

DESIGNING FOR THE FORGOTTEN:  
A LOOK AT HOW THE BUILT ENVIRONMENT MAY BE ABLE TO HELP REDUCE SOME  
TRIGGERS ASSOCIATED WITH POST TRAUMATIC STRESS DISORDER (PTSD).

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## LOOKING OUT

BRANDI CARLILE

I WENT OUT LOOKING FOR THE ANSWERS AND NEVER LEFT MY TOWN.

I'M NO GOOD AT UNDERSTANDING, BUT I'M GOOD AT STANDING GROUND.  
AND WHEN I ASKED A CORNER PREACHER I COULDN'T HEAR HIM FOR MY YOUTH.  
SOME PEOPLE GET RELIGION, SOME PEOPLE GET THE TRUTH.  
I NEVER GET THE TRUTH, I NEVER GET THE TRUTH.

I KNOW THE DARKNESS PULLS ON YOU. AND IT'S JUST A POINT OF VIEW.  
WHEN YOU'RE OUTSIDE LOOKING IN YOU BELONG TO SOMEONE.  
AND WHEN YOU FEEL LIKE GIVING IN AND THE COMING OF THE END,  
LIKE YOUR HEART CAN BREAK IN TWO, SOMEONE LOVES YOU.

I LAY THIS SUITCASE ON MY CHEST SO I CAN FEEL SOMEBODY'S WEIGHT.  
AND I LAY YOU TO REST JUST TO FEEL A GIVE AND TAKE.  
I GOT A NEW INTERPRETATION AND IT'S A BETTER POINT OF VIEW,  
YOU WERE LOOKING FOR A LANDSLIDE, I WAS LOOKING OUT FOR YOU,  
I WAS LOOKING OUT FOR YOU, SOMEONE'S LOOKING OUT FOR YOU.

I KNOW THE DARKNESS PULLS ON YOU. AND IT'S JUST A POINT OF VIEW.  
WHEN YOU'RE OUTSIDE LOOKING IN YOU BELONG TO SOMEONE.  
AND WHEN YOU FEEL LIKE GIVING IN AND THE COMING OF THE END,  
LIKE YOUR HEART CAN BREAK IN TWO, SOMEONE LOVES YOU.

I AM AFRAID OF CROSSING LINES. I AM AFRAID OF FLYING BLIND.  
AFRAID OF INQUIRING MINDS. AFRAID OF BEING LEFT BEHIND.

I CLOSE MY EYES I THINK OF YOU, I TAKE A STEP I THINK OF YOU,  
I CATCH MY BREATH I THINK OF YOU, I CANNOT REST I THINK OF YOU

MY ONE AND ONLY WRECKING BALL, AND YOU'RE CRASHING THROUGH MY WALLS.  
WHEN YOU'RE OUTSIDE LOOKING IN YOU BELONG TO SOMEONE.  
AND WHEN YOU FEEL LIKE GIVING IN AND THE COMING OF THE END,  
LIKE YOUR HEART COULD BREAK IN TWO, SOMEONE LOVES YOU.



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## Designing for the Forgotten

**A look at how the built environment may be able to help reduce some triggers associated with Post Traumatic Stress Disorder (PTSD).**

### ABSTRACT

For the larger part of human history, mental illness has been shrouded in a demoralizing stigma of shame, embarrassment and disgrace.<sup>1</sup> In a broader social culture mental illness is rarely discussed outside of a doctor's office or in hushed conversation. It is, instead, often swept under the preverbal rug with the hope that no one will know that it is even there. Until recently, the very idea of having any form of mental disorder prevented most people who suffered from it from seeking help.<sup>2</sup> Consequently, those with less severe diagnoses go largely unnoticed in everyday life, while acute sufferers become isolated, almost invisible to society. It is easy for anyone without a direct link to this community to completely overlook the existence of mental illness.

In recent years, a growing effort has been focused on reducing the stigma around mental disorders.<sup>3</sup> As this effort intensifies and a culture shift begins to occur, the topic of mental health is beginning to be discussed in a more open, accepting forum. In particular, conversations outside of the medical community are addressing how to help those who suffer from mental illnesses. This paper will focus on one form of mental illness, Post Traumatic Stress Disorder (PTSD), that affects seven to twelve percent of the general population in the United States, and will attempt to draw a theoretical connection between the built environment and a number of subconscious triggers common to PTSD.<sup>4</sup> Through the analysis of case studies and other research, this work will endeavor to identify particular design strategies that, when implemented as part of a strategic framework can significantly improve the lives of those

with PTSD. The primary intent of this work is to inform and educate the design community to the issues of PTSD and to instigate a substantive design response for positive change.

*Must you carry the bloody horror of combat in your heart forever?*

-Homer, *The Odyssey*

### PROBLEM IN PERSPECTIVE

It has been called a myriad of names throughout history. In the military, "nostalgia," "irritable heart," "shell shock," and "combat exhaustion," were all terms used to describe soldiers who were "mentally weak" and could not bear the realities of war.<sup>5</sup> These expressions persisted through the beginning of the Vietnam War, when it was referred to by a more clinical term, the "Vietnam Combat Reaction."<sup>6</sup> Today, it is commonly (and diagnostically) referred to as Post Traumatic Stress Disorder or PTSD.

PTSD can affect anyone who has experienced a traumatizing event and remains one of the most undiagnosed and untreated health issues in the United States.<sup>7</sup> According to the Department of Defense, it is believed that up to 40 percent of all current American armed forces who have served in Operation New Dawn, Operation Iraqi Freedom and Operation Enduring Freedom suffer from PTSD symptoms.<sup>8</sup>

Ironically, PTSD is the most diagnosed illness affecting United States troops, even after grouping all physical injuries together, by a margin of 5 to 1 (see Figure 1).<sup>9</sup> For those outside the military, the numbers are equally alarming. Approximately half of all men, women

and children affected by serious natural disasters and up to 43 percent of civilians involved in serious car accidents, violent attacks and sexual assaults develop long-term symptoms of PTSD.<sup>10</sup>

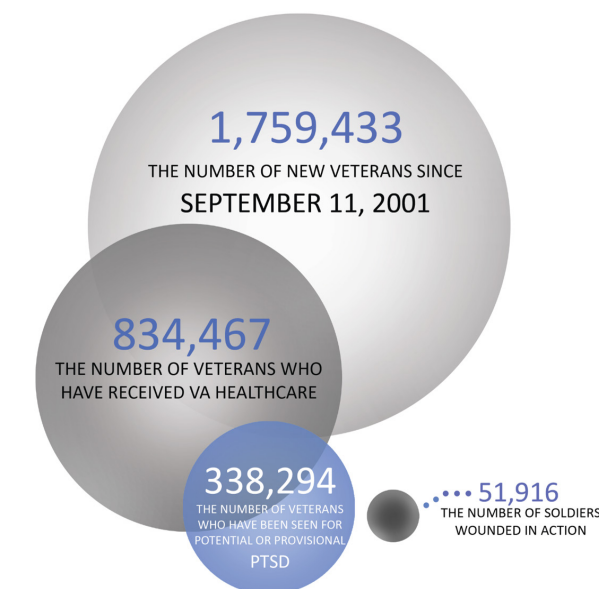


Figure 1: PTSD numbers in veterans since 2001 - 2013. (graphic by author)

PTSD has increasingly become a buzzword in the news, largely tracking the United States military's engagement in Iraq and Afghanistan. One news story after another depicted soldiers returning home from a tour of duty "broken" and unable to adjust back into civilian life.<sup>11</sup> As a result, a campaign to reduce the stigma associated with this disorder was undertaken, and was spearheaded in a large part by the United States military. In the ensuing 13 years, the military has funded and started hundreds of new research studies to fully understand how war and trauma affect the brain both physically and mentally.

Now, over a decade later, a clearer picture about what causes PTSD is beginning to form and new psychological treatment methods are being implemented across the country to help those affected by PTSD. However, overlooked in these research studies is how non-clinical fields can also aid in helping those affected by PTSD. This paper will examine different design strategies that draw a distinct connection between the built environment and the subconscious portion

of the mind that controls the triggers associated with PTSD. It will also discuss how the design community can instigate substantive change that improves the lives of PTSD sufferers through the buildings they design.

### THE SUBCONSCIOUS TRIGGER

Psychoanalyst Sigmund Freud believed that the behavior and personality of a person are derived from the "constant and unique interaction of conflicting psychological forces that operate at three different levels of awareness: the conscious, the preconscious (subconscious), and the unconscious."<sup>12</sup> These three levels combine to make up each individual, directing their responses to the various environments to which they are exposed. According to Freud, the conscious mind includes everything that one is aware of and is able to talk and think about rationally.<sup>13</sup> This includes part of the short-term memory, but not all of it. The preconscious (subconscious) mind includes the rest of our short-term memory that can be summoned at the will of the conscious.<sup>14</sup> The ability to recall one's home address is an example of this. This piece of information is not always present in our conscious mind, but can be resurrected at a moment's notice when needed.

The deepest level of Freud's model of the psyche is the unconscious mind. The unconscious mind is believed to hold the deepest and darkest feelings, thoughts, urges and memories that are completely outside of the conscious mind.<sup>15</sup> Many of these feelings are of pain, anxiety, fear and conflict.<sup>16</sup> According to Freud's work, the unconscious mind continues to influence behavior and experiences even though one is completely unaware of these underlying influences.<sup>17</sup> This unknown behavior is often described as a "gut" reaction. In these instances, the behavioral responses are often actually driven by accessing and using memories stored in the subconscious and unconscious mind, including vivid memories of the experiences surrounding traumatic events. When these specific memories are used to make the subconscious and unconscious decisions, a trigger is formed that allows those memories, feelings, and emotions to come to the surface of the conscious mind.<sup>18</sup>





Figure 2: Visual example of how PTSD treatments help to reduce sensitivity to a traumatic event.

When a traumatic event occurs, the automated response system or the “fight or flight” system that is a part of our imbedded survival instinct is activated. This process includes changes to help heighten our senses, increase our strength and increase the speed at which we cognitively process the environment around us.<sup>19</sup> This is known as a “hyper-vigilant state.”<sup>20</sup> After the event is over, the brain begins to process all the information that it has intercepted and stored. 90 percent of all individuals experiencing a traumatic event show signs of PTSD symptoms immediately following the traumatic experience; this is considered a normal – or typical – response. A response crosses the line from typical to abnormal when the brain fails to process the memories and information it has stored to cope naturally with the traumatic event over time. Only those patients that have not developed adequate coping mechanisms within three months of the initial event, may be clinically diagnosed with PTSD.

It is important to understand that there is no cure for PTSD. The memories of the traumatic incident will always remain. The goal of PTSD treatment is to reduce the sensitivity to specific triggers that are associated with the resurrection of the memories from the subconscious to the conscious level of the mind.

The process of identifying and diagnosing PTSD can be challenging. On average, it takes between three and seven years for a person showing symptoms to seek help because of the stigma surrounding the disorder.<sup>21</sup> As the PTSD progresses, a person’s demeanor, personality and general outlook on life can dramatically change. Anger management and aggression can be difficult to manage which leads to violent outbursts. Studies show that violent sex crimes among military personnel spiked by 90 percent

between 2006 and 2011, domestic violence increased by 33 percent and child abuse by 43 percent.<sup>22</sup> Additionally, male soldiers with PTSD are up to three times more likely to demonstrate aggression against their female partners than those who don’t have PTSD.<sup>23</sup> Because of this, relationships often break down, friends distance themselves, and depression becomes more likely, which makes PTSD and its fallout on a daily basis even more complex.

Far too often, PTSD is only associated with war and its warriors, but this could not be further from the truth. PTSD manifests itself where ever there are traumatic events taking place. This is why it is as common to those living in the public housing projects of Chicago as it is to those soldiers returning from the deserts of Iraq and Afghanistan.<sup>24</sup> In fact, people suffering from the aftermath of a natural disaster are more likely to develop PTSD than a soldier.



Figure 3: PTSD prevalence (graphic by author)

The root of PTSD is trauma, regardless of the cause or location. War in the desert, sexual assault on a college campus, or tsunami on the coast, the result is the same. Understanding the breadth of PTSD and its triggers is critical to understanding the connection between the built environment and the symptoms

## CASE STUDY #1: DESIGNING FOR AGGRESSION

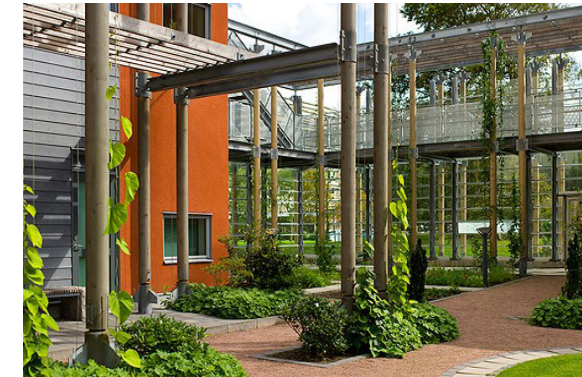


Figure 4: Östra hospital exterior garden

When it was time for Östra Hospital in Sweden to design and build a new physical facility to replace their aging one, they turned to researchers at Chalmers University of Technology and Gothenburg University to help consult with the design. Working off of a tentative design theory that proposes a link between the physical environment of the psychiatric facility and patient violence, researchers proposed ten measures that, when used together, could help to reduce violent attacks within the new hospital. Unlike most related research, these ten measures have nothing to do with staff and patient demographics, but rather focus on how the physical and built environment affect the attitudes and actions of the people who use the spaces.<sup>25</sup>

The research findings were significant. After nine of the ten proposed measures were implemented in Östra Hospital, coercive measures (in the form of belt restraint and injections) were reduced by 21 percent and 44 percent respectively when compared to its former facility.<sup>26</sup> In the same period, the researchers also studied a control hospital facility which did not undergo renovation. At the control facility, the number of injections increased by 29 percent.<sup>27</sup>

“This has provided scientific evidence suggesting that well designed medical architecture can help reduce aggression and violent situations within psychiatric in-patient care.”<sup>28</sup> Outlined

below are the ten proposed measures and the theoretical suppositions underpinning the Östra Hospital study that ultimately have provided a reduction of aggression and violent outbursts in this psychiatric facility:

### 1. Single Patient Rooms

Research has shown that the number of persons sharing a bedroom, bathroom, or cell (in prisons) strongly correlate with higher crowding stress and lower privacy, perceived control, and illness complaints.<sup>29</sup> “Crowding research in prisons has shown that prisoners in two-bed cells are more stressed, commit more disciplinary infractions (implying more aggression), and have higher rates of reported sickness than those in small single-bed cells.”<sup>30</sup>

### 2. Design for Smaller Ward Patient Group Size

Multiple research studies involving student residence halls and apartment buildings has found that smaller population sizes (12 to 18 people at full occupancy) on each floor, corridor, or unit are associated with lower perceived crowding stress while granting stronger interpersonal contact with other members of the group.<sup>31</sup>

### 3. Designing for Personal Control

A greater sense of control of personal space by patients leads to reduced stress. This can be achieved by providing movable seating in dayrooms, lounges, and other shared spaces in psychiatric wards that enhance the patient’s capability to regulate personal space and interactions with others.<sup>32</sup>

### 4. Noise Reduction

Several studies have reported that reducing noise levels within a building reduces stress in standard hospital applications. Other research studying nurses in non-psychiatric facilities have found that noise-reducing design measures lower staff “stress, annoyance, perceived work demands and pressure, and may help to reduce burnout,” a major issue in the medical field.<sup>33</sup> Similarly, in instances where memories can be triggered, such as with disorders such as PTSD,



reducing the exterior noise as well as noise from within can greatly reduce the likelihood a trigger will occur.

5. Nature Window Views

Several studies focusing on non-psychiatric hospital patients as well as non-patient groups have found that viewing nature reduces stress.<sup>34</sup> Physiological changes from stress – and from a reduction of stress – is apparent throughout all body systems. According to Dr. Mimi Guarneri, a cardiologist and the medical director of Scripps Center for Integrative Medicine, “We know that the body heals best when it’s not in a high anxiety state and producing lots of stress hormones that raise the heart rate and lower the immune system. If we can design facilities that decrease patients’ anxiety, then we can help them decrease the pain and help them to heal faster.”<sup>35</sup>



Figure 5: Östra hospital exterior garden

6. Garden Accessibility

“Evidence from studies in non-psychiatric (general) hospitals indicates that patients and visitors who use and have access to gardens report reduced stress, improved emotional well-being, and higher satisfaction with care quality.”<sup>36</sup> As previously described, viewing nature scenes is important, but for the patients who are ambulatory, garden accessibility is a way for patients to escape and find privacy (See Figure 3).

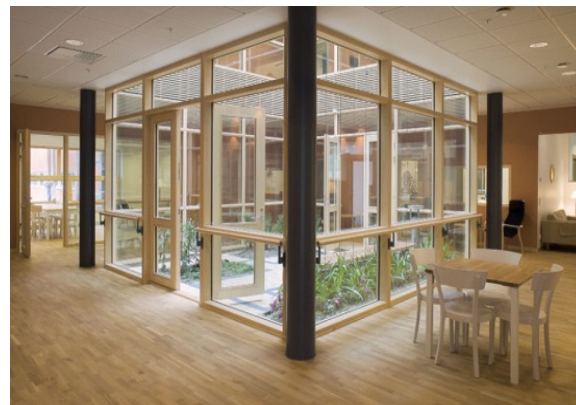


Figure 6: Östra hospital interior garden space

7. Nature Art

Studies in general hospitals with ethnically diverse patients have found that the majority of patients respond with positive emotions and prefer nature art above abstract artwork. Similarly, images displaying emotionally negative or challenging subject matter were also greatly disliked. In a small study, a review of archival data showed that the psychiatric patients had physically attacked several pieces of artwork displayed in the ward, each of which exhibited abstract subject matter and styles.<sup>37</sup>

8. Daylight Exposure

Several studies of psychiatric and non-psychiatric patients suggest that designing buildings to provide higher exposure to natural light reduces depression and allows for shorter stay times for depressed patients when compared to facilities with low exposure to natural light.<sup>38</sup> In cases of serious depression, these studies found that inpatient care time was shortened when patients are placed in a room with more natural light. Additionally, an investigation of Alzheimer’s patients showed that agitation levels were lower in facilities designed for more light in interior spaces when compared to buildings with less interior light levels.<sup>39</sup>

9. Staff Workstations + Wayfinding

The placement of staff workstations, and hence, staff accessibility to the patients, likely affects the quality of care provided. It has been proposed

that inadequate or problematic communication between staff and patients contributes to stress and violence.<sup>40</sup>

Similarly, the design and location signage and other wayfinding devices can contribute to or reduce stress in healthcare facilities. Studies in general hospitals of patients and visitors have found that difficult or complicated wayfinding creates increased levels of stress.<sup>41</sup>

10. Homelike Characteristics

Providing residential, homelike characteristics is widely recommended as a best practice in the design of psychiatric hospitals, Alzheimer’s facilities, and nursing homes or long term care facilities for the reduction of stress, agitation, and violence.<sup>42</sup>

Stress-Reducing Environmental Factors in Psychiatric Wards	Old hospital	Newer hospital	Control hospital
Bedrooms in one ward* (number of 1-bed and multi-bed rooms)	1-bed: 2 2-bed: 3 4-bed: 2	1-bed: 10 2-bed: 2	1-bed: 2 2-bed: 1 4-bed: 2
Patient population size of one ward at 100% designed bed occupancy	16	14	12
Movable seating + adequate space in day rooms to regulate relationships	movable: no spacious: no	movable: yes spacious: yes	movable: no spacious: no
Noise reduction features	no	yes	no
Garden accessible to ward patients	no	yes	no
Nature window views	a few	yes	no
Nature art, not abstract art	mixed	mixed	mixed
Design for higher daylight exposure	no	yes	no
Staff stations close to patient areas, with good visibility over areas	visibility: poor close: yes	visibility: good close: yes	visibility: poor close: yes
Other best practices: home-like	no	yes	no

\* Ward layouts and bedroom mix varied somewhat in each hospital. The information in Table 1 represents the environmental features of a representative or typical ward in each facility.

Figure 7: Comparison of ward environments in three psychiatric hospitals with respect to stress-reducing environmental features in the Design Theory

SUPPOSITIONS: CROSS DISCIPLINE APPLICATIONS

Although not tailored specifically for PTSD patients, the Östra Hospital case study provides a clear connection between the physical/built environment and aggression reduction in psychiatric care facilities that treat a wide range of mental health issues. Many findings addressed in the Östra study can be directly applied to the symptoms and triggers of PTSD (see Figure 4). Aggressive behaviors can occur

in any building environment and is often one of the main reactions PTSD sufferers experience once a trigger has been initiated. By adapting Ulrich’s tentative design theory that links the physical environment with the emotional response of aggression, these design strategies which are intended to promote a sense of calm and relaxation, can be applied in any building environment. For example, movable seating can easily be placed in hotel or office lobbies while natural light can be employed through the use of skylights in big box stores and other large commercial buildings. Exterior glazing can be incorporated along the front of the building to allow for a greater transparency to the people entering the building while still clearly marking points of egress and exit. Sound attenuation techniques can be used to reduce noise seepage from the outside, and acoustical membranes can be applied to dramatically reduce the stress and anxiety someone feels while traveling through a space.

Most of these measures are fairly straightforward, if not common, and can have dramatic effects on PTSD sufferers who use and occupy a space. For example, sound, particularly a single, unexpected sound such as a car backfire or a jet engine of a passing airplane, is one of the most common triggers for people with PTSD. Special attention to the sound barrier used in the construction of a building could mean the difference in whether an individual with PTSD can live, work, or play in any given building.

CASE STUDY #2: THE SUBCONSCIOUS IN THE EVERYDAY

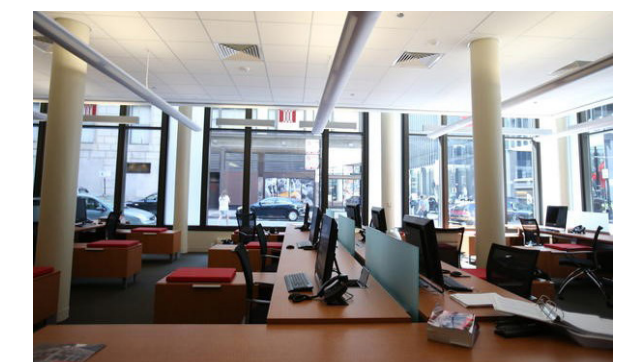


Figure 8: Interior picture of the renovated Veterans Legal Support Center & Clinic



The Veterans Legal Support Center & Clinic at the John Marshall Law School in Chicago, Illinois is making headlines in the Greater Chicagoland area as the first non-healthcare related program to specifically design its interiors to reduce the symptoms of PTSD. The free legal clinic was established to help provide veterans with necessary legal services.

Chad Harrell, the Architect of record for the project, stated, "You have to look at the design through a filter. When you use PTSD as a filter, you can see the areas that you have to alter because they might create a sense of discomfort and stress."<sup>43</sup> The furniture in the project emphasizes the use of wood and wood patterning that evokes nature. Acoustic and thermal insulation keeps traffic noise out even while allowing for increased transparency and expansive views through extensive use of windows (See figure 5).

This ground-breaking approach to the clinic design came about when the school's director, Brian Clauss, overheard some veterans talk about avoiding certain buildings, even when it meant missing important appointments because the buildings didn't "feel right" or, worse, triggered the symptoms of their PTSD. When the school set about renovating the law clinic, this issue was at the forefront of Clauss' mind. At the conclusion of the project, it was determined that the additional PTSD design concepts cost no more than 5% more than what a typical build-out would be but created a greater return in the actual mission of their organization.<sup>44</sup>

#### **SUPPOSITIONS: REALISTIC AND AFFORDABLE PERSPECTIVES**

When the Veterans Legal Support Center & Clinic at the John Marshall Law School was being designed, the Östra Hospital study had not been released yet so there was no empirical evidence that could be used to aid in the design. There was only common sense applied through a different lens, a different perspective. This unique lens allowed the designer to interact, experience and momentarily live the life of the people who would be using the space. This is precisely the type of perspective, when applied to other applications and building typologies, can dramatically change

the way designers look at and design for people who not only suffer from PTSD, but other mental disorders as well. Although unique, the design strategies employed it can easily be applied to other programs and uses.

#### **CASE STUDY #3: THE BUSINESS OF ARCHITECTURE**

If Walmart were a country, it would have the 26th largest economy in the world, just after Austria. The influence and power of the Walmart brand is second to none in the United States and paves the way for most big-box retail platforms that exist around the world. In the book *Toward a Better Box: An Examination of Walmart's Value Driven Architecture*, the author states,

"In order to provide financial savings to the customer and financial success to the investors, Walmart's strategies behind value-driven architecture are implemented to keep the structures simple, functional, flexible, and above all, economical. This may override the way the structure affects the quality of the built environment. Successful retail companies must adapt to changes in trends, new products, new merchandise, etc. As its founder Walton understood that in order to be successful and meet the company's financial goals as well as pass the savings to the customers, the buildings would have to be stripped down to the most functional form."<sup>45</sup>

This was the design philosophy Walmart implemented from its first store in Rogers, Arkansas in 1962 until about fifteen years ago when Walmart stores across the nation

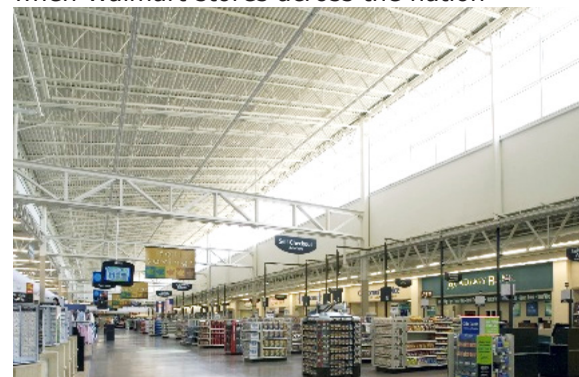


Figure 9: Example of a big box store utilizing daylighting systems.

began to be overhauled when the term "Super Walmart" came into existence. Since then the exterior layout of both new and old buildings have changed dramatically as a response to new research that promoted a new definition of "economic" architecture.

One of the company's research studies analyzed the impact of several proposed changes to the exterior façade of the building. As a result, large glass facades, skylights, and warmer exterior and interior finishes and colors have become standard because they provide a brighter, more cheery environment for shoppers to be in. Walmart proved that when customers are happy, they tend stay in the store longer and are more likely to buy something they were not initially intending to buy.

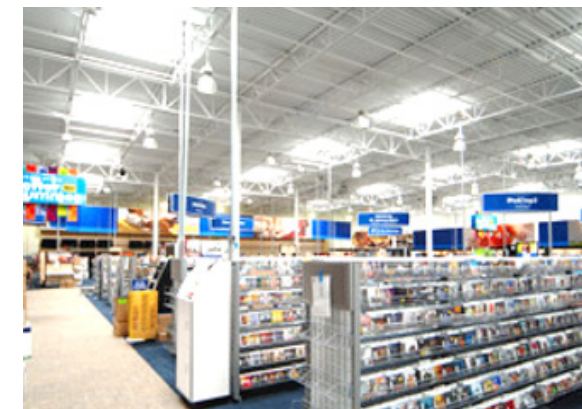


Figure 9: Example of Walmart's utilization of skylights throughout it's store.

Walmart's findings underscore previous findings. In a 1999 Pacific Gas & Electric company (PG&E) day-lighting study, it was found that when all other things were equal, day-lighted stores had 40% higher sales than those without day-lighting.<sup>46</sup> Like Walmart's findings, the PG&E study indicated that the additional sales were not due to more transactions (by more customers). On average the day-lighted stores only saw a 1-2% increase in the number of transactions per month. Rather, the same number of customers were buying 40% more goods.<sup>47</sup>

#### **SUPPOSITIONS: MOVING BEYOND THE EMOTIONAL APPEAL**

It is a reality in the architectural industry that it

is extremely difficult to test new ideas without an evidence-based foundation and proof of economic benefit. However, as these case study examples prove, such data are available – or are worth further research and testing. Simply adding daylighting systems into big box stores or large footprint facilities is just one example of how a designer can make the financial case for a strategy that can simultaneously help PTSD sufferers without relying totally on the emotional appeal by its self.

#### **CONCLUSION**

Egress and accessibility standards for individuals with disabilities are written into nearly every building code across the United States. These standards are imposed and enforced to ensure that all persons, can enter, move and inhabit a space easily and safely. Unfortunately, it is typically easier to, identify and respond to those who have visible physical disabilities from those who do not. Paradoxically, in other instances, such apparent disabilities might be used to isolate and discriminate against this group of people. In the case of accessibility codes, however, recognizable evidence of disability has only aided in the protection of the interests of this group. Despite the fact that physical handicaps make up 12.1 percent of the American general population, the Americans with Disabilities Act, universal design principles and other accessibility codes are applied on to all new construction and substantial renovation projects.

Yet, in comparison, 26 percent of the American population has some mental illness or disability.<sup>48</sup> That means that 1 in every 4 people that walk into a bank or a grocery store – a quarter of the people architects design for – have a mental health issue. Unfortunately this particular group is traditionally overlooked by mainstream commercial architecture, if not society in general.

As is evident from the case studies provided herein, change is not only possible, but is practical. It is apparent that this is not something that can be done overnight, nor will the same design strategies work for every mental illness, but the design community can begin by focusing

on one mental illness that affects between 7 and 12 percent of the general population in the United States and move forward from there to take the lead in pursuing alternative means for helping those who suffer from a disorder that has the capacity to rip apart a life from the inside out.

Throughout my research, I learned that PTSD is both a deeply personal issue for most of the people who have it or who have loved ones who are affected by it, and that PTSD is one of the greatest equalizers out there. It has no prejudices, it has no favoritism. What it does have is an unbelievable ability to humble us and change our lives forever. This paper was written with the utmost respect given to every person who had or is living with PTSD with the hope that through thoughtful design their lives can be changed for the better.

It is time to begin designing for the forgotten.

## ADDENDUM

From the very beginning of researching the topic of PTSD, it was the human toll that was left in the wake of this disorder that affected me the most. The more stories I read about the personal accounts of the horrifying trauma that these people went through, the more I empathized and wanted to help each one of them. I wanted to, in my naivety, wear the white hat and fix this small part of the world that I thought I could fix.

The depth of the research quickly became emotionally overwhelming in a way I had never expected or experienced before. As I learned more about the true depth of the pain and suffering these people were going through, my childish enthusiasm and zeal about working on my thesis quickly turned into a deep seated feeling of responsibility and obligation to help them. I am not typically someone that shows a lot of emotion, I empathize deeply, but I do not express it well. I tend to keep my feelings on the inside, but the emotions that I felt, the weight that I felt as a result of the responsibility I placed on myself made working on this thesis extremely difficult. As I reflect back through the entirety of the thesis process, it is this weight that I can instantly feel back on my shoulders.

At times, to be completely honest, that weight became too much and I had to set aside my thesis, sometimes for a week or more, just to be able to emotionally handle working on it further. Each time I did this, it felt like I was letting down all of those people whose faces and stories were constantly on repeat in my mind. I began to question my own emotional strength in comparison to all the other people in the world who had experienced a traumatic event so powerful that it could cause PTSD. I began to see this as a weakness and it took me a long time to realize that it wasn't.

I debated back and forth about whether I should write all of this down in this addendum, but the more I thought about it, the more I realized that if I didn't I would just be sweeping the greatest lesson I learned in graduate school under the rug. This journey, this emotional roller coaster that I rode for a year and a half taught me a

very important lesson and that is I am human - I have limits, I can't always compartmentalize my emotions and just keep pressing forward like I have always done in the past. Instead this thesis it helped me to begin to open up emotionally in a way I had never done before. I would like to thank Diane Fellows who was my professor in ARC636. At this point in the process I was doing my initial research and coming to grips with what this thesis was really about. She encouraged me to embrace the imperfections that I was finding in myself and to be a voice for those who don't have one. I would also like to thank Katherine Setser and Craig Hinrichs who comprised my thesis committee. Your guidance and critique were invaluable to me as I was unpacking all of the different issues this thesis brought up. You kept pushing me to look further, research more, and to believe in myself and what I was doing. Your support throughout this process meant so much to me. I also cannot thank you enough Kat for all the hours I spent in your office talking through things and for helping to keep my eyes on the big picture.

I will be the first one to say that my research and project only barely touches the tip of the iceberg in regards to what I believe to be real design strategies that can actually help people with PTSD. I am hopeful that soon there will be scientific research and studies performed that will give us real, quantifiable data to work off of.

This project affected me more than I could have ever imagined, but it is an experience and a lesson that I will now be able to carry with me for the rest of my life.



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8. In most circumstances, as many as half of all people who suffer from PTSD never seek or receive proper medical treatment or aid for their PTSD. This is slowly changing in the U.S. Military as it continues to raise awareness of PTSD within its ranks. Unfortunately, though, few in the civilian world are knowledgeable about PTSD or have access to medical services that specialize in mental health treatments.
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10. The U.S. Army Office of the Surgeon General (OSG) defines a case of PTSD as an individual having at least two outpatient visits or one or more hospitalizations at which PTSD was diagnosed. Specific percentages place diagnosed PTSD at 14% - 17%. The "up to 40%" includes undiagnosed and "minimally adequate" treatment that does not qualify under the OSG definition, but is accepted by the Department of Defense as an accurate representation of the true breadth of affected persons.
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14. When entering the search terms "PTSD" "soldier" and "Broken" into Google, 640,000 results show up. On the first page alone, news stories featured titles "Broken by war: the Army reservist still battling with combat stress - and worried about declining mental health support for the growing ranks of part-time soldiers," "Broken Warrior: One soldier's struggle," "PTSD: The soldier's private war," "Broken Heroes- the fifth estate," and "Panorama's Broken by Battle showed the impact of PTSD on soldiers struggling to adapt to civilian life" just capture a glimpse of the picture the news media has painted about PTSD.
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22. After the amygdala sends a distress signal, the hypothalamus activates the sympathetic nervous system by sending signals through the autonomic nerves to the adrenal glands. These glands respond by pumping the hormone epinephrine (also known as adrenaline) into the bloodstream. As epinephrine circulates through the body, it brings on a number of physiological changes. The heart beats faster than normal, pushing blood to the muscles, heart, and other vital organs. Pulse rate and blood pressure go up. The person undergoing these changes also starts to breathe more rapidly. Small airways in the lungs open wide. This way, the lungs can take in as much oxygen as possible with each breath. Extra oxygen is sent to the brain, increasing alertness. Sight, hearing, and other senses become sharper. Meanwhile, epinephrine triggers the release of blood sugar (glucose) and fats from temporary storage sites in the body. These nutrients flood into the bloodstream, supplying energy to all parts of the body.
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AREN'T VISIBLE ON THE SURFACE

THE WORLD AROUND US, WHAT WAS GREEN

TYPE OF ARCHITECTURAL DESIGNATION

OR ANY OTHER TYPE OF ARCHITECTURAL DESIGNATION

THE MISSION OF THESE DESIGNS IS FIRST AND FOREMOST TO HEAL

THEY CAN AFFECT PEOPLE ON A PSYCHOLOGICAL LEVEL

THEY CAN AFFECT PEOPLE ON A PSYCHOLOGICAL LEVEL

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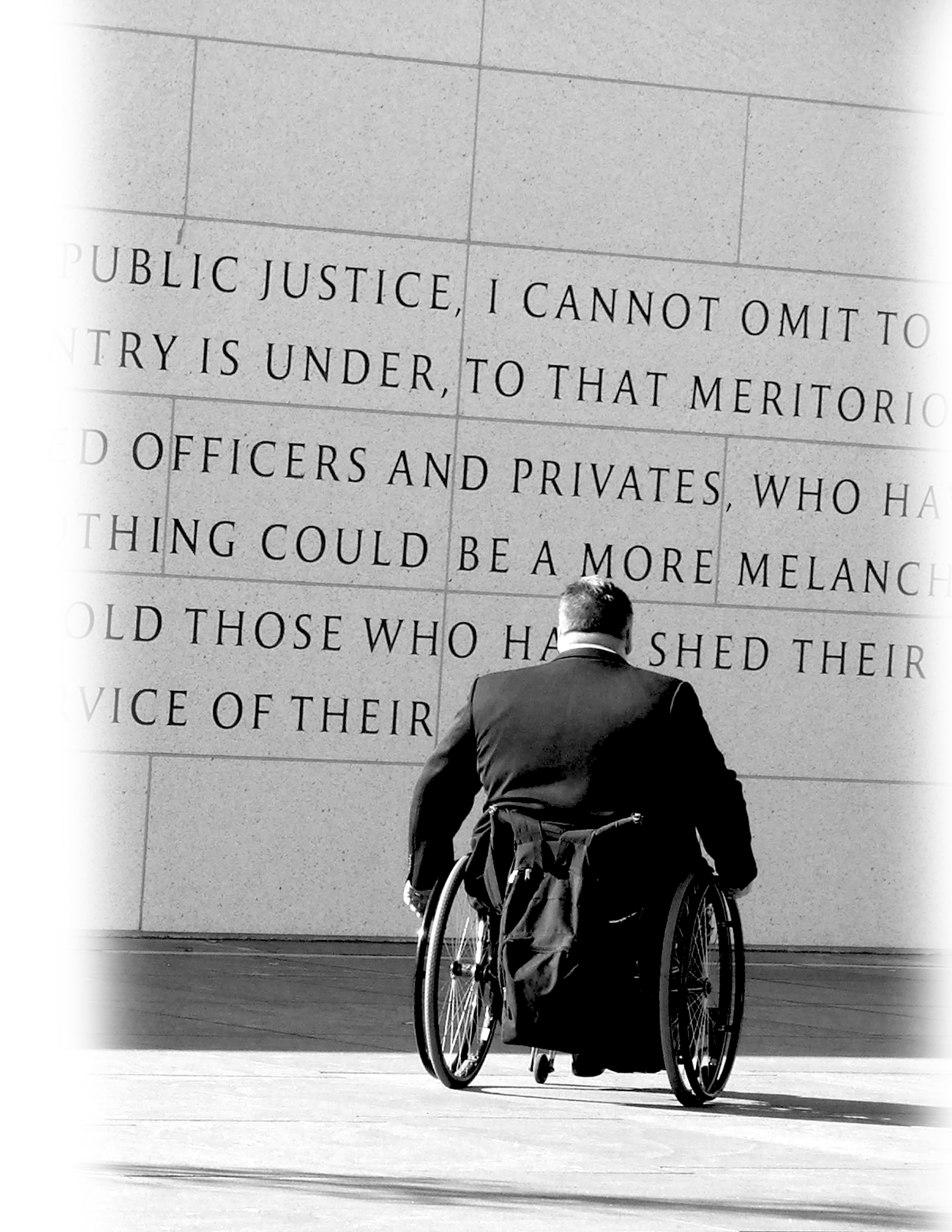
THEY CAN AFFECT PEOPLE ON A PSYCHOLOGICAL LEVEL

THERE ARE 316.1 MILLION PEOPLE IN THE UNITED STATES OF AMERICA. IN THE SHADOWS, THERE ARE AS MANY AS 37.92 MILLION AMERICANS THAT WILL SUFFER FROM THE SYMPTOMS OF POST TRAUMATIC STRESS DISORDER (PTSD) IN THEIR LIFETIMES. EVEN WITH A DEMOGRAPHIC THIS LARGE, THERE HAS BEEN NO REAL DISCUSSION ON HOW THE BUILT ENVIRONMENT CAN INFLUENCE THESE SYMPTOMS. IT IS EVERY ARCHITECT'S RESPONSIBILITY TO UNDERSTAND HOW THEIR DESIGNS AFFECT OTHER PEOPLE. THIS IS OUR RESPONSIBILITY

# DESIGNING FOR THE FORGOTTEN

THE CIRCLE REPRESENTS THE PROPORTIONAL AREA OF PEOPLE WITH PTSD IN THE UNITED STATES  
FULL PAPER SIZE: 11" X 17" = 187 in<sup>2</sup>  
AREA OF CIRCLE: .12 X 187 in<sup>2</sup> = 22.44 in<sup>2</sup>

TO REMOVE THE SIZABLE STIGMA AROUND PTSD, ANY FEELING OF A TRADITIONAL MEDICAL OFFICE OR HOSPITAL SPACE FOR THE PRIMARY MISSION OF POST TRAUMATIC STRESS DISORDER (PTSD) IN THEIR LIFETIMES. DIFFERENT LAYOUTS OR ZONES ADJUSTED TO THESE DIFFERENT TRIGGERS CAN CREATE A MORE EFFICIENT AND FUNCTIONAL SPACE FOR THE PRIMARY MISSION OF POST TRAUMATIC STRESS DISORDER (PTSD) IN THEIR LIFETIMES. DEPENDING ON THE TYPE, THE TRIGGERS CAN OVERLAP. WHAT MAY HELP ONE, MAY HURT ANOTHER



# PTSD ANALYSIS



## WHAT MAY HELP ONE MY HURT ANOTHER...

THROUGHOUT MY TIME WORKING ON THIS THESIS PROJECT, THIS SENTENCE SEEMED TO BE THE NEVER-ENDING WHEEL THAT KEPT TURNING ROUND AND ROUND, NEVER PROVIDING DIRECTION OR RESOLUTION. TRYING TO CATEGORIZE ANY LARGE, OVERARCHING SIMILARITIES IN THE MANNER IN WHICH PTSD AFFECTS INDIVIDUALS IN A WAY THAT IS SPECIFIC TO A PROBLEM THAT COULD BE PINPOINTED, ANALYZED AND THEN RESOLVED, BECAME FUTILE. IN THIS INSTANCE THE ZOOM WAS TOO FOCUSED ON TOO MANY INDIVIDUALS WITH TOO MANY SPECIFIC TRIGGERS. THESE INDIVIDUAL SPECIFICS, SPANNING EVERY CONCEIVABLE AVENUE IN WHICH PTSD COULD MANIFEST ITSELF, WERE OVERWHELMING THE BASIC PROCESS OF IDENTIFYING AND RESOLVING THE MAJOR ARCHITECTURAL ISSUES THAT CAN CAUSE TRIGGERS JUST BECAUSE OF THE SHEER NUMBER OF POSSIBILITIES. AFTER DISCUSSING IN DEPTH THIS ISSUE WITH MY COMMITTEE, IT WAS DECIDED AND AGREED UPON THAT A NARROWING OF THE TYPES OF TRIGGERS THAT THIS PROJECT WOULD FOCUSED ON NEEDED TO OCCUR. AS A RESULT, I CREATED FIVE FICTIONAL PEOPLE THAT WOULD REPRESENT WHAT I FOUND IN MY RESEARCH TO BE THE MOST PREVALENT BACKSTORIES, SYMPTOMS, AND TRIGGERS ASSOCIATED WITH PTSD IN THE UNITED STATES TODAY. THESE FIVE STORIES THAT ARE WRITTEN ON THE NEXT PAGE USE BOTH BROAD STROKES AND SPECIFIC DETAILS TO EXPRESS NOT ONLY THE FACTS BEHIND THE TRAUMA, BUT ALSO HOW THE PTSD HAS MANIFESTED AND AFFECTED THEIR DAILY LIVES AND THE TIMELINE IN WHICH THEY HAVE OR HAVE NOT SOUGHT OUT TREATMENT. IT ALSO EXPRESSES THE TYPES OF SYMPTOMS THAT THEY EXPERIENCE AND THE TYPES OF ENVIRONMENTAL CONDITIONS THAT CAN TRIGGER A PTSD EPISODE. FROM THIS POINT ON IN THE THESIS DISCOVERY, THESE FIVE PEOPLE SET THE BENCHMARK FOR ALL DESIGN DECISIONS REFLECTED IN THE COMPLETED COMPLEX.

IN THE LIST OF COMMON ENVIRONMENTAL CONDITIONS THAT CAN CAUSE TRIGGERS, IT IS IMPORTANT TO UNDERSTAND THAT ANY RELIGIOUS, CULTURAL, HISTORICAL OR POLITICAL CONTEXT IN WHICH THESE CONDITIONS ARE FOUND ARE NOT, IN ANY CAPACITY, THE FOCUS OF THIS THESIS. THIS THESIS INSTEAD FOCUSES ON THESE CONDITIONS IN THE CONTEXT THAT THEY ARE ONLY SHAPES, SOUNDS, AND TEXTURES, WITH NO ADDITIONAL INTRINSIC VALUE. THIS IS STATED TO ENSURE THAT THE TECHNICAL TERMINOLOGY USED IN THIS SECTION IS NOT IN ANY CAPACITY CONNECTED TO ANY RELIGIOUS, CULTURAL, HISTORICAL, OR POLITICAL CONTEXT.



# THE FACES OF PTSD

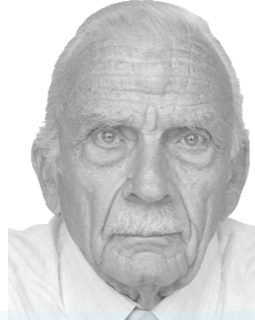
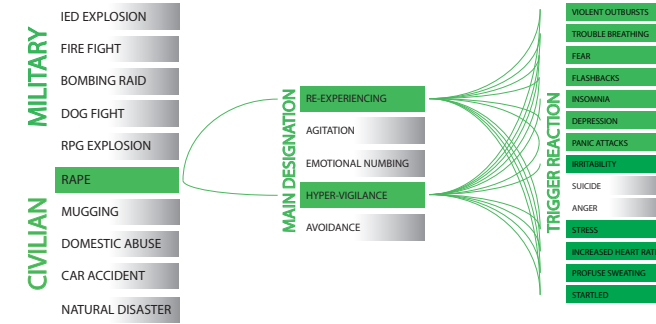


MARY

AGE AT TRAUMA: 19  
CURRENT AGE: 22

AS A FRESHMAN IN COLLEGE, MARY WAS ATTACKED AFTER WALKING HOME FROM THE LIBRARY ON CAMPUS. SHE WAS VIOLENTLY BEATEN AND SEXUALLY ASSAULTED. EVEN THOUGH SHE IMMEDIATELY PRESSED CHARGES, HER ASSAILANT HAS NOT BEEN CAUGHT. KNOWING THAT HER RAPIST IS STILL AT LARGE, SHE BECOMES HYPER-AWARE OF HER SURROUNDINGS AT NIGHT AFRAID THAT HE MIGHT ATTACK HER AGAIN. THE ANXIETY OF THIS CAN CAUSE HER TO HAVE FLASHBACKS THAT FORCE HER TO RE-EXPERIENCE THE TRAUMA OVER AND OVER. BECAUSE OF THIS, HER DAILY ROUTINE HAS CHANGED SIGNIFICANTLY. LIVING BY HERSELF PROVED TO BE TOO MUCH AND WAS FORCED TO MOVE INTO A MORE SECURE APARTMENT COMPLEX WITH ROOMMATES. ANYTIME SHE IS OUT IN THE EVENING OR AT NIGHT SHE HAS TO BE WITH AT LEAST ONE FEMALE FRIEND OR FAMILY MEMBER. EVEN THEN SHE STILL FEELS VULNERABLE. SHE OFTEN HAS PANIC ATTACKS IN LOW LIGHT ENVIRONMENTS LIKE PARKING GARAGES, BASEMENTS, AND STAIRWELLS NO MATTER THE TIME OF DAY.

MAIN TRIGGERS:  
BEING ALONE AT NIGHT; BEING IN LOW LIGHT ENVIRONMENTS; BEING AROUND LARGE GROUPS OF MEN WITHOUT WOMEN AROUND

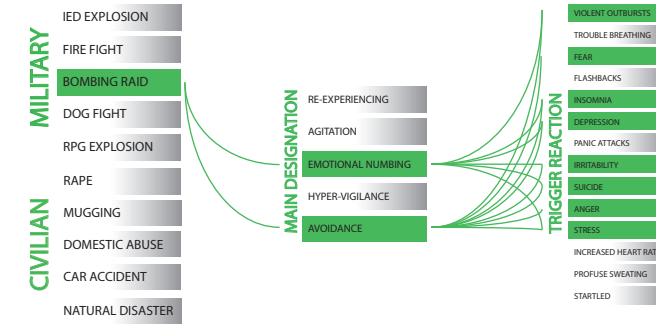


ROBERT

AGE AT TRAUMA: 20  
CURRENT AGE: 93

ON DECEMBER 6, 1941, ROBERT, A 20 YEAR OLD ARMY AIR CORP RESCUE BOAT OPERATOR WHO WAS ENJOYING PARADISE ON THE ISLAND OF HAWAII. ON DECEMBER 7, 1941, THAT PARADISE TURNED TO HELL. ROBERT WAS WORKING THE NIGHT SHIFT AND WAS ASLEEP WHEN THE ATTACK FIRST STARTED, SOMETHING THAT HE CREDITS WITH SAVING HIS LIFE. AFTER THE ATTACKS BEGAN HE IMMEDIATELY WAS CALLED TO BEGIN RESCUING SAILORS WHO WERE ON THE NAVAL SHIPS ATTACKED DURING THE BOMBING RAID. "I SAW HOW EASY, HOW FAST, IT IS TO DIE." SAVING AS MANY AS HE LOST. ROBERT BURIED THE MEMORIES FROM THAT DAY AND THE REMAINDER OF HIS SERVICE DURING WWII FOR YEARS. UNABLE TO TALK ABOUT WHAT HE EXPERIENCED WITH FAMILY OR FRIENDS, HE WENT THROUGH LONG PERIODS OF DEPRESSION AND ANGER THAT EVENTUALLY COST HIM HIS MARRIAGE. HITTING HIS SON WAS THE LAST STRAW. AFTER THAT HE ATTEMPTED SUICIDE THREE TIMES. EACH WERE UNSUCCESSFUL. TO THIS DAY HE LIVES WITH CHRONIC DEPRESSION, HAS A STRAINED RELATIONSHIP WITH HIS SON AND DAUGHTER AND CANNOT WATCH ANY FILM OR MOVIE THAT EVEN CLOSELY RESEMBLES THE FIGHTING IN WWII.

MAIN TRIGGERS:  
LOUD, UNEXPECTED NOISES; WWII MEMORABILIA; FIRE; GUNSHOTS; THE SOUND OF A MOTORBOAT

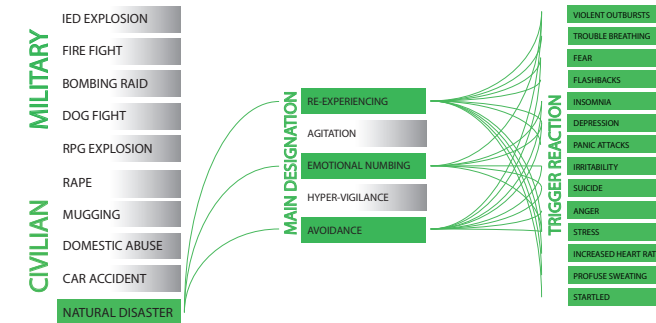


ALEENA

AGE AT TRAUMA: 64  
CURRENT AGE: 74

BEFORE BECOMING A POLITICAL REFUGEE AND IMMIGRATING TO THE UNITED STATES IN 2007, ALEENA LIVED IN PAKISTAN WHERE SHE LIVED THROUGH THE KASHMIR EARTHQUAKE. THE MAGNITUDE 7.6 EARTHQUAKE KILLED MORE THAN 80,000 PEOPLE AND DISPLACED MORE THAN A MILLION. LOSING HER SON AND NIECE, ALEENA, BECAME ONE OF THOSE DISPLACED AFTER HER HUSBAND LOST HIS SHOP AND THEY LOST THEIR HOME IN THE DESTRUCTION. SPEAKING OUT AGAINST THE HORRID CONDITIONS MANY OF THE DISPLACED PEOPLE WERE LIVING IN WITH LITTLE WATER AND VIRTUALLY NO FOOD, ALEENA WAS ARRESTED BY THE GOVERNMENT. RELEASED A YEAR LATER, SHE SOUGHT POLITICAL ASYLUM IN THE U.S. FOR HER AND HER REMAINING FAMILY. ONCE HE REACHED THE U.S. SHE TRIED TO PUT THE PAST BEHIND HER. UNFORTUNATELY THIS BEGAN TO DISTANCE HERSELF FROM HER FAMILY AS SHE WAS UNWILLING TO DISCUSS THE CIRCUMSTANCES AROUND THE DEATH OF HER SON AND NIECE. AT NIGHT, SHE RE-EXPERIENCES THE EARTHQUAKE IN THE FORM OF NIGHTMARES. HER LACK OF SLEEP HAS ALSO ADDED TO THE STRAIN SHE FEELS BETWEEN HERSELF AND HER FAMILY.

MAIN TRIGGERS:  
NIGHTMARES AT NIGHT; EARTHQUAKES; DISCUSSING HER SON OR NIECE

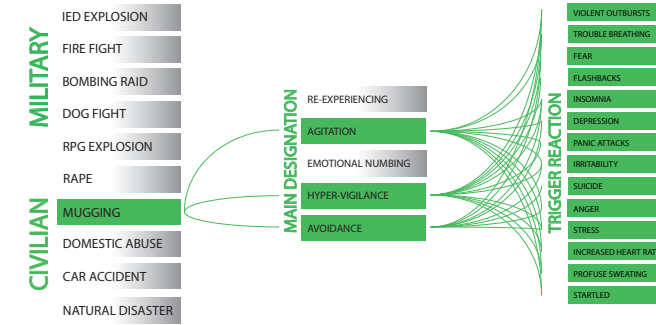


THOMAS

AGE AT TRAUMA: 26  
CURRENT AGE: 27

AFTER LEAVING A RESTAURANT WHERE HE WAS MEETING UP WITH SOME FRIENDS, THOMAS WAS MUGGED WALKING TO HIS CAR IN AN ADJACENT PARKING LOT. FOUR MEN ATTACKED HIM, THREATENING HIM WITH GUNS, KNIVES, AND PIPES BEFORE TAKING HIS WALLET, CELL PHONE, AND WATCH. EVEN THOUGH HE SURRENDERED HIS PROPERTY WITHOUT FIGHTING, THE FOUR MEN BEAT HIM BREAKING HIS ARM AND THREE RIBS. HE TOOK A HIT TO THE HEAD WITH A METAL PIPE SHATTERING HIS ORBITAL SOCKET AND BREAKING HIS JAW. AFTER HEALING FROM HIS INJURIES, THOMAS BLAMED HIMSELF FOR BEING VULNERABLE ENOUGH TO ALLOW HIMSELF TO BE HURT. HE WAS ANGRY ALL THE TIME. HE TOOK BOXING CLASSES AND SELF DEFENSE CLASSES TO BLOW OFF STEAM, BUT NOTHING WOULD HELP LESSEN THE FEAR AND ANGER THAT HE FELT EVERY TIME HE LEFT HOME ALONE OR WITH HIS GIRLFRIEND. HIS BIGGEST FEAR WAS THAT HE WOULDN'T BE ABLE TO PROTECT HER. THIS FEAR KEPT HIM FROM SLEEPING, DEVOTING ALL OF HIS TIME TO TRAINING. ANYTIME FAMILY OR FRIENDS WOULD CONFRONT HIM, HE WOULD BECOME DEFENSIVE, ANGRY, IRRITABLE AND SOMETIMES VIOLENT.

MAIN TRIGGERS:  
WALKING ALONE OR IN A SMALL GROUP AT NIGHT; FEELING INADEQUATE; SEEING A GUN, KNIFE, OR METAL PIPE

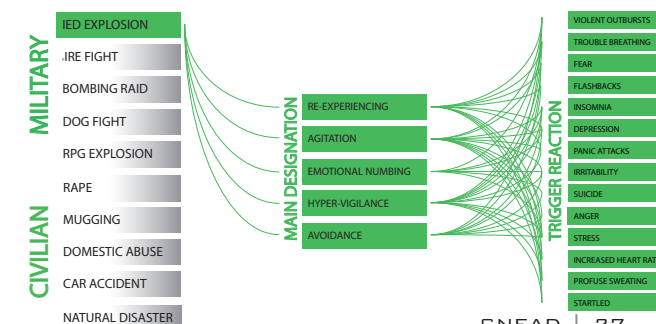


WILLIAM

AGE AT TRAUMA: 27  
CURRENT AGE: 31

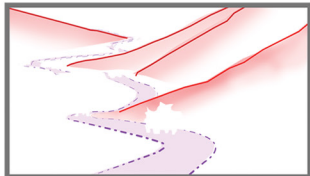
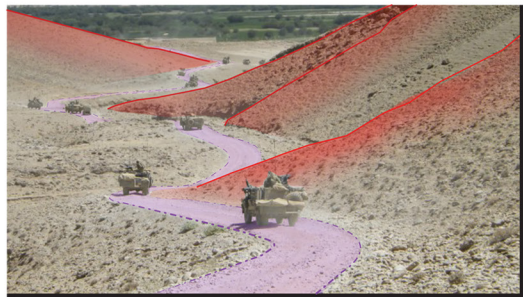
WATCHING THE TOWERS FALL ON 9/11 WAS THE MOTIVATION BEHIND WILLIAM JOINING THE ARMY ROTC IN COLLEGE. AS A FIRST LIEUTENANT DEPLOYED TO IRAQ, WILLIAM WAS ENGAGED IN A NUMBER OF RESCUE MISSIONS. ON ONE MISSION, HIS CONVOY WAS THE ONE THAT NEEDED RESCUING. RIDING IN THE FIRST HUMVEE, WHEN THE BLAST HIT, IT THREW THEIR VEHICLE FIFTEEN FEET INTO THE AIR. RPG'S WERE SHOT BEFORE AT THE TWO HUMVEES BEHIND THEIRS BEFORE WHAT WAS LEFT OF THEIR TIRES HIT THE GROUND AGAIN. EIGHT WERE DEAD IMMEDIATELY, THREE WERE CRITICALLY WOUNDED INCLUDING WILLIAM, MISSING BOTH LEGS AND HAVING THIRD DEGREE BURNS ON TORSO AND ARMS, WILLIAM PULLED HIMSELF AND ANOTHER SOLDIER OUT OF THE BURNING HUMVEE WHERE HE HELD OFF THE INSURGENTS UNTIL HELP COULD COME. IT TOOK WILLIAM OVER A YEAR AT WALTER REED MEDICAL CENTER TO BE ABLE TO WALK AGAIN. HE WAS AWARDED AN HONORABLE DISCHARGE AND GIVEN A PURPLE HEART. HE WAS ALSO AWARDED THE SILVER STAR FOR HEROISM. NOW TWO YEARS LATER, WILLIAM LIVES WITH HIS PARENTS IN A WHEELCHAIR ACCESSIBLE HOME. HE HAS BECOME UNATTACHED TO LIFE. ROUTINELY DRINKING HIMSELF TO SLEEP. HE HAS CONTEMPLATED SUICIDE, BUT FEELS LIKE HE CAN'T DO THAT TO HIS PARENTS. HE ALREADY FEELS LIKE SUCH A BURDEN TO THEM.

MAIN TRIGGERS:  
UNEXPECTED LOUD NOISES; GUN SHOTS; FAN BLADES; FIRE; THE SMELL OF BURNING RUBBER

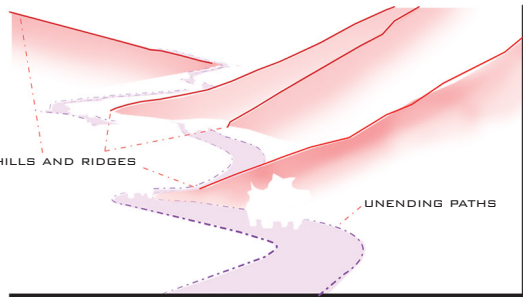




# ENVIRONMENTAL TRIGGERS

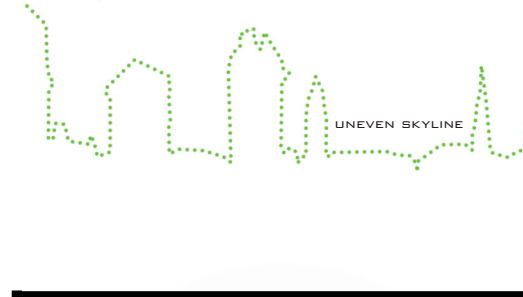


CONVOY ROUTE - IED EXPLOSIONS;  
RPG EXPLOSIONS

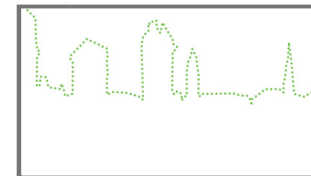


HILLS AND RIDGES

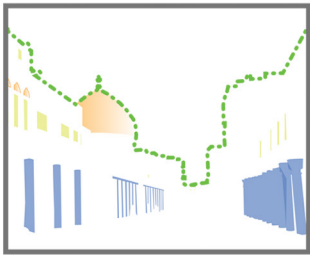
UNENDING PATHS



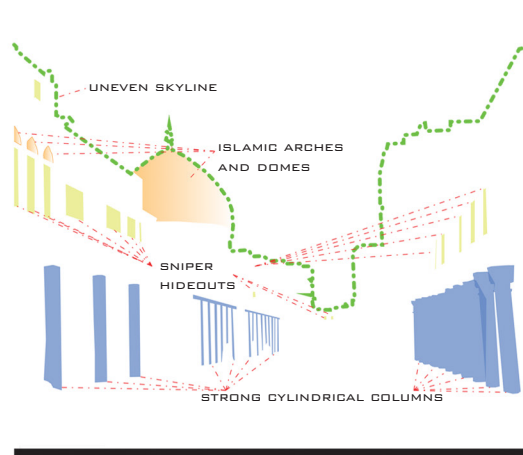
UNEVEN SKYLINE



RUINS - BOMBING RAIDS;  
NATURAL DISASTERS



PATROL AREAS - SNIPER ATTACKS;  
RPG EXPLOSIONS;  
SUICIDE BOMBERS

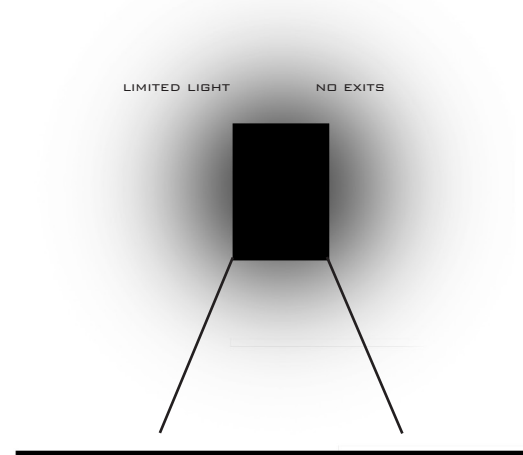


UNEVEN SKYLINE

ISLAMIC ARCHES  
AND DOMES

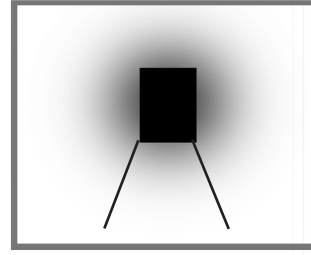
SNIPER  
HIDEOUTS

STRONG CYLINDRICAL COLUMNS



LIMITED LIGHT

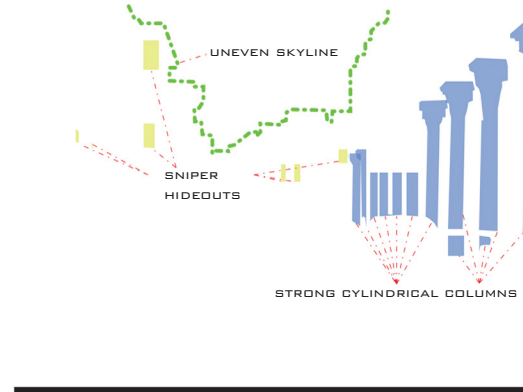
NO EXITS



DARK HALLWAYS - RAPES;  
MUGGINGS;  
ASSAULTS



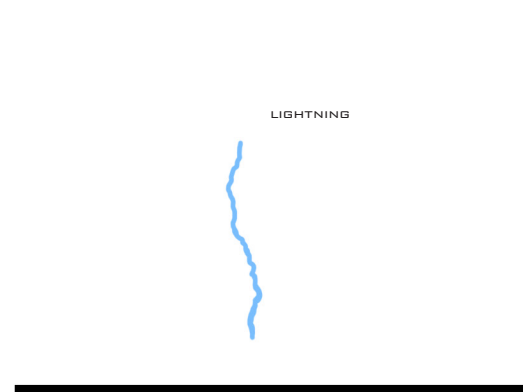
PATROL AREAS - SNIPER ATTACKS;  
RPG EXPLOSIONS;  
SUICIDE BOMBERS



UNEVEN SKYLINE

SNIPER  
HIDEOUTS

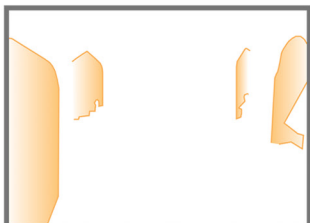
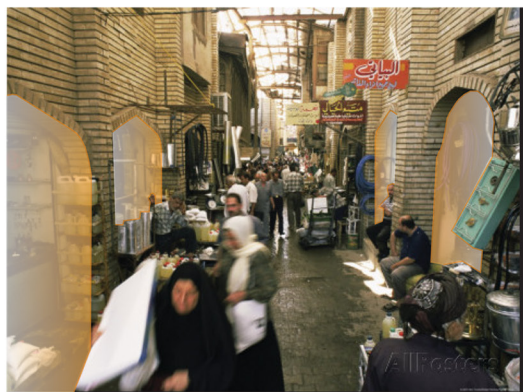
STRONG CYLINDRICAL COLUMNS



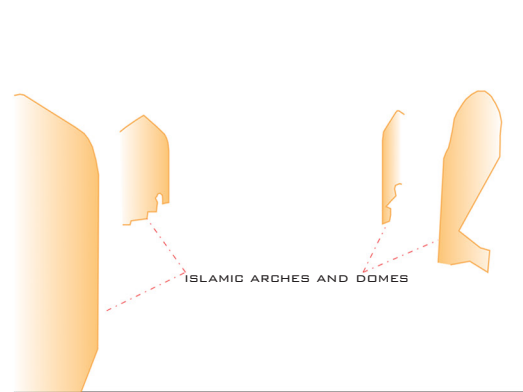
LIGHTNING



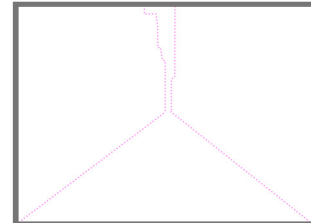
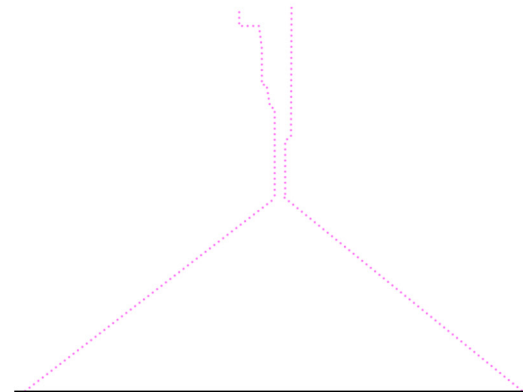
LIGHTING - BRIGHT FLASHES OF LIGHT;  
THUNDER;  
WIND;  
STORMS;  
NATURAL DISASTERS;



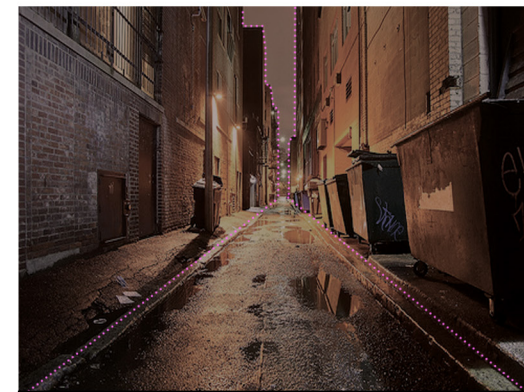
PATROL AREAS - SUICIDE BOMBERS



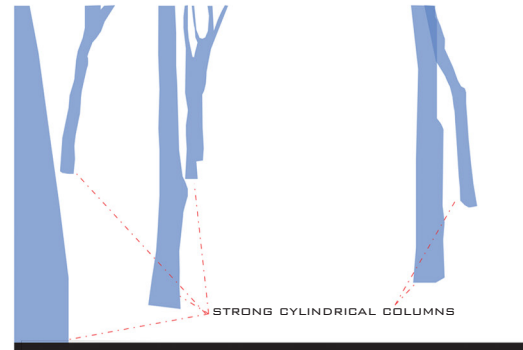
ISLAMIC ARCHES AND DOMES



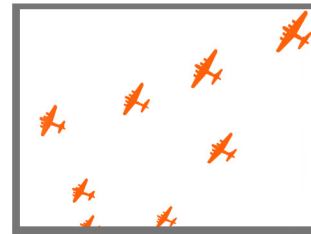
ALLEYWAYS - ABANDONED, DARK  
ROADS;  
LIMITED VISIBILITY



PATROL AREAS - BOMBING RAIDS;  
SNIPER ATTACKS



STRONG CYLINDRICAL COLUMNS

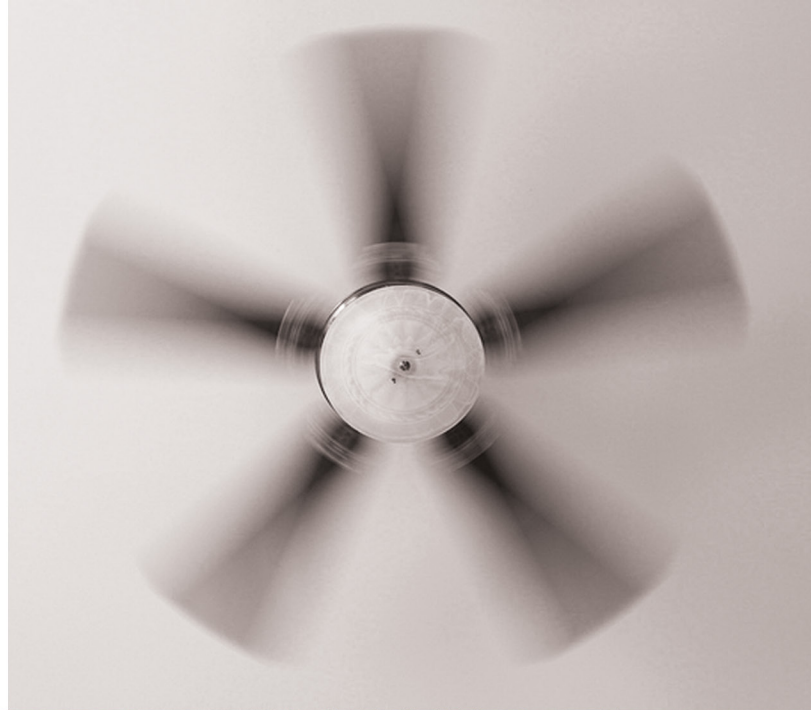


PLANES - BOMBING RAIDS

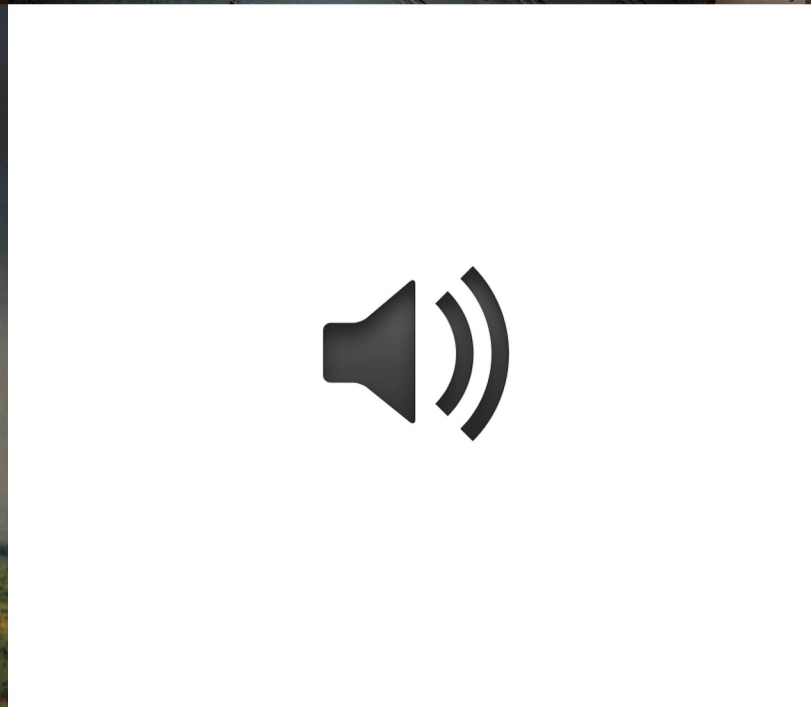




NOT ALL TRIGGERS ARE  
STIMULATED BY VISUAL  
CUES ONLY.



SOUND AND LIGHT ARE  
BOTH EQUALLY IMPORTANT  
TO UNDERSTANDING HOW  
A TRIGGER MAY MANIFEST  
ITSELF.







## SITE ANALYSIS

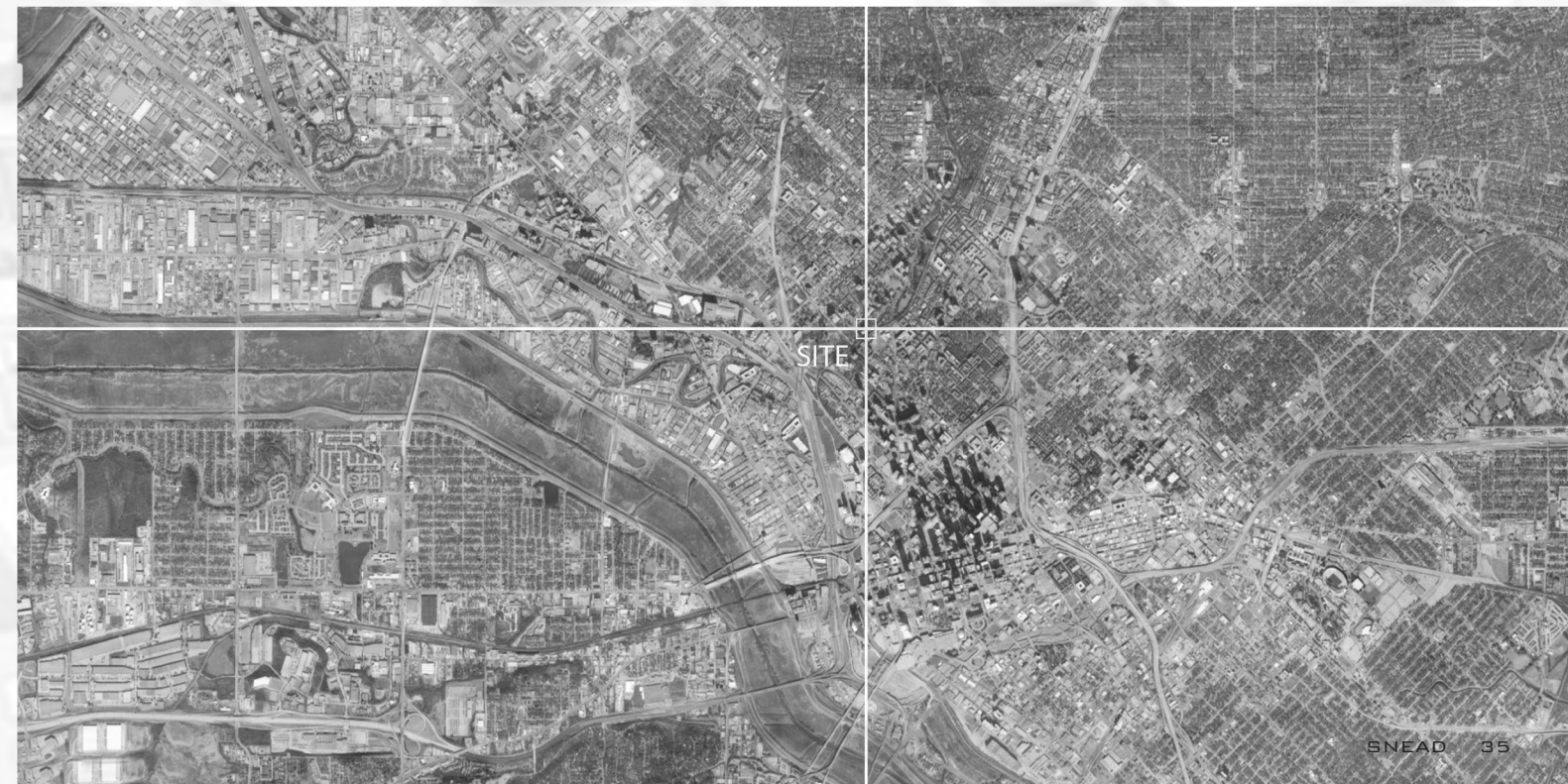
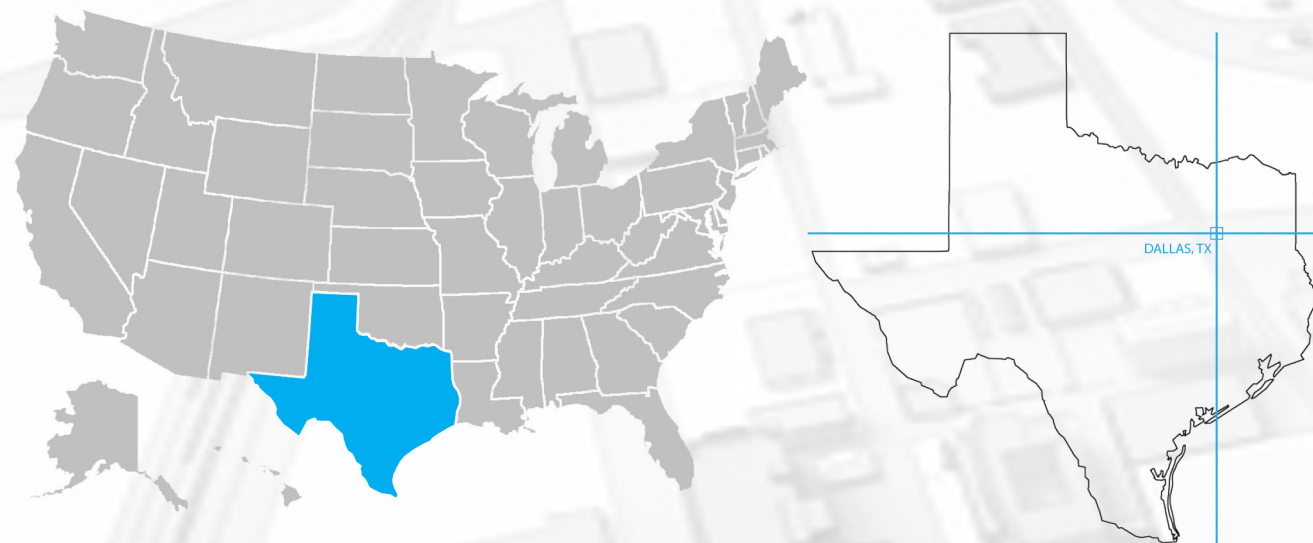


THIS PAST SUMMER I LIVED AND WORKED IN DALLAS, TX. DURING MY TIME THERE I LEARNED A LOT ABOUT THE RICH AND DIVERSE AREA THAT MAKES UP THE DALLAS / FT. WORTH REGION. EVEN THOUGH DALLAS IS A MASSIVE CITY OF 7 MILLION PEOPLE, I LEARNED THAT DALLAS HAS A HUGE POPULATION OF VETERANS, IN FACT TEXAS HAS THE SECOND HIGHEST PERCENTAGE OF VETERANS IN THE US. BUT, WHAT IS EVEN MORE INTERESTING AND EQUALLY RELEVANT TO MY THESIS IS THAT DALLAS HAS A CRIME RATE MORE THAN TWICE THAT OF THE NATIONAL AVERAGE. WHAT THIS MEANS IS THAT THERE IS LIKELY A SIGNIFICANT PERCENTAGE OF THE POPULATION THAT LIVE AND WORK IN THE DALLAS AREA THAT HAS PTSD WHETHER THEY KNOW IT OR NOT. THIS IS THE EXACT DEMOGRAPHIC I AM LOOKING FOR.

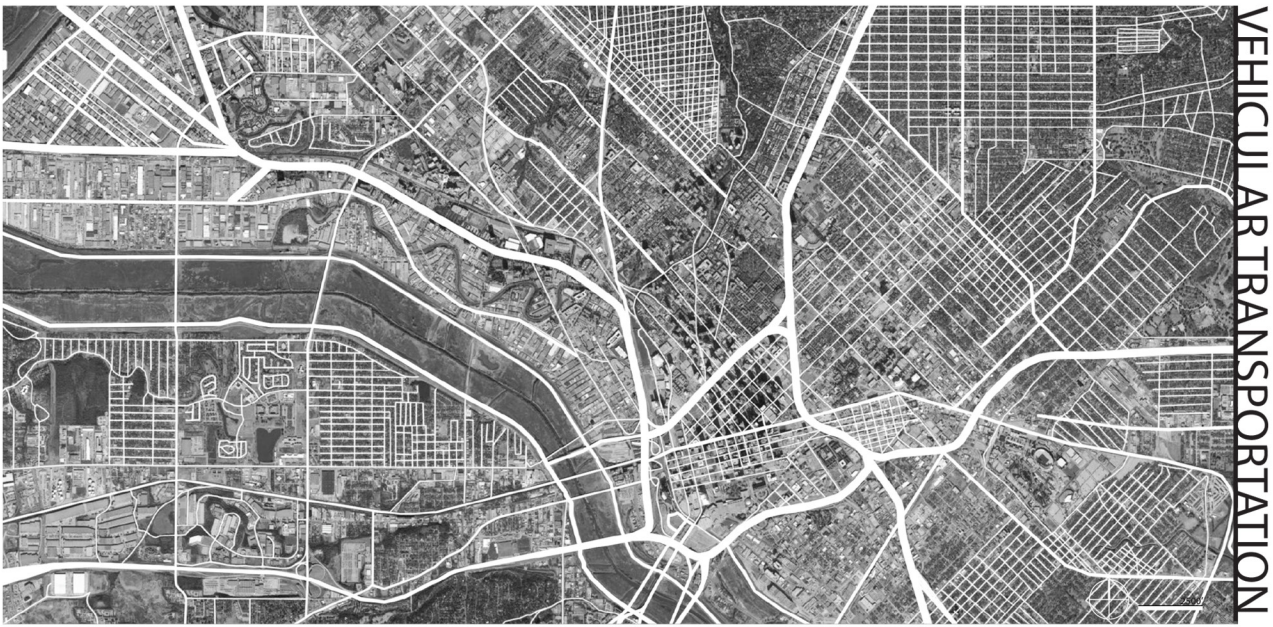
THE SITE THAT I SELECTED SITS ON THE EDGE BETWEEN OAKLAWN AND UPTOWN ALONG THE KATY TRAIL WHICH IS A 3 MILE BIKE PATH THAT FOLLOWS THE NORTHERN BOUNDARY OF UPTOWN.

LOCATED DIRECTLY BETWEEN THE TWO MAJOR MEDICAL DISTRICTS IN DALLAS, THIS SITE IS CLOSE ENOUGH TO THE MAIN HOSPITALS TO RECEIVE SUPPORT AND GUIDANCE, YET FAR ENOUGH AWAY TO LESSEN THE SIGMA AROUND THE FACT THAT PTSD IS A MEDICAL DISORDER – WHICH IS ONE OF THE MAIN REASONS PEOPLE DON'T SEEK OUT HELP.

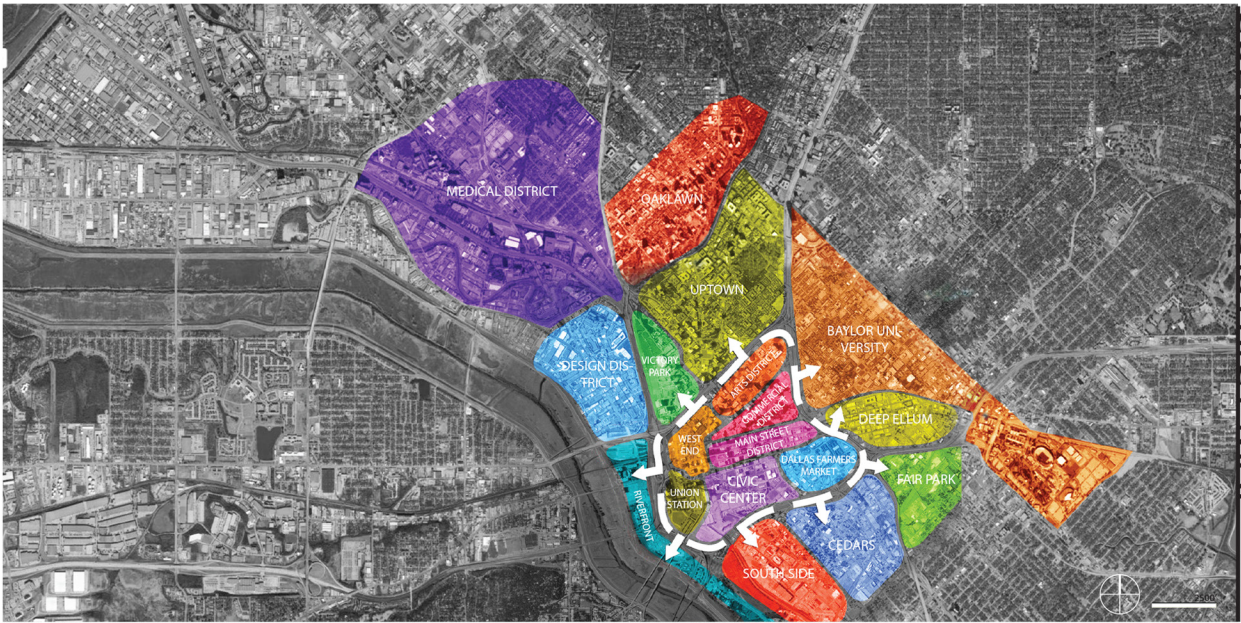
ZOOMING IN, THE SITE I HAVE SHOWN HERE IN BLUE PROVIDES NATURAL SOUND BARRIERS TO THE DENSE URBAN AREA THAT IT SITS IN, WHILE AT THE SAME TIME, IT IS SURROUNDED BY CITY PARK LAND THAT PROVIDES NOT ONLY A SENSE OF RELAXATION FOR THE VISITORS TO THE CENTER, BUT IT ALSO PROVIDES THE BEST CONTROL FOR THE RESEARCHERS OVER THE ENVIRONMENT AROUND THE CENTER – WHICH, IN A RESEARCH SETTING IS KEY TO MITIGATING FACTORS THAT CAN INFLUENCE THE FINDINGS.



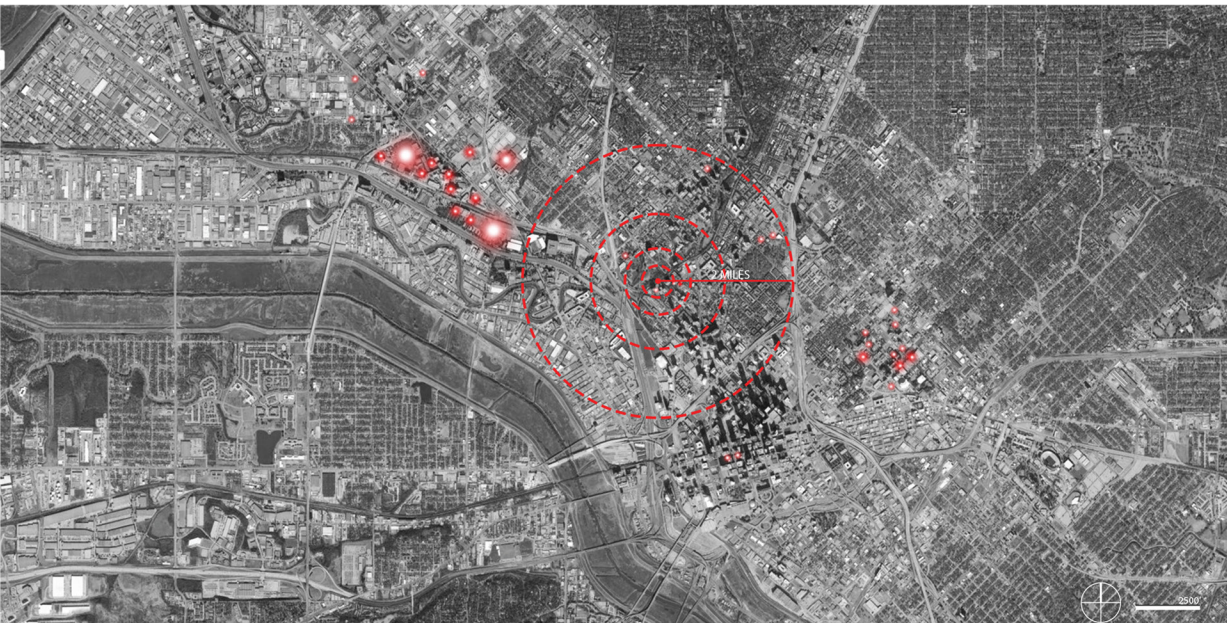




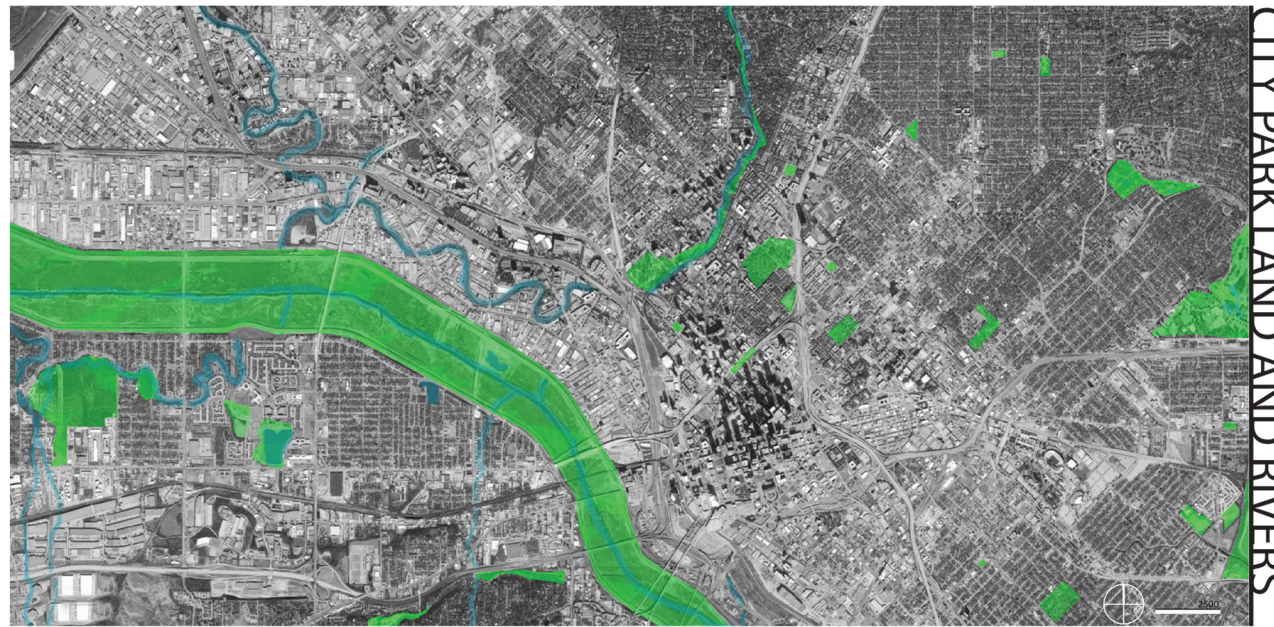
VEHICULAR TRANSPORTATION



CULTURAL DISTRICT MAP



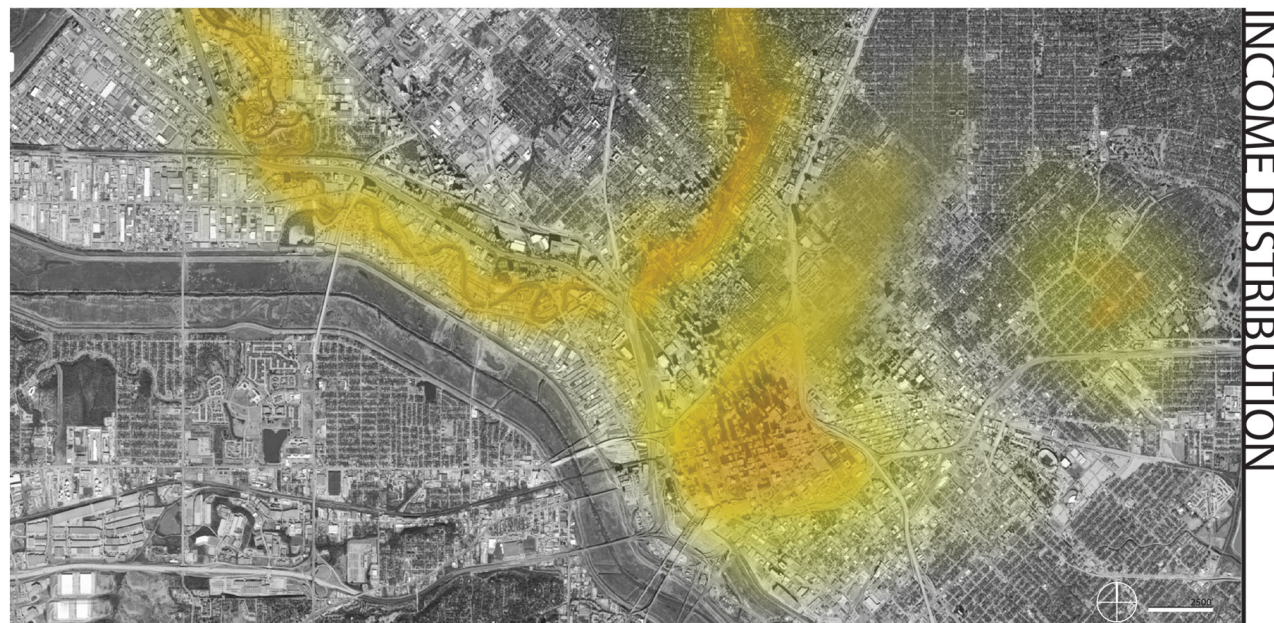
DALLAS REGIONAL HOSPITALS



CITY PARK LAND AND RIVERS



CRIME RATE DISTRIBUTION



INCOME DISTRIBUTION





CULTURAL DISTRICTS



TOPOGRAPHY

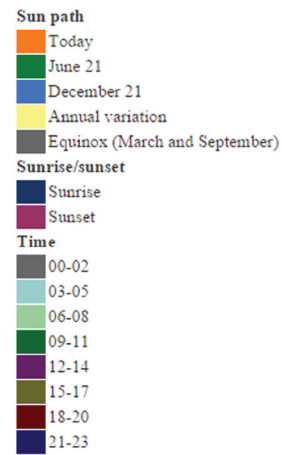
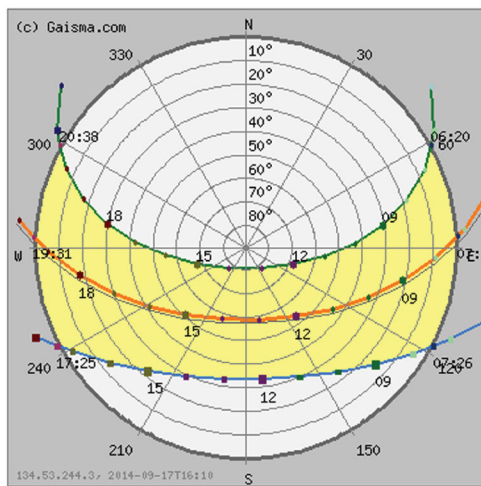


PARK LAND

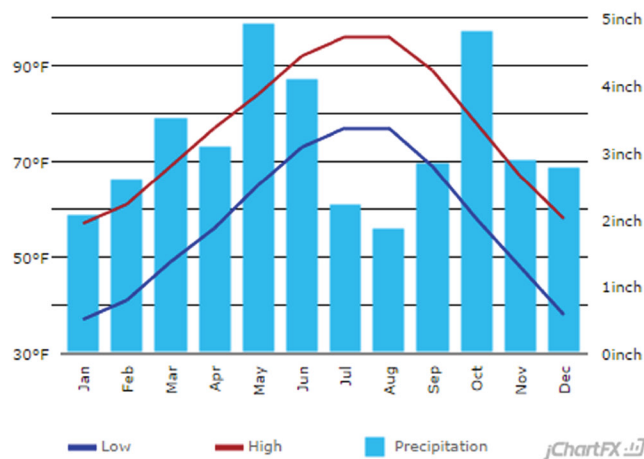


PHOTOGRAPHS OF THE SITE NEAR THE CREEK BED

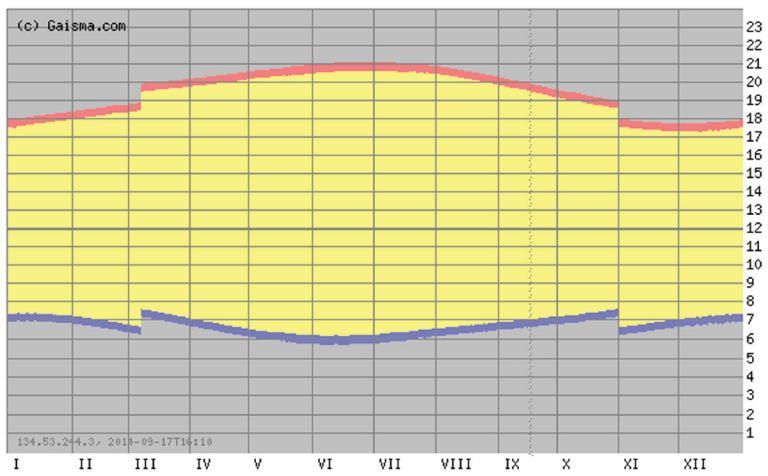




SUN PATH DIAGRAM



DALLAS CLIMATE CHART



SUNRISE, SUNSET, DUSK AND DAWN TIMES

Date	Sunrise	Sunset	Length	Change	Dawn	Dusk	Length	Change
Today	07:12	19:31	12:19		06:47	19:55	13:08	
+1 day	07:13	19:29	12:16	00:03 shorter	06:48	19:54	13:06	00:02 shorter
+1 week	07:17	19:21	12:04	00:15 shorter	06:52	19:46	12:54	00:14 shorter
+2 weeks	07:21	19:12	11:51	00:28 shorter	06:57	19:36	12:39	00:29 shorter
+1 month	07:33	18:52	11:19	01:00 shorter	07:08	19:17	12:09	00:59 shorter
+2 months	06:58	17:25	10:27	01:52 shorter	06:32	17:52	11:20	01:48 shorter
+3 months	07:23	17:23	10:00	02:19 shorter	06:56	17:50	10:54	02:14 shorter
+6 months	07:34	19:37	12:03	00:16 shorter	07:09	20:02	12:53	00:15 shorter

SOLAR ENERGY AND SURFACE METEOROL-  
OGY

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Insolation, kWh/m <sup>2</sup> /day	2.50	3.23	4.19	5.26	5.61	6.24	6.54	5.79	4.94	3.84	2.70	2.25
Clearness, 0 - 1	0.47	0.48	0.50	0.53	0.51	0.55	0.58	0.56	0.55	0.53	0.47	0.46
Temperature, °C	5.25	7.92	12.15	17.31	21.74	25.14	27.30	27.28	23.64	18.83	11.73	6.17
Wind speed, m/s	5.95	6.25	6.80	6.60	5.86	5.30	5.00	4.80	5.19	5.62	5.99	5.87
Precipitation, mm	49	62	74	103	129	84	56	54	83	95	62	57
Wet days, d	6.9	6.5	7.6	7.7	8.8	6.6	5.0	4.9	7.1	6.3	6.3	6.7

SUNRISE, SUNSET, DUSK AND DAWN TIMES

TEMPERATURE CHARTS

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F:	57	61	69	77	84	92
Average low in °F:	37	41	49	56	65	73
Av. precipitation in inch:	2.05	2.6	3.5	3.07	4.92	4.09
Days with precipitation:	7	8	8	9	9	6
Hours of sunshine:	155	159	220	238	279	326
Average snowfall in inch:	1	1	0	0	0	0

Annual high temperature:	77°F
Annual low temperature:	57.3°F
Average temperature:	67.15°F
Average annual precipitation - rainfall:	37.54 inch
Days per year with precipitation - rainfall:	81 days
Annual hours of sunshine:	2911 hours
Av. annual snowfall:	2 inch

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	96	96	89	78	67	58
Average low in °F:	77	77	69	58	48	38
Av. precipitation in inch:	2.2	1.85	2.83	4.8	2.87	2.76
Days with precipitation:	5	6	5	6	6	6
Hours of sunshine:	341	325	274	240	191	163
Average snowfall in inch:	0	0	0	0	0	0

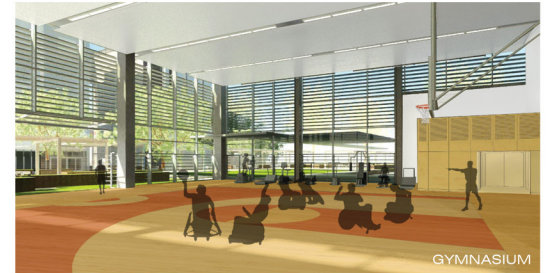
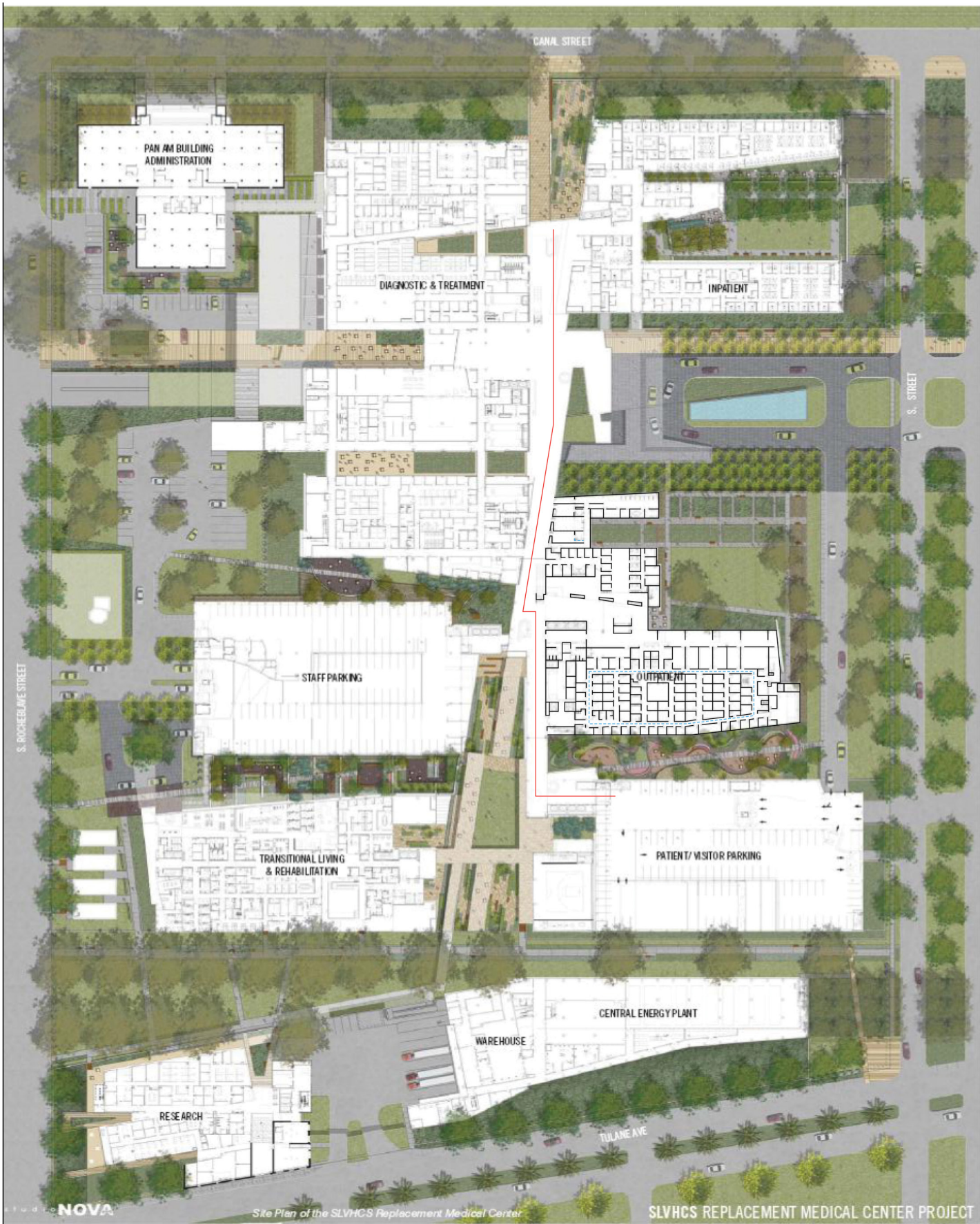
Dallas - Fort Worth Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Temperature	43.4	47.9	56.7	65.5	72.8	81.0	85.3	84.9	77.4	67.2	56.2	46.9	65.4
Avg. Max Temperature	54.1	58.9	67.8	76.3	82.9	91.9	96.5	96.2	87.8	78.5	66.8	57.5	76.3
Avg. Min Temperature	32.7	36.9	45.6	54.7	62.6	70.0	74.1	73.6	66.9	55.8	45.4	36.3	54.6
Days with Max Temp of 90 F or Higher	0.0	0.0	< 0.5	1.0	5.0	20.0	28.0	26.0	14.0	3.0	0.0	0.0	96.0
Days with Min Temp Below Freezing	14.0	8.0	3.0	< 0.5	0.0	0.0	0.0	0.0	0.0	< 0.5	3.0	10.0	37.0

Dallas - Fort Worth Heating and Cooling	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Heating Degree Days	670	484	286	75.0	0.0	0.0	0.0	0.0	0.0	51.0	275	566	2407
Cooling Degree Days	0.0	5.0	29.0	90.0	246	480	629	617	372	119	11.0	5.0	2603

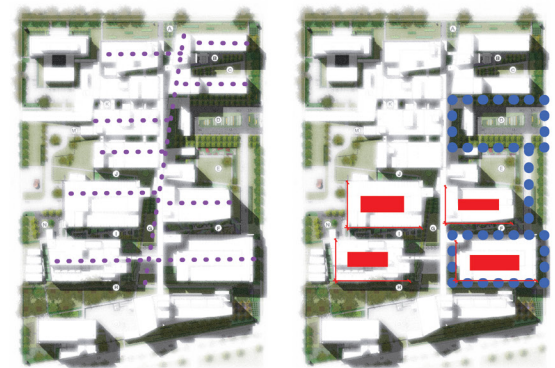
Dallas - Fort Worth Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (inches)	1.8	2.2	2.8	3.5	4.9	3.0	2.3	2.2	3.4	3.5	2.3	1.8	33.7
Days with Precipitation 0.01 inch or More	7.0	7.0	7.0	8.0	9.0	7.0	5.0	5.0	7.0	6.0	6.0	7.0	79.0
Monthly Snowfall (inches)	1.1	0.9	0.2	< 0.05	< 0.05	0.0	0.0	0.0	0.0	< 0.05	0.1	0.2	2.5

Other Dallas - Fort Worth Weather Indicators	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Wind Speed	11.0	11.7	12.7	12.4	11.1	10.6	9.8	8.9	9.3	9.7	10.7	10.8	10.7
Clear Days	10.0	10.0	10.0	9.0	8.0	11.0	15.0	15.0	13.0	14.0	12.0	11.0	135
Partly Cloudy Days	6.0	6.0	8.0	8.0	10.0	12.0	10.0	10.0	9.0	7.0	6.0	6.0	97.0
Cloudy Days	16.0	13.0	14.0	13.0	13.0	8.0	6.0	6.0	9.0	10.0	12.0	14.0	133
Percent of Possible Sunshine	52.0	54.0	58.0	61.0	57.0	67.0	75.0	73.0	67.0	63.0	57.0	52.0	61.0
Avg. Relative Humidity	57.5	70.5	69.0	69.5	72.0	73.5	68.5	65.5	67.5	69.5	68.5	69.0	71.5





- (A) Canal Street Entry
- (B) Chapel Garden
- (C) Veteran's Courtyard
- (D) Main Entry Courtyard
- (E) Education Courtyard
- (F) Outpatient Courtyard
- (G) Wellness Courtyard
- (H) Banks Street Promenade
- (I) Transitional Living Courtyard
- (J) D&T Courtyard
- (K) Cafeteria Courtyard
- (L) Emergency
- (M) Service Dock
- (N) Transitional Living Drop-off
- (O) Main Loading Dock

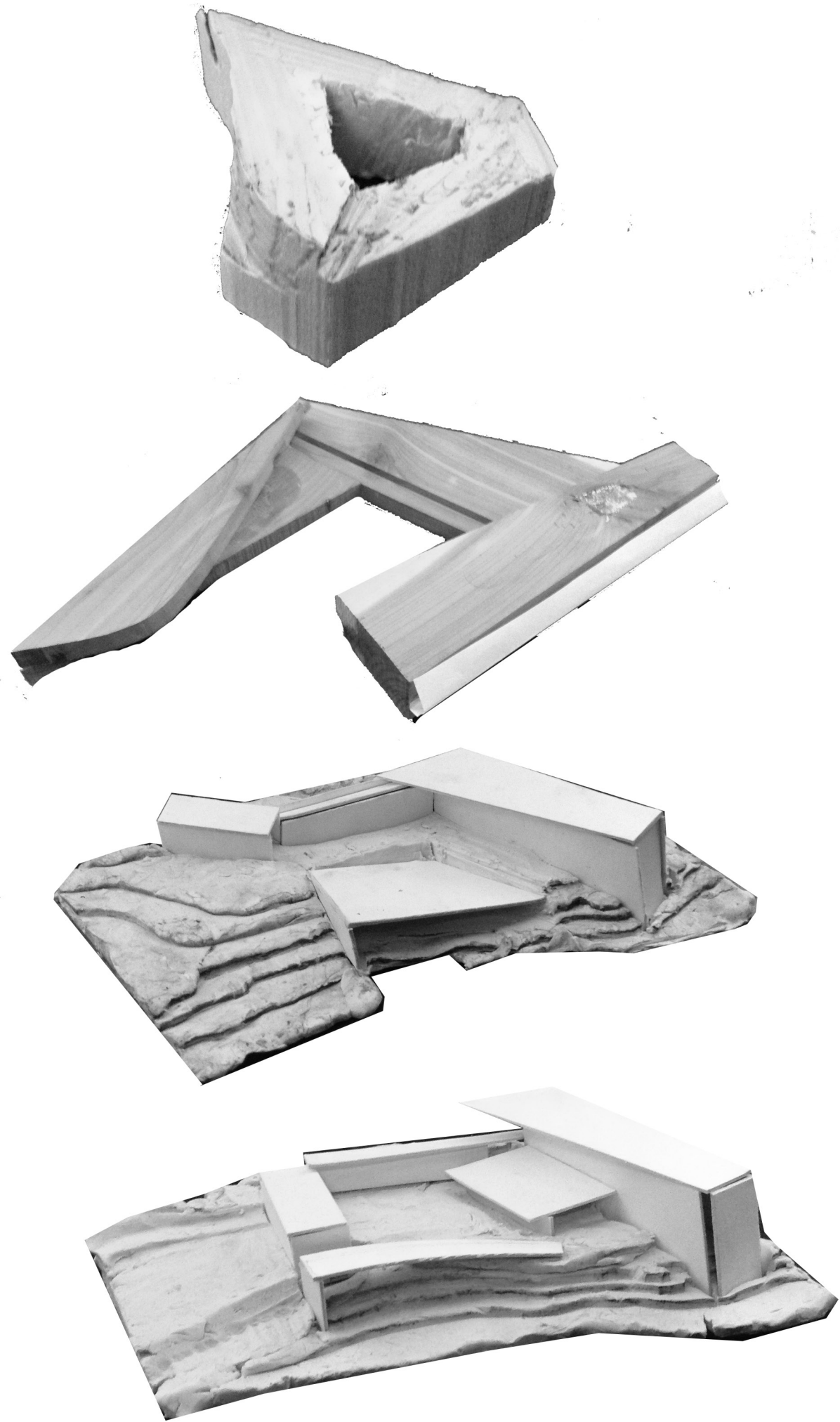


- GOOD**
1. WAYFINDING THROUGH CAMPUS.
  2. INTERNAL WAYFINDING IS COMPARTMENTALIZED.
  3. DYNAMIC LANDSCAPING BETWEEN SECTIONS OF BUILDINGS.
  4. USE OF NATURAL LIGHT IN RECREATIONAL AREAS TO REMOVE THE FEELING OF BEING IN A BOX.
  5. USE OF SOUND PARTITIONS IN WAITING AREAS TO PROMOTE PRIVACY WHILE DAMPENING SOUND.

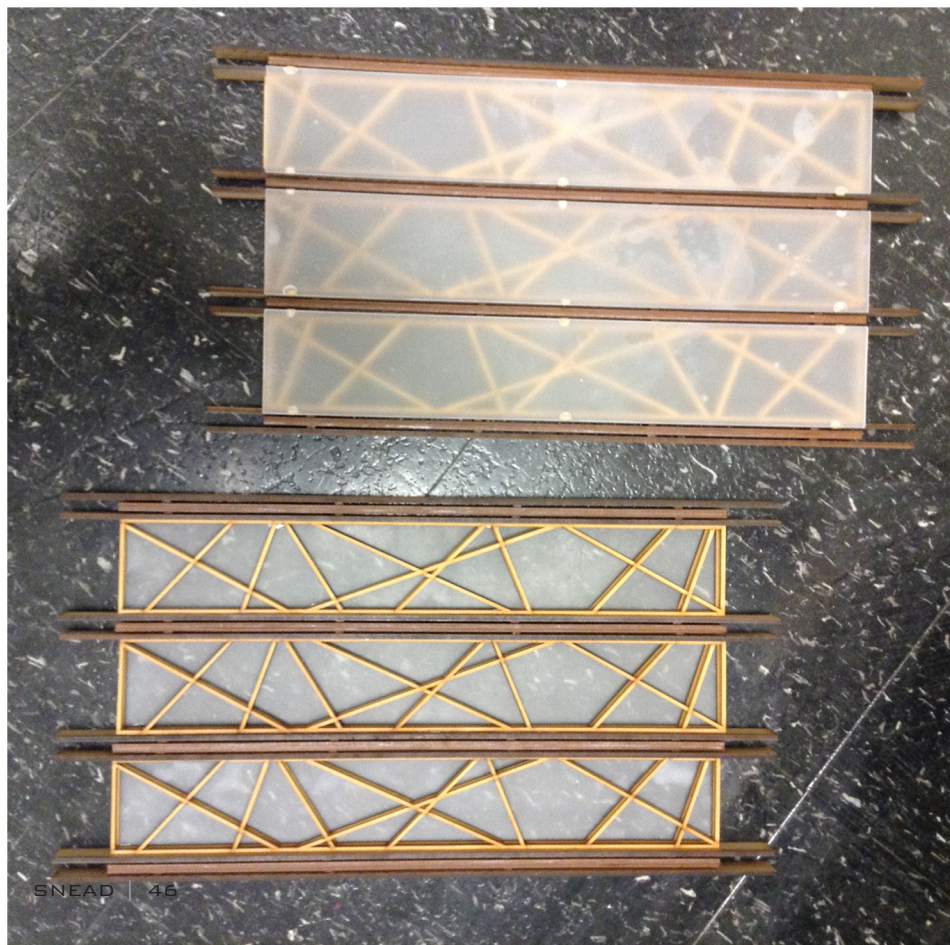
- BAD**
1. DISTANCE BETWEEN PARKING STRUCTURE AND MAIN ENTRANCE.
  2. WIDTH TO LENGTH ANALYSIS. LACK OF INTERNAL GREEN SPACE, BOTH VIEWS AND ACTUAL INTERIOR GARDENS.
  3. LIMITED VARIATION ON EXTERIOR ROOM PROGRAMMING.
  4. CAMPUS AS A WHOLE IS NOT ON A HUMAN SCALE (TOWERING BUILDINGS OVERHEAD)



FORM PROGRESSION







THESE MODELS WERE SCALED TO THE SIZE OF THE OUTDOOR THERAPY AREAS. THEY WERE USED TO TEST SHADOW AND LIGHT TRANSMITTANCE ACCROSS THE DIFFUSER TO MAKE SURE THAT THE WEBED STRUCTURAL SYSTEM DID NOT CAUSE DRAMATIC SHADOWS. THIS SYSTEM WAS USED IN THE FINAL DESIGN.







# THESIS PRESENTATION







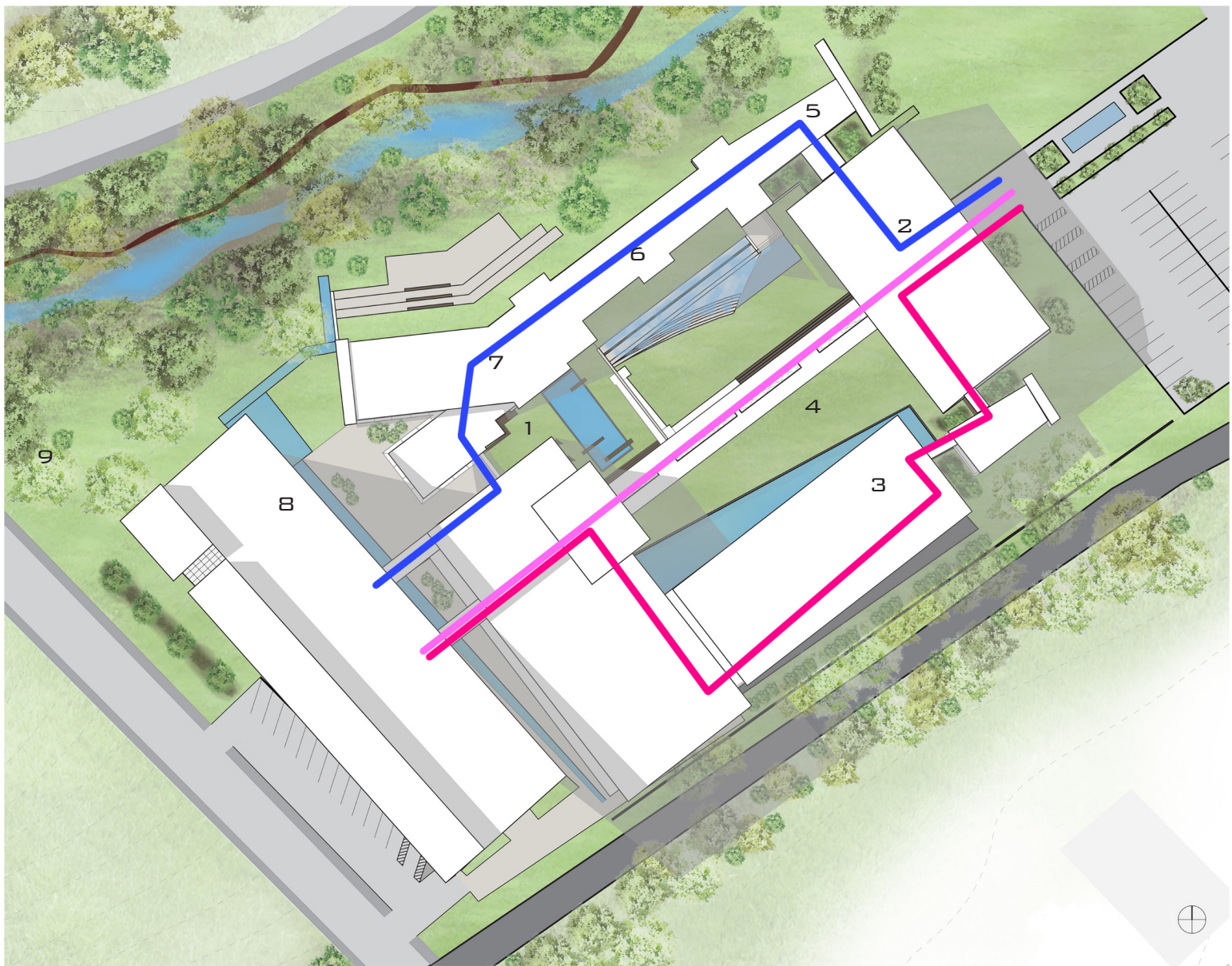


SITE PLAN



MAIN COURTYARD VIEW





THREE DIFFERENT PATHWAYS THROUGH THE COMPLEX ALLOW PEOPLE WITH DIFFERENT ENVIRONMENTAL TRIGGERS THE ABILITY TO NAVIGATE THROUGH ALL PORTIONS WITHOUT BEING EXPOSED TO AREAS THAT COULD BE HARMFUL TO THEIR THERAPY. THE BLUE LINE FEATURES VIEWS OF THE CREEK BED AND A FOREST. THE LIGHT PINK PATH PROVIDES AN EXTREMELY SHELTERED VIEW OF THE COURTYARD. THIS HAS THE MINIMAL OUTSIDE INFLUENCE TO ALLOW FOR THE SAFEST TRAVEL PATH. THE HOT PINK PATH SHOWS VIEWS OF BOTH THE COURTYARD AND THE LANDSCAPED HILL WHICH HAS A RUNNING PATH ON THE TOP OF IT.



2

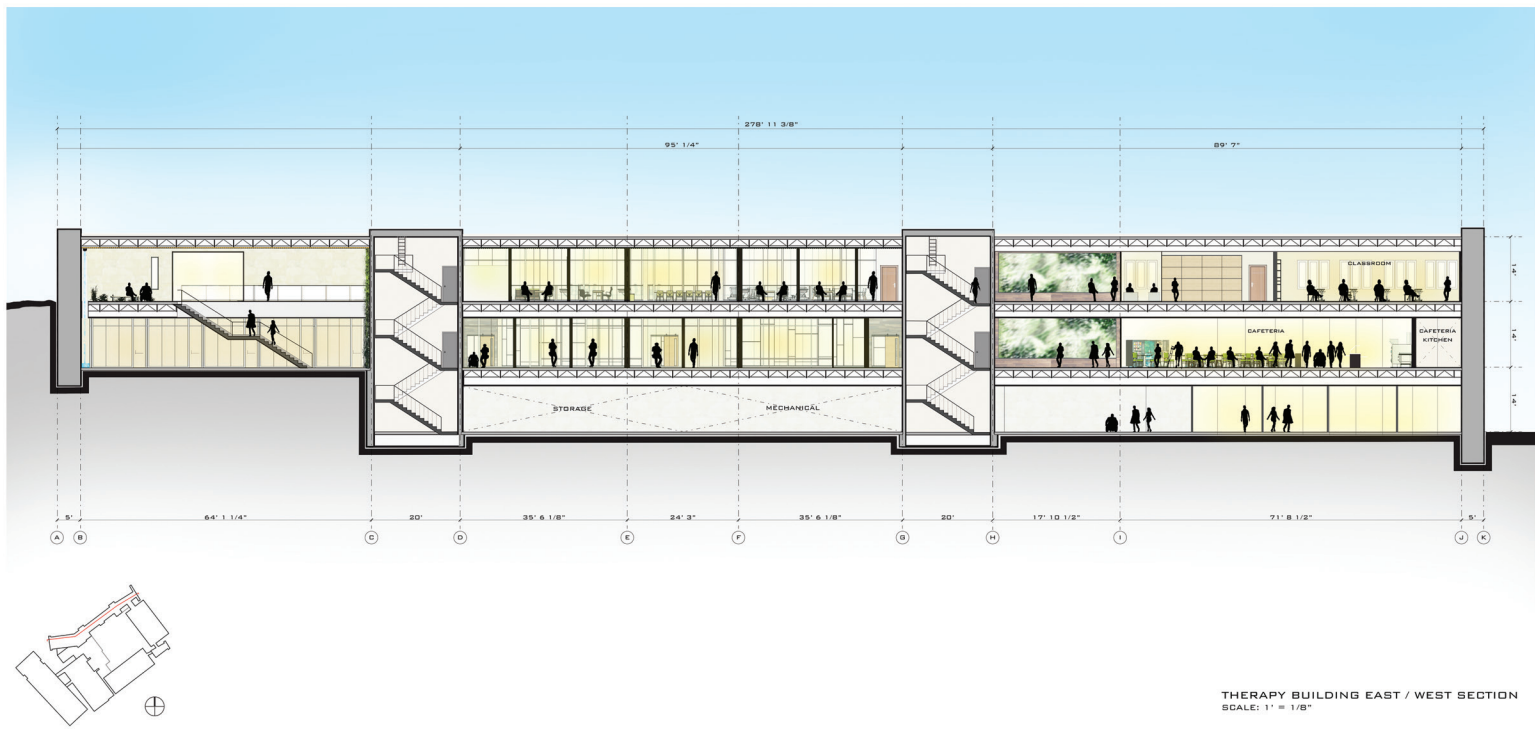


3



4



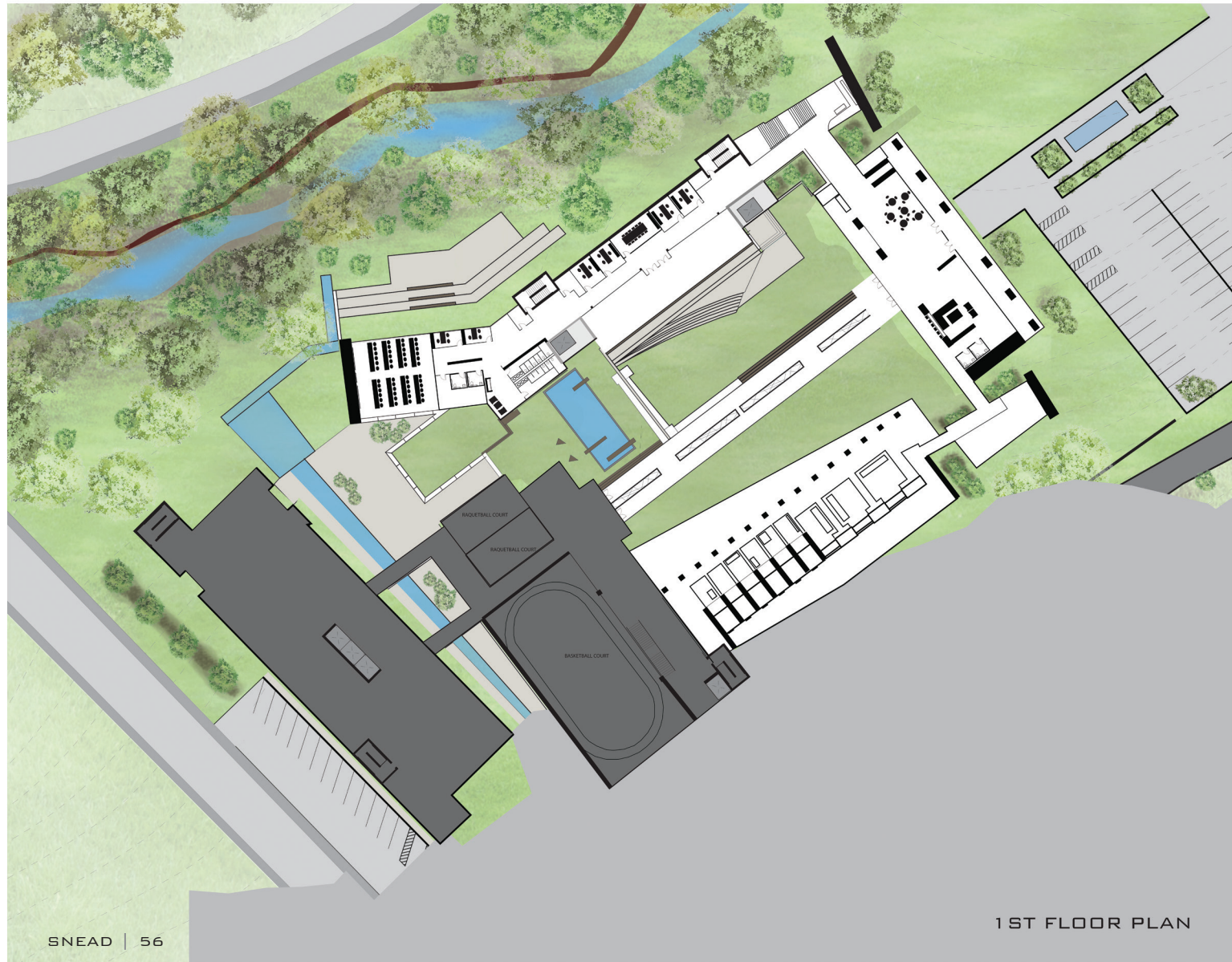


THERAPY BUILDING EAST / WEST SECTION  
SCALE: 1" = 1/8"



THERAPY BUILDING ENTRANCE

5



1ST FLOOR PLAN



THERAPY BUILDING MAIN HALLWAY

6



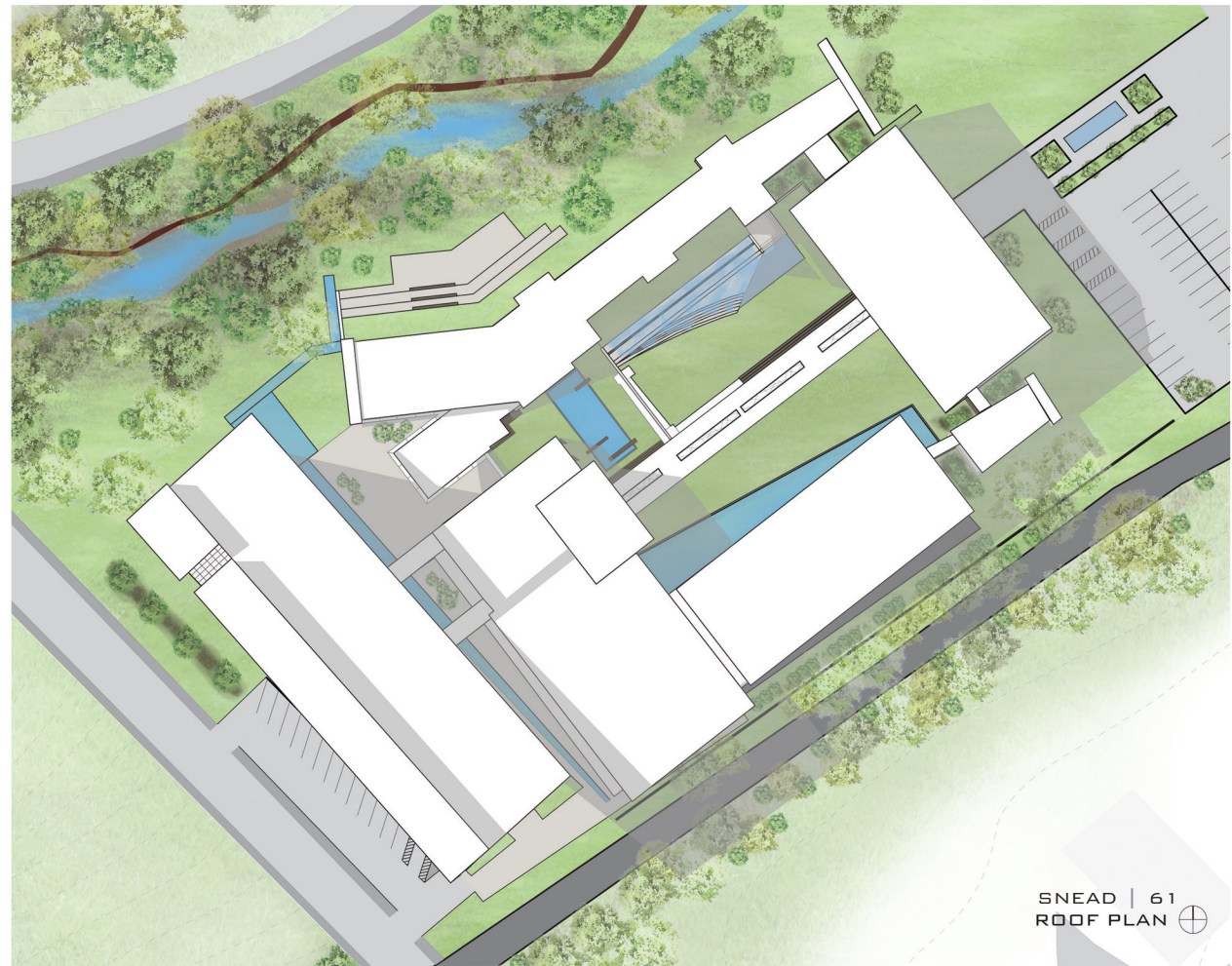
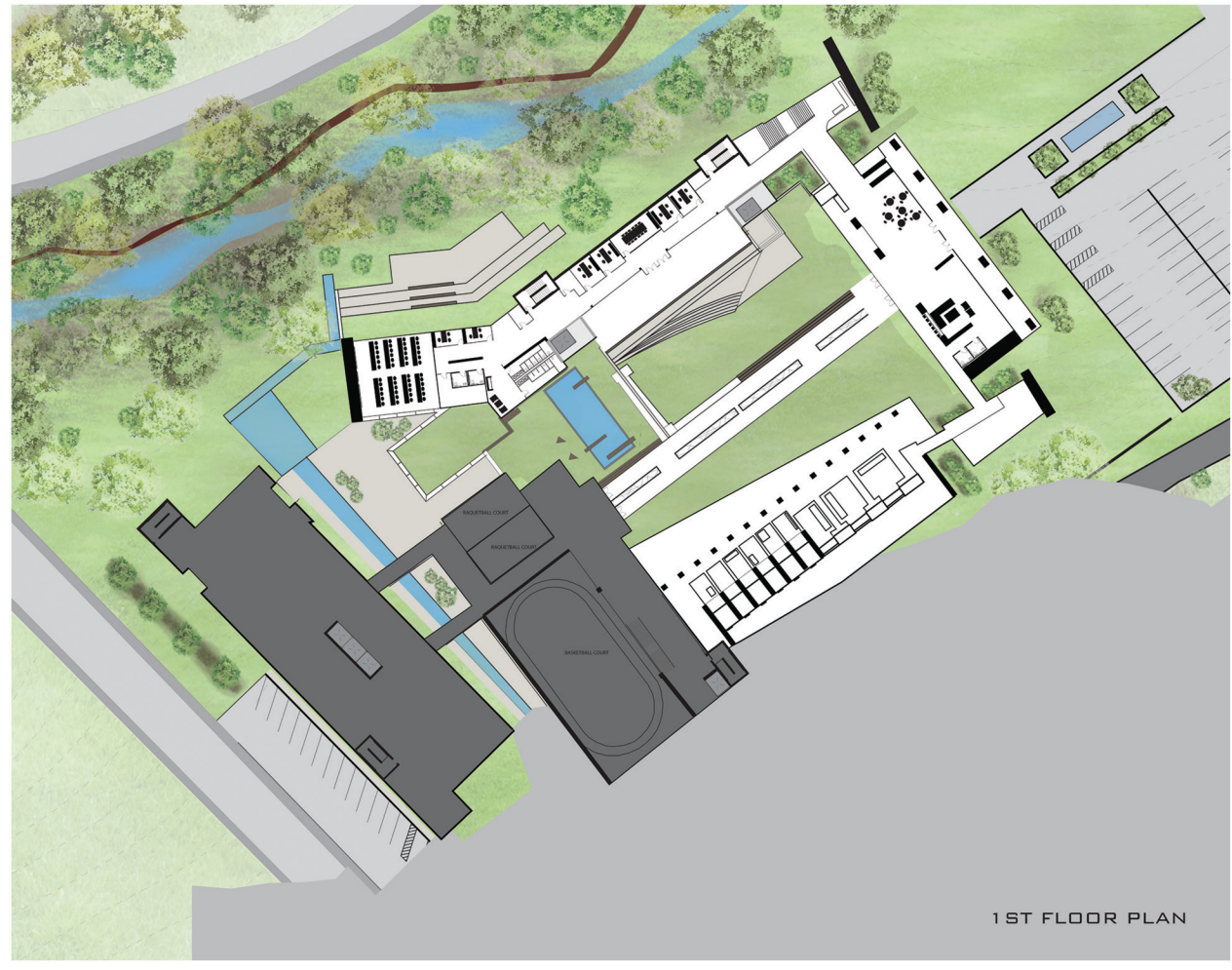
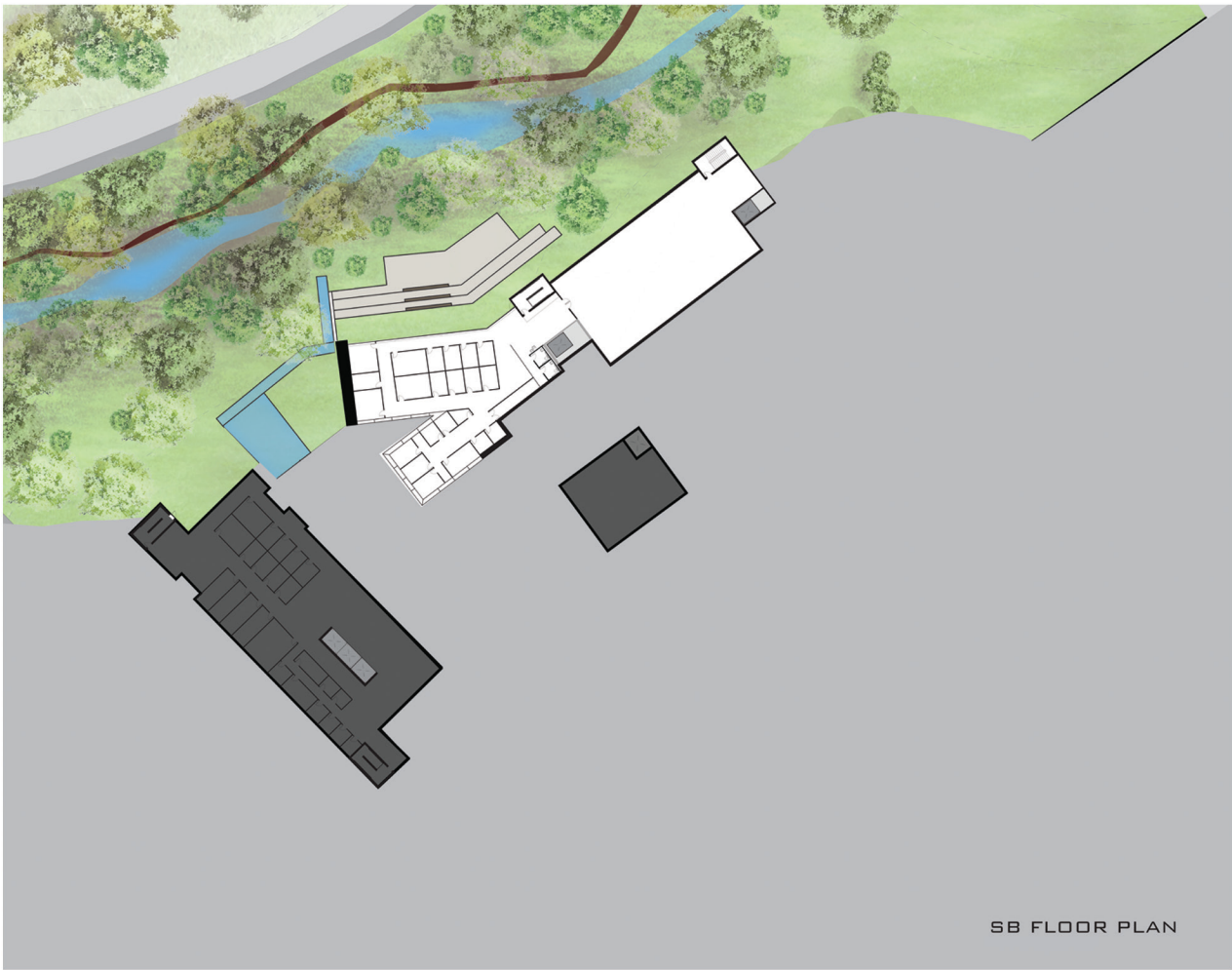
THERAPY BUILDING CAFETERIA

7

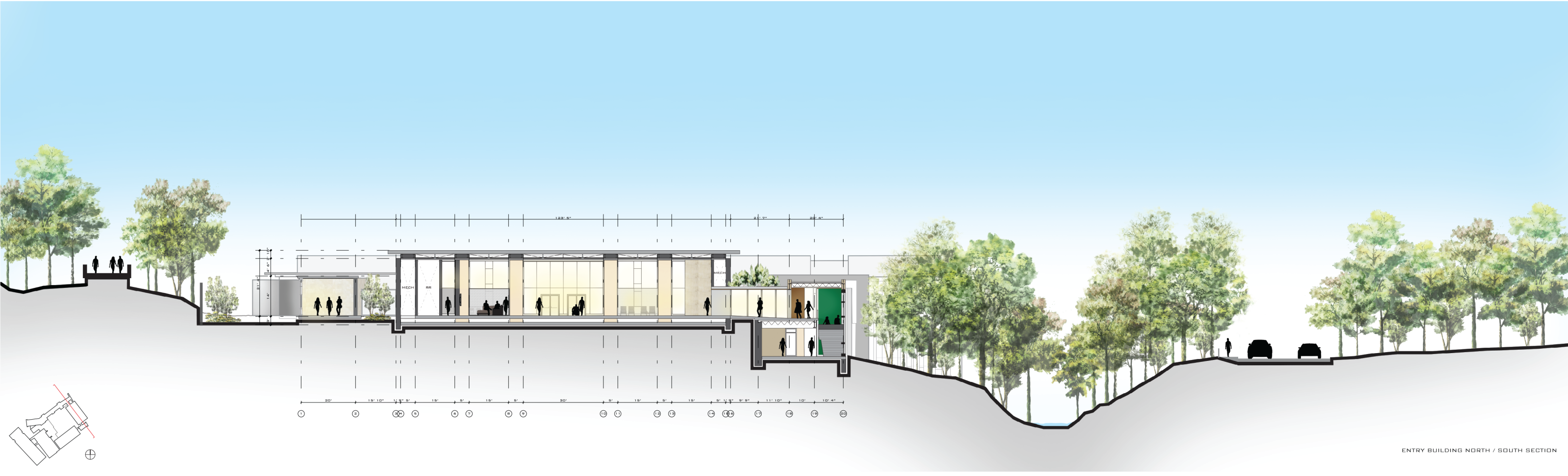




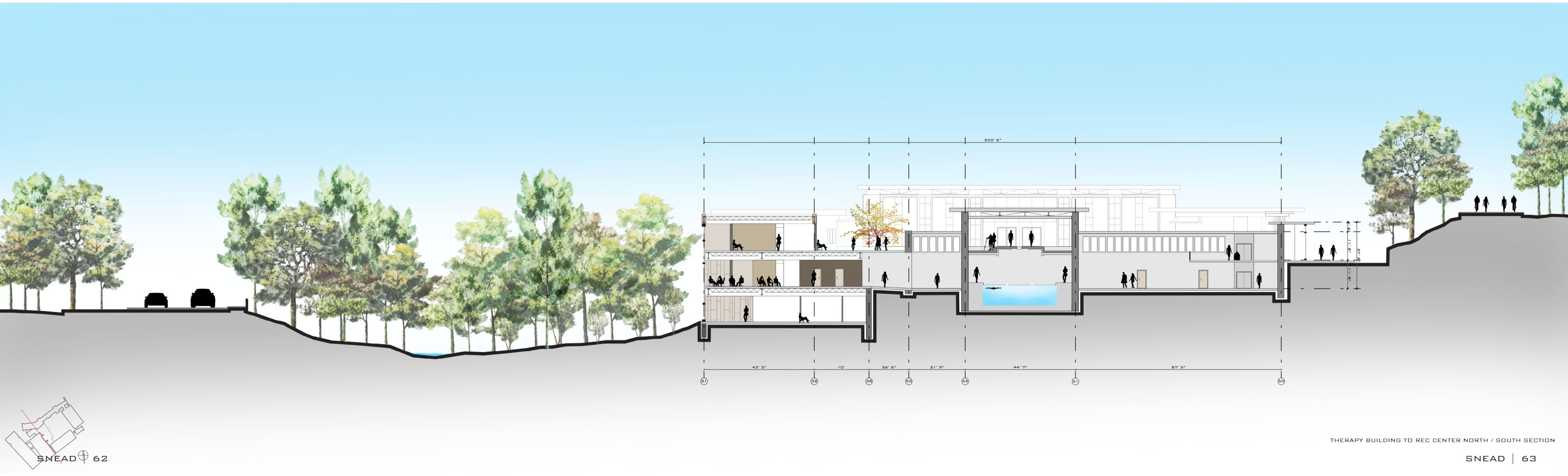






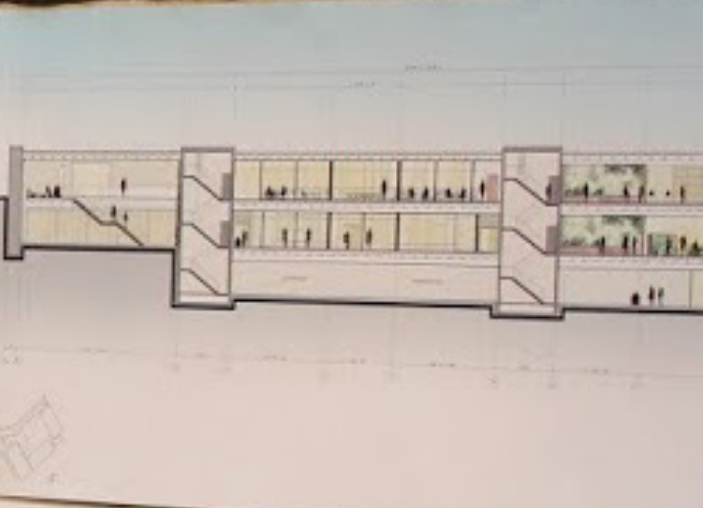


ENTRY BUILDING NORTH / SOUTH SECTION



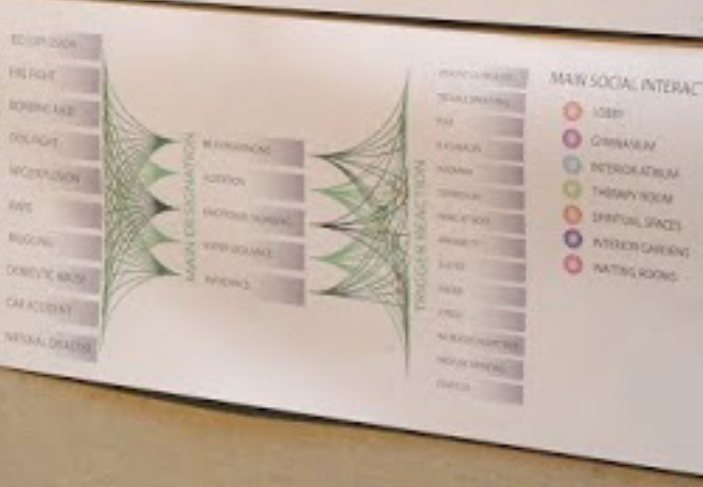
THERAPY BUILDING TO REC CENTER NORTH / SOUTH SECTION





**THE FACES OF PTSD**

MARY	ALLIED HEALTH	PTSD
ROBERT	ALLIED HEALTH	PTSD
ALBERT	ALLIED HEALTH	PTSD
THOMAS	ALLIED HEALTH	PTSD
DAVID	ALLIED HEALTH	PTSD







THE FACES OF PTSD

NAME	AGE	STATUS	LOCATION
1. JAMES	35	WARRIOR	AFghanistan
2. JAMES	35	WARRIOR	Afghanistan
3. JAMES	35	WARRIOR	Afghanistan
4. JAMES	35	WARRIOR	Afghanistan
5. JAMES	35	WARRIOR	Afghanistan
6. JAMES	35	WARRIOR	Afghanistan
7. JAMES	35	WARRIOR	Afghanistan
8. JAMES	35	WARRIOR	Afghanistan
9. JAMES	35	WARRIOR	Afghanistan
10. JAMES	35	WARRIOR	Afghanistan

60





