ABSTRACT

Title of Thesis: THE CO-ADAPTED COMMUNITY: A NEW VISION FOR THE PARKS AT WALTER REED

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The human-canine bond is one that has existed for thousands of years, yet not until more recently has it gained serious attention in the military medical field. The following thesis will use architecture as a way to explore the physical and psychological rehabilitative relationship between veterans and rescued canines. As soldiers return home from deployment, many struggle with reintegration into civilian life. The therapeutic potential of service dogs, however, has become a widely recognized recovery tool. Meanwhile, there are thousands of non-service dogs suffering extended periods in animal shelters with adverse psychological effects. In a society primarily centered on the typical human experience, the built environment often demonstrates a narrow perspective that lacks sensitivity towards the atypical user. Soldiers and dogs alike perceive and experience the world uniquely, and a further exploration of their distinct relationship can begin to inform how we might develop a new type of shared healing environment or co-adapted community.

THE CO-ADAPTED COMMUNITY: A NEW VISION FOR THE PARKS AT WALTER REED

by

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Dedication

To Gloria Ayalde-Perez – my mom, my hero, my angel. Your strength, determination, and passion for life will forever continue to inspire me.

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List of Abbreviations

AAA	Animal-Assisted Activity
AAT	Animal-Assisted Therapy
ANS	Autonomic Nervous System
ASV	Association of Shelter Veterinarians
AVMA	American Veterinary Medical Association
BRAC	Base Realignment and Closure Commission
COSC	Combat and Operational Stress Control
LRA	Local Redevelopment Authority
NICOE	National Intrepid Center of Excellence
OEF	Operation Enduring Freedom
OFS	Operation Freedom's Sentinel
OIF	Operation Iraqi Freedom
OIR	Operation Inherent Resolve
OND	Operation New Dawn
PNS	Parasympathetic Nervous System
PTSD	Posttraumatic Stress Disorder
SFC	Sergeant First Class
SNS	Sympathetic Nervous System
TBI	Traumatic Brain Injury
VA	U.S Department of Veterans Affairs
WCC	Warrior Canine Connection
WRAMC	Walter Reed Army Medical Center
WRNMMC	Walter Reed National Military Medical Center

Introduction

The co-adapted community – we live in a built environment that appears to be dominated by the human touch; yet, when we consider the term "co-adaptation," it raises this idea that we as humans are part of a much greater system that is heavily connected to other living beings. This thesis will explore architecture as a means to enhance the rehabilitative experience, which can be shared for mutual benefit, of humans (Homo sapiens) and canines (Canis lupus familiaris). The human-canine bond is one that has existed for thousands of years, yet not until more recently has it gained serious attention in the medical field. The role of canines as a therapeutic tool for humans is increasingly demonstrating psychological, physiological, and cognitive health benefits. Traditionally a more person-centered experience, this thesis seeks to expand upon the ideas rooted in the human-animal bond to further investigate the potentials of a mutualistic relationship. The following thesis will focus on the rehabilitation of veterans and rescued canines – two species and two seemingly disparate programs that actually show many need-based parallels. As soldiers return home from deployment, many suffer not only from physical injuries, but from psychological trauma as well, making the return and reintegration into civilian life difficult. An estimated 30% of post 9/11 veterans suffer from Posttraumatic Stress Disorder (PTSD) and an average of 22 veterans will commit suicide every day.[1] As the healing potential of animals becomes more widely recognized, the demand for

[1] "Paws for Veterans | Rescuing Dogs to Rescue Heroes," accessed December 5, 2015, http://www.pawsforveterans.com.

psychiatric service dogs continues to increase and outweigh the supply. Dogs continue to be bred for the sole purpose of becoming service dogs; meanwhile, over 3,000 dogs are euthanized every day as animal shelters reach resource capacity.[2] Most who do not suffer this fate are left to dwell in the cold and restrictive nature of the animal shelter typology, which is oftentimes non-conducive to socialization and cognitive stimulation. In a society that cannot begin fathom the experiences of soldiers, and in a world that is unable to see through a dog's eyes, it becomes imperative for us as architects to move beyond our preconceptions of design and establish a unique frame of mind, so that we can create more user-sensitive places. This thesis presents an opportunity to expand the scope of therapeutic design as seen through a unified lens of soldier and canine alike. An expanded understanding of psychological trauma and its relationship to spatial design may begin to inform a more sensitive and inclusive design methodology.

[2] "Paws for Veterans."

Chapter 1: The Human-Canine Bond

From Wolf to Dog

The American Veterinary Medical Association describes the human-animal bond as a "mutually beneficial and dynamic relationship… that is influenced by behaviors considered essential to the health and well-being of both," and acknowledges the significance of this longstanding relationship as it relates to the medical field.[3] For the purposes of the forthcoming proposal, this thesis will focus specifically on the human-canine bond – a bond that goes back at least 15,000 years and has long raised curiosity and opportunity.

Though it has become common knowledge that the domesticated dog, *canis familiaris*, is a direct descendant of the wolf, *canis lupus*, there is still contention as to how and when this development arose. It was originally believed that the domesticated dog was a direct result of humans who adopted and tamed wolf cubs. Biologist Raymond Coppinger, refutes this theory, asserting that it is more likely that the domestication was instead an outcome of the wolves themselves.[4] According to the adapted cognition hypothesis, the dog's evolutionary divergence in social development was a product of contextual forces that necessitated behavioral

[3] "Human Animal Bond," *American Veterinary Medical Foundation*, accessed October 24, 2015, https://www.avma.org.
[4] "Dogs That Changed the World: What Caused the Domestication of Wolves," PBS, 2011, http://www.pbs.org/wnet/nature.

adaptations in the wolf.[5] When humans began to establish settlements around 15,000 years ago, the disposal of waste inevitably began to attract the attention of scavengers, including wolves. The concept of "flight distance" as explained by Coppinger, is the distance at which an animal will remain in the presence of humans before fleeing. He speculates that some wolves had shorter flight distances, and were therefore able to feed among people. This advantageous behavioral quality was gradually passed down, ultimately creating a species that could engage with humans.[6] Unlike their wolf ancestors, dogs acquired the ability to read human cues, reinforcing a communicative bond between the two species.

Regarding the mystery of when the dog came to be, ancient dog burial sites have been a strong point of departure. This archeological evidence marks the origin of dogs sometime between 12,000 and 14,000 years ago. The "ritualistic disposal" of dogs suggests that humans saw a commonality between themselves and canines in dealing with the afterlife.[7] In Israel, the discovery of a burial dating back 12,000 years revealed a puppy in the arms of an elderly human, further depicting the human-canine attachment (Figure 1). Additional evidence of skull remains in Russian caves places dogs back even further to the era of hunters and gatherers.[8] Genetic analyses and cranial remains suggest that the dog species may have developed as early as 32,000

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[5] Marc Bekoff, Colin Allen, and Gordon M. Burghardt, *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition* (Cambridge, Mass.: MIT Press, 2002), 366.
[6] "Dogs That Changed the World: What Caused the Domestication of Wolves," PBS, 2011, http://www.pbs.org/wnet/nature.
[7] Darcy F. Morey, "Burying key evidence: the social bond between dogs and people," *Journal Of Archaeological Science* 33, no. 2 (February 2006): 158-175. *Academic Search Complete*, EBSCO*host* (accessed October 11, 2015).
[8] David Grimm, "Dawn of the Dog," *Science* 348, no. 6232 (April 17, 2015): 274-279. *Academic Search Complete*, EBSCO*host* (accessed October 11, 2015).

years ago.[9] Regardless of the exact date of canine domestication, dogs eventually evolved and developed a cooperative dependent relationship with humans. They have since strengthened this relationship, finding a powerful niche in the lives of humans.

Figure 1: Woman and dog burial site dating back 12,000 years found in northern Israel
Source: pinterest.com

Human Theories

The human attachment to animals can be tied to three distinct theories: Biophilia Theory, Self Theory, and Social Support Theory (Figure 2). The Biophilia Hypothesis, presented in 1984 by Edward Wilson, asserts that a human's innate predisposition towards other living organisms is an evolutionary survival tool. Whether as a food source, hunting companion, or military and police force reinforcement, animals have long provided life support for humans. Animals such as dogs have an instinctual protective and territorial nature. Their keen senses allow

[9] Grimm, "Dawn of the Dog," 274-279.

them to alert others of potential threats, making them an ideal household caretaker.[10] The sense of safety offered by this species reinforces the value of canines as seen through Wilson's perspective of human nature.

The Self Theory emerges from the concepts underlying self and "selfobject" psychology. At a person's core is his/her perception of self. In order to sustain a positive sense of self, people rely on the contributions of external sources or objects. Some animals can become significant selfobjects because of their companionship, constancy, admiration, and lack of judgment. The need to care for and provide for an animal can also contribute to one's sense of self-worth. Individuals who have suffered from human-inflicted trauma often experience difficulties with trusting others, engaging in social interactions, and feeling safe. Consequently, they tend to place greater trust and value in animals as a means of achieving self-support.[11]

Closely relating to the theory of self, the Social Support Theory explains that animals, which are often anthropomorphized, can become a strong support system for humans and even begin to fill family voids. Dogs, for instance, display unconditional affection, respond to human cues, and have a seemingly acute understanding of human emotions and behavior. For a person who struggles with feelings of isolation, a dog can also help facilitate social interactions with other people.[12]

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[10] Mary Jalongo, "An Attachment Perspective on the Child-Dog Bond: Interdisciplinary and International Research Findings," *Early Childhood Education Journal* 43, no. 5 (September 2015): 395-405. *Academic Search Complete*, EBSCO*host* (accessed October 11, 2015).
[11] Sue Ellen Brown, "The Human-Animal Bond and Self Psychology: Toward a New Understanding," *Animal Issues*, 2004.
[12] Jalongo, "An Attachment Perspective on the Child-Dog Bond."

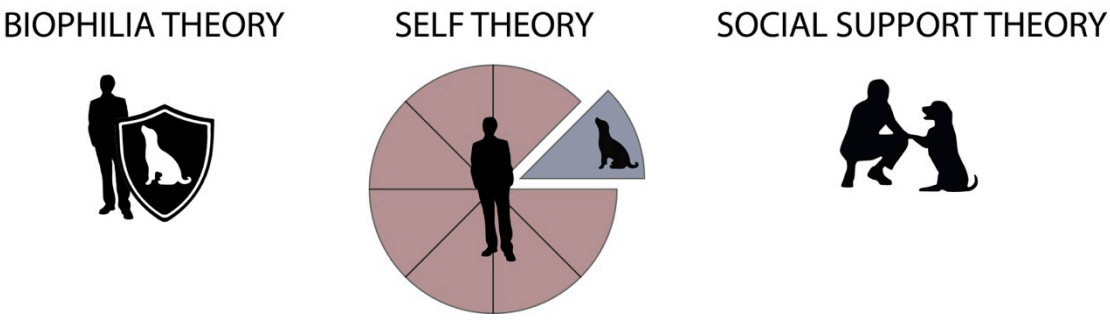

Figure 2: Animal attachment theories
Source: Author

Canine Data

Even though the significance of dogs' roles in the lives of humans is widely recognized, the question remains of how dogs feel towards humans. Although there is no way to know exactly what a dog is thinking, recent technological advancements are allowing scientists to perform brain imaging studies that are helping to provide a glimpse into the minds of these animals. At Emory University, an MRI was used to study a dog's odor processing behavior. The results revealed that the dogs prioritized the human scent over everything else, and that the smell of their owners triggered activity in the brain's "reward center". The findings suggest that "dogs rely on humans more than they do their own kind for affection, protection, and everything in between." The study also demonstrated similarities between humans and canines in the cortical processes associated with vocal tonality. This begins to shed light on the communicative understanding between these two species.[13] Aside from oral communication, non-verbal interactions play a significant role in this unique human-

[13] Theresa Fisher, "Brain Scans Reveal What Dogs Really Think of Us," last modified November 20, 2014, https://mic.com/articles/104474/brain-scans-reveal-what-dogs-really-think-of-us#.6e4yhXHH5.

animal bond. Researchers have found that the gaze shared between human and canine is beneficial to both species. Aside from primates, dogs are the only other animals that look into the eyes of humans. For both the dog and person, this engagement releases oxytocin, a hormone that helps modulate emotional reactions and foster the development of social attachments.[14] The preceding material begins to offer insight as to why the canine species continues to positively impact the human community and medical field, and reinforces the continued pursuit of research and application in this area.

[14] Norman Epstein, "Effects of Service Dog Training on Family Functioning of Service Members with PTSD" (lecture, University of Maryland, College Park, MD, October, 21, 2015).

Chapter 2: Application

Definitions

Animal-Assisted Therapy (ATT) is a concept that is rapidly gaining momentum in the health field. This goal-oriented form of therapy consists of a certified animal and handler team that work to provide social, physical, or psychological support for an individual as part of his/her therapy plan (Figure 3). The schedule, treatment objectives, and patient progress are carefully documented as part of the rehabilitative process.[15]

Animal-Assisted Activity (AAA) takes on a less structured methodology. The purpose of this intervention is to provide motivational and recreational support for the recipient in a therapeutic setting. AAA visitations are often spontaneous and can be directed by trained professionals or volunteers.[16] Therapy animals, also referred to as companion or emotional support animals, are used to administer both AAT and AAA. These animals can range from domesticated pets to farm animals to marine animals; however, dogs are the most commonly used.[17]

The term "service animal" should not be confused with or used interchangeably with "therapy animal." Service animals undergo a specific training

[15] Lori Fike, "Occupational Therapists as Dog Handlers: The Collective Experience with Animal-Assisted Therapy in Iraq," *The United States Army Medical Department Journal*, (2012): 51.
[16] Fike, "Occupational Therapists as Dog Handlers."
[17] Lorraine Ernst, "Animal-Assisted Therapy: An Exploration of Its History, Healing Benefits, and How Skilled Nursing Facilities Can Set Up Programs," *Annals of Long-Term Care* 22, no. 10 (2014), http://www.annalsoflongtermcare.com.

and certification process to assist in performing tasks for someone with a disability. As explained by the ADA guidelines, service animals accompanied by their handler are granted access into public spaces that would otherwise prohibit the presence of an animal. Types of service animals include guide dogs, hearing dogs, mobility dogs, and psychiatric service dogs.[18]

Figure 3: Animal visitation at VA Medical Center
Source: dogster.com

History of Animal-Assisted Interventions

As previously discussed, the human-canine bond extends back thousands of years. However, not until more recently has this bond begun to progress into the medical arena. Since the ninth century people have grown increasingly aware of the natural healing potential of animals. The first documented case of animals in the context of mental health occurred after an English Quaker, William Tuke, observed the malpractices of psychiatric facilities. The 1796 York Retreat created a unique setting that employed the use of farm animals to improve the quality of life

[18] "PTSD: National Center for PTSD," accessed October 26, 2015, http://www.ptsd.va.gov.

experienced by patients.[19] Further experimentation with animals as a healing tool in West Germany led to the use of equine therapy to treat epileptic patients during the mid 19th century.[20] Fast-forwarding to the early 1930s, Sigmund Freud, a key player in the AAT movement, found that dogs have a "special sense" when he observed his dog, Jofi's, interaction with patients. Freud believed that the dog could judge the stress level of a patient, and also noted that Jofi helped ease the patient-therapist dialogue (Figure 4). During the 1960s, psychotherapist Boris Levinson, made strong advances in the field when he began using his dog in child therapy sessions. His publication, "The Dog as a Co-Therapist," coupled with Freud's earlier findings, offered a new platform for the use of animals in a therapeutic setting.[21]

Figure 4: Sigmund Freud and his dog, Jofi
Source: The Wall Street Journal, wsj.com

[19] Jan Shubert, "Dogs and Human Health/Mental Health: From the Pleasure of Their Company to the Benefits of Their Assistance," *The United States Army Medical Department Journal*, (2012): 21.
[20] "Paws for Therapy Dog History," accessed October 25, 2015, http://www.gkcmanske.com/paws-4-history/.
[21] Ernst, "Animal-Assisted Therapy."

In 1977, Delta Foundation, now Pet Partners, brought together a group of medical professionals who shared an interest in animal improvements on mental health, and pioneered a research effort to extend their ideas beyond theory and anecdotal evidence. As their findings became more concrete, these leaders worked to establish community programs that promoted the newfound value of the human-animal bond. In 1989, the Delta team developed a training program to standardize efforts and ensure optimal therapeutic services.[22] Initially met with great skepticism, the idea of utilizing animals as a therapy tool is now emerging as a strong viable treatment option in the health field.

Health Benefits

The presence of and interaction with canines has demonstrated many positive psychological, physiological, and cognitive effects on humans. Although a significant amount of evidence is anecdotal, an increasing number of studies are bringing a more tangible value to the processes underlying this bond. Since the 1970s, many studies have been conducted evaluating the physiological impact of dogs. Results suggest that interactions with a dog have the potential to enhance human immune system responses. They have also found that exposure to a companion pet significantly reduces heart rate, cortisol, and blood pressure levels. A stress test in 2001 demonstrated the correlation of pet ownership to increased performance on stress-intensive cognitive tasks. Cognitive functioning has also been a major area of exploration in the relationship of the elderly with canines. When looking at the behavior of dementia patients after experiencing dog therapy, they demonstrated

[22] "Our History," *Pet Partners*, accessed October 24, 2015, http://petpartners.org.

improved social interactions and a substantial decrease in feelings of agitation and loneliness. Similarly, the presence of dogs during therapy sessions for aphasic stroke patients resulted in increased communication and participation. Psychiatric patients experienced comparable positive results, as they engaged in more open conversations with the dogs.[23]

AAT for individuals who have a history of trauma has also been a major topic of discourse. A study in 2014 tested the effect of canine therapy on cognitive behavioral processing. The results suggested that animal therapy has the potential to "enhance the therapeutic alliance between therapist and patient." The presence of a dog during therapy can create a more empathetic and seemingly safer atmosphere, thus facilitating engagement with environmental stimuli associated with traumatic experiences. There was concern that the palliative effects of dogs could interfere with a human's natural processing and coping mechanisms; however, this study demonstrates that animals can diminish symptoms of depression and alleviate distress experienced during memory recall without impeding these critical emotional responses.[24] Even though the field of research in an animal's healing role has made great advancements, there are still many unanswered questions and unexplored matters waiting to maximize on the potential of the human-canine bond.

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[23] Michele L. Morrison, "Health Benefits of Animal-Assisted Interventions." *Journal of Evidence-Based Complementary & Alternative Medicine* 12, no. 51 (2007): 54-56, 10.1177/1533210107302397.

[24] Melissa G. Hunt and Rachel R. Chizkov, "Are Therapy Dogs Like Xanax? Does Animal-Assisted Therapy Impact Processes Relevant to Cognitive Behavioral Psychotherapy?" *Anthrozoos* 27, no. 3 (Sep 01, 2014): 457-469.

Canines and the Military

Although still relatively recent in practice, the benefits of animals as observed on the general population have demonstrated exceedingly promising results and are now expanding into the military realm. However, the idea of using canines as part of the actual rehabilitation process, whether physical or psychological, rather than simply assigning service dogs to veterans upon civilian reintegration, is a concept that remains relatively new. Before proceeding into these current AAT and service dog practices, it is important to understand the evolution of the canine's military involvement.

Whether horses, dolphins, pigeons, or dogs, animals have a long-established participation in the human history of war. In today's military practice, dogs are most commonly recognized for their combative presence and role in enemy threat detection. However, history shows that canines have also carried a more therapeutic significance in these combat environments.[25] Animal mascots have made large contributions in supporting troop spirit and unification. During the U.S. Civil War, Sallie the puppy was adopted to serve as the military mascot and provide moral support for the troops. Rescued from the battlefield during World War I, Smokey the Yorkshire Terrier became the first known therapy dog as she provided emotional support for the wounded soldiers at the Pawling Army Air Force Convalescent Hospital (Figure 5).[26] As World War II arose, General Eisenhower also expressed a sincere appreciation for his terrier mascots who were "the only 'people' [he could]

[25] Perry R. Chumley, "Historical Perspectives of the Human-Animal Bond Within the Department of Defense," *The United States Army Medical Department Journal*, (2012): 18.
[26] "Paws for Dog Therapy History," http://www.gkcmanske.com/paws-4-history/.

turn to without the conversation returning to the subject of war."[27]

Figure 5: Smokey, rescued during WWI, became the first known therapy dog
Source: trihes.gr

Canines have since made considerable contributions to active service members and veterans, and their relevance within the military health system has become an important avenue of exploration. In 1983, the U.S. Army Veterinary Corps began an evaluation of the interdependency of humans and animals within the military community and medical field. Their conclusions recognized animals as a viable opportunity for health professionals to more effectively reach out to soldiers.[28] Since the 1990s, Combat and Operational Stress Control (COSC) units have been integral parts of the U.S. Army. In 2007, a commander request was made to initiate the implementation of AAT in COSC. Two Labradors, Sergeant First Class (SFC)

[27] "DOD Human-Animal Bond Principles and Guidelines, Department of the Army," 2003, https://archive.org/stream/ost-military-medical-tbmed4/tbmed4_djvu.txt.
[28] Chumley, "Historical Perspectives of the Human-Animal Bond Within the Department of Defense," 18-19.

Boe and SFC Budge were the first dogs deployed to Iraq as part of this new mission (Figure 6).[29] Following these medical advancements, the Army has worked to standardize service and therapy animal practices across all military sectors, both in active duty and post-war settings.[30]

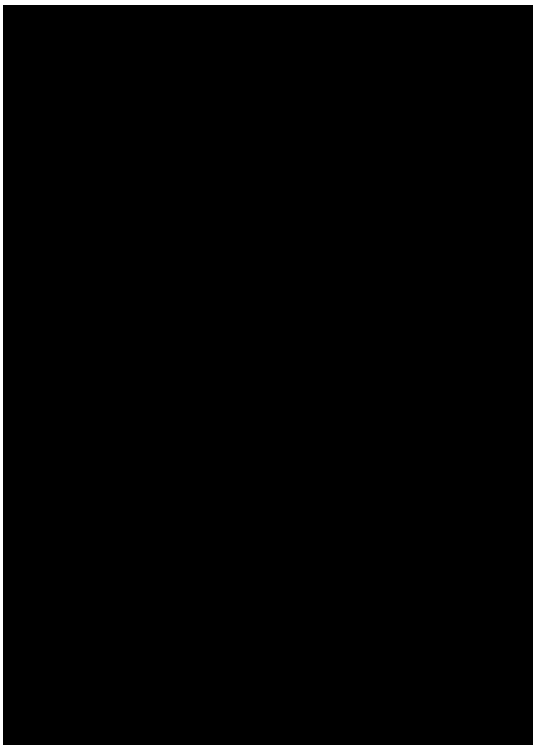

Figure 6: FSC Budge, part of first pair of COSC dogs deployed (served two tours in Iraq)
Source: The United States Army Medical Department Journal

Veteran-Canine Programs

As recognition and demand for animal therapy services has continued to expand, more organizations have begun to develop programs that cater to the needs of wounded warriors and veterans. The Walter Reed National Military Medical Center (WRNMMC) has been at the forefront of the human-animal movement, and continues

[29] Elspeth C. Ritchie, "The Early Years," *The United States Army Medical Department Journal*, (2012): 5.
[30] David A. Rubenstein, "Perspectives," *The United States Army Medical Department Journal*, (2012): 2.

to set an example for other medical facilities seeking to enhance the rehabilitative experience.[31] In some aspects, the value of these nontraditional practices remains largely unquantifiable, but to those who have personally experienced the power of the human-canine bond, the impact is undeniable. *Canines with a Cause* and *Warrior Canine Connection* are among the many programs that are making strides in the military healthcare system, capturing the essence of the mutually benefitting bond between human and canine.

Canines with a Cause, founded in 2011, was developed with a powerful vision that seeks to bring together and help three groups of individuals: dogs, inmates, and veterans. In this unique scenario, dogs are rescued from probable euthanasia and given a new purpose in life. Before being paired with a veteran, however, the dogs are relocated to a prison where they receive basic training and constant socialization from an assigned inmate. In this unlikely rehabilitative partnership, prison inmates are granted the opportunity to provide a life-altering service for those who have served their country. Entrusted with this large responsibility, the inmates learn the value of patience, commitment, and care. Witnessing the impact of their hard work also gives these individuals a sense of pride and fulfillment that they may not otherwise experience in the prison environment. After this phase the dogs are paired with a veteran, and together they undergo a training program that targets the veteran's specific therapeutic or service needs. "By rescuing dogs from kill shelters and using

[31] Arthur F. Yeager and Jennifer Irwin, "Rehabilitative Canine Interactions as the Walter Reed National Military Medical Center," *The United States Army Medical Department Journal*, (2012): 57.

prison inmates as a means to train, [*Canines with a Cause*] essentially save three lives: the veteran, the dog, and the inmate." [32]

Warrior Canine Connection (WCC) was established in 2005 by social worker, Rick Yount. This program aims to use an experiential learning model as the primary rehabilitative tool for recovering warriors. The premise of WCC is founded upon the idea of a "mission," where warriors suffering from posttraumatic stress are tasked with training the service dogs for fellow disabled veterans.[33] As explained by Yount, this adjunct therapy program provides a positive setting in which soldiers, struggling with the aftereffects of deployment, are given a renewed sense of worth. By actively training the dogs, the warriors are encouraged to practice patience, positivity, and praise. In socializing the dog and exposing it to the world, they too become reengaged with society. The psychological benefits gained from these interactions continue after program completion, and are reflected as the warriors work to assimilate back into civilian life.[34] Recently, the University of Maryland has demonstrated an interest in further exploring the effects of Yount's program on family relationships. The university has partnered with the Walter Reed National Military Medical Center (WRNMMC) and the National Intrepid Center of Excellence (NICOE), and beginning in 2016, will conduct a four-year clinical trial examining the biological, social, and psychological impacts of the service dog-training program.[35]

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[32] "Saving Three Lives," *Canines with a Cause*, 2015, https://canineswithacause.org.
[33] Epstein, "Effects of Service Dog Training on Family Functioning of Service Members with PTSD."
[34] "How We Help Warriors," *Warrior Canine* Connection, accessed October 27, 2015, http://warriorcanineconnection.org.
[35] Epstein, "Effects of Service Dog Training on Family Functioning of Service Members with PTSD."

Chapter 3: Defining the Issues

The aftereffects of war leave many people haunted by memories of their experiences, and with more soldiers returning home, careful attention needs to be paid to veteran medical services. Between 2013 and 2018, the Post-9/11 veteran population is estimated to grow by a factor of 51 percent, with Washington D.C. being one of the most rampant areas of growth. This raises questions regarding the future of veteran care and rehabilitation services. Posttraumatic Stress Disorder (PTSD) is a prevalent issue among war veterans, with 22 committing suicide every day in the United States.[36] The U.S Department of Veterans Affairs (VA) estimates that PTSD is experienced among 30% of Vietnam War veterans, 10% of Gulf War veterans, 11% of Afghanistan War veterans, and 20% of Iraq War veterans.[37] Between January 2000 and June 2015 alone there were 138,197 incident cases of PTSD among those deployed for Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND), Operation Inherent Resolve (OIR), and Operation Freedom's Sentinel (OFS). During this period there have also been 327,299 cases of Traumatic Brain Injury (TBI) and 1,645 major limb amputations.[38] There is, however, an apparent disconnect between Post-911 veterans and the VA healthcare system. Most Post-911 veterans have a service-related

[36] "Paws for Veterans."
[37] Matthew A. Finn, "Posttraumatic Understanding: The Connections Between Posttraumatic Stress and Environmental Design," *projects.perkinswill.com*, accessed October 24, 2015, http://projects.perkinswill.com/files/PosttraumaticUnderstanding_2014.pdf.
[38] Hannah Fischer, "A Guide to U.S. Military Casualty Statistics," August 7, 2015. https://www.fas.org/sgp/crs/natsec/RS22452.pdf.

disability, yet they are requesting VA enrollment and services at a significantly lower rate than other war veterans.[39] During the 1990s, VA treatment facilities were criticized for their substandard care and health practices. In the last decade, this institution has worked to establish itself as a leader in the military veteran health industry, dedicated to providing benefits to veterans and their families. Although the VA has made great strides in this realm, concerns still exist regarding the timeliness and accessibility of its services.[40]

Instead, veterans have more recently been seeking out support from a less conventional source. Service dogs are being increasingly recognized as an additional therapeutic resource for both physical and psychological traumas. Currently, the VA does not provide physical or psychiatric service dogs for veterans. The VA provides veterinary services for dogs that are part of an individual's rehabilitation plan for physical impairments; however, until more conclusive research is found to support the use of service dogs for PTSD, the VA will not provide veterinary care to psychiatric service dogs.[41]

Without sufficient support from the VA, returning soldiers are seeking other individuals to fill this niche; but with the mounting interest from veterans, dog-training facilities are struggling to meet these increasing demands. The supply of service dogs has consequently become unmonitored and fragmented, jeopardizing the

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[39] "Profile of Post-9/11 Veterans: 2013," August 2015, http://www.va.gov/vetdata/docs/SpecialReports/Post_911_Veterans_Profile_2013.pdf.
[40] Daryl S. Paulson and Stanley Krippner, *Haunted by Combat: Understanding PTSD in War Veterans including Women, Reservists, and Those Coming Back From Iraq,* 22.
[41] "Dogs and PTSD," a*ccessed October 24, 2015,* http://www.ptsd.va.gov/public/treatment/cope/dogs_and_ptsd.asp.

standardization of this process and quality of animal service. The shortage of PTSD service dogs has also resulted in a waiting list of as much as four years.[42]

Meanwhile, over 3,000 dogs are being euthanized every day throughout the nation.[43] Many of these dogs are filled with unrealized potential, yet, in a life of confinement, they are denied the possibility of sharing their love and devotion. Within this unfortunate framework lies an opportunity to capitalize on the unique human-canine bond, and explore a mutually healing relationship by pairing veterans with rescued canines. On a more global scale, this idea of symbiosis extends beyond providing a place where veterans and dogs can coexist in a rehabilitative setting. More broadly, it raises questions of poly-cultural design, or lack thereof. How can the built environment be more flexibly and sensitively designed to adapt to a variety of users? Through a more narrowed exploration of how veterans and canines perceive space differently, the following analysis will take steps towards better understanding a more inclusive design methodology.

[42] Rebecca Ruiz, "Veterans Rave About PTSD Service Dogs, but Research Lags," last modified August 3, 2012, http://usnews.nbcnews.com/_news/2012/08/03/12971693 -veterans-rave-about-ptsd-service-dogs-but-research-lags?lite.
[43] "Paws for Veterans."

Chapter 4: The Human Perspective

The Return Home

The return home from deployment can be a momentous occasion – one that brings a sigh of relief – for soldiers and those waiting to receive them. However, this is also a time of transitioning, healing, and recovering from the physical and psychological wounds of war. This can be a difficult period as veterans often become withdrawn from their families and communities. Reintegration into society can pose an internal struggle for veterans who continue to feel bounded to the military and find it difficult to feel a sense of belonging outside of that world. In the combative setting, soldiers are trained to obey orders and suppress typical emotional responses. Upon returning from deployment, these strongly instilled habits are often brought home with them, affecting their social behavior and relationships.[44]

In Paulson and Krippner's *Haunted by Combat*, a mythical construct is used to identify the phases of a "hero's journey:" separation, initiation, and return. The separation phase signifies a hero's call to duty and the transition from the pre-trauma period of his/her life. The initiation phase represents the next point of the journey where a person enters a new and challenging environment – war. In the final reintegration phase the individual returns home and strives to merge his/her seemingly disparate pre and post war lives. A soldier's "psychological return from

[44] Epstein. "Effects of Service Dog Training on Family Functioning of Service Members with PTSD."

battle is not [necessarily] simultaneous with the physical return."[45] Oftentimes, a soldier is caught in a "pseudo-return," forced to face the experiences and traumas of war before leaving this emotional state of purgatory. These invisible wounds can lead to depression, anxiety, guilt, substance abuse, and Posttraumatic Stress Disorder.[46]

Posttraumatic Stress Disorder

Simply stated, a traumatic event is one that can affect a person's ability to accurately perceive and function within his or her surroundings. Posttraumatic Stress is a "normal [reaction] to an abnormal situation" that, if enduring and severe enough, is classified as Posttraumatic Stress Disorder (PTSD).[47] Defined by the American Psychiatric Association, PTSD is "a condition that results from experiencing (or witnessing) life-threatening events that extend beyond one's coping capacity, emotional resources, and/or existential world view." Historically, PTSD has been an elusive concept – one that people have struggled to comprehend and recognize. Extensive research has more recently helped bring recognition to this condition along with many treatment and support resources. However, this advancement towards more "mainstream" medicine tends to try to oversimplify a problem that stems from a range of social, psychological, physiological, and theoretical understandings. Aside from a more general comprehension of the condition, it is also important to acknowledge the greater complexity of this state and the personal nuances that affect each individual differently.[48]

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[45] Paulson and Krippner, 54-102.
[46] Paulson and Krippner, 54-102.
[47] Finn, 5.
[48] Paulson and Krippner, xvi-1.

Generally speaking, symptoms of PTSD can be categorized by re-experiencing, avoidance, emotional numbing, and hyper-arousal. Psychologist Stanley Krippner theorizes that flashbacks may simply be "unsuccessful attempts to make sense of an experience." So poignantly expressed in his book, *Haunted by Combat,* "a veteran 'sees' the enemy upon awakening, 'hears' a bomb explode during a television drama, or 'feels' shrapnel entering his or her body." These recurrences are emotionally taxing, and are often dealt with by suppressing one's feelings and avoiding situations that recall particular memories. This detachment is a defense mechanism that can be detrimental to relationships with family, friends, and coworkers. An individual suffering from PTSD may also experience hyper-vigilant behavior demonstrated by increased anxiety, irritability, or even aggression.[49] These symptoms are a result of the brain's exaggerated reading of environmental stimuli, and although people may recognize the deceptiveness of their perception, they are often unable to inhibit this psychological response.[50]

Psychotherapy is a form of treatment that has shown much promise in overcoming PTSD. This treatment plan involves a dual process. The first step works towards verbalizing the traumatic incidents and related triggers. Through this retrospective approach, individuals then learn to re-associate repressed memories to a safe present-day context.[51] Although great advancements have been made in this field, there is so much that continues to elude our understanding of the PTSD healing process and its relationship to spatial perception.

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[49] Paulson and Krippner, 15-16.
[50] Finn, 6.
[51] Finn, 6.

Perception of Space

The built environment cannot cure a person from a physical or mental illness, but it can help facilitate the healing process. In considering how design can begin to respond to issues concerning Posttraumatic Stress, it is important to gain an understanding of how the brain processes environmental stimuli. In a typical situation, information is transmitted to the brain's "gatekeeper," which assesses the relevance of the stimulus. This information is processed through a system of higher-order thinking and then stored as either a short or long-term "associated" memory. This means that the new memory has contextual significance within the brain's network of memories. In a high-level stress event, however, the stimulus information bypasses the process of higher-order thinking and instead activates the autonomic nervous system (ANS). This can trigger either the sympathetic nervous system (SNS), which prompts a "fight or flight" response, or the parasympathetic nervous system (PNS), which results in "tonic immobility." This means that the brain has determined that the best course of action is to succumb to the situation. While in this state of shock, the individual remains immobile with an inability to sense pain or fear. The activation of the ANS results in a "disassociated" memory. Though fragmented and possibly nonverbal, the memory is stored and made accessible as a learning and survival tool. This type of memory is often triggered by environmental stimuli although it can be difficult for a person to articulate what the actual trigger is or even how it is related to a past traumatic event.[52] This divergence from the typical memory formation process is depicted in Figure 7.

[52] Finn, 5.

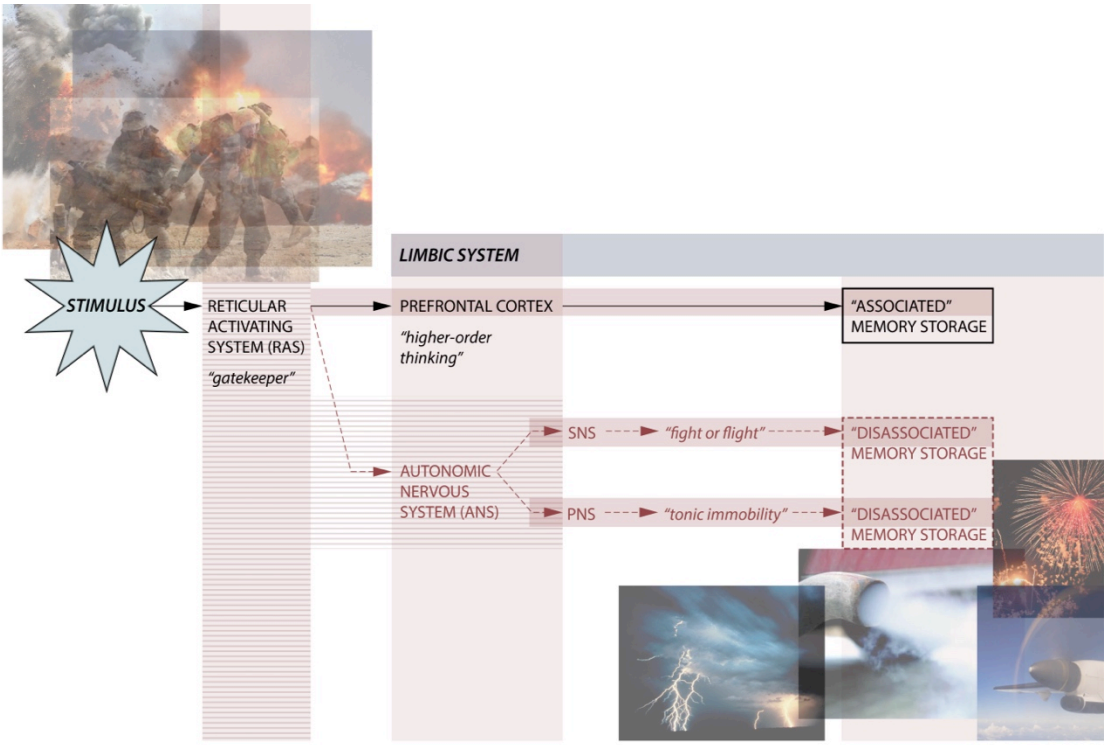

Figure 7: Traumatic memory processes
Source: Author

In his paper, *Adapting the Environment Instead of Oneself*, David Kirsh explores adaptation to one's environment, migration, and altering the environment itself as three plausible solutions to maximizing the gains of a person's physical and cognitive exertion. Since PTSD reflects an inability to adapt to one's surroundings, it can be concluded that a modification of the built environment is the optimal tool for promoting healing. By designing spaces that minimize the expenditure of energy, more bodily resources can be harnessed for a psychological or physical recovery. When considering veterans with PTSD, design can be used to create environments that are more adeptly perceived. This strategy can include minimizing cognitive loads and reducing the spatial complexity of an environment. Through a more controlled

exposure of environmental stimuli, a person is able to more easily recognize potential triggers while focusing more energy towards the healing process.[53]

A visual analysis was also conducted to further analyze this idea of environmental stressors experienced by veterans with PTSD. Figure 5 shows a matrix of seemingly mundane spatial conditions. The conditions that were diagrammatically explored include stairways, restrictive paths, circuitous paths, and visually overloaded spaces. Red markers in each of the matrix diagrams were used to delineate locations where a soldier might be weary of potential threats while navigating similar types of spaces. These spatial conditions were also analyzed in terms of the qualitative attributes that might contribute to the perceived stress of these spaces.

Threats in the field of combat exist three-dimensionally. IEDs can be buried underground and enemies can be hidden behind windows or in rooftops. In this type of environment it is important to demonstrate quick judgment, alertness, and intuitive behavior. When navigating a space, a soldier seeks to be in a position of dominance, whether on higher ground or secured and unexposed areas, while avoiding potential lines of fire. There are certain spatial settings that are more prone to danger. Stairways, for instance, are complex spaces that provide many opportunities for hidden threats. Ascending into a space especially puts a person in a vulnerable position. The "fatal funnel," a restrictive path with a limited and controlled means of egress, is also a condition that should be avoided or cautiously traversed. Subtle nuances in spatial articulation can provide important cues about an area, but a space that is exceedingly complex can result in cognitive overload.

[53] Finn, 9.

The principles depicted in the matrix (Figure 8) were then applied to a real-world example. The photograph beside the matrix, taken in Kas, Turkey, might typically be perceived as an inviting and positively stimulating pedestrian experience. However, to a soldier who has suffered from psychological trauma, this space may be highly characterized by distressing stimuli. The photo was explored through more general principles of protection, navigation, contemplation, and engagement to gain a deeper understanding of potential triggers associated with different architectural elements. Within these categories, possible indicators of stress were outlined. These principles begin to reveal potential discrepancies between the actual and perceived environment, while also informing ideas related to sensitive restorative design.

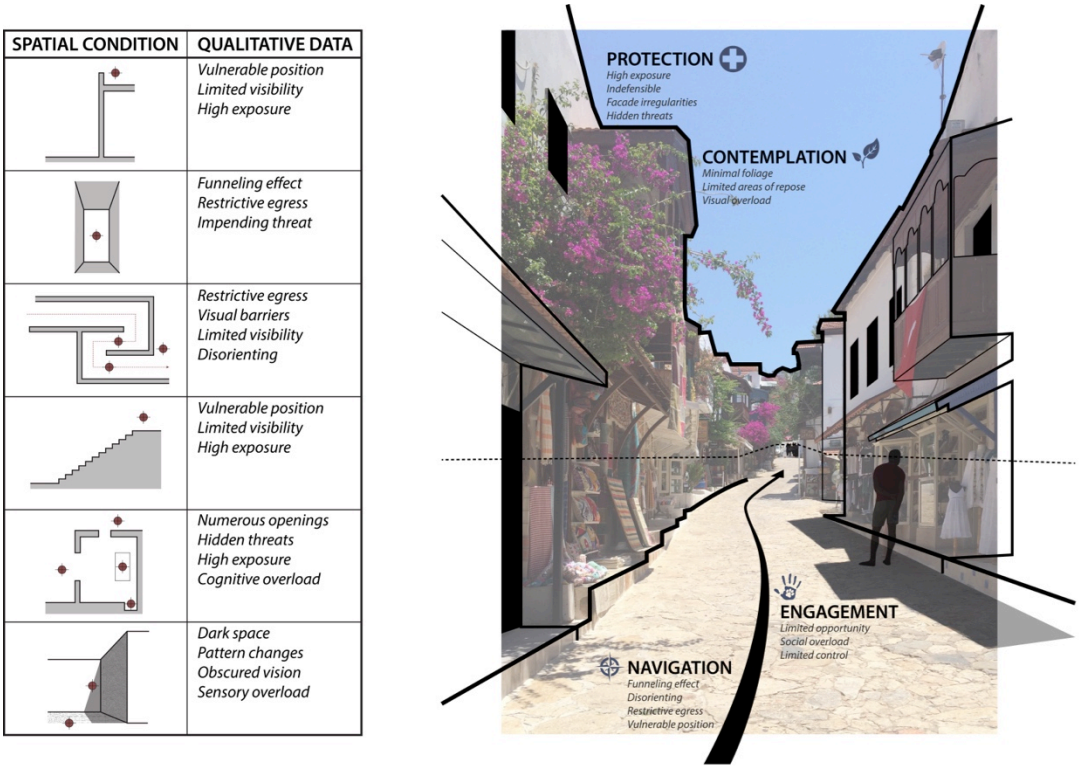

Figure 8: Spatial conditions matrix & perceived spatial threats
Source: Author

Chapter 5: The Canine Perspective

Animal Shelter Concerns

Whether a result of excessive expenses, behavioral concerns, time commitment, neglect, or abuse, the unfortunate reality is that many dogs are committed to a life in animal shelters. The development of temporary care facilities for stray or abandoned animals in the United States dates back to the late 19th century. Shelters were initially established as an animal control tactic that provided shelter for dogs for only short durations. The inconsistencies and lack of monitoring across these facilities, however, have contributed to an overloaded system that struggles to ensure standardized and quality animal care.[54] More recently, the main objective of animal shelters has been to rehome neglected animals. However, with many negative connotations attached to the shelter typology, shelters have often become more of a practical long-term housing tool rather than a means to promote a positive animal adoption experience.

Design and animal care, aside, being relocated to a shelter is already a great source of stress for an animal. Forced to adjust to a confined and unfamiliar environment with strange scents, animals, and people, animals can often face a difficult and psychologically strenuous transition. Compounded with the fact that many animals are forced to endure prolonged stays in the restrictive nature of

[54] Sandra Newbury et al., "Guidelines for Standards of Care in Animal Shelters," (2010), http://www.sheltervet.org/assets/docs/shelter-standards-oct2011-wforward.pdf.

shelters, this experience can have long-term adverse effects on animal health. Confronted by restriction, monotony, and isolation, as well as social and recreational deprivation, animals can often develop behavioral problems such as excessive nerves or aggression.[55] In an unfortunate domino effect, these attributes can contribute to an animal being deemed less adoptable by a family. With these concerns in mind, it is important to consider how design might begin to address ideas of animal welfare and reintegration into society.

Design Needs

The Association of Shelter Veterinarians (ASV), an international organization that strives to better animal health through design improvements, has worked to compile guidelines for animal shelter care standards. The American Veterinary Medical Association (AVMA) recognizes five principles critical to animal welfare: freedom from hunger and thirst, freedom from discomfort, freedom from pain, freedom to express normal behavior, and freedom from fear or distress.[56]

Animal shelters typically require practical spaces for animal intake, examination, holding, isolation, adoption, treatment, food preparation, laundry, and veterinary services. The specific needs of the species, the projected number of animals, and the duration of stay should all be considered when designing animal care facilities. The primary shelter enclosure for an animal should allow sufficient room for natural postural adjustments. Minimum spatial requirements demand that all animals be allotted space for laying, sitting, standing, eating, walking, and playing

[55] Newbury et al., "Guidelines for Standards of Care in Animal Shelters."
[56] Newbury et al., "Guidelines for Standards of Care in Animal Shelters."

(Figure 9). Animals should also be granted views outside of their enclosures while providing certain reclusive outlets that prevent visual contact with other animals. In considering interior floor finishes, impervious surfaces are typically implemented for sanitary reasons. However, other materials can be used selectively in simulated home settings. When establishing these basic needs for canines, it is important to consider the size variations of different breeds and ages.[57] These disparities in size and movement ranges are further explored in Figure 10 and Figure 11.

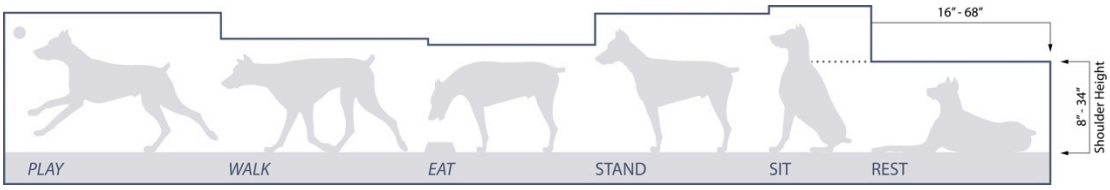

Figure 9: Basic canine spatial needs
Source: Author

Aside from meeting the practical spatial and housing needs of animals, it is important to remember that healthy animal design should promote both physical and psychological wellbeing. Application of behavioral enrichment principles should be considered when developing each space. Interactive settings, hiding and playing opportunities, and protected outdoor recreation areas are all important to creating a mentally and physically stimulating environment. Dogs, specifically, also need to have opportunities for meaningful interactions with humans. Acoustic, air, and light quality control are additional factors that contribute to an animal's health. Sound overloads are disruptive and can quickly escalate, causing distress in animals. Studies have shown that a comfortable acoustic environment, such as playing soft classical

[57] Newbury et al., "Guidelines for Standards of Care in Animal Shelters."

music, can have a soothing effect on animals. Like humans, animals also need ample access to fresh air and natural light. Interior spaces should provide a balance of light and darkness that supports the natural circadian rhythm. Animals are innately routine beings and react well to a positively structured environment.[58]

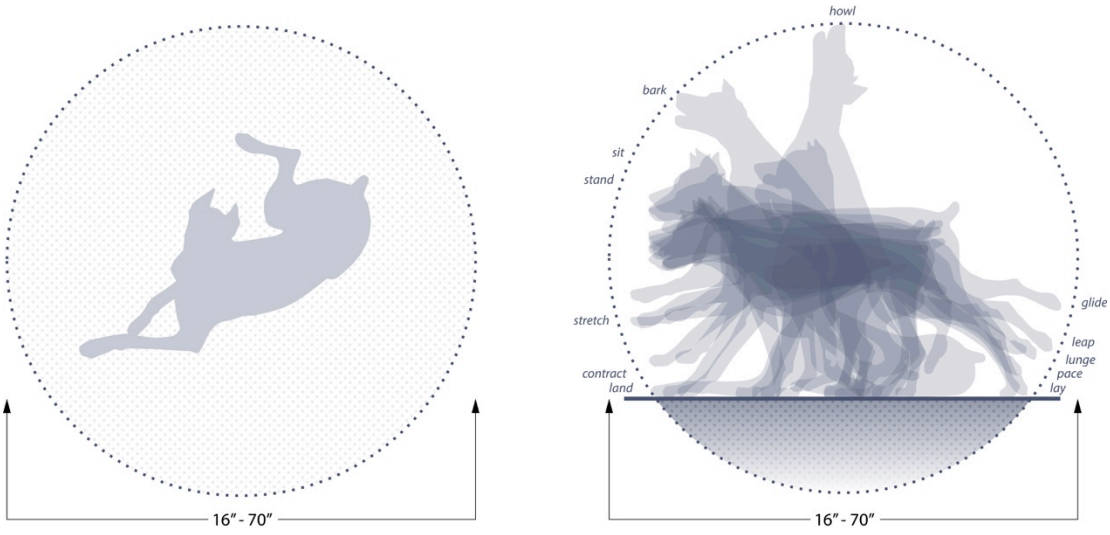

Figure 10: Movement range of Chamo, a 4-year old Doberman pinscher plan view (L), Movement range of Chamo, a 4-year old Doberman pinscher elevation view (R)
Source: Author

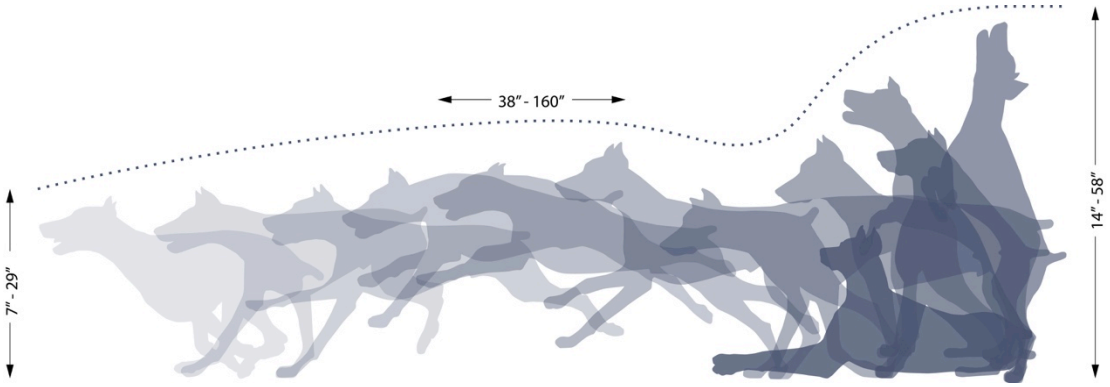

Figure 11: Movement range of Chamo, a 4-year old Doberman pinscher expanded sequence
Source: Author

[58] Newbury et al., "Guidelines for Standards of Care in Animal Shelters."

Socialization is a key part of the behavioral development process. This can be achieved by encouraging constructive exposure to different types of stimuli and engagement in social interactions. Positive reactions to experiences are reflected in an animal's appetite, activeness, sociability, grooming, and sleep habits. The most common stressors occur when an animal lacks control over its environment and is discouraged from expressing normal animal behaviors. Aggression, depression, lack of energy, repetitive actions, and withdrawn behavior are all indicators of an animal suffering from stress.[59]

Perception of Space

As humans, we see the world through a unique lens – one, however, that is limited by the capacity of our senses. Sometimes it can be easy to forget that not everyone or everything sees and experiences their surroundings in the same ways that we do. How, for instance, does a dog perceive space? Although it is likely that this question will never be fully answered, scientific research has given us great insight into the canine perspective.

While people generally experience the world through their eyes, dogs do not rely heavily on their sense of sight; rather, they "see" the world more intricately through their noses. This makes a dog's spatial experience profoundly distinct from a human's. A study in 2009 revealed that dogs' olfactory processes are highly more complex than our own. Compared to our 6 million olfactory receptors, dogs have approximately 300 million. Unlike people, dogs have a more sophisticated system

[59] Newbury et al., "Guidelines for Standards of Care in Animal Shelters."

that allows them to breathe and process smells separately and simultaneously. Since their nostrils are further apart, they can breathe discretely from each nostril and distinguish the direction of the smell's source. As a dog exhales, air is funneled through the nostril's sides, allowing for new air to be drawn in. A dogs' olfactory cortex, which is responsible for processing these smells, takes up almost 13 percent of the brain's area compared to our less than one percent. Dog cognition researcher, Alexandra Horowitz, clarifies the common misconception that odors are perceived stronger or "louder" by dogs, and explains that dogs instead experience richer smells that provide them with deeper layers of information about the scent. A dog's sense of smell may also begin to suggest a certain comprehension of time. This unique spatial understanding allows them to perceive traces of who or what has been where. It is speculated that the strength of a scent may also serve as an indicator of how much time has elapsed since the emanation of the odor source. A passing breeze might even provide a dog insight into the future – perhaps an indication of an oncoming person that is not yet visible.[60]

So, if a dog "sees" primarily with its nose, then what does it see with its eyes? There is a wide field of research dedicated to understanding a dog's visual range, visual acuity, and motion, light, and color sensitivity. A dog's relative position to the ground largely impacts its perception of space. Dogs' shoulder heights can range from 8 to 34 inches, meaning that they perceive their surroundings from a significantly lower perspective than do humans. This altered point of view is further

[60] Caroline Williams, "Sense and Sense Ability," *New Scientist* 211, no. 2826 (August 20, 2011): 32-37. Academic Search Complete, EBSCOhost (accessed November 11, 2015).

explored in Figure 12. A dog's altered field of view is an aspect that also considerably impacts this spatial experience. Although it varies between breeds, dogs have an estimated 240-degree view range with a binocular overlap of approximately 60-degrees (Figure 13). These numbers, however, can vary based on a dog's relative eye placement and snout length. [61]

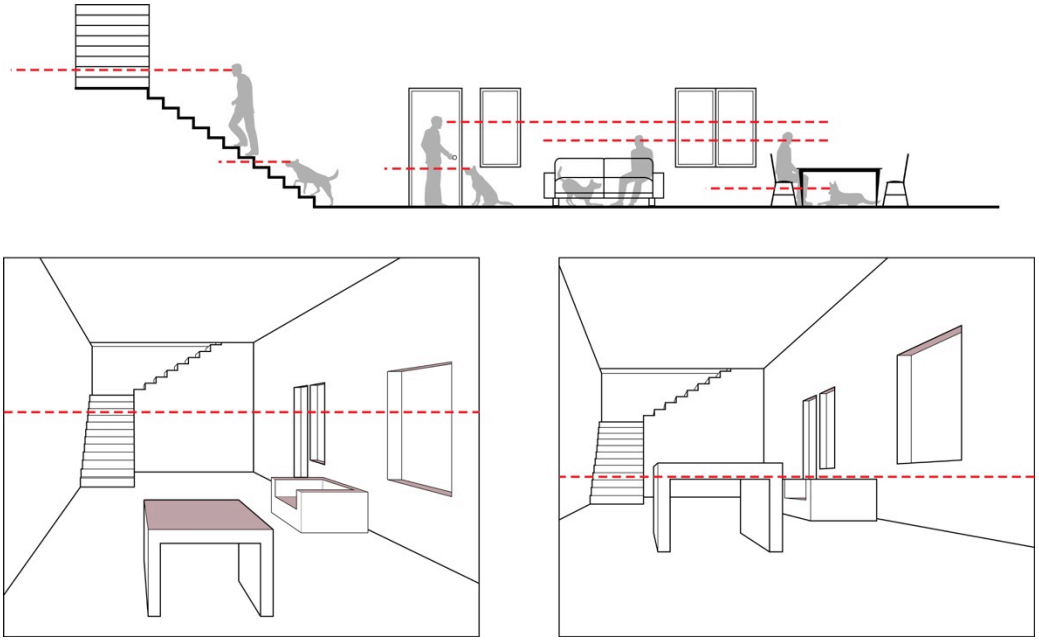

Figure 12: Spatial interactions (T), Human Perspective (L), Canine Perspective (R)
Source: Author

[61] Paul E. Miller, DVM and Christopher J. Murphy, "Vision in Dogs," *JAVMA* 207, no. 12 (1995): 1631-33.

Figure 13: Field of view, color perception, and visual acuity comparison
Source: Author

A dog's keen photoreceptors also make it particularly sensitive to the perception of motion. A study of police dogs, conducted in 1936, revealed that dogs were more easily able to identify a moving object 2,900 feet away compared to a stationary object that stood over 1,000 feet closer. Dogs have also demonstrated sensitivity to light, especially through their enhanced vision in low light atmospheres. Both humans and dogs use rod photoreceptors to help them navigate dimly lit areas. They differ, however, in the fact that, while a human's retina consists primarily of cones important to daylight and color processing, a dog's retina relies more heavily on rods. Dogs also have a tapetum lucidum behind the retina. This reflective tissue redirects light back through the retina, allowing the photoreceptors to capture excess light. While enhancing a dog's low light perception, this light scattering effect can

diminish the resolution of a perceived image.[62] A dog's visual acuity is far worse than that of the typical human. Studies estimate that on average a dog has 20/75 vision, meaning that what a dog can clearly see from 20 feet away, a person with 20/20 vision would be able to distinguish from a distance of 75 feet (Figure 14). [63]

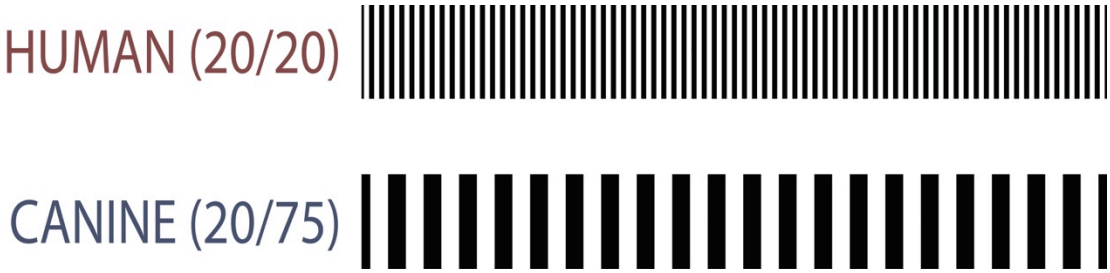

Figure 14: Comparison of visual acuity and resolution perception
Source: Author

Color vision is a topic of discourse that has sparked much interest in the realm of dog vision. For a long time, it was believed that dogs could only see in shades of grey. However, research has demonstrated that dogs have the two types of cones, allowing them the biological capacity for dichromatic vision. It is speculated that dogs perceive the light spectrum in hues of blue and yellow. This spectrum most likely displays intermediate wavelengths in shades of grey, with a small neutral point appearing white. This mode of color discrimination is comparable to that of a person with deuteranopia, or red-green colorblindness. Even though dogs see fewer colors than humans with trichromatic vision, they have an advantage when it comes to the discrimination of grey tones. In 1909, Orbeli reported that dogs are able to distinguish between shades of grey indistinguishable to humans. This can serve as a beneficial

[62] Paul E. Miller, "Vision in Dogs," 1623-25.
[63] Paul E. Miller, "Vision in Dogs," 1631-33.

visual aid especially in an animal that has adapted well to low light conditions. In a world driven mostly by sight and human-centered architecture, the use of a dog's other senses as well as contextual cues and brightness discrimination become important when navigating space.[64]

A dog's sense of hearing is also a predominant trait. Dogs can hear sounds from a distance four times greater than a typical hearing person. With a frequency range of 67-45,000 Hz, compared to a human's range of 64-23,000 Hz, dogs have the capacity to hear sounds of significantly higher frequencies. The flexibility of a dog's ears also facilitates its sense of hearing.[65] These sensitive qualities make sound control an important aspect of canine design. Figure 15 shows an abstract visual representation of a canines' senses compared to those of humans.

Figure 15: Abstract visual comparison of senses
Source: Author

[64] Paul E. Miller, "Vision in Dogs," 1631-33.
[65] "Understanding a Dog's Senses," accessed December 5, 2015, http://www.dogbreedinfo.com/articles/dogsenses.htm.

Spatial perception can also be thought of in more conceptual terms. In understanding shared space, dogs have three degrees of distinction: intimate, personal, and social space (Figure 16). This spatial recognition is especially important to territorial animals that communicate primarily through body language and social cues. Unlike humans, who can conceptualize space in terms of inches, feet, and miles, a dog's comprehension of distance is more abstractly limited to their olfactory range.[66] The idea of a more abstract spatial understanding, however, is also mirrored in the social interactions of humans. For both humans and dogs, the distinctions between intimate, personal, and social space can fluctuate as a result of visual, olfactory, and auditory cues, as well as certain traumatic experiences.

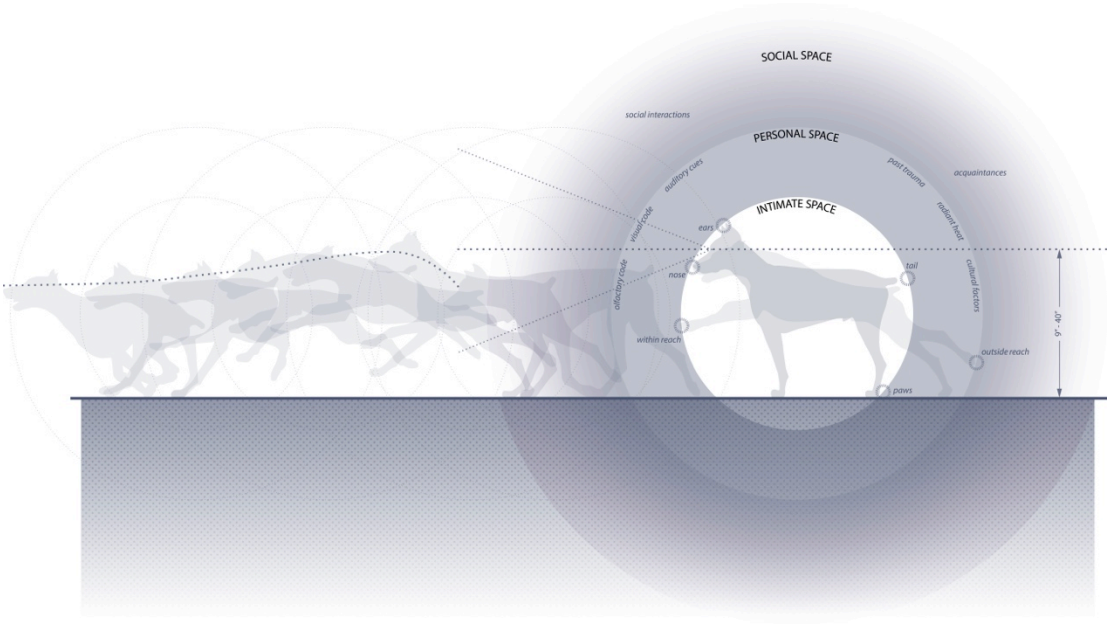

Figure 16: Perception of shared space
Source: Author

[66] Cesar Millan, "A Little Space," accessed December 5, 2015. https://www.cesarsway.com/dog-psychology/more-techniques/a-little-space.

Similar to the exploration of the human spatial experience represented in "Chapter 4: The Human Perspective," Figure 17 illustrates how certain typical spatial conditions may be differently experienced by a dog. In a world that is generally designed for the typical human, questions of how other species might experience the same space are rarely considered. This diagram explores architectural ideas of protection, navigation, contemplation, and engagement, as a dog might perceive them. An enclosure, for instance, that seems comfortable to a person, might be overwhelmingly large for a dog. A stairway may also pose difficulties for this smaller species, forcing it to make adjustments to its natural gait in order to traverse the steps. Overall, these general principles of design should be used as a means to recognize a way in which architecture can become more sensitive to a broader audience.

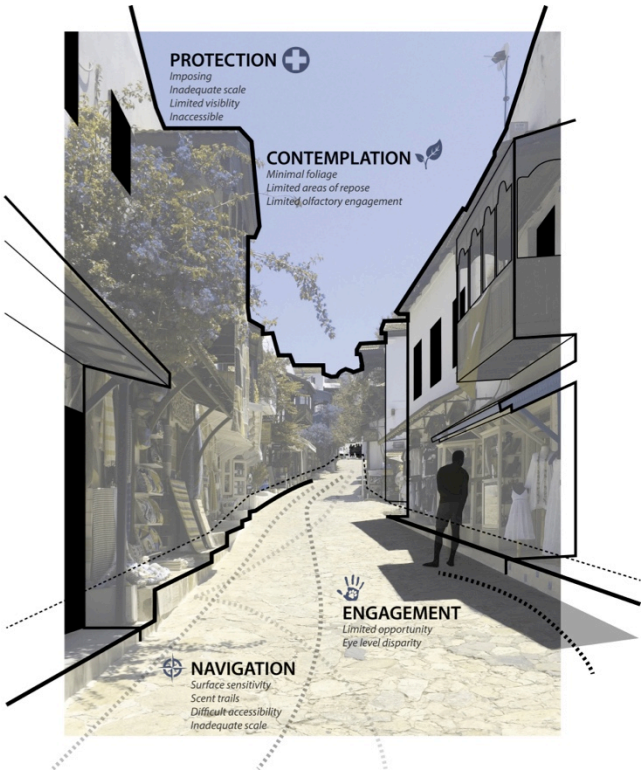

Figure 17: Perceived spatial experience
Source: Author

Chapter 6: Precedent Analysis

The following explores a range of projects that engage ideas of sensory experience, healing, and animal design. Using the preceding research to better understand spatial perception and the relationships between humans and canines, an analysis of different building types that address similar issues can begin to expose these ideas in a more concrete manner. These projects explore concepts related to sensory experience, scale sensitivity, natural healing, community integration, procession, and tectonics. More specifically, this analysis explores practices of path, threshold, porosity, lighting, and green space. Application of the design principles learned from this precedent analysis should be used to inform a more holistic design strategy.

Therme Vals, Peter Zumthor (1996)

Therme Vals, a hotel and spa project built over the springs of Graubünden, Switzerland, provides a uniquely integrated sensory experience. Inspired by the surrounding landscape, this building is constructed of local quartzite slabs and embedded into a hillside reflecting a cave-like expression. Peter Zumthor exercises an elegant restraint in the architecture's spatial manifestation. The procession through the building emphasizes a pure and spiritual healing experience. In an informal organization of spaces, the architect delineates the intended succession through the building while still offering unique opportunities for retreat and exploration (Figure 18). Zumthor's use of controlled views also helps to demonstrate his intent and to

create a feeling of anticipation in the visitor. Through a thoughtful and limited presence of natural and artificial light, one experiences an enhancement of the nonvisual senses, and consequently, a certain sense of self-awareness (Figure 20). The transitions from cold to hot, the ascension and descent into spaces, the feeling of the water and luminescent stone, and the acoustic quality of the water lapping on the wall's surface, all contribute to an enriching user experience.[67] When considering poly-cultural or all-inclusive architecture, this project serves as a powerful design tool and model. The underlying ideas of Therme Vals demonstrate a keen attention to the body, mind, and range of sensory perception.

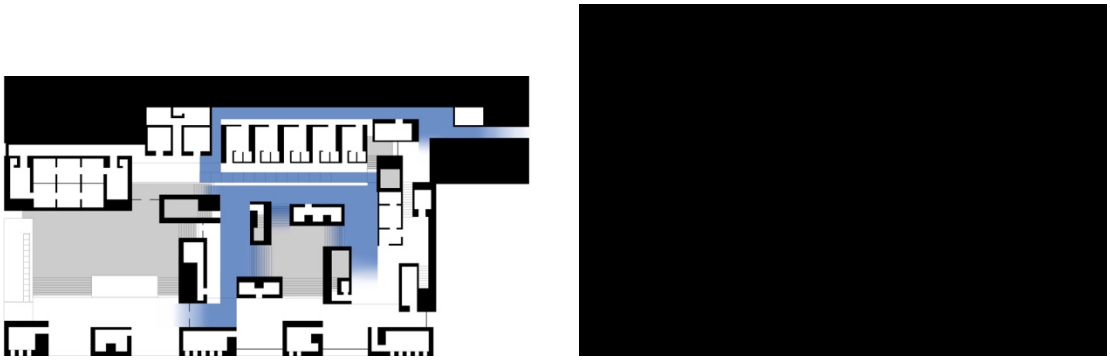

Figure 18: Informal procession reinforces explorative experience
Source: Author

[67] "The Therme Vals / Peter Zumthor," last modified February 11, 2009, http://www.archdaily.com/13358/the-therme-vals.

Figure 19: Threshold conditions created through elevation, acoustic, and lighting transitions
Source: Author

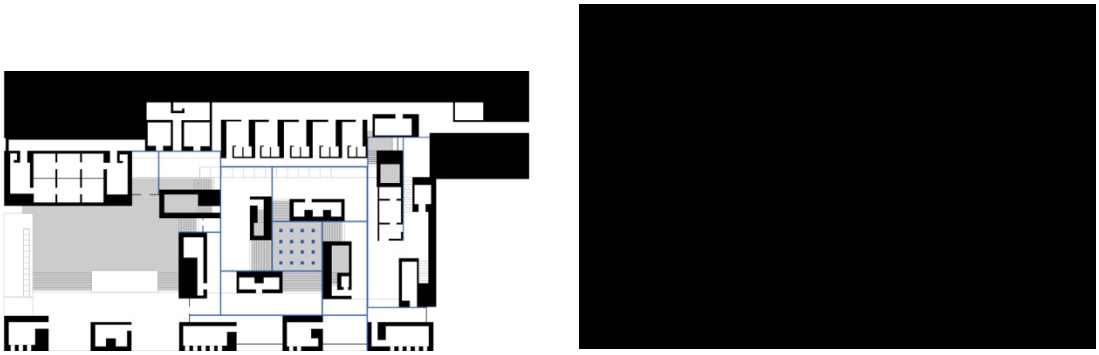

Figure 20: Backlighting and crevice lighting created with diffused daylight for visual way-finding
Source: Author

Anchor Center for Blind Children, Davis Partnership Architects (2007)

The Anchor Center for Blind Children in Denver, Colorado is a school that was designed to create a sensitive and engaging multisensory experience for visually impaired children. Situated in a residential neighborhood, this single-story building mirrors the small surrounding contextual scale. The building's interior programmatic elements are organized along a linear spine, allowing for a clear and easily navigable path (Figure 21). An elevated and northwardly angled roof fills this central corridor with diffused clerestory lighting (Figure 23). The classroom clusters, which are reflected in the projecting forms of the façade, are clad in brick masonry that creates a braille-inspired push and pull texture. [68]

The design's playfully integrated use of scale, lighting, color, material, and acoustic variations offers a place of learning and exploration at all levels. Consideration of exterior and interior connections was significant to the development of the design. On the south side of the building are a sensory garden and playground that encourage a range of tactile, olfactory, and auditory experiences. Among these recreational elements, concrete paths with gradually increasing control joints signify the approach and entrance to the school.[69] Once inside the building, recessed wall details, scaled appropriately for the use of children, serve as a way-finding tactic for the students (Figure 21). Additionally, hardwood flooring and light strips along the floor's edge are used to reinforce the linear procession through the space (Figure 23).

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[68] "Anchor Center for Blind Children," accessed November 18, 2015, http://davispartnership.com/projects/anchor-center-blind-children/.
[69] "The Anchor Center for Blind Children." accessed November 18, 2015, http://www.fransenpittman.com/Portfolio_Detail/pid/Nonprofit/id/17/The_Anchor_Center_for_Blind_Children.

A unique threshold condition is also established in order to indicate the transition zones from corridor to classroom. Tinted skylights that reflect colored light off of the white surfaces, changes in floor materiality, and drop ceilings that alter the acoustic quality of the space, work collaboratively as spatial markers (Figure 22).

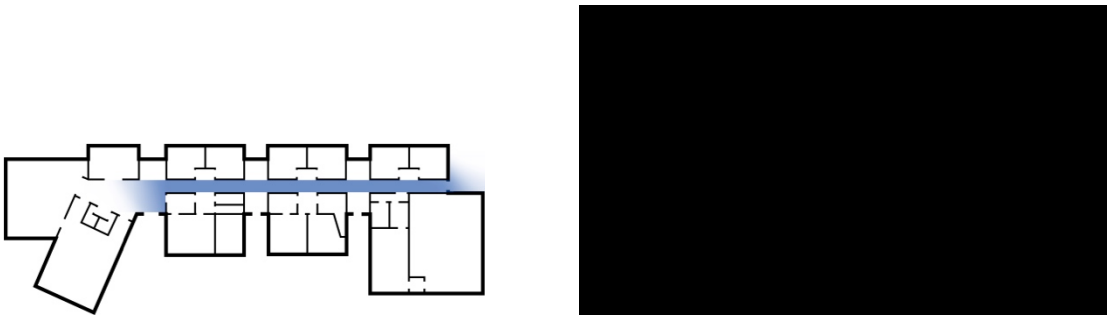

Figure 21: Linear path for navigational clarity reinforced by recessed detailing
Source: Author

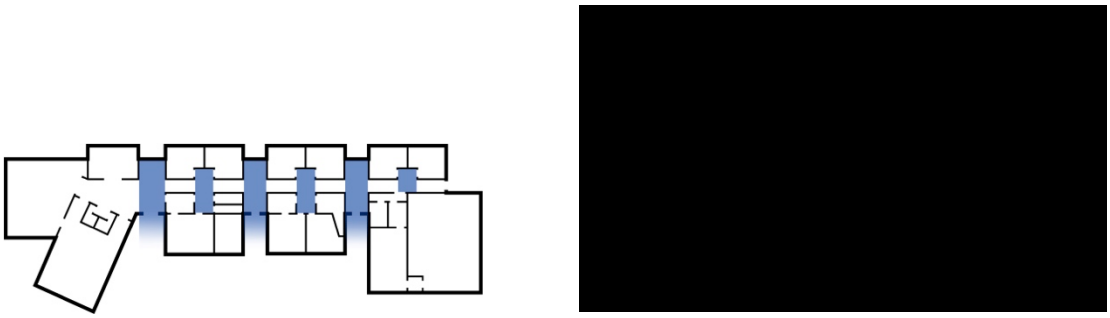

Figure 22: Threshold conditions highlighted by changes in light, color, and acoustic quality
Source: Author

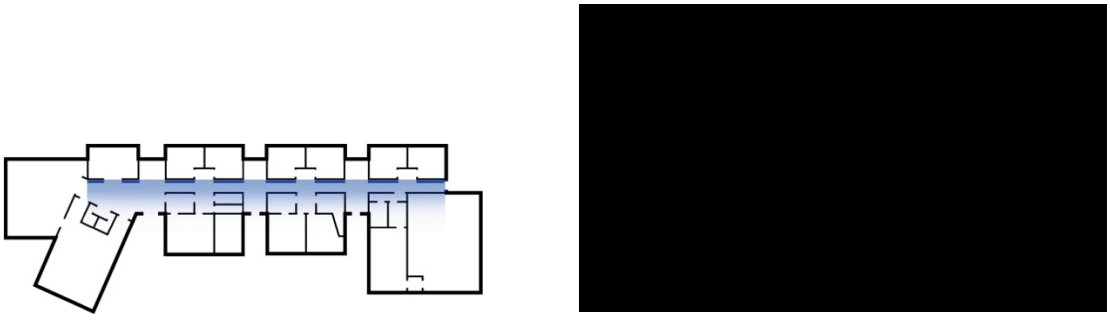

Figure 23: Floor lighting and diffused clerestory lighting reinforce spatial procession
Source: Author

Maggie's Center Gartnaval, OMA (2007)

Maggie's Centers are a global architectural movement inspired by the vision of Margaret Keswick Jencks, a terminally ill cancer patient who strongly believed in the power of design as a restorative strategy. She and her husband envisioned a goal to provide cancer patients with inspiring architecture and care services, and this mission has since manifested into 17 projects worldwide.[70]

The Maggie's Center in Glasgow, Scotland strives to provide a space that fosters emotional support and psychological wellbeing. Straying from the oftentimes imposing and sterile hospital environment, this project maintains a small human scale that helps to reinforce a sense of community and comfort. The single-level structure is organized in a circular configuration of interconnected counseling rooms, multipurpose area, kitchen, dining space, and offices all around a central garden courtyard (Figure 24).[71] These strategically defined spaces are kept open in order to reflect a unified and non-insular culture. This idea is further highlighted by the abundance of glazed walls that help create a strong visual connection to the surrounding forested setting (Figure 27). Further emphasizing its relationship with the natural landscape, the main corridor has ramps that help mitigate between the subtle topographical changes within the site (Figure 25). The flat wood veneer ceiling

[70] Samuel Medina, "The Story of Maggie's Centres: How 17 Architects Came to Tackle Cancer Care," last modified April 27, 2014, http://www.archdaily.com /498519/the-story-of-maggie-s-centres-how-17-architects-came-to-tackle-cancer-care.
[71] Kelly Minner, "OMA Designed Maggie Gartnaval Opens Today," last modified October 3, 2011, http://www.archdaily.com/173513/oma-designed-maggie-gartnaval-opens-today.

follows the changing direction of the path, reinforcing the building's spatial sequence while also giving it a sense of warmth (Figure 24).

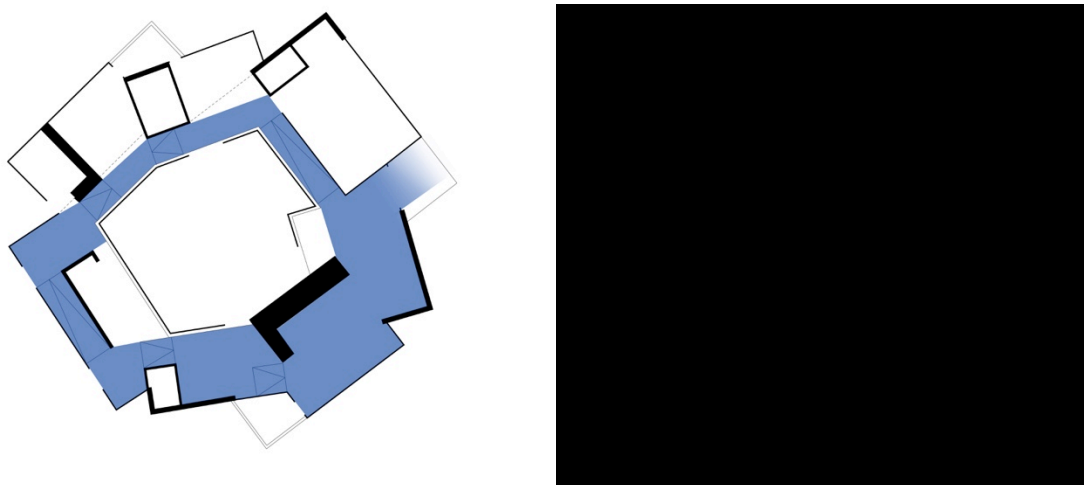

Figure 24: Circular path promotes connectivity and visibility between programmatic activities
Source: Author

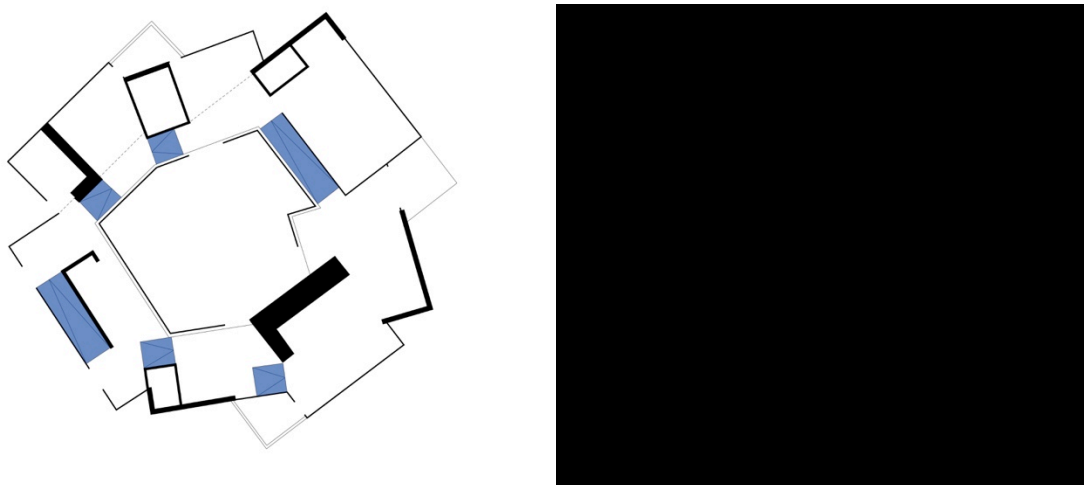

Figure 25: Transitional moments created by a gradual descent between spaces
Source: Author

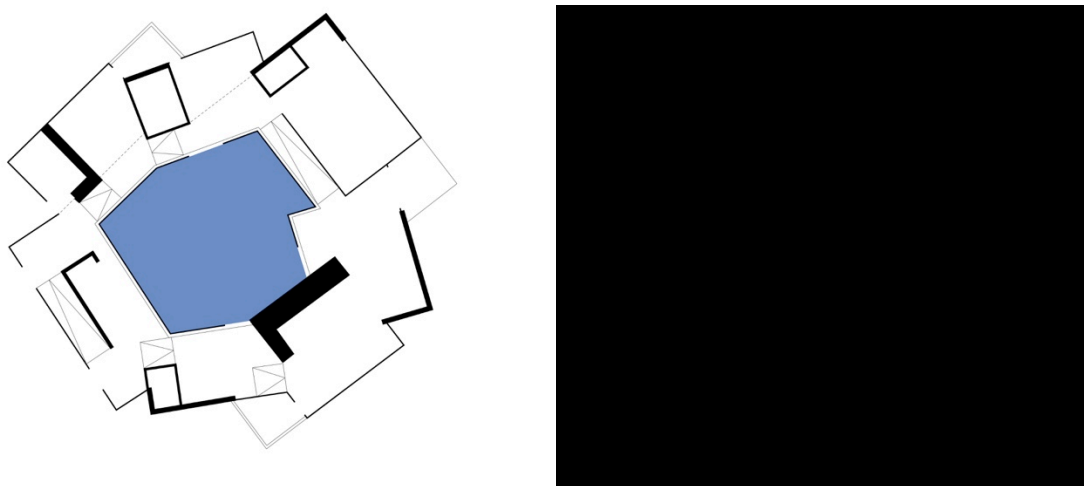

Figure 26: Green space enclosed within building as visual healing tool
Source: Author

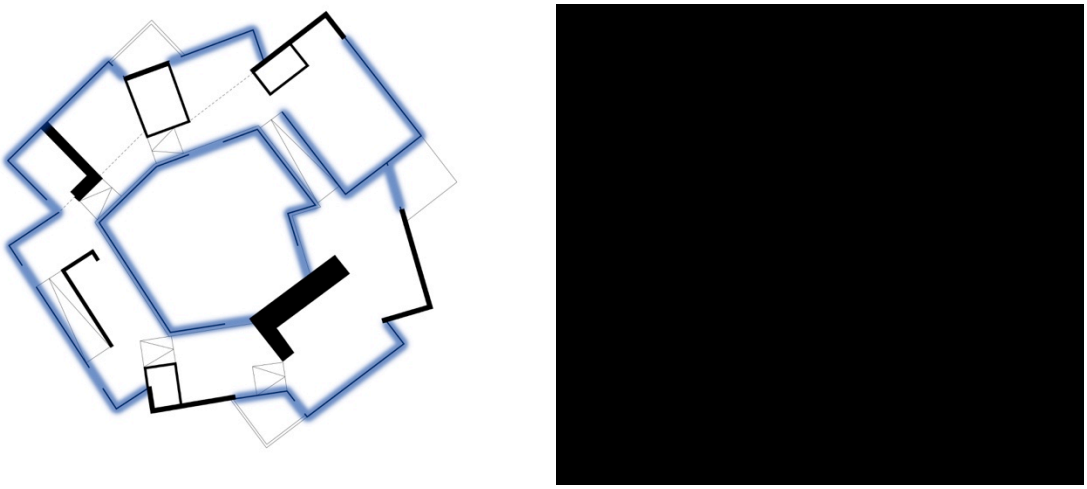

Figure 27: Porosity of vertical surfaces emphasizes a visual connection to nature
Source: Author

Woy Woy Rehabilitation Unit, Woods Bagot (2013)

The Woy Woy Rehabilitation Unit is a 24,000 square foot addition to the Woy Woy Hospital complex along the coast of New South Wales, Australia. This project annex provides a range of healthcare services for patients experiencing physical illnesses. With a "homes in the park" motif, the design seeks to create a restorative environment that reflects a strong integration with the natural setting. The building sits among tall native grasses and eucalyptus groves. Connecting to this park setting, the form of the w-shaped building creates two framed exterior courtyards (Figure 30). These integral spaces draw one's spatial experience outwards, while acting as a visual expression of time, growth, and renewal. These gardens also help bring an abundance of natural light into the building.[72]

In a building that strives to provide a place of comfort and healing, creating a sense of "home" becomes important. Unlike the typical institutional building, the Woy Woy Rehabilitation Unit creates a more intimate and tranquil atmosphere. The building's three wings take on a residential scale and extend out onto covered patio spaces that act as thresholds between the built and natural setting (Figure 29). The gestural roof, reminiscent of the traditional hipped roof, along with the use of wood and brick, also help strengthen this residential appeal of the building. The local inspiration of this healing center is apparent even at the detail scale of the building.

[72] "Woy Woy Rehabilitation Unit / Woods Bagot," last modified October 2, 2014, http://www.archdaily.com/551038/woy-woy-rehabilitation-unit-woods-bagot.

The alternating bricks of grey, brown, and blue hues draw inspiration from the native term, “woy woy,” meaning big lagoon.[73]

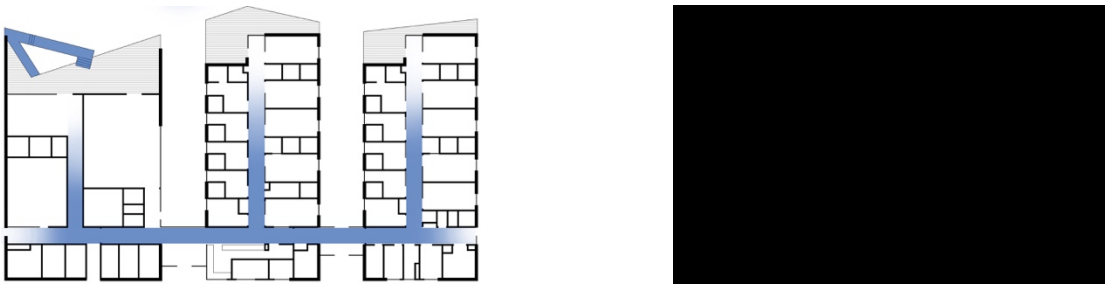

Figure 28: Primary linear path broken by perpendicular outlets
Source: Author

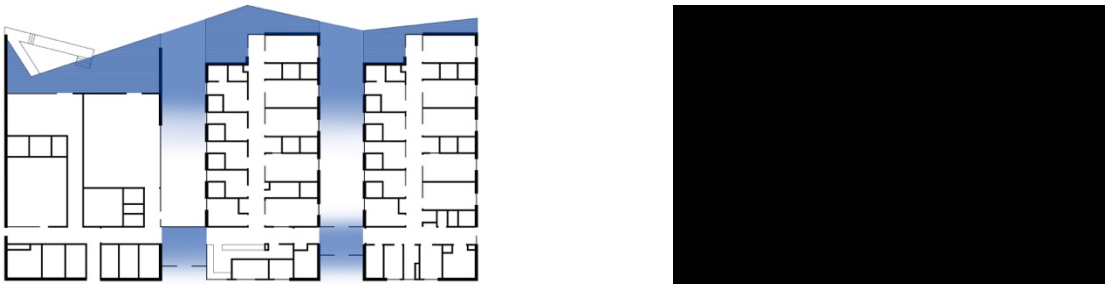

Figure 29: Threshold conditions create a dynamic flow of building interior and exterior
Source: Author

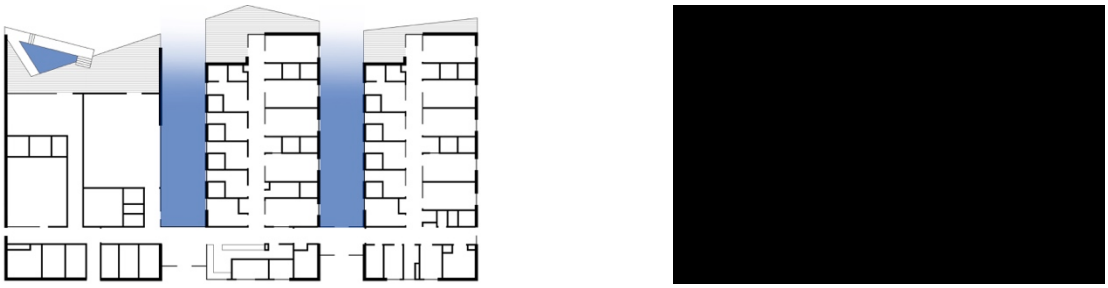

Figure 30: Building form used to create enclosed green spaces
Source: Author

[73] “Woy Woy Rehabilitation Unit.”

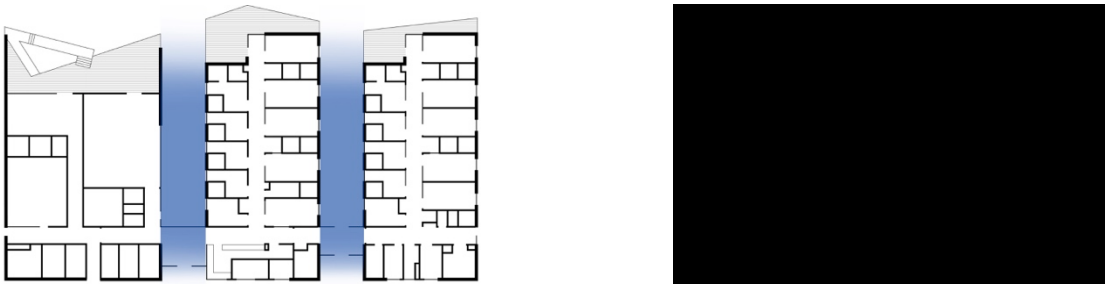

Figure 31: Porosity at critical moments highlights connection to nature
Source: Author

South Los Angeles Animal Care Center & Community Center, RA-DA (2013)

The South Los Angeles Animal Care Center is a 24,000 square foot project that challenges the notions of typical animal shelter design. This innovative exploration strives to create an atmosphere that more positively engages the community while encouraging more animal adoptions. The main distinguishing characteristic of this facility is an outdoor gallery leading into a boulevard and "kennel garden" (Figure 32). The aim of this space is to mirror a pedestrian retail street that draws people through the project. This tranquil, open environment encourages more positive interactions between the people and animals. The boulevard is defined by tree canopies and terminated with a large park space. The comfortably shaded kennels along this thoroughfare are arranged strategically so that dogs face green walls or park spaces rather than one another. This organization creates an inviting atmosphere with reduced noise levels, and thus encourages a more positive human-canine experience.[74]

Figure 32: Outdoor gallery
Source: ArchDaily

[74] "South Los Angeles Animal Care Center & Community Center / RA-DA," last modified June 29, 2013, http://www.archdaily.com/ 407296/south- los- angeles-animal-care-center-and-community-center.

Horse Barns

In looking at animal architecture typologies, horse barns became an important point of departure for this design analysis. Since this building type is intended for the use of both humans and animals, it provides constructive insight into ideas of materiality, natural lighting, scale variations, practicality, accessibility, and spatial implications. Figure 33 shows a matrix of horse barn designs and details that helped serve as inspiration for the following proposal.

Figure 33: Horse barn matrix
Source: Author

Chapter 7: A Unifying Strategy

Traditionally, a person serves in the military between the ages of 18 and 30 (Figure 34). After returning from deployment, he/she is left to deal with the physical and invisible wounds of war. Psychological trauma is something that is difficult to rationalize and overcome. While some soldiers seek out professional care, others struggle to heal alone. This can become an overwhelming journey to recovery.

Distinct yet parallel to this path, dogs who wind up in shelters often remain there for most of their lives. With an average lifespan of 13 years, the average age of dogs taken to animal shelters is 18 months. The unfortunate reality is that not every dog is adopted and the condition of many animal shelters is less than ideal. Although many of these abandoned dogs are smart and sweet-tempered, most of them are left caged with unfulfilled potential.

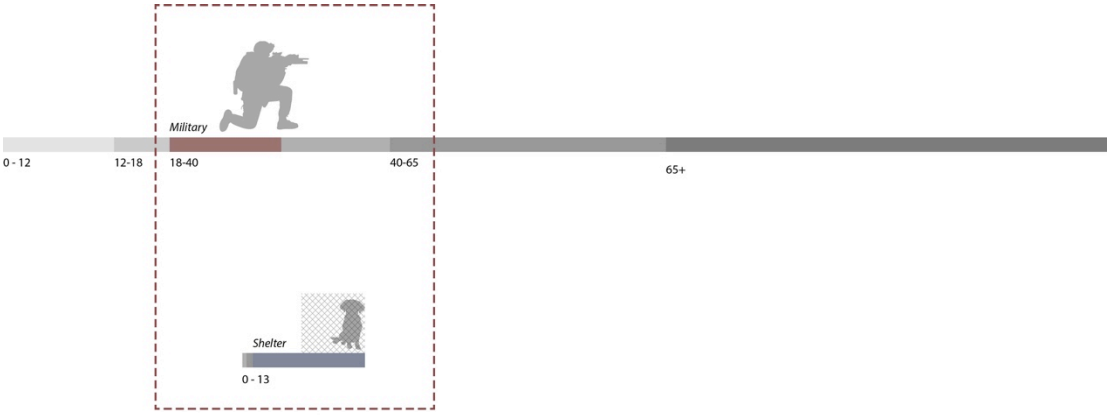

Figure 34: Military service & canine shelter period
Source: Author

Although these two conditions have traditionally remained distinct paths (Figure 35), more recently, the trajectory of returning soldiers and rescued canines has begun to converge (Figure 336). People have begun to recognize the potential of dogs as a healing tool, service-bred and rescued alike. With an increasing number of veteran-canine programs being developed, more dogs are being released from shelters as well as re-socialized and trained to perform physical and psychiatric services for returning warriors and veterans.

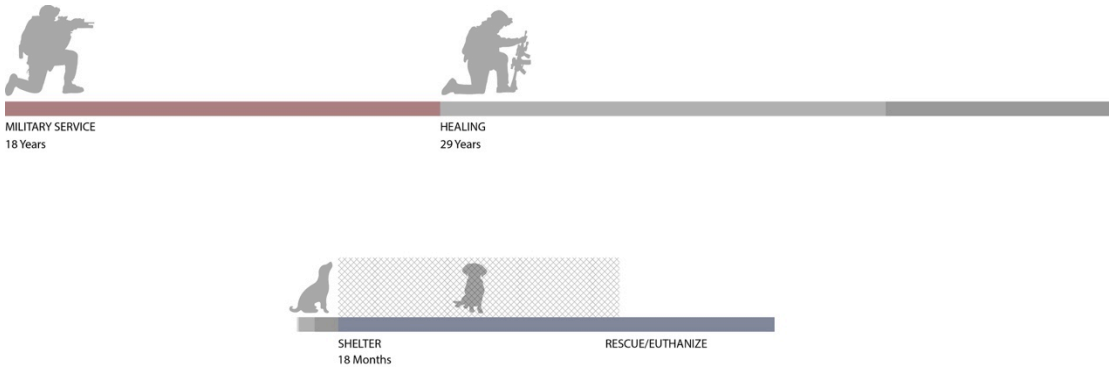

Figure 35: Traditional model for veteran & sheltered canine
Source: Author

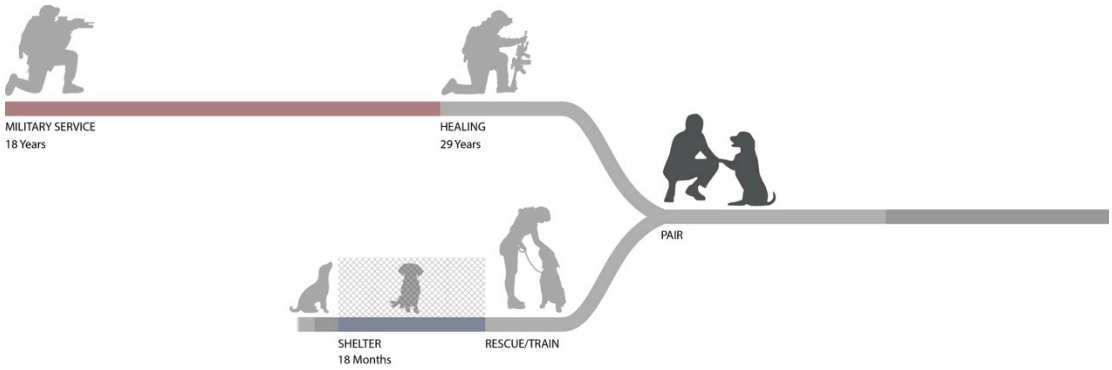

Figure 36: Progressive model pairing veterans & canines
Source: Author

This thesis challenges the preceding methodology with a more progressive approach to healing. As depicted in Figure 37, this proposal aims to create a further integrated model for the healing process of both veterans and rescued canines. By pairing the veteran and dog at an earlier stage, the caring, re-socialization, and training of the dog becomes an integral part of the veteran's physical and psychological rehabilitative process.

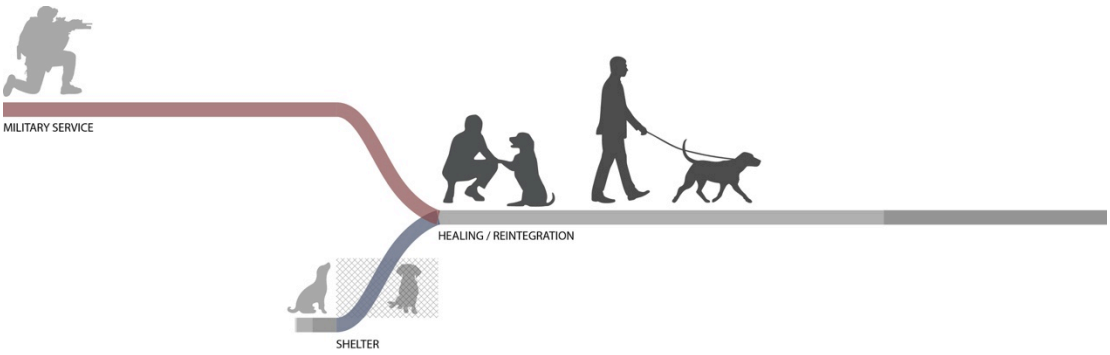

Figure 37: Thesis intervention
Source: Author

Program Development

This thesis consists of the development of a unique program that fosters a mutualistic relationship between veterans and rescued canines. More globally, this program is not only intended to bring together two species, but also to serve as a model for poly-cultural design. When considering the desired programmatic elements, it was important to first reaffirm the set of objectives that this proposal seeks to address. Focus words that were considered when establishing these project goals are as follows: healing, collaboration, reintegration, education, community, and

culture. Keeping these ideas in mind, this proposal aims to challenge preconceptions of the healing environment. On a more general scale, this project will have a tripartite division consisting of a veteran program, canine program, and shared program. Although individual veteran and canine services will be offered, more important to the rehabilitative experience will be the blended program. Figure 38 outlines, more specifically, the programmatic spaces existing within each of these broader subdivisions.

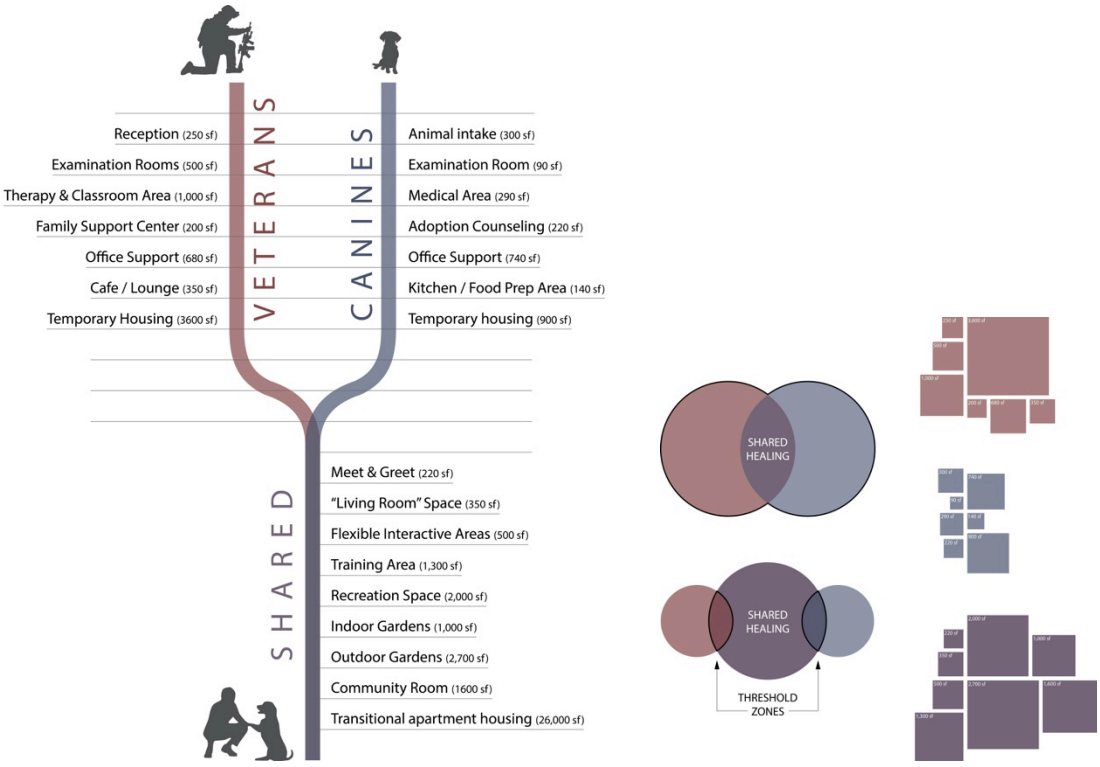

Figure 38: Program Distribution
Source: Author

The veteran program will consist of a variety of therapeutic spaces. These areas should provide opportunities for both independent and group therapy sessions. Family support is a large part of the healing process, so spaces that offer opportunities for family visitation and participation are a key component of the program. It is also important for individuals to feel a sense control over their environment. Therefore, spaces should remain flexible and promote both intimate and social settings. They should also demonstrate sensitivity to one's cognitive and spatial experience while providing a home-like atmosphere.

The canine program will provide temporary shelter for rescued canines. Looking back to the ideas of healthy animal design discussed in "Chapter 5: The Canine Perspective," this area should reflect a sensitivity to scale, movement, perception, and environmental stimulation. It will also consist of spaces that exude a comfortable quality and simulate a home setting. Flexible recreation areas will provide an enriching environment that promotes socialization among the dogs. These spaces will be interactive settings that engage the canines' senses and provide opportunities for physical activity and relaxation.

The shared program is the unifying element of this proposal. This project should reinforce a sense of harmony and cohesion, not just within the rehabilitation facility, but also with the outside community. With both an inward and outward reach, the shared program will provide an opportunity for this type of collaborative healing. As the main focus of the healing process, veterans and canines will be paired together to assist each other both physically and emotionally. Training and recreation areas will allow for this relationship to take place. These spaces should foster

collaboration and education. Moreover, they should reflect an understanding of varying states of mind, behavioral needs, spatial perceptions, and physical limitations. This training program should extend beyond the physical boundaries of the building and into the surrounding site, creating an experiential network of mutual learning and healing. Therapeutic gardens and trails will allow for more intimate reflection, decompression, and recreation. Additionally, a community center will serve as a vehicle to heal and reintegrate the veterans and canines into the community. This can become a flexible space that is used to facilitate job training, to promote adoption of the rescued dogs, and to house social events. Transitional housing will be an additional portion of this blended program. This residential component will allow veterans to be housed with their paired dogs as they both prepare to transition back into society.

A strong connection between the distinct programs and shared spaces will be crucial to the unification of this project. The transition spaces between the areas strictly for veterans and strictly for canines, will serve as thresholds from the human and canine worlds into a poly-cultural atmosphere (Figure 38). These zones will be places where the two distinct worlds begin to blend into one. This project will use these areas as an opportunity to spatially question and challenge the norms of perception. Through sensory engagement, these neutral zones can begin to bring a certain awareness that one is transitioning into a different “world.”

Site Selection

The following is a comparison of three potential sites that were explored for the design proposal. This analysis encompasses an investigation of accessibility, mobility, greens spaces, and contextual character in rural, suburban, and urban settings. It considers the relevance and implications of these issues as they relate to a potential rehabilitation development. Figure 39 shows the three sites that were considered for the proposal: Schaeffer Farms, Walter Reed National Military Medical Center (WRNMMC), and the former Walter Reed Army Medical Center (WRAMC). Figure 40 illustrates military and animal care affiliated locations surrounding each of the potential sites. This network of external organizations and buildings could serve to support the development of the intended project.

Figure 39: Potential sites
Source: Basemap – Google Earth, Diagram – Author

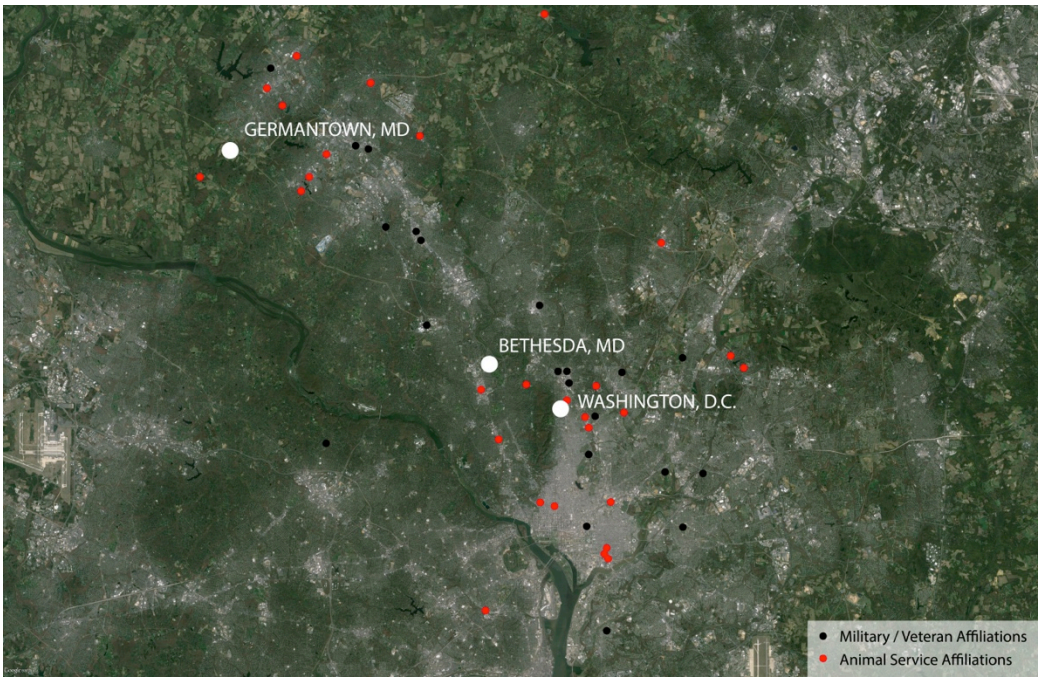

Figure 40: Potential site affiliations
Source: Basemap – Google Earth, Diagram – Author

OPTION 1: Schaeffer Farms

The Schaeffer Farms of Germantown, Maryland have been planned as the new headquarter location for the existing Warrior Canine Connection program that was discussed in "Chapter 2" Application." Therefore, a further analysis of this location was a logical point of departure when considering the related proposal of this thesis. The Schaeffer Farms consist of a network of walking, biking, and horseback riding trails. This site is bounded to the south by Seneca Creek, to the west by Little Seneca Creek, and to the East by Blackrock Road (Figure 41). The main entrance is off of Schaeffer Road, north of the site. With a 15-mile interconnecting series of trails, this remote site has the potential to accommodate a large variety of recreational and therapeutic programs in a tranquil setting. Figure 44 depicts the rich variety of moments experienced throughout the Schaeffer trails. The vast amount of green open

space makes this rural location conducive to a largely nature-driven program (Figure 43). Moreover, its minimal site constraints allow for greater flexibility in developing the project and potentially extending the site's programmatic functions into the surrounding parklands. However, as illustrated in Figure 42, its remoteness makes this site accessible to a smaller audience, and could possibly hinder the goal of community reintegration. The closest civic center to the site is the South Germantown Recreational Park, which is surrounded by a large suburban development. Moreover, bus routes do not stop within a one-mile radius of the farms, making access to this site more car-reliant. The Walter Reed Military Medical Center is a thirty-minute drive from these farms.

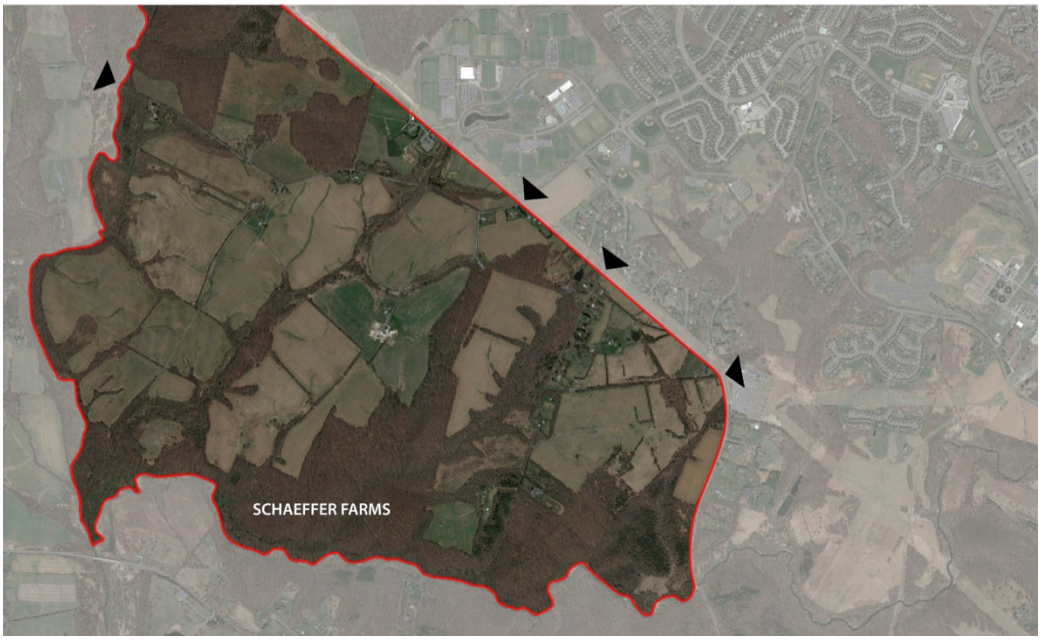

Figure 41: Accessibility: Limited by remote location
Source: Basemap – Google Earth, Diagram – Author

Figure 42: Mobility: Isolated and reflective setting enhanced by walking trails
Source: Basemap – Google Earth, Diagram – Author

Figure 43: Green patch: Rural setting transitions into more suburban fabric
Source: Basemap – Google Earth, Diagram – Author

Figure 44: Existing site character: Rich variation in trail typology
Source: Basemap – Google Earth, Diagram – Author

OPTION 2: Walter Reed National Military Medical Center

The Walter Reed National Military Medical Center (WRNMMC) in Bethesda, Maryland was developed in 2011 after joining forces with the Washington, D.C. Walter Reed Army Medical Center (WRAMC). This campus, which serves active duty members, returning warriors, veterans, and their families, stands as one of the largest military medical centers in the nation. Recognizing the potential of animal healing, this facility has already partnered with a variety of service and therapy dog organizations. Therefore, this location holds a lot of potential for the development of a new joint rehabilitation program for veterans and canines. Northeast of the medical center is an open 10-acre site that this thesis considers for development (Figure 45).

The WRNMMC is located north of downtown Bethesda, and across the street from the National Institutes of Health and the Medical Center metro stop, making this

a very accessible community. The metro stop is just a little over a half-mile walk from the proposed site and the WRNMMC also has a shuttle bus service that takes people to the metro (Figure 46). As Figure 48 shows, the buildings surrounding the site have a very institutional appearance. However, the buildings towards the north of the site are smaller in scale and more residential in character. East of the site there is a recreation center as well as a suburban development. Since this site is located by the WRNMMC the proposed project could exist as part of the medical facility and work in conjunction with the campus' existing services. Its proximity to both urban and suburban centers also makes this a strong area for development.

Figure 45: Accessibility: Facilitated by proximity to metro station
Source: Basemap – Google Earth, Diagram – Author

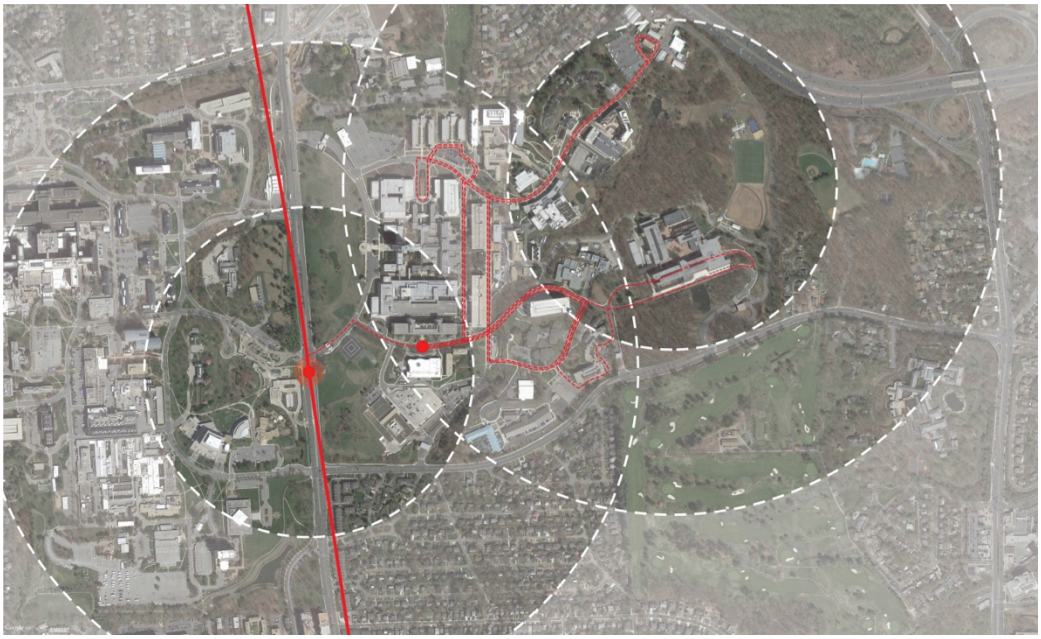

Figure 46: Mobility: Campus walkability supported by bus routes
Source: Basemap – Google Earth, Diagram – Author

Figure 47: Green patch: Recreational division between dense campus and suburban fabric
Source: Basemap – Google Earth, Diagram – Author

Figure 48: Existing site character: Primarily institutional setting
Source: Basemap – Google Earth, Diagram – Author

OPTION 3: Walter Reed Redevelopment Site

The former WRAMC is located in northern Washington, D.C. This campus closed in 2011 and moved its services to Bethesda, MD for the development of the WRNMMC. The western area of the campus will be occupied by the U.S. Department of State. However, the Local Redevelopment Authority (LRA) has gained control over 66 acres of the 110 acre site, and has been tasked with developing a reuse plan for that portion of the site (Figure 49).

This site is surrounded by four primarily residential neighborhoods: Shepherd Park, Takoma, Manor Park, and Brightwood. The main access points into the site are through Main Drive NW approaching from the west as well as Butternut and Dahlia Street NW coming from the east. This is a very accessible site, with several nearby bus stops and approximately a 10-minute walking distance to the Takoma Park metro

station (Figure 50). As depicted by Figure 51, this former medical campus has a unique site condition, sitting in a primarily urban context yet bounded to the west by Rock Creek Park. This juxtaposition creates an opportunity to explore design in both a natural park and more rigid urban setting. The new veteran and canine rehabilitation project could potentially help expand the currently limited park program and usage.

Figure 49: Accessibility: Facilitated by proximity to metro station
Source: Basemap – Google Earth, Diagram – Author

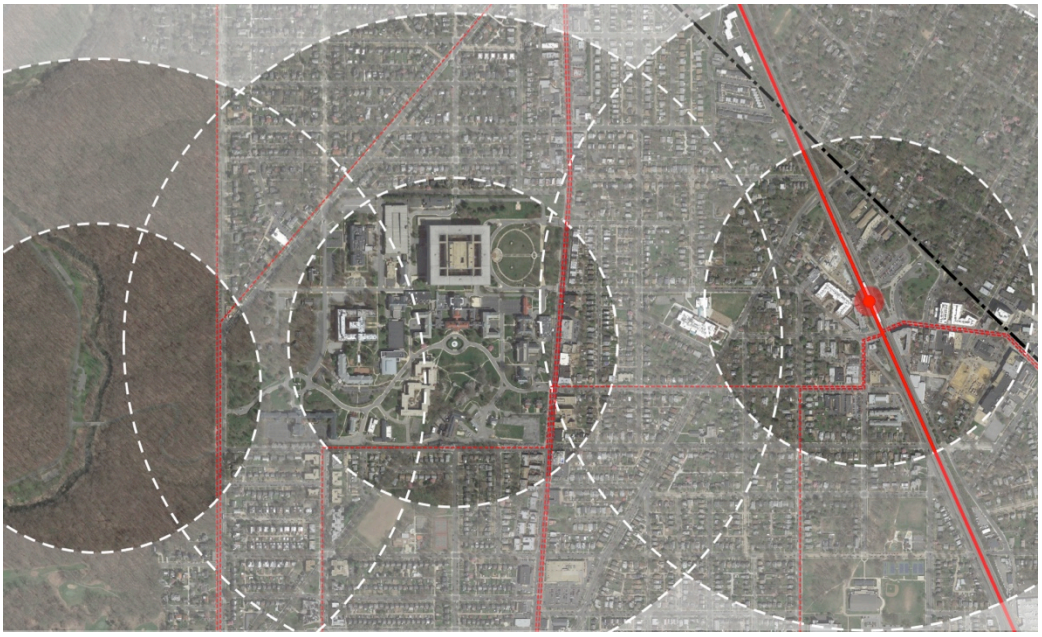

Figure 50: Mobility: Walkability of campus enriched by proximity to national park
Source: Basemap – Google Earth, Diagram – Author

Figure 51: Green patch: Urban street grid creates abrupt transition to vegetated forest
Source: Basemap – Google Earth, Diagram – Author

Figure 52: Existing site character: Landmark site characterized by historic buildings
Source: Basemap – Google Earth, Diagram – Author

SITE SELECTION

Based on a preliminary exploration of accessibility, mobility, green patches, and contextual character, the Walter Reed redevelopment site was selected for further analysis and development of the following design proposal (Figure 53). The merits of both the Schaeffer Farms and WRNMMC, however, are still acknowledged, and these locations could ultimately serve as future development sites for smaller satellite projects.

High ● ⟷ ○ Low	OPTION 1 SCHAEFFER FARMS	OPTION 2 WRNMMC	OPTION 3 WRAMC
COMMUNITY ENGAGEMENT	●	○	●
CONNECTION TO NATURE	●	○	●
PROXIMITY TO URBAN CENTER	○	●	●
PROXIMITY TO AMENTITIES	○	●	●
PROXIMITY TO MEDICAL SUPPORT	○	●	●
ACCESSIBILITY	○	●	●
WALKABILITY	○	●	●
SUSTAINABILTY	●	○	●
REFLECTIVE SETTING	●	○	●
MIXED LAND USE	●	○	●

Figure 53: Site Scorecard
Source: Author

Funding

Potential funding sources and stakeholders is an aspect of this project that should be substantially considered, especially since this design proposal will most likely be for non-profit. With a project targeting both veteran and canine health, this opens up a wide target audience that may be interested in supporting this proposal. Figure 54 depicts some of these organizations.

Figure 54: Potential key players in the project

Chapter 8: Site Analysis

History

Prior to becoming the WRAMC, this site was a rural area of land that remained isolated from the rest of Washington, D.C. The Civil War brought on the need for military medical support, but it was not until 1905, however, this land was purchased for the development of an Army hospital. During this time, the surrounding land consisted primarily of wooded areas, farmland, and estate properties. As World War I arrived, the hospital began treating an increasing number of patients creating a need for expansion. This demand resulted in an additional 44-acre purchase during the 1920s, which allowed for the construction of other supporting temporary buildings across the campus. The Walter Reed center worked to treat injured military members as well as civilians plagued by the flu. In over a century of existence, Walter Reed served over 150,000 active duty personnel and veterans from all military branches. The campus facilities have provided not only medical care, but also education and research development services for the United States Armed Forces. After being advised by the Base Realignment and Closure Commission (BRAC) in 2005 to relocate its services, the D.C. campus closed and has since merged with the WRNMMC in Bethesda.[75]

[75] "History," *a*ccessed November 18, 2015, http://www.walterreedlra.com/background/history.

Figures 55-60 display a graphic representation of the campus' growth between 1911 and 1987 as well as plans for the intended future of this site. As seen in these figure-ground drawings, the highlighted area south of the original hospital building lies within a river valley through which Cameron's Creek historically flowed. Throughout the evolution of the campus, this topographically diverse and ecologically sensitive area has been treated quite distinctly compared to the more formal nature of the rest of the site. This prompts the question of whether this specific site within the campus is in need of an intervention that more rigorously highlights the significance and beauty of the historic lawn. The following design proposal seeks to reimagine the future of this site, bringing forth a program that will hark back to the military history of this area while also enhancing its identity as the heart of the Walter Reed campus.

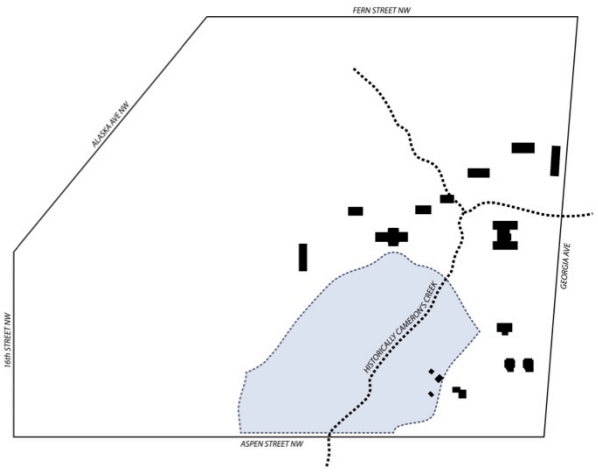

Figure 55: 1911 Campus plan
Source: Author

Figure 56: 1917 Campus plan
Source: Author

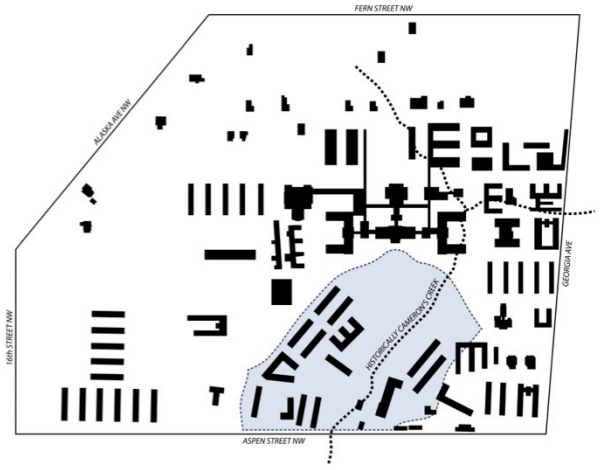

Figure 57: 1927 Campus plan
Source: Author

Figure 58: 1945 Campus plan
Source: Author

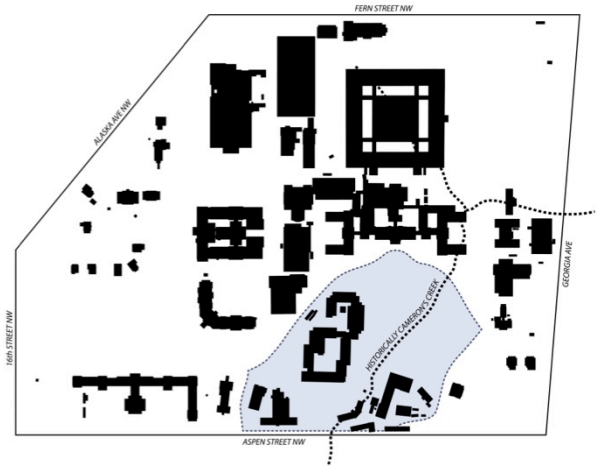

Figure 59: 1987 Campus plan
Source: Author

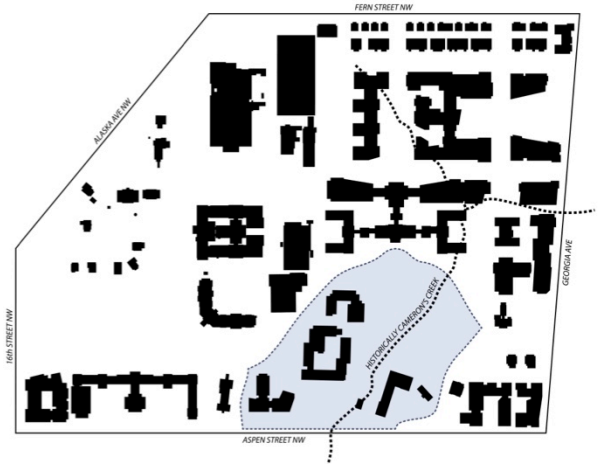

Figure 60: 2024 Campus plan (Torti Gallas 2015 proposal)
Source: Author

Existing Site Conditions

The former WRAMC is located in northern Washington, D.C. (Figure 61). As depicted in Figure 62, the campus is bounded to the west by Rock Creek Park, and is only a 10-minute walk from the Takoma metro station. Brightwood Heritage trail, which highlights the Civil War history of the area, also exists south of the site and stops just short of the Walter Reed campus at the Battleground National Cemetery Park. This presents a great opportunity to develop the campus as an extension of the heritage trail, and create a stronger connection back to the hiking trails of Rock Creek Park.

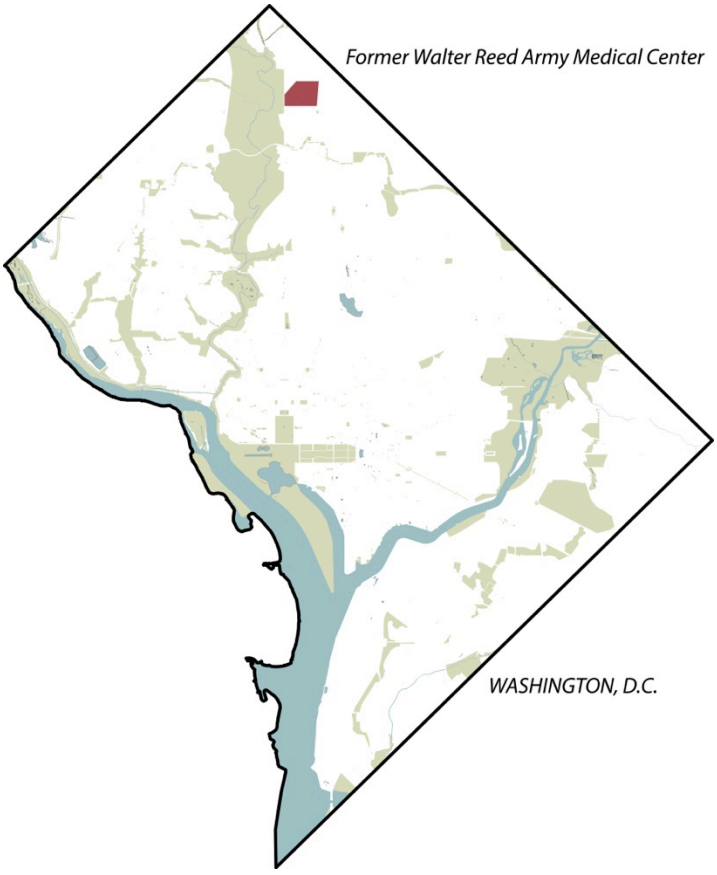

Figure 61: Washington, D.C. map & site location
Source: Author

As was previously mentioned, following recommendations from the BRAC in 2005, the WRAMC was closed in 2011 and its services were relocated to the new WRNMMC in Bethesda. This beautiful landmark site has since become an area for potential redevelopment. Figure 63 highlights the portion of the campus designated to the LRA.

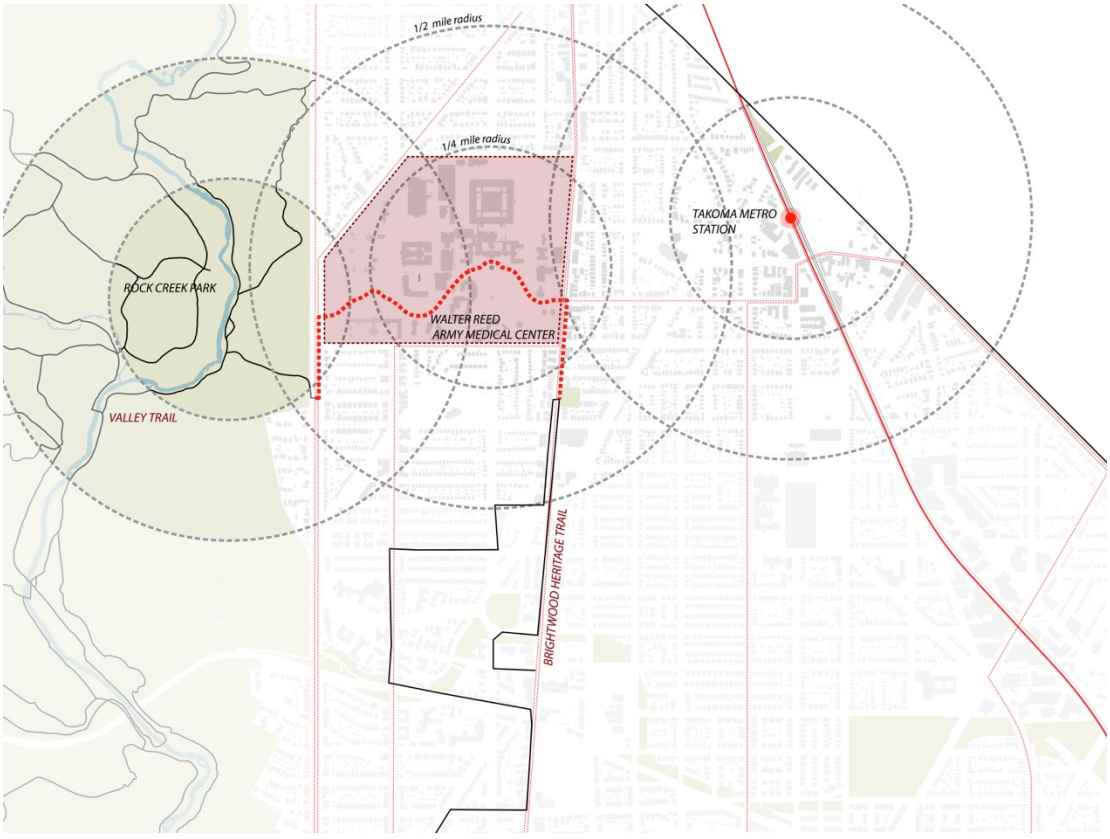

Figure 62: Site accessibility, walkability, hiking/heritage trail & proposed campus trail extension
Source: Author

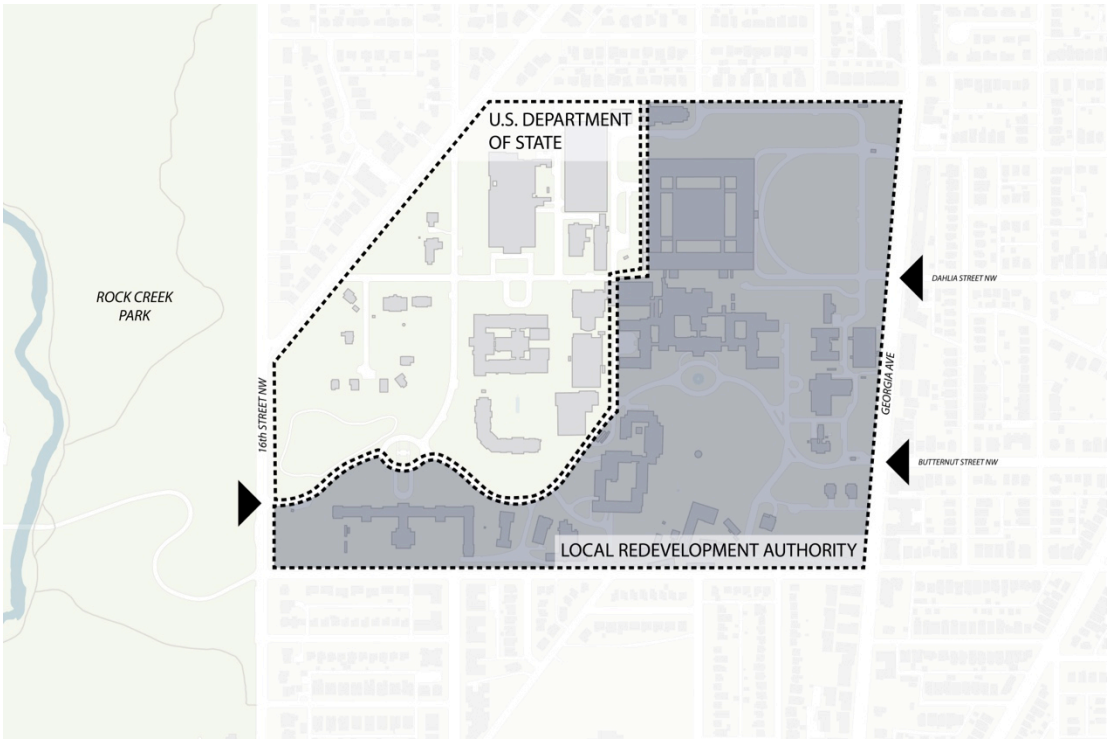

Figure 63: Local Development Authority (LRA) site designation
Source: Author

"The Parks at Water Reed"

The LRA has led the planning process for the redevelopment plan of the former Walter Reed site. Figure 64 illustrates the 2015 master plan proposal by the architecture and planning firm, Torti Gallas and Partners, for the historic campus. The following thesis proposal will reimagine the proposed Parks at Walter Reed and work within the fabric of this master plan.

The Parks at Walter Reed proposal aims to reactivate the site with a new mixed-use development while better integrating it with the surrounding community. In seeking to preserve the identity of this former campus as a restorative center, the reuse plan capitalizes on the idea of creating a sustainable urban catalyst that can

extend its environmental, social, and economic impact beyond the site. The preservation and adaptive reuse of significant buildings will also play an important role in retaining the essence of the campus. The original hospital building is one such building that will remain as the core of the site. The plan also proposes the restoration of historic green spaces throughout the site through recreational, agricultural, and storm water system implementations.

Figure 65 outlines key places within this master plan proposal, some of which include the redevelopment of a historic building along Georgia Avenue as a new visitor's center, the redevelopment of the general hospital building as part of the proposed commerce and science center, as well as the existing rose garden pavilion and proposed lake that visually connect back to Luzon Avenue. The area designated "Aspen Ridge" will be the primary location of the thesis design intervention. Figure 66 outlines the primary sinuous promenade through Main Drive down to the Rock Creek Park Valley Trail. It also depicts the obstructed views down to the historic lawn and proposed waterfront amenities caused an existing building on this valley. Although the embodied energy of the large existing building is important to acknowledge, simply creating an opening in the building, as shown in the proposal, may not sufficiently contribute to the sustainable and revitalizing design agenda of the campus. This thesis proposal seeks to implement a more minimal physical presence on the site and recapture the linear visual connection from the Georgia Avenue gateway to Rock Creek Park (Figure 67). Figure 68 delineates two critical points along the park gateway and Aspen Ridge that exist on the same topographical contour and emphasize the vast design opportunities for this river valley.

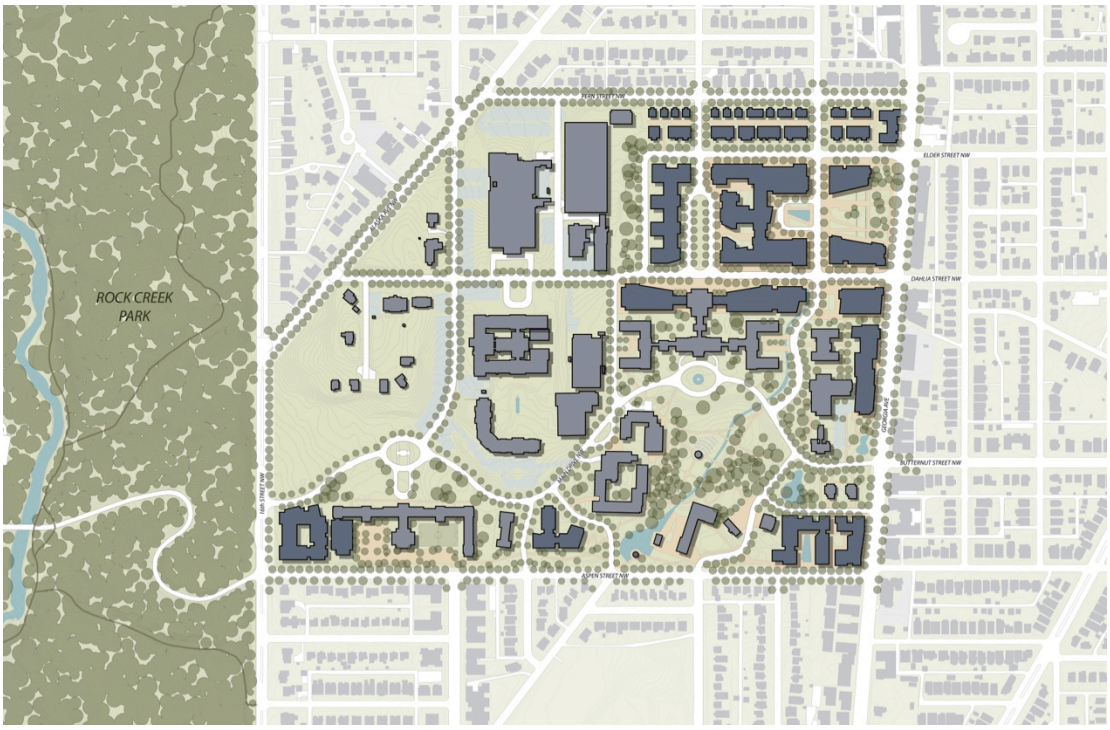

Figure 64: 2015 Master plan proposal by Torti Gallas and Partners, Inc.
Source: Author

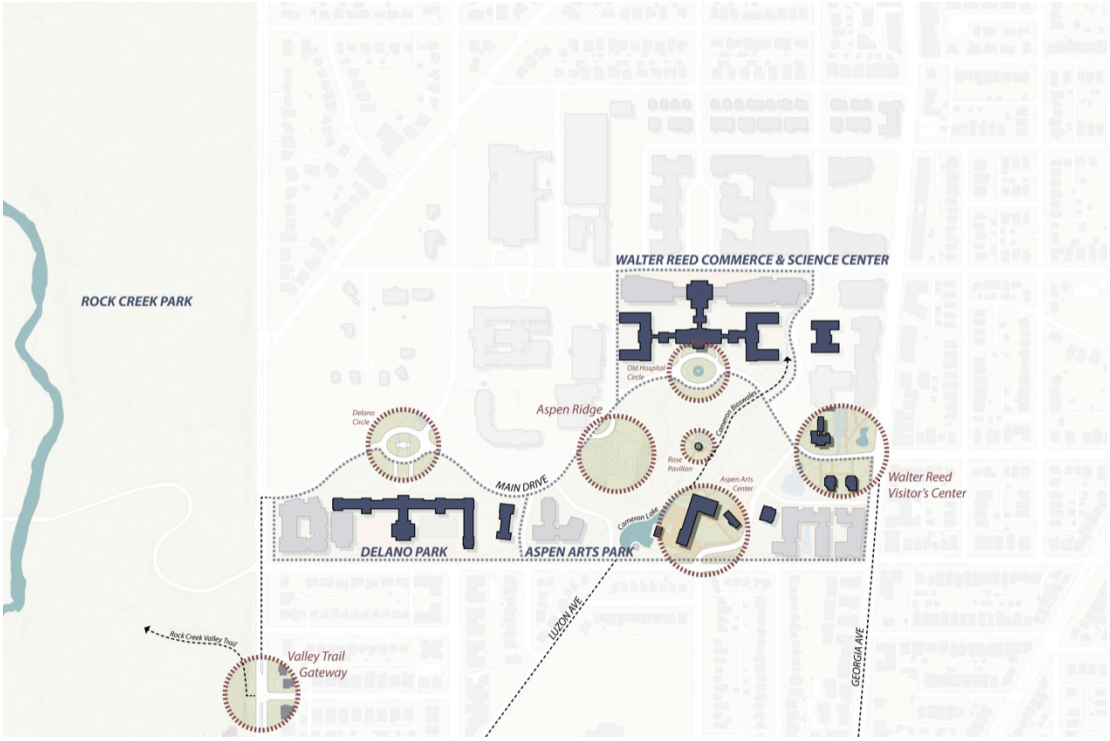

Figure 65: Key places diagram
Source: Author

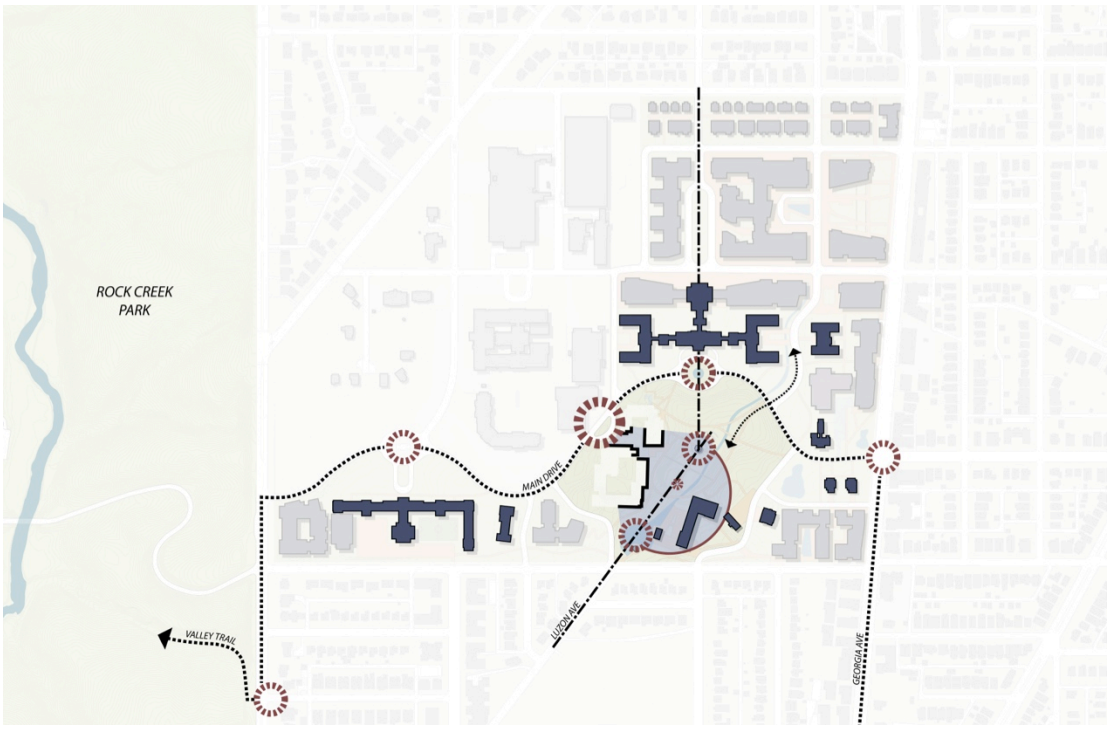

Figure 66: Primary sequence, axial shift, and obstructed view to historic lawn
Source: Author

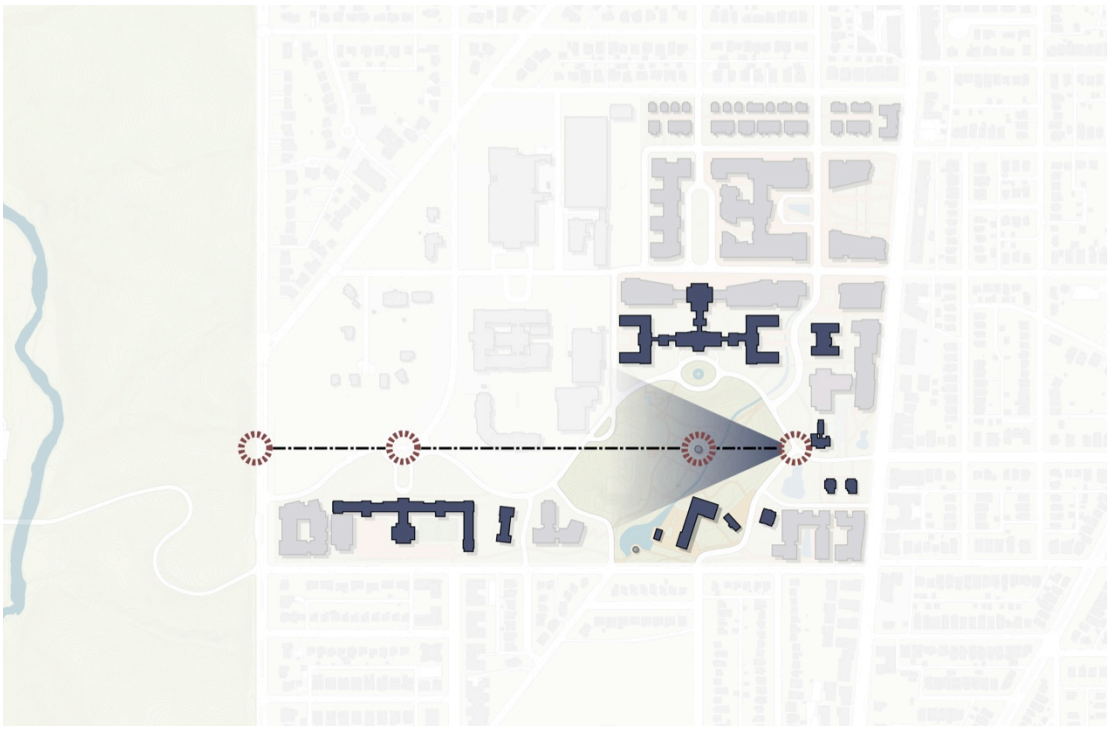

Figure 67: Linear visual connection to Rock Creek Park
Source: Author

Figure 68: Critical elevation points
Source: Author

Chapter 9: Design Proposal

Design Approach

Throughout the research and design investigation, four overarching principles were developed as a way to help guide the process: protection, navigation, contemplation, and engagement. Ideograms of these tactics are depicted in Figure 69.

For an individual who has suffered trauma, having a feeling of being *protected* is an important spatial need. This means developing spaces that allow one to have a sense of control over one's environment, finding a balance between openness and enclosure, and providing opportunities for strong visibility over one's surroundings whether through strategic vantage points or controlled views.

Navigational clarity also ties into the idea of security and comfort within one's surroundings. This concept relates to design simplicity and restraint, and can be expressed through a variety of ways including building organization, tectonic language, lighting, color, and structure.

Creating a *contemplative* setting is important to the design of an enriching restorative environment. Opportunities for multisensory engagement can help one feel more self-aware and grounded. The goal behind this tactic is to foster a strong connection between mind, body, and nature.

Finally, providing controlled settings for *engagement* is a significant component of the psychological healing process. In this specific project, the idea of engagement includes not only designing moments of human-canine interaction, but

also creating opportunities for the program users to more socially engage with the surrounding community.

These four tactics, which helped propel the following thesis proposal, provided a way of rationalizing and quantifying the more qualitative nature of the design.

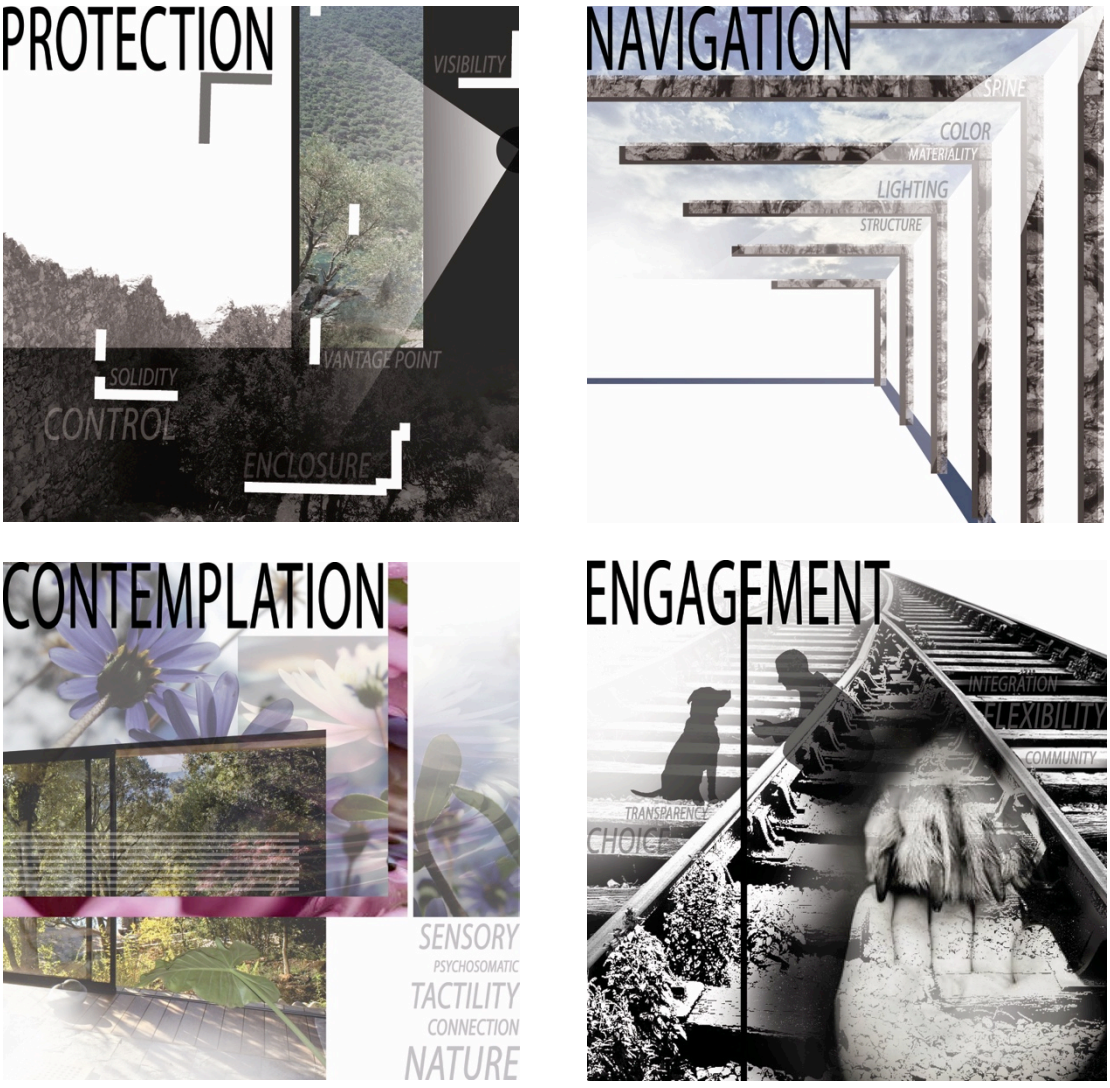

Figure 69: Research & design tactics
Source: Author

Site Design

The following design proposal exists just south of the historic Walter Reed hospital building within the highlighted area depicted in Figure 70. This proposal seeks to create an enriching experience not only for users of the proposed healing facility, but also for members of the community visiting the new Parks at Walter Reed. Upon entering through the new primary campus gate along Georgia Avenue one will encounter a proposed gateway overlook (Figure 71 & 72). This will allow visitors a moment to stop and appreciate the view of the landscape from across the valley. Acting as a backdrop to this wonderful view, there will be a row of linear mixed/transitional apartment buildings for artists, seniors, and veterans. A series of six hillside veteran cottages and a community room will also wrap around the sinuous site contours. These green-roofed cottages will house new incoming soldiers attending the on-site healing program. The primary shared veteran-canine program will exist within a building overlooking the proposed Cameron Lake and new Arts Center within the historic central heating plant. As depicted in Figure 72, salvaged on-site material will also be used to create low brick garden walls along the boundaries of the site's previously existing building. The garden walls will weave through the proposed site and building design acting as an indication of the past as well as a symbol of healing and regeneration.

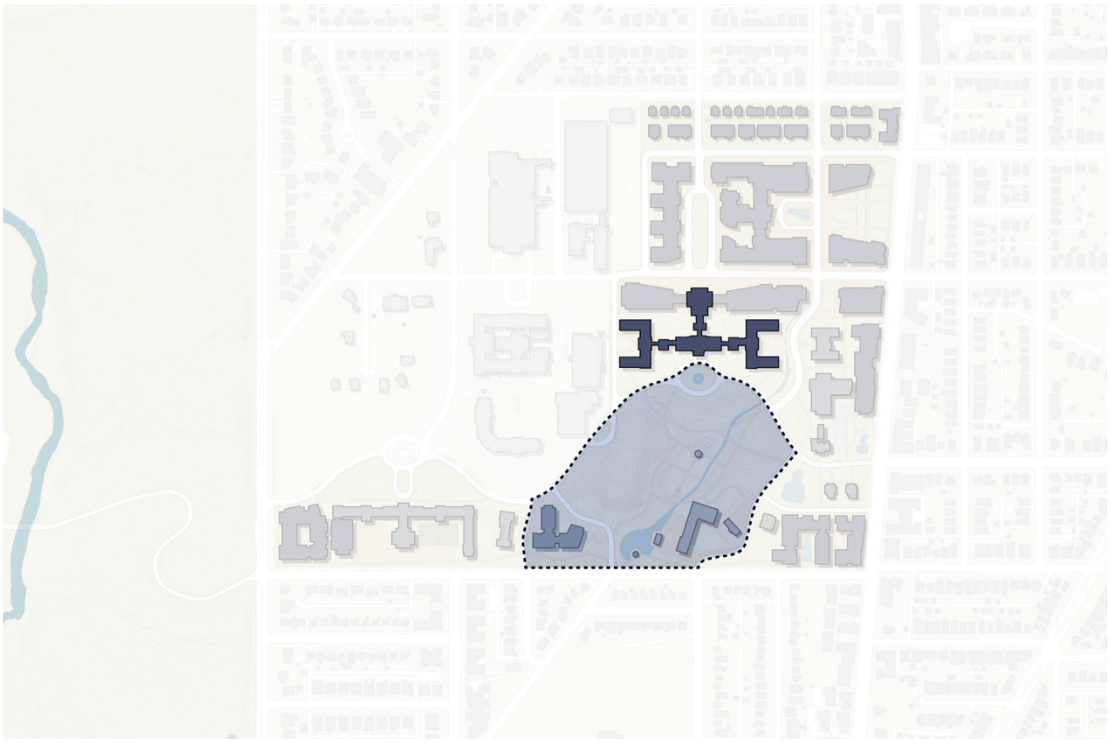

Figure 70: Site boundary within campus
Source: Author

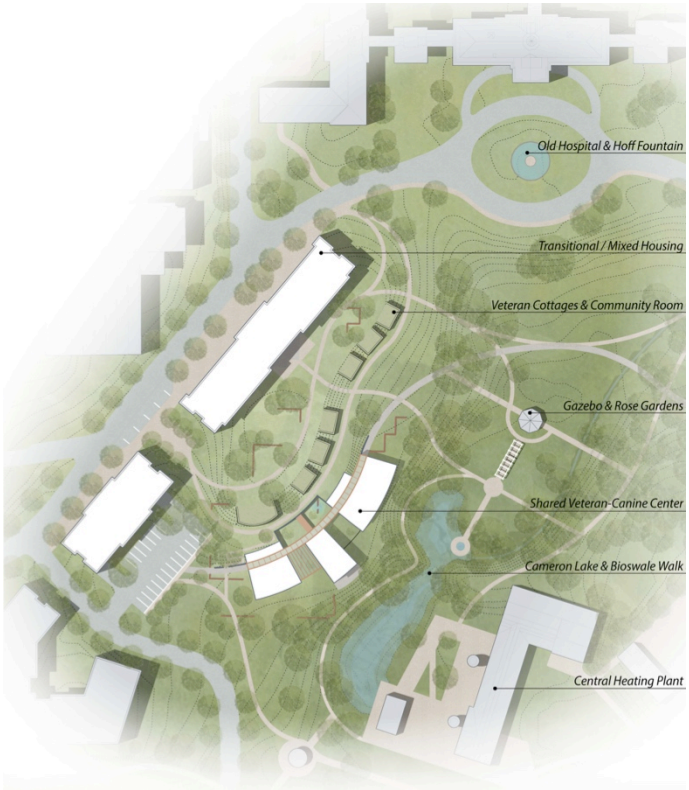

Figure 71: Rendered site plan and key design features
Source: Author

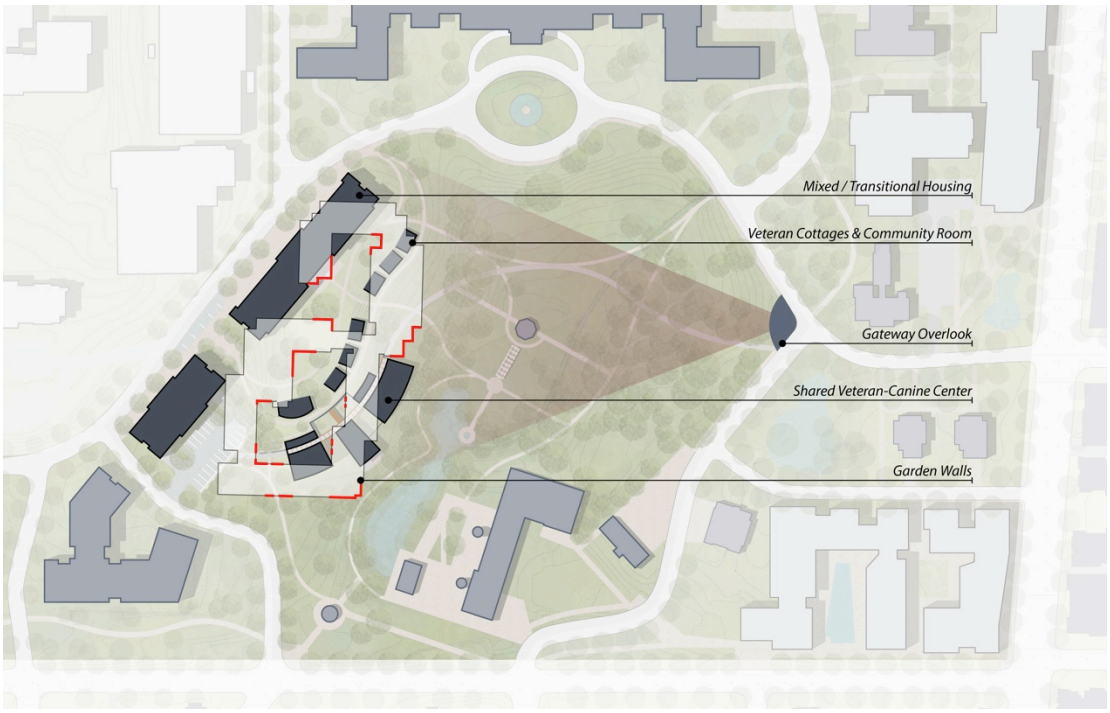

Figure 72: Site organization
Source: Author

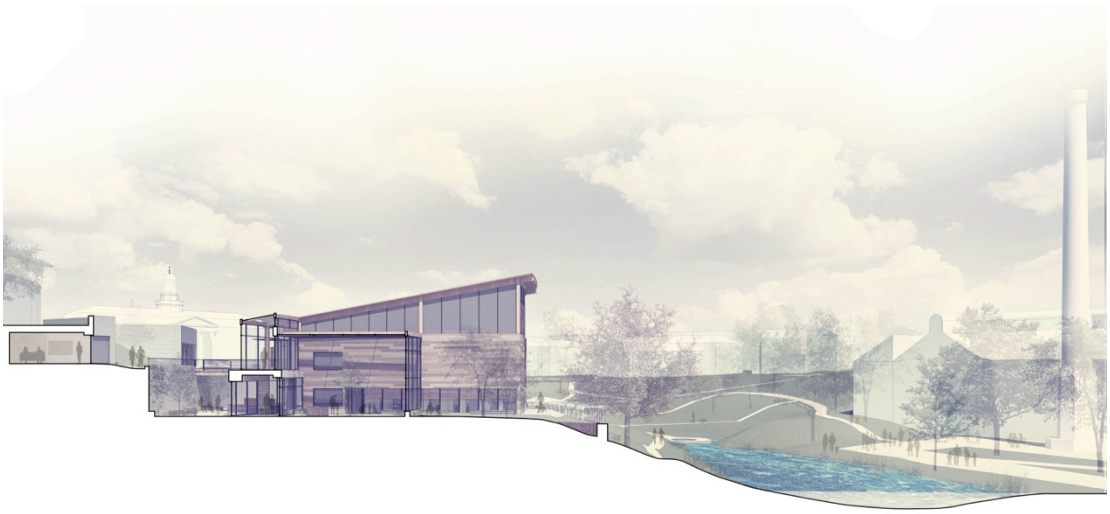

Figure 73: Site section perspective
Source: Author

Shared Veteran-Canine Center Design

The overall design of the shared veteran-canine healing facility is centered on the idea that the building exists as an extension of the historic lawn. By weaving the more informal landscape through the building, the distinction between interior and exterior space is blurred. This not only serves an aesthetic purpose, but also the more pragmatic idea that elements of nature are a powerful healing tool. In a program that seeks to engage its users with the surrounding community, this design parti allows for the building to manifest itself as a symbol of collaboration and integration (Figure 74). In following the driving narrative of the soldier and dog coming together, the experience of both individuals is paralleled through the building procession.

As the soldier, one approaches and enters the building from a high point on the site, which fosters a sense of confidence and security (Figure 75 & 77). The central entryway of the building is primarily glazed in order to allow for the passage of diffused morning light while also promoting visibility and a feeling of serenity as one enters the facility. The program on this level of the building is organized along a main curving spine. The southwest medical intake wing houses offices, examination, and conference rooms for incoming patients. The central wing, which grants beautiful views of the surrounding landscape, houses the reception area, café, family support lounge, and flexible group therapy/classroom area. The main corridor also provides views out to the landscape, fostering a sense of prospect as well as a visual connection to other fellow soldiers. Figure 78 depicts one's view to the indoor garden space below and the waterfront beyond. The living quarters of the soldiers exist separate from this primary healing facility. The series of cottages that are carved into

the hillside are placed along the curving contours of the site (Figure 73, 74 & 75). As shown in Figure 79, the cottages are enclosed on three sides allowing for controlled views out to the surrounding landscape while also creating a feeling of self-awareness and protection.

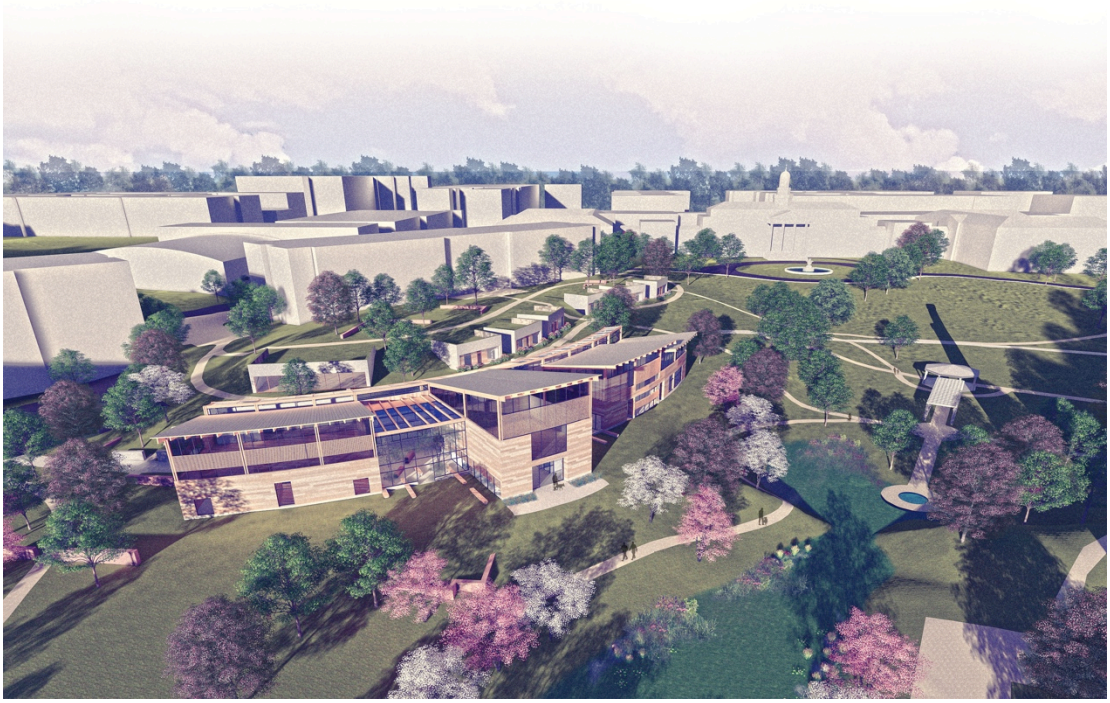

Figure 74: Aerial view from south
Source: Author

Figure 75: First floor plan overlaid with design tactics
Source: Author

Figure 76: Ground level plan overlaid with design tactics
Source: Author

Figure 77: Primary veteran entrance
Source: Author

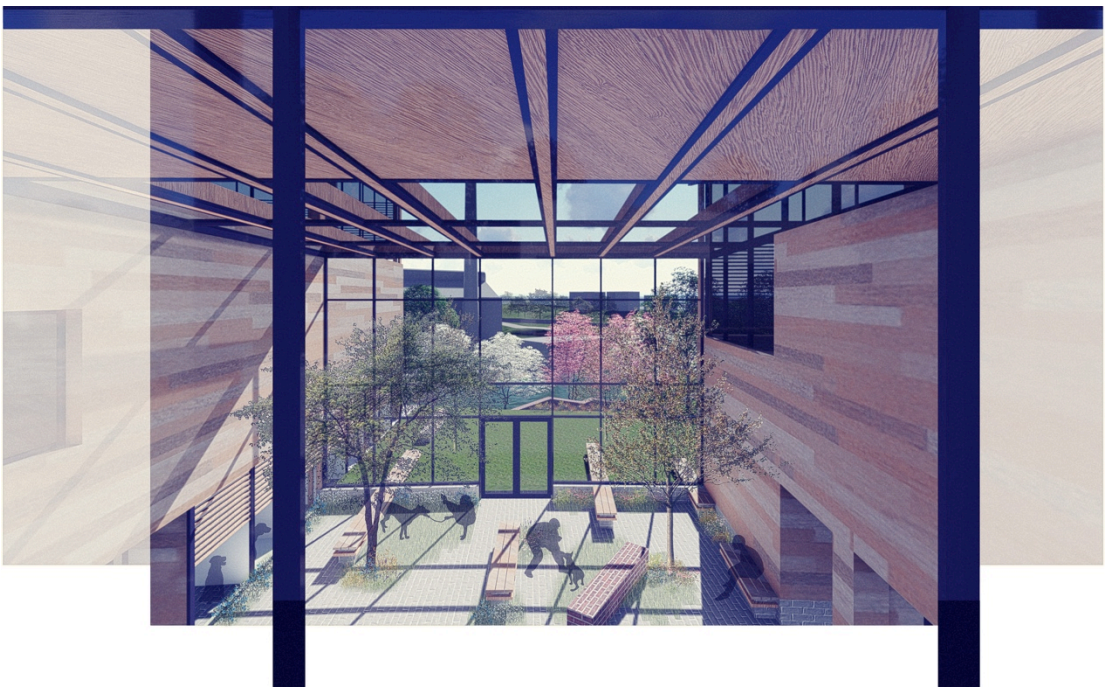

Figure 78: View overlooking
Source: Author

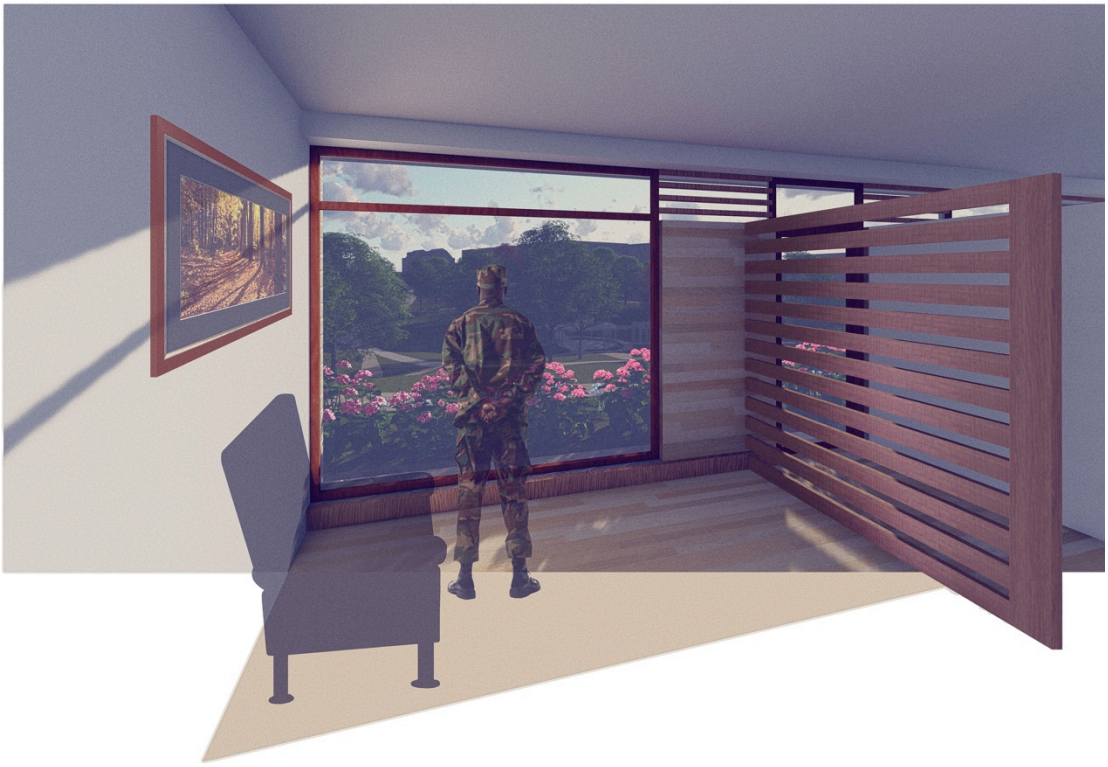

Figure 79: Veteran cottages
Source: Author

As the dog, one enters the building at the lower ground level of the building (Figure 76). This entrance exists along a primary path of the campus, allowing for the building to act as a more formal extension of the site procession. Acting as a forecourt to the building, low garden walls made from the salvaged brick on-site help create an enclosure that considers the lowered eye level of a dog (Figure 80). Also recognizing the limited color recognition of dogs, a low grey brick retaining wall extends from the building exterior into the building itself. For the dog, this neutral element reinforces both a visual and olfactory continuity through the building. Meanwhile, for the soldier who also utilizes this path, this continuous wall promotes a sense of solidity and protection. The primary outdoor path is also paved in grey brick and is mimicked with grey tile through the interior corridor of the building. This facilitates a more

unified reading of the ground and retaining wall elements. Moreover, the limited material palette allows for the grey brick "ground" elements to visually contrast from the warmer wood elements that compose the primary building structure. Similar to the upper level of the building, the ground level building program is organized along the main curving spine. The southwest wing houses the reception area as well as the medical components of the canine program including offices, intake, examination, and surgical rooms. Exemplified in Figure 81, the monotony of the main building spine is broken through views and access to interior and exterior garden spaces. As dog and handler progress through the building, a blue recessed wall detail helps indicate one's arrival at the kennels. The dog kennels exist along the central wing of the building (Figure 76). They follow a similar architectural language to that of the veteran cottages, yet are interpreted at a different scale. Figure 81 illustrates how the fenestration is lowered to a level that is more appropriate for the smaller size of a dog. The visual modification cues the human of a programmatic shift and promotes a unique human-canine interaction in which the human is brought down to the level of the dog. This not only discourages the dog from negative jumping behavior, but also encourages the soldier to sit while engaging in a more tranquil and passive bonding experience.

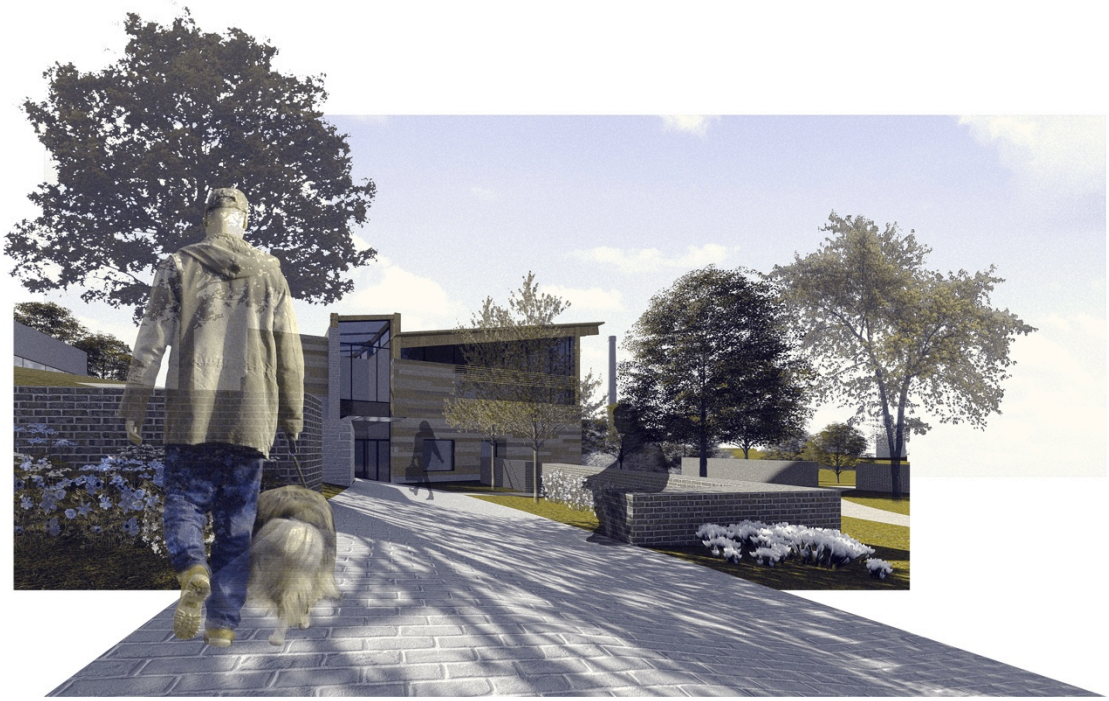

Figure 80: Primary canine entrance
Source: Author

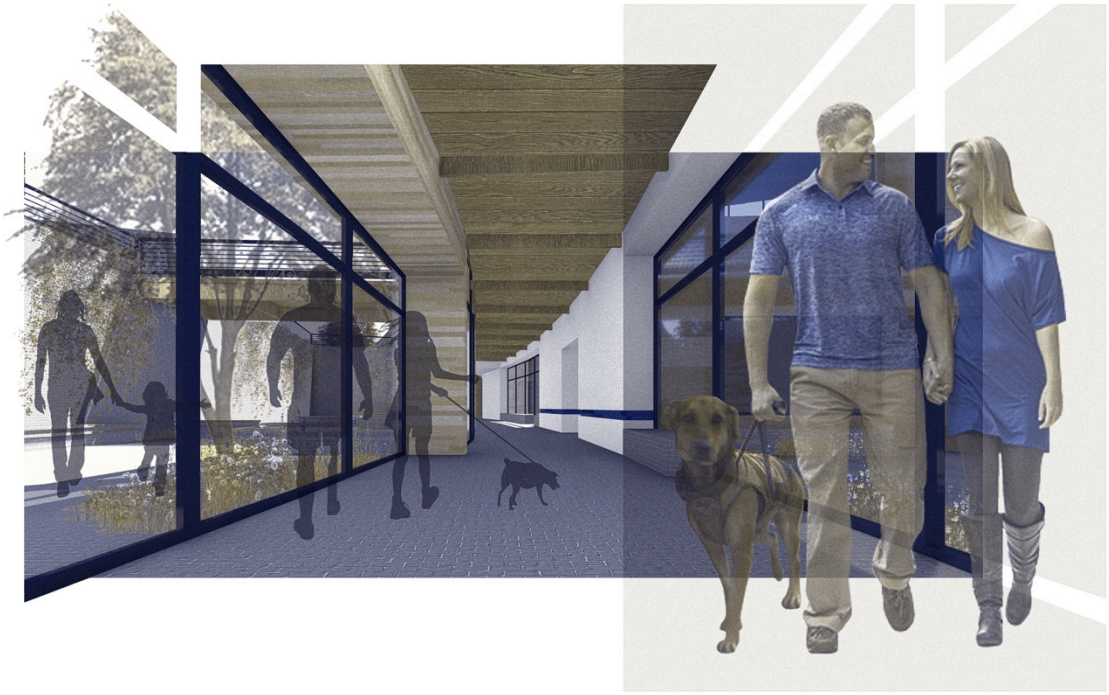

Figure 81: Spine
Source: Author

Figure 82: Kennels
Source: Author

The shared veteran-canine portion of the program begins on the ground level in the southwest wing. Here, there is a small meeting room in which the soldier and dog are first introduced (Figure 76). Since flexibility and control of one's environment is crucial for an individual, human or dog, who has experienced trauma, the use of this room can extend out into a larger indoor garden space (Figure 76 & 83). The garden is meant to act as a communal space that fosters both active exploration and more passive contemplation. Figure 84 is a speculative rendering of how a dog might differently experience this same garden space. Since a dog's vision is not its primary sense, more general visual elements such as light, shadow, and contrast play a greater role in the spatial interpretation of the garden. This presents an opportunity for the garden to become a place that engages multiple senses, allowing for both dog and human to feel more grounded in his/her surroundings. Whether

through tactile differences between the wood, brick, stone, and grass, or olfactory stimulation from the variety of plants, this space creates a stimulating and engaging environment that can enhance the bonding process. The previously described kennels also look into the flanking garden spaces, creating further opportunities for engagement between human and canine.

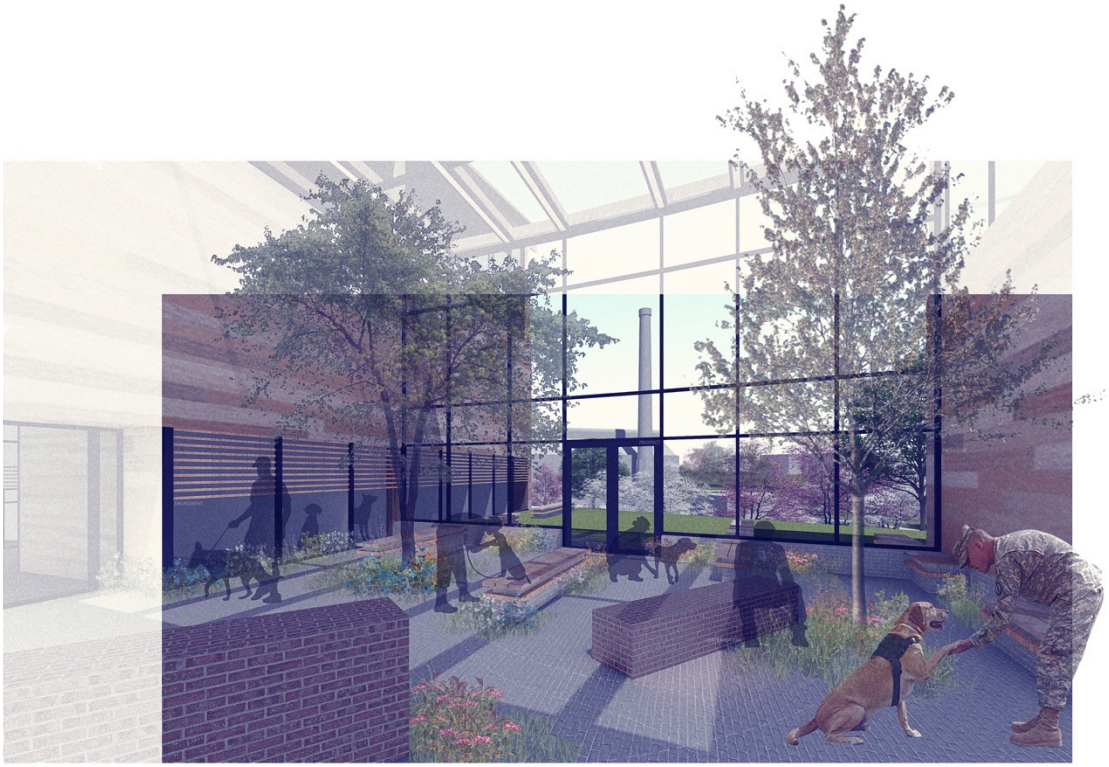

Figure 83: Interior garden view from human perspective
Source: Author

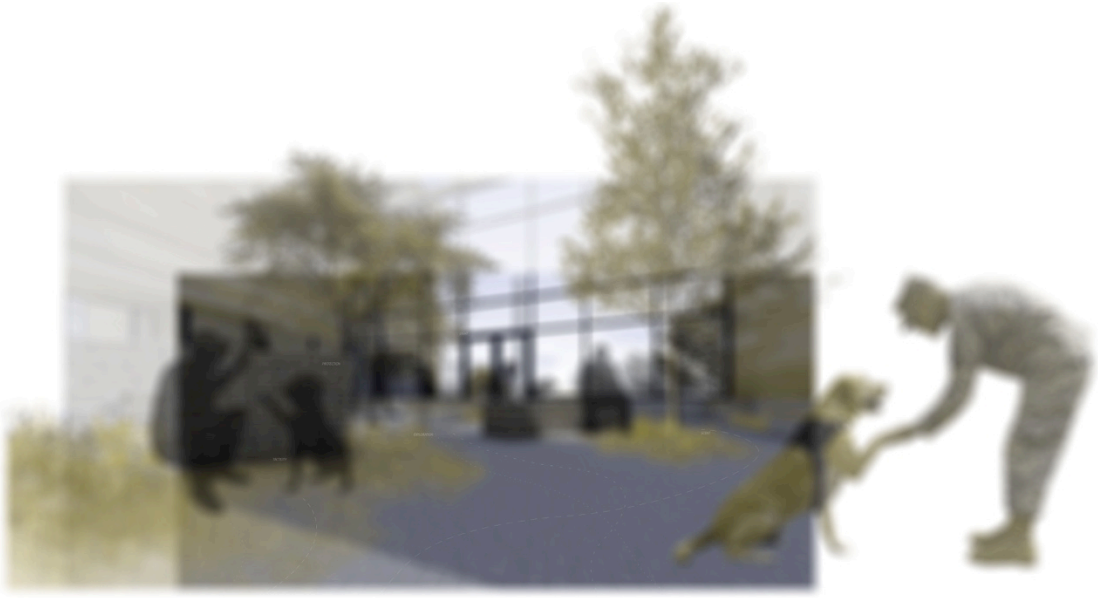

Figure 84: Interior garden view from canine perspective
Source: Author

The garden sequence continues in a sweeping manner through the building, creating a dialogue between the interior and exterior landscape. Aside from the garden areas, the northeast wing of the building houses the primary shared building program (Figure 76). In this wing there is a series of flexible interactive spaces for the soldier, dog, and trainer that extend out into a final outdoor garden space. There is also an open "living room" area with a fireplace that seeks to simulate a relaxing home-like environment. At the northernmost end of the building there is a formal group training area. This space allows for trainers to have more general learning sessions that engage the veterans as they teach the dogs basic training behaviors as well as more advanced and specific service skills. Also centered within this wing is an open stairwell that leads up to a less formal shared recreation space (Figure 75, 85 & 86). For a soldier with PTSD or a dog, a stair might be perceived as psychologically or physically daunting. This design, however, embraces this

architectural element as an opportunity to promote physical activity and active bonding as both individuals work to overcome personal uncertainty. A brick wall along the southeast end of the stair gives this dynamic space a certain sense of enclosure while simultaneously acting as the core wall of the living room below. Low fenestration along the stair landing also provides relief within this wall, granting strategic visual breaks for dogs traversing this space. Upon arriving in the main east-facing recreation area, one encounters a space filled with warm morning light and contemplative views out to the lake and historic buildings beyond.

It is important to remember that the program for the soldier and dog does not end here within the boundaries of the building. The bonding, training, and integration process is meant to extend out to the surrounding campus. Whether a long meditative walk through the nearby Rock Creek Park, a visit to the more lively commercial district in the northern part of the campus, or a stroll along the lake and new arts district, this healing program aims to create bountiful opportunities for the veteran and canine to engage in new experiences and ultimately reintegrate the pair back into the community.

Figure 85: Recreation center view from human perspective
Source: Author

Figure 86: Recreation center view from canine perspective
Source: Author

Conclusion

This thesis began with the idea of a "co-adapted community" and an interest in the question of how architecture could be used to foster a mutualistic healing relationship between human and canine. In seeking to explore these ideas, the project looked more closely at the relationship between soldier and canine. Psychological trauma is a concept that remains highly misunderstood and intangible, especially when considering the personal nuances of an individual's experiences and reactions to unique events. PTSD and its relationship to design is an area of study that remains widely unresolved, but one that has great architectural significance. On a greater scale, this document questions the sensitivity of current design practices, and asks one to explore the potential of a more poly-cultural design agenda. This thesis proposal only begins to scratch the surface of a very complex social issue, and my hope is that it will spark further conversations and interest in this area of study.

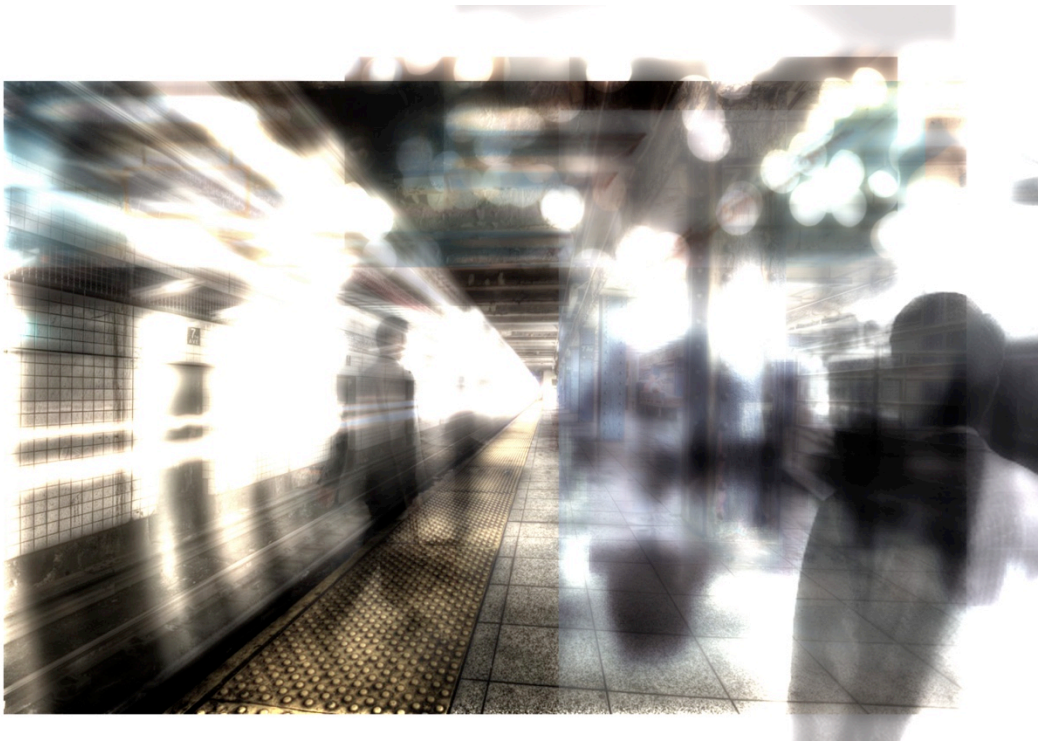

Figure 87: Abstract interpretation of veteran experience hyper-vigilance
Source: Author

Figure 88: Abstract interpretation of veteran experiencing flashbacks
Source: Author

Figure 89: Abstract interpretation of canine reacting to conditions that recall past abuse
Source: Author

Figure 90: Presentation boards
Source: Author

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