

## ABSTRACT

Title of dissertation: THE CREATION, EVOLUTION , AND  
DEGRADATION OF THERAPEUTIC  
LANDSCAPE DURING THE 19<sup>TH</sup> AND 20<sup>TH</sup>  
CENTURIES IN THE UNITED STATES

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During the 18th and 19th centuries, planners, and medical reformists emphasized the restorative effects of natural settings in healthcare facilities. Then, in the 19th and 20th centuries, many hospitals campuses across the United States extensively applied therapeutic landscapes in their designs. While the architectural history of hospitals has been studied thoroughly, the gardens of healthcare institutions have not been independently investigated. In the 20th century, socio-cultural changes and modern technologies caused a degradation of therapeutic landscapes in hospitals. Today, new approaches to medicine and health necessitate a reexamination and reinvention of hospital landscapes in order to better align hospital atmospheres with modern healthcare goals. The goal of this dissertation research is to understand the transformation of hospital landscapes, their evolution and degradation within their socio-cultural context during the 19th and 20th centuries in the United States. This

study will also addresses the broad concept of therapeutic landscapes and holistic approaches to using hospital gardens for restorative purposes. Therefore, this research aims to redefine the therapeutic landscape in healthcare facilities by proposing ideas to expand their socio – cultural capacities and extend their therapeutic properties beyond conventional practice.

This research hypothesizes that throughout the 19th and 20th centuries in the United States, the therapeutic landscape in hospitals was degraded, and that the reemergence of conventional landscape practices is insufficient to address the whole healing properties of hospital sites. To achieve the stated goal, this research applied a qualitative approach through a case study method. Data collection was conducted via a triangulation strategy, and included semi- structural interviews, content analysis, and an extensive literature review. In analyzing the collected data, I used thick description, spatial-comparative analysis, and content analysis integrated into a holistic framework, in order to examine both historical and modern practices. Analysis of results concluded that throughout the 19th and 20th centuries, the therapeutic hospital landscapes in the United States became degraded due to the introduction of new technologies. In addition, the reemergence of conventional landscape practices, such as small healing gardens, does not fully address the restorative potential of hospital sites. Therefore, many new possibilities need to be explored and implemented.

## ABSTRAKT (in German)

Titel der Dissertation :     DIE SCHÖPFUNG, ENTWICKLUNG UND DER  
                                  VERFALL DER THERAPEUTISCHEN  
                                  LANDSCHAFT IM LAUFE DES 19. UND 20.  
                                  JAHRHUNDERTS IN DEN VEREINIGTEN  
                                  STAATEN

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Während des 18. und 19. Jahrhunderts betonten Architekten, Raumplaner und medizinische Reformisten die analeptischen Effekte von natürlichen Umgebungen im Gesundheitswesen. Später, im 19. und 20. Jahrhundert, haben viele Krankenhäuser in den Vereinigten Staaten therapeutische Landschaften in ihr Landschaftsdesign integriert. Während die architektonische Geschichte von Krankenhäusern gründlich untersucht wurde, wurden die Gartenanlagen der Einrichtungen des Gesundheitswesens nicht unabhängig betrachtet. Im 20. Jahrhundert führten soziokulturelle Veränderungen und moderne Technologien zu einem Verfall der therapeutischen Landschaften in Krankenhäusern. Heute erfordern die neuen Denkansätze im Bereich Medizin und Gesundheit eine erneute Untersuchung und Neuerfindung von Krankenhauslandschaften, um die Krankenhausatmosphäre besser mit den modernen Gesundheitszielen zu vereinen. Der Zweck dieser Dissertation ist es, die Umwandlung von Krankenhauslandschaften, deren Entwicklung und Verfall in ihrem soziokulturellen Kontext während des 19. und 20. Jahrhunderts in den

Vereinigten Staaten zu verstehen. Diese Studie beschäftigt sich auch mit dem breitgefächerten Konzept der therapeutischen Landschaften und ganzheitlichen Ansätzen zur Nutzung von Krankenhausgärten für regenerative Zwecke. Daher zielt diese Forschungsarbeit darauf ab, die therapeutische Landschaft im Gesundheitswesen neu zu definieren, indem sie Möglichkeiten in den Raum stellt, ihre sozio-kulturellen Eigenschaften zu erweitern und ihre therapeutischen Eigenschaften über die herkömmliche Praxis hinaus zu erweitern. Diese Forschungsarbeit nimmt an, dass während des 19. und 20. Jahrhunderts in den Vereinigten Staaten die therapeutische Landschaft in Krankenhäusern dem Verfall preisgegeben wurde und dass die Wiederherstellung der konventionellen Landschaftspraktiken nicht ausreicht, um die gesamten heilenden Eigenschaften der Gesundheitseinrichtungen auszuschöpfen. Diese Dissertation hat einen qualitativen Ansatz durch eine Fallstudienmethode angewendet. Die Datenerhebung erfolgte über eine Triangulationsstrategie und umfasste semi-strukturelle Interviews, Inhaltsanalysen und eine umfangreiche Literaturrecherche. Bei der Analyse der gesammelten Daten verwendete ich eine umfassende Beschreibungen, eine räumlich-vergleichende Analyse und eine Inhaltsanalyse, die in einen ganzheitlichen Rahmen integriert wurde, um sowohl historische als auch moderne Praktiken zu untersuchen. Diese Forschungsarbeit kommt zu dem Schluss, dass während des 19. und 20. Jahrhunderts die therapeutischen Krankenhauslandschaften in den Vereinigten Staaten durch die Einführung neuer Technologien dem Verfall preisgegeben wurden. Darüber hinaus kann die Wiederherstellung konventioneller Landschaftspraktiken, wie z. B. kleiner Heilgärten, nicht vollständig das regenerative Potenzial von Krankenhausgeländen wiederherstellen. Viele neue Möglichkeiten müssen erforscht und anschließend umgesetzt werden.

THE CREATION, EVOLUTION , AND DEGRADATION  
OF THERAPEUTIC LANDSCAPE DURING THE 19<sup>TH</sup> AND 20<sup>TH</sup>  
CENTURIES IN THE UNITED STATES

by

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## Preface

Memories of the mornings of my youth are infused with the smell of damask roses and gentle breezes ruffling the leaves of weeping willows in my paternal grandparent's fruit garden. I spent many hours every day with my siblings playing among the liliun flowers, under the shades of walnut, hazelnut, and quince trees in famous courtyard garden of my mother's parents. During the destructive war between Iran and Iraq, I experienced a true "biophilic garden" in their well-maintained yard, beautifully planted with snowball hydrangeas and Persian silk trees, which was inhabited by numerous birds and insects.

My hometown, Kermanshah, was once famous for its beautiful landscape and herbal medicine. As a young adult, I worked on the preservation of historic buildings and gardens and I always felt connected to a particular hospital and its story. In 1916, an American woman, Dr. Stead, opened the first modern hospital in the city. The hospital was once famous for its renowned physicians, and successful treatment of patients. In the popular culture of the region, this hospital was known as the "American hospital", and it had a beautifully designed garden. Even a century after it was built, the cultural influence of that institution remained noticeable in everyday life of the local citizens. For instance, the word "Bakh" (garden in Kurdish) was used by people to refer to all hospitals and healing environments because the gardens were so closely associated with that reputable hospital. After earning Master's degrees in Architectural Engineering and Urban Design and Planning, I served as a member of the board of the Expertise Committee of Healthcare Design and Construction in the

national headquarter and technical office of the Social Security Organization of Iran. Heeding my mother's advice to use my talents to care for humans, I designed and built several hospitals and healthcare buildings across Iran.

In 2010, immigrating to the United States gave me valuable experience in the healthcare industry. Being involved in several hospital projects extended my knowledge of American healthcare design and building standards. It also increased my familiarity with pioneering research methods in therapeutic environments as well as the restorative impacts of nature in hospital settings. Pursuing Ph.D. with a special concentration on therapeutic landscapes has been a life-changing experience that has provided me a solid foundation for academic and professional practice. This experience has been a significant milestone and has put me on a spiritual journey to care for the sick and ease human burdens. It is my hope that this dissertation contributes to academia and inspires professionals in healthcare design to expand the restorative properties of hospital environments beyond those of the contemporary facilities. Those professional and personal experiences, in addition to what I learned inspire me to return to my motherland and apply the knowledge and experience of therapeutic garden design to serve the people who once valued the healing effects of nature.

This dissertation has been organized in six chapters as following; The first chapter introduces the literatures, key concepts, research questions and hypothesis. A methodological framework was constructed, and has been discussed thoroughly in the second chapter. Although the third chapter is actually a literature review, it serves as document analysis. Within this chapter, six critical examples have been

investigated to examine the hypothesis of this research. The fourth chapter focuses on Walter Reed Army Medical Center as the case study of this dissertation. The fifth chapter highlights important results of this study. Finally, the sixth chapter addresses the conclusion, limitations and contributions of this qualitative inquiry into the study of therapeutic environments.

## Dedication

This dissertation is dedicated to my mother, Fatemeh Pakzad, whose  
encouragement, trust, and constant love sustain her children.

May her memory remain as an endless source of healing for me.

## Acknowledgements

First and foremost, I'd like to express my appreciation for my advisor, Kelly Diana Cook. It has been an honor to be her Ph.D. Student, and I am grateful for her valuable contributions of time, wise guidance, and financial support. Her trust in my ability to conduct this research, and her very productive reviews of my work, motivated me during the tough times as I pursued my Ph.D. I am especially grateful to all of my advisory committee members for their helpful personal advice and academic contributions during my residency at the University of Maryland, College Park, which aided me in finishing this research. This project has also benefited from the generous editing provided by the English Editing for International Graduate Students (EEIGS) program administered by the Graduate School, University of Maryland College Park. I am grateful to all of the people at the EEIGS office, including Linda C. Macri, Sharon Von Bergener, Norine Walker, and John L. Kuntz. Conducting this dissertation would have been more difficult without support from the University Library System. I am deeply grateful to the McKeldin Library staff, and for the services they offered through text books, interlibrary loan, and a welcome study environment. I would also like to thank, in particular, Dr. Eric W. Boyle, the chief archivist at the National Museum of Health and Medicine, which granted me access to the Walter Reed Army Medical Center Historical Collection, Otis Historical Archives. I also wish to thank those distinguished scholars and professionals who accepted my invitation for an interview and assisted my work through their insight and expertise on this subject.

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## List of Abbreviations

Abbreviation	Meaning	Page
AEH	America's Essential Hospitals	73
AFIP	Armed Forces Institute of Pathology	251
AMEDD	The Army Medical Department of the U.S. Army	52
ARSGW	Annual Report of the Surgeon General to the Secretary of War	145
ART	Attention Restoration Theory	187
ASLA	The American Society of Landscape Architects	178
BRAC	Base Realignment and Closure	267
CAEDD	City of Austin Economic Development Department	191
CAREN	Computer Center and Assisted Rehabilitation Environment	267
DEPMED	Deployable Medical Center	148
DHD	Dutch Hospital Design	167
DHS	Department of Homeland Security	99
EBD	Evidence Based Design	135
FBCH	Fort Belvoir Community Hospital	159
GAMC	Glendale Adventist Medical Center	176
GSA	U.S. General Service Administration	101
HEPA	High Efficiency Particulate Air	161
HVAC	Heating, Ventilation and Air Conditioning	161
ICRC	International Committee of the Red Cross	138
ITS	Intelligent Transportation Systems	333
JAMA	Journal of the American Medical Association	332
LCA	Landscape Characteristic Assessment	45
LEED	Leadership in Energy and Environmental Design	161
MASH	Medical Army Surgical Hospital	148
MATC	Military Advance Training Center	224
MUST	Medical Units Self-Contained and Transportable	148
NAMI, Athens	National Alliance on Mental Illness, Athens	109
NARA	National Archives and Records Administration	243
NICOE	National Intrepid Center of Excellence	156
NIH	National Institute of Health	153
NMHM	National Museum of Health and Medicine	259
NTHP	National Trust for Historic Preservation	99
NYC	The City of New York	65
PIU	Principles of Intelligent Urbanism	334
PTSD	Post-Traumatic Stress Disorder	155
TEMPERK	Tent, Expandable, Modular, Personal	148
TIIH	The Institute for Integration	155
UNESCO	The United Nations Educational, Scientific and Cultural Organization	167
USAMD	United States Army Medical Department	220
USMMC	United States Military Medical Center	220
UTMM	Urban Typo Morphological Method	45
UV radiation	Ultraviolet radiation	161
WCCS	The War Camp Community Service	227
WRAMC	Walter Reed Army Medical Center	258
WRNMMC	Walter Reed National Military Medical Center	267
YMCA	The Young Men's Christian Association	227

# **Chapter 1: Introduction**

## **1.1. General Description of the Areas of Concern**

This dissertation carries out a qualitative inquiry into the creation, evolution, and degradation of therapeutic hospital landscapes during the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States. It explores the therapeutic characteristics of hospital landscapes and interprets the design fashions, cultural values, historical events, and medical and scientific advances that shaped hospital grounds. Accordingly, this study examines the evolving concept of healing, as well as hospital design in its socio-cultural environment, in considering how hospital landscapes may be used to improve public health and enhance well-being. This dissertation includes study of both historical and contemporary hospital practices. The historical part aims to understand how socio-cultural changes and the introduction of modern medicine influenced the therapeutic environments of hospitals and their landscapes. This study of modern hospitals shows why the reemergence of conventional healing gardens does not address the full restorative potential of hospital grounds, and explores the future possibilities for enhancing the therapeutic properties of hospital landscapes. The conceptual research problems of this dissertation are concerned, first, with the socio-cultural role of hospital landscapes, an understudied topic in the literature. Second, the dissertation focuses on the therapeutic landscapes of hospitals, a subject that has not been researched independently, as it is typically classified under studies of hospital architecture. The conclusion of this inquiry will shed light on the influential factors that led to the

evolution of hospital landscape design, both in terms of historical and conventional practices.

The practical application of the results of this dissertation can extend to future design and planning strategies that improve the therapeutic qualities of hospital landscapes, both within existing institutions and new healthcare facilities. These strategies are applicable at different scales according to the socio-cultural and environmental conditions of the sites. The conclusion of this dissertation contributes to the literature on therapeutic landscapes, as well as methodologies and research on restorative environments and the practices of healing gardens. The implications of the results of this dissertation confirm the importance of the historical role of hospital landscapes and their restorative effects, and also describe the development of public parks during the last two centuries. This dissertation explores previous research on therapeutic gardens and investigates the design and planning strategies that improve or hinder the restorative values of natural settings in healthcare facilities. As a result, this study suggests a broader application of healing gardens, extending the restorative values of nature beyond the boundaries of contemporary hospitals by implementing a holistic approach to therapeutic landscape design. In other words, this study offers a new perspective to regenerate a model of healing landscape in new healthcare facilities. While qualitative methods are very common in research on therapeutic landscapes, this qualitative inquiry applied case-study methods to investigate both the historical and contemporary practices of healing gardens in the United States. Therefore a qualitative framework was established by integrating three methods. The framework applied comparative spatial analysis, content analysis, and thick description to analyze the data.

## **1.2. Literature Review and Key Concepts**

The focus of this dissertation is on existing studies of hospital landscapes that incorporate major historical events, histories of military medicine, medical and technological advancements, and landscape design and architectural practices in addition to the study of the socio-cultural evolutions of the United States during the 19<sup>th</sup> and 20<sup>th</sup> centuries. During the 16<sup>th</sup> and 17<sup>th</sup> centuries, the courtyard gardens of cruciform hospitals included pleasing vistas and medicinal gardens to heal patients. Primitive hygiene regulations, fresh air, and proper ventilation determined the hospital spaces. Additionally, the intellectual belief in the healing power of nature fostered a new type of restorative landscape in mental hospitals in both Europe and the United States. The recent studies by Arnold (2016), Andrews & Scull (2001), and Granshaw & Porter (1989) comprehensively show how hospitals interacted with the urban spaces of London during the 17<sup>th</sup> and 18<sup>th</sup> centuries. Furthermore, Granshaw & Porter (1989), Risse (1999), Henderson; Horden and Pastore (2007), and Kisacky (2017) described the impacts of hospitals on American society during the last two centuries. In addition to the traditional role of hospitals as a place for spirituality and healing, their transformation due to socio-cultural changes in American cities in the 19<sup>th</sup> and 20<sup>th</sup> centuries have been investigated. Although the preceding studies thoroughly discussed the socio-cultural roles of hospitals and their impact on urban environments, the influence of those communities to create and shape the hospital's outdoor spaces and the perception of the therapeutic landscape in the 19<sup>th</sup> and 20<sup>th</sup> centuries American cities have not yet been studied. The architectural history of hospitals over the last two centuries has been well-studied; their design patterns were also researched intensively

in both the scholarship of Thompson and Goldin (1975) and in more recent work by Kisacky (2017). Such research, however, ignored the landscape and outdoor environments of hospitals, which played a critical role in the creation and transformation of healthcare facilities due to medical and technological changes.

The influence of bureaucracy and technological advancements on American hospitals was discussed by Rosenberg (1995). Also, as argued by Starr (1984), the design strategies of hospitals were seen as a metaphor for the evolution of medicine. Less attention has been paid to the naturalistic settings and gardens of both mental and medical hospitals during those eras. The extensively landscaped grounds of American asylums have been moderately reviewed. For instance Ziff & Gladding (2012) discussed the social and environmental conditions that generated the therapeutic landscape of one of the golden examples of the 19<sup>th</sup> century's asylums. The well-known Kirkbride plans, which were also studied by Yanni (2007). Her study demonstrates the intersection between medical and material culture (Simonsen, 2007). Finally, the effects of drug therapy on the degradation of those institutions and their gardens was researched through a typological review of asylums. Despite those studies, the resemblance and differences of gardens in both the mental and medical hospitals have not been investigated enough to understand the relationships between their therapeutic landscapes and medical practices. Extensive studies on the urban parks and American public spaces were conducted by Cooper-Marcus and Francis (1997), which provided a guideline for designing hospital sites. Other studies, like Rawlings (1998), resulted in a classification of healing gardens based on their restorative theories and principles.

Also, the benefits of healing gardens in hospital settings have been explored through several case studies, including famous examples by Cooper-Marcus & Barnes (1999).

The integration of healing gardens into conventional healthcare facilities has been determined to be a critical shift in the health institutions of the late 20<sup>th</sup> century, as argued by Gerlach-Spriggs, Kaufman, and Warner (2004). In 2015, two studies, by Cooper-Marcus & Sachs and Winterbottom & Wagenfeld, demonstrated the best practices of therapeutic landscapes in the United States which also satisfy other humanistic dimensions of patient's demands, although they did not propose a holistic approach and extensive perspective on entire hospital campuses. Three major cultural components of therapeutic landscapes include human interactions, social construction, and perceived meanings, as defined by Gesler and Kearns (2002). In the same way, Dunkley (2009) and Given (2015) gave significance to the spatial study of therapeutic landscape, and noted that the evolution of hospital sites has not yet been properly addressed. Initiated by Ulrich (1984) and Kaplan (1984), the positive effects of nature and views of nature on humans have been studied and expanded since the last decades of the 20<sup>th</sup> century. Other researchers concluded that environmental conditions such as privacy and exposure to natural elements result in healing (Cooper-Marcus, 1991). Pretty, Peacock, Sellens, & Griffin (2005), and Ward-Thompson (2011) argued that being in nature has a restorative outcome. The study of restorative environments was extended to urban spaces by Faber-Taylor, Kuo, & Sullivan (2001). Other studies suggested that natural and biophilic environments have positive influences on human concentration (Cimprich, 2007). In 2010, Ward-Thompson, Aspinall & Bell, while describing the elements that encourage public health and well-being, addressed the

innovative approaches to creating restorative landscapes. Neither previous typological studies, nor quantitative and evidence based researches, have addressed both the social-cultural and spatial organizations of therapeutic landscapes in hospitals.

### **Therapeutic Landscape, Restorative Environment, and Healing Garden**

Around the mid-17<sup>th</sup> century, the word “therapeutic” was re-introduced to European medical literature. The origin of the word comes from the old Greek word “therapeutic,” which means to treat medically (Hooper, 1839). In the mid-19<sup>th</sup> century, therapeutic was defined as “healing powers of nature.” Merriam-Webster (2016) suggests three definitions for the word “therapeutic,” divided according to the medical or non-medical processes they reference. The first is treatment of disease or disorders by remedial agents or methods; the second and third have meanings addressing the “beneficial effect” and “favorable results” of something on both the body and the mind. On the other hand, Cambridge Dictionary (2016) incorporates happy, relaxed, and healthful connotations to the word. According to the existing literature, “therapeutic landscape” is a garden or planted area that encourages health and well-being (Therapeutic Landscapes Network, 2016). The traditional definition of therapeutic landscape concentrated on those historic or culturally significant sites that gained popularity or fame because of their physical, mental or spiritual restorative properties (Gesler, 1993). Similar to the preceding approach, medical geography put more emphasis on historic and natural characteristics when connecting a specific site with health and well-being (Velarde, Fry, & Tveit, 2007). Within the discourse of medical geography, Gesler (2003) describes the four dimensions of therapeutic landscape that create the sense of place, including 1) natural environment, 2) built environment, 3)

symbolic environment, and 4) social environment. However, ecological psychology applies the theories of environmental affordability and defines it as a “salutogenic environment” (Grahn, Ivarsson, Stigsdotter, & Bengtsson, 2010).

In contrast to the ecological psychology approach, environmental psychology translates therapeutic landscape using two separate sets of theories. While Kaplan & Kaplan (1989) applied the “attention-restoration theory” to describe the main characteristics of the therapeutic landscape, Cooper Marcus & Barends (1999) used the aesthetic-affective theory to define healing properties and mechanisms of nature. In the field of horticultural therapy, the theories of flow experience and sensory stimulation describe the process of mental and physical recovery (Detweiler et al., 2012; Söderback, Söderström, & Schäländer, 2004). Based on the definition of “restore” by Merriam-Webster (2016), a restorative garden is a landscaped environment that brings us back to existence or to a former and original state. While environmental psychology describes the word “restorative” as recovery from mental fatigue, the historical approach emphasizes the order of the space and the beautiful setting that results in mental and physical healing (Gerlach-Spriggs, Kaufman, & Warner, 2004). Since ancient times, healing gardens have been outdoor spaces designed to satisfy the physical, psychological, social, and spiritual demands of patients and physicians in hospital settings, or non-hospital settings such as religious spaces. Erikson (2012) provides a general and broad definition of a healing space: that which restores health and wellness, and which may have some historical components. The gardens for stress relief, social support, and provision of privacy and control are included in her broad definition (Erickson, 2012). By contrast, the University of Minnesota suggests two

definitions based on well-known studies by Ulrich and Eckerling (1996). They argue that all gardens include healing properties, then they also specify that current healing environments targeted specific functions and patients “to make people feel better” (Eckerling, 1996). The recent approach to holistic medicine considers different aspects of human behavior and human nature as interdependent, and therefore defines health as the natural state of humans; it also emphasizes the natural settings that balance the body, mind, spirit, and emotions of a human being (Academy of Integrative Health & Medicine, 2016).

### **Cultural Landscape**

The word “landscape” is a combination of “land” and a Germanic word, “scapjan or schaffen”, which means “shaped lands” (Haber, 1995). In 1908, Schlüter<sup>1</sup>, defined the geography as the landscape science<sup>2</sup> (James & Martin, 1981), then he classified two general types of landscape; “Original landscape”<sup>3</sup>, and “Culture landscape”<sup>4</sup> (Elkins, 1989). The Cultural Landscape Foundation (2016) suggests a broad definition of “cultural landscape”: any landscape that has an association with humans or human activities (The Cultural Landscape Foundation, 2015). It also has been defined as a kind of cultural property, and a representation of the combined works of nature and humans (UNESCO World Heritage Centre, 2015).

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<sup>1</sup> **Otto Schlüter** (12 November 1872 - 12 October 1959) was a German geographer. Schlüter was a professor of geography at the University of Halle from 1911 until his death. He is credited with creation of the term cultural landscape which is one of the turning points of geographical history.

<sup>2</sup> In German: “Landschaftskunde”

<sup>3</sup> In German: “Urlandschaft”

<sup>4</sup> In German: “Kulturlandschaft”

The World Heritage Committee describes the associative cultural landscape as one “that is valued due to its religions, artistic or cultural associations of the natural element” (UNESCO World Heritage Centre , 2015).<sup>5</sup> As stated by the National Park Service (2015), a cultural landscape is “a geographic area (including both cultural and natural resources and wildlife and domestic animals) associated with a historic event, activity or person or exhibiting other cultural or aesthetic values” (National Park Service, 2015). Likewise, from a cultural geographer’s perspective, cultural landscape refers not just to a piece of scenery, but to a wide range of socially created units (Meining, 1979; Richards & Robertson, 2003).

### **Moral Treatment, Environmental Determinism, and Miasmatic Theories**

**A. Environmental Determinism**, a semi-scientific 19<sup>th</sup> century approach, argues that climate and terrain determine human behavior and activity (Semple, 1911). According to Correia (2016), environmental determinism claimed that the physical and natural environment draw the boundaries around and prescribed the possibilities of human societies. While affecting human health and cultural changes, theory partially determined the spaces of hospitals during the 19<sup>th</sup> and 20<sup>th</sup> centuries.

**B. Miasmatic Theory**, suggests that bad or corrupt air is a major source of many illnesses and diseases (Sterner, 2016; Last, 2007), and that the presence of any miasmatic substance, poisonous vapor, or suspended particles from decaying water causes endemic disease (Hoy, 1996). This theory influenced locating process of the healthcare facilities and urban park in the United States (Small, 2008).

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<sup>5</sup> UNESCO World Heritage Committee, 1992-2017.

**C. Moral Treatment** is a theory of human psychological care that recommends using “moral discipline” to restore and heal patients who have a “mental disorder.” This medical-cultural approach to the care of mentally ill people prevailed during the 18<sup>th</sup> and 19<sup>th</sup> centuries, originating from both psychiatry and Christian moral concerns (Laffey, 2003). As described by Wellcome Trust (2015), during the 18<sup>th</sup> century “mental treatment” was the foundation of mental health care in Britain and the Western world that advocates for treatment of mental patients in asylums (Wellcome trust , 2015).

### **Sanitation Reform and the Social Hygiene Movement**

A statistical study and detailed survey was conducted in the 19<sup>th</sup> century by Edwin Chadwick<sup>6</sup> and his colleagues to determine if there were any connections between urban environments and health. His study was read in the United States and resulted in research on urban pollution, and consequently, public health reforms and creation of urban parks in many American cities from 1870 to 1930 (Melosi, 1980). During this period, reformers conducted many scientific studies, and their modern methods and techniques resulted in the social hygiene movement (Cowen, 1964).

### **Hospital**

The word “hospital” originates from the Latin “hospes,” which implies guest. Another word, “hospitum,” has the same roots and means hospitality and hospitable reception (Simpson, 1977). According to the Cassells Standard Latin Dictionary, “Hospes is thus the root for the English words host, hospitality, hospice, hostel and

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<sup>6</sup> He was an English social reformer who is famous for reforming the Poor Laws and improving sanitation and public health.

hotel.” The word hospital, which is used to describe a place where the sick are cared for, implies various meanings depending on the geographical location and linguistic characterizations of the place. The modern Latin languages of southern Europe use the variations of the Latin word “hospitale” or “hospitālis”, such as, “Hôpital” (French), “Ospedale” (Italian), “Hostal” (Spanish) and “Hospedal” (Portuguese). In addition, some Eastern European nations which culturally adopted Latin features such as the Roman language or Catholic Christianity also use variations of the Latin root of hospital, such as “spital” or “spitale” (Romanian), and “Szpital” (Polish). The word “Spitel” in Middle English and “Spital” in old German referred to a charitable house that provided care for low-class and poor patients. While the word that is used in Latin languages has positive implications, the words used in Germanic languages signal some negative impressions of the place. For instance, the words “Krankenhaus” (German), “Ziekenhuis” (Dutch), “Sykehus” (Norwegian) and “Sjukhus” (Swedish) mean the house of sick. All of these words were constructed from two separate parts of sick and house. Similarly, in Iranian languages, the words for hospital mean the place for sick such as “Bimarestan” (Persian for medical hospital), “Temaristan” (Persian for mental hospital), Nakhosh khanah (Kurdish for medical hospital), “Temar Khanah” (Kurdish for mental hospital), with the exception of “Shifa khanah” (Dari dialect of Persian) which means the house of healing. On the other hand, in Arabic, both the words “Dar Al shifaa” (old Arabic and frequently used in context of Islamic architecture) and “Mustashfan” (modern Arabic) are translated to the place of health and indicate positive meanings.

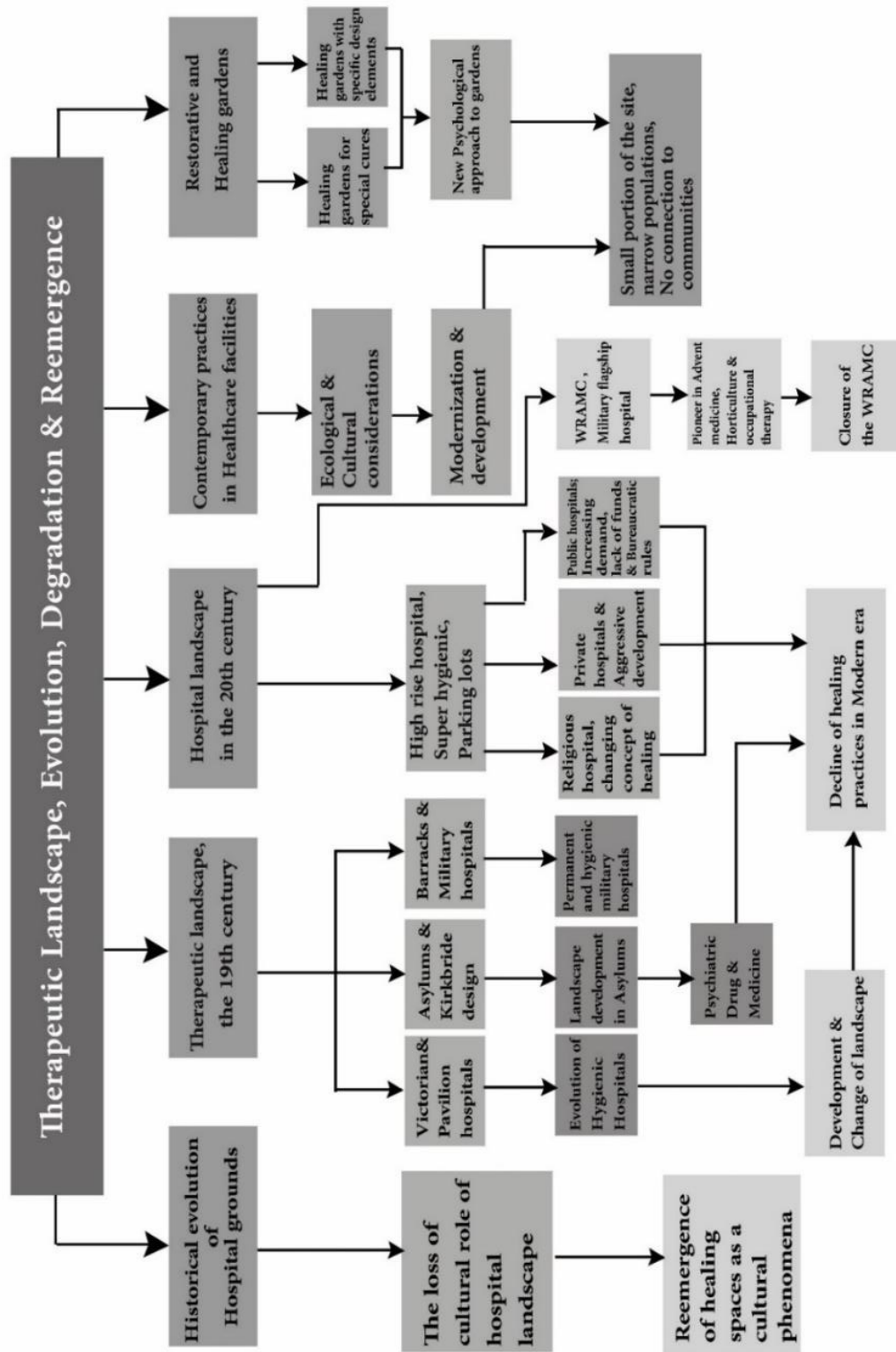


Table 1. Map of Territory of the research (by author).

### 1.3. Purpose of Research

The main assumption of this research is that the therapeutic characteristics of hospital landscapes have been lost or degraded due to the social evolutions, scientific advancements, and medical progress of the last century. This research interprets the design fashions of therapeutic institutions by examining the evolving cultural values, historical events, scientific advances, and spatial perceptions of hospital sites during the 19th and 20th centuries in the United States. This qualitative inquiry investigates the relationships between constructed environments, and explores the concept of healing at the Walter Reed Army Medical Center, which is used as the case study. Hospital sites are significant urban structures; also, they play a critical role in urban landscapes in current degraded urban environments (REC, 2008)<sup>7</sup>. As strategic resources (Dejeant-Pons, 2006; Beatley, 2010), hospital sites not only improve public health within their medical functions and enclosed structures (Gesler & Kearns, 2002), but they also affect well-being beyond their boundaries in the surrounding communities. Accordingly, this research proposes that hospital landscapes can be an active agent in the greater mosaic of urban landscape, offering a broad range of therapeutic impacts on neighboring communities. The study of the “social system of health culture”<sup>8</sup> (Weildman, 1977), with a focus on the evolving concept of “healing” through hospital landscapes, opens a new perspective on existing literature. Through a socio-historical study of hospitals’ landscape design, this study extends the domain of

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<sup>7</sup> Regional Environmental Center for Central and Eastern Europe [REC], 2008.

<sup>8</sup> The organization delivery of healthcare system, in any social-cultural context, is defined as the “social system of health culture”. According to traditional positivist health geography, health culture includes the spatial arrangements of a system and its components (Weildman, 1977).

the “healing space” beyond the walls and construction of those sites. By referring to the experiences of the last two centuries in the United States, the analogies and results of this study may help landscape architects, administrative and medical staff, and urban designers and planners to reconsider hospital sites and their therapeutic environments on a larger scale in order to more effectively benefit public health. Recent studies confirm the advantages of using gardens and plants in healthcare facilities to lower the cost of health delivery and improve the satisfaction of patients, families, and staff (Ulrich, 2002; Hartig, 1991; Horsbrough, 1995). Such studies advocate for creating new gardens in order to enrich healing experiences within the spaces and improve the physical environments of existing medical facilities (Williams, 1999). This research can develop the current scale of small enclosed healing gardens (Souter Brown, 2015) by extending them to the larger boundaries of hospitals, thereby reclaiming the restorative properties of plants and other healing elements in the landscape design of healthcare facilities. Besides increasing the green areas, this approach to design provides an environment for people to engage and socialize with one another on a larger scale, and consequently, the hospital landscape may be redefined as a sociocultural space.

#### **1.4. Problem Statement**

##### **The Propositions of the Research**

**Proposition 1:** Recent research on therapeutic environments suggest that there are a broad range of values, including mental, physical, and socio-cultural ones, in landscaped settings and gardens on hospital campuses, which affect human healing and overall well-being.

**Proposition 2:** Historically, both natural settings and cultural landscapes, such as gardens, were perceived as healing sources, and their restorative properties were applied in healthcare institutions.

**Proposition 3:** Throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries, socio-cultural changes and the rise of advent medicine and cutting edge technologies precipitated an evolution in hospital design, which led to the degradation of therapeutic landscapes on hospital grounds in the United States.

**Proposition 4:** The advanced medical studies and holistic approach to care necessitate reexamining conventional healing environments and reinventing therapeutic landscapes at state-of-the-art hospitals.

### **Research Hypothesis**

This research hypothesizes that, throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States, the therapeutic landscape was degraded and the reemergence of conventional landscape practices was unable to address the potential healing properties of hospital sites.

### **Research Questions**

**Main Question:** How has the concept of therapeutic landscape in the United States evolved, degraded, and reemerged on hospital grounds during the 19<sup>th</sup> and 20<sup>th</sup> centuries?

**Sub-Question 1.** What are the historical-cultural components of American society (such as modern technologies, advent medicine, and religious and social perceptions)

that influenced hospital sites and their therapeutic landscape during the 19<sup>th</sup> and 20<sup>th</sup> centuries?

**Sub-Question 2.** How have healing practices and military medicine in the 20<sup>th</sup> century shaped the spatial-physical environment and the therapeutic landscape of Walter Reed Army Medical Center?

**Sub-Question 3.** How can hospital sites address the broader concept of the therapeutic landscape in health care facilities?

## **Objectives**

1. Explore and describe the impacts of socio-cultural events, advent technologies, and modern medicine on the evolution of therapeutic landscape during the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States.
2. Define a broader conception of therapeutic landscape through the socio-cultural lens of 19<sup>th</sup> and 20<sup>th</sup> century development, and by looking at the spatial environments of current hospital sites in the United States.
3. Explain and evaluate the reemergence of healing landscape in contemporary practices of healthcare design in Europe and the U.S.
4. Generate a hypothesis that addresses both the historical degradation and recent reemergence of healing gardens in hospital design, while expanding upon the theories of healing gardens beyond those found in the existing literature.
5. Test the research hypothesis through an in-depth investigation of Walter Reed Army Medical Center (WRAMC).

## Chapter 2: Methodology

### 2.1. Philosophical Approach

In this study, the therapeutic landscape is considered as a subjective phenomenon<sup>9</sup>. Therefore interpreting the spatial representation of healing landscape, and investigating the restorative experiences within hospital grounds in its historical and contemporary contexts facilitate more in-depth understanding of therapeutic landscape and its subjective meaning. Traditional geographical perspective describes the space and landscape from the lens of outsiders and concentrates on the morphology of external forms (Angen, 2000; Guba & Lincoln, 1989), while recent humanist approach in geography emphasizes the identity and the experiences of insiders (Cosgrove, 1998). Therefore, through conducting *Epistemological approach*<sup>10</sup> to this research, not only the realities or the meanings within the concept of therapeutic landscape were studied (Edwards, 1967; De Gialdino, 2009) but also its context was studied from a closer view (Mason, 1996; Hay, 2010). The relation between the realities of therapeutic landscape (the Truth of the space) and perceptions of participants (the Beliefs of insiders) reconstruct our “Knowledge” of the therapeutic dimensions of hospital grounds. It is expected that the result of this research will be located somewhere in the intersection of the “Truth” and “Beliefs”.

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<sup>9</sup> The subjective character of experience is a term in psychology and the philosophy of mind denoting that all subjective phenomena are associated with a single point of view ("ego"), (Nagel, 1974).

<sup>10</sup> **Epistemology**, as the philosophical approach that embraces the main theme of this research, has particular focus upon the way which therapeutic landscape, is understood, experienced, or produced (Mason, 1996). Epistemology is defined as the way of understanding the world (the surrounding space), and the process to justify beliefs (Hay, 2010).

## 2.2. Interpretive Framework

The social constructivist framework studies the contexts and interprets them as the phenomena while describing individual's experiences (Moustakas, 1994; Creswell, 2013). The subjective meanings of therapeutic landscape are formed within their interactions with other social elements through historical and cultural norms (Durkheim, 1982), therefore using the *social constructivist*<sup>11</sup> framework leads to an in-depth investigation through those meanings (Crotty, 1998). According to Gergen (1985); "Researchers who conduct social constructionist analysis, focus on discourse as well, but less to criticize (mis)representations than to understand how reality comes to be constituted...in written text" (p.48). Therefore, here, content analysis has been conducted to investigate the representation and the socio-cultural role of the therapeutic landscape (as the phenomena), in hospital grounds during the last two centuries in the U.S (as the context). Additionally to evaluate the validity of the results from the content analysis of existing literatures more reliable source of data are required. Then the qualitative content analysis provides more data to vindicate, justify or reject the internal validity of the research hypothesis.

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<sup>11</sup> **Social constructivism**, suggests a search for new understanding of the environment which we live in (Creswell, 2013). In this type of interpretive device, according to Creswell (2012), the focus is on "the specific context in which people live and work in order to understand the historical and cultural settings of participants"(p.25). Thus, the personal interpretation of research's findings, historical-cultural background and research experiences and interactions with space, shape the final conclusion of study.

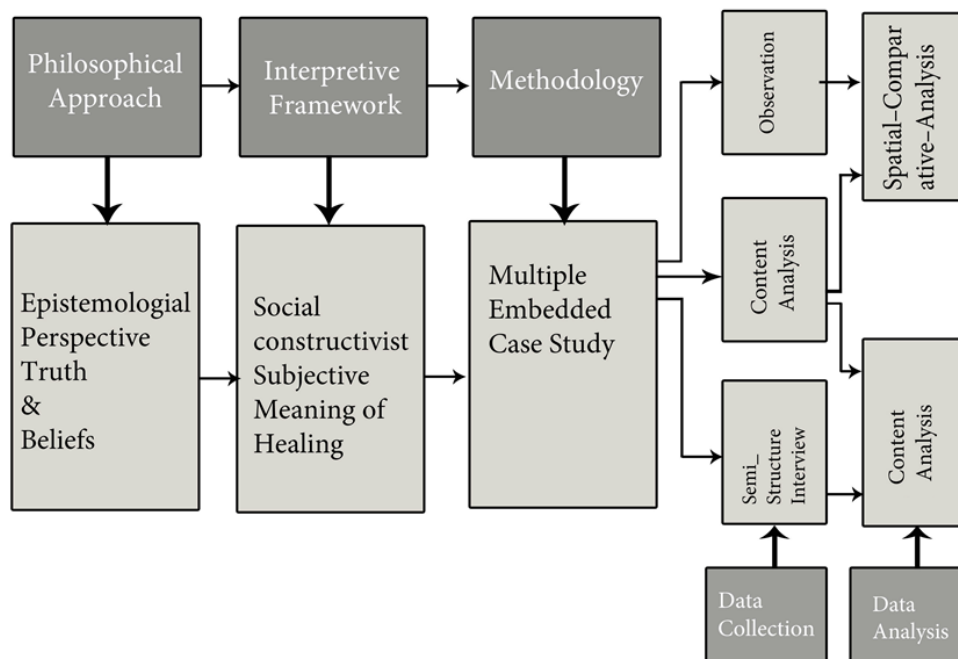


Table 2. The Research design of the study, Philosophical approach and Interpretive Framework (by author).

### 2.3. Qualitative Case Study Approach

In this qualitative research, both the deductive reasoning<sup>12</sup> and abductive inference<sup>13</sup> will be utilized in order to achieve a new understanding from general theme of therapeutic design in the United States during the last two centuries to the more specific example of WRAMC. To study “therapeutic landscape”, in its cultural - social context, the *case study*<sup>14</sup> methodology was implemented. This methodology was conducted because the boundaries between therapeutic landscape (phenomenon) and

<sup>12</sup> Deductive reasoning will be implemented for analyzing the literature, critical examples and the case study.

<sup>13</sup> This will be conducted through the content analysis of the interview transcripts.

<sup>14</sup> The “**Case Study**” is a research method, which has been used in many situation to contribute to our knowledge in related phenomena (Yin, 2013).According to Gerring (2004); “the case study is an intensive study of a single unit for the purpose of understanding a larger class of similar units”(p.342).Thus in order to explore in-depth nuances of phenomenon, contextual influences and also any explanations of phenomena, the case study methodology is used (Baxter J. , 2010).

its spatial –cultural context are not very clear, for example the healing characteristic of space has been defined and constructed in according to distinctive religious beliefs, technological methods and social orders. Both concepts of “healing” and “landscape” include different embedded units, such as historical, social, medical, spatial and even architectural units. To explain the causes and effects of the changing healing spaces, the different embedded units within the case study were investigated. Therefore, *a single case study approach* was designed that embodied multiple units. These units are those that impacted the concept of healing and can be classified as the historical-cultural events, medical advancements and even architectural styles.

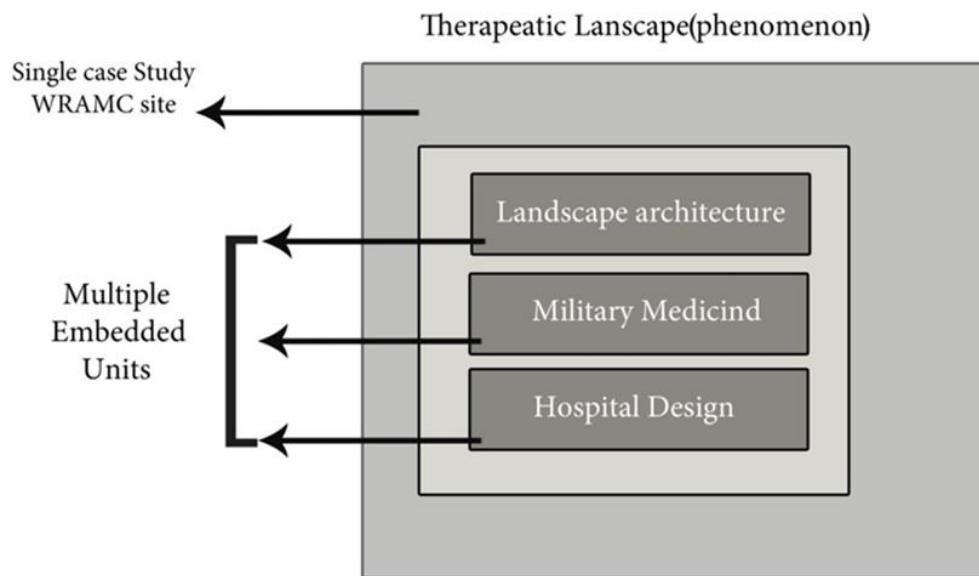


Table 3. A single case study with multi embedded units (by author).

### Generalization of Hypothesis

According to Kennedy (1976) and Creswell (2013), the results of case study research are not generalizable, while Alison & Zelikow (1999) forcefully argued that a single case study can be the basis for generalization. In fact, generalization in science is rarely

based on a single experiment; it is usually based on multiple sets of experiments that have been replicated under different conditions. In this sense, the case study like the experiment does not represent a “sample,” but in doing *case study research*, the goal is to *expand and generalize theories (Analytical Generalization)*, and not to extrapolate probabilities (Statistical Generalization). Analytic generalization is distinct from statistical generalization, in that it does not draw inferences from data to a population. Instead, analytical generalization compares the results of a case study to a previously developed theory (Yin, 2010). In this qualitative case study method, to find credibility in a research hypothesis, a “*Triangulation Strategy*” was applied in two different scopes of work. Those two scope of works include: first, the greater context of the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States and second the WRAMC site (Critical Case or Case Study). This triangulation strategy includes investigation and study of other research studies and their conclusions in the most related disciplines of this research, such as architecture of healthcare facilities, contemporary military medicine, and socio-cultural studies of the last two centuries in the United States. There are a number of case studies that are famous examples of explanatory research, Allison & Zelikow (1999) argue.

### **Generalization Method and Communication**

In this study, the analytical generalization has been made and its conclusions can communicate with two different types of audiences in two scopes of work. First, *General Hypothesis*: the evolution of hospital sites and their landscape design in the last two centuries have been explored within an extensive literature review. Then, its causal relations to medical advancements, socio-cultural development of American

society, and the landscape and architectural movements have been explained. Landscape and architectural historians, therapeutic designers and medical researchers benefit from the first scope of work. Second, the evolution of WRAMC and its landscape have been explained with more details in the second scope of work. This part aims to *challenge or support the Hypothesis* findings. This part can develop a foundation for comparison among other research related to military hospitals; the findings of this comparison might be confirmed or rejected by other cases of military hospitals<sup>15</sup>. But, the lack of the similar or related case study research, with a special focus on the historical-cultural evolution on therapeutic landscape, has made this study more challenging.

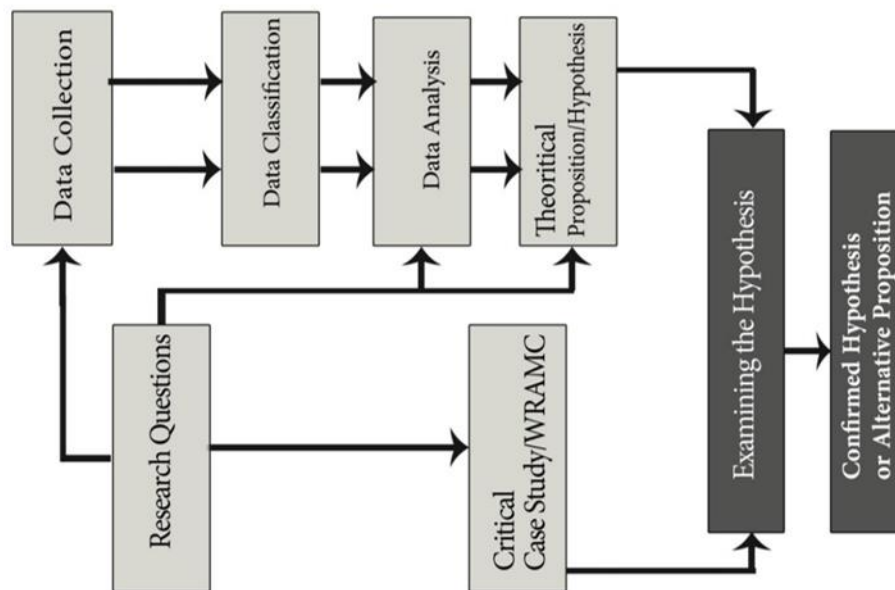


Table 4. The research design, establishing hypothesis and examining it through critical case (by author).

<sup>15</sup> "Beyond making a claim, the generalizability of the findings from a single case study increases immeasurably if similar results have been found with other case studies—whether such studies already existed in the literature or were completed after the first case study" (Yin, 2010).

## 2.4. Data Collection

This qualitative inquiry tries to provide insight and open a new perspective to the phenomenon of therapeutic landscape, even though sufficient data and extensive literature on hospital landscapes are not available. In order to present an in-depth understanding of the case, many forms of qualitative data were collected. There are two major classifications of data, namely, primary and secondary sources. *The primary data* was collected from institutions such as the Library of Congress, the “Wellcome Trust” in the United Kingdom, ASLA, AIA, and The National Museum of American History, U.S. National Library of Medicine, The WRAMC redevelopment office, The National Museum of Health and Medicine, The Office of Medical History at the U.S. Army Medical Department, and The Walter Reed Society and interview transcripts. *Most of the secondary data* was collected from a literature review. According to the nature of this study, one type of data doesn’t satisfy a detailed comprehension of the case, so the data collection process for this research may include following techniques:

### Content Analysis

This method was used for both collecting the data, and also analyzing them, because landscape architecture is expressed by drawing, mapping, constructing and planting, these types of data should be collected by *content analysis* of texts, images, maps, and photos (Deming & Swaffield, 2011; Flyvbjerg, 2006). In Conceptual Analysis (which will be implemented in this research) the assurance of theme is coded and categorized to respond the research questions<sup>16</sup>. (Krippendorff, 2013). According to Krippendorff (2013); “Content analysis is a research technique for making replicable

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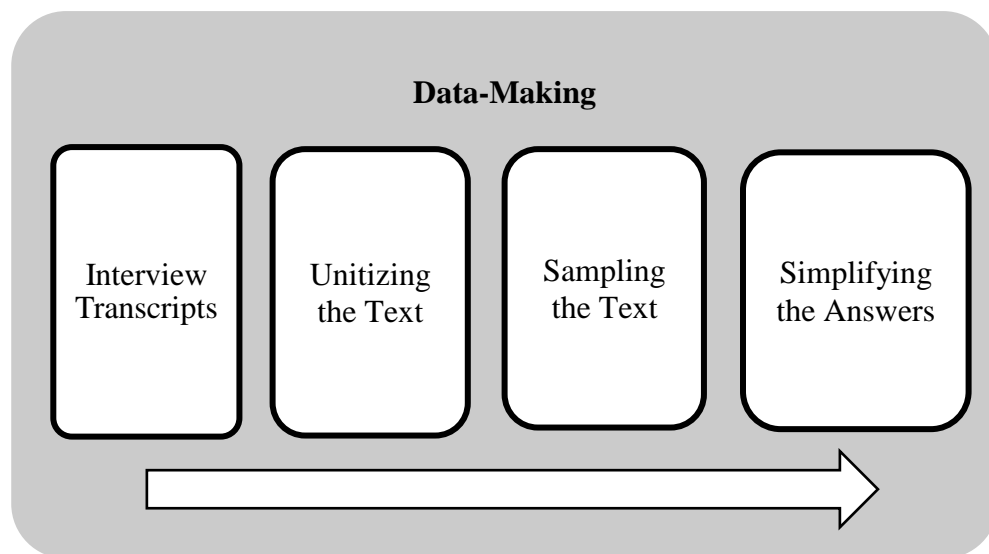
<sup>16</sup> This was done through the carefully designed interview’s questions.

and valid inferences from texts (or other meaningful matter) to the contexts of their use”. The subjects of this analysis are the interview transcripts which have been generated by interviewing seven context-experts and key informants. The result from analyzing these texts is aimed to back the finding of the other parts of the dissertation to make the final justification more reliable and replicable. The focal point of the interview questions is the therapeutic design of the hospital grounds in the last two centuries with a special emphasis on the Walter Reed Army Medical Center as the case study. The targeted questions produce the very specific answers and consequently very narrow units of texts. This sampling process automatically limits the range of interpretations and possible inferences concerning the main questions of the research.

**The Framework of the content analysis:** The proposed conceptual framework by Krippendorff (2013), that provides criteria and standards for evaluation of the results of the content analysis has been chosen and is modified to apply to this research. This framework is simultaneously general and simple in its structure and includes following components:

- A. **Body of the text**, which was provided by interview transcripts.
- B. The **research questions**, which concerns the evolution, degradation and reemergence of the therapeutic landscape on hospital grounds in the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States.
- C. A **context** of the analyst’s choice that includes; the landscape practices in healthcare facilities, the social and cultural events, medical and scientific events that shaped and evolved the environment of the United States during the last two centuries.

D. **Data-Making**, during this phase, the body of texts has been unitized, sampled and simplified to be ready for inferring. The text has been unitized according to expertise and background of interviewees. These unitized texts, have been sampled based on the specific questions of the interviews. Therefore, each of these sampled text corresponds to specific themes or aspects of the existing body of knowledge. Simplifying process include, rewriting the answers, using a third person, reducing a whole answer to minimum winning till phrases. These minimalized texts answer their questions while ignoring non-useful parts of those answers.



*Table 5. The Framework & process of Data Making for Content analysis (by author adopted from Krippendorff, (2013)).*

### **Observation**

Observation is considered as one of the major ways to collect the data. The most important advantage of observation is its capability to collect both qualitative and quantitative data, and it is especially useful for studying behavior and human responses to space (Yin, 2013; Deming & Swaffield, 2011). During the data collection,

Observation was applied especially for the pilot study of the WRAMC (see Appendix E). This research didn't intend to observe the behavior and human activities (Because of this, the research is exempt from IRB review, and see appendix A). In preparation for being on site for the case study, the researcher must be familiar with the landscape and architectural features of the case study site. To that end, *the inventory investigations* of physical elements and spatial order of the existing therapeutic landscapes of the case study<sup>17</sup>, and four critical examples<sup>18</sup> were conducted. In early September of 2015, during the site visit, photos of gardens and landscape elements were taken. These images specifically will be used in order to study the evolution of the WRAMC. Observation was not conducted through the whole process of the study. It has a little contribution to the final conclusion, but the pictures of the recent status of landscape showed design, development and changes of the landscape from the establishment to the closure of the hospital. Studying these pictures solely cannot make a reliable conclusion, but in combination with other documents and sources, it can help develop the hypothesis in these ways: First, despite the dramatic changes of the site, the physical elements of the site and the main structure of landscape have partially survived. Thus, investigating the causal relationships of these partial changes was a part of the whole research investigation. Second, the diverse architectural styles of buildings represent the different socio-cultural, technological significant forces that evolved on the site and its original landscape during the last century. These conclusions support the main theoretical proposition of the research in two ways. It is expected that the analytical

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<sup>17</sup> Walter Reed Army Medical Center

<sup>18</sup> Include; Walter Reed National Military Medical Center, St. Elizabeths Hospital, Fort Belvoir Community Hospital, and Johns Hopkins Hospital.

study of observation's data help to make a connection between external forces and physical-spatial evolutions inside the WRAMC campus. Then, in a broader perspective, these results will be analytically generalizable to other military or non-military hospitals in the United States.

### **Semi-Structured Interviews**

Semi-Structured interviews have been conducted to collect data from participants, regarding their perception of healing spaces and landscape. (Hay, 2010; Yin, 2013). According to the interdisciplinary nature of the research, semi-structured interviews benefits this research in two ways; First, by implementing this type of interview, new ideas are allowed to be brought up. Also a framework of themes will be explored according to expertise of interviewees. Second, this type of interview is specifically useful for this qualitative research because the different questions from diverse specialties and various points of view can be asked to provide more reliable and valid responses to the research questions (for more information regarding the interviewees, participant sampling, interview questions, and important considerations of interview process refer to appendix D).

## **2.5. Data Analysis**

### **Thick Description**

Thick description the method of analyzing the data in this qualitative inquiry which has been especially useful for detailed literature review. According to Lincoln and Guba (1985) thick description is a way to achieve “ a type of external validity” by describing phenomenon in detail the researcher can evaluate and see if the conclusion is transferable to other situations (Lincoln & Guba, 1985). In addition Holloway (1997)

argued that by doing this the researcher connects the social and cultural patterns to their immediate context (Holloway, 1997). Therefore implementing thick description facilitated the understanding of socio-cultural context of the evolution of hospital grounds during the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States.

### **Thick Description to investigate the Concept of Cultural Landscape within Hospital Settings**

According on the definitions provided by Sauer (1925) and UNESCO (2012), any hospital site, historic or modern can be an example of a very cultural landscape. In any hospital site, the culture of health care delivery is a real force that constantly shapes and redefines the physical environment and landscape of health care institutions. The interactions of hospital organization and patients, introduced a fashion of therapeutic behaviors and activities that constructed hospital indoor and outdoor spaces. These indoor and outdoor spaces were also symbolic environments, designed according to the latest and most advanced technological methods and scientific theories. Additionally, they always proposed significant associations to public domains, such as art and cultural beliefs of their contexts, while evolving continually. Any research in health geography with a cultural perspective demands a theoretical foundation based on qualitative methods rather than familiar quantitative methods (Kearns & Gesler, 1998; Moon, 1995). Three major components of healing landscapes include: interaction of humans with their environment, social construction of health, and perceived meanings and cultural construct of health (Gesler & Kearns, 2002). According to Gesler and Kearns (2002), there are five types of therapeutic landscapes: natural, built, symbolic, belief, and social relation landscapes. Recently there has been a considerable shift of

attitudes in hospitals from surgery and recovery services to provide a broader range of healing space for patients and employees. Thus, the therapeutic environments of hospitals can be redefined as the social or symbolic healing landscape (Gesler, Bell, Curtis, & Hubbard, 2004). From the Foucauldian<sup>19</sup> analytical view, any investigation of “spatial discipline” within therapeutic environments provides a framework to gain the in-depth comprehension of orders in space (Given, 2015). This analytical framework can be applied to design process and constructed space, which are the products of human activity and conditions of place (Dunkley, 2009; Evans, Crooks, & Kingsbury, 2009). The inherently dynamic relationships between physician and patients have been defined through a hierarchical order in the enclosed spaces of hospitals; therefore, the characteristics of therapeutic space have been defined in different ways (Knott & Franks, 2007).

## **Content Analysis**

**A. An analytical construct** is a system of operations to strengthen the research’s logic from knowing the context and its connection to the text being analyzed. The “indices and symptoms analysis” was conducted as the proper type of analytical construct for this research. The criteria for establishing a construct will be founded on the correlation and symptomatic relationship between hospital’s landscape on one hand, and medical advancement and design practices on the other hand. To strengthen the reliability of this type of construct, Krippendorff (2013) suggests that these reference indices; first,

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<sup>19</sup> Studies employing the **Foucauldian discourse analysis** may for example look at how figures in authority use language to express their dominance, and request obedience and respect from those subordinate to them. In a specific example, a study may look at the language used by teachers towards students, or military officers towards conscripts. This approach could also be used to study how language is used as a form of resistance to those in power (Given, 2015).

should answer the research question while excluding other answers. Secondly, these indices should not be affected by accidental or irrelevant variables, within the units of the text. The process of the text analysis have been be manually implemented for the following reasons;

- Due to nature of the study and expected outcomes, the proper type of computer software was not available<sup>20</sup>.
- Since the regular computer aids are not able to go beyond the meaning of the words in sentences to find the symptomatic functions of the words, therefore the interview transcripts have been manually analyzed. This is more suitable when the sensitivity of the topic and the required expertise in therapeutic landscape and hospital history come to account.

As Krippendorff (2013) states, when developing an analytical construct to achieve more certainty, the researcher has to rely on a diverse group of sources, including; first, experts' knowledge and experiences, which are considered an asset in improving the validity of the result. Second, the established theories especially in well-researched contexts develop generalization of the results. Third, embodied practices, which are the previous academic or professional practices add value to the final result by making it more generalizable. Therefore benefiting from different expertise made the criterion for selecting the interviewees at the beginning of the process.

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<sup>20</sup> Such as, Annotations for Mac, ATLAS.ti, CAQDAS Comparison, CDC EZ-Text.

**A. Inferences,** the abductive inference<sup>21</sup> was employed for analyzing the texts. By unitizing the texts to answering the questions, abductive inference make a logical bridge between two distinctive and particular phenomena (therapeutic landscape and socio-cultural environment of the last two centuries in the United States).

**B. Narrating the Results,** First the result of inference, has been examined against the research's questions, then they confirm or reject the research's hypothesis. In this way they contribute to the main research's conclusion.

**C. Validating Evidence** and justification of the result. The research focused on the bodies of the text that have meaningful connections to context of hospital design when responding the research questions. Accordingly to validate the inferences from the content analysis, sampling validity<sup>22</sup> and semantic validity<sup>23</sup> are employed. The steps to obtain validity have been classified as follow; first, since the sampled texts have been produced by interviewing the distinguished experts, who have been engaged with the theme of therapeutic design and the specific case of WRAMC, the result of the analyzed texts represent the true "population of phenomena", and therefore ensure **sampling validity**. Second, the main question and three sub-questions of the research have been covered with 15 questions posed to seven interviewees. A multi-level structure of the questions, and the different background of interviewees, made it

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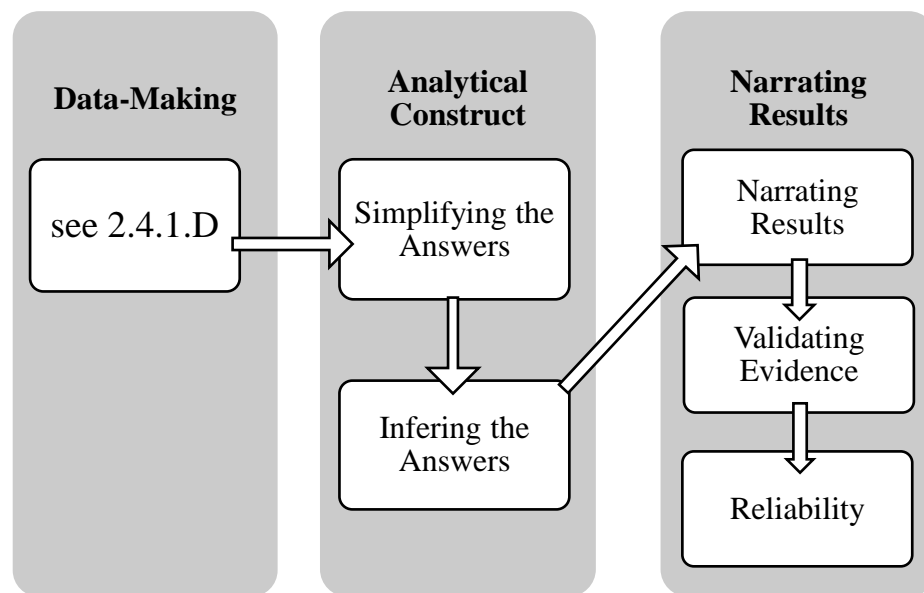
<sup>21</sup> Abductive reasoning (also called abduction, abductive inference) is a form of logical inference which goes from an observation to a theory which accounts for the observation, ideally seeking to find the simplest and most likely explanation.

<sup>22</sup> "When the phenomena of interest is accurately represented in the texts that researchers are analyzing", and biases have been prevented in the process of selecting the text, that research process has sampling validity (Krippendorff, 2013).

<sup>23</sup> Semantic validity "is the degree to which the analytical categories of texts correspond to the meanings these texts have for particular readers, or the roles they play within a chosen context" (Krippendorff, 2013).

possible for the unitized texts to correspond to the whole domain of the research's hypothesis. Therefore this process support the **semantic validity** of the research conclusion.

**D. Reliability;** the results of the content analysis must be replicable in principle (Krippendorff, 2013), to gain reliability. To that end, first, the researcher interviewed several people with diverse expertise and specific focus on the American therapeutic design and landscape. Their specialty, in both academia and professional practice, include; the history of military medicine, healing landscape, healthcare architecture, public health, and civic engagement of WRAMC and its neighborhood. Second, to reconcile potential discrepancies, the researcher has studied the published works and backgrounds of the interviewees to assess data accuracy.



*Table 6. The Framework and process of analyzing the data (by author adopted from Krippendorff(2013)).*

## Spatial Comparative Analysis

Spatial comparative analysis was conducted to interpret the data and to emphasize how phenomenon (landscape) may present differently due to the differences in historical-cultural boundaries. This research design, which has flourished in urban design and architecture, **aims to focus on the place as an initial basis** for conducting comparison analysis in therapeutic space. Therefore, through the literature review, this study determined **the Critical Examples**<sup>24</sup> (it is not a critical case, but it is similar to a Judgment Sample) of therapeutic landscapes from major design styles, socio-cultural, scientific and political movements during the last two centuries. Then, any data including texts, images, maps...with specific focus on their design and external forces, and internal organizations that impacted those sites were collected on a more detailed scale. In next step, those critical examples were studied to investigate and explain their dialectical relationships with their immediate and broader contexts. Therefore, based on those formal-spatial comparisons, their sites' evolution were explained.

There are several well-known methods to conduct spatial comparative analysis for built environments, including “Traditional Morphological Method”, “Space Syntax”, and GIS. Due to four reasons, the Traditional Morphological Method has selected to analyze the critical examples of hospital landscapes. First, the major, portion of this research deals with historical documents and material. Second, the nature of this

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<sup>24</sup> “**Judgment sampling** is a common nonprobability method. The researcher selects the sample based on judgment. This is usually an extension of convenience sampling. For example, a researcher may decide to draw the entire sample from one "representative" city, even though the population includes all cities. When using this method, the researcher must be confident that the chosen sample is truly representative of the entire population” (StatPac, Inc, 2014).

research is qualitative, and the traditional morphological method integrates very well into it. Third, space syntax and GIS cannot detect all of those unmeasurable patterns of environment that can be easily recognized in traditional method (Sun, 2013). Fourth, implementing GIS analysis and Space Syntax methods requires massive data to be transferred into specific software in a specific format, which is very time consuming process. In fact, Traditional Morphological Method (TMM), as a qualitative inquiry focuses on the study of combined man-made and natural environments. Qualitative Spatial Analysis is a result of a systematic study of cities and their historical development (Sima & Zhang, 2009). The research in urban morphology can characterize the wider context of urban landscape (Whitehand, 2007). Therefore, any urban context or block of a city is considered as a part of a greater landscape (Schlüter, 1899). Accordingly in this research, spatial comparative analysis concentrated on the natural and human-made elements of the hospital sites, to investigate any possible shared design features, and similar patterns that shaped their therapeutic landscapes. Consequently this investigation is expected to reveal a correlation between the therapeutic functions of those sites (critical examples), and syntactical characteristics of them. Additionally, it is expected that, the conclusion can justify the sub-propositions concerning the spatial configuration and representation of therapeutic design of landscape in the last two centuries in the United States.

### **The Integrated Framework for Spatial Comparative Analysis**

To spatially analyze the therapeutic strategies and practices that shaped the hospital's landscape, a single morphological approach cannot be beneficial to research, due to following reasons; first, these systems mostly focus on quantitative data, which

is not available in this study. Second, the hospital environments include both buildings and landscapes, required a mix method to combine both the building elements of hospitals, and therapeutic characteristics of landscapes. Third, the healing activities and their plot patterns in hospital sites has not been studied via a spatial analysis method. Therefore an integrated framework has been created to study restorative design and landscape practices. This framework is combined from two familiar spatial-analytical methods; first, Urban Typo-Morphological Method (UTMM), and Landscape Characteristic Assessment (LCA).

#### **A. Urban Typo-Morphological Method, and Variables**

This systematic morphological method studies urban environment and any portion of the land through its historical evolution, and consider them as a systems. According to this approach; the perceived systems are constituted from street systems, building's patterns. But typo-morphological method especially concentrates on the structures and elements of space in smaller scales (Sima & Zhang, 2009), for instance; in neighborhood or campus scale. The flexibility of this method and its adoptability in qualitative studies are the main reasons for its application in this research. Based on the traditional morphological approach<sup>25</sup>, the axonometric and aerial photographs have been used extensively. The Google Earth became very useful in order to provide realistic profiles from the grounds of the critical examples and the case study. After

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<sup>25</sup> The general genres of urban-morphological studies are classified into; geographical, architecture, science, and philosophy. The most important consideration in each of these genres, is the way they represent urban spaces in distinguished model. According to Sima, and Zhang (2009); "Ichnographies provide a concise way to depict urban fabric, while axonometric and aerial photographs expand the understanding of urban space in the third dimension" (p.103:3).

understanding the spatial organization of the sites, the critical examples and the case study were examined against the variables to clarify the therapeutic environment of the hospital's landscape. The variables for typo-morphological analysis have been previously specified by other studies such as Gulgonen (1988), Nanda, (1989), Koster (2001), Lang (2005), Shayesteh, and Steadman (2016). Then these variables have been modified, adopted, and re-classified in this research via six major categories including: 1. Geographical context, 2. Historical significance, 3. Socio-cultural context, 4. Design & planning characteristics, 5. Landscape characteristics, 6. Environmental and ecological considerations.

#### **B. Landscape Characteristic Assessment, and Variables**

The particular characteristics of every individual site define the unique identity and represent the real values of its landscape, and make it distinguishable. Emphasizing on those characteristics, provide transparent explanation and more structured understanding of that landscape properties. The main reasons for selecting Landscape Characteristic Assessment method are; first, this approach includes assessing the physical elements, besides socio-cultural factors (Scottish Natural Heritage & The Countryside Agency, 2002). Second, it fits best in qualitative studies, and especially responds well in historical research (Mahony & Wharton, 2016). Third, urban morphological analysis and landscape characteristic assessment represent many commonalities, for example; both of them deal with assessing and studying of form-function relations, urban evolution, and urban history (Tudor, & Natural England, 2014). Fourth, both methods consider landscape as a medium and simultaneously define it as “common thread” that integrate social, economic, and environmental needs

(Mahony & Wharton, 2016). The landscape of both the critical examples, and case study have been compared against the variables, which were adopted from previous therapeutic studies, as follows;

1. According to Jiang (2015), person-nature engagement strategies that are used in the hospitals' site include: viewing nature, being presence in urban nature, active engagement with nature.
2. Cooper-Marcus, and Sachs (2013), classified the typologies of therapeutic landscapes and healing gardens in general hospital's environments as follows; Viewing garden, roof garden , courtyard, backyard garden, nature and fitness trail, extensive landscape grounds, entry garden, green house and farms, healing garden, and water garden<sup>26</sup>.
3. The critical examples and critical case were examined against their connectivity to surrounding context, and their emphasis on natural healing elements. Based on the results of interview with experts of healthcare design, and therapeutic landscape. Accordingly, the connectivity of a hospital to its surrounding context include; permeable boundaries of the site, direct connections to urban open spaces, providing place for cultural or social activities, and finally , visual connections to its community (Batties, 2015; Marble, 2015; Marcuse, 2015; Sachs, 2015; Tusler, 2015; Wrenn, 2015).
4. In the same way, the critical examples and case study have been studied against the design and planning strategies, which encourage or discourage restorative values

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<sup>26</sup> The last three were added by author.

- and therapeutic properties of the hospitals (Batties, 2015; Marble, 2015; Marcuse, 2015; Sachs, 2015; Tusler, 2015; Wrenn, 2015).
5. Based on the study by Scwheitzer, Glipin, and Frampton (2004), and Verderber (2010), the ecological considerations and environmental elements have been applied to evaluate those strategies that intended to improve restorative landscape of the critical examples and case study.

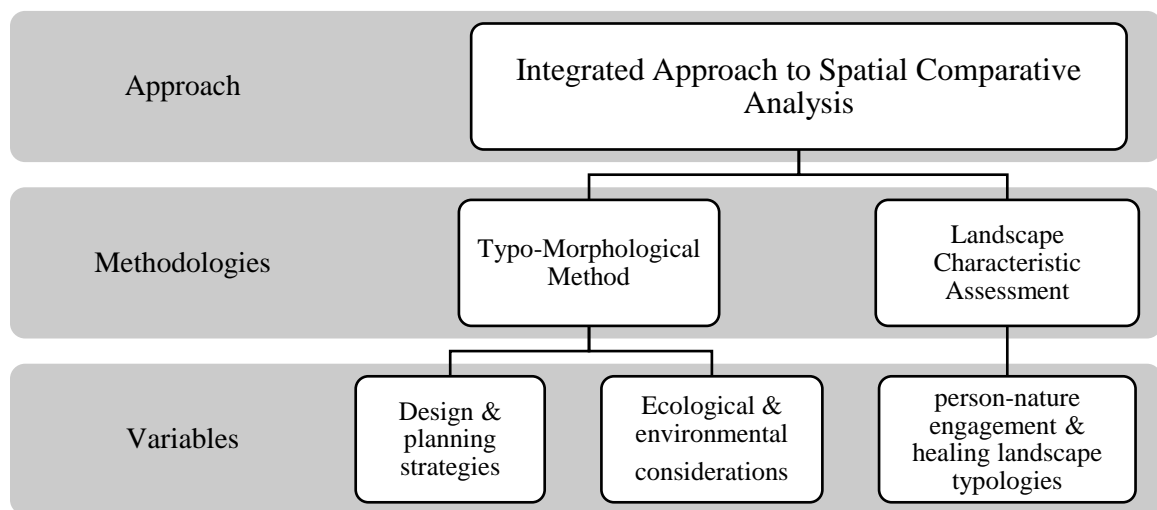


Table 7. Integrated framework to spatial comparative analysis (by author).

## 2.6. The Criteria for Selecting the Cases Study and Critical Examples

Qualitative case study research generally expects what is common between cases within an idiographic<sup>27</sup> frame; therefore, the cases are considered as neither entirely unique nor entirely representative of the phenomenon (Baxter, 2010). During

<sup>27</sup> Based on the definition by Merriam-Webster Dictionary, idiographic means “relating to or dealing with something concrete, individual, or unique” (Idiographic, 2015).

this research, as a qualitative case study, the emphasis was not on the “more-cases-is-better” approach. Therefore, this research aims to discuss *an explanation of therapeutic landscape* (phenomenon) within one site. In order to achieve more *analytical generalization*,<sup>28</sup> and more transferability, the case must be selected carefully (Flyvbjerg, 2006).

## 2.7. Pilot Research

The Pilot Study was implemented during the summer of 2015 and includes the following:

1. Two semi-structured interviews that were completed.
2. Site visit and photography of existing landscapes that were implemented.
3. A visit to the recently designed and constructed hospitals and their healing gardens.

During the summer of 2015, a series of primary data, including historical drawings, maps, site plans and landscape photos of WRAMC, were collected. These data were obtained from National Museum of Health and Medicine (NMHM). The data were retrieved from the “Otis Historical Achieves” and include: 1. Otis Archives Collected material, 2. Public Affairs office Files, and 3. Series 003: Photographs. Also, the site was visited within the pilot study and the primary data of this observation<sup>29</sup> was explained to interpret the spatial-physical evolution of landscape.

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<sup>28</sup> According to Yin (2014), **analytic generalization** is, “the logic whereby case study findings can extend to situations outside of the original case study, based on the relevance of similar theoretical concepts or principles.”(p. 237).

<sup>29</sup> See part 2.4.2. , and Appendix F

## Chapter 3: Document Analysis of the Existing Literatures

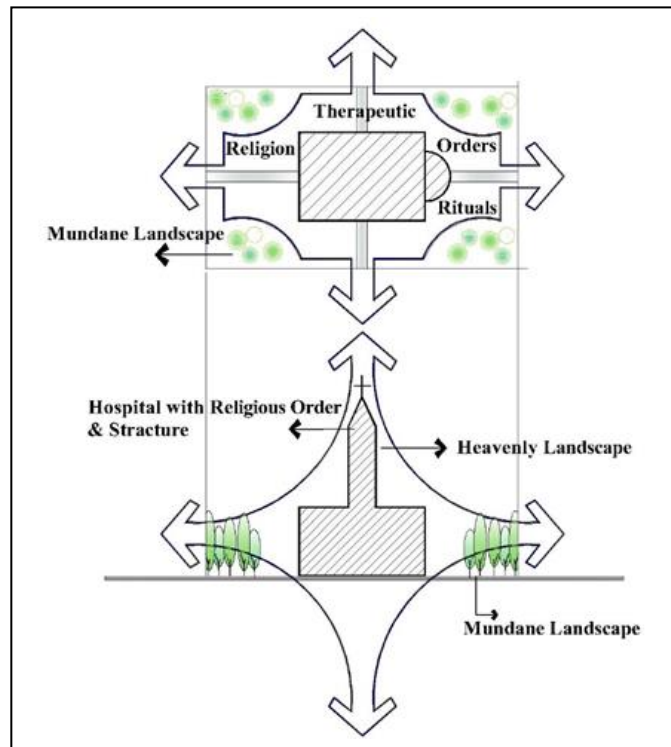
### 3.1. The Origins of the Modern Healing Spaces and Hospitals

The modern practices of medicine have roots in the scientific advances and cultural changes during the 17<sup>th</sup> and 18<sup>th</sup> centuries. The monastic communities, where the healing process through herbs and prayer in cloistered gardens was practiced, were the primitive types of hospitals in Europe during the Middle Ages until the 18<sup>th</sup> century (Thompson & Goldin, 1975; Cooper Marcus & Sachs, 2013). Two distinct approaches in European continent affected the evolving ideas of the health spaces during the 18<sup>th</sup> and 19<sup>th</sup> centuries. First was the reformation of prisons and hospitals which suggested by John Howard<sup>30</sup> in England. The second were the theoretical-historical studies of gardens and the value of landscape to increase the positive feeling and health in Germany. One of the first recommendations for designing gardens in hospitals is written by Hirschfeld<sup>31</sup>, who proposed the healing impacts of nature on patients. He emphasized the close proximity between gardens and hospitals (Schepers, 1980), and argued, "...the garden should be directly connected to the hospital...and should have everything to enjoy nature and to promote a healthy life." (Hirschfeld, 2011).

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<sup>30</sup> **John Howard** (1726 –1790) was a philanthropist and an English hospital and prison reformer.

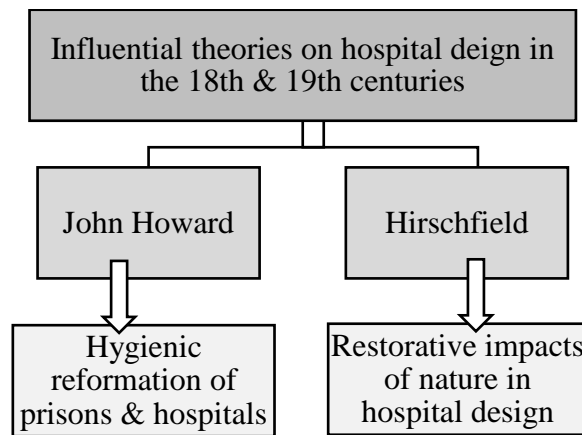
<sup>31</sup> "**Christian Cay Lorenz Hirschfeld**, (1742—1792) German intellectual and Horticultural theorist.



*Figure 1. Healing space of Monastic -Infirmaries, and Religious hospitals (Image by author).*

During the 18<sup>th</sup> century, in addition to monastic communities, “almshouses” were the institutions that provided not only care for patients but also custody for poor people. Founded in 1736, as an infirmery, “Bellevue Hospital”, was the first health facility in colonial America. The hospital included only one ward of six beds in Manhattan, New York City (The City of New York [NYC], 2014; Griffin & Osborn, 1915; Connor, 1990). The main idea was to quarantine sick people in a wilderness landscape, away from the residential areas. Bellevue Hospital was a public institution with an “occupational therapy” approach to its social problems of the day (Knights, 2000) this made Bellevue Hospital not only different from other almshouses but also a pioneer in occupational therapy in new land. Before the 19<sup>th</sup> century, according to Haggard & Hosking (1999): “the belief that medical knowledge would be advanced by

probing evermore deeply into body”, was the most influential achievement of the renaissance of hospital’s design. During this time, the establishment of “Fine Medical Architecture”, as a new architecture tradition, builds a place for conducting healing through scientific medical works, such as hygiene, sanitation, and sterilizations practices (Haggard & Hosking, 1999).



*Table 8 Two theories that influenced hospital design during the 18<sup>th</sup> & 19<sup>th</sup> centuries (by author).*

### **3.2. The Scientific Advances and the Different Traditions that Shaped the Healing Spaces during the 19<sup>th</sup> Century.**

#### **Medical Hospitals:**

After 1860, there was a radical change in the rules of hospital design, which resulted from the new understanding of “germ theory”, and the discovery of bacteria (Heathcote, 2010). The new “Hygienic hospital plans” (Thompson & Goldin, 1975; Pevsner, 1976), which was the direct result of Florence Nightingale’s philosophy of modern nursing (Nightingale, 2015), and “Social Hygiene revolution” (Jones, 1986) in Britain became one of the prominent ideas during the 19<sup>th</sup> and the early 20<sup>th</sup> centuries

in Europe and United States (Granshaw & Porter, 1989; Darton, 1996). When the hospitals gradually evolved and became centers for medical training, and clinical laboratories (Granshaw & Porter, 1989), their landscapes diversified more<sup>32</sup>. In Europe, the hospital grounds evolved from multiple courtyard gardens<sup>33</sup>, to connected buildings along both river sides<sup>34</sup> and at the later decades of century, they evolved into the primal patterns of pavilion hospitals<sup>35</sup> (Pevsner, 1976). The next major shift in hospital design and provision of outdoor space was the development of “Pavilion style Hospitals”<sup>36</sup> (Taylor, 1977), with courtyard gardens between the wards. These enclosed gardens were considered as effective component of the healing environments at the early 19<sup>th</sup> century (Gerlach-Spriggs, Kaufman, & Warner, 2004). The significant characteristic of the pavilion pattern was satisfying both modern hygienic requirements for medical building in its wards and at the same time embracing the natural healing within their courtyard gardens. This design of mass and space, which included hardscape and softscape, was advocated as “the most perfect form of hospital architecture” (Kuhn, 2014; Guadet, 2011) .

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<sup>32</sup> This diversity was more obvious throughout European continent, and England was an exemption of this diversity.

<sup>33</sup> “Hotel des Invalides”, Paris, founded 1670 by Liberal Bruant & Jules Hardouin mansard, or “Guy’s Hospital” in London.

<sup>34</sup> “Hotel-Dieu, in Paris before the fire of 1772.

<sup>35</sup> The “royal Naval Hospital, in Greenwich”, unexecuted design by sir Christopher Wren in 1702, or “The “Hotel-Dieu, the new design by C.F.Viel & J.B, Le Roy in 1773.

<sup>36</sup> Design for a Hospital, by J.N.L.Durand, Paris, 1809, or “Hospital Lariboisiere, in Paris, by Gaunthier , 1839-54.

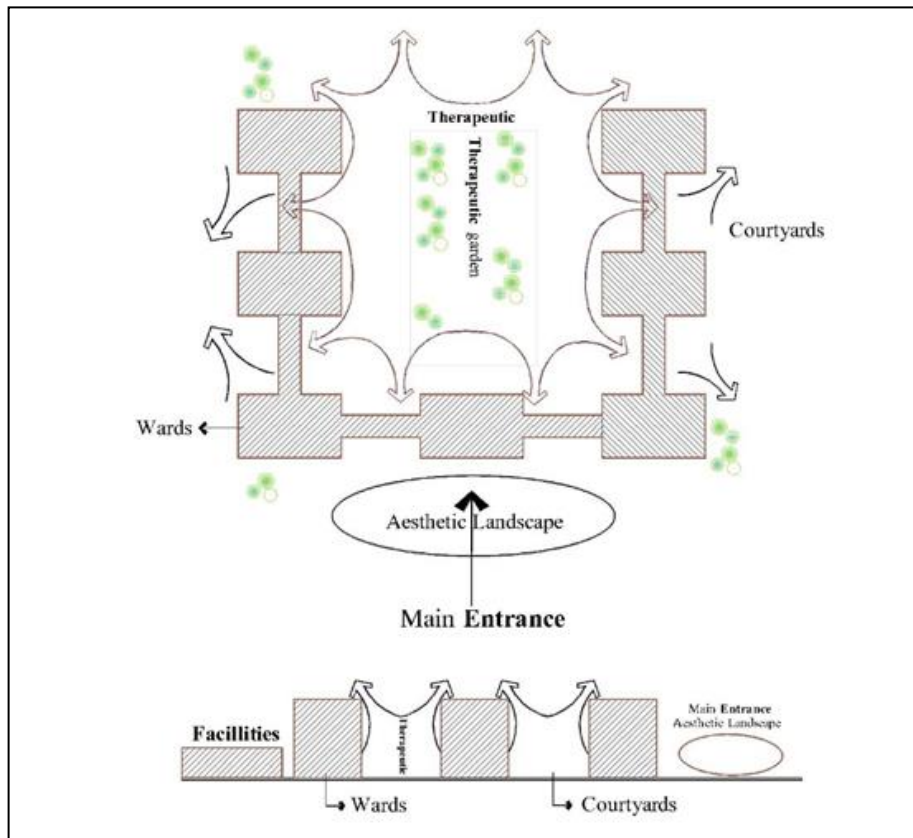
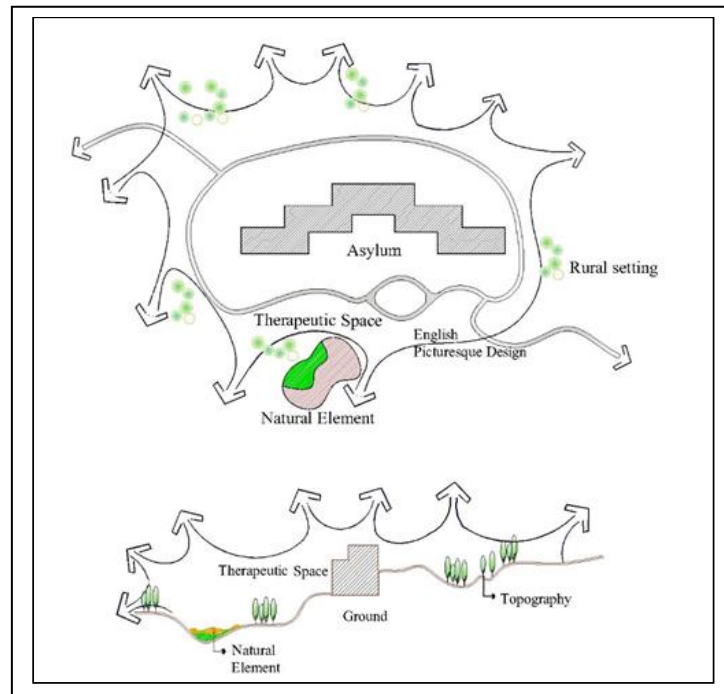


Figure 2. Pavilion Hospital and healing courtyard gardens (Image by author).

### Mental Hospitals:

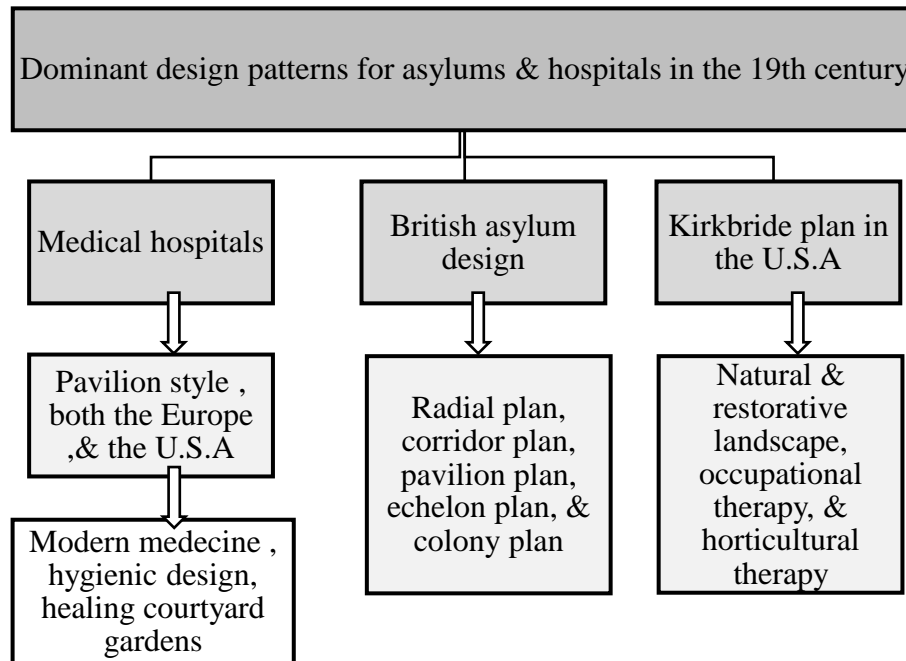
In the late 17<sup>th</sup> and early 18<sup>th</sup> centuries, according to Elkes and Thorpe (1967) the humanitarian reforms of medical facilities resulted in a gradual shift in thinking about mental illness. Therefore, the “Lunatic Asylums”, were being accepted publicly in the western world (Porter, 2003). By the 1850’s, in the fields of medical and healthcare architecture, it was accepted that a naturalistic landscape has a direct role on the treatment of insane patients (Cooper Marcus & Sachs, 2013). In the second half of the 19<sup>th</sup> century, the restorative impacts of landscape were the dominant idea that shaped the healing space in most all asylums in the Eastern United States. These

philanthropic beliefs and humanitarian efforts influenced the planners and physicians in the United States. For instance, the proponent of this type of restorative landscape was Dr. Kirkbride<sup>37</sup>, who advocated for the role of natural elements of grounds, such as plants, topography, and creative architectural design, in addition to the rehabilitation activity in rural settings .His design of the Pennsylvania asylum with its well-known “Kirkbride Plan” became an inspiring model of the healing environment (Ziff, 2012; Yanni, 2007).



*Figure 3. The diagram of therapeutic environment of Kirkbride plans, their ground and building arrangement (Image by author).*

<sup>37</sup> **Dr. Thomas story Kirkbride** (1809-1883), A founding member of (AMSAI), and forerunner of the American Psychiatric Association ,that significantly influenced Asylum communities in the U.S.A.([www.kirkbridebuildings.com](http://www.kirkbridebuildings.com))



*Table 9. Dominant Architectural and landscape design strategies and patterns in the 19<sup>th</sup> century (by author).*

### **3.3. Hospital Grounds and its Evolution in the United States during the 19<sup>th</sup> and 20<sup>th</sup> Centuries**

**Summary;** In the early 19<sup>th</sup> century, promising empirical science emphasized the significant impacts of environment on human behavior and health. Since the beginning of colonization of the New World, European immigrants found themselves closer and also more vulnerable to nature than in their previous homelands. Therefore, the idea of “environmental determinism” became accepted by elites, politicians and commonly was believed by the whole society. Then, this idea dominated the mainstream approach to urbanizing the East Coast of the United States. Therefore, the health impacts of surrounding environments, and the therapeutic power of a beautiful landscape were among those crucial factors that shaped and located American cities. Asylums and

botanic gardens were the first scientific implementations of environmental determinism that redefined the American urban and rural landscapes. In addition to need for treatment of insane patients, they could “contribute to the welfare of the American people”<sup>38</sup> by practicing the plant science and gardening methodologies of their time. Asylums as a therapeutic combination of man-made (architecture) and nature (landscape) symbolized a restorative marriage of American society and pristine land of a young country to peruse an American dream in an ideal way. As Rothman (2002) argued, asylums provided spaces to control insane people who potentially could break the rules of the democratic and capitalist government. Therefore, the therapeutic environment and moral treatment practices of asylums not only provided healing for mentally ill patients in rural settings, but also signaled some degrees of socio-cultural controls that tried to keep cities more safe and healthy. From the very early stages of locating their sites and construction, asylums were considered to be self-sufficient institutions and ecologically sustainable sites; for example, Friend’s Asylums was built with the material that was extracted from the site, and agricultural practices were not only part of occupational therapy but also aimed to self-sustain the community. In the 19<sup>th</sup> century, Miasmatic theory was a scientific motivation and key player in the health revolution of American cities that influenced the public health and therapeutic landscape of American cities. The city officials and planners accepted the Miasmatic

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<sup>38</sup> “The United States Botanic Garden is rooted in the nation's heritage. During the late 18th century, George Washington, Thomas Jefferson and James Madison shared the dream of a national botanic garden and were instrumental in establishing one on the National Mall in 1820. The institution actually traces its beginning to 1816, when the constitution of the Columbian Institute for the Promotion of Arts and Sciences in Washington, D.C., proposed the creation of a botanic garden to collect, grow and distribute plants of this and other countries that might contribute to the welfare of the American people.”(www.usbg.gov, 2017).

theory, which resulted in a considerable urban health improvement. Application of that theory in design, offered a new type of therapeutic landscape in the heart of populated and polluted American cities. Later, rejecting Miasmatic theory by introducing Germ theory, dramatically changed the landscape of hospital and introduced a new type of hospitals. In the early 20th century, the prestigious asylums that once converted American rural landscapes into therapeutic landscapes, emphasizing advanced social and medical theories, declined due to a sharp decrease in financial support and flourishing modern neurology.

### **Creation of the Modern Medical Hospitals in the United States**

The Civil Wars (1861-1865) in United States resulted in the emergence of the modern forms of public hospitals. During “the Second Industrial Revolution”<sup>39</sup>, rapid urbanization, expansion of the Capitalist economy, massive immigration and advancements of medical technology resulted in the specialization of departments within American public hospitals (Muntone, 2011; Connor, 1990; America’s Essential Hospitals [AEH ], 2015). By 1910 the number of hospitals reached 4400; which were divided in two categories, Public and Religious hospitals (U.S.Bureau of the Census, 1976; Vogel, 1989), this especially important from the point of view that the religious practices , orders, and rituals besides the medical practices still defined the main theme of therapeutic environment of a large number of hospitals. During that time, many Catholic hospitals and public healthcare institutions had religious affiliations that shaped their internal order and care for sick. At the beginning of the 20<sup>th</sup> century, while

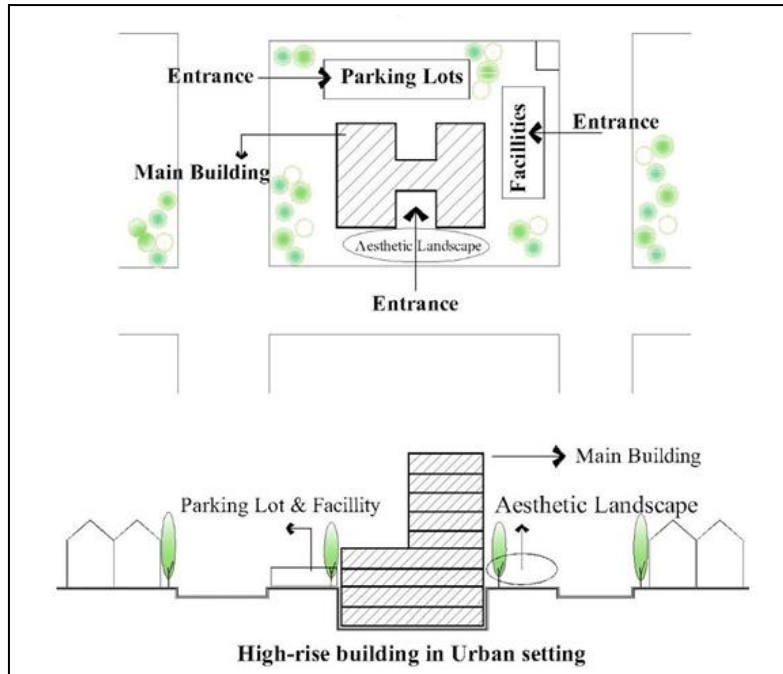
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<sup>39</sup> **The Second Industrial Revolution**, also known as the Technological Revolution, was a phase of the larger Industrial Revolution corresponding to the latter half of the 19th century, sometime between 1840 and 1860 until World War (Muntone, 2011).

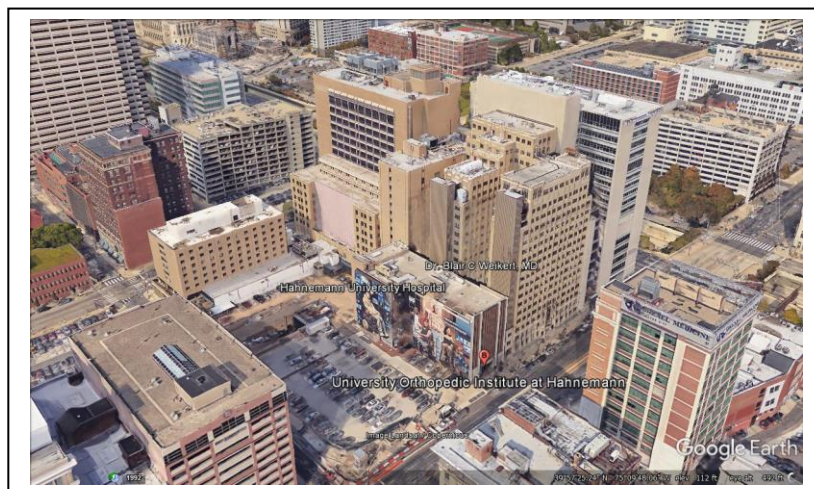
the land-consuming, low-rise pavilion hospitals began to be replaced by intensively functional high-rise or skyscraper medical centers, parking lots expanded in the sites at the expense of landscape and gardens disappeared (Curtis, 1996). The early modernism<sup>40</sup> applied new technologies inside the highly efficient buildings (Frampton, 2007). Therefore the cubic structure of buildings dictated the rectangular forms of the Architecture (Conrads & Bullock, 1975 ; Curtis, 1996), and banned decorative ornaments of any kind, from indoor to outdoor space (Want, 2009). The landscape of hospitals that were considered as the true symbols of triumph of technology and science, were affected dramatically (Haggard & Hosking, 1999; Thompson & Goldin, 1975).

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<sup>40</sup> **Modernism** is a philosophical movement that, along with cultural trends and changes, arose from wide-scale and far-reaching transformations in Western society in the late 19th and early 20th centuries. Among the factors that shaped Modernism were the development of modern industrial societies and the rapid growth of cities, followed then by the horror of World War I. Modernism also rejected the certainty of Enlightenment thinking, and many modernists rejected religious belief (Pericles Lewis, 2000; Everdell, 1997).



*Figure 4. The high-raised, and early modern hospital. The lack of the therapeutic landscape resulted from replacing hospital gardens with parking lots and other facility structures. In many cases the only designed landscape was entry landscape with aesthetic values. (Image by author).*



*Figure 5. Hahnemann University Hospital was established in 1885. The South Tower and its Art Deco façade on Broad St., was America's first skyscraper teaching hospital<sup>41</sup>, now the campus includes only towers and parking lots (Image courtesy of Google Earth, 2016).*

<sup>41</sup> The first to teach homeopathic medicine in the United States (The Legacy Center, 2016).

## **Scientific Approaches that Changed the American Landscape:**

### **A. Environmental Determinism incorporated into the Early American Landscape**

In the discourse of American landscape design and gardening, environmental determinism can be traced back to the 18th century. When describing the foundation of the early American botanic gardens, O'Malley (1996), argues that; "the botanic garden developed in past as response to the new empirical sciences and to the new understanding they fostered of the influence of environmental conditions..." (p.210). O'Malley (1996), connects the creation of the United States to the perception of nature during the 19th century, as he argues, "...environmental determinism (was) pervasive in America, where a new nation that proclaim itself to be in compliance with natural law, (and) was in its formative stage. The botanic garden was perhaps the clearest attempt to construct an improving environment." (p.211). Fredrick Law Olmsted believed that nature affects human through an unconscious process. According to Yanni (2007), Olmsted theorized the idea about positive impacts of beautiful scenery on the mind, and adopted this theory in his five asylum landscape projects. The idea that the climate, terrain and built environment shape human behavior is called "environmental determinism" (Semple, 1911). In the 19<sup>th</sup> century, city planners and asylum designers believed in the concept of environmental factors that determine the human activity and psychology, as Rothman (2002) noted. During the Jacksonian Era, between 1828 and 1854, this theory was very popular among politicians, physicians, and geographers, throughout the European countries and North America. In the context of American history, the desire for living in an agrarian community, and leaving the

polluted industrialized city has connections with two prominent figures, Andrew Jackson Downing, and Thomas Jefferson. As the supporter of this theory, and advocate of colonization, Jefferson located the University of Virginia of Charlottesville, in natural surroundings, and argued that the ideal life should be lived in farms and close to nature to protect people from the bad effects of the city (Jefferson, 2011). According to Woods (1985), Jefferson borrowed the word “Pavilion” from hospital design and used it for the university’s buildings, arranged them in pavilion style over a large open area of grass lawn to control the behavior of young students in his academic village. Historically, the predominant expectation from prisons, universities, medical hospitals, and asylums had been some degree of surveillance to determine the human behavior via the media of design and construction (Yanni, 2007). According to what is stated, it can be argued that the idea of environmental determinism has been incorporated into the American landscape design since the early years of the 19<sup>th</sup> century to improve the public health and apply natural elements to create therapeutic spaces. This is critically important because the next examples of therapeutic landscape designs of American asylums and medical hospitals during the 19<sup>th</sup> and the early 20<sup>th</sup> centuries referenced to this theory to shape their environments.

## **Therapeutic Design of Asylum Grounds in the 19<sup>th</sup> Century**

### **A. Beginning of Asylums in the United States, and its Social and Political**

#### **Background**

Around 1770, superintendents of the insane asylum on the East Coast of the United States were the first psychiatrists. Later, during the late 18<sup>th</sup> and all of the 19<sup>th</sup> centuries, professional psychiatry as a medical specialty was practiced in insane asylums. In the early 1840s, Dorothea Dix, a humanitarian activist, traveled around the states, and persuaded states' governors and congressmen to construct special hospitals for the "indigent insane." These buildings were like other civic institutions; public schools, prisons, universities were symbols of enlightenment in American society (Payne & Sacks, 2009). Also, there were other political intentions that have been involved to accelerate, and embrace the widespread idea of asylums in 19<sup>th</sup>-century America. According to Yanni (2007), the establishment of state-funded asylums and shaping its environments by doctors and architects resulted in the creation of psychiatry as an acknowledged branch of medicine. Throughout the 19<sup>th</sup> century, physicians perceived that if they treated insane people in healing spaces for specific periods of time, a vast majority of them could be cured. Physicians of the 19<sup>th</sup> century considered architecture and landscape design as an effective media for the treatment of their patients. As Porter (2003) argues, the history of psychiatry clearly demonstrates that architecture had a single importance in both the asylum projects and the institutional-social role of mental hospitals. The invention of new types of insane hospitals always proposed a great deal of challenges to their architects and designers. Providing a homelike, benevolent natural environment, while considering the

institutional surveillance and some degree of social-cultural controls at the same time, made the task more complicated and time consuming (Yanni, 2007). While, insane hospitals became the symbol of a civilized nation, they were manifesting the inverse effects of industrialization, urbanization and capitalism. Therefore, it can be said that, the architects and landscape designers of American asylums had a significant role for incorporating the design strategies and medical theories to create therapeutic landscapes.

Since the beginning of the 19<sup>th</sup> century, the number of asylums increased due to racial separation, massive migration from Europe to the United States, an increase of private and more specialized insane hospitals, and an increase of family-less and displaced people (Grob, 2011). The insane were considered a symbolic and practical threat to individuals, families, and society as well. This perceived threat shaped the arrangement and organization of the asylum, as Grob (2011) described it: “The paradox is evident in the architecture of the linear plan asylum: the exterior of large asylum projected a civic presence, while the interior were broken up into smaller rooms...” (p.10). Therefore, the arrangement and planning of the American asylums during the 19<sup>th</sup> century present that how the socio-cultural changes and perceived medical knowledge of the time shaped and influenced the therapeutic landscape of the United States.

#### **B. The Building and Ground of Asylums Embraced “Moral Treatment”**

After the Civil War, the advancement of medicine resulted in the creation of neurology as a new branch of medical expertise (Bollet, 2002). This new specialty took a scientific approach and harshly criticized the bureaucratic, isolated, and old-fashioned treatments in asylums, and therefore caused the degradation of therapeutic landscape

design. The 19<sup>th</sup> century type of asylum is considered to be an “American Invention” (Payne & Sacks, 2009). Thomas Story Kirkbride, a superintendent of the Pennsylvania Hospital for the Insane, provided the original blueprint of many of those asylums. His idea was constructed on the healing theory of “moral treatment.” Based on that concept; “a well-designed and beautifully landscaped hospital could heal mental illness, and by removing afflicted from the society and placing them in a peaceful environment filled with a regiment of structured activity...” (Payne & Sacks, 2009, p.8) they can regain their health. The centerpiece of Kirkbride’s design was a V-like arrangement of connected pavilions at both sides of the central administration building. This order provided a vast open view to the landscape and maximum access to sunlight and fresh air. Those symmetrically flanked pavilions, complied with hierarchical orders in addition to gender and racial segregations, and therefore followed cultural and psychiatric rules of their time. In most of the cases, they have been located in the countryside, in rural areas within a distance from cities. This locating strategy offered opportunities to design the grounds as pleasure landscapes implementing a picturesque style of planting, where patients could relax and stroll. Payne and Sacks (2009) argue that, since the visitors were not allowed into the buildings, the public lobbies and landscape of asylum were “the chief agent of propaganda to exert a positive influence on public perception” (p.8). During the 19<sup>th</sup> century a combination of cultural belief, medical practices and design shaped the therapeutic landscape of insane asylums. One of the most important elements of the build environment in asylums was the naturalistic landscape and its impact on the moral treatments of patients (Rosenberg, 1977). As Hawkings (1991) argues: “they (asylum reformers) incorporated the social belief in the

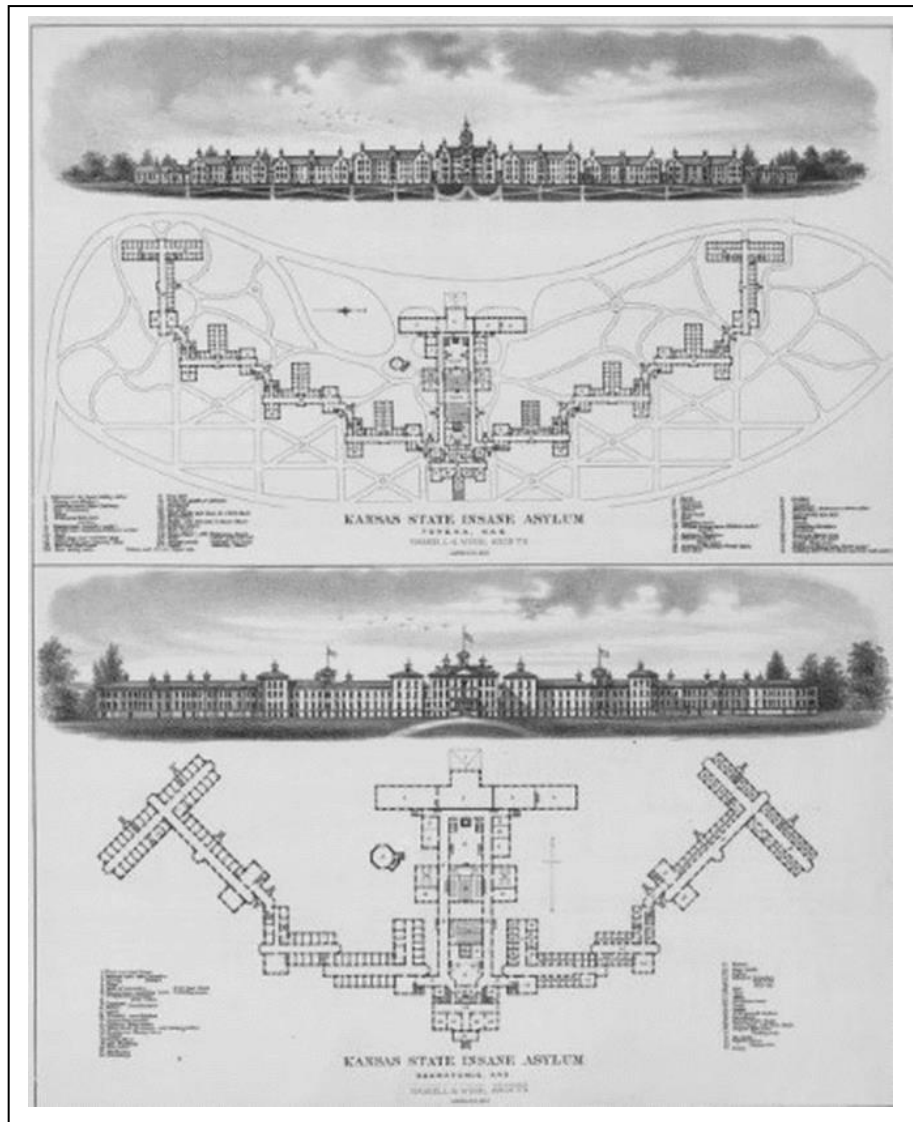
moral and physical; benefits of beautiful, naturalistic surroundings into their program of treatment for the insane” (p.40). The essential theme of the reforms was emphasis on either work or amusement activities in the outdoor spaces of the asylums (Rosenberg, 1977). The naturalistic design principles prescribed the location of the asylum in the countryside in a specific distance from crowded and polluted cities (Hawkins, 1991, p.42), where the pristine and perfect spirit of nature surrounded the whole institution. Horticultural and agricultural writers encouraged the healing quality of nature including gardening and farming, while the physicians, superintendents, and reformers of asylums were appealing for implementing this idea. In addition to delivering relief, the surrounding landscape of mental hospitals in their rural settings, provided an environment for gardening and farming, which was intended as a part of therapeutic plan for curing the insane. In 1846, Ray emphasized the crucial role of the naturalistic landscape in the treatment of insane, in addition to its beautiful appearance (Ray, 1846). The holistic approach considered every moment or detail of the activity in the site or building’s design as the chance for patients to gain their physical and mental health. According to Kirkbride (2012), “...it should never be forgotten, that every object of interest that is placed in or about a hospital for the insane, perhaps be the first step towards bringing back a disordered mind to reason” (p.47). Kirkbride, proposed a naturalistic design for the Asylum’s landscape, and Ray believed that the unattractive landscape could depress and distress the patient’s condition. While the well-designed complex of buildings and therapeutic landscape is a medium of treatment and can offer pleasant recovery in general (Ray, 1854), in the second decade of the 19<sup>th</sup> century, as Tomes (1981) described it, the landscape of asylums was defined as the

“primary example of naturalistic built landscape” (Tomes, 1984). The grounds of asylums were designed to have more social, and political impacts, and as Hawkings (1991) argues, to be “explicitly designed to generate positive mental impressions on both patients and public, the therapeutic landscape of the asylum anticipated the characteristics and cultural intent of the rural cemeteries and public park that followed it” (p.73). From the 1840s to the 1880s, the number of asylums increased from 18 asylums to 139 mental hospitals, and in 1948, the Illinois Department of Finance reported that 261 state mental hospital and institutions for “mental defectives” existed (cited in Payne & Sacks, 2009)<sup>42</sup>. By the end of the 19<sup>th</sup> century, the distinguished architecture of asylums had been hosted by the American landscape, and their constructions spread to every state within a half century (Payne & Sacks, 2009). During the late-19<sup>th</sup> and early-20<sup>th</sup> centuries, the quality of care in asylums declined, due to the several financial recessions, including the years 1893, 1907, 1937. This resulted in budget crisis, and low wages and staff shortages. Despite these problems, the mental hospitals remained popular, because they provided a convenient response to instant care and guarantee the peace of mind for society via the advanced drug therapy methods as Payne & Sacks (2009) argued. As the 20<sup>th</sup> century began, insane asylums and their therapeutic landscapes declined while medical hospitals flourished, increasing their prestige and prevailing their practices around the world (Yanni, 2007). During WWII, the State hospitals were more functional, like public housing buildings, and had no decorative design despite the preceding generation of Victorian castle-like, highly ornate asylums (Schultz, 2002). But, during the 1950s one of the essential aspects of

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<sup>42</sup> Illinois Department of Finance. A budget survey of state mental hospitals, “Commodity Cost and Budgeting for State mental Hospitals.” 1948.

psychiatric practices of the 19th century asylums remained without significant change. Located in rural settings, the mental hospitals still were self-sustaining communities, where both farming and gardening were heavily practiced for the next decades. Therefore, it can be concluded that the gardening and occupational therapy were the important elements of the therapeutic landscape of mental hospitals. Due to the introduction of psychiatric drugs, and a series of court decisions that resulted in forbidding patients to do labor, all hospitals abandoned agriculture and gardening operations by the end of the 1970s (Talbot, 1979). As the result the restorative landscape of hospitals were deprived from previous horticultural therapy and gardening.



*Figure 6. Two Models of Kirkbride Plans (V shaped plans) in Kansas State. (Above) Kansas State Insane Asylum in Topeka & (Below) Kansas State Insane Asylums, in Osawatomie were designed by Haskell & Woods Architects according to the Kirkbride Plans and recommendations (Image courtesy of Kansas Historical Society, 2017).*

### **From Asylum to Urban Parks; Introducing Therapeutic-Naturalistic Landscape into the North American Cities**

During the 19<sup>th</sup> century in the United States, urban parks were the symbols of productivity, social cohesion, sanitary and public health encouraged democratic values, and alleviated racial and class segregations. The mid-19<sup>th</sup> century American industrial

cities were characterized with all types of environmental filth including air pollution, disease contagion and epidemics. The urban parks in the United State of America followed the British city parks with less than two decades' delay. In the middle of the 19<sup>th</sup> century, the positive effects of urban green areas to reduce further health costs, founded arguments that resulted in significant health revolution in American cities (Melasi, 2000). Consequently, many urban parks were developed while financially relying on support from businesses and wealthy citizens (Crompton, 2013). The expansion of urban parks along the East Coast was largely dependent on medical studies, and urban improvement policies of the United Kingdom (Melasi, 2000). For instance; Crompton (2013) argues that the miasmatic theory was the scientific concept that encouraged and justified all expenses for urban park developments. Until the 1880s, the miasmatic theory was gradually replaced by germ theory, while many urban parks were planned in cities like New York City, Baltimore, and Boston (Duffy, 1968). For example, in late 1884, a report from the New York City Commission resulted in the planning and development of six parks, such as Gramercy Park and Union Square. The health outcomes of the urban green areas and its justification with the science was clearly stressed: "it is concluded that Parks are indispensable to the health of great centers of population—in fact which is sustained by the highest authorities in sanitary science" (cited in Crompton, 2013)<sup>43</sup>. During that time, the Miasmatic theory was largely popular, and the separation of routine life of citizens and the major sources of those unpleasant and unhealthy vapors (Burnett, 1978). Developing American cities,

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<sup>43</sup> Originally from; Commissioners for the sanitary survey of the state of Massachusetts. (1850). Report of a general plan for the promotion of public and personal health. Boston, MA: Ditton & Wentworth.

two planning options were available: the first was to escape from crowded downtowns, and to find a benevolent environment with fresh air, clean water in woods at a reasonable distance from the business centers; the second was to redesign green areas in an urban context in favor of city life (Burnett, 1978)<sup>44</sup>. Szczygiel and Hewitt (2000) noted that a combination of naturalistic and man-made landscapes in cities was very well-admired and welcomed due to “their benign and pathogenic characteristics” (p.73). The late 19<sup>th</sup> and the early 20<sup>th</sup> centuries are considered as the era of “urban revolution”, “City Beautiful Movement” and rapid expansion of American cities, as Briggs (1963), noted: “...Between 1860 and 1910, places with more than 50,000 inhabitants increased in number from 16 to 109” (p.47). In 1845, a New York City health inspector, John Henry Griscom, published the first in-depth research about the city’s sanitary system and its consequences (Duffy, 1968). In his report, creation and construction of the public green areas was considered to have a positive contribution in improving urban health, because in the same year, a campaign in the city of Brooklyn, led by Walt Whitman, successfully managed to establish a new urban space, Washington Park (Crompton, 2013). This park inspired other public projects in the city. for example, the directors and principals of the Brooklyn City Hospital, adjacent to park, constructed a new hospital beside that park, and later they emphasized the effects of fresh air for patients’ recovery and therefore improved the efficiency of the hospital (Simon, 1972; Crompton, 2014). Within these years, parks were perceived as a partial remedy for curing urban disease, and this idea was supported by horticultural scientists, physicians, and confirmed by designers and politicians.

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<sup>44</sup> In 1859, Scientific American released a report about city public parks, presenting such alternatives, and discussed the importance of urban parks for providing healthy and happy lives for people.



Figure 7. The plan of Prospect Park in Brooklyn (1871), Created in 1867 by Frederick Law Olmsted and Calvert. The park was designed to be a resort for all citizens and bring health to the city (Image courtesy of William Bishop, *Manual of the Common Council of the City of Brooklyn*, 1871, retrieved from public domain of U.S.A).

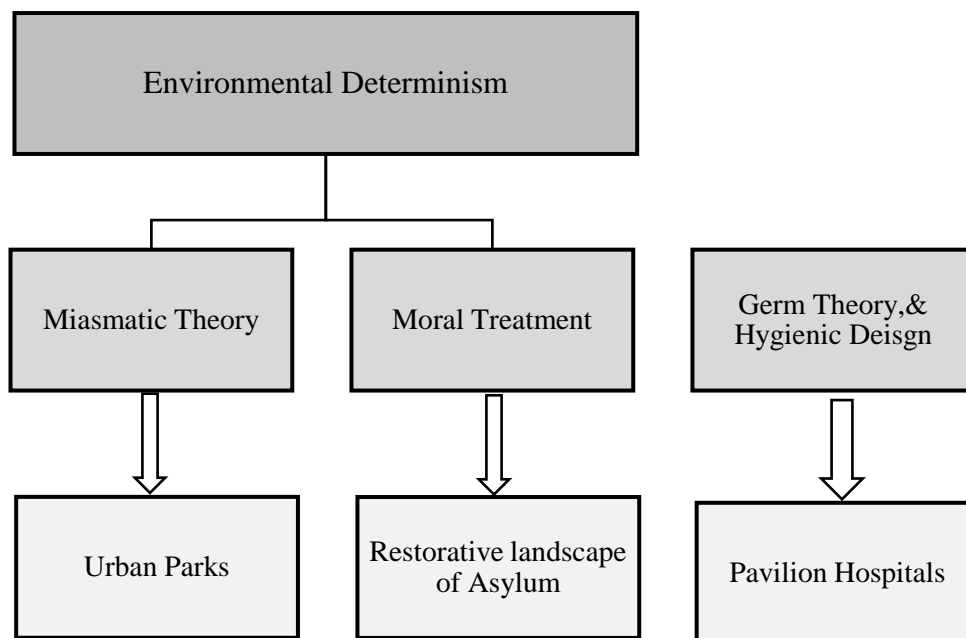


Table 10. The scientific theories and design solutions that shaped American Therapeutic Landscape in the 19<sup>th</sup> century (by author).

## **The Implementation of a new Approach in Healthcare Facilities after WWI**

By the end of the WWI, rehabilitation hospitals often included gardens or outdoor areas that provided entertainment, sport, and agricultural activities for their patients (Darton, 1996; Connor, 1990). Between WWI and WWII, “Horticultural Therapy” became more prominent. Considered as a subset of “Occupational Therapy”, this approach used the restorative impacts of gardens to improve the physical and mental health of people (Francis, Stone Rice, & Lindsey, 1994; Cooper Marcus & Barens, 1999). Between the 1940s and 1950s, rehabilitation centers were caring for war veterans with horticultural therapy, while other hospitals abandoned this type of practices and used drug therapy. This idea was extensively practiced by their caregivers and gained public acceptance (Relf, 1992; American Horticultural Therapy Association [AHTA], 2015; Simson & Straus, 2003). The environments of public hospitals were dominated by advancements in medicine and demographic changes such as increasing number of women and minorities. Despite the lack of funds, around 1950s; “Hill-Burton Act” affected the landscape of hospitals dramatically. One of the consequences of passing the “Hill-Burton Act”<sup>45</sup> was the expansion of American community (Sultz & Young, 2011). Between 1950 and 1965, the great majority of these hospitals established “Intensive Care Units” (Russell, 1979; Relman, 1982; Stevens, 2007) that brought new necessities for designing both indoor and outdoor spaces. Therefore the easiest and fastest access to emergency units for automobiles and ambulances became

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<sup>45</sup> **The Hospital Survey and Construction Act** (or the **Hill–Burton Act**) is a U.S. federal law passed in 1946, during the 79th United States Congress. It was sponsored by Senator Harold Burton of Ohio and Senator Lister Hill of Alabama. The Act responded to the first of President Truman's proposals and was designed to provide federal grants and guaranteed loans to improve the physical plant of the nation's hospital system. Money was designated to the states to achieve 4.5 beds per 1,000 people (Sultz & Young, 2011).

common in every type of hospital, and their engineering implementations dramatically affected the general design of site and reshaped landscape in accordance to these new functional necessities. Therefore, the ground of public hospitals were modified for automobiles, which resulted in suppression of natural elements and their healing properties.

## **The Cultural and Social Shifts determine the new Environments of Health**

### **A. The impacts of Hill-Burton Act**

Along with this expansions of the 1960s and 1970s, these periods are marked by demographic shift that also altered landscape of hospitals. The large American cities changed due to immigration and economic shifts (Stevens ,1999). So, huge waves of young and affluent white, white-collar families moved from downtowns to recently developed suburban neighborhoods, which left most of the elder and minority American populations behind in inner cities (Jacobs, 1992; Talen, 2005). Consequently, most of the private and public hospitals relocated to suburban sites in newly developed neighborhoods. The suburban areas offered more available land with less commercial value that provided opportunity of free space and less compacted landscape around the public buildings and hospitals. Besides this, in the next decades, the new planning strategies such as New Urbanism<sup>46</sup> encouraged green areas as the one of the main elements of design and planning of communities (Duany, Plater-Zyberk, & Speck, 2010; Jacobs, 1992). As the result of these changes, new hospitals had more

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<sup>46</sup> **New Urbanism** is “an urban design movement which promotes walkable neighborhoods containing a range of housing and job types (Boeing, Church, Hubbard, Mickens, & Rudis, 2014).

open space and larger site, and also located in green neighborhoods with more access to nature. Indeed these changes created a different context and representation of landscape for hospitals, as they were not connected to older institutions in the cities (Stevens, 1999). For example, New Urbanism advised the creation of well-defined outdoor space for public buildings including hospitals, and relegated parking lots to the back of main building, and provided with a limited number of shady walkways throughout the sites.

## **B. The impacts of Medicaid**

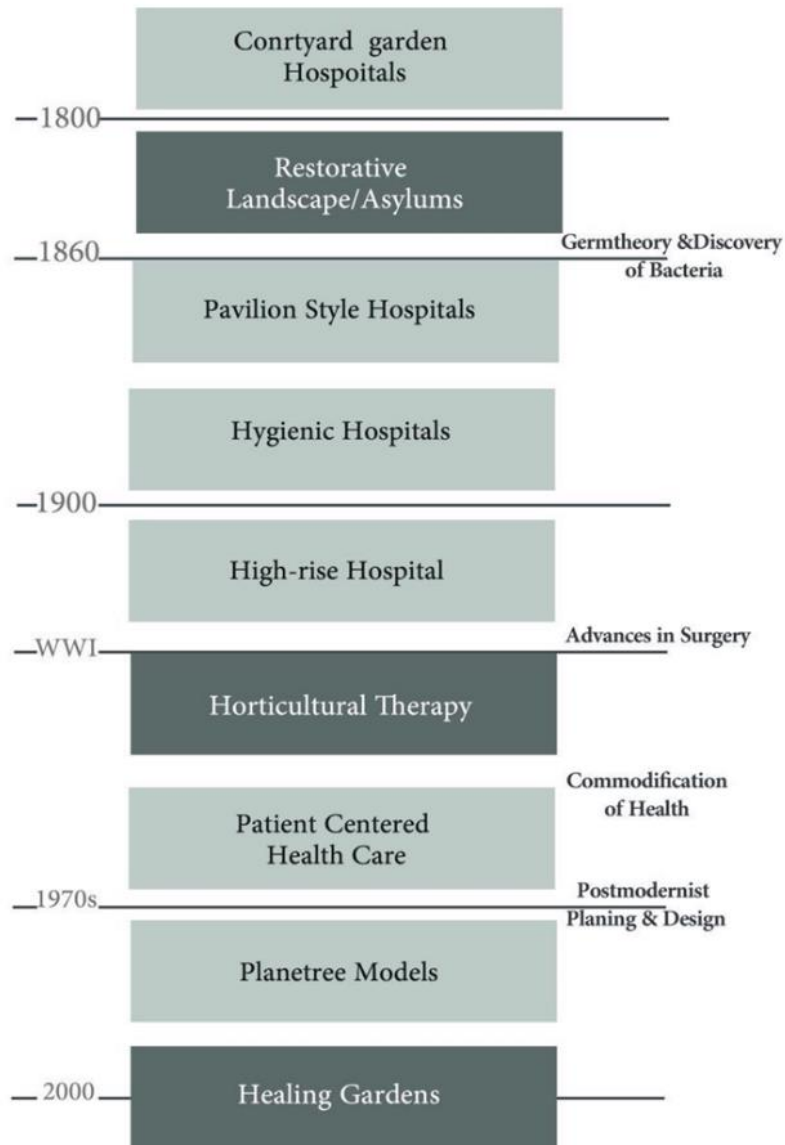
Enacting Medicaid and Medicare in 1965, was a pivotal event that provided healthcare for indigents and elderly in order to “War on Poverty” and to achieve a “Great Society” (Stevens & Stevens, 1974; Mann Wall, 2015). Indeed in the 1960s, the lack of adequate health care for the urban and rural poor, affected medicine in the United States (Grogan, 2006). This serious issue turned the public hospitals to the contexts of conflicts, because providing proper quality of care for many was not possible (Sultz & Young, 2011; Callahan & Wasunna, 2006). Due to the implementation of Medicaid and Medicare between the 1965 and 1980, all types of hospitals had to comply with newly enacted construction regulations, in order to manage their costs. Those regulations, dictated the considerable restriction on unnecessary projects and any type of spending which had no immediate health outcome (Callahan & Wasunna, 2006; Weinberg, 2003), and de-emphasized landscape projects. Therefore, all types of hospital’s grounds turned to a combination of the paved walkways, aesthetic gardens at the main entrances, and finally large flat areas of green grass. Therefore, site design strategies focused on the safety and accessibility for both

employees and clients, and providing parking spaces according to the safety and zoning regulations (Burpee, 2008; Verderber, 2010), while the gardens and restorative landscape in healthcare facilities lost their importance.

### **Returning to Nature for Healing, Reemerging of the Past**

The implementation of patient-centered care in hospitals and healing spaces gained a significant place with founding of “Planetree” in 1978 (Cooper Marcus & Barens, 1999; Planetree, 2014). Planetree approach; included first, bringing back gardens and the natural elements of the site to health care facilities which had been lost since the late 19th century. Second, they committed to cultural transformation in order to create patient’s friendly environments in hospitals, and provided support to satisfy the future expectations of healing environments (Planetree, 2014). During the 1980s, the growth of for-profit hospitals resulted in closure of more than 600 community hospitals, mostly small and non-profit institutions (Prince & Ramanan, 1994) .This particularly impacted the rural American landscape and deprived the access to the therapeutic infrastructures. The hospitals in the last decade of the 20th century saw two opposite forces, which means the culture shifted to patient-centered care and the economic changed from caregiver to the organizations for purchasing the care. In addition to these shifts, the active role of private sector insurance companies changed the theme and tendency of hospitals toward cost-containing attitudes (Weinberg, 2003; Callahan & Wasunna, 2006). Hence, the hospitals focused on outpatient services, ambulatory care centers, improving acute care departments, and finally hospice and nursing homes especially for chronically ill clients (Stevens, 1999). Thus, the healthcare providers, planners and policy-makers recognized that the constructed

environments of hospitals are important components in the very competitive health care industry (Mann Wall, 2015). These significant cultural, economic, and organizational shifts along with the widespread academic research aimed to establish an evidence based foundation for healing impacts of plants and gardens on people (Ulrich, 2002; Williams, 1999). Consequently those shifts and efforts marked a significant turning point, which advocated the use of nature to restore the mind and body of patients in patient friendly environments of healthcare facilities, which is called “healing gardens” movement. The following diagram summarizes the major cultural, economic, scientific and historical events that altered and shaped the therapeutic landscape of hospitals during the 19<sup>th</sup> and 20<sup>th</sup> centuries.



*Table 11. Major medical, cultural, organizational and historical events that shaped and altered hospitals' therapeutic landscape during the 19th and 20th centuries (by author).*

In following pages two critical examples of asylums and one critical example of public hospital with religious affiliations will be studied. Their creation and the evolution of their therapeutic landscape have been discussed in detail. Study of these examples are important because they show the cultural and scientific shifts that determined the therapeutic environments of mental and medical hospital during the 19<sup>th</sup>

and 20<sup>th</sup> centuries, additionally they have been significant models in American medicine and health care design.

### **St. Elizabeths Hospital (Critical Example I)**

St. Elizabeths Hospital is a hospital that had great impacts on the care for mental disorders. Its location and historical backgrounds in addition to its impacts on the District of Colombia make it a distinguished example. Its landscape was dramatically changed within the last century due to the advancing medical practices. Studying its site reveals the scientific approaches that shaped and evolved the campus design and changed the perception of therapeutic landscape.

#### **A. The Creation and Evolution of the Hospital**

The establishment of St. Elizabeths Hospital was the result of continuous attempts by Dr. Thomas Miller, who was the president of the DC Board of Health during the 1830s. He petitioned Congress to build a hospital for mental illness in the District of Columbia. In 1852, Dorothea Dix's recommendations facilitated the establishment of the hospital (Lowe, 2016). The initial plans and organizational charts of the hospital were prepared in 1852 by Dix and Dr. Charles H. Nicholas, who was appointed as the first superintendent of the facility. They became responsible for the design and planning of the hospital as well as locating a proper site for the hospital. The site was selected on the headlands in the southeast of Washington, D.C., located on the Bladen farmlands with a broad vista to both the Potomac and Anacostia Rivers (Yanni, 2007). Like many asylums of the 19<sup>th</sup> century, the administration and other significant buildings were designed to comply with "Kirkbride's Plan."

In 1851, officials nominated an experienced and well-known architect in D.C., Thomas U. Walter,<sup>47</sup> to design the hospital (Holley, 2016). During the process of selecting the site, Kirkbride's recommendations regarding good soil for farming and gardening in a rural setting was considered as well as providing fresh air for ventilation of indoor spaces of the hospital. In 1853, the actual construction was began in three sequences. Walter delivered the design of the building in Italian Revival and Italian Gothic Revival styles. In January 1855, the newly designated Government Hospital for the Insane, officially opened its doors and accepted its first patents. During the Civil War, hospital buildings served the wounded soldiers of the U.S. Army, and the U.S. Navy.<sup>48</sup> Between 1856 and 1898, two other buildings were added for African American patients (Lowe, 2016). In 1916, Congress officially renamed the whole facility St. Elizabeths Hospital (NARA, 2016) <sup>49</sup>. The following image is a clear represents that the hospital site was extensively planted and designed, it also was planned according to the accepted therapeutic practices of the 19<sup>th</sup> century such as gardening, creation, and green house activities.

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<sup>47</sup> "Thomas Ustick Walter (1804- 1887) was an American architect and the dean of American architecture. He was the fourth Architect of the Capitol and responsible for adding the north (Senate) and south (House) wings and the central dome that is predominately the current appearance of the U.S. Capitol Building. Walter was one of the founders and second president of the American Institute of Architects" (Frery, 1940).

<sup>48</sup> During that time, the U.S. Army general hospital carried the name of St. Elizabeth's Army Medical Hospital, and was different from mental hospital on the same site.

<sup>49</sup> National Archives and Records Administration



Figure 8. The St. Elizabeths Government Hospital for the Insane around 1855, its picturesque landscape, farms, and gardens located in the ground had extensive views to north side of the Anacostia River (Image courtesy of Nichols, Coyle, Walter, & United States Congress. Senate, 1860)<sup>50</sup>.

By the 1950s, same as many mental hospitals and asylums in the United States, the quality of care in St. Elizabeths had drastically declined. The poor quality of treatment and slow advancement of the drug therapies, in addition to the “Community Mental Health Act” of 1963, resulted in the functional deterioration of many mental institutions, including St. Elizabeth’s (Lowe, 2016)<sup>51</sup>. Due to the significant architecture and important contribution to the history of medicine during the 19<sup>th</sup> century, St. Elizabeths Hospital was added to the National Register of Historic

<sup>50</sup> Retrieved from the Library of Congress, <https://www.loc.gov/item/88693084/>.

<sup>51</sup> According to the Historic American landscape Survey “The cultural landscape of the hospital is associated with events that have made a significant contribution to the broad patterns of United States history”<sup>51</sup> from: HALS No. DC-11, in “HISTORIC AMERICAN LANDSCAPE SURVEY, ST. ELIZABETHS HOSPITAL WEST CAMPUS”, P.1

Landmarks in 1990 (Markon, 2016). Despite those efforts, the National Trust of Historic Preservation placed the site and its buildings into the “nation’s 11 Most Endangered Places in 2002” (National Trust for Historic Preservation [NTHP], 2016), because the landscape and building was extensively destructed. After purchasing the specified portion of land in 2007, the Department of Homeland Security (DHS) held a commencement ceremony at the ground of Hospital in 2009 (Department of Homeland Security [DHS], 2016). In 2010, the original property of the hospital was divided into three parts, while the eastern part, a functionally limited mental hospital, is still operating under the District of Columbia, Department of Mental Health.

### **B. Therapeutic Environment and Landscape of the Hospital**

During the 19<sup>th</sup> century and the first half of the 20<sup>th</sup> century, St Elizabeth’s Hospital played a significant role in developing and implementing scientific treatment for mentally ill patients. It was one of the first healthcare facilities in the United States that specifically accommodated African Americans. Furthermore, it was one of the earliest mental health hospitals in the country and one of the pioneering institutions that provided hydrotherapy and psychodrama for insane patients (U.S. General Services Administration's [GSA], 2016), as well as pet-therapy<sup>52</sup> (National Institutes of Health [NIH], 2016). The hospital originally was founded based on the concept of “moral treatment,” which specially focused on emotional and psychological recovery of patients via exposing them to nature (Millikan, 1989). Between the 1860s and the 1870s, many improvements in the grounds resulted in increased agricultural

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<sup>52</sup> for the first time in 1919

production, refined the pleasure gardens, improved water resources, in addition to the site drainage system (Millikan, 1989).

During the last decade of the 19<sup>th</sup> century, Alvah Godding,<sup>53</sup> an amateur horticulturalist, planted the grounds of St. Elizabeths with rare and unusual plants, and trees from all over the United States, Eastern Europe, India, and Persia (U.S. General Services Administration's [GSA], 2016). In 1874, the St. Elizabeths' agricultural activities expanded to provide food, and occupational therapy (Millikan, 1989). Between 1877 and 1899, which is known as the Godding Period, farming and planting expanded to the west campus. The most notable changes in the landscape of the west campus included planning new pleasure grounds, an arboretum, formal water features, bridges, benches, and pavilions. From 1899 to 1937, the hospital dramatically expanded and many modern facilities were built on the site. New buildings were constructed and the landscape was re-designed to introduce the modern therapeutic theories of the 19<sup>th</sup> century (Yanni, 2007). During this period, Superintendent Dr. Luther D. Robinson asked Fredrick Law Olmsted, Jr. to plan and design the landscape of the old property and the new expansion. According to Otto (2016), "although Olmsted's work at Saint Elizabeth's did not go beyond conceptual recommendations, the spirit of his comments was taken to heart in the layout of the new building ..., opening up the landscape behind the Center Building, New Patient buildings on the east campus were separated from the remaining agricultural uses by a wooded ravine" (p.19).

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<sup>53</sup> He was the son of the second superintendent, Dr. William. Godding.

Since 2010, St. Elizabeths , as a teaching hospital with psychiatry and psychology training programs, “the state-of-the-art-facility that incorporates best practices in modern, inpatient mental healthcare with an environmentally sensitive design and sustainable strategies” (District of Columbia Department of Mental Health, 2016). In the newly reconstructed facility, the indoor and outdoor therapeutic spaces include treatment and living areas with sufficient daylight and fresh air, private green areas for each patients room, enclosed courtyard gardens, the largest green roof in all psychiatry facilities in the United States, and a museum that has been created by patient’s art-works (District of Columbia Department of Mental Health, 2016). As O’Connell (2016) states, the eight connected, planted courtyards, which step down, bring back the flanked Kirkbrid’s Plan. By virtually disappearing into the landscape, the whole building with its vegetated green roofs contributed into preserving the historical landscape of St. Elizabeth’s. A vast variety of native plants have been planted in the courtyard gardens that not only are essential for reducing heat island effects, but also are considered to be functional elements in the storm water management system of the new design (Ellis & Reilly, 2016). The evolution of therapeutic landscape of St. Elizabeths can be summarized as following: First, during the last century many buildings have been added, which dramatically changed the landscape of the hospital (figure 24). Second, despite the developments of the last century some portions of the original landscape of the ground survived, which include; naturalistic landscape on the north, and picturesque landscape around the site (figure 25). Third, the significant characteristics of the ground were first; the broad views to Anacostia & Potomac Rivers, and Washington D.C, second designed landscape around the main building

(figure 26). Forth, the winding network of roads in the ground were designed according to picturesque style, and provided maximum exposure to nature (figure 27).

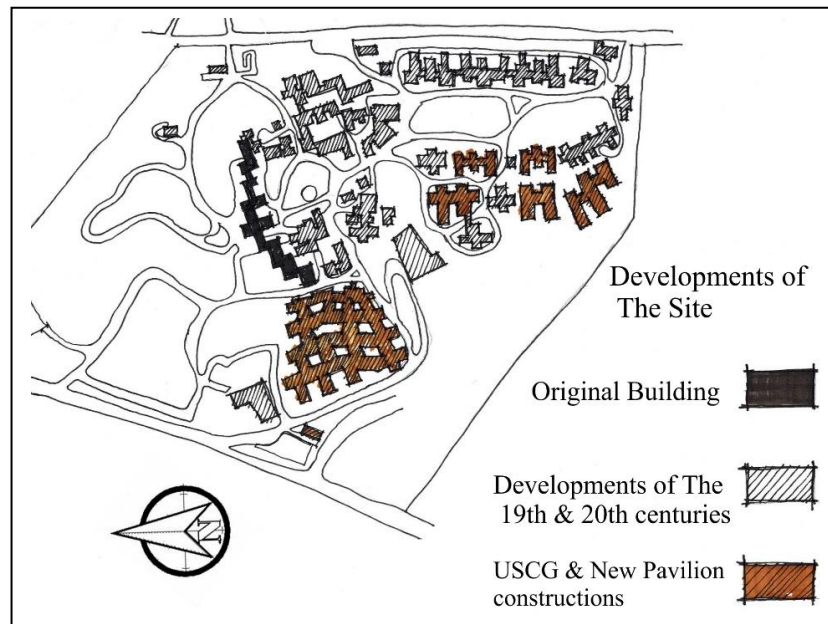


Figure 9. During the last century many buildings have been added, which dramatically changed the landscape of the hospital (Image by author).

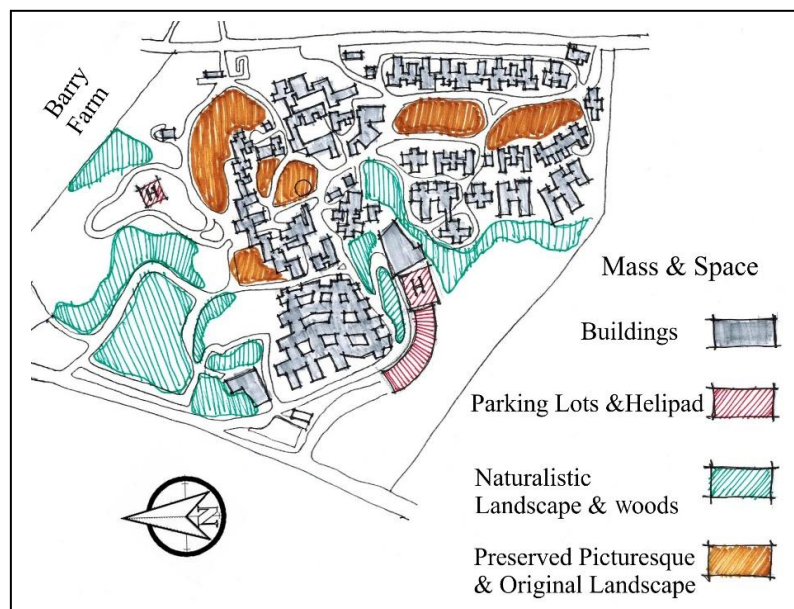


Figure 10. Despite the developments of the last century some portions of the original landscape of the ground survived, which include; naturalistic landscape on the north, and picturesque landscape around the site (Image by author).

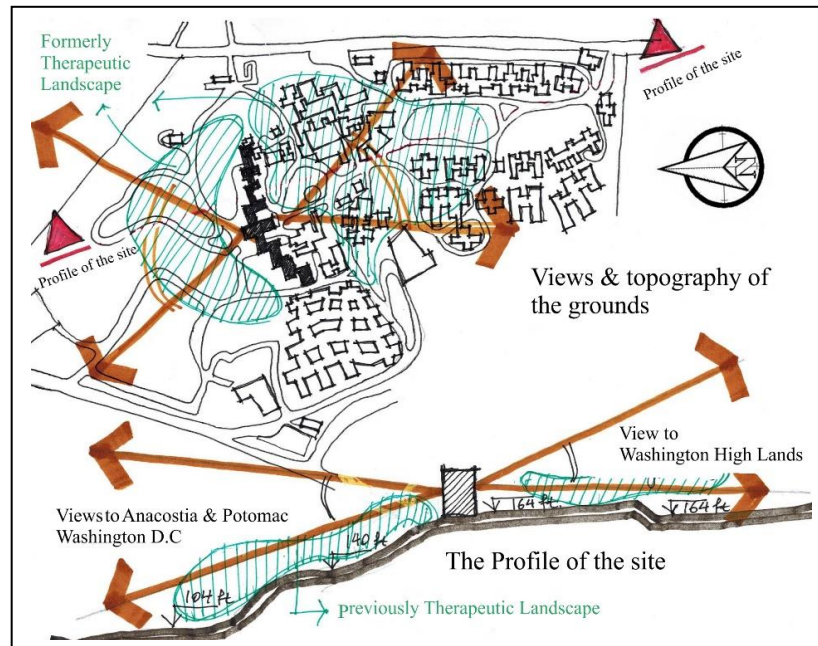


Figure 11. The significant characteristics of the ground were first; the broad views to Anacostia & Potomac rivers, and Washington D.C, second designed landscape around the main building (Image by author).

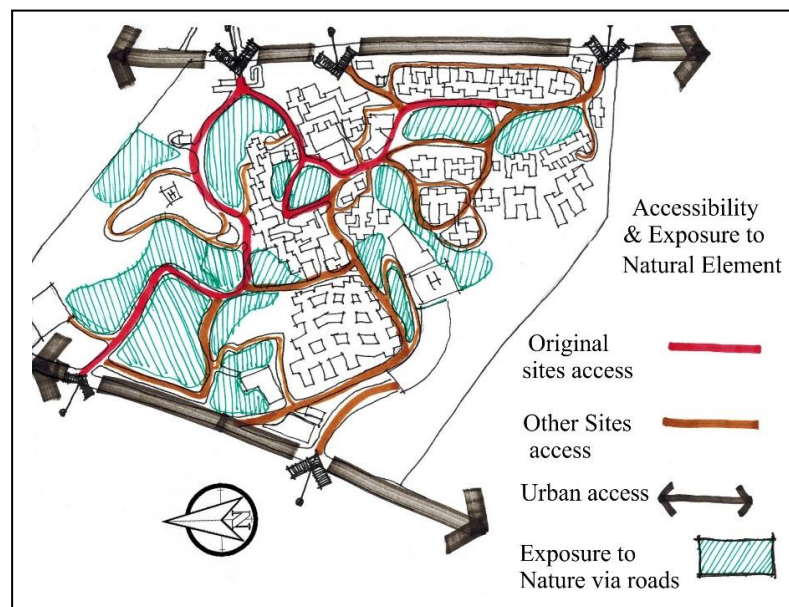


Figure 12. The winding network of roads in the ground were designed according to picturesque style, and provided maximum exposure to nature (Image by author).

## **Athens Lunatic Asylum (Critical Example II)**

Athens Asylum is a pure example of the 19<sup>th</sup> century therapeutic landscape that had a great impact on the city. It also is one the most documented asylums of the United States that has been designed based on the scientific methods and cultural beliefs of the time. Additionally, the landscape of the asylum was designed and constructed by one of the students of Olmsted, and therefore the therapeutic design of the campus included the Krikbride style and Olmsted tradition, which greatly influenced the therapeutic environments of the United States during the 19<sup>th</sup> century.

### **A. The Creation and Evolution of the Hospital**

During its operation from 1874 to 1993, Athens Lunatic Asylum served a large variety of patients including Civil War veterans (McCabe, 2016), and children and criminals with mental disabilities (Beatty & Stone, 1984). Later, hospital officials selected Levi Tucker Scofield, a prominent architect and sculptor, to design the main building. The terrain was originally made up of 141 acers of farm land. By the next decade, the property expanded and became 1019 acres, and comprised different types of land, including cultivated, wooded, pasture, campus and recreation (McCabe, 2016). The architectural design followed with the “Kirkbride Plan,” and from 1868 to 1878, the construction of the main building was constructed (McElroy, 2016), and was constructed in the late 19<sup>th</sup>- and early 20<sup>th</sup>-century Revival and lavish late Victorian styles<sup>54</sup>. From the beginning of the construction, the idea of a self-sustaining institution on the site was followed by officials and superintendents. For example; the brick used

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<sup>54</sup> According to National Register of Historic Places Information System (2007).

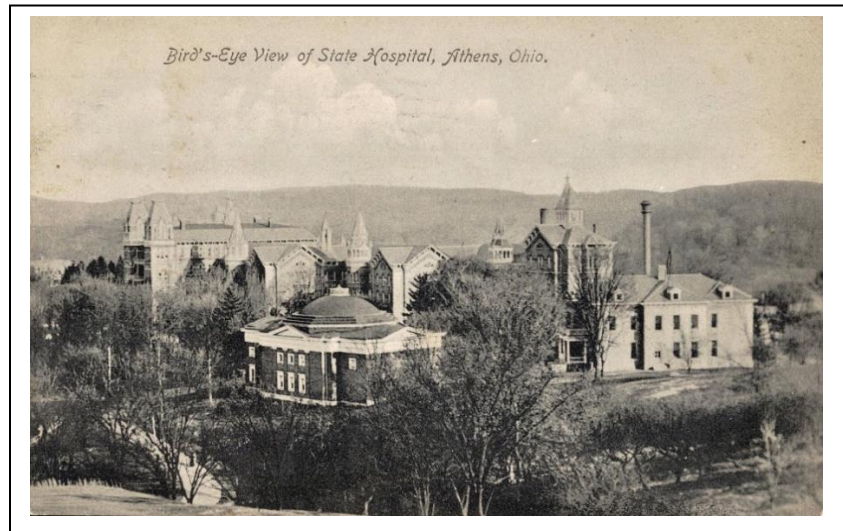
was from the clay of the site and fired on the site as well (Asylum Projects, 2016). Herman Haerlin, a student of Fredrick Law Olmsted,<sup>55</sup> was nominated to design the site and the grounds of the hospital (Asylum Projects, 2016). The design intended to include both the recreational and picturesque landscapes, as well as the farmlands throughout the property. During the 1910's and the 1920's, the hospital was rather self-sufficient in many farm and dairy products (McCabe, 2016), while Haerlin's designed landscape with its hills, wooded areas, a spring, a creek, and waterfall that were accessible for the local citizens for recreation purposes.

In the second half of the 20<sup>th</sup> century, major events and reforms determined the future of the ground and dramatically changed the landscape of the hospital. In the 1960s, the University of Ohio purchased some parts of the farmland from the hospital to build its Convention Center. From the late 1960s to the early 1970s, due to the constant flooding of the Ohio University campus, the Army Corps of Engineers re-channelized the Hocking River Athens that impacted both the University of Ohio campus and hospital's site (Woodward, 1988). Consequently, State Route 682 was redirected and, as a result, the water resources and four recreational and decorative lakes on the grounds were removed. By the early 1980s, the number of patients decreased and by 1993, patients were being moved out from the Athens asylum. In March 1980, the main building was added to the list of National Register of Historic Places (National Park Service, 2016), but the surviving designed landscape was not

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<sup>55</sup> "Herman Haerlin was born in 1832 in Württemberg, Germany, and died in 1905 in Cincinnati. Some sources claim he was a student of Olmsted, but thus far these claims are not corroborated by any outside evidence. Haerlin was also involved in the landscape designs of the Ohio State University campus, the Athens Mental Center (otherwise known as "the Ridges"), the Spring Grove Cemetery in Cincinnati, and Snyder Park " (The Cultural Landscape Foundation, 2016).

proposed into the list, while the hospital building was added. While the Ohio Chapter of the National Alliance on Mental Illness (NAMI) restored the cemeteries of the asylum (NAMI Athens , 2016), the therapeutic uses of the site itself, its natural elements, and the recreational environments of the ground have been abandoned.<sup>56</sup>



*Figure 13. The bird's eye view from north-west toward the main building shows the topography of the ground. (Image courtesy of Southeast Ohio History Center, 2016).*

## **B. Therapeutic Environment and Landscape of the Hospital**

In the 19<sup>th</sup> century, Athens asylum, with its park-like ground, on the steep topography between forest and river was a symbol of hope for Athens' community. Agricultural activities were considered to be the signs of mental healing and economic progress. The designed landscape of the asylum was a method for moral treatment philosophy of the time (Tomes, 1984; Valenstein, 1986). According to Ziff and Gladding (2012), those attractive views and highly functional cultivated lands provided

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<sup>56</sup> The healing and picturesque characteristics of the hospital's landscape of this hospital has been repurposed to a memorial site; for example, every year around Halloween, the schools provide tours for students on the site and buildings (Coleman, Henderson, Willis, Moran, & Scurman, 2005).

both work and exercise in addition to healing through pleasure and delight. Influenced by Olmsted, Haerlin strongly believed in the restorative properties of the naturalistic setting of the landscape and therefore insisted on preserving the pristine wilderness of the grounds. The designer personally supervised the development of the site, introduced evergreen seedlings to it, and improved the hygiene and health conditions of the institution (Ziff & Gladding, 2012). For example, he developed a system for sewage treatment and planned a network of ponds to purify the potable water for the asylum. He proposed a system to supply clean water was a multi-purpose plan that not only provided water and ice but also created beautiful scenery, and four man-made lakes for boating. Seriously concerned about miasmatic theory, Haerlin, successfully converted the swamp-like lowlands on the northern side of the property into a source of healthy running water and picturesque lakes (Ziff & Gladding, 2012). His attempts to create a vegetable garden and plant fruit trees had its roots in the 19<sup>th</sup>-century belief that a self-sustained landscape is a more healthful one (Valenstein, 1986). The landscape design of the Athens Asylum implemented the principles of the “moral treatment” theory and therefore a variety of gardens, pleasure grounds, trails and strolling spaces, all of them which had been prescribed for their healing effects (Valenstein, 1986). A hundred years before Roger Ulrich, who published his research describing the positive impacts of windows to natural settings on the recovery of patients (Ulrich, 1984), Haerlin and asylum workers created significant vistas to lakes and landscape to heal the mentally ill patients via the hospital’s windows. The institution had a greenhouse, with permanently employed gardeners and florists, who supplied ward, and public spaces with fresh flowers. In this geographically beautiful situation, and on strategically

important hills with steep slopes, the architecture and landscape of the hospital provided a pleasing visual connection to the city of Athens (Ziff & Gladding, 2012).

The significant characteristics and major developments of Athens asylum can be summarized as follows; first; the asylum's landscape was permeable with no significant fence that was occasionally converted the grounds into a public park, where regular citizens and patients mingled under the same conditions (Ziff, 2004). Second; in 1907, the grounds and pavilion of the asylum became a shelter to the public, due to a flood hazard in the city (Ohio Historical Society , 2016), while 100 years later, disaster preparedness was introduced as one of the major trends in design and construction of healthcare facilities by the Center for Health Design in the United States (Malone, et al., 2015).Third; The recent developments, building & parking lots, changed the original landscape of the ground, while minor portions of the ground survived. Forth; the location and orientation of the main building provided two paramount vistas to first, the Hocking River, artificial ponds, and the city of Athens in north. Secondly, views to natural woods of the rolling hills in south.



*Figure 14. The main building of Athens asylum with its Late Victorian revival architectural style, which was surrounded by lakes and gardens were the key features of the healing landscape of the ground (Image courtesy of [www.asylumprojects.org](http://www.asylumprojects.org), 2016).*



*Figure 15. The landscape of Athens asylum around 1893. “Out for an Airing”, exposure to natural elements of landscape was one of the major means to heal insane (Image courtesy of City of Athens, Ohio).*

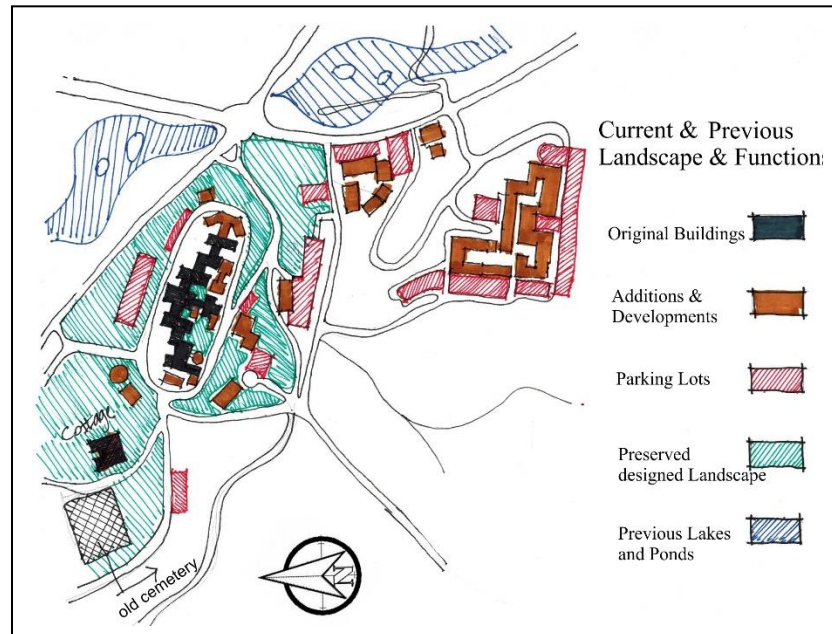


Figure 16. The recent developments, building & parking lots, changed the original landscape of the ground of Athens asylum, while minor portions of the ground survived (Image by author).

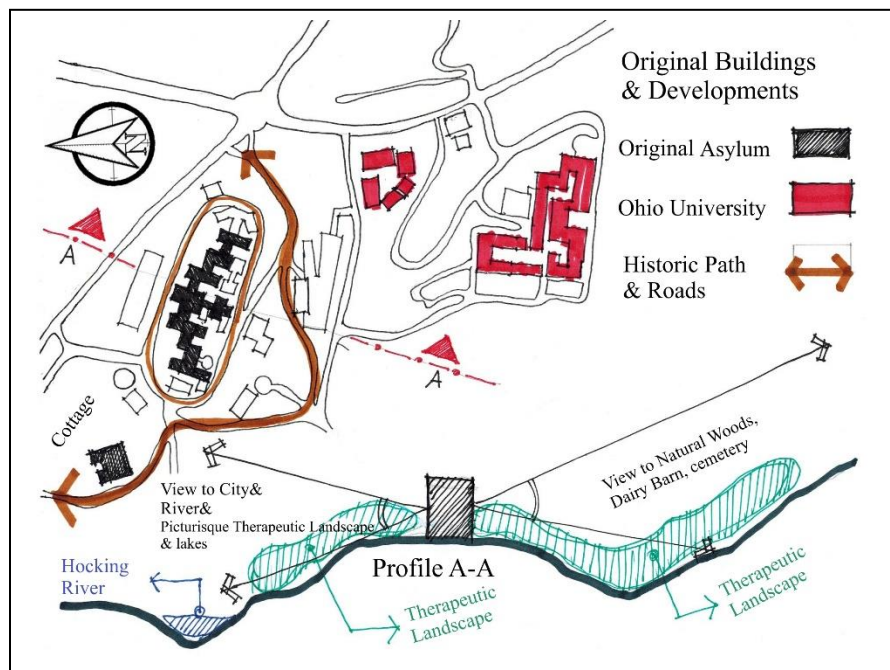


Figure 17. The location and orientation of the main building of Athens asylum provided two paramount vistas to first, the Hocking River, artificial ponds, and the city of Athens in north. Secondly, views to natural woods of the rolling hills in south (Image by author).

### **John Hopkins Hospital (Critical Example III)**

Johns Hopkins Hospital was established as the first pavilion-style hospital in the United States. It has strong religious connection to heal the patients, in addition to the well-known history of combining research in caring for the sick. Its contribution to cultural changes and medical advancements in the country made it a significant example to investigate.

#### **A. The Creation and Establishment of the Hospital:**

In 1872, John Hopkins, a philanthropist and a merchant in mid-Victorian Baltimore, purchased 13 acres of land, which was the old Maryland Hospital for the Insane during the Civil War. He erected a hospital, “which shall, in construction and arrangement, compare favorably by any other constitution of like character in this country or in Europe” (Harvey & McKusick, 1989). By establishing an integrated system of hospital and medical university that included teaching and research that laid a solid foundation for a revolution in medicine in the United States. From the beginning of the locating process, environmental considerations resulted in selecting the site at “Londenschlager’s Hill” at east central Baltimore city, for the excellent drainage of the hill and existence of springs, in addition to fresh breezes that provided ventilation and were critical for future sanitation of the hospital (John Hopkins Health System, 2016). Hopkins’ vision was a system of symmetrical wards for 400 patients, and additional buildings for convalescence, which would be surrounded by hospital grounds that were planted with trees and flowers to heal the sick and destitute of Baltimore. He also asked that the impact of religion be felt within routine activities of the hospital (Risse,

1999)<sup>57</sup>. John Shaw Billings, a medical officer, drafted the initial plans according to the barrack system of military hospitals. Billing's plan was a carefully designed system of wards with ventilation to prevent the spread of contagious disease, but the authorities and trustees decided to create permanent pavilions instead of temporary buildings (Billings, 1975). The hospital owned one of the most advanced heating and ventilation systems in the world for preventing the spread of infection (John Hopkins Health System, 2016). This was a clear indication of the new medical theories, such as germ theory, that shaped the hospital environments.

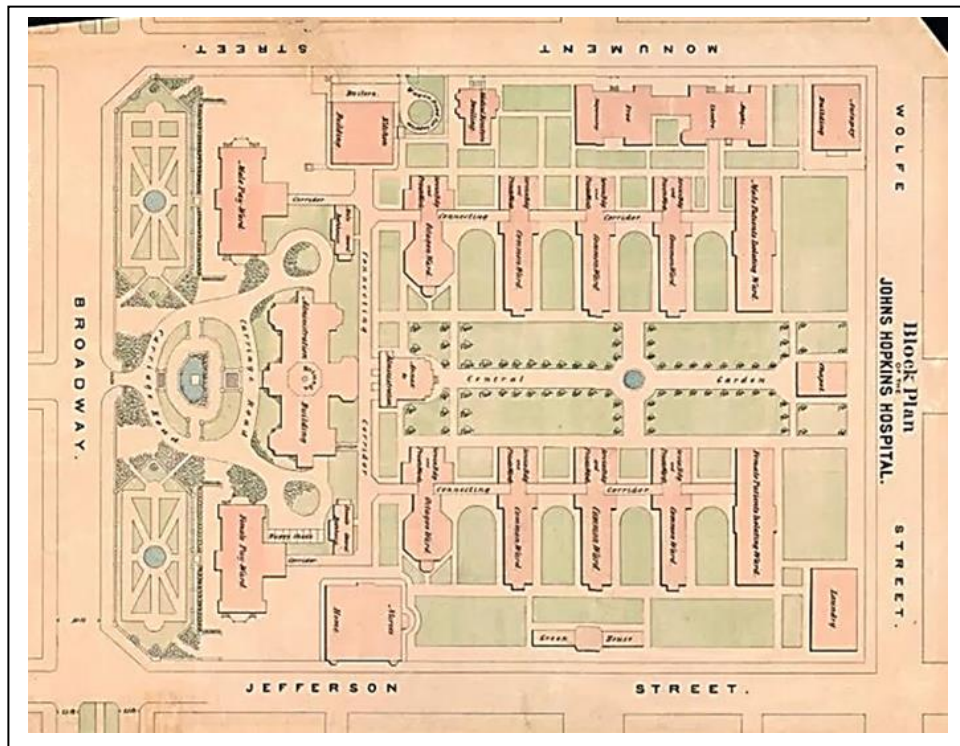
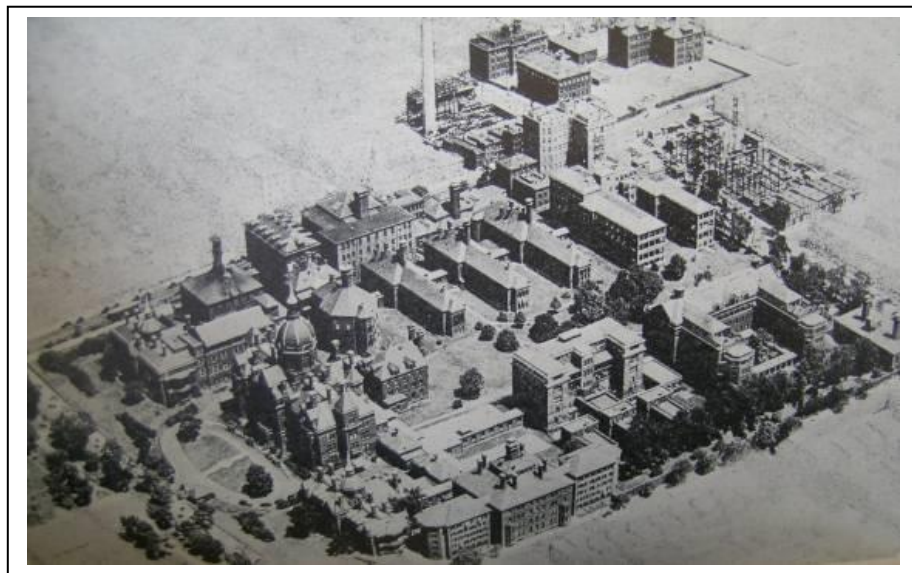


Figure 18. The original pavilion design of John Hopkins Hospital in 1877, by John Shaw Billings and Architect: John R. Niernsee. Its wards and central courtyard in addition to inviting entrance landscape (Image courtesy of Johns Hopkins Sheridan libraries, Library (Sheridan) General Collections, 2016).

<sup>57</sup> The "Christus Consolator" or "The Divine Healer" statue, is located in the lobby of the domed Billings Administration Building at The Johns Hopkins Hospital.

In 1893, John Hopkins University was one of the first medical schools that admitted women (Burrow & Burgess, 2011). It can be considered one of the initial steps that changed the masculine environment of John Hopkins Medical School, and later shifted the culture of care in public medical hospitals. The buildings were designed in Queen-Anne style with pressed brick and a pitched-roof covered by slate and copper. The east-west corridor connected five independent pavilions. While the Northern building rose above the complex, the southern parts were designed lower, to allow sunlight to reach to the ground and other pavilions (Risse, 1999). In 1893, admitting four women in return of their financial support to open John Hopkins University. The decision made the John Hopkins University one of the first medical schools that admitted women (Burrow & Burgess, 2011). The east-west corridor connected five independent pavilions. While the Northern building rose above the complex, the southern parts were designed lower, to allow sunlight to reach to the ground and other pavilions (Risse, 1999).



*Figure 19. The aerial view of John Hopkins Hospital around 1950's that shows the original landscape design of courtyards, southern side of hospital and the main entrance (Image courtesy of Kilduffs Baltimore Hospitals, 2017).*

The entrance landscape included two formal gardens, designed in a symmetrical style with a fountain along North Broadway Street. The formal gardens were connected to the main building with a circle and a central fountain (Thompson & Goldin, 1975). The landscape design of the ground included a large courtyard garden and an inviting entrance landscape. The central courtyard was planted with trees that provided light, and a soothing view for ambulatory patients in pavilions (Thompson & Goldin, 1975). At the eastern end of the campus, a separate isolation ward was constructed to make sure that the wind direction prevented the miasmatic diseases from affecting the hospital. In 1889, J.S. Billings, who was greatly responsible for the initial design and planning of Johns Hopkins Hospital, stated, “A hospital is a living organism made up of many different parts, having different functions, but all these must be due proportion and relation to each other and to the environment to produce the desired results” (Billings, 1889). Sir William Osler, was the first chief of the Department of Medicine in the hospital, and invented the concepts of “residency” and “grand rounds,” which are considered two critical practices of modern hospitals. He converted the Johns Hopkins Hospital environment to a medical facility and the house of technical teaching and research<sup>58</sup>, while, considering it as a shelter and refuge for destitute patients (Osler, 1907). The Oslerian concept of clinical laboratory and scientific study of disease was mixed with the original wish of the founder of the hospital to have religious symbols and agenda in management and organizational activities. In this way, on the one hand Johns Hopkins Hospital expanded its roots back to late 18<sup>th</sup>-century European models,

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<sup>58</sup> According to Risse (1999), Osler considered the Johns Hopkins Hospital a traditional shelter or “place of refuge for sick poor of the city,” while in addition to Christian model, he also characterized the hospital with the enlightenment ideas of creating a medical facility with a focus on research.

such as Edinburgh and Vienna, and on the other, referred to religious institutions as Middle Ages' monasteries (Risse, 1999). The students in residency training at Johns Hopkins Hospital were highly qualified physicians and prominent scientists that filled top positions across the country, and improved the American Medical schools and modern medicine practices<sup>59</sup> (Johns Hopkins Medicine, 2016).

## **B. Evolution and Development of the Hospital**

Now, only few historic buildings remain and have been preserved (National Park Service, 2016), including the main building and a pavilion ward with its small courtyard that houses the department of physical medicine and rehabilitation. The central grand courtyard garden has vanished and became an asphalt parking lot. In 2012, two new medical towers were completed, the Charlotte R. Bloomberg Childrens Center Tower and the new Sheikh Zayed Tower (Pogrebin, 2012), which changed the whole landscape of campus. During the last 25 years, Johns Hopkins Hospital has been ranked one of the top hospitals in the United States (U.S. News & World Report , 2016), and its development aggressively expanded its clinical buildings and facilities beyond its original boundaries across East Monument Street and Orleans Street. This huge postmodern red brick and glass architecture of clinical institutions and elevated solid concrete parking garages have dramatically affected the urban landscape of the Baltimore downtown. New integrated design and research methods have been implemented to improve the therapeutic landscape and accessibility of the campus, for example, to improve the “way finding in hospital,” an architectural firm, Perkins &

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<sup>59</sup> Hospital gained recognition through its well-respected staff--doctors Welch, Osler, Halsted, and Kelly. Welch was responsible for training many of the outstanding physicians of the day, such as Walter Reed. He also founded at Hopkins the nation's first School of Public Health.

Will, inspired by the interpretation of Osler, designed two entrance canopies to provide shelter in the main entrance and children's emergency entrance (Vinnitskaya, 2012). Also, the landscape architecture firm, OLIN created an inviting green plaza, which provides shade and small opportunities to connect to nature, along Orleans Street (Johns Hopkins Hospital, 2016a). Additionally small meditation or memorial gardens around the hospital have been created to partially integrate the site's storm water management plan<sup>60</sup>. In the Sheikh Zayed Tower, more than 50 artist have installed their artworks to soften the clinical setting of the hospital with nature including landscape images, flower petals, rocks, and sculptures inspired by nature (The Johns Hopkins Hospital, 2015).



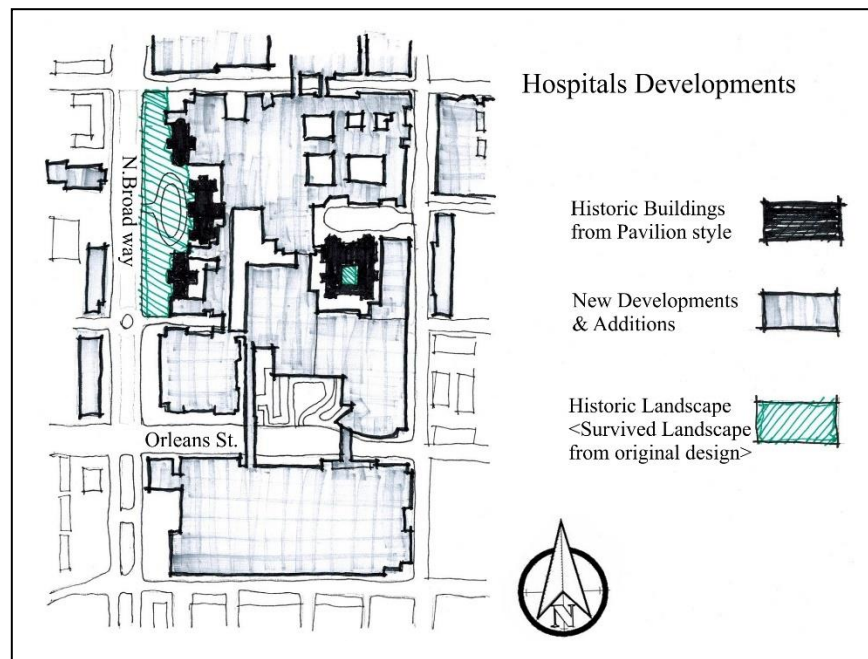
*Figure 20. Philips Building Courtyard (1913) which has been survived until nowadays, with some changes in its original design. It was designed for the psychiatric clinic and proposed to heal patients (Image courtesy of Johns Hopkins Medicine, Retrieved from [www.hopkinsmedicine.org/psychiatry](http://www.hopkinsmedicine.org/psychiatry), 2016).*

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<sup>60</sup> Including Sara's Garden for Kids, & Meditation Garden, off the lobby of the Zayed Tower.



*Figure 21. A view from Orleans St. to the emergency entrance, its landscape and canopy and Johns Hopkins Children's Center towers in background (Image courtesy of Johns Hopkins Medicine, 2016).*



*Figure 22. During the last century, the site's developments of Johns Hopkins Hospital changed the landscape and aggressively extended beyond the boundaries of the hospital (Image by author).*

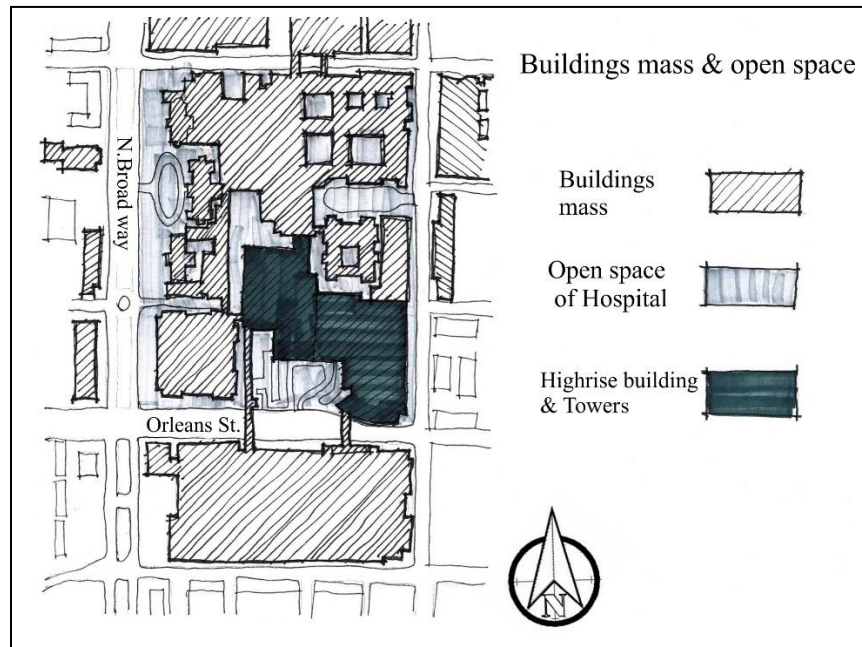


Figure 23. New high-raised buildings and towers of Johns Hopkins Hospital changed the urban landscape of the neighborhood. Additionally, densely constructed campus suppress the therapeutic properties of the site (Image by author).

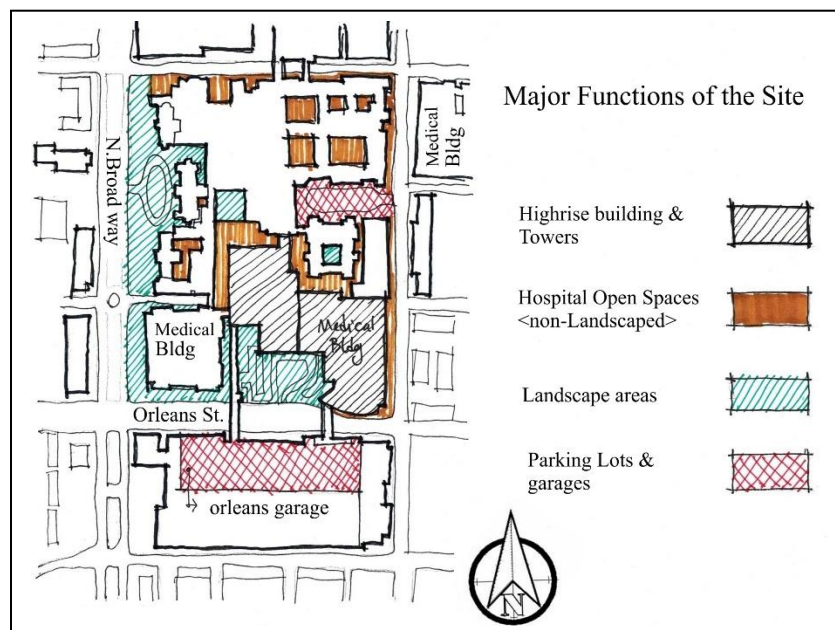
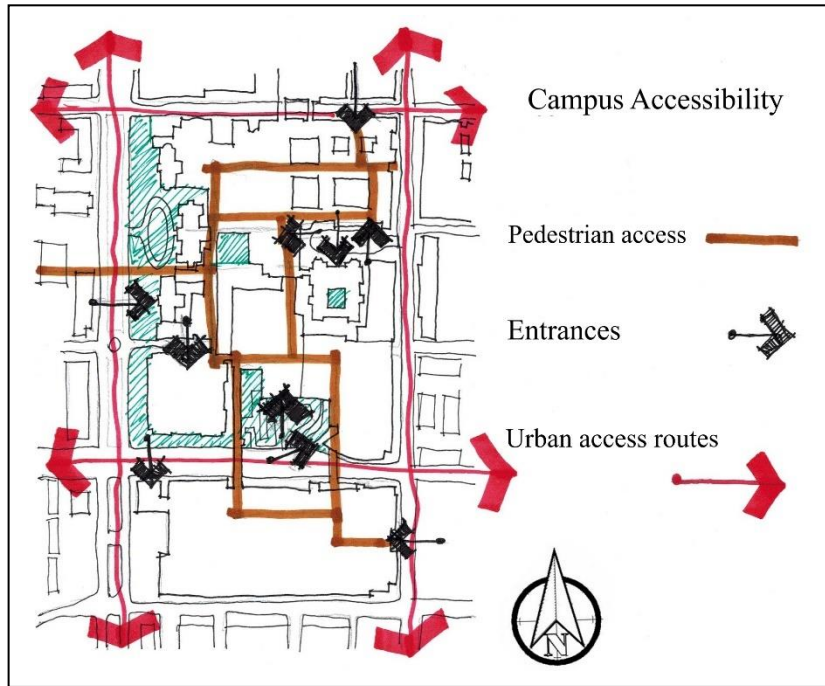


Figure 24. The major landscaped areas of Johns Hopkins Hospital include two entry gardens, while the original grand courtyard was converted to parking lot (Image by author).



*Figure 25. The system of the roads and entrances of Johns Hopkins Hospital offered inadequate exposure to nature, in addition to the lack of barriers between the buildings and polluted urban streets (Image by author).*

### 3.4. War, Medicine Advancements, and Hospital Innovations

**Summary;** in the mid-19<sup>th</sup> century, the catastrophic experience of high casualties in the Crimean War, initiated a new era in military medicine. Despite the failed efforts in the both sides of the battle field to reduce the mortality rate of wounded soldiers, systematic medical training, personal sanitary of soldiers, and innovations in military hospital design were significant achievements of that war. The medical reforms and scientific research based on the Nightingale's recommendations resulted in considerable innovations in hospital design that diversified military hospital planning as follows: first, temporary barrack hospitals by renovating military barracks; second, hutted hospitals; third, pre-fabricated barrack hospitals, and last, convalescent

hospitals. The major considerations of the new patterns of military hospitals were only functional efficiency and hygiene design of their wards. The last model, convalescent hospitals, which was developed by some Nightingale's sketches, adapted to public use. Additionally this pattern applied the restorative properties of nature and landscape to provide therapeutic environments for both civilians and soldiers. After the Civil War in the United States, hygienic regulations gained importance and aimed to reduce the casualty of wounded soldiers. This agenda resulted in the establishment of a Sanitary Division in the U.S. Military. While, Military Time and Movement Efficiency and hygienic design resulted in creation of more developed and successful models of mobile-field hospitals, the new development of the neuro-physiology introduced medical treatment and drugs as more efficient practices for healing disordered soldiers. This caused a sharp decline in therapeutic landscape design within the public hospitals.

### **A. Modern Wars and Hospital Innovations**

During the 18<sup>th</sup> and 19<sup>th</sup> centuries, in the British Empire, the political pressure made military hospitals critically important. In 1854, Britain and France declared war against Russia—the Crimean War. After a year, three out of four of every British soldier died from disease and had been admitted to regimental or general hospitals a long distance from front lines (Small, 2008). In 1855, Nightingale's efforts resulted in improvement of the overall situation in the "Barrack Hospital of Scutari"<sup>61</sup> near

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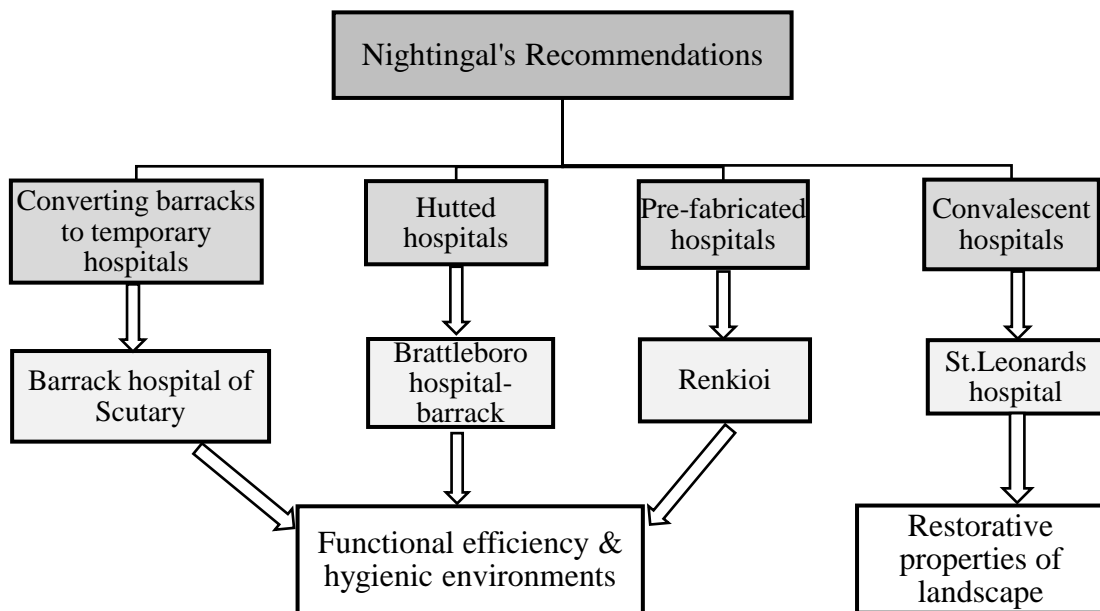
<sup>61</sup> Selimiye Barracks, also known as **Scutari Barracks**, is a Turkish army barracks located in the Üsküdar district on the Asian part of Istanbul, Turkey. It was built first in 1800 by Sultan Selim III for the soldiers of the newly established Nizam-ı Cedid (literally "New Order") in frame of the Ottoman military reform efforts.

Istanbul. Therefore, this hospital became a model for other military installations that were converting to hospitals (Goldin, 1994). Later on, some hutted hospitals opened near the front line to provide treatment for the larger proportion of wounded soldiers (Bostridge, 2009). Meanwhile, an innovative prefabricated barracks hospital, “Renkioi” was designed and installed by, Brunel, an English engineer. This model was a prototype that was derived in accordance to Nightingale’s recommendations for hygienic hospital wards and very soon became well-known worldwide (Burdett, 2012). According to Small (2008), “the hygienic hospital was invented by Nightingale, who made a significant contribution to larger projects, through her pre-eminent role in hospital design. Her well-known book, *Notes on Hospitals*, became a standard text for hospital designers. She was also personally involved in advising on the building of many hospitals in Britain and overseas...” (p. 40); therefore, she improved her original idea of the hygienic hospital to a realistic architectural model. Her favored “Pavilion Hospital” was a radical departure from the monumental Victorian hospital, which was achieved from the experiences of Scutari Barrack Hospital. In 1860, the pavilion hospital was rapidly expanded throughout the European and American cities. According to Verderber (2010), several characteristics of this pattern made it more desirable for new hospitals, such as “attractive campus setting, amid landscape grounds, natural ventilation, day lights, views and terraces.” (p. 24). One of the interesting designs of Nightingale, the Convalescent hospital<sup>62</sup>, is arranged as cottages with colonnades around the courtyards (Nightingale, 2015). In this small model, the tradition of courtyard gardens that were forgotten since the 18<sup>th</sup> century, had been

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<sup>62</sup> **Convalescence** is the gradual recovery of health and strength after illness or injury.

recalled on a different scale. Another noteworthy hospital was constructed according to the hygienic rules and environmental consideration of the time. The hospital de la Santa Cruz y San Pablo, designed and built in Barcelona by Antonio Gaudi, a famous Spanish architect (Goldin, 1994). Its modernist and functional plan included elevated wards and courtyards in between to provide fresh air and ventilation and also bright interiors to wards. On the end of each ward, there were terraces where the patients with Tuberculosis could enjoy the outdoors in good weather. This design innovation became a key feature in following models of “Tuberculosis Sanitariums.”



*Table 12. Medical reforms and scientific innovations diversified the military hospitals in Europe, during the 19<sup>th</sup> century (by author).*

## **B. Medicine and Military Discourse in United States**

Historical studies of hospitals in the United States illustrate dramatic transformations that took place in health care institutions between the 1880s and 1920s. While the studies focus on civilian hospitals, they paid less attention to the military health discourse (Rosenberg, 1987). The understandings of bacteriology, the germ theory, the changes in economy and demography, the pioneer design ideas in hospitals (Stevens, 1999), and after-effects of war, were the major forces behind the expansion of institutional health in United States during the late 19<sup>th</sup> century (Adler, 2014).

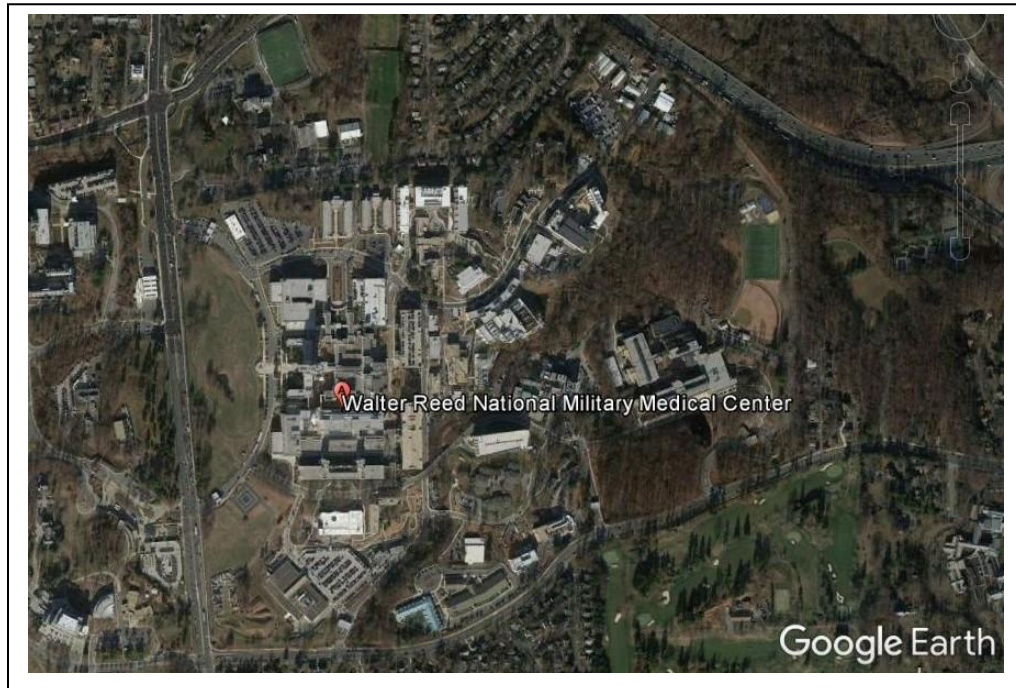
The larger medical culture of the early 20<sup>th</sup> century in both military infrastructures and civilian health systems affected army hospitals. In other words, after civil wars, many army medical institutions were perceived as frontlines of battle against diseases (Annual Report of the Surgeon General to the Secretary of War [ARSGSW], 1908; Gillett, 1994). The new building's style of military hospital was the product of evolving concept of medical sciences and nursing practices that considered access to fresh air, sufficient light and indoor spaces as the critical and basic regulations for hospital design (Verderber & Fine, 2000). Military medicine has been different from public care systems; firstly, it has been under a broader influence from military needs to foreign policy, secondly, the nature of the military advocates more centralized and institutionalized systems, which shapes its healthcare environment. Thirdly, the military always looks beyond the domestic to international structures to prove their competitiveness (Hammond, 1863).

## **Walter Reed National Military Medical Center (Critical Example IV)**

Walter Reed National Military Medical Center is the leading military hospital in the country; its establishment was a direct consequence of closure of the WRAMC. Many modern technologies and advance medical treatments have been combined with the research of healing environments in this institution, to change the healthcare system of the United States. Additionally this hospital carries the name of Walter Reed, which is important in American military and culture. It also embraced one the best healing landscape practices, which has been incorporated into constant laboratory research on healing environments.

### **A. Establishment of a New Military Hospital**

The establishment of Walter Reed National Military Center (WRNMMC) is a direct result of the Base Realignment and closure of Walter Reed Army Medical Center (WRAMC). In September 2011, WRAMC joined the National Naval Medical Center. This decision combined two Military hospitals and shaped one unique medical institution on one campus. WRAMMC has 8,500 staff members, and their mission is to serve families and members of veterans and active duty military members, leaders of the country, while delivering “World-Class” healthcare through an integrated system in addition to setting standards of education and research (Walter Reed National Military Medical Center [WRNMMC], 2016). The combination of these two institutions aimed to move healthcare’s boundary with synergic and revolutionary methods to beyond the existing borders.



*Figure 26. The site of Walter Reed National Military Center (WRNMMC), and its green surrounding neighborhood with north Chevy Chase local park, Rock Creek River on the East, and National Institute of Health in West (Image from Google Earth, 2016).*



*Figure 27. Modernist Architecture of the hospital, and inviting landscape along the Rockville Pike (Image credit: U.S. Army).*

## **B. Landscape and Design of WRNMMC Campus**

The modern architecture of WRNMMC, despite its huge buildings, and large areas of parking lots, offers insufficient green space to connect the campus of the hospital to its surrounding beautiful woodlands. The site design has provided excellent access for automobiles while accommodating very large parking facilities in both the north and south of the site, in addition to two elevated full concrete parking garages for patients and staff behind the main building (Bldg. 2). The design of the site, makes this obvious that the access for cars and shuttles was the priority during the campus planning and design. The only significant landscape is a vast grass-covered area with a moderate slope in front of the main entrance along Rockville Pike and Wood Road. This inviting landscape includes a naturalistic loop pathway with a small temporary water pond, in addition to the flagpole at the highest part of a manmade hill. On the low slope of this landscape, trees have been planted to encourage characteristics of the ground.

## **C. The Green Road Project at the WRNMMC Campus**

In September 2011, when WRNMMC started its operation, it was supposed to be an example of the “inspiring hospital of future,”<sup>63</sup> and a place that would introduce “a new era of holistic medicine.”<sup>64</sup> The campus of WRNMMC was very well designed to properly respond to the logistics and traffic demands, but the lack of functional green areas and natural landscape were considered from the early days of its operation. Green Road as a natural healing environment was proposed for the WRNMMC campus, and

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<sup>63</sup> Stated in ; The Institute for Integrative Health’s web site

<sup>64</sup> Stated in ; The Institute for Integrative Health’s web site

includes trails, green spaces and a local stream that ends in the Rock Creek River. The project starts from the south of the campus along the stream that passes the site and eventually reaches into the woods on the northwest of the grounds, and north of Chevy Chase Park. According to the Institution for Integrative Health: “they and their partners have created the Green Road—a woodland garden where service members and their families will find respite amid forest and wildlife, beside a tranquil stream” (The Institute for Integrative Health [TIIH], 2017a). The main goal of proposing this healing landscape is to provide recovery and restoration for wounded warriors who suffer from PTSD and Traumatic Brain Injury. “The Green Road Project team hopes to scientifically demonstrate the positive impact of nature encounters on human health within three years. Objective evidence will advance the case for increasing community green space and making exposure to nature a therapeutic mainstay” (The Institute for Integrative Health [TIIH], 2017b). The dedication ceremony took place in September 2016. At the beginning of the 2017, a team with expertise will initiate a targeted research that will study the participant responses under different conditions of high traffic urban streets and green roads in two pathways. They have established five metrics, three of them that have been developed previously under the “Epidauros Project.” This was a model for holistic care that was launched in 2001 by Dr. Fred Foote, to measure and design therapeutic spaces for soldier-patients of the Iraq Liberation War (Foote, Bulger, Frampton, & Pellegrino, 2012). Green Road, as a natural healing environment and research laboratory has three tasks to accomplish: first, it will be a place to connect military members and their families to nature. Second, this space will reduce their stress and depression through exposure to nature. Third, it

will be a place to celebrate the memories from fallen comrades (TIIH, 2017a; Foote & Schwartz, 2012). The planning and design strategies that shaped the site of WRNMMC are include; first, the campus planning divided the site into separate zones include; the clusters of buildings, and green areas. Therefore not only the medical buildings were not exposed to nature, but also views from the hospital to natural elements were minimized. Then, two planning strategies suppressed therapeutic properties of the landscape of the WRNMMC. First; the medical cluster of buildings was surrounded by parking lots, and high-raised garages. Second, the naturalistic green and landscaped areas have been disconnected by buildings arrangements and major roads of the campus. The therapeutic strategies that were implemented into the new landscape design are summarized as follow; First, Three phase of the Green Road Project, the local stream and the woods inside the site provided an opportunity to connect these healing gardens to surrounding natural environments. Second, Phase two of Green Road project, is healing garden, an environment for improving social cohesiveness of soldiers and their family and a cultural landscape to celebrate fallen comrades. Therefore, the Green Road project in WRNMMC is significant in two ways. First, introduces a new approach in therapeutic landscape design in existing facilities, and also indicates a new era of combining constant research into design practice.

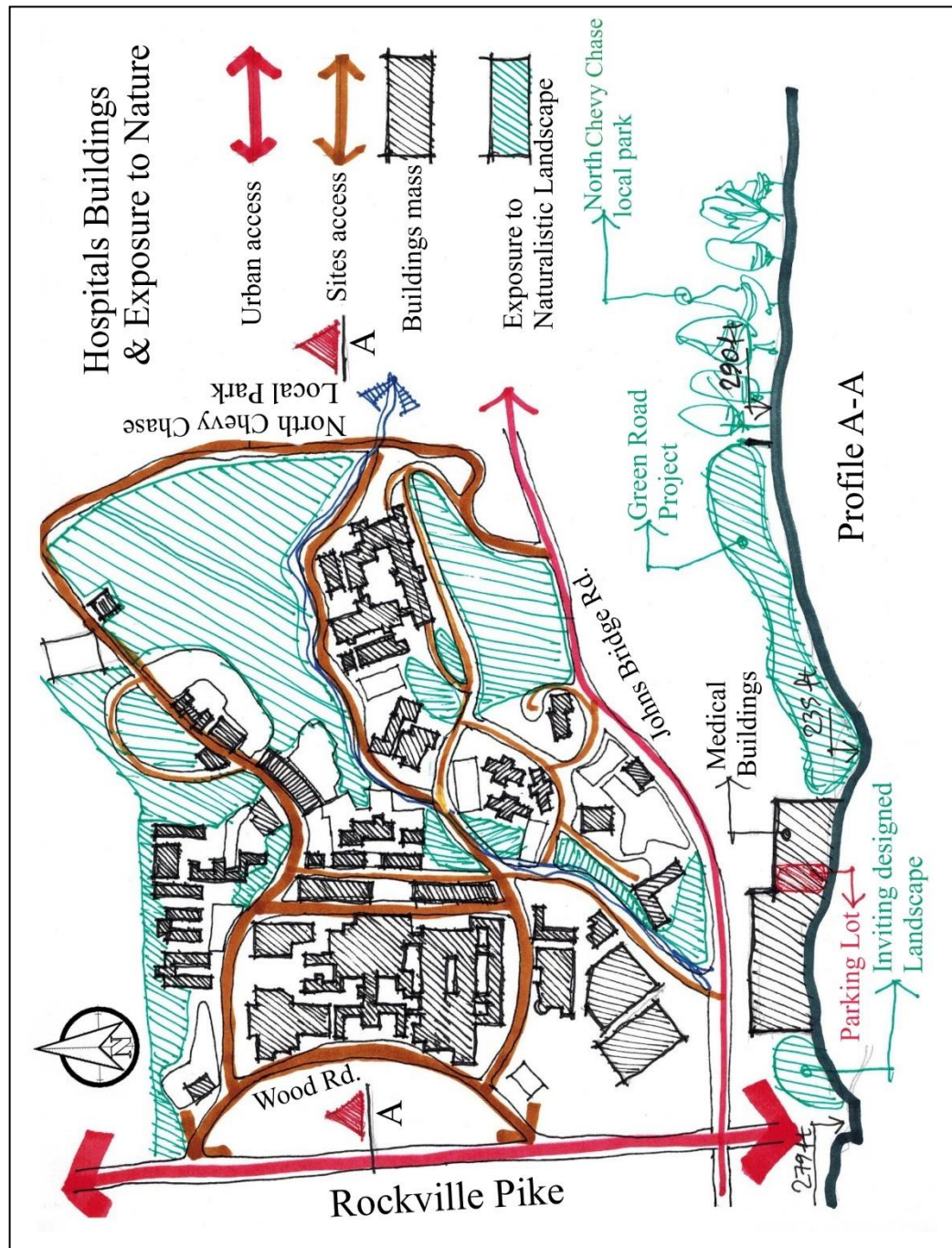


Figure 28. The campus planning of Walter Reed National Military Medical Center divided the site into separate zones include; the clusters of buildings, and green areas. Therefore not only the medical buildings were not exposed to nature, but also views from the hospital to natural elements were minimized (Image by author).

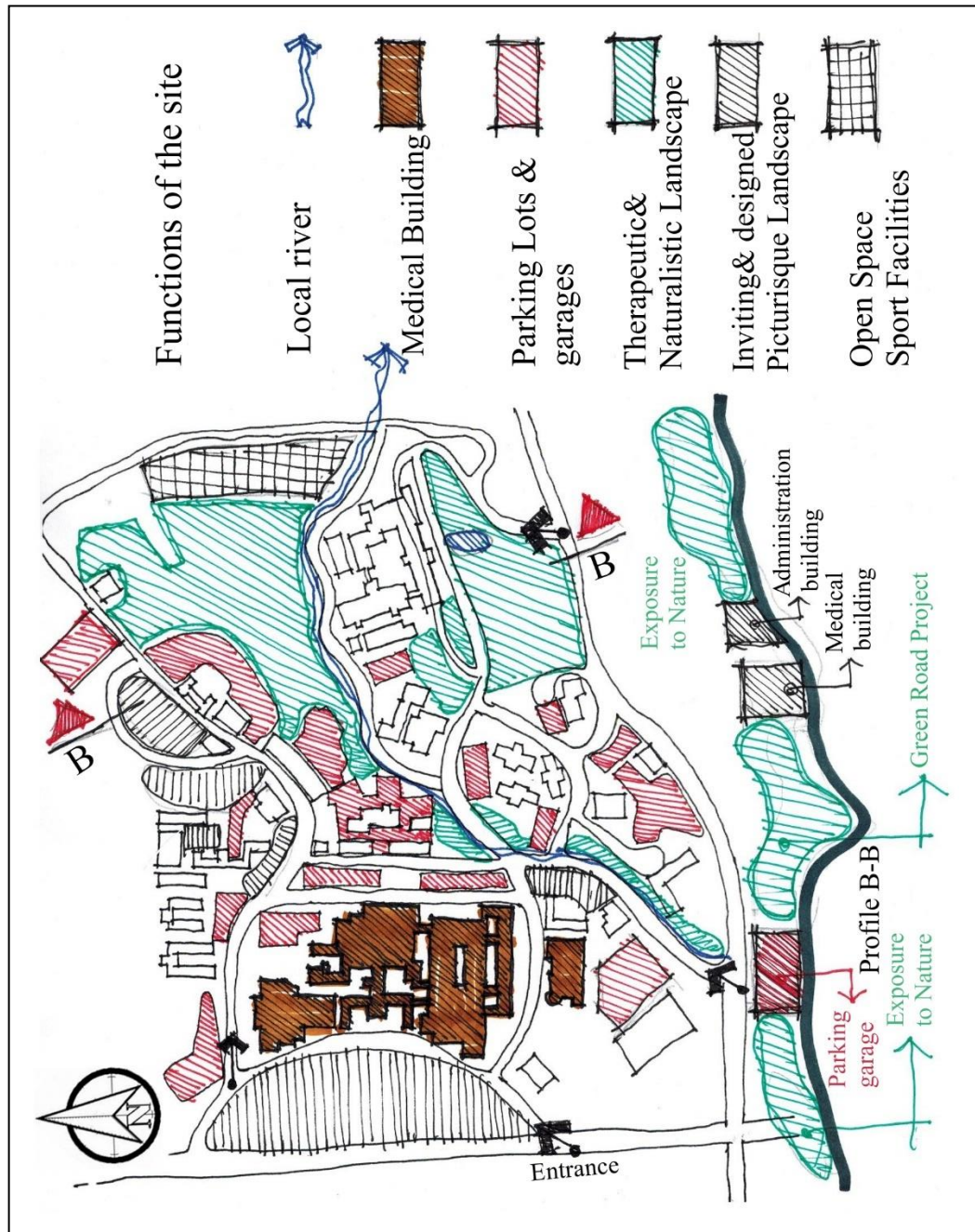


Figure 29. Two planning strategies suppressed therapeutic properties of the landscape of the WRNMMC. First; the medical cluster of buildings was surrounded by parking lots, and high-raised garages. Second, the naturalistic green and landscaped areas have been disconnected by buildings arrangements and major roads of the campus (Image by author).

## **Fort Belvoir Community Hospital (FBCH), (Critical Example V)**

Fort Belvoir Community Hospital is also one of the leading military hospitals that has been designed and constructed according to the latest methods of evidence-based design. This is a unique and very expensive experience in history of the military medicine in the United States, and providing the most effective therapeutic environments was the main agenda of its design. Its establishment was also one of the consequences of the closure of the WRAMC.

### **A. Establishment of the new Military Hospital**

Located at Fort Belvoir, in Northern Virginia, the hospital provides healthcare for Army, Navy, and Air Force members and their families. The establishment of the Fort Belvoir Community Hospital in 2011 was one of the results of the Base Realignment and Closure of Walter Reed Army Medical Center, announced in 2005. After that, “The U.S. Army Corps of Engineers initiated a radical reorganization of the military health care system in the Washington metropolitan area” (Rocha, 2012). The location of the hospital was former Dewitt Army Community Hospital, which was opened 1957 with 46 beds. Following the Korean War, the Army planned and built the Dewitt Army Community as one of its nine hospitals, to serve the wounded soldiers. The site of the new hospital was purposefully re-selected due to its 30 miles distance to major sources of the air pollution and congested highways. The previous hospital was located in a close proximity to significant natural features such as Dogue Creek, Potomac River, & their surrounding natural forest. An architectural firm, HDR, Inc., designed the modern facility of hospital with 120 beds. The design concept aims to bring the natural elements theme to the hospital site. The seven-story architecture,

which flanks on each side resemble the well-known “Kirkbrid Plan.” The initial ideas of landscape design and the main building of the hospital are reminiscent of a 19<sup>th</sup> century American asylum.

### **Ecological Strategies improved Healing Landscape of the Site**

HDR was responsible for full design and engineering parts of the project, while the landscape and site was designed and constructed by a separate company, Dewberry. The design process applied evidence-based design to achieve proper LEED certification (Foote, 2015). The building’s mass and structure increased during the initial design process, but the building was planned in seven stories to prevent further spread of its prints. This design approach saved more space for landscaping and open spaces in the site. The Hospital incorporated an extensive evidence-based design methodology<sup>65</sup> in landscape lighting to improve patient’s satisfaction. Four major EBD principles that directly influenced landscape of the hospital include: first, connecting patients to nature for positive distraction; second, implementing strategies for further growth by saving open spaces in site. The design team focused on improving the quality of both the outdoor and indoor environments. New technologies, like UV radiation, CO<sub>2</sub> monitors and HEPA filtration were implemented to prevent the growth of pathogens (Pullinger, 2012). Energy. Efficient HVAC and lighting systems were installed to save energy, compared to regular hospitals. Ecological strategies to aim more sustainability and wellbeing in the hospital by incorporating green roofs: first, to harvest rain water and save it in underground cisterns for landscape irrigation. Second,

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<sup>65</sup> It was the first military hospital, which has been designed with EBD approach.

the green roofs and rain gardens provided healing landscape by exposing patients to nature (Rocha, 2012).

The nature and adaptive plants were planted on green roofs to reduce rainwater runoff, and decreased the heat island effects, in addition to exposing patients to healing scenery from their personal rooms. As Rocha (2012) states, nature's healing power and resource efficiency was considered as the core themes for building a happier and healthier environment for both patients and staff. Large windows and glass walls in public interior spaces provide pleasing outside views and plenty of natural daylight to heal the patients faster. Sunshine, fresh air and exercise have been accessible through the construction of a "park-like exterior courtyard" and the river pavilion healing garden (Pullinger, 2012). Both the visual and perceptual connections to nature are aimed at improving both way-finding and walkability of interior-exterior spaces of the hospital (Pullinger, 2012). Despite many attempts to turn the site into a restorative landscape, a large portion of land in front of the main elevation of hospital, between the main building and Belvoir Road has been specified for a huge parking lot at the ground level, so only a narrow portion of the site between this parking lot and the main building has been landscaped. Additionally, two huge cubic concrete elevated parking garages on each end of the flanked wings of the hospital enclosed the front part of the site and disconnected it from the whole site.

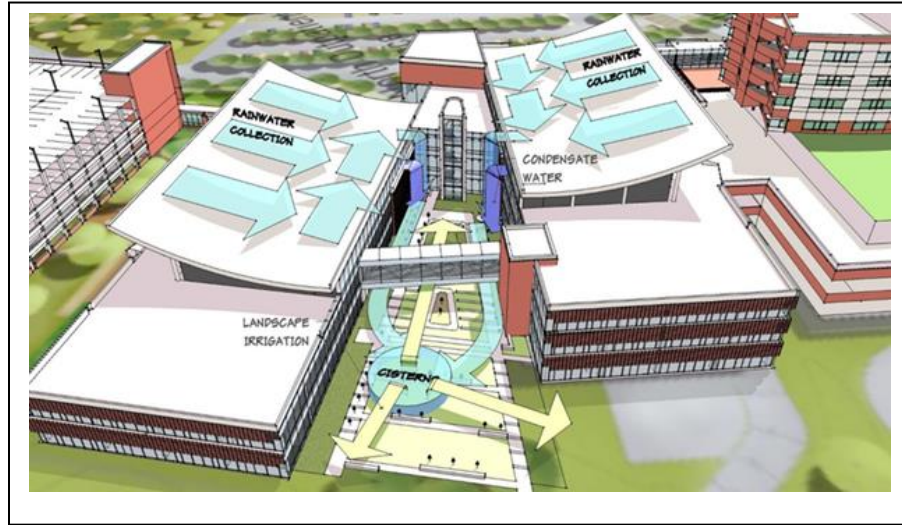


Figure 30. The hospital's rainwater harvesting system, including sloped roofs, rain gardens, green roofs and cisterns (Image courtesy of [www.army.mil](http://www.army.mil)).

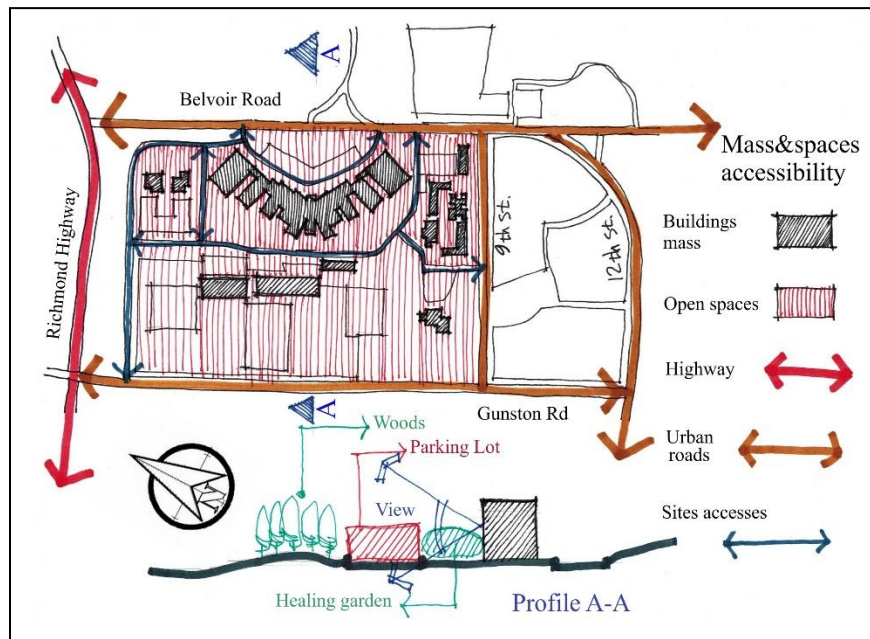
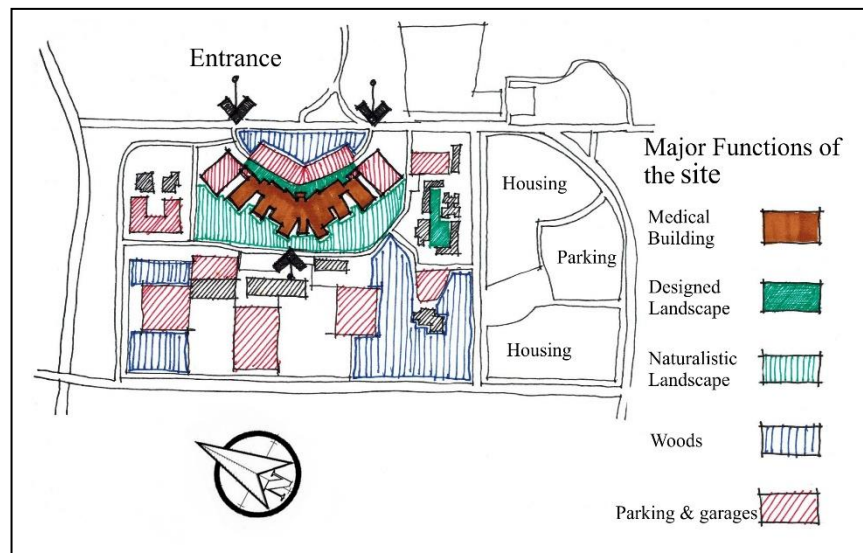


Figure 31. The architectural design of the FBCH created a few views to natural settings, while minimized the foot print of the buildings. Despite a large portion of lands, the huge open spaces in the campus are left unplanted (Image by author).



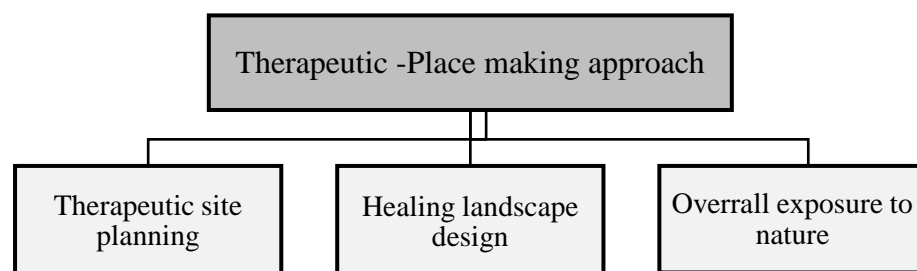
*Figure 32. The main building of the FBCH is surrounded by parking lots, and garages. Additionally, inadequate amount of natural elements discourage the restorative values of the site (Image by author).*

### 3.5. Current Empirical Literature Relevant to Research

#### Place-Making in Hospital's Landscape Design

Environmental approaches in hospital's site design are fairly recent phenomena. Old-fashioned institutional policies and short-term economic considerations resulted in huge neglect of ecological sustainability and environmental commitment to neighboring communities of hospitals. In this regard, Verderber (2010) argues that "paying attention to the local community can help to shape/reshape a hospital and a medical center's civic role." (p. 45). The implementation of such an idea can result in a considerable evolution in two dimensions. First, it elevates social cohesiveness while combining it with physical health. Second, this approach will advocate ecological health in surrounding communities. During the history and up through the modern

years, hospitals have contributed to the sense of place, “Genius Loci”<sup>66</sup>, in their communities. In modern time, the modernist urban theory of expanding residential neighborhoods out of the cities and constructing generic buildings of hospitals in suburban areas have failed to achieve any degree of “Civic Identity.” Ecological insights into healthcare design and “sensibility of place” have been expressed in just a few recently constructed hospitals. Since the late 19<sup>th</sup> century, an institutional rootlessness has been endemic to healthcare facilities specifically in big cities in the western world (Relph, 2008). In the age of standardized franchise healthcare, a genuine design solution that considered vernacular culture, world-wide technologies, and ecological health in a holistic approach has not been properly investigated. In his book, “Innovations in Hospital Architecture” Verderber (2010) discusses “three facets of genuine place making” that include “site planning, landscape design” and “nature”—each is viewed as a “therapeutic interventions, ‘from the scale of community to patients’ room” (p. 6).



*Table 13. Holistic & multi-scale therapeutic intervention strategies in hospital design (Adopted from Verderber, 2010).*

<sup>66</sup> “*Genius loci* is the Latin for the spirit or guardian deity of a place and is a phrase that has been adopted in English and into other languages and achieved a broad degree of popularity. While spirit of place/genius loci was originally, and to some people still is, closely associated with beliefs about the sacred character of places, it has been increasingly secularized” (Relph E. , 2016).

## **Discussion on the Theory of the Restorative Gardens**

Since ancient times, sun, moon, earth and water of gardens have shaped human psychological sensations and physical health. Historically, when society acknowledged the role of nature on human feelings and the experience of space, gardens became therapeutic environments (Gerlach-Spriggs, Kaufman, & Warner, 2004). At the beginning of the 20<sup>th</sup> century, the effects of specialization and pathological approach to patients made hospital environments more similar to an office or laboratory. Thus the self-healing human became diseased entities in the hospital. Since the 19<sup>th</sup> century, occupational therapy was extensively practiced in mental hospitals and asylums in the United States of America. But in the later decades of the 20th century, there were significant innovations that made a solid foundation for establishment of healing gardens. While during this period urban and acute-care hospitals witnessed a huge loss of gardens (Rosenberg , 1995; Stevens, 1999), the horticultural therapy and “milieu therapy”<sup>67</sup> expanded the dimensions and typologies of healing environments of hospitals (Watson & Burlingame, 1960; Schlensinger & Holzman, 1970; Davis, 1944). The term “healing” is broad and implies the process of well-being in general. Cooper Marcus and Barnes (1999) have described it in two ways; “First, is achieving a degree of relief from physical symptoms or awareness of those symptoms..., A second form of that healing can take, is that of stress reduction and increase levels of comfort for an individual dealing with the emotionally and physically trying experiences of a medical setting” (p.3). According to them there are several mechanisms that make a garden,

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<sup>67</sup> The Menninger Clinic defines milieu therapy in this way; “The milieu is a supportive environment in which Menninger staff work with patients to provide safety and structure while assessing the patient’s relationships and behavior. A milieu is considered therapeutic when the program’s community provides a sense of civility, membership, belonging, care and accountability.” (The Menninger Clinic, 2015)

restorative or healing. The most well-known are characteristics to be aesthetically natural (Cooper Marcus & Barends, *Healing Gardens*, 1999). But the design approach that promotes social activities and engaging people in exercise, mediating alone, talking to each other and wandering in nature has significant potential to enhance the therapeutic impacts of landscape beyond existing gardens. Therefore, a healing garden encompasses all preceding subcategory typologies. Gerlach-Spriggs, Kaufman, & Warner (2004), argue that: restorative gardens are not an alternative mode of therapy, and they cannot replace any medical interventions. The function of hospital gardens is enhancement to a medical procedure, and they essentially contribute to the sense of well-being (Gerlach-Spriggs, Kaufman, & Warner, 2004).

The cultural influences impact our perception and response to the healing power of nature (Unruh, 1997; Osler, 1998). As Osler (1998), states: “The spirituality of gardens has spanned the world in time and in geography. The mystical quality that a garden throws off is as powerful as scent of flowers” (p.16). The restorative environment has a more specific aspect of individual psychology that is beyond the cultural values and social norms (Kaplan & Kaplan, 1989). The highly technological societies and the stressful routine activities cause, as they are called, “direct attention” and fatigue. Therefore, they suggest that experiences in natural environments will facilitate recovery from these ever-increasing stresses (Kaplan & Kaplan, 1989). In their book, restorative experience is described as psychological impacts of gardens that “invigorate” and refresh the man and therefore has healing power (Kaplan & Kaplan, 1989). One of the common sources of stress in human life is illness or hospitalization. The psychological impacts of stress can result in changing blood pressure, influence

heart rate, muscle tension, and mental concentration (Ulrich, 1993). The psychological studies showed that exposure to nature or at least some natural elements reduce stress quickly. In a stressful situation our brain and body have either “biophilic”<sup>68</sup> or “biophobic” responses to space. For example, in health related conditions and space, our first decision to stay or skip the space is critical, while after that, our second response or our brain-body adaptation has greater importance for a longer period of time. Their findings suggest that the historical-emotional background of an individual determines the choices which are made in order to settle in a landscape and reside in nature. (Orians & Heerwagen, 1992). In Levis (1996), many examples of many human made environments have been studied to prove the beneficial impacts of nature on constructed space (Lewis, 1996).

#### **A. The Typologies of Healing Gardens**

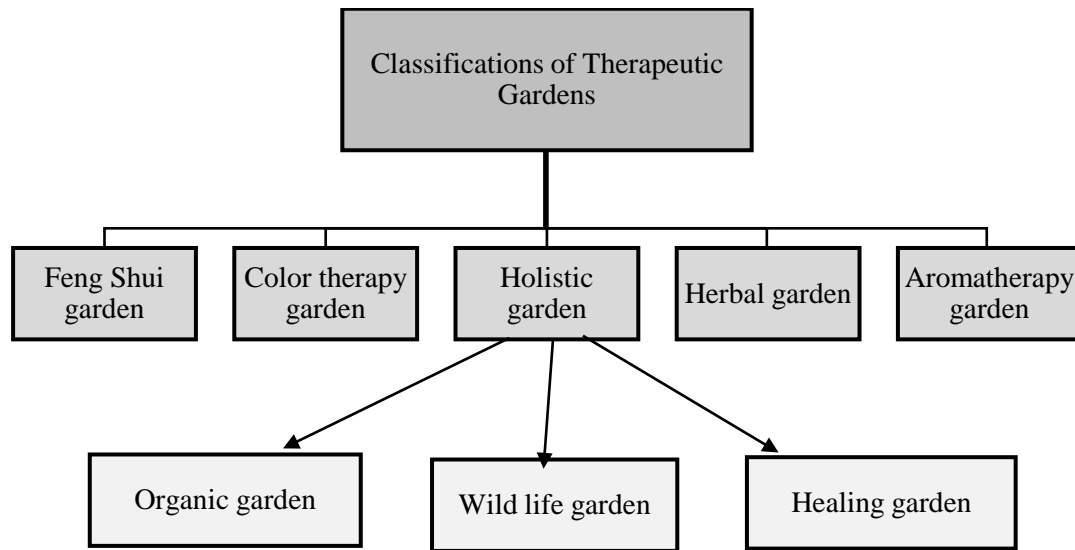
Increasing interest in holistic medicine throughout the modern world made people return to complementary therapies, such as aromatherapy, feng-shui, meditation and various approaches to herbal medicine (Caplan, 1992). The healing gardens are stimulating environments, both mentally and physically. These gardens can be designed in very specific manners to respond to the needs of narrowed targeted population or they can provide a very broad range of sensory experiences. Also, the design elements and material in addition to the scale of those gardens are major determinants of healing gardens’ typology.

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<sup>68</sup> **Biophilism** is a belief that animals have rights which human beings should respect.

## B. Classification of Therapeutic Gardens; Design Principles and Elements

According to Rawlings (1998); “Touch, sight, sound, smell, and taste can all be created for, and each has a significant role to play in maintaining the health”.(p.12) The basic human senses are significant factors that shape our perception of healing environments like gardens, therefore healing gardens also can be classified according to those senses (Rawlings, 1998) as below:



*Table 14. Classification of therapeutic gardens according to their restorative approaches, and design elements (Adopted from Rawlings, 1998).*

### C. Classification of Therapeutic Gardens; Specific Functions and Patients

Another classification of therapeutic landscapes is based on specific places where those gardens are designed such as hospitals, hospices, clinics, nursing homes, and continuing care retirement communities. These gardens also are designed for a targeted population, often with specific purposes including educational activities and physical exercises or may provide a very special kind of treatment for patients. Several scientific methods are used to design more efficient healing spaces which recently have become common in the healthcare industry such as evidence-based design (EBD)<sup>69</sup> (The Center for Health Design, 2015), and Lean<sup>70</sup> (Lean Construction Institute , 2015). According to the American Society of Landscape Architects [ASLA] the classification of healing gardens based on treatment of a specific disease can be divided into two major categories for Adults and Children (The American Society of Landscape Architects [ASLA], 2015)as below:

Adult	Children
Alzheimer's and Dementia	ADD/ADHD
Asthma & Respiratory Disorders	Autism Spectrum Disorders
Cognition	Cognition
Depression	Depression
General Health	General Health
Heart Health	Nature Deficit Disorder
Hospital Recovery	Obesity
Obesity	
Post-Traumatic Stress Disorder (PTSD)	
Stress, and Stroke	
Type II Diabetes	
Well-Being	

*Table 15. Classification of healing gardens according the targeted population of patients (ASLA, 2015).*

<sup>69</sup> “**Evidence-Based Design (EBD)** is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes” (The Center for Health Design, 2015).

<sup>70</sup> “**Lean Design and Construction** is a production management-based approach to project delivery -- a new way to design and build capital facilities. Lean production management has caused a revolution in manufacturing design, supply and assembly.” (Lean Construction Institute , 2015)

## **A Synopsis of the Recent Studies and Methodologies of Therapeutic Environments**

In the late decades of the 20<sup>th</sup> century, two studies by Ulrich that examined the views to nature or natural scenes concluded that the outdoor visual environments have positive impacts on patients and have significant advantage on brick and mortar walls (Ulrich, 1983; Ulrich , 1984). Likewise, in 1984, Kaplan implemented a theoretical analysis and suggested that the natural settings in cities have strong restorative effects. This recuperative process was classified in two processes of fascination and coherence. Also, he classified three contents of the therapeutic process as active participation, observing nature and conceptual nature (Kaplan , 1984). In 1989, Olds published the results of his research that focused on the healing influences of nature. The results implied that the outdoor spaces with natural elements have strong healing characteristics. He also added that only those indoor spaces that contained natural elements demonstrated some degree of healing properties. This survey research concluded that both the indoor and outdoor natural environments can influence the healing perception of people (Olds, 1989). During the early 1990s, Francis and Cooper-Marcus conducted two qualitative formative research studies in order to explore: first, the healing elements of nature and, second, to understand the environmental conditions and spaces, which could provide refuge during stress and depression. The results of the first study summarized that most of the participants preferred specific degrees of privacy in public spaces with dominant natural elements, such as plants, water features, and benevolent meteorological conditions (Francis & Cooper-Marcus, 1991). In the same way, the second study suggested that the majority of the respondents selected natural settings to deal with stress conditions (Francis & Cooper-Marcus, 1992).

Following the landmark research studies, which were conducted by Ulrich during the late 1980s, many studies during the early years of the 21<sup>st</sup> century, (Pretty, 2004; Pretty, Peacock, Sellens, & Griffin, 2005; Ward Thompson, 2011), investigated the contributions of natural elements to mental and physical health, and focused on the recurring themes between landscape features and health. Advocating the restorative impacts of nature on humans, their studies classified three significant ways for human-nature involvement as follows: first, visual connection to natural settings; second, presence in natural settings; third, green exercise. In 2001, two different studies by Kaplan (2001) and Kuo, Bacaicoa, & Sullivan (2001) demonstrated that viewing natural settings in residential spaces improves human satisfaction with neighborhoods and also strengthens the functional effectiveness, in addition to overall wellbeing. These studies, (Kuo, Bacaicoa, & Sullivan, 2001; Kaplan, 2001), confirmed the results of the previous qualitative research that was conducted by Collins (1975), and had shown that the spaces without windows are not preferred by people. Since 1984, the experimental research by Ulrich that a “view through a window may influence recovery” was considered a classic study, and developed by many researchers as well. For example; in 2008, Pati, Harvey, and Barach investigated the correlation of the stress level of nurses and exposure to nature via the windows of hospitals. Their research implied views away from nurses’ stations, to natural settings can increase the alertness and reduce their stress (Pati, Harvey, & Barach, 2008). Regarding the health benefits of exposure to nature, Stigsdotter, et al., (2010), conducted research based on “the Danish National Representative Survey,” which indicated that close proximity to green areas improves the health and wellbeing in specific ways. Similarly, improving mood

and the stress-reducing benefits of being present in nature have been demonstrated by several research studies (Cooper-Marcus & Barnes, 1995; Whitehouse, et al., 2001; Ulrich, 1993).

Historically, real presence in nature is assumed to have therapeutic influence on humans. Accordingly, active exposure to nature, including all types of activities in natural settings, and sport in green areas were concluded to have positive impacts as well as increase positivity and effectiveness (Kaplan, 2001; Pretty, 2004). Since the Middle Ages, activities such as horticulture therapy, and gardening were perceived as being healing, and recent studies confirmed their positive impacts, for example, in patients with dementia (Detweiler, et al., 2012). Owing to preceding studies, Jiang (2015) classified the research on a person's nature engagement. According to her study, there are three major categories based on the degrees of human involvement with nature as follows: the first is positive exposure, including windows at home, workplace and patients rooms, and picturesque painting in health care environments (Jiang, 2015). The second is moderate engagement that includes indoor plants in workplaces and hospitals, roadside planting, nearby nature in residential areas, gardens at the workplace, and finally healing gardens (Jiang, 2015). The third, active engagement includes horticultural therapy, and green exercises (Jiang, 2015). Since the 19<sup>th</sup> century, environmental psychology has studied and examined the ways in which nature can heal people. The recent environmental-psychological literatures are classified in two schools or approaches: the first focuses on attention-restoration hypothesis, and the second concerns "biophilia" and the restorative effects of the living system. In 1989, Rachel and Stephen Kaplan published the results of their studies that were conducted

during a course of twenty years. They founded their research hypothesis on Attention Restoration Theory (ART), and suggested that being present in nature, or looking at natural settings improves people's concentration. In their book "The Experience of Nature" they explained how different natural settings can deliver satisfaction to humans and how people understand various natural settings, from the wilderness to backyard gardens (Kaplan & Kaplan, 1989). The results of their studies were proven by the later research. For example, Berman, Jonides, & Kaplan (2008) explored the cognition of human interaction with nature and concluded that nature can increase memory, reduce depression, and have positive effects of people's moods. Faber Taylor, Kuo, & Sullivan (2001) conducted an evidence-based study and reported that viewing natural settings can heighten the self-discipline in girls in urban environments. Wells & Evans hypothesized that rural children are less stressed because of their presence in more natural environments (Wells & Evans, 2003). Another study by Cimprich suggested the natural and "biophilic" environments can improve attention in women who suffered from breast cancer (Cimprich, 2007). Berman et al. (2008) classified ART in two separate components, namely, involuntary attention and directed attention.

When a cognitive- control process directs our attention, it results in some restorative status and recovery mood in people (Berman, Jonides, & Kaplan, 2008); this needs efforts and concentration on positive feelings or images. Kaplan (2001) inferred that when fascination with the system is examined, for example by natural settings, the direction attention effects gains its maximum positive impacts. Recently, the attention-restoration theory has been enhanced in fields of urban study as well as landscape architecture. For example, recent studies of urban parks, cities and green

infrastructures proved the healing properties of those environments and their advantages over densely constructed spaces and hardscapes. Laumann, Gorling, & Stormark (2001) conducted two separate sets of studies and developed a rating scale that measures restorative elements of environments.

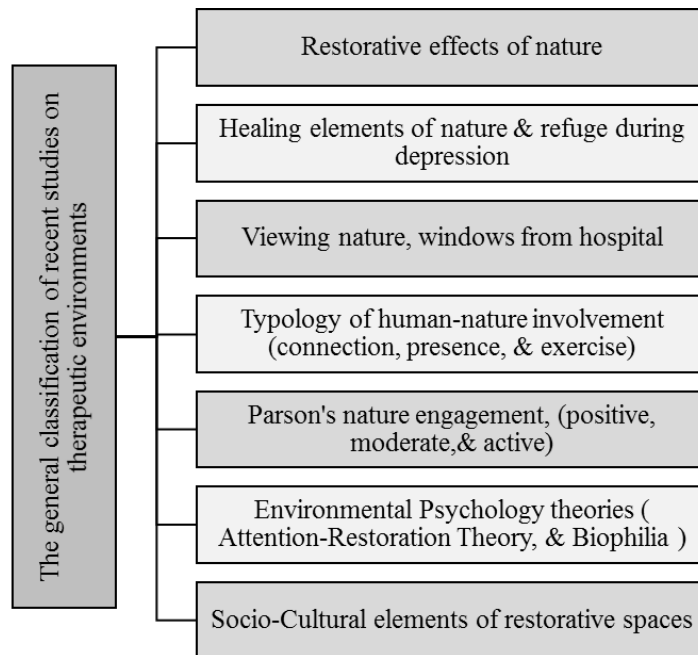
Furthermore, they concluded that “environments with natural elements generally scored higher than city environments on all measures.” Additionally, Herzog et al., (2003) assessed the restorative components of nature, and confirmed the results of Laumann, Gorling, & Stormark (2001). Scopelliti and Giuliani (2004) have shown the different healing potentials of natural or man-made environments in various stages of people’s lifespans. The latest ART studies concentrate on urban settings and the importance of small green areas. The results of those research studies confirm the significance of restorative impacts of urban pocket parks on their surroundings communities (Scopelliti & Giuliani, 2004). For instance, Nordha, Alalouch, & Hartig (2011) studied small urban parks from Scandinavian cities, examined their potential restorative impacts, and provided guidance for designing healing-pocket parks. Just few studies have considered the socio-cultural components or urban environments, which can influence our perception of healing, For example, Wilkie and Starridou (2009) argued that a “person with an urban preference perceived both nature and urban environments equal in restoration potentials; this may explain circumstances when environmental choice appears inconsistency to cognitive restoration goals.” Considering the importance of local conditions and therefore emphasizing the perceived image of health and restoration in every individual’s mind, they demand application of more quantitative or mixed methods to analyze the urban parks (Wilkie

& Stavridou, 2013). In 2013, Irvine et al. highlighted the divergences between perceived image real reasons for visiting urban parks, as they stated “Derived effects highlighted relaxation, positive emotions....,” as well as “spiritual well-being.” One of the significant aspects of their research is their methodology, which is a qualitative content analysis of 312 park users in 13 public parks in United Kingdom. Their study defines the motivations for using urban parks in two levels: person level and environmental level.

Accordingly, the outcomes of that study have been classified from large scales of the global, physical, and narrowed down to very micro-scales, such as social and spiritual levels (Irvine, Warber, Devine-Wright, & Gaston, 2013). The biophilia hypothesis has been defined by Encyclopedia Britannica, as the human tendency to connect to nature and any living systems (Rogers, 2016). Wilson (1984), associated the word with various forms of life. In recent architectural practices, green strategies and sustainable design approaches aim to connect human with nature again (Wilson, 1984; Kellert & Calabrese, 2015). According to Kellert (2016): “we need nature in a deep and fundamental fashion, but we have often designed our cities and suburbs in ways that both degrade the environment and alienate us from nature.” He argued that by implementing green design strategies we can reconnect to the natural world, and build “hospitals, where patients heal faster... and communities where people know more of their neighbors and families thrive” (Kellert, 2016). A new study classified the components of “Biophilic Architecture” as follows: first, the naturalistic dimension, second; the wholeness of the site; third geometric coherency (Caperna & Serafini, 2015). Describing the “biophilic design” and its connection to producing healthy urban

settings, Caperna & Tracada (2012) emphasized the sociological and psychological potentials of sustainable urban design to encourage life and unburden human's cognitive system. Likewise, other studies demonstrate the medical benefits of biophilic gardens at Children's Hospital Boston (Franklin, 2012).

The efforts for understanding the restorative impacts of biophilic design is not limited in urban scale or outdoor environments. For instance, Park & Mattson (2009) suggested that "patients in hospital rooms with plants and flowers had significantly more positive physiologic responses, and also conveyed positive impressions of hospital employees caring for patients" (Park & Mattson, 2009). One of the innovative approaches in the therapeutic landscape design is a strategy based on aesthetic-affective theory. According to Grahn, Ivarsson, Stigsdotter, & Bengtsson (2014), the restorative properties of an environment, such as landscape can be influenced by the visual elements of that environment. Based on the aesthetic-affective theory, Ulrich et al. (1991) mentioned two separate biological responses to natural stressors; "restoration responses following stressful activities," and "attention approach responses... that favored wellbeing" to describe human stress recovery during exposure to natural settings and cities.



*Table 16. The general classification of the recent studies on therapeutic environments based on 3.5.4 (by author).*

### **Dell Children’s Medical Center, (Critical Example VI)**

Dell Children’s Medical Center is one of the most distinguished examples of green architecture and healing landscape practices of the world. It has very targeted patient populations, and strong religious associations that determine its therapeutic environments in a specific way. The overall design of the hospital advocates the connecting the hospital to its cultural and ecological context, which makes it unique among the recent practices.

#### **A. Establishment of the new Hospital**

The Dell Children’s Medical Center is an immediate consequence of relocating Children’s Hospital of Austin that was constructed on the University Medical Center Brackenridge Campus in 1988. It was built on 32 acres of the brown fields of the former Robert Mueller Municipal Airport. According to a report provided by the City of Austin

Economic Development Department in 2015, the redevelopment and reuse plan of previous airport aims to be an interactive mixed use community, a model of urban development and should advocate sustainability and diversity in East Austin (City of Austin Economic Development Department [CAEDD], 2015). This development program specifies 140 acres to public parks and open spaces, more than 13 miles of trails, in addition to locating Dell Children's Medical Center there as a major focal point of its development (CAEDD, 2015).

Construction of the hospital was recognized as crucial and the first step for implementing the reuse and development of the master plan through an extensive public participation process and bottom-up decision-making (CAEDD, 2015). Therefore, to serve a broad community including 46 counties in East Austin for locating the hospital in the proposed development site, several key factors came into consideration: first, its connectivity to the local public parks via trails and green paths; and second, its distance to downtown Austin, the University of Texas, Hancock Mall, and Hancock recreation center (CAEDD, 2015). Eventually, the hospital was located in the northern portion of the development's site, with a walking distance to commercial centers. It also was connected to Paterson Park and Lake Park through a connected system of green ways that embrace the whole 711-acre site (CAEDD, 2015). The hospital, initially was opened in 2007, and was completed in 2013; it also is the "Level I" pediatric trauma center for the central Texas region (Seton Healthcare Family, 2016). Financially, it is a philanthropic project with a Roman Catholic affiliation (Seton Healthcare Family, 2016) that strives to provide an earth-friendly healing environment for kinds. In 2008, the Dell Children's Medical Center was the

first hospital in the world that achieved Platinum-level LEED certification with its synergic design of the building and landscape combined the community and cultural values of Austin into environmental commitment within a hospital setting (Seton Healthcare Family, 2016).

## **B. Therapeutic Design and Green Strategies Shaped the Site**

A low horizontal design of the main building provides an opportunity for reflecting the unique landscape of the area. The site planning presents a combination of way-finding strategies and green features (Knapp, 2008). Emphasizing on the therapeutic properties of artworks, exposure to nature, the holistic approach to healing design used courtyards and architectural symbols to offer healing environment not only to kids but also to their families. Cultural values and symbolism have been combined also therapeutic design and green strategies in both architectural and landscape design of the hospital. For example, such courtyards of the main building represent the seven eco-regions of the 46 surrounding communities (Knapp, 2008). Integrating special artworks and an amphitheater for the music, made the hospital a landmark in the surrounding neighborhoods and also translates the hospital into a metaphor of the Central Texas eco-region.

As described by Knapp (2008), the “breathtaking” design of Dell Children’s grounds includes “a three acres, multilevel Healing Garden,” “a sensory Garden,” “Butterfly Gardens,” “a plethora of art form” for healing, “courtyards” that represent seven echo-regions, and indigenous plants” of landscape. This is noteworthy to consider that all these gardens are accessible for the public and are connected to a hike & bike greenbelt of the larger development area. To encourage physical activities,

wellbeing and more accessibility to the hospital and neighboring communities, the architectural firm, Polkinghorn Group Architects, Inc., and Landscape architecture firm, TBG Partners, Inc., have reached out to with a set of green strategies to respond to the environmental circumstances of the site. For example, the site houses two green roofs, which are also publicly accessible: the first is a Conference Center Garden with 3,950 sq. ft., and the second is Chapel green roof garden, with 7,015 sq. ft. Both gardens comply with sustainable design principles, and provide accessible amenities, for patients (Polkinghorn Group Architects, Inc., 2013). From the early stage of the design, green strategies incorporated the drought-tolerant native plants that used the city's reclaimed water for irrigation (Risner, 2016). Following the LEED ground lines and using the native materials in design, for instance in the Red Rock Wall and the Wood Wall, attempts were made to contextualize the local culture, in addition to serve "way-finding" as one of the primary goals of the site planning. Referring to the religious origins of the hospital, a tall tower was designed as a landmark to help visitors to find their way, and as a symbolic monument that recalls the headpieces as the nuns. Despite the positive efforts and innovative strategies to convert the hospital site to a therapeutic landscape by adding green roofs and healing gardens, more than half of the site is occupied by parking garages. The most important healing garden and major part of the hospital's landscape have been located on the south side of the site, between the wards and Lancaster Drive. This landscaped area is exactly on opposite side of the hospital's main entrance, without significant connection to any of the entrances of the hospital. This restriction might be due to the safety regulations for of the hospital patients, who are all children.

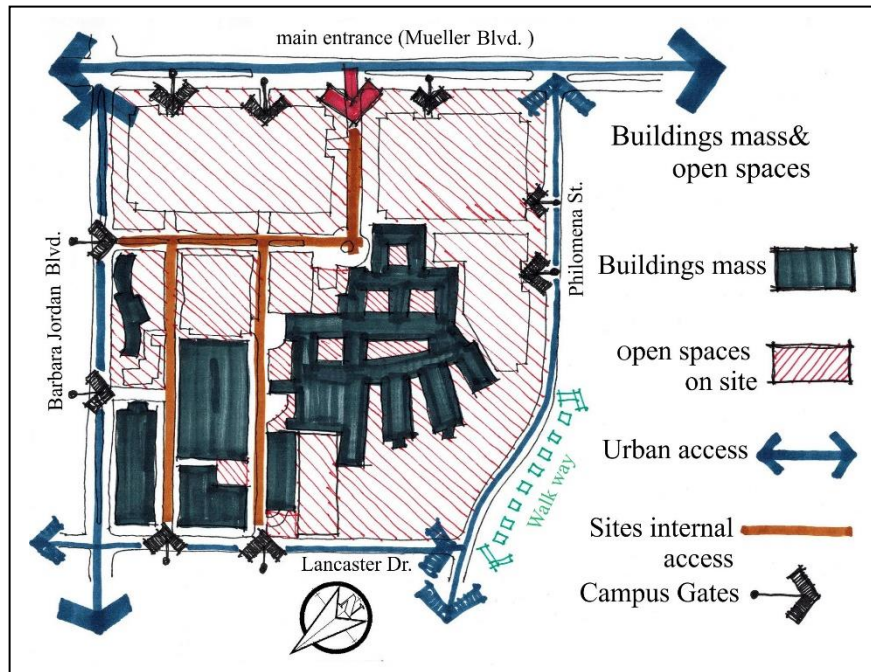


Figure 33. In Dell Children's Medical Center, huge portions around the main building were planned as open spaces, also the site has several entrances (by author).

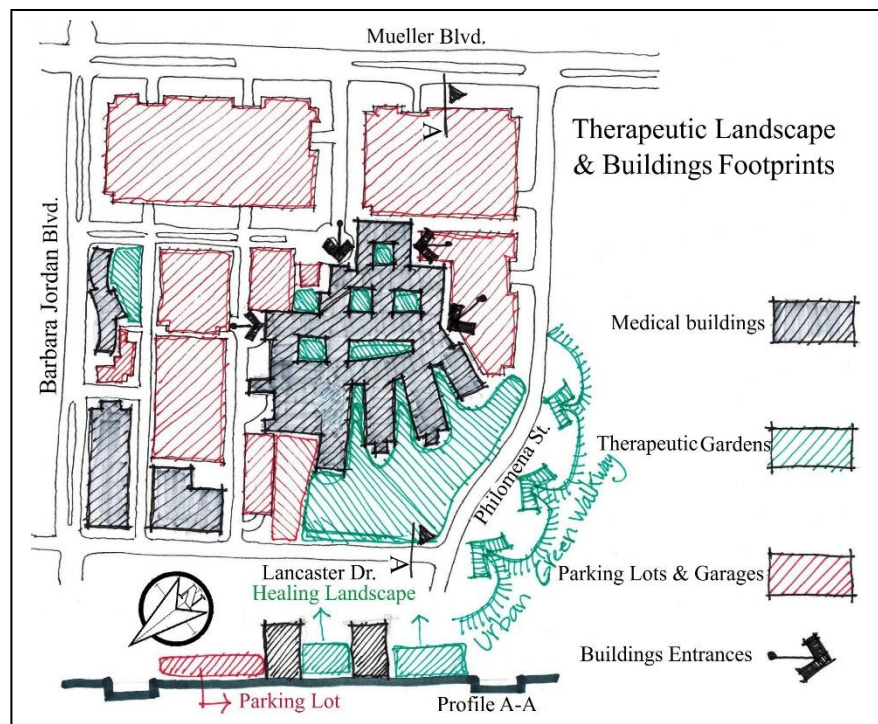


Figure 34. Major parts of the site of Dell Children's Medical Center have been specified to parking lots and garages around the main building. In addition to the courtyard gardens, the only therapeutic outdoor space is isolated in back of the main building (by author).

## **Chapter 4: Case Study and its Context**

### **4.1. The Context; Washington, D.C.**

Since its establishment, Washington, D.C., has been a symbol of many values and ideas, including numerous attempts to improve the city's environment, which have been properly discussed in many research studies. But, the city's struggle for health and especially making a healthier city by design and planning has been less presented in previous studies. Considering the scientific and cultural context of the 18<sup>th</sup> and 19<sup>th</sup> centuries, there were limited resources for designers and planners to create healthier public spaces in densely populated urban centers. During the 19<sup>th</sup> century, the nation's capital was suffering from serious public health issues, which directly revealed itself in the existing chronicles and literatures of that time. The planners of the city recognized these problems in the initial stages of their works, so their ideas tried to respond and partially solve the problem and improve the health issues in the urban fabric of the nation's capital. For example, the L'Enfant plan for the city, proposed a system of garden-like avenues that allowed free circulation of air in the city. In the last quarter of the 19<sup>th</sup> century, planting trees and paving streets, not only changed the urban landscape of the city, but also improved some health and safety issues. It is noteworthy to remember that, during the 19<sup>th</sup> century, the scientific studies of environmental health approved the concept of the "Miasmatic theory of disease causation," and this concept was common among the cities officials and planners as well as to regular people. It is obvious that any attempt to clean the city's environment from miasmic substances by construction or landscaping resulted in creation of a healthier place, at least in the mind of the citizens of the America 19<sup>th</sup> century. Developing and creation of urban parks on

the East Coast of the United States, was a direct consequence of this perception. Therefore, Washington D.C., like New York, Baltimore and Boston, witnessed noticeable proliferation of local parks and creation of large urban green areas that connected the city to its surrounding natural landscape. This type of natural landscape, like Rock Creek in the city, addressed the therapeutic values of nature, which was highly admired by the founders of the United States many years ago.

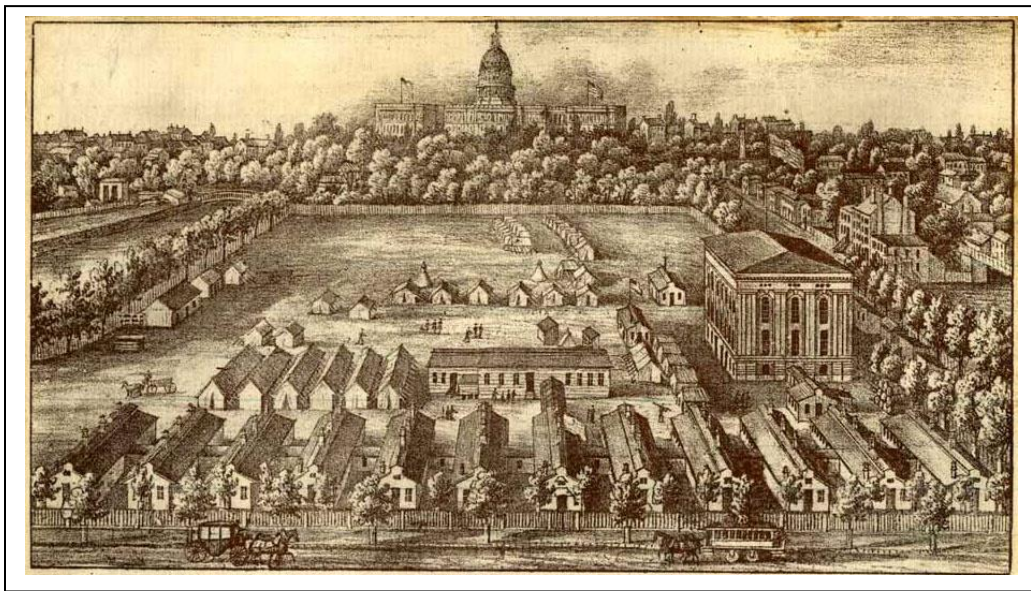
### **Hospitals and Changing Landscape of the Nation's Capital**

Throughout the Civil War, an increasing population as well as the construction of barracks and military hospitals, changed the landscape of Washington D.C. The strategic location of the city and its accessibility from many frontlines turned the whole city to a huge hospital. Due to increasing number of wounded soldiers, the previous system of care for sick collapsed, which caused a healthcare crisis on two level. Existing local hospitals were overcrowded and unable to serve the wounded and the traditional nursing services, with its masculine culture, couldn't provide sufficient care for military and non-military patients. Consequently, three innovative solutions were implemented in order to overcome that crisis and respond to the demands for better healthcare infrastructure. First, within the urban fabric, many civic buildings were converted into temporary hospitals. Second, the military re-examined a European solution and turned many of its suburban barracks to temporary hospitals, with wooden wards and transferable shelters. The third solution was more innovative and was based on scientific advances of the time in Europe. Thus, the primitive pavilion hospitals were introduced to the United States. Simultaneously, the need of care for an increasing number of wounded, in addition to the courageous spirit of American women, opened

the doors of hospitals to change their traditional roles and gradually alter the masculine environment of hospitals.

According to Lewis (2015) the actual number of facilities that admitted wounded soldiers was higher than real hospitals, based on his research: “There were fifty-three hospitals in all, not including the numerous churches, mansions, hotels...” Also during the early periods of the Civil War the Capitol building served as a temporary hospital (United States Surgeon General's Office, 1888). According to the Civil Wars’ historical records, up to 85 hospitals were mentioned within and around the city during at that time (Bowman, 2016). The famous examples of these hospitals are St. Elizabeth’s Hospital, Lincoln General Hospital, Harewood General Hospital, and Armory Square Hospital. A typical example was Harewood General Hospital at William Wilson Corcoran’s county retreat. In 1862, the hospital was designed and constructed according to the latest studies and medical practices of the time. The outside and inside walls were whitewashed. The “V” shaped buildings, including wood frame buildings and tents, with plenty of vents and windows for generous air circulation promoted the sanitation and better recovery. In 1864, the hospital had fifteen wards with a capacity of almost 2,080 patients (Civil War Washington, 2016). In 1872, the Federal government prepared a plan for the Harewood site, the grounds of the Civil War hospital and the site of a soldier’s home, to build a large urban park (Green, 1962). The site was located in a suburb of Washington D.C on farmlands and hills. The view from the south side of the hospital, according to the following drawing, represents no significant design of landscape but the fresh air and natural views to heal the wounded soldiers.

Between 1861-1862, the pavilion style hospitals<sup>71</sup> were mandated by the U.S. Sanitary Commission (U.S. National Library of Medicine , 2016). One of the best was Armory Square Hospital, located west of the Capitol on the site of today's National Air and Space Museum. It was built in 1862 had 1,000 beds in twelve pavilions, based on the British design, to adapt the Nightingale's principles. The view in Figure 9, depicts the close distance of the hospital to the U.S. Capitol building on the National Mall, the abundance of trees and green areas represent the location of the hospital in huge garden-like areas in the middle of the crowded and muddy streets of Washington, D.C. The design of this campus did not follow its peers during the Civil War, and resembled the primitive pavilion styles.



*Figure 35. Armory Square Hospital (Image courtesy of;U.S. National Library of Medicine , 2016).*

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<sup>71</sup> As they were called “state-of-the-art hospitals”.

The Finley General Hospital, was operating from 1862 to the end of the Civil War, on Bladensburg Road north of Boundary Street<sup>72</sup> and had 1,061 beds (Murray, 1996-1997). As Walt Whiteman (cited in Murray, 1997) described; *“That little town, as you might suppose it, off there on the brow of a hill, is indeed a town, but of wounds, sickness, and death. It is Finley Hospital, northeast of the city, on Kendall Green, as it used to be call’d.”* Additionally, there were many other hospitals with similar features and design patterns, but differences in size and capacity, such as; “Campbell, on Seventh Street, 900 beds; and Carver and Mount Pleasant on the Meridian Hill with 1,300 and 1,618 beds, respectively” (United States Surgeon General's Office, 1888).



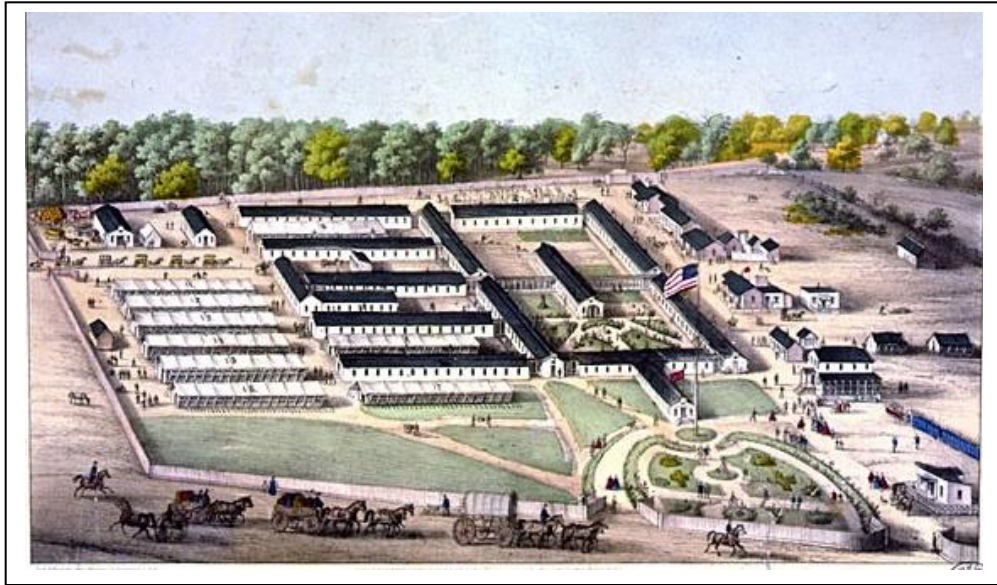
Figure 36. The Finley General Hospital (Image credit; Charles, 2016).

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<sup>72</sup> Now is Florida Ave.

## **Changing the Therapeutic and Cultural Landscapes of the District of Columbia**

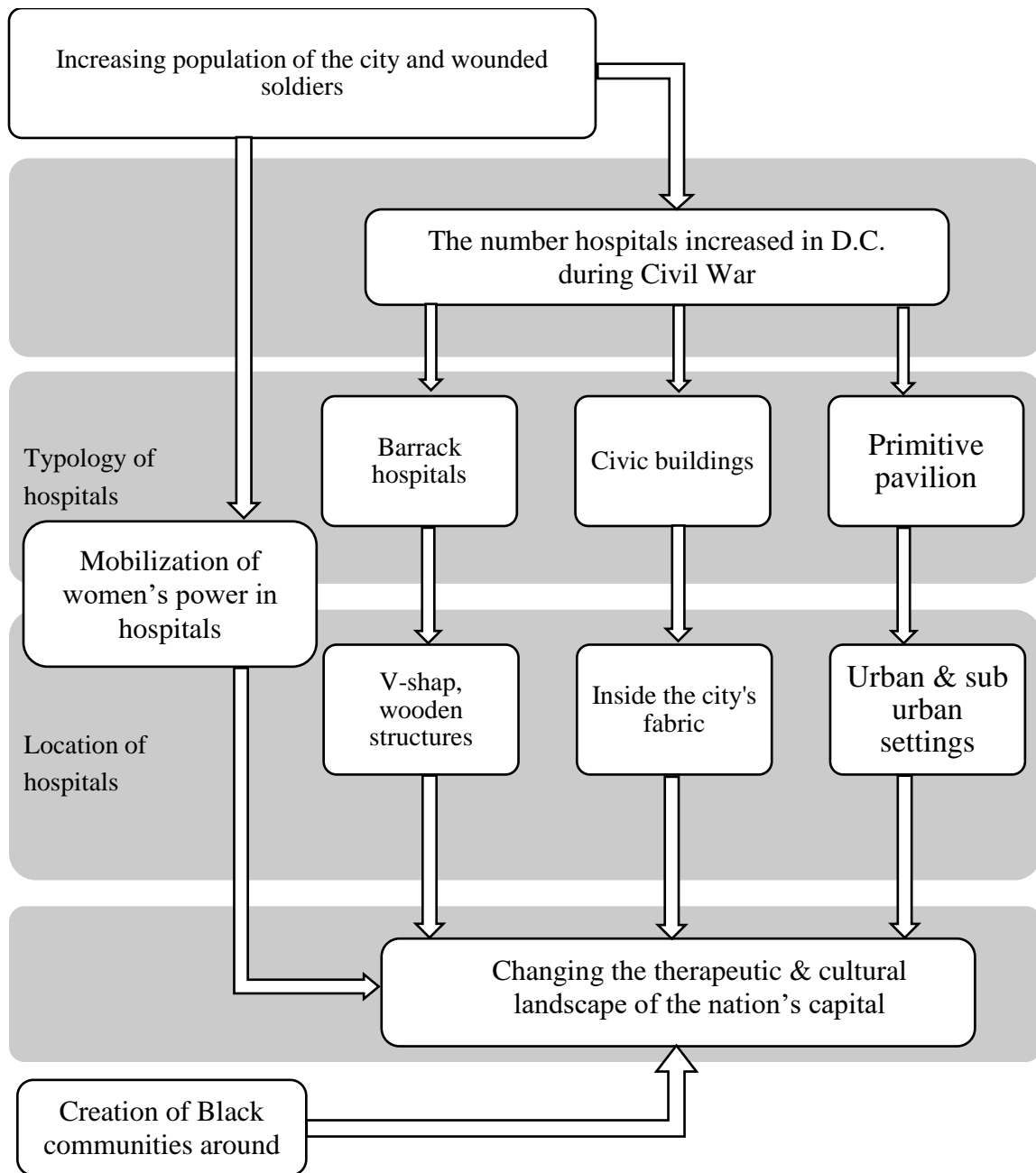
According to Bordewich (2009), inefficiencies and injustices impacted the design and planning of the city from the beginning. He argued that selecting the site of the capital, the architectural design of White House appeased the Southern Slavery, and was a projection of exploited slave labor (Bordewich, 2009). In April 1862, nine months before the Emancipation Proclamation, slaves in Washington gained their freedom. In the District, when close-knit black communities were established by newly freed skillful slaves, the hospitals' inside and around Washington became hubs for these every night developing residential neighborhoods. One of the well-known examples is the St. Elizabeth's Hospital in the southeastern area of the city (Lewis, 2015). Campbell General Hospital, Freedmen's Hospital, opened its doors in September 1862, and received many patients in December of the same year. Eventually it was evacuated in July 1865 (Civil War Washington, 2016). Similar to most of the hospitals during the Civil War, it was built as an Army barrack, and later converted to a government hospital. It housed former slaves, Freedmen, then in 1868, became a teaching hospital (Stolp-Smith, 2016; Murray, 1996-1997). According to a drawing that shows a bird's eye view of the site around 1864, the campus had been organized in a pavilion style, with wards that enclosed the courtyards. The tents had been organized in parallel rows, and site design included two landscape designs. One was the main entrance of campus and the other was the front part of central courtyard.



*Figure 37. The Campbell General hospital (Image courtesy of; U.S. National Library of Medicine, 2016).*

Florence Nightingale's book, "Notes on Nursing", was published in America at almost the same time. The writings offered opportunities to many nurses to pass the existing social and cultural norms of the time. Therefore, these open-minded nurses could fight for the Union and provide higher quality of care for wounded and sick people (Giesberg, 2000; United States Sanitary Commission, 1871). Many hotels and churches changed their primary functions and served as temporary hospitals, such as Union Hotel. The Union Hotel, located on Bridge and Washington Streets with few blocks distance from Rock Creek, had witnessed many changes since George Washington time. Louisa May Alcott (2006), an Army nurse, reported that the hospital was "a perfect pestilence box", she complained about the "cold, damp, dirty full of vile odors from wounds, kitchens, washrooms, and stable" of the hotel (Alcott, 2006). The Sanitary Commission reported the deficiencies of baths, water closets and sinks, and the lack of mortuary as the major problems of the hotel (Lewis, 2015).

Despite the high prices and shortages, around 1917 was the time for women to break from the traditional constraints and with their patriotic acts serve their country, as Blatch (1918) described in her book, “Mobilizing Woman-power,” “Fate has prepared women to share fully in saving of civilization” (Blatch, 1918). In hospitals and healthcare facilities “Women broke down the resistance of male doctors to serve as physical and occupational therapist at the government’s Walter Reed Hospital” (Breuer, 1997). The gardens of Walter Reed Army Hospital had been the place for female politicians and wives of the United States Presidents to meet wounded soldiers. For example, in 1924 the vice president’s wife visited the wounded on the Walter Reed Army Hospital’s grounds and took ceremonial photographs (Walter Reed Army Medical Center Borden Institute & Standlee, 2009). There are other hospitals that were constructed after the Civil War, and due to expansion of the city relocated several times from inside the city to the suburbs and eventually to outside of the District of Columbia. The Columbia Hospital for Women was built after the Civil War and served the city until 2002. The Naval Hospital was built in a large brick building in 1866 and was evacuated forty years later, but was used with different functions under government ownership. In the early 20<sup>th</sup> century, the most notable military hospital, Walter Reed Army Medical Center was built and became a flagship of military medicine for the entire century. It was located in the northern corner of the District, between the grounds of the North Takoma, and Rock Creek Park.



*Table 17. Civil War changed the therapeutic and cultural landscape of the Washington D.C. (by author).*

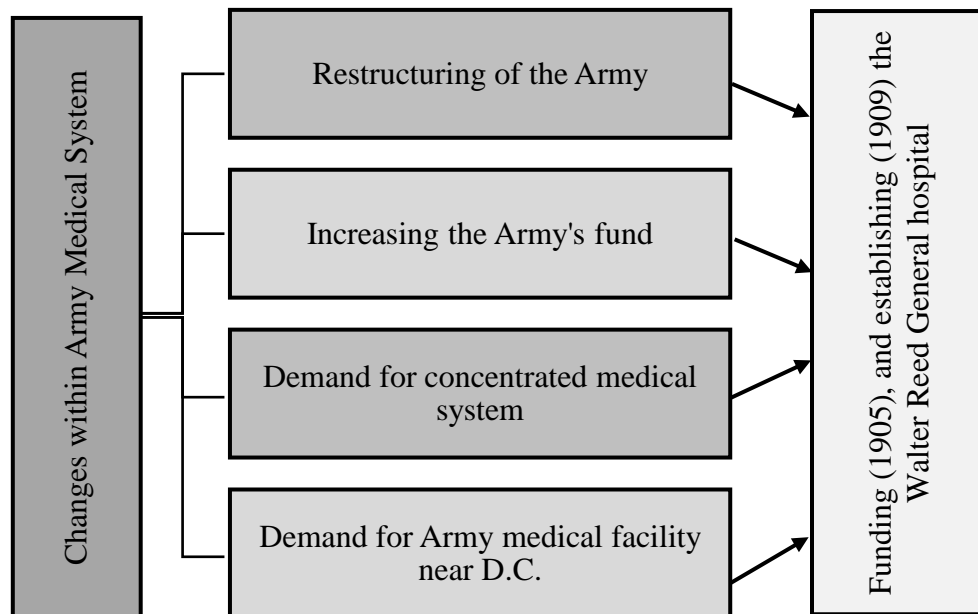
#### **4.2. Case Study; Walter Reed Army Medical Center**

Walter Reed Army Medical Center (WRAMC) as a flagship medical center, reflects significant changes in its cultural role during the last century within the context of the U.S. Army. This case cannot be representative of all hospitals in the 19th and 20th centuries, but the evolution of WRAMC illustrates the transformation of the concept of therapeutic places throughout a specific time frame. In addition, this site witnessed a dramatic change during the last century, which reflects the socio-cultural and historical-political forces that shaped the therapeutic environments of the hospital.

##### **Beginning of Walter Reed General Hospital**

According to Adler (2014), the conditions which lead to establishing of Walter Reed General Hospital had roots in changes within the army's medical system. These included, pursuing imperial interests which resulted in the restructuring of the army and an increase in its fund; the army encountering some negative experiences and inefficiencies due to the lack of concentrated medical system; the demand for an army medical facility near the capital, not only to serve soldiers but also to satisfy states medical needs in addition to treat special cases was emerging. William Borden reporting on the Washington Barrack, an army hospital in D.C, the inadequacy of the existing facilities, which was poorly constructed for temporary use declared "the necessity of a new general hospital site and building", and made it "more urgent" case (U.S. War Department, 1904). Despite the constraints, the hospital was established, because it was adopted as a separate policy from military expansions and therefore was perceived and favored by a large spectrum of politicians (Adler, 2014; Standlee, 2009). Funding of the hospital was mentioned in a 1905 civil appropriation bill of War

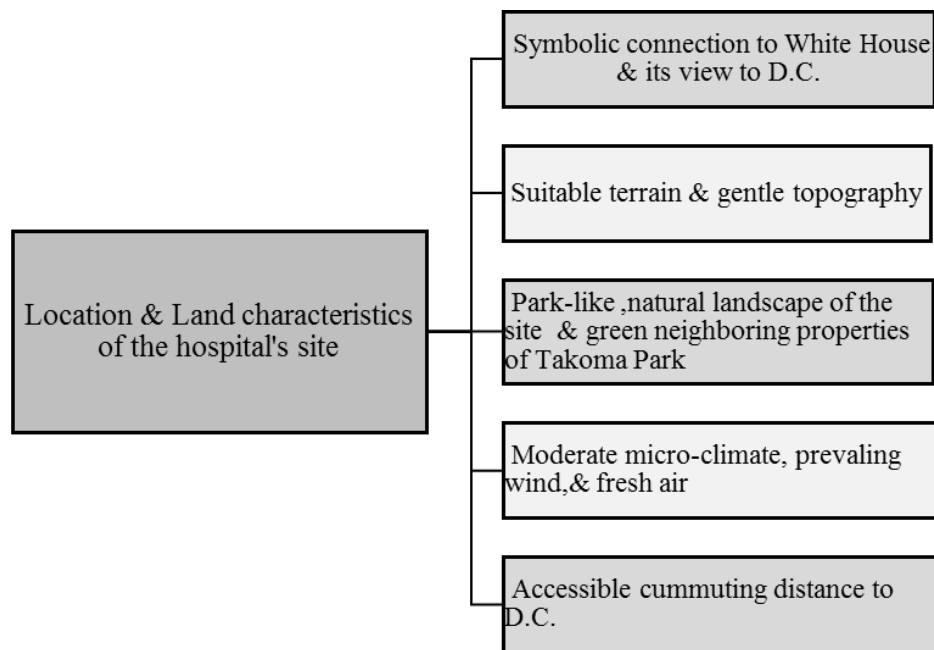
department, which specified \$100,000 for purchasing the site, and \$200,000 for building the hospital. In the same year, War department passed an order and named the institution as the Walter Reed General Hospital (Weed, 1923). The fundamental idea of the hospital design was increasing military medical efficiency in accordance with emerging “disease transmission” and “pragmatic tents”, in addition to cutting a huge spent on veteran’s pensions (United States Army Medical Department [USAMD], 2009; Adler, 2014). Finally, on May 1; 1909, Walter Reed General Hospital opened its doors. The completion of the hospital was a complex of the Army Hospital, the Army Medical School, the Medical Museum, and the Surgeon General’s Library. After construction the hospital had to serve not only as a General Army Hospital, but also as a post hospital for several Barracks and camps. After some years in 1918, three adjacent lands were purchased to afford ground space for the rapidly developing buildings (United States Military Medical Center [USMMC], 2013; Pierce, et al., 2009).



*Table 18. The causes of Walter Reed General Hospital’s establishment (by author).*

## Land Characteristics and Environmental Conditions of the Ground

Located in Takoma Park on 16<sup>th</sup> street and symbolically connected to White House, during locating and zoning the site several points came to consideration. Later, in 1923, Lieut. Col. Frank Weed reported: the diverse terrain of the site includes a gently rolling portion that was suitable for the constructions. The park-like landscape were purposed in the hilly portions, the land which is called “Serpentine curves of main roads”, and the parts which were covered by well-spaced trees (USAMD, 2009; Weed, 1923). The important environmental elements of the site, such as general characteristic of soil and sub soil well studied, the moderate climate of the site, also prevailing wind were considered. The proposed design situated in “the sanctuary status of a well-managed suburban residential section”, and the hospital was connected to the center of Washington D.C. by Asphalt streets (USAMD, 2015; Weed, 2015).



*Table 19. Ecological considerations, & Environmental conditions of locating the site (by author).*

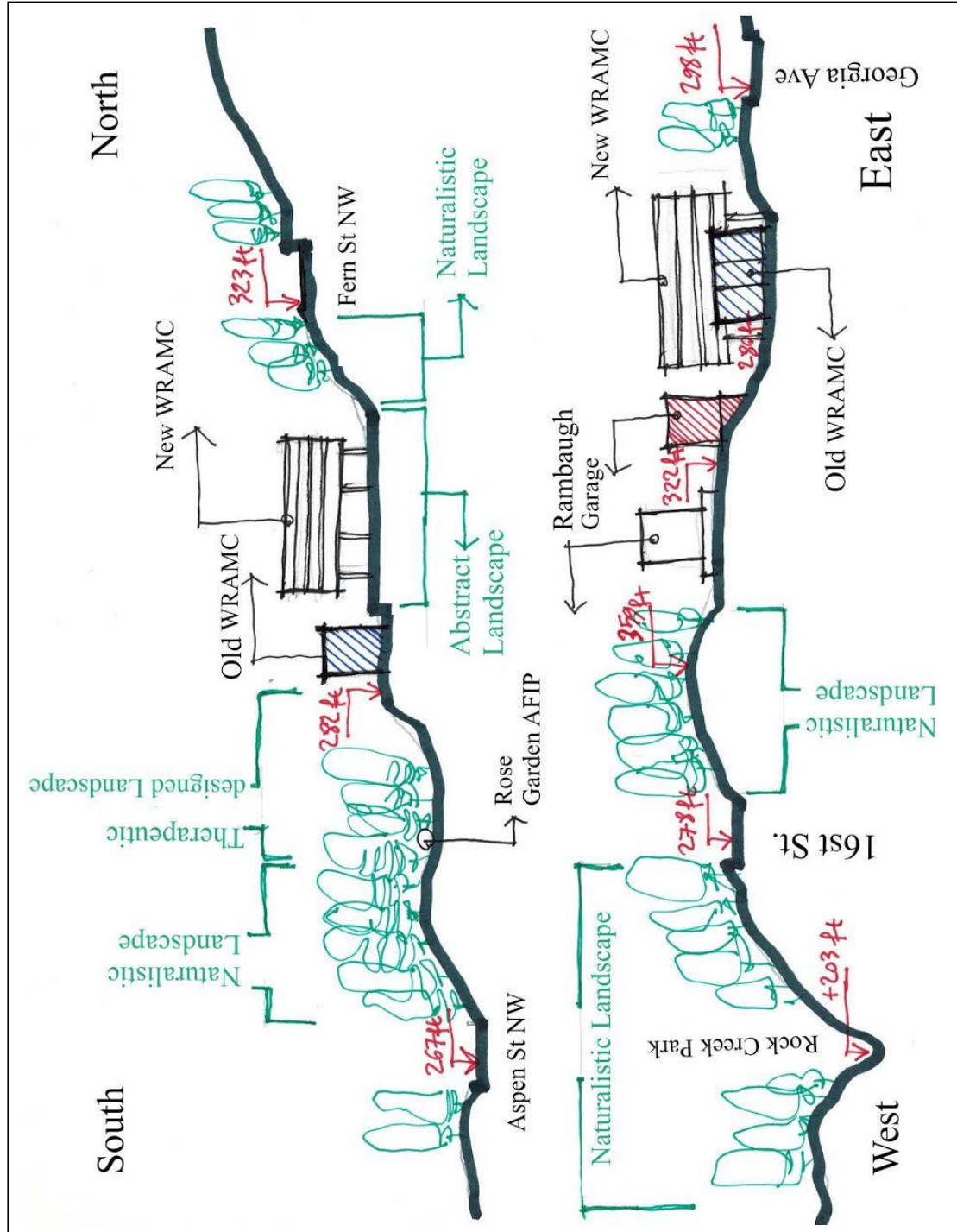
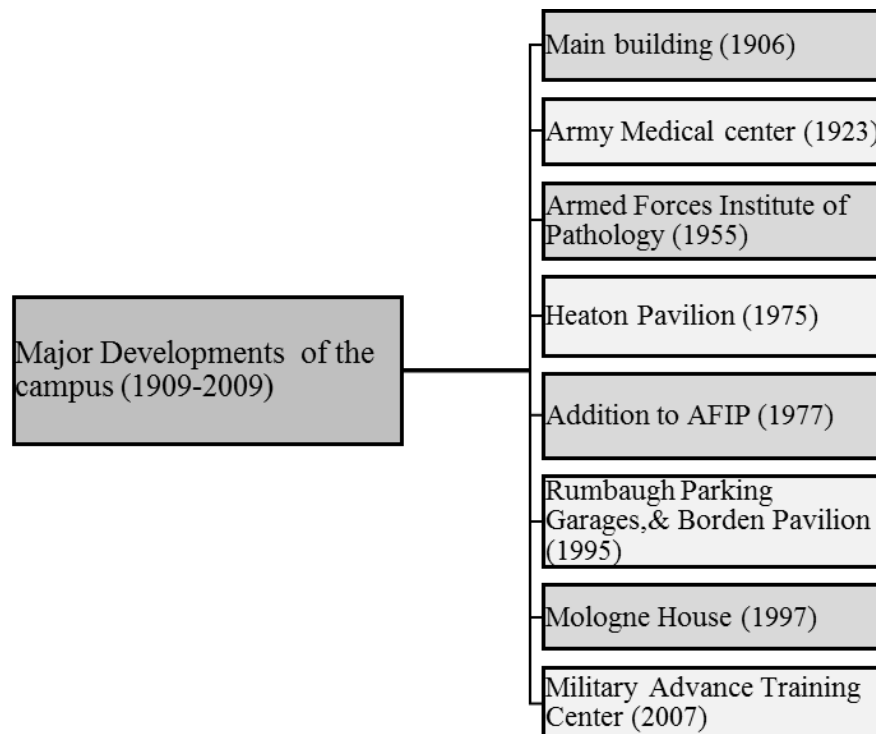


Figure 38. The terrain and topography of the ground, exposure to natural green areas, in addition to the gardens of WRAMC determined the restorative landscape of the hospital during the 20<sup>th</sup> century (The profiles were produced by author, with assistance of Google Earth profile's tool, 2016).

## Major Developments and Projects that Impacted the Landscape

The Army Medical Center was constructed on the same campus of the hospital in 1923. During WWI the capacity of the hospital grew from 80 beds to 2500 beds in short period of time. In 1955, the Armed Forces Institute of Pathology was built on campus, and later in 1971, had another addition to this recent building (Weed, 1923).The additional structure was built in 1977, which was designed for “the highest –quality patient care”, to accommodate 250 beds. In 1994, they rededicated the main building as the “Heaton Pavilion”. In addition to “Rumbaugh Parking Garage”, and “Borden Pavilion” which was opened in the following year (1995), the “Mologne House” opened in 1997 and ten years later (2007),the Military Advance Training Center was constructed (USMMC, 2015; Pierce, et al., 2009).



*Table 20. Permanent constructions that changed the hospital’s landscape during the 20<sup>th</sup> century (by author).*

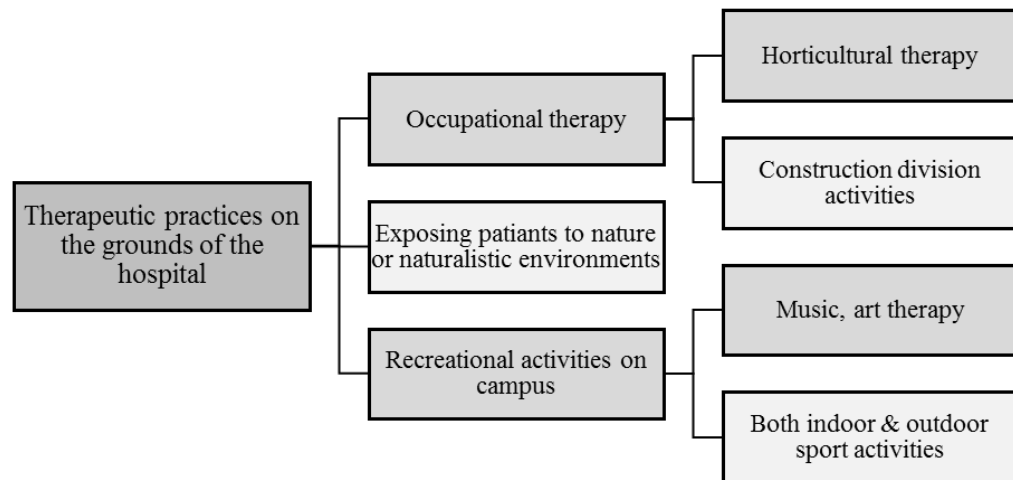
## **The Therapeutic Functions of the Gardens in Walter Reed Army Medical Center**

In 1955, the first organized experience of occupational therapy was initiated at the hospital, in order to treat people who needed “functional treatment”. By doing that, the healing dimensions of hospital extended beyond the physical treatment of injured soldiers. The idea was that restoring of the body would result in an increasing self-respect in patient’s disabilities. As stated: “its purpose was to help each patient to find himself and function again as a whole man-physically, socially, educationally and economically.” (USAMD, 2015). Recreational activities were provided by the Red Cross, and different sources, such as YMCA<sup>73</sup>, Knights of Columbus, Jewish Welfare Board, and WCCS<sup>74</sup> provided other recreational amenities for staff and nurses of the hospital. Those recreational activities included sports, music and art in indoor and outdoor spaces. The main outdoor recreational facilities were five tennis courts, a swimming pool, and field and sightseeing trips, excursions to the places of interests like Mount Vernon and Great Falls. Meanwhile, the entire park like site provided for events and gatherings in good weather conditions (Weed, 1923).

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<sup>73</sup> the Young Men’s Christian Association

<sup>74</sup> the War Camp Community Service



*Table 21. Therapeutic practices and restorative uses of the hospital's landscape (by author).*



*Figure 39. The ground, gardens and court yards of the hospital provided the therapeutic environments for handicapped soldier to gain recovery via walking in nature , (Image source; National Museum of Health and Medicine, Box 12, Folder 156, 001\_colorADJ).*



*Figure 40. Soldier-patients were practicing horticulture therapy and working in greenhouses, this temporary greenhouse replaced by new one in 1943. (Image source: National Museum of Health and Medicine, AFIP, Reeve 275).*



*Figure 41. Reconstruction Division of Hospital provided a joint program of occupational therapy and gardening for wounded soldiers (Image source; National Museum of Health and Medicine, AFIP, Reeve 469).*

### **4.3. A Century of Evolution; the Developments of Hospital and its Ground during the 20<sup>th</sup> Century**

#### **Foundation of Walter Reed Army General Hospital**

In 1864, during the Battle of Forest Sevens, the confederate troops stayed at the grounds of the Walter Reed campus to attack the District of Columbia (Standlee, 2009). Between 1900 and 1901, Major Walter Reed, leading the U.S. Army Yellow Fever Board in Cuba, researched and prevented the impacts of Yellow Fever in U.S. military campaigns in Cuba, and later during the Spanish War. After Reed's death, Borden who was a friend of Reed, decided to raise funds to establish a new hospital replacing the old military hospital at Washington Barracks (Standlee, 2009). According to Pierce, et.al (2009), "Borden also worked to have the new hospital named for his friend, in his desire to honor Reed, Borden succeeded in ways he could not imagined." (p. xiii) In December 1908, when the hospital was completed, the original Walter Reed General Hospital defined "World Class" for military facilities, and continued to be a leader in military medicine for nearly 100 years (Adler, 2014). Borden's plan for the complex, which was reflected in a three dimensional design by architect Marsh and Peters, was a single campus that included Walter Reed General Hospital, the Army Medical School, the Army Medical Museum, and the Surgeon General's Library (Standlee, 2009). In 1909, the 43 acres of land of the developing campus, known as the Cameron Tract, was purchased for \$100,000. This site contained the main hospital building for administration, inpatient care building with 65 to 80 beds and two other quarters. Within two years several support facilities were added.

In 1906 two architects Marsh and Peters designed the initial but thoroughly planned hospital ground and Walter Reed institution's site according to the Borden's ideas. This comprehensive plan included the Walter Reed General Hospital, the Army Medical School, the Army Medical Museum, and the Surgeon general's Library. The pavilion style was perfectly organized around a central green mall. The mall consisted on three large courtyard .The designers didn't consider the divers slops and topography of the site and future purchases of surrounding properties.



*Figure 42. The initial campus design as called “Borden Dream”, (source of image; National museum of Health and Medicine, AFIP, WRAMC, History collection, Reeve 2938).*

In May 1909, Walter Reed General Hospital officially started its operation. This was the first U.S. Army general hospital with a permanent structure and a capacity of 80 patients (Adler, 2014). From 1911 to 1915, several buildings were constructed including; the Army Nurse Corps' clinical facility Building 1, an Isolation hospital, the west and east as additions to main building. During WWI, scattered temporary buildings around the site were accommodating the rapidly growing numbers of wounded soldiers of European battlefields.



*Figure 43. The oldest picture of Walter Reed General Hospital in 1909 (Image source; National Museum of Health and Medicine, AFIP, AMM 484).*

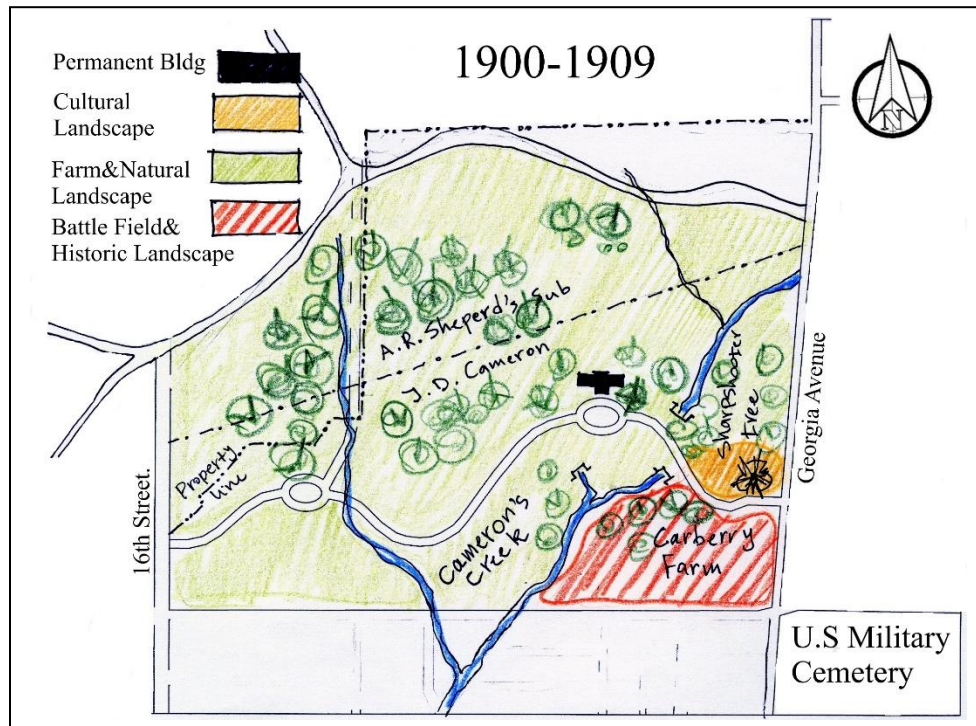
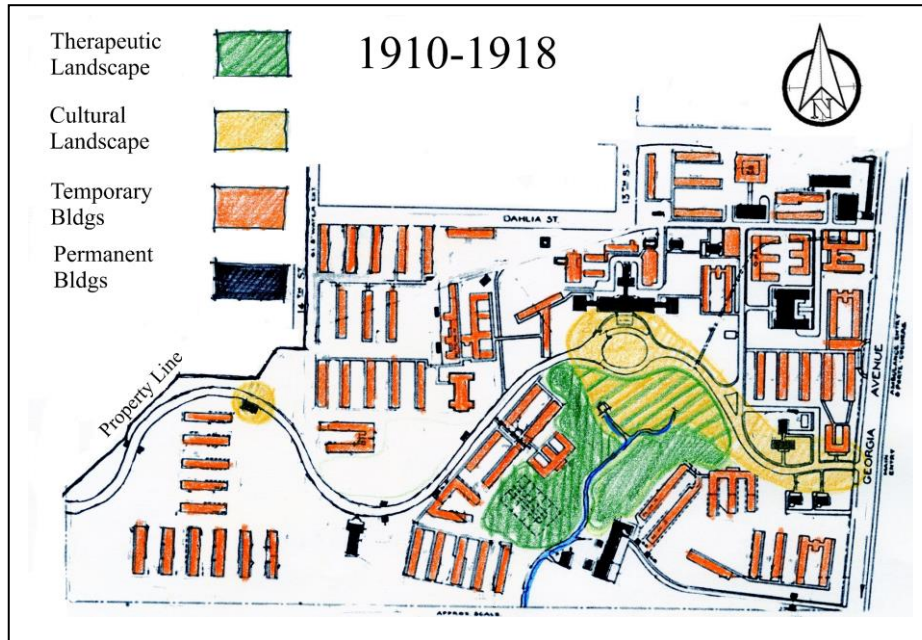


Figure 44. The Walter Reed Campus around 1909 (by author).

Around the late 1920s, some important permanent buildings were added to the east and west sides of the “Old Main” Walter Reed hospital. By the end of 1917, the capacity of the hospital increased to 950 beds to satisfy the needs of the WWI wounded. During the same year, about 25 acres of surrounding land was purchased and attached to the initial site. One year later, the capacity of the hospital reached 2,500 which was the highest admission during WWI. Pierce, et.al (2009) mentions that; “In addition to the wounded, war brought volunteers to the hospital to assist in their care and recovery.”(p.8, 9) During this time, the Red Cross Gray Ladies, a volunteer society, played a crucial role assisting and giving care to patients in the hospital.



*Figure 45. The site evolved during the First World War, many temporary buildings were constructed around the site, the landscape and ground played therapeutic and cultural roles to provide healing and heighten the sense of pride in wounded soldiers and citizens (Image by author).*

### **Between two World Wars, Permanent Construction and Cultural Landscape of Hospital Ground**

After WWI, the rehabilitation of wounded soldiers became one of the critical roles of Walter Reed especially in the early 1930s. The U.S. Congress provided funds for closure of temporary military hospitals to build permanent ones. Therefore, between 1920 and 1922, the Army procured 44 acres of land in 16<sup>th</sup> Street Heights, and added to the existing site. As a result, the site increased to its present size of almost 116 acres. In the late 1930s major east and west buildings were attached to “Old Main”, as Building 1 is called. President Harding was the first president of the United States that visited Walter Reed. He meet with wounded soldiers in a garden party on a beautiful Sunday in May (Standlee, 2009). In 1923, the famous Washington children’s tradition, the rolling of Easter Eggs, was held on Walter Reed’s grounds. In 1927, Washington’s

first Easter Sunrise Service was also held on the Walter Reed site. A new building opened in 1923, to the west of Building 1, which was a permanent construction for the U.S. Army Medical School at the location of the tent-sheltered Hospital Campus. Between 1919 and 1926 James D. Glennan, the commander of both the hospital and medical center, was an advocate and planner of the Walter Reed gardens (Pierce, et al., 2009). He developed the formal garden on the southern side of the main building. He planted many Japanese cherry trees on the upper boundary of the rose garden. In 1928, the second Easter Sunrise Service which was largely broadcasted, was held on the Walter Reed site. This event became a historical event because 8,000 people attended the service, including the hospital's personnel and nurses who shaped an impressive "Living Cross" (USMMC, 2013).



*Figure 46. On early, 1923, the First Easter Egg Roll was held in the formal gardens of Walter Reed General Hospital (Source of image; NMHM, AFIP, WRAMC, History Collection).*

In addition to the religious events, throughout this time the landscape of Walter Reed witnessed the graduation ceremonies of Nursing School students, outdoor nurse's classes in the gardens of the campus and their morning exercises. During the 1930s, rehabilitation or physical therapy was largely practiced in both indoor and outdoor spaces of the hospital. The wards accepted patients for physical therapy practices in addition to social events, and recreation ceremonies. Those rehabilitation activities often extended to re-education, occupational therapy for recovering their bodies' coordination to bring them to normal life (USAMD, 2009). These creative activities were carefully organized to heighten the patients' self-esteem and give them a sense of accomplishment via a range of very diverse practices from gardening in the green house to practice courses of farming, chicken raising, carpentry, and other crafts. In 1918, several green houses were constructed on the east side of Georgia Avenue to supply the hospital needs of flowers and some fresh vegetables. Later in 1943, despite the lack of funding for a green house, the U.S. Park Service donated three greenhouses to Walter Reed Hospital. Reconstruction of Walter Reed allowed the soldier-patients to work in activities such as gardening, and landscaping which actually was considered as horticulture therapy and occupational therapy activities (Pierce, et al., 2009). Due to massive construction projects mostly from 1930 to 1939, the campus turned into a very well organized site, where a symmetrical design of buildings made it a uniform site with orderly landscape. After the war, Walter Reed accepted more civilian patients, and the rehabilitation activities declined because the Veteran Administration took responsibility of taking care of veterans in their own facilities out of Army hospitals (Pierce, et al., 2009).



*Figure 48. Red Cross hall building in 1932, the photo shows the view and landscape of ground with plenty of light and open perspective from the south elevation. Image source: " Box 010, Folder 00106, OHA 355: Walter Reed Army Medical Center Historical Collection, Otis Historical Archives, National Museum of Health and Medicine".*



*Figure 47. When Bldg. 40 was completed, the flag moved from in front of the Bldg. 1 to its new place. This photo depicts the design and landscape of the new headquarters of the Army Medical Center in 1935. Image source: " Box 010, Folder 00106, OHA 355: Walter Reed Army Medical Center Historical Collection, Otis Historical Archives, National Museum of Health and Medicine".*

In 1932, a number of buildings were added to the Army Medical School and they moved the flagpole from in front of the main building (Bldg. 1) to the east entrance of Building 40. In 1933, Memorial Fountain was constructed in front of the main building. In early 1922, the initial plans of a memorial chapel on campus had begun. Its ground breaking took place on November 11, 1929 at 11 a.m. and the stone was laid on May 28, 1930 (Pierce, et al., 2009). In 1933, the Army School of Nursing closed its doors, due to the sharp decrease in the demand for nurses. In this decade, the removal of the temporary constructions and many permanent buildings on the north side of Building 1 have shaped the landscape of the campus. Between 1928 and 1932, the new buildings of the Red Cross Hall were completed (USMMC, 2013) with beautiful landscape and design of green spaces on its south side. In 1932, the landscape in front of the new headquarters of the Army Medical Center (Building 40) was designed. Its front ground was designed in a three-level landscape and planted with the flag that moved from in front of the hospital to the highest part of it, to welcome the visitors and patients. An aerial photo taken in early 1935, from the main elevation of the hospital with the flag, the pergola, and rose garden in the foreground of the picture. In this view, the extensive landscape design of the southern side of the campus attracts the attention and implies the importance of the therapeutic practices on the hospital grounds during that time. Around 1932, many landscape projects were completed on the campus. These projects, despite the differences in size, location, and design features had one essential goal in common. They provided healing for people. According to Pierce, et.al (2009), General Albert E. Truby was a great supporter of these gardens, because he strongly believed in the healing power of nature on the patients in the hospital. Therefore, some

projects like the pergola and portal garden flourished during his time at Walter Reed.

(p.70)



*Figure 50. Greenhouse 3, Bldg.50 in 1930's. In 1943, despite the lack of funding for a green house, the U.S. Park Service donated three greenhouses (Image source; NMHM, WRAMC, Box 11, Folder 152).*



*Figure 49. An aerial photo from the gardens and grounds in front of the Bldg.1, The rose garden, Pergola and formal garden in foreground in the early 1935,( Source: National Archives and Records Administration, SC 320751 retrieved from Pierce, et al., 2009).*



Figure 51. In 1933, Memorial Fountain was constructed in front of the main building. For decades it provided scenic view and healing inseparable element of hospital in public memories (Image Source; NMHM, WRAMC, Box 11, Folder 152).

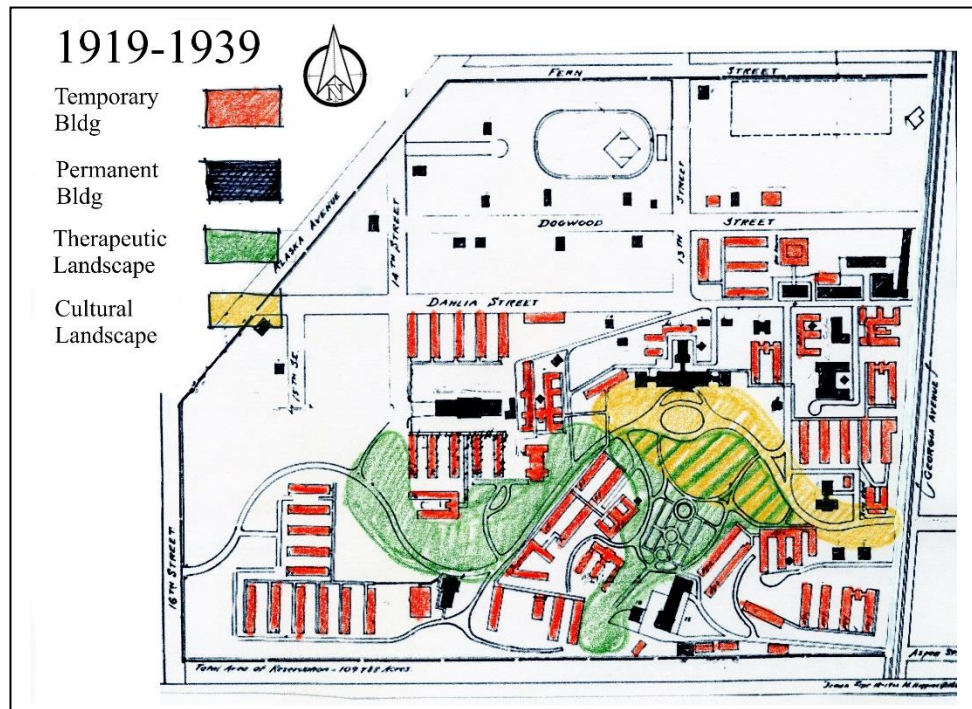


Figure 52. Landscape and the campus between two World Wars. The temporary buildings had occupied huge area of the ground, the gardens flourished and the Memorial fountain was constructed in front of Building.1. (Image by author).

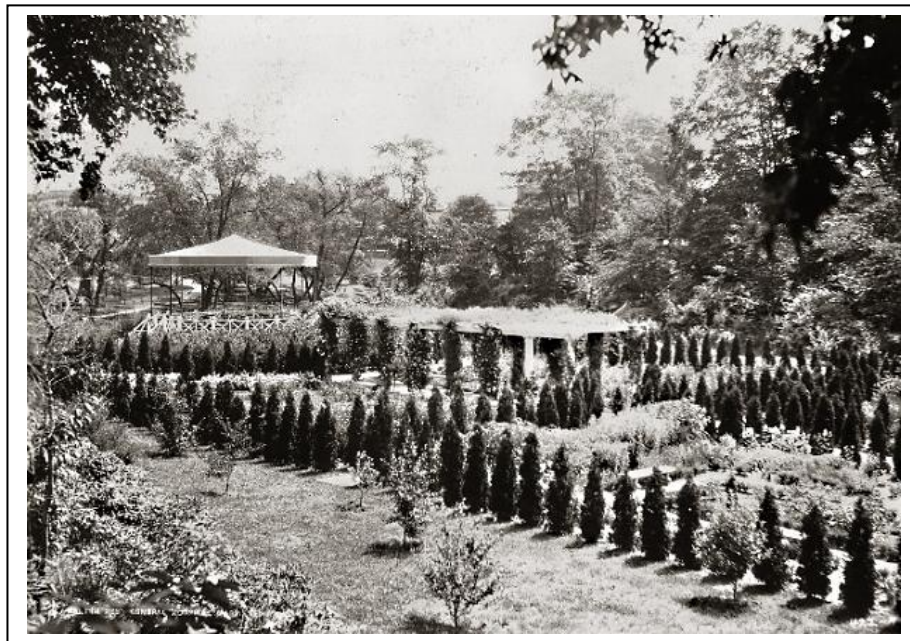
## **The Second World War, and Beautiful Gardens of Walter Reed Hospital**

By the beginning of WW II, previous expansions of Walter Reed could not accommodate the needs for new wounded soldiers. These needs caused the Army to purchase the old National Park Seminary, located at Forest Glen, in 1942. This new, but purchased, 185 acres of land was used as the convalescent section, while the rehabilitative works took place in Camp Ord, some miles away from main campus and Forest Glenn camp (Pierce, et al., 2009). During 1940's, the Memorial Chapel was heavily occupied with both memorial services and wedding parties. When weather allowed, those weddings were placed in the outdoor space around the Chapel. On September 11, 1946, President Harry S Truman came to Memorial chapel, and attended his first church service as the President of the United States (Pierce, et al., 2009). On the Walter Reed campus, the plants and picturesque landscape of the head-quarter of the Army Medical Center's entrance had grown, and a very well-defined enclosed healing space was built in coordination with "the Solarium building", which belonged to the Red Cross. On the south elevation of the Solarium, the beautiful gardens, especially during the sunny days, provided benevolent conditions for the sick to gain healing through walking and roaming the grounds. In the early 1950s, the formal garden of Walter Reed was perfectly grown, and well maintained, with its symmetrical order, therefore patients and staff were able to walk through it and refresh their minds and bodies. In addition to those gardens, a trail and a garden path was constructed on the south side of the campus to give a taste of wandering in the pristine wilderness to visitors and patients. Same as before, rehabilitation activities in Walter Reed Hospital, in the occupational therapy shop, were implemented with more focus on non-

agricultural activities such as music therapy, winding rugs, and using modern technologies of the time such as typing, and voice recording (Pierce, et al., 2009; Standlee, 2009).



*Figure 53. In 1948 the Solarium added to the southern elevation of the Red Cross Hall. (Source of Image; Walter Reed Army Medical Center, Directorate of Public Works Archives, retrieved from Pierce, et al., 2009).*



*Figure 54. In 1940's the Formal Garden became mature. (Source of Image; Standlee, 2009).*



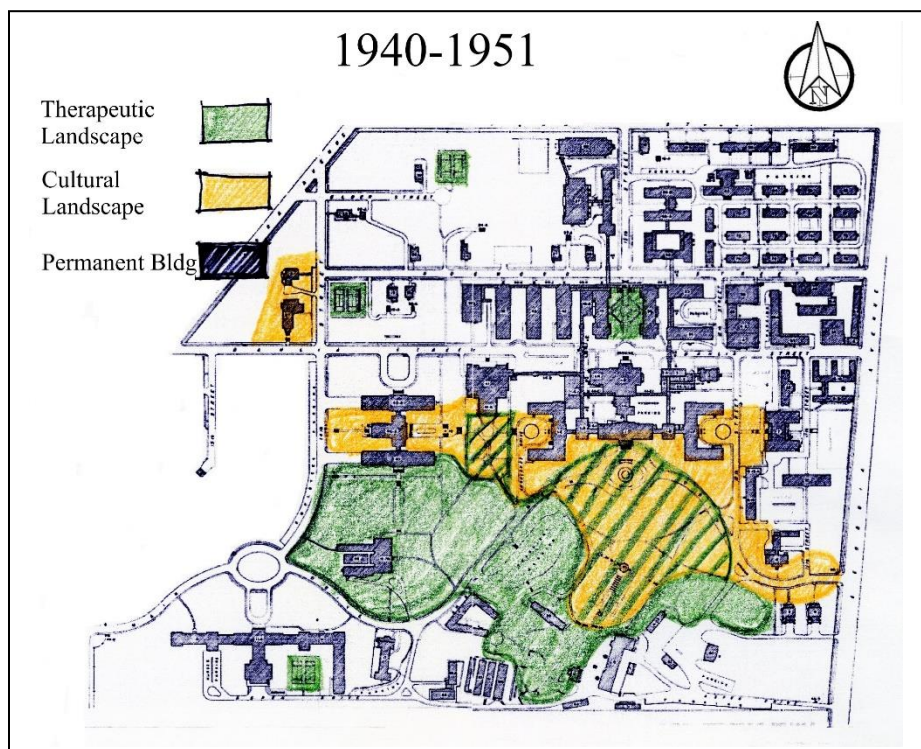
*Figure 55. A garden path in WRAMC campus, 1948. (Source of image: National Museum of Health and Medicine, AFIP, WRAMC History Collection).*



*Figure 56. A Courtyard garden in the north side of the Bldg1, which was replaced with parking spaces in 1950's. (Source of image: National Museum of Health and Medicine, AFIP, WRAMC History Collection).*



*Figure 58. Memorial Chapel was a place for religious and official ceremonies as well as giving peace and healing to citizens, staff, and wounded soldiers. (Source of image; U.S. National Library of Medicine, 2017).*



*Figure 57. During the Second World War the site witnessed a dramatic development of permanent constructions, and extensive therapeutic use of the gardens and the ground. (Image by author).*

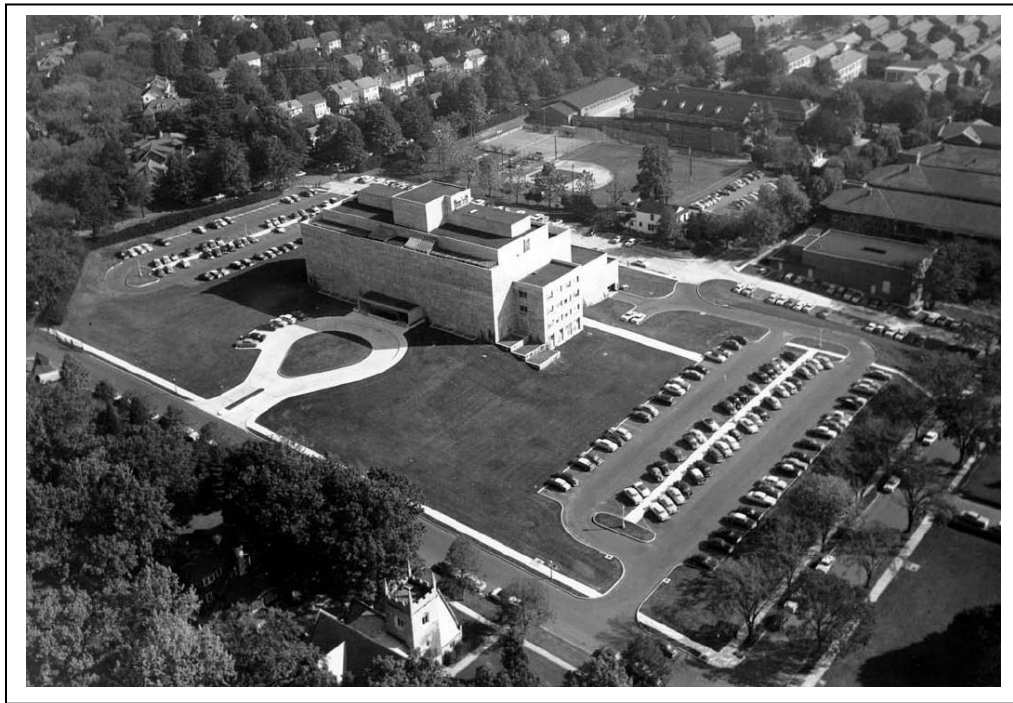
## **Modern Architecture and Walter Reed Army Medical Center**

In 1951, the 100<sup>th</sup> anniversary of Major Walter Reed's birth, the name of all campus institutions changed to Walter Reed Army Medical Center. During the 1950s, the Armed Forces Institute of Pathology (AFIP), Building 54, was added to Walter Reed's grounds. This was one step to achieve the "Borden's Dream". AFIP had been designed in a mausoleum style, its construction took four years from 1951 to 1955 (Walter Reed Society, Inc, 2016). The solid concrete structure had been designed to be resistant to atomic attacks (Defense Department, 2011). The giant building in the upper north west of the site, with a huge blind elevation, represented a clear contrast to the beautiful gardens and red brick buildings. Shapiro (2016) described the building; "Standing aloof from the rest of the elegant Walter Reed campus, Building 54 was, to borrow (and maybe misuse) Vincent Scully's term, a "sacred mountain" inspired by the Soviet threat". Then he added; "Though its architecture was driven by functional concerns, Building 54 was also – at least in retrospect – an exemplar of the Brutalist architectural style that was just coming into vogue. Between the groundbreaking in July 1951 and the dedication in 1955 Le Corbusier completed the chapel of Notre Dame du Haut in Ronchamp and the administrative center at Chandigarh, both examples of the style. Brutalism would become a common style for US federal office buildings, and would be the basis for Walter Reed's new main hospital in the 1970s, but there would never be something like Building 54 again." (Shapiro, 2016) On the other hand, at the same time, between the west side of the main building, and the south part of the Red Cross Hall, the Solarium was improved. The Red Cross Hall improvements provided wide open balconies to harvest sunlight and view the gardens. During the 1950s many

international and famous persons visited the hospital, and very soon the organization and its design became a model of a modern Army Hospital (Pierce, et al., 2009). When the eight-story building of the Armed Forces Institute of Pathology was completed, a giant cul-de-sac and two large automobile parking lots were added which introduced the era of site design for cars to the pedestrian friendly grounds of hospital.

The “Hoff Fountain”, in front of the main building (Bldg.1), with its beautiful and symbolic view toward the gardens became the subject of a large number of renderings and depictions. Additionally, its landscape, surrounding gardens, and other connected landscape elements such as the well-known bandstand of the Rose Garden and pergola turned to a permanent space for important ceremonies and social events. For instance, at the Easter Sunrise Service of 1956, the attended population were estimated to be between 30,000 and 40,000, which was the largest in history (Pierce, et al., 2009). In this decade, same as the previous periods, the beautiful landscape included symmetrically designed formal gardens, and the north courtyards of the main building or naturalistic grounds of the campus, played an essential role to provide healing for patients, to the satisfaction of staff and visitors. In the 1960s, several new construction buildings and monuments were built on the Walter Reed site. Two new temporary structures were added to the south side of Red Cross Hall. These buildings, which exist today, occupied the portion of land in front of the Solarium and closed its open perspective to the gardens (Pierce, et al., 2009). During this decade, President Eisenhower was a patient in Walter Reed for 11 months. Therefore, a balcony was added to the eastern wing of the “Main Building”, to make him able to enjoy the healing effects of fresh air and sunlight in addition to views of the gardens and grounds (Pierce,

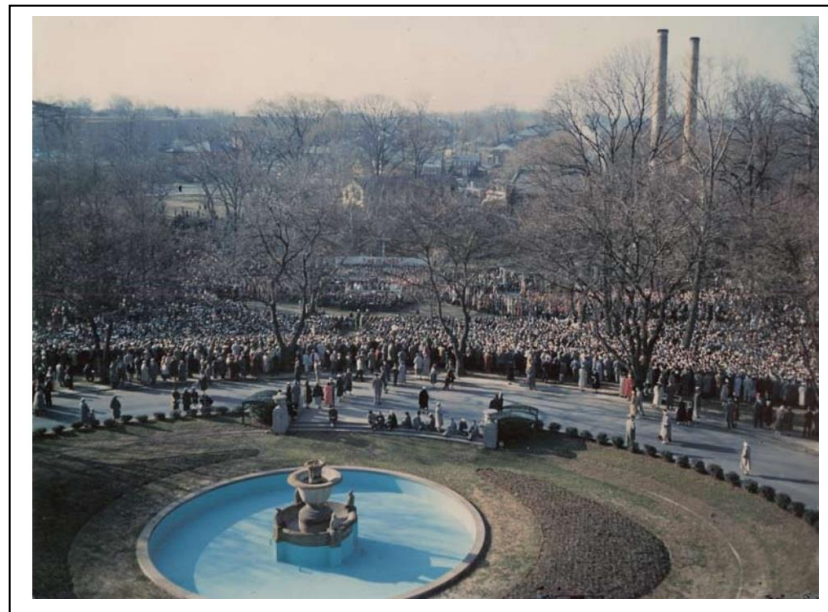
et al., 2009). In November 1966, the dedication ceremony of the Walter Reed Memorial was held. The Walter Reed Memorial was located in Delano Circle. Felix de Weldon, an artist, sculpted the bust of Walter Reed on a 25-foot tall shaft of white-amoco cream marble with terrace steps of Georgian marble. Many important people and Walter Reed relatives attended the dedication (Pierce, et al., 2009). Similar to the last decades, the ground of the hospital served as a beautiful space for ceremonies and events, for example, in 1956, the traditional Easter Sunrise was well attended by civilians as well as staff families (Pierce, et al., 2009).



*Figure 59. Armed Force Institute of Pathology, (Source of Image: National Museum of Health and Medicine, AFIP, WRAMC History Collection).*



*Figure 61. A view from soldier-patients roaming around the Rose Garden. (Source of Image; National Museum of Health and Medicine , Box 12, Folder 156).*



*Figure 60. In April 1956, estimated 40,000 people attended in Easter Sunrise Service at WRAMC grounds. The view show the landscape from Hoff Fountain toward the south and Smoke towers (Image source: " Box 010, Folder 00106, OHA 355: Walter Reed Army Medical Center Historical Collection, Otis Historical Archives, National Museum of Health and Medicine")*

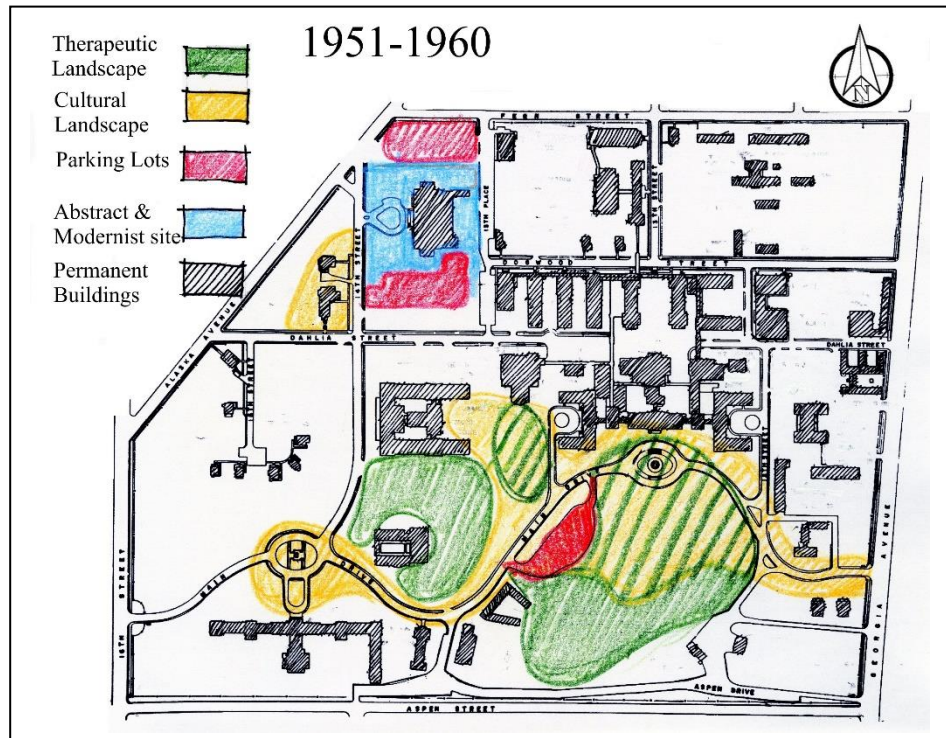


Figure 63. Between 1951 and 1959 the site was developed with construction of AFIP, and parking lots (Source: author).

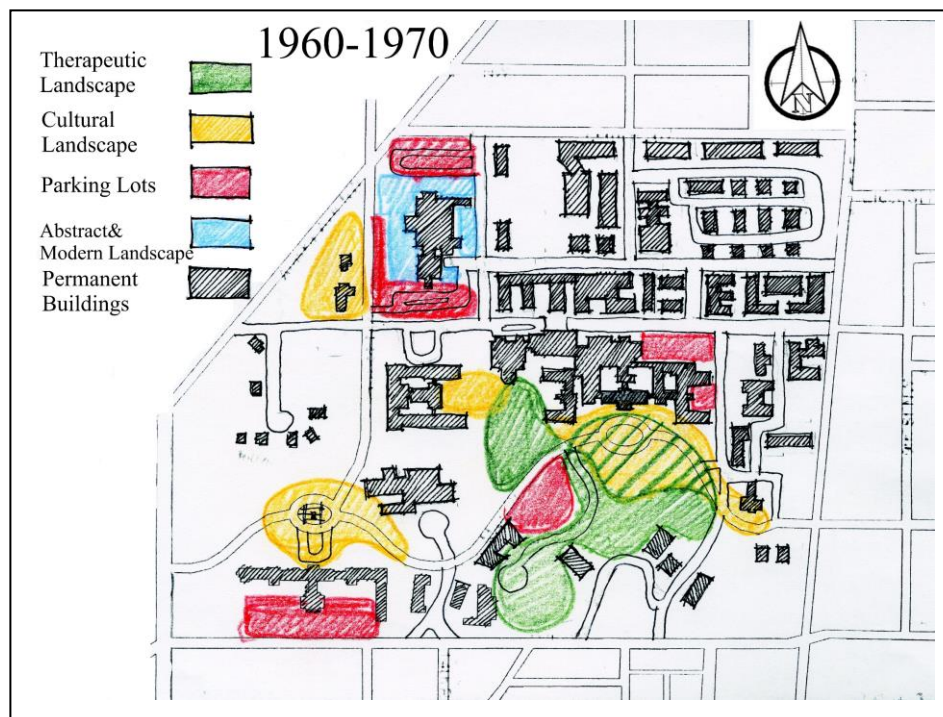


Figure 62. In 1960's, more parking lots were added to the site and the healing uses of the gardens were declined (Source: author).

## **The Landscape of Contrast; Late Modern Hospital, and Abstract Landscape, in WRAMC**

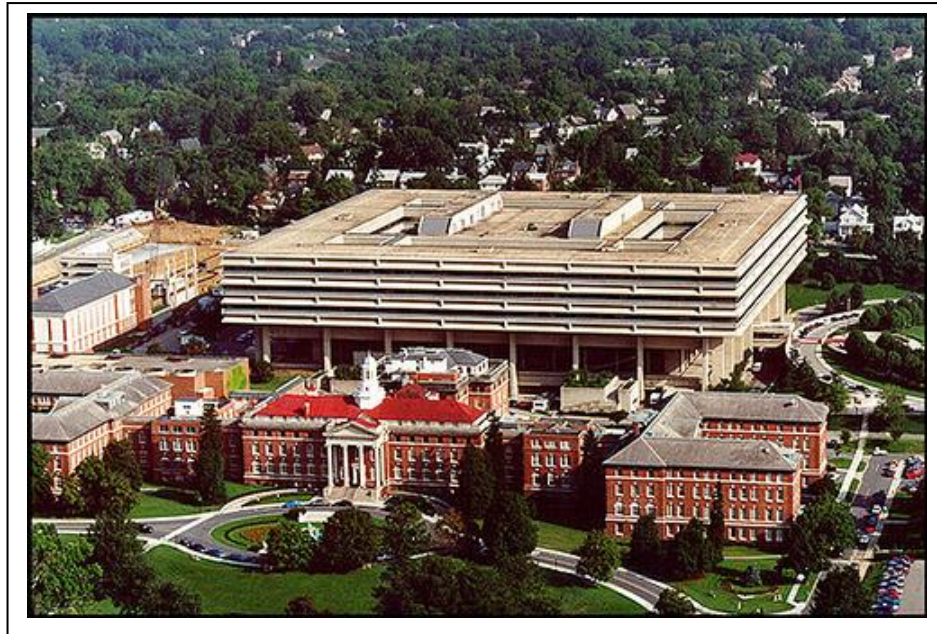
The major events between 1970 and 1980 were classified by three construction projects: Building 2, an addition to the Armed Forces Institute of Pathology, and Abram Hall. The most important project, the new clinical building with a huge underground parking lot, was started in 1972, completed in 1977, and occupied in 1978. As Pierce, et al (2009) mentioned, after several years, former Walter Reed Commanding General Heaton<sup>75</sup> with assistance of U.S. Senators, successfully achieved his long term goal. In 1967, the U.S. Congress had granted the funding for building a new health care facility at the Walter Reed Hospital (Pierce, et al., 2009) that changed the landscape of the campus and neighboring community of an entire century. To provide space for locating the massive project, some services and corresponding facilities were moved to the Forest Glen campus. The cube shaped concrete architecture dominated the view and paramount space in north side of main building. The geometry of the new building demonstrated a distinguishable contrast to the naturalistic picturesque landscape and the rose-brick Georgian Revival style architecture of the previous decades. Symmetrical design and rectangular plan of Building 2 had a large open space in its west side that defined its main entrance to Georgia Avenue. The entrance and its landscape was originally designed with an arrangement of two wide semi-circles of trees that enclosed the front yard and defined the entrance in a very abstract style. According to Verderber & Fine (2000), Building 2 of the Walter Reed Army medical

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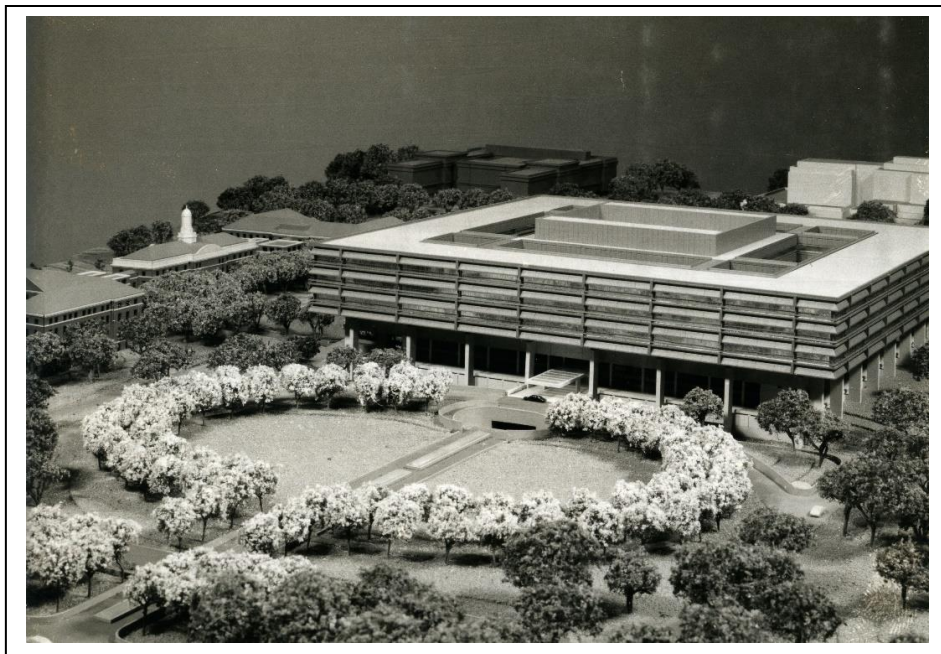
<sup>75</sup> In 1967, General Heaton, as the U.S. Surgeon General, procured funds from the U.S. Congress to develop the hospital. The planning phase took almost five years until its completion in 1972. The new giant facility included 28 acres of floor space, and 5,500 rooms, with 1,280 beds. Later in 1994, the building was named the Heaton Pavilion.

Center (WRAMC) in Washington, D.C. was an example of Late Modernist Architecture (Verderber & Fine, 2000). The building was designed by Stone, Marraini, and Patterson of San Francisco. Their design resembles Le Corbusier's pure modernist style (Verderber & Fine, 2000). Floating on plaza and above the grounds of entire campus, the building consisted of several enclosed, symmetrical courtyards to provide daylight for interior spaces. These rectangular minimalist spaces included small circular water ponds and minor landscaping.

As mentioned, many buildings on the north side of the site were demolished to make an enough space for construction of Building 2, therefore, beautifully designed courtyard gardens were erased as well. The other important building, the addition to the AFIP, was constructed at the same height of the original AFIP building, but had windows and later became the National Museum of Health and Medicine. This new building had roof gardens that served as green traces for entire building. The third building, Abram Hall, was located on the south side of the main building with different styles of design and approaches to the landscape of the ground. Its dedication was in 1975 and was proposed to be the primary housing for enlisted people. The building's design considered the topography of the grounds, included three courtyard gardens to facilitate the access to fresh air and natural light for the interiors. The facades were built with brick, a combination of concrete and large surfaces of glass. The facades included terraces, balconies and large windows toward the main gardens and main building of the campus. Several entries provided convenient pedestrian access from other sides and different levels of topography to Abram Hall.



*Figure 65. New Modernist Concrete architecture has arisen above the Main Building, and affected the sky line of both the campus and neighboring community (Photograph source : Public Affairs, Office of the Surgeon General, US Army, 2016).*



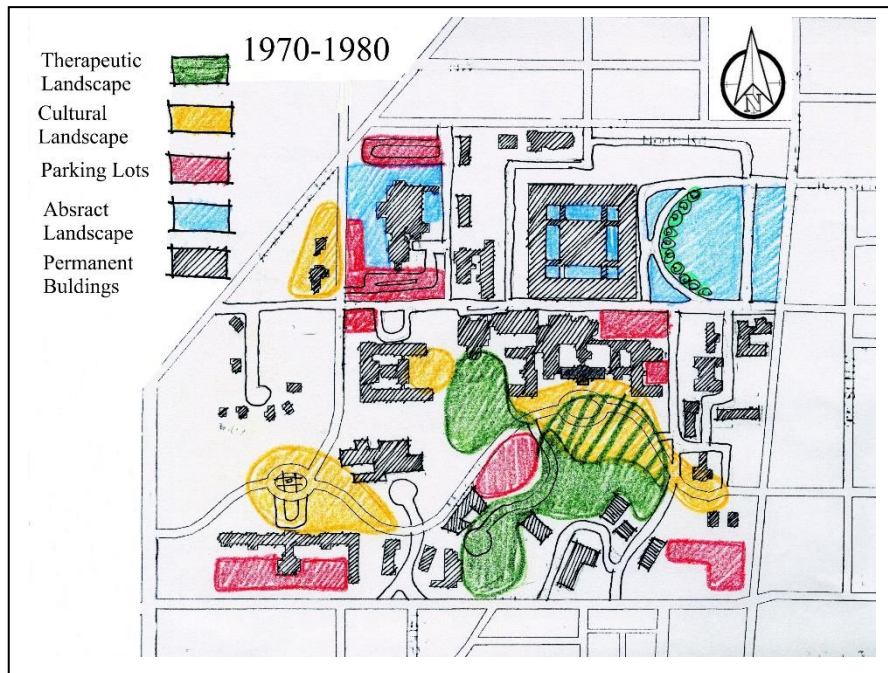
*Figure 64. The model of Building 2 (Heaton Pavilion) and its abstract landscape. (Source of Image; National museum of health and medicine, Box 12, Folder 157, WRAMC).*



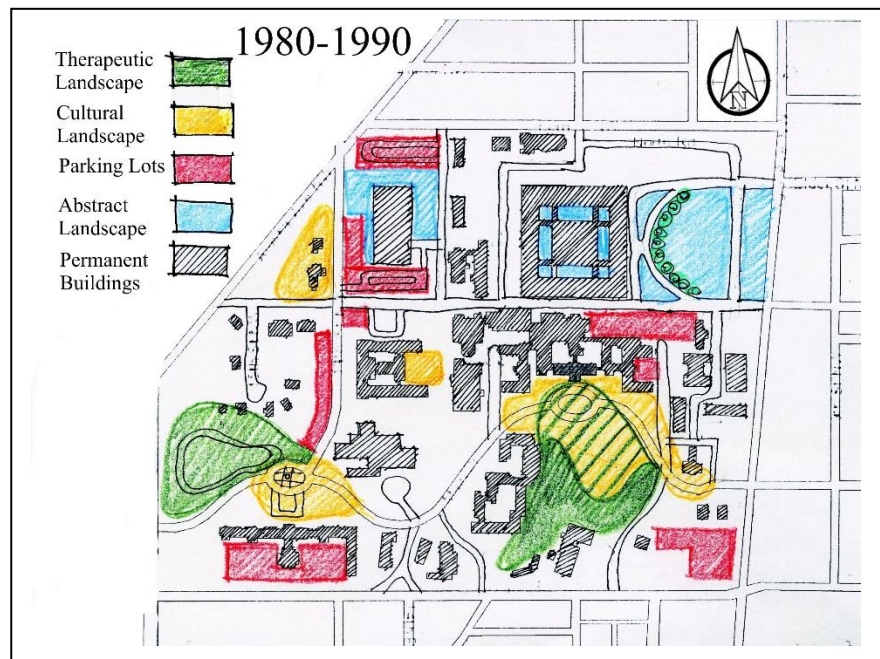
*Figure 66. An aerial view to new wing of Armed Forces Institute of Pathology buildings, (Source of Image; Pictomtry International Corp, 2016).*



*Figure 67. A general view to Abram Hall, including its courtyards, the ground of Walter Reed, Rose Garden, Pergola, Hoff Fountain and the Main Building (Source of Image; Pictomtry International Corp, 2016).*



*Figure 68. Constructing Heaton pavilion & its abstract landscape dramatically changed the Northern side of the campus (by author).*



*Figure 69. An exercise trail in the western side of the campus, and Abram Hall increased the restorative values of the landscape (by author).*

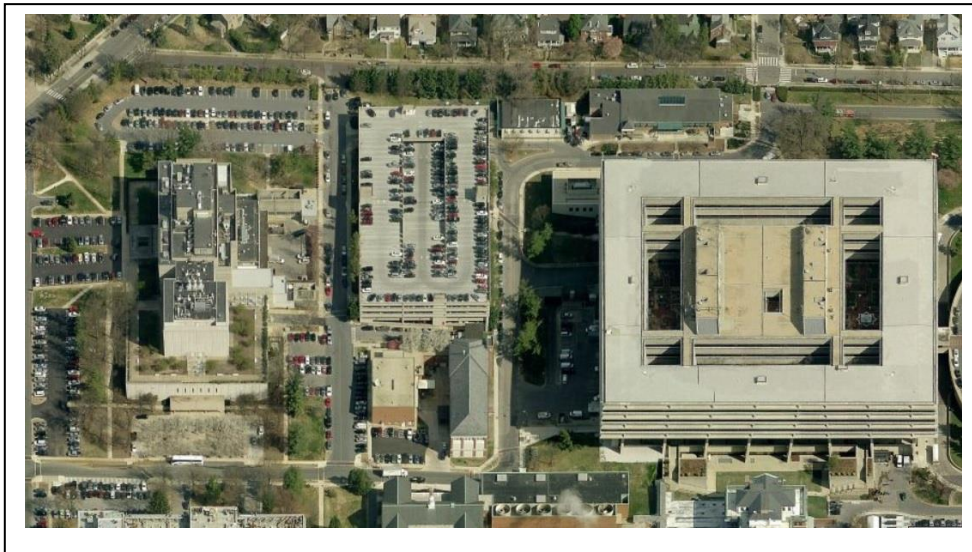
## **The Grounds of WRAMC Accommodates Visitors and Automobiles**

The early 1990s was a period of improvement and expansion of clinical services in Walter Reed Hospital. The number of physicians and medical students increased, the other fields of medicine and medical care was growing into separate and independent departments, which all resulted in parking issues on campus (Pierce, et al., 2009). Once again the flagpole was relocated and moved to the front of Building 2, which was now considered the hospital's main entrance and a symbol of Walter Reed at the time. Between 1990 and 1999, several new construction projects evolved the landscape of the site. In 1993, the demands for parking were properly satisfied with construction of the "Rumbaugh Parking Garage" (Pierce, et al., 2009), located among Pavilion 2, Red Cross Hall and the AFIP original building. In 1997, the "Mologne House Hotel", was completed in the northwest side of the Walter Reed Memorial to accommodate soldiers and their families when visiting the facility (Pierce, et al., 2009). The design of the Mologne House Hotel included a courtyard with a fountain and a pool with a direct connection and open view to the campus grounds. Since the completion of Building 2, in the last decade, the gate of Georgia Avenue, on the opposite side of Elder Street officially became the main entrance of the whole facility. To preserve the important historical role of the "Main Drive", and also to put an emphasis on its beautiful and picturesque design, a new guard house located at the intersection of Main Drive and Georgia Avenue was constructed in simple red brick in accordance with the original style of the Main Building. Since 1950's until this period, the greenhouse was actively providing flowers for the wards, and internal ceremonies. Additionally, the greenhouse supported the horticultural therapy programs at the hospital's Department of

Psychiatry, unfortunately at the end of the decade the greenhouses were demolished (Pierce, et al., 2009).



*Figure 70. The entrance of new hospital with cherry trees and flagpole that included walkway and Tulip garden (Image Courtesy of; [www. NorthwestMilitary.com](http://www.NorthwestMilitary.com), 2015).*



*Figure 71. Rambaugh Parking Garage, located between Heaton Pavilion and AFIP buildings, construction of this parking garage satisfied the lack of parking spots for entire period of Walter Reed's operation (Source of image; Pictomtry International Corp, 2016).*

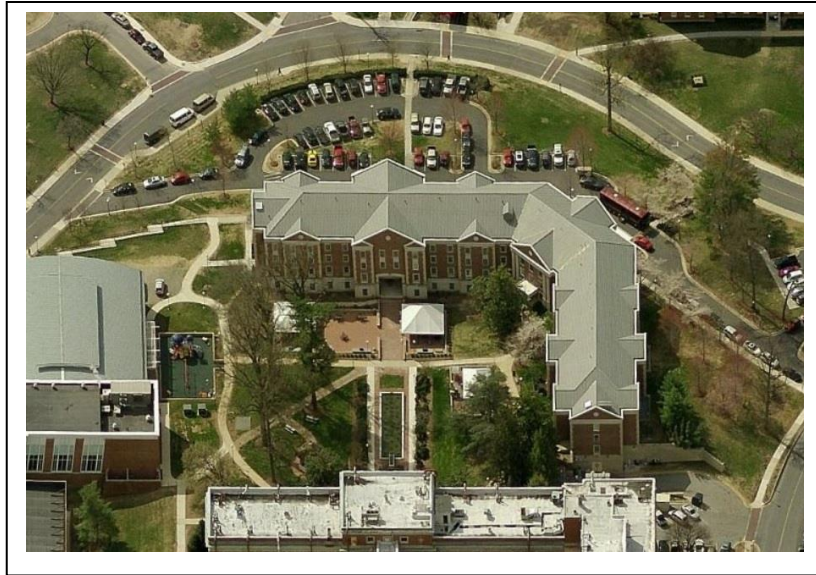


Figure 72. An aerial view to Mologne House Hotel, with its enclosed courtyard garden, pool and gazebos (Source of Image; Pictomtry International Corp, 2016).

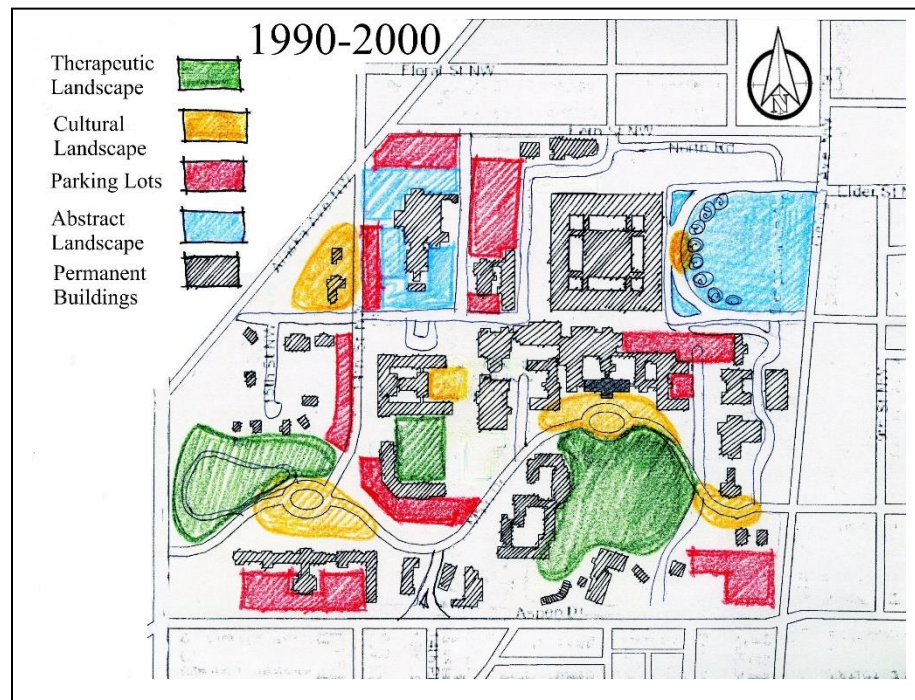


Figure 73. The Giant parking garage & Mologne House hotel were constructed with huge contrast to each other and imbalanced the restorative values of the whole site (by author).

## **The Closure of WRAMC (2000-2009), and Virtual Healing Environment**

During its last decade in Washington, D.C, the campus witnessed only two construction activities and by the mid-2000's the site reached to its maximum capacity to have additional space more development. One of the buildings was the Military Advance Training Center (MATC), located in the north part of the campus, close to the main hospital building (Bldg. 2). The second project was Wagner Sport center, which was an athletic facility and named in honor of Lt. Colonel Karen Wagner in 2003 (Pierce, et al., 2009). In this decade, Walter Reed was approaching its centennial, while it became the last years for Walter Reed on the grounds between Rock Creek Park and Takoma Park. In 2005, the Base Realignment and Closure (BRAC) commission mandated the U.S. Army to close Walter Reed Army Medical Center in Washington, D.C. and move it to the National Naval Medical Center in Bethesda, Maryland (Walter Reed National Military Medical Center [WRNMMC], 2016). In 2007, despite the Army agreement on closure of the hospital, the increasing number of patients and war wounded forced the Army to fund and construct the Military Advanced Training Center (MATC). The MATC building had a Computer Center Assisted Rehabilitation Environment (CAREN), that beside the significant safety, and high performance, provided a virtual conditions for patients (Lockwood, 2016). This virtual environment prevented patients from engaging in physical activities in nature and from wandering in the beautiful landscape of campus.



Figure 74. A general view from the top to Walter Reed Army Medical Center, 2010 (Image Source; Esri, 2016a).

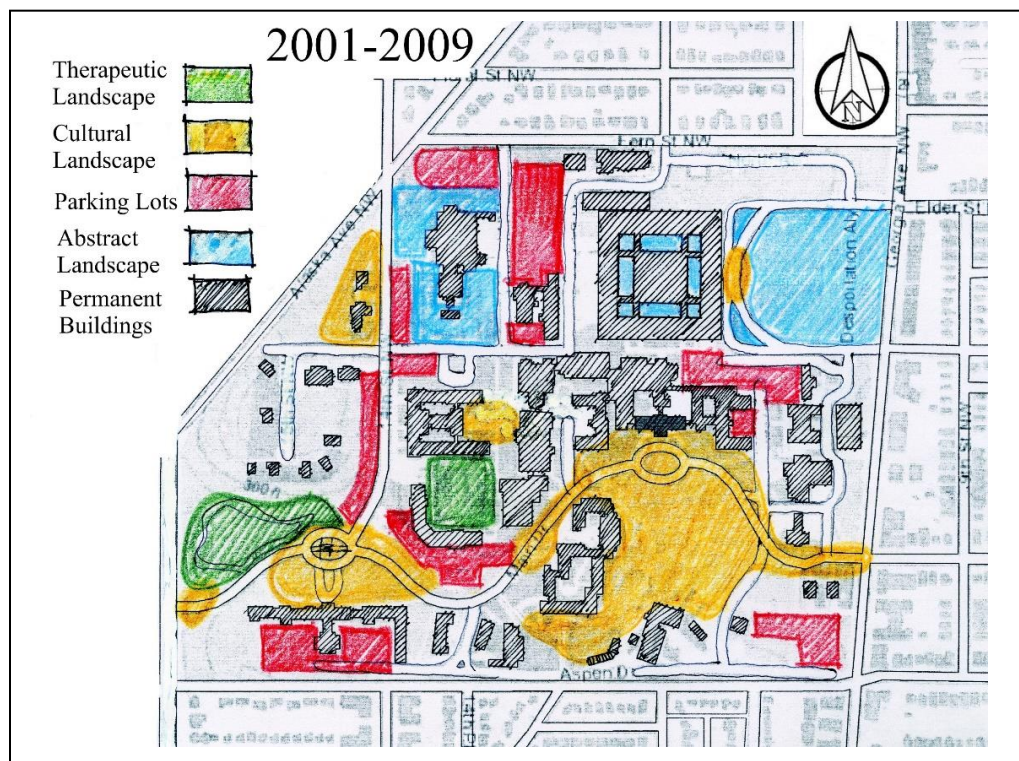


Figure 75. The restorative uses of the landscape was abandoned, and only two minor portions of the landscape were used for their therapeutic values (by author).

## **Chapter 5: Results of the Research**

This Chapter has been organized in three sub-chapters according the methods of data collection and data analysis. Then each of these sub-chapters was organized based on the main question and sub-questions of the dissertation, which eventually will lead to building or rejecting the research hypothesis.

### **5.1. Summary and Results of the Literature Review**

#### **Therapeutic Landscape of the 19th and 20th Centuries**

**Sub-Questions 1:** What are the historical-cultural components of American society that influenced hospital sites, and their therapeutic landscape during the 19th and 20th centuries?

##### **A. Environmental theories, therapeutic practices of the 19<sup>th</sup> century**

Throughout the 19th century, air quality and natural ventilation maintained their importance. Scientific research of hygienic design and public health increasingly gained significance to determine the design, not only of hospitals, but also urban environments. But in another direction, the healing properties of nature created the therapeutic landscape of mental hospitals in Britain and the United State in different ways. The romantic idea of nature as healer, which was inherited from the 18th century's psychiatric practices, influenced 19th century medicine and consequently created a new type of therapeutic environments that embraced the restoration properties of nature to a great extent. Both the American and British insane asylums applied the same theories and practices to improve the patients' condition, but there were a huge differences between the design and physical dimensions of these institutions. While the

British asylums had small and limited portion of land, the American asylums extended their landscape to rural farms and natural woods. Probably the unlimited amounts of natural resources shaped the extensively landscaped grounds of the American asylums. The abundant land, water sources, and good soil provided many opportunities for asylums to implement agricultural therapy and occupational therapy and become self-sustaining societies. In addition to that, many philanthropic donations provided funds for purchasing more land and improving their construction. The scientific studies of the 19th century resulted in a huge division between the medical hospitals and psychiatric institutions. These resources caused distinctions in organization and management approaches to the care of the sick and, finally, the architecture and landscape design of hospitals and asylums. For example, the study of Cholera by John Snow and the discovery of bacteria by Louis Pasteur impacted the use of nature in hospital environments in a way that degraded the therapeutic landscape of hospitals. Specialization and improving the quality of indoor spaces of the 19th century's hospitals resulted in increasing their footprint, gradually introducing new design patterns and abandoning the courtyard style in health care institutions. For example, prison and hospital reformation by John Howard in England introduced new hygiene regulations in hospitals in addition to examining innovative design patterns for mental hospitals. While in the early 18th century, the American hospitals didn't show significant distinctions from almshouses, later the scientific advances in the early 19th century radically changed not only the role of hospital design, but also the provision of care in those institutions. Around the mid – 19th century, the understanding of “germ theory”, the discovery of bacteria, and the “social hygiene theory” were prominent

ideas that evolved the courtyard gardens of healthcare institutions into pavilion hospitals. In this type of hospital, the therapeutic gardens reemerged into semi-enclosed gardens between the wards, to provide fresh air, sunlight, and pleasing views of landscape beside the medical treatment for patients. For example, in Johns Hopkins Hospital, the grand central courtyard and gardens between the wards bring sunlight and fresh air into the hospital's indoor spaces. While the hospital was designed with one of the most advanced ventilation technologies at the time, it benefited from the natural and fresh air of its gardens. While the medical treatment based on the research was one of the focal points of Johns Hopkins hospital, the restorative impacts of nature were examined in Philips courtyard garden in the care of psychiatric patients (Refer to 3.2.). In the early 19th century, the idea of "environmental determinism" was accepted by the elite of society as well as the public. The most significant invention based on that theory is the creation of asylums and their therapeutic landscapes. Kirkbride plan and its recommendations are considered the outstanding American contribution to implement the rules of environmental determinism. During this era, asylums and botanic gardens were the first scientific application of environmental determinism that redefined the American urban and rural landscapes. Additionally, the asylums were politically important because, by controlling the insane, they could protect democratic society. Therefore, the therapeutic landscape and moral treatment practices of asylums not only provided healing for mentally ill patients in rural settings, but also signaled some degrees of socio-cultural controls that aimed to keep American cities safe and healthy.

Self-sufficiency and ecological sustainability were among the main factors as to where to locate the asylums. Many types of those landscape practices were

extensively implemented in asylum grounds, including horticulture therapy, different kinds of occupational therapy, green house, and recreational activities. Also, those extensively landscaped grounds featured winding paths and roads, artificial ponds, fruit gardens, farms, and dairy structures. The picturesque design of the asylum grounds best fit into high-raised lands and hills. Many exotic and natural plants were growing outdoors and in the greenhouses of asylums. The creation of the whole therapeutic environment of these institutions were the results of close collaboration among architects, landscape architects, botanist, gardeners, physicians, and superintendents of asylums. One of the important aspects of the asylums were their connection to surrounding communities. In many cases, the grounds had no barriers or fences and provided restorative environments for their communities. In addition, asylums occasionally offered refuge and shelter for the citizens. In some notable examples, the institutions were planned based on the immediate needs of surrounding neighborhoods (Refer to 3.2.9, 3.2.10, 3.2.3.c). The scientific approaches, such as moral treatments, environmental determinism, and miasmatic theory, were key players in the health revolution of American cities (Refer to 3.2.2). The park-like grounds of asylums were popular due to their restorative properties, and their health benefits to society. Approaches in asylums grounds, the application and successful examination of those theories in American cities, especially on the east coast, resulted in considerable urban health improvements (Refer to 3.2.2, 3.2.4). Therefore, the urban parks continued growing and expanded throughout the American urban landscape. Later, the real practices of prominent landscape architects of the North America validated and confirmed the restorative values of public parks (Refer to 3.4.2). In the early 20th

century, the therapeutic landscapes of asylums dramatically declined due to the introduction of new approaches and scientific methods in neurology and mental treatment (Refer to 3.2.5).

### **B. Civil War, Washington D.C. and Hospitals**

The Civil War changed the therapeutic and cultural landscape of the nation's capital, Washington, D.C., which later influenced the urban landscape of other American cities. During this era, the increases in the population of the city and the number of wounded soldiers led to greater demands for care and more hospitals. . So the primitive pavilion hospitals, besides other temporary healthcare facilities, changed the urban and suburban landscape of the city. The rise in the number of women working in hospitals and creation of black communities around a number of hospitals, such as St. Elizabeth's and Freedmen's Hospitals, redefined the cultural landscape of the Washington, D. C. (Refer to 4.1).

### **C. Modern Hospitals, and Changing Culture of American Society in the 20<sup>th</sup> Century**

During the early decades of the 20th century, the environments of public hospitals were changed by advancements in medicine and demographic changes. Despite those changes, rehabilitation hospitals still offered extensive occupational and horticultural therapies. For example between the two world wars, and after WWII, those approached practiced to improve the physical and mental health of veterans (Refer to 3.2.5, 4.2.4, 4.3.2, 4.3.3). In 1946, "The Hospital Survey and Construction Act" was passed, which eased the expansion of American Community Hospitals. With new needs, consequently, the outdoor and indoor spaces of hospitals evolved to accommodate new

medical treatments and the growing presence of automobiles changed the landscape of hospitals (Refer to 3.2.5). Since the early decades of the 20<sup>th</sup> century, the international modernist architecture dictated highly efficient, cubic design, high-raised hospitals that influenced their surrounding urban landscapes. (Refer to 3.2.1). After WWII, the demographic shifts and economic changes evolved the cultural landscape of the communities inside American cities. As a result, many public hospitals were re-located to suburban areas, mostly of white-affluent and newly developed neighborhoods (Refer to 3.2.6, 4.1.1, 4.1.2).

### **Therapeutic Design and Military Medicine during the 19<sup>th</sup> and 20<sup>th</sup>**

#### **Centuries:**

**Sub-question 2:** How have healing practices and military medicine in the 20<sup>th</sup> century shaped the spatial-physical environment and the therapeutic landscape of Walter Reed Army medical center?

#### **A. Evolution of the Military Medicine in the 19<sup>th</sup> Century**

In the mid-19<sup>th</sup> century, high casualties in the Crimean War initiated a new era in military medicine. Medical training, personal sanitation, besides hygienic, and efficient hospitals were the direct result of Nightingale's recommendations during that war. Therefore, four types of military hospitals were introduced. While the functional efficiency and hygienic environment were the significant aspects in temporary barracks, hutted and pre-fabricated hospitals, using restorative properties of nature in convalescent military hospitals was distinguishable (Refer to 3.4). During the American Civil War, anew medical studies, especially neurology, were introduced. The advancements of medical treatment for mental patients in the foundation of mental

hospitals, took a different approach from asylums in the care of disordered soldiers and civilians. Therefore, the procedures of medical and scientific treatments were applied that caused a diminishment of the therapeutic landscape practices in hospitals. During the Civil War, fresh air and hygienic regulations gained importance in military medicine, leading to establishing the sanitary division infection control and reducing the number of casualties. The military time and movement efficiency created mobile-field hospitals which were constantly developed during the 19<sup>th</sup> and 20<sup>th</sup> centuries (Refer to 3.4).

#### **B. During the Civil War, Military Hospitals determined the Therapeutic – Cultural Landscape of Washington D.C.**

During the civil war, more than fifty-three hospitals were serving the wounded and regular patients. Therefore, many military barracks were converted to temporary hospitals, and major civic buildings temporarily were also used as hospitals. In addition to those, a new type of primitive pavilion hospital was introduced to the city. The temporary barrack hospitals, included wooden structure wards that were organized into a “V” shape on two sides of the central open spaces, such as Harewood General Hospital and Lincoln General Hospital. These hospitals were located in the suburban areas, on high-raised land to use the benefits of fresh air and breezes to heal the wounded. Enjoying the natural ventilation of suburban hills and their natural forests, few of these hospitals had any designed landscape, such as Campbell General Hospital. Therefore, during the Civil War, the national capital became a huge hospital and included many hospitals (Refer to 4.1.2 & 4.1.3). After the Civil War, many of the barracks hospitals were demolished or relocated to suburban areas of Washington, D.C.

### **C. Establishing Walter Reed Army Medical Center**

After the Civil War, the Army medical system encountered dramatic changes. Besides a restructuring of the Army and increasing the Army's fund, there were demands for a concentrated military medical system. In addition to them, due to demolishing or changing the functions of previous military hospitals around the nation's capital, there was a need for locating an Army medical facility near D.C. (Refer to 4.2.1). The Walter Reed Army Medical Center was funded in 1905 and opened its doors to patients in 1909. During the early stages of locating the site, many factors came into consideration which shaped the future therapeutic environments of the hospital. Those factors are classified in two categories; first, land characteristics and the natural settings of the ground, such as a suitable terrain, gentle topography, park-like, and moderate micro climate with abundant fresh air and prevailing winds. In addition to green settings of the Takoma Park and Sheperd Park neighborhood, there was the symbolic connection to the White House and the very accessible proximity to the city's downtown (Refer to 4.2.2 & 4.2.3). The diverse terrain and landscape of the grounds of the WRAMC provided opportunities for different types of therapeutic practices in the hospital during the 20<sup>th</sup> century in order to treat people who needed functional treatments. These treatments were applied via different processes including, horticulture therapy, construction activities, making handcrafts, and using technologies and machines. The well-known formal gardens and naturalistic landscape of the campus, in addition to the green houses, provided maximum exposure of the patients to nature for healing. Furthermore, the recreational activities, such as indoor and

outdoor sports, as well as music and art therapy, benefited wounded soldiers and fostered their recovery (Refer to 4.2.4).

#### **D. Evolution of the Therapeutic and Cultural Landscape of the WRAMC**

In 1906, the initial design of the hospital complied with latest design approach of the time, which was pavilion style hospital with a huge rectangular courtyard surrounded by the wards. The design depicted the formal design of the landscape and an organized series of planted trees. This design was never implemented due to lack of the funds and ignoring the existing topography of the site. In 1909, the main building was constructed above an engineered land and started its operation. An artistic drawing of 1919 represented a distinguished pattern of massing and spacing on the ground. That proposal included a semi-pavilion style of wards behind the main building, the organization of high-raised construction with courtyards in middle, and convalescent cottages on the western end of the property. The main drive, a serpentine road from east to west of the site, became the major landscape element that embraced the gardens and major open spaces of the grounds. During the 20<sup>th</sup> century, many activities and operations resulted in a flourishing of the therapeutic gardens on the grounds of the WRAMC ,which included; attaching more lands to the site, developing landscape projects around the campus, establishing memorial fountains, green houses, planting trees, replacing temporary wards with more hygienic permanent buildings, formal garden, solariums, the courtyard garden on the north side of the main building, the garden path, and finally the rose garden and its pergola.

On the other hand, many construction and planning operations resulted in declination of the therapeutic landscape of the hospital. Increasing the temporary buildings due to increasing the number of patients during WWII, transferring the rehabilitation practices to Veteran Administration, everyday increasing parking lots on the grounds, transferring the convalescent buildings to Forest Glen site, development of the buildings on the southern side of the solarium that resulted in blocking sunlight, constructing brutalist building of AFIP, demolishing the famous courtyard garden and erecting the giant Heaton Pavilion that changed the skyline of the neighborhood. Finally, high-raised Ram Baugh parking garages and closure of the greenhouses, besides establishing the Military Advanced Training Center, resulted in a sharp degradation of the restorative values and functions of the ground (Refer to 4.3). Along with those therapeutic practices many cultural events and activities added value to the landscape of the WRAMC, including; Volunteer societies and civilians wounded during the wars, the institution became famous as a “World Class” hospital and flagship of the military medicine, graduation ceremonies and nursing school classes, presidential visits, memorial and wedding services in the Memorial chapel, presidential church service. Additionally the Easter sunrise services, erecting the Walter Reed statue in Delans circle, popular and artistic depictions of the hospital, abstract design of Heaton pavilion and modernist front yard landscape which signaled a drastic shifts in culture of medicine, the flag pole relocated several times that represented the shifts in power and cultural importance, reconstruction of hospital’s Gate to respect the origin of the hospital and maintained its cultural appearance ,and finally Mologne House was designed to provide a family-center environments for the hospitals patients.

## **Recent Therapeutic Practices, Relevant Theories, and Researches**

**Sub question 3:** Why and how can hospital sites address the broader concept of the therapeutic landscape as compared to the contemporary landscape practices in health care facilities?

### **A. Therapeutic Landscape as a Symbolic Landscape**

The outdoor and indoor spaces of a hospital are created by human behaviors and their response to surrounding environments. The interactions of patients, staff, and visitors with hospital environments, are determined by design, space, organization, and culture of the healthcare institutions. Therefore, the synergistic results of therapeutic practices of a hospital include many elements, from architecture, nature, construction, technology, health delivery, and politics as well as the locality and identity of the place. Accordingly, limiting the definition of the therapeutic environment of hospitals to any specific group of restorative elements does not reveal the whole dimension of the therapeutic environment in healthcare institutions. In addition to that, everyday changing technologies and medical practices convert the therapeutic environment of hospitals to cultural environment. These cultural landscapes are very dependent on their environmental elements and also are very location specific. In other words, the therapeutic landscape includes three major types of cultural landscape. First because humans make it, it is a designed landscape. Second, it constantly evolves, defining it as a continuing landscape. Third, this environment embraces many values and represents socio-cultural norms, making it as an associative landscape (Refer to 3.3.1).

Three major components of healing landscape are; the interaction of humans with their environment, social construction of the health as well as perceived meanings, and the cultural construct of the health as defined by Gesler and Kearns (2002). These factors comprehensively regulate and order the hospital's landscape. The conditions of the place and corresponding human activities generate some different degrees of locality. Within a course of several decades, the hospital environment can create memories and social identity in its community. Therefore, the therapeutic landscape of a hospital strengthens the sense of place and becomes a symbolic landscape (Refer to 3.3.2). Therefore, many famous hospitals, such as the WRAMC and the Athens asylum maintained their cultural significance and symbolic roles even after their closures. In some cases, the name of a well-known health care institution has been transferred to other or new organization to emphasize the cultural and symbolic identity of the previous hospital, for instance, after the closure of the original Walter Reed Army Medical Center in D.C., the name of Walter Reed is carried by a new hospital in Maryland.

### **B. Therapeutic Landscape, Ecological Design, and Place-Making**

A new approach in hospital design, which focuses on the local conditions of the site and its surrounding community, can improve public health as well as advocate the civic role of the healthcare institutions. Implementation of a place-making approach in healthcare design has revolutionary results that heightens social cohesion and physical health and advocates the ecological health of its surrounding communities. During the 20<sup>th</sup> century, the modernist urban and architectural theories failed to achieve any place or civic identity, and ecological insights into healthcare design were expressed in few

instances. According to Verderber (2010), holistic and multi-purpose therapeutic intervention strategies, including therapeutic site planning, healing landscape design, and providing maximum exposure to nature, determine the future practices of health care design (Refer to 3.5.1).

In recent years, ecological-cultural considerations shifted the focal point of therapeutic design practices. In many cases the approaches of ecological, restorative, and cultural strategies have been used simultaneously to improve the quality of the environment and humanized the hygienic spaces of hospitals. The ecological strategies advocate the ecological health of the site and its community, as well as the biophilism, which they often include engineering methods, such as storm water management and rain harvesting that produce different types of gardens, such as roof gardens, water gardens, or butterfly gardens. On the other hand, the restorative strategies aim to maximize the benefits of exposure to nature, as a main source of healing by implementing extensive green areas or locating hospitals in suburban settings (Refer to 3.5.3). While healing gardens, prayer gardens, trails, and playgrounds are the products of the contemporary restorative practices within hospital landscapes, the cultural strategies and place making emphasize the vernacular and cultural elements to empower the public spaces of hospitals to expand over their boundaries. As a result, new healthcare design theories combine restaurants and coffee shops into hospital courtyards or gardens. (Refer to 3.5.1 c & 3.5.4). The recent therapeutic gardens are classified according to their restorative approaches, design principles, and elements or are based on their very specific functions and targeted populations (Refer to 3.5.3).

## **5.2. Summary and Results of the Interviews' Content Analyses**

### **The Therapeutic Landscape of the 19<sup>th</sup> and 20<sup>th</sup> Centuries**

Sub-Question 1. What are the historical-cultural components of the American society (such as: modern technologies, advent medicine, religious and social perception), that influenced hospital sites, and their therapeutic landscape during the 19th and 20th centuries?

#### **A. The Association and Impacts of Cultural Values and Healing**

##### **Characteristics of Hospitals Landscapes**

During the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States, American society has evolved dramatically evolved, that changes its cultural values and its perceptions. Hence, the historical evolution of hospital landscape represents the impact of those social and cultural values on the built environment. Therefore, the cultural values that encourage or discourage the therapeutic properties of hospital sites have been investigated, for example in WRAMC, which is a prime example of military hospitals. In general, the individuals experience of or in response to any environments defines the cultural values of that space (Wrenn, 2015). To illustrate, a combination of natural or naturalistic elements and man- made structure shapes our landscape and so defines human's interrelation with its surrounding environment (Wrenn, 2015). By examining a site, where those different orders<sup>76</sup> intersect, their alteration and any augmentation will be revealed. Those changes were influenced by humans and influence humans as well (Wrenn, 2015). In the same way, as Cooper-Marcus (2015) states, the impacts of

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<sup>76</sup> natural, man-made

cultural values in outdoor spaces in healthcare facilities are more visible in the design and order of those spaces. Since the majority of people use hospitals, the outdoor spaces of health care facilities can be considered as real reflections of the cultural values of their users (Cooper-Marcus, 2015). According to her, having an herbal medicine practice or herbal garden in a hospital which serves Native American not only is a cultural symbol but also have healing impacts (Cooper-Marcus, 2015). In the present day, American culture is constituted from different sub-cultures. So understanding shared values and common cultural trends that may impact the modern landscape design at American hospitals, will open a perspective for future researches (Cooper-Marcus, 2015). Although, the users' reactions to their environment determine the cultural perception of people, for example in a hospital, the other cultural components, like the users' religion, education gender, or belief, will define that physical environments in different ways (Tusler, 2015). For instance, the colors, sounds, and artifacts can have a different impact on different people (Tusler, 2015). Likewise, Sachs (2015), mentions that during creation of a guidelines for physical design of an interior or exterior spaces of a hospital, the role of cultural values and cultural perceptions must be recognized in advance. Considering gender and class differences, the planning and design standard should help us achieve equity and safety regardless of the local cultural values, these type of standards will evenly, be healing in universal measures (Sachs, 2015). Any intervention in built or natural environment, has its direct and indirect effects. In particular, a hospital and its landscape can have positive or negative impacts on its surrounding community. As Batties (2015) discusses how the positive interaction of a hospital and its neighborhood can provide opportunities to heighten the sense of

community, and therefore improve the cultural values of that community. She demonstrates, that the people of Shepherd Park, which located immediately on the north side of the WRAMC, had very positive perception about the hospital and its landscape (Batties, 2015). To put it simply, the regular interactions with soldiers and their families, for the residents of Shepherd Park was a value and benefit for both the patients and residents (Batties, 2015). Furthermore, symbols and cultural totems, such as the Caduceus or the staff of Asclepins, can represent healing. In regarding to that, WRAMC was the flagship of military medicine and therefore a symbol of healing. As Marble (2015) argues, while the healing characteristics and therapeutic practices of the hospital constantly changed over the course of a century, the healing values and their cultural impacts remained important due the following reasons; first, it was well known place, second, it could attract the best staffs and doctors because it was prestigious institution. Third, presidential visits and VIP patients, added cultural values to the hospital. Fourth, it could get extra funding. Fifth, the institution honored the military patients, and the nation honored them. Sixth, it was a research institution that used cutting edge technologies of medical treatment. During the last century, the landscape of military hospitals in the United States was defined especially by dominant cultural values of the military. For instance, while there were churches for religions services in any military barracks and hospital, the religion didn't have major impact on military hospital. In other words, since the U.S. government is neutral in religion, the religious buildings, monuments, or activities didn't affect the architecture and landscape design of military hospitals (Marble, 2015). Furthermore, the priority goal of hospitals was serving military patients, and their families, so the wealth and class didn't come into

consideration (Marble, 2015). Throughout the first half of the last century, the patient population was heavily male, but during 1970's and 1980's the gender balance became more even. Therefore, the masculine culture of military hospitals shaped the early days of the hospitals and their landscape (Marble, 2015). Finally, the long periods of stay for patients in military hospitals due to the lack of modern medicine like antibiotics, specifically in the early decades of the 20<sup>th</sup> century, the secured and enclosed characteristic of military properties and hospitals, the type of therapeutic practices of that era such as occupational therapy, physical therapy and amputation, which demanded long process time, in addition to design and architectural characteristic of wards with 40 beds, encouraged a strong sense of community, in WRAMC (Marble, 2015). Altogether, during the last century, military regulations and cultures, medical limitations and specific types of medical treatments in addition to the system centered theories of management and design (Foote, 2015) shaped and continually evolved the therapeutic landscape of the WRAMC.

### **B. The significant advances, that shaped therapeutic features of the hospital's landscape during the last century**

During the 19<sup>th</sup> and early decades of the 20<sup>th</sup> centuries, the hospital grounds were heavily influenced by therapeutic landscape practices. In addition to the socio-cultural situation of American cities, the medical knowledge and scientific advances of those periods were essential reasons for establishing such gardens on Hospital grounds. According to Cooper-Marcus (2015) the most innovative designed model that determined the therapeutic environment of medical hospital in the 19<sup>th</sup> century, was creation of "Pavilion Style Hospital". Influenced by Florence Nightingale, this new

model focused on the recuperative impacts of fresh air and sunlight to treat patients in hospital wards (Cooper-Marcus, 2015). The first and most notable model in the United States is Johns Hopkins Hospital in Baltimore, MD. In addition to the grand courtyard and several small courtyards between the wards, the narrow and long design of its wards allow air flow and sunlight to penetrate indoor spaces and to foster the recovery of patients (Cooper-Marcus, 2015). Sachs (2015) argues that throughout the 20th century the scientific advances worked against people's access to the therapeutic landscape. For instance, the discovery of penicillin prevented access to fresh air and natural air conditioning. Cooper-Marcus (2015) believes that Roger Ulrich's research, especially "the view from the window, in 1984" was the beginning of the healing garden movement that altered the hospital's landscape in the last century. Referring to the therapeutic landscape traditions of the 19<sup>th</sup> and the early 20<sup>th</sup> centuries, Wrenn (2015) considers that encouraging nature on hospital grounds as the most progressive idea to benefit patients and urban population by shaping therapeutic landscape of healthcare facilities. Admittedly, the significant role of new technological advances, which aim to re-integrate nature into hospital environment, should not be ignored. A typical example are new water cleaning technologies that allow designers to use water features to heal patients in both inside and outside of the hospital (Sachs, 2015). In the last century, the discovery of a dangerous water borne bacteria resulted in abandoning water features in healthcare facilities. But the recent technologies, such as UV filters or certain chemicals, allowed hospitals to re-consider the healing properties of waters features.

During the 20<sup>th</sup> century, the landscapes of many military hospitals were specified by rehabilitation activities and not gardens for recovery wounded soldiers (Tusler, 2015). But after the WWII, the new demands for care resulted in using advanced technologies in hospitals. In many cases the old structures didn't support installing or implementing the new technologies. Therefore, new buildings and modern hospitals were proposed (Batties, 2015), and huge modernist concrete buildings were constructed on the WRAMC due to the inefficiency of the old buildings. As Marble (2015) exemplifies, the new type of care inside the hospital, like the ICU and new medicine for TB, changed the architecture and landscape of WRAMC around 1960's and 1970's. Examining the indoor and outdoor environment of WRAMC against the most current scientific approaches in hospital design, Foote (2015) claims that; first, the WRAMC, like many hospitals of its time, represented a factory that processed and treated people with their advanced technologies without paying enough attention to the human dimension of care. In short "considering evidence-based design, the WRAMC was not a successful example, in general" (Foote, 2015). But there were units, such as Mologne House, which provided a healing environment for the wounded and their families by using music, art, and nature. Second, implementing the "holistic care" approach, involving healing art practices and exposure to nature, made the WRAMC a successful therapeutic landscape (Foote, 2015). The healing components of that landscape included; the Rose garden, art exhibition in National Medical Museum right next to the main building, and the open and green amphitheater, as well as its proximity to the Rock Creek Park.

**C. Are there any religious connections with healing which impact or shape  
the therapeutic landscape of hospitals sites?**

There is a lot of discussion about how religion informs nature and how nature informs religion. In historical times as well as modern times, faith played an important role in the healing process (Wrenn, 2015). According to Cooper-Marcus (2015), the Roman Catholic Church very soon recognized nature as an aspect of God. They integrated the gardens and special herbal and medicinal gardens into their churches. The Roman Catholic Church used landscape and gardening for their healing properties (Cooper-Marcus, 2015). Since ancient times, the spiritual and religions concepts always have been symbolized into physical forms. Those symbolic forms shaped and constructed the human environment (Tusler, 2015). Typical of such symbolic forms are cruciform hospitals in Catholic lands and hospitals with Mandela forms (Tusler, 2015). In other words, Christian hospitals represent the most obvious religious connections, as Sachs (2015) describes, St Joseph Hospital in Bryan, Texas is a catholic hospital. Its garden was designed to be separated from the chapel, while maintaining its sacred characteristics<sup>77</sup>. In that environment, people can go and pray and simultaneously benefit from nature and the nuns who work in the garden. In all of those of gardens, the symbolic presence of religion, such as icons of Jesus or the Virgin Mary are still common (Sachs, 2015). She also adds; while religious hospitals have the mission to take care of people in the name of their God, most healthcare facilities in the United States are secular (Sachs, 2015).

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<sup>77</sup> In recognition of the life-affirming powers of a garden and the importance of providing a soothing environment for cancer patients and their loved ones, the Cancer Center at St. Joseph Hospital dedicated and blessed the Gerard L. Gagnon Cancer Care Healing Garden in 2008.

Although, all hospitals have their own chapels, like airports, those chapels don't influence the main function and the hospital's organization, such as their landscape (Sachs, 2015). During the last century, the cultural changes of American society, caused a dramatic shift in the religious beliefs of people. While the previous generation of Americans were organizationally religious, current generations are more spiritually religious (Wrenn, 2015). As Wrenn (2015) claims, the current generations of Americans prefer to connect to a natural landscape to satisfy their spiritual expectations. Therefore, nature becomes the main source of the spiritual and healing.

In a military context, all military posts and barracks still have their own chapel, so it was assumed that WRAMC, as hospital and military institutions, owned its chapel independently (Marble, 2015). In the 1930's, a chapel was built on the WRAMC campus to serve the personnel, staffs, and patients of the hospital. The main purpose of constructing the chapel was providing an environment for cultural and religious events, so the building was located separately from the main buildings and the landscape of the hospital. In that case, Marble (2015) argues that religion did not influence the landscape and its healing characteristics. Despite that, Batties (2015) points out that the Cross on one of the hospital gates on Georgia Ave is translated to a clear symbol and representation of Christianity in general. Regarding the religious connections and healing properties in military hospitals, Foote (2015) opens a new perspective; according to him, in a military hospital, every patient's treatment has some spiritual components. While confirming previous opinion, he adds "since the military is not sectarian, the spiritual values and sacred feelings, such as bravery, comradeship, and honor, are being emphasized" (Foote, 2015). Recently in the military environment,

spiritual assessment techniques have been developed to understand a patient's spiritual crisis. For critical example, at WRMMNC, there are chaplains who accept patients from different religious backgrounds and constantly are the source of spirituality and healing for patients (Foote, 2015). The sacred component of military contexts can be addressed in the physical environment of military hospitals, for instance, in Green Road Projects, a healing garden in WRMMNC, the components like, honor, bravery of the failed comrade have been symbolized into designed elements of landscape (Foote, 2015).

### **Therapeutic Design, and Military Medicine during the 19<sup>th</sup> and 20<sup>th</sup> Centuries**

Sub-Question 2. How have healing practices and military medicine in the 20th century shaped the spatial-physical environment and the therapeutic landscape of Walter Reed Army Medical Center?

#### **A. How does Historical Background of WRAMC represent Wellness?**

Hospitals and their therapeutic environments are defined by both their actual medical performance and their perceived healing images in the public's mind. Since the selected case study of this research, WRAMC has a rich historical background, the study of the perceived therapeutic image of the hospital and its evolution within American history of medicine will clarify its cultural role in order to provide healing for people. During the 20<sup>th</sup> century, WRAMC gained the highest priorities and emotional support due to serving soldiers and their families (Batties, 2015). Its historical background represented an image of the wellness, healing, and medical advances (Wrenn, 2015). Additionally its reputation for using cutting edge technologies (Tusler, 2015), and highest level of medical service, beside its beautiful landscape, many artifacts which rendered the beautiful gardens of WRAMC, and

abundant stories about wounded soldiers who healed in the hospital, created its strong identity in the region and beyond it (Wrenn, 2015). The idea of continuity of being treated in WRAMC passed through generations, made it nationally recognized institution (Marble, 2015) gave it significance in the mind of the American Public (Wrenn, 2015). Those socio-cultural factors, such as recognition of the healing properties of the whole hospital by public and media, generated a positive image of the hospital (Marble, 2015). In general, a healing image of a hospital depends on the outsider point of view and insider perspective (Sachs, 2015). For instance, when all background memories, shared cultural values come to consideration, the therapeutic image or healing perception of a hospital, here WRAMC, gains a unique cultural significance in the American history and culture.

**B. How the Changes in Military Culture and Medicine impact the Landscape of Hospital to be more or less Therapeutic?**

**C. What are those Significant Elements of Military Culture which had or have an impact (Negative or Positive Impacts) on the Therapeutic Characteristics of the Place?**

Generally, in any military post or barracks, order and chain of command impact the site in ways to be more efficient and less expensive (Wrenn, 2015). During the last century, three characteristics distinguished the military hospital from other hospitals (Marbles, 2015). First, previous military hospitals had a much focused patient population, which involved men only men. This masculine culture of the military hospital could easily be recognized from public ones. Second, in military hospitals, the rehabilitation center was not separate from the main hospital. As the result, the long

term stay of patients from different battlefields created a specific culture with shared values among soldiers. Third, in military hospitals, rehabilitation practices and restorative activities for veterans or wounded soldiers took place in outdoor spaces of hospitals, that encouraged therapeutic effects of nature on patients (Marble, 2015). While in military hospitals, a lot of care was provided by people in uniforms, there were non-military doctors and nurses who served wounded soldiers as well. In many cases, the military care givers were more trusted by patients than regular volunteers, or civilian care givers. This caused a problematic division among the hospital's community (Marble, 2015). Around 1960's and 1970's, redevelopment of many military hospitals were not consistent with original idea of healing through nature, and didn't provide a welcoming environment as well (Wrenn, 2015). For example, in WRAMC, the new development and brutalist architecture of the new hospital represented a different approach to care of sick (Marble, 2015). Despite that dramatic decline in restorative characteristic of the hospital and its campus, WRAMC as the flagship in military medicine always drew public attention and properly responded to the high expectations with its VIP and advanced laboratories. As Marble (2015) argues, these elements had a huge positive impact on the therapeutic environment of the hospital. Within the last decade, according to Sachs (2015), the Department of Defense and Veterans Administration have been very proactive to improve the environment of their health care facilities by establishing the standards of excellence and creating an evidence-based design checklist. They became more advanced than many private and nonprofit, non-military healthcare systems (Sachs, 2015). A significant turning point that improved the hospitals environments was implementation of a holistic approach

into care for veterans and wounded soldiers (Sachs, 2015). Some of their successful projects are as follows; Fort Bliss in El Paso, TX, and NICOE Sites in both Bethesda, MD and San Antonio, TX. Currently, the implementation of holistic medicine and combining it with conventional care system has made the military a leader in hospital design and construction (Foote, 2015). In other words, the military has improved and enhanced the therapeutic values within its hospitals by; first, a new set of standards for evidence- based design; second, disseminating integration of care; third, advanced therapeutic units; fourth, arts and nature programs; and, fifth, family centered projects across the nation (Foote, 2015). For instance, the military made an important transition to holistic medicine because conventional medicine was not working for some targeted groups like, PTSD patients. In general, despite those successful steps, the authoritarian and very bureaucratic nature of the military still resisted the changes. Therefore, Foote (2015), argues that the traditional characteristics of the military prevent innovations and new ideas and also hinder the potentials of therapeutic design of hospital environments.

### **Recent Theories, Researches, and Design Practices related to Therapeutic**

#### **Landscape Design**

Sub-Question 3. Why and how can hospital sites address the broader concept of the therapeutic landscape rather than the contemporary landscape practices in health care facilities?

**A. What are those Ecological Considerations and Environmental Conditions that determine Healing Aspects of Landscape?**

Historically, in both the western and the eastern traditions, site conditions were critical factors to locate a hospital or gardens, in order to build the healthiest environment. In most of the cases, the micro-climate directly impacts the healing properties of the architecture and landscape of a site. First, according to Cooper-Marcus (2015), the ecological and environmental considerations should extend to the local situation and micro-climate of the site, to reach maximum available healing properties of the landscape. Therefore the design should emphasize those aspects of the landscape that attract and soothe people (Cooper-Marcus, 2015). Second, a healing space or restorative landscape should not harm the environment and the earth as Sachs, (2015) emphasizes. For example, in healthcare facilities, when pesticides and non-renewable energy are used, that landscape is not generally classified as a healing space. Those types of sites might be healing for human, but they are not healing when the overall ecological conditions are considered (Sachs, 2015). There are gardens where everything is in harmony, where sustainability and therapeutic intersect. For instance, by designing one garden which includes the two functions of healing and a rain garden, we provide soothing for the human and a cure for water run-off. With respect to that, a holistic approach, such as native and adaptable plants, saves water, uses fewer pesticides, and encourages biodiversity, creates a therapeutic environment which is more sustainable (Sachs, 2015). One of the well-known and successful examples of this approach during the last century is WRAMC. The natural elements of the environment, to the extent that they existed, were key factors to the creation of the therapeutic landscape of the hospital. During the early stages of hospital's construction, the idea of purity, clean water, and clean air came to consideration, therefore Wrenn

(2015) argues that in case of WRAMC or any constructed healing landscape, those ecological considerations that shaped the physical environment of the site, must be seen as a part of the site's heritage. Comparing two different phases of the site's construction and later developments, Marble (2015) points out the different approaches which shaped and changed the therapeutic landscape of the hospital differently. In early decades of the 20<sup>th</sup> century, the terrain of the site was engineered to accommodate the neo-federalist colonial architecture of the main building, and also to deliberately landscape the site to amuse and distract the patients. This improved the overall environment and increased the overall happiness, well-being, and healing of patients (Marble, 2015). On the contrary, during construction of the second half of the 20<sup>th</sup> century, the emphasis was on the modern medicine and technology rather than healing properties of nature (Marble, 2015). Hospitals, like other built environments, have environmental impacts on their adjacent communities. The surrounding neighborhood of WRAMC includes: a middle class community on Shepherd Park and upper middle-income areas on 16th street (Batties, 2015). Both have been very stable residential and environmentally more favorable than a regular neighborhood in Washington D.C., also the urban landscape of both neighborhoods varied with the pastoral style and park like landscape of WRAMC (Batties, 2015). This suggests that, the urban planning of those two communities, and the specific design of the WRAMC's landscape, represent a transition from green space and a tranquil setting of hospital to neighboring residential communities. Considering the context of the hospital, Washington D.C., the hospital expanded over a century and accommodated parking garages as well. Consequently, the constant evolutions changed that tranquil and pastoral landscape of the hospital but

it didn't destroy it completely. In the meantime, the site became more accessible for cars, and caused a huge traffic problems for its surrounding communities (Batties, 2015). While the internal changes of the site caused environmental problems for outside, the establishment and everyday development of the hospital was huge job creation that was considered an economic engine that financially improved the city and supported the local businesses along Georgia Ave (Batties, 2015). Based on what is stated it can be concluded that, the changes in the hospital and its landscape impacted the environmental conditions of surrounding communities and shaped, and eventually altered, the therapeutic environments of its neighborhood.

## **B. How a Specific Hospitals Site can be considered as the Healing Landscape?**

### **How can a Hospital Outdoor Space turn to the Therapeutic Landscape more Efficiently?**

The human perception of surrounding environment is a result of many measurable and non-measurable factors. Similarly, those different elements of space are being constantly affected by evolutions and changes of the human mind. The hospital environments are candid representatives of the human perception of health and healing. The fifth question of the interviews examines those physical and non-physical factors that can turn a space into a healing environment. According to Sachs (2015), an ideal hospital site can be a landscape which is thoroughly therapeutic. First, parking lots and concrete sidewalks prevent converting the whole site into a restorative environment. Second, without enough green and natural components, a hospital site cannot be therapeutic (Sachs, 2015). Then, she suggests several strategies to convert the whole site into a therapeutic environment, which includes biophilic design, using

natural elements, alluding to natural elements, a clear way finding systems, and alleviating the physical and mental stresses of patients, staff, and visitors (Sachs, 2015). On the other hand, in a functional design, converting the whole hospital site into a healing landscape seems to be a very difficult task, due to a lot of engineering and functional needs, as Cooper-Marcus (2015) says. She points out the practical conflicts with the principles of healing landscape design (Cooper-Marcus, 2015). According to her, when the ratio of green components of a site to hardscape is about 7 to 3, the site can be considered green and lush enough to have effective stress reducing effects and be healing (Cooper-Marcus, 2015). Wrenn (2015) proposes that incorporating small healing gardens do not make the whole site environmentally therapeutic. Even though the current literature advocates the design for sensory experiences and physical activities in specific portions of the site, these strategies cannot lead to a holistic approach of the therapeutic design (Wrenn, 2015). As an architect with distinguished experience in hospital planning and design, Tusler (2015) suggests that designing the hospital buildings on the same level as their landscape can help to make more efficient therapeutic environment friendlier, walkable, and welcoming environment. He argues that the lower hospitals have more chance to promote social connections, and can increase views to the nature, and provide more horizontal accesses to the landscape (Tusler, 2015). Finally, from the point of view of conventional urban planning and management; as Batties (2015), describes, “Turning a hospital to a therapeutic landscape has less to do with city’s regulations and Zoning’s laws”. She adds the incorporating open spaces to healing environments should start from the medical industry, and become their priority (Batties, 2015).

### **C. How can Social Connections in Neighboring Communities be used in a Hospital Site to Encourage “Public Healing”?**

During the 19<sup>th</sup> century, the ground of Asylums provided a space for patients to heal and also occasionally interact with their communities. Additionally, the regular citizens and villagers could come and benefit from therapeutic features of the Asylum’s landscape. So the therapeutic opportunities and positive impacts of social interaction between a hospital and its neighboring environments have been examined through the seventh question of interviews. In a larger scale, during city planning, the connectivity of a hospital’s site to the whole city and especially the hospital’s public and green areas should come into consideration (Batties, 2015). From a planning perspective, according to Batties (2015), there are ways to connect a hospital site to its surrounding communities, such as; planning street grids, organizing streetscape, and designing the layout of green spaces. Besides those, involving natural elements during the site design and planning phase, will be mutually beneficial for the both neighborhood and hospital (Batties, 2015). While accepting the critical role of natural elements, Cooper-Marcus (2015) emphasizes inviting strategies to allow people from surrounding communities to come and join the hospital community during special events, walk through and use the hospital gardens. Then she adds an example; the “Stenzel Healing Garden” at Legacy Emanuel Hospital<sup>78</sup> in Portland, which was deliberately designed for people, staff, and visitors to use the gardens. There, a walking passage from one street to another was designed, which is open to the public. In that environment, patients who suffer from stroke or other disabilities can undergo physical therapy and learn to walk

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<sup>78</sup> Officially the Children's Hospital at Legacy Emanuel

again (Cooper-Marcus, 2015). Furthermore, Cooper-Marcus (2015) describes two goals for this strategy. First, open the green space and garden to people, so that patients feel that they are not cut off from their community. But there are disadvantages that any designer should be aware of. First, those type of open gardens are not applicable in specific situations like psychiatric hospitals or patients who suffer from dementia. Second, the open gardens cannot provide enough privacy and refuge for patients and their conditions (Cooper-Marcus, 2015).

One of the example of this types of garden is St. Thomas Hospital in London, close to the House of Parliament at center of London. It is an extensive green roof garden on the sunken parking garage. It is open for patients, staffs, visitors, and local people, where the patients always complain about their privacy during their presence in garden (Cooper-Marcus, 2015). By way of contrasts, there are many successful examples of integrating hospitals in their communities, such as Mary Hitchcock hospital in New Hampshire, which offers public services like lunch, car repair, laundry, and restaurants for its neighbors (Tusler, 2015). Because of this innovative solution, the design team of Mary Hitchcock hospital won the “Legacy Award” of the American college of Health Care Architects (Tusler, 2015). Another example is the Kaiser Permanente hospital system on the U.S. West Coast. They became one of the leaders in the country that promote wellness by extensive services beyond their medical services, such as educational classes, Tai-Chi, and acupuncture healing practices (Tusler, 2015). Integrating hospital environments into its social context is a recent trend in Health care Industry. Instead of being a separate building on the hill to treat the sick, this encouraging trend is about welcoming, respecting patients, and making the hospital

environment more affordable for them (Sachs, 2015). Hence, it will be beneficial for public, when a hospital is more connected to the larger community, and becomes more involved in its socio-cultural context by adding classes and wellness programs (Sachs, 2015). As a successful project, the Don Jail<sup>79</sup>, which historically shared its site with a hospital, was converted into health care facility, including a museum, and its site converted to a landscape to a public park, Hubbard Park. During the early decades of the 20<sup>th</sup> century WRAMC, as a significant medical- cultural institution, was embraced by its immediate urban context. The landscape was porous, allowed community events to take place, and brought people to campus for matters other than illness. Thus, the WRAMC and its cultural landscape established strong connections with its neighboring community (Wrenn, 2015). Especially during WWI and WWII, the social connections among patients and doctors and other medical staffs within the hospital gained strength (Marble, 2015). Empowering those connections was mostly due to the type of medical treatments of that time and the duration of the patients stay in hospital. While the social connections of the whole hospital's community to its surrounding urban neighborhoods gradually declined due to some security measures (Marble, 2015). Eventually, during the last decades of the 20<sup>th</sup> century, the counter-terrorism measures caused a limited connection between WRAMC and its outside environment. For example, the guards at gates, discouraged people from entering the site, and signs prohibited photography of the buildings and the landscape (Marble, 2015). In fact, until the recent wars, the military health care system used to be more open. To demonstrate, the campus of WRNMMC, in Bethesda, MD, didn't have fence around it (Foote, 2015). But after the

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<sup>79</sup> The Don Jail is a former jail in Toronto, It was completed in 1864, and was converted to the administrative wing of Bridgepoint Health, a rehabilitation hospital.

terrorist attacks in September, 2011, the site was enclosed with fence and barbed wire, these preventative measures manifested strong contrast with holistic medicine as the hospital's mission and approach (Foote, 2015). Despite this, military health system is an advocate of those strategies to bridge hospital to its community to a greater extent, the most notable example is WRNMMC. In this Institution; first, the largest healing arts program in the nation in WRNMMC aims to reach beyond the boundaries of the hospitals. Second, the Green Road Project, which is the largest healing garden, and the therapeutic laboratory provide healing for PTSD patients and their families (Foote, 2015). Additionally, the community of the Maryland Network, is planning to establish local healing gardens and healing arts programs for veterans through the Walter Reed art and nature program (Foote, 2015).

#### **D. What Characteristics of the Site Design, represents, improves, or hinders the Therapeutic Perception of Hospital's Landscape?**

During the 20<sup>th</sup> century, engineering design of hospitals sites, without considering the natural characteristic of the grounds, such as topography, and other natural elements, like water, hindered the healing values of those landscape (Tusler, 2015). While in a few examples of very recent practices, a new approach in planning of hospital indoor and outdoor spaces encourages people to use the landscape and socialize. This combined strategy improves the therapeutic value of the hospital's landscapes (Tusler, 2015). Particularly, implementing the contemporary theories and practices of healing landscape, such as biophilic design creates new warm and inviting gardens, consequently bringing life and health into hospital's sites (Sachs, 2015). Conversely, over emphasizing hi-tech, super hygienic design and sterile environment

while setting the design goals will cause an inevitable decline in the healing environment of the hospital (Sachs, 2015). Then Sachs (2015) summarizes that using new technologies, modern materials, and innovative engineering strategies can have different impacts, which improve or hinder restorative effects of the landscape. While, to follow the fashion and commercial trends in landscape design will hinder the therapeutic values of landscape in hospitals (Cooper-Marcus, 2015). In addition to that, emphasizing two strategies can improve healing properties of health care facilities: first, understanding the benefits of research in therapeutic design, especially in designing gardens for targeted patients, such as Alzheimers. Second, working with patients, their families, and staffs will respond to their actual needs (Cooper-Marcus, 2015). Examining the environment of WRAMC, against preceding criteria, the hospital therapeutic environment, both indoor and outdoor spaces, during the first half of the 20<sup>th</sup> century were a balance between a medicine and a healing landscape. Instead, the development of 1970's and later focused on technology and medical practices (Marble, 2015). As Wrenn (2015) describes the modernist concrete buildings, parking garages were not constructed in the way that support the original and restorative landscape of the hospital.

### **Important Recommendations and Major Considerations in Respect to the Future Developments of Hospital Sites**

Despite the contemporary landscape designs and campus planning of health care facilities, future practices should apply innovative strategies and revisit the successful historical approaches. In order to address a broader concept of the therapeutic landscape

and campus planning two sets of recommendations and strategies in two scales come into consideration.

#### **A. First, Urban Design and Planning Strategies**

1. From developing standpoints, the economic values and physical size of the site should be considered. Therefore, amenities and non-medical functions should be planned to serve the hospital community and surrounding neighborhood (Batties, 2015).
2. The campus planning should advocate recreational amenities within the site, especially for children of the patients' families (Batties, 2015) and people from hospital's neighborhood.
3. In historic sites to regenerate the sense of place, extend the quality of space, or revitalize the community's identity, a thoughtful plan must preserve the valuable landscape and buildings of the hospital (Batties, 2015; Wrenn, 2015).
4. Provide opportunities for public enjoyment, social interaction, and strengthening the community's identity (Wrenn, 2015).
5. Inviting campus planning and site design to make the hospital ground more livable and connect it to its surrounding socio-cultural context (Tusler, 2015).
6. When a single building doesn't fit to their site and neighborhood, it can be demolished and reconstructed in order to serve the landscape and its neighborhood, one of the examples is the new hospital in WRAMC (Marble, 2015).

7. From the early stages of locating the site and planning, connection to the local and natural parks and its relation to the surrounding communities should be seriously considered (Sachs, 2015).
8. Including open and public spaces, such as plaza, gardens, could connect the campus to community and will provide an environment for people to socialize (Sachs, 2015).
9. A hospital without fences and barriers could connect to the city. Having an artist with the people, staffs, and patients in the gardens, in addition to other types of community's engagements can encourage healing in a cultural ways (Foote, 2015).

#### **B. Second, Campus Planning and Landscapes Design**

1. Designing the site to be porous for activities from the surrounding communities (Wrenn, 2015).
2. The design team should think about the whole site, therefore strengthening the relationship between architect and landscape architect is crucial (Cooper-Marcus, 2015).
3. The landscape architect must be aware of the research available in the field (Cooper-Marcus, 2015)
4. While designing gardens and outdoor spaces, the staffs should be involved in the beginning, during a participatory process. Therefore, they will be encouraged to use that environment (Cooper-Marcus, 2015).
5. Involving a landscape architect in the early phase of planning and design (Cooper-Marcus, 2015).

6. Locating the outdoor spaces or landscape areas at very beginning stages of process, probably will make it easier to turn a whole site to a therapeutic landscape (Cooper-Marcus, 2015).
7. The designer must classify the permanent and adaptable elements of the campus, including the buildings and landscape (Tusler, 2015).
8. The general design should provide landscape for patients, where they enjoy healing properties of nature, this might be achieved by planning and relocating parking lots and other services (Tusler, 2015).
9. An appealing design of the campus is a key factor (Tusler, 2015).
10. Planning to mix patients and staffs in public areas is desirable and could result in a safer environment (Tusler, 2015).
11. In historic sites, the core buildings and valuable elements of landscape should be preserved, according to their importance for the history of American medicine (Marble, 2015).
12. The whole site planning and design process should aim to create a healing environment symbolically and actually, (it may look like a forest or a park with planted trees to provide a lot of shade during summer) (Sachs, 2015).
13. Encouraging bio-philial, introducing proper types of fauna and flora, has positive impacts (Sachs, 2015).
14. When emphasizing biophilic design, selecting natural or naturalistic materials is critical (Sachs, 2015).
15. A research informed design, in addition to innovative practices, can lead to beautiful and healthier hospitals (Sachs, 2015).

16. The therapeutic effects of art works and cultural practices can be implemented to improve both the indoor and outdoor environments of hospitals (Sachs, 2015).
17. During planning and design phase of the healing landscape, privacy of staff and patients is important factor that must be considered (Sachs, 2015).

### **5.3. Summary and Results of Spatial Comparative Analysis of the Critical Examples**

#### **The Context**

##### **A. Geographical Conditions**

**Sunlight:** The buildings of the St. Elizabeths Hospital, Athens Asylum, and Johns Hopkins Hospital were designed in a linear arrangement of wards from East to West that provided maximum sunlight for both the indoor and outdoor spaces. While, in WRNMMC, Fort Belvoir Community Hospital, the sun path in the sky had no significant impacts on the overall massing of the buildings. But, in Dell Children's Medical Center, the linear design of wards and proposed courtyards facilitated reaching sunlight into buildings. The picturesque landscapes of St. Elizabeths, and Athens Asylum, and the healing gardens of Dell Children's Medical Center were located in the areas with maximum exposure to sunlight.

**Wind Direction:** In both the St. Elizabeths, Athens Asylum, and the original plan at Johns Hopkins Hospital, the design of the flanked wards and densely planted trees in the asylum grounds, the high-raised pavilions of north side of the hospital prevented winter winds and storms, and worked as wind shields. The low-raised pavilions of

Johns Hopkins and its semi-courtyard gardens between the wards, in addition to V-shaped architecture of the asylums, could benefit from breezes and ambient winds. On the other hand, the building's orientation and site's arrangements of Fort Belvoir and Dell Children's Hospitals did not locate their healing landscape in a way that enjoyed benevolent winds. In addition to that, the perpendicular arrangements of buildings in the densely constructed site of WRNMMC did not properly respond to the wind direction. The front landscape of St. Elizabeths and Athens Asylum, allowed the wind to be channelized among trees into indoor spaces. Therefore, considering the micro-climate conditions such as sun path and wind direction, both the architecture and landscape design of St. Elizabeths, Athens Asylum and the original plan of Johns Hopkins were more climatologically responsive than the other two military hospitals. Accordingly, the spatial arrangements and site planning of Dell Children's situates between those two preceding types of hospital landscapes.

**Terrain and Topography:** In those critical examples, the main buildings and major landscaped areas were established on engineered grounds to accommodate the functional and esthetic needs. The St. Elizabeths and Athens Asylum were oriented with minor deviations from the east-west direction, to comply with the local topographies and counters. The winding roads of picturesque design in those grounds followed the counters and their spacing. In Johns Hopkins Hospital, the whole pavilion and courtyards were located on a naturally elevated flat land. In contrast, the engineered site and the building's arrangement of WRNMMC ignored the local topography, while the campus roads and accesses followed the counters of the ground. Conversely, both the Fort Belvoir and Dell Children's were constructed on the flat lands without

significant topographical characteristics. The overall design of their buildings and mass orientations complied with the boundaries at their sites.

**Natural Elements of the Site and Surroundings:** The St. Elizabeths, Athens Asylum and WRNMMC are relatively close to major rivers of their regions, while views to rivers in St. Elizabeths and Athens Asylum became prominent vision lines that influenced their landscapes. In fact, the WRNMMC has no visual linkage from its site to the river (Rock Creek), due to topographical constraints and location of the local north Chevy Chase Park. In spite of WRNMMC, Fort Belvoir, and Dell Children's Hospital, there is no direct connection to the local parks on the Johns Hopkins Campus. While the existence of freshwater supply and springs were crucial for establishing St. Elizabeths, Athens Asylum and Johns Hopkins, it was not considered during planning and locating Fort Belvoir and Dell Children's Hospital. Although there are an artificial pond and a local creek on WRNMMC campus, they have been maintained and engineered for their aesthetic and restorative purposes, and not for supplying potable water.

## **B. Socio-Cultural Context**

**Dominant Cultures:** while both St. Elizabeths and Athens Asylums were mental hospitals, the dominant culture of St. Elizabeths has been very resilient and reproduced itself effectively in different generations and, therefore, St. Elizabeths has been a multicultural healthcare institution. On the other hand, both the WRNMMC and Fort Belvoir were proposed to serve military members and their families. Although there were many efforts to open the WRNMMC to the public for its restorative effects, the high security measures still control the site. Due to their strong religious affiliations,

both Dell Children's Hospital and John Hopkins have been more open to the public than previous examples.

**Cultural Significance:** St. Elizabeths was the first federally operated mental hospital, and was the leading psychiatric hospital in the United States. Also, its close proximity to the nation's capital added cultural value and significance to the hospital. In comparison, Athens Asylum is one of the most studied mental hospitals and its strong social and cultural connections to the city of Athens, gave an importance to the hospital. While WRNMMC became a pioneer in military medicine, Fort Belvoir was designed with the latest research-based approaches to creating a humanized environment for the caring of the sick. While, Johns Hopkins Hospital was the first pavilion hospital in the United States, it has gone under many developments and changes, and it still represents the culture of super-hygienic and scientific methods of care. On the contrary, the Dell Children's Hospital manifests the socio-cultural and environmental diversity of its context, which makes this critical example unique among the others.

**The Surroundings:** Both Johns Hopkins and St Elizabeth's were located and developed in the areas with Black and other minority populations. Those local ethnic conditions influenced the architecture and landscape of the hospitals. During the early years, the ethnic and economic culture of the Athens Asylum was constituted from majority White and middleclass Americans, while the White effluents constructed the major population of the neighborhoods around WRNMMC, Dell Children's urban context is constructed from very diverse ethnics and economic classes.

Regarding **gender classification**, the WRNMMC and Fort Belvoir are relatively even gender environments. The targeted patient's population of Dell Children's Hospital

created a space where the majority of caregivers are female. Admitting equal numbers of both female and male patients in St Elizabeth's and Athens Asylum required an even number of male and female nurses as well. In its early years, Johns Hopkins was an interesting example, because establishing Johns Hopkins Medical School provided a field for women to compete with the predominantly masculine environment of American hospitals.

**Religious Environment of Hospitals:** Due to separation of Church and State, military institutions and hospitals, like WRNMMC and Fort Belvoir are secular organizations that provide care for military patients from all religious equally. Despite that, John Hopkins and Dell Children's offer care to more diverse patient populations, which may be the result of the religious affiliation and healing missions of the Roman Catholic faith.

## **Landscape Design and Environment Planning**

**A. Urban Setting and Neighborhood Zoning:** like many mental hospitals of the 19<sup>th</sup> century, both St Elizabeth's and Athens Asylum were originally located in suburban settings, within primary farmlands that later became residential areas. The WRNMMC was formerly located in green suburban areas with mix-use residential and parks areas. Fort Belvoir Hospital is located on a former green urban hospital site and a secured community with dominant military functions. Dell Children's is located on previously brownfield and new developed residential and mix-use urban settings.

**B. Landscape Characteristic:** the designed landscape of St Elizabeth's Hospital and Athens Asylum complied with the picturesque style of the 19<sup>th</sup> century, despite many developments in both of the sites, and the winding roads and the major architectural

elements have been preserved. The extensively planted grounds of the hospitals provided maximum exposure to nature. The land characteristics and high-raised grounds created significant vistas and views to both the urban and natural elements. The landscape elements of those asylums included artificial ponds, farms, greenhouses and pleasure grounds. In these asylums, different types of restorative activities such as pet therapy, moral treatment, occupational therapy, art therapy and horticultural therapy were practiced. The architecture design of the main buildings embraced the natural settings of the grounds and provided vast views to nature. The campus of WRNMMC was developed over several years, and the overall site design was not integrated into the landscape of the grounds. The only significant landscape of the campus is the hospital's front entry landscape. The most important restorative landscape is green road healing garden along the local creek of the ground. Johns Hopkins Hospital was originally constructed in pavilion style, which encountered dramatic developments during the last century. The grand courtyard and gardens between its pavilions provided restorative effects by exposing patients to nature. There are several small healing gardens in the hospital site, which apply therapeutic values of nature to the patients. While the horizontal and V-shape massing of Fort Belvoir aimed to maximize the therapeutic effects of nature, the parking garages on site impact any positive connection to nature. The major therapeutic element of the hospital is a healing garden of Dell Children's Hospital, which was constructed with high-tech, sustainable approach and green materials. The hospital's site is connected to public parks via a system of greenways. Different types of exercise, sensory, butterfly, artificial water and healing

gardens have been proposed into the site. The overall site design includes perpendicular systems of parking lots wards and interior roads of the campus

**C. Environmental and Ecological Strategies:** both the St. Elizabeths and Athens Asylum engineering methods were used to store, deliver and purify potable water besides the restorative use of water features. Philips Courtyard Garden in John Hopkins Hospital still contains a healing garden with its water features. The local creek in WRNMMC has been engineered for both storm water management and its therapeutic values in green road projects. The artificial lake and water garden located in the north corner of Dell Children's Hospital are supplied by the reclaimed municipal water. In Fort Belvoir, a system of rain water harvesting strategies provides water for healing gardens and landscaped areas of the site. In contrast, in Athens Asylum and St. Elizabeths Hospital, the major environmental considerations focused on the erosion control and supplying potable water, self-sustaining approaches. The new examples such as WRNMMC, Dell's Children, and Fort Belvoir, storm water management, rain water harvesting decreasing heat island effects and using green material has become a primary goal in design and planning of the hospitals' landscapes.

### **Therapeutic Strategies and Practices that shaped the Hospital's Landscape**

#### **A. Person-Nature Engagement**

Based on the research by Jiang (2015), the strategies for human involvement in nature have been studied as follows: the extensively landscaped grounds of St. Elizabeths and Athens Asylum in addition to the V-shape architecture of their main buildings provided the maximum views to nature in the north and south sides of both sites. The pleasure grounds, green houses and fruit gardens of St. Elizabeths and Athens Asylum exposed

patients and engaged them with nature. Like many mental hospitals of the 19<sup>th</sup> century, St. Elizabeths and Athens Asylum were located in suburban areas, and therefore being present in urban nature was not proposed and desirable during locating both the sites. Conversely, Johns Hopkins Hospital was located in urban areas, and provided views to nature via its courtyards. The landscape of the hospital did not offer any type of active engagement with nature. The recent constructed hospitals, Dell Children's and Fort Belvoir, have been designed to create opportunities for involvement with nature, and viewing it through the transparent walls and large windows of the hospitals. In addition to the green courtyards of Dell Children's, both of them can benefit from green urban environments of their surroundings due their proximity to greenways and local parks. Despite the green urban neighborhoods around the WRNMMC, the architecture design and site planning of its campus offered a few opportunities for being present in nature and viewing it. At the same time in this hospital, Green Road Healing Garden became an environment for active involvement in nature. Conversely, the gardens and landscape of WRAMC increased active engagement and presence into nature, and its diverse architectures and buildings emphasized on viewing the natural setting of the campus.

### **B. Typology of Therapeutic Landscape used on Site**

According to the classification, which has been suggested by Cooper – Marcus & Sacha (2013), the typology of therapeutic landscapes of the case study and critical examples have been studied as follows: the landscape of both WRAMC and WRNMMC included nature and fitness trails. While WRAMC, which resembled Athens Asylum and St. Elizabeths, had greenhouses and farmlands in addition to its extensively landscaped

grounds, WRAMC clearly referred to the therapeutic practices of the 19<sup>th</sup> century. The courtyard and backyard gardens of Dell Children's represent a shift toward the landscape traditions of pre-19<sup>th</sup>-century eras. The water gardens of Athens Asylum and Dell Children's have been created according to their specific, very local conditions, and their ecological considerations. In Athens Asylum, water ponds provided potable water for the hospital and a water garden of Dell Children's uses water efficiency strategies to create a restorative environment.

### **C. Connectivity to Surrounding Context**

Although many asylums and hospitals of the 19<sup>th</sup> and 20<sup>th</sup> centuries were enclosed within their semi-secure sites, the permeable boundaries of Athens Asylum were a unique example. In Dell Children's and Johns Hopkins, the sites were planned to directly connect to their surrounding urban open spaces. The landscapes of St. Elizabeths Hospital, Athens Asylum and WRAMC provided spaces for cultural and social events, while visual connections to their communities in Fort Belvoir and Athens Asylum were one of the major considerations during their design planning.

### **D. Applications of Healing Elements of Nature**

During the 19<sup>th</sup> and the early 20<sup>th</sup> centuries, hospital and asylum designers were concerned about the healing impacts of sunlight, fresh air, clean air, benevolent wind and breeze. The landscape designers and medical architects of St. Elizabeths and Athens Asylum emphasized on the healing power of those natural elements. In the same way, the design and planning of the therapeutic landscapes of WRNMC, St. Elizabeths and Athens Asylum focused on pleasing views and vistas in the both indoor spaces and outdoor environments of the hospitals.

### **E. Design Strategies that encourage Healing Impacts and Values of Hospital Landscapes**

Low-rise buildings of St. Elizabeths, Athens Asylum and Dell Children's facilitated the connectivity between indoor and outdoor spaces and therefore transferred natural views inside their buildings. Despite most of the critical examples, the transparent architecture of Fort Belvoir brings the natural elements inside the hospital. The main entrances of Johns Hopkins, St. Elizabeths and Athens Asylum were constructed in a park-like style. The winding roads of St. Elizabeths and Athens Asylum and Serpentine Street of WRAMC, maximized the exposure to natural elements. The V-shape design of St. Elizabeths, Athens Asylum and Fort Belvoir embraced their front grounds and therefore minimized the separation of their architecture and landscapes. In a different way, the pavilion design of Johns Hopkins enclosed the green courtyards by its wards. In WRAMC, the location of the main building above the topography opened broad views to naturalistic settings and gardens. Distraction strategies such as art works have been implemented in both St. Elizabeths and Johns Hopkins, which encouraged healing in the hospital environments.

### **F. Planning Strategies that discouraged Healing Properties of the Hospitals' Landscapes**

Construction of high-rise architecture in WRAMC, WRNMMC and especially Johns Hopkins towers discouraged the healing properties of their landscapes. The multi-story parking garages, caused the degradation of restorative grounds in the hospitals, for example, in WRAMC, WRNMMC, Johns Hopkins and Fort Belvoir. Constructing the whole site, or developing the major portions of the hospital's campus, for instance, in

WRNMMC and Johns Hopkins, suppressed the therapeutic properties of landscaped and green areas of those healthcare facilities. Finally, proximity to traffic and polluted streets are among the major conditions that caused the decline of therapeutic values in Johns Hopkins.

### **G. Ecological Considerations and Sustainable Strategies that improve the Therapeutic Landscape of Hospitals**

The most important ecological consideration during the 19<sup>th</sup> and 20<sup>th</sup> centuries in both the hospitals and asylums was site planning according to the micro-climate conditions of the grounds, which dramatically influenced WRAMC, St. Elizabeths and Athens Asylum. In addition, rainfall harvesting was proposed in both the previous and recent practices, for example, in Dell Children's and Athens Asylum. Other ecological strategies, such as using vernacular materials native plants, storm water management and green material, were applied in the hospital's architecture and landscape.





Spatial-Comparative Analysis (5.3.1,& 5.3.2)					
		Critical Example I	Critical Example II	Critical Example III	
		Walter Reed National Military Medical Center	St. Elizabeths Hospital	Athens Lunatic Asylum	
	<p>Image</p>  <p>Aerial photos credit: Google Earth, 2016. "Scale not given".</p>				
Geographical Context	Micro Climate (Sun & Wind directions)	More rain & less comfort days than average of the U.S.A. Prevailing wind from NW & South with 203 sunny days per year.	More rain & comfort days than average of the U.S.A. Prevailing wind from NW to W, & South.	Rainfall equals to average of the U.S.A., but sunny days and comfort days are less than the U.S.A average. Prevailing wind from SW-South.	
	Terrain Characteristics (Flat land, Steep slope, engineered ground)	Moderate-rolling counters, & engineered ground.	Flat plateau in east portion of the site, & steep slope in the west and north toward Anacostia River.	Steep slope in both the hills of the south, & river side in the north of the site.	
	Previous land use	Agricultural & farmlands	Farmland, Blagden's farm	Farmlands, Natural forest like area	
	Important natural elements of site or surrounding areas	Rock Creek Park, & the North Chevy Chase Local park	Anacostia & Potomac Rivers. Expansive views to D.C. and capital.	Hocking river, natural dense woods in the south of the site.	
	Topography characteristics	Diverse topography & gentle rolling hills with steep slope on the northern side of the local stream.	Diverse topography from plateau in the north east of the site and steep slope in the north west of the site.	Steep-close counters from south to north on the river side.	
Historical Significance	Notable historical periods	1945, developments after WWII. 1979, elevated parking garages. 2008, WRNMMC ground breaking.	Nicholas Era (1852-1855) Peak of patient's population (1950's)	Establishment & construction of the institution (1868-1878) Re-channelizing the river (1960's-1970's)	
	Major historical events associated to site	1940, Roosevelt visit of the hospital. 1963, Kennedy autopsy in the hospital. 1987, Reagan visit & treatment in the hospital.	2002, transferring western campus by Federal Gov. 2013, USCGHB move in to site.	1907, sheltering the citizens of the Athens due to flood	
	Historic monuments	Entrance tower (2003)	Whole western campus, & the central building.	The main building, the cottage B, and cemetery of the asylum	
	Developments sequences	Foundation (1938), Modernization of the hospital (1960). The new inpatient bldg. (1973), WRNMMC groundbreaking (2008).	1855, opening of the hospital 1969, community-based center opening 2010, New Civil hospital was built on the site.	1885-1900 developments of the farm offices. 1909, Cottage B 1924, Sanitarium construction	

Table 22. Spatial Comparative Analysis of the Critical Examples – continue on next page (by Author).

			<i>Critical Example I</i>	<i>Critical Example II</i>	<i>Critical Example III</i>
			<b>Walter Reed National Military Medical Center</b>	<b>St. <u>Elizabeths</u> Hospital</b>	<b>Athens Lunatic Asylum</b>
	<b>Socio-Cultural Context</b>	Dominant cultural context of the hospital	Military (Navy, Army,& Airforce )	Mental hospital, Black community	Civil hospital for insane, serving Civil War veterans
		Cultural significance	Flagship & pioneer of the military medicine	The first federally operated mental hospital, leading psychiatric hospital in D.C.	One of the most documented Asylums. Strong social,& cultural connections to the city
		Social context of site and surrounding areas (race, gender, class...)	Moderate-density neighborhoods, White affluent population	Black community, lower-middle class families	Suburban, close proximity to Ohio University of the Athens, White Christian middle class
		Religious activities in site	Available priest for every religion to provide healing for wounded soldiers, but the hospital is neutral to religion.	Secular institution	Christianity in the early years
		Foundation & establishment	Established as Naval hospital	Psychiatric hospital in 1852	Establishment of the mental hospital in 1868
	<b>Design &amp; planning characteristics</b>	Setting (Urban, sub-urban , or rural setting)	Green urban setting, residential and <del>mixuse</del>	Sub-Urban setting	Sub-Urban setting
		Neighborhood zoning	Residential, Parks,& Museum	Residential & farmlands	Residential & farmlands
		Major urban or architectural monuments of surrounding sites	National Institute of Health, U.S. national Library of Medicine	Main central bldg., & U.S.C.G head quarter	Administration bldg.,& wards, the Ridges, dairy barn, cultural Art center
		Architectural style	The late modern, Semi-Pavilion high-rise hospital	Italianate Revival ,& Gothic Revival	The Late 19 <sup>th</sup> & 20 <sup>th</sup> century Revival , and the late Victorian Style
		Hospital Specialties	Inpatients, outpatient, Cancer Center, & Children Center	Psychiatric hospital	Psychiatric hospital
	<b>Landscape characteristics</b>	Site design (morphology, geometry)	No integrated landscape, & overall site design. Picturesque design of the entrance landscape.	Designed landscape in west and around the main building, Naturalistic areas in West & South sides of the campus, winding design of the roads.	Designed landscape around the main building, winding roads
		Exposure to nature	Along the local stream(Green Road Project), & green areas on the east portion of the site close to the north Chevy Chase local park.	Vista to Anacostia & Potomac Rivers, view to farmlands and planted trees during the later eras.	Via woods in the south, and artificial ponds, & river in the north side of the site.
		Typology of landscape design	Natural, & Naturalistic landscape. Courtyard design, green roofs.	Picturesque and naturalistic landscape	Picturesque , naturalistic landscape, & Fruit gardens
		Therapeutic elements of landscape design	Natural elements, local creek, woods, courtyards, green roofs.	Woods, designed ground, green houses, & farms.	Artificial ponds, green houses, farms, gardens pleasure ground.
		Restorative activities	Occupational therapy, holistic care, behavioral health, rehabilitation therapy. Community engagements via Art ,& cultural activities	Pet therapy, moral treatment, occupational therapy, & Art therapy	Occupational therapy, horticultural therapy, & moral treatment
	<b>Environmental &amp; Ecological considerations</b>	Environmental considerations of design	Energy efficiency, sustainable design, exposing to nature.	Fresh air, naturally raised area of land, good soil & sub-surface drainage	View to river & woods, visual connectivity to the city
		Ecological technologies used in site	Solar energy, holistic approach to both the indoor & outdoor design, green roof design.	Soil drainage, & soil engineering. Open vista, perspective and sunlight	Self-sustainability approach. Preserving pristine nature of the campus.
		Cutting edge engineering or scientific methods used in planning the site	Evidence-based design, sustainable approach, storm water management, erosion control	Pleasure, & convenient grounds, erosion control. Advanced horticultural technologies	Engineering system of water treatment, & water supply. Artistic design of artificial ponds in campus landscape. Converting swamplands to fresh water supply. Soil erosion control.

Table 23. Spatial Comparative Analysis of the Critical Examples – continue on next page (by Author).





Spatial-Comparative Analysis (5.3.1,& 5.3.2)					
		Critical Example IV	Critical Example V	Critical Example VI	
		Johns Hopkins Hospital	Fort Belvoir Community Hospital	Dell Children's Medical Center	
	 <p>Aerial photos credit: Google Earth, 2016. "Scale not given".</p>				
Geographical Context	Micro Climate (Sun & Wind directions)	Rainfall more than average of the U.S., but the sunny days & comfort days less than average of the U.S. Prevailing wind from NW to W, & South	More rainfall, less sunny days, and comfort days than the average of the U.S. Prevailing wind from NW-WNW, & South.	Less rainfall, more comfort days, & sunny days than the average of the U.S. Prevailing wind from South to SE	
	Terrain Characteristics (Flat land, Steep slope, engineered ground)	Excellent drainage of the hill, abundant water supply on the site. Fresh air, & constant breeze, and natural ventilation	Flat Land, and engineered ground	Flat Land, and engineered ground	
	Previous land use	Farmlands & Woods	DeWitt Army Community Hospital	Brownfields of the former municipal airport	
	Important natural elements of site or surrounding areas	Springs, views to Butcher Hill	Dogue Creek, Potomac river, Urban Forest	Connecting to a system of greenways & trail	
	Topography characteristics	High ground, but Plateau	No significant topography	No significant topography	
Historical Significance	Notable historical periods	1876, establishing Johns Hopkins University 1889, Oslerian Era, 1893 School of Medicine	Ground breaking of the hospital in 2011	Not Applicable	
	Major historical events associated to site	1889, foundation of the hospital. 1925 Wilmer eye institute 2012, Children's Center & Sheikh Zayed Towers	2007 the ground was broken of Fort Belvoir's south post golf	Redevelopment & reuse plan of the previous airport	
	Historic monuments	Johns Hopkins Medical Complex	Not Applicable	Not Applicable	
	Developments sequences	1889 design & construction 1912-1925 development of Clinical bldgs. 2012 Constructing two tower buildings	1957 as Dewitt hospital 2011 as Fort Belvoir	Initial opening in 2007 Final completion in 2013	

Table 24. Spatial Comparative Analysis of the Critical Examples – continue on next page (by Author).

			<i>Critical Example IV</i>	<i>Critical Example V</i>	<i>Critical Example VI</i>
			<b>Johns Hopkins Hospital</b>	<b>Fort Belvoir Community Hospital</b>	<b>Dell Children's Medical Center</b>
	<b>Socio-Cultural Context</b>	Dominant cultural context of the hospital	General Hospital, both inpatient & outpatient services	Hospital for military members and their families	Children's hospital
		Cultural significance	The first pavilion design in the U.S.A, leading medical institution	Designed with EBD,& Family friendly approach	Representative of the 46 counties of the east Texas
		Social context of site and surrounding areas (race, gender, class...)	Black urban community of Baltimore	Home of several military organizations	Diversity in climate, culture, ethnic,& land use
		Religious activities in site	Catholic affiliation	Secular institution	Roman Catholic affiliation
		Foundation & establishment	1889 as a general hospital	2011 , establishment of the hospital	2007, establishment of the hospital 2013, Completion of the hospital
	<b>Design &amp; planning characteristics</b>	Setting (Urban, sub-urban , or rural setting)	Urban setting	Green urban setting	New developed urban setting
		Neighborhood zoning	Residential , mostly Black & European immigrants settlements	Military & residential	Residential & mixed use
		Major urban or architectural monuments of surrounding sites	Historic buildings of the Johns Hopkins Medical Complex	Post Headquarters Building, Fort Belvoir, VA	Northwest greenway, Mueller Lake Park, Bartholomew district Park, Patterson Park
		Architectural style	Queen Anne	High-tech architecture, sustainable ,& green building	High-tech sustainable & green building design
		Hospital Specialties	General, Neurology, Ophthalmology...	Cardiology, Urology,& Labor and Delivery	Children's outpatient,& outpatient,& trauma
	<b>Landscape characteristics</b>	Site design (morphology, geometry)	Pavilion design, Central Grand Courtyard & eight surrounding courtyards	Engineering site design , horizontal massing in the site	Perpendicular system of interior streets of the site , artificial pond
		Exposure to nature	Through courtyards , & picturesque inviting landscape	Natural woods in a small portion of the site	A system of greenway & connected public parks
		Typology of landscape design	Courtyard & Inviting landscape, healing garden	Designed healing gardens, courtyard, & natural woods	Exercise, sensory, butterfly, artificial ponds, & healing courtyards
		Therapeutic elements of landscape design	Philips restorative garden, & Milton and Harriet Memorial garden. Providing shelter & refuge for poor	Healing garden	The multi-level courtyard healing gardens
		Restorative activities	Exposure to landscaped areas and planted areas. Psychiatric treatment	Exposing to nature, for family & patients	Activity & amusement for kids in the gardens of the hospital
	<b>Environmental &amp; Ecological</b>	Environmental considerations of design	High raised land, fresh air, sunlight	Locating the site 30miles away from congested highways	Converting Brownfields to hospital, proximity,& accessibility to public parks
		Ecological technologies used in site	Site engineering for clearing the grounds , and flood prevention	Rainwater harvesting, and storm water management	Using vernacular materials of the Texas, using reclaimed water,& water saving irrigation system
		Cutting edge engineering or scientific methods used in planning the site	Ventilation and hygienic design	Improving both the indoor & outdoor spaces by using high technologies	Way-finding in the site design, green roofs

Table 25. Spatial Comparative Analysis of the Critical Examples (by Author).

<div> <div>Primary Emphasis</div> <div>Secondary Emphasis</div> </div>		Person-Nature Engagement Strategies used in the site <sup>80</sup>		
		Viewing Nature	Being Present in Urban Nature	Active Engagement with Nature
Critical Example I	Walter Reed National Military Medical Center	-		
Critical Example II	Fort Belvoir Community Hospital			-
Critical Example III	Johns Hopkins Hospital			-
Critical Example IV	St. Elizabeths Hospital			
Critical Example V	Athens Asylum			
Critical Example VI	Dell's Children Medical Center			
Case Study	Walter Reed Army Medical Center			

Table 26. The Person-Nature engagement strategies which were applied in landscape design of the hospitals (table by author).

<sup>80</sup> Based on the studies by: Pretty et al., 2005; Ward-Thompson, 2011, and Shan Jiang (2015).





























<div> <div>Primary emphasis</div> <div>Secondary emphasis</div> </div>		Typology of therapeutic landscape used on site <sup>81</sup>									
		Viewing garden	Roof garden	Courtyard	Backyard garden	Nature & fitness trail	Extensive landscape ground	Green house, farmlands <sup>82</sup>	Eatery gardens	Healing garden	Water garden
Critical Example I	Walter Reed National Military Medical Center	-			-		-	-			-
Critical Example II	Fort Belvoir Community Hospital			-	-	-	-	-			-
Critical Example III	Johns Hopkins Hospital		-	-	-	-	-	-			-
Critical Example IV	St. Elizabeths Hospital	-	-	-	-	-			-	-	-
Critical Example V	Athens Asylum	-	-	-	-	-			-	-	
Critical Example VI	Dell's Children Medical Center					-	-	-	-		
Case Study	Walter Reed Army Medical Center		-		-				-	-	-

Table 27. Typology of therapeutic landscape designs which were used on the site of the hospitals (table by author).

<sup>81</sup> The criteria adopted from Cooper-Marcus, & Sachs (2015).

<sup>82</sup> According to the studies by American Horticultural Therapy Association, (2016).










































Primary emphasis 		Connectivity to surrounding context <sup>83</sup>				Application of healing elements of nature <sup>84</sup>					
		Permeable boundaries of the site	Direct connections to urban	Provide place for cultural or social	Visual connections to its	Sunlight	Fresh & clean air	Wind & breeze	Pleasing view & vista	Wind shield by landscape	Shade trees
Critical Example I	Walter Reed National Military Medical Center	-	-		-				-	-	
Critical Example II	Fort Belvoir Community Hospital	-	-	-			-	-		-	-
Critical Example III	Johns Hopkins Hospital	-		-	-				-	-	-
Critical Example IV	St. Elizabeths Hospital	-	-		-						
Critical Example V	Athens Asylum		-							-	
Critical Example VI	Dell's Children Medical Center	-		-	-			-	-		-
Case Study	Walter Reed Army Medical Center		-								

Table 28. Connectivity to surrounding contexts, and application of healing elements of nature (table by author).

<sup>83</sup> Adopted by author, according to results from interviews with (Batties, 2015; Cooper-Marcus, 2015; Foote, 2015; Marble, 2015; Sachs, 2015; Tusler, 2015; Wrenn, 2015).

<sup>84</sup> Adopted by author, according to results from interviews with (Batties, 2015; Cooper-Marcus, 2015; Foote, 2015; Marble, 2015; Sachs, 2015; Tusler, 2015; Wrenn, 2015).








































		Design strategies that encourage healing values of the hospital's landscape <sup>85</sup>					Planning strategies that discourage healing properties of the hospital's landscape			
		Low rise building	Transparent Architecture to landscape	Accessibility via nature in arrival zones	Embracing landscape by buildings mass	Positive distractions for stress reduction	High-rise building	Locating parking & garages in close distance to the medical buildings	Proximity to traffic, air & sound pollution	Densely constructed campus
Primary emphasis										
Secondary emphasis										
Critical Example I	Walter Reed National Military Medical Center	-	-	-	-	-			-	
Critical Example II	Fort Belvoir Community Hospital	-		-			-		-	-
Critical Example III	Johns Hopkins Hospital									
Critical Example IV	St. Elizabeths Hospital						-	-	-	-
Critical Example V	Athens Asylum						-	-	-	-
Critical Example VI	Dell's Children Medical Center			-			-	-	-	-
Case Study	Walter Reed Army Medical Center	-							-	

Table 29. Design & Planning strategies that encourage and discourage therapeutic properties of the hospitals landscape (table by author).

<sup>85</sup> Adopted by author, according to results from interviews with (Batties, 2015; Cooper-Marcus, 2015; Foote, 2015; Marble, 2015; Sachs, 2015; Tusler, 2015; Wrenn, 2015), and Shan Jiang (2015).

























<div>Primary emphasis </div> <div>Secondary emphasis </div>		Ecological considerations and Sustainable strategies that improve the therapeutic landscape of hospitals <sup>86</sup>					
		Using vernacular materials	Native plants	Considering Micro-climate	Storm water management	Rainfall harvesting	Green material
Critical Example I	Walter Reed National Military Medical Center	-	-	-			-
Critical Example II	Fort Belvoir Community Hospital	-	-	-			
Critical Example III	Johns Hopkins Hospital	-	-			-	-
Critical Example IV	St. Elizabeths Hospital	-				-	-
Critical Example V	Athens Asylum						-
Critical Example VI	Dell's Children Medical Center				-		
Case Study	Walter Reed Army Medical Center	-	-			-	-

Table 30. Ecological considerations and Sustainable strategies that improve the therapeutic landscape of hospitals (table by author).

<sup>86</sup> This criteria is adopted from Schweitzer, Gilpin, & Frampton (2004) by author.

## **Chapter 6: Discussion**

### **2.8. Conclusion**

#### **Answer to Main Research Question**

##### **A. How Therapeutic Landscape of Hospitals evolved and degraded during the 19<sup>th</sup> and 20<sup>th</sup> Centuries?**

*Evolution of therapeutic landscape;* during the late 18<sup>th</sup> and 19<sup>th</sup> centuries, professional psychiatry as a medical specialty was practiced primarily in insane asylums. Therefore, psychiatrists considered architecture and landscape design to be an effective media for treatment of patients. The acceptance of the moral treatment theory heavily influenced the medical procedure and care for mentally ill people. The restorative features of those landscapes included maximum exposure to nature via extensively landscaped grounds and networks of winding paths, and application of natural elements such as water in the form of artificial ponds and springs. Before WWII, many residential communities developed across the American landscape, providing a healthy environment, and maximum exposure to nature, for affluent people. In the mid-20<sup>th</sup> century, scientific research, technological advancements, socio-cultural changes, and new hospital patterns caused the degradation of therapeutic landscapes in asylums.

*Degradation of restorative landscape;* after the Civil War, neurology was created as a new scientific approach and in the next century would flourish. The introduction of psychiatric drugs, and a series of court decisions ruled against the interests of patient labor, entire restorative activities such as gardening and horticultural therapy that had been part of asylums were abandoned. On the other hand, acceptance of the germ theory in scientific and medical societies influenced many inventions in construction technology, including ventilation systems and a

revolution in hospital design that resulted in improved hygiene. As the result, the therapeutic landscape of asylums was replaced by pavilion hospitals and their hygienic wards. At the beginning of the 20<sup>th</sup> century, the lands consuming low-rise pavilion hospitals were gradually replaced by highly functional skyscraper hospitals. After WWII, developing hospitals beyond their properties became increasingly expensive or difficult to maintain. Due to these factors, many pavilion hospitals were demolished and then reconstructed in skyscraper style. Likewise, further developments of those high-rise hospitals resulted in highly constructed campuses and suppression of their landscapes, consequently causing degradation of the restorative landscape of healthcare facilities.

## **B. How did Re-emergence of Modern Landscape Practices not address the Whole Healing Properties of the Hospital Grounds?**

The conventional hospitals do not properly facilitate the therapeutic value of nature for the following reasons. First, as already discussed, the extensively landscaped sites and holistic approach to therapeutic practices in hospital grounds declined in the preceding century. Second, while many studies confirmed the positive impact of nature and natural settings in healthcare facilities, their findings did not result in a considerable shift in the design and site planning of hospitals. Therefore, the holistic approach to therapeutic design was comprised of a series of principles and criteria to measure the restorative properties of the hospital landscape. These principles were established based on the results and synopsis of recent studies and methodologies on healing environments, as well as assessments of healing landscapes that were previously discussed in this dissertation. These criteria were then examined against the case study, and another six critical

examples, in order to answer the pros and cons of the current healing gardens and campus planning in hospitals. Those criteria are classified as follows.

#### **- Application of Healing Elements of Nature**

Despite the landscape practices of the 19<sup>th</sup> and early 20<sup>th</sup> centuries, the benevolent characteristics of local environments and micro-climates of the sites were not considered in locating and planning hospital buildings. Pertinent environmental elements that were usually not factored in included sunlight, sun direction, fresh and clean air, wind and breeze, pleasing views and vistas, use of trees for windshield and shade, topography, and terrain characteristics.

#### **- Design and Planning Strategies**

There are several strategies that improve therapeutic practices and connect the medical buildings in hospitals to their surrounding landscapes. The first is designing the building mass to embrace landscape instead of being enclosed by it. The second is applying positive distraction methods by designing to reduce stress (Cooper-Marcus, 2015). These strategies were partially implemented in a few instances but have not yet been accepted by designers and hospital management teams. The parking lots and garages were located everywhere in hospital campuses within a close distance to medical buildings. In addition, many hospitals in urban areas are exposed to air and sound pollution from traffic, which can drastically influence their healing environments and negatively impact the health and efficiency of their staff (Ulrich, 2004). Reducing the building footprint and re-developing the sites create densely constructed campuses and suppress the restorative values of landscape of hospitals.

- **Person-Nature Engagement:**

The studies on restorative impacts of nature in urban environments describe three types of strategies to achieve maximum engagement (Pretty et al., 2005; Ward-Thompson, 2011; Jiang, 2015): first, viewing nature; second, being present in urban nature; and third, being actively engaged with nature. Initiated by Ulrich (1984), studies on the viewing of nature have been conducted since the last decades of the 20<sup>th</sup> century. After abandoning horticultural therapy in hospitals, active human engagement with nature was reexamined through several successful projects, including trails and green pathways, which also measure the health outcomes of exercise in the natural settings of hospital campuses. The biggest disadvantage of these few constructed examples is the disassociation and isolation of these green-exercise environments in hospital sites with their surrounding spaces.

- **Topology of Restorative Gardens:**

Barnes and Cooper-Marcus (1999) extensively described the healing gardens and provided a broad typology for them. Their study was based on the constructed healing gardens and other types of gardens in healthcare facilities. Since then, those small, enclosed healing gardens have become popular in recently constructed or renovated hospitals. In most of the cases, these restorative gardens were constructed according to the hospital specialty or very narrowed-down, targeted patients. The more scientific approach to the design of healing gardens specified them according to their healing approach and design elements (Rawlings, 1998) or classified them based on different medical specialties (ASLA, 2015). Therefore, the limited spaces of these gardens do not satisfy the broad range of demands from patients, staff, and visitors of hospitals.

### **- Connectivity to Surrounding Context:**

During the last two centuries, hospitals and asylums were perceived as the urban landmarks of modern societies. Despite this, the development of skyscrapers, commercial towers, and cultural buildings has changed the urban landscape of the surrounding communities of hospitals. In addition, over-emphasizing indoor environments and hygienic design often prevented extended views and allowed only for a poor visual connection to the surrounding landscape. Security measures banned or limited socio-cultural activities in hospital campuses, leading to a narrow focus on medical procedures to take care of the limited access of sick patients and control the movement of people in both indoor and outdoor environments. As a result, the permeable boundaries of hospital landscapes were replaced by walls, fences, and surveillance cameras that decreased the connectivity of hospital campuses to their urban environments.

### **- Ecological Considerations and Sustainable Strategies**

In recent years, a growing body of knowledge on sustainable design, eco-friendly planning, and green buildings has positively impacted healthcare design and construction. For instance, the use of vernacular materials, native plants, and green materials prevail in contemporary building practices. Similarly, energy efficiency strategies, rainwater harvesting, and storm water management solutions are now routinely implemented in hospital campus planning, which has significant impacts on both the environment and human health.

## **Answers to Sub-Questions of the Research**

### **Question 1. What are the Historical-Cultural Components of American Society that Influenced Hospital Sites, and their Therapeutic Landscapes, during the 19<sup>th</sup> and 20<sup>th</sup> Centuries?**

During the 19<sup>th</sup> century, scientific research about the importance of air quality and natural ventilation, in addition to Nightingale's recommendations, resulted in hygienic design of hospitals and, later, improved urban environments and public health in American cities. The Civil War changed the cultural and therapeutic landscapes of American cities; for example, Washington, DC, witnessed a dramatic change in the number of wounded and the number of patients, which caused more demand for hospitals. Around that time, the advancement of medicine and demographic changes transformed the environments of American public hospitals as they dramatically expanded across the United States. Then, a combination of medical hospitals and research institutions became an ideal model for the healthcare facility. Applying the results of those studies, reformation of hospital environments resulted in degradation of therapeutic landscapes and the creation of super-hygienic indoor spaces in healthcare facilities. During the 19<sup>th</sup> century, the theory of environmental determinism, accepted by most of American society, created the American asylum and its famous therapeutic landscapes.

Extensively landscaped grounds of asylums and botanical gardens in American cities were the first scientific applications of two theories: environmental determinism and moral treatment. Also, they were signals of socio-cultural controls in a young and democratic country. During the locating process of asylums, self-sufficiency and ecological sustainability were major considerations. According to local conditions, and the demographic status of patients, a broad range of

therapeutic practices were implemented across an asylum's ground, including horticultural therapy, occupational therapy, green house activities, recreational activities, pet therapy, and water therapy.

In the early decades of the 20<sup>th</sup> century, two different approaches to healthcare delivery—medical-research based and moral treatment theory caused a division between medical hospitals and psychiatric institutions. The modernist architecture ignored the therapeutic properties of natural settings in hospitals. Therefore, those restorative practices were forgotten in both the medical and mental hospitals. The everyday increasing number of cars in American cities, and expanding parking lots and garages changed the landscape of hospitals, discouraging the healing values of the park-like landscapes of asylums and thoroughly altering the campus planning of medical hospitals. After WWII, the commodification of the healthcare industry led to advocating for patient-centered healthcare institutions to humanize the hospital environments. In the 1980s, the plane tree model was introduced to the western world, aiming to bring back in healthcare facilities the extensively landscaped spaces and gardens of the 19<sup>th</sup> century.

Around the early 1990s, Roger Ulrich's research initiated the healing garden movement to soften the brutalist design of hospitals. This approach, bringing nature back into hospitals, was one of the most progressive ideas to shape the therapeutic landscape of hospitals in the 20<sup>th</sup> century. During the latter decades of the 20<sup>th</sup> century, advanced technologies played a significant role in reintegrating healing properties of natural elements into medical procedures in order to benefit both the patients and hospital staff. Despite these problems, the holistic approach to care and future research in the U.S. military opened a new perspective in the early years of

the 21<sup>st</sup> century. On the one hand, hospitals were the symbols of healing and, on the other hand, they were constantly changing. As their cultural values evolved, however, their socio-cultural impact remained vital to the community.

**Question 2. How have Healing Practices and Military Medicine in the 20<sup>th</sup> century Shaped the Spatial-Physical Environment, and the Therapeutic Landscape of Walter Reed Army Medical Center?**

During the second half of the 19<sup>th</sup> century, military healthcare system focused on functional efficiency and hygienic design. Therefore, the practices of restorative gardens were not welcomed in military hospitals. During the American Civil War, many military barracks turned to temporary barrack-hospitals, which were constructed with wooden wards, temporary shelters, and tents. Consequently, an increasing number of military hospitals around and inside the nation's capital changed the urban and therapeutic landscapes of the city. After the Civil War, hygienic regulations established the Sanitary Division in the U.S. Government. Military time and movement efficiency created new models of mobile-field hospitals, and advancements in neuro-physiology suggested drug therapy and medical treatments to heal disordered soldiers. During the later decades of the 19<sup>th</sup> century, cultural changes in the United States military and demands for renovating the medical system created a pioneer model of an army medical facility. Therefore, the reasons for establishing Walter Reed General Hospital in the early years of the 20<sup>th</sup> century included reconstruction of the Army system, an increase in Army funds, demand for concentrated Army funds, demand for a concentrated Army medical facility near Washington, DC, and practicing advanced technologies and scientific research to care for Army members and politicians.

Finally, a park-like ground in a green neighborhood of Takoma Park, with moderate climate and prevailing wind, was selected, which had previously been woodland and farmland. The property had several symbolic values, including its direct connection to the White House through 16<sup>th</sup> Street, and its historical association to the Civil War that added cultural significance to the site as flagship of military medicine. Also, suitable terrain offered good drainage and gentle topography with an accessible commuting distance to Washington, DC, all among the criteria that influenced the site's selection. Until the late 1920s, many temporary wooden structures were added to the site. But, major developments that changed the landscape of the campus occurred after WWII. The most significant design features of the hospital's landscape were the serpentine road (Main Drive) and picturesque landscaped areas organized around it, formal gardens, Memorial Fountain, Rose Garden with its Pergola, a garden path on the south side, and a trail on the west side of the campus. The diverse terrain and landscape design of the hospital granted a unique opportunity for therapeutic practices on the grounds of Water Reed Army Medical Center (WRAMC). The occupational therapy practices were included in the horticultural therapy in gardens and greenhouse, and in construction of Division activities.

During the 20<sup>th</sup> century, many cultural activities and social events shaped and evolved the cultural landscape of the hospital. Therefore, it can be concluded that the WRAMC was also a cultural institution that influenced its surrounding community. It was a flagship of military medicine with an important place in popular culture, as well as being a prestigious place in American military discourse. During the first half of the 20<sup>th</sup> century, the long-term hospitalization of the wounded soldiers, the military characteristic of the campus as a barrack, in addition

to the feeling of comradeship among patients and care givers, created a strong sense of community inside the hospital. During the later decades, this sense of community was dramatically changed due to medical advancements and application of innovative technologies that caused the short-term residency of patients in the hospital. During its operation, the hospital strengthened its cultural and economic connections to its neighborhood and the city of Washington, DC.

**Question 3. Why and how can Hospital sites address the Broader Concept of the Therapeutic Landscape rather than the Contemporary Landscape Practices in Health Facilities?**

Since the beginning of the 20<sup>th</sup> century, hospitals have been one of the significant elements of urban environments due to their medical functions and service to the cities. They are also designed to be prepared for disaster conditions. Additionally, they are active man-made environments that work 24 hours per day. The huge buildings, supporting facilities, and often generously expanded sites contribute to the creation or change in the urban landscape of a hospital's surroundings. Beside their main responsibilities to care for the sick, modern hospitals encourage well-being for patients, their families, and staff, while promoting public health in their neighborhoods and cities. Therefore, they directly influence the therapeutic environment of their context. According to Ulrich et al. (2004), during the first decade of the 21<sup>st</sup> century, the United States encountered one of the largest increases in hospital construction. In 2004, the United States spent \$16 billion to build healthcare facilities, while it was expected that \$20 billion would be spent every year by 2010 (Babwin, 2002).

Because these expensive facilities remain for several decades, they should be designed with a new approach to not only satisfy the traditional role of hospitals, but also to reduce staff, patients, and their families' stress and fatigue and increase effectiveness in delivering care and improve patient safety. Finally, considering their huge ecological footprints, and their micro-climatic roles, "hospitals could save billions by improving their environment" (Scanell, 2016). According to a research study by Chung & Meltzer, (2009), published in the Journal of the American Medical Association (JAMA), "The U.S. healthcare sector is responsible for producing 8 percent of the country's total carbon dioxide emissions" (Cited in Scanell, 2016). Recently, many NGO and environmental research institutions lobby in the United States and Canada to establish more environmentally friendly regulations, and advocate for green standards for hospitals (Sibbald, 2002; Canadian Coalition for Green Health Care, 2016).

To summarize:

- **First**, the holistic approach to therapeutic landscape design declined in hospitals during the 20<sup>th</sup> century.
- **Second**, the contemporary research on positive impacts of nature did not result in major shifts in the site design of healthcare facilities, as follows:
  - The natural healing elements were not thoroughly applied or considered in site planning.
  - High rise hospitals prevented transparency and therefore access to nature.
  - The gardens and landscapes of hospitals were isolated by buildings and urban streets.
  - The medical buildings often are disconnected from landscape and site.

- Distraction methods to reduce the stress has been partially implemented in indoor spaces in hospitals.
- Reducing footprints of buildings resulted in densely constructed campuses and consequently suppressed the restorative values of hospital sites.
- Person-nature engagement strategies mostly focused on viewing nature in indoor spaces instead of the outdoor environments of hospitals.
- Therapeutic activities, such as horticultural therapy, pet therapy, and gardening were abandoned.
- The small healing gardens of a hospital site do not cover the whole site, and are not connected to their surrounding urban environments.
- The recent healing gardens are designed for targeted populations or specific functions that cannot address a broad range of public demands.
- The enclosed sites of hospitals do not provide access for the public and are not connected to urban structures.
- The landscape practices of recently constructed hospitals do not provide space for socio-cultural events to connect a hospital's community to their surrounding neighborhoods.

It can be concluded that hospital sites of the future might entail a broader conception of the therapeutic landscape than seen in conventional practices. The growing body of research on therapeutic design and environmental health and well-being, plus promising advancements of medicine, pioneering architectural, environmental and medical technologies, constantly expands the horizons of healing landscape design in less-known but bright realms. Therefore, the hospital ground should be re-discovered as green urban infrastructures that promote health and wellbeing. Similarly, many planning approaches emphasize the creation of

diverse opportunities for socio-cultural activities in hospital sites, such as implementing an open and transparent design that consequently connects patients and staff to their families and communities. These research studies and methodologies offer a broad and very diverse ranges of strategies to establish and examine different design methods for healing gardens and therapeutic landscape that will dramatically change the hospital grounds of the future.

### **Revisiting Propositions and Hypothesis of the Research**

**Proposition 1:** Recent research on therapeutic environments suggest that there are a broad ranges of values, including mental, physical, and socio-cultural values, in landscaped settings and gardens of hospital campuses for human healing and overall well-being.

**Proposition 2:** Historically, both the natural settings and cultural landscapes, such as gardens, were perceived as healing sources, and their restorative properties were applied in healthcare institutions.

**Proposition 3:** Throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries, socio-cultural changes, advent medicine, and cutting edge technologies instigated the evolution and influenced the degradation of the therapeutic landscape of hospital grounds in the United States.

**Proposition 4:** The advanced medical studies and holistic approach to care necessitate re-examining conventional healing environments and reinventing the therapeutic landscapes of state-of-the-art hospitals.

### **Research Hypothesis:**

During the 19<sup>th</sup> century, hospital landscapes, asylum gardens, and public parks were created for their restorative values across the United States. Later they evolved according to the medical theories, socio-cultural norms, and universal design methods and engineering practices. In the 20<sup>th</sup> century, therapeutic landscape of both mental and medical hospitals degraded due to the modern technologies and medical approaches to healing. However, within the last decades of the last century restorative gardens have again flourished in contemporary practices, although their conventional applications do not thoroughly address the cohesive and comprehensive therapeutic values of nature in landscape design and campus planning.

### **Contribution and Locating the Research in Literature**

#### **- Architectural History of Hospitals**

Many research on the architectural history of hospitals explored the social roles of healthcare facilities from medieval to modern times. While the results of those studies may be of interest for the social history of medicine, these studies also thoroughly investigated the relationships between hospitals, cultural changes, and religious organizations. As examples, Thompson and Golden (1975) comprehensively studied the hospital patterns, and classified them according to historical periods and design styles. Granshaw and Porter (1989), while emphasizing the social role of hospitals, discussed the impact of industrialization and philanthropist donations into modern developments of healthcare institutions. While describing hospital transformation from infirmaries to modern institutions, within specified periods and geographical locations, Risse (1999), opened a thematic discussion to study spirituality, social demands, religious orders, and

technology in hospital design and management. Although the social and historical developments of hospitals have been thoroughly studied in previous research, a few disquisitions on history of hospitals concerned outdoor spaces, landscapes, and their developments. The results of this research emphasize hospital landscapes, and investigated those as inseparable parts of healthcare facilities.

### **- Socio-Cultural Study of Hospitals**

Rosenberg (1995) examined the growth of healthcare systems in the United States and clarified the impacts of American bureaucracy and technological obsession on the high cost of hospital services. Based on that study, the roots of modern American healthcare system can be traced back to the 19<sup>th</sup> century. While Rosenberg (1995) argued that the hospitals became a special space to serve middle and upper class Americans, his study did not describe how specific social classes shaped both the indoor and outdoor environments of hospitals. As Starr (1984) asserted, the evolution of medicine, medical procedures, and hospital design can be seen as a metaphor of “The Social Transformation of Medicine” in the United States. The findings of this dissertation predicted that the future reformations of the American hospital system during the first decades of the 21<sup>st</sup> century will continue to influence and evolve their physical environments and therapeutic landscapes in many innovative ways. The existing literature did not discuss or properly predict the socio-cultural demands for more sustainable hospitals. Similarly, due to the scientific and technological advancements of the 20<sup>th</sup> century, the evolution of hospitals was comprehensively analyzed, while the impacts of healthcare institutions on their surrounding communities was missing. This dissertation investigated the consequential relationships between medical and technological advancements in hospitals and the evolution of their outdoor environments.

Additionally, it tried to assess the socio-cultural impacts of those therapeutic environments on their immediate neighborhoods.

#### **- Connections to Asylum Grounds**

The extensively landscaped grounds of American asylums in the 19<sup>th</sup> century were investigated through many works. One of the successful in-depth studies on therapeutic landscape was published by Ziff and Gladding in 2012. Their book comprehensively discussed the landscape and environmental conditions that influenced the restorative outdoor spaces of Athens Asylum as a golden example of this kind. They also presented how accommodation of political decisions, economic situations, and practicing moral treatment defined the healing gardens of that asylum. In addition, Yanni (2007) studied the Kirkbride plans across the United States, their evolution, and their decline. That study also discussed the impacts of neurological treatment and drug therapy on the degradation of asylum grounds. In addition to those studies that perfectly investigated the creation of architecture, landscape, and American culture in asylums, this dissertation offers a comparison among other types of hospitals, which may have similarities and differences in landscape design due to shared scientific and cultural values.

#### **- Sustainability and Hospital Design**

Recent publications have addressed the transformation of American hospitals since the 1960s and 1970's. For instance, Verderber and Fine (2000) described the diversification of hospitals based on their medical specialties. Calling them "the healing machines" imply the technological approach to the care of sick people during those eras and the diminishing restorative landscape. Later, Verderber (2010) provided a classification for contemporary hospital practices, and

focused on sustainability as the main theme of hospital industry. In his book, he concisely reviewed the changing characteristics of hospital site design and landscape from historic times to present days. Despite all of that, this dissertation provided a different classification of hospital design according to their approach to site planning and therapeutic landscape design.

### **- Healing Gardens and Restorative Environments**

Cooper-Marcus and Francis (1997) conducted an extensive research study on urban parks and other American public spaces. Their results provided a guideline for designing outdoor spaces including hospital sites. Later, in 1998, Rawlings classified healing gardens based on their restorative approaches and healing theories. Another study by Cooper-Marcus and Barnes (1999) discussed the benefits of healing gardens in hospitals settings and explored several case studies from psychiatric hospitals to general ones. Later Gerlach-Spriggs, Kaufman and Warner (2004) argued that the integration of restorative gardens into contemporary “factory-like” hospitals is a significant shift. They emphasized the historical role of therapeutic landscape in health institutions. Although a few post-occupancy evaluations of therapeutic gardens have been published. Cooper-Marcus and Sachs (2015) released the conclusion of their research that demonstrates the best practices of healing gardens in the United States. Finally, in 2015 Winterbottom and Wagenfeld used examples to show those therapeutic landscape practices that satisfy human demands, including learning and sensation. Extending the perspective of healing garden studies, this dissertation studied therapeutic landscape using prime examples of hospital design and the best practices of therapeutic landscape, and aimed to broaden the view to entire hospital campuses. According to the results of this dissertation, it can be argued that many possibilities still remain to be examined.

This goal can be implemented via a holistic approach to site planning instead of very targeted and small healing gardens. Additionally it can be claimed that the historical and cultural context in every health institution influences the creation and evolution of its healing landscape. This may change the original design over periods of time, whether to increase or decrease the restorative values of those landscapes.

### **- The Studies on Walter Reed Army Medical Center**

Regarding the case study, Walter Reed Army Medical Center (WRAMC), two valuable studies have been published<sup>87</sup>, which comprehensively documented the major constructions, gardens, therapeutic activities, and cultural events over a century. This dissertation tried to understand those engineering practices, socio-cultural events, and medical and restorative treatments that shaped the therapeutic landscape of Walter Reed Army Medical Center through a comparison to other examples. This dissertation studied Walter Reed Army Medical Center in a broader context of American military medicine and the therapeutic environment and cultural landscape of Washington, D.C. during the 19<sup>th</sup> and 20<sup>th</sup> centuries. The conclusion of this study argued that WRAMC and its gardens had a greater therapeutic and cultural impact than regular military or civic hospitals, because it was a flagship military hospital and a unique case in American medicine and the architectural history of hospitals.

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<sup>87</sup> First; Borden's Dream (2009), by Borden institute & Standlee. Second; Walter Reed Army Medical Center Centennial (2009) By Borden institute and Pierce et al.

## **-Therapeutic Environments and Cultural Landscape**

Gesler (1992) defined therapeutic landscape as those environments that are associated with a process of treatment and healthcare. The cultural landscape approach considers healing landscape as a symbolic space that represents the human belief and socio-cultural values via restorative and medical practices. According to Kearns and Gesler (1998), new approaches to health geography and therapeutic environments should be investigated through more qualitative approaches. Three major components of healing landscape include human interaction, social construction, and perceived meanings, all of which were defined by Gesler and Kearns (2002). Additionally Dunkley (2009) and Given (2015) argued that any study of spatial order of therapeutic environments should provide rigorous comprehension of the design and cultural elements. This dissertation focused on those embodied elements in therapeutic landscape of well-known examples and investigated human activities, and its perceived meanings within their socio-cultural contexts.

## **- Scientific Research and Contemporary Studies of Therapeutic Landscape**

Ulrich (1984) and Kaplan (1984) studied the restorative impacts of nature and view from windows to natural elements. Francis and Cooper-Marcus (1991) concluded that environmental conditions such as privacy and exposure to natural elements like water and plants result in some degree of healing. The studies by Pretty, Peacock, Sellens, and Griffin (2005), and Ward-Thompson (2011), described three significant ways to heal by being involved in nature. Recently, the correlation of the stress level of nurses and exposure to nature via windows was studied and its results emphasized the positive effects of viewing nature, not only for patients but also for staff (Pati, Harvey, & Barach, 2008). The results of the

study by Stigsdotter, et al. (2010) emphasized the benefits of proximity to green areas. Furthermore, activity in nature has been shown to improve positivity and effectiveness (Kaplan, 2001; Pretty, 2004). The importance of natural settings in urban environments has been studied and reported by Faber-Taylor, Kuo, and Sullivan (2001). Another study by Cimprich (2007) suggested that natural and biophilic environments improve human concentration. Considering the results and conclusions of the preceding studies, this dissertation extended the area of research on therapeutic landscape to the specific case of Walter Reed Army Medical Center (WRAMC) and the six critical examples. Additionally, this dissertation investigated therapeutic landscape practices through a historical lens and conventional practices to gain a holistic approach to the subject. It also aimed to explore the opportunities to reintegrate the extensive therapeutic landscape into modern hospitals.

### **Contribution to Methodologies**

This dissertation has applied a qualitative case study approach to study the therapeutic landscape of hospitals during the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States. Since the main goals of case study research studies are to expand and regenerate previously developed theories, this dissertation compared preceding theories and results on restorative environments to its case study, Walter Reed Army Medical Center. To strengthen the credibility of the research hypothesis, triangulation strategy in data collection and data analysis was applied. This qualitative approach utilized both the deductive reasoning (literature review, study of critical examples, and the case study), and abductive inference (interview analysis) to expand the understanding of the general theme of therapeutic landscape within both the historical context and contemporary practices. Within the discourse of therapeutic environments, the historical studies of hospital architecture and their

socio-cultural environments during the 19<sup>th</sup> and 20<sup>th</sup> centuries in the United States were explored. Also, the contemporary literature of restorative landscape has been investigated via the two methods of content analysis and spatial comparative analysis. Therefore, this dissertation innovatively synthesized three qualitative methods to tailor a case study approach that investigated the phenomena of therapeutic landscape at Walter Reed Army Medical Center via both its historical roots and modern developments during the 20<sup>th</sup> century. The elements of the framework are as follows: First, the spatial comparative analysis was implemented, as this study concerns both the historical and conventional developments of hospitals landscape. Second, thick description of the literature, including case study and critical examples, were applied to gain external validity. Third, semi-structured interviews were conducted to collect data from key informants of healing gardens and hospital design. The data was analyzed through content analysis methods to strengthen the reliability and validity of the results. Combining extensive literature review of therapeutic landscapes, content analysis of interview transcripts, and spatial comparative analysis of the golden examples of hospital design will be well integrated into studies of hospital architecture, history of medicine, and therapeutic landscape design. This invented qualitative framework will benefit the future studies of restorative environments, in addition to suggesting an integrated framework to research both the cultural landscape and healing gardens together.

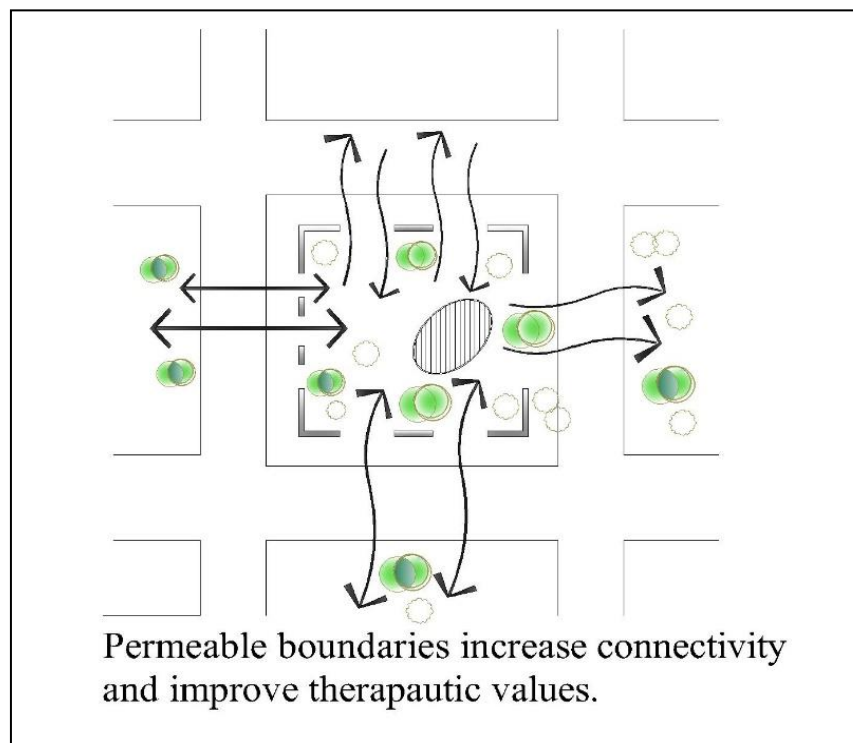
### **Contribution to Design Practice**

The results and conclusion of this dissertation indicated that several design and planning strategies can specifically improve the quality of hospital campuses and extend the restorative values of their landscapes. It is noteworthy that the implications of this study are applicable in both new hospitals and for improvements

to existing hospital environments. Therefore the design implications are classified as follows:

1. During the process of locating a site for new hospital or remodeling the site of existing healthcare facilities, several influential factors such as micro-climate, terrain and topographical characteristics, and natural elements on the sites that encourage or discourage the restorative properties of hospital landscapes, should be considered.
2. Considering the historical background, and the socio-cultural context of hospital sites, in planning and design can improve the sense of place in future or existing hospitals. Also, by doing this designers and planners can strengthen the hospital's identity and connect it to their communities, which impacts the healing value of those healthcare facilities.
3. According to the results of the studies by Pretty, Peacock, Sellens, & Griffin, (2005); Ward-Thompson (2011); and Jiang (2015), and the conclusions of this dissertation, it can be said that strategies such as person-nature engagement are applicable in every hospital site, in any scale, without limitations. These strategies can heighten the therapeutic characteristics of both the indoor and outdoor spaces in healthcare facilities.
4. The studies of Cooper-Marcus and Sachs (2015), Rawlings (1998) and the results of this dissertation concluded that there are many possibilities and opportunities to design and build a diverse type of healing gardens in hospitals regardless of their scale and specialties.
5. Increasing the connectivity to surrounding context, especially in urban areas, will extend the therapeutic impacts of hospital landscapes through the following strategies: making permeable boundaries around the sites, directly

connecting sites to urban open spaces, planning places for socio-cultural events, and designing visual connections to nature. These strategies also reactivate the socio-cultural roles of the healing landscape of healthcare facilities.



*Figure 76. Permeable boundaries in hospital sites provide space for socio-cultural activities (by author).*

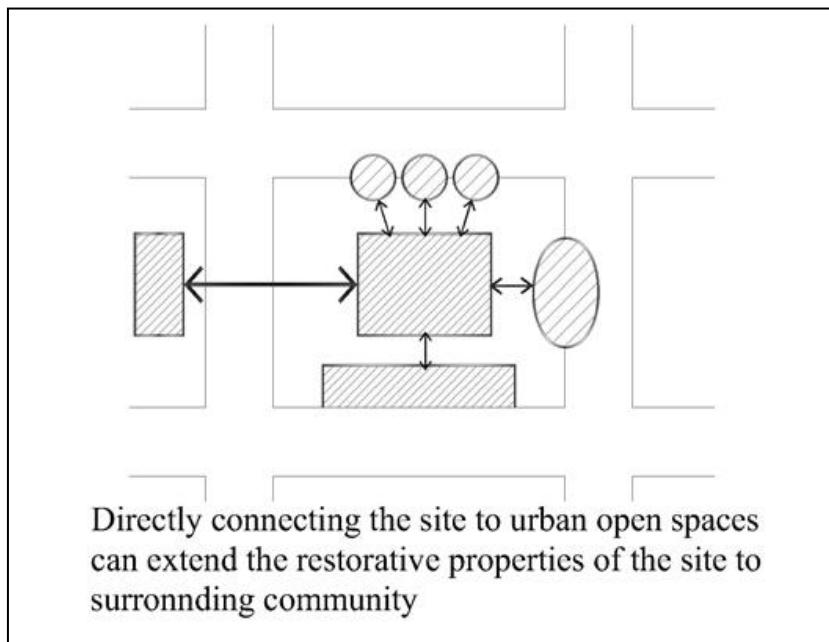


Figure 77. Connecting hospital campus to surrounding urban spaces (by author).

6. Other ideas include embracing landscape through building mass, such as V-shaped patterns, and embracing the building mass by landscape and gardens can positively influence both hospital sites and their indoor environments.

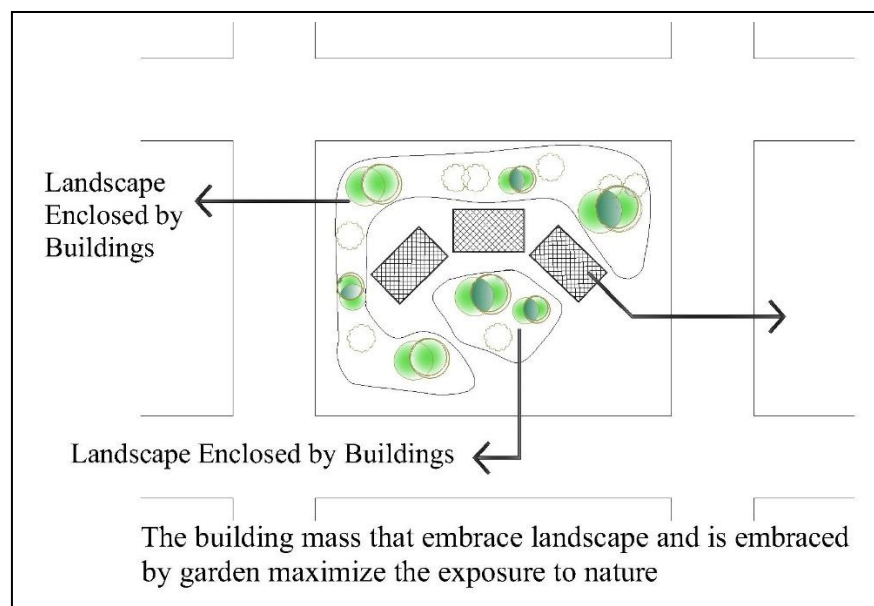
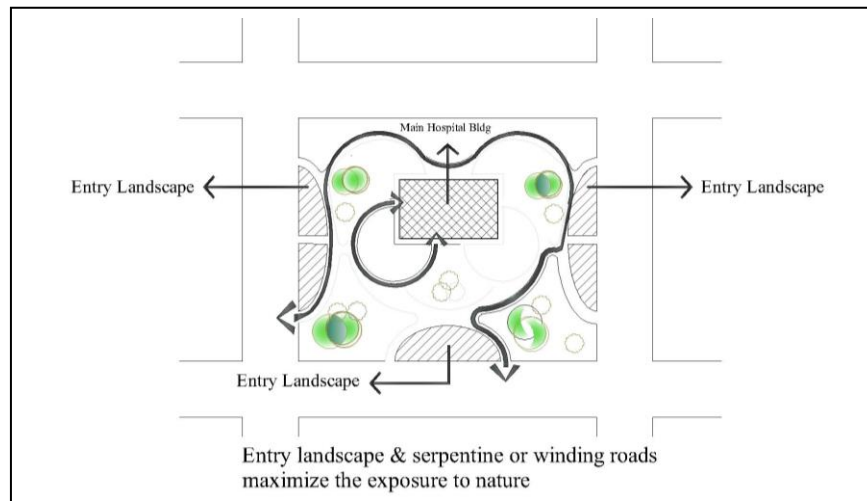


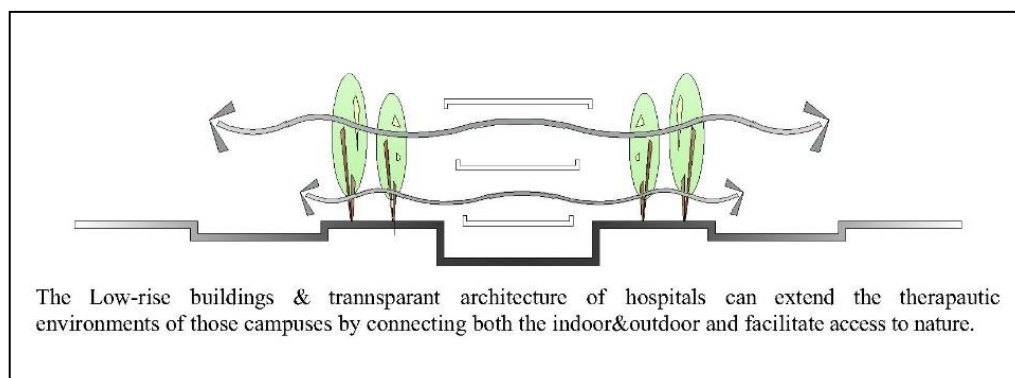
Figure 78. V- Shaped arrangement of hospital buildings embracing gardens (by author).

7. In addition to accessibility via naturalistic design of hospital outdoor spaces, designing serpentine roads and green entries can improve restorative values of nature in hospital campuses.



*Figure 79. Winding roads and green entries in hospital campus design (by author).*

8. In addition to the results of the previous studies, the conclusion of this dissertation emphasizes the architectural design, landscape planning, and engineering methods that improve the therapeutic values of landscapes in healthcare facilities. For example, both the low-rise buildings and transparent architecture improve the connectivity of indoor and outdoor environments; therefore extending views from inside to landscaped areas can improve the restorative value of hospital environments.



*Figure 80. Low-rise and transparent buildings encourage therapeutic benefits of landscape (by author).*

9. Conversely, high-rise buildings, locating parking lots and garages, in addition to densely constructed hospital campuses, will discourage the healing properties of their landscapes.

10. The results of this dissertation and the study by Schweitzer, Gilpin, and Frampton (2004) argue that ecological strategies not only can heal our environment and earth, but also have restorative influence via the metaphor of landscape in both hospital and non-hospital settings. Some of those ecological strategies are summarized as follows: using vernacular materials, native plants, storm water management, rainfall harvesting, and Green materials.

## **6.2. Limitations**

**First**, this dissertation used a pure qualitative approach to investigate therapeutic landscape. Although this research partially relied on the conclusions of some quantitative studies, and created a framework for assessing the restorative characteristics of landscape, it would be valuable if some data was collected and analyzed quantitatively to assist the final conclusion.

**Second**, although the sample size (the number of examples and case study) is typically limited in qualitative approaches, special comparative analysis of more critical examples would improve representative distribution of the examined population and probably increase the generalizability of the conclusion. To overcome this issue, the critical examples were selected through an extensive literature review.

**Third**, although the lack of available data and access to military hospitals did not impact the final conclusion of this research, the study of more military hospitals and their landscapes could extend the conclusions of this research.

**Fourth**, although there are many research studies on the healing gardens and therapeutic landscape, the lack of prior independent studies on the therapeutic landscape of hospitals and their evolution was a gap that this dissertation examined, which hopefully opened opportunities for future studies.

**Fifth**, using GIS data is beneficial for special-comparative analysis, however, the initial attempts to obtain this data were not successful.

**Sixth**, since the semi-structured interview was implemented to collect the data, that information might be subject to some unintentional biases, although these did not have a significant impact on the conclusion of the research. The sources of biases might be selective memories, attributions, and exaggerations by both the interviewees and author of this dissertation.

**Last**, there may be potential bias in data analysis due to the academic and professional background of the author of this study. This type of bias is always possible due to the personal interpretation involved in qualitative research.

### **6.3. Recommendations for Future Research**

This dissertation intended to provide a holistic framework to understand the creation, evolution, and degradation of therapeutic landscape in hospitals during the 19<sup>th</sup> and 20<sup>th</sup> centuries. It also tried to recognize architectural patterns, construction elements, and landscape strategies that improve and extend the restorative values of hospital landscapes.

**First**, although the conclusion of this study was proposed for hospital grounds, it will be valuable to examine this methodology for urban parks or other public spaces.

**Second**, as mentioned, integrating some quantitative data into qualitative studies will improve the validity of the results.

**Third**, according to the discussion and literature review of this study, during the 19<sup>th</sup> century American and European asylums applied therapeutic landscape in different ways; also there was a second alternative for mental hospitals inside the urban fabrics of American cities. The study of those typologies may extend the result of this research or open a new perspective.

**Fourth**, integrating hospital landscapes into their urban communities, and increasing connectivity to their surrounding neighborhood, not only will enhance the therapeutic impacts of hospital landscapes, but also improve their socio-cultural roles. Therefore, future studies on typology and an in-depth investigation of the socio-cultural significance of hospital landscapes will be valuable.

**Fifth**, since this dissertation studied three prime examples of military hospitals, its conclusion cannot be generalized to all military health care facilities of the 20<sup>th</sup> century. So, expanding this study and its method to more military hospitals will add value to the results of this dissertation by extending or modifying them.

**Finally**, investigation of therapeutic landscape in drought conditions in order to measure the restorative factors and generate design guidelines for hospital landscape in dry land will be beneficial for both academia and the public.

## Appendices

### A. UMD Institutional Review Board Decision



UNIVERSITY OF  
MARYLAND

INSTITUTIONAL REVIEW BOARD

1204 Marie Mount Hall  
College Park, MD 20742-5125  
TEL 301.405.4212  
FAX 301.314.1475  
irb@umd.edu  
www.umresearch.umd.edu/IRB

DATE: June 17, 2015

TO: Reza Mabadi

FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [756037-1] The Physical and Spatial Evolutions of Therapeutic Landscape within Hospital Grounds during the 19th -20th Centuries in the U.S.A

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: June 17, 2015

REVIEW CATEGORY: Exemption category #2

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the IRB Office at 301-405-4212 or [irb@umd.edu](mailto:irb@umd.edu). Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Maryland College Park (UMCP) IRB's records.

## B. CITI Training Certifications

### B.1. Social/Behavioral Research with Human Subjects

#### COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COURSEWORK REQUIREMENTS REPORT\*

\* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

• **Name:** Reza Mabadi (ID: 4837091)  
• **Email:** reza.mabadi@live.com  
• **Institution Affiliation:** University of Maryland College Park (ID: 1526)  
• **Institution Unit:** Plant Science & Landscape Architecture  
• **Phone:** 2407130058

• **Curriculum Group:** Social & Behavioral Research - Basic/Refresher  
• **Course Learner Group:** Same as Curriculum Group  
• **Stage:** Stage 1 - Basic Course  
• **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

• **Report ID:** 16057479  
• **Completion Date:** 06/02/2015  
• **Expiration Date:** 06/01/2018  
• **Minimum Passing:** 80  
• **Reported Score\*:** 97

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID:1127)	05/22/15	3/3 (100%)
Students in Research (ID:1321)	05/30/15	10/10 (100%)
History and Ethical Principles - SBE (ID:490)	05/31/15	5/5 (100%)
Defining Research with Human Subjects - SBE (ID:491)	05/31/15	5/5 (100%)
The Federal Regulations - SBE (ID:502)	05/31/15	5/5 (100%)
Assessing Risk - SBE (ID:503)	06/01/15	5/5 (100%)
Informed Consent - SBE (ID:504)	06/01/15	5/5 (100%)
Privacy and Confidentiality - SBE (ID:505)	06/01/15	5/5 (100%)
Research and HIPAA Privacy Protections (ID:14)	06/01/15	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID:488)	06/01/15	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID:14928)	06/01/15	5/5 (100%)
University of Maryland College Park (ID:13418)	06/02/15	No Quiz
International Research - SBE (ID:509)	06/02/15	5/5 (100%)
Internet-Based Research - SBE (ID:510)	06/02/15	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID:483)	06/02/15	3/4 (75%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program  
Email: [citisupport@miami.edu](mailto:citisupport@miami.edu)  
Phone: 305-243-7970  
Web: <https://www.citiprogram.org>

## B.2. Humanities Responsible Conduct of Research

### COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COURSEWORK REQUIREMENTS REPORT\*

\* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Reza Mabadi (ID: 4837091)
- **Email:** reza.mabadi@live.com
- **Institution Affiliation:** University of Maryland College Park (ID: 1526)
- **Institution Unit:** Plant Science & Landscape Architecture
- **Phone:** 2407130058
  
- **Curriculum Group:** Humanities Responsible Conduct of Research
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** This course is for investigators, staff and students with an interest or focus in the Humanities research. This course contains text, embedded case studies AND quizzes.
  
- **Report ID:** 17573629
- **Completion Date:** 10/09/2015
- **Expiration Date:** N/A
- **Minimum Passing:** 80
- **Reported Score\*:** 97

#### REQUIRED AND ELECTIVE MODULES ONLY

	DATE COMPLETED	SCORE
Responsible Conduct of Research (RCR) Course Introduction (ID: 1522)	10/09/15	No Quiz
Research Misconduct (RCR-Basic) (ID: 16604)	10/09/15	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	10/09/15	5/5 (100%)
Authorship (RCR-Basic) (ID: 16597)	10/09/15	5/5 (100%)
Peer Review (RCR-Basic) (ID: 16603)	10/09/15	5/5 (100%)
Mentoring (RCR-Basic) (ID: 16602)	10/09/15	4/5 (80%)
Conflicts of Interest (RCR-Basic) (ID: 16599)	10/09/15	5/5 (100%)
Collaborative Research (RCR-Basic) (ID: 16598)	10/09/15	5/5 (100%)
Responsible Conduct of Research (RCR) Course Conclusion (ID: 1043)	10/09/15	No Quiz
University of Maryland College Park (ID: 13418)	06/02/15	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program  
Email: [citisupport@miami.edu](mailto:citisupport@miami.edu)  
Phone: 305-243-7970  
Web: <https://www.citiprogram.org>

### B.3. Students conducting no more than Minimum Risk

#### COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COURSEWORK TRANSCRIPT REPORT\*\*

\*\* NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Reza Mabadi (ID: 4837091)
- **Email:** reza.mabadi@live.com
- **Institution Affiliation:** University of Maryland College Park (ID: 1526)
- **Institution Unit:** Plant Science & Landscape Architecture
- **Phone:** 2407130058
  
- **Curriculum Group:** Students conducting no more than minimal risk research
- **Course Learner Group:** Students - Class projects
- **Stage:** Stage 1 - Basic Course
- **Description:** This course is appropriate for students doing class projects that qualify as "No More Than Minimal Risk" human subjects research.
  
- **Report ID:** 17573628
- **Report Date:** 10/09/2015
- **Current Score\*\*:** 96

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	05/30/15	10/10 (100%)
University of Maryland College Park (ID: 13418)	06/02/15	No Quiz
History and Ethical Principles - SBE (ID: 490)	05/31/15	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	05/31/15	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	05/22/15	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	05/31/15	5/5 (100%)
Assessing Risk - SBE (ID: 503)	06/01/15	5/5 (100%)
Informed Consent - SBE (ID: 504)	06/01/15	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	06/01/15	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	06/02/15	Quiz Not Taken
International Research - SBE (ID: 509)	06/02/15	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	06/02/15	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	06/01/15	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	06/02/15	3/4 (75%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	06/01/15	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	06/01/15	5/5 (100%)
I Have Agreed to be an IRB Community Member. Now What? (ID: 13018)	10/09/15	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program  
Email: [citisupport@miami.edu](mailto:citisupport@miami.edu)  
Phone: 305-243-7970  
Web: <https://www.citiprogram.org>

### **C. The Academic and Professional Biographies of Interview Participants**

#### **1-Leila Batties (M.A., Communications, University of Miami)**

“She is a partner in Holland & Knight's Washington, D.C., office and a member of the firm's Real Estate Section and an adjunct professor at the University of Maryland in College Park. Ms. Batties focuses on land use and zoning and represents property owners, developers and investors. From 2010-2015 Ms. Batties was on the Board of Directors for the D.C. Housing Finance Agency, including a term as Vice Chair of the Board. In November, she was appointed to the Walter Reed Army Medical Center Site Reuse Advisory Committee as a community member representing the Shepherd Park neighborhood” (Knight, Holland &, 2016), where she was grew up and therefore has a valuable understanding of the Walter Reed Army Medical Center’s neighborhood.

#### **2-Doug Wrenn (MLA, North Carolina State University)**

“He is a Principal with Rodgers Consulting, Inc., where he directs the firm’s work on a broad range of urban planning and site development projects including healthcare facilities .He has directed multi-disciplinary teams on large-scale community planning and urban redevelopment projects, for both public and private real estate interests. He established a national reputation for his work in urban waterfronts, initially as author of the Urban Land Institute’s first book on the subject, and later as a planning consultant on numerous projects. In 2013, he was the panel chair of the “Temporary Uses at the former Walter Reed Army Medical Center”, which was held by Urban Land Institute Washington D.C” (ULI Washington, 2016).

3- **Clare Cooper Marcus** ,Professor Emeritus in the Departments of Architecture and Landscape Architecture at the University of California, Berkeley, Clare Cooper Marcus is internationally recognized for her pioneering research on the psychological and sociological aspects of architecture, land-use planning, and landscape design – and is particularly interested in the distinguishing elements of public spaces such as the gardens around hospitals, care facilities, and public housing estates. Her use of methods derived from Gestalt Therapy, and concepts from Jungian psychology have allowed her to closely examine people’s relationships and attachments to their homes, which is best illustrated in her internationally-renowned book *House as Mirror of Self* (1995). Her most recent work, *Healing Gardens: Therapeutic Benefits and Design Recommendations* (1999), which won the EDRA Award for Place Research in 2000, focuses on the therapeutic benefits of gardens in hospitals and other health care facilities. And *People Places: Design Guidelines for Urban Open Space* also received a Merit Award from the American Society of Landscape Architects in 1993. Cooper Marcus is an associated partner of Healing Landscapes, a consulting firm that specializes in user-needs analysis related to the programming, design and evaluation of outdoor spaces in health care settings” (University of California Berkeley, 2016).

#### 4- **Wilber Tib Tusler**, FAIA, FACHA

“Wilber "Tib" Tusler, FAIA, FACHA, healthcare architect, planner, educator, and researcher exemplifies leadership in healthcare. Tib has focused his career on programming, research, and service to the profession. A graduate of Virginia Tech and MIT, Tib Tusler distinguished himself as a leader of the programming group at SMP in San Francisco. He was a leader in the implementation of the VA building system, research studies on regional planning methodologies, and the application of

computer planning tools to health care design. Mr. Tusler has served as a member of the AIA Academy on architecture for health for over 35 years, serving as chair of the Academy in 1988. He chaired the research committee, leading its transformation into the Coalition for Health Environments Research (CHER), later merged with efforts of the Center for Health Design. Tib Tusler continues to serve the profession as a Board member of the American College of Healthcare Architects and the research board of the Center for Health Design” (Hamilton, 2016).

**5- Sanders Marble, (PhD from King’s College London)**

He is a Senior Historian, in Office of Medical History Office of the Chief of Staff, US Army Medical Command. He has written or edited eighth books and a number of articles on World War I, and military medicine. He is a senior historian at the U.S. Army Office of Medical History, and has worked as a historian at the Smithsonian and Walter Reed Army Medical Center (U.S. National library of Medicine [NIH], 2016).

**6- Frederick O. Foote, MD.**

“Frederick O. Foote, MD, a retired U.S. Navy physician, leads the Epidauros Project, which aims to integrate whole-person care in hospitals and clinics throughout the U.S. Military Health System. A practicing neurologist for 20 years, Dr. Foote served at the National Naval Medical Center (NNMC) in Bethesda, MD, in numerous positions, including chairman of the NNMC Ethics Committee and team leader of the Neurosciences Service Line. He is an adjunct assistant professor at The Uniformed Services University of the Health Sciences, Health Services Administration. His forthcoming book of poetry, to be published by Grayson Books, was inspired by his experiences in Afghanistan treating the wounded of the Iraq/Afghanistan Wars” (The Institute for Integrative Health, 2016).

**7- Naomi Sachs, ASLA, EDAC, and MLA.**

“She is currently a PhD candidate in Architecture at Texas A&M University within the Center for Health Systems and Design. For her dissertation, Naomi is developing a standardized toolkit for the evaluation of gardens in healthcare facilities. She is the recipient of the 2014 Center for Health Design New Investigator Award and the 2012-2013 W. W. Caudill Endowed Graduate Research Fellowship in Architecture. Naomi is Founding Director of the Therapeutic Landscapes Network, a knowledge base and gathering space that provides information, education, advocacy, and inspiration about landscapes that promote health and well-being. The TLN website, [www.healinglandscapes.org](http://www.healinglandscapes.org), serves a global, interdisciplinary network of designers, health and human service providers, scholars, and garden and nature enthusiasts. As her “day job,” Naomi is Editorial Assistant for Health Environments Research & Design Journal (HERD). Naomi serves on the faculty at the Chicago Botanic Garden Healthcare Garden Design Certificate of Merit program; the Center for Health Design’s Environmental Standards Council; and the Editorial Review Board for the American Horticultural Therapy Association’s *Journal of Therapeutic Horticulture*. She is Past Chair of the American Society of Landscape Architects’ Healthcare and Therapeutic Design Professional Practice Network. While living in Beacon, NY, Naomi served on the City of Beacon Planning Board and as Chair of the City of Beacon Tree and Streetscape Committee. Naomi Sachs Design offers landscape design and consulting services for healthcare, commercial, public, and residential clients with a focus on restorative landscapes and evidence-based design (EBD)” (Therapeutic Landscapes Network, 2016).

#### **D. Semi-Structured Interview Script and other Information regarding the Interview Process**

##### **Interview protocol:**

The Physical and Spatial Evolutions of Therapeutic Landscape within Hospital Grounds during the 19<sup>th</sup> -20<sup>th</sup> Centuries in the U.S.A. An investigation in the spatial perception of healing, and a study of historical-cultural evolutions of the changing landscape of the Walter Reed Army Medical Center.

**Expectation of interview:** An interpretation of design fashions by examining the evolving cultural values and the spatial perceptions of hospital sites in the United States during the 19th and 20th century, overall and within the case study (Walter Reed Army Medical Center).

**General Setting<sup>88</sup>:** Semi-structure interviews have been conducted to collect data from participants, regarding their perception of healing spaces and landscape. The purposeful sampling, that is common in the most types of qualitative researches, is used in order to find the key informants to interview.

**Time of interview:** 30-45 minutes for each interview

**Place:** It will be determined by interviewees' convenience

**Interviewer:** Reza Mabadi, Ph.D. candidate from the University of Maryland

**Interviewee:** The data collection has been done in different layers. The interview has been conducted through the different layers of informants; briefly two major types of key informants and experts have been interviewed. That includes landscape designers and landscape historian and other cultural experts, which make 7 interviews in total.

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<sup>88</sup> **Important Note:** There are some supplementary documents such as historical pictures, maps from historic periods, which will be presented to respondent for specific and corresponding questions.

**Questions:**

Semi-structured interview script: Sub questions are to be used if more exposition on the topic is necessary from the respondent.

1. In general, how would you define the word “therapeutic”?

1.1. Are there physical elements that encourage or represent healing?

1.2. Are there non-physical things that represent or encourage healing?

2. How much are the cultural values involved in healing characteristics of this site?

2.1. What are those cultural values that encourage or discourage the healing character of space here?

2.2. Do those cultural values directly or indirectly impact the healing dimensions of landscape? (Such as religious; gender, class, wealth, poverty, collective memories, historic narratives...)

3. How much ecological considerations and environmental conditions are involved in healing aspects of landscape within this site (Walter reed Army Medical Center).

3.1. What are those ecological considerations?

3.2. To what degree do they affect the perception of healing within the site?

4. How does this constructed site represent “healing” in your mind?

4.1. Do you think that healing is just an “idea” in your mind? Or something that is outside and obvious?

4.2. Do you think that space can contain healing and be therapeutic independently? In the case of “Yes” and “No” please explain “Why?”

5. Do you consider this hospital site, Walter Reed Army Medical Center, as the healing landscape?

- 5.1. Why, if Yes or No, please explain!
- 5.2. In general, how can the hospitals (both interior and exterior spaces) turn to the therapeutic landscape more efficiently?
6. How does historical background of this medical center represents wellness to you?
7. How can social connections in neighboring communities be used in a hospital site to encourage “public healing”?
8. What are the significant scientific advances that have shaped therapeutic features of this landscape during its operation in the last century?
9. Are there any religious connections with healing which impact or shape the therapeutic landscape of this site? What are those?
10. How can this site encourage the “healing” in surrounding communities?
11. What characteristic of this site design represents, improves, or hinders the therapeutic perception of its landscape?
12. Do you think that the changes in military culture and medicine impacted the landscape of hospital to be more or less therapeutic comparing with other hospitals?
13. What are those significant elements of military culture which had or has impact (both negative and positive impacts) on therapeutic characteristic of the place?
14. How the therapeutic background of the hospitals grounds should be considered in the recent zoning regulations and the new development plan of the site?
15. What are your most important recommendations and major considerations in respect to the future development of the site? (They can be personal and specific or general). Why you have chosen them?

## Interviewees

The study and analysis of subjective meaning within the therapeutic landscape of the 19<sup>th</sup> and 20<sup>th</sup> centuries demand two different types of investigation. The first was conducted through an extensive literature review and collecting data from primary sources and secondary sources. The second was the investigation of contemporary experiences and perception of therapeutic landscape, through interviews, especially in regard to the selected case study, the Walter Reed Army Medical Center (WRAMC) or other recent practices. Therefore, two specific groups have been interviewed, in order to translate the subjective meaning of therapeutic landscape in both the “19<sup>th</sup> and 20<sup>th</sup> centuries in the United States” and the “WRAMC”. The population of interviewees is selected according to the interdisciplinary nature of research. Thus, it is expected that the result in addition to the therapeutic design and history, contributes to other disciplines, such as history of science and medicine, healthcare design, and military medicine studies. Therefore, a limited number of experts in healthcare design, healing landscape design, and military studies, and history of medicine have been interviewed. *This dissertation specifically focused on WRAMC, as the case of study to examine its hypothesis.* Thus, a number of cultural experts, municipal administrators of Washington, D.C., and scholars that have been involved in the WRAMC were among the interview population (see Appendix C). This study interviewed seven key informants chosen at random representing all genders and races. The patients and their families have not been interviewed and also no personal and private question have been asked.

## **Participant Sampling**

In this research, the main method of selecting interviewees was “*Purposeful Sampling*” therefore, informants have been contacted in these ways:

3. Through the literature review, the first set of people according to their availability, interest, and expertise is contacted. This strategy is called “*Opportunistic Sampling*”.
4. After reaching out to the first set of interviewees, they have been asked to introduce people who can contribute to the research by interviewing them; thus, the “*Snowball or Chain Referral Sampling*” was applied as well. Through the snowball sampling, the first set of interviewees were asked to recommend other experts, with the same or close discipline in the research domain, who might be interested in contributing to this study. In the case where the initial participant didn’t introduce any contact, additional opportunistic sampling was considered to find other informants.

## **Interview Questions**

*The script of semi-structured interview questions* has been attached as an appendix at the end of the dissertation (see Appendix D). This questionnaire was specifically designed for the second type of interviewees, who had a connection or experience with the WRAMC. There are main questions and some of them have sub-questions. These questions have been classified from general at the beginning to more specific, and narrowed down questions, at the end. Any of those questions aim to open a window to a different aspect of the main theme of the research, such as: physical and design elements of therapeutic landscape, general and specific perception of healing, cultural values that impact healing and site, social aspects of healing, historical background and site characteristics.

## **E. The Report of Site Visit**

Site Visit: The photos were taken by the author of this research during the site visit in the early September 2015.



*Figure 81. View from the Main drive to the Main Building, or Old Walter Reed Hospital.*



*Figure 82. The Hoff Memorial Fountain in front of the Main Building.*



*Figure 83. View to Rose Garden, Gazebo and the smoke towers.*



*Figure 84. The fountain in the Rose Garden.*



*Figure 85. View from the General George Glennan fountain to rose Garden and Pergola.*



*Figure 86. View from the terrace of Abrams hall to the “Main Building” that shows the topography and slopes of the land.*



*Figure 87. The serpentine road, the “Main Drive”, from Memorial Fountain to west side of the site.*



*Figure 88. The Walter Reed Memorial on the Delano Circle.*



*Figure 89. The exercise trail is located on the west side of the campus.*



*Figure 90. The courtyard garden of Abrams Hall.*



*Figure 91. The “New Hospital”, Heaton Pavilion and its underground parking garages.*

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