

ABSTRACT

Title of Thesis: A DESIGN FOR NATURE RX ON THE
UNIVERSITY OF MARYLAND CAMPUS

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There has been a rising trend of mental health issues among college students. Studies have shown that time spent engaged in nature activities such as forest bathing can improve physical and mental health. *Shinrin-yoku*, or forest bathing, originated in Japan and is the practice of walking through the forest and processing all of its elements through sensory observation. As a designated arboretum, the University of Maryland (UMD) College Park campus possesses an untapped resource that can increase greenspace exposure for UMD students and open the doors to forest bathing opportunities. Through a literature review and site inventory and analysis, I have developed a design that centers around forest bathing practices and infuses the principles of Nature Rx@UMD, an initiative that prioritizes the natural environmental benefits of UMD campus. The Campus Creek Nature Rx@UMD site invites users to slow down, notice elements of the forest for mindful awareness and be restored.

A DESIGN FOR NATURE RX ON THE UNIVERSITY
OF MARYLAND CAMPUS

by

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Preface

Why Nature Rx@UMD?

It was only about three years ago that I learned about the term “forest bathing,” which is a direct translation from the Japanese term, *Shinrin-yoku*, defined as to “bathe in the environment of the forest, using all your senses to experience nature up close” (Miyazaki, 2018, p. 9). This practice is done by walking slowly through the forest in no hurry for a morning or afternoon (Miyazaki, 2018). During studio in my second semester of the Master of Landscape Architecture (MLA) program, we worked on a project at Brookside Gardens to address their drainage issues while also enhancing the user experience with seating areas and pathways. In researching inspirational images, our studio came across photos of people “forest bathing” as a way of connecting to and relaxing in nature. From an early age I had always connected with nature and knew that forests had a healing power, but I never had the verbiage to make the correlation.

I had not yet chosen a thesis topic and was inspired by the concept and philosophy of forest bathing. Initially, I had planned to design an area closer to my home in Howard County. When I learned of the NatureRx@UMD program and the Agro-Ecology Corridor, I thought a designed space specifically for NatureRx@UMD on the University of Maryland (UMD), College Park campus would be beneficial for students, as well as for faculty and staff. The UMD campus is picturesque with beautiful grounds, iconic buildings and the treasured Testudo mascot sculptures. As a student myself, I saw the great value of creating a space on campus for the mental and physical well-being of students.

This MLA thesis proposes a design for a new “Nature Rx@UMD” space along Campus Creek. The design, informed through a literature review of relevant research, site visits, and site inventory and analysis, seeks to improve the overall health and well-being of UMD students by creating a network of paths and spaces in a natural and forested setting on the campus.

Personal Forest Bathing Experience

After learning about forest bathing, I wanted to have my own experience. I sought out two different styles of forest bathing techniques. The first was close to my home in Ellicott City, at the Howard County Conservancy, which coincidentally was where I had my wedding the year before. The forest bathing session was led by Thomas Wardell, who was completing his training to be a certified forest therapy guide through the Association of Nature and Forest Therapy (www.natureandforesttherapy.org). He mentioned that he is of Native American heritage and that the philosophy of forest bathing speaks to his heritage and even holds parallels.

Thomas led us through the forest bathing steps based on Amos Clifford’s book, *Your Guide to Forest Bathing* (2018). The group met on a warm September afternoon. We gathered around picnic tables for introductions. Thomas went over his background, how he came to hear about forest bathing and what the practice meant to him. He spoke about the hours he spends as a truck driver and one day hearing a story on National Public Radio about forest bathing and it piqued his interest. There were nine participants; a few participants knew Tom, but most were interested in

connecting with nature and believed in the philosophy of nature as a healing tool. Before we began our forest bathing journey Tom explained that after every “invitation/immersion” (Clifford, 2018, p. 61) there would be time for a sharing circle where each participant was invited to share with the group how they felt, what they noticed around them and also inside themselves. He also expressed the importance of disconnecting and unplugging from the outside world by switching off our mobile phones.

For the first invitation, Tom explained that we were at the “threshold” of our forest bathing experience. We were invited to sit on the ground, close our eyes, and listen while touching the ground’s grass and vegetation near us. We were also encouraged to stand facing the sun and to be grounded and focused on our intention for this experience. From the threshold our next invitation was to walk along the path, which was mowed to designate a walking path. With Tom leading, we followed, walking as slowly as possible, not passing his pace, designed to soak in and intentionally be aware of the elements around us by touching, smelling, seeing, hearing. This invitation was about 15 minutes, only covering approximately 50 yards.

With the next invitation we were to find our “sit spot.” The sit spot was intended to help us notice where we were and engage all of our senses, and to create a restful mind and body. This could be anywhere within close range of Tom. I chose a spot leaning against a tree near a stream. After being in our sit spot for 20 minutes Tom had us buddy up and show the other person where our sit spot was and talk about what we liked about it. This portion was the first time that we conversed, and it was an hour into our time together. The final invitation was the “tea ceremony.” We

gathered where Tom had set up a tablecloth on the ground. On the tablecloth were nine cups and snacks. The tea ceremony is a place for people to gather and discuss their experiences. During this invitation, Tom talked about the importance of nature and the invitations. One of the things I found profound about Tom and his teaching/guiding was the wolf call. He used this call to alert and gather everyone together.

I learned more than I thought I would have when participating in this experience. I have walked through many forests, but never with such intention of immersion. Taking the time to slow my pace and isolate all the elements around me quieted my “monkey brain.” Due to the structure of the experience I felt more grounded when sitting, more comfortable speaking in the share circle, and our group felt connected to each other and isolated from everything else. I ended up truly enjoying this experience and gaining a lot of tools that I could use in the future.

My second forest bathing experience was in the evening, during a full moon, at the National Arboretum in Washington, D.C. This was not a typical forest bathing experience because it was only held one weekend a month during a full moon. I was eager to have another forest bathing experience under my belt to better understand the different ways that people lead and teach the art of *Shinrin-yoku*. About 20 people gathered after hours outside the Arboretum’s visitor’s center. Our guide was Clare Kelly, a D.C. resident who had found a home in nature and wanted to communicate and translate the art of forest bathing to her city community.

Similar to my first forest bathing session, we gathered in a group for introductions and Clair spoke about the intention of the practice. She then invited all

of us to share who we were, where we were from, and what made us decide to have this new experience. Although it was also based on Amos Clifford's book, Clare's version was much more relaxed and less structured. It was helpful to experience first-hand these two very different forest bathing techniques.

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It is almost impossible to get through life without help from others. Luckily, I have a wonderful and patient wife, Ashley Lohmeyer, who helped me through all of graduate school. I want to thank her times a million for her support and navigation through the past three years. I would not be anywhere without the unwavering encouragement from my mother, Patricia G. Wallace. She saw my creative side at an early age and was smart to never allow coloring books, but only blank sketch pads to draw from my imagination. I want to thank my in-laws, Mike & Rachel Lohmeyer for taking a huge interest in my degree and allowing me set up on the ping-pong table in their basement as my studio.

Completing a thesis during a global pandemic was not ideal, but my committee was very adaptable and forgiving. Thank you to my Chair, Dr. Naomi A. Sachs and thesis committee, Dr. Jennifer Roberts, Dr. Joseph Sullivan and Professor Dennis Nola. It was a pleasure working with all of you and the entire LARC department over the past three years.

It was the forest bathing experiences I took that helped me gain a better understanding of what it truly means to engage in nature. I'm so happy to have met Thomas Wardell and Clare Kelly. Both of you do inspiring work as forest therapy guides and I may consider pursuing this vocation to further help others connect with nature.

Thank you to Dr. Olivia Mays, Mental Health & Stress Management Coordinator at UMD Health Services. Our conversation regarding student mental health on the UMD campus was enlightening. Thank you to Dan Hayes (Architect, UMD Facilities) for the vast knowledge of UMD history. Though I never spoke directly to Lexie Mayewski (Project Manager, Campus Creek Restoration Project, Heery Engineering/UMD) she was very helpful in setting me up for success with all the information regarding the Campus Creek Restoration Project. I greatly appreciated the site inventory and the Construction Documents you provided. Karen Petroff, for tree advising on the Nature Rx@UMD site. Don Rakow for taking the time for a Zoom meeting and sharing your vast knowledge of campus Nature Rx.

To the students of LARC340 in the Fall of 2019, it was a pleasure being your TA for not only that semester, but two others over the last three years. I enjoyed working with all of you and watching your designs unfold. I look forward to crossing paths in the future.

Last, but not least, to our “small but mighty team”, Studio S. It was great working with you over the past three years and wish you both the best.

Table of Contents

Preface	ii
Acknowledgements	vii
Table of Contents	viii
List of Figures	x
Chapter 1: Literature Review	1
1.1 Forest Bathing History Internationally and in the United States	1
1.2 Terms and Definitions Related to Nature Therapy	2
1.3 Nature: Its Benefits for the Mind, Body and Soul	4
1.4 The Mental Health of College Students in the United States	5
1.5 Mental Health Resources on UMD Campus	8
1.6 An Overview of Campus NatureRx in the United States	9
Chapter 2: Methods	12
2.1 Site Selection: Existing Nature Rx@UMD sites & potential sites for Nature Rx on the UMD College Park Campus	12
Existing Nature Rx@UMD Sites	12
Narrowed Down to Four Sites	13
2.2 The Site: Campus Creek	15
Opportunities & Constraints	16
Boundaries & Connections	17
2.3 Site Inventory and Analysis	18
Physical	18
Biological	25
Cultural	27
Site Visits	33
2.4 Aligning with the UMD Agro-Ecology Corridor	34
AGNR's Strategic Initiative	35
The Agro-Ecology Corridor	36
Fall 2019 Student Design in LARC340	36
2.5 Conclusion	38
Chapter 3: Nature Rx@UMD Campus Creek	39
3.1 Nature Rx@UMD Campus Creek Design Goals and Objectives	39
Objectives	39
Conceptual Diagram	40
3.2 Program: Design Brief, and the Language of Forest Bathing	41
3.3 The Spaces	43
Nature Hangout	44
Community Area	47
Mindful Meditation	48
Sensory Pergola	51
3.4 Design Elements	54
3.5 Plant Material	58
3.6 Maintenance	59
3.7 Programmed Activities in the Nature Rx@UMD Space	60

Chapter 4: Discussion	63
4.1 Limitations.....	64
4.2 Future Research	64
Chapter 5: Conclusion	66
References.....	67

List of Figures

All figures are by the author unless otherwise noted.

Figure 1.1	<i>A Timeline of Forest Bathing & Nature Rx Organizations</i>	p. 3
Figure 2.1	<i>Existing Nature Rx Sites on UMD Campus</i>	p.13
Figure 2.2	<i>Four Potential Sites</i>	p. 15
Figure 2.3	<i>Physiographic Provinces of Maryland</i>	p. 19
Figure 2.4	<i>Watersheds and Floodplains of Maryland</i>	p. 20
Figure 2.5	<i>Maryland Hardiness Zone Map</i>	p. 21
Figure 2.6	<i>Site Elevation Map</i>	p. 22
Figure 2.7	<i>Slope Map</i>	p. 23
Figure 2.8	<i>Soil Map</i>	p. 24
Figure 2.9	<i>Precipitation in College Park, MD</i>	p. 25
Figure 2.10	<i>Campus Creek Restoration Project</i>	p. 26
Figure 2.11	<i>Tree Inventory (100+ of species outlined in red)</i>	p. 26
Figure 2.12	<i>Historical Markers Surrounding the Nature Rx Site</i>	p. 27
Figure 2.13	<i>Forest Conservation Easement within Nature Rx Site</i>	p. 28
Figure 2.14	<i>Campus Creek Restoration Project Map</i>	p. 29
Figure 2.15	<i>Red Benches Near Creek</i>	p. 30
Figure 2.16	<i>Handprint on Tree</i>	p. 30
Figure 2.17	<i>Makeshift Pathway to Creek</i>	p. 30
Figure 2.18	<i>Circulation Map</i>	p. 31
Figure 2.19	<i>Campus Construction Near the NatureRx@UMD Site</i>	p. 32
Figure 2.20	<i>Campus Call Box Locations</i>	p. 32
Figure 2.21	<i>Campus Creek</i>	p. 34
Figure 2.22	<i>Oakland Hall (February)</i>	p. 34
Figure 2.23	<i>Public Health Building</i>	p. 34
Figure 2.24	<i>Path to Terrapin Garage</i>	p. 34
Figure 2.25	<i>Oakland Hall (May)</i>	p. 34
Figure 2.26	<i>Foot Bridge to Lot UU</i>	p. 34
Figure 2.27	<i>AGNR's Five Strategic Initiatives</i>	p. 35
Figure 2.28	<i>Agro-Ecology Corridor Map</i>	p. 36
Figure 2.29	<i>Proposed Site Designs for UMD Farm Expansion</i>	p. 37
Figure 3.1	<i>Conceptual Diagram of Nature Rx Design</i>	p. 40
Figure 3.2	<i>Hand Sketch of Proposed Signage at Nature Rx@UMD Site Entrances</i>	p. 41
Figure 3.3	<i>Nature Rx@UMD Site Plan</i>	p. 44
Figure 3.4	<i>Nature Hangout Site Plan</i>	p. 45
Figure 3.5	<i>Nature Hangout Site Plan with Section Elevation Cut Line and Perspective Viewshed</i>	p. 46
Figure 3.6	<i>Section Elevation Through Entry, Stationary Hammocks & Hammock Posts</i>	p. 46
Figure 3.7	<i>Perspective from Path Looking South Towards Oakland Hall</i>	p. 47

Figure 3.8	<i>Community Area Site Plan</i>	p. 48
Figure 3.9	<i>Mindful Meditation Site Plan</i>	p. 49
Figure 3.10	<i>Section Through Platform, Pathways, Stream & Elevated Sidewalk</i>	p. 50
Figure 3.11	<i>Perspective from Lot SSI Looking at Proposed Entry Patio & Seating</i>	p. 50
Figure 3.12	<i>Sensory Pergola Site Plan</i>	p. 52
Figure 3.13	<i>Sensory Pergola Section Elevation Cut line and Perspective Viewshed</i>	p. 52
Figure 3.14	<i>Section Through Archways, Pergola, Stream, Proposed Land Bridge and Wellness Way</i>	p. 53
Figure 3.15	<i>Perspective of Entry on Wellness Way to Pergola Area</i>	p. 53
Figure 3.16	<i>Perspective of Pergola Area Facing North Toward the Xfinity Center</i>	p. 54
Figure 3.17	<i>Elevated Pathway</i>	p. 55
Figure 3.18	<i>Forest Bathing Trail Concept</i>	p. 55
Figure 3.19	<i>Platform Inspirational Image</i>	p. 55
Figure 3.20	<i>Platform Inspirational Image Section</i>	p. 55
Figure 3.21	<i>Pavilion Inspirational Image</i>	p. 56
Figure 3.22	<i>Lighting Inspirational Image</i>	p. 56
Figure 3.23	<i>Lounge Benches</i>	p. 56
Figure 3.24	<i>Stationary Hammocks</i>	p. 56
Figure 3.25	<i>Boulder Seating</i>	p. 57
Figure 3.26	<i>Boulder Seating Section Elevation</i>	p. 57
Figure 3.27	<i>Pergola Inspirational Image</i>	p. 57
Figure 3.28	<i>Archway Inspirational Image</i>	p. 57
Figure 3.29	<i>Informational Signage</i>	p. 58
Figure 3.30	<i>Low Profile Wayfinding Plaque</i>	p. 58
Figure 3.31	<i>Proposed Species Table</i>	p. 59
Figure 3.32	<i>Student Organizations</i>	p. 62

Chapter 1: Literature Review

1.1 Forest Bathing History Internationally and in the United States

The origins of forest bathing stem from the early 1980s, when the term *Shinrin-yoku* was first introduced in Japan. Tomohide Akiyama, former director of the Japanese Forestry Agency, linked health benefits to time in the forest. (Li, 2018). The concept was a way to encourage the citizens of Japan to use the thousands of miles of forest in their country for therapy. *Shinrin-yoku* is derived from Shinto and Buddhist practices, which both have a strong connection to nature (Li, 2018). Though not directly a “forest bathing” organization, Nature Sacred (formerly the TKF Foundation), started in 1996 and has recently been exploring its value in the forest bathing movement (*Forest Bathing in Sacred Places*, 2019). Healthy Parks, Healthy People started in Victoria, Australia as a movement to connect people to nature for preventative and restorative health benefits (<https://www.parks.vic.gov.au/healthy-parks-healthy-people>). This movement has spread to many countries including Canada, Finland, Scotland, Singapore, South Africa, South Korea, and the United States (<https://www.parks.vic.gov.au/healthy-parks-healthy-people>). In the early 2000s the Healthy Parks, Healthy People movement came to the US National Park Service. In 2012, Amos Clifford started the Association of Nature and Forest Therapy to help train people to become guides to lead forest bathing experiences. Park Rx America began in Washington, DC in 2017 to help connect people with the outdoors. Figure 1.1 is a graphic timeline of forest bathing; Nature Rx and four of the many colleges that have some type of nature-based wellness initiative are outlined in yellow.

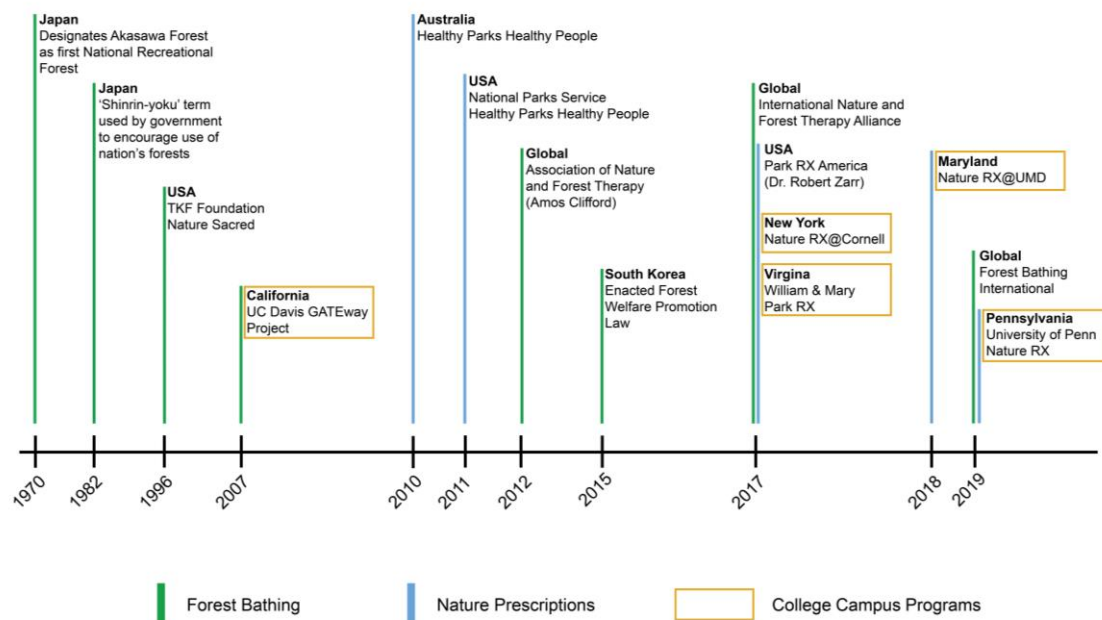


Figure 1.1

A Timeline of Forest Bathing & Nature Rx Organizations

1.2 Terms and Definitions Related to Nature Therapy

Many different words and terms are used to describe the connection with and healing power of nature, including nature therapy, green prescriptions, nature prescriptions (“Nature Rx”), forest therapy, *Shinrin-yoku*, forest bathing, and ecotherapy. Throughout this document, the terms forest bathing and nature therapy will be interchanged to mean the overall restorative aspect that nature brings to our physical and mental health. The act of surrounding oneself with natural stimuli in order to restore a calm sense of being is what I believe to be both nature therapy and forest bathing. The term Nature Rx will refer to the use of nature as a means to directly treat a certain ailment such as depression, anxiety or high blood pressure.

Shinrin-yoku is defined as “staying and or walking in forests in order to promote physiological and psychological health by breathing in the volatile substances released by trees” (Morita et al., 2007, p. 55). In the article, “Psychological effects of forest environments on healthy adults” the researchers revealed that emotions and feelings are improved by practicing *Shinrin-yoku* (Morita et al., 2007). The study was conducted in Tokyo University Forest, Chiba, Japan with 498 participants, both male and female. It was done to survey students’ emotional state and enjoyment before and after walking in the forest on four separate visits. The average time spent in the forest was two hours and 20 minutes. The majority of participants enjoyed time spent in the forest, while no one responded with a dislike of the forest environment (Morita et al., 2007).

In a review of the research on the physiological effects of nature therapy in Japan, the authors define nature therapy as “a set of practices aimed at achieving ‘preventive medical effects’ through exposure to natural stimuli that render a state of physiological relaxation and boost the weakened immune functions to prevent disease” (Song et al., 2016, p. 2). The first investigation, conducted in 1990, reviewed in the article, was on the physiological effects of being in a forest environment by testing salivary cortisol (a stress hormone) levels. This study sample was small but showed that time in nature did reduce stress (Song et al., 2016). Later, between 2005-2015, more experiments were conducted measuring cortisol levels, heart rate variability, blood pressure, and pulse rate to show the effects of relaxation. The study was done with 744 participants to test their stress response. These studies were conducted with multiple variables including: urban green space, plant therapy, visual stimulation, olfactory stimulation, wooden material, and tactile stimulation. The authors of the review concluded that “the therapeutic effects of

natural stimulation suggest simple, accessible, and cost-effective method to improve the quality of life and health of modern people” (Song et al., 2016, p. 13)

1.3 Nature: Its Benefits for the Mind, Body and Soul

Spending even a short amount of time in nature has been shown to have significant physical and psychological benefits (Hunter, 2020; Meredith et al., 2020). Connecting with nature reminds us that the universe is vast, leading us to an overwhelming sense that there is so much out there beyond ourselves (Li, 2018). It would be difficult to find a medicine to replace the feeling one receives from walking under a tree canopy or stepping from stone to stone crossing a stream.

Studies have shown that even a small amount of time spent in nature is beneficial to the mind and body. A scoping literature review by Meredith and colleagues found that as little as 10 minutes of sitting or walking in nature, as opposed to the same activities in more urban settings, positively impacted people’s mental health (2020). Another study found that “when the duration of the nature experience is between 20 and 30 min, the gain in benefit is most efficient” (Hunter, 2019, p. 13). A recent study in the United Kingdom has shown that getting 120 minutes a week in nature will greatly help in one’s overall well-being (White et al., 2019). Whether the 120 minutes is done in two days or four, the marker of that amount of time is necessary for good health. According to Dr. Qing Li, president of the Japanese Society of Forest Medicine, connecting to nature (*Shinrin-yoku*) can reduce stress, lift depression and enhance energy (Li, 2018).

1.4 The Mental Health of College Students in the United States

1.4a Epidemiology of Mental Health

Anxiety, low self-esteem and depression are all mental health issues that affect the average student on a university campus (Binkley & Fenn, 2019). Each year has a different set of issues that affect a student. According to the National Institute of Mental Health (NIMH), symptoms of anxiety include feeling on edge, being easily fatigued, having difficulty concentrating, irritability, and having issues sleeping (*NIMH*, 2018). Long-term deadlines, social pressures and multiple classes at the same time can make for a very anxiety inducing terrain. Depression, explained by NIMH, can have “severe symptoms that affect how you feel, think, and handle daily activities, such as sleeping, eating, or working. To be diagnosed with depression, the symptoms must be present for at least two weeks” (*NIMH*, 2018). Most people battle with the ups and downs of daily life, but an extended time of sadness is a clear mark of depression.

University life is stressful for all students, and most struggle with mental health issues at some point during their time in school. According to a recent survey by the American College Health Association (2019):

- 87% of college students report feeling overwhelmed by all they had to do
- 66% of college students report overwhelming anxiety
- 84% of college students report feeling exhausted (not from physical activity)
- 66% of college students report feeling very lonely
- 56% of college students report feeling that things are hopeless
- 45% of college students report feeling so depressed it was difficult to function

Currently, there is a national mental health crisis for college students as they meet new people and try to survive on their own. “By the age of 25 years, 75% of those who will have a mental health disorder have had their first onset” (Pedrelli et al., 2015, p. 2). For many students, treatment is overlooked as there can be an embarrassment or stigma factor. Additionally, the realization that there is an issue can be debilitating for students. Normalizing mental health issues into conversation should start at the collegiate level (or even before) to foster a better understanding of symptoms and how and where to seek help.

In addition to stress, students suffer from mental fatigue due to studying, reading, homework, projects, and exams. Attention Restoration Theory (Kaplan, 1995) states that mental fatigue can be eased by using four principles: being away, extent, fascination, and a compatibility. “Being away” is taking one’s self out of a normal routine or activities. “Extent” is an environment that engages the mind for rich thought. There are two types of “fascination,” soft and hard. An example of soft fascination referring to the outdoors would be viewing a stream or lake in a natural setting. An example of hard fascination while being outside would be watching a high intensity competitive sports game such as soccer. The final principal is “compatibility” which is when the setting aligns with what the individual wants to achieve (Kaplan, 1995). A study by Laumann, Garling and Stormark (2001) found college students rated natural environments more restorative than urban settings whether students imagined themselves in or viewed videos of the natural environments. Viewing a natural space helps to heal and slow down the mental strain students battle throughout their college years.

1.4b Mental Health of UMD College Students

UMD is no stranger to mental health struggles, which can affect many different aspects of student life. Stressors include social pressure, roommate issues, the need to seem in control and to appear successful, screen time, and time management. More specifically, mental health struggles include anxiety, depression and low self-esteem (Beiter, 2015). All of these issues are overwhelming and can be hard to manage as a young person navigating life away from home. The Counseling Center on the UMD campus is available for intake appointments but scheduling further help from the few psychologists on staff has been a barrier to students getting the needed mental health care (Chaudhary, 2018).

Each life of an individual UMD student varies, but some personal struggles are universal. Time management is a very large hurdle for new students and more seasoned students alike. Other stressors include social commitments, scholastic pressures or day to day roommate issues. Typical students average above 12 credits a semester; those credits may include labs, extensive homework hours, and adjusting to classes not only in person but also online. Many majors require or suggest work experience or internships which add another dimension of executive function for a student to navigate. Freshmen typically deal with adjusting to a new home away from family, while seniors are stressed with decisions for after graduation: jobs, finances, travel. All these personal challenges create instability. Without realizing their struggles, students are creating inconsistent habits juggling daily stressors which can lead to overwhelming mental health issues (O. Mays, personal communication, April 8, 2019).

According to Dr. Olivia Mays, Mental Health and Stress Management Coordinator at UMD Health Center, there is no current data on student mental health other than the national statistics. Specific to UMD students, a Food Access and Student Well-being Study concluded that food insecurity led to stress, social pressures, low self-esteem, and poor body image (Wang et al., 2019). The three largest themes of stress that Dr. Mays sees most often are academics, roommate issues and food.

Dr. Mays also identified the three key barriers to students spending time in nature: (1) concerns about safety; (2) a perceived lack of time; and (3) accessibility to outdoor Wi-fi. Regarding safety, there is a significant amount of campus construction, which has impaired navigation on the grounds. Lack of lighting also hinders visibility, and a person alone can feel very unsafe. Wheelchair access is limited in some areas on campus creating issues of safety and independent movement. Students are also inundated with text and email alerts of crime on and near campus making it feel unsafe to explore or change pathways (O. Mays, personal communication, April 8, 2019). After chatting with Dr. Mays, it seems apparent that most students do not allot enough time for mental health breaks due to the performing environment on campus academically and socially. It would be more likely that students would take work tools such as laptops outside to at least be in nature while studying, but lack of Wi-Fi access in the natural spaces makes this difficult.

1.5 Mental Health Resources on UMD Campus

UMD offers several resources for students who seek help for their mental well-being. On-campus resources include the Health Center, the Counseling Center and the Memorial Chapel. The Health Center offers a variety of ways to help students with their mental fitness, including group meditations, relaxation training and management

consultation to assist those who need to slow down. The Health Center also offers massage, acupuncture and dog therapy to support students (health.umd.edu).

The Counseling Center on campus provides workshops for anxiety and depression as well as individual or group counseling (counseling.umd.edu). All these resources support the student population in a clinical way. UMD has created an abundant amount of different options for a student to seek help and support. However, according to the Diamondback, the Counseling Center at UMD is overloaded with students reaching out for mental health care (Chaudhary, 2018). Wait times are up and the UMD Counseling Center offers only 8 sessions in a 12-month period (www.counseling.umd.edu/cs/).

The Memorial Chapel has many outlets for different denominations and non-faith-based support. The Garden of Reflection & Remembrance is adjacent to the Memorial Chapel. The garden, funded by Nature Sacred and designed by students and faculty in the UMD Landscape Architecture program, boasts two water features, a labyrinth for meditation (guided or self-propelled) and journals in the Nature Sacred benches for anonymous writing of one's thoughts.

The services provided on campus may not be meeting the demands of the students. While there are many outlets for students, many setbacks to seeking help are found. New treatment modalities, especially non-pharmacological, will benefit students.

1.6 An Overview of Campus NatureRx in the United States

1.6a Campus NatureRx

Many campuses across the US have adopted Nature Rx initiatives to foster the mental and physical health and well-being of college students and other users. The four universities highlighted in Donald Rakow and Greg Eels' book, *Nature Rx: Improving*

College-Student Mental Health (2019), are Cornell University, University of California, Davis, The College of William & Mary, and the University of Minnesota. Each initiative is based on the practice of using nature to heal. The number of colleges to start Nature Rx initiatives continues to grow. By 2019 at least seven campuses had some sort of Nature Rx program, and the national group Campus Nature Rx was formed as a way to share information (<https://www.campusnature.com/home>).

1.6b NatureRx@UMD

In 2018, Dr. Jennifer D. Roberts and Dr. Shannon Jette in the University of Maryland School of Public Health initiated Nature Rx@UMD (<https://sph.umd.edu/laboratory-resources/naturerxumd>). Using the Park Rx America framework, NatureRx@UMD helps the UMD community to self-reflect, connect, serve, and thrive through nature-based engagement. On the NatureRx@UMD website there is extensive research on the therapeutic benefits of nature for psychological and physical well-being. Also, there is a very helpful interactive map locating twelve NatureRx@UMD sites on campus. Each site is described with a few details of its amenities and features.

The Relevance of Nature Rx Spaces on Campuses

Although many colleges and universities in the US now have Nature Rx programs, most—including UMD—have identified already existing sites as options for students who want to connect with nature on or near campus. Few have sites that have been designed specifically for Nature Rx, forest bathing or some other modality of nature engagement. This thesis project fills a gap with a design, as well as programming suggestions, for a Nature Rx site on the UMD College Park campus. The Methods section

details my identification of the site, site inventory and analysis, and the project's alignment with the UMD Agro-Ecology Corridor initiative.

Chapter 2: Methods

2.1 Site Selection: Existing Nature Rx@UMD sites & potential sites for Nature Rx on the UMD College Park Campus

When looking for a site, or even a series of sites, on the UMD College Park campus to design a space for NatureRx@UMD, I had several priorities. The ideal space would have good perspectives and sight lines, an abundance of vegetation, low noise factor, an existing natural water feature, visual accessibility to people passing through and around the site, and close proximity to mental and/or physical health related facilities.

Existing Nature Rx@UMD Sites

The UMD Arboretum, Park Rx America and Nature Rx@UMD identified twelve areas on campus as Nature Rx@UMD sites, which are listed on the Campus Map (<https://sph.umd.edu/laboratory-resources/naturerxumd>). Their aesthetic quality, which I have classified to more accurately define and identify each space, ranges from urban to semi-urban to natural, based on the estimated amount of green space and hardscape paving in each distinct area. Figure 2.1 indicates the location of the twelve sites and their classification. Six sites are classified as urban. For example, Tawes Plaza and Frederick Douglas Square are almost completely paved with some small areas of grass or shrubs. The “urban” sites are highly trafficked by pedestrians and serve as gathering spaces or pass-through avenues to other places. Two sites are classified as “semi-urban” with a higher ration of vegetation to paving in the space. Four sites are classified as “natural” based on the lack of paving and high percentage of vegetation. These sites are quieter,

both in terms of noise and amount of people, and have the lowest degree of formal design.

Figure 2.1

Existing Nature Rx Sites on UMD Campus



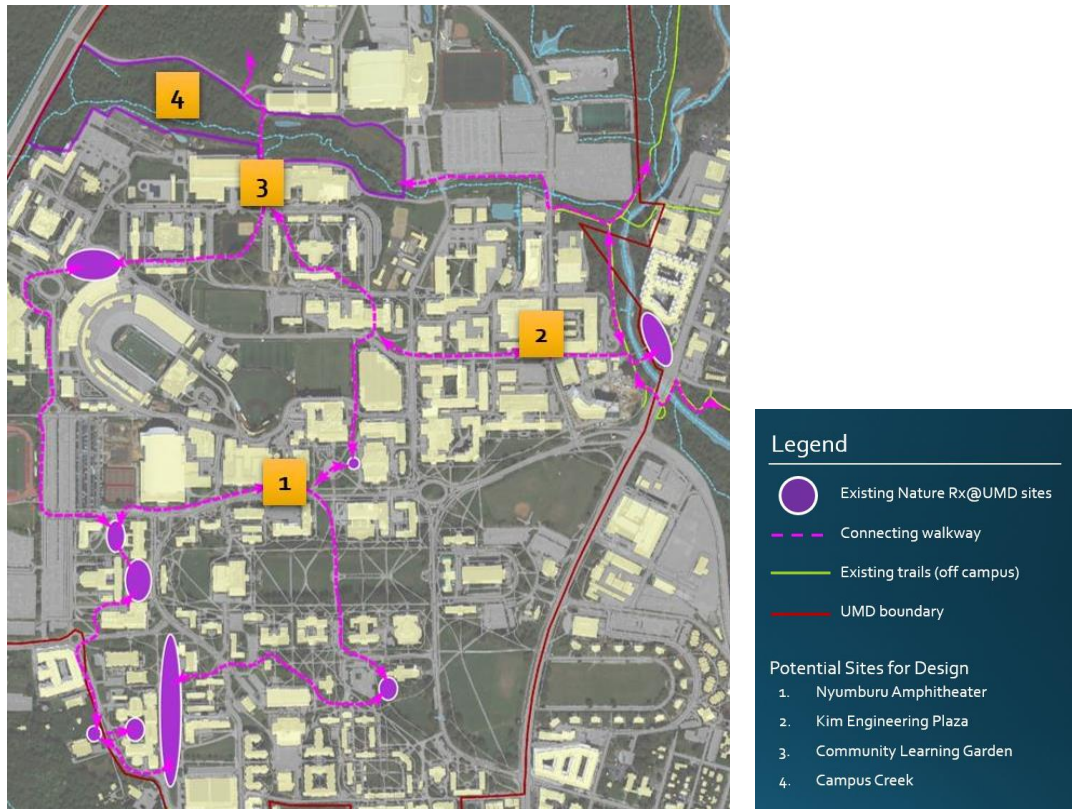
Narrowed Down to Four Sites

After examining the existing NatureRx@UMD sites and other spaces on campus, I eliminated all but four sites that were considered for the NatureRx@UMD thesis project. As listed on the map (Figure 2.2), site number one was the Nyumburu Amphitheater. This site, though not one of the existing NatureRx@UMD sites, had potential based on its high visibility and proximity to Stamp Student Union and Hornbake Plaza (which has an existing NatureRx@UMD site). It is important for people to be able to find a NatureRx@UMD site. However, there is a considerable amount of noise pollution in the area generated from people, vehicular traffic and construction. Furthermore, this area will soon be adjacent to the Purple Line light rail line. This added

mode of transportation will also add to the noise pollution in the area. One positive to this location would be having direct access for users to a NatureRx@UMD site.

Site number two was Kim Engineering Plaza located near two walking/biking trail systems and a highly used pedestrian entrance to campus for students along Route 1. The Kim Engineering Plaza was almost all concrete with nine trees separated in their own containers in a grid pattern. This site was soon ruled out due to plans for construction of a new adjacent building. The Community Learning Garden, site number three, was also a consideration based on its proximity to dormitories, the School of Public Health and the Eppley Recreation Center. This garden is well-used and -maintained, but has a severe grade facing north and is already heavily designed and programmed. The final site was not a Nature Rx@UMD site, but had promise due to its location, existing features and potential for design. I was very aware of the Campus Creek area since I parked my car at the Terrapin Trail Garage every time coming to campus. I would walk the pedestrian path, including the footbridge over Campus Creek from the garage that leads to parking Lot SS1 located between the Eppley Recreation Center and the Public Health Building.

Figure 2.2
Four Potential Sites



2.2 The Site: Campus Creek

The final space considered and ultimately selected for this thesis design as an immersive NatureRx@UMD experience was the forested area along Campus Creek. The north area of campus is ideal for a NatureRx@UMD site with the natural waterway running its length and density of tree canopy and other vegetation. This is one of the most heavily wooded areas on the UMD campus. This site is adjacent to the Wooded Hillock to the north and is close to existing NatureRx@UMD sites and the Paint Branch Trail. It is near the School of Public Health, Eppley Recreation Center (two important health-related entities on the UMD campus) and three dormitory communities. The Eppley Recreation Center is home to the Maryland Adventure Program that offers outdoor experiences, classes and rental gear to students. There is high potential for connection

between this program and NatureRx@UMD. Having three dormitory communities (Ellicott, Denton and Cambridge) within .25 miles of the NatureRx@UMD site will build a strong relationship between these spaces. The Campus Creek area is also next to Terrapin Trail Garage, which brings students, faculty and staff who park in the garage over the site via a footbridge. The area is very serene despite being surrounded by buildings, parking lots and roads. It is visible yet quiet, easy to get to, yet feels secluded.

Opportunities & Constraints

Opportunities

There are many opportunities with this site and its location on campus. There is currently no formal programming and it is highly forested with close access to the Wooded Hillock north of Terrapin Trail. This site is ideal because it is adjacent to many dormitory quads, the Eppley Recreation Center and the School of Public Health building. There is high visibility of pedestrian traffic through and around this site due to the number of parking lots and garages that students, faculty and staff use. In this space, the Campus Creek that runs the length of the site recently underwent a stormwater restoration project. The Nature Rx site also aligns with the mission of the Agro-Ecology Corridor (see page 36). The College of Agriculture & Natural Resources created the Agro-Ecology Corridor from the untapped green areas on campus to incorporate areas for experiential learning and research opportunities for all students. The Forest Conservation easement on the site is an opportunity and a constraint. While it will limit built structures, it will give longevity and protection from further development to this proposed project.

Constraints

There are a few constraints on the NatureRx@UMD site. The noise coming from traffic on Route 193 on the western end is a factor. As mentioned above, there is a Forest Conservation easement within the space that will limit the design and infrastructure. Due to the riparian slopes, accessibility and ADA compliance must be addressed to safely enable people of all abilities to and within the spaces. The NatureRx@UMD site is located on the north end of campus, so the lack of awareness to people around campus may be an issue.

Boundaries & Connections

Boundaries

The NatureRx@UMD site is limited by the surrounding infrastructure. Route 193 is at the western end; Terrapin Trail runs the length of the site at the northern side and Wellness Way runs along half of the southern side of the site. Parking Lots 2A and UU are at the southwestern and eastern end of the site. Behind the Eppley Recreation Center there are tennis courts and a challenge course directly adjacent to the site.

Connections

Even with the boundary, there are many connections. The NatureRx@UMD site is within .25-mile walking distance of 12 dormitories and 2 existing Nature Rx sites. Around the site there are many potential access points adjacent to pedestrian traffic. There are “goat paths” (mowed grass paths) from Lot UU to the Terrapin Trail Parking Garage. Beyond the site are areas for further nature exploration: The Wooded Hillock, Paint Branch Trail and Lake Artemesia. The proposed NatureRx@UMD site will also

enhance the proposed Agro-Ecology Corridor by offering a space for students to engage with nature through active and/or passive activities.

2.3 Site Inventory and Analysis

The NatureRx@UMD site is a large (22 acre), heavily vegetated area with a creek running the length of it, abundant wildlife and space for walking trails and gathering areas. The following site inventory and analysis is information gathered to accurately assess the selected NatureRx@UMD site. The three main site inventory categories are physical, biological and cultural.

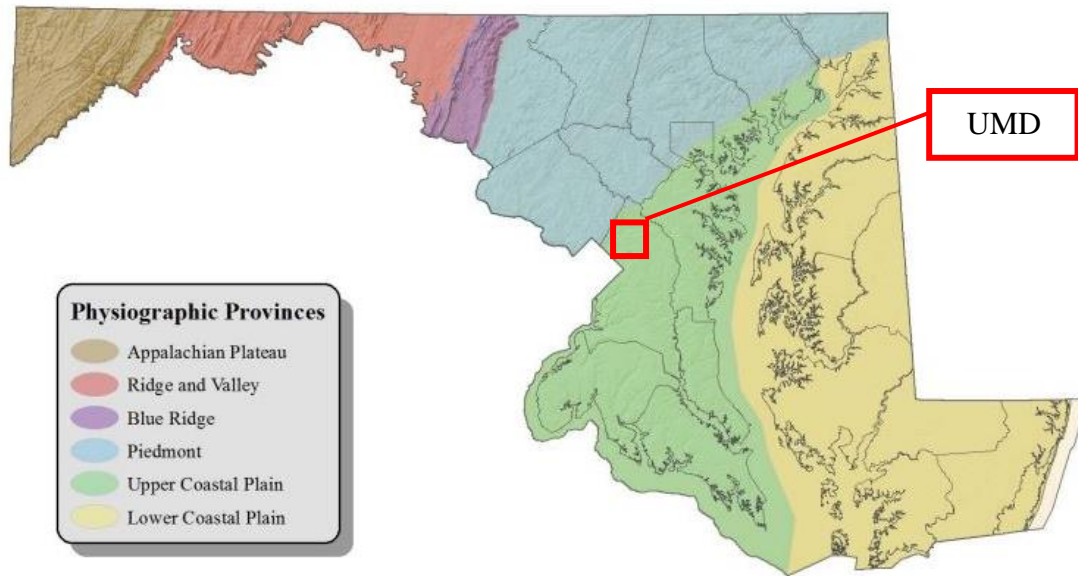
Physical

Physiographic Areas of MD

Maryland has five different types of physiographic areas (Figure 2.3). From western Maryland to the eastern end they start with the Appalachian Plateau, Ridge & Valley, Blue Ridge, Piedmont, Upper Coastal Plain, and Lower Coastal Plain. The UMD campus is in the Upper Coastal Plain just below the Fall Line. The Fall Line is where the Piedmont overlaps the Coastal Plains creating a ridge or Fall Zone.

Figure 2.3

Physiographic Provinces of Maryland

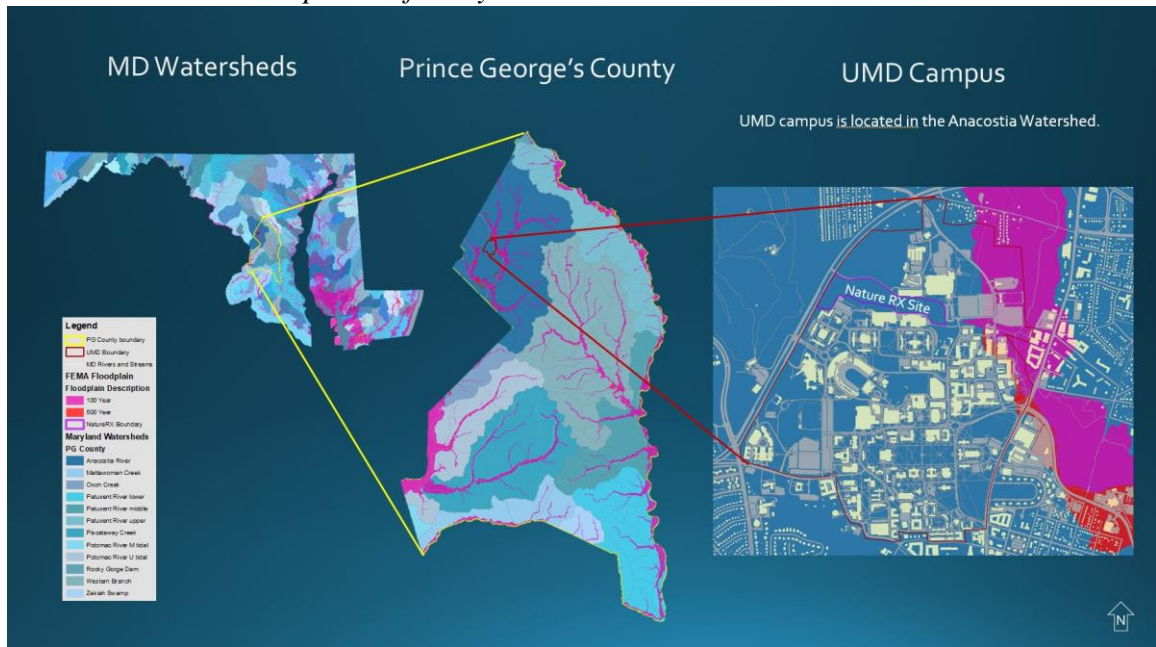


(dnr.maryland.gov)

Hydrology

Image 2.4 shows the watersheds of Maryland and Prince George's County. The NatureRx@UMD site is in the Anacostia River watershed. The 100-year floodplain is indicated in magenta and the 500-year floodplain is in red. The NatureRx@UMD site is not in either floodplain. The main consideration on the site is the condition of Campus Creek.

Figure 2.4
Watersheds and Floodplains of Maryland



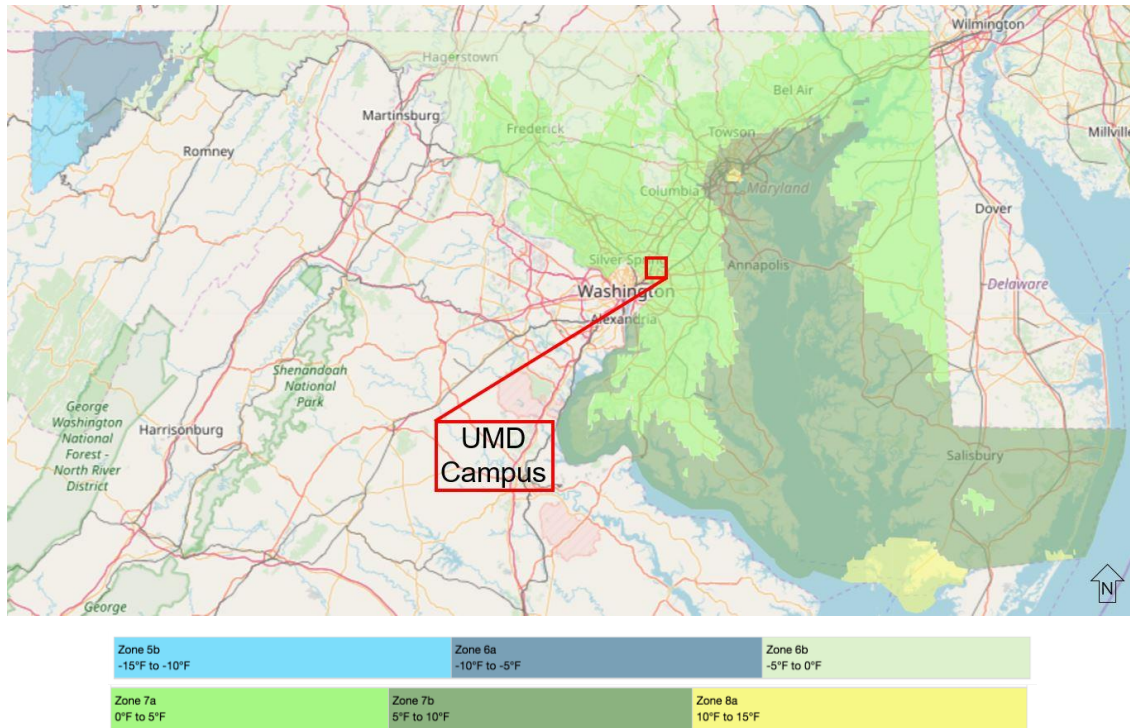
(Prince George's County GIS)

Maryland Hardiness Zone

Figure 2.5 depicts the most current hardiness zone map available on the USDA website (2012). This data was collected from 1976-2005 (USDA, 2012). Due to the vast amounts of information on climate change, it could be estimated that the UMD campus will eventually be classified in Zone 7b (NOAA, 2019). It is important to consider potential changes in climate zones when specifying trees and other vegetation for the design to ensure that all plants will thrive, even as climatic conditions become warmer.

Figure 2.5

Maryland Hardiness Zone Map

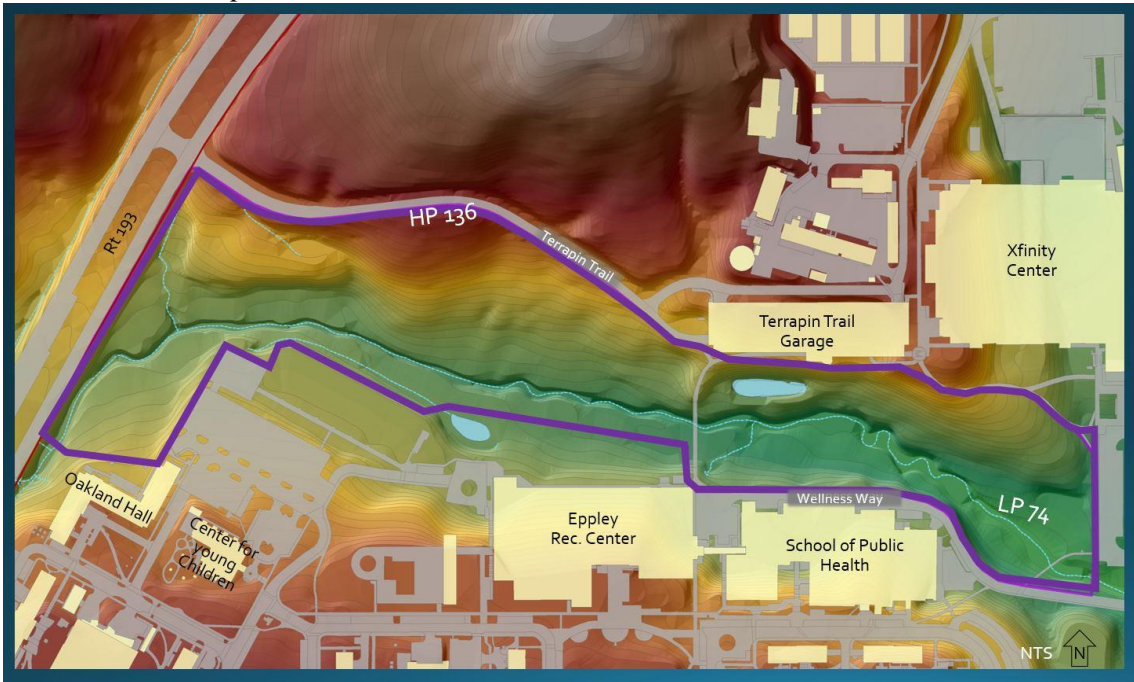


(USDA, 2012)

Elevation

Figure 2.6 indicates the NatureRx@UMD site outlined in purple overlaid on the site elevation map. The map shows the elevation change from the low point of 74 feet above sea level to the high point of 136 feet. The 62-foot change in elevation is mostly gradual over the site with relatively few steep slopes. Regarding trail design, the terrain will be fairly easy to implement a pathway system with minimal grading.

Figure 2.6
Site Elevation Map

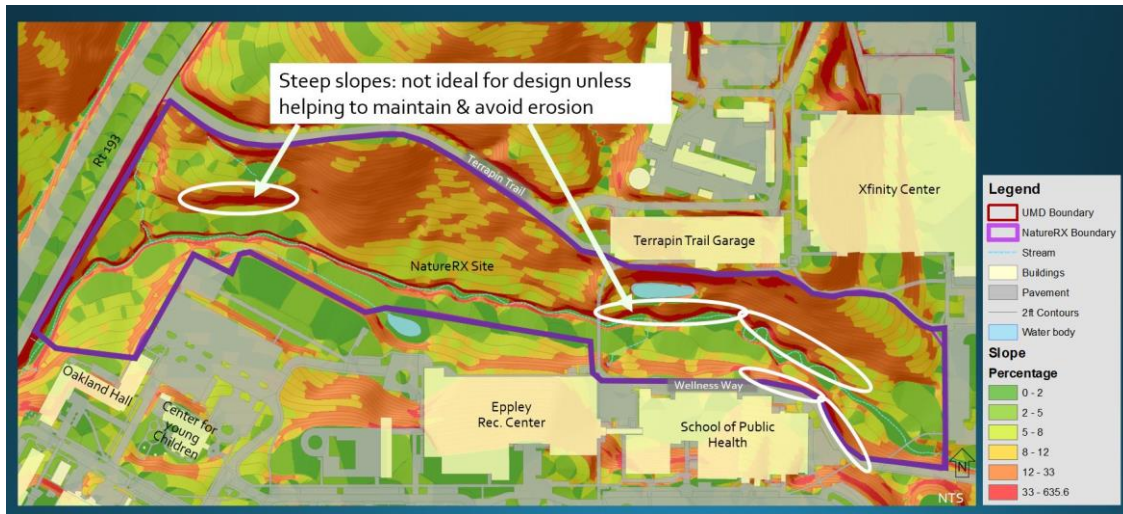


(GIS)

Slope

The colors in Figure 2.7 indicate the steepness of slope. Red has 33%+ slope and the darkest green is the flattest area with 0-2% slope. The steepest slopes are found south of Terrapin Trail Garage around the retention pond, along Route 193, and north of the School of Public Health building. The terrain is predominantly flat along the southern bank of Campus Creek. This is the ideal location for most of the pathways that will easily lead users to various spaces within the site.

Figure 2.7
Slope Map

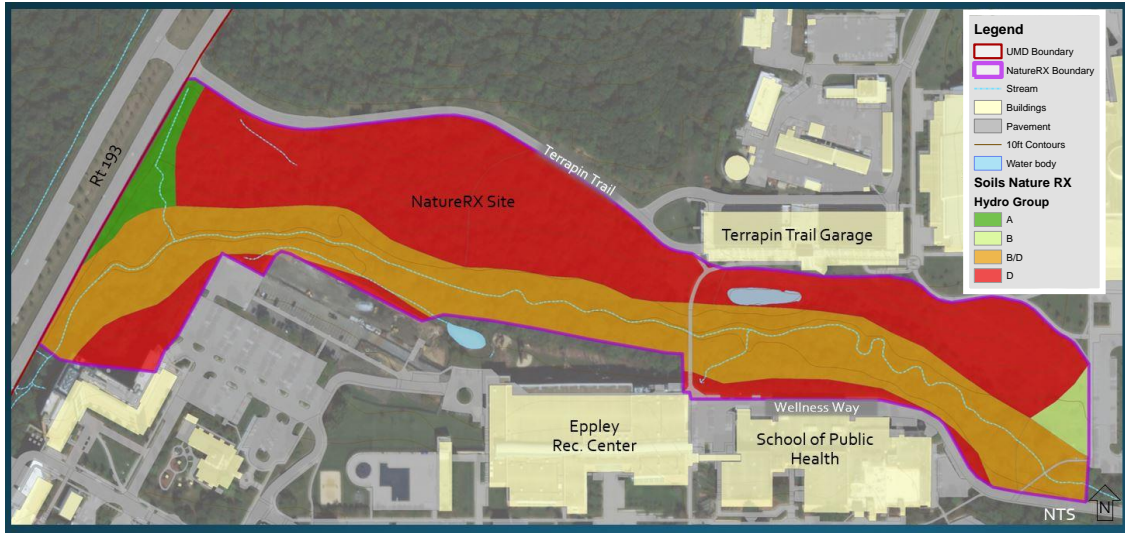


(GIS)

Soil

Soil consists of a mix of four basic types: sand, silt, clay, and loam. The hydrological groups are broken up into A, B, C, and D classifications. The dominant soil group on the NatureRx@UMD site is soil class D (shown in red). A mix of B & D class soils surround Campus Creek waterway. Soil class A and B are the least present in the NatureRx@UMD site boundary. Soils can determine the type of vegetation that will thrive, or materials needed for infrastructure. As shown in Figure 2.8, most of the site will have some difficulty sustaining certain vegetation if in the D classified soil. Class D soil contains higher percentages of clay and is lower in nutrients needed for ideal vegetation growth. Soil class A or B contains a better combination of silt, sand and clay. A good strategy to identify what plants could thrive in D soil is to use more of the species that are already present. Building infrastructure in D soil can be done but is not ideal due to the water retention of clayey soil.

Figure 2.8
Soil Map



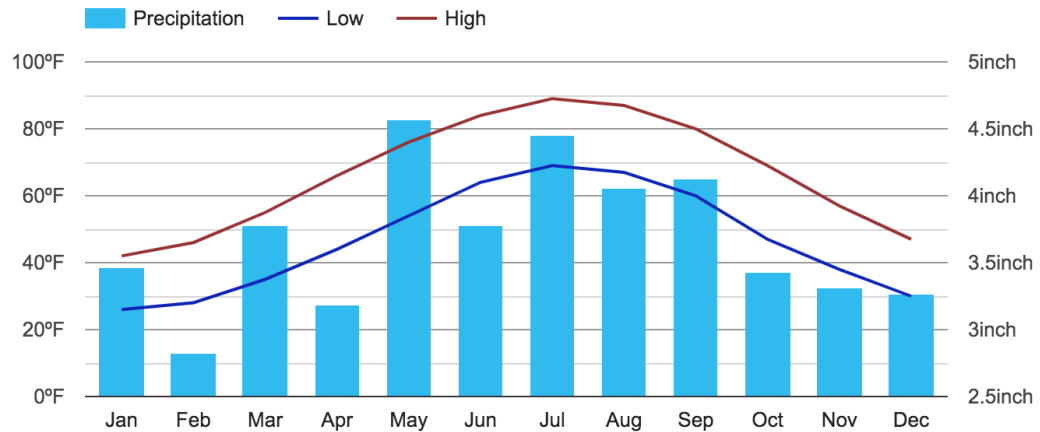
(GIS)

Maryland Climate

College Park, MD averages 44.26 inches of precipitation (mostly rain) per year. The average temperature for Maryland is 55 degrees Fahrenheit. Temperatures range from 26 degrees Fahrenheit in January to 89 in July. Humidity in Maryland is highest in the late summer at around 75% and lowest in the late winter around 60%. Image 2.9 shows a graph of the average temperatures each month in College Park, MD. Temperature and precipitation are factors to consider when implementing vegetation and type of materials used for infrastructure and design elements.

Figure 2.9
Precipitation in College Park, MD

College Park Climate Graph - Maryland Climate Chart



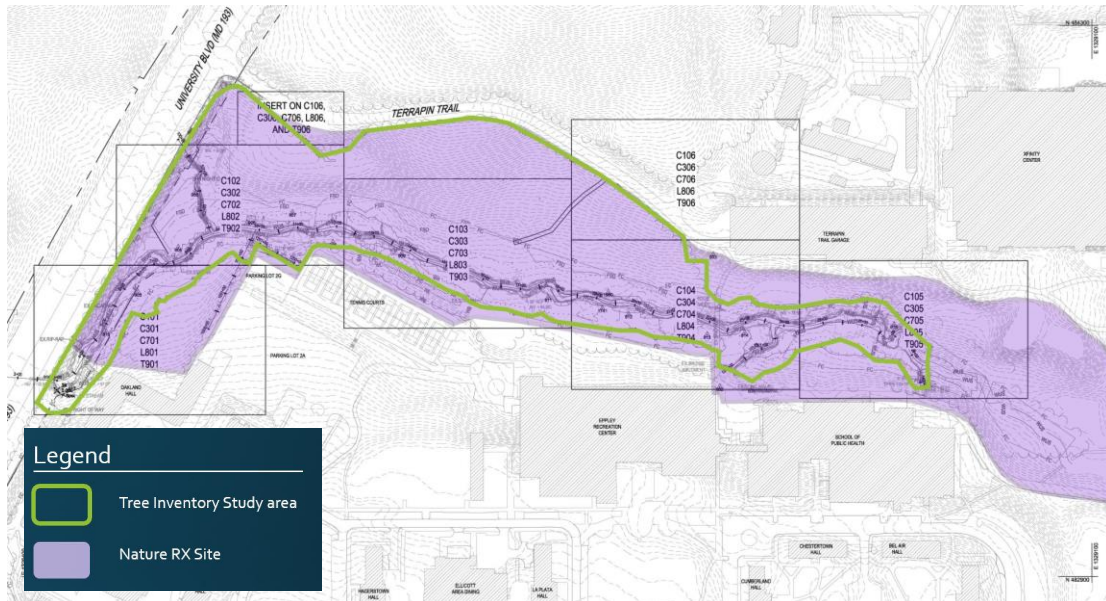
(Maryland State Climatology Office)

Biological

Vegetation

Tree inventory was collected from the construction documents produced by Whitney, Bailey, Cox & Magnani, LLC and University of Maryland Facilities Management. Figure 2.10 is the key plan from the construction documents with the study area outlined in green. Figure 2.11 shows the tree inventory taken by Whitney, Bailey, Cox & Magnani, LLC in graph form. The trees with over 100 species counted in the project are outlined in red. The gathered tree inventory from the Campus Creek Restoration Project will be taken into consideration when implementing more vegetation. Invasive species will be cut back where necessary.

Figure 2.10
Campus Creek Restoration Project



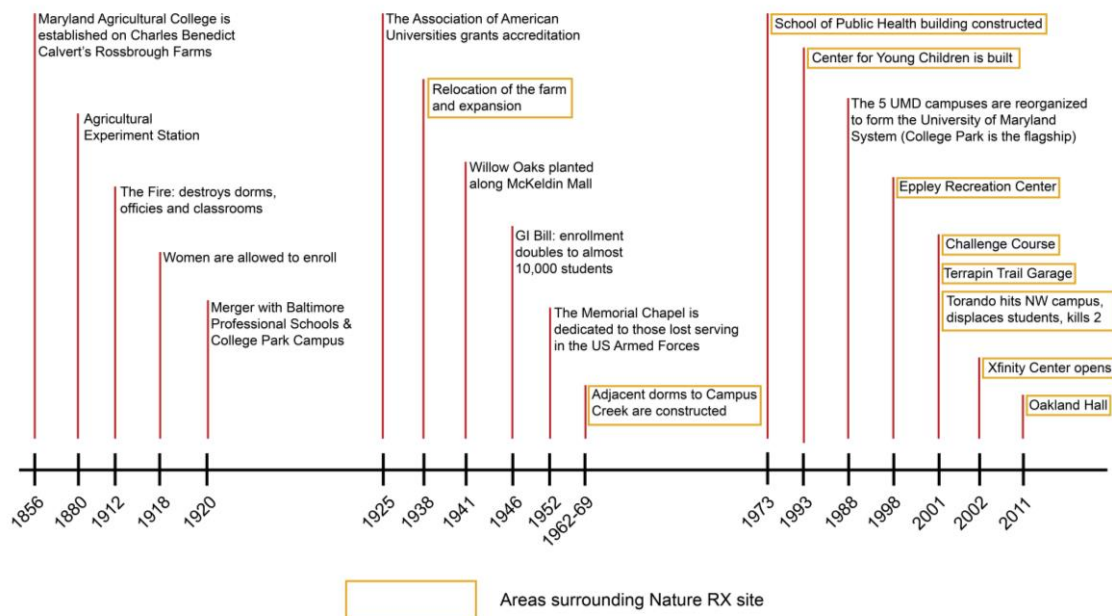
Cultural

UMD History

The University of Maryland was started in 1856 on the estate of Charles Benedict Calvert. UMD began as the Maryland Agricultural College, focusing on the improvement of agriculture production in the state (<https://www.umd.edu/history-and-mission/timeline>). Figure 2.12 shows a timeline of major events of UMD. The items in a yellow frame relate to the NatureRx@UMD site. The Nature Rx site was very heavily forested up until the late 1960s. The dormitory communities Ellicott, Denton and Cambridge were all built between 1962-1969. The exception is Oakland Hall, which was built in 2011. In 2001, a tornado hit the northwest corner of campus, flattening trees and upending cars. Also, in this year the Terrapin Trail Garage was built, cutting into the forested area with Terrapin Trail. The following year, in 2002, the Xfinity Center was built.

Figure 2.12

Historical Markers Surrounding the Nature Rx Site

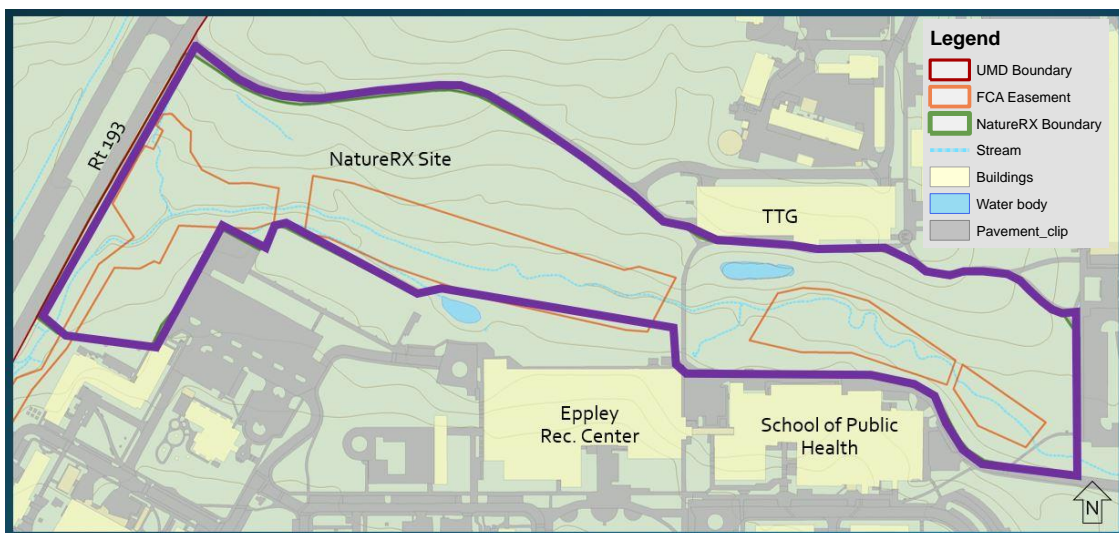


Forest Conservation Act Easement

The Maryland Forest Conservation Act of 1991 was implemented to preserve the state's forests during land development (dnr.maryland.gov). Part of the site planning process in Maryland is to evaluate each site's critical areas adjacent to streams and wetlands and to focus on critical areas of eroding soils and large contiguous blocks of forest or wildlife corridors. This means there can be no built development within the area if it is over 40,000 sq. feet (about 1 acre). Anything over this amount will require a Forest Stand Delineation and a Forest Conservation Plan to be submitted for approval. These will require planting and replanting of vegetation in the developed land. The design implications of the FCA easement for this project will be to avoid building any structures within the easement shown outlined in orange in Figure 2.13. If a design falls into the easement area, it must be kept under 1 acre. The design also needs to avoid eroding areas, unless the design includes strategies for implementing ways to mend erosion through vegetation or structure.

Figure 2.13

Forest Conservation Easement within Nature Rx Site

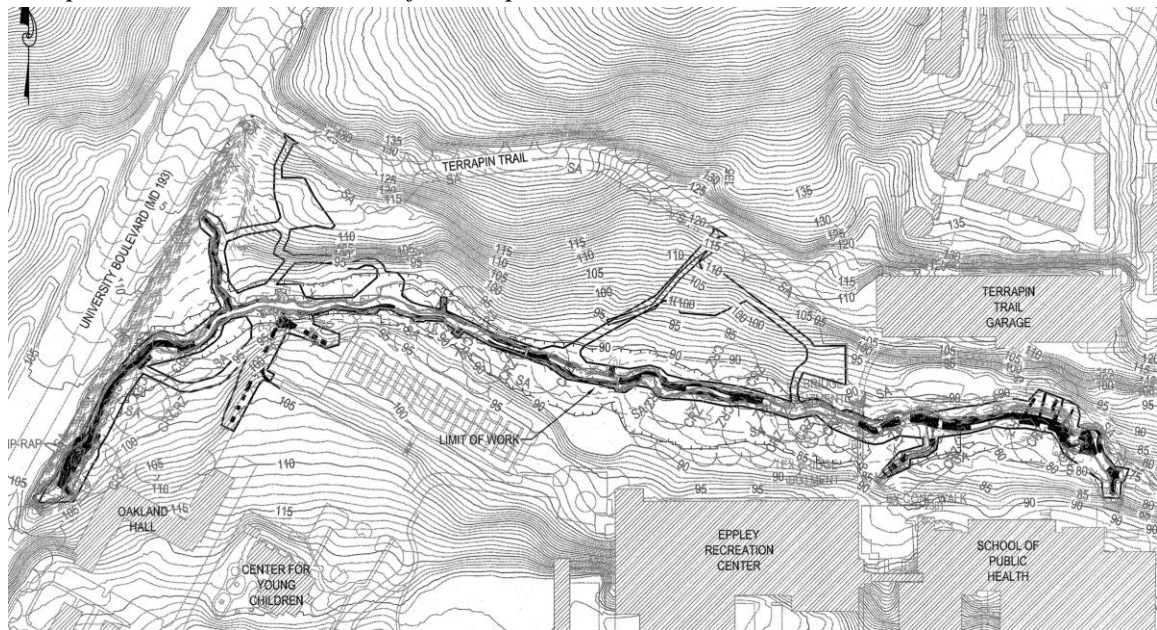


Campus Creek Restoration Project

The Campus Creek Restoration Project started in June 2019 and ended in November 2019. The main purpose of the project was alteration of the creek's alignment and stormwater management of surface water runoff. The study area (Limit of Disturbance) was 14.63 acres that started at the western edge of the UMD campus near Route 193 and ended in an area of the creek on the north side of the Public Health building. The majority of the project was in the FCA easement, necessitating a Forest Stand Delineation and a Forest Conservation Plan. Six hundred seventy-four plant species were removed, and 700 native species were planted. The design intentions around the CCRP are to enhance the native plantings with more of the same vegetation and to avoid areas of built stormwater management. Figure 2.14 shows the Limit of Disturbance with a heavy line.

Figure 2.14

Campus Creek Restoration Project Map



(Whitney Bailey Cox & Magnani, LLC)

Circulation

High volume vehicular traffic is only Route 193 to the west. Low volume vehicular circulation runs east-west along the northern edge of the site, as well as the north side of the School of Public Health building. This circulation has no outlet. There is currently minimal formal pedestrian circulation within the Nature Rx@UMD site. The only pedestrian access is from two pedestrian bridges that cross over the Campus Creek: one from the Terrapin Trail Garage to the parking lot between Eppley and SPH and the other at the lower, eastern edge from Wellness Way to the UU parking lot. There is a “goat path” (an informal pedestrian path) through the grass from Lot UU up to the sidewalk into Terrapin Trail Garage. Figure 2.18 depicts the circulation on the site. It is clear from Figures 2.15-17 that people do walk on the site, but no formal pathway or seating exists. The photos also show evidence that people want to use these spaces for what this thesis proposes. The red benches pictured in Figure 2.15 were removed in the Spring of 2020.

Figure 2.15
Red Benches Near Creek



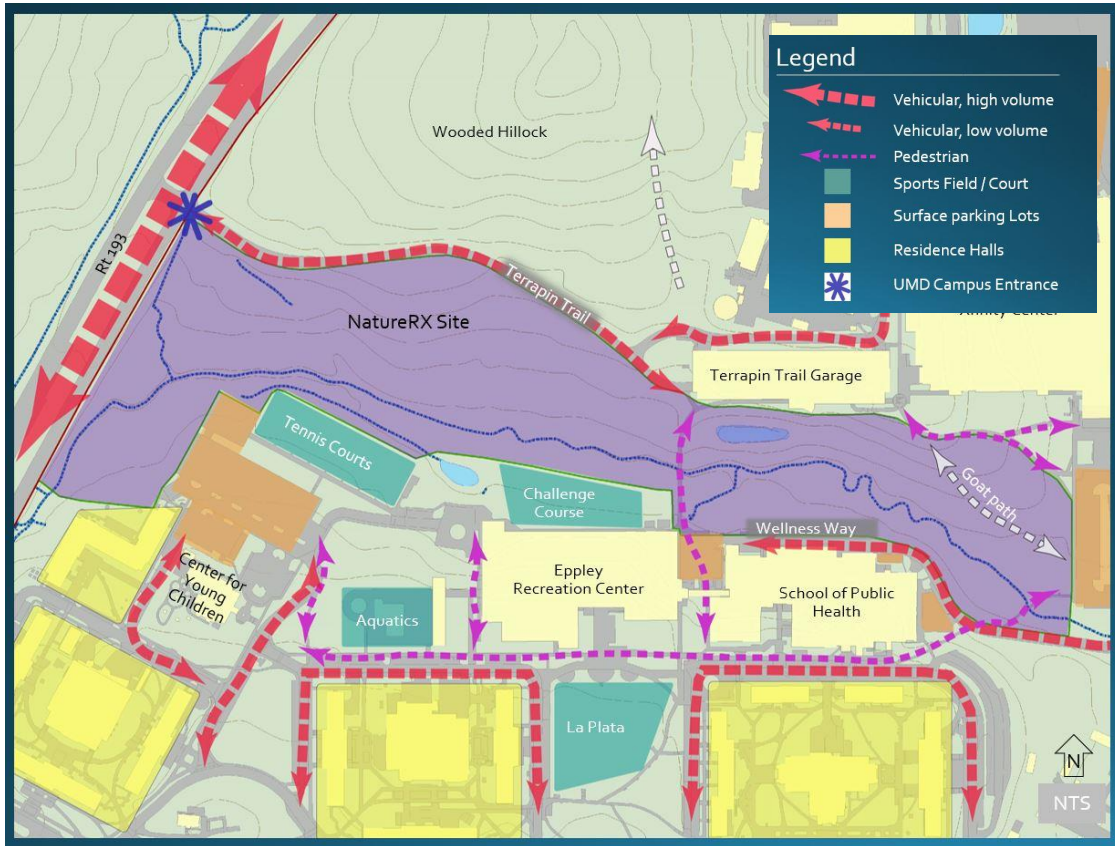
Figure 2.16
Handprint on Tree



Figure 2.17
Makeshift Pathway to Creek



Figure 2.18
Circulation Map

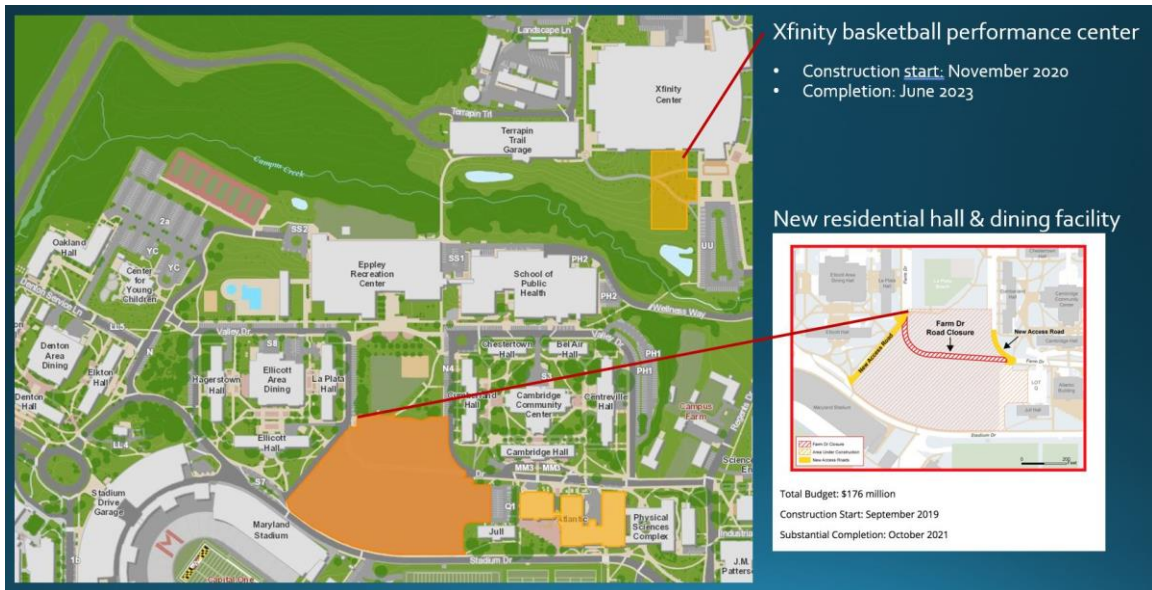


Campus Construction

Image 2.19 indicates current and upcoming construction near the NatureRx@UMD site. Since the start of this thesis, the location of the Basketball Performance Center has shifted horizontally along the south façade of the current Xfinity Center. The new dorms and dining facility will bring more connectivity to the NatureRx@UMD site.

Figure 2.19

Campus Construction Near the NatureRx@UMD Site

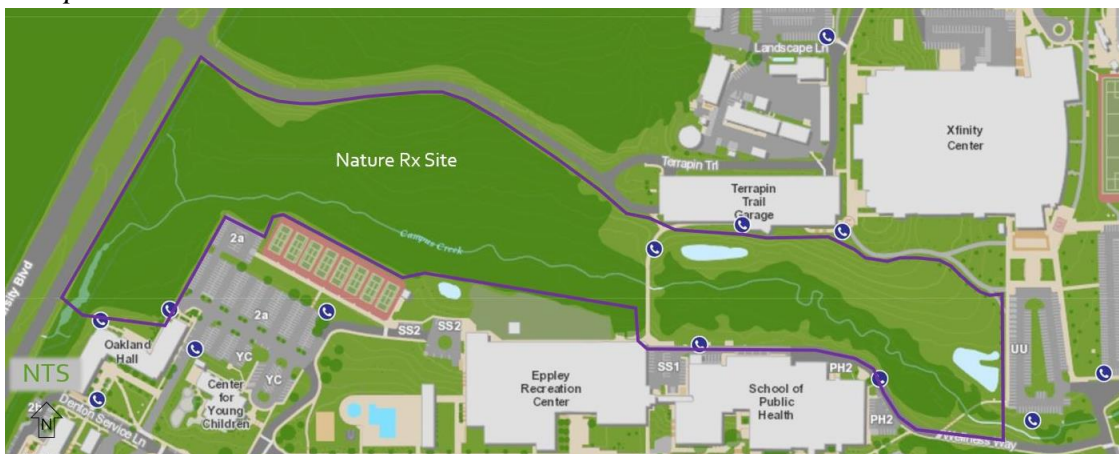


Campus Safety

Safety is always a factor to consider when designing a space. Figure 2.20 shows the Nature Rx site with the existing emergency call box locations in and around the space. These call boxes, as well as new design interventions, will help to keep users safe at all hours of the day and night.

Figure 2.20

Campus Call Box Locations



Site Visits

Although I have walked *through* the site almost every day since 2017 on my way from the Terrapin Trail Garage to the Plant Science building and back, I made two formal visits after identifying Campus Creek for my NatureRx@UMD thesis site. The first visit was in February 2020 when the site was sparse of leaves and much less green. The second time was in May 2020, when the site was lush, and vegetation was in bloom. Due to COVID-19 restrictions, UMD ended all in-person classes on Friday, March 13 and students were (and still are, at the time of this writing) discouraged from visiting.

Each site visit was pleasant. Most of the terrain was easy to access and maneuver through; there were some areas of steep slopes and overgrown vegetation that I avoided. The sounds of birds and the stream gave a sense of calm. I had a feeling of separation from the surrounding hustle of students and cars on the perimeter of the site. Walking the site, there were many places to take in the view with a different sensation. The space is very lush and green, with many different materials and natural wonder. The photos shown below (Figures 2.21-2.26) are just a few of the many images taken on the two sites visits. Even in the colder months of the year, the Campus Creek area is beautiful to explore.

February 2020 Site Visit

Figure 2.21
Campus Creek



Figure 2.22
Oakland Hall



Figure 2.23
Public Health Building



May 2020 Site Visit

Figure 2.24
Path to Terrapin Garage



Figure 2.25
Oakland Hall



Figure 2.26
Foot Bridge to Lot UU



2.4 Aligning with the UMD Agro-Ecology Corridor

The UMD Agro-Ecology Corridor is a current initiative through the College of Agriculture and Natural Resources (AGNR) that would benefit from an addition of a trail network for Nature Rx@UMD. The Campus Creek NatureRx@UMD site is located within the context of the Agro-Ecology Corridor. Adding spaces for nature therapy will enhance the campus experience by promoting the mental and physical well-being of

students and visitors. Both initiatives have a central theory rooted in advocating for the environment, and they both benefit the college life experience.

AGNR's Strategic Initiative

The Agro-Ecology Corridor supports the AGNR's five Strategic Initiatives shown in Figure 2.27. Their mission: "As the University's cornerstone college, we embody the land-grant mission with a commitment to eliminate hunger and malnutrition, preserve our natural resources, improve quality of life, and empower the next generation through world-class education" (agnr.umd.edu).

Figure 2.27

AGNR's Five Strategic Initiatives



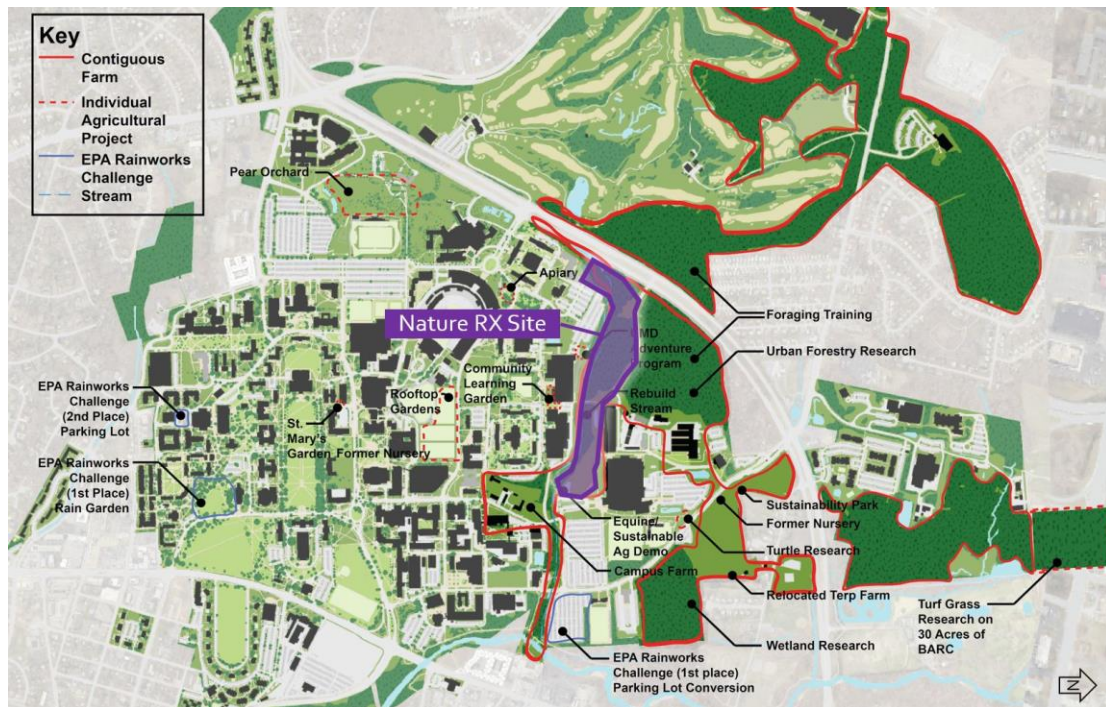
(agnr.umd.edu)

The Agro-Ecology Corridor

The mission of the Agro-Ecology corridor is “to incorporate experiential learning and research opportunities for all students at all levels at the University of Maryland” (agnr.umd.edu). Figure 2.28 outlines the green spaces in the Agro-Ecology Corridor and the existing research projects around campus. The area in purple highlights the Campus Creek NatureRx@UMD site, demonstrating how it can be part of the system of green areas on campus that facilitate the education, health and well-being of students.

Figure 2.28

Agro-Ecology Corridor Map



(AGNR & LARC, 2019)

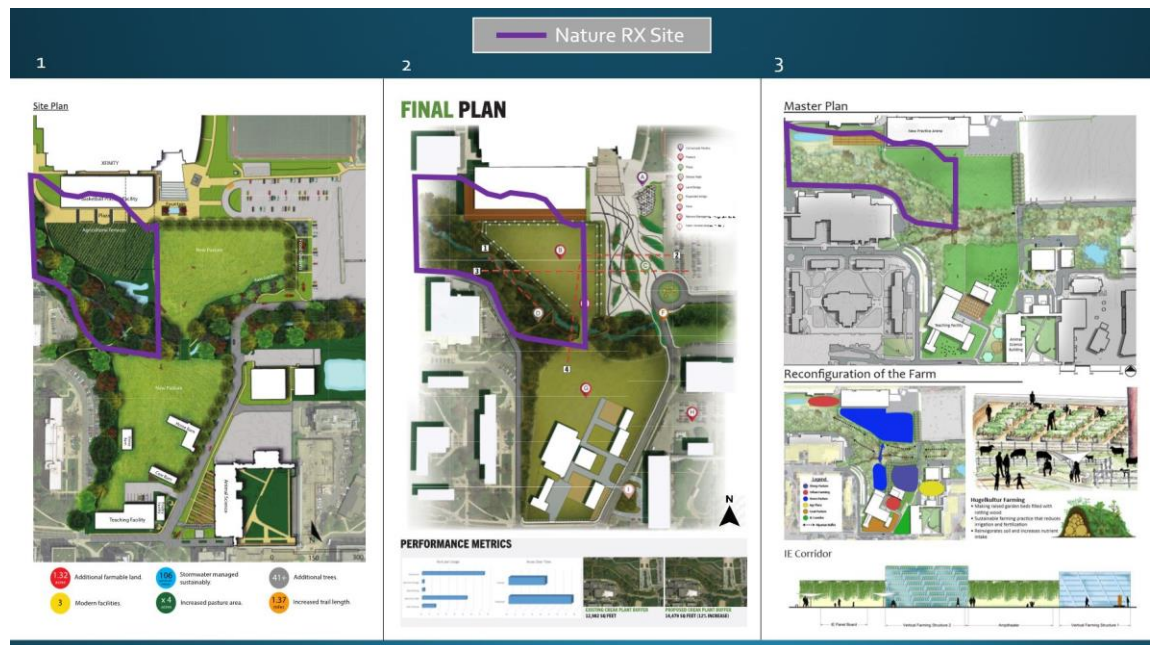
Fall 2019 Student Design in LARC340

Figure 2.29 shows the Landscape Architecture students' design work from LARC340, the design studio taught by Professor Dennis Nola in the Fall of 2019, for an

expansion of the current farm on the UMD College Park campus. Overlaid in a purple line is the boundary of the Campus Creek NatureRx@UMD site at the eastern most end. The students, working in teams, were challenged with designing an innovative farm expansion to align with the Agro-Ecology Corridor. All teams implemented a land bridge connecting the current farm property to a proposed pasture where there currently is a parking lot. The Agro-Ecology Corridor will be enhanced by overlapping LARC340 ideas for a new farm expansion with a space for NatureRx@UMD. Most importantly, the student body will gain more learning experiences and a better quality of life on campus.

Figure 2.29

Proposed Site Designs for UMD Farm Expansion



(LACR340 Students, Fall 2019)

2.5 Conclusion

Based on the prevalent struggles of student mental health and the natural vegetation on the University of Maryland's campus, a designed space for nature immersion will maximize both the site and the benefits of green space for NatureRx@UMD. There is prevalent compatibility with the goals of the Nature Rx@UMD site with the mission of the Agro-Ecology Corridor and the College of Agriculture and Natural Resources' five strategic initiatives. After conducting the site inventory and analysis phase of this thesis project, I concluded that Campus Creek is the ideal place for enhancing UMD student life through Nature Rx.

Chapter 3: Nature Rx@UMD Campus Creek

This chapter covers the design goals and objectives, and the actual design, for the Campus Creek NatureRx@UMD site. The entire space is intended for passive and active, as well as programmed and unprogrammed, nature engagement for the purpose of restoration. The literature review, combined with site inventory and analysis, informed the goals and objectives and the design program. I have used the eight steps of *Shinrin-yoku* (forest bathing) as a framework for design decisions.

3.1 Nature Rx@UMD Campus Creek Design Goals and Objectives

The primary goal of creating a NatureRx@UMD space on the UMD College Park campus is to *facilitate the mental and physical health and well-being of students through passive and active engagement with nature*. The design strategy of the Campus Creek site is to invite students to connect in a more immersive and mutually beneficial relationship with nature.

Objectives

- Reduce student stress and anxiety
- Enhance student joy and relaxation
- Engage the senses
- Facilitate social support and connectedness
- Create opportunities for movement and exercise
- Establish at least three forest bathing “invitations” for user participation
- Inform users of the mental and physical health benefits of being in nature
- Ensure a sense of safety

Conceptual Diagram

Figure 3.1 graphically explains how student mental health issues, overlaid with the NatureRx@UMD design solution, can lead to positive outcomes. This is taken a step further in the design. At each main entrance to the NatureRx@UMD site, signage with a map will suggest pathways and invitations to take based on specific physical and mental health goals. Figure 3.2 shows a sketch of a proposed sign. The left side has a map of the NatureRx@UMD site. The center has four plaques, each with a mental or physical health related question on the front. Each one flips over to reveal suggested areas, suggested time frame and various invitations based on the ailment or purpose for the user's intention. Sample questions could range from a simple: "Do you need time to clear your thoughts?" to "Feeling overwhelmed?" The panel on the right contains information about Nature Rx@UMD, the who- what- where- why- & how.

Figure 3.1

Conceptual Diagram of Nature Rx Design

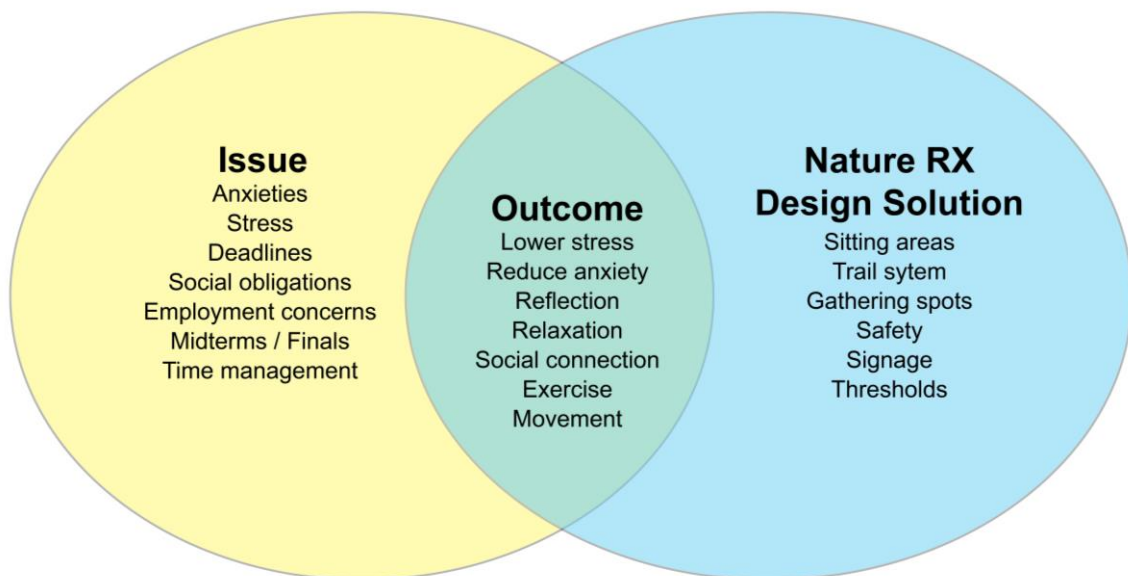
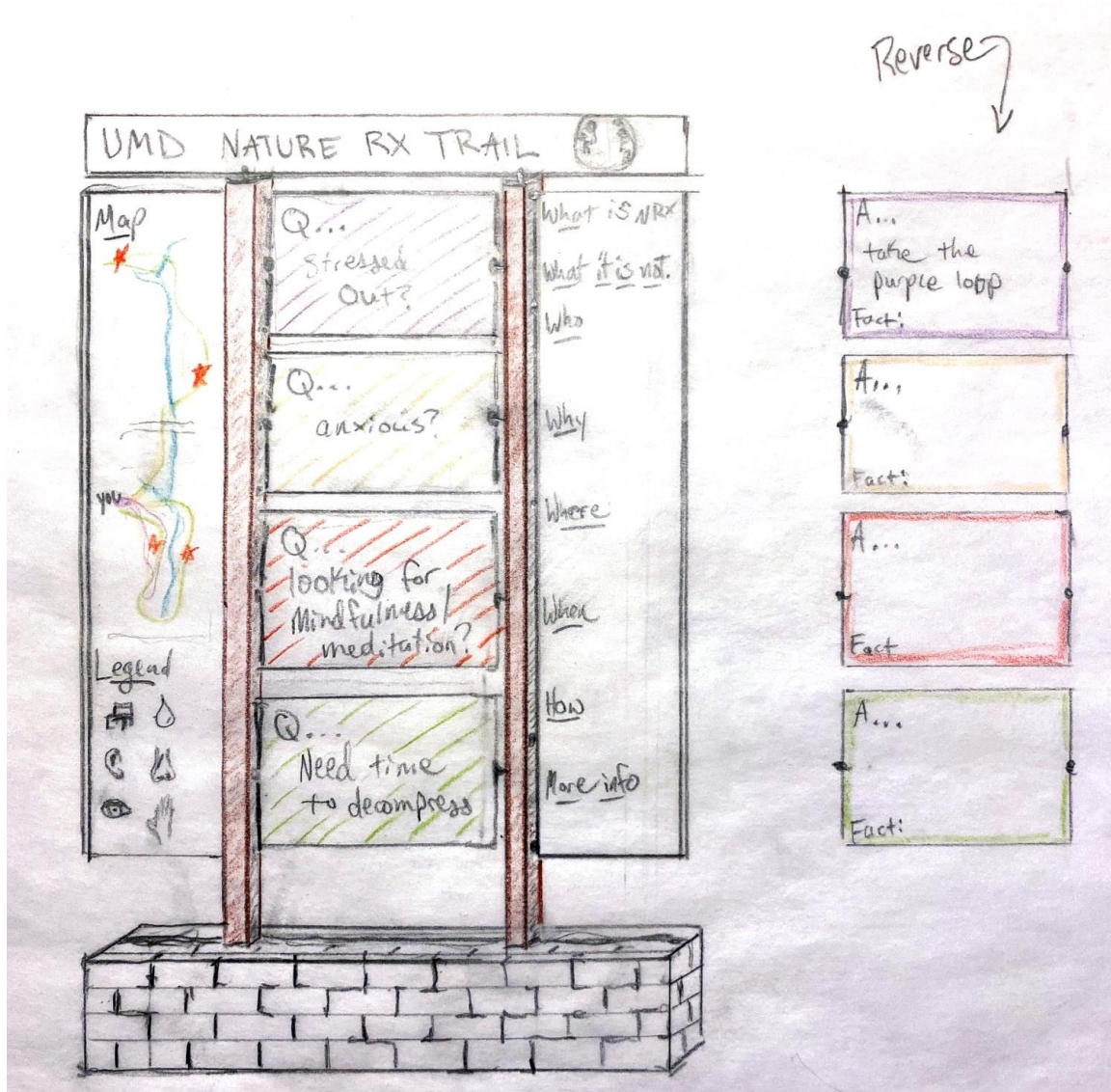


Figure 3.2

Hand Sketch of Proposed Signage at Nature Rx@UMD Site Entrances



3.2 Program: Design Brief, and the Language of Forest Bathing

Much of this design takes its structure from the practice of *Shinrin-yoku*, or forest bathing, as is done in Japan and elsewhere around the globe. The eight steps are articulated clearly by Amos Clifford in his book, *Your Guide to Forest Bathing* (2018):

1. *Having intention.* For example, having a clear purpose to dedicate time in nature to think and heal.

2. *Threshold*. A distinct transition entering into a forested space.
3. *Sitting in one place*, embodied awareness, deep breathing with eyes closed, bringing attention to all senses (15-20 minutes).
4. *Walking slowly*, in order to quiet the mind (15 minutes).
5. *Invitations*. Between 1–3 invitations, described below, that can take from 20-60 minutes.
6. *Sit* and reflect (about 20 minutes).
7. *Tea ceremony*. At the end of the individual’s forest bathing, all participants gather together over tea and food to discuss the experience they have independently shared.
8. *Threshold of incorporation*. Marks the end of the forest bathing practice and return to regular life. Participants are encouraged to continue to “notice what they are noticing.”

The *invitations* are the tools used to “notice what you are noticing” (Clifford, 2018, p. 73). They correlate to the four elements: earth, water, air, fire. An *earth invitation* could be holding a stone found on your walk, smelling the forest soil, or walking barefoot on the earth. A *water invitation* could be gazing at a stream or touching water with your hands or feet. *Air invitations* include breathing in the forest scents deeply and mindfully, cloud watching and facing the wind. For *fire*, the invitations are about energy and how you can give and receive that energy to the elements around you. An example is visualizing growing roots from your feet as you plant them firmly on the ground.

The senses are the key to connecting to an invitation. The senses used are the five basic senses of smell, sight, touch, taste, and hearing. Also important are the metaphysical senses, including imaginal, body radar, proprioception, heart sense, and mirror (Clifford, 2018). Engagement of more than one sense provides positive distraction (Ulrich, 1979) and is supported by Attention Restoration Theory (Kaplan, 1995). The uses of forest bathing include healing, renewal, solace, solitude, and mindfulness.

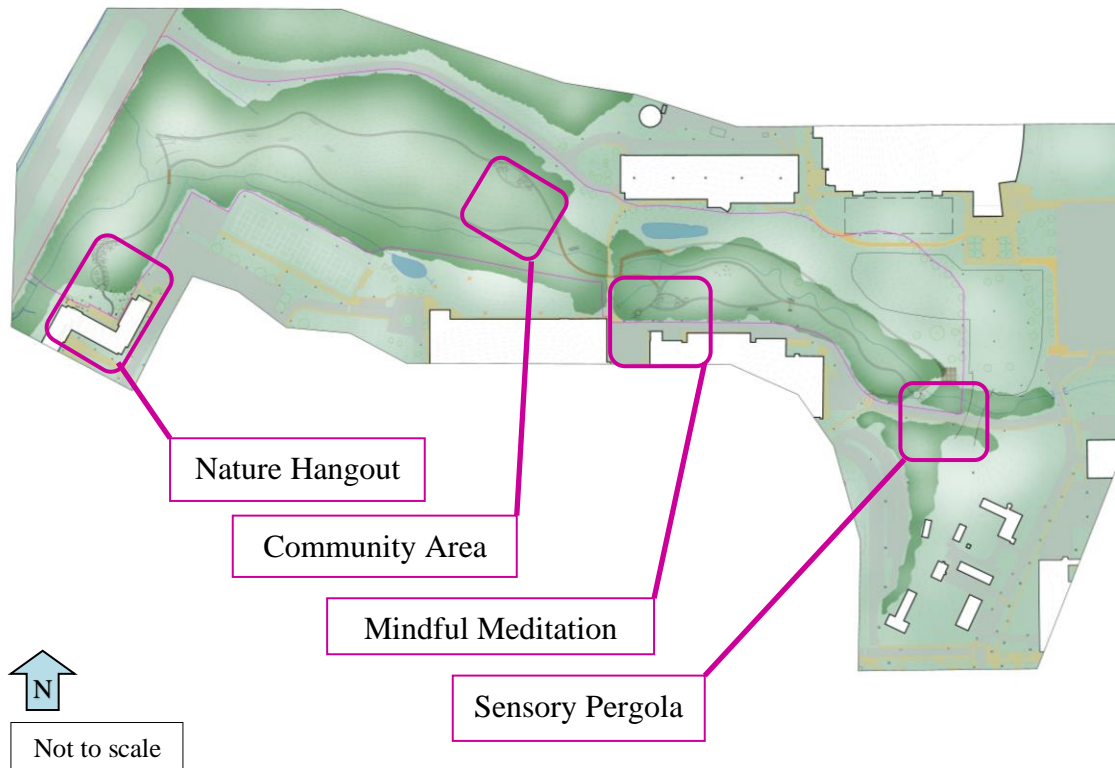
As presented earlier in this text, a “dose” of nature is an important part of the language of nature therapy. The design of the Nature Rx@UMD site is orchestrated to support the practice of forest bathing for any amount of time. The network of trails and spaces have been created to offer different doses of lengths of paths and experiences based on how long someone has and what each individual is looking to improve for their health.

3.3 The Spaces

The design of the NatureRx@UMD site is meant to be used as an informative guide to having a forest bathing experience alone or with a group. The space can, of course, just be a path through the forest to a nice bench to eat lunch or have a quiet conversation. In addition to the “threshold” entrances and pathway system, four primary spaces within the NatureRx@UMD site facilitate the forest bathing experience. These are the Nature Hangout, Community Area, Mindful Space, and Sensory Pergola, shown together in Figure 3.3 and then described and illustrated individually below. Along the paths, boulders set into the grade are another way for people to engage with nature.

Figure 3.3

Nature Rx@UMD Site Plan



Nature Hangout

The Nature Hangout, shown in Figures 3.4– 3.7 is at the westernmost end of the Nature Rx@UMD site. It is close to the Denton dormitory community and accessible through Oakland Hall or from parking Lot 2a. Components of the Nature Hangout include:

1. An entryway to mark the threshold of the NatureRx@UMD experience.
2. A gathering space for relaxing in stationary hammocks under the tree canopy. The stationary hammocks are made from metal piping and repurposed firehose. Stationary hammocks are good for people who do not have their own hammock. Also, these could be seen as an art piece or destination of intrigue.

3. A space for hanging one's personal hammock under the tree canopy; the poles with hammock attachments give students an area to hang their hammocks without hurting trees. This area behind Oakland Hall is ideal due to its proximity to adjacent dormitory communities and the Eppley Recreation Center.
4. A seat wall for gathering that enables users to look outward to the forest or inward toward the designed space.
5. Lighting along the path to create safety and nighttime interest. The chosen lighting design will be low profile to not take away from the natural forest aesthetic.

Figure 3.4

Nature Hangout Site Plan

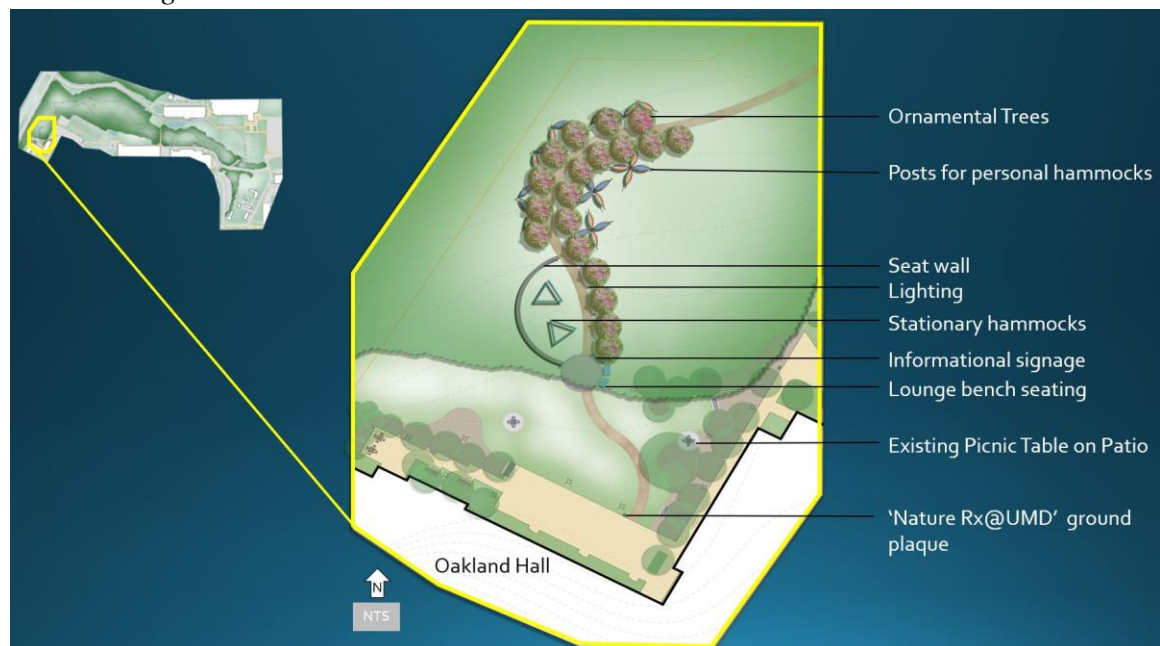


Figure 3.5

Nature Hangout Site Plan with Section Elevation Cut Line and Perspective Viewshed

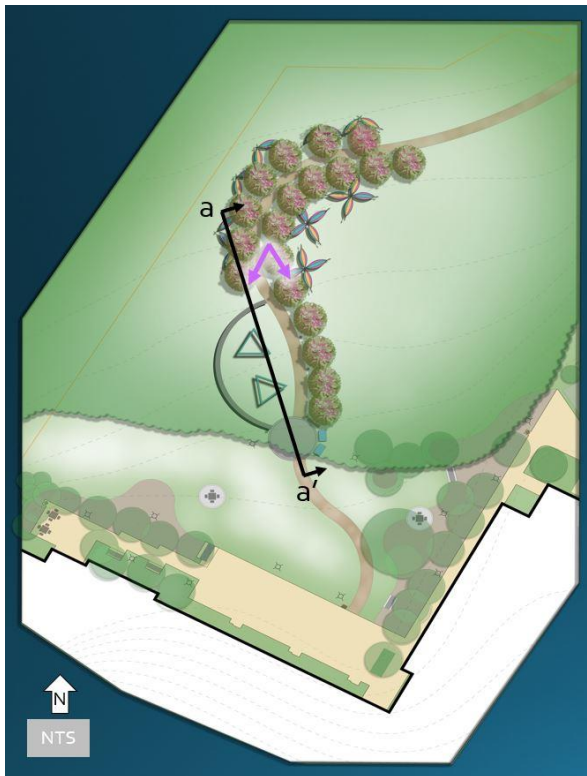


Figure 3.6

Section Elevation Through Entry, Stationary Hammocks and Hammock Posts

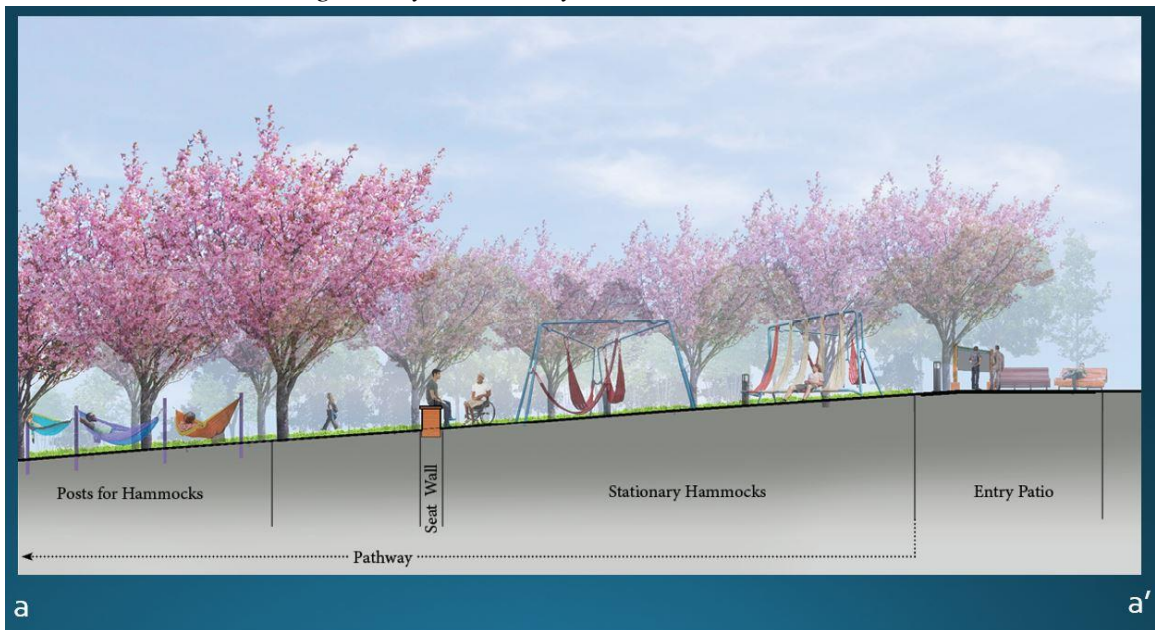


Figure 3.7

Perspective from Path Looking South Towards Oakland Hall



Community Area

Social support is crucial for the health and well-being of people at any age, but especially for young adults, many of whom may be away from home for the first time. They are forging new friendships and relationships with peers. Due to time constraints, this area does not have all of the detailed design elements. The Community Area, shown in Figure 3.8, features the following elements:

1. The entry to this area is on pathways from Mindful Meditation and Nature Hangout.
2. Seating areas that facilitate gatherings of 2-10 people or more.
3. Seating for solitary users on lounge benches.
4. Pavilion for groups to gather.
5. Sensory vegetation including ornamental trees planted throughout entire Nature Rx@UMD Site.

6. Lounge benches for relaxed seating under the forest's canopy.
7. Lighting along the path and in the designed space to create safety and nighttime interest. The chosen lighting design will be low profile to not take away from the natural forest aesthetic

Figure 3.8

Community Area Site Plan



Mindful Meditation

The Mindful Meditation area, shown in Figures 3.9–3.11, is located adjacent to parking Lot SS1 which is between the Eppley Recreation Center and the Public Health building. Through the implementation of comfortable seating and easily accessible pathways, the area is designed for restorative time under the tree canopy. Components of the Nature Hangout include:

1. Signage at entryway for clear indication of the designed space.

2. Entry patio set back from parking Lot SS1 to fully immerse oneself under the tree canopy.
3. Pathway loops for an easy stroll in the forest to other Nature Rx invitations or for simple use of the path's direction.
4. Comfortable bench seating near the stream and in the entry patio to reflect and take time in nature.
5. A two-level open platform for sitting and gathering.
6. Lighting along the path near the platform to create a sense of safety.
7. Ornamental trees that are planted throughout the entire Nature Rx@UMD Site.
8. An elevated walkway set just above the forest floor in areas where the ground is typically wet. This also enables users to easily cross the creek and have more immersive nature experiences.

Figure 3.9
Mindful Meditation Site Plan



Figure 3.10

Section Through Platform, Pathways, Stream & Elevated Sidewalk

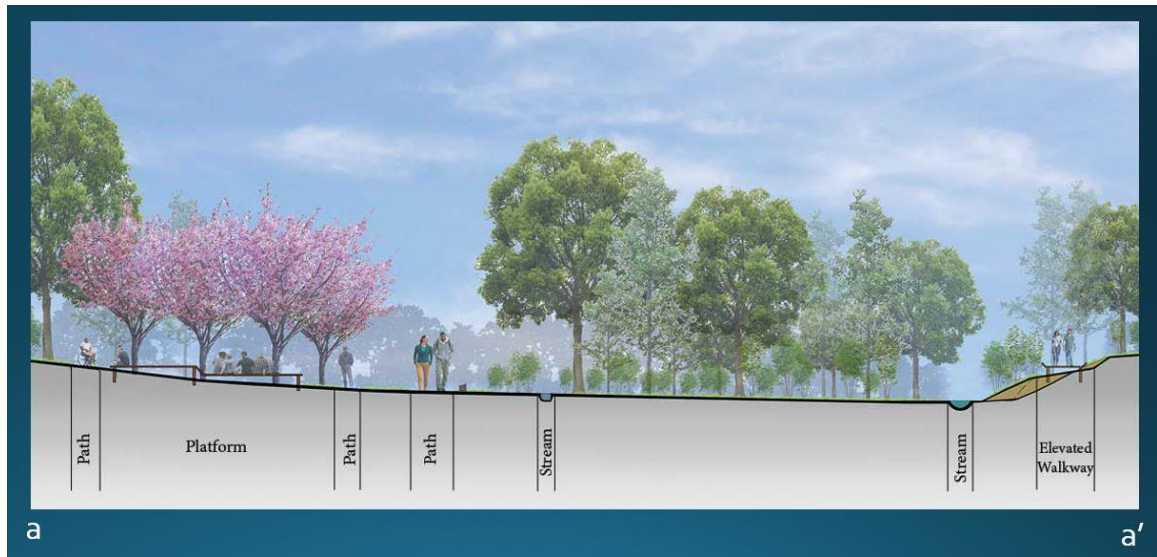


Figure 3.11

Perspective from Lot SS1 Looking at Proposed Entry Patio & Seating



Sensory Pergola

The Sensory Pergola area shown in Figures 3.12–3.16, is located south of the Xfinity Center. The entry patio is on Wellness Way and offers two pathway options and lounge bench seating under a pergola draped in floral vines. Components of the Nature Hangout include:

1. An entry patio located across from existing sidewalk on Wellness Way to invite people into the space.
2. Seat walls around the patio to help with grading and for people to gather.
3. Signage at the entry patio to clearly show the designed space and its purpose for forest bathing.
4. Elevated walkway that is ADA compliant and enables all users to safely travel the pathway to various areas of Nature Rx@UMD site.
5. Multiple paths to choose for difference nature experiences.
6. A large pergola with native vines growing on top to create a floral canopy that enhances the senses.
7. Comfortable seating of lounge benches beneath the pergola that gives users the opportunity to linger.
8. The arches with vines growing on them gradually get taller & more spread apart down the path as they lead away from the Sensory Pergola. The idea is while walking on the path, the view opens up to the meadows beyond the Sensory Pergola as if on is walking out of a forested canopy.
9. Views of the proposed pasture expansion give a nostalgic Maryland feel seeing the farm animals grazing.

Figure 3.12
Sensory Pergola Site Plan

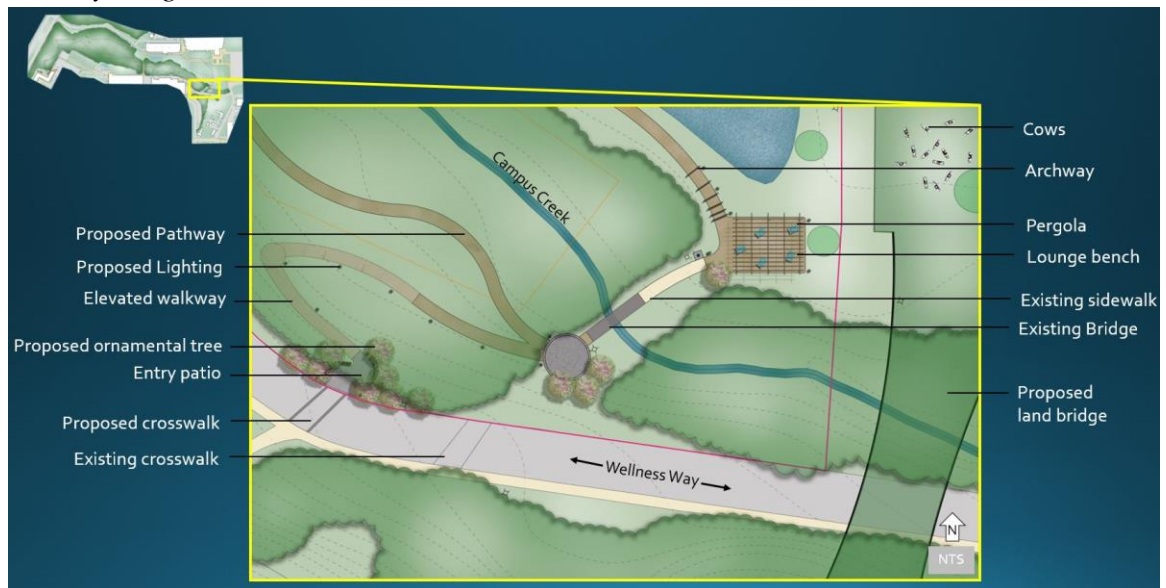


Figure 3.13
Sensory Pergola Section Elevation Cut line and Perspective Viewshed



Figure 3.14

Section Through Archways, Pergola, Stream, Proposed Land Bridge and Wellness Way

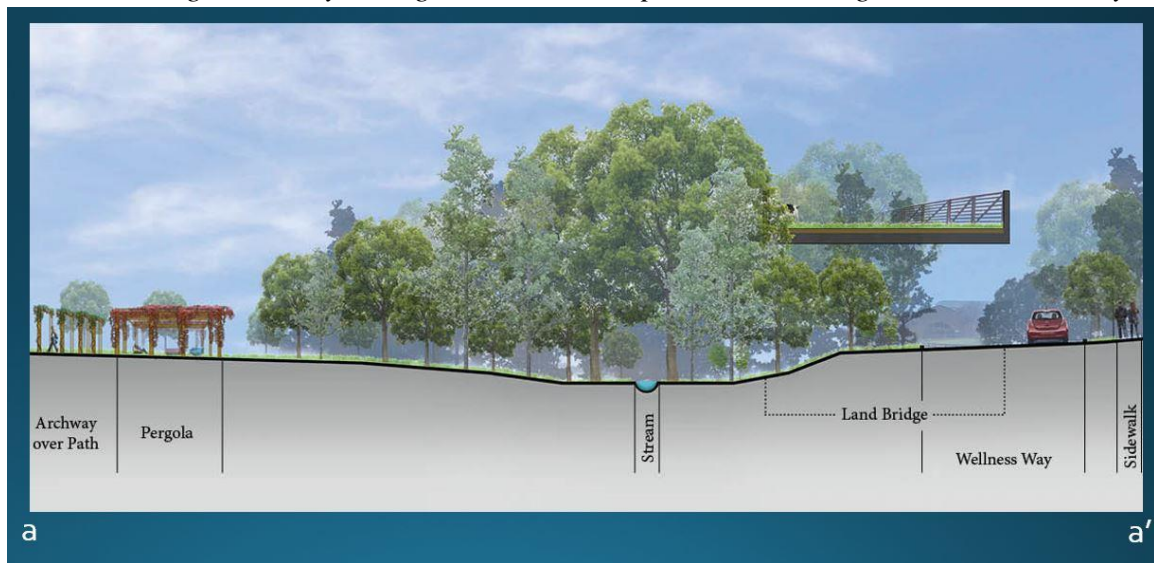


Figure 3.15

Perspective of Entry on Wellness Way to Pergola Area



Figure 3.16

Perspective of Pergola Area Facing North Toward the Xfinity Center



3.4 Design Elements

Design elements throughout the NatureRx@UMD site include seating, gathering spaces, signage, lighting, and a trail network carefully created for mindfulness and reflection (see Figures 3.17-3.30). The seating (lounge benches, hammocks and boulders) was chosen to enable users to be comfortable remaining in one spot for a period of time. The gathering areas are specifically placed as destination points to immerse users in nature and for groups to easily gather or for individuals to relax. The signage was designed to not be overbearing, but to be accessible enough to use as part of the NatureRx@UMD experience on the site. The trail network throughout the site was designed as a guide to take people through the forest comfortably with ease, using natural

material that will require little maintenance. Proposed lighting along the path and at certain gathering areas is designed to foster safety and enhance aesthetic quality at night.

Trails

Figure 3.17

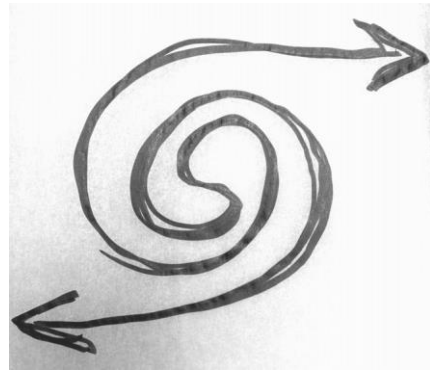
Elevated Pathway



(Topia Landscape Architects, 2013)

Figure 3.18

Forest Bathing Trail Concept



Gathering Spaces

Figure 3.19

Platform Inspirational Image



Figure 3.20

Platform Inspirational Image Section

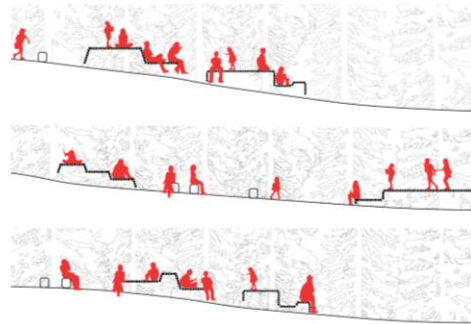


Figure 3.21

Pavilion Inspirational Image



(Perry Lakes Park Pavilion, 2002)

Lighting

Figure 3.22

Lighting Inspirational Image



JCC Nite LED Bollards

Seating

Figure 3.23

Lounge Benches



(Chapultepec Park, Mexico City)

Figure 3.24

Stationary Hammocks



(off-ground.com, Amsterdam, Netherlands)

Figure 3.25
Boulder Seating



Figure 3.26
Boulder Seating Section Elevation



Pergola / Archways

Figure 3.27
Pergola Inspirational Image



(DLC, 2016)

Figure 3.28
Archway Inspirational Image



(Gardner, 2017)

Signage

Figure 3.29
Informational Signage

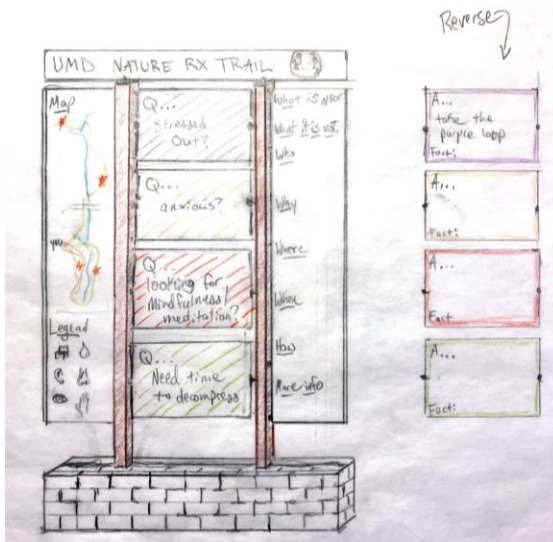
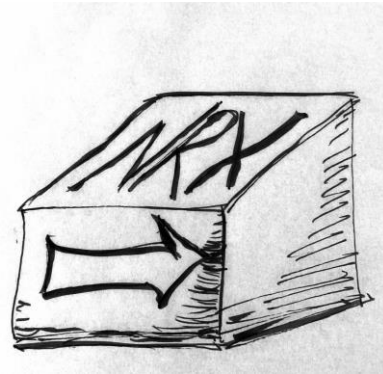


Figure 3.30
Low Profile Wayfinding Plaque



3.5 Plant Material

The beauty of the chosen site is that most of the existing vegetation will remain. The proposed vegetation will add more dimension for sensory invitations to the space, enhancing the experience. Below is a list of plants that would not only enhance the Campus Creek Nature Rx@UMD spaces, but also add to the goals of the Agro-Ecology Corridor. For example, to achieve the “forage” goal of the Corridor, some of the species are edible plants native to Maryland. This will help encourage education about native plants and add to the already abundant arboretum on campus. Figure 3.31 is a table of suggested species that would benefit the NatureRx@UMD site, the Agro-Ecology Corridor and the UMD Arboretum.

Figure 3.31
Proposed Species Table

Trees	MD Native	Edible for Humans	Sensory	Showy	Light Requirements
<i>Acer saccharum</i> (Sugar maple)	X	X	Sight	Fall	Sun to Shade
<i>Asimina triloba</i> (Pawpaw)	X	X	Taste	April/May	Sun to Shade
<i>Betula nigra</i> (River birch)	X		Touch	Feb/March	Part Shade
<i>Carya illinoensis</i> (Pecan)	X	X	Taste	March-May	Sun
<i>Magnolia virginiana</i> (Sweetbay magnolia)	X		Smell	April-July	Part Shade
<i>Prunus angustifolia</i> (Chickasaw plum)	X	X	Taste	Feb-May	Sun - Part Shade
Shrubs					
<i>Aronia melanocarpa</i> (Black chokeberry)	X	X	Taste	Fall	Part Shade
<i>Ceanothus americanus</i> (New Jersey tea)	X	X	Taste	March/April	Part Shade-Shade
<i>Cercis canadensis</i> (Eastern redbud)	X		Sight	Spring	Part Shade-Shade
<i>Corylus americana</i> (American hazelnut)	X	X	Taste	Fall	Part Shade-Shade
<i>Rhus aromatica</i> (Fragrant sumac)	X		Smell	Fall	Sun to Shade
<i>Vaccinium corymbosum</i> (Highbush blueberry)	X	X	Taste	Fall	Sun to Shade
Vines					
<i>Bignonia capreolata</i> (Crossvine)	X		Sight	March-May	Sun - Part Shade
<i>Campsis radicans</i> (Trumpet creeper)	X		Sight	June-Sept	Sun
<i>Clematis virginiana</i> (Virgin's bower)	X		Sight	July-Sept	Sun to Shade
<i>Lonicera sempervirens</i> (Trumpet honeysuckle)	X	X	Taste	March-June	Sun - Part Shade
<i>Parthenocissus quinquefolia</i> (Virginia creeper)	X		Sight	Fall	Sun to Shade
Grasses and Groundcover					
<i>Athyrium filix-femina</i> (Common lady fern)	X		Touch	N/A	Shade
<i>Carex flacca</i> (Blue sedge)	X		Touch	N/A	Part Shade
<i>Gaultheria procumbens</i> (Eastern teaberry)	X		Smell	June-Aug	Part Shade
<i>Panicum virgatum</i> (Switchgrass)	X		Touch	Fall	Sun -Part Shade
Herbs & Perennials					
<i>Aruncus dioicus</i> (Goat's beard)	X		Sight	May-June	Sun to Shade
<i>Asclepias tuberosa</i> (Butterfly milkweed)	X		Sight	May-Sept	Sun
<i>Chelone glabra</i> (White turtlehead)	X		Sight	July-Sept	Sun to Shade
<i>Echinacea purpurea</i> (Purple coneflower)	X		Sight	April-Sept	Sun-Part Shade
<i>Rudbeckia hirta</i> var. <i>pulcherrima</i> (Blackeye susan)	X		Sight	March-Nov	Sun
<i>Solidago odora</i> (Anisescented Goldenrod)	X		Smell	July-Oct	Sun

3.6 Maintenance

One goal of the NatureRx@UMD site is to have minimal maintenance. A general upkeep of trails and infrastructure would need to be performed on a regular basis; this stewardship would need to be determined by a university- or student-group in cooperation with the university's facilities personnel. There are a number of existing

groups on campus that have the potential to spearhead continual upkeep of the Nature Rx@UMD site. Overgrown (some invasive) species will initially be cut back to allow for movement through the space, but not so much that it would hinder the forest aesthetic. Keeping invasive species at bay must be part of the ongoing maintenance program. This task might be best suited as a stewardship opportunity out of the Arboretum or the Plant Science and Landscape Architecture department. Because the space will have an increased number of people, regular emptying of trash and recycling receptacles will be essential.

3.7 Programmed Activities in the Nature Rx@UMD Space

Potential UMD programming for the Nature Rx@UMD site could include a variety of initiatives to help broaden its presence on campus. For example, a mental health pledge/handbook given out to freshmen and new students to make them aware that UMD takes mental health seriously. Expanding the awareness of NatureRx@UMD on campus will help to normalize the conversation about mental health. Creating an overall consciousness shift toward a more integrative nature-based experience on campus will help student's psychological and physical well-being.

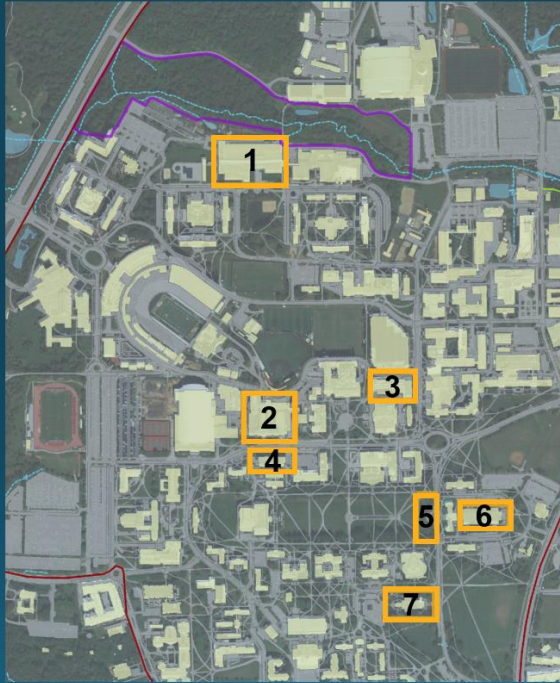
There is an abundance of outdoor learning and personal growth potential on the Campus Creek Nature Rx@UMD site that a variety of student organizations and courses could benefit from. The site can be used as a gathering space for a plethora of groups on campus. The student organizations shown in Figure 3.32 are just a few of the on-campus clubs that might directly benefit from the proposed Campus Creek NatureRx@UMD site.

The number indicates the building/area that the group typically meets. The activities and values of these groups would fit well with the site.

It has designated areas for both personal growth and spiritual gathering. Adjacent to the NatureRx@UMD site is the Eppley Recreation gear rental center. Currently they do not offer hammocks, but the idea might be considered. An informational brochure about the Nature Rx@UMD site in the rental center would increase visibility. Other programmed activities for the site might include yoga and other movement classes held in one of the gathering spaces (pavilion or platform); student-driven forest bathing walks organized by Nature Rx@UMD; meditation groups from the campus Counseling Center or Health Center; and foraging excursions as an extension of the Community Garden and promoted by the Arboretum. Orchestrating stewardship programs for tending to vegetation and the creek itself would further bring attention and ownership to the site.

Figure 3.32
Student Organizations

1. Eppley Recreation Center
 - a) Adventure Program
2. Stamp Student Union and/or varying sites
 - a) Active Minds
 - b) Yogi Terps
 - c) Residential Hall Association
3. Plant & Science
 - a) SASLA
 - b) Bee Club
 - c) Horticulture Club
4. Health Center
 - a) Terps for Recovery
5. Lower Mckeldin Mall
 - a) Terps in Trees (Hammock Club)
6. Armory
 - a) Terrapin Trail Club
7. Memorial Chapel and varying sites
 - a) Various religious denominations



Chapter 4: Discussion

The stress epidemic of college students is prevalent on the UMD campus. To find other methods outside of a brick & mortar solution, or a pharmacological solution, the answer is in the trees. The Campus Creek NatureRx@UMD site on campus is an ideal place for a leisurely walk through the forest, or a deeper forest bathing experience, without having to venture far. Campus Creek runs the length of the site, providing natural water sounds and attractive views. The flat terrain enables users of all abilities to easily access and maneuver through the site. An abundance of vegetation provides a beautiful green canopy and a feeling of enclosure while still being adjacent to the hustle of student life surrounding the site. The elements needed for forest bathing will easily align with the proposed design of the NatureRx@UMD site as well as the Agro-Ecology Corridor.

The NatureRx@UMD site will allow for a network of trail loops, areas for gathering and comfortable places for sitting, and a place for meaningful and restorative forest bathing. Inviting users to the site through informational signage will allow for meditation on a bench, a mindful walk through the trees or a relaxing hour in a hammock. Engaging the spaces and trails will help the well-being of the student body. The north end of the UMD campus could be looked at as its own neighborhood of dormitory buildings, recreation center and food establishments. Implementing the Campus Creek Nature Rx@UMD site will tighten the relationships between these built structures as well as enable the students to better connect with their natural surroundings. The designed areas for reflection within the Campus Creek Nature Rx@UMD site will allow students to ‘unplug’ from their daily stressors without having to seek clinical help across campus.

Providing therapeutic healing as a preventative measure has the potential to reduce the demand for reactive “after-the-fact” therapy.

4.1 Limitations

The two limitations that hindered this project were time and the COVID-19 pandemic. Ideally, a pre-occupancy evaluation (PreOE) with surveys, interviews or focus groups and behavior mapping would provide a “baseline” of how the site is currently used. Such data is useful for comparison if a post-occupancy evaluation (POE) is performed. The time and funds to gain Institutional Review Board approval for a PreOE was not within a Master’s thesis budget. Campus closure due to COVID-19 limited access to the site and prohibited access to the Landscape Architecture studio in the Plant Science building. The pandemic has also caused more stress for students (Zhai & Du, 2020). Even though this has put a heavy damper on the entire campus population, it is clear that a space for nature therapy on campus is needed for everyone’s well-being.

4.2 Future Research

Further research could be conducted to fully explore designing a nature-based therapy space on a university campus. For example, a feasibility study for a proposed build-out of the entire Campus Creek NatureRx@UMD site would help the university to better assess the costs and time needed to complete the project. Looking at the entire UMD campus as a whole network of Nature Rx spaces would help to connect them. Since there are already 12 NatureRx@UMD spaces on the UMD campus, designing a directional path and signage to better connect these spaces could help the student body experience Nature Rx.

There are many questions to consider after the NatureRx@UMD site has been built. Even without the baseline PreOE data, a POE could be conducted on how the site is used. The health outcomes for students and other users could be evaluated. Some questions to consider include: Does the site actually benefit people in the way that it was intended to? Are students who use it less stressed? Are they happier? Are they better able to focus? Has there been a shift in how people at UMD talk about mental health?

Chapter 5: Conclusion

The goal of this Master of Landscape Architecture thesis was to design a site for University of Maryland students to engage in nature therapy and forest bathing. A designed site on the UMD College Park campus will tie in with the existing Nature Rx@UMD program to improve the mental and physical health of students. The Campus Creek area on the north side of the University of Maryland College Park is an ideal location for this Nature Rx@UMD design project due to its natural vegetation, water element, accessibility, and proximity to the proposed Agro-Ecology Corridor.

The design was derived from a literature review, site inventory and site analysis. The eight steps for forest bathing, as outlined by Clifford (2018) were the backbone of the created spaces on the Campus Creek Nature Rx@UMD site. From the literature on college student stress, it is evident that there is a need for non-clinical modalities to help young adults manage their mental health. There is also clear research on the healing powers of nature. Spending as little as 20 minutes a day for six days a week can help reduce anxiety and lower heart rates. The inventory and analysis completed for the Nature Rx@UMD site has enforced the design ideas based on forest bathing.

The primary goal of creating a Nature Rx space on the UMD campus is to *facilitate the mental and physical health and well-being of students through passive and active engagement with nature*. The design of Campus Creek is a strategy is to invite students to connect in a more immersive and mutually beneficial relationship with nature. The overall design program and individual elements were implemented into the design to further address the goal of creating a space on campus for the well-being of the students.

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