, creating a pleasant and fragrant winter garden. During the cooler months the vegetation would not inhibit the sunlight, but in the warmer months it would cast a shadow over the space to keep it cool.

Another reason it was oriented towards the northwestern wind was because the planes fly into the wind, therefore, they would be flying directly overhead when the cool wind is blowing from the northwest. I felt that the space does not have to be symmetrical because when the planes take off they are already banking to the northwest and not every plane has the same flight path, unlike when they land.



first conceptual plan



blow-up of conceptual plan and proposals

Nest

- Protection from cold winds
- Winter garden
- Private space: calm activity
- Sunken into ground

Amphitheatre

- Capture and channels breezes
- Open space
- Public space: lots of activity
- Rising out of the earth

Entrance

- Introduce wind
- Allows one to choose place on site
- Connects nest and amphitheatre
- Views over entire site

Conceptual Plan

- Two main gathering spaces: nest and amphitheatre
- Nest is oriented towards the northwest
- Amphitheatre is symmetrical and oriented north and south
- One main entrance connecting two gathering spaces
- Parking located on edge of site close to parkway
- Parking will be increased to accommodate for excess usage and green space will be more connected and consolidated
- Hike and bike trail to weave through site and spaces reducing interaction with vehicles
- Pathways' level of detail and material hierarchy corresponds to speed of movement
- Strong axis established along landing flight path and in alignment with glide slope equipment
- Boat ramp to remain where it is
- FAA land will be left alone and not changed
- Connection made to waterfowl sanctuary



Part III The Design

C 5: Initial Design Investigations

C 6: Overall Masterplan

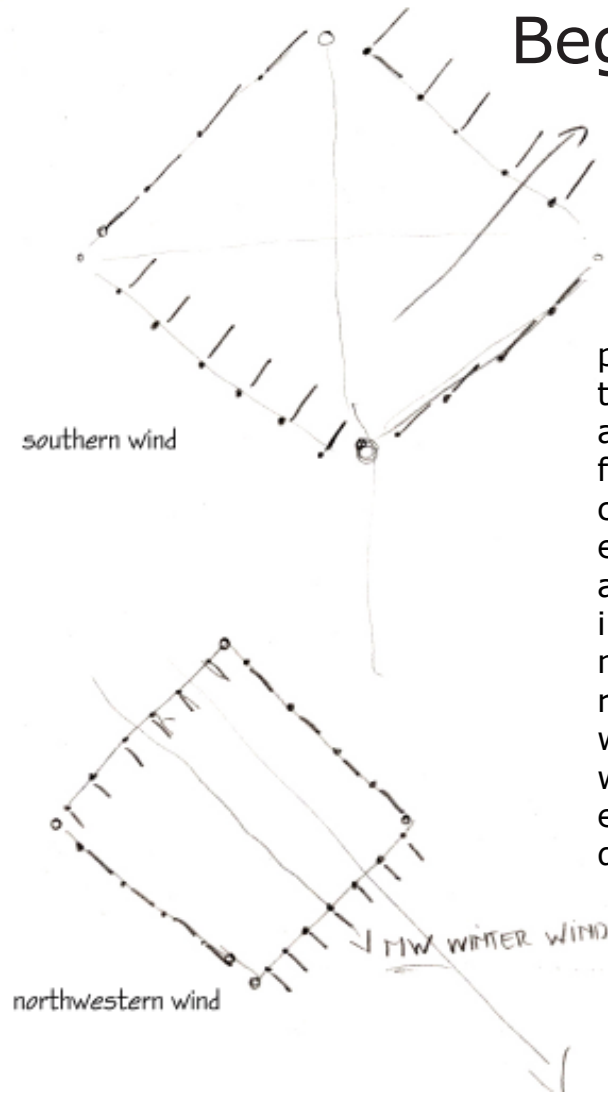
C 7: The Entrance

C 8: The Pods and the Nest

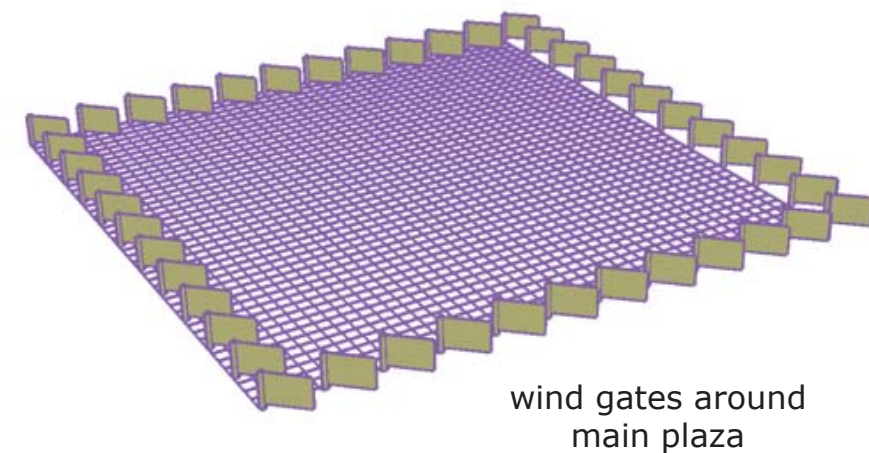
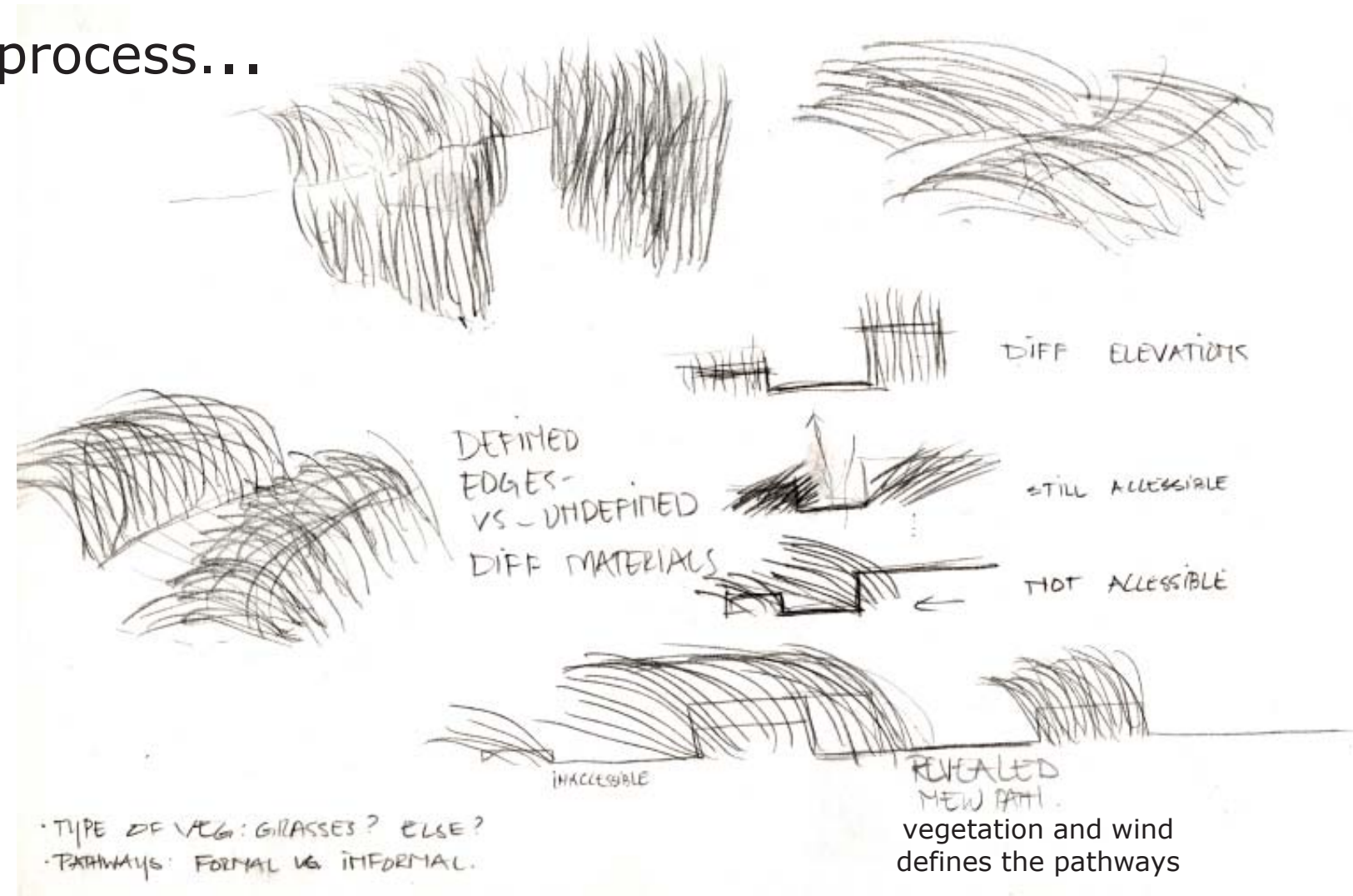
C 9: The Dunes and Air Plaza

C 10: The Hike and Bike Trail

Beginnings of the design process...

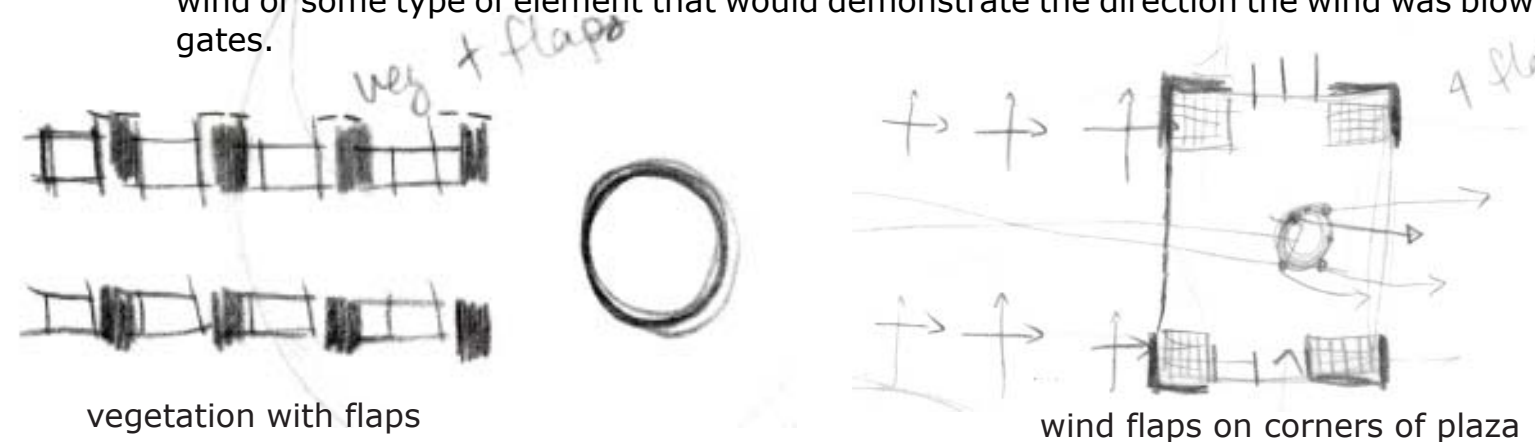


One of the challenges with this project was the many great ways to design the site. I knew there would be an amphitheatre space and a nest-like space from the previous investigations, but the connectivity and sequence of the experience was to be determined. I played a lot with the pathways and how the wind's interaction with the vegetation or a manmade material could determine the route one took. The journey one took would be determined by the direction the wind was blowing, creating a different experience every time of the year and during the different times of the day.



wind gates around main plaza

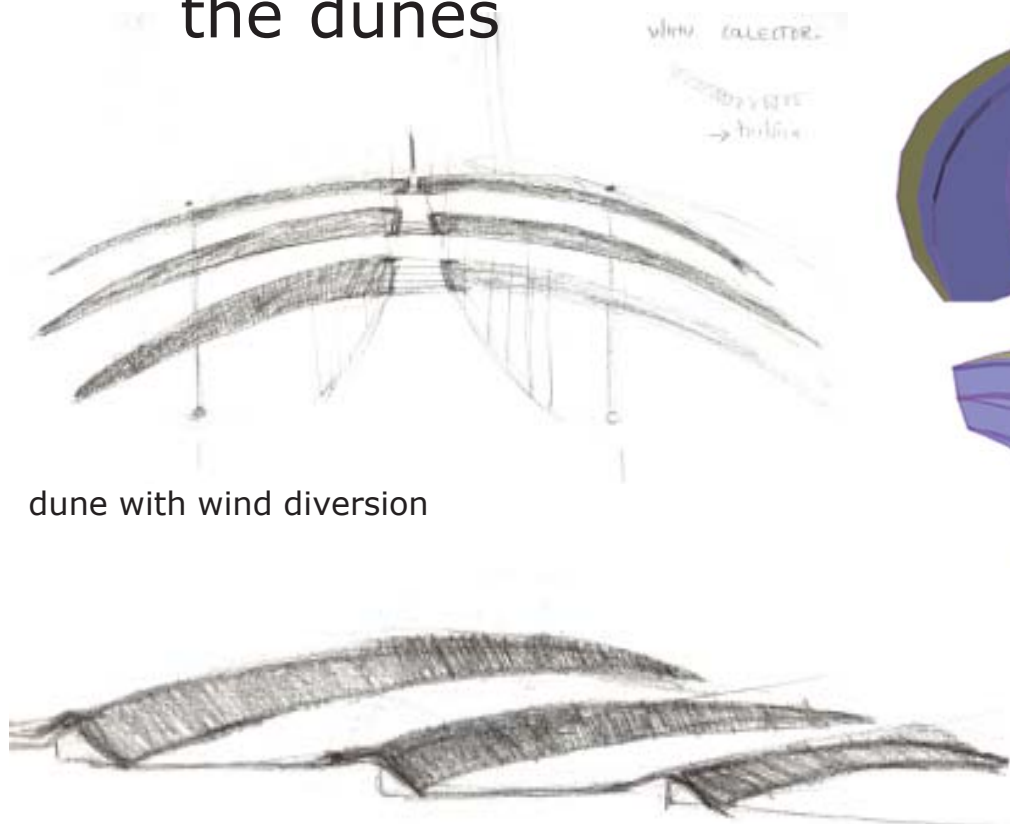
The entrance into the site was an important place for the sensory experience to begin. Since we as humans rely most heavily on our sense of sight, I wanted the visitors to be aware of the wind's direction from the beginning. The entrance would have fine textured plants that would dance in the wind or some type of element that would demonstrate the direction the wind was blowing, like the wind gates.



vegetation with flaps

wind flaps on corners of plaza

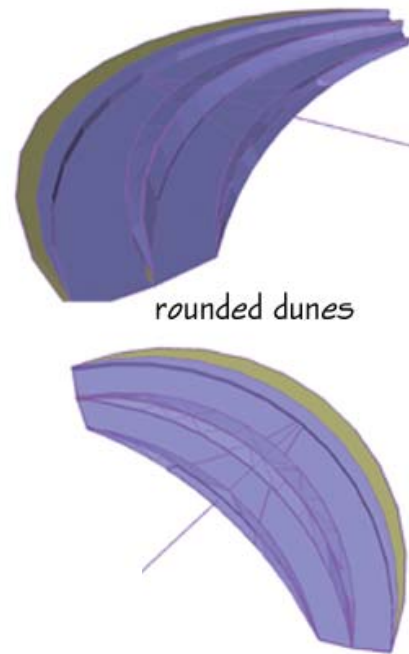
the dunes



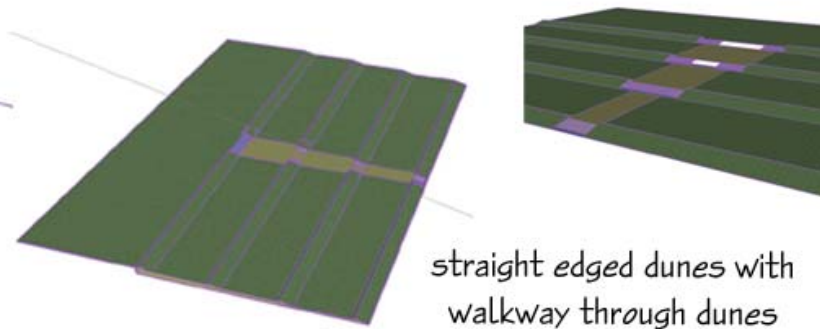
dune with wind diversion

section perspective of the dunes

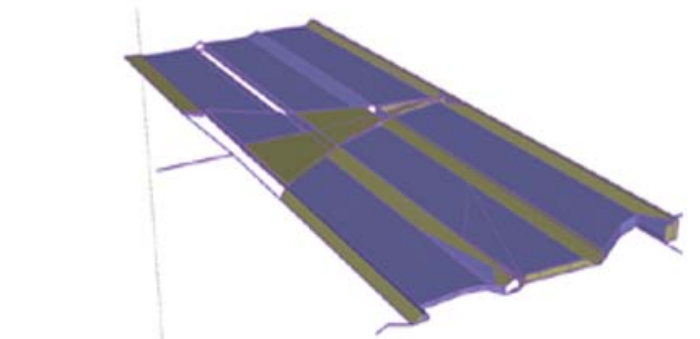
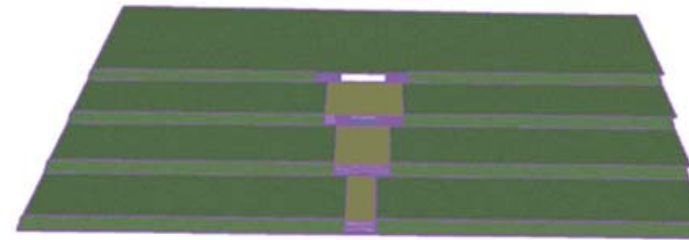
WIND COLLECTOR
WIND DIVERGENCE
→ to feel



rounded dunes

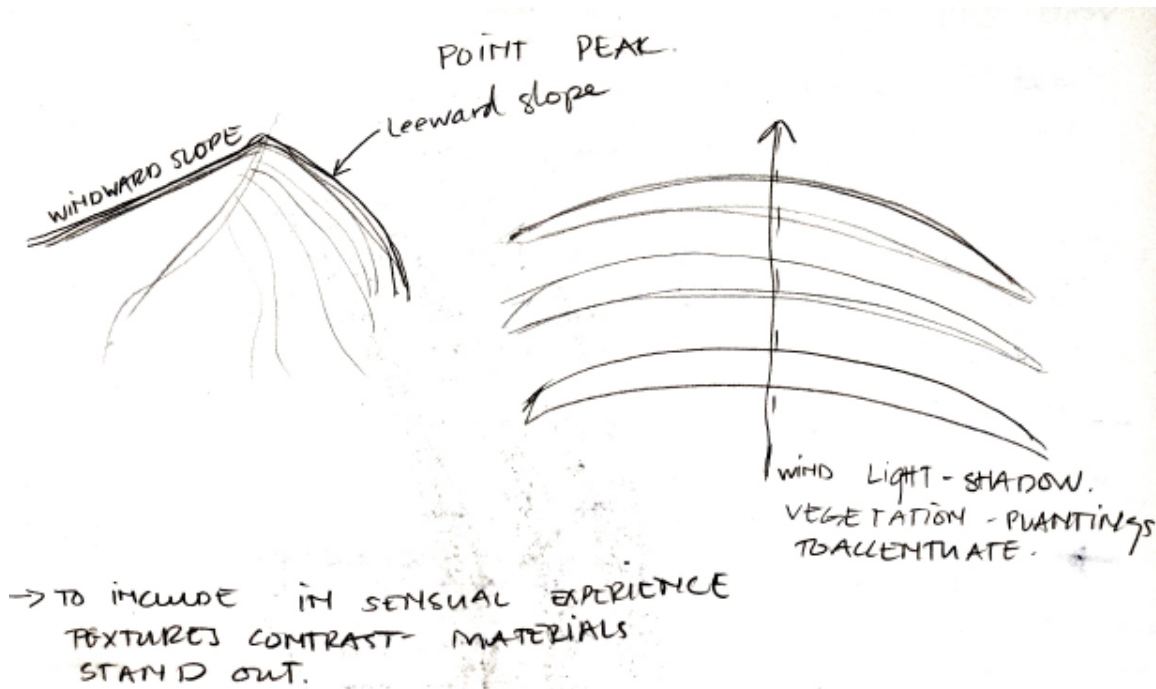


straight edged dunes with walkway through dunes

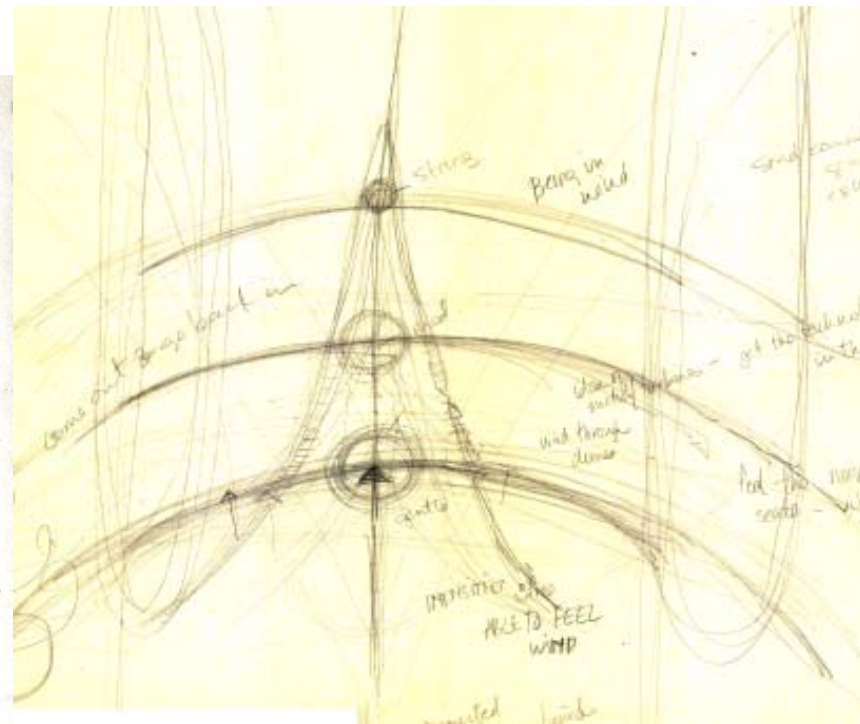


straight edged dune with tapered wind diversion

3-D exploration of dune shape and gathering spaces



wind direction and dune slopes

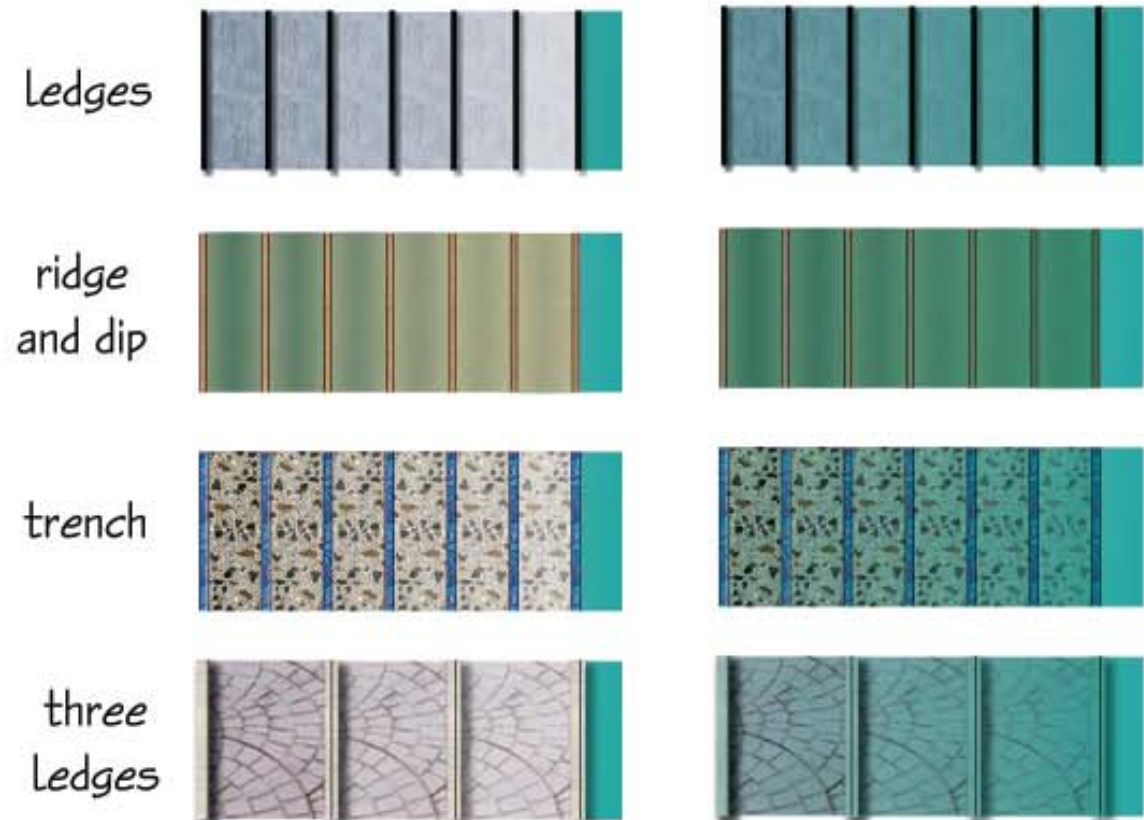


dunes with gathering space and focal points

Having dunes on the site was an idea that could fulfill many design objectives: a place for watching the planes land and take off, a place to hide or be in the wind and a natural element that is formed by the wind. When I began exploring options for the dunes, I was unsure of whether they would be rounded or straight. I was not trying to construct a natural dune, but use its form within the design to symbolize a real sand dune. After looking at different dune types and which wind conditions form each one, I chose the rounded dune since they are formed with two prevailing winds, like the site. By having the dunes, a gathering space could be formed in the middle, maintaining symmetry and forming a place for a wind diversion and channeling of the breezes during the warm summer months.

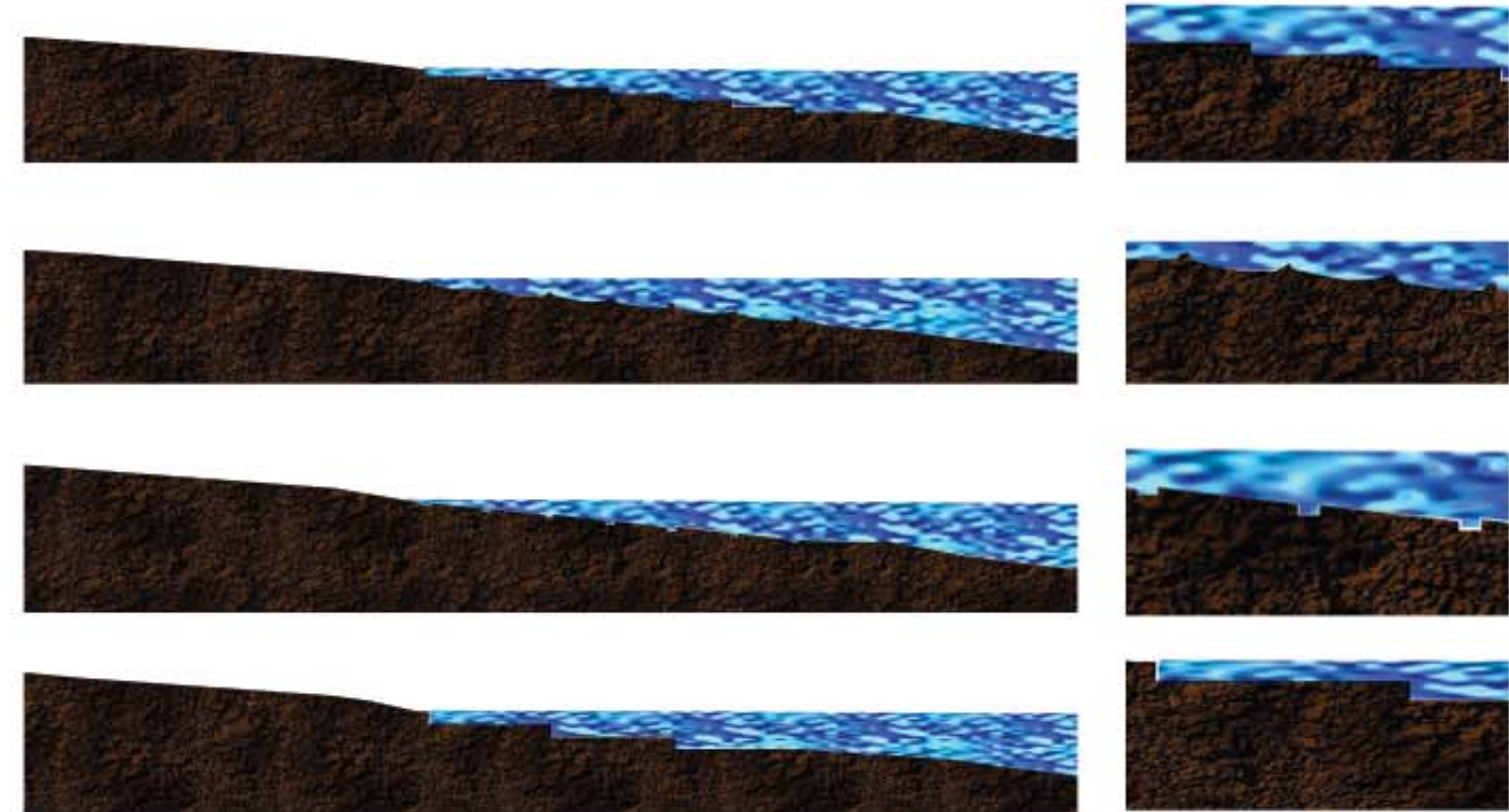
tidal interaction

plan view: low tide plan view: high tide



section: high tide

blow-up of section



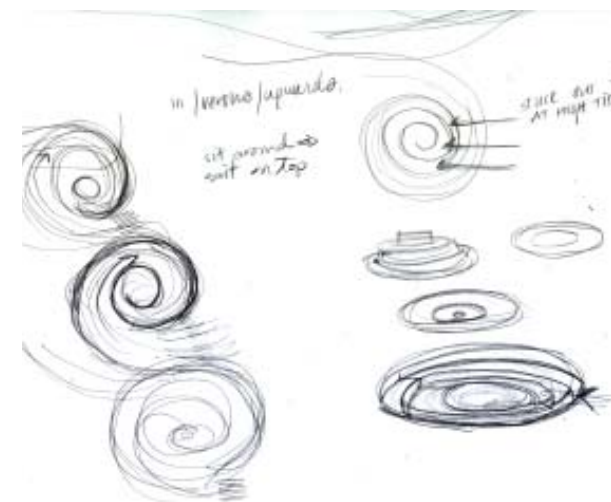
spiral one: on land



spiral two: half land half water



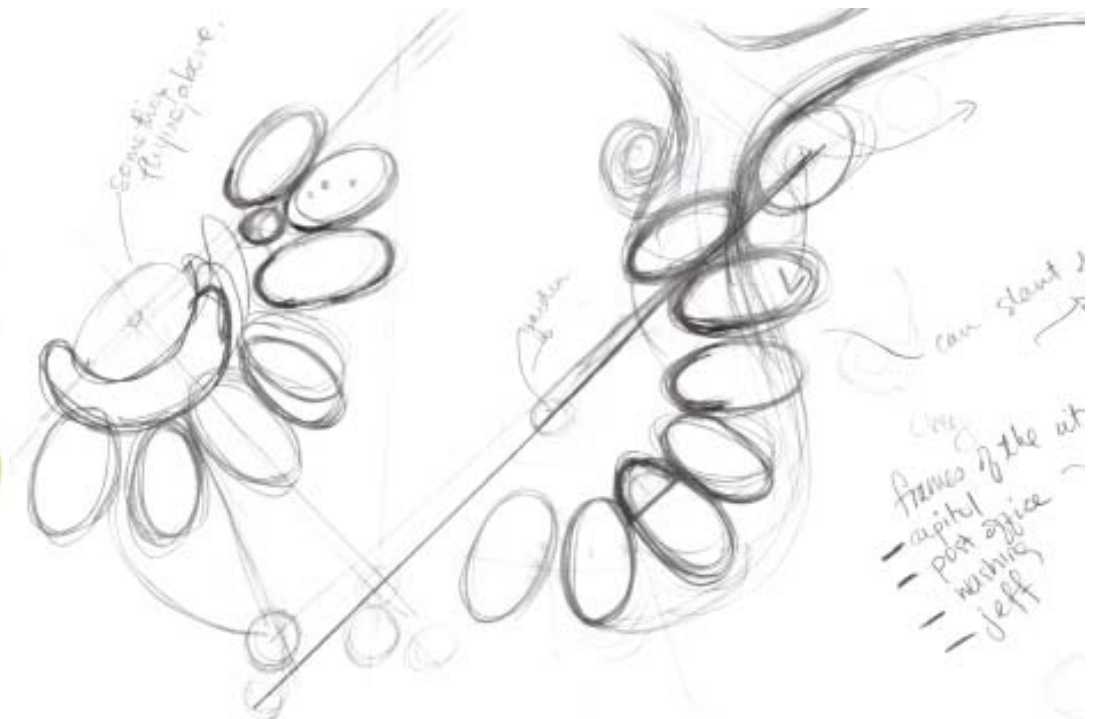
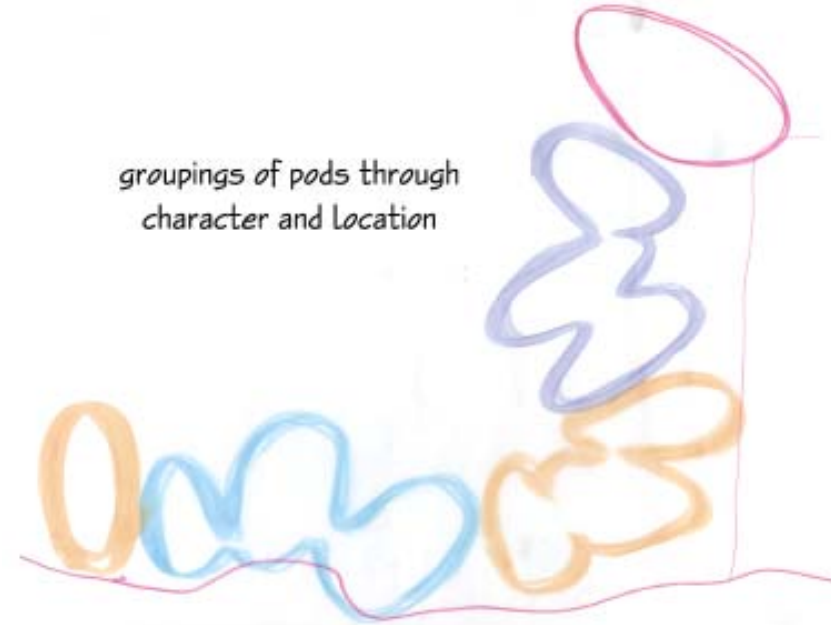
spiral three: in water



The Potomac River runs along the eastern edge of the site, providing a prime opportunity to reveal some aspects of tidal movement. I analyzed timing patterns from high tide to low tide and vice versa. On average the cycle is about 13 hours: 5.5 hours from low tide to high tide and 7.5 from high tide to low tide. Allowing a paved space to slowly submerge into the water with specific elevation drops, according to the average elevation change between high tide and low tide, could be an interesting way to educate the visitors about the pattern of the tides.

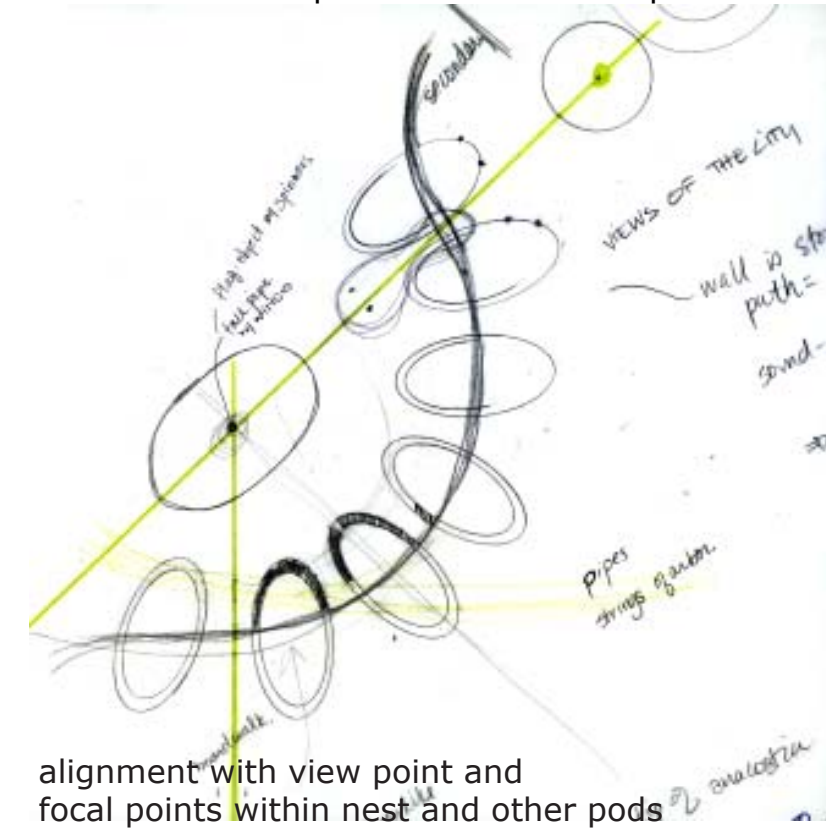
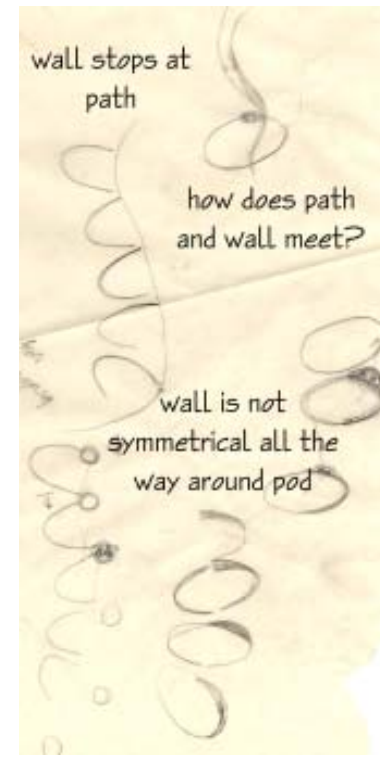
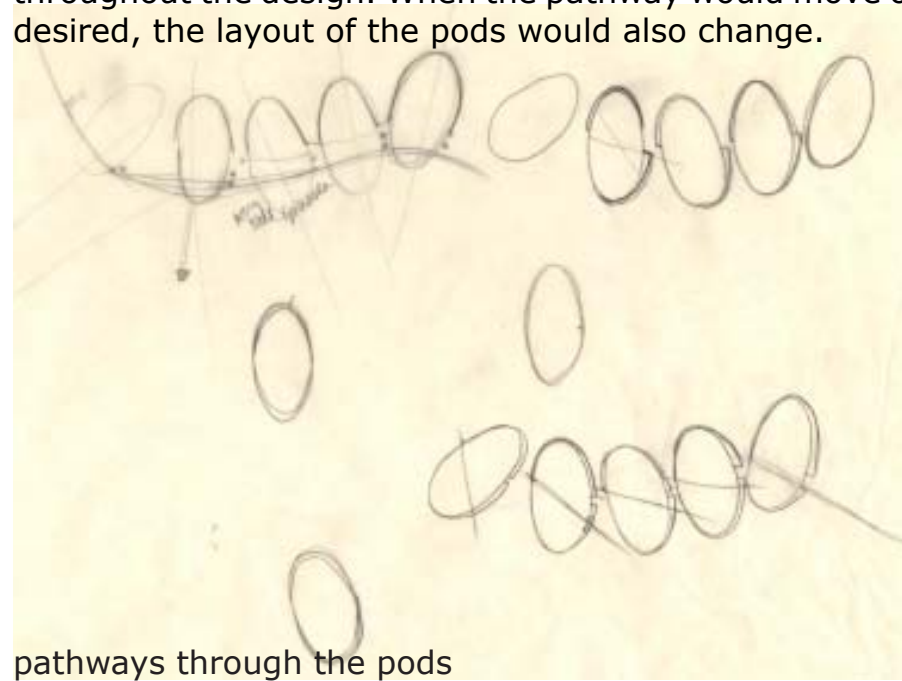
After some time, a series of spirals emerged in the design, that engaged the river. The first spiral was all on land, the second was half on land, half in the water and the third was all the way in the water. By incorporating a musical element into these areas, one could begin to understand the tidal action as well as how the winds vary over water and land.

the pods and parabolic walls



The idea for the pods emerged when considering how one would move from the main entrance down towards the water. This side of the park was also the area where I wanted to create more private spaces for people to enjoy. I explored ideas of how the pods would spiral downwards towards the water, rotating around the central pod: the nest. How would these spaces be grouped, organized and would their function change within the different groups was also thought about for a great deal of time. Determining the exact layout of the pods was a continuous challenge throughout the design. When the pathway would move or a different alignment was desired, the layout of the pods would also change.

The idea of a parabolic wall arose, forming a hard border to the pods' edge, to further the sensory experience. The parabolic walls would stop at the pedestrian pathway and the remaining portion of the pod's edge would be formed by a wavy fragrant grass and herbaceous plant material. The pods themselves would be of turf grass.



pathways through the pods

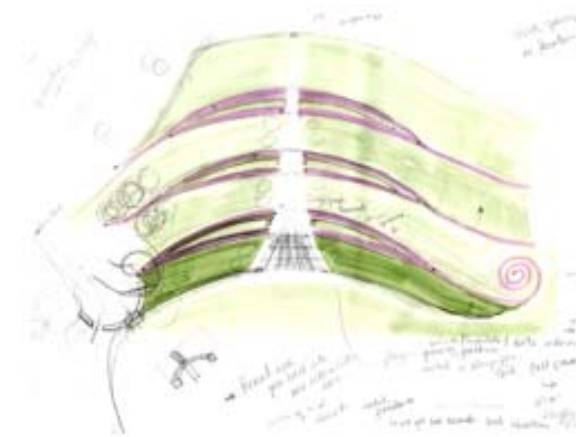
alignment with view point and focal points within nest and other pods



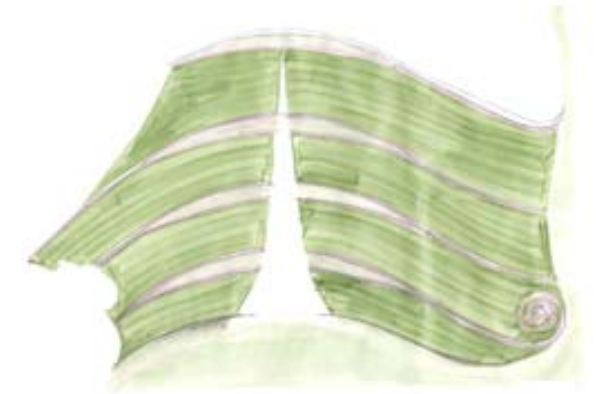
pathways lined with wavy flowy grasses and flowers



vegetation only around dunes



specific vegetation around dunes



colored fragrant wavy prairie grass inbetween dunes

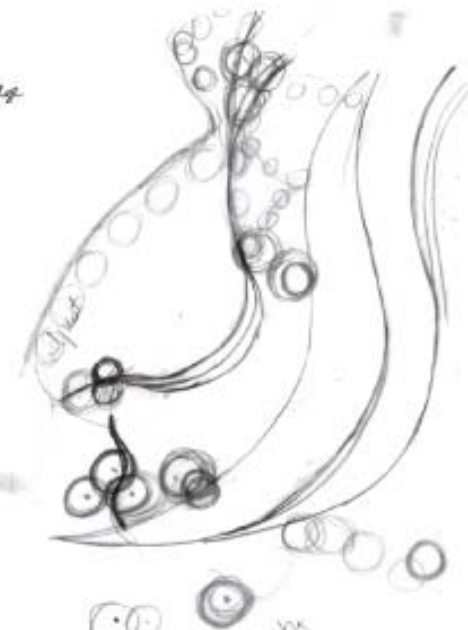
evolution of dunes' vegetation



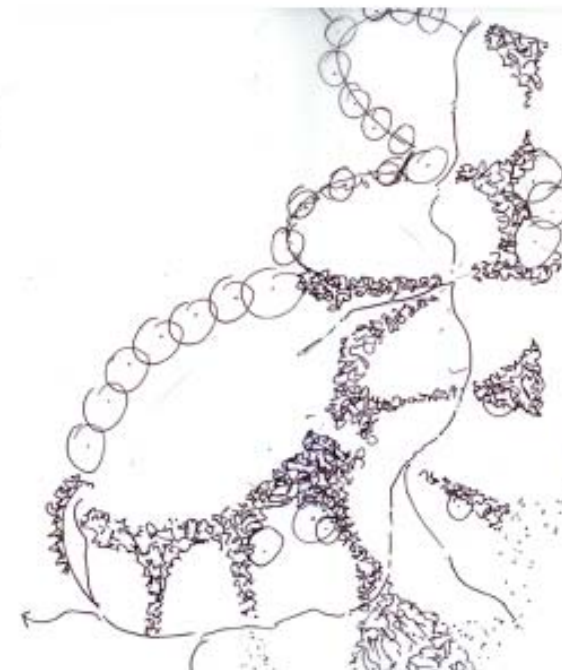
vegetation different for wind direction



vegetation varies through groups of pods



vegetative swaths accentuating curvilinear form

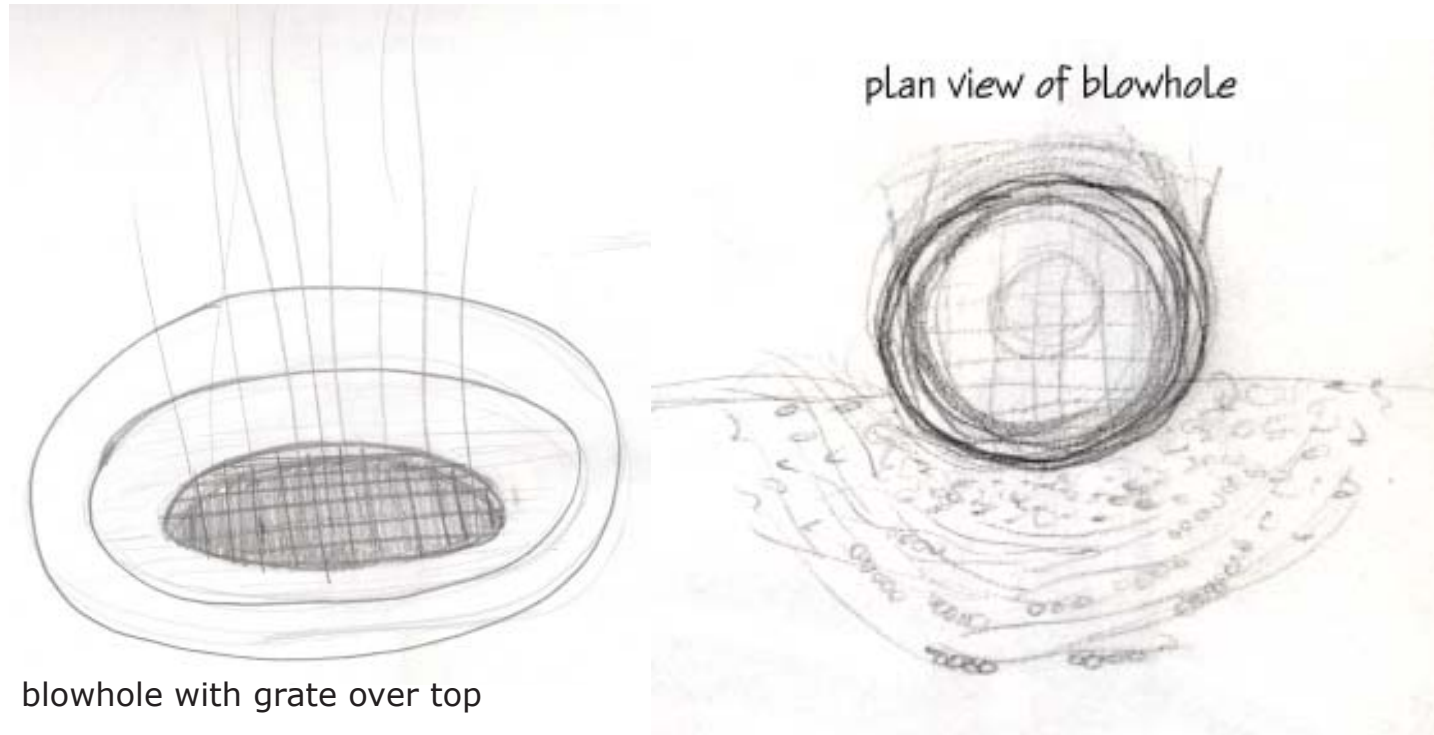


vegetation accentuates pods' form and border



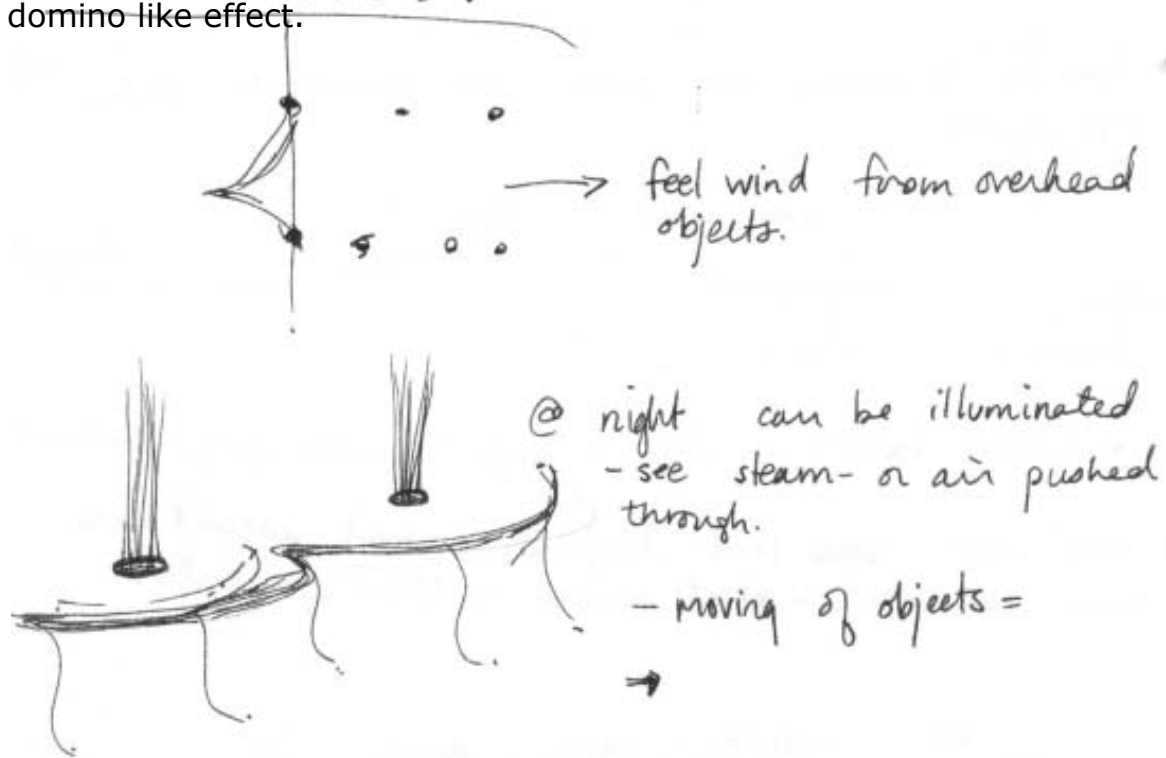
vegetation types and function wavy, fragrant, connects all pods

evolution of pods' vegetation



blowhole with grate over top

Wake turbulence was one of the major factors driving the design and especially in the space of the dunes. An element that would react to the wake turbulence was what I was exploring when I thought about a blowhole. This blowhole could blow up mist or cool air, refreshing visitors in the summertime and making them aware of a phenomenon that usually goes unnoticed. The blowholes could demonstrate the movement of the wake turbulence and a chain of blowholes could be activated in a domino-like effect.



SPA

something - like a fan

blowhole with fan like airplane's engines

What if top was like a horn's end



RAISED OUT OF GROUND:

section of blowhole

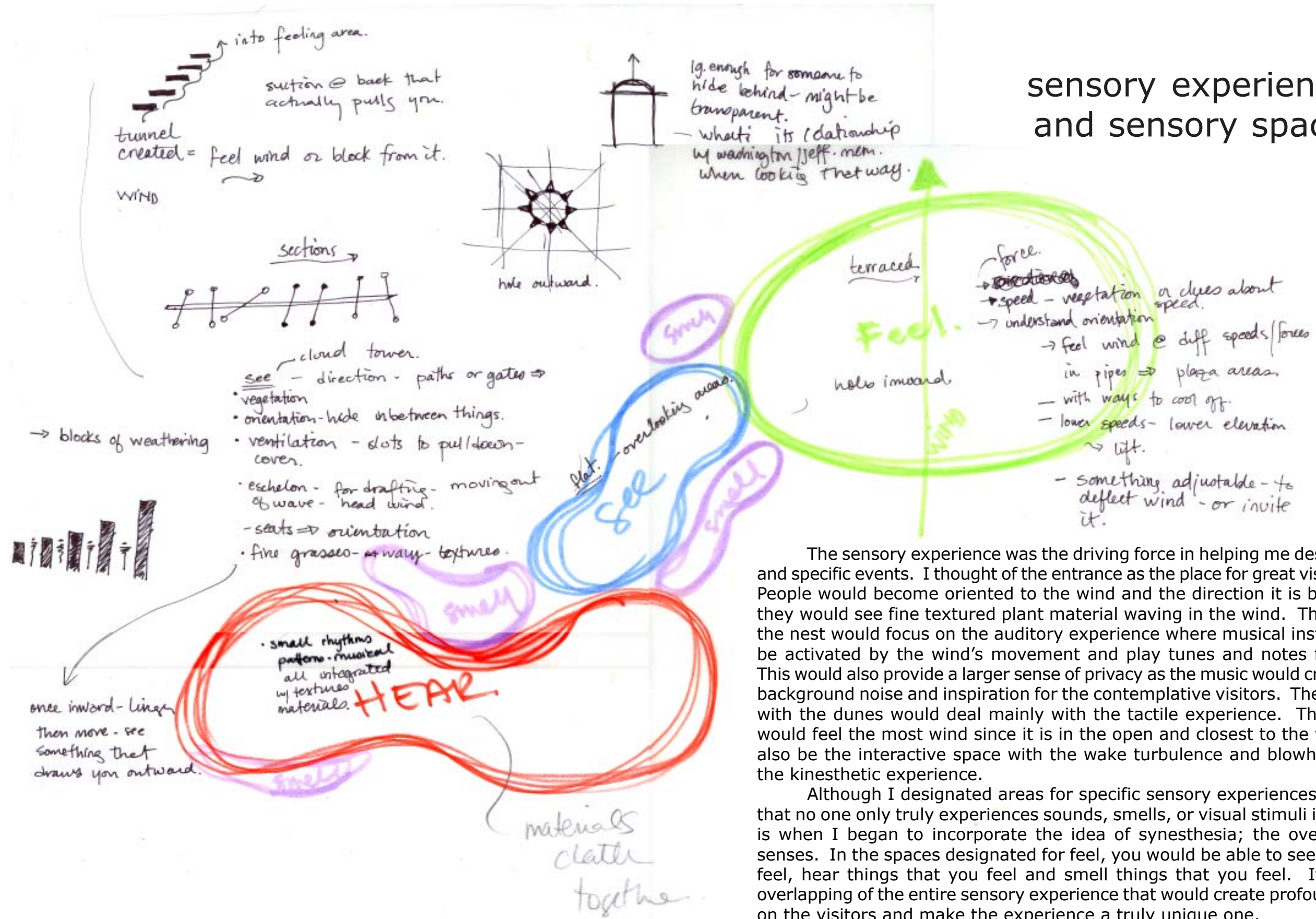


als - what would we?

something underneath is very reactive to movement - vibrations -

blowholes being integrated into the idea of synesthesia
feel hear see smell water and mist and
recognize the wake turbulence

sensory experiences and sensory spaces



The sensory experience was the driving force in helping me designate function and specific events. I thought of the entrance as the place for great visual stimulation. People would become oriented to the wind and the direction it is blowing because they would see fine textured plant material waving in the wind. The space around the nest would focus on the auditory experience where musical instruments would be activated by the wind's movement and play tunes and notes for the visitors. This would also provide a larger sense of privacy as the music would create interesting background noise and inspiration for the contemplative visitors. The summer space with the dunes would deal mainly with the tactile experience. This is where one would feel the most wind since it is in the open and closest to the water. It would also be the interactive space with the wake turbulence and blowholes, furthering the kinesthetic experience.

Although I designated areas for specific sensory experiences, I also realized that no one only truly experiences sounds, smells, or visual stimuli in isolation. This is when I began to incorporate the idea of synesthesia; the overlapping of the senses. In the spaces designated for feel, you would be able to see things that you feel, hear things that you feel and smell things that you feel. It would be this overlapping of the entire sensory experience that would create profound impressions on the visitors and make the experience a truly unique one.

Sound

WIND ~ MOVEMENT - ENCOUNTER - SOUND

Revelation of wind & tides

- : its presence
- : intensity
- : direction
- : changes
- : seasonal

Synesthesia

- : hear tidal movement / tidal level
- : feel the noise / planes
- : see the noise
- : see music / notes
- : hear scents / textures

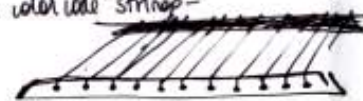
Musical instruments

pipes
piano
harp

ABOVE



Sit under pergola/arbor -
aeolian harp on top.
vegetation around arbor
→ see through - to harp/strings.
strings stretched bit between
poles?
reacts to plane - intensifies
when plane goes over.
• focal pt towards monument
→ diversion - towards next spot.
→ color code strings -



THROUGH



People move through -
can see/hear where
noise is coming from
→ changes as wind
changes
- diff strings @
diff heights - diff
sounds.
- accentuates change in
direction - color code
panels that move
- look @ upright planes.
- can change exp. by
change location - by or
above.

UNDER OVER



people can enhance/change
sand exp. but also happening
naturally.
→ can interact/engage w/
site - materials.
- pipes → sand hitting & passing
through - wind enters into
hole -



One of the first ideas that came to mind about the synesthetic experience was to move under, through and over the musical instruments. Providing a covered patio area with an aeolian harp stretched over the top would provide an interesting place for sitting as well as further enhancing one's experience with the airplanes. Tuning the harp's strings so that when the plane went over, the shear off of the plane would cause the harp to play another tune was another idea. Moving through the musical instrument consisted of a few options. One idea was that the strings would be stretched between two points and the strings would be of different heights. Another was that the retaining walls could be a vertical piano and the wooden flaps

would move with the wind's direction and frequency. Moving over the musical instrument would be composed of a series of terracing decks, moving closer to the water, and part of the structure would be made of bamboo pipes. The pipes would be activated by the wind and the tidal action. People on the deck or boardwalk could also change the tunes that the pipes were playing by standing on the entire opening or a portion of it.

In the end I chose another concept for the musical instruments and did not use this idea. The pods and other elements in this area lent themselves to a more cohesive experience that linked all the pods together from the highest pod to the lowest pod.

evolution of the design

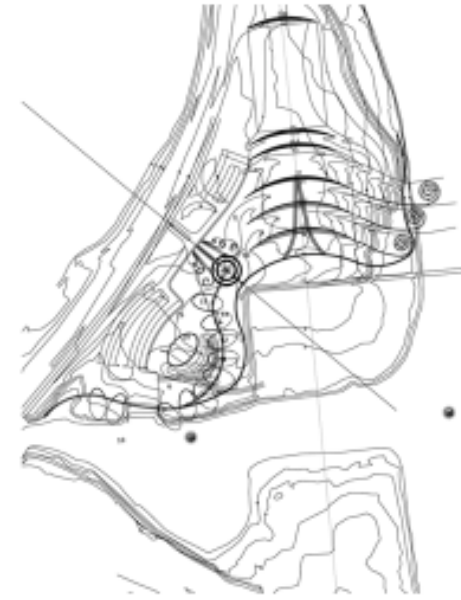
stage one



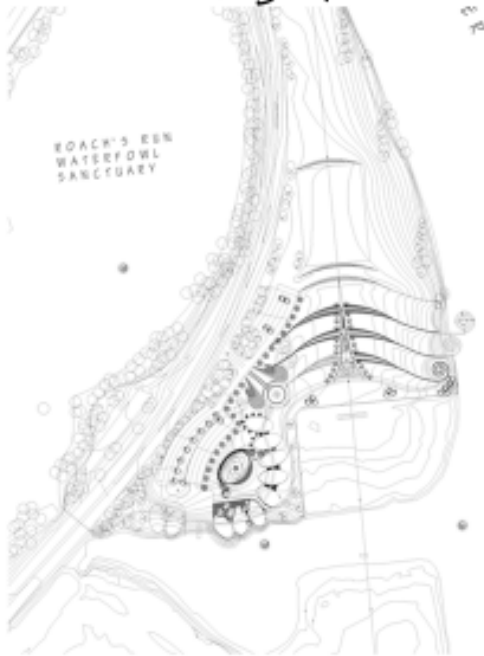
stage two



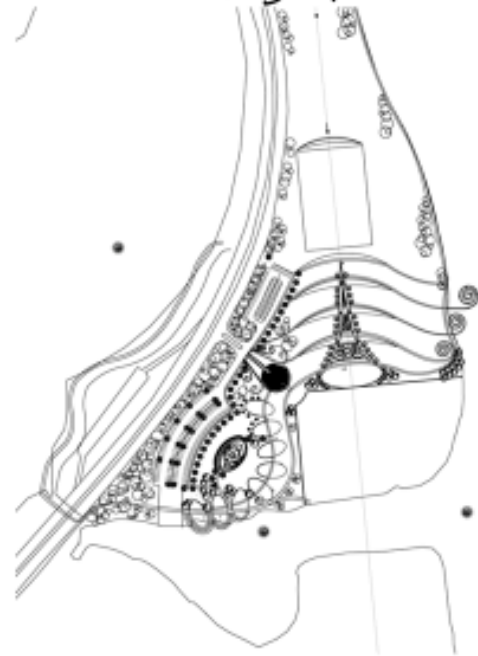
stage three



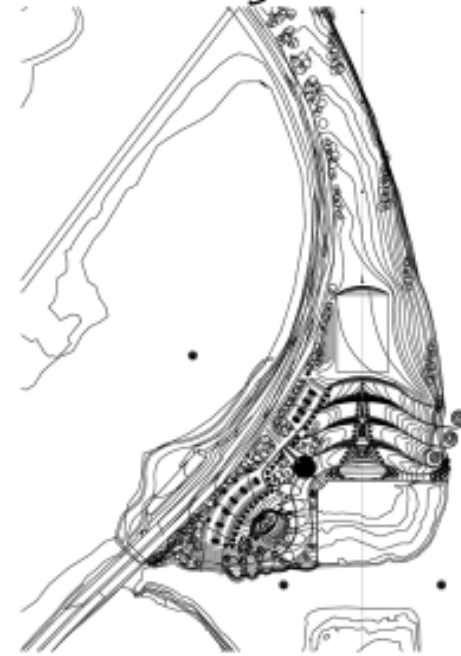
stage four



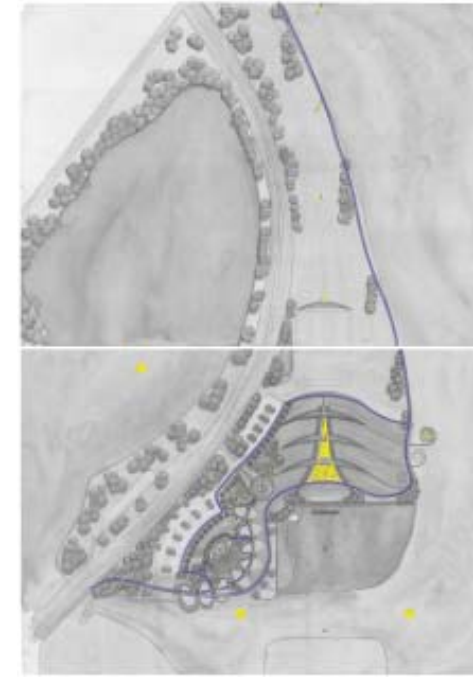
stage five



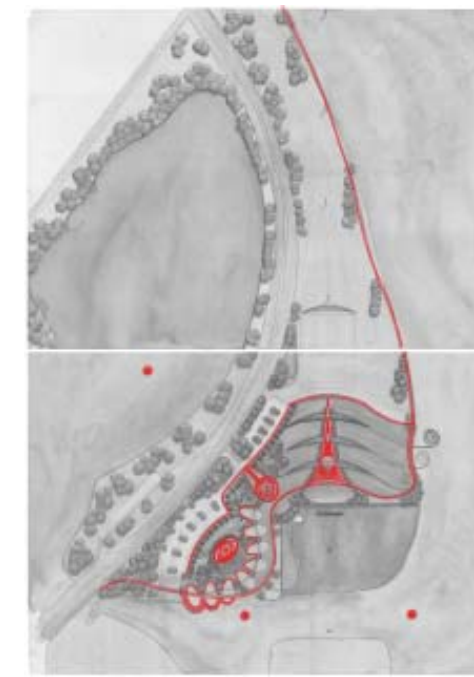
stage six



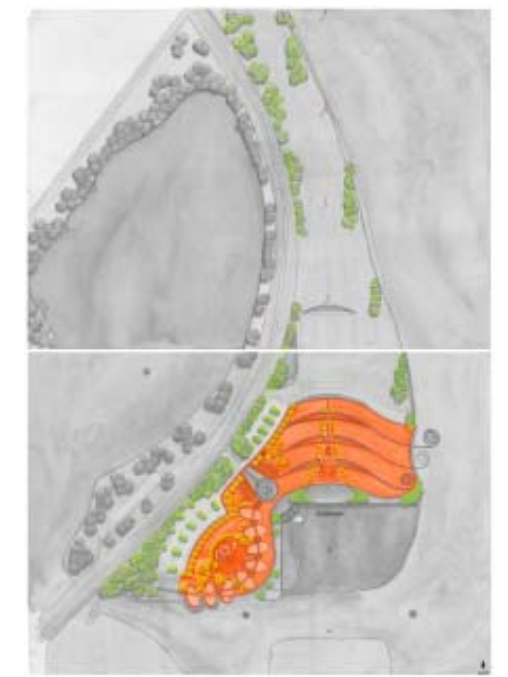
second to last plan



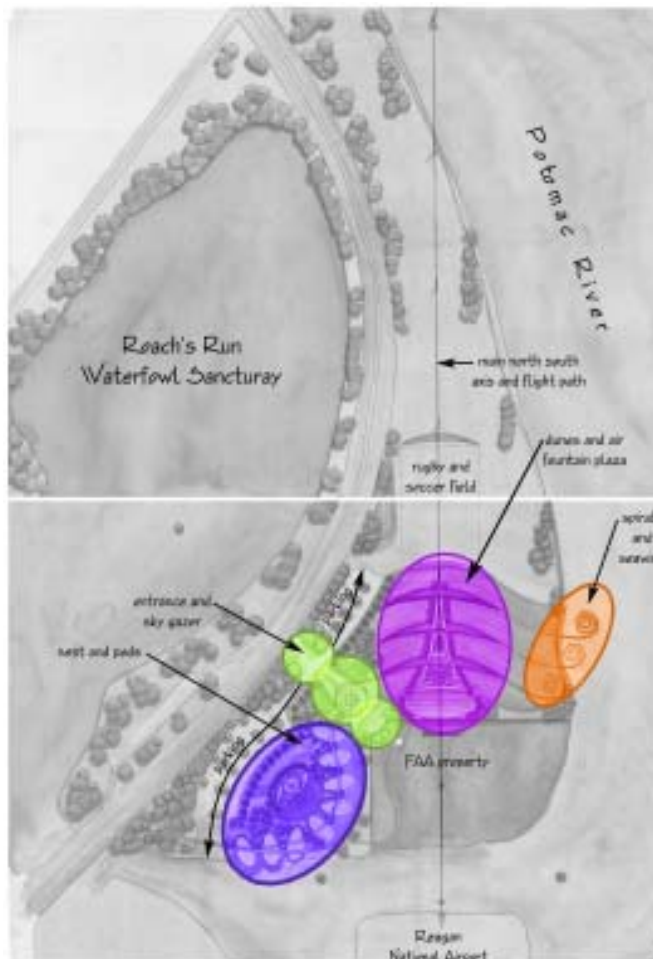
wind elements and pathways



hardscape



trees and heavily vegetated areas

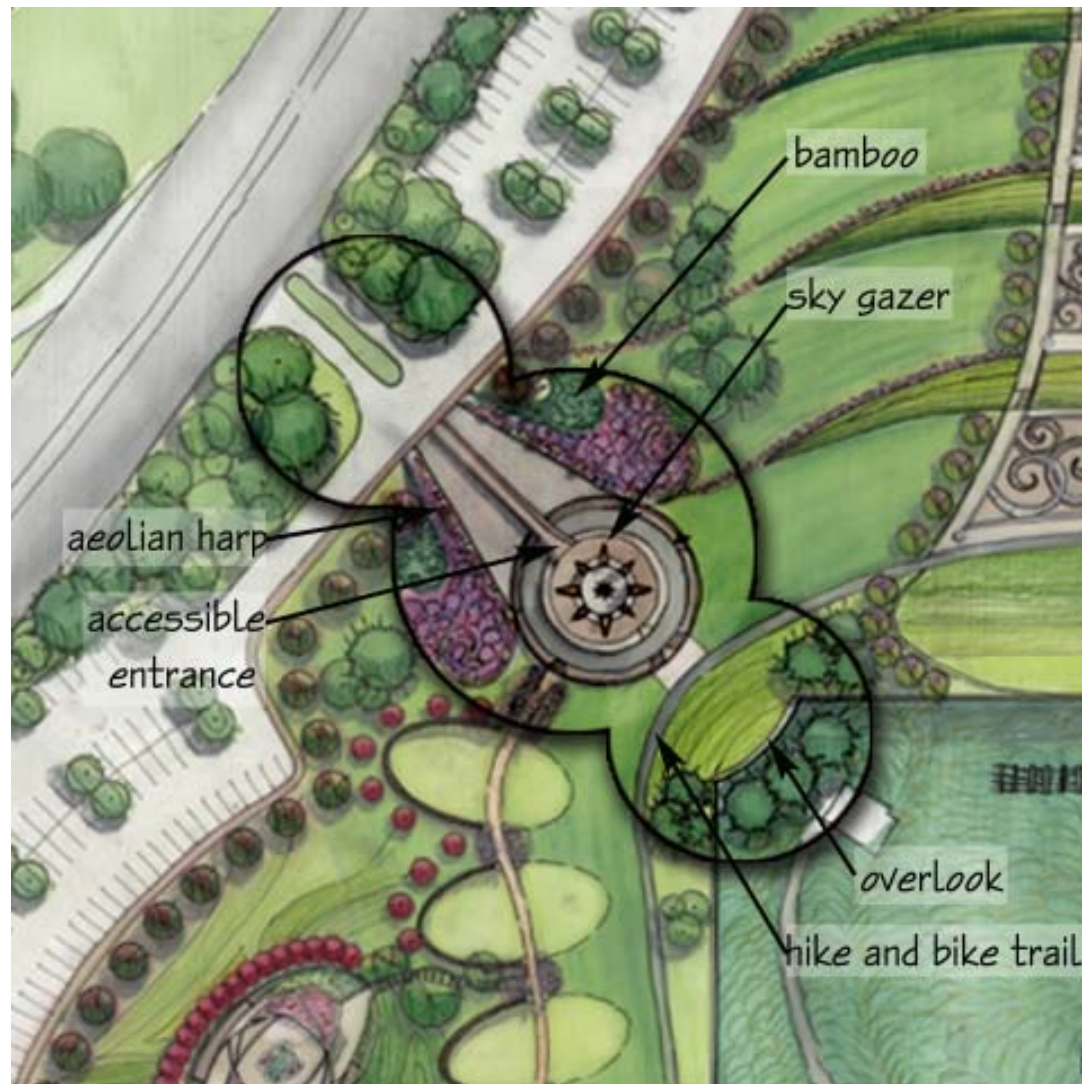


site analysis

The driving forces in the design are the wind and how by engaging the senses into the design one can begin to better understand the natural world around them. Because of the unique location near the airport, the airplanes are a significant design component for revealing the wind. Since society's use of technology has made us dependent upon it and we have been separated from the natural processes, I want to reintegrate the technology (the airplanes) into the landscape in order to further our recognition of the natural phenomenon in and around our world. I use the presence of the planes to create and highlight the sensory experience, making that one moment when they fly over, a climatic experience, that later when everything returns to normal, one will better recognize and appreciate the wind in its natural state. The pipes will blow naturally as the wind glides over the circular opening top, creating notes that join the other notes of the musical garden, but when the planes fly over, the song changes for a few seconds, and then returns to its improvised melody.

The entrance is designed to orient the visitors to the site's wind through strong visual clues. The area of the nest and pods is a musical garden full of never ending melodies. The dunes and spiral areas focus on being able to feel the wind since this space is fully exposed to the wind. The vegetation throughout the site creates an olfactory experience as the different fragrances dance and flutter in the wind.

final masterplan



the entrance

The entrance to the site is oriented towards the northwest. This orientation was chosen because it allows for easy access from the George Washington Parkway and sets up a strong axis extending from the Potomac River to Roach's Run Waterfowl Sanctuary. A windsock would be placed at the entrance to show people on the George Washington Parkway the direction the wind is blowing as well as a symbol for the wind park.

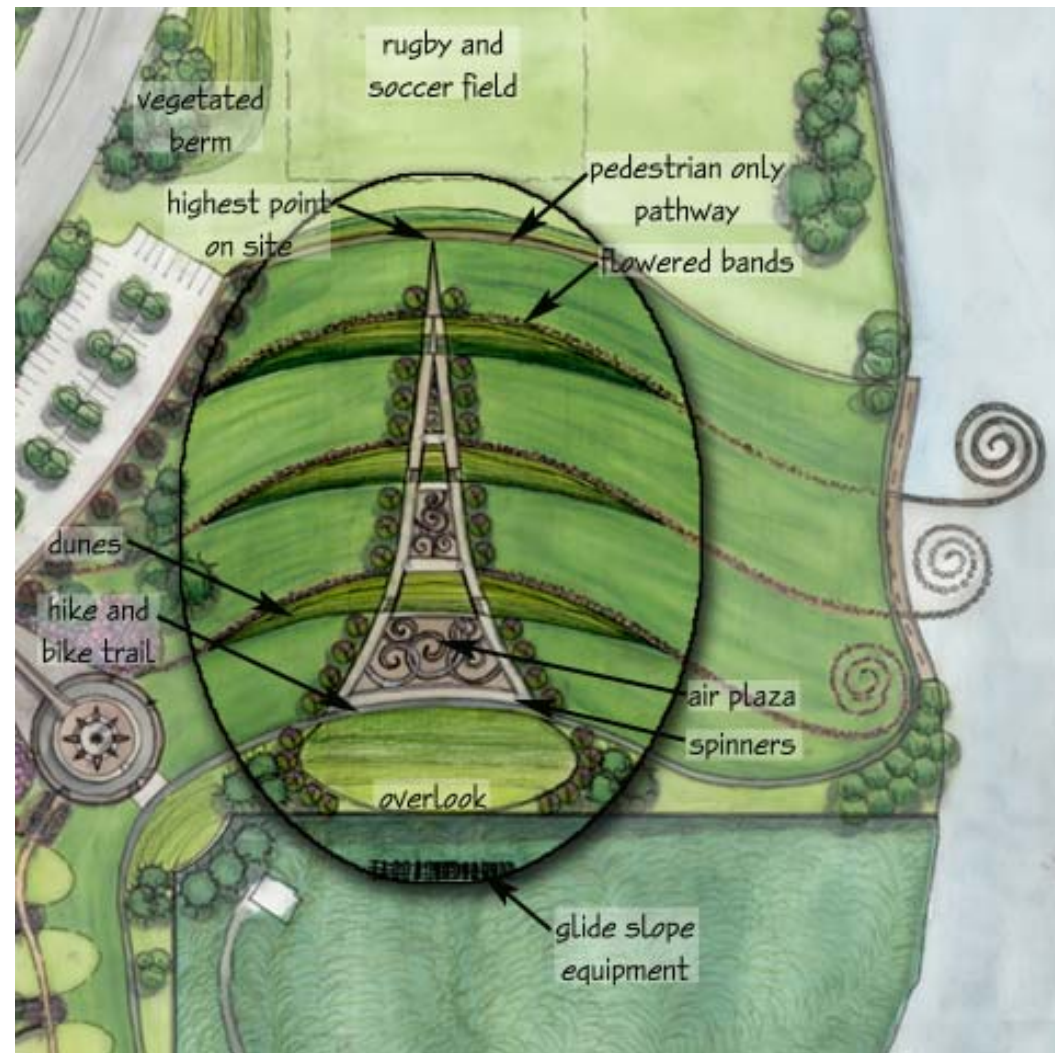
Once into the site, the main sidewalk leading up to the entrance is lined with weeping Higan cherry trees because of their swaying motion and the cherry blossoms as they fall to the ground will create pink swaths of air movement. There is bamboo lining the entrance as are aeolian harps that entice the ears of those entering. These elements frame the views of the sky gazer, where people can sit inside and observe the sky. Through these elements one will begin to notice the wind, its characteristics and the direction that it is blowing.



the nest and the pods

The nest is a place of refuge from the cold winter winds and will also be a shady cool space during the summertime. There are crapemyrtles surrounding the space in order to cast a wind shadow over it when the northwest wind blows. There is a vegetative berm also on the northwestern side that will cause the wind to move in an upwards direction as it approaches the nest. The nest has vegetative swaths that spiral inwards towards the center as the walkways terrace downwards.

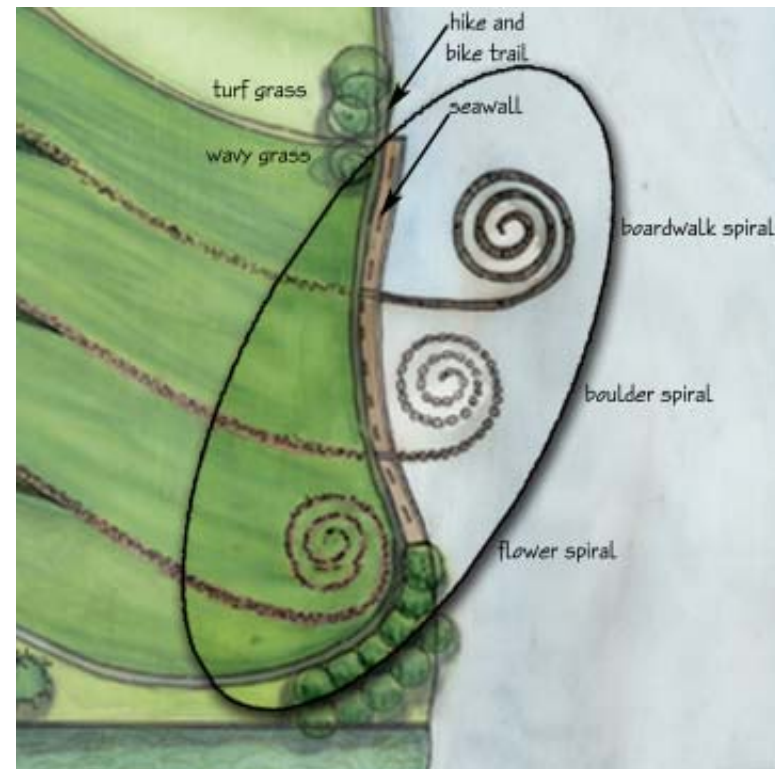
The pods are designed to give many private spaces for people to sit and relax. The experience is designed to move one from the entrance down towards the water and boat ramp and vice versa. Parabolic walls and a tall grassy edge serve as the borders for these turf grass pods. Lavender and mint line the pedestrian pathway creating pleasant scents as one passes through this space. Musical pipes play notes and melodies with the use of wind, creating a musical garden.



dunes and air plaza

This space was created with the summer wind in mind, although it will be used throughout the entire year. The airplanes are the main factor that drove design decisions. Dunes were incorporated into this area, creating an amphitheatre feel and a space for people to watch the planes land and take off. The centerline of the dunes aligns with the flight path, creating a symmetrical space. The dunes have short grass on their slopes and the space between them has wavy mid-height grass that blows in the wind, like a wheat field, however, people can still walk through it. On the backside of the dunes vegetative swaths will have scented flower bands that connect the dunes to the main entrance sidewalk as well as the Potomac River.

Moving up through the middle of the dunes is the wind diversion, creating a series of air plazas. Each one is of a different scale because the diversion forces them to be. There are two spinners at the front of each plaza that will generate energy, helping power each air plaza.



spirals

The spirals were included in the design to demonstrate how the wind moves differently on land and water. The first spiral is all on land and continues the fragrant flower band from the dune. This also creates the curve for which the hike and bike trail turns around as it finally sees the DC skyline. The second spiral is made of flat-topped boulders placed on a concrete bed so that they do not move once placed in the water. One can venture out on them and have the unique feeling of being in the water or almost walking on it. The third spiral is a boardwalk out into the Potomac and has booth bay bells in the center of the boardwalk. The booth bay bells will ring according to the direction the tide is moving.

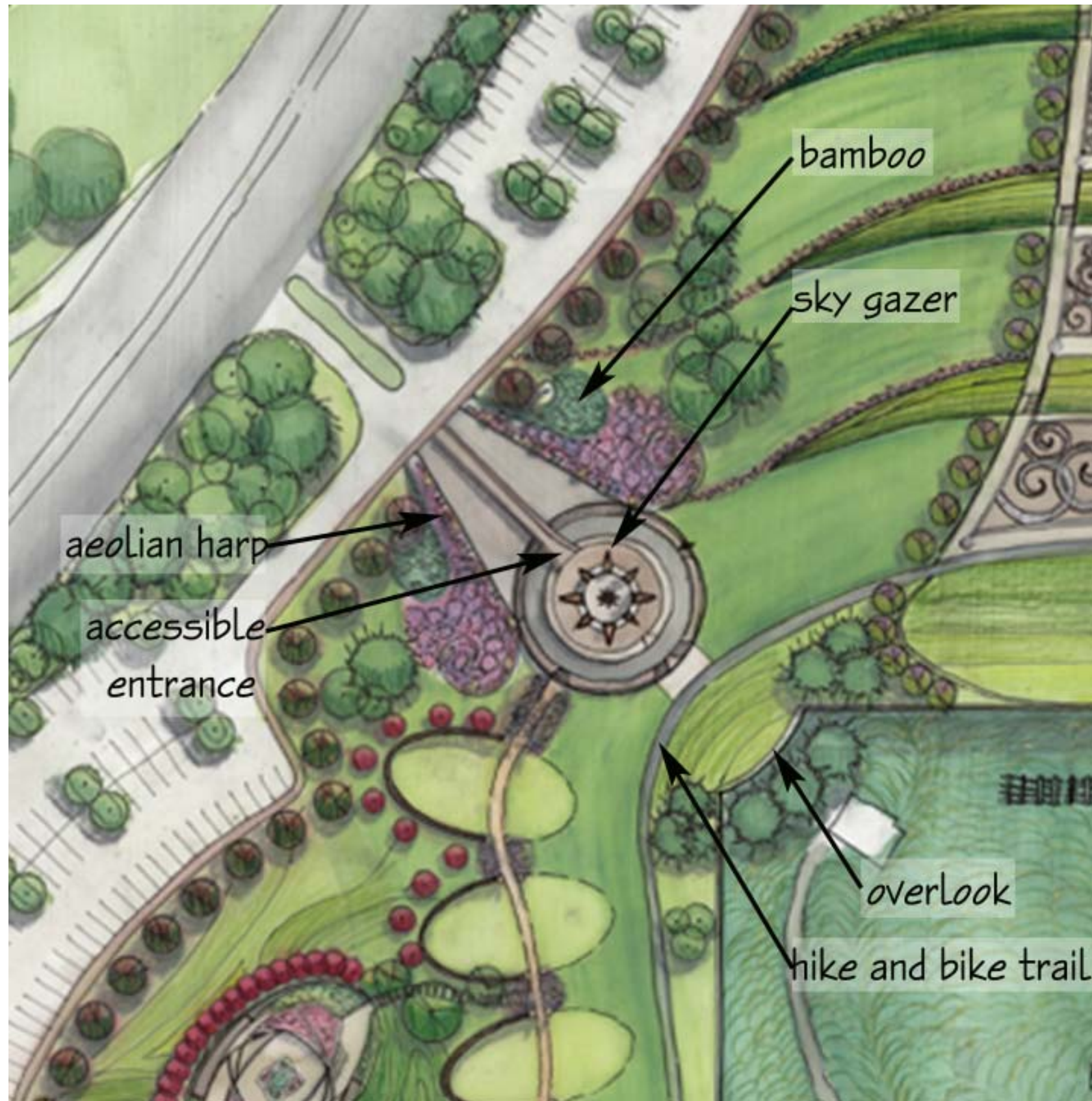
Along the hike and bike path and between the spirals is a seawall. This seawall will be a place for people to sit, being right up on the river's edge and viewing the DC lights at nighttime.



flight path

The main north-south axis for the site is determined by the flight path. As the planes come in for landing, when the wind is blowing from the south, they fly right overhead. On the northern edge of the site, there will be a series of four windsocks that increase in height, reflective of the runway protection zone (RPZ) established by FAA. There will be a rugby and soccer field centered along the flight path and two dunes facing it, serving as seating. There is also a series of three dunes and three air plazas. At the tip of the air plazas, the end of the wind diversion rises up significantly, being the highest point on the site and a great lookout spot. At the southern end of the site, where the site meets the FAA property, a ten foot wall is constructed to deter anyone from negligent behavior as well as draw one's view upwards towards the planes.





section through entrance

Elements of entrance:

- Sky gazer
- Aeolian harps
- Windsock
- Water fountains anchoring axis
- Accessible entrance



northwest section through the main entrance and sky gazer

The long northwest section shows how the water features anchor the axis and provide a strong geometry to the site. From the sky gazer plaza one can look over the FAA land as well as off towards the wake turbulence activated water fountain. The treatment of the FAA boundary is with a ten foot wall that points the visitor upwards towards the sky and looking at the airplanes.



northwest blown-up section through main entrance and sky gazer



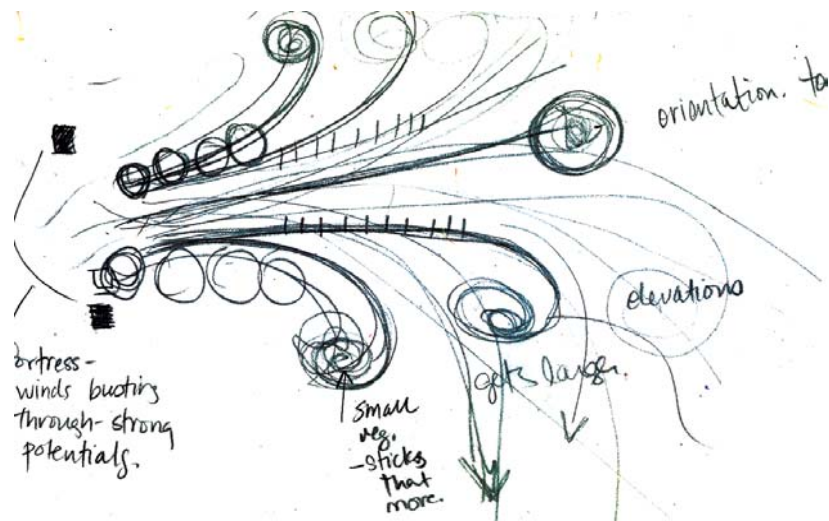
hike and bike trail view of sky gazer

The vegetation around the entrance helps to frame the sky gazer. The sky gazer is the main feature to orient the visitors to the site and wind direction.

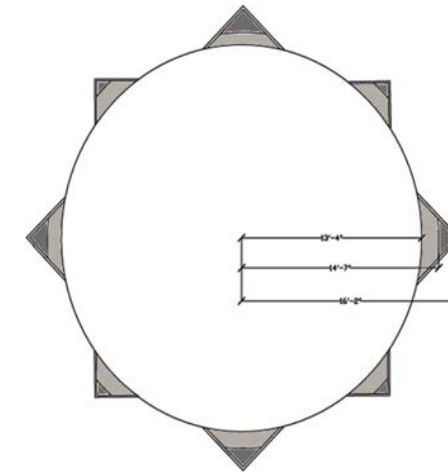
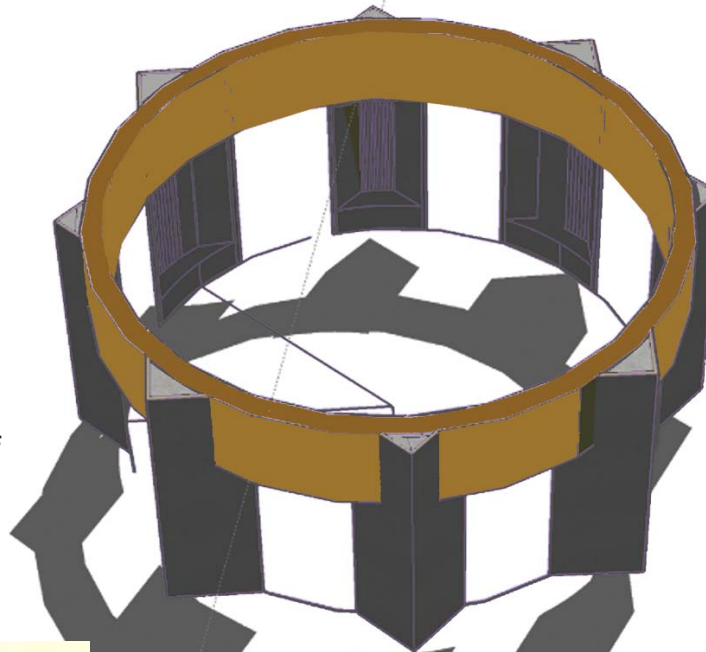


entrance view of sky gazer

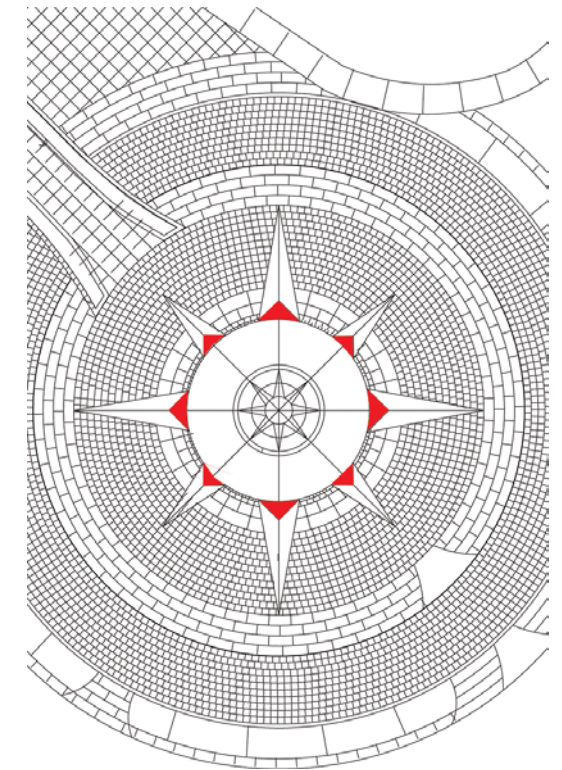
the sky gazer



Upon entering Gravelly Point, the vegetation frames the view of the sky gazer. Intending to heighten one's awareness of the wind's direction, the sky gazer allows one to gaze up at the sky, stars or moon, looking upwards through the gazer and observing the sky's movements. The paving patterns within the sky gazer plaza orients one within the site and also reveals the site's relationship with the airplanes.



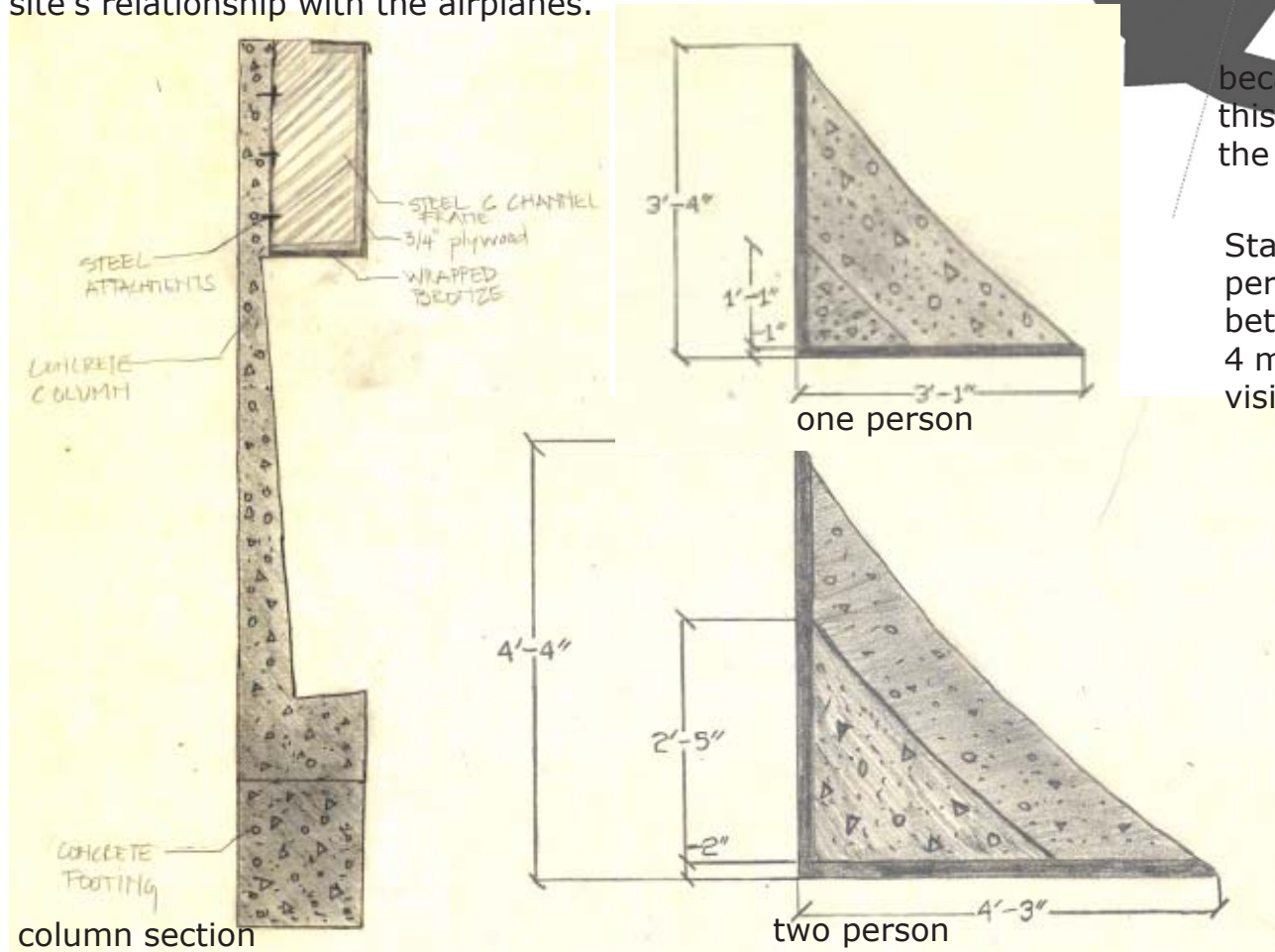
dimensions of sky gazer



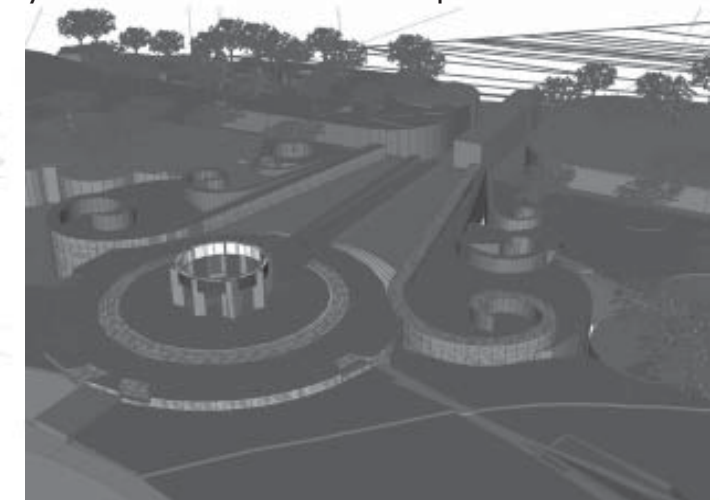
paving plan and single and double person columns

When considering the material for the sky gazer I kept in mind the summer heat. I chose concrete because of its coolness and strength. I also wanted a strong dark rim to frame the sky and I achieved this through the usage of bronze which has a nice texture that will accent the shadows and shimmers of the sun.

When considering the design for the columns I wanted to have a place where people could linger. Standing up on a slanted wall would suffice for viewing, but in order to contemplate the sky for longer periods of time or to actually see the stars, moon or clouds move, allowing one to sit down would ensure better success. The columns are designed for one and two people. The one person columns are on the 4 minor cardinal directions. The two person columns are one of the four major cardinal directions. The visitors can choose to sit within the column where they can feel the wind or be protected from it.



view of sky gazer and plaza



bird's eye view of entrance and sky gazer



clouds



sunrise/sunset



eclipse



stars



moon

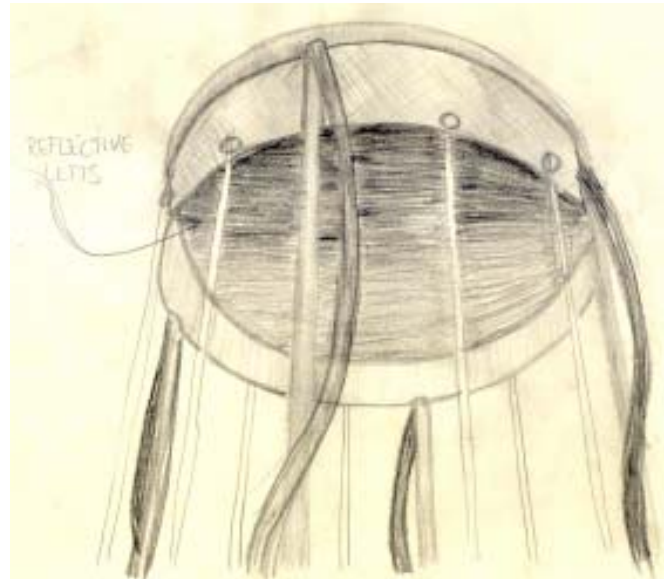


night lighting

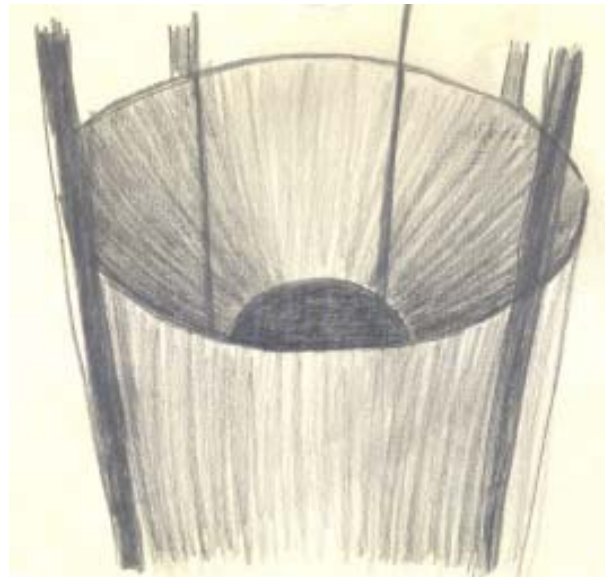
The idea of the sky gazer originated from the idea of being able to see the clouds move. It was originally called the cloud tower, but because there might not always be clouds visible in the frame of the tower, I realized that it could be used for a variety of other experiences.



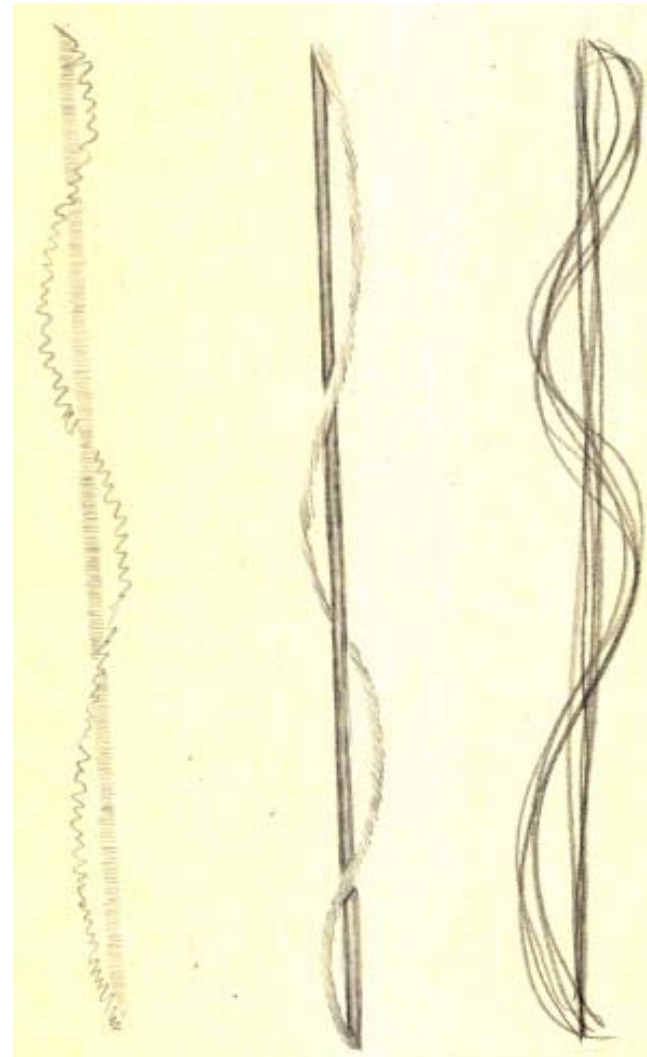
perspective of harp



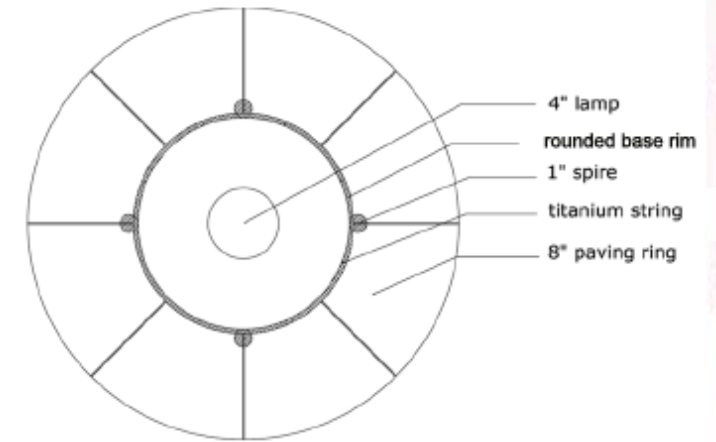
The aeolian harp will be designed so that the top portion has a reflective lens. This reflective lens is parallel to the ground and the light projected upwards from the base of the harp will serve to light the entrance pathway as well as highlight the harps themselves.



The base of the harp was designed so that a thin metal megaphone will be placed on the inside of the frame. This megaphone will help the sound resonate and also serve as a space for the light to emerge from. The lamp will be placed inside the base of the harp and project its light upwards creating a glow around the harp and the space it occupies.

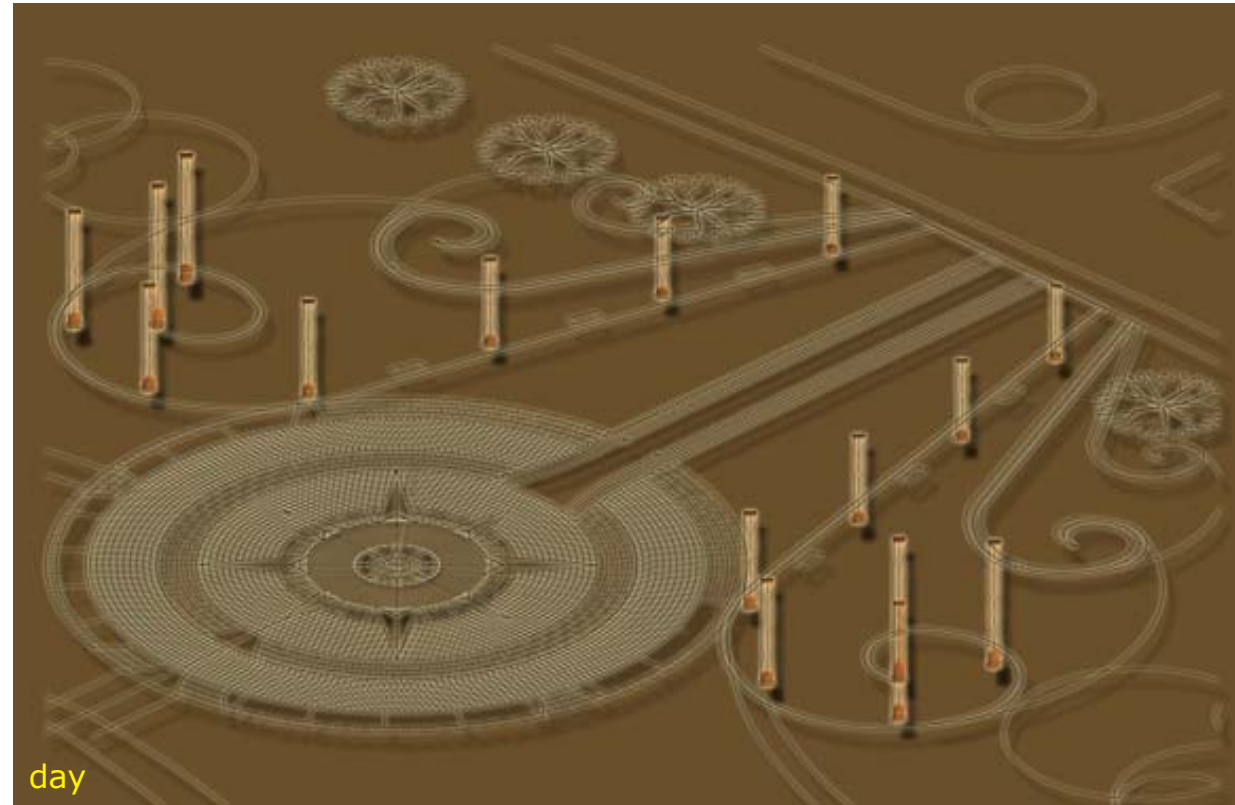


The spires that will provide the support between the the base and the top will be of two different rods. Each rod will begin and end at the top and base of the harp, and one of the rods will wrap itself around the other. The two rods will also have different textures in order to enhance the contrast between each rod. Each rod will be 1" in diameter and the heights will vary according to the note that they will be tuned to.

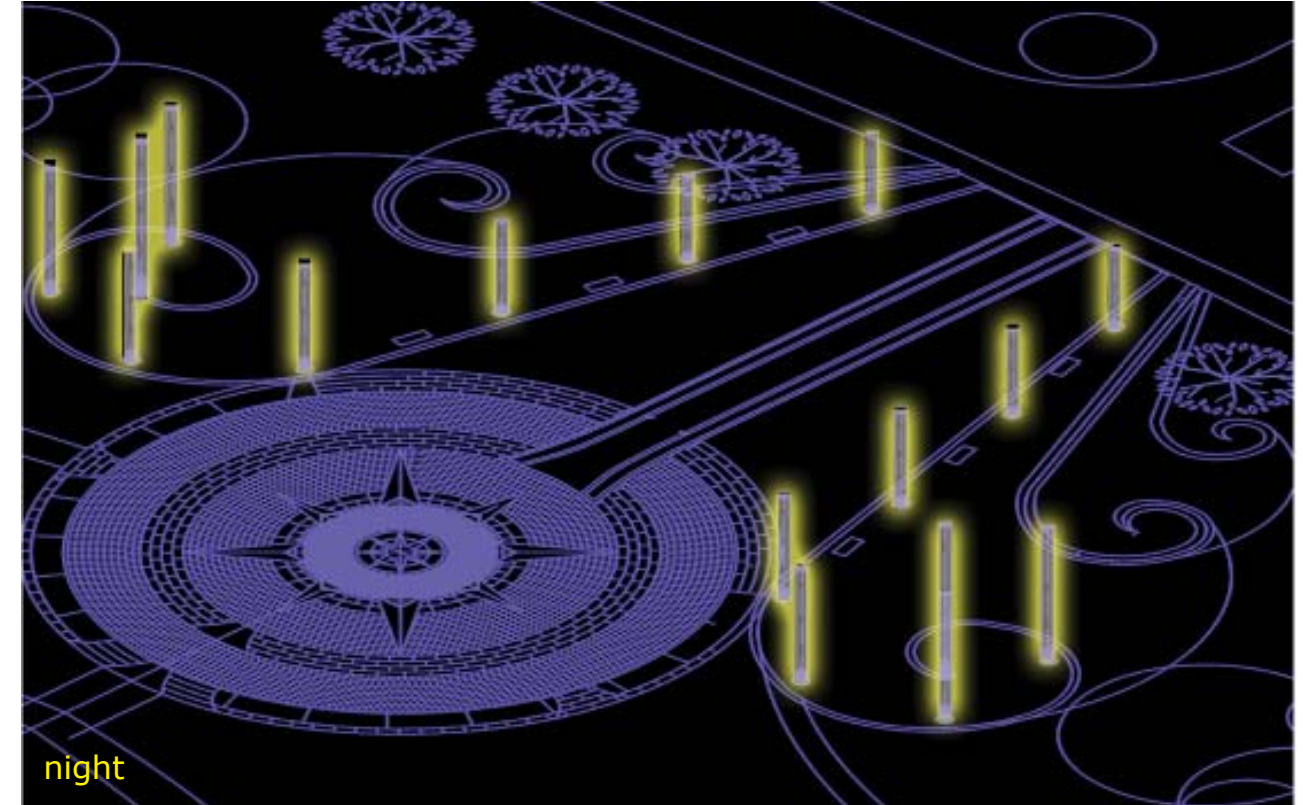


One of the unique aspects to the aeolian harp is that each string is tuned to the same note, however, each string is of a different dimension. In this harp there will be eight strings made of titanium, so that they can withstand the outside weather. The tuning pins will be located on the top and bottom of the string and help to adjust the strings to the appropriate note.





The aeolian harps will be placed along the line of the largest curl that represent the wind blowing into the site. Benches will be placed between the first three harps in order to provide spaces for lingering or meeting up. The harps will begin at 5' and gradually rise up to 10' tall. The 5' tall harp, being the *do* in the musical scale, is the first harp in the entrance. As one moves through the space the harps rise in height, framing the view of the sky gazer as well as raising the visitors eyes into the sky towards the airplanes.



Gravelly Point is a place that is also used at night. Many people visit the site to watch the planes as well as look at the DC lights and buildings. The harps will serve as glowing sticks that illuminate the entrance into the site, but will not overwhelm the space. For those using the hike and bike trail the illuminating glow sticks will also serve as a landmark along their path.



section with aeolian harps at main entrance



section with aeolian harps spiraling around vegetation



section line through nest

Elements of winter space:

- Nest: winter garden
- Pods
- Parabolic wall
- Pipes
- Hike and bike trail
- FAA overlook



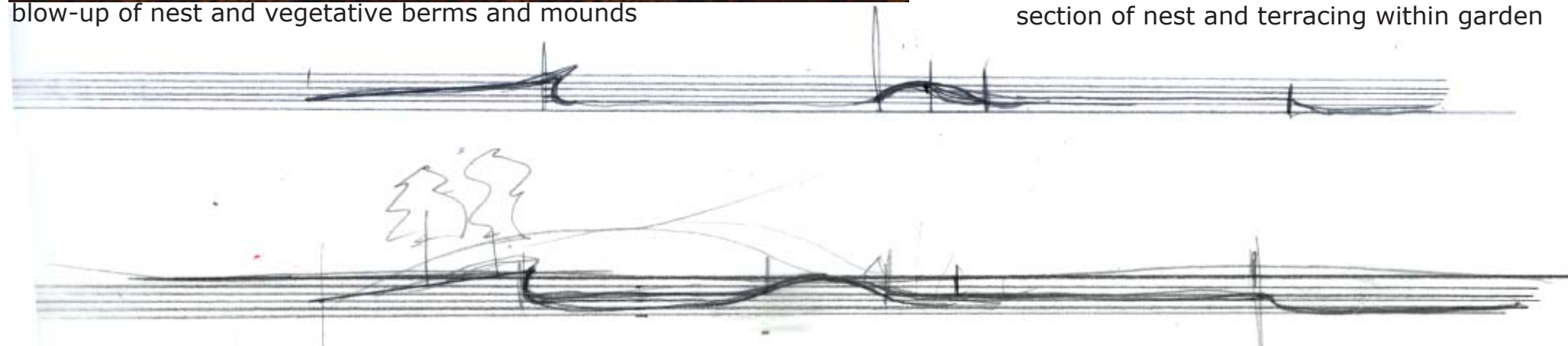
northwest section through nest



blow-up of nest and vegetative berms and mounds



section of nest and terracing within garden



initial topography design for northwest section and nest: rolling and providing spaces of refuge from cold winds

The nest was conceived as a place where one could take refuge during the colder times of the year. The trees on the surrounding edges would help cast a wind shadow over the space and provide a great opportunity for a winter garden. The nest would have vegetation that blooms in the winter and gives off pleasant fragrances.



looking down at nest and trees casting a wind shadow



side view of nest



bird's eye view of entire nest

the nest

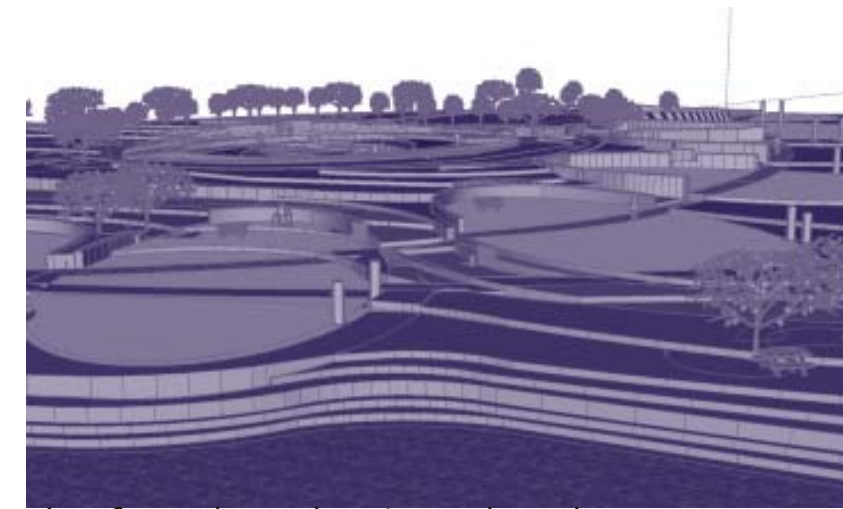
I tried to convey several aspects with this image. First, I wanted to show that this is a pleasant space to be during the colder months with the tall dark wall on the back, the space being sunken into the ground and trees providing protection. Second, this image communicates that one can be in this space even if there is a lot of wind and there will be colorful and fragrant vegetation throughout the year. The retaining wall is made of slate to generate heat in the winter months, but is in the shade and therefore cool in the summer months. Lastly, this space is located under the flightpath when the planes take off northbound, flying into the prevailing cool northwestern wind, being a great place to watch the planes take off.

The nest's form was derived from the idea of twigs providing a snug place of refuge. The vegetative swaths wrap around the space, starting up higher in elevation and moving lower through the space, resembling actual twigs in a nest.

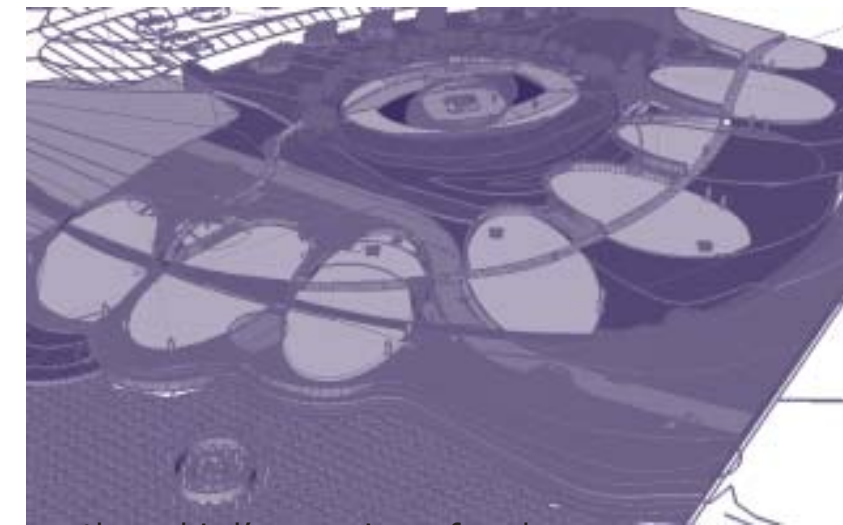


Pods. pipes. parabolic walls

The spacing for the pods was the first element to be designed. There are eight pods of the same size that spiral downwards towards the water. Each one represents a different note, covering the entire musical range: *do re mi fa so la ti do*. The pod nearest the water has the lowest note of *do* and the notes move up through the scale to the highest one represented/played in the pod closest to the sky gazer plaza. The notes for each pod, include different octaves of that note and are played by the bronze pipes that line the main pedestrian pathway between the sky gazer plaza down to the boat launch. The pathway is lined with lavender and corsican mint to enhance the sensory experience. The pods' edges are formed by tall wavy grass to one side of the pedestrian pathway and a four foot parabolic wall made of polished sandstone on the other. The individual pods create private spaces for picnics and observation of the airplanes.



view from channel up towards pods

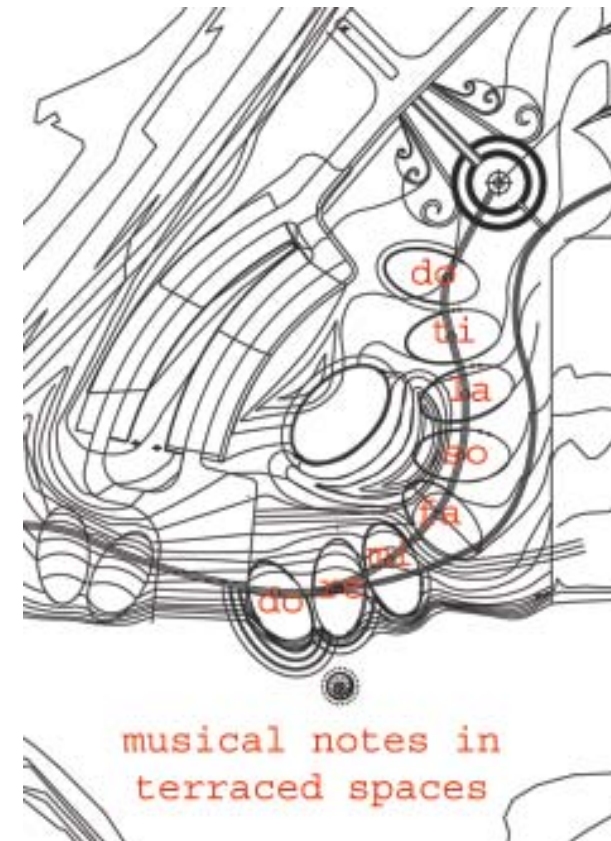
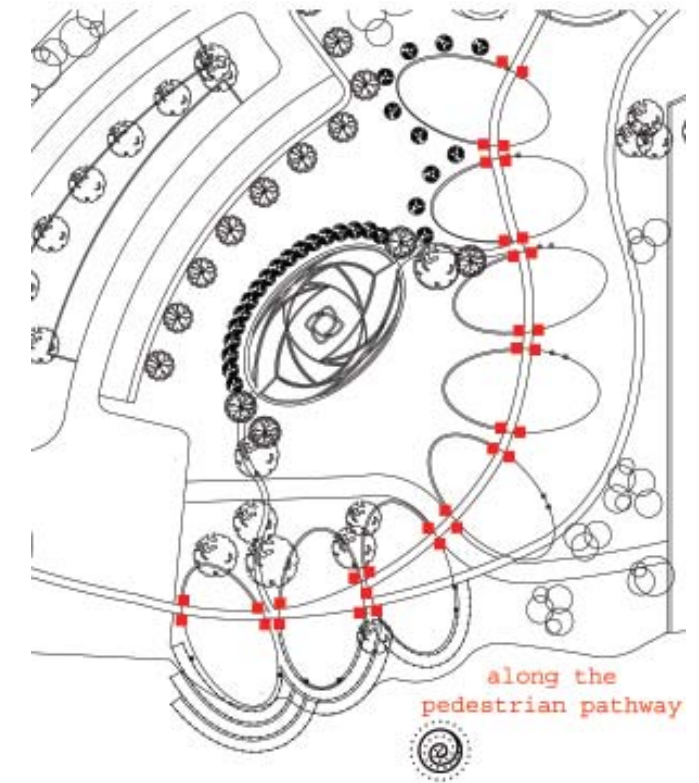
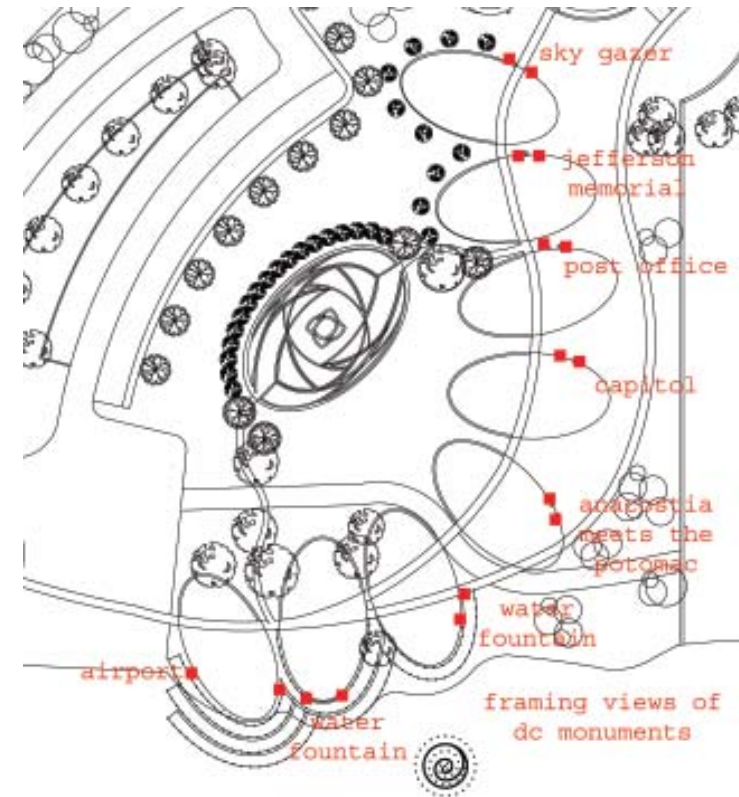
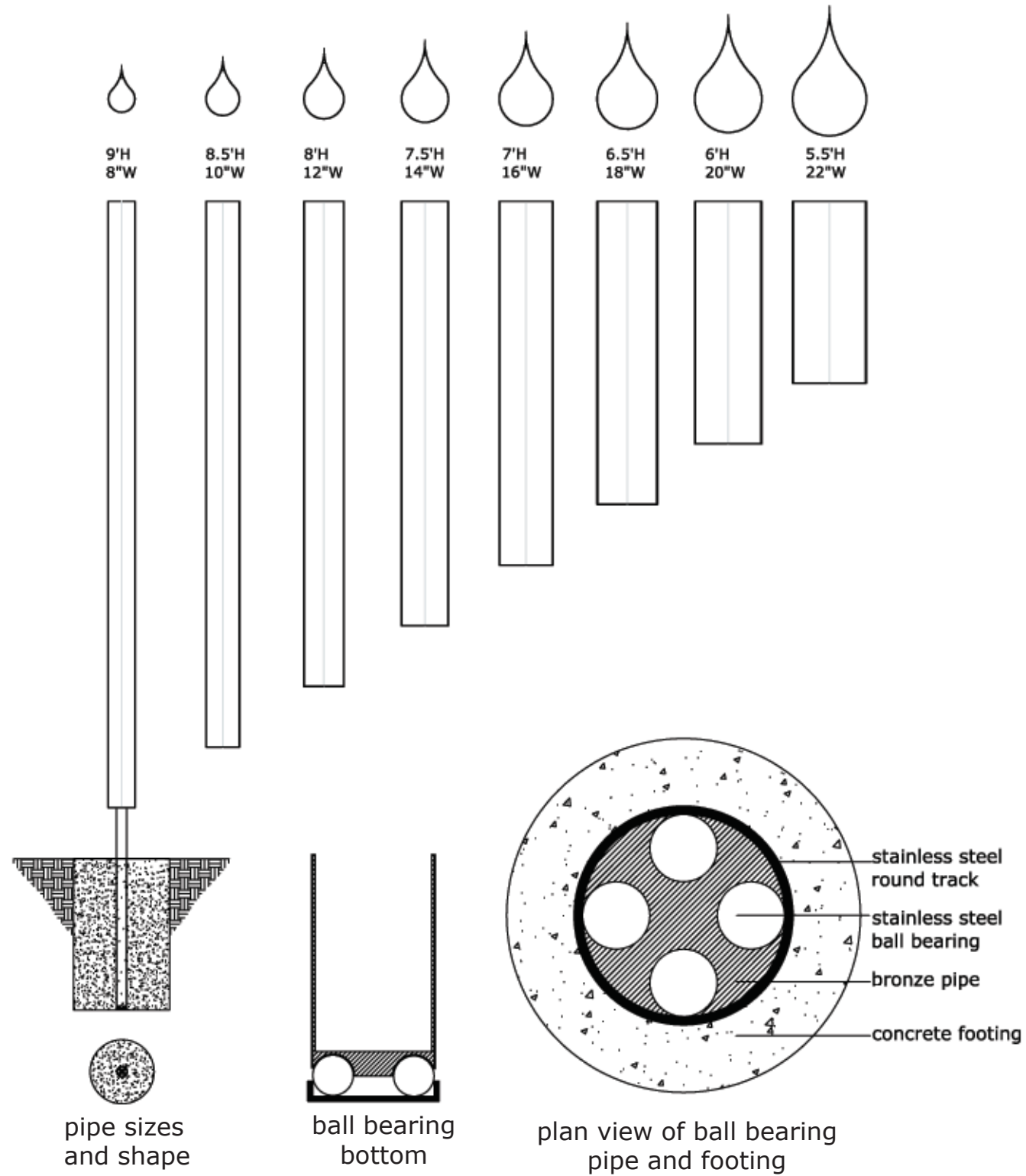


southern bird's eye view of pods



northern bird's eye view of pods

the pipes



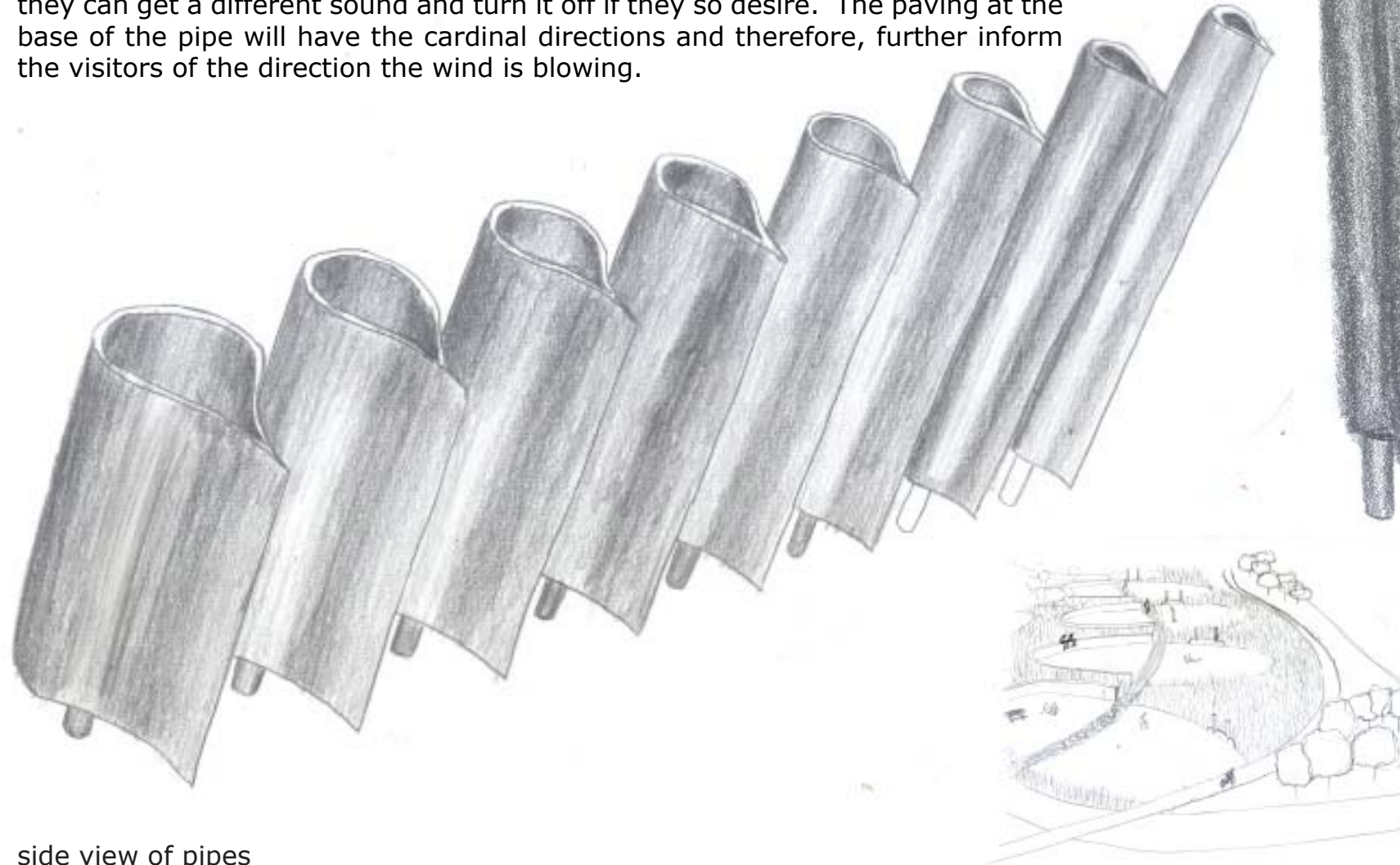
When deciding where the pipes would be placed, I originally placed them in locations where they would frame views of DC and its monuments. I chose the location and spot from the center of the pod along the pathway and from there framed the view of the designated monument. One of the important aspects to this site is that along the George Washington Parkway here is where the entire experience changes. Once you get to Gravelly Point in car and on bike, the monuments and DC's skyline is presented and the sequence of monuments is unveiled. When I began to explore the pipes in a three dimensional perspective they seemed a bit awkward by themselves when they framed the views. I also adjusted the pods to accommodate for a strong intersection with the pedestrian path and hike and bike trail, and that made it almost impossible to achieve my original goal of framing DC views. I then chose to simplify the design and place the pipes along the pathway, making the experience within the pods more cohesive and with stronger connectivity.

the pipes: form

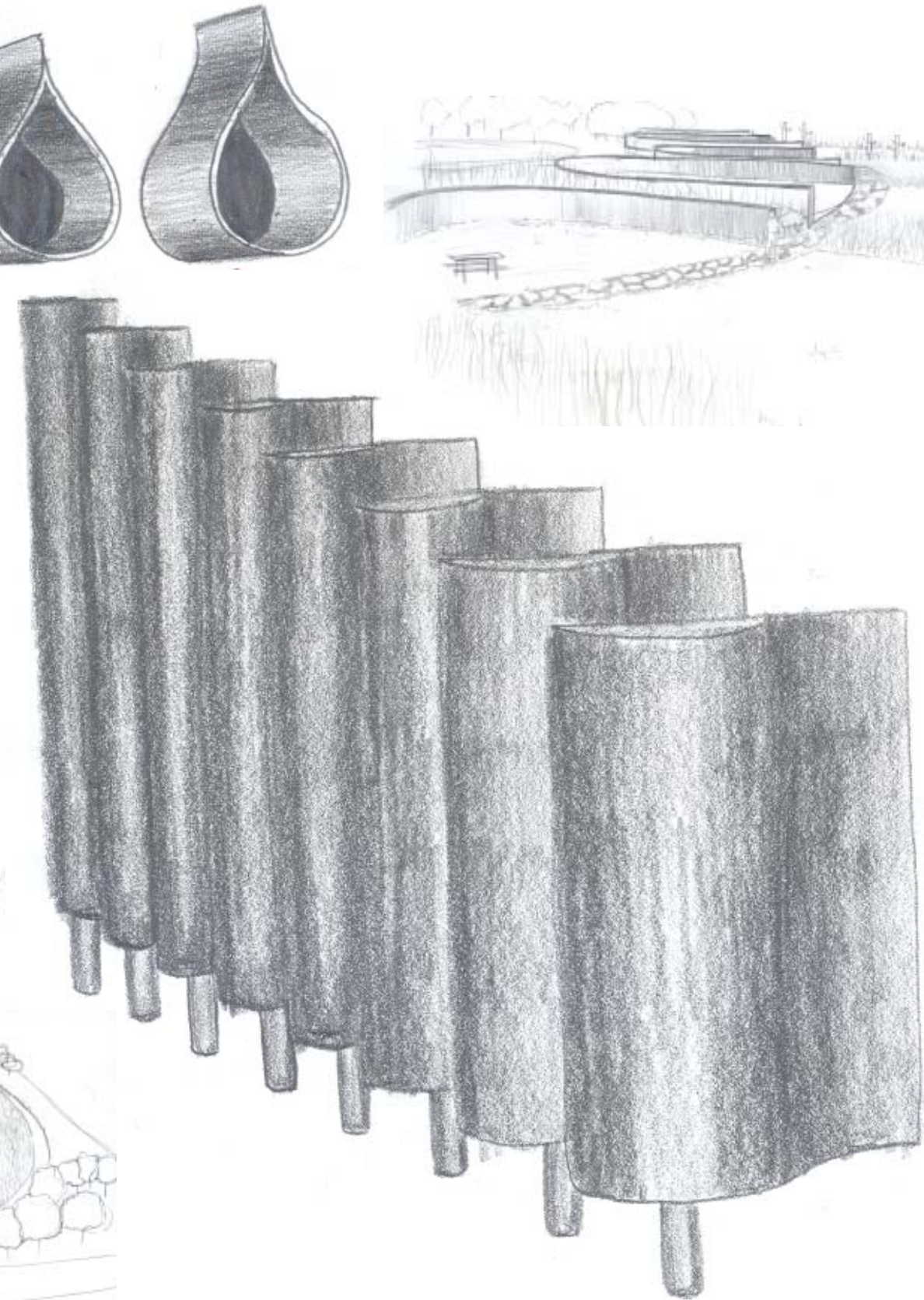


top view of pipes

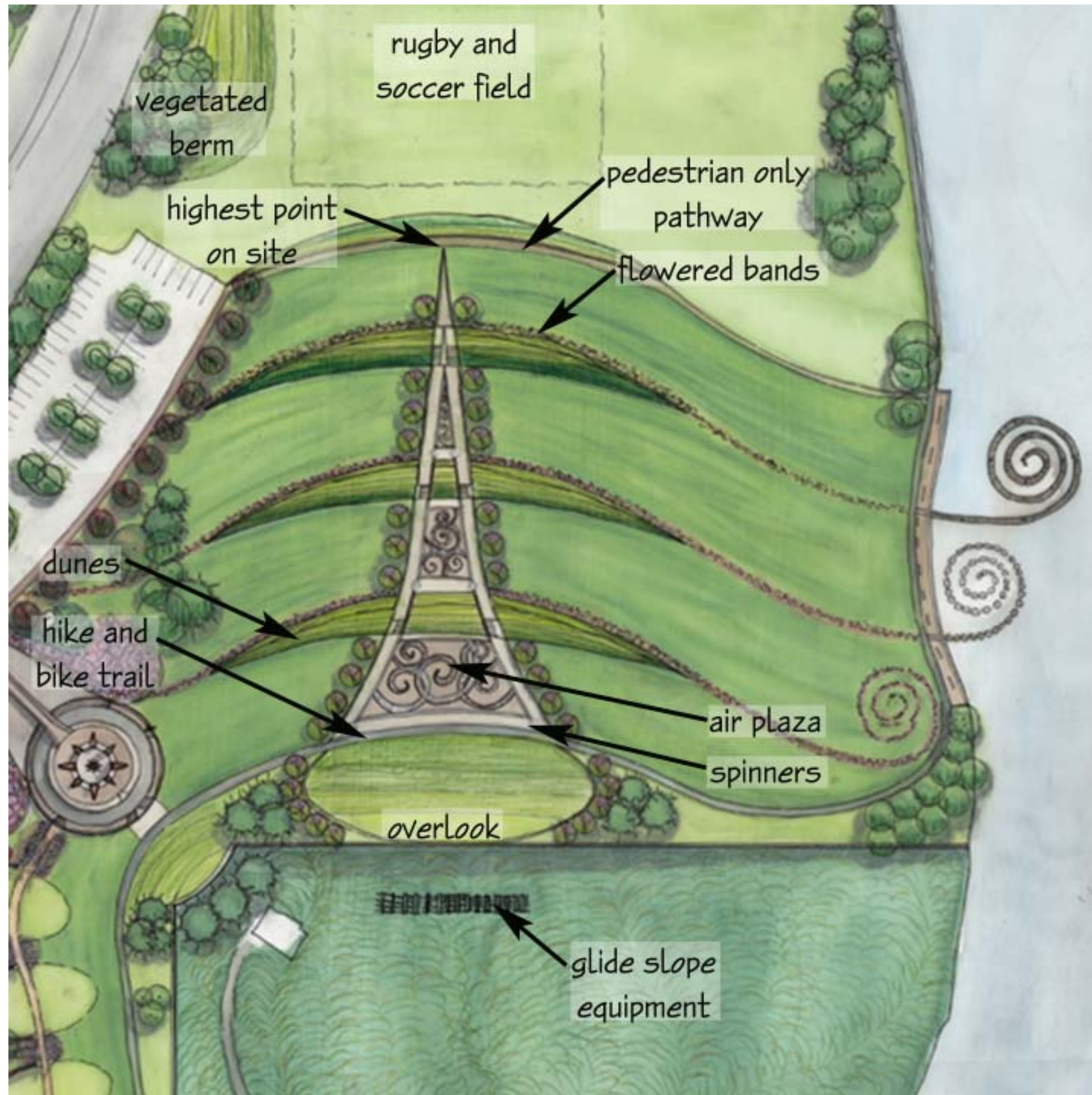
The design for the pipes came from the idea of them being able to move with the direction of the wind. The fin-like tip will move to the opposite direction of the wind. The pipe has a ball bearing base, allowing it to turn around and also allowing for the visitors to interact with the pipes. They can turn the pipe so that they can get a different sound and turn it off if they so desire. The paving at the base of the pipe will have the cardinal directions and therefore, further inform the visitors of the direction the wind is blowing.



side view of pipes



side view of pipes: shortest to tallest



Elements of summer space:

- Dunes: slopes and vegetation
- Air plaza: spinners and blowholes
- Spirals: land and water
- Hike and bike trail
- Rugby and soccer field
- Overlook: towards runways



north to south section along flight path



section of FAA wall and overlook



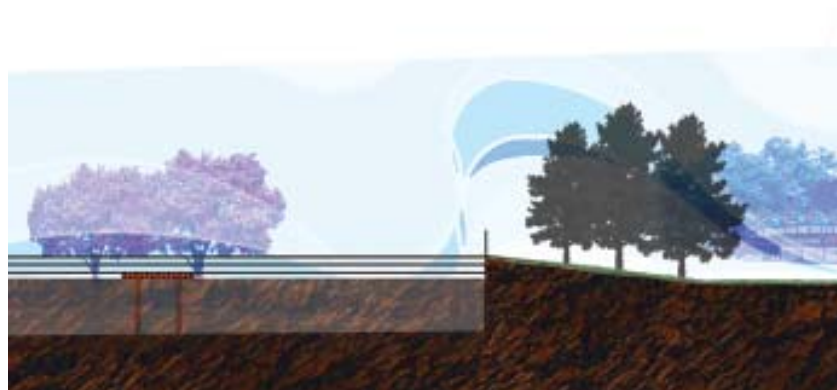
section of rugby fields and dune seating



section of windsocks on land and in Potomac



north to south blow-up section of dunes and air plaza



section of FAA wall and glide slope equipment



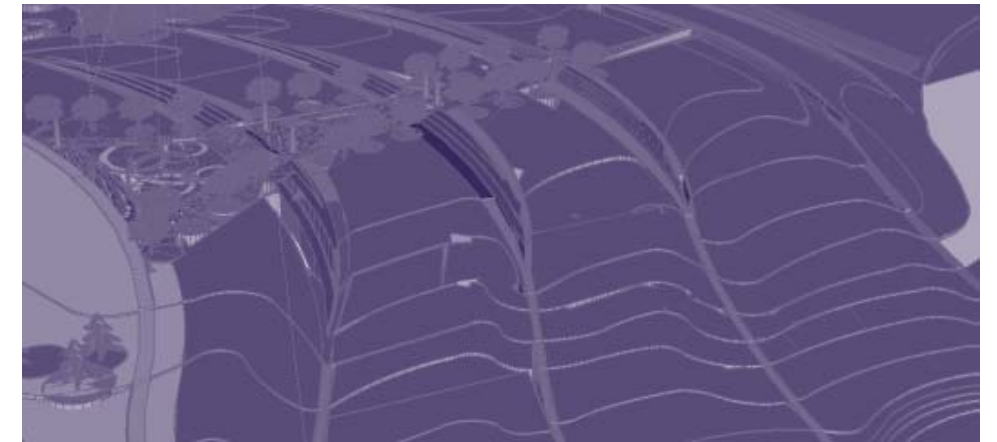
section of air plaza



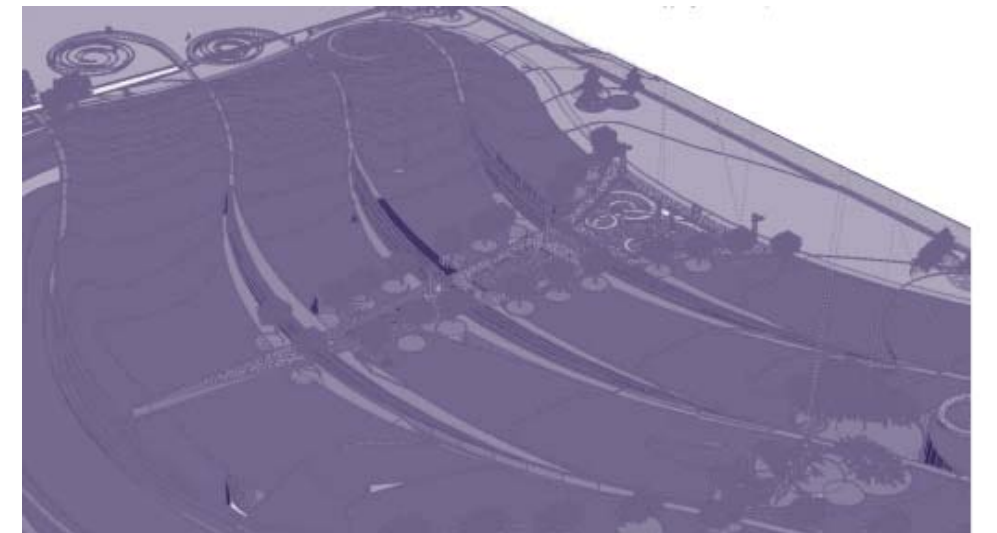
section of highest point on site: wind diversion tip



top view of air plaza and dunes



bird's eye view of dunes and air plaza: towards GW Parkway



bird's eye of dune and air plaza: towards Potomac River

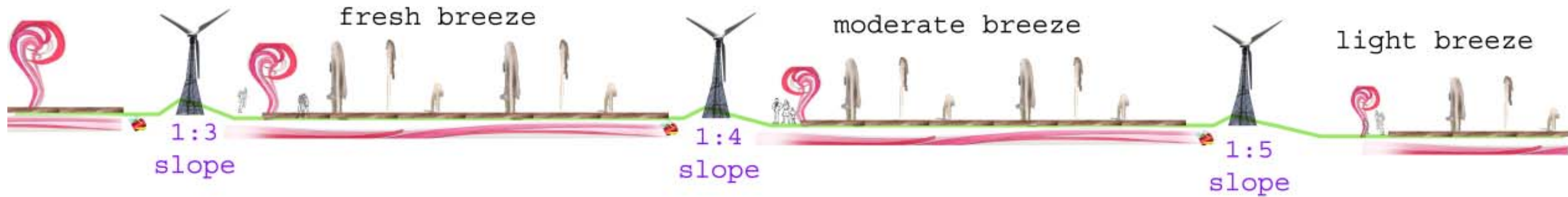
air plaza and dunes

The dunes and the air plazas are designed as a gathering space to watch the planes land and take-off and as an interactive plaza influenced by wake turbulence. The dunes have short grass so people can sit, lie on their backs or stand on the ridges and watch the planes. The dunes continue through the air plaza so that within all the hardscape there is a softscape place to sit.

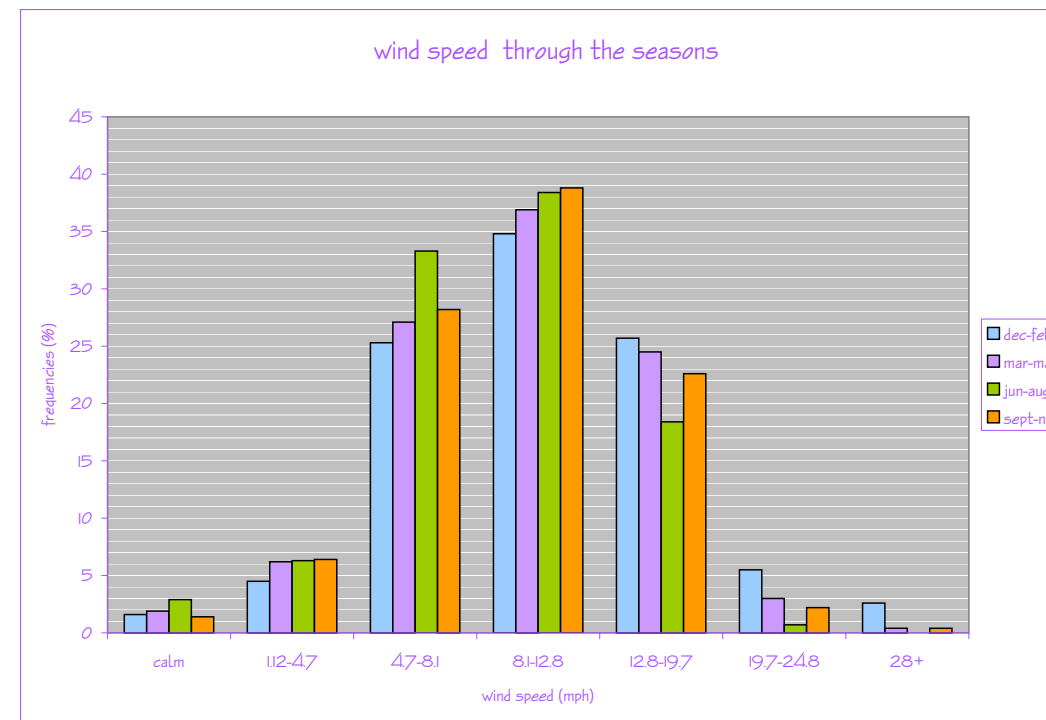
The air plaza includes the blowholes shooting up mist and cool air and a water fountain. The blowholes and fountain are in spiral shapes that are designed into the paving pattern. The spirals represent the wake turbulence that is coming off of the planes' wings. Both the blowholes and water fountains will function at a normal height and frequency, however, when the planes go over and the wake turbulence reaches the plaza, the water fountains will increase in height and the blowholes will blow stronger.

The spinners will also be activated and spin according to the speed of the wind on the site. They will generate energy to run the water fountains and the blowholes, however, in case not enough wind is present an additional back up energy supply will be needed.

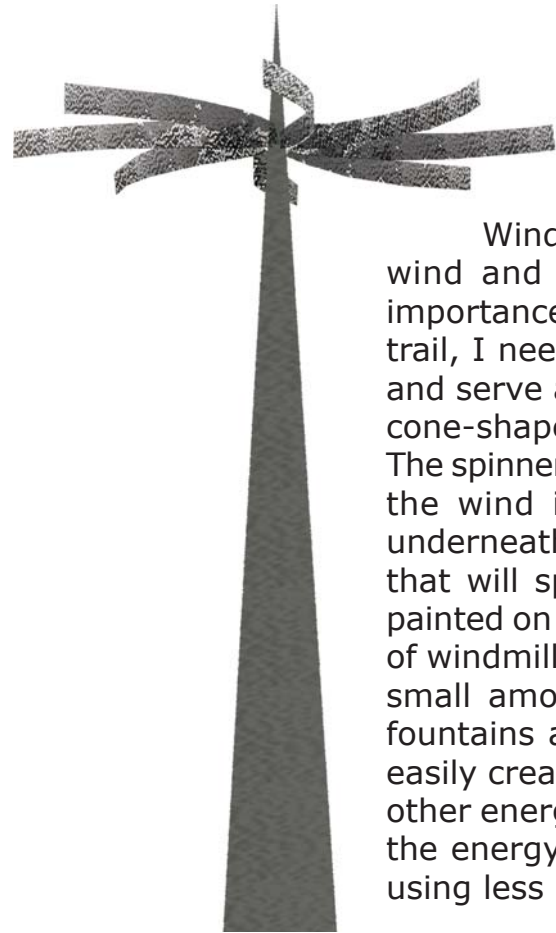
wind intensity



BEAUFORT NUMBER	MPH	FORCE	EFFECTS
0	<1	CALM	SMOKE RISES VERTICALLY, NO PERCEPTIBLE MOVEMENT
1	1-3	LIGHT AIR	SMOKE DRIFT SHOWS WIND DIRECTION; TREE LEAVES BARELY MOVE
2	4-7	LIGHT BREEZE	WIND FELT ON FACE; LEAVES RUSTLE, SMALL TWIG MOVE
3	8-12	GENTLE BREEZE	LEAVES AND SMALL TWIGS IN CONSTANT MOTION; BLOWS UP DRY LEAVES FROM GROUND
4	13-18	MODERATE BREEZE	MOVES SMALL BRANCHES; RAISES DUST AND PAPER AND DRIVES THEM ALONG
5	19-24	FRESH BREEZE	LARGE BRANCHES AND SMALL TREES IN LEAF BEGIN TO SWAY, CRESTED WAVELETS FORM ON INLAND WATER
6	25-31	STRONG BREEZE	LARGE BRANCHES IN CONTINUOUS MOTION
7	32-38	MODERATE GALE	WHOLE TREES IN MOTION; INCONVENIENCE IN WALKING
8	39-46	FRESH GALE	BREAKS TWIGS AND SMALL BRANCHES; DIFFICULT TO WALK
9	47-54	STRONG GALE	LOOSENS BRICKS ON CHIMNEYS; BLOWS ROOF SLATING OFF, LITTERS GROUND WITH BROKEN BRANCHES
10	55-63	WHOLE GALE	TREES UPROOTED; CONSIDERABLE STRUCTURAL DAMAGE
11	64-75	STORM	WIDESPREAD DAMAGE
12	>75	HURRICANE	SEVERE AND EXTENSIVE DAMAGE



Incorporating wind speeds into the air plaza was a strategy to help the visitors learn about and identify the wind categories. We often hear on the news that the wind is 15-20 mph N-NW, but not many people can walk outside and know what speed the wind is blowing. Therefore, I analyzed the average speeds on the site throughout the year and came to the conclusion that there are three main speed categories: 4.7-8.1 mph, 8.1-12.8 mph, and 12.8-19.7 mph. These three wind speeds fit into the Beaufort Numbers for Wind Force of light breeze, moderate breeze and fresh breeze, and since there were three dunes and three plaza areas, each plaza represents a different speed. The force of wind that comes out of the blowholes will be the factor that allows one to recognize the different wind speeds. The dunes also vary in slope from 1:5 on the first dune to 1:3 slope on the last dune. The treads of the stairs also increase in intensity with the wind from a four inch riser to an eight inch riser.



the spinners

Windmills are one of the most noticeable and symbolic icons of wind and of environmentally friendly practices. Because of the importance of this space and its interaction with the hike and bike trail, I needed a significant element that would be activated by wind and serve as a learning component. The final design was an inverted cone-shaped tower, 20 feet tall, with a spinner located on the top. The spinner has eight scooped blades and will spin in whichever direction the wind is blowing. The scooped blades have, painted on their underneath in order to be visible to those on the ground, a pattern that will spiral inwards as the blades turn around, similar to those painted on an airplane's engines. I explored various designs and details of windmills and spinners in which the blades would rotate easily with small amounts of wind in order to generate energy for the water fountains and blowholes. Many people do not realize that wind can easily create energy and by capturing it we can reduce the amount of other energy sources we use. Although this project is not solely using the energy captured by these spinners to run the air plaza, it is still using less energy than it would otherwise need.

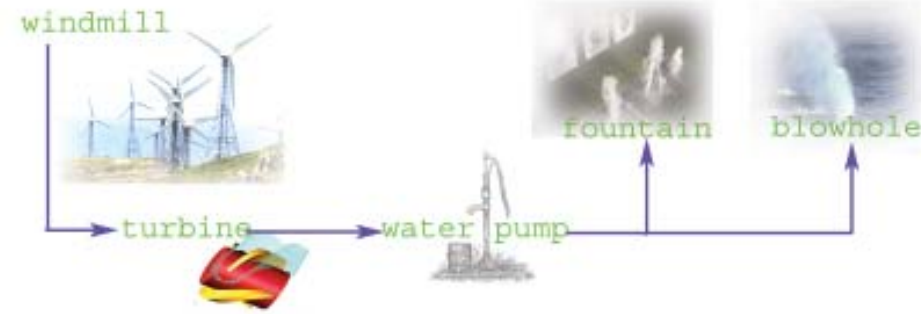
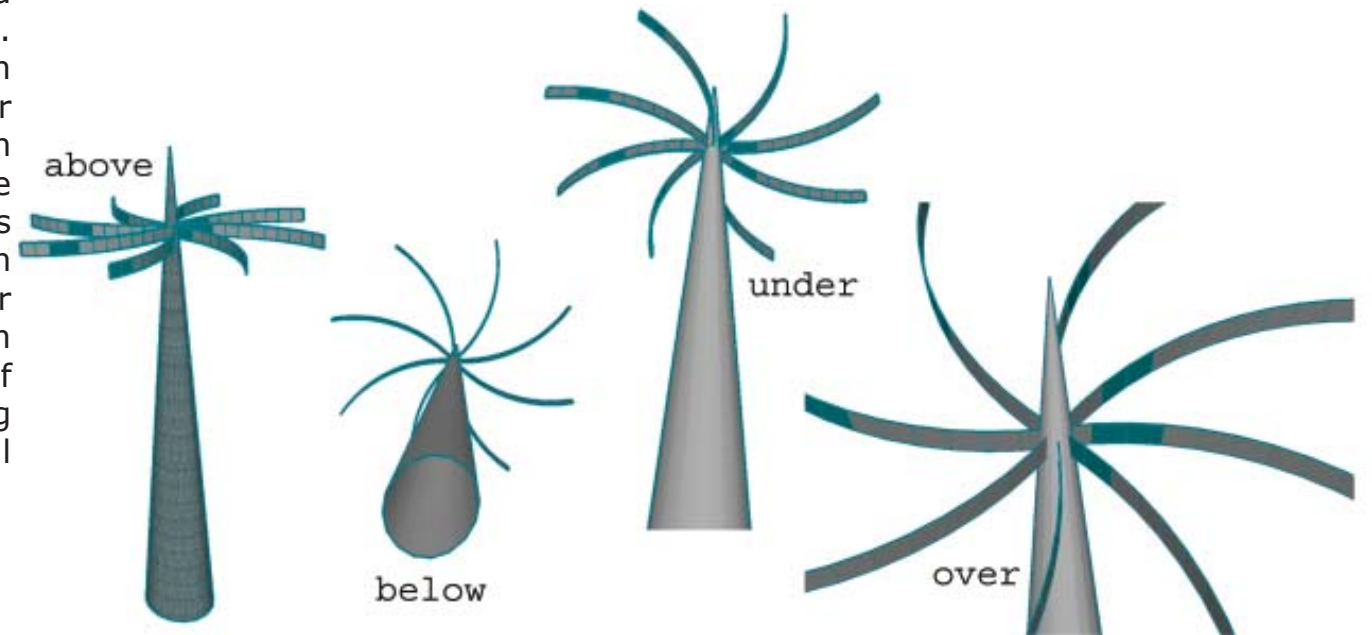
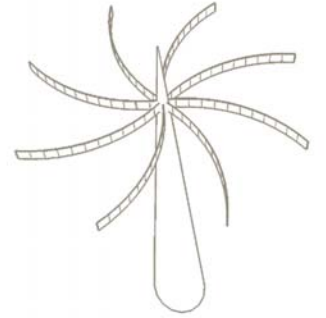


diagram of energy collection and generation



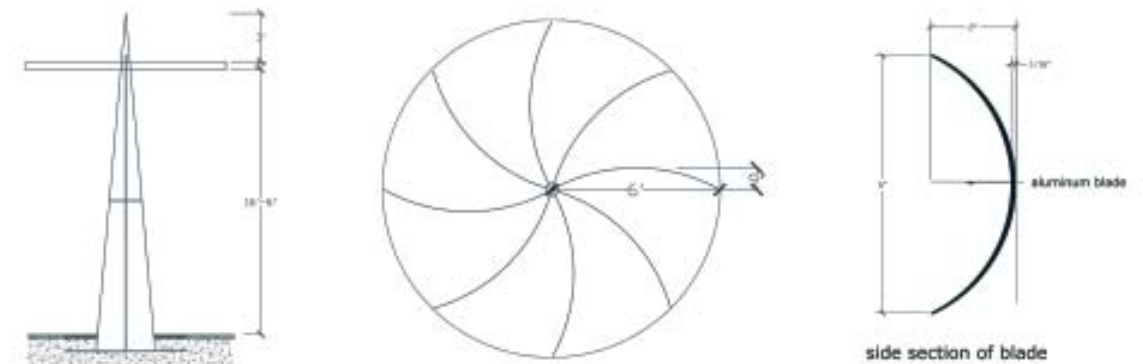
spinner models and different perspectives



sketch of how spinner's blades move and location



sketch ideas for blades and form



spinner and blade details



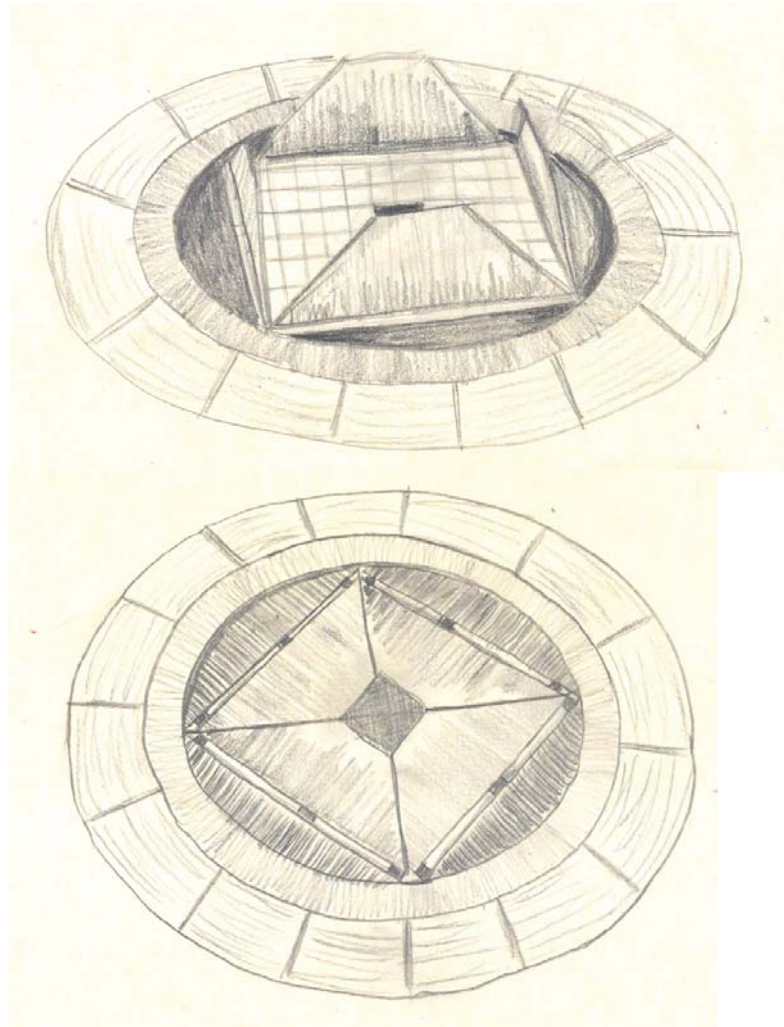
image of air plaza



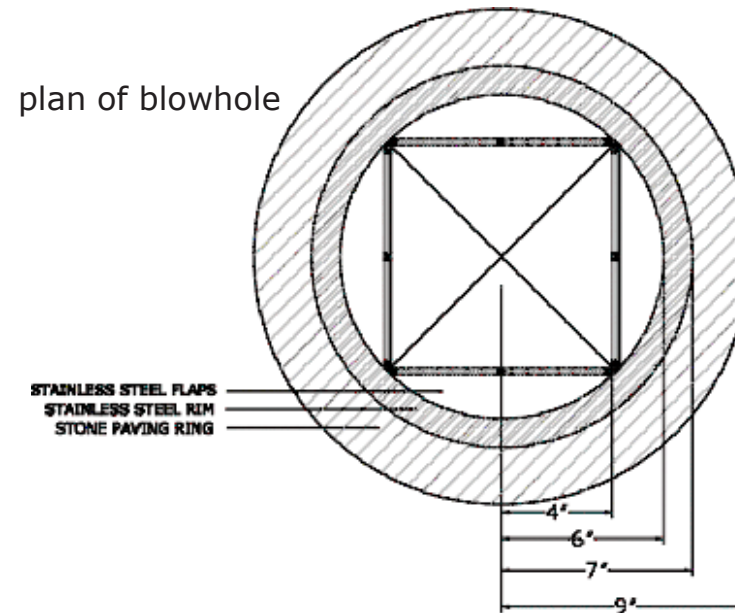
close-up of blowhole



close-up of blowhole

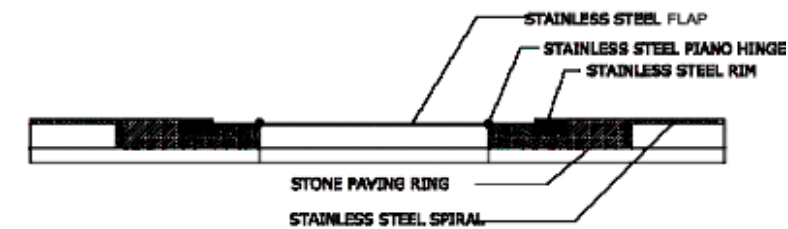


perspectives of blowhole



plan of blowhole

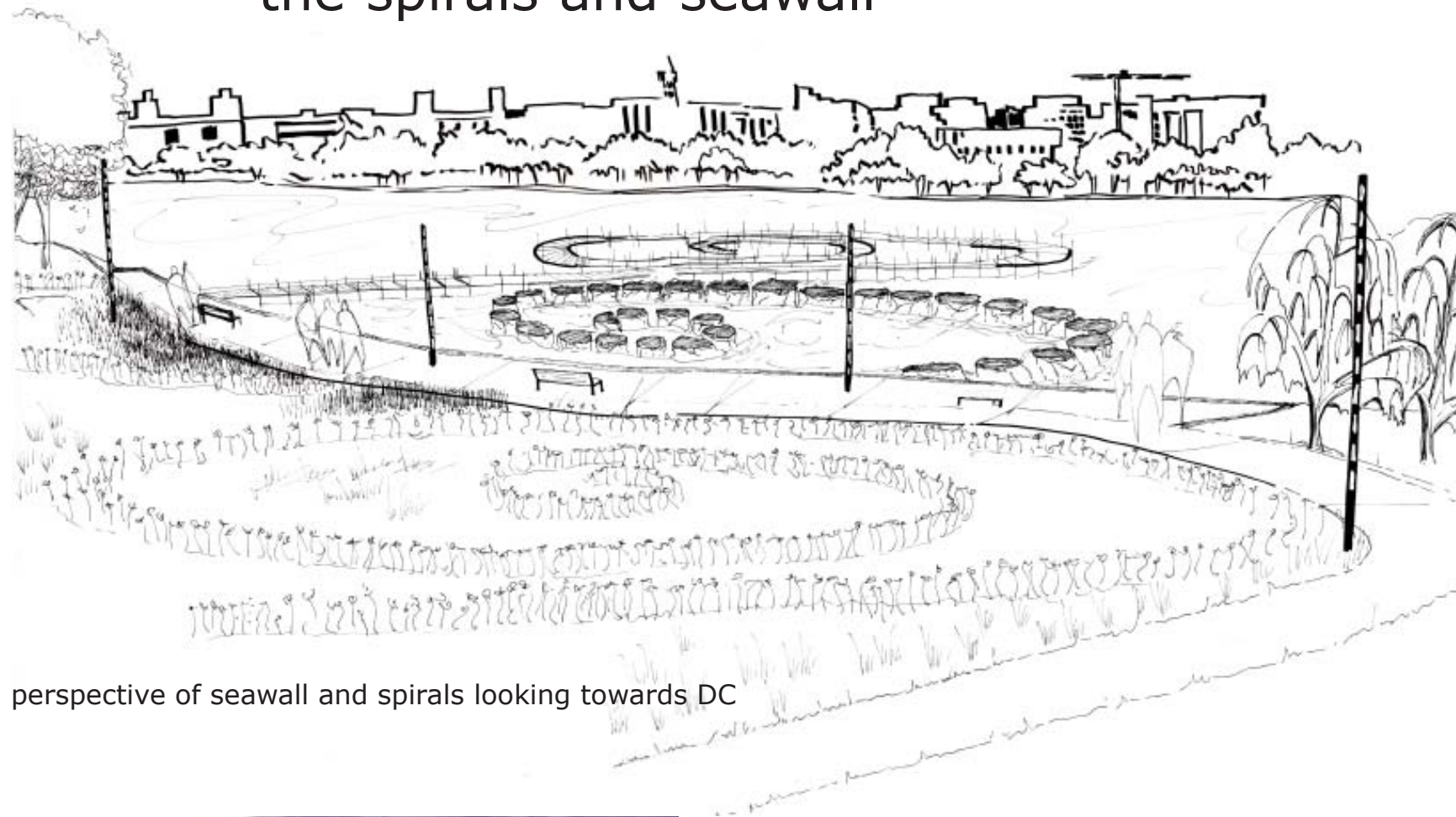
section of blowhole



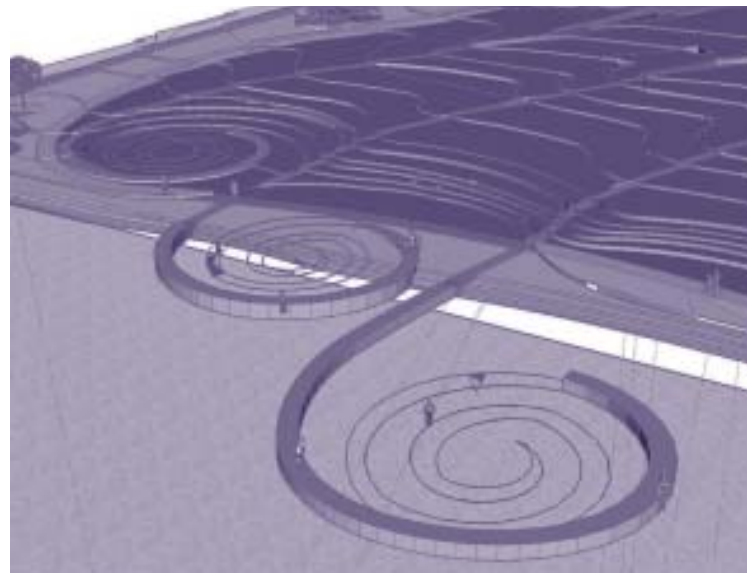
the blowholes

The blowholes were a way to allow one to cool off during the hot summer months and also to demonstrate the different speeds of wind. Initially, I was going to have them be the main feature in the plazas and also thought that all the spirals would be of blowholes. However, when rethinking how the idea of synesthesia could be further incorporated into the design, I retained the main spiral in the middle of each plaza as a water fountain. This allows people to see the effects of wind, feel them, hear and smell them as the planes fly over and the wind is captured. When considering the design for the blowholes I was not sure if I wanted the blowholes to emerge out of the ground, rising upwards a foot or so, however, when considering safety, I thought it would be better if the blowholes remained flush with the ground to reduce accidents. The final design for each blowhole came out of the idea of a heart's valves and how the valves move only in one direction, allowing something out but not in. The blowholes will open, letting mist and cool air out, and shut back down until more pressure builds up. Each flap will open on a piano hinge and in the case of someone stepping on a part of the blowhole, it will simply stay shut until they move off.

the spirals and seawall



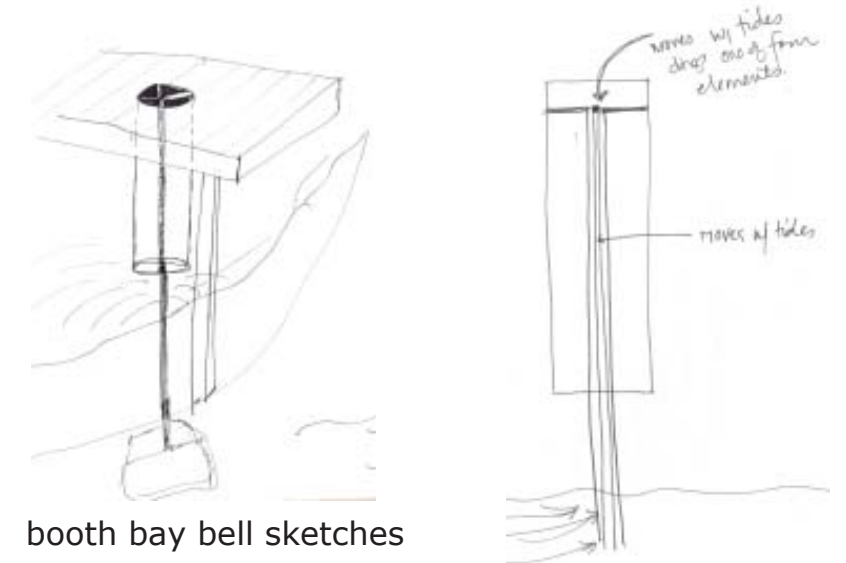
perspective of seawall and spirals looking towards DC



bird's eyes view of spirals



sketch of spirals

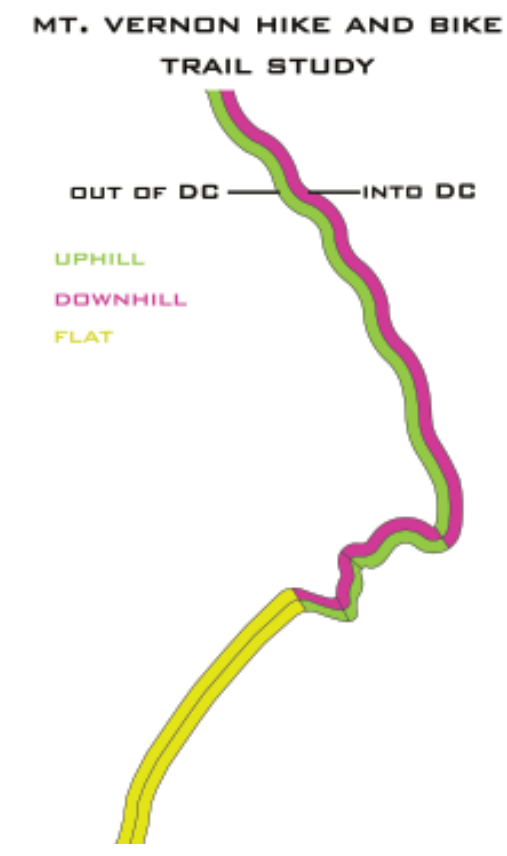
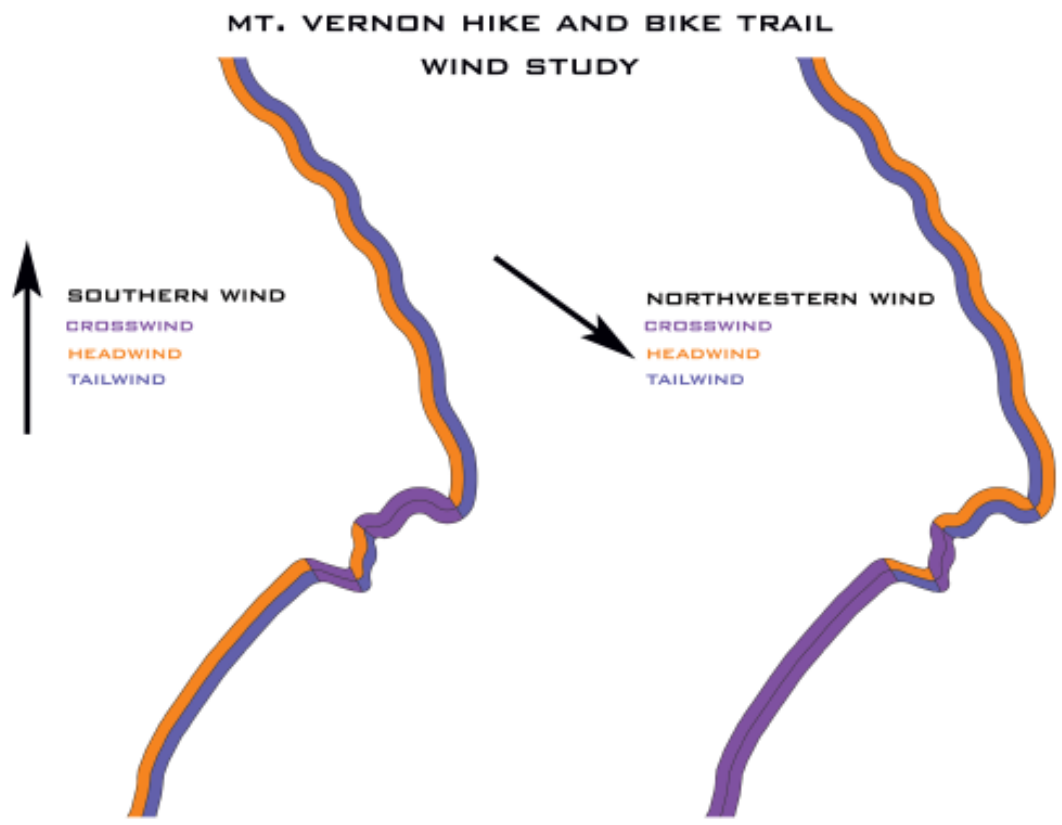
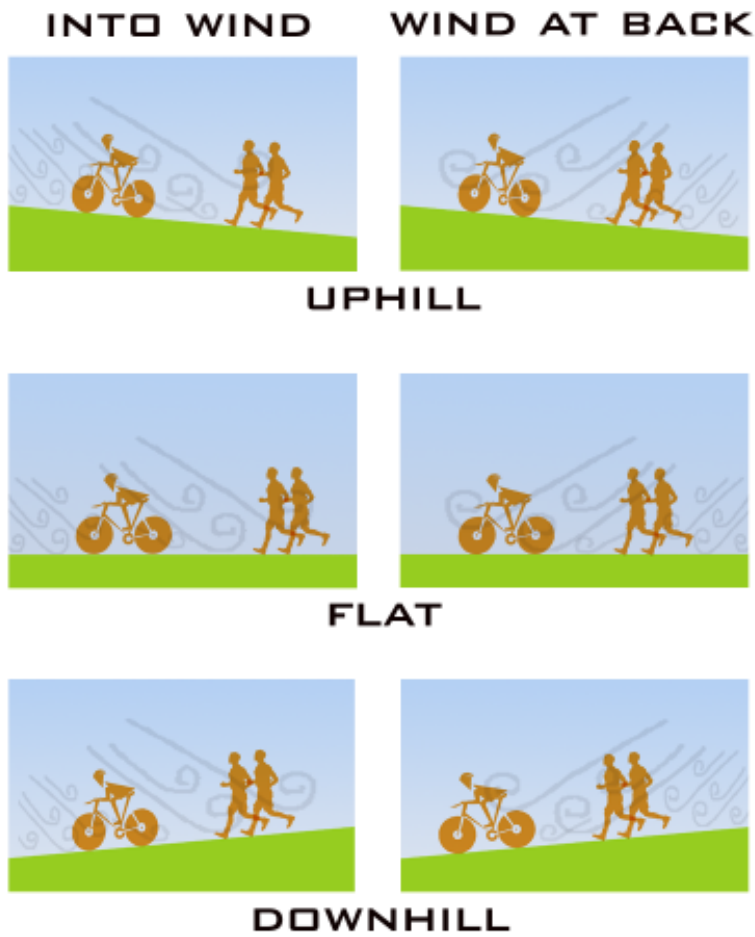


booth bay bell sketches

The three spirals trailing off of the dunes connect the site to the Potomac River and further the representation of wake turbulence. Each spiral is made of different materials: flowers, flat-topped boulders and a wooden boardwalk into the river. The initial idea was to have one on land, one half on land and half in the water and one completely in the water. When working with this original idea, the land between the hike and bike trail and the river was lacking function. This led to the idea of having a seawall with a waterfront area for people to linger, enjoy the fresh wind off of the Potomac and look at the DC skyline, especially at night. The seawall area incorporates subdued light sticks, providing some lighting for security, but not overwhelming for those choosing to look at the skyline. The lighting elements will also serve as a landmark for those who travel on this trail frequently.

The final design has one spiral on land and two spirals in the water, however, the second spiral of flat-topped boulders is not out as far into the water as the boardwalk spiral. These spirals form an interesting journey for the pedestrians and cyclists on the hike and bike trail as they quickly go from being absorbed into the site, to riding and walking along the river's edge, being completely exposed to the wind.

The boardwalk spiral also incorporates the idea of a booth bay bell that will sound with the incoming and outgoing tides. There will be two pieces of metal with different thicknesses and will sound differently when the tide is coming in or going out. The booth bay bells will be visible to those walking on the boardwalk so they can see the movement of the tides through the movement of the bell.



	SCENARIO ONE		SCENARIO TWO	
	DOWNHILL INTO DC	UPHILL OUT OF DC	DOWNHILL OUT OF DC	UPHILL INTO DC
NOV-APR	TAILWIND	HEADWIND	HEADWIND	TAILWIND
MAY-OCT	HEADWIND	TAILWIND	TAILWIND	HEADWIND

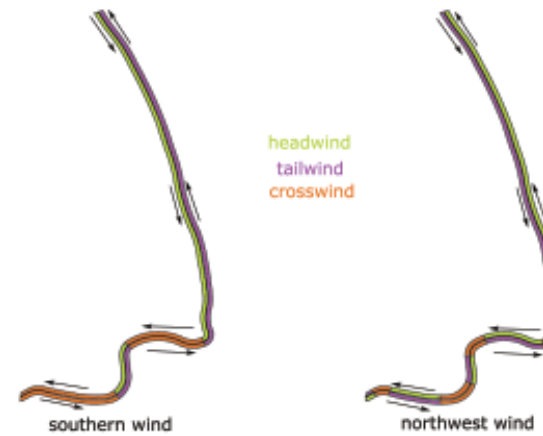
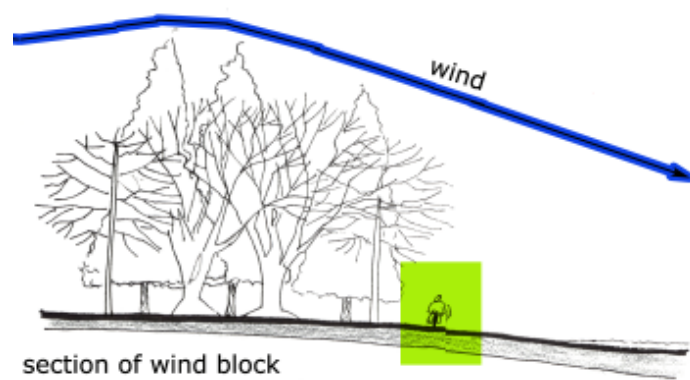
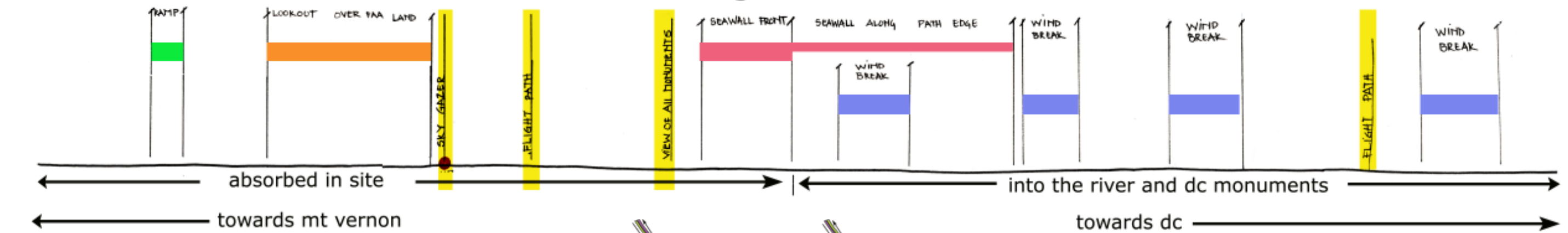
ACCENTUATE EXTREMES OF DIFFICULTY
 SUMMER MOST USE-FAST DOWNHILL, SLOW UPHILL
 WARM WIND IN SUMMER AS A HEADWIND
 CONSISTENT SPEED IN WINTER

TAILWIND IS AT BACK IN WINTER TIME WHEN GOING DOWNHILL
 SUMMER MOST USE-MODERATE SPEED WITH HEADWIND DOWNHILL AND TAILWIND UPHILL
 COLD WINTER WIND AS HEADWIND UPHILL

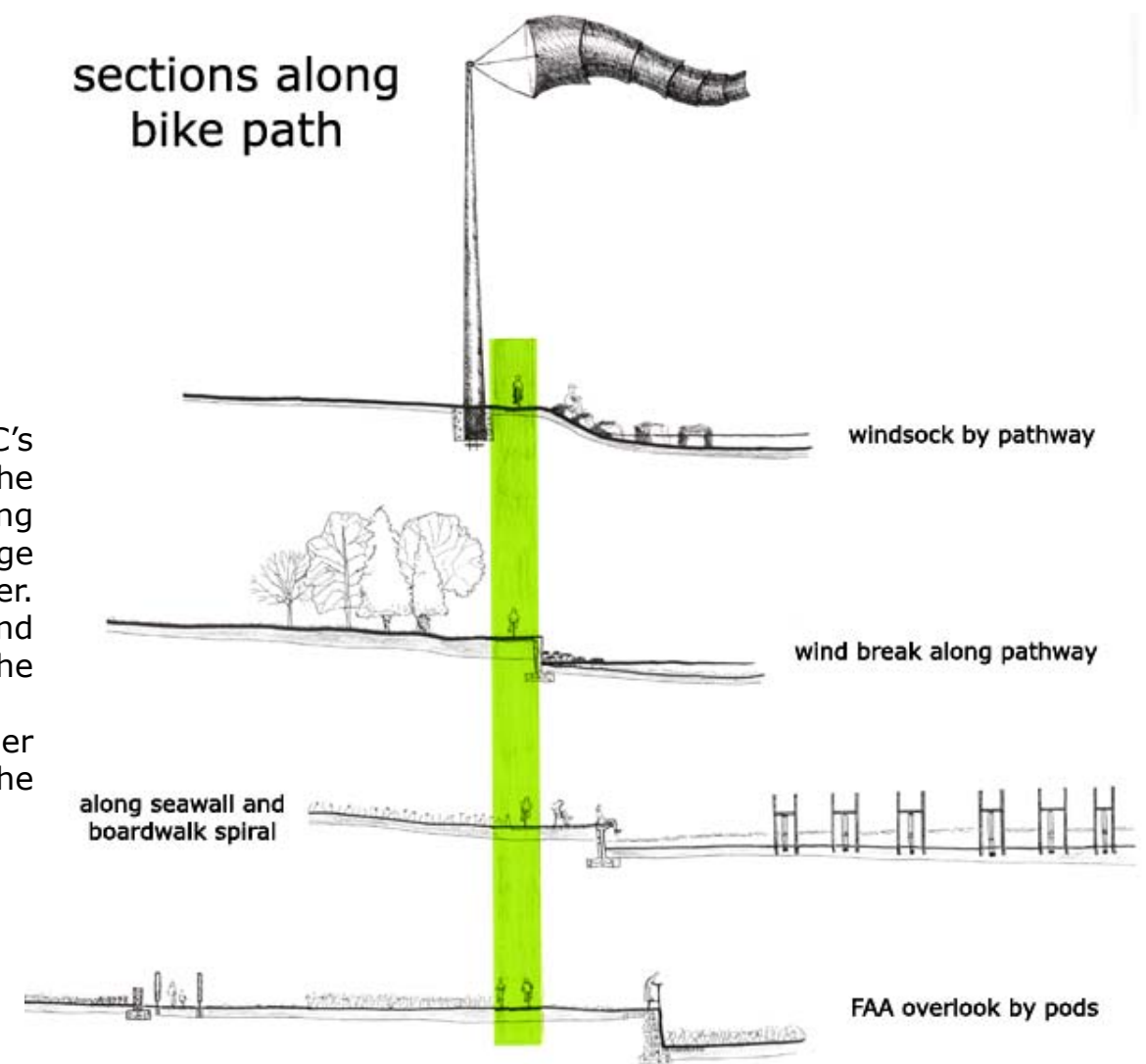


The Mt. Vernon Hike and Bike Trail was one of the most interesting and exciting elements to design. The trail, in its current pathway, crosses the entrance road, creating interaction with every vehicle entering the site. This was something I knew needed to change and it could easily be done. Another aspect to the trail was the great opportunity to engage its users in the site, creating an awareness of the wind because the cyclists always use the wind to their advantage or hate it, when blowing harshly in their faces. I began thinking about the hike and bike trail and whether the experience would focus on extremes or of an overall consistent ride. A study of uphill and downhill riding with headwinds and tailwinds was also considered for the design. In the end, I incorporated wind breaks, consisting of large groups of trees, in order to cast wind shadows over the hike and bike trail to reduce the degree of cold biting wind on the bikers and joggers faces as they travel northbound. I felt that in the summer time the wind is more pleasant and refreshing so breaking the wind in the summer wasn't as necessary as it is in the winter.

section along bike trail



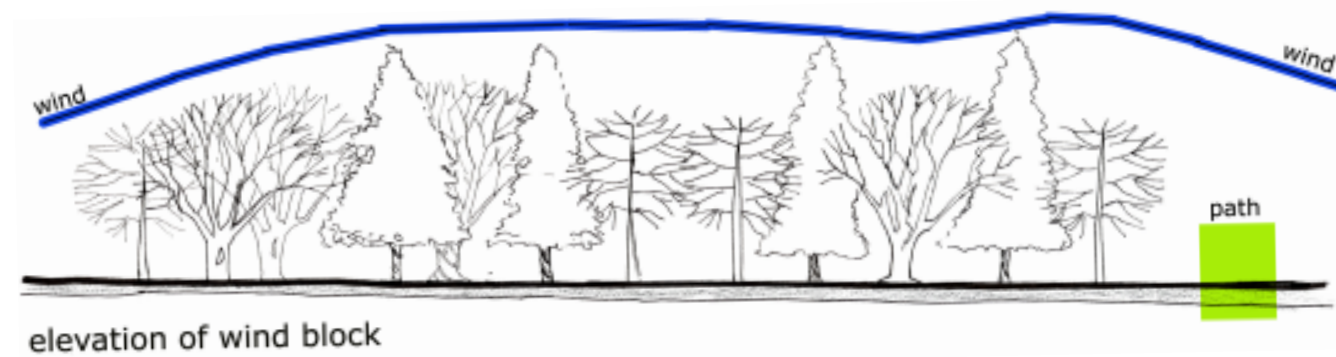
sections along bike path



One of the great aspects to this site is that it is a key location for experiencing and seeing DC's monuments. I tried to make this an even more climatic experience for those traveling northbound on the trail by having a significant drop in elevation (for this site), accelerating one's self towards the river, rounding the bend through the two first spirals and then having before you all of DC. The experience would change from being totally absorbed into the site and sheltered, to fully exposed and peacefully alone along the river.

Along the trail there are places where one can stop, take a break and watch the planes take off and land. As one rounds the pathway and enters into the section of the pods, they can stop off and sit on the retaining wall, stop at the air plaza and dunes, or continue on towards the seawall and take a rest there.

Wind breaks are incorporated into the trail to make the journey more pleasant during the colder months. The wind breaks consist of evergreen and deciduous trees in order to cast a wind shadow over the trail and further tie into the vegetation along the hike and bike trail.



Design Conclusion

The design process is about personal preference suited to the designer's strengths and work habits. Incorporating the thesis aspect brings in a substantial theoretic component that challenges the designer to explore ideas and investigate a concept that they themselves soon become an expert in, and even at points along the process, is exploring questions their professors do not have answers to or are likewise exploring answers for. It is an entire year of intense endurance, patience with oneself and one's personal design investigation that results in a great reward. Working with a project that asks a critical question, thoroughly explores an answer, responds and communicates unique solutions which then leads to new questions, sets in motion the pathway for a continual journey of learning.

Designing and researching at the same time enabled me to directly investigate and apply design ideas that I found intriguing in the readings. By simultaneously incorporating these ideas into the design new questions arose allowing me to identify more specific aspects to follow up on, and further developing the design criteria. The site had many invisible and visible, artificial and natural phenomena, and through the landing, finding, founding and grounding stages of the design process, described by Christopher Girot, they became vital elements to the overall landscape design. The design and program was informed by not only by the poetic and technical research but by the site's environmental components. The dialogue between the design and research was very strong at times while quiet in moments of intense design. There were some times, especially towards the end, when I should have looked back into my writings and the quotes from my readings that originally inspired me because they uniquely and clearly articulated aspects of design that would have better served me than my own words.

Beginning the design process with my exploration of watercolors was another aspect to the design process that I would strongly encourage all thesis students to do. It was an artistic and abstract way to understand my intuitions about wind, further my understandings of the more technical side of wind and the airplanes and have it all documented. The series of paintings could have evolved into a much more extensive series, but I felt like I had reached the heart of the information that I would be able to incorporate in the actual design.

When a significant amount of research, site analysis, and conceptual plan was completed I encountered one of the hardest parts to the design process; what direction I was going to take the design and how I was going to create the experience on the site. There were so many complex layers to the site, so many important points I wanted to make and so many ways to achieve my design goals that it took some time to actually find a solid starting point. Once I found this point the design began to unfold, serving as a catalyst for the language, influencing the form, direction and experience each space took on and adjusting as needed to make the entire experience cohesive and dynamic. The final design came together creating naturally and technological activated elements, private and public spaces, active and inactive places, high points against low points, climaxes contrasting with returns to the normal, absorption changing to exposure, cool cycling into warm and then back to cool, refuge and prospect and the human and the natural systems, which integrated into one experience, takes on different levels each time a visitor comes to Gravelly Point.

The goals that I kept in mind were creating a revelatory landscape, integrating the site's technology and fostering a sensory experience that reveals the natural phenomena of wind. It provides the structure for the visitors to grasp onto whichever elements they find most interesting, creating their own level and style of improvisation within the landscape which accentuates the different ambiances and seasonal effects throughout the entire year. The design incorporates the notion that by connecting one experience with another, reiterating simple understandings, yet expanding one's knowledge through diverse interactions of complex meanings, it ensures a better chance that the visitors will actually engage themselves in the landscape, instead of seeing cliché aspects of wind that arouse little thought.

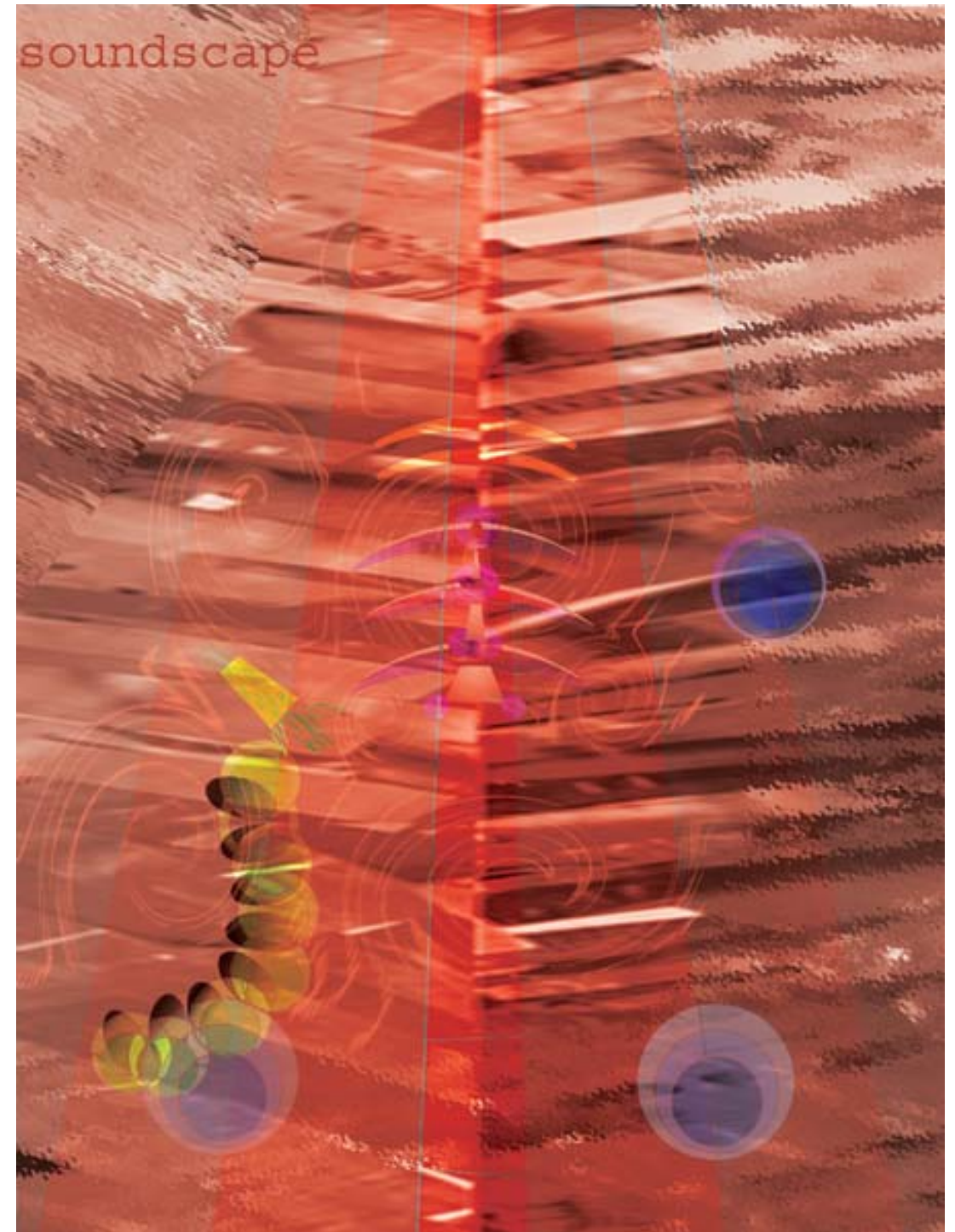


image of soundscape on site

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Catherine Annalisa Miller

Education

Virginia Polytechnic Institute and State University

Blacksburg, Virginia
Alexandria, Virginia

- Masters of Landscape Architecture, Fall 2005
- Thesis: A Revelatory Landscape: Wind Through the Senses
- Cumulative GPA: 3.79

University of Texas at Austin

Austin, Texas

- B.A., Spanish and Portuguese, Spanish Honors, May 2000
- Major GPA: 3.8 Cumulative GPA: 3.54
- Certificate of Business Foundations

Experience

Fall 2004 Parker-Rodriguez Incorporated Alexandria, Virginia

Landscape Architect Project Assistant

- Beechtree Community, Upper Marlboro, MD: helped with construction documents, planting plan and material selection for model homes and surrounding streets and lots
- Brambleton Community Loudoun County, VA: helped with lot divisions, rendered plans, organized and adapted engineering files, grading plans and planting design

Summer 2004 LaPierre Studios Alexandria, Virginia

Landscape Architect Project Assistant

- Lockheed Martin Facility, Norfolk, VA: helped with construction documents, site furnishings, bollard layouts, bidding and negotiation meetings, cost estimation, cut sheets for site details
- Eighteen 81 Condominiums Rosslyn, VA adapted Photoshop images to revisions, designed a corner park, grading plan for corner park, attended meetings with developers, architects and engineers

August 2003-May 2004 Virginia Tech Blacksburg, Virginia

Landscape Architecture Teacher Assistant

- Teach Introduction to Landscape Architecture course to undergraduates
- Organize class lectures and activities
- Evaluate students on performance

August 2000-May 2002 Austin Independent School District Austin, Texas

First and Second Grade Bilingual Elementary Teacher

- Instruct students in native language and develop English speaking and writing skills
- Prepare and direct appropriate curriculum for Gifted and Talented and Special Education students
- Chair and Editor of school newspaper

Skills

- Proficient in Office XP, Paint Shop Pro, Adobe Photoshop, Adobe Page Maker, Auto CAD, Land CAD, Arc View GIS, Sketch Up and other computer programs
- Knowledge about grading, materials, hydrology, construction documents, individual tree care and maintenance and deciduous plants and trees
- Read, write, and speak Spanish fluently
- Read, write, and speak Portuguese proficiently

International Studies

Universidade de Coimbra

Coimbra, Portugal
Summer 1999

- Intensive Portuguese Language and Culture Course

Colegio Juan Zorrilla de San Martin

Cordoba, Argentina
August 1995-July 1996

- Rotary International Exchange Student

Awards

- ASLA National Merit Award April 2005
- Landscape Architecture Book Award April 2005
- Virginia Chapter ASLA Scholarship: Excellence in Design April 2004
- Department Scholarship for Design Achievement Decemeber 2003



Russ and I after my defense.



Annastina and I out at Gravelly Point.