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Integrating The Ohio: Through Sustainable Urban Design

Carly Clevensline

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INTEGRATING THE OHIO: THROUGH SUSTAINABLE URBAN DESIGN

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**Thesis submitted
to the Davis College of Agriculture, Natural Resources and Design
at West Virginia University**

in partial fulfillment of the requirements for the degree of

**Masters in
Landscape Architecture**

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School of Design and Community Development

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2018**

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Abstract

Integrating the Ohio: Through Sustainable Urban Design

Carly Clevenstine

Humankind's relationship with water began before our inception. Our very existence and evolution depended on it, as all life on our blue planet does. However, over time and perhaps more notably since the dawn of the industrial revolution, this relationship has shifted---changed. Riverfronts became dominated by railroads and industry severing access to the water in our urban environments. In Pittsburgh, Pennsylvania the neighborhood of Manchester experienced further separation when the neighborhood was divided in two by a raised, walled highway and the industrial riverfront was renamed Chateau. Both neighborhoods have suffered from blight and vacancy subsequently. Using historic and GIS maps, sustainable design standards as well as scientific evidence of the effects of water on our health, well-being, creativity and happiness; this thesis seeks to examine why this connection to the Ohio River is vital to both residents and the city of Pittsburgh. And finally how we can redesign the industrial waterfront to reconnect both Chateau and Manchester with the river and serve as a model for sustainable redevelopment of these important cultural places.

Integrating the Ohio:

THROUGH SUSTAINABLE URBAN DESIGN

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FIGURE 1.1: ILLUSTRATES THE
SITE BOUNDARY, CHATEAU, &
MANCHESTER

IMAGE: GOOGLE EARTH PRO

introduction

“People protect what they love. How can people protect what they don’t understand?”

-JACQUES COUSTEAU (as quoted by his grandson Fabien Cousteau in his TED Talk What I learned from spending 31 days underwater)

Designing our urban spaces to enhance and encourage the connection with the river and land surrounding them is vital to the health and well-being of a community and its members. Water has the unique ability to make a person happier, healthier, and more connected to the world around them. However, during the industrial revolution the urban waterfronts were dominated by railroads and industry limiting, and in some cases eliminating, access to the river. For the neighborhood of Manchester in Pittsburgh, Pennsylvania which sits near the confluence of the Ohio River, this relationship was further severed in the 1960's when it was divided in two by the construction of a raised, walled highway, Ohio River Boulevard (PA Route 65/US-19) with limited access to the other side. The industrial waterfront was redeveloped and renamed, Chateau. This thesis seeks to examine how we can redesign our post-industrial waterfronts to improve and reconnect people with their rivers while serving as a model for the redevelopment of these important cultural spaces where we meet nature.

site selection process

This 189 acre, linear site [Images 2.1-2.37] runs along the Ohio River for a little less than a mile and a half with no marked public access to the river's edge. Residents of Chateau were forcibly moved during construction of the raised highway and others have abandoned the industrial waterfront. Residents of Manchester, if never moving beyond the walls would not be able to tell there was a river anywhere close to them despite three rivers within blocks of them. As Pittsburgh grows, land along the water becomes valuable and will be sought out by developers.

Currently segregated from the rest of Pittsburgh, the lack of opportunities for youth living in Manchester is understandable. The Child Opportunity Index (COI) is calculated based on Education,

IMAGES 2.1 & 2.2: THREE RIVERS HERITAGE TRAIL

IMAGES 2.3-2.8: CURRENT
CONDITIONS

Health & Built Environment and Neighborhood Social & Economic Opportunity indicators rank Manchester as Low for overall opportunity, Educational opportunity, and Social & Economic opportunity; Ranks very low for health & environmental opportunity. "Unlike utilizing a single indicator, such as neighborhood poverty rate, the chief assumption underlying a composite index is that multiple neighborhood factors have a combined influence on children. Some characteristics (e.g. poverty, high unemployment, and a lack of healthy food choices) have detrimental effects, while others (e.g. access to health care, good schools, and quality early childhood education) are advantageous. The COI reflects the combined contributions of these positive and negative effects" (diversitydatakids.org, 2018).

With the ability to redesign a neighborhood we are given numerous challenges and opportunities to improve the lives of the residents in and around it. Manchester and Chateau, once a single, united neighborhood, thrived in the industrial age. Redevelopment in the mid-20th century divided this mixed industrial, commercial and residential neighborhoods into two. The riverfront became dominated by industry and severed the relationship with the residents of Manchester and the Ohio River. Re-imagining Chateau provides a unique opportunity to reconnect Manchester with the riverfront and to develop the site in such a way that benefits the environment and the health and well-being of both current residents and future residents of Manchester and Chateau, as well as, the entire city of Pittsburgh.

**IMAGES 2.9-2.10:
CURRENT CONDITIONS**

IMAGES 2.11-2.16:
CURRENT CONDITIONS

IMAGES 2.17-2.22:
CURRENT CONDITIONS

IMAGES 2.23-2.28:
CURRENT CONDITIONS

IMAGES 2.29-2.33:
CURRENT CONDITIONS

**IMAGES 2.33-2.37:
CURRENT CONDITIONS**

water is vital for life

Earth is a bright, blue 'marble' unlike anything else in our known universe. Seemingly fragile from a distance, this planet is teeming with biodiversity and life. It's a bit astonishing, to think of how all the right circumstances happened serendipitously for our planet to support life (as we know it). Earth's distance from the sun keeps the planet at a habitable temperature, neither too hot, nor too cold. The unique formation of the ozone layer protects us from our star's harmful rays and makes possible the presence of the single substance most scientists agree is necessary for life - water. Composed through the bonding of two hydrogen atoms and a single atom of oxygen, this chemical formation is currently the basis for NASA as they search for alien life - "follow the water". Philip Ball describes this element as "essential for the kind of delicate chemistry that makes life possible" (Watanabe, 2007). The presence of water is the main reason why we are able to exist on planet Earth.

FIGURE 3.1: SHOWS HOW OVER TIME THE THREE RIVERS HAVE CHANGED FLOW & CARVED THE LAND AROUND PITTSBURGH

While seventy-one percent of our planet is water, over ninety-six percent of that water is saline, and less than four percent of that is freshwater (Perlman, 2016). Rivers only constitute for 0.0002 percent of the total water on Earth, for most people, are their main source of usable water. In Allegheny County, ninety percent of residents rely on the Allegheny, Monongahela and Ohio Rivers for drinking water (Cleanriverscampaign.org, n.d.). Rivers are givers of life, consistently called the 'lifeblood' of the community.

“Love flows deep in rivers”

- AMITAV GHOSH FROM *THE HUNGRY TIDE*

A river's tributaries, much like our own veins carrying vital nutrients, stretches across the land allowing a single drop of water to fall on land and then be carried to the oceans. Rivers are constantly changing, ever evolving and molding the land to fit its needs [Figure 3.1]. Water levels rise and fall, changing the river's path, and even altering the direction from which it flows. The sheer force that rivers exude has the ability to deflate one's own ego. This valuable ecosystem not only provides drinking water but also habitats both in it and along its edges, transportation, opportunities for recreation, a source for food and economic viability.

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need for reconnection

Human's bond with water

IN THE BODY

Humankind's bond with water begins at our very inception. As an egg, surrounded in a nutrient-rich, saline liquid, we grow for nine months in our mother's womb. Protected, and nourished by the warm water, we are swayed by the muffled voices and oceanic-like sounds that enclose us. This bond between humans and water is significant and can be used as a resource by designers to improve our health and everyday lives.

We must not ignore water's ability to heal the body. Exposure to nature ('green space') is well known to have numerous benefits on everything from productivity to recovery time after surgery. However, exposure to 'blue' space (areas in and around water) has the potential for even greater restoration. Access to water can also provide a form of therapy

to treat trauma or autism, give communities a sense of togetherness and unity and even encourages physical activity (Wallace, 2014). Despite the known benefits of exposure to nature, the EPA estimates that Americans spend roughly 93% of our time indoors. In many urban settings, such as the Manchester neighborhood, access to the river can be extremely limited. This shortage of access to the water inhibits the ability for one to achieve the many benefits that can be obtained from this astounding, and irreplaceable resource.

***“The supreme good is like water, which
nourishes all things without trying to.”***

- LAO TAU

IN THE MIND

Happiness is contagious. While we have evolved to react more intensely to negative experiences than positive ones to ensure our own survival, we have the ability to rewire our brain to have more positive thoughts and feelings, and therefore greater levels of happiness. Rick Hanson, a neuropsychologist and author, describes in his TED talk 'Hardwiring Happiness', how to increase positivity and happiness. The first step is to focus on positive experiences and thoughts that we have. By keeping these in our mind for and focusing on them for a longer period, negative thoughts and feelings will resist easily creeping back in the positive ones will stick around and last for a greater period of

time. It's not just changing your mind, it's rewiring the actual way your brain works; "The mind can change the brain to change the mind" (Hanson, 2013). In order to be successful at this, he has developed an acronym to help one learn the process: 'HEAL yourself'. The first step is to 'Have a positive experience', after that, 'Enrich it' by locking this experience in your brain, and then truly 'Absorb it'. The last step,

“If you take care of the minutes, the years will take care of themselves.”

- TIBETAN SAYING

'Link the positive and negative' is optional since it requires you to link a positive experience with a negative one and is considered risky can stir-up negative feelings and emotions (Hanson, 2013).

Mappiness, a 2011 study first conducted by George MacKerron and Susana Mourato in the United Kingdom, used an app to track the levels of happiness by sending out randomized signals throughout the day that prompted users to respond. Over 1.1 million responses were then cross-referenced with GPS locations and known activities of the users to rate different places based upon responses. The study found that people are happiest when in nature, but even higher rates of happiness were reported when the person is near a body of water. In marine and coastal regions there is an increase of 5.2% reported,

a percentage equivalent to the difference between 'attending an exhibition and doing housework'. 'Mappiness 2.0', will be an on-going study developed by Dr. George MacKerron and Nick Begley and will continue the research while also providing feedback for users to understand how their own happiness is affected by different situations, sleep, eating patterns, etc. Mappiness 2.0 will be launching in July 2018 and conducted as a worldwide study (mappinessapp.com, 2018).

Although this evidence supports claims of benefits, water alone does not guarantee a setting that is preferred over another, how the water and water's edge are treated largely impact the perception of these spaces. A clean, flowing river with a natural edge and vegetation is how people tend to prefer their rivers. Pollution (or the perception of), in the form of sewage, chemical, smell, etc. and other signs of human impact decreases the likelihood of a positive experience and therefore, also decreases the amount of recreational use in and along the river (Kaplan and Kaplan, 1998, p113). Plants, although beneficial, can with little or no maintenance also have a negative effect on the benefits, perception and actual safety of the space (Kaplan and Kaplan, Portland, Chicago, Baltimore). River-banks that have eroded away also decrease the quality of the perception and therefore the positive benefits. Another way the perception can be altered is due to a possible traumatic personal experience or negative feelings towards the water. A flood or river that has overflowed its banks can result in destruction, and in worse case death, is easily associated with negative feelings or perception.

Humankind has sought for centuries to tear away nature believing that this lead to civilization and the act of being, well, 'civilized'. "Because so many children and adults spend their days in completely man-made environments, they develop aversions and even fears about what they view as dirty, untamed, and dangerous natural environments" (Wallace, 2014, p 266). In fact, forty-nine percent of adults do not get the recommendation People are now being diagnosed as having nature-deficit disorder as a result of not being engaged with natural environments. One solution is 'Park Prescriptions' a concept developed by Park Rx America, "a non-profit organization whose mission is to decrease the burden of chronic disease, increase health and happiness, and foster environmental stewardship, by virtue of prescribing Nature during the routine delivery of health care" (parkrxamerica.org). Park Rx America partners with managers of accessible, public land and water along with physicians and other healthcare providers to prescribe patients time outdoors and in nature.

Modern day life has left us overloaded with information and stimuli, making the ability to focus extremely difficult (Kaplan and Kaplan, 1998, p17). 'First world problems', like distractions from cell phones, the internet, and social media, the things keep us connected and bound to the world '24-7', each buzzing with notifications, emails, calls, etc.; and it is this attachment and availability that has even 'successful' people ditching their smartphones. Sounds of sirens and horns, even office chatter, is enough to put us on sensory overload. Human's separation from nature has left a rift in our lives. Our busy and stressful lives have

caused a rift, separating us from nature, and historically designing our environments in a manner that "fails to support people's need and requirements" (Kaplan and Kaplan, 1998, p2). People with successful and seemingly 'perfect lives' are susceptible to mental fatigue resulting in less competence and a decrease in happiness.

Our limited capacity for direct-attention and a preponderance of information and stimuli at any given moment of the day causes us to suffer more and more from mental fatigue, resulting in a reduction in productivity, stress and even burnout. Leading the way in the field of environmental psychology, Rachel and Steven Kaplan authors of the book *With People in Mind* wrote, "the natural environment can foster well-being and can enhance people's ability to function effectively" (p1). This idea of nature and happiness being linked is not a new or radical idea, yet it's still underplayed in American culture. For example, in the last twenty years many schools have chosen to cut recess out of the day to allow for more time for lessons and standardized tests even though The American Academy of Pediatrics (AAP) says recess and physical activity are essential "for optimizing a child's social, emotional, physical, and cognitive development", and further recommends sixty minutes of "moderate to vigorous activity per day" (Reilly, 2017). And even though some schools are rebuilding with connections to nature in mind, most new building construction lacks windows or have windows that do not open, depriving the children and staff of natural sunlight or fresh air and a breeze. While some schools are rebuilding with this connection in mind many are

still building classrooms without any windows entirely.

To experience restoration from nature a landscape does not necessarily need to be 'wild' or 'untamed'. There are many different 'natural' settings (ie. a place with an abundance of vegetation) that can be beneficial to one's health and well-being such as parks, backyards, gardens, fields, etc. Restoration and relaxation from access to a natural environment are unparalleled, however, these benefits are greatly amplified when introducing a water element. Completely untamed wilderness is not necessary to achieve these benefits. Urban spaces, even small ones, can be designed in such a way that maximizes on the ways restoration can be achieved. According to the Kaplan's theory of Attention Restoration Theory (ART), there are four elements an environment must have in order for it to provide restorative benefits; extent, 'being away', soft fascination and compatibility.

EXTENT

A landscape that gives one the chance to explore provides restoration through extent. The landscape does not need to be anything special or extraordinary and can be large, or small to provide extent. Obstructed views can limit the amount of exploration, but a view that is only partially limited can also provide a sense of mystery, or desire to "explore" what is behind the obstruction. Curved paths, berms, or layering vegetation also piques curiosity, creating another element of mystery help to provide greater extent.

'BEING AWAY'

The restorative qualities from 'being away' can be achieved indoors as well as outdoors. One does not need the physical change of a place, the simple act of looking out a window gives the mind a chance to wander and explore the landscape. This gives the viewer a chance to 'escape' and helps one recover from mental fatigue.

SOFT FASCINATION

Fascination does not necessarily come only from new or interesting places, it can also come from "processes such as thinking, doing and wondering" (Kaplan et. al., 1998, p20). The setting, however, should be captivating and interesting to the viewer. Nature can provide fascination through the dancing of light along the water, the growth and beauty of vegetation, or the sounds and sights of insects, among other things.

COMPATIBILITY

For a landscape to have compatibility it must fit what the expectations of the viewer or visitor. Hunting/fishing, gardening, bird watching, etc., as well as environments that allow for activities that are related to survival (hunting/gathering, safety), tend to be higher incompatibility.

Noise levels can be challenging in urban environments and a source of sensory overload. 'Unwanted noise' such as traffic, sirens, even

conversation can be deafening at times (Wallace, 2014, p205). Positive or negative, the sounds in our surrounding environments influence our lives. Human beings have a threshold of sound ranging from 0 decibels to 140 dB, at which point we generally experience some level of associated pain and at 165 dB there can be permanent damage to the ear canal (Wallace, 2014, p205). In a report released by the EPA in 1974, the ideal noise level for us is around 55 dB outdoors and 45 dB indoors before there is "activity interference and annoyance". Levels should also not exceed more than 70 dB for a 24-hour period to prevent hearing loss or damage over one's lifetime. For a bit of perspective to how this compares to real-world noises; a New York Subway was recorded ranging from 106-112 dB whereas the level of a 'babbling brook' is about 20 dB (Wallace, 2014, p205-6). While most would probably consider a 'babbling brook' a positive sound, many urban noises can have unwanted results. Sometimes the effect of this unwanted noise is small, such as the inability to hear a conversation, other times it takes a greater toll on one's health and well-being, like the loss of sleep, change of mood or a trigger for PTSD. This disruption and exposure to negative sounds can lead to a need for restoration.

The sound of water has a positive effect on the human brain and body. Human life begins in our mother's womb listening to 'swooshing' sounds similar to the sound of the ocean (Wallace, 2014, p206). As if cosmically related somehow, the frequency and rhythm of water are like that of the human breath (Wallace, 2014, p207). Every year

people flock to the seaside, some just to hear the sound of the waves crashing on the land. For me, it's the sound of the rain hitting a river or lake, the trickling of the water from the paddle across the water, and sometimes that muffled 'swooshing' silence you get as your ears dip below the surface of the water. It's relaxing and calming, accompanied by a sense of "weightlessness" that surpasses the literal gravity of my actual being. Activity in the medial prefrontal cortex is ignited by the sound of water, the part of the brain that is strongly

“In water, everything is ‘dissolved’”

· MIRCEA ELIADE

correlated with creativity, emotions, self-image, and insight (Wallace, 2014, p220). The emotions described that arise when hearing, or being close to water, are similar to those felt when listening to music, such as "joy, sadness, tension, wonder, peacefulness, power, nostalgia, transcendence" (Wallace, 2014, p220).

The use of water features in urban environments can be used to draw people in and provide a moment of restoration. Parks with water elements tend to be flocked with people, especially in the summertime. Fountains can become landmarks or points of interest and sometimes the watering hole for local and passing birds and other wildlife. In Rome and Venice, Italy the public drinking fountains are

easy to miss disguised as works of art. Water flows consistently from decorative fountains, providing a local or visitors with a chance to refill a water bottle and a moment of escape and refreshment. Even pocket parks in urban environments with rushing or falling water, like Paley Park in New York City, have the capacity to drown out the surrounding city noises allowing the visitor a moment of escape and relaxation. If the water element is integrated with stormwater management, it can serve both aesthetics and function. Proximity to a river has the added benefits of nature and a naturalized setting, however, noises from a slow-moving river such as the Ohio, are difficult to hear from a distance. Access to the edge of the river, therefore, is necessary for sound benefits from the river.

Landscape Preference

Landscape preference is also an important factor in determining a person's enjoyment of a space. Even though personal preference may differ from person to person, there are some general design and management factors that can influence the overall preference of a space. Unchanging landscapes, large areas of indistinguishable landcovers, dense vegetation and obstructed views all result in less desirable spaces. By contrast, unobstructed views and highly visible views, well-maintained landscape, smooth ground, as well as evenly spaced trees, resulting in a more desirable landscape. Landscapes of a greater preference can be broken down into four different factors; coherence, complexity, legibility, and mystery.

COHERENCE:

In order for a landscape to have coherence, it must be organized. Organizing a space can be by creating orderly areas or different 'regions'. A region can be formed by designating different land uses in the space. Regions also can be composed of varying ecosystems or by separating different types of vegetation. Using repeating themes helps the viewer distinguish different relationships and uses in the landscape. The use of unifying textures, while limiting contrasting texture also creates coherence in a landscape. Lastly, using repeating themes in a landscape improves the coherence of a space.

COMPLEXITY:

Landscapes with greater complexity offer more exploration and therefore, as discussed, can increase the restorative qualities. While having a lack of complexity can be dull or boring, too much variety can create confusion (Kaplan et al., 1998, p14).

LEGIBILITY:

Legibility in a landscape comes from its distinctiveness and ease of wayfinding.

MYSTERY:

Mystery in a landscape comes from the desire for one to keep exploring. Hints of what's to come, such as a curved path or a partially obstructed view, is alluring. In contrast a view or path that is completely blocked or with obstructed with dense vegetation feels less safe and

decreases a person's curiosity.

Wayfinding is a critical element in urban design for coherence and exploration of a space. While some people enjoy the mystery and spontaneity of finding 'hidden treasures' that comes through wandering, having well-developed signage, maps, etc. is appreciated, and necessary for many. Thoughtful design and execution of wayfinding are as important as having it. Lack of thought or poorly designed wayfinding can contribute to greater confusion and can create more problems than it will solve. Dividing larger spaces into smaller, more distinct regions not only contributes to a better perception of the space, it also helps one with wayfinding (Kaplan and Kaplan, 1998, p50). Maps should be designed to include these regions as well as landmarks accompanied by paths, main attractions, and other notable signage. The map design, as well as signage, should lack complexity, 'less is more' and be easily understood by a variety of ages and users (Kaplan and Kaplan, 1998, p56). Use of clear and identifiable symbols is encouraged due to the simplicity and lack of language barriers.

The use of landmarks or other distinguishing characteristics increases the how legible a landscape is and makes wayfinding less complicated. Chateau has the enormous benefit of being near a large number of Pittsburgh landmarks and has a few of their own. Bicycle Heaven the

'largest bicycle museum in the world' and Johnny Angel's Ginchy Stuff and Music Museum are in the heart of Chateau in the same building which is easily spotted by the colorful artwork painted on the former industrial building. This significantly increases the legibility of the site and helps make wayfinding easier and more straightforward. However, foci (areas of focus), which includes landmarks, can be defined in a few different ways. Natural or man-made, foci/ landmarks typically have a notable or identifying characteristic that could easily be found by a resident or visitor. Examples of this could be a unique building/ structure, a rock formation or a stand of trees, statues, art, or important nodes or intersections.

Studies have shown that while nature alone has the benefits on health and well-being, environments and landscapes with water further increase these benefits. The European Centre for Environment and Human Health (ECEHH) website states their focus is on interdisciplinary research to fully understand "the complexity of environment and human health issues". Their research uses both quantitative and qualitative methods to look at several different areas, one being 'Well-being and the Environment'. In doing so they hope to "(unpick) the possible therapeutic properties of both 'blue' and 'green' environments, and quantifying these effects to aid their inclusion in planning and policy" (ecehh.org). In 2010, the ECEHH conducted a study using images from both built and natural environments. Of

those photos, half of them contained a water feature or element. The findings of the study showed that natural space is indeed preferred over the built environment, however, the images with water and 'natural' green space were higher than the 'natural' images without water. Even more interesting are the images of the built environment that contained water elements or features. A canal, for example, was, rated as high as the natural spaces (Wallace, 2014, p54). This idea suggests that adding water features in an urban environment can have an equivalent effect as adding a park.

Views and Vistas

A view is something that can be enjoyed from a distance and even if "one is not a part of the landscape one is viewing, one can get a great deal of satisfaction and other benefits from views and vistas" (Kaplan and Kaplan, 1998, p99). At this point in history, there have been numerous studies that have shown benefits to humans' health and well-being by providing views, especially those views that include vegetation (Kaplan and Kaplan, 1998, p99). Prisons, hospitals, apartment buildings, workplaces and schools with views and vistas beyond their walls profoundly and positively affect people. Franklin (2012) observed that patients in hospitals with windows and a view, recovered from illness and injury in a shorter amount of time than those without. In one study, "prisoners who viewed ocean waves,

waterfalls, aquariums and other serene images were 26% less likely to be disciplined for violence than a control group that did not watch the videos" suggesting the calming effect one has when observing bodies of water (Denson, 2017). Students who viewed nature before asking to complete a task performed better, paid greater attention and felt a sense of 'restoration' (Mooney, 2015). Those people that had views from their workplace reported finding their job "more challenging, greater enthusiasm for their job, and reported higher life satisfaction and overall health" (Kaplan and Kaplan, 1998, p99). A study done in the United Kingdom showed that a view of a river generates "an 82 percent price increase" in property value than a "comparable residence five miles inland" (Wallace, 2017, p71).

Views and vistas can vary on how beneficial they can be and are influenced by several factors. As mentioned previously, a view of vegetation is more beneficial to a person's health and well-being than say a view of a parking lot or city skyline. One will also become more absorbed in the vista if it has extent, this element provides interest and enhances the quality of the view (Kaplan and Kaplan, 1998, p101).

Views and vistas also provide a unique opportunity for the viewer to use their imagination and temporarily 'escape' reality. Several factors can also influence the extent such as depth, or a sense of depth; changes in the topography and types of vegetation or spaces, such as a "balance of trees and open areas" and "richness of elements in

the viewshed" (Kaplan and Kaplan, 1998, p101-2). Dependent on the 'mystery' and 'sense of depth' one can enjoy a "mental exploration of an area hidden from view" even if the place is somewhere they know well (Kaplan and Kaplan, 1998, p105).

There are a few things to carefully consider when designing these views and vistas in order to maximize their benefits. First, the density of vegetation or lack thereof can potentially influence how safe one perceives the space to be. Large, open spaces can feel overwhelming or daunting. Second, the view should have both coherence and focus. In order to have coherence, a space must have "distinct regions or groupings to help organize the view" (Kaplan and Kaplan, 1998, p103). This will also help make the area feel safer and more manageable (Kaplan and Kaplan, 1998, p115), and can be accomplished by using different visual patterns or designating areas with a specific "land use or land cover" (Kaplan and Kaplan, 1998, p103). Focus can be addressed on a variety of different scales, both large and small. A contrasting element will help to direct the viewer's attention, acting as a "starting point for examining a scene" (Kaplan and Kaplan, 1998, p103). There are several ways to accomplish this design element depending on the circumstance, such as using vegetation or other elements to help 'screen' an area directing one's eye. Simple scenes that narrow a viewer's focus eases finding a starting point for examination.

Water Related Activities and Therapies

While my parents probably remember the first time my head went under water, I have no memory of learning to swim. My mother joined me in lessons as an infant as if learning to swim was as essential to life as learning to walk or talk. Her side of the family would gather for a week on the Outer Banks each summer, a vacation I prepared for all year by reading books about marine biology. I spent the hot days riding the waves until my skin was shriveled on my fingers and toes, and every freckle had appeared on my pale skin. As a child I was stung by jellyfish, bitten by crabs, trapped by currents, became panicked or confused by which direction the surface was ---events I can remember as scary and even terrifying, yet never ceasing or slowing that desire to be in the water.

“Exercise is parent medicine”

- JAIMAL YOGIS

During high school and my undergrad, I spent six years as a lifeguard and swim instructor. Working this job, I saw people of all ages and abilities use the water for recreation, stress relief, exercise, etc. The elderly and people with pain enjoyed the weightlessness and the decreased pressure on joints or sore limbs. Using the natural resistance of the water through activities like aqua aerobics or even simply walking laps, using the natural resistance of the water they

were able to build muscle, flexibility, and strength. Teaching swim lessons I watched as the fear was replaced by sheer joy and sparkle in a child's eyes as they popped up their head up after submerging it for the first time. Perhaps the greatest reward for myself came from teaching the seventy-five-year-old man to swim and realizing it was never too late to learn something new that you have always wanted to do, and the suddenly confident 12-year swimming along with her peers, who weeks prior had been petrified to get near the water.

There is a true rhythmic, meditative state that accompanies the act of swimming that goes beyond the buoyancy and sense of weightlessness. Releasing endorphins and endocannabinoids, swimming like other forms of exercise, helps the mind cope with stress and anxiety (Wallace, 2017, p110). Breathing is focused and rhythmic, carefully timed with each stroke. As your body stretches and lengthens a swimmer enters a quasi-meditative state (Wallace, 2017, p110). The mind quiets and paired with the weightlessness comes a feeling of euphoria. Swimming, however, is only one form of recreational activity/therapy possible from the water.

As mentioned with swimming, there is a true sense of weightlessness that is accompanied when one is in water. As one relaxes and lays back in the water, sounds are drowned out and muffled. Floatation tanks have been shown to be a source of therapy for people who have ADHD, PTSD, autism, depression, stress, physical pain, whiplash, and

people on the 'verge of burnout'. Flotation has also been shown to enhance creativity and mental/physical performance. While most of the studies have been done using floatation tanks, the simple act of floating is responsible for the beneficial qualities.

Fishing more than likely co-exists with the evolution of humans. Once done solely for nourishment it has evolved into a beloved recreational activity as well. People who fish describe many reasons for this pastime such as the desire to escape, the quiet/peacefulness, freedom, that time away from cares and responsibilities. Although it has the potential to become a very expensive hobby it doesn't have to be. The equipment to fish is relatively inexpensive and can be very simple and primitive (though the difficulty may increase). With access to a body of water, such as the Ohio River, people with a wide variety of income levels and abilities can enjoy the benefits associated with this activity. Specific health-related benefits also include treatment for traumatic brain injury (DBI) and post-traumatic stress disorders (PTSD) both of which are often associated with veteran suicide. Project Healing Waters Fly Fishing and Rivers of Recovery use fly-fishing to help combat veterans who are dealing with DBI, PTSD or in need of other psychological or physical rehabilitation. Casting for Recovery is a group who holds fly-fishing retreats to "enhance the quality of life of women with breast cancer through a unique retreat program that combines breast cancer education and peer support with the therapeutic sport of fly fishing" (castingforrecovery.org).

New evidence suggests that our ancestors, *Homo erectus* used small watercraft (or perhaps logs) to travel 1.9 million years ago (Gabbatis, 2018). Used for utilitarian purposes like fishing and navigation, boats have played a large role essential to survival. Today, while some make their living fishing or shipping goods from boats, their use is increasingly recreational. Recently, boating, sailing, kayaking, surfing, paddle boarding, like fishing, have been used to help those with physical/psychological disabilities or those suffering from emotional trauma.

Self-propelled activities like canoeing, kayaking, and paddle boarding provide a rhythmic-like, meditative state while one is gliding along the surface of the water. Lifting the paddle from the water creates a trickle along the surface as the rotation is completed to propel further along. When there are two or more people rowing a certain 'flow' must coexist to maintain a straight path. The combination of the rhythmic rowing, the sound of water whooshing as the paddles meet with the water, and the overall environmental experience of being out in the water gives people the sense of peace and tranquility.

Recently, programs are using boating and sailing as a form of rehabilitative therapy for people with "physical disabilities (including paralysis, blindness, deafness, and amputation); developmental disabilities like ADHD, autism and Down Syndrome; those with

traumatic brain injury (TBI) and other injuries; as well as people who have experienced emotional trauma" (Wallace, 2014, p127). Programs like Sea Scouts, through Boy Scouts of America, allow both boys and girls to learn about teamwork and sailing. Experiencing that sense of 'freedom' that one gets acting as captain on the 'open water', "for children who through no fault of their own are forced to live a difficult life, constricted by circumstance, freedom is a profoundly uplifting liberation" (Wallace, 2014, p128).

Environmentally

INCREASING HABITAT AND BIODIVERSITY

The Ohio River is a host to several species both aquatic and terrestrial. In the water there were at one time around 80 species of mussels, five are thought to be extinct and fifteen of which are endangered due to dredging, water quality, overharvesting, pollution, the introduction of foreign species, etc. (Ohioriverfdn.org. n.d.). Some species of mussels can live as long as 100 years though most live between 10- 50 years, filtering nearly 8 gallons of water per day (Molluskconservation.org. n.d.). Around 100-120 species of fish still live beneath the surface of the Ohio and there are records of 164 different species, though many have suffered a fate similar to the mussels due to the same conditions. Terrestrial wildlife, such as deer, opossums, raccoons, skunks, minks, muskrats, beavers, etc. use the river or its banks for habitat or food

a more resilient Pittsburgh

FIGURE 4.1 ILLUSTRATES WHAT PITTSBURGH WOULD LOOK LIKE IF THE FLOOD ZONES WERE COVERED WITH TREE CANOPY

and water source. Many shorebirds and migratory waterfowl also make their home or stopping point along the Ohio River. Endangered species like the bald eagle, osprey, least weasel, green salamander and bow fish also inhabit this area, and special care should be taken to protect their known habitation areas from disturbance or development.

Increasing green space along the water's [Figure 4.1] edge provides a valuable habitat to many different species of wildlife both in and out of the water. As landscape architects, we have a responsibility to increase the biodiversity in every project we do, regardless of how small, or large that may be. Kate Orff, the founder of SCAPE, lives by this principle and emphasizes biodiversity in all of her firms' work. The importance of this especially in urban areas where habitat is facing greater losses and therefore there is also the greatest decline of biodiversity. A landscape architect's purpose is to put the human needs at the forefront of their designs, so it is just as important to ask how other species and the overall environment is impacted by their designs. It is not enough to accept what is consistently seen as an inevitable decline of numerous species and habitats. As environmental advocates, we must seek to go beyond our human users and embed biodiversity into every project. Orff's design of the Blue Wall Center in Cleveland, SC is one of many where biodiversity is exemplified in a number of manners. Through the creation of 'microclimates', or small pockets that represent different landscapes, the site features a meadow, bog, Hemlock forest and even a bat habitat. This can be linked to the concept of creating regions discussed in the sections

flood map

1912 FLOODWAY

100 YEAR FLOOD ZONE

FIGURE 4.2 ILLUSTRATES THE FLOOD ZONES ALONG THE SITE.

focused on coherence, restoration, and wayfinding.

INTEGRATING STORMWATER MANAGEMENT

Reducing the dependency on the combined sewer system through a variety of different stormwater management techniques is key to this redevelopment project. All new development could tackle on-site stormwater detention and at the very least be able to store a large amount of water to be slowly released over time into the sewer system. Each block must have a delineated green space to provide on-site management. Green, brown (more specifically as a host for habitat) and blue roofs (temporary storage of rainwater) installed on newer buildings or readapted buildings can capture and use stormwater. Each block must have a delineated green space to provide on-site management. Cisterns can be installed to capture stormwater from buildings or other spaces and can be stored above or below ground and used for greywater or on-site irrigation. Bioswales are helpful for capturing and slowing the velocity of rainwater off sidewalks and streets and channeling it an appropriate area, like a rain garden or bioretention area.

'AQUA-TECTURE': FLOATING ARCHITECTURE

Many scientists predict that rain will increase as well as the severity of the storms as the climate changes. When redeveloping flood-prone areas, it is crucial that we redesign them in such a way that "strengthens the role of water and topography as a system" (Braae, 2015,

p83). According to Pittsburgh's building and development standards pertaining to developing in the floodplain "all new construction in the floodplain will be required to be in full compliance with the current regulations. Generally, all new commercial construction will be required to be flood proof or elevated 18" above the base flood elevation. Generally, all residential construction will be required to be elevated 18" above the base flood elevation" and when it comes to making improvements to existing development "work that costs less than 50 percent of the value of the structure, no additional requirements are triggered. Work that costs more than 50 percent of the value of the structure is termed a substantial improvement and the structure must come into compliance with the ordinance" (Pittsburghpa.gov. n.d.).

Building along a river presents the obvious problem of flooding during heavy periods of rainfall. Houseboats and floating houses is not a new concept in places like Seattle and Amsterdam, but Third Nature, a Danish firm and Baca Architects out of the UK are pushing the idea a little further by designing an innovative type of architecture [Figure 4.3] that uses an ancient physical law discovered by Archimedes, the law of buoyancy; "Buoyancy of a submerged body corresponds to the weight of the displaced fluid" (tredjenatur.dk. n.d.). Combining the need for stormwater management, these buildings fill a reservoir beneath them, and then rises slowly upward. Third Nature claims the cost of construction can be made up through the addition of a 5-story building. The amphibious 2-story house designed by Baca Architects uses large steel beams to guide and steady the structure as the water fills the basin below. A portion of the structure never fully merges above the water to ensure the stability of the building. While the idea can be used for structures as small as houses Third Nature sees this as an answer the ever-present parking dilemma in many cities.

FIGURE 4.3: SKETCHES BASED ON ARCHITECTURE BY
THIRD NATURE - TREDJENATUR.DK

connection

Pre-European Settlement

The Ohio River at one time flowed north, emptying into Lake Erie. As the last glaciers retreated, the land rose, changing the direction the river flowed (PopularPittsburgh, 2015). Early historic maps show several small islands in the river around the Northshore of Pittsburgh. Chateau appears to perhaps have been an island at one point, the land wet and marshy, perhaps completely submerged before the mass settlement of the areas, by the 1800's the island has been replaced by land [Image 5.1].

People have long been altering the environment to effectively produce a landscape that better fits their needs. Even the Amazon rainforest is suspected to be at least 11.8 percent "human engineering over a long period of time (Cardinal-Pett, 2016, pg3). Every settlement pattern is evident from the earliest inhabitants to the ones that occupy the

IMAGE 5.1: COMPOSITE: OHIO RIVER. 1796. (CROPPED)

urban landscape today. Pittsburgh is a city built upon the water that flows through it [Figure 5.2]. People have inhabited this region for over 16,000 years, the earliest site known in North America, the Meadowcroft Rockshelter in Washington County which borders the south-west part of Allegheny County (Journals.psu.edu, 2009). Many native tribes such as the Adena, inhabited the region throughout various times. Amongst the first of the known peoples were the Adena culture, the “pre-contact American Indian culture” who lived in southwestern Pennsylvania and other neighboring states in the region. The Adena are known for living along and close to rivers, as well as being mound builders. Built intentionally with symbolism, or perhaps political motives, mounds (or

A black silhouette of the Pittsburgh skyline is positioned at the bottom of the page, behind the word 'timeline'. It features several buildings of varying heights, including a prominent one with a pointed roof on the left and a tall, rectangular building in the center.

timeline

artificial hills), are "one of the oldest and most persistent signs of the collective construction" (Cardinal-Pett, 2016, p25). Often made from earth, stone, shells and even garbage these mounds are believed to be used for rituals pertaining to burial, hunting, fishing, festivities or forging. With a regional network of more than 500 sites throughout Pennsylvania, Ohio, Indian, West Virginia and Kentucky, Appalachia, the Adena are thought to have had a "vibrant and affluent regional network" (Cardinal-Pett, 2016, p45). They were eventually succeeded by the Ohio Hopewell culture who continued the tradition of mound building and then later the Iroquois, Shawnee, Lenape and Seneca Tribes inhabited the region. Overtime to become 'civilized', groups of people have attempted to "conquer and tame nature" (Francis and Hester, 1990, p241-2). In the Pittsburgh region, this meant the arrival of the European settlers.

Recognizing the importance of the confluence of the Monongahela and Allegheny Rivers for transportation and trade, the French were the first Europeans to settle the area in the early 1750s and had established Fort Duquesne by 1754 laying claim and triggering the French and Indian War. The British, worried that the French would gain an advantage in this 'New World', launched failed attempts to seize the fort. On the evening of November 24, 1758, the British advanced and planned to attack the following day only to discover the French had abandoned the fort and burned it to the ground. Taking control of the confluence, the British completed Fort Pitt in 1761.

dis-connection

Industrialization

Industrialization happened in Pittsburgh much like it did in the rest of the world [Image 6.1]. Research conducted in the last thirty years describes this as more than the technological advancements of the late eighteenth-early nineteenth century. These 'waves' of industrialization occurred due to varying underlying reasons and interactions between "ecology, forms of government, culture, religion, faith and purchasing power" (Braae, 2015, p22). Pittsburgh, a blossoming city with navigable rivers, rich in natural resources and home to some of the most innovative minds in

IMAGE 6.1: CHATEAU, MANCHESTER. PLATE 15. 1890. [COMPOSITE]

America at the time would soon make a name for itself during this epic age. The rivers in Pittsburgh helped make one of the first successful industries in Pittsburgh, boatbuilding. In 1811, the invention of the steamboat changed the way people traveled. No longer would a boat be sent solely one-way down the Ohio River and Mississippi Rivers to the Gulf of Mexico, there was a possibility of roundtrip journeys. With the ability to travel upstream, boats could now more easily access the Missouri River to the North. This made it possible to go from Pittsburgh to Montana and many places in between. With travel possible to all points on the Mississippi onward to Montana, Pittsburgh quickly became an arrival point for settlers looking to move west earning the reputation as the 'Gateway to the West'. Some historians believe more people traveled west on a steamboat than they did in covered wagons (Public Rights on Rivers).

Abundant with raw resources and the ability to transport goods over a great distance, industry in Pittsburgh grew significantly. Hard-working, skilled craftspeople most of whom were recent immigrants to the country helped turn the city into an "industrial giant---America's steel and glass capital" (Journals.psu.edu, 2009). The glass industry, by 1840 had no competition, and a decade later Pittsburgh became known as the 'Iron City'. Even as the country sat on the verge of the civil war, Pittsburgh flourished (Journals.psu.edu, 2009). Innovators like Andrew Carnegie and George Ferris (inventor of the Ferris wheel) made Pittsburgh a household name by the turn of the century.

IMAGE 6.2: PITTSBURGH SERIES. H.C. TORRACE. 1919

“There is one evening scene in Pittsburg which no visitor should miss. Owing to the abruptness of the hill behind the town, there is a street along the edge of a bluff, from which you can look directly down upon all that part of the city which lies low, near the level of the rivers. On the evening of this dark day, we were conducted to the edge of the abyss, and looked over the iron railing upon the most striking spectacle we ever beheld. The entire space lying between the hills was filled with blackest smoke, from out of which the hidden chimneys sent forth tongues of flame, while from the depths of the abyss came up the noise of hundreds of steam-hammers. There would be moments when no flames were visible; but soon the wind would force the smoky curtains aside, and the whole black expanse would be dimly lighted with dull wreaths of fire. It is an unprofitable business, view-hunting; but if anyone would enjoy a spectacle as striking as Niagara, he may do so by simply walking up a long hill to Cliff Street in Pittsburg, and looking over into -- hell with the lid taken off.”

- JAMES PARTON, THE ATLANTIC MONTHLY, 1868

Industry in Pittsburgh, however, came at a cost [Image 6.2]. Air was black as smoke, sewage filled rivers and streams while slag and refuse filled the valleys. The appearance of Pittsburgh was not the only issue that was accompanied by industry. Pollutants like diesel fuel, degreasing agents, PCB oils, arsenic, cadmium, lead, etc. are commonly associated with railroad, steel and iron operations leached into the soil and water. Raw sewage was dumped into the rivers without filtration. Relying on the river for drinking water, typhoid fever and cholera ran rampant through Pittsburgh in the mid to late 1800's and early 1900's. In the last decade of the 19th century, area physicians and a persistent women's advocacy group had raised enough alarm

**IMAGE 6.3: SEWER SYSTEM. PLATE
21, G. M. HOPKINS & CO. 1890.**

about the need for a water filtration system. Plan for implementation began in the late 1890's and executed by 1907. However, sewage treatment would not be put into practice until 1958.

Prior to 1867, Manchester/Chateau was a part of Allegheny City before becoming incorporated into Pittsburgh. Manchester became both a business hub and a "thriving residential area, with a vibrant African-American community" (Eustis, 2017). The residents of Manchester discussed the importance of diversity in their neighborhood during the community meeting on August 28, 2017. How the people here have always been intertwined; company owner living next door to a factory worker, people of all races and cultures - all living within proximity to the companies/industries they owned and worked for. During the industrial revolution, what is now Chateau in Manchester, was predominately heavy industries such as steel, glass, and oil. These industries and other forms of manufacturing were dependent on the river for transportation of goods, water resources and for disposal of waste products. Railroad tracks dominated the river's edge throughout Pittsburgh and in Chateau, limiting access and creating hazardous crossings [Image 6.4]. During the 1940's after the end of WWII, the suburbs outside of the city limits grew rapidly, as it did in most of the country. The construction of the Interstate Highway System along with racial tensions, segregation, and economic inequality, the United States experienced a phenomenon known as 'white flight'; the mass migration of middle class and working-class Americans of European descent from the cities to the suburbs. The burgeoning suburbs along with the changing industry spawned what is known as the 'Pittsburgh

*Copyright: Historical Society
of Western Pennsylvania*

LOOKING WEST, FROM FOOT BRIDGE OVER
OHIO RIVER BOULEVARD

IMAGE 6.4:[ABOVE]
NORTH SIDE LOOKING TOWARDS
CHATEAU STREET. N.D.

[BELOW]
VIEWS OF THE OHIO RIVER
HIGHLIGHTED IN SAME IMAGE.

Renaissance', between 1946 and 1973. This period redeveloped, on a large scale the city's urban environment. One of these projects sought to expand an industrial park and integrate the city with the suburbs by decreasing the commute time through the construction of Ohio River Boulevard (PA Route 65).

THE 'GREAT WALL OF MANCHESTER'

In 1961 construction on the raised highway began [Image 6.5]. Seven hundred and twenty-three families and businesses were relocated to build a two-story, concrete and brick wall dividing the neighborhood in two, Manchester and the new industrial park along the waterfront, Chateau. All but a few left Chateau and little visual evidence remains that there is anyone left living there today. The population of Manchester suffered too, and in 20 years lost nearly 28 percent of their residents (Eustis, 2017). With the erection of the raised highway residents of Manchester lost views and limited the connections to the riverfront along the Ohio River. There are two underpasses that allow people to pass from one neighborhood to the other. While both nodes provide access to the river, the dark and poorly lit underpasses below the boulevard are also loud and can be dangerous residents claim. Beaver and Chateau street, which both travel in one direction with 3-4 lanes in parts, run along the length of the highway on the ground level. Although the speed limit on both roads is 35 mph the lack of traffic lights along with the look and feel of an interstate causes most traffic to travel faster than posted. The number of lanes, lack of traffic lights, amount of traffic and the speeds at which vehicles

**IMAGE 6.5: CHATEAU STREET WEST RE-
DEVELOPMENT PROJECT. JAMES MCCLAIN.
1963.**

travel on Beaver and Chateau street create numerous hazards for pedestrians and bicyclists, especially people with limited capabilities and children.

Walking down the tree-lined, brick-laden sidewalks I can get an image of what Chateau must have looked like before redevelopment in the 1960's, late 19th-century Victorian homes and a peek into the epic industrial age that occurred here during that time. Today through Manchester and Chateau are fragmented

pieces of what they once were, not unlike the sidewalks that are now raised and broken by the roots of the trees. Divided in two by what has been dubbed the 'Great Wall of Manchester', the population in Chateau drastically declined and is estimated today to be anywhere from three to eleven residents. Manchester's population has also been declining since the 1940's, although recent interest due to its walkable location and historic homes have brought in developers and 'house flippers' who recognize its potential to be an up and coming neighborhood. Residents hope that this revitalization doesn't lead to a lack of affordable housing and gentrification, erasing the historic role of diversity in the neighborhood. The community has taken a number of steps to fix up abandoned and vacant properties, renovating them and then selling them at a lower, more affordable costs in attempts to limit the 'flipping' of the historic houses in Manchester. Residents are also encouraged to participate in a grant that helps match the money they put forth towards a facade renewal. Although there is a community garden, parks, community gathering areas and green space are also limited and in need of repair. Opportunities for outdoor recreation nearby are slim, facilities like the community pool have been abandoned and the athletic fields need refurbishing.

Several cities that, like Pittsburgh, built raised highways in the late 1950s and 1960s as a sign of economic prosperity have begun to remove them. While the federal government often covered 90 percent of the cost to build these interstates, the burden is now placed upon the cities or states. Although it seemed like a good

idea at the time, many urban areas, like Manchester and Chateau, suffered as a result, doing more harm than good. Displacement and segregation of lower class neighborhoods was the norm. After the systems were built they contributed to more air and noise pollution and depreciated the surrounding properties. As they have begun to deteriorate many cities are finding that the cost to maintain and repair this aging infrastructure is often more expensive than it is to remove them completely and level the roads. Once removed, cities like Milwaukee and Boston have turned the space into parks and boulevards. This redevelopment has been accompanied by not only improvements in aesthetics and safety but also in property value.

The removal of this barrier is a vital part of this design for both the success of Chateau and for the residents of Manchester and presents several design opportunities exist through the leveling of Ohio River Boulevard. The primary opportunity is the re-establishment of linear connections to the riverfront. This is beneficial for traffic patterns between the two neighborhoods, as well as, connections to other areas of Pittsburgh. Safe connections through enhancement of intersections, reduced speed limits and traffic lights can be established along the new boulevard to allow for bike lanes, crosswalks, and decreased severity of traffic accidents. Currently, the pavement to pavement span of the boulevard is 271'; merging the traffic lanes creates space for elements like stormwater management, pocket parks, or transportation stops and shelters while decreasing the amount of pavement.

**'VACANCY': PERCENT OF IMPERVIOUSNESS, LACK OF GREEN SPACE/
TREE CANOPY & RIVER ACCESS**

Chateau is a sea of pavement and buildings with large floor area ratios (FAR), with 82.6 percent of the land cover an impervious surface [Figure 6.6]. Several of the parking lots regularly sit empty, others act as vehicle storage for various transportation companies, both underutilize this valuable space. Compacting these companies into a parking garage or two would condense the vehicles and allow for more development and/or green space. There are three privately owned marinas on the site, consuming much of the land along the river's

STAIR ACCESS TO
CSO OUTLET/
LEGALITY OF PUBLIC
ACCESS
UNKNOWN

VEHICULAR/
PEDESTRIAN ACCESS

PRIVATE PROPERTY/
NO TRESPASSING

STEEP SLOPES/
NO ACCESS/
PROPERTY
OWNERSHIP
UNKNOWN

OFF-SITE ACCESS
POINTS

IMAGE: GOOGLE EARTH PRO

FIGURE 6.7: CURRENT RIVER ACCESSIBILITY

edge. The city owns much of the remaining property severely limiting the opportunity for public access [Figure 6.7].

The Three Rivers Heritage Trail is the only public 'green space' that exists in Chateau, there are no parks or open spaces. Although the trail runs along the river for the length of the site there is no marked public access to the river's edge. It is unknown if one would be considered trespassing if they were to fish from the edge. Although there are a few street trees most of the vegetation lies unkempt, along the river bank. Due to the lack of tree canopy the summer temperatures in Chateau is higher than other neighborhoods (with higher percentages

of tree canopy coverage), a phenomenon is known as the Heat Island Effect (the warming and then release of heat from pavement, roofs, etc.). This excess heat can cause a variety of problems ranging from health issues like heat stroke to a greater dependence on energy to cool surrounding buildings, Tree canopy coverage combats the heat island effect and can reduce temperatures in the summer from 2-9 degrees. Trees also play a valuable role in stormwater management and the reduction of air pollution with the ability to absorb over 1,600 gallons of rainwater a year and sequester around 48 pounds of CO₂ [Figure 6.8-9]. Another benefit to urban street trees is the reduction of indoor particulate matter by more than 50 percent (Maher, B.A. et al).

tree species present

ACER	PYRUS
MALUS	CATALPA
AESCULUS	QUERCUS
PLATANUS	FRAXINUS
AILANTHUS	TILIA
PRUNUS	GINKGO
CARPINUS	ULMUS

tree canopy vs. temperature

TREE CANOPY: %
MEAN SUMMER
TEMPERATURE: °F

FIGURE 6.8 &
FIGURE 6.9:

reconnection

Clean Water Act

“There were all kinds of signs—’No swimming,’ ‘No boating,’ ‘Use at your own risk,’ ‘Polluted water.’ It didn’t even look like water. It looked like oil and grease and paint.”

- ELAINE MARSH

In 1969 the Cuyahoga River caught on fire, and although it had been on fire at least thirteen times since 1868, this time would stand out among the rest. This time, despite other critical events like the Vietnam War, sparked the newly elected President Richard Nixon, to take a stand about air and water pollution declaring it a 'top priority' (Grant, 2015). The Clean Water Act was passed in 1972 with the goal of making the water in the United States 'swimmable and fishable' by 1983 and to eliminate all toxic discharges by 1985.

While these goals were not met the overall health of the nation's rivers has improved - to an extent. In Pittsburgh, there is stigma and caution surrounding pollution, as well as, health and safety concerns regarding recreational use and fishing in the rivers these days, and rightfully so. In 2010, the Ohio River discharged 31.1 million pounds of toxic discharges, equivalent to the weight of 3,729,017 gallons of water or, ranking it the most polluted waterway in the nation (Hopey, 2012). Combined sewage, where both stormwater and sewage use the same pipes during rain events, is still prevalent throughout Chateau, the city of Pittsburgh and other surrounding areas. Warnings are released about contact with the water after storms as this can lead to a host of health hazards in the rivers such as "harmful bacteria, parasites, viruses, pharmaceuticals, synthetic hormones, heavy metals, petroleum products, trash, and sediment" (Cleanriverscampaign.org, n.d.). Suggestions made by the PA Fish and Boat Commission warn those who fish about limiting the amount of catch they eat, especially among certain species, to reduce exposure to toxins that have accumulated in the fish populations found in the three rivers. In Pittsburgh, in the Ohio River, because of PCB levels in the fish recommendations for Freshwater Drum, Largemouth Bass, Black Crappie, Sauger, Walleye, Smallmouth Bass and White Crappie and Spotted Bass are limited to one meal a month; All suckers, Flathead Catfish, Hybrid-Striped Bass, White Bass and Channel Catfish less than 18" should be limited to six meals a year; Carp and Channel Catfish greater than 18" should not be consumed at all. Much of the pollution today, however, is less

IMAGES 7.1-7.2[TOP & BOTTOM]: GOOGLE, MAP DATA 2018

noticeable than it once was, visibly limited to mostly sediment after a rainfall or combined sewer overflow, but the perception will likely linger.

IMPORTANCE OF REVITALIZATION OF FORMER HEAVY INDUSTRIAL WATERFRONTS

Although rivers have been the 'back door' of our societies for a long time, "a place to hide unsightly factories, sewage plants, and garbage dumps. Access to the river has been blocked by industrial uses, barbed-wire fences and, most significantly, railroad tracks" (Riverkeeper.org, n.d.). 'Recycling' these former industrial heavy areas can be looked at and regarded as a "natural component of every dynamically evolving city. As such is an indicator of a healthy urban growth" (Braae, 2015, p80). These landscapes have become a "new type of cultural heritage" being "folded back into the urban context" (Braae, 2015, p68, 43). Luckily for designers, there is no 'one-size fits all' solution to a problem we can, however, know what has worked and see how it could apply it. This gives us the unique opportunity to get creative with what has been determined an issue or constraint and to take advantage of existing opportunities. In the end, the goal is not to eliminate or erase the traces of the neighborhood's industrial heritage because it is a record of its past and should be remembered in the future. Pittsburgh has the opportunity to re-imagine these former industrial sites along the three rivers, connecting them to form a larger picture [Image 7.1-2]. The potential to restore and provide a clean and

ecologically functioning river system and more resilient Pittsburgh.

Reusing brownfields decreases the dependency on undeveloped land (greenfields). Densifying the urban population creates many benefits for the residents that live there such as access to; public transportation (use decreases the city's burden of road maintenance and infrastructure), amenities such as hospitals and healthcare, schools/education, etc. Railway lines no longer in use can offer different opportunities to connect lines connecting not only for people but also for biodiversity of wildlife and vegetation. Building upon the existing assets enhances the industrial cultural heritage of the site.

Pittsburgh has managed to adapt the city to the changing industrial needs of the local and global markets over the past 100 years. Once dominate industries such as timber, coal, steel, glass have peaked and fallen but Pittsburgh today, with the same hard work and determination, has persevered by relying on the assets they still have and re-inventing themselves for the future. Moving towards innovative technology and Pittsburgh on a whole still heavily rely on their rivers for an inexpensive method of transportation for goods and services, and according to the Army Corp of Engineers is the "2nd busiest inland port and the 22nd busiest port of any kind in the nation" (Lrp.usace.army.mil, 2017).

CURRENT 'GREEN' PROJECTS IN PITTSBURGH

Pittsburgh has begun to encourage and implement a number of 'green' projects many of which connect with the rivers. In recent years improvements have been made along the river in the Northshore near the stadiums and casino. One proposed development plan for the Strip District, Lawrenceville, "The Green Boulevard reimagines and repurposes the underutilized Allegheny Riverfront and rail corridors to improve mobility and transportation, create new open space, and spur economic revitalization" (riverlifepgh.org). The site when completed will feature both active and passive recreational activities, connecting with trails and commuter bike lanes. Another project near the Mattress Factory is looking at managing stormwater through the 'greening' of the alleys in the area. In terms of sustainable architecture, Pittsburgh has been a leader since the early 1990's. Boasting projects like Phipps Conservatory and Botanical Gardens: Center for Sustainable Landscapes (LEED Platinum) and the Children's Museum of Pittsburgh (LEED Silver), among others. Pittsburgh is also home to the "first "green" convention center and world's largest "green" building", David L. Lawrence Convention Center (Visit Pittsburgh, n.d.).

through policy: the water's edge

The river's edge is as vital as the river itself. The riparian zone, the land where meets the river's edge or the banks of a river, provides several ecological services and hosts a variety of different plant and animal species. Due to its proximity to the water and biological richness, the riparian area has been a nutritional source long before cities were built. From here, one can fish standing along the banks or use the abundance of waterfowl for a steady food source. It has been debated throughout history who 'owns' or has rights to this land. Rivers have been used as boundaries, delineating and dividing territories or regions. Due to the evolving and ever-changing nature of the river's edge, the deepest part of the river, the thalweg, is most often used as a dividing line. This imaginary line does nothing to divide the water physically, its fluid form knows only the boundaries of the land.

It should come to no surprise that property along rivers, and other bodies of water, are often sold for more compared to further inland. In recent decades, cities and developers have recognized this premium and have looked towards the redevelopment of the urban spaces along their rivers to help increase economic opportunities that these areas have to offer. Cities such as Chicago, San Antonio, and Pittsburgh have recognized the economic importance of these areas.

With the abandonment of heavy industry, such as the manufacturing of glass and steel, and deserted railroads many cities have looked to reuse them for recreation and development. Organizations such as Riverlife, a non-profit working towards a vision for the three rivers in Pittsburgh, who assist various community stakeholders (developers, community members, property owners, etc.) "to create new parks, trails, real estate development, and riverfront art and events" while encouraging public access even as private developments are built along the river's edge (Riverlife, 2017). Larger collaborative efforts across the country have helped to create a network of trails from the well-graded, abandoned railroads for bicycling and pedestrian activities. Monumental examples are the Great Allegheny Passage and the C&O Canal Towpath which follows alongside several rivers for 333 miles from Pittsburgh to Washington, DC.

Although it is not currently in place, Pittsburgh over the past couple of years has been working with a variety of partners including Riverlife to improve the former industrial areas along the rivers and the quality of the rivers. Their mission is to rezone the declining industrial waterfronts along the three rivers to allow for a variety of uses rather than just one. Riverlife's website states that "the Allegheny, Monongahela, and Ohio Rivers and their riverfronts are valuable cultural and ecological resources of city-wide and regional significance that contribute to the public's economic, environmental, recreational, and aesthetic well-being. The City intends to improve the ecological health of its rivers and riverfronts for the benefit of the public through regulation of 6

development along its riverfronts. Regulation through the Riverfront (RIV) Zoning District [Figure 7.3-4] will limit potentially detrimental impacts near the riverfronts while allowing for high-quality, sustainable development and preservation of the diverse character of the City's riverfronts. The RIV Riverfront Zoning District (pghriverfrontzoning.com) is intended to promote the development of the City's riverfronts in a manner that:

- a. Acknowledges the historic diversity of uses, the varied character, and the economic value of the riverfronts;
- b. Facilitates mixed-use development that physically and functionally integrates
with the riverfront and strengthens pedestrian connections to the riverfronts;
- c. Maintains and creates connections between the riverfronts and neighborhoods
within the City;
- d. Protects areas of industrial use from encroachment of incompatible uses;
- e. Creates an environment that supports multiple modes of transportation;
- f. Promotes sustainable development;
- g. Improves of the ecological health of the rivers;
- h. Conserves and enhances riverbanks and riverfronts;
- i. Conserves, restores, and enhances native riverbank and

aquatic plant life,

improves river ecosystem health, and supports biodiversity; and

j. Improves the scenic qualities and the public's enjoyment of riverfronts by

preserving, creating, and enhancing public views and access to the riverfronts.

K. Reconnect people to the rivers, connect destinations, maximize public access."

**RIVERLIFE'S CORE PRINCIPLES OF DEVELOPMENT ALONG THE RIVER:
(RIVERLIFEPGH.ORG)**

- "Feature waterfront as the front door
- Showcase the river's history
- Activate the waterfront
- Limit obstacles and connect to the river
- Engage with the water
- Connect seamlessly along the riverfront and into neighborhoods
- Repair and enhance the environment
- Employ high-quality architectural materials and sustainable engineering practices.
- Riparian buffer no less than 75' with 3 zones of buffer (pg 7)
- Have perpendicular connections every 400-600'
- Connections should be publicly accessible
- Public activities, events, cafes (permanent and temporary) liven up

space."

RIVERFRONT- INDUSTRIAL MIXED USE
(PGHRIVERFRONTZONING.COM)

"Max building height: 150 feet

2-unit, 3-unit, multi-unit residential, smaller assisted

living permitted (less than 8 sleeping rooms)

Agriculture with beekeeping (limited)

Music/Art Studio, animal care, grocery store, financial institution, bed and breakfast, hotels, club/music venue, cultural center, educational classroom, library, indoor recreation, religious assembly, restaurants (no fast food), safety service, sidewalk cafes, parks and recreation, office (limited to 10,000 square feet), medical marijuana growing and processing"

RIVERFRONT-GENERAL INDUSTRIAL (PGHRIVERFRONTZONING.COM)

"Utility, freight terminal, construction, funeral home, labs, manufacturing and assembly, parks and recreation, office (limited to 10,000 square feet), medical marijuana growing and processing, recycling collection"

landmarks

Drew Matheison
Center

Bicycle Heaven &
Johnny Angels

Manchester
Elementary School

Heinz Field

Carnegie
Science Center

Rivers
Casino

FIGURE 7.5: LANDMARKS

Chateau's location makes it a prime spot for redevelopment with its proximity to amenities like Allegheny General hospital and attractions such as Carnegie Science Center, Rivers Casino Pittsburgh, Heinz Field, PNC Park, National Aviary, Randyland, Mattress Factory Museum, the Andy Warhol Museum, Stage AE, and the Children's Museum of Pittsburgh [Figure 7.5]. Given the opportunity to design for the future, Pittsburgh should pass regulations mandating new development provides public access along the river's edge. The legislation would continue to break down socio and economic barriers to the river and water-related activities.

**FIGURE 8.1: POPULATION
COMPARISON**

case studies:

PITTSBURGH POPULATION: 303,625
(2016 estimate)

302,407
(2017 estimate)

PITTSBURGH METRO POPULATION:

2,353,045

‘Superilles’

BARCELONA, SPAIN

Barcelona had grown tired of traffic congestion, poor air quality, unsafe/lack of bicycle routes and infrequent of public transportation. With 99% of the population farther than 250m (0.155 miles) from a bus stop, an average frequency of twelve minutes of wait time for a bus and failure of four stations (out of 7) to meet the EU standards for nitrous oxide (NO₂) emissions and particulate matter, Barcelona knew the system needed an overhaul if things were to change. In 2000 the city began to look at the “possibility of a new more efficient bus network, reducing the number of routes, but keeping the same number of buses and increasing the frequency to cut waiting times and traffic” (Valerio, 2016). By reconfiguring the existing urban layout into a Director of the

Road Hierarchy

FIGURE 8.2: 'SUPERILLES'

Urban Ecology Agency of Barcelona and designer, Salvador Rueda, looked at implementing a radical movement throughout the entire city of Barcelona. Rueda, who also leads the projects' implementation, came up with the idea in 2002 while designing a new bus network that would improve the efficiency of the system. The idea behind these "Superilles" is fairly simple [Figure 8.2]; you group together, if possible, nine city blocks and only allow through traffic (buses, trucks, etc.) "between and among those blocks" (Vox, 2016). Local traffic is allowed on the interior streets which use reduced speed limits and a series of one-way loops to discourage use of the streets. Working in phases, the first phase reduces the speed of interior streets to a max speed of 20km/h (12.5 mph) and for the most part, can easily be implemented through signage and traffic signals. The second phase removes curbside parking limiting parking to off-street garages and further reduces the speed limit of interior streets to 10km/h (6 mph) to all for the streets to host "games, sports, and cultural activities such as cinema" (Valerio, 2016).

In 2014, Barcelona published an Urban Mobility Plan designed to "give the city back to the people (and reduce pollution)" with four main objectives in mind; safe mobility, sustainable mobility, equitable mobility and efficient mobility (Urban Mobility Plan of Barcelona). With the approval of the Urban Mobility Plan and "Superilles", Barcelona has already added 186 miles of bicycle lanes, green space and has begun to improve the efficiency of the bus system with hope to increase the frequency of buses to every five to six minutes. Rueda estimates

that by the time the second phase has been completed there will be a 61% reduction in roads "dedicated to motorized traffic, 94% of space on interior streets will be reclaimed by pedestrians, 94% of the population "will not be exposed to dangerous levels of particulate matter" and 73.5% will "not experience noise levels over 65 dB (Valerio, 2016). After phase two is complete it is estimated that the volume of traffic will further reduce by 21% (Valerio, 2016).

The Urban Mobility Plan also addresses that it will take more than the city implementation of a design in order for this idea to be successful and looks at ways to publicizing the advantages of walking and using bicycles as means of transportation. Through community outreach and communication, Barcelona is promoting the "role of pedestrians" in creating a sustainable city and the health benefits that will accompany this lifestyle. Focusing on safety, improving the bicycle lane networks and theft prevention the city also hopes to increase bike ridership to help alleviate traffic and pollution.

IMAGE 8.3: TELLISKIVI, JUNE 2017.

Telliskivi 'Creative City'

TALLINN, ESTONIA

POPULATION: 449,604 (2018)

A visitor to Old Town, a UNESCO World Heritage Site in Tallinn, Estonia, may not know to walk 10-15 minutes west, take the tunnel under the busy street of Toompuiestee; to cross the tracks at the train stations only to then follow the abandoned railroad to a former industrial park --- unless you have been tipped off by a local. In recent years Telliskivi ('Creative City') [Images 8.3-8.8], located in the old Baltic Railways industrial complex, has become a cultural center in the city of Tallinn. A mecca for street art and creative minds, the space entertains a 24-hour, public art gallery and hosts more than 600 cultural events each year. Restaurants, bars, shops, outdoor recreational activities and attractive night lighting have created a lively and inviting atmosphere that has become a successful reinvention of the dilapidated space.

IMAGE 8.4-8.8: TELLISKIVI, JUNE 2017

A 15 MINUTE WALK FROM
OLD TOWN WILL LEAD
YOU TO ONE OF TALLINN,
ESTONIA'S NEWEST
CULTURAL MECCA.

South Harbour School Denmark

COPENHAGEN, DENMARK

POPULATION: 5,707,251 (2016)

Copenhagen is a rapidly growing city in Denmark. With the need for additional infrastructure, such as schools, Denmark embarked on a new and different type of public school. Placed strategically along the harbor, the South Harbour School seeks to integrate maritime, science and sustainability into the curriculum. There is a large emphasis on the connection between indoor and outdoor learning. Students are exposed to a variety of non-traditional studies such as sailing, and are taught everything from learning how to fish, to then prepare the fish to eat and finally how to cook it. JJW Architects along with PK3 Landskab, JJW Landscape designed the building and grounds with the students at the forefront of the design. A long staircase connects the city and school to the water. The roofs of the building activated spaces that allow for play, lessons, connections and views of the city and harbour.

San Antonio Riverwalk

SAN ANTONIO, TEXAS

POPULATION: 1,492,510 (2016 estimate)

1,511,946 (2017 estimate)

Surrounded by 18th-century buildings the San Antonio Riverwalk designed by Robert H. H. Hugman in 1929, has become an international landmark and focal point within the city attracting more than 5000 people per day on the weekends and over 11.5 million people annually [Images 8.9-8.14]. Although the project did not gain any momentum until the 1940's, phases of the plan began implementation with the addition of hotels, restaurants, and shops in the downtown area in

IMAGES 8.9-8.14: SAN ANTONIO RIVERWALK

IMAGE 8.9-8.14: SAN

the 1960's and have completed stretches of the walk as recently as 2013. Stretching over fifteen miles this linear walk explores many different spaces from constructed gardens to naturalized river edges. Beautiful gardens and well-implemented vegetation create a welcoming atmosphere for both residents and tourists. This bend in the river creates a unique experience as one strolls or boats through the downtown section of the Riverwalk. Basements of the buildings along the street level have been converted into cafes, restaurants, and shops. Street level access points, stores, and buildings with both stairs and elevators make the Riverwalk universally accessible. The sunlight sparkles and fractures on the surface of the water stippled by the leaves of the trees during the day, and at night dances with different colors of light along the walk. Though the city and the river differ quite a bit in scale and culture, this Riverwalk creates a variety of small, intimate spaces and different design details. There is a sense of mystery and curiosity that is peaked as you walk through the space, following the bends of the river and the play of light and the shadows from the shade that create an overall restorative experience. Eight feet wide in most places, certain parts of the walk like the portion downtown can feel a bit crowded and overrun with tourists at times, while other places are quieter and utilized more by residents.

the Pearl District

PORTLAND, OREGON

POPULATION: 639,863 (2016 estimate)

647,805 (2017 estimate)

Located in downtown Portland, Oregon, the Pearl District [Images 8.15-8.19] is the former home to industrial and railroad-based operations during the early 20th century. However, like much of the United States, the once-booming industrial industry and the changing of transportation patterns lead to a decline of the area. Over the next couple of decades, many of the buildings sat vacant and forgotten. In 1978, an artist by the name of Ted Savinar began renting one of the spaces in the area. By the mid-1980's art galleries began to open due

IMAGE: 8.15 OVERLOOKING THE PEARL DISTRICT

IMAGES 8.16-8.19: THE PEARL DISTRICT

to the growing number of artists who now lived in the district. It was around this time that others started recognizing the potential in the former industrial warehouses and began to purchase and renovate the buildings. In 1992 and 1994 Portland released the River District Vision Plan and River District Development Plan, respectively, which helped to create the River District Urban Renewal Plan (1998). This plan helped to provide incentives for those that wanted to invest and improve the former industrial waterfronts. In 2000, various stakeholders created the "Pearl District Development Plan, A Future Vision for a Neighborhood in Transition". Numerous cultural amenities downtown, as well as an urban growth boundary, made this area a prime location for redevelopment. Instead of eliminating the former industrial buildings, they were adapted and reused to house a variety of business such as DIESEL, art galleries, and restaurants, as well as residential space. Redevelopment of the Pearl District has helped to breathe life back into the area while meeting both regional and state goals for growth management.

Wide, tree-lined sidewalks allow use by both bicyclists and pedestrians with enough space for outdoor dining from the numerous cafes and restaurants. Several parks and green space exist throughout the neighborhood. Although the railroad still runs along the river the south-west corner of the site begins a waterfront park trail and extended park along the water's edge. A pedestrian bridge crosses the tracks and from there several other access points to the river's edge, both naturalized and designed exist.

IMAGES 8.20-8.21: CHICAGO RIVERWALK

Chicago Riverwalk

CHICAGO, ILLINOIS

POPULATION: 2,704,958 (2016 estimate)

2,716,450 (2017 estimate)

The Chicago Riverwalk [Images 8.20-8.25] is a modern-day success story drawing Chicago, IL tourists from around the world. Completed in 2016, the 1.25-mile path runs along the Chicago River. Although once a dumping ground for the slaughterhouses and other industries, the city of Chicago recognized the importance of access to the river by both residents and visitors. Businesses and development have spawned from the spaces created along the river, as well as access the public did not have before. The success of this project alone has inspired and encouraged other cities to rethink their riverfront spaces. Distinctive regions or 'rooms'; The Marina, The Cove, The

IMAGES 8.22-8.24: CHICAGO RIVERWALK

IMAGES 8.25: CHICAGO RIVERWALK

River Theater, The Swimming Hole, The Jetty and The Boardwalk help to divide and give the spaces a sense of place. These 'rooms' provide numerous access points to the river allowing boats to dock or the launching of kayaks. The Riverwalk is used for many different forms of recreation and is boasted as an 'adult playground'. Although many use it to 'play', the walk is a point for leisure and relaxation. Restaurants provide outdoor seating or a way to grab a quick bite to eat. Public art lines the pedestrian trail boasting bright colors that enliven the space. Vegetation planted along the walk was carefully chosen in order to survive periods of both inundation and drought.

inspiration

PITTSBURGH, PA

The following images are existing projects and popular destinations currently in Pittsburgh
[Images 8.26-8.36].

IMAGES 8.26: THE POINT, PITTSBURGH

IMAGES 8.27-8.30: THE CULTURAL DISTRICT & NORTH SHORE

IMAGES 8.31-8.32: THE POINT, PITTSBURGH

IMAGES 8.33: WATER CUBE

IMAGES 8.33-8.36: THE POINT, PITTSBURGH

designing to emphasis connection with the Ohio river

mission statement

To re-establish a **CONNECTION** between the community of Manchester with the Ohio River by improving the urban fabric in Chateau through **WATER-BASED DESIGN**. The goal is to create a **WALKABLE, HUMAN-SCALED** community by promoting the **SAFETY** of bicyclists and pedestrians, **INTEGRATING WATER** features in the built environments, increasing and enhancing the **PUBLIC GREEN SPACE** along the riverfront as well as **TREE CANOPY** coverage throughout while layering its **INDUSTRIAL ARCHITECTURAL HERITAGE** with **SUSTAINABLE** new growth and development. Improving this connection would not only prove to be a valuable asset for the **HEALTH AND WELL-BEING** of both the residents of Manchester and Pittsburgh but also benefit the City and the region both **ECONOMICALLY** and **ENVIRONMENTALLY**.

FIGURE 9.1: WORD MONTAGE

objectives

TO INCREASE ACCESS TO THE OHIO RIVER, SAFE CONNECTIVITY AND MULTIMODAL TRANSPORTATION.

- Re-define connections between Chateau, Manchester, the Ohio river and surrounding areas in Pittsburgh.
- Provide public access points to the river and river's edge.
- Create pedestrian-first circulation.
- Increase access to, and efficiency of multi-modal transportation.

TO INCREASE THE HEALTH AND WELL-BEING OF RESIDENTS AND VISITORS.

- Create restorative environments.
- Maximize River Views.
- Encourage aquatic recreation and therapies.

TO INCREASE HABITAT AND BIODIVERSITY.

- Maintain and enhance vegetation along the water's edge.
- Foster habitat development.
- Increase tree canopy cover.

TO CREATE A MODEL FOR SUSTAINABLE DEVELOPMENT.

- Integrate stormwater management.
- Adaptive reuse of former industrial buildings.
- Revitalize a culturally relevant brownfield.

opportunities

- Provide public access to waterfront
- Recreation
- Industrial Architecture
- Views
- Habitat and Biodiversity

constraints

- Railroad
- Current Zoning regulations
- Walled Highway
- Traffic congestion
- Floodzone

programming

- RIVER ACCESS
- WATER FEATURES
- RESTORATION/THERAPY
- FISHING
- SWIMMING
- BOATING
- OTHER FORMS OF OUTDOOR RECREATION
- PLAY
- CULTURAL AWARENESS
- EDUCATION FOCUSING ON HISTORY, CONNECTIVITY TO
NATURE AND SUSTAINABILITY
- PUBLIC ART
- COMMUNITY GATHERING SPACES
- HABITAT DEVELOPMENT

mapping of design goals & their connectivity

FIGURE 9.2: GOALS AND THEIR CONNECTIVITY

preliminary master plan:

The first part of the design process looked at the existing architectural and other cultural assets. Criteria for decisions about architectural assets that should be preserved to maintain cultural sensitivity were based upon the history of the site and the materials used for building, brick and steel. The majority of existing brick buildings will remain along with two steel hangers currently on site. Reminiscent of the iconic industry and steel mill history that once existed along the waterfront in Chateau, these hangers should be adapted and repurposed into open-air markets or other public spaces.

The next step looked at connectivity. The goal for the connectivity is to reconnect Manchester with the river through a pedestrian-friendly,

FIGURE 9.3: PRELIMINARY MASTER PLAN

redevelopment of Chateau that increases access to the riverfront for all. Focusing on preferential landscapes, water-related activities, sustainable urban development --- and how these elements relate to the Ohio River along with one another, connectivity was developed between Manchester, Chateau and the Ohio. Using the historic street layout, in addition to the current layout, the large blocks in Chateau were broken up, and divided to humanize the scale. By doing this a network of connecting 'pedestrian-first' streets and outer arterial streets can be created similar to the 'superilles' in Barcelona.

The path is perhaps one of the most defining characteristics of a design as it leads one through a space. It instructs the visitor to move through and explore the defined areas in the landscape. Using the existing Three Rivers Heritage Trail and maps of railroads located in Chateau during 1912, paths were created that move throughout the space along the riverfront into Chateau acting as a defining element that helps to unify the space. From here, additional paths were

FIGURE 9.4: 'SKETCH' OF HORIZON GARDEN

created to unite streets and pedestrian corridors where no railroad had existed previously but there was a need for links and additional circulation.

After the path was developed the neighborhood was broken up into four defining districts based upon the relationships of different programming elements. To further clarify the large site, smaller, more intimate regions were developed based upon programming elements that were planned in each district. From here land uses were also assigned to each block.

To create a mounding landscape representative of the historic Native people which will in turn invoke a sense of depth and mystery. Mounds, as well as the existing 'island' on site, conjured a cylindrical theme while the railroad (or idea of one), developed into a line for a contrasting element.

FIGURE 9.5: 'SKETCH' OF RAILROAD GARDEN

Both became repeating elements in the landscape. Another theme is the idea of industrial spaces being reclaimed by nature. Legibility and coherence is reinforced with repeating vegetation of colors and textures. Ideas of industrial spaces being reclaimed by nature.

views

FIGURE 9.6: VIEWS FROM STREETS
PERPENDICULAR TO THE RIVER

**FIGURE 9.6: VIEWS FROM STREETS
PERPENDICULAR TO OHIO RIVER BOULEVARD**

FIGURE 9.7: ARCHITECTURAL ASSETS

building survey

- Adaptive Reuse
- Redevelop
- Landmark

O H I O
R I V E R

FIGURE 9.8: BUILDING SURVEY

- ROADS-1912
- RAILROAD-1912
- CURRENT LAYOUT-2018
- RIVER'S EDGE

FIGURE 9.9: HISTORIC &
CURRENT LAYOUT/CONNECTIVITY

RAILROAD-1912

ROADS-1912

CURRENT LAYOUT-2018

**FIGURE 9.10: AXON SHOWING
LAYOUT/CONNECTIVITY**

HEINZ FIELD

PNC PARK

BLOCK LAYOUT -1912

CURRENT LAYOUT -2018

FIGURE 9.11: AXON SHOWING
BLOCK SIZE/LAYOUT

composite diagram

- SITE BOUNDARY
- MAIN VEHICULAR CIRCULATION
- OHIO RIVER BLVD.
- THREE RIVERS HERITAGE TRAIL
- RAILROADS:1912
- ADAPTIVE REUSE
- REDEVELOP
- LANDMARK
- FEMA FLOODPLAIN
- NODES

FIGURE 9.12: COMPOSITE DIAGRAM

current transportation routes

FIGURE 9.13: COMPOSITE DIAGRAM

annual average daily traffic (AADT)

A map of downtown Oakland, California, showing major roads and traffic data points. The map is oriented with the city center at the top. Major roads like US-19 (Downtown Freeway) and Chateau St. are highlighted in orange. A red dotted line runs horizontally across the map, indicating the location of the traffic data points. Green dots are scattered along the roads, representing individual data points. The map also shows a grid of smaller streets and a body of water (the Oakland Estuary) at the bottom.

US-19 SOUTH.....	16951
US-19 NORTH.....	15598
CHATEAU ST.....	5844
BEAVER AVE.....	4245

number of miles traveled by mode

(for people traveling to Downtown and Oakland in
millions)

1.3 Telecommute

1.5 Human Powered

21.1 Public Transportation

38.2 Motor Vehicle

proposal one: bridge

Ohio River Blvd.
'Bridge'

Arterial Streets

Local Traffic/
Pedestrian/Bicycle

FIGURE 9.14 & 9.15 (NEXT PAGE):
VEHICULAR CIRCULATION PROPOSALS

proposal two: complete street

Ohio River Blvd.
Complete Street

Arterial Streets

Local Traffic/
Pedestrian/Bicycle

0

0.25

0.5

1 Miles

proposed districts

- INDUSTRIAL/ART
- MARINA
- EDUCATION/CULTURE
- MARKET

FIGURE 9.16: PROPOSED DISTRICTS

proposed composite diagram

path development & land use

FIGURE 9.18: PROPOSED LAND USE

preliminary master plan

FIGURE 9.19:
DISTRICTS ARE BROKEN UP
INTO SMALLER 'REGIONS'
BASED ON PROGRAMMING
AND GOALS.

**design
solutions and
recommendations**

final master plan

0 200' 400'

An aerial photograph of a city, likely Pittsburgh, showing a river (the Allegheny River) flowing through it. A large, irregularly shaped area along the riverbank is highlighted with a colorful, abstract pattern of yellow, green, and orange, overlaid with a black grid. This area represents the 'master plan' mentioned in the text. The surrounding city is densely packed with buildings, streets, and green spaces. A large stadium is visible in the lower right quadrant. The text 'master plan in context' is overlaid in the top right corner, and 'DOWNTOWN' is overlaid in the bottom right corner. The image is credited to 'IMAGE: GOOGLE EARTH' in the bottom left corner.

master plan in context

DOWNTOWN

IMAGE: GOOGLE EARTH

connections & nodes

▲ NODES

0 200' 400'

linear viewsheds

0 200' 400'

An aerial photograph of a city waterfront, split vertically. The left side features a yellow grid of blocks along the water, with black dots and lines indicating connections. The right side features a grey grid of blocks, also along the water, with orange and green lines indicating connections. The water is a teal color. The text 'figure/ground' is in the top left, and 'street connections' is in the bottom right.

figure/
ground

street
connections

‘Marsh’

forming the Ohio River. Here you learn that these islands are habitats supporting a variety of animals and species. The bottoms are hollow and have openings allowing for the construction of mussel reefs to help filter the water and act as a hideout for other aquatic life. Wayfinding shows the surrounding landmarks and assets. If you were to continue further, the pedestrian bridge would continue to weave under the West

Islands

As you enter Chateau on the Three Rivers Heritage Trail coming from the various attractions in the North Shore, you approach a series of vegetated, cylindrical, ‘industrial islands’ along the shore of the Ohio River. A universally accessible path rises up and away from the shore. Weaving its way through these micro-habitats, there is a chance to stop and visit two of the islands. While pausing, you can enjoy views towards Mount Washington, Point State Park and the confluence of the Monongahela and Alleghany

End Bridge to the opposite side of the shore.

Leaving the islands following the path back towards Chateau you will look upon a small forest and wetland, a small glimpse of this area before mass settlement and development. This 'region' is host to a variety of native plant and animal species. The trees cool the surrounding summer temperatures, decreasing the heat island effect. The wetland collects grey- and stormwater from the site

with the ability to hold over two million gallons of water decreasing the dependency on the combined sewer system.

Continuing along the river's edge you arrive in the 'Market District'. Along with residential buildings, where one can browse shops, enjoy restaurants or the other amenities. A steel hanger houses an open-air market and patio space create the 'Horizon Garden', framing and reinforcing the view of the Ohio River. The space can host farmers, other vendors or social/ community events. Adjacent to the market large rocks sit stacked upon one another, mimicking the surrounding topography while providing an opportunity to sit and enjoy lunch or climb about. The water feature provides a chance to fill up a water bottle, cool off or relax and listen to the splashing sounds of water as it hits the rocks.

Along the river's edge is a series of steps

Market

Steps

stormwater retention

1" of Rain ~ 27,154 Gallons on 1 Acre

Chateau- 189 Acres

189 Acres ~ 5,132,106 Gallons

The 'Bowl' can hold: 655,958 Gallons of water

Wetland can hold: 2,334,446 Gallons of water

- Each Circular Aqua-texture Parking Garage can hold: 7,396,817 Gallons of water
- (CAN HOLD OFF SITE STORMWATER BEFORE REACHING THE RIVER) ^{x3}

Total Possible Retention: **25, 180, 495** Gallons of water

-or-
nearly **38** Olympic size swimming pools

490% of stormwater on site captured

PERSPECTIVE G: ISLANDS AND MARSH

river to wetland

PERSPECTIVE E: STEEL-HANGER, OPEN-AIR MARKET

PERSPECTIVE F: STEPS TO RIVER ALONG THE THREE RIVERS HERITAGE TRAIL

Bowl

and seating, allowing access and a chance to engage with the river. The pavement is patched with vegetation able to withstand periods of both inundation and drought. Two ADA accessible ramps provide an alternative route for those who do not want to meander to find the easiest way down. Here the land meets the water's edge providing a chance to dip your feet in the cool water, fish or relax by the water's edge. A visitor's center floats on the water providing site information and an

on/off point for Pittsburgh's water taxi or other boat services.

Wandering farther along the trail, one approaches an arcing series of vegetation, radiating away from, and towards the market. The repeating textures and lines create cohesion and legibility of the garden, providing a place of relaxation and restoration. Continuing along, the path gradually slopes toward a bowl-like gathering space where two paths converge. Large, grass-covered stairs engulf the

paths in a circular fashion. Acting as a focal point and landmark this space is adaptable for a variety of functions; outdoor classroom or theatre space, a place to relax, gather, etc. During heavy rain events and flooding the 'bowl' functions as bioretention for the site, collecting 656,000 gallons of stormwater and slowly releasing it into the sewer after a period of influx. Coming out of the 'bowl', you enter the 'Cultural District'. A community center, new Bidwell Training Center and UMPC building with rooftop greenhouses, sit among Bicycle Heaven and Johnny Angel's original location and other public buildings. Among these, another amphibious building makes an appearance bordering the development area. A new school, connected on a linear

Ripple Garden & Expression wall

Education Station

section - 'bowl'

0 10' 40'

section - 'steps'

'Bowl'-p142

'Steps'

PERSPECTIVE D: THE 'BOWL'.

THE 'BOWL' WITH RETENTION

PERSPECTIVE B: EXPRESSION WALL LOOKING TOWARDS THE OHIO RIVER

Beach

axis with the current Pre-K-8th grade school in Manchester, focuses on a curriculum that is strongly integrated with the rivers and nature. The building has the ability to rise up two stories above ground level during flood events, combining innovative technology with education. A colorful playground uses repeating forms, circles and lines, to create different patterns and spaces. Small, playful

mounds screen partially obstruct views into the space, invoking a sense of mystery and curiosity. And with a little imagination, they can even transform into islands surrounded by a pit of lava. A smaller version of the 'bowl', dips into the ground, with the ability to retain stormwater when necessary. One section of this circular element is a smoothed concrete slide. The steps function to lead one out of the bowl but can also be an object of play, or an outdoor classroom depending on the

Outdoor Art Gallery

Duquesne Light Co. Campus

users' wishes and needs. Although it is a part of the school grounds, it is open for the public when not in use.

Continuing to follow the path, the landscape begins to gently roll like ripples in the water and at points slightly hide what lies ahead. If restoration is needed, shallow, grass waves will cradle your body giving you a moment of relaxation and a chance to gaze upon the river. As the ripples end, two paths converge and become separated by a four-foot-high, 'expression wall' sloping upward from the ground, a place for local street artists, or aspiring artist to create temporary works of art. As you leave the space the wall gradually slopes down, disappearing again into the landscape.

From here you enter the 'Marina District' and get a glimpse of the 'beach' behind repeating themes of vegetation and mounds proceeded by a feeling of 'being away'. Following the universally

**PERSPECTIVE A: 'BEACH' & BOARDWALK CONNECTING
CHATEAU WITH THE RIVER**

PERSPECTIVE H: RAILROAD GARDEN LEADING TO 'THE
BREAD FACTORY' AN OUTDOOR ART GALLERY

Ohio River Boulevard

accessible boardwalks down, you enter a space sitting along the edge of the water. Made with grass and permeable pavers instead of traditional sand, you are provided with an opportunity to sunbath by the water. The river water discourages most swimmers, so a free admission, pool sits along the edge for a safe place to swim or float, creating opportunities for people of all income levels. Docked to the land, the pool floats in an inlet at the former marina filtering the river water as it passes by. The water taxi's second, and final stop is also here allowing visitors to easily travel and from this space. An amphibious visitors center encourages water-related activities, while providing classes on boating, kayaking, canoeing, etc. and renting equipment as well. From the beach, you can see

the marina and public boat launch a little farther down the shore.

From here you can continue on the Three Rivers Heritage Trail off the site but not before passing the new Duquesne Light Co. Campus. Condensing the currently scattered offices and storages centers throughout the site, the Duquesne Light Co. has a welcoming plaza space and cohesive vegetation patterns found in other regions on the site. If you choose to stay on site and follow the historic rail lines you would come across 'The Bread Factory', an industrial art warehouse with an outdoor street art and sculpture garden. Pools of water spill over stone, trickling on the surface below, providing a moment of escape and restoration.

Ohio River Boulevard, now lowered, moves with sinuosity mimicking the river it was named after. The curves of the road forces traffic to

slow down as they enter the site. The narrowing of roads, a vegetated median and street trees continue to foster this behavior. Pedestrian and bicycle paths run along the buildings for ease of access to the buildings and for more efficient circulation. 'Buffer zones', created from the serpentine shape of the road, increase the safety of bicyclists and pedestrians while providing opportunities for stormwater management, bus shelters, T-stops/bus shelters and pocket parks. Arterial streets serve much of the traffic and public transportation, running along the border streets of Chateau. The smaller 'green streets' are pedestrian and bicycle first corridors. Vehicles still have access, yet the conditions are safe for a variety of other uses as well. The speed on these connector, 'green streets', is limited to 10 mph. A curb-less design allows for a multifunctional space supporting a range of activities. To eliminate vehicles from driving on pedestrian paths street trees are placed as a buffer and the use of different materials aesthetically delineates the 'road' for drivers. One-way streets through the blocks help to

PERSPECTIVE C: STREET VIEW TOWARDS JOHNNY ANGEL'S GINCHY STUFF & BICYCLE HEAVEN

perspective & section key

WETLAND
SECTION

steel-cut bus shelter concept

discourage thru traffic and parking is placed along the outer blocks. On-street parking for residents and some temporary and ADA parking is also located here eliminating on-street parking on the arterial streets to keep traffic moving smoothly and decreasing.

Currently, there are a number of bus stops in Chateau along the intersection currently there, while the majority of those will remain unchanged those that do not fit along the proposed arterial streets will be moved to one. Bus shelters will accompany each stop to make the wait more hospitable for riders. Citywide transportation routes will be located on bus shelters and are lit by LED lighting at night for easy to read navigation. Two additional stations for the 'T' will be added at the predominant intersections. Although the rail line rises above the ground for the current last two stops on the Northshore, south of the site, it is proposed that it goes again below ground to eliminate adding another raised structure. Placing it below ground will also eliminate the potential for accidents if it was placed at ground-level as a part of the complete street. All proposed paths connect eventually with the Three Rivers Heritage Trail which runs along the river on the west side of the site.

Surrounded by landmarks and amenities, the opportunity for connection to and from Chateau is only as good as the ease at which people can find and locate them. Wayfinding in the form of street art is currently used at Bicycle Heaven and Johnny Angel's which are easily identifiable by the color designs. Invoking the historical industry, laser-cut steel panels equipped with directions and distances will be placed along the trails as well as major intersections. While its proximity to numerous attractions is prevalent, there is a lack of basic amenities such as grocery stores. The addition of these amenities is a valuable part of the design to the future residents of Chateau and to the residents of Manchester.

A-A

0 400 800

B-B

0 400 800

A-A

B-B

C-C

D-D

E-E

C-C

0 400 800

D-D

0 400 800

E-E

0 400 800

current sections

A-A

158

0 400 800

A-A

B-B

C-C

D-D

E-E

C-C

D-D

E-E

COLUMBUS AVE.

N FRANKLIN AVE.

PENNSYLVANIA AVE.

NORTH AVE.

0 400 800

0 400 800

0 400 800

proposed sections

section A-A

Residential Connecting Corridor

'Green Street'

Ohio River Boulevard

RIV Proposed Height with Existing Heights-

out of scale with average height of buildings
currently in Manchester and Chateau.

Project Proposed Building Heights

MAXIMIZE VIEWS:

Views towards the river should be open as much as possible. All streets and pathways that are perpendicular to the river should be free and clear. Utility lines/poles should be placed underground during redevelopment to eliminate the obstruction of views by utility lines and poles. By implementing several linear breaks through the addition of the 'green streets' dividing the larger blocks which are dominated mostly with single story warehouses and desolate parking lots several more opportunities for views are implemented. Low lying vegetation and trees with high canopies allow for a clear line of sight. Vegetation around the river's edge should be maintained and kept, allowing and enhancing views of the water. Views can further be enhanced by using trees and other vegetation to 'frame' views of the river.

SUSTAINABLE REDEVELOPMENT

While the connection to the river is vital to the design, it is important to hold sustainability at the core of any development/redevelopment project. Most of Chateau is relatively flat in comparison to much of Pittsburgh. Little topography change makes it roughly one-third of it vulnerable to flooding. Development in these areas should be limited. Where development is needed, industrial, commercial and services such as parking are better suited for these areas, rather than residential buildings. The river's edge and other flood-prone areas is an opportunity to increase the amount of green space and tree canopy coverage in Chateau. While there is currently vegetation and trees along the edge it is unkempt and acts as another barrier physically and visually to the river. Maintenance of these areas, along with the removal of invasive species and any unhealthy or diseased trees will aid in opening up views of the Ohio River, Mount Washington, and Downtown. The replanting of native species will help to increase the habitat and biodiversity.

STORMWATER MANAGEMENT:

By incorporating stormwater management into the design not only is the demand on the sewer decreased but it also provides an opportunity for education, additional green space, tree canopy coverage as well as habitat for birds and other wildlife. All new development should attempt to manage all their stormwater on-site and greywater when possible. Each block should have a delineated green space to provide on-site management. Green, brown and blue roofs installed on newer buildings can capture and use stormwater. Cisterns can be installed to capture stormwater from buildings or other spaces and can be stored above or below ground and used for greywater, on-site irrigation or slowly released back into the sewer system after a rain event. Bioswales are helpful for capturing and slowing the velocity of rainwater off sidewalks and streets and channeling it an appropriate area, like a rain garden or bioretention area. Reducing the dependency on the combined sewer system through a variety of different stormwater management techniques is key to this redevelopment project.

Porous pavement is used throughout the design borrowing from many of the streets and intersections downtown. Historic details like brick, granite, and cobblestone should be used to define crosswalks for cohesion with the ones Downtown. Permeable pavement/pavers, like brick and stone, will increase the amount of stormwater that will enter the ground rather than act as runoff, burdening the combined stormwater system. If asphalt is needed, porous asphalt should be used. All new development should manage all their stormwater on-site and attempt greywater as well if and when possible. Each block should have a delineated green space to provide on-site management. Cisterns can be used to collect and store rainwater to be used for irrigation or to be slowly released back into the sewer system.

intersection examples

PITTSBURGH, PA

USE OF GREEN ROOFS OR BLUE ROOFS:

Cheaper than solar, green roofs are becoming an environmental solution to the toll of buildings on energy consumption. Having been used by numerous cultures for millennia this practice has become mainstream. France has passed regulations that all new buildings must have a green roof or solar panels; San Francisco passed a law requiring certain new buildings to have a green roof; and Chicago is leading the nation with "5,564,412 square feet of green roof coverage" (CityofChicago.org, n.d.). Green roofs reduce the heat island effect by adding the cooling advantage of vegetation which has the added benefit of being a great insulator helping to keep the building cool in the summer and warm in the winter. Stormwater uptake and storage is another way Pittsburgh and Chateau could benefit, reducing the demand on the cities combined sewer system. Birds and other animals will also use the additional green space as habitat. Green roofs not only provide many environmental benefits they can have psychological benefits as well. Views of green roofs are one way to provide the benefits of views and vistas to urban, better attention and performance on tasks.

ARCHITECTURE & URBAN DESIGN

Manchester has a rich architectural history and although Chateau lost a majority of what was there before the redevelopment in the 1960's there is still a few remnants of the industrial era. Maintaining the architectural integrity and using these buildings is important to the place-making as well as the identity of the neighborhood. These buildings can and should be adapted to modern architecture and energy saving amenities such as updating the glazing. Any remnants or details of the industrial past that are not acting as a barrier (i.e. fences) should remain and be incorporated into the development of the space. Public and residential buildings are centralized and linked together, buffered from the noise and pollution of the busy streets. Mixed-use buildings line the arterial streets combining commercial, office and also some

SCULPTURAL BIKE RACK. PITTSBURGH, PA

residential uses.

MAINTAIN INDUSTRIAL ARCHITECTURAL INTEGRITY THROUGH ARCHITECTURAL LAYERING:

Due to the stability of brick structures all historic industrial buildings should be preserved or re-adapted for part of the newer buildings through architectural layering. This can be done using modern technologies (ie. eco-friendly windows/doors, green roofs, renewable energy, etc.) and design to preserve its historic significance and move to more sustainable buildings for the future. The United States Green Building Council (USGBC) has developed a rating system to determine the overall sustainability of a building and/or site, LEED (Leadership in Energy and Environmental Design). Certification can be attained at four different levels Certified, Silver, Gold, and Platinum. Points are awarded for an integrated process, materials used, energy and water-related systems. These guidelines and examples that already exist in Pittsburgh should be continued and strongly encouraged in all future growth and development. Although LEED certification can be expensive, and not always practical, their guidelines can be followed and applied to a degree in any new project.

MATERIALS & TEXTURES:

Materials used should represent the rich cultural history of the area to facilitate a 'sense of place'. In the case of Pittsburgh, there are many iconic symbols that should be represented throughout the design. Careful consideration and use of local materials is imperative so that it feels as much of a part of Pittsburgh as it does its own space. Brick, granite, and steel are widely prevalent materials recurring throughout the Manchester, Chateau, Downtown and other neighborhoods throughout Pittsburgh. Brick is used for pavement, as a facade on the walled highway, and for residential, commercial and industrial buildings and was criteria for buildings that should remain through the

Materials Palette

PERMEABLE RECYCLED CRUSHED GLASS
'PAVEMENT

STONE, GRANITE, BRICK

LOCAL & RECLAIMED WOOD

CORTEN STEEL

redevelopment of the neighborhood. Granite meets the brick and is used for sidewalk curbing throughout the downtown area. Many intersections have street or district names carved into the granite along each corner and use a different pattern of brick, granite, and cobblestone to help designate pedestrian crossing zones.

EDUCATION:

Home to the Bidwell Training Center, Bicycle Heaven and the Drew Mathieson Center, designing and developing a community with a strong educational center holds onto an important programming element that currently exists in Chateau. The proposed development will maintain these programs, albeit updating the facilities while expanding upon it to include K-12 education as well. Opportunities to educate about native species, stormwater management, the Ohio River, etc. should be incorporated throughout the design in order to merge the outdoors with education. Borrowing from the South Harbour School integrating the schools with the river and river-related activities such as fishing, and boating would allow kids from all economic backgrounds to have the opportunity to benefit from this valuable resource. Although it is true for adults as well, children who have more exposure to nature become intrigued by it which helps to form an emotional bond.

PUBLIC ART/STREET ART:

Public art is often overlooked and underrated in the design of urban spaces. Free, and available to the masses, public art breathes life into the landscape. Opinions may vary about the aesthetics of different pieces of public art, however, it generally enlivens and improves the aesthetics of a space. Public art may come in many forms, both commissioned and sometimes done illegally. Street art, although often done illegally, seeks to provide a message or mural and goes beyond the basic graffiti or 'tagging'. Pittsburgh features public art in a variety of ways and places; a pocket park with sculpted, blooming magnolia trees among live ones, a glowing water cube, "Energy Flow" lighting on the Rachel Carson bridge, among others. More recently Pittsburgh has recognized the value of street art and is using it to brighten spaces all over the city.

Plant Recommendations

STREET TREES:

Nyssa sylvatica-Black gum
Magnolia stellata-Star Magnolia (tree form)
Cercis canadensis-Eastern Redbud
Acer griseum-Paperbark Maple
Carpinus caroliniana-American Hornbeam
Amelanchier x grandiflora – Serviceberry

UPLAND SPECIES:

Tilia americana-Basswood
Quercus alba-White Oak
Quercus coccinea-Scarlet Oak
Quercus velutina-Black oak
Fagus grandifolia-American beech
Fraxinus americana-White Ash
Liriodendron tulipifera-Tulip Poplar
Pinus strobus-White Pine
Cornus florida-Flowering dogwood
Cercis canadensis-Redbud

WETLAND SPECIES:

FLOODPLAIN TERRACE:

Echinacea purpurea-Purple Coneflower,
Sorghastrum nutans-Indian grass
Schizacyrium scoparium-Little Bluestem
Viburnum spp.-Viburnum
Rosa virginiana-Virginia rose
Carpinus caroliniana-Ironwood
Prunus spp.-Cherries
Quercus rubra-Red Oak
Quercus coccinea-Scarlet Oak
Quercus phellos-Willow Oak
Carya spp.-Hickories
Juniperus virginiana-Eastern Red Cedar
Celtis occidentalis-Hackberry
Hamamelis virginiana-Witch Hazel

LOW & HIGH MARSH:

Nyssa sylvatica-Black gum (L&H)
Salix nigra-Black Willow (L)
Quercus bicolor-Swamp White Oak (L)
Platanus occidentalis-American Sycamore (L&H)
Betula nigra-River Birch (L&H)
Magnolia virginiana-Sweetbay Magnolia (L&H)
Lindera Benzoin-Spicebush (L&H)
Cephalanthus occidentalis-Buttonbush (L)
Carex vulpinoidea-Fox sedge (H)
Eutrochium purpureum-Joe Pye weed (H)
Solidago spp.-Goldenrod (H)
Monarda didyma- Beebalm (H)
Vernonia fasciculata-Ironweed (H)
Aster novae-angliae-New England Aster (H)
Asclepias incarnata-Red Milkweed (L&H)
Eupatorium perfoliatum-Boneset
Comptonia peregrina-Sweet Fern (H)

EMERGENT (SHALLOW WATER):

Iris shrevei-Wild Iris
Scirpus atrovirens-Dark Green Bulrush
Hierochloa odorata-Vanilla Sweet Grass
Sagittaria latifolia-Arrowhead
Alisma plantago-aquatica-Water Plantain
Pontederia cordata-Pickerelweed

SUBERGENT (OPEN WATER):

Nymphaea odorata-Water Lily
Vallisneria spiralis- Wild Celery
Potamogeton pectinatus-Sago Pondweed
Potamogeton perfoliatus- Redhead Grass

conclusion

As our cities are redeveloped for future, the connectivity and cultural significance of the industrial waterfront should be carefully considered along with sustainable development and practices. Merging the stories from the people who have lived the land, with the river --- with water, a compound we are innately connected with, facilitates restoration, a sense of place --- a chance to 'escape'. Access to the river is a vital resource to the health and well-being of the people living in close proximity to the Ohio River in Pittsburgh. Given an opportunity to redevelop, Pittsburgh, and other cities, should ensure through policy, mandatory public access to the waterfront for all new development along the river's edge. Enacting policy now will ensure these waterfronts are maintained and accessible for generations to come.

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FIGURE 6.6:

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ALL IMAGES & FIGURES SECTION 10 (EXCEPTION BELOW):

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EXCEPTION:

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