Road as Recovery:
Using the Urban Street Network as a Therapeutic Resource to Support Positive Mental Health

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A thesis submitted in partial fulfillment of
the requirements for the degree of

Master of Landscape Architecture

University of Washington 2013

Committee:
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Program Authorized to Offer Degree:
Landscape Architecture

ABSTRACT

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This thesis explores the therapeutic qualities of the pedestrian urban street network that support positive mental health and well-being. Mental health is an important yet often neglected aspect of modern lives and the stresses associated with living in urban environments are a constant challenge to it. The day-to-day experience of moving through the city affects our health, mood, and physiology, with impacts on long-term health, productivity, and interactions with other beings. Reviewing literature in health, environmental psychology, and landscape architecture, I argue for the need and viability of using the urban street network as a daily resource or delivery system for stress restoration and mental health promotion for individual and community health. Developing an approach to plan and design a therapeutic street network within the public right-of-way requires addressing a broad spectrum of city, neighborhood, and street scales. Focusing on the psychological development of youth and prevention of mental health disorders, schools and the resources adolescents use everyday – such as parks and libraries – become nodes of a delivery system. Green infrastructure, city and community assets, and other opportunities for urban nature and positive sensory experiences connect these nodes to provide a contiguous, accessible, and therapeutic system of services. A framework is developed to explore how the public right-of-way supports therapeutic goals by enriching their meanings and values. This concept is then applied to redesign the street network surrounding Washington Middle School in central Seattle.

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Many, many thanks to Professor Nancy Rottle and Professor Daniel Winterbottom for helping to complete this thesis and for being part of the amazing adventures I have had getting here.

I would like to thank to Luanne Smith, Professor Julie Johnson, and Professor Iain Robertson for – whether it was conscious or not – their well-timed words of encouragement and compassion that boosted my spirits when it was needed most.

I am thankful for my cohort, friends and family for the fun, laughter, and kindness they generously shared to keep life as balanced as possible.

And most importantly thank you, Dylan for your endless support in all things life related, for your patient conversation and grammar lessons, and for the humor and martinis that kept me on the saner side – for the most part – through it all.

figure a: scenes from my commute, Leeds, England

Leaving my house for work I have a decision to make. I have 5 extra minutes this morning and the sun is not yet up. I could get to work by taking the shared bus/bike lane 4.5 miles through the city, or I could take the scenic route. The extra five minutes do not really matter since both routes take the same amount of time, but one way takes me under the branches of the sweet smelling cedar trees, magnified by the light mist this morning. This pleasantry is short-lived, however, so, as usual, I head for the narrow footpath at the end of the street. By the time I get to the dirt track the muted sun has peaked over the horizon and, as I crest the hill, the clouds part momentarily, sunlight shimmering off the rain droplets on the wet green valley below me. It is quiet: the only sounds are the crunch of my bicycle tires on the dirt trail and the whiney of the horse that lives on the urban farm across the way. The dirt track meets a gravel path and I am under the cover of an urban forest, protected from the misty rain. An ancient brick wall overcome by climbing vines runs the length of this path to my right and to the left there is nothing but trees and groundcover. Soon the wild garlic will bloom here, their bright aroma giving them away before I even see them, and I think about the pesto I will make with their leaves and flowers. At a break in the wall I decide to get off the trail and ride through the old neighborhood alleys to see if the crocuses have popped up under the old linden tree. The narrow alley is just wide enough to bike through, and with no room to spare, I hope no one comes the other way until I get to the end. I pop out of the alley and see the old tree, naked and lonely in the late winter. Maybe the crocuses will be there tomorrow. More people are out now walking, biking, busing, and driving. The city is awake, and I cross the street to bike through the city park, drawing out my quiet morning just a little bit longer. Moving through an allée of trees and past a statue of Queen Victoria, her flower garden being tended to by city workers, I reach the corner and merge onto the bike lane I share with the city bus. Fortunately this is the shortest part of my trip and as I reach the downtown I veer off the bike lane onto a main pedestrian street in the shopping district. With my extra 5 minutes I turn down a side street and lean my bike against the window of the French bakery to buy a freshly baked chocolate croissant. The man behind the counter sees me and knowingly packages up my buttery treat. Back on my bike I am almost at work. I pass by the daily farmer's market, waiting at the 5-way intersection thinking about summer when the honeysuckle growing along the fence behind me will bloom

with aroma frenzy. I cross the canal bridge and can see it snake its way along the city edge before I pull into the parking lot of my office. I lock up my bike feeling bright and cheery, happily thinking I get to do this all over again tomorrow.

This was my joyful commute for over a year and was the inspiration for this thesis. It was a route I found by exploring my neighborhood with the intention of finding a quick and easy route to work since taking the bus took just as long or longer in heavy traffic. As I discovered these gems of open space pleasure became just as important as convenience. It was the ephemeral sights and smells, the guaranteed quiet, the chance to glimpse the signs of changing seasons, the fun of moving up, down, around and through spaces, and the freedom to pick and choose my own path that coaxed and seduced me to ride my bicycle or walk to work everyday. It was not a pursuit to improve my mental health or relieve stress, but in the process it sure did.

figure 1.1: Copenhagen school play street

DEFINITIONS AND ABBREVIATIONS

Mental health – a physiological, psychological, behavioral, and emotional condition. Poor mental health refers to the negative conditions developed due to chronic exposure to stress, including stress, depression, mental fatigue, and anxiety. Positive mental health is the ability to cope with the stresses that initiate or exacerbate these conditions.

Stress restoration or stress recovery – a positive change in physiological and psychological states that produces changes in emotion and behavior beneficial to cognitive functioning, performance, and physical, psychological and social health.

Nature – biotic or abiotic forms, beings, processes, and phenomena, while not originally created by human technology, exists with or without an intentional human hand. For this thesis there is no distinction between nature found in a wilderness and the nature found in a potted plant.

CDC – The National Centers for Disease Control

WHO – The World Health Organization

NA – The National Academy of Sciences

CITIES AND HEALTH

The way we build our cities has significant impacts on human health. Historically, changes in governing, economy, security, and culture have been the catalyst for development, growing cities into increasingly large and complex systems of people, structures, and machinery. While the technologies of these urban systems have flourished in their own sphere, the experiential quality of these systems has more often than not led to a degradation or loss of human and environmental health. Most recently however, in the face of increasing urban density, economic belt-tightening, climate change, and cultural and social shifts, some cities are beginning to confront their aging infrastructure and outdated planning and design guidelines through holistic practices that boost performance, increase functions, and improve the health of a more inclusive set of users. New York City, Portland, Chicago, and Seattle are just a few US cities developing new policies and changing their cityscapes to use new technologies and natural elements to reduce energy consumption, curb the heat island effect, and filter and clean stormwater.

These technological and ecological advancements can have meaningful human health impacts affecting the economy, productivity, and well-being of communities and the nation. Physical health concerns like nutrition, physical fitness, and exposure to pollution are starting to be addressed through programs such as bike shares, community gardens, and play streets. However, mental health issues, found in the top 10 concerns of public health agencies (CDC, 2013), continue to be an uncomfortable, misunderstood, and ignored topic in the health conversation.

The reasons for poor mental health are multitudinous and complex, and often go unaided or made worse by the inequitable and defective US health care system. Public health organizations are now recognizing the long-term social and economic damage poorly treated mental health disorders can have on the nation, calling for preventative programs and policies among a diverse community of disciplines, not just the medical profession. This thesis is a small attempt to engage this complex public health issue through the design and planning of our built environment.

In the last couple of decades, researchers in public health, environmental psychology, and other disciplines have been methodically designing studies to gather measurable data to support the idea that nature benefits health. Their evidence, briefly reviewed later, is a small but representative sampling of ongoing work being done to quantitatively understand the relationship between environment and health, the physiological and psychological processes of these interactions, and their impacts. They not only provide insight on the mental health benefits of nature, but are also a source of inspiration towards the future of our cities. Coupled with qualitative evidence in landscape architecture and the poetry and imagination of others, these findings present a holistic concept of what healthy places look like.

Research studies on therapeutic gardens in healthcare settings are finding supportive physiological and psychological evidence that they improve health outcomes for patients with acute health conditions (Wolf, Flora & Housley, 2012). I propose however to thoughtfully integrate the goals of therapeutic environments into the public realm where there is great potential for everyday mental health support. By analyzing public space qualities for therapeutic benefits, these qualities take on new meanings and values making it possible to identify design strategies in the public right-of-way to support mental health. Teaming up with local residents, health, educational, and other community institutions is vital as it reveals issues and possible solutions, values and meaning, and instills stewardship and opportunities for community cohesion. Addressing the needs of children and the elderly in the public right-of-way welcomes their presence and participation, generates social interaction, and shapes a place that is accessible to all.

Streets are a conduit for people, animals, automobiles, utilities, water, and information and they appear in a variety of forms and sizes, such as highways, neighborhood streets, pedestrian paths, shortcuts, and alleys. They are not only the most ubiquitous public space, but also make up a large portion of urban open space. In Seattle the public right-of-way encompasses 26% of the total land area (SPU 2009, p1). The qualities and characteristics of these spaces can be determinants of how they are used and by whom. The prioritization of vehicle movement over pedestrian movement in the public right-of-way since the 1920s (Mars, 2013) led to changes in the built

environment that continue to discourage active modes of transportation like walking and bicycling. This coincides with the preponderance of lifestyle diseases – those attributed to sedentary habits – over infectious diseases (CDC, nd) around the same time. Reversing this priority constitutes an equitable way to engage the pedestrian again to promote both physical and mental health.

This reversal of priority does not mean banishing vehicles from the street, but using the space more efficiently for the benefit of multiple functions. Modern cities are organized by what Katherine Wolf (2003, p141) describes as "gray infrastructure systems…network[s] of concrete and steel facilities and conduits that deliver a defined service or product", a singular system where "human factors are an understated component" of the system. By contrast "green infrastructure [such as street trees, parks, and streams]…enables a wide range of economic and social activities, including community growth." Recently, this concept is most often advocated for hydrological services, like green stormwater infrastructure in Seattle. Used alongside streets, within parking lots and fragmented land, or residential gardens, these systems provide multiple public services – clean and slow stormwater, increase biodiversity, and improve the safety and aesthetics of pedestrian corridors – as opposed to an underground pipe system with a singular role of moving water. Integrating green stormwater solutions into the public right-of-ways is a holistic solution to urban issues of environmental and human health while supporting the "human factor" by increasing opportunities for essential nature contact in the city.

Cities already include some green infrastructure systems (GIS) established through their parks, community gardens, and urban forests. Though primarily valued for their social and aesthetic functions, trees and plants provide relief from summer heat through shading and evapo-transpiration, blocking cold winter winds reducing energy needs to heat buildings, and protecting pedestrians from unpleasant weather. They clean air pollution, absorb water, and provide habitat for pollinators that keep our flowers and veggies in bloom. The mature vegetation and development of these urban nature areas carries an established presence and can be used as important connectors and conductors of pedestrian movement because of the sense of place they create. Infrastructure for active transportation

is also considered “green” because these “modes tend to have fewer associated environmental consequences, while enhancing the physical and mental health of users, and often promoting strong social connections” (Rottle & Yocum, 2010, p52). Building upon these green infrastructure systems within the public right-of-way increases the frequency of healthy connections to provide a continuous corridor of therapeutic spaces.

One of the more important connections to this system is the one to home. Making these places easily accessible through proximity to home increases the likelihood of active transport because they are considered both “a destination for recreational activities and routes to get places” (Lee & Moudon, 2004, p154). In Wanderlust, Rebecca Solnit (2000, p260) discusses how the contemporary division of walking for recreation versus walking for utilitarian purposes came to be in response to “advances” in technology – the car replacing the walk to the store, the treadmill replacing the walk for health – continually trying to solve the by-product problems of new technology. She observes, “The body has ceased to be a utilitarian entity for many Americans, but it is still a recreational one, and this means that people have abandoned the everyday spaces – the distance from home to work, stores, friends – but created new recreational sites that are most often reached by car: malls, parks, gyms.” While destinations such as these do encourage physical activity once you arrive they actually contribute to some of the social and environmental barriers of physical activity such as lack of time, work and childcare responsibilities, a lack of social support, poor access and connections, unsafe conditions, and unsatisfying aesthetics (Lee & Vernez Moudon, 2004). However, by reclaiming Solnit’s abandoned everyday spaces the street can become a delivery system of physical and mental health benefits that encourage routine healthy behaviors and social interactions shared among a diversity of ages, incomes, races, and ideas.

This thesis explores the ways in which urban public space can contribute to everyday stress reduction, a foundation of positive mental health. I first delve into the important question, “What is mental health?” by analyzing its definition, processes, and relationship to the built environment. Following, I propose a planning and design approach ranging from the scale of the city down to the intimate space of the street where the goals of therapeutic gardens and the

qualities of successful public spaces are compared to understand the meanings and values of therapeutic public space. I use this as a framework to identify features and conditions of the public realm that support positive mental health and as a tool to guide and test my design decisions at a middle school site in the Central District of Seattle, WA.

Changing the use of the road changes the entire community."

- J.B. Jackson

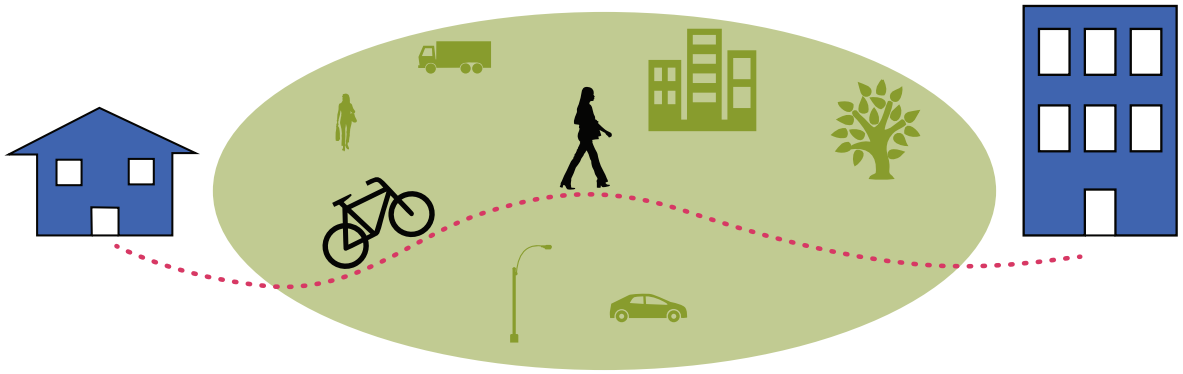


figure 1.2: rebuilding the urban commute

figure 2.1: NYC, The Highline

WHAT IS MENTAL HEALTH?

Mental health is a crucial part of healthy human development, determined by genetic, biological, social, and psychological factors. (NA, 2009). Mental health disorders can emerge from a wide range of factors, such as diet, lifestyle, trauma, social exclusion, discrimination, pollution, violence, biological makeup, and dementia.

The mainstream concept of mental health illness in the US is usually associated with major mental health issues such as schizophrenia, severe depression, and post-traumatic stress disorder (PTSD). While these serious mental health illnesses affect about 6% of the US population, about one quarter of the population has one or more mental disorders, the most common being depression and anxiety (NIMH, nd).

The World Health Organization (WHO) describes positive mental health as "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community." (WHO, 2004). There are several important concepts in this definition. First is the connection of mental health outcomes with social and environmental factors – that external interaction with one's community, a collection of people, structures, spaces, and experiences influences internal responses. Second is the idea that mental health is not the absence of disease, stress, anxiety, or depression but the ability to cope, to be resilient, to recover and be restored. Like physical illness, there are prevention strategies as well as treatment for mental health illnesses to help in the process of recovery and develop resiliency. The third concept, the ability to work productively and fruitfully, is a challenge with our modern day demands. A positive outlook on life in the form of self-achievement, hope, and optimism can come from the role one plays in his or her family, job, and community. However, these roles can also be the source of mental fatigue and stress being both cause and outcome of mental health disorders.

A national discussion of the role mental health plays in many aspects of everyone' lives is often avoided, shunned, or belittled because of the lack of understanding of what mental health is. With greater

HEALTH is “a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity.
– World Health Organization

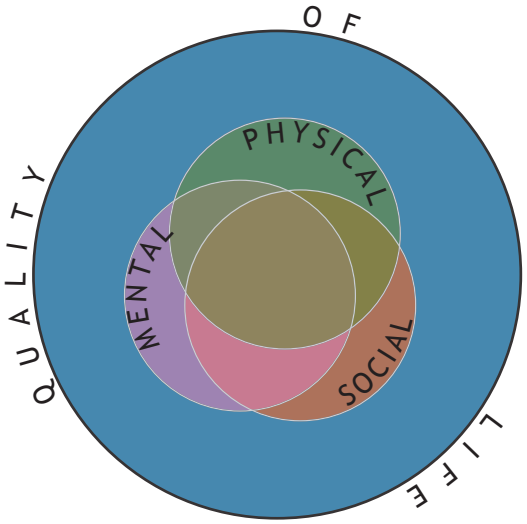


figure 2.2: WHO definition of health

understanding of the causes and implications of mental disorders on not just the individual, but the whole of society, national and international public health organizations are emphasizing efforts towards mental health disorder prevention. The Centers for Disease Control and Prevention (CDC), WHO, and the National Academy of Sciences (NA) promote policies, programs, and services through a cross section of sectors, such as education, labor, housing, and transportation.

Recognizing mental health as a public health issue has two important meanings. The first meaning is that spatially it affects people over a large area, from the size of a neighborhood to the whole nation. Second, it means mental health illness is not only preventable, but it is easier and less costly to prevent rather than treating it after it becomes established and systemic.

The practice of landscape architecture encompasses similar issues of scale and population, lending great potential to contribute to these public health efforts. Including mental health promotion as a value and goal in the design of our urban infrastructure gives support to

these programs and policies, acting as a conduit and platform between different sectors' agendas, the community, and the individual.

Mental Health Statistics for the US[1]

- 6% of adults live with a serious mental illness such as schizophrenia, bipolar disorder, PTSD
- 25% of adults experience some mental illness in a given year, only 40% of them receive treatment
- 20% of youths age 13-18 experience severe mental disorders in a given year, only 50% receive treatment
- Among adults, half of all mental, emotion, and behavioral (MEB) disorders were first diagnosed by age 14

Economic Impacts of Mental Heath Illness in the US[1,2,3]

- Mental health is the leading cause of disability in the US
- The cost of treatment and lost productivity is estimated at $247 billion a year
- The cost of ADD/ADHD in treatment and lost productivity is estimated to be $42.5 billion dollars a year

1.National Alliance on Mental Illness, (nd). Mental Illness Facts and Numbers. Retrieved from http://www.nami.org/factsheets/mentalillness_factsheet.pdf, Oct 23, 2013
2. http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=28
3. Pelham, W. E., Foster, E. M., & Robb, J. A. (January 01, 2007). The Economic Impact of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. Journal of Pediatric Psychology, p32.

MENTAL AND PHYSICAL HEALTH INTERRELATIONSHIPS

Mental health is inextricably intertwined to physical health and therefore a foundation to overall health. Their reciprocal influence has shown a relationship between chronic depression, stress, and anxiety and the risk of heart and vascular disease, diabetes, respiratory illness, cancer, and obesity. (WHO, 2004). A look at the physiological effects of stress gives us an idea of this mental/physical health interconnection.

Stress response is the human body's built-in, automatic mechanism that heightens our perceptions and awareness during uncertain circumstances, preparing our body to react to threats against our perceived sense of safety. Temporary stress can be beneficial and exciting, giving us the energy and drive to get through certain unknown situations (like working towards a deadline, moving out of harm's way, or the thrill of experiencing a rollercoaster).

When a person confronts a stressful situation a series of enzymes turn on and off certain physiological functions. Adrenaline will increase the heart rate, blood pressure, and energy supply. Cortisol will increase glucose into the blood stream and suppress non-essential functions like the digestion, central nervous, and immune systems. When the stress event has passed, the body switches the stress response off and functions return to normal (Mayo Clinic, 2010). In a prolonged state of stress or exposure to a complex combination of stressors, however, these enzymes are continually being pumped out, prohibiting normal physiological functioning. It is easy to see how these mechanisms can produce and/or exacerbate health problems such as heart disease, diabetes, obesity, depression, memory loss, aggression, and anxiety.

To manage stress, doctors recommend a strategy of removing oneself from the stressful situation, mentally and physically, then trying relaxation techniques, such as gardening or visiting a favorite place, and lifestyle changes of diet and exercise. Physical exercise has significant positive mental health outcomes and may help in stress reduction and relieve symptoms of depression through two mechanisms: increasing endorphins (hormones that reduce pain and produce a "feel good" effect) and/or keeping the stress response

system in shape through better communication between the body's neurological, physiological, and muscular systems (Dishman & Sothmann, 2005). Unfortunately, societal and cultural pressures like the reliance on automobile transportation, the dwindling minutes of physical education at schools, and the rise in hours of computer and television entertainment are contributing to a more sedentary lifestyle that could have significant impacts on these physiological and psychological relationships.

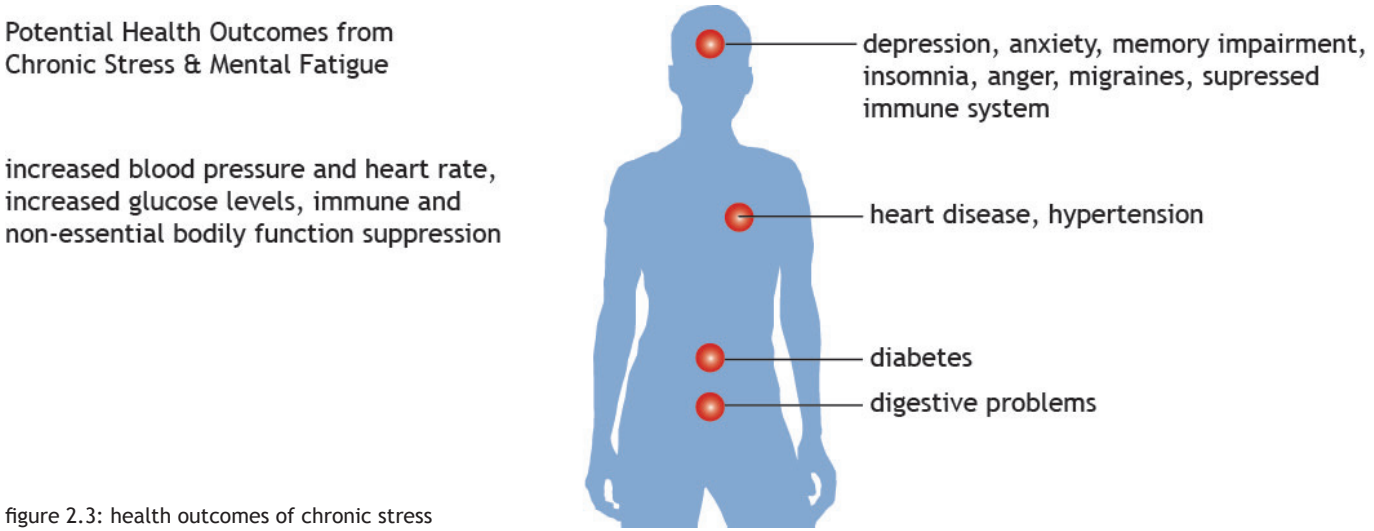


figure 2.3: health outcomes of chronic stress

figure 3.1: Llubljana pedestrian street

CHAPTER THREE: MENTAL HEALTH RESPONSE TO NATURE & THE BUILT ENVIRONMENT

As discussed earlier, being mentally healthy does not mean the absence of disease or disorder, but the ability to function in a way that fulfills concepts of happiness, self-worth, productiveness, and optimism that support feelings of overall well-being. However, without this ability to cope with stressful situations, a degradation of physical and mental health can occur. Baum (2012, p60) proposes, "Stress affects mood, behavior, and problem solving, changes individuals' motivation to achieve goals or engage in self-protective behavior, and appears to lessen restraints against harmful behaviors. Stress affects the whole body." Therefore, the process of reacting to stressors can therefore be considered a foundational determinant of mental health and is a fundamental component of the framework of this thesis.

The idea that exposure to nature is beneficial to mental health is not new, however quantitative research providing supportive evidence of positive health outcomes is. Several theories explain how nature helps relieve stress and because much of the studies and literature reviewed here are based on these theories a concise discussion is useful to understand the building blocks of the research and theories.

ATTENTION RESTORATION THEORY

Attention Restoration Theory (Kaplan, R. & Kaplan, S. 1989) suggests prolonged, focused attention results in mental fatigue (an antecedent to stress) and that passive, effortless attention, – what the Kaplan's call *"fascination"* – is necessary to restore this acuity. Fascination can occur through many kinds of experiences, such as books, games, and physical activity for example. Nature, however, provides a powerful medium for restoration because of the opportunities for reflection it can provide. The most beneficial forms of fascination should also include: a feeling of *being away*, even if it is conceptual, rather than physical (looking out the window) to distance oneself from the stressor; an environment of *extent*, one ample and interesting enough to easily hold engagement; and *compatibility* with the environment so one feels comfortable to act naturally. (Kaplan, 1995).

…to explore and affiliate with life is a deep and complicated process in mental development. To an extent still undervalued in philosophy and religion, our existence depends on this propensity, our spirit is woven from it, hope rises on its currents.

- E.O. Wilson

EVOLUTION THEORY

Evolutionary theories suggest that the power of nature as a stress reliever is an inherent process developed over a long period of time as humans evolved in natural environments. It contends that humans adopted a positive association of certain natural elements and configurations in the landscape to their physical safety, survival, and wellbeing and that this is what modern humans psychologically respond to when experiencing nature. Just as the body immediately reacts to threatening circumstances, so too does it reverse this reaction when confronted with conditions of safety and comfort. Places with water and vegetation- associated with drinking, eating, and protection in pre-modern humans – are aesthetically preferred as an unconscious, unthreatening, and beneficial response to environment. Another avenue of this theory proposes that because of this physiological and psychological adaptation to the natural environment, these types of natural features are easily understood – as opposed to complex urban conditions – by the brain and therefore does not overwork and tire the sensory systems (Ulrich, R. et al., 1991). While the urban environment is generally

seen as the antithesis of nature it does have the capacity to foster a relationship with this innate sense of nature by designing with natural elements and processes in mind. With the population of city dwellers growing, we need the city to provide these types of benefits. Qualities and processes of nature such as the motion of clouds and dappled light, temporal and life cycle change, pattern variations of biotic and abiotic forms, and multi-sensory experiences that people find aesthetically pleasing produce an emotional response and can cultivate meaning that psychologically attaches people to place (Heerwagen, 2009).

NATURE AND NURTURE

Richard Louv (2005) explains in his book, Last Child in the Woods, the benefits nature has on child development and the mental, physical, and spiritual costs children and society face growing up in a world that incrementally prohibits and excludes those experiences. While Louv himself adamantly states that Nature-Deficit Disorder is not a scientifically proven medical condition, it does stimulate the conversation about nature vs nuture…do humans have a positive, innate response to nature, or does it develop over time and exposure? Relational psychology proposes that human motivation and emotional response are related to previous experience embedded with place meaning and value (Santostefano, 2008). This theory places the utmost importance of the role of nature in young human lives. While an appreciation for nature can be realized at any point in one's life, the powerful therapeutic services nature provides greatly benefits from the early establishment of the meaning and value of nature.

HEALING GARDENS

Healing, restorative or therapeutic gardens have a long history, ever since walls were built to provide a sense of safety and control over what was outside. Medieval monasteries that treated the sick often had courtyards to grow medicinal herbs and food. These gardens were also places for rest and spiritual prayer, containing symbolic plants and garden elements and paths to move amongst them

(Gerlach-Spriggs, et.al.1998). More recently a resurgence of these types of gardens are found in hospitals and healthcare settings and function quite similarly. Claire Cooper Marcus and Marni Barnes (1999) describe a healing garden as having three roles: to provide relief from physical symptoms, to reduce stress, and improve a sense of overall well-being. Whether a small nook or expansive campus, these outdoor spaces are specifically designed to "motivate people to spend time outside where other experiences besides viewing nature can enhance the healing function of the garden" (Marcus, Barnes, p4). These types of environments are an important resource for stress restoration and promoting positive mental health and are discussed later in comparison with public space to understand their role in the public right-of-way.

SOCIAL SCIENCE RESEARCH ON NATURE'S INFLUENCE ON HEALTH

Studies in public health, environmental psychology, landscape architecture and other disciplines have been methodically designing studies to gather measurable data to support the idea that nature benefits health. The following is a small but representative sampling of ongoing work being done to quantitatively understand the relationship between environment and health, the physiological and psychological processes of these interactions and their impacts.

ACCESS TO GREEN SPACE LOWERS AGGRESSION

This study reveals nature's influence on self-regulation of emotions and social support. Kuo and Sullivan (2001) report a positive relationship between having access to vegetation and lower levels of aggression in residents of low-income housing complexes in Chicago. Comparing crime reports and surveys of psychological aggression between people with access to greenspace around their home and those without, they found that residents surrounded by trees and lawn reported lower feelings and acts of aggression,

which was reflected in police reports. Kuo and Sullivan also propose that greenspace provided a pleasant place for people to take their children and socialize, thereby increasing the surveillance of activity around the complex and creating a stronger social support network.

PHYSIOLOGICAL EFFECTS OF NATURE

The physiological effects of immersing oneself in nature are being carefully documented at Japan's Nippon Medical School. Scientists have found that "forest bathing" or walking in and viewing the forest for as little as 15 minutes results in measured changes of lowered blood pressure, pulse rate, activity in the sympathetic nervous system (responsible for stress response), and cortisol levels. What is also striking is the longevity of these physiological changes, persisting much longer in people who have had nature experiences compared to those who received similar physiological benefits gained from relaxing in an urban environment. (Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010).

THE EFFECTS OF GREEN SPACE ON CHILDREN WITH ADD/ADHD

While immersion in nature is proving to be a powerful resource of restoration of the stress system there is growing evidence that even exposure to highly controlled forms of nature in urban environments can be found to provide daily mental health benefits. Walks and activity in urban nature settings such as tree lined streets, parks, and playing fields were shown to have salutary effects for children diagnosed with ADD/ADHD (Kuo & Taylor, 2009) (Taylor & Kuo, 2011). When exposed acutely and routinely to green spaces for as little as 20 minutes, children showed a decrease in symptoms, such as hyperactivity and impulse control, and improved cognitive functioning. The results were the same across different genders, ages, and wealth (Taylor & Kuo, 2011). The implications of everyday nature exposure could result in less need for prescription medication, increased social functioning, and improved school performance.

RESILIENCY

Ottosson & Grahn (2008) found that nature experiences have a positive and strong influence on mental health recovery after a major life crisis. Furthermore, those people who had more routine

nature experiences *before* a crisis were psychologically less affected by the crisis than those with less exposure. This study on recovery and resiliency underscores the importance of the presence of and engagement with nature during a child's developmental years, especially in lower income communities where children already have higher rates of mental health distress and fewer opportunities to access green space (Dannenberg, Frumkin, 2011, p42). While an appreciation for nature can develop at any point in a person's life, fostering this at an early age can provide long-term benefits. Building mental health resiliency is one way public health workers are trying to improve community and economic health (NA, 2009).

figure 4.1: Copenhagen bicycle life

INTRODUCTION

As mentioned earlier, scale and population are inherent considerations shared by public health and landscape architecture. To design a pedestrian network that supports mental health in the public right-of-way it is necessary to look at the larger city scale to identify nodes and connections to provide a continuous route and also the more intimate street scale where people come into contact with the city through their senses. Tackling an entire city population would be an extremely complex task, so I have purposely narrowed the focus population to youth, which makes a sensible approach in several ways.

Focusing on youth supports the public health endeavors of prevention. The National Academies report that mental health issues pose a

> major health threat [that can] have life-long effects that include high psychosocial and economic costs, not only for the young people, but also for their families, schools, and communities…interventions before a disorder manifests itself offer the best opportunity to protect young people. Such interventions can be integrated with routine health care and wellness promotion, as well as in schools, families, and communities." (NA, 2009).

Teaching children healthy habits in their early years can impact their overall mental developmental and encourage continued practice over a lifetime.

Following the philosophy of UNICEF and 8-80 Cities, among others, "a neighborhood where children's activities are encouraged and supported is likely to be a safer and better place for everyone else as well. Building strong social bonds is part of a self-perpetuating process that can strengthen local development on every front" (Bartlett, 1999, p. 124). Recognizing children are active participants in the city supports democratic, safe, healthy, and accessible places that are important concepts in childhood development and for all inhabitants of the city.

And finally, focusing on areas surrounding schools and other youth resources, such as community centers, libraries, and parks, where mental health and wellness programs and policies are introduced and practiced establishes a key starting point of this delivery system. These youth resources are nodes or hubs of their everyday activity. The paths and environments to and from these nodes offer children

places to practice in the community what they learn in formal settings away from authoritarian control, expanding their physical as well as emotional and developmental boundaries. “When neighborhoods provide a secure and welcoming transition to the larger world, children can gradually test and develop their competence before confronting the full complexity of a city.” (Bartlett, 1999, p.122.)

CITY SCALE TO FINE DETAIL

At the city scale, using a radial map to identify schools, community centers, libraries, major transit hubs, and other places where youth people gather on a day-to-day basis reveals high priority areas and where potential linkages to create an extended network. Figure 4.2 shows a map of several neighborhoods in central Seattle with circles representing a quarter mile radius around each youth resource entrance.

figure 4.2: radius map

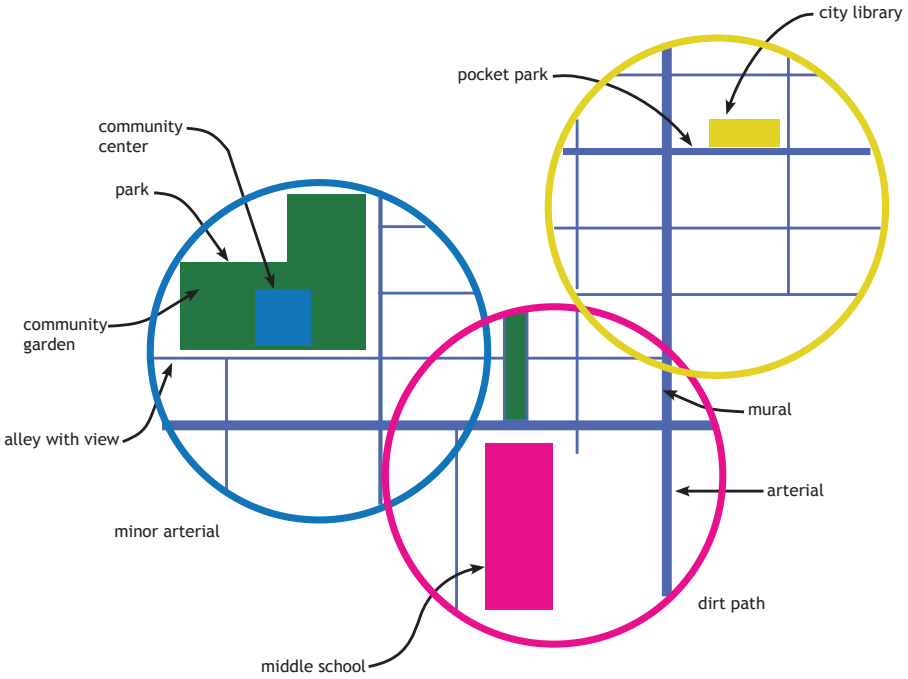


figure 4.3: radius details anaylising street typologies and characteristics

Each radius (figure 4.3) can then be analyzed for characteristics and qualities beneficial to promote mental health using street typology, existing infrastructure, amenities, vegetation, and topography and areas for potential interventions. Community involvement would be necessary to fine-tune route selections by finding out the routes already taken, the ones avoided, the ones wished for and why. Local residents have insight into the particular locations and qualities of their neighborhood that they like or do not like, and ones that may not be determined from mapping analysis, such as the use of shortcuts, footpaths, or vacant lots.

Working with schools, health centers, and public health agencies to determine particular health issues of the area or implementation of programs and policies can be an important resource for design considerations. Seattle Children's hospital, for example, holds community classes on parenting, ADD/ ADHD, nutrition, stranger anxiety, and emotional expression. The Washington State School Department publishes a school wellness policy recommending awareness programs

for nutrition and physical exercise (OSPI, 2013). Understanding community issues and working with local institutions and residents can provide meaningful collaborations and insight in the design process.

As we move down the scale spectrum we come closer to touching, seeing, hearing, and smelling the finer details of the city street. This is where people respond physically and emotionally to the qualities of the surrounding environmental stimuli. Positive responses happen when cities

> provide good conditions for people to walk, stand, sit, watch, listen, and talk. If these basic activities, which are tied to the human sensory and motor apparatus, can take place under good conditions, these and related activities will be able to unfold in all possible combinations in the human landscape. Of all the city planning tools available, attention to this small scale is most important. (Gehl, p118)

Besides making a place enjoyable, comfortable, and safe, these sensory details are what Barnes and Marcus (1999, p88-89) describe as "critically significant" in therapeutic landscapes, especially in terms of perception where "past experience and present expectations" integrate with the response to stimuli creating "symbolic value".

An example of this is the feeling a person experiences on a bike lane raised to sidewalk level as opposed to a dedicated lane at the street level (see figure 4.4). They both provide safety, but increasing the elevation by 6" changes the way we sense traffic on the road. The added height gives an advantage of visual prospect over a larger area, the sounds of a car slightly dampen, the inherent curb of a raised surface provides a tangible barrier from traffic, and the surface of the pavement may feel different due to textures of surface materials or have less debris like gravel, broken glass, oil, and trash. The curb can also create a sense of additional width between cyclist and traffic, even though none may actually exist, that can be sensed through sound and wind from passing cars. As the brain computes these combinations of senses with what is known about streets and sidewalks, the perception removes cycling from the realm of the vehicle-dominated street to the slower realm of pedestrian activity, a learned, safe experience. This physical change of the built environment supports a diverse population, not limited by age or ability, extending the opportunity of cycling to a larger group of people covering a spectrum of skills and perceptions.

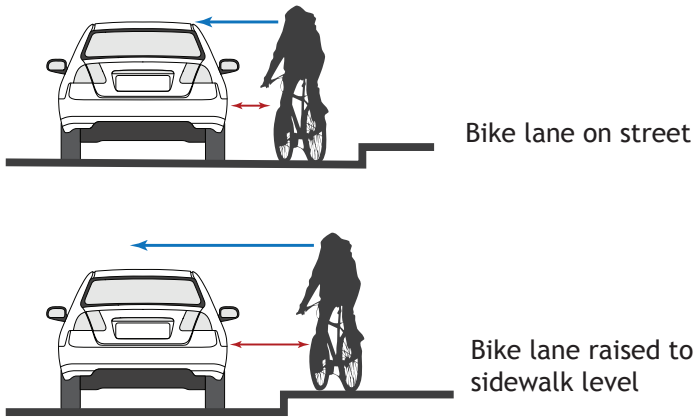


figure 4.4: Spatial & Visibility Differences of Raised vs Sidewalk Level Bicycle Lanes

RELATIONSHIPS OF THERAPEUTIC SPACE & PUBLIC SPACE

To better understand how urban street infrastructure can support positive mental health, I consider and compare the role of two relevant types of landscape to identify commonalities and distinctions: public space, the sphere of the right-of-way, and healing gardens and therapeutic landscapes, designed specifically for stress restoration. At first glance these realms appear to be in opposition of one another. A therapeutic garden is often associated with a health care facility in an enclosed, semi-private space, usually designed for a specific group, providing quiet space where one can find solitude or visit with close friends and family; whereas a city street can be noisy and crowded, private and public spaces abutting or blending into each other with the opportunity to watch other people and be watched by strangers. However, they actually share similar conditions and characteristics that can aid in stress restoration for the pedestrians in the public right of way. Integrating therapeutic elements into the public realm provides an opportunity for pedestrians to relax and recover from daily

stresses, supporting resiliency to stress and long-term positive mental health.

PUBLIC SPACE

Jan Gehl, the Danish urban design consultant and architect, has been studying the relationship between humans and built form in the public realm since the 1960s. Through his research and expertise in urban planning and design he developed a list of quality criteria that are essential to create vibrant, healthy, cities made for people. Organized into four components of Protection, Comfort, Delight, and Place, they relate directly to the experience of the senses (Gehl, 2010, p 238 & Gehl & Gemzoe, 2011). Bain, Gray, and Rogers (2012) propose similar ideas with direct application to the realm of the street, including opportunities for natural systems within the network. Under Gehl's umbrella of criteria, their combined ideas are introduced here and then followed by a more detailed exploration of their use and impact in the built environment as they relate to the components of therapeutic spaces.

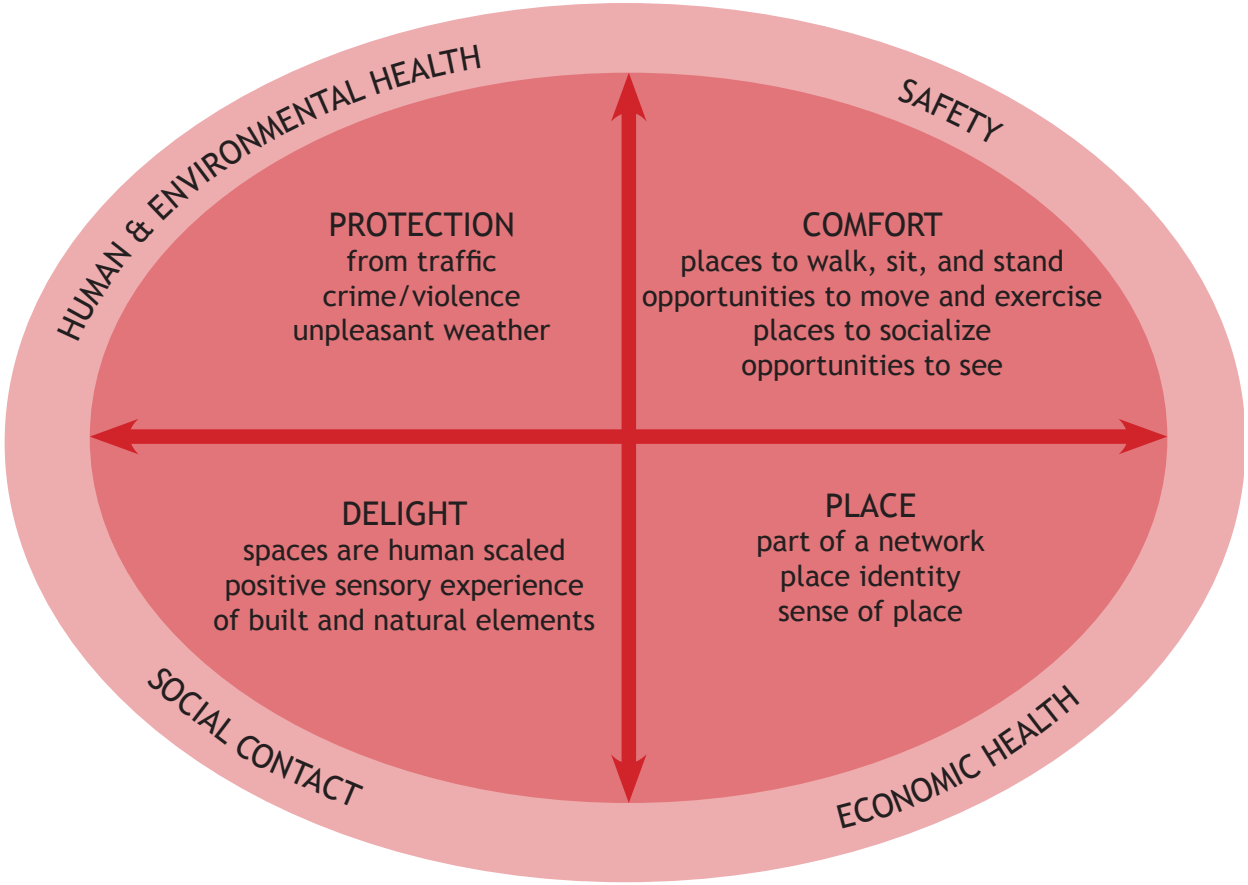
Protection and Safety – Encompasses elements that promote feelings of security from physical harm and crime, safety from traffic and accidents, and protection from the uncomfortable experiences of weather and environmental degradation, such as noise and pollution.

Comfort – Responds to the activities that attract people to a place and invites them to stay and come back. These include providing comfortable and useful places to exercise and play, to discover and be entertained, have a conversation, socialize, and be in a crowd as a participant or an observer.

Delight – Refers to the positive sensations when experiencing the surrounding environment, such as the aesthetics of nature, details of materiality, pleasant sounds and smells, opportunities to enjoy good weather, and a sense of scale that helps communicate all this information.

Place – Identifies scales and their context to the city. The city scale looks at place in terms of its network, connections, and accessibility. At a smaller scale, such as a neighborhood, place is identified by

characteristics that distinguish itself from other places or uses, reflecting local values or interests. Sense of place gets to the heart of a place, the knitting of history and emotions of individuals and groups that gives it identity and attaches people to place.



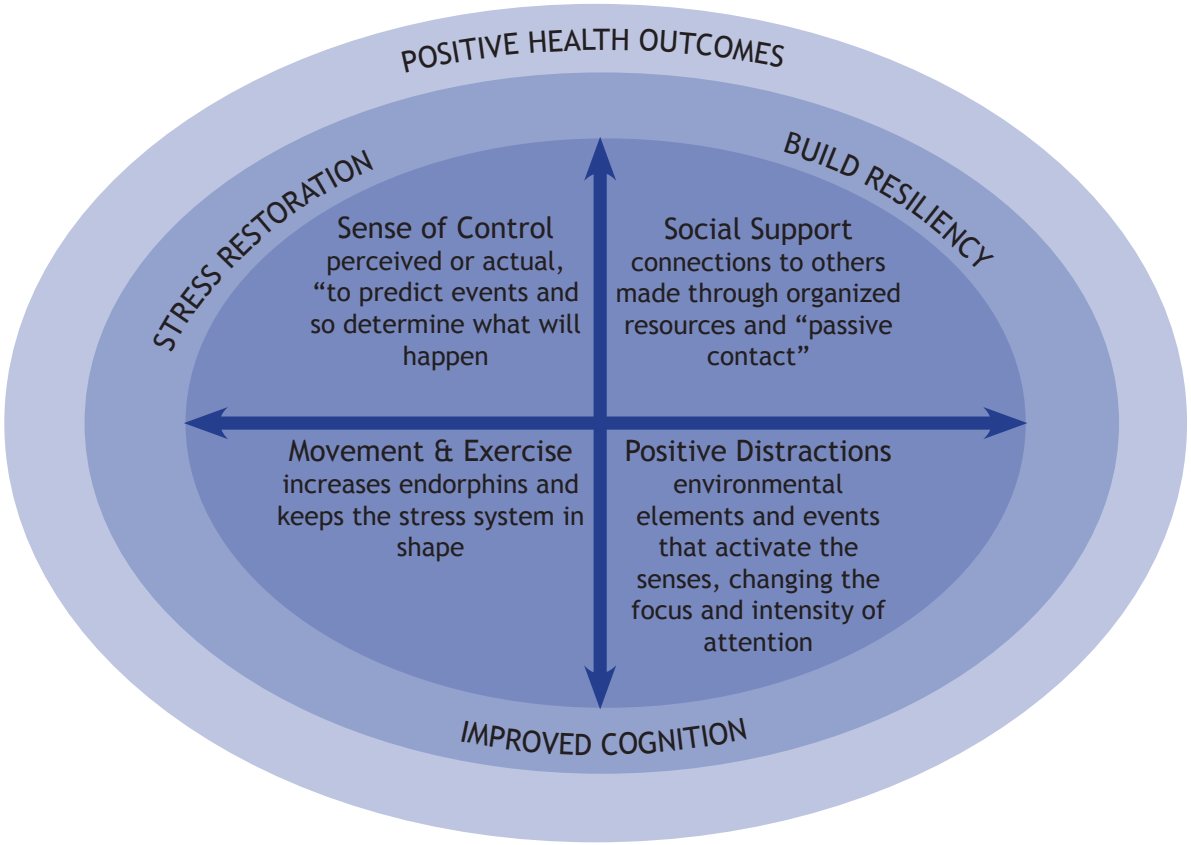
Criteria from: **Gehl, J. (2010) and Bain, L., Gray, B., & Rodgers, D. (2012)**

figure 4.5: Qualities of vibrant public space

THERAPEUTIC SPACE

The research reviewed earlier suggests that while there are many settings that can provide mental restoration, nature however, has a very potent salutary effect. This phenomenon is adapted to the built environment most commonly through healing gardens in healthcare settings. As a contrived form of "nature" set amongst a most unnatural environment of institutional sterility, it is not so different to suggest a similar injection among an urban street network. Why should a healing environment be limited to places you need to go to when you have past a certain point of illness that medical help is necessary?

What does it mean to be therapeutic? Marcus & Barnes (1999) suggest the main benefit, or health outcome, of a therapeutic environment is the ability to relieve stress caused by events and environmental qualities, which then allows other inter-related processes, such as physiological, psychological, and behavioral, to recover. They describe four necessary components of healing gardens that can help alleviate stress in patients, staff, and visitors of health care facilities; a sense of control, a place for physical movement and exercise, access to nature and positive distractions, and social support. Although these components are attributed to therapeutic gardens in healthcare settings these ideas and goals resonate to spaces beyond the garden walls. The following discussion unravels these concepts through the lens of the public right-of-way to refine definitions and answer the questions, "What does it mean to be therapeutic in a public space?" and "How does this translate into form and space?"



Graphic based on: Marcus, C. C., & Barnes, M. (1999, p37)

figure 4.6: Effects of Therapeutic Environments on Health Outcomes

WHAT DOES A THERAPEUTIC STREET LOOK LIKE?

An initial comparison of the general qualities of good public space and therapeutic components to determine similarities or distinctions was unhelpful, initiating a closer look at the meanings behind their ideas. Breaking down the components of therapeutic space into their psychological and developmental meanings using information from the fields of psychology and child development provides an opportunity for a more nuanced comparison of these two types of spaces. This subsequent diagram (figure 4.7) illustrates alternate meanings and values of public space and emphasizes how the qualities of successful public space can offer mental health benefits. The larger text in the diagram signifies which therapeutic goals are most often met by public space.

This diagram helped create a matrix (figure 4.8) used to compare each therapeutic goal to determine a public space affordance – a physical constraint "that affect the user's perception of available actions being offered within an environment" (Still & Dark, 2013, p. 287) - for stress restoration. While there are many crossovers and multiple benefits offered through these public space qualities a single affordance is detailed for simplicity. These urban qualities are able to support more than immediate economic, aesthetic, and social functions; they can greatly benefit the developmental and long-term mental health of individuals and communities. This reinterpretation of benefits could offer ways to connect to other disciplines in the health fields trying to promote community prevention programs and policies.

Following the matrix, each therapeutic component is discussed in detail to understand what the psychological process means for mental health, followed by a visual description of precedent images of public space organized from the matrix.

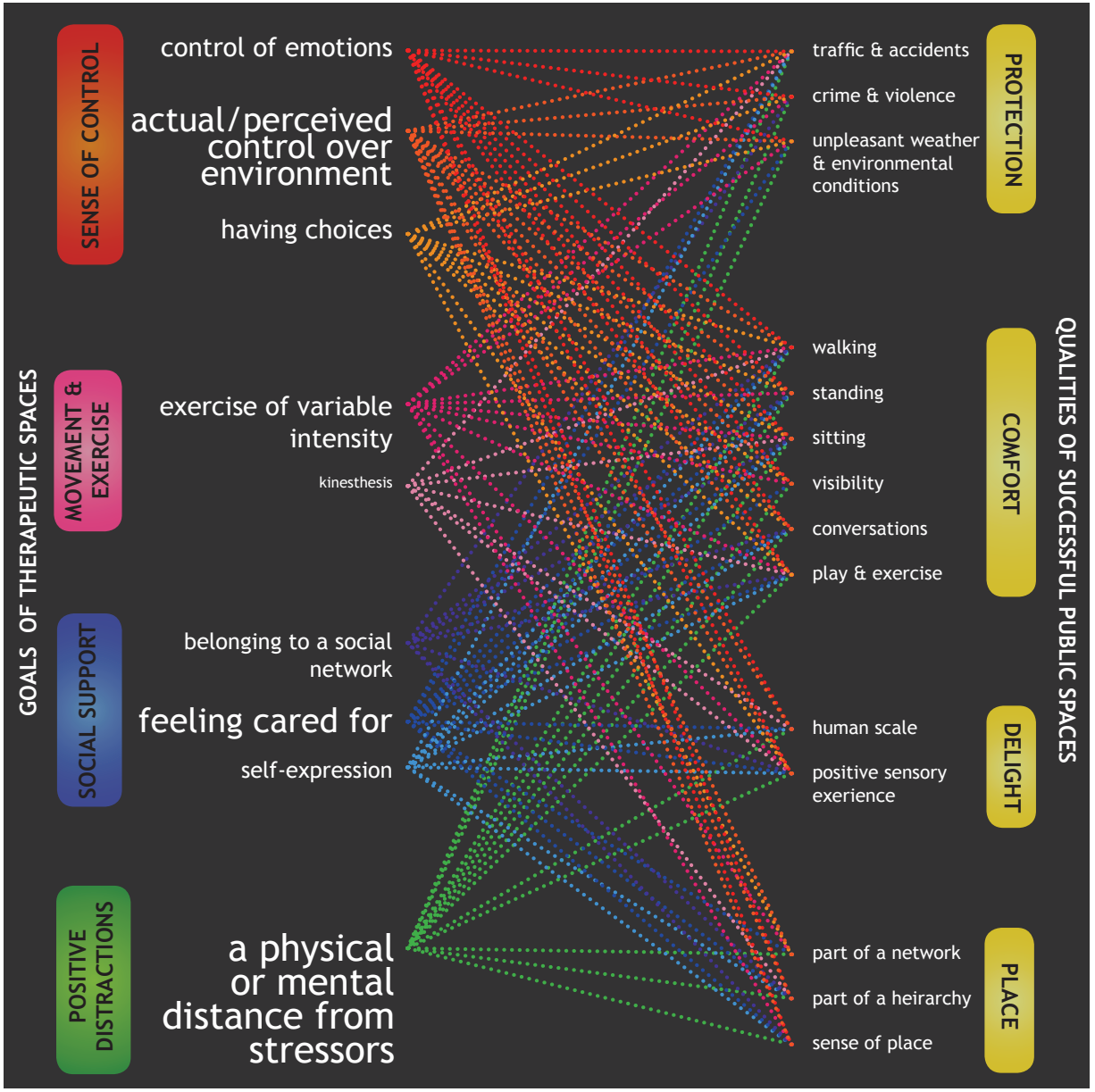


figure 4.7: Comparision of Therapeutic Goals and Successful Public Space

Public Space Affordances for Therapeutic Benefits

	Sense of Control	Physical Movement	Social Support	Positive Distractions
Protection				
from traffic & accidents	Buffering – *environmental control*	Dividing spaces by activity -*variable intensity of movement*	Elements that support safe movement across traffic- *feeling cared for*	Replace overused and ignored traffic signage with intuitive features that respond to the senses
from crime & violence	Clear visibility of and through surroundings – *emotional control*	Appropriate lighting -*variable intensity of movement*	Active neighborhood spaces throughout the day- *belonging to a social network*	
unpleasant weather & environmental conditions	Exposure options – *having choices*	Good drainage, sun and wind protection -*variable intensity of movement*	Sun and wind protection- *feeling cared for*	Emphasize natural processes while being protected from weather
Comfort				
walking	Choice of a continuous route with proximity to home – *having choice*	Surface materials appropriate for activity -*variable intensity of movement*	Path width for 2 or more to move together side-by-side - *belonging to a social network*	Interesting detail at path edges
sitting	Frequent seating availability- *environmental control*	Places to rest - *kinesthesis*	Space for large and small groups to gather - *belonging to a social network*	Comfortable forms facing interesting views
standing	Space to stop without impeding movement of others – *emotional control*	Places to pause, rest or stretch - *variable intensity of movement*	Wide sidewalks for spontaneous meetings - *belonging to a social network*	Places to lean while waiting
visibility	Unambiguous route – *environmental control*	Views of "Intermediate destinations", elements that can be seen ahead to walk to (Alexander p.586), influences pace and entice exploration- *variable intensity of movement*	Eyes on the street aspect, Jane Jacobs- *feeling cared for*	A range of views, partially hidden or small scale to wide expanses
conversation places	Wide sidewalks or nooks with low level noise – *emotional control* -	Path width for 2 or more to move together side-by-side - *variable intensity of movement*	Arrangement and types of seating to facilitate social interactions - *belonging to a social network* –	Sound reduction or amplification reveals other sensory perceptions
play & exercise	Multifunctional forms of street furniture that can also be used for exercise and playing – *environmental control*	Street playthings - *variable intensity of movement*	Outdoor areas to meet and interact with others provides opportunities to experiment with social roles (Barlett, p22)- *self-expression*	Material and form qualities that emphasize natural processes – heat absorption, reflection, wind, slope

figure 4.8: Matrix of Therapeutic Public Space Qualities

	Sense of Control	Physical Movement	Social Support	Positive Distractions
Delight				
human scale	Balance width of pedestrian area to building height – *emotional control*	Changes in width and height along a route - *kinesthetics*	Small scaled elements and detail – *feeling cared for* through care of place	Small scaled or intangible element and detail experiences that arouse the senses – creates *distance from stressors*
positive sensory experience	Textures, sounds, smells, and views that displace stressors – *emotional control*	Spatial arrangement of elements and speed of movement influences the amount of sensory information reception – *variable intensity of movement*	Sharing sensory experience strengthens social bonds – *part of a social network*	A variety of sensory experiences that changes with time for a range of ages and cultures - *distance from stressors*
Place				
part of a network	Wayfinding cues – *environmental control*	Types of connection with other parts of the city - *variable intensity of movement*	Easy connectivity to public spaces and community activities - *feeling cared for*	Easy and nearby connections for active transportation can remove stressors such as missing a bus or being stuck in traffic
part of a public space hierarchy	Gateways – *environmental control*	Topography influences how people move - *kinesthetics*	Elements that identify community's culture and values – *self-expression*	Intuitive use displaces stress and annoyance from ambiguity

When the spirits are low, when the day appears dark, when work becomes monotonous, when hope hardly seems worth having, just mount a bicycle and go out for a spin down the road, without thought on anything but the ride you are taking."

- Arthur Conan Doyle

A SENSE OF CONTROL

Perceived or actual, the feeling of being in control "is a powerful mediator of stress, providing individuals with a sense that they can cope effectively to predict events and so determine what will happen" (Gatchel & Baum, 1983, p 65). The opposite, not feeling in control is expressed through insecurity and fear, effecting our attitudes, activities, and interactions with others. Evans and Cohen (as cited in Marcus and Barnes, 1999, p.38) found that a sense of control over environmental stressors often reduced the negative effects of stress, whereas a lack of control increased those effects. Therefore having a choice, or at least the perception of choice, is also an influential aspect of having a sense of control.

The way we interpret the conditions and qualities of the built environment can have a strong impact on this sense of control and can be an influential motivating factor to encourage active forms of transportation. For example, a child who is able to walk or bike to school on their own (e.g. fears are controlled because the route to school is considered safe) can control their own pace and navigation

of the route. This can influence confidence, emotional regulation, and competency that support positive mental health and contribute to such skills as decision-making, orientation, and tolerance.

Unstructured outdoor play is an important activity in developing a sense of control, for children and adults alike. While exploration and experimentation of our physical and social surroundings is in itself a way to relieve stress, it also constructs our understanding of environment, ideas of social relationships, and expressions of control (Bartlett, 1999, p22). Play promotes abstract ideas that can be extrapolated to the environment and other aspects of life. The natural world is a great way to foster this capability because of the broad opportunities for activities and interpretations of the environment. However, opportunities for unstructured play are diminishing due to the rigid schedules of organized activities, decreasing open space, concerns for safety, and just more time spent indoors (Louv, 2008).

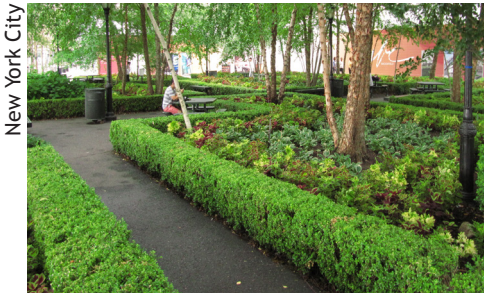
While there are many factors that determine our psychological capabilities, the way we design our cities can help support positive mental health, psychological development, and the empowerment that comes through making good choices, predicting events, overcoming fears, and controlling emotions and behavior. The examples on the following page show how public space qualities can influence one's sense of control.

Qualities and characteristics of Public Space that afford a Sense of Control

control of emotions | control of environment | having choices

In stressful situations managing emotional reactions turns off the body's stress response system to return to normal functioning. This positive response to external stimuli reinforces feeling of self-control.

New York City



Protection from Crime & Violence - Clear field of vision

This green oasis in NYC connects a waterfront plaza to Battery Place. The high, airy tree limbs and low growing ground cover allows a person to see across the space. The eye can trace the path through the space because of the geometrically pruned, hedge. Low height light poles are placed along the path and in the planting beds for visibility at night.

Budapest

Conversation Places - Nooks and calm paths

Having to shout or listen over noise is frustrating. These benches in Budapest are set back from traffic and sidewalk noise and the low wall prevents the sound of a conversation from floating away.

Portland

In Portland pedestrian alleyways between apartment blocks offer a quiet place to step off of the main arterial road.

Llubljana

Places to Stand - Stopping without impeding the movement of others

On this street in Llubljana movement happens along the wide, smooth center path while the cobble stone edges are instinctually reserved for window shopping, waiting spouses, coffee breaks and chance meetings of friends. The edges provide respite from crowds and speeds of other pedestrians.

New York City

Positive Sensory Experience - Sensory elements that displace stressors

The sounds, sights, and smells of a city take a toll on our stress system and emotions. The sound of the waterwall at Paley Park in NYC overwhelms the diurnal street noise. The visual and auditory effects are potent sensory distractors just a few steps from the street.

figure 4.9: Affordances of Sense of Control – control of emotions

control of emotions | control of environment | having choices

Understanding the functions and elements of an environment helps anticipate experiences, reducing stress caused by fear and insecurity. Outdoor creative play helps us envision how to use the existing environment to meet our needs.

Seattle

New York City

Protection from traffic & accidents - Buffers

Fear of accidents dissuade many people from biking or walking (Lee & Vernez Moudon, 2004). Buffers can provide a sense of control of this fear by creating space away from high speeds, exhaust, and noise. These four images show a range of types of buffers. In Seattle, the single painted bike line provides minimal separation from traffic. NYC moves the paralleled parked car lane to the outside of the bike lane for a protected buffer. Vancouver, BC fixes a buffer in place with vegetated planters. Copenhagen uses trees, zig zag benches, and a fun path that merges the boundary of school space and public sidewalk, introducing children to the city realm.

Vancouver

Copenhagen

Copenhagen

Hartford

credit: http://theiquilt.org

Visibility - Unambiguous routes

Being lost is a stressful experience. In Copenhagen, this bike and walking path is lined with lime green poles that can be seen across a distance. In Hartford, CT wayfinding signs to city destinations are integrated onto existing signage infrastructure, reducing unnecessary street clutter.

figure 4.10: Affordances of Sense of Control – control of environment

control of emotions | control of environment | having choices

New York City

credit: http://citysoftwalks.com

Washington, DC

Places to Sit - Frequency of seating

One of the pleasures of going for a walk is finding a nice place to sit. Knowing there is a place to rest along the way is a necessity for those who cannot walk long distances and need to rest along the way.

Softwalks studio in NYC developed pop-up seating that can be attached to scaffolding infrastructure, a constant element of NYC's urban fabric, providing seating availability in limited space. Meridian Park in Washington, DC has a plethora of seating integrated in walls, planters, and water fountains in the park. Simple wooden platforms attached to a series of steps give added comfort in Copenhagen. Many benches are found on the street bordering popular Jamison Park in Portland, OR.

Copenhaen

Portland

Llubljana

Human Scaled - A spatial balance of height and width

Distance dictates what we can sense in our surroundings. When we are outside the "social field of vision", about 80 feet, it becomes difficult to identify objects and visually communicate with others (Gehl, 2010 p35). This street in Ljubljana feels intimate and personal because details can be seen from the roof tiles to the street cobbles. Our brains translate this visual information into expectations of the street experience.

Copenhagen

Places for Play & Exercise - Multi-functional elements for temporary personal use

Using existing elements to function in different ways gives greater variety of activities that can happen in a space. Inspired by a rock wall this boy in Copenhagen uses metal grills as an alternative to climb the walls, developing his ability to adapt and extrapolate information.

Seattle

A picnic table in a Seattle neighborhood park temporarily becomes exercise equipment.

figure 4.11: Affordances of Sense of Control – control of environment

control of emotions | control of environment | having choices

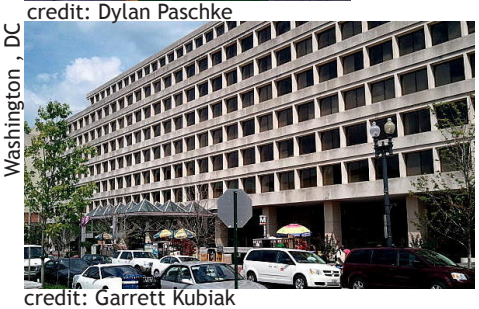
Seattle

credit: Dylan Paschke

Part of a Network - Connection identity

As a pedestrian, moving around the city often requires public transportation. Clearly identified connections keep people moving on their way. The large, colorful art poles that support the electrical wires of Seattle's street car and mark the stops are visible along the street corridor.

Washington , DC



credit: Garrett Kubiak

Washington, DC's metro entrances, however, are frustratingly camouflaged into the cities building facades, invisible to approaching pedestrians.

Copenhagen

Part of a Hierarchy - Gateways

This gateway marks the entrance of Banana Park in Copenhagen. Its functional use, a rock climbing wall, indicates the type of activity that happens here.

The stylized fish painted on the concrete support columns of I-5 in Seattle welcome people to the International District.

Seattle

credit: Dylan Paschke

Seattle

Seattle

Sense of Place - Landmarks to determine distance and orientation

Large landmarks can help with orientation and be seen from greater distance, such as the Space Needle.

Small, unique elements and details embed in mental maps and can serve as a reminder of distances and orientaiton.

figure 4.12: Affordances of Sense of Control – control of environment

control of emotions control of environment having choices

The ability and opportunity to make personal decisions, however small, boost a sense of autonomy and control that is influential in coping with stressful situations.

Seattle

Atlanta

credit: Daniel Clarke

Places to Walk - Continuity

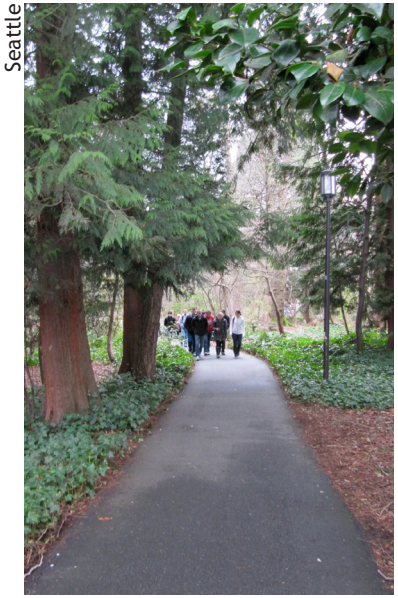
Sidewalks and bike lanes that end abruptly or disrupt the flow of movement are not only inconvenient, but dangerous for people trying to navigate around them. A telephone pole, fire hydrant, and ADA ramp are crammed together making movement difficult.

The abrupt end to this sidewalk in Atlanta, GA forces people to cross a wide and busy road.

Portland

Copenhagen

Seattle



Exposure to Weather - Options for exposure

The city offers many opportunities to protect people from the unpleasant weather. Buildings, awnings, and arcades are urban elements that provide shade and break the wind and rain. Trees, especially evergreen, are excellent absorbers of rain while giving off pleasant aroma.

In Portland, the awning keeps those closest to the building dry.

At Copenhagen's playhouse, movable tables and chairs can be positioned in the sun or shade.

A footpath at the University of Washington in Seattle is dry where mature evergreen trees grow at its edge.

figure 4.13: Affordances of Sense of Control – having choice

Next to a leisurely walk I enjoy a spin on my tandem bicycle. It is splendid to feel the wind blowing in my face and the springy motion of my iron steed. The rapid rush through the air gives me a delicious sense of strength and buoyancy, and the exercise makes my pulse dance and my heart sing.

- Helen Keller

PHYSICAL MOVEMENT AND EXERCISE

Physical exercise may help in stress reduction physiologically through two mechanisms: increasing endorphins (hormones that reduce pain and produce a "feel good" effect) and/or keeping the stress response system in shape through better communication between the body's neurological, physiological, and muscular systems (Dishman & Sothmann, 2005). The body undergoes a similar response to exercise as it does stress, so the idea is that exercise is a way for the body to practice stress recovery because a healthier stress response system helps others bodily systems like the immune system to work better and recover faster. Besides these physiological and physical responses of regular exercise, like maintaining an average weight and increased energy, psychologically it can boost self-esteem and decrease depression and anxiety.

Does movement have to be moderately or highly intense to provide stress-reducing benefits? A study on leisurely garden walking indicated lower levels of depression in older adults. Surveys revealed restoration occurred through personal reflection influenced by

the aesthetic elements of the garden encountered on the walk (McCaffrey, Hanson, & McCaffrey, 2010). Similarly, labyrinths have recently become popular in healing gardens at health care facilities. Used for exercise and meditation, they are designed as a simple to follow, one-way path with a back and forth pattern that leads to a center point and returns the walker back to the original starting point. It is suggested the pattern of the path prompts rhythmic breathing for optimal oxygen exchange and stimulates the kinesthetic senses (Sternberg, 2009, p120 & and TLN, 2010), the sensory system embedded through nerves in skin, muscles, and joints that makes us aware of our bodily position in relation to the surrounding environment. While there is no quantitative evidence of a correlation between kinesthetic awareness and emotions, it could be through this sense that people enjoy the phenomena of rhythmic motion from rocking chairs, swings and trampolines, riding skateboards and bicycles, or participating in yoga or tai chi. Halprin considers motion to be an important aspect in how we experience and find meaning on city streets. "…movement is the purpose for the space, and it should function to activate [t]his kinetic experience in a series of interesting rhythms and variations in speed and force. The qualities of moving up and down ramps and steps, of passing under arches and through buildings, of narrowing and widening of space, of long and closed views, of stopping and starting are qualities which make a vital urban experience for the walker and his mobile point of view" (Halprin, p197).

Qualities and characteristics of Public Space that afford Movement & Exercise

variable intensity of movement | kinesthesis

Space is a necessary component of movement and in the city there are limited amounts. A healthy street network not only supports active transportation but considers the range of speeds, needs, and amenities to encourage people of all abilities to participate.

Budapest

Protection from Traffic & Accidents - Division of activity space

A clear division of walking and cycling space can be useful along areas with high activity use. Paving patterns, colors, and materials can intuitively help differentiate between pedestrian and cycling paths.

Portland

Protection from Unpleasant Weather - Integrate weather processes with infrastructure

Streets are sloped to shed rain water towards the curb and then to drainage grates often found at street corners. When they become clogged the puddles they form become spray hazards to the pedestrian. Planting strips that collect rainwater protect people from splash and puddling by both collecting water and creating a buffer zone.

figure 4.14: Affordances of Movement & Exercise - variable intensity of movement

Llubljana

Protection from Crime & Violence - Lighting for people

Lighting for people is different than lighting for cars because people move slower and need to see more detail to feel safe. At night people need light to see all around them, not just lighting the path in front of them. Light poles at low heights can spread a more intense light for better visibility and cut down on light pollution.

New York City

Bollards mark a stair ramp to cross a bridge in Llubljana. Lincoln Center's lighted water fountain draws people towards it and offers a place to pause.

New York City

Places to stand - Stationary elements facilitate motion

Pausing at a stop light kills a cyclist's momentum. In Copehagen cyclists have railings to lean on keeping their balance and feet at the ready.

credit: Peter Cromwell

variable intensity of movement | kinesthesis

Places to Walk - Surface Materiality

The speed at which a person moves and the effort exerted is influenced by surface materials. Smooth, hard surfaces facilitate faster speeds. Textured, softer surfaces slow speeds down, absorb more shock, and can engage the senses with sounds and smells.

A double row of granite pavers laid among cobblestones are spaced for pleasant and easy travel by wheelchair, stroller or bicycle.Concrete paving and wood decking indicate a separation of fast and slow activities. Grass growing between concrete pavers indicates this path is made for walking. Crushed granite gravel is an invite to pedestrians and slow cyclists.

Vancouver

Conversation Places - Path width

Wide sidewalks allow two or more people to walk and talk comfortably even in crowed spaces.

Denver

Positive Sensory Experience - Fine grained details sized for human speeds

Sensory perception and information processing occur at speeds relative to walking and cycling. At driving speeds the level of detail that can be interpreted is reduced (Gehl, 2010, p43). The slow pace of being on foot allows the brain to process small details.

Cesky Krumlov

Visibility - Intermediate Destinations

Views of “intermediate destinations”, temporary goals along a route, help keep a person moving without having to constantly think about the next step (Alexander, 1977, p586), such as this stairway in the Czech Republic.

figure 4.15: Affordances of Movement & Exercise - variable intensity of movement

variable intensity of movement | kinesthesis

Copenhagen

Places for Play & Exercise - Street Activities

Play spaces on neighborhood streets provides an opportunity for high intensity play and exercise close to home, especially in urban areas that have limited open space.

This street play space in Copenhagen is made up of simple areas for flexible activities with more structured activities like trampolines. In Washington, DC water is a magnet for activity. through direct contact or visual curiosity it is an enduring source of engagement.

Washington, DC

Seattle

Part of a Network - Proximity to Home

A walkable neighborhood provides more transportation choices, and therefore better access to the city as a whole. The Highpoint neighborhood in Seattle was planned as a walkable community with protected sidewalks connecting to public transportation and neighborhood resources.

Copenhagen

Sense of Place - Intergenerational

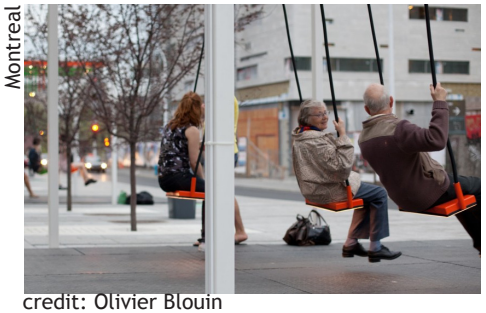
Infrastructure that reunites the utilitarian and recreational purposes of walking and cycling becomes an everyday experience enjoyed by all ages.

figure 4.16: Affordances of Movement & Exercise - variable intensity of movement

variable intensity of movement **kinesthesis**

This sense of bodily position and motion in relation to our surroundings can be a source of pleasure and relaxation. It can also function as a mapping mechanism that runs in our sensory background feeling our way up and over, around and under, through and out of the landscape. Daily journeys become a choreographed dance that joins place identity and orientation with motion.

Montreal



credit: Olivier Blouin

Places to sit - Moving while resting

Having a place to rest does not necessarily mean being still. Swings, gliders, and rockers provide rhythmic rest. Each swing in this Montreal art installation triggers a musical note, creating melodies when joined by multiple players. A light source underneath the seat keeps the fun going into the night.

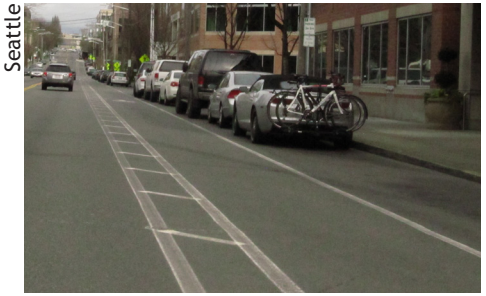
Leeds

Human Scaled - Changes in scale along a path

The small, walled lane runs between gardens. Overhead mature trees create a tunnel and vines grow up and over walls until it opens around the bend with an expansive view of a valley. The variety of scales while moving through this space changes exposure to the sun and shade, temperature, moisture, and feelings of prospect and refuge.

Leeds

Seattle



Part of a Heirarchy - Topography

The scope of Seattle's topography can be identifed through street infrastructure. Numerous bike lanes run north/south with moderate grade changes. East/west streets slope as much as 26% from Puget Sound to Lake Washington and are characterized by stair climbs. While speeding downhill on a bike is more, the climb on the way back up gives a good workout.

figure 4.17: Affordances of Movement & Exercise - kinesthesis

Natural scenery employs the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system.

- Fredrick Law Olmsted

ACCESS TO NATURE AND POSITIVE DISTRACTIONS

Positive distractions, environmental elements and circumstances, activate the senses, changing the focus and intensity of attention, thereby reducing mental fatigue and stimulating stress restoration. Experiences such as listening to music, playing, or reading can alter a person's physiological, psychological, and emotional responses to stressors, however a variety of evidence supports experiencing nature to be the most salubrious, being more effective in reaction time, intensity, and duration (Kaplan, 1995 & Ulrich, 1991). Some of this research was discussed earlier, reporting positive results for improved emotional control, concentration levels in children with ADD/ADHD, strengthening of coping skills and resiliency, and better physiological responses. They illustrate the potential power nature can provide to relieve depression, anxiety, stress, increase cognition and performance, improve social relationships, and improve physiological health. While these studies show that immersion in nature provides high levels of and long lasting beneficial health outcomes they also provide evidence that our urban environments with highly controlled natural qualities – like street trees and city parks – do provide benefits, too. With more people living in cities

than ever before, urban nature may be the only type of open space some people have access to. This is especially important in poorer areas of the city, where fears for child safety from crime, drugs, and traffic keep them indoors (Bartlett, 1999, p123). The impact of these everyday exposures to urban nature are substantial when considering their potential to reduce the need for prescription medications, increase social functioning, and improved school performance in light of the current health statistics.

activating the senses

Streets are the cause of stress in many urban journeys. The harsh sounds and bland sights activate the senses, but in deleterious ways that fatigue and stress the body. Nature, play, humor, and art that render salubrious emotional responses can be integrated into other urban systems that improve health, environmental, and ecomonic performance.

Copenhagen

Protection from traffic - Slowing speeds and a sense of safety

Curb extentions and gentle road curves slow traffic and allow more room for trees and plants or even a pocket park.

Portland

Weather & Environmental Conditions - Emphasize natural processes

This shelter in Portland collects rainwater from the roof. Standing underneath you can watch it fall through a series of runnels and hear it pass under the sidewalk into Tanner Springs park.

Zadar

Resonant tones born from the ebb and flow of wave action through Zadar's Sea Organ captivates and connects the pedestrian with its hypnotic, otherworldly sounds and rhythms of the sea.

figure 4.18: Affordances of Positive Distraction - activating the senses

Vancouver

Places to Walk - Interesting detail at path edges

Details at edges easily catch the eye. These stones elicit wonder by both their existence and ability to defying gravity.

Seattle

Visibility - Range of views with a comfortable seat

Urban forests have so much to offer the eyes (nose, fingers, and ears, too). A comfortable seat helps take in the variety of shapes and sizes, distant views through trees, and close-up details of the surrounding plant and animal life.

Tiverton

Chicago

*Play & Exercise - Play and h*umor

Humor, like exercise, is a great stress reliever. Subtle gestures or a bold delivery, irony, satire, farce or parody, humor can be found anywhere with the reward of a smile, laugh, and relief of of stress symptoms.

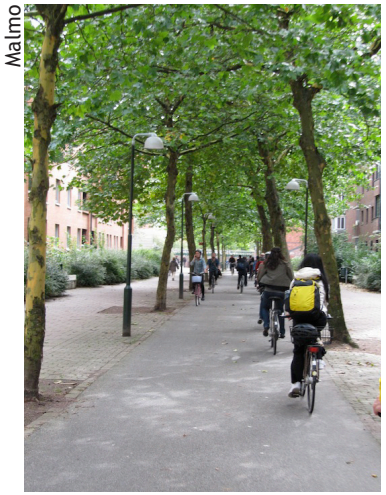
credit: http://commons.wikimedia.org - crown fountain

activating the senses

Seattle

Leeds

Malmo



Copenhagen

Newport

Seattle

Sense of Place - A Favorite Place
Favorite places are important environments in supporting positive mental health. They are special places of beauty and freedom that stimulate our senses. We seek them for temporary escape, relaxation, and emotional regulation. They are most often places with natural elements and tied with emotional meaning offering stress restoration and opportunties for reflection. These are scenes from some of my favorite walking and biking places.

Copenhagen

Seattle

Part of a Hierarchy - local artwork

"...artwork promotes the sustainability promise of the place, poetically revealing innovations and engaging visitors and residents in participation, understanding and caring" (Simpson, 2007).

figure 4.19: Affordances of Positive Distraction - activating the senses

People seek information about other people when they experience the landscape

- Joan Iverson Nassauer

SOCIAL SUPPORT

Social health is one of the components that define overall health, and numerous studies report the idea that people who have strong social connections have healthier, longer, happier lives. These connections are made through organized social resources such as information exchange, social support, and collective action (Dannenberg, Frumpkin, Jackson, 2011) but also through smaller inclusionary activities that occur everyday, such as small talk and people watching, what Gehl (2010, p22) calls "passive contacts, opportunities to simply see and hear life in the city…[as] an unpretentious and non-obligating form of contact."

Studies from the UNESCO program Growing Up In Cities and others document the value of public space in a child's social development, where children "simultaneously develop as independent individuals and learn to benefit and contribute to social relationships and community activities." (Chawla & Malone, 2003, p126). This can be difficult for children in US cities. Because of fears of bullying, crime and transportation concerns many children are driven to school,

removing them from the exposure to community life that helps foster personal development such as competency, tolerance, place identity, and social bonds. At the same time, adults outside their peer group can deter social acceptance and activities when they perceive groups of teenagers hanging out as troublemakers (Travlou, 2003, p12). "If the child's education is limited to school and home, and all the vast undertakings of a modern city are mysterious and inaccessible, it is impossible for this child to find out what it really means to be an adult and impossible, certainly, for him to copy it by doing" (Alexander, p. 294). An accessible pedestrian network that is close to home with safe, stimulating spaces helps to establish and maintain a child's presence in the city by supporting "passive contact".

As a more organized form of social support in the built environment, Teig, E. et al (2009) found that community gardens "serve as a positive social influence within neighborhoods and also as a catalyst for other positive place-based social dynamics." These public spaces foster trust, sharing, reciprocity, and collective decision-making in the garden community and beyond as members try to engage and recruit participation from local groups. Its outdoor presence is an important factor in creating social bonds because it publicly expresses community and personal identity.

Qualities and characteristics of Public Space that afford Social Support

belonging to a social network | feeling cared for | self-expression

Spatial size and form, the arrangement of elements, and its connection to its surroundings lend function to passive and organized social activities. Outdoors spaces can bring social presence and community connection to a neighborhood by putting activities on public display where sensory experiences can be shared.

New York City

Crime & Violence - Activate space

Turning abandoned lots into community gardens can incease people presence and pique interest in passers-by.

Vancouver

Places to Walk, Places to Stand - Walking and talking

Wide sidewalks where two or more people can comfortably walk and talk, or step to the side for a chance meeting with a friend. This sidewalk in Vancouver, BC accomodates 5 chatting friends side-by-side. Planters have space between them to move off to the side or cut around pedestrian traffic.

figure 4.20: Affordances of Social Support - belonging to a social network

Seattle

A Sense of Place - Connecting to Place

In Seattle, residents gather on nice evenings at the Mt. Baker Ridge Vewpoint to watch the sunset fall over the Olympic Peninsula. Basalt stones line up with the equinoxes and solstices to mark the passing of the seasons.

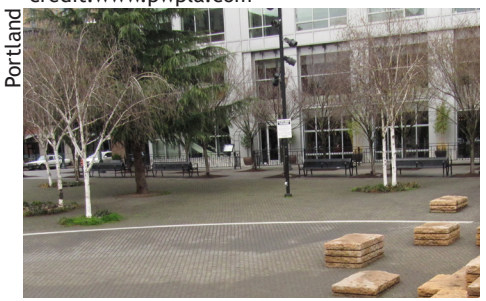
Portland

credit:www.pwpla.com

Places to Sit, Conversation Places - Flexible meeting space

Plazas can provide small, intimate space nested within a large spaces for group activities. They make good connections between different types of pedestrian streets by possessing movement and staying power.

Portland



Jamison Park in Portland has many flexible spaces. The largest space changes by water pooling in front of the stone blocks, the smallest can be created between the trees or staking ground on one of the water fountain rocks.

belonging to a social network *feeling cared for* *self-expression*

Conveniences and details that make walking and cycling more pleasant, accessible and safe are tangible affirmations of community presence and the pedestrian's right to the city.

Portland

New York City

Visibilty - Seeing and being seen

Jane Jacobs' (1961) acute observations of the social interactions in the city continues to resonate - seeing and being seen brings a sense of safety through passive social contacts. Outdoor seating and transparent windows at street level are appreciated amenitites and increase visibility to and from street space.

Zurich

credit: EURIST e.V.

Traffic & Accidents - Safe movement across traffic

Raised crosswalks slow traffic and keep the pedestrian elevated. Sufficient crossing and waiting times at crosswalks respect people with mobility challenges.

New York City

Weather - Covered outdoor spaces

Cafe tables and chairs in NYC open to the public. No purchase necessary.

Seattle

Human Scaled - Personalization of space

Small scaled details communicate personal and societal values and commitment. Murals can bring life to large blank spaces and communicate an ambition, an idea, or commentary.

Portland

This street corner in Portland is actively formed and maintained by residents. The care of the neighborhood is seen through the many hands that helped build and paint this unique intersection.

figure 4.21: Affordances of Social Support - feeling cared for

belonging to a social network *feeling cared for* *self-expression*

Common spaces with a range of organized recreational activities and unstructured creative play support self-expression and experimentation with social roles while building a personal relationship with the environment (Bartlett, 1999).

Seattle

Positive Sensory Experience - Sharing experiences

Sharing sensory experiences can strengthen social bonds. This community garden in Seattle welcomes the community to explore, learn and participate. An endeavor achieved with the help of many organizations, the garden has many personalized details to surprise and delight visitors.

Seattle

Denver

Play & Exercise - Spaces of expression

This corner skate park in Denver attracts different ages, abilities, and types of activity. It is located between downtown and several urban villages, connected by the riverwalk and bike path. The ramps range from beginner to advanced level and has a central covered gathering area.

figure 4.22: Affordances of Social Support - self-expression

SUMMARY

Addressing mental health as a public health issue requires a multi-disciplinary strategy that emphasizes mental health development and prevention, not just treatment of disorders after they have become established. The urban public street network can play a supportive role towards a goal of community mental health. In keeping with recommended public health strategies of prevention for long-term health, as well as the philosophy of progressive urban designers and planners, a foundational consideration of this thesis is to support the needs of children and the elderly, thereby meeting the needs of all people. A discussion of city structure through a range of scales organizes my approach of addressing supportive community mental health in the public realm: a city-wide scope to identify potential networks, a walking radius scope to find connections, and a sensory scope to evaluate the therapeutic qualities of urban public space.

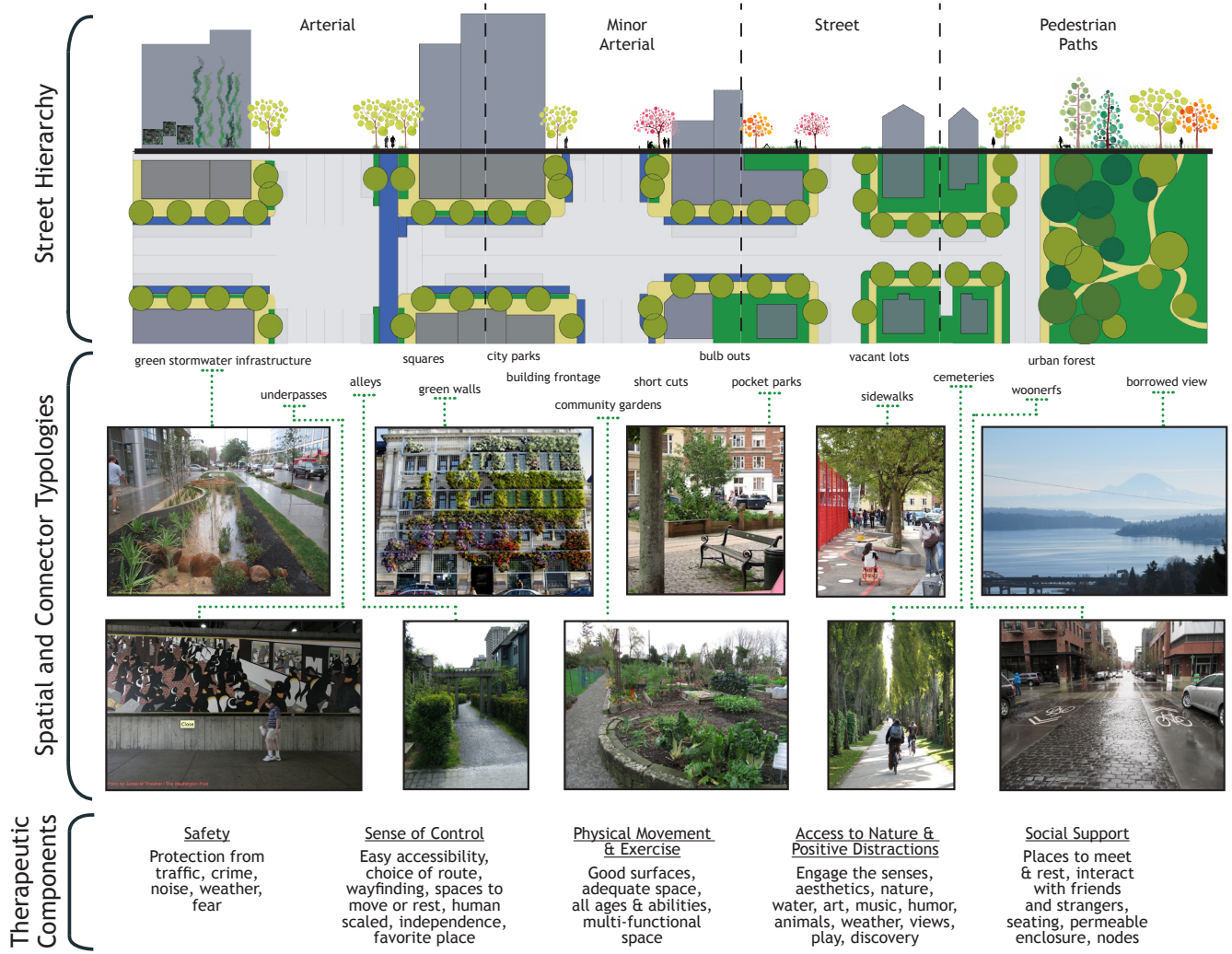


figure 4.23: conceptual framework for a network of therapeutic streets

figure 5.1: Portland, OR alleyway

SITE INTRODUCTION

Objective

The main goals for this design are to provide an environment of experiences that relieve stress and mental fatigue in safe and appealing surroundings for students and the neighborhood to move through and gather socially. The components of therapeutic environments discussed previously – sense of control, physical exercise, social support, and positive distractions – are addressed in the public right-of-way to support active transportation that provides mental health benefits on the daily commute.

A Brief History of the Central District

Washington Middle School is located in Seattle's Central District, off South Jackson Street between 20th Avenue and 22nd Avenue, one of the oldest residential areas of the city. After Henry Yesler cleared the area of old growth forest in the 1880s, a cable car was built to climb the steep grade attracting more people to settle here. It has always been a culturally diverse area; Jewish, Scandinavian, Japanese, and African Americans built their homes, churches, and businesses here. After World War II, Jewish, European and Japanese families began moving out of this area while the African American population grew to replace them. The community struggled with poverty, housing and job discrimination, and violence during the Civil Rights era. The 1990s brought some gentrification to the area as many white families began to move back into the area, now making up 58% of the population. This neighborhood also has a rich music background, having been the place to hear jazz music in the years before WWII. Its reputation as an incubator of successful musicians continues today through its award winning music programs at Garfield High School (Henry, 2001 & JSMHP).

DEMOGRAPHICS AND HEALTH

Analysis of WMS student demographics of 5th to 8th graders affirms an ethnically diverse area (figure 5.2). Of the approximately 1,160 students 8.6% are considered “transitional bilingual”. Census tract figures covering WMSs district show median household income ranges from $13,782 to over $144,000. We can assume that most students are from families on the lower income end of the scale as 50.9% of students are enrolled in the reduced or free lunch program. This is an important finding in terms of mental health as evidence suggests “low levels of household income are associated with several lifetime mental disorders” (Sareen, et.al., 2011). King County Community Health Indicators for mental health reflect this finding, documenting 24% of Seattle residents with incomes below $15,000/yr had more than 14 days of mental distress compared to 6% of residents with incomes over $75,000/yr (see figure 5.3). A 2011 survey of King County 8th graders indicates the percentage of youth behaviors and dispositions that increase the risk of mental health disorders (see figure 5.4).

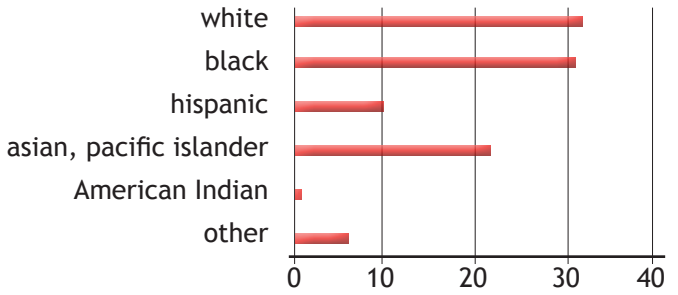


figure 5.2: Washington Middle School Student Ethnicity (n=1150)[1]

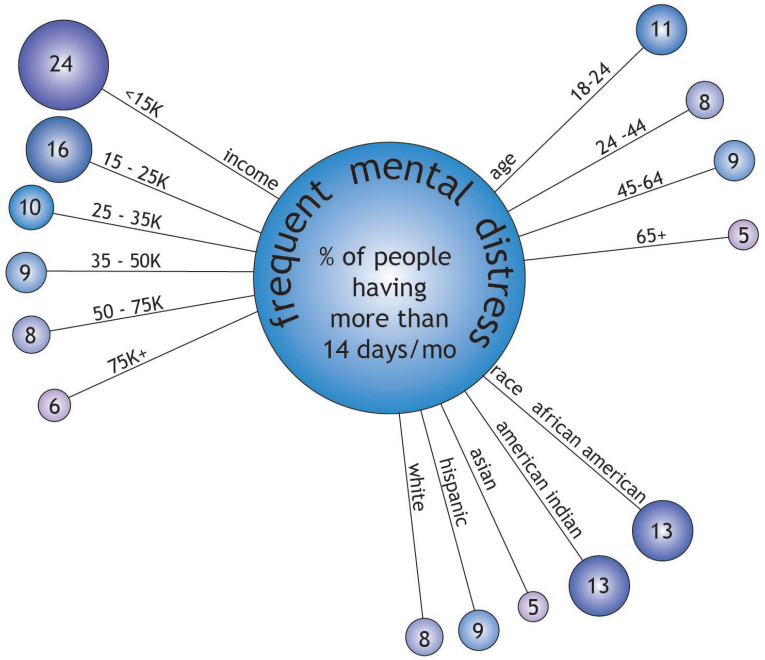


figure 5.4: **King County Heath Indicators - frequent mental distress**[3]

Behaviors & Dispositions that Potential Increase Mental Health Disorders[2]

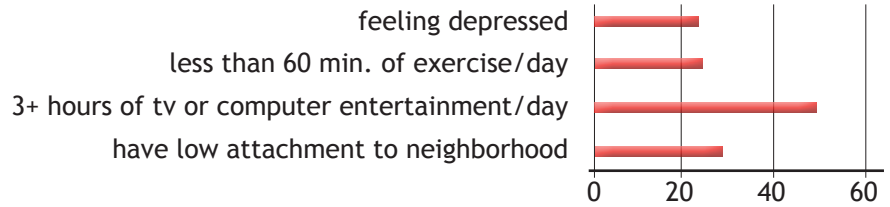


figure 5.4: Washington State Healthy Youth Survey 2010

1. Office of Superintendent of Public Instruction (OSPI). (nd). Compare my School. Retrieved January15, 2013) from: http://reportcard.ospi.k12.wa.us/SideBySide.aspx?schoolId=1&OrgTypeId=1&reportLevel=State&orgLinkId=

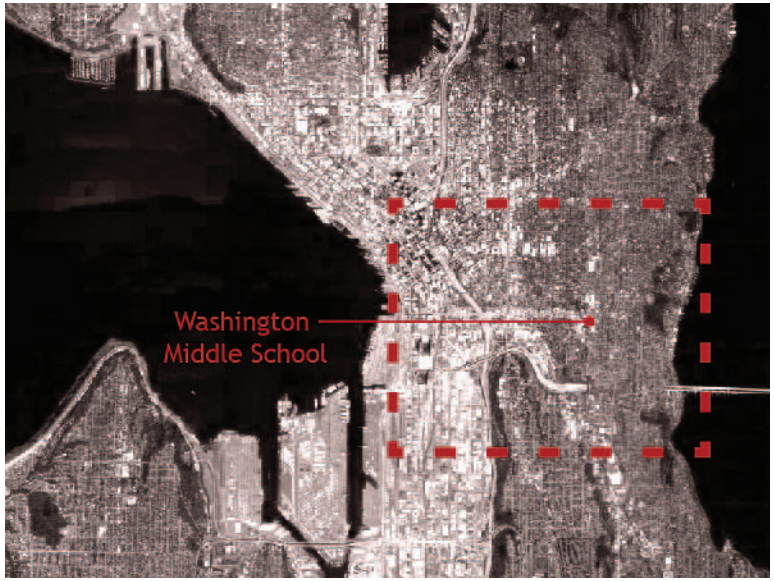
2. King County Department of Community and Human Services (September 20, 2013). Washington State Healthy Youth Survey 2010. Retreived from: http://www.kingcounty.gov/healthservices/SubstanceAbuse/Services/Prevention.aspx

3. Public Health – Seattle and King County. (nd). Community Health Data. King County Community Health Indicators. Retrieved (January 13, 2013) from: http://www.kingcounty.gov/healthservices/health/data/indicators.aspx

MAPPING AND SITE ANALYSIS

The site analysis is conceptually organized by decreasing scales, though going back and forth was necessary to analyze and recheck findings. First, the school's district boundary, city street infrastructure, public transportation options, and the local area community and youth resources – parks, community centers, libraries, etc. – where students might spend time after school are identified in context to the city. The neighborhood features are then highlighted by a quarter mile walking radius and analyzed to determine the possible pedestrian connections. After determining these connections, a more fine-grained analysis of sensory qualities along the street segment identify potential enhancement or changes to the public right-of-way to benefit restoration from stress and mental fatigue.

City: Streets and Transit (figure 5.5) – South Jackson Street is a minor/major arterial street that runs in an east-west direction across Seattle from Puget Sound to Lake Washington. It highest elevation point is 332', but topographically it has a gentle grade change compared to arterials north and south of it, making it one of the easier east/west crossing. However, there is little public transportation that runs in this direction – only one bus of limited runs. There are more frequent bus options running north-south along 23rd Avenue or Rainer/Boren Avenues. The First Hill Street Car is under construction and will provide an east/west connection on Jackson, but only at 14th Avenue to downtown, its main length running north/south on Broadway Avenue. Major public transit hubs are just beyond a mile of the school – Mt Baker Bus Terminal and Light Rail to the south on Rainer Ave and Seattle King Station downtown. There are few dedicated painted bike lanes, mostly sharrows – the inept name for a car lane shared with cyclists – running north/south along Martin Luther King Jr. Way South and 20th Avenue South and east/west on South Jackson Street and Yesler (although the hills are very steep along this route). A footpath called the Central Park Trail crosses South Jackson at WMS, however there are safety and accessibility concerns that leave the trail little used, as I discuss later. Zoning and Parks (figure 5.5) – The area around WMS is zoned neighborhood/commercial, with a mix of low-rise apartments, single-family homes, and small businesses. At the corner of



Washington Middle School walking boundary

arterial street

bike lane or sharrow

street car

Washington Middle School

parks

transit hub

single family housing

mixed-use residential

downtown development

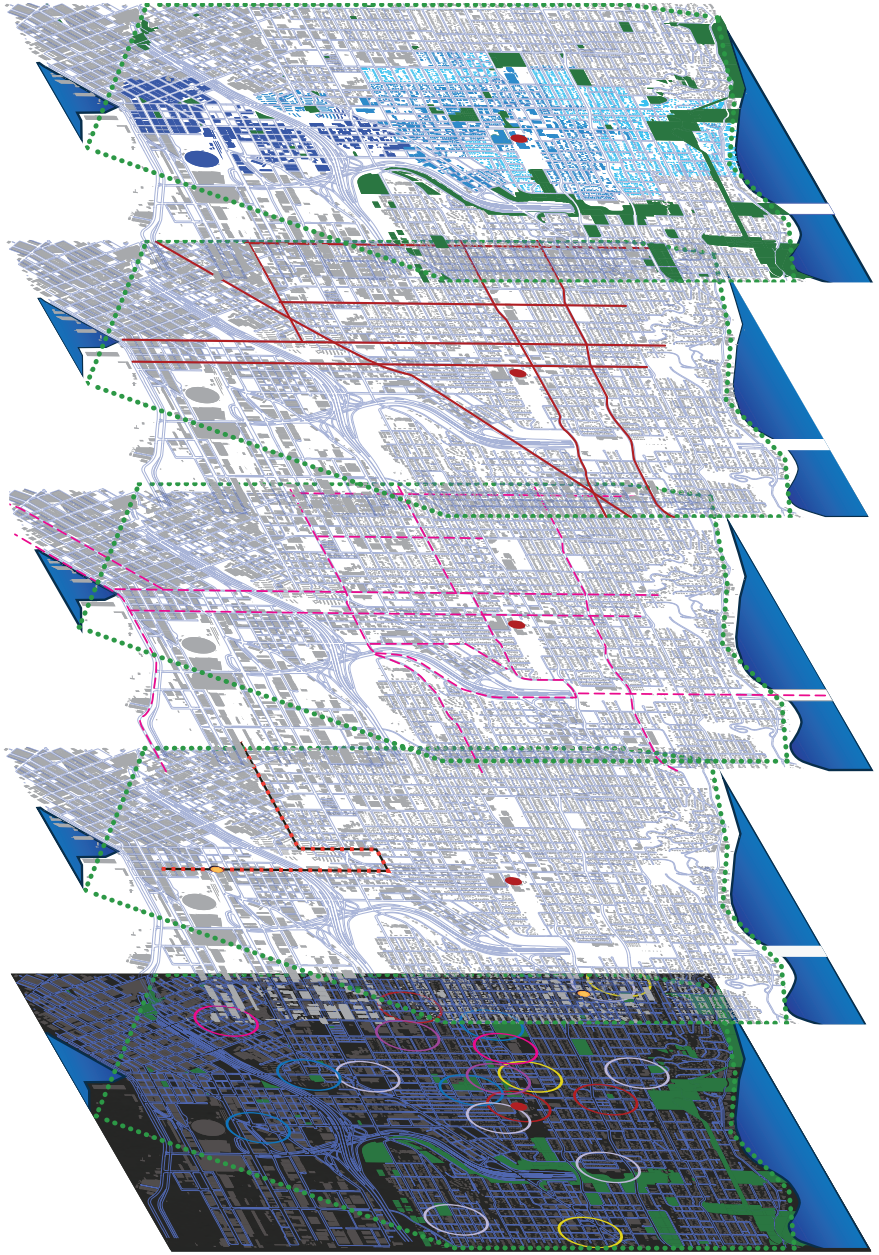


figure 5.5: Site Analysis

Zoning info from Seattle Department of Planning and Development http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web_informational/dpds022048.pdf

Walking zone http://www.seattleschools.org/modules/groups/homepagefiles/cms/1583136/File/Maps/boundarymaps/pdfs/AA_MS_Washington.pdf?sessionid=3ae1b47ea24aa19a5facfff321946c0f

Jackson and 23rd are two shopping plazas with large parking lots, with another commercial zone fronting South Jackson Street west of WMS towards 18th Avenue. It is a fairly dense neighborhood with many local resources within walking distance. The area is fortunate to have a variety of parks close by, a great potential for therapeutic and connector space.

There are great opportunities here for continuous, dedicated walking and biking paths. While Seattle Public Schools delineate a walk zone for WMS, within a 2-mile walk to school, there are no recommended routes by the school district. The area is zoned largely for neighborhood mixed-use of low to mid-rise buildings contributing to a potentially large pedestrian base, especially from those who do not own cars like the tenants in the recently opened low-income housing apartment complex for the formerly homeless. Major transportation hubs may still be too far for most people to comfortably walk to, but better cycling and walking infrastructure to local public transit options are a great way to connect people to the city and encourage daily exercise.

Neighborhood: (figure 5.6) A closer look at the neighborhood surrounding WMS begins to show relationships between community resources in context with public transportation, the street network, parks, and community centers with distances between many of these day-to-day resources of less than half a mile. There are quite a few schools and after school programs in the area serving all grades that would benefit from better-connected, safe and therapeutic walking routes. The radius' help to identify the proximity of resources to one another and help determine walkable paths and connections. The radius around WMS and the radii intersecting it indicate high levels of pedestrian and cycling activity to the east and west along Jackson and north through Lavisso Park. Observations of student activity and a walking audit by the WMS students lead by Feet First (Quinn, L. & Das, S., 2010) supported these findings except for the northern route through the park – interestingly, students who participated in the walking audit were not aware of the park at all, even as a part of the Central Park Trail that passes in directly in front of the school.

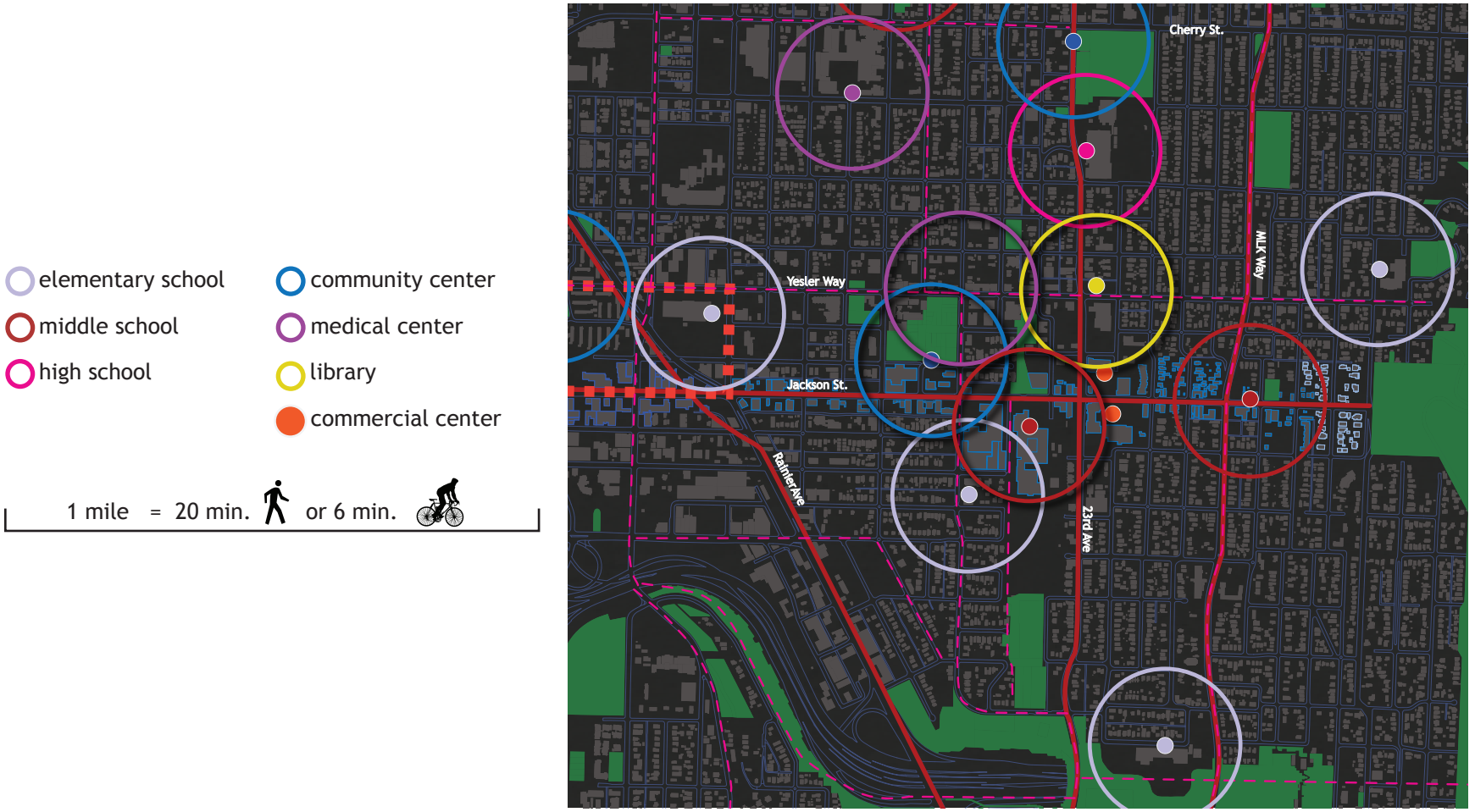


figure 5.6: Central District radius mapping

Street: There are three main areas of focus for this design exploration – Jackson Street between 20th Avenue and 23rd Avenue, important because of its heavy use, the Central Park Trail because of its car-free path to the north and potential therapeutic space, and the corner of 20th Avenue and Jackson Street as a connector to points east and north. The following visual assessment describes the needs and challenges of these areas developed from synthesizing the mapping analysis, observations, and student walking audit. Afterwards, design opportunities are suggested for each area with their therapeutic benefits notated by the following icons:


Sense of control


Exercise and movement


Social support


Nature and positive distractions

VISUAL ASSESSMENT

SOUTH JACKSON STREET

In section view, this segment of Jackson Street creates a bowl – the elevation at 23rd Avenue is 290', descending to 258' at the mid-block crossing at WMS, and then ascending again to 272' at 20th Avenue. WMS sits further below the crossing at an elevation of 250'. Building frontages along this stretch are uninteresting, being windowless for the most part. Warning and caution signs near WMS propagate the sidewalks which are typically 6' or less, uneven, and cluttered with utility poles, amenities, and other signage. Observations of Jackson Street activity were conducted on three week days and one Sunday during the months of January and February. Even during these coldest of months there was pedestrian and cycling activity throughout the day. The most pedestrian activity occurred at the opening of school at 7:30am, but activity was high at the closing of school at 2:30pm and at rush hour at 5pm (Figure 5.7). This can be accounted for the combined morning commutes and the observation of children being dropped off more often by parents than being picked up from school. School openings and closings cause traffic backups and aggressive

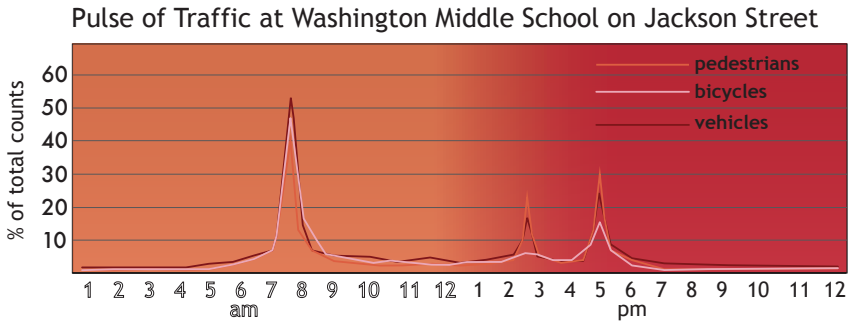


figure 5.7: Pulse of traffic at Washington Middle School on Jackson Street

driving by parents and commuters prompting the school to hire two crossing guards. In addition to the extra car traffic, school buses and large delivery trucks for the bakery next door begets an atmosphere of chaos, noise, and pollution from vehicle exhaust. When parked along the road these large vehicles prohibit pedestrian and cyclist visibility, sandwiching people in between building and trucks. The mid-block crossing WMS is at the bottom of the hill, an impulsion of higher speeds. After school some students walk to the bakery or the Promenade Center for snacks. It is a lively area as cyclists commonly bike on Jackson Street because of its comparatively gentler slope, pedestrians walk to the bus stops and other neighborhood resources, and local preschools walk children to the park.

Challenges and Needs of Jackson Street South

- Safety for pedestrians and cyclists from traffic, noise, and pollution, ADA compliance
- Walking and biking infrastructure is of poor quality that and detracts from the neighborhood
- High traffic speeds can make crossing the street difficult
- Poor visibility due to freight truck parking

Opportunities

- Decrease vehicle lane width for multiple benefits – slow traffic, widen sidewalks, incorporate dedicated bicycle lanes 
- Implement buffer between pedestrians and traffic – decreases noise, improves safety and aesthetics 
- Replace ineffective signage with elements such as curb extensions with vegetation, raised crosswalks, and lighting to increase actual and perceived pedestrian safety and aesthetics 
- Apply green stormwater solutions for ecological and human health 

20th Ave. & Jackson St.

Central Park Trail

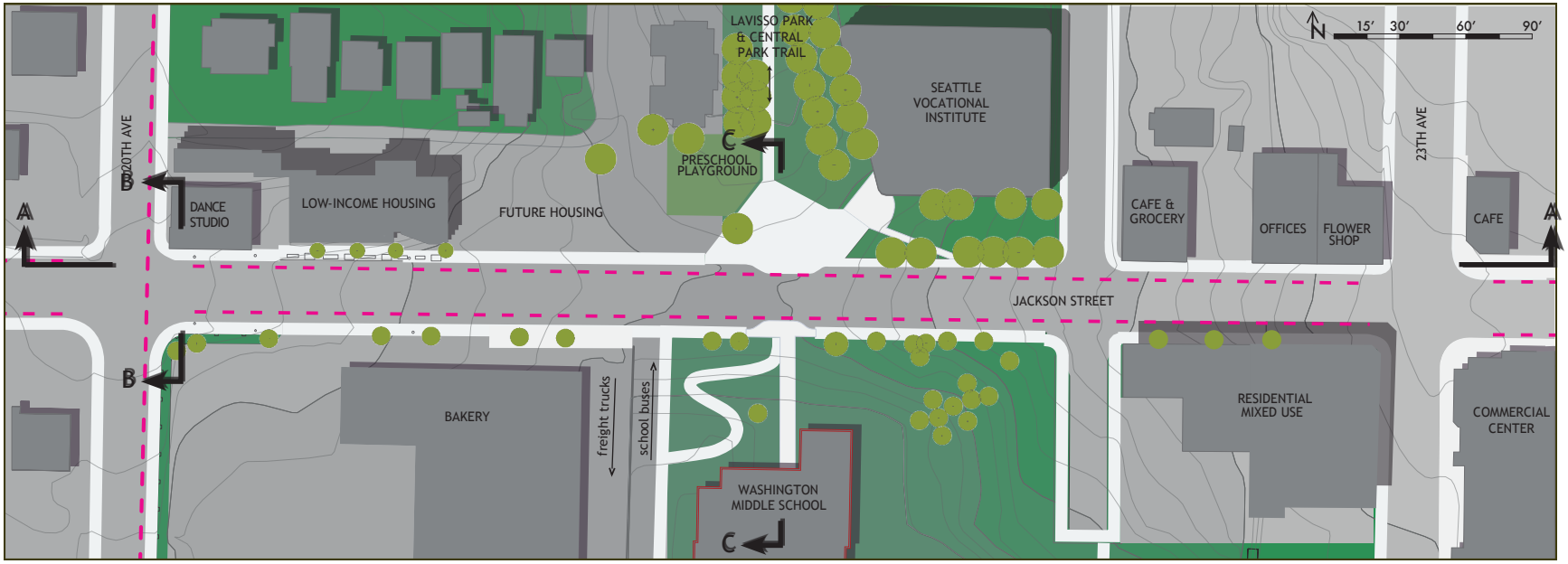


figure 5.8: Challenges & Needs

South Jackson Street

OPPORTUNITIES

connect to other neighborhoods

Apply green
stormwater solution

Improve safety at crossing

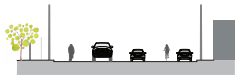
Section AA

frame views

personalizing space to
create a sense of place
and community identity

improve pedestrian connections

frame views



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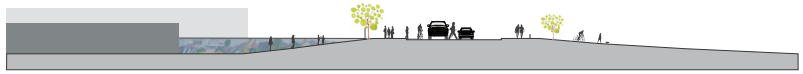


Section CC

15′ 30′ 60′ 90′

figure 5.9: Opportunities

CENTRAL PARK TRAIL AND LAVISSO PARK

The Central Park Trail runs north/south, starting at Judkins Park, passing the entrance of Washington Middle School, crossing Jackson Street and into Lavisso Park. Buildings are set back far from both sides of the road creating a sunny, wide-open space, however the entire entrance to the park is concrete, punctuated only by four stunted oak trees and a non-descript planting bed. In essence it looks like an expansion of the street. Located on the north side of Jackson are a covered bus stop, a preschool playground, and a couple benches that look towards the street and – on sunny days – Mt. Rainier. Students hang out here after school or wait for the Metrobus or a ride to pick them up. They were observed talking in groups, chasing each other, reading, listening to headphones, doing homework, and eating snacks. Outside of school hours I observed many dog-walkers, recreational and utilitarian cyclists, elderly pedestrians, and families walking along the trail.

On the south side of Jackson Street the Central Park Trail cuts up a steep slope. There is a meandering, gently ascending path to assist users with disabilities, which is still rather steep and utilitarian, or a steep path that leads directly up to Jackson Street. This large area is mostly turf with a few stubby trees, its south-facing slope receiving a lot of sun. Children were never observed spending time here playing or hanging out.

Challenges and Needs of Central Park Trail and Lavisso Park

- A spacious, but bland area to pass through or pause in
- Programmed activity is limited to preschool children
- Pedestrian connections to the Lavisso park, Pratt park, and points north are eclipsed by the unappealing, boring concrete entrance
- Crossing the street here can be dangerous, due to poor lighting, especially winter mornings and evenings, traffic, and visibility around parked vehicles
- Neglected space next to the school is a barrier to the school's presence in the community

Opportunities

- People presence throughout the day 
- A large space for a variety of physical and social activities and age groups 
- Sunny location 
- Great view of Mt. Rainier 
- Outdoor classroom space 
- Community garden to connect the school to the neighborhood, support school nutrition programs, and provide ADA accessibility from WMS to Jackson Street 

20TH AVENUE AND JACKSON STREET

20th Avenue is a slower street with a north/south bike lane leading to Pratt Park, intersecting with Jackson Street that connects to downtown and the soon to be First Hill Street Car. Being so close to the park families were often observed walking along 20th Avenue. There is a window gallery run by Pratt Art Institute showcasing student work and a wall mural that attracts a lot of positive attention. Along Jackson Street it is a passing point for students living in the International District and east of the school. Puget Sound, the Port of Seattle, and some downtown buildings are visible from the street corners. Sidewalks are narrow, cluttered with overgrown vegetation and utilities, and have a general unkempt appearance. There are parking lots fronting three corners of the intersection, currently a dance studio occupies the building on the forth.

Challenges and Needs of 20th Avenue and Jackson Street

- The intersection is often used by pedestrians and cyclists, but the sidewalk is narrow and unappealing, and cyclists are sharing their lane with vehicles
- There is nothing to announce the vicinity of the school or parks to drivers or pedestrians

Opportunities

- Drop off and pick up area for students to encourage exercise and avoid traffic along Jackson Street and 23rd Avenue 
- Great views and pedestrian activity could support a pocket park 
- A gateway to the school and neighborhood 

figure 6.1: Tanner Springs Park, Portland, OR exploring urban nature

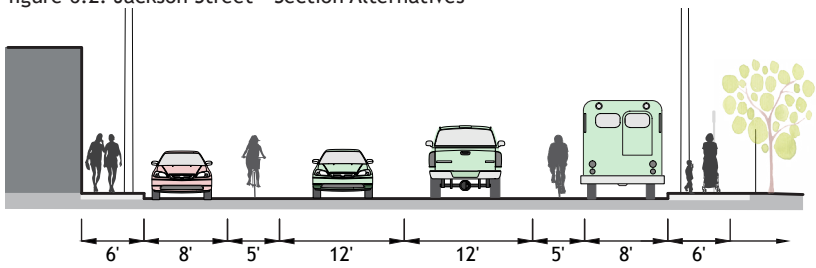
JACKSON STREET LAYOUT

There are several elements along Jackson Street that offer opportunities for improved human and environmental health. After taking measurements to determine the spatial needs for pedestrians, cyclists, and vehicles I found that the vehicle lane widths for travel and parking are unnecessarily wide. Decreasing the widths of vehicle lanes allows for the pedestrian and cyclist realm to expand and helps to slow the speeds of cars moving downhill. Other considerations for the street layout were:

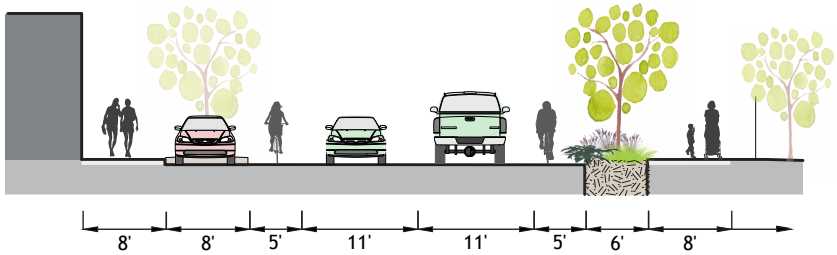
- Connections beyond this street segment to avoid abrupt changes to travel lanes for all modes of transportation
- The turning radius onto Jackson Street for school buses and from Jackson Street for bakery freight trucks
- Exposure to weather – north side of the street is sunnier
- Driveways – some businesses only have access from Jackson Street

I tested three different arrangements of sidewalks, cycle lanes, parking, planting strips and vehicle travel lanes to find the optimal conditions for continuous, safe, and pleasant pedestrian and bike movement while calming but not restricting vehicle traffic. Figure 6.2, shows the typical existing street layout with oversized vehicle lanes, 6' sidewalks and 8' parking on both sides of the street. Option 1 shows minimal changes – sidewalks on both sides widened to 8', planting strips replace extraneous parking and no change to the cycle lane location. While this option creates a safer and more pleasant walking experience, I quickly eliminated any configuration positioning the cycle lane next to the vehicle travel lane – even with curbs or bollards separating the two – due to unpleasant safety and sensory experiences. Option 2 and 3 are organized based on speed of travel mode, keeping the slower, active forms of transportation next to each other and raised above the faster, central vehicle travel lanes. Option 3 explores a 2- directional, double cycle lane that presents problems when considered with the context of Jackson Street as a whole. With the new streetcar line, the cycle lane would need to revert to two single lanes that I foresee as a clunky transition for cyclists approaching downtown. Option 2 (see plan in figure 6.4) is the most appropriate considering the whole length of Jackson Street with goals of continuous, safe, and pleasant service. There is ample

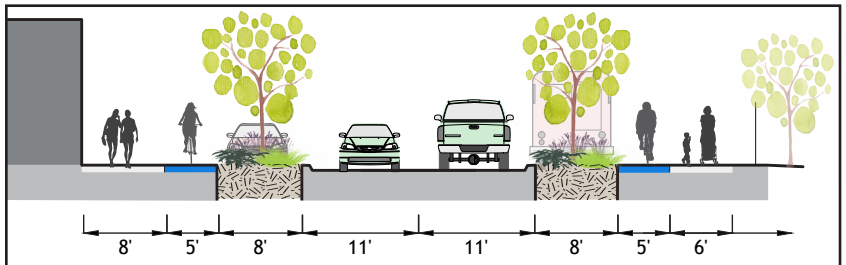
figure 6.2: Jackson Street - Section Alternatives



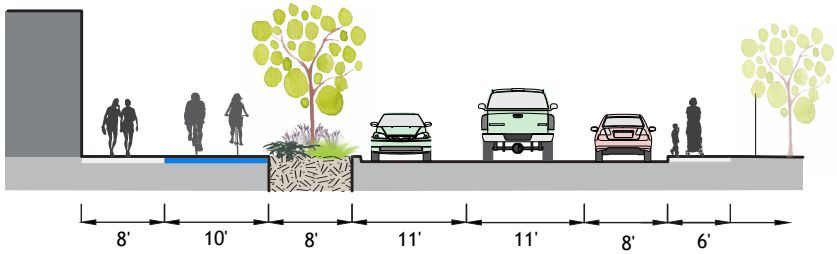
Existing street setion, typical



Option 1: Buffered planter strip alternating with parking, typical bike lane



Option 2: Alternating buffer/parking, dedicated bike lanes



Option 3: Buffered, two-directional dedicated bike lane, parking lane opposite

room to handle the density of pedestrians and cyclists while leaving room for a protective and engaging buffer of planting strips and natural drainage systems. Street trees are planted along both sides of the road to give a sense of opening and enclosure of human scales and for the provision of weather protection. I retained selective on-street parking and vehicle space for metro and school bus drop-off and pick-up, short-term parking for businesses and housing without parking lots, and room for the turning radius of school buses and bakery trucks.

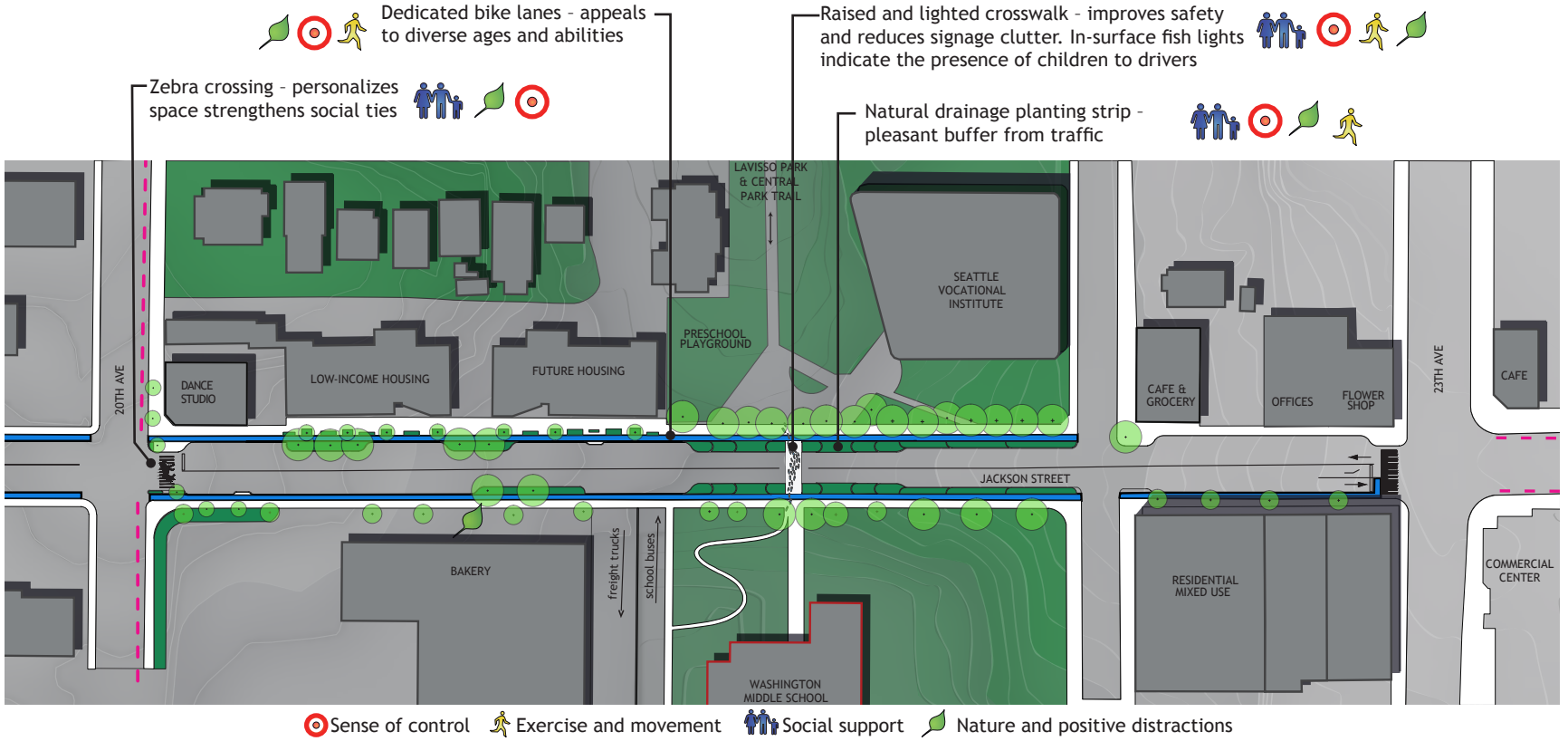
Along this street segment there are two, timed intersection crossings, one at 20th Avenue and one at 23rd Avenue, and one mid-block crossing at WMS. I propose using the crossings as gateways to the neighborhood, using art and creative design strategies to introduce drivers and pedestrians to the area. Creative and artistic alterations of mundane urban features are a way for communities to interpret their history and values, express their character and identity, and communicate stewardship and care. They can also be used to bring attention to drivers and pedestrians without the overuse of caution signs.

At the timed crossings curb extensions inform drivers of a change in lane pattern, provide better visibility for pedestrians and drivers, and create space for plants and artwork. On the road surface the typical crosswalk stripes are transformed into playful patterns of animal shapes and piano keys (figure 6.3) in reference to the musical history of the area.

figure 6.3: Jackson Street and 23rd Avenue- piano crosswalk

The mid-block crossing at WMS is well used, but is a safety concern due to its location at the bottom of the hill. During school hours 2 crossing guards help children cross the street and orange crossing flags are provided for pedestrians to use at other times of day. There is a multitude of signage overhead and on the sides of the roads warning drivers of the speed and pedestrian crossings ahead. However, because of the wide road signage placement conflicts with where the driver should be looking and the signs tend to go unnoticed. Here I suggest a raised crosswalk to slow traffic speeds and provide the physical and visual continuity of the Central Park Trail that it is currently lacking. Lighting is an important need at this crossing especially in the winter months when it is still dark when school opens in the morning. Low lampposts are positioned at the edges of the crossing and in-street, pedestrian activated lighting formed as a school of fish direct students towards WMS. To avoid conflicts with cyclists at crossings and bus stops a series of painted circles increase in size as a signal for cyclists to watch for pedestrians towards the approach.

The topography along this segment presents an opportunity to reveal hydrologic processes by collecting, filtering and moving rainwater through a series of natural drainage planting strips that fill and spill over weirs to the basins below. As a green infrastructure system it has multiple benefits: it reduces the amount of stormwater entering the city's combined sewer overflow and cleaning it before entering Puget Sound, supports urban biodiversity and access to nature through a plant palette attractive to pollinators and people, provides a safe and attractive pedestrian area by buffering vehicle speeds and noise, engages pedestrians with the movement of water when it rains, and becomes a learning resource for local schools.



approaching the mid-block crossing at Washington Middle School

figure 6.4: Jackson Street plan and vignette

CENTRAL PARK TRAIL AND LAVISSO PARK

The trail and park are part of the public right-of-way with qualities that make it both a place for moving through and a place for staying in. There are many opportunities for social, physical, and sensory experiences at this site, given its size, location, and connections to neighborhood resources, with the objective of supporting mental health. To the north of Jackson, children wait for their parents or mill around here after school, but there is nothing interesting or inspiring. While it sits right across the street from WMS, it is a space without school or parental authority, a place to experiment with social roles and individual expression, but under the eye of the larger community.

Currently there is no distinction between the sidewalk and the park entrance. The perception being the park is not a park, simply an expanded sidewalk. To resolve this, I clarify the two spaces and their intended use with a change in surface materials and patterns to reflect the type of activities that could take place there (see figure 6.5 for plan and 6.6 for sections). The sidewalk intended for efficient and quick movement is smooth concrete, while the park entrance surface of crushed gravel crunches beneath feet, alluding to natural settings where we tend to move more slowly. The meandering edge between sidewalk and park entrance blurs the division of space inviting users into the park by maintaining the sense of the public realm on either side. The trail itself is concrete with a paving pattern that directs pedestrians into and through the park.

The trail divides the park entrance into two large spaces and I use the current topography – sloping downward towards the north – to reinforce the change in elevation and accentuate the kinesthetic experience of moving through the landscape. To the east of the trail a multi-leveled garden that collects excess stormwater sits at the bottom of a large gathering area, The Perch, that overlooks the park. This space is divided into smaller social niches through the arrangement and variety of seating, a covered shelter with swings, and a set of wide seat stairs. Seating can accommodate functions other than a place to rest, such as social support and exercise from swings and the balance bench (see figure 6.7). They also afford a sense of control through the physical and mental challenge of manipulating elements in the environment. Site amenitites, like benches, shelter,

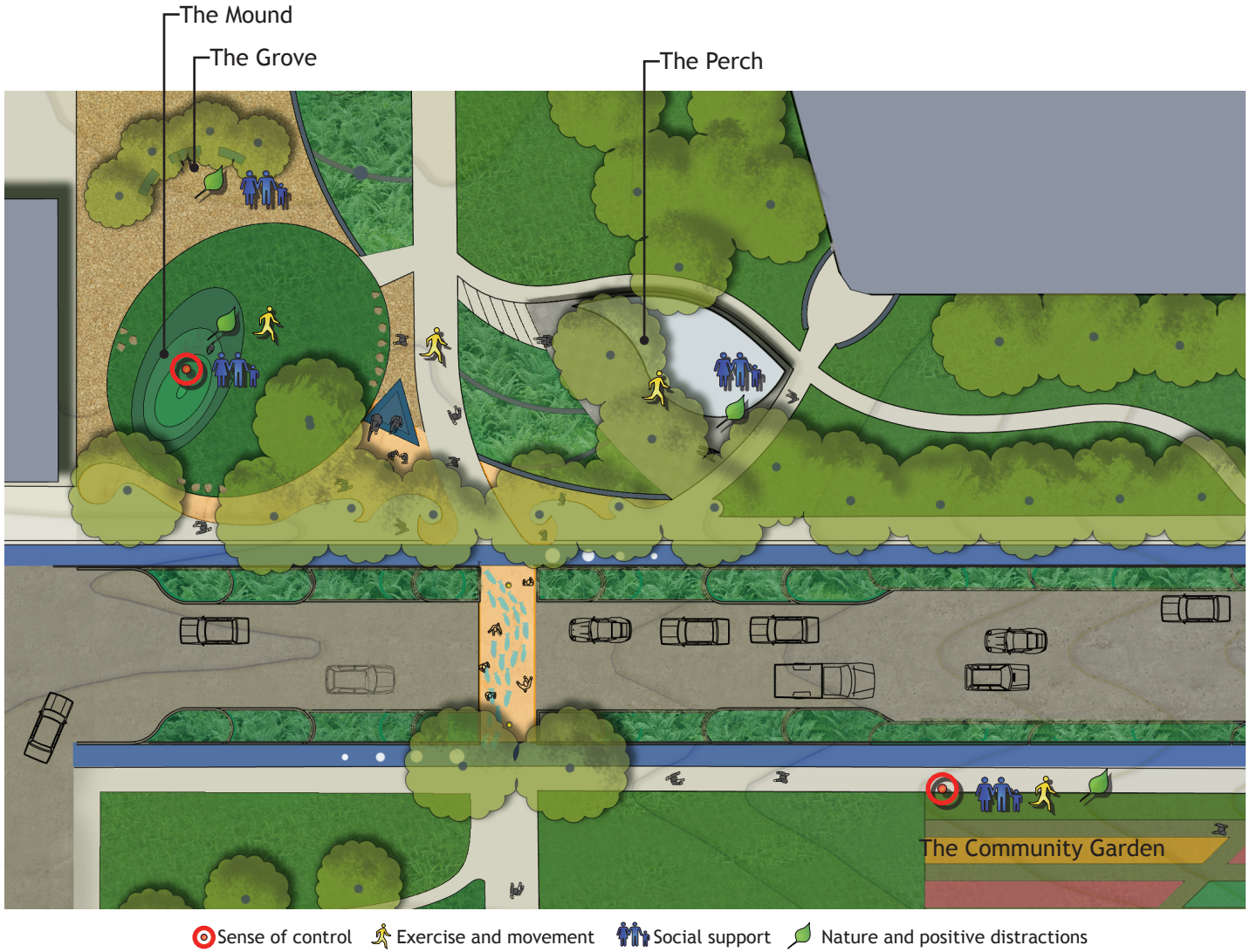


figure 6.5: Central Park Trail and Lavisso Park plan

figure 6.6: Central Park Trail and Lavisso Park sections

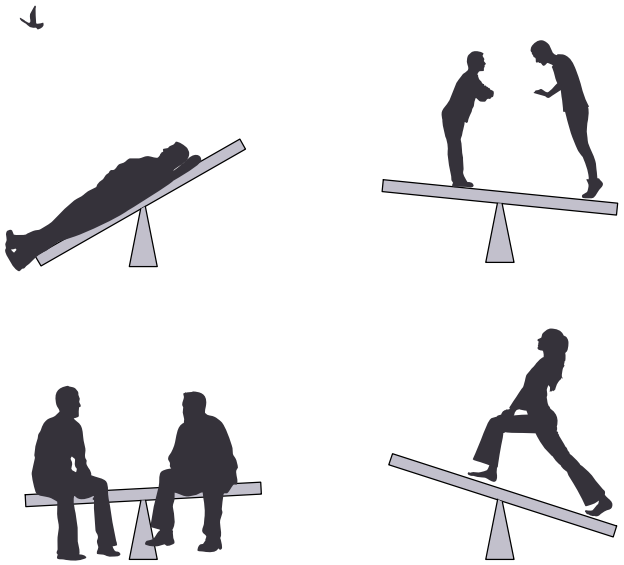


figure 6.7: balance bench

and walking surfacesare made of natural materials of wood and stone and diverse plantings provide textural, visual, and olfactory qualities intended to activate the senses.

To the west of the trail, the preschool play area currently takes up half of the entrance space with a fence surrounding it, excluding most users of the site. To encourage a more diverse social experience, I propose to replace the play equipment with simple elements appealing and adaptive to a wider range of ages. The Lookout is a grassy mound that provides climbing, running, rolling, and creative play opportunities for all age groups. It sits amid a slightly sloped, grass field for running, throwing, and other games and is surrounded by low boulders for climbing and sitting. Children can get a closer look into the trees from the top of the Lookout and, on clear days from this vantage point, a view of Mt. Rainier.

The Grove of small trees with seating underneath delineates the back edge of this outdoor playroom creating a feeling of intimacy while maintaining views across the site. A rain garden collecting rainwater from the site separates the Grove from the Central Park Trail further

defining this area. A narrow step stone bridge across the garden provides a landing to investigate plants and animals that live there.

To the south of Jackson a community garden makes great use of this neglected space. The height of WMS is only one-story so the hillside has sun all day, perfect for growing food. Terracing the hillside has several benefits: it provides more garden plots, important in Seattle as there is a long wait list for the P-Patch program, and it creates a gently sloping path up the steep hill through a socially and experientially diverse environment. As a community garden, it integrates the school and the community, extending a social and learning invitation between each other. School classes and health and well-being programs could support ongoing work in the garden, inspire place attachment and stewardship, and possibly even provide healthy food for the school.

20TH AVENUE AND JACKSON STREET

As discussed earlier, the intersection here uses artwork as a gateway to this area. The concept of the zebra crossing develops further into this corner pocket park as the zebra's habitat – the savanna. The extended curb provides space for a small amount of seating surrounded by raised planter boxes filed with grasses that release their fragrance in the sun or breeze. A lamppost in the form of the baobab tree – also known as the Tree of Life – is symbolic of continuity and positive life amidst harsh conditions. The widened sidewalk would make room for a green wall along the corner building that could be used to grow fruit or vegetables. 20th Avenue would be a sensible turn-off for parents dropping off or picking up children from school, with connections to Yesler Way or driving around the block using 18th Avenue back to Jackson Street. This pocket park provides a safe place for children to wait for parents or eat an afterschool snack from the bakery or other local restaurants. It could also offer a place for neighbors to meet, a rest stop for elderly walkers, have a lunch break, or to watch the sunset.

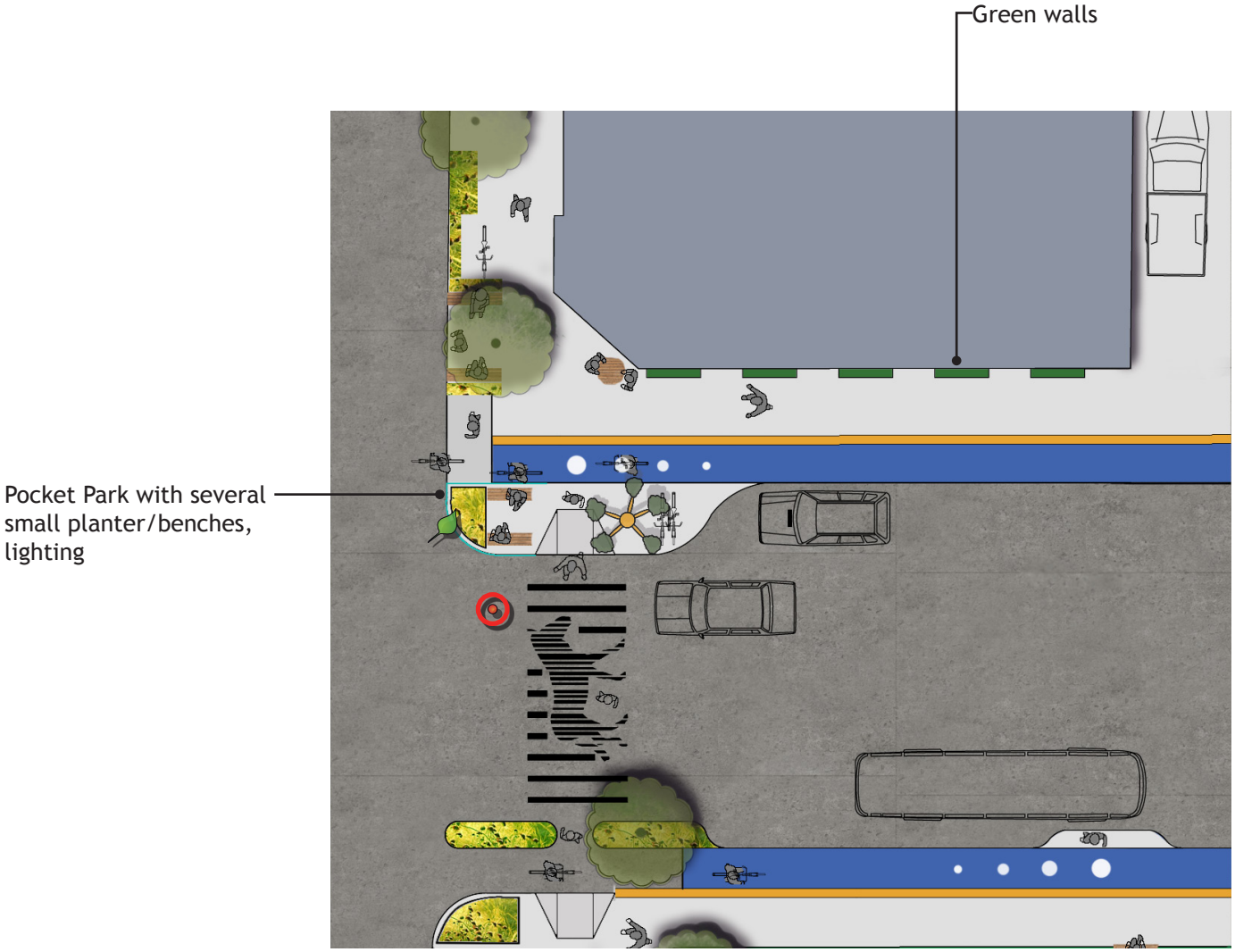


figure 6.8: 20th Avenue and Jackson Street plan

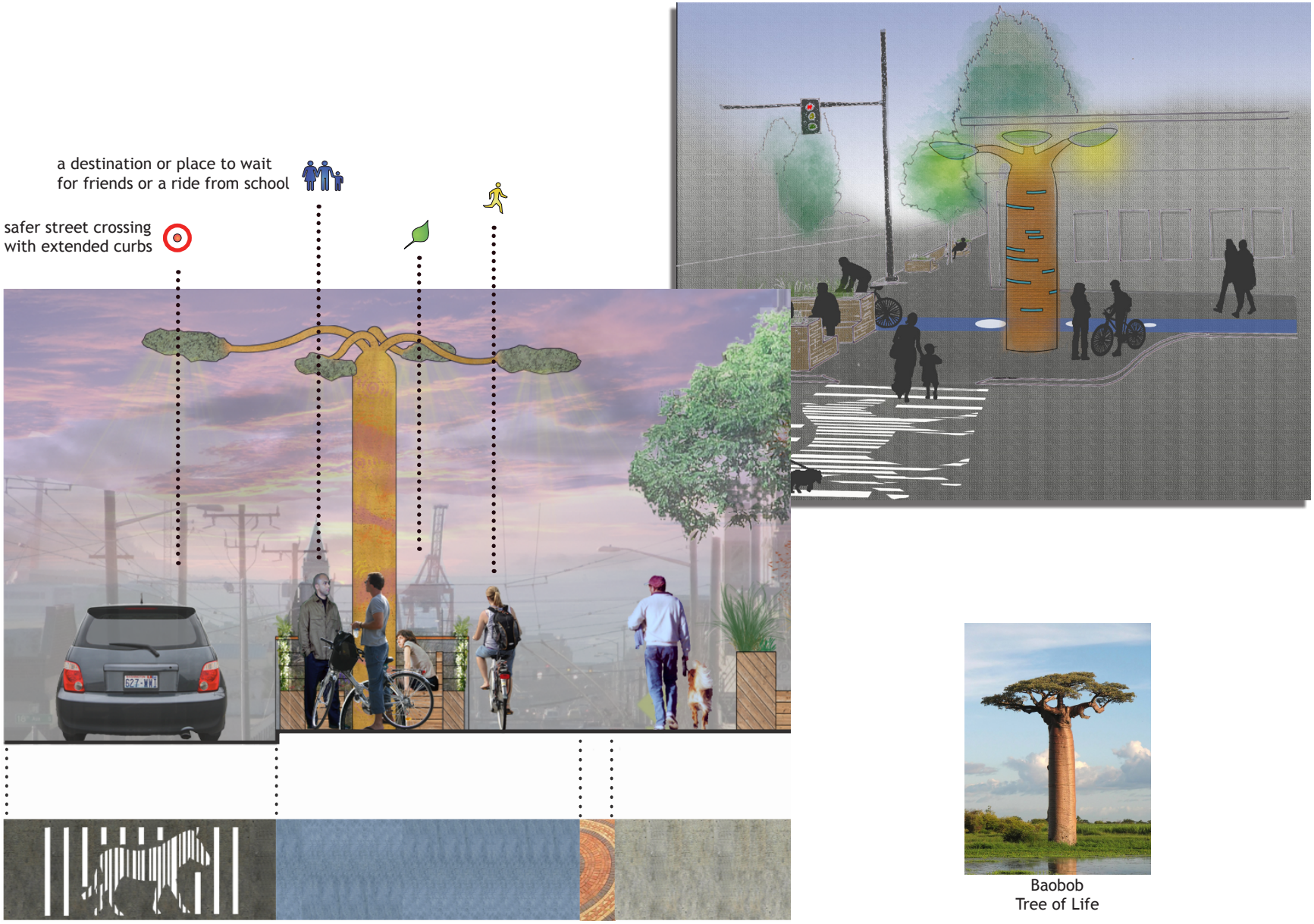


figure 6.9: 20th Avenue and Jackson Street section and vignette

Baobob
Tree of Life

figure 7.1: NYC, Lincoln Center

CHAPTER SEVEN: REFLECTIONS

The goal of this design thesis was to explore how the everyday, pedestrian urban right-of-way can be a resource for reducing stress and mental fatigue – a fundamental requisite for positive mental health – with significance as a process for the prevention of mental, emotional, and behavioral disorders. The process of gathering information and developing and testing theories was not straightforward as each new idea or finding shaped and altered the process, thought, or route I was to take. Looking back at this tortuous process helps understand the complexity of designing for health, evaluating the process for successes and missed opportunities, and gauging the potential performance of the design approach.

UNDERSTANDING MENTAL HEALTH

I do not have a background in health or psychology, so establishing a basic understanding of the psychological and physiological processes that affect our overall health was an important first step. I imposed research limits on the sphere of information and current views to include psychological and physiological health and the role of nature and the built environment in affecting wellness. And even with these limitations, the wealth of information remains overwhelming and eye opening. Several findings from this research were especially inspiring, directing the trajectory of this thesis. First, the principle of resiliency to stress – whether or not a person has an established illness or disorder – as part of the World Health Organization's definition of being mentally healthy explains the complexity of mental health issues and the stigma associated with an incomplete understanding of mental health. Second was the endeavors of public health agencies to focus efforts on mental health development and disorder prevention, especially in children before disorders become establish. Third was the statistics of the long-term social and economic costs of mental health disorders in the US. And lastly, the research by environmental psychologists and others on the effects of nature and the built environment on mental health. This research influenced the approach to finding and choosing a site, defining user groups, characterizing the components of therapeutic and public spaces, and the design elements and relationships to include in the design explorations.

FRAMEWORK FOR A THERAPEUTIC STREET NETWORK

Developing an approach to plan and design a therapeutic street network within the public right-of-way required addressing a broad spectrum of city, neighborhood, and street scales. Again, this was not straightforward as my decisions were influenced by literature on environmental psychology, landscape architecture, and therapeutic garden design. The benefits of therapeutic environments are gained from the intimate sensory interactions of the surroundings. However, when considering therapeutic goals for a street system that straddles the larger city scale there are challenging issues concerning continuity, public/private ownership, and mobility concerns, especially for people with disabilities, in regards to Seattle's steeply sloped streets. In considering a network of therapeutic environments across a city, I needed to understand how and where people move through the city and the destinations to implement continuity. Recognizing there are already spaces in the urban environment that provide therapeutic benefits, it became clear that these points should be used as connective pieces. Public heath agencies' recommendations to focus on mental health disorder prevention in children helped me to establish a starting point from an overwhelming choice of options. The planning approach of using quarter mile radius mapping to identify potential therapeutic networks supports implementation through phasing simply by focusing on a small section of the city to identify existing or potential therapeutic connections and routes within the larger framework. Community members with intimate knowledge of their neighborhood could identify potential connections with other neighborhoods. With much of the street frontage privately owned, working with businesses and owners would be challenging but could enrich the system immensely. This approach also allowed me to address the issues of continuity by suggesting potential connections without having to actually map out an entire network, an effort I realized was beyond the scope of this thesis.

PUBLIC SPACE AND THERAPEUTIC SPACE RELATIONSHIPS

Analyzing the relationship between public space qualities and therapeutic goals helped identify their shared and alternative meanings and values to understand the concept of therapeutic public space. Breaking down the components of therapeutic space into their psychological and developmental meanings and using information from the fields of psychology and child development, helped distinguish how the qualities of successful public space could offer mental health benefits. For instance, a pocket park can be defined as a neighborhood park, a pleasant place to rest or socialize- a public space quality benefit. But for someone with a mobility issue, a walk to that park could represent an important goal, and by reaching that goal psychologically it improves self-esteem and confidence, building up their resiliency to stress – a therapeutic benefit. This analysis and the illustrated examples were important influences in my design choices and were helpful to push design solutions that covered more than just the basic qualities of safety and comfort. What would have been helpful had time allowed would be the development of a survey of holistic therapeutic qualities of public space to test these ideas.

DESIGN EXPLORATIONS

Pedestrian and cyclist safety and sensory experience were constant considerations in developing each designed area. Dedicated bike lanes, wider sidewalks, planted buffers, and their identifiable wayfinding qualities definitely improve the safety and enjoyment of moving through this area. These changes could bolster the confidence of parents to allow their children to walk at least some portion of the way to school. Participating in active transportation in a pleasant environment contributes to improved physical and mental health, such as reducing ADD/ADHD and depression symptoms, reducing stress, and relieving mental fatigue. With a nearby woodland park it did not seem necessary to try to recreate a nature immersion experience, but to keep nature at hand in a variety of urban experiences to activate the senses. Supportive social environments for adolescents were an important goal because of their unique needs as they transition from being children under parental and school control to teenagers making decision for themselves. Observations of groups of adolescents hanging out crammed on sidewalks and street corners to watch the actions of others indicates that the park entrance would

be a successful place for social activities to take place. Programmed activities are intentionally kept minimal and informal to encourage participation by many users.

Jackson Street and 20th Place Way leading to the entrance to Washington Middle School, like many Seattle streets, do not comply with ADA rules due to the steep slope of the street. While these issues were not fully embraced – a topic that would be great to continue in another project – they were considered through the choice of site – Jackson Street is the less steep of the east-west arterials of this area, in the design and location of crossing areas, and the multifunctional terraced design of the community garden. Urban topography and ADA accessibility are challenging elements when dealing with existing sites and their limited space and more time would need to be devoted to investigate these particular issues.

This schematic design endeavors to incorporate the therapeutic qualities of public space through relationships of space, form, and sensory experience. The broad scope of this thesis however did not allow for a more developed city plan and design. I would have liked to more fully explore the materiality of natural elements in contrast with the built environment. These ideas could have also benefited from an extended scope, connecting neighborhoods to further experiment with the concept of radius mapping.

One thing that would strengthen this thesis is more involvement with the community. I was able to find valuable information from a Walkability Audit directed by Feet First to understand some of the students' concerns with walking in this area. But efforts to interview school counselors at WMS and Odessa Children's Clinic to find out general information about student issues, their policies, and school programs that address mental health were not successful. My hope was to identify the mental health programs implemented at the school and clinic and develop design alternatives to support those programs. In lieu of direct input, I researched some of the mental health issues Seattle Children's Hospital address within the community, through parenting and general community health classes, such as Emotional Expression, Stranger Anxiety, and ADD/ADHD. I think this design addresses these issues, but community input

is invaluable to the design process. For instance, the local residents would be integral in identifying where therapeutic spaces already exist, maybe an alley or short cut, making their entrances more visible to pedestrians. Engaged community members would have important contributions to the identity of the place. I developed the zebra themed pocket park because of the play on a term for crosswalks – zebra crossings – but it also seemed appropriate to celebrate animals around an area where children gather and play. Involvement with the school, residents, and businesses would provide a more robust concept reflecting their history and values and would profit from community acceptance through care and stewardship.

CONCLUSION

The public street network has the potential to support immediate and long-term mental health for individuals and communities. Analyzing the relationship between successful therapeutic environments and public space identifies qualities and conditions beneficial to mental health in the public space. Establishing and connecting these qualities in the city street network generates an accessible delivery system, reuniting the recreational and utilitarian activities of walking and cycling. Thus, the pedestrian and cyclist commute through the city becomes an opportunity to improve physical and mental health on an everyday basis.

The urban public right-of-way is a highly contested network of transportation space, with utilities, people, cars, bikes, and information vying for space. As cities grow, creative approaches to integrate these needs as a holistic, infrastructure system are necessary to maintain human and environmental health. While physical health is just beginning to be championed in city planning and design, mental health is most often an avoided topic. The problem with this is two-fold – first we are missing out on the opportunity to improve the

performance of our infrastructure with integrated, holistic solutions to the public right-of-way, which benefit mental health, and secondly it perpetuates the misunderstanding and stigma of mental disorders. Addressing these issues in the public space of the street figuratively airs the community mental health issues we face and offers real benefits from the day-to-day interactions we have with our built environment.

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