

SUPPLEMENTING THE ADA DESIGN STANDARDS

Addressing Mental Health and Illness through Standards of Design
Adapted from the WELL Building Standard



S U P P L E M E N T I N G T H E
A D A D E S I G N S T A N D A R D S

2019 Architectural Research Report | a. a. mueller

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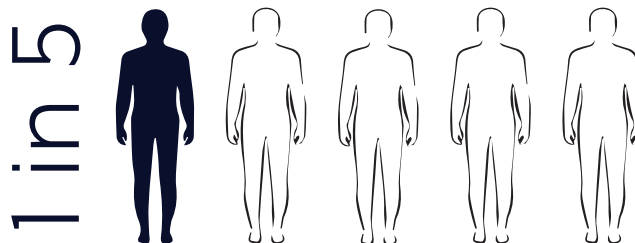
A B S T R A C T

The 2010 ADA Design Standards were originally crafted to allow people with disabilities access to the built environment, including public accommodations, commercial facilities, and state and local government facilities. Familiar to architects, engineers, and interior designers, these standards focus primarily on physical disability and wellbeing of those that are disabled—yet pay no attention to the impact in which the built environment has on occupant’s mental health. Various sources argue that mental health goes hand-in-hand with physical health. In fact, mental health is a facet physical health essential to achieving prosperity when functioning in society. With that, can the ADA Design Standards be supplemented by an additional set of architectural-related standards designed specifically to mitigate mental health and illness amongst occupants in various building types?

Mental Illness and Disability

Introduction

The term 'mental illness' is used to define a group of illnesses that have a direct effect on the mind or brain. This condition impacts a considerable number of people across the nation, where 1 in 5 adults in the United States are diagnosed with a mental illness. This equates to 19% of the population, or 44.7 million people. This significant percentage of people live with mental, behavioral, or emotional disorders in their daily lives, however such diagnoses are not immediately palpable; people cannot see them like they do in a person physically impaired. Such conditions are not limited to depression, anxiety, bipolar, obsessive-compulsive disorder, schizophrenia, and attention deficit disorder (National Institute of Mental Health, 2017).



19%
44.7 million
people

Figure 1.1 | Mental Illness Statistics

One in Five U.S. Adults experience some form of mental illness. That is approximately **19%** of the U.S. population.

Mental Health: the stigma

Mental health is a familiar concept to most people around the United States that relates closely to physical health. To define it, mental health encompasses one's "emotional, psychological, and social well-being. It also affects how one thinks, feels and acts, as well as helps determine how one may "handle stress, relate to others, and make choices" (Mentalhealth.gov, 2017).

"To define it, mental health encompasses one's "emotional, psychological, and social well-being; it affects how one thinks, feels and acts and helps determine how one may "handle stress, relate to others, and make choices."

-Mentalhealth.gov

Knowing the number of people that are diagnosed with a mental illness, mental health should possess high importance in life. In fact, the CNN "reports that 90 percent of Americans value mental and physical health equally." However, a stigma continues to interfere with people's perception of mental health and illness (Hussung, 2016). It is typically

seen and treated differently than physical health, and the issue does not fall short from discrimination. People diagnosed with a mental illness face discrimination through different facets including health coverage, judgments from society, and even in “families, friends and employers” (Mental Health Foundation, 2018). So, why does a stigma exist, and what are the implications that come with it?

The societal impression of mental illness is that people with “mental ill health are violent and dangerous,” which is not the case. They are “more at risk of being attacked or harming themselves than harming other people.” The media is also a fair contributor to the stigma associated with mental health. It portrays people with mental illness as “dangerous, criminal, evil, or very disabled and unable to live normal, fulfilled lives” (Mental Health Foundation, 2018).

The Mental Health Foundation states, “people with mental health problems say that the social stigma attached to mental ill health and the discrimination they experience can make their difficulties worse and make it harder to recover” (Mental Health Foundation, 2018). Not to mention that people with mental health problems are “amongst the least likely of any group with a long-term health condition or disability to:

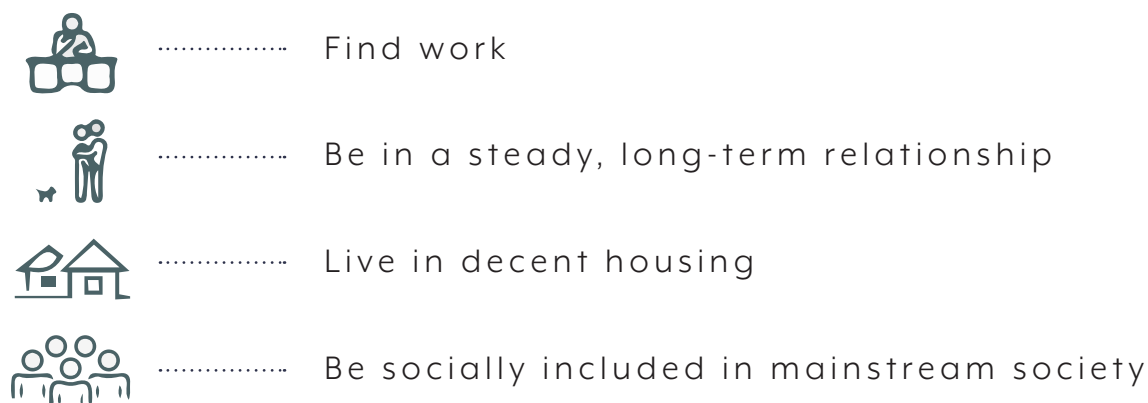


Figure 1.2 | Mental Health: Limiting Major Life Activities
(Mental Health Foundation, 2018).

For many reasons, mental health goes hand-in-hand with physical health. In fact, mental health *is* physical health, and it is essential to achieving prosperity when functioning in society (Byron, 2014).

Mental Illness: AMI vs. SMI

Mental illness affects people of all ages and demographics; men, women, racial and ethnocultural groups, and those in different socioeconomic statuses. For that reason, it is evident that mental illness does not discriminate. Each individual is different, however, and may experience varying classifications of mental

illness. The National Institute of Mental Health (NIMH) classifies mental illness into two different categories including ‘Any Mental Illness’ (AMI) and ‘Serious Mental Illness’ (SMI). More specifically, AMI is defined as all recognized mental illnesses, or a “mental, behavioral, or emotional disorders” that can range from “no impairment to mild, moderate, and even severe impairment.” On the other hand, SMI is a smaller and more severe subset of AMI; also a “mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities.” Further, the NIMH states that “the burden of mental illness is particularly concentrated among those who experience disability due to SMI.” (National Institute of Mental Health, 2017). Amongst AMI and SMI, the most common types of mental disorders include:

MENTAL DISORDER	CLASSIFICATIONS
ANXIETY DISORDERS	Panic Disorders, Phobias, Obsessive-compulsive Disorder, Post-Traumatic Stress Disorder
MOOD DISORDERS	Major Depression, Bipolar Disorder, Persistent Depressive Disorder, Seasonal Affective Disorder (SAD)
SCHIZOPHRENIA DISORDERS	Individual has “thoughts that appear fragmented” and finds it difficult to process information

Figure 1.3 | Mental Disorder Classifications

Disability-Adjusted Life Years

Since mental health effects all demographics across the world, the global burden of “mental health illnesses is significant” (United Interiors, 2018). This can be measured in the amount of life-years lost amongst healthy people; also known as *Disability-Adjusted Life Years* (DALY). According to the World Health Organization, a DALY is “one lost year of ‘healthy’ life.” This term is used as a measurement to understand the gap between current health and an “ideal health situation” in which people live to a specific age, “free of disease and disability” (World Health Organization, 2018). Figure 1.4 notes that the worldwide number of years, both lived with or lost to, mental illness and substance abuse disorders in 2010 equated to 331.5 million years of life. These numbers include life with a disability, premature mortality, or disability-adjusted life.

Mental illnesses and substance use disorders accounted for: (2010, Worldwide)

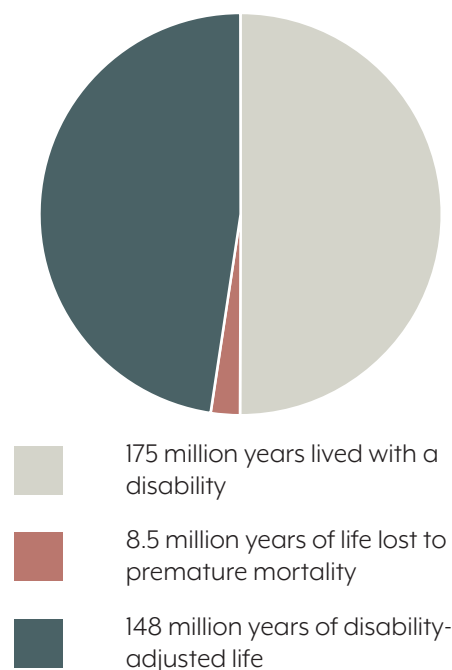


Figure 1.4 | Disability-Adjusted Life Years

Mental Illness Demographics

As stated before, mental illness manifests within a wide range of demographics. However, mental illness is more prevalent in certain age groups, sexes, and ethnicities. The two graphs below show percentage differences between AMI and SMI amongst varying demographics. While the percentage of AMI is generally greater than SMI in all demographic categories, it is important to note that those diagnosed with Serious Mental Illnesses make up a significant percentage of those with Any Mental Illness. Looking at the “overall” columns, AMI makes for 18.3%, while SMI makes for 4.2% of the population. Between AMI and SMI, females are more affected by mental illness compared to males. Further, a greater percentage of young-adults experience mental illness symptoms compared to older ages. Further, mental illness is more prevalent amongst White, American Indian/Alaskan Native, and those with two or more races between both graphs.

Prevalence of **Any Mental Illness** Among U.S. Adults in 2016
Data Courtesy of Substance Abuse and Mental Health Services Administration

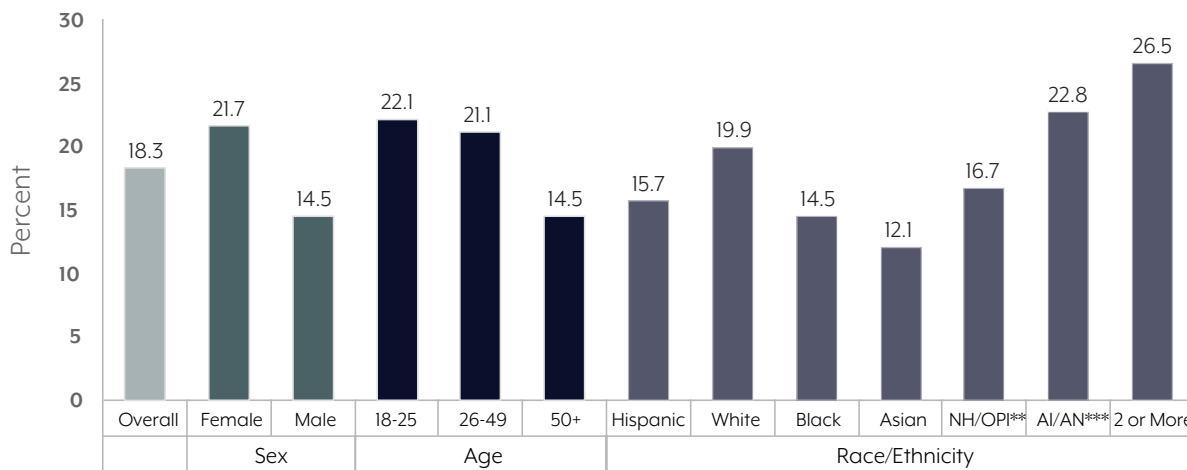


Figure 1.5 | Prevalence of AMI in the U.S.

Prevalence of **Serious Mental Illness** Among U.S. Adults in 2016
Data Courtesy of Substance Abuse and Mental Health Services Administration

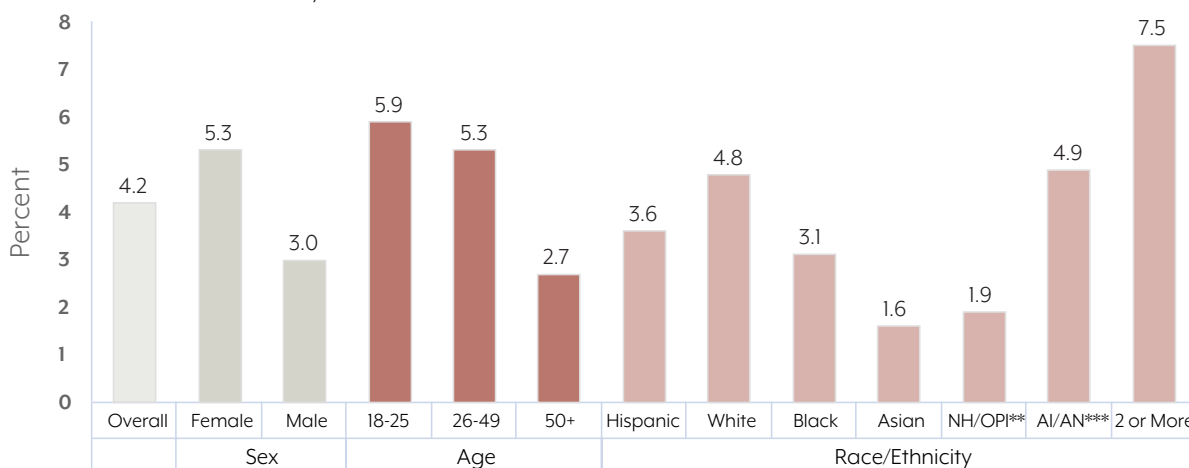


Figure 1.6 | Prevalence of SMI in the U.S.

**NH/OPI = Native Hawaiian / Other Pacific Islander

***AI/AN = American Indian / Alaskan Native

Can Mental Illness be Classified as a Disability?

The Americans with Disabilities Act (ADA), which became a law in 1990, defines a disability as “a person who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record or such an impairment, or a person who is perceived by others as having such an impairment (What is the Americans with Disabilities Act (ADA)? 2017). There are several different forms of disabilities, however select ones are covered under the ADA Design Standards. According to the Centers for Disease Control and Prevention (CDC), there are “many types of disabilities, such as those that affect a person’s” **vision, movement, thinking, remembering, mental health, social relationships, communicating, learning, and hearing**. Figure 1.7 displays the differing classifications of disabilities.

Poor mental health effects one’s functionality in relationships, productive activities (including work, school, and care giving), and the ability to “adapt to and cope with adversity” (Parekh, Ranna 2018). Interestingly enough, those experiencing mental illness can also encounter adverse physical effects on their health. Scientific studies have shown links between mental illness and heart disease, depression and anxiety and cancer mortality rates, depression and diabetes, and schizophrenia and osteoporosis (Horton, 2018).

Mental illness can be classified as both an invisible disability and psychiatric disability. Invisible disabilities are those that are “hidden and not immediately apparent,” including categories of chronic pain, fatigue, and mental illness (Disabled World Towards Tomorrow, 2018). Further, mental illness is a subcategory under the “broader ADA term mental impairment.” The term ‘psychiatric disability’ can be used interchangeably with ‘mental illness’ when it significantly interferes with the “performance of major life activities, such as learning, working, and communicating, among others” (Boston University, 2018). For various reasons, mental illness can be classified as a disability, thus should be protected under the ADA.

The term ‘psychiatric disability’ can be used interchangeably with ‘mental illness’ when it significantly interferes with the “performance of major life activities, such as learning, working, and communicating, among others.

-Boston University



Figure 1.7 | Disability Classification

Key Definitions

biophilic design (n):

bi·o·phil·ic de·sign

- The genetic disposition one has toward nature (Mazuch, R. n.d.).

disability (n):

dis·abil·i·ty

- A person who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment (What is the Americans with Disabilities Act (ADA)? 2017).
- Any condition of the body or mind (impairment) that makes it more difficult for the person with condition to do certain activities and interact with the world around them” (Disabled World, 2018).

environmental psychology (n):

en·vi·ron·men·tal psy·chol·o·gy

- Studying interactions between individuals and their physical surroundings (Maki, 2017).

invisible disability (n):

in·vis·i·ble dis·abil·i·ty

- Those that are hidden and not immediately apparent, including chronic pain, chronic fatigue, chronic dizziness, and mental illness.

mental illness (n):

men·tal ill·ness

- A general term for a group of illnesses that affect the mind or brain. These illnesses, which include bipolar disorder, depression, schizophrenia, anxiety and personality disorders, affect the way a person thinks, feels and acts

psychiatric disability (n):

psy·chi·at·ric dis·abil·i·ty

- A term that is used when mental illness significantly interferes with the “performance of major life activities, such as learning, working, and communicating, among others” (Boston University, 2018).

salutogenesis (n):

sal·u·to·gen·e·sis

- The promotion of active health and wellbeing rather than concentrating on the pathogenic approach that deals solely with resultant disease and injury (Mazuch, R. n.d.).

salutogenic design (n):

sal·u·to·gen·ic de·sign

- Focus on the positive impact of design on human health (Rickard-Brideau, n.d.).
- Helps to “maintain physical and mental well-being... helping [people] to lead healthier and potentially longer lives. It is the ultimate investment in people, in an architectural sense” (Rickard-Brideau, n.d.).

universal design (n):

uni·ver·sal de·sign

- A design approach that implies equity and social justice by design; a focus on social inclusion (Preiser, 2001).

A D A

H I S T O R Y

While many people are familiar with the Americans with Disabilities Act, it does not solely originate in 1990 when it was passed by law. The relationship between physical disabilities and architectural obstructions have been recognized in the past yet were understood by different terms that are not regularly used today. Discussed on the following page are a few key dates to encompass the framework behind the ADA Design Standards.

ADA TIMELINE OF EVENTS

1950s

Barrier-free design was “first used in to describe the effort of removing physical barriers from the ‘built environment’ for people with disabilities. This type of design began in part after World War II when spaces needed to become more accommodating for injured veterans (Preiser, 2001).

Tim Nugent, director of rehabilitation education on the Champaign Urbana Campus of the University of Illinois, wanted to train young paraplegics to manage independently. Nugent noticed that several **Architectural barriers** “stood in the way of their being able to realize their full potential for achievement and compete successfully with others for the material rewards that America offered” (Goldsmith, 2000).

1961

American National Standard Institute (ANSI) Accessible and Usable Buildings and Facilities is created: Became the “private sector model for a technical standard for accessible features (History of Accessible Facility Design, n.a.).

1964

Civil Rights Act is implemented; directly relates to the Americans with Disabilities Act.

1968

Architectural Barriers Act is implemented. Facilities that are “designed, constructed, altered, or leased with certain federal funds” must be “accessible to persons with disabilities” (History of Accessible Facility Design, 2017).

1970s

Ron Mace, a handicapped architect created the term, “**Universal Design**.” According to Mace, this concept “seeks to encourage attractive, marketable products that are more usable by everyone. It is design for the built environment and consumer products for a very broad definition of user” (Preiser, 2001). It is a “design approach that implies equity and social justice by design” (Preiser, 2001). Furthermore, Universal Design uses a **bottom-up** versus a **top-down** approach.

1973

Rehabilitation Act, Section 504 is implemented. Includes “accessible new construction and alterations” (History of Accessible Facility Design, 2017).

1986

Rehabilitation Amendments Act is implemented. “Requires that facilities designed, constructed, altered, or leased with certain federal funds be accessible to persons with disabilities” (History of Accessible Facility Design, 2017).

1990

Americans with Disabilities Act (ADA): “Prohibits discrimination on the basis of disability; establishes design requirements for the construction or alteration of facilities required to be accessible” (History of Accessible Facility Design, 2017).

1991

U.S. Department of Justice passes first **ADA Standards for Accessible Design**.

2010

U.S. Department of Justice **updates the ADA Standards for Accessible Design**. These standards are intended to “set minimum requirements – both scoping and technical—for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities” (What is the Americans with Disabilities Act (ADA)? 2017).

Figure 2.1 | ADA Timeline

SALUTOGENIC
DESIGN

"The most unfortunate thing is that very few organizations and even design professionals recognize the benefits of salutogenic design (designing for wellness). Salutogenic design isn't something that's "cool" or "good for PR". It's a measurable aspect of design that can help a building's inhabitants operate at their peak of effectiveness, maintaining physical and mental well being, actually helping them to lead healthier, and therefore longer lives."

-Little Architects

Designing for Salutogenesis

Humans spend over 90% of their lives indoors, so the buildings they inhabit must have some sort of effect on their overall health. An important concept to review in this case is ‘salutogenic design,’ which validates the impact of the built environment on the human body. Salutogenic design originates from sociologist Aaron Antonovsky’s theory of ‘salutogenesis’ which translates into ‘health origins.’ This term was coined in 1979 and focuses on the “promotion of active health and wellbeing” over pathogenesis, a concept that focuses on one’s resultant “disease or injury” (Mazuch, R, n.d.).

On the other hand, salutogenic design is a “measurable aspect of design that can help a building’s inhabitants operate at their peak effectiveness, maintaining physical and mental wellbeing,” assisting them to lead healthier and longer lives. This concept is an “ultimate investment in people, in an architectural sense” (Little Architects, 2018).

Certain responses to the built environment have “universal effects” on people—like the amount of daylight in a space, which many people have a positive response to. However, in a psychological sense, each individual reacts to differing environments in different ways. Think of the psychological phenomenon, ‘nature versus nurture.’ According to Little Architects, certain environmental factors are “personal and specific,” based on one’s “genetic wiring—where genetics set the stage and the environment activates those genes in different ways” (Little Architects, 2018).

Certain psychological theories, like the ‘Field Theory Rule’ developed by Kurt Lewin declare that the environment has a direct effect on one’s behavior. More specifically, Lewin developed the idea that “emphasized the importance of individual personalities, interpersonal conflict, and situational variables.” He argued that “behavior is the result of the individual and the environment” (Cherry, 2018). Lewin’s Field Theory can be defined by a specific formula, where behavior (B) is a function of the person (p) and their environment (e) (Burnes, 2013).

B=f(p,e)

Diagrams explain this phenomenon and show experimental evidence behind the reasoning of Lewin’s Field Theory Rule. Figure 3.1 below shows the environment, while Figure 3.2 shows the person and the goal in which they are trying to achieve. The dotted line notes the different spaces they must go through during life—shaping them in different ways. Individuals may “have the same goal, but the field to get there may be different” (Burnes, 2013).

Knowing the information behind the Field Rule, stressors within the built environment have a significant impact on individuals. Many associate stress with the workplace, however “just about any place where people spend significant periods of time can initiate stress in the user” which includes residential, commercial, and educational facilities (Little Architects, 2018).

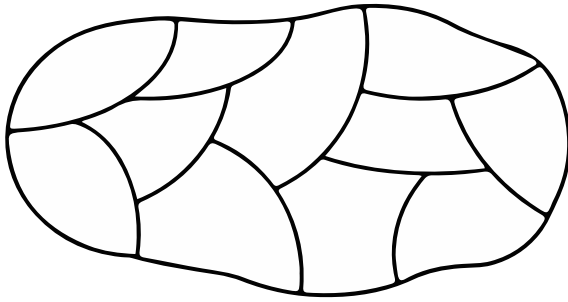


Figure 3.1 | Field Theory Rule

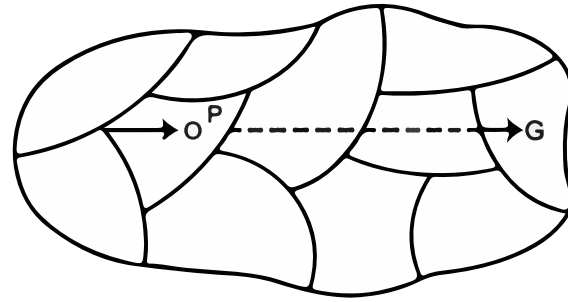


Figure 3.2 | Field Theory Rule: Person vs. Goal

While designing a space that is better for people’s health and wellness is critical, very few “organizations and design professionals recognize the benefits of salutogenic design;” or designing for wellbeing. It is important to note that the spaces designed by professionals have a “direct impact on physical and mental fatigue, awareness, memory cognition, [and] depression” (Little Architects, 2018). For these reasons, providing a standard framework behind the ADA Design Standards can be the key to unlock betterment of mental health in building inhabitants across the United States.

Does the Built Environment Affect Mental Health?

Research suggests that there are several factors that impact mental health in the built environment. Specifically speaking, components like the amount of greenery in a space, access to physical activity, and natural light have an affect on one’s symptoms of mental illness. The information below notes these environmental qualities and their impact on mental health.

Mental Health and Biophilia/Comfort

- “Because the mind plays a vital role in an individual’s overall health and well-being, an atmosphere the supports a healthy mental state can have significant psychological and physical benefits (International Well Building Institute, 2017).”
- “Chronic low level disturbances or mental distress play increasingly important roles in some of the most common chronic diseases” including in depression, stress/anxiety (Voinov, 2013).
 - Focus on “significantly reducing the most common sources of physiological disruption, distraction and irritation and on enhancing acoustic, ergonomic, olfactory and thermal comfort to prevent stress and injury and facilitate comfort, productivity and well-being (International Well Building Institute, 2017).”
- “A physical space in which design principles align with an organization’s core cultural values can positively impact employees’ mood and morale. Integrating aesthetically pleasing elements into a space can help building occupants derive a measure of comfort or joy from their surroundings.” (International Well Building Institute, 2017).

Mental Health and Fitness

- Exercise and Depression: promotes neural growth, reduced inflammation, and new activity patterns to promote feelings of “calm and well-being” Releases endorphins to energize a person.
- Exercise and Anxiety: relieves “tension and stress, boosts physical and mental energy, and enhances well-being through the release of endorphins.”
- Exercise and ADHD: Physical activity immediately boots brain’s “dopamine, norepinephrine, and serotonin levels - all of which affect focus and attention.”
- Exercise and PTSD and trauma: Can help nervous system become “unstuck” and begin to move out of the immobilization stress response that characterizes PTSD or trauma (Sharma, 2006).
- “Exercise is one of the most effective ways to improve mental health. Regular exercise can have a profoundly positive impact on depression, anxiety, ADHD, and more” (Help Guide, n.d.).

Mental Health and Light

- Benefits of natural light:
 - Natural light boosts vitamin D storage, leads to higher productivity, helps with sleep, and improves mood.
- Natural light, vitamin D, and depression:
 - “Employees working in natural light record higher levels of energy than those working under artificial light”
 - “The amount of sunlight one receives during the day has a direct impact on how much one sleeps at night (Davis, 2014).”
- Natural light and circadian rhythm:
 - “Light influences the human body in non-visual ways. Humans and animals have internal clocks that synchronize physiological functions on roughly a 24-hour cycle called the circadian rhythm (International Well Building Institute, 2017).”
 - “All light- not just sunlight- can contribute to circadian photoentrainment. Given that people spend much of their waking day indoors, insufficient illumination or improper lighting design can lead to a drift of the circadian phase (International Well Building Institute, 2017).”
 - “Exposure to natural light can improve occupant mood, alertness and overall health. Ideal lighting involves proper exposure to diffuse daylight, as well as careful design of windows and glazing to avoid excessive glare and heat gain. Windows are therefore a key variable for both ensuring that occupants receive enough light for positive physiological and subjective effects, but also not too much light that causes discomfort or becomes a source of distraction. Balancing energy performance, thermal comfort and access to quality daylight are essential to proper building design” (International Well Building Institute, 2017).

Utilizing the WELL™ Building Standard as a Basis for Supplementing the ADA Design Standards

During the process of curating a comprehensive list of ADA Design Standards directed toward mental illness, focus was set on the WELL™ Building Standard. The reason behind this includes their extensive scientific and biometric research on the built environment relating to the wellbeing of inhabitants. The information provided by WELL has underwent scientific, practitioner, and medical review, making their information credible and trustworthy.

This handbook consists of a comprehensive list of supplementary Design Standards hand-selected by the author that specifically relate to mental health. Each standard is comprised of minimum components that should be applied to the built environment, very much like the current 2010 ADA Design Standards. The information provided in this book is courtesy of the International WELL Building Institute, and can be accessed from (<https://www.wellcertified.com/en>).

The purpose of this research report is to supplement the ADA Design Standards with a framework focused on mental health and illness. A specific procedure process has been used in this research to select the standards that will benefit the mental health of inhabitants the greatest. In particular, the WELL™ Building Standard is a viable option in selecting standards best for mental health due to their scientific research on the topic of physical and mental wellbeing. This foundation was developed in October 2014 after several years of extensive scientific and medical research behind the human response to the environment. WELL™ focuses on the “design, operations and behaviors within the places [people] live, work, learn and play” in order to optimize and “advance human health and wellbeing” (International Well Building Institute, 2017).

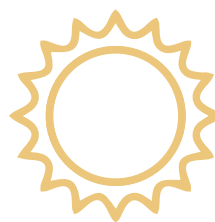
The WELL™ Building Standard focuses on seven areas of human wellness, each of which can be standardized into the built environment. These areas include the **mind, fitness, light, nutrition, water, air, and comfort**. This research process involved selecting specific standards that directly apply to mental health through a basis of background research and inclination.



DESIGNING FOR THE
MIND



DESIGNING FOR
FITNESS



DESIGNING FOR
LIGHT



DESIGNING FOR
BIOPHILIA/COMFORT

Figure 4.1 | WELL Concepts

DESIGNING
FOR THE
MIND

D E S I G N S T A N D A R D S

Several components geared toward psychological health can be implemented into the built environment to promote optimal mental well-being. Qualitative and quantitative biophilic qualities, adaptable and private spaces, ceiling height, and artwork are elements that improve a building occupants' state of mind to provide a positive effect on mental health.

DESIGNING FOR THE MIND

BIOPHILIA - QUANTITATIVE*

01

OUTDOOR BIOPHILIA

MINIMUM REQUIREMENTS

I. At least 25% of the project site area meets the following requirements:

Features either landscaped grounds or rooftop gardens accessible to building occupants.

Consists of, at minimum, 70% plantings including tree canopies (within the 25%).

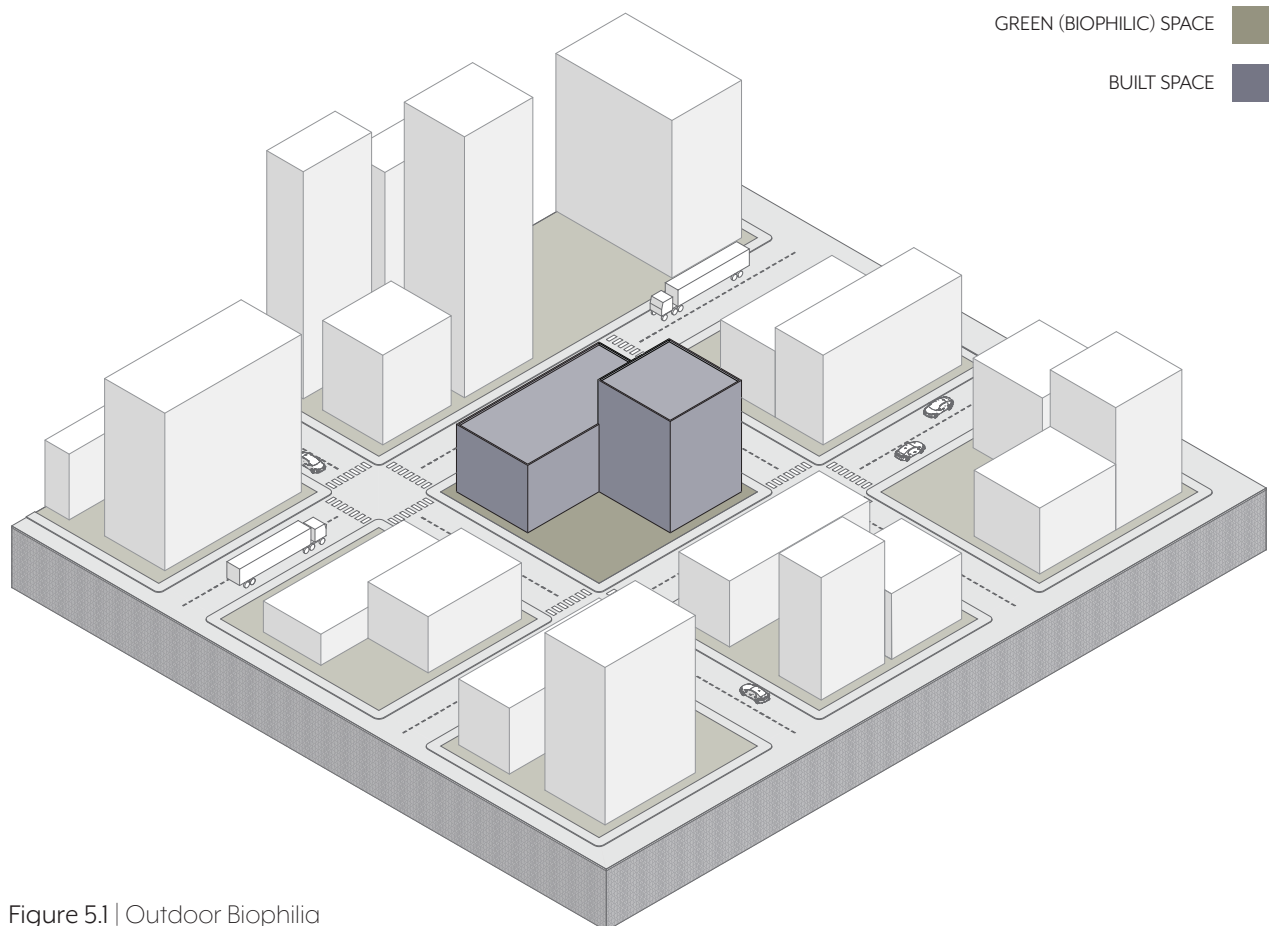


Figure 5.1 | Outdoor Biophilia

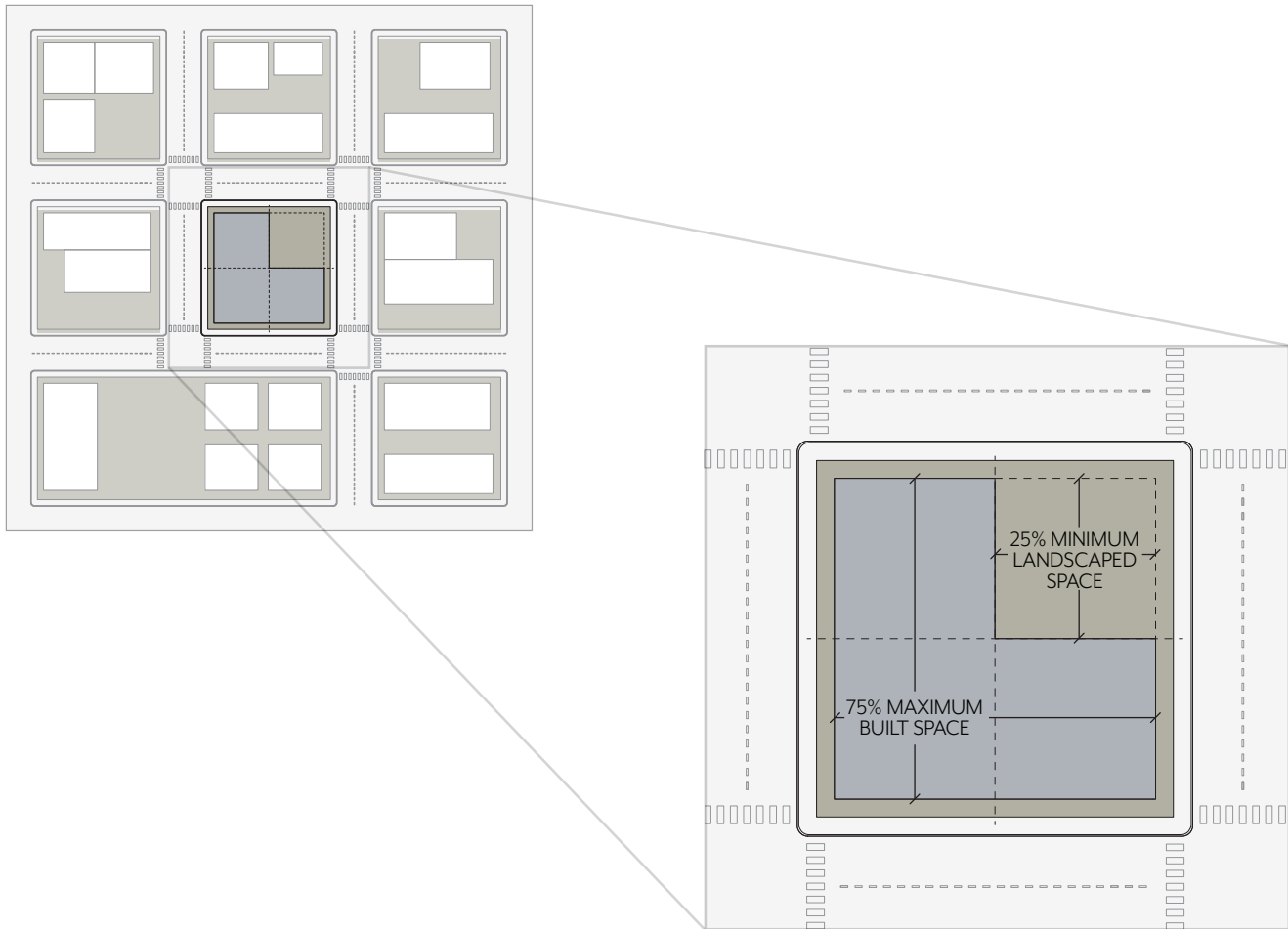


Figure 5.2 | Outdoor Biophilia Percentage

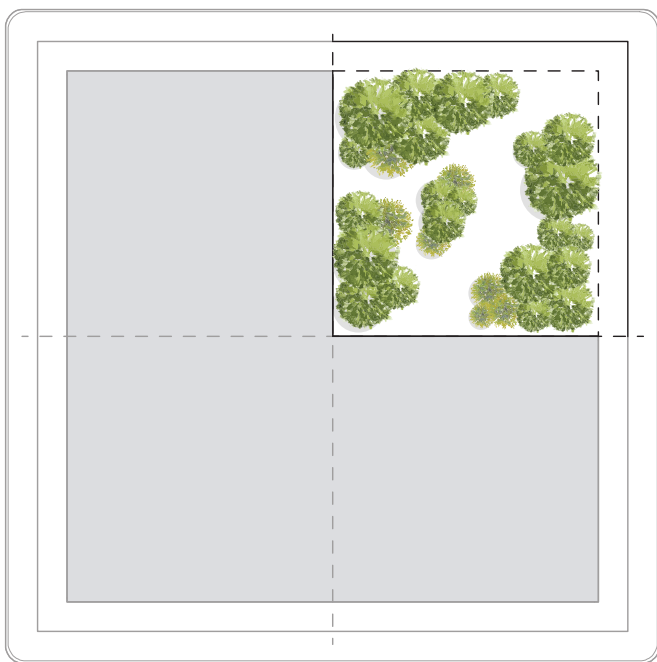


Figure 5.3 | Planting Percentage

NOTES

Figures 5.2 - 5.3 reveal a sequence of required greenspace needed in a given project. Please note that Figure _ displays a minimum ratio of 1:3 landscaped space versus built space. Within those numbers, Figure 5.3 shows that the landscaped space must be covered by 70% canopies or plants, and 30% hardspace.

DESIGNING FOR THE MIND

ADAPTABLE SPACES*

02

STIMULI MANAGEMENT

SEE FIGURE 6.1

- I. Seating and spatial layouts are organized into separate workplace zones and provide differing degrees of sensory engagement. Regularly occupied spaces of 2,000 ft² or larger provide documentation of methods used to establish appropriate zones based on the guidelines below:

Programming plan is developed, using data from interviews, surveys, focus groups and observational research, to establish the organization's culture, work patterns, work processes and space utilization

Annotated floor plans incorporate research data to establish work zones that support a variety of work functions

Designated quiet zones are provided as enclosable or semi-enclosable rooms with no more than three (3) seats per room

Designated collaboration zones are provided as enclosable or semi-enclosable rooms with no less than three (3) seats and at minimum one visual vertical surface area for communicating ideas or work

03

PRIVACY

SEE FIGURE 6.2

I. Projects with gross floor area greater than 20,000 ft² provide a designated quiet space for focus, contemplation and relaxation, which meets the following requirements:

| Space is at minimum 75 ft² plus 1 ft² per regular building occupant, up to a maximum of 800 ft²

| Ambient lighting provides continuously dimmable light levels at 2,700 K or less

| Noise Criteria from mechanical systems is 30 or lower

| A plan is developed that includes a description of how the project incorporates two of the following elements:

- | Plant wall and/or floor plantings
- | Audio device with nature sounds
- | A variety of seating arrangements

04

SPACE MANAGEMENT

REQUIREMENTS

I. To minimize clutter and maintain a comfortable, well-organized environment, minimal storage requirements are addressed through the provision of a combination of one of the following:

| A workstation cabinet at a minimum volume of 4 ft³ for each regular occupant

| A personal locker at a minimum volume of 4 ft³ for each regular occupant

DESIGNING FOR THE MIND

PRIVACY & SPACE MANAGEMENT

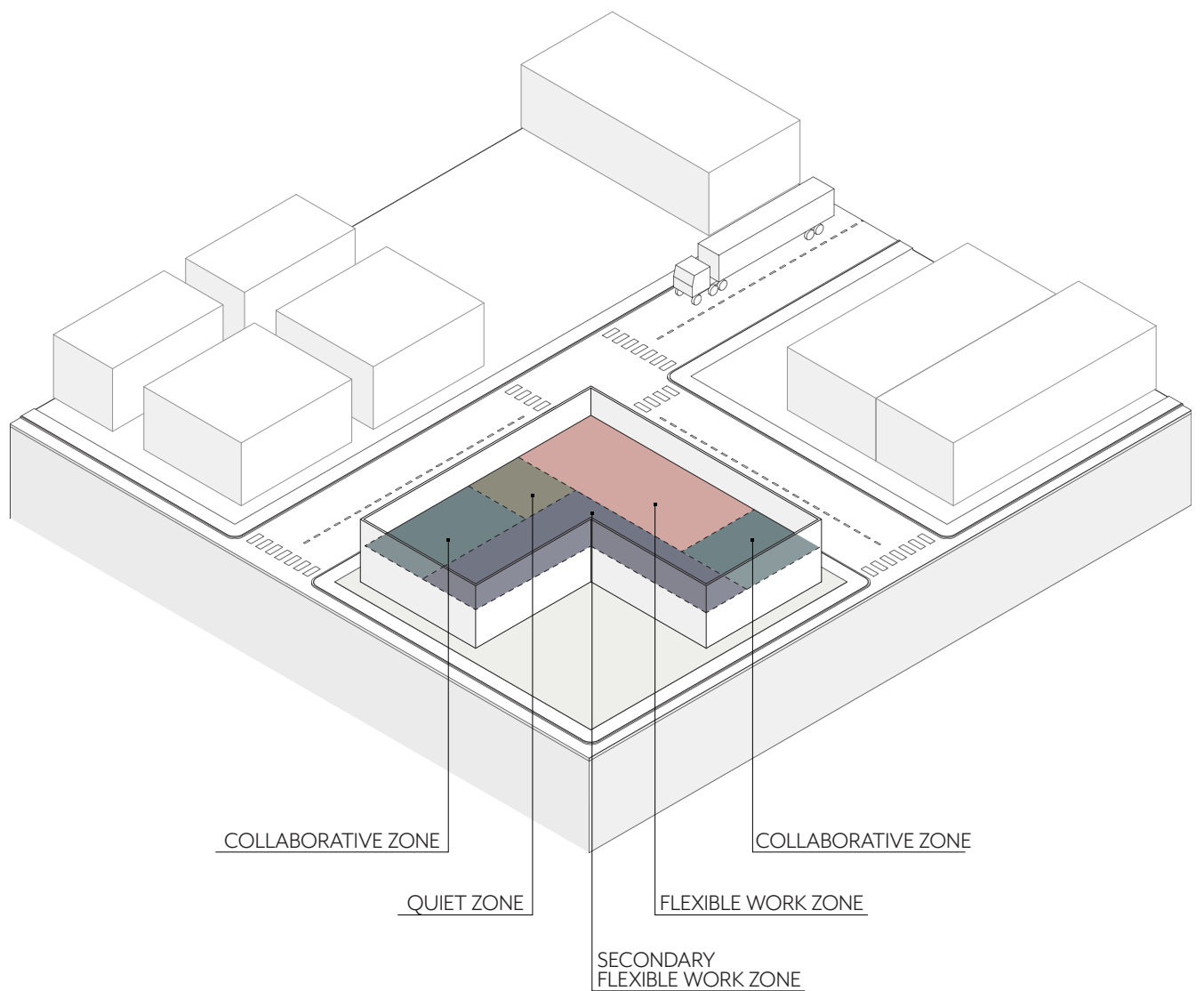
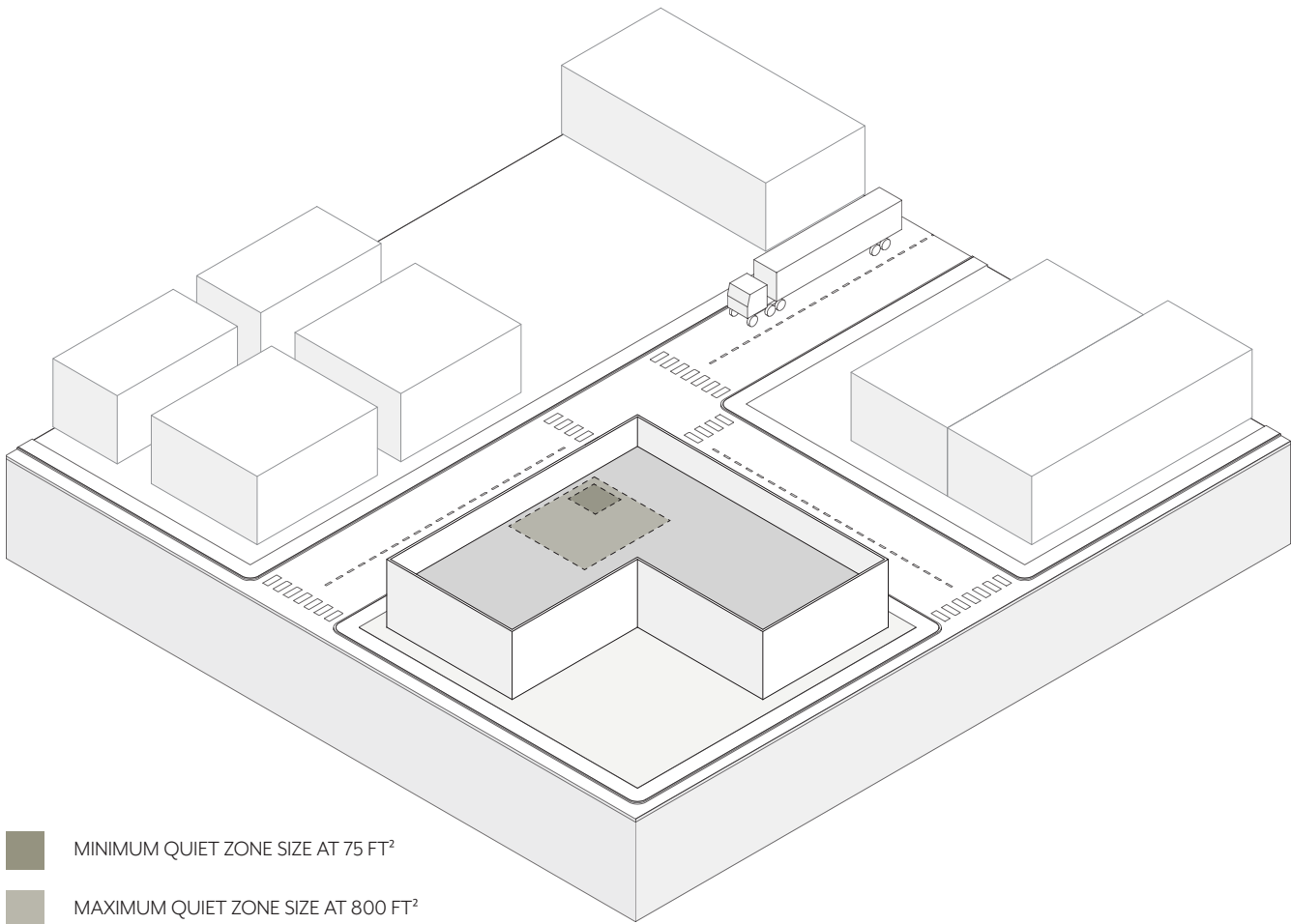


Figure 6.1 | Space Management



- MINIMUM QUIET ZONE SIZE AT 75 FT²
- MAXIMUM QUIET ZONE SIZE AT 800 FT²
- FLOOR PLATE SQUARE FOOTAGE AT 5,840 FT²

Figure 6.2 | Privacy

DESIGNING FOR THE MIND

BEAUTY & DESIGN*

05

CEILING HEIGHT

REQUIREMENTS

- I. Ceiling height that is proportional to room dimensions provides an expansive, comfortable and open feel to the interior space. Floor to ceiling heights for regularly occupied spaces meet the following requirements:

Rooms of 30 feet width or less have ceiling height of at least 8.8 feet.

Rooms of greater than 30 feet width have ceiling height of at least 9 ft plus at least 0.5 feet for every 10 feet.

Rooms that provide a full wall view to the outdoors or an atrium space (with at least twice the ceiling height of the room) have a minimum ceiling height of 9 feet for a room width of 40 feet plus at least 0.5 feet for every 15 ft over 40 feet.



Figure 71 | Ceiling Height Section

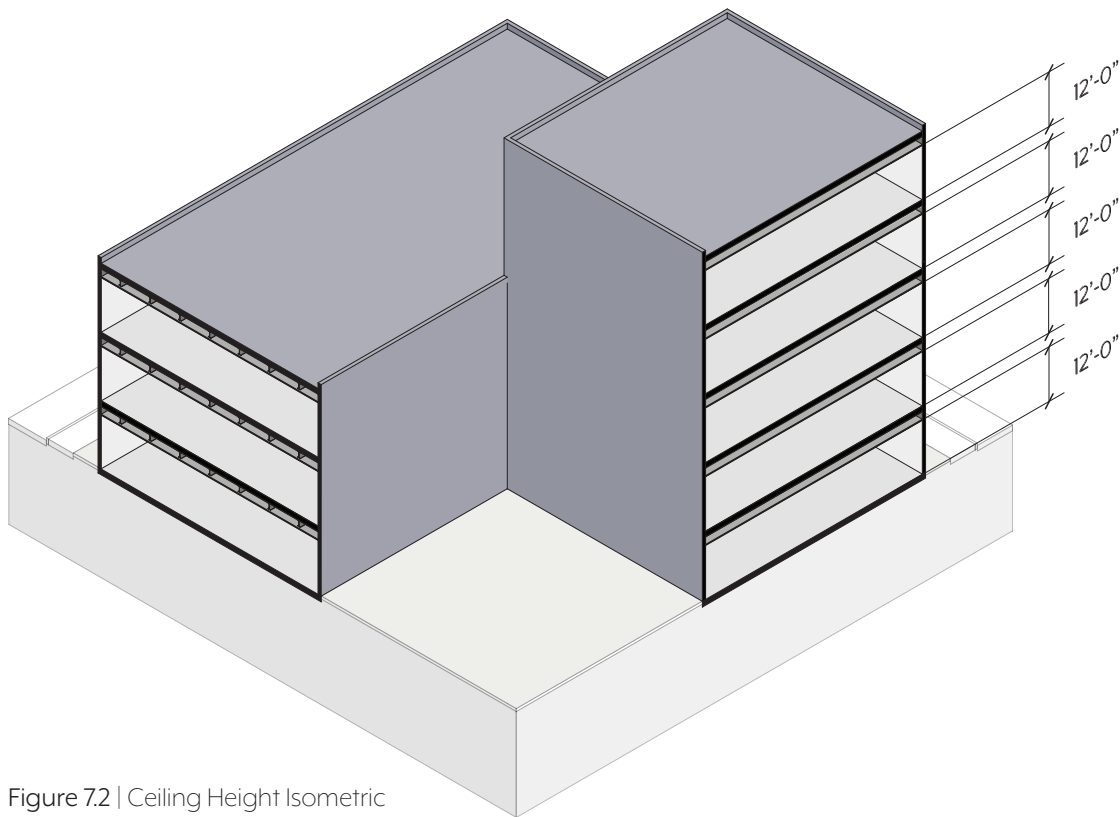


Figure 7.2 | Ceiling Height Isometric

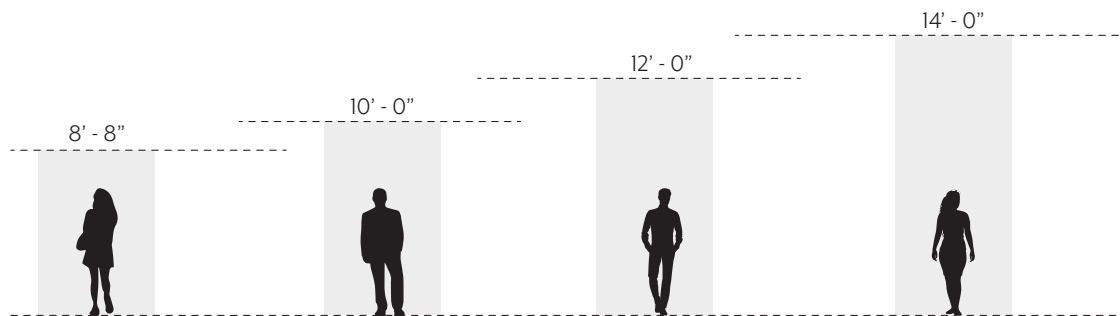


Figure 7.3 | Differing Ceiling Heights

NOTES

Figures 7.2 - 7.3 display various ceiling heights. The allowable ceiling height may vary, only being part of an overall emphasis on the increased volume of space. For the heating and cooling of spaces with a larger volume due to ceiling height, aim for passive systems to reduce energy usage and bills. Projects with varying ceiling heights throughout are a feasible option in order to create different spaces for building inhabitant preferences.

DESIGNING FOR THE MIND

BEAUTY & DESIGN*

06

ARTWORK

- I. Integration of artwork to interior space adds complexity to the visual field. A plan is developed that includes a description of how the project incorporates meaningfully integrated artwork in:

- | Entrances and lobbies

- | All regularly occupied space greater than 300 feet²

07

SPATIAL FAMILIARITY

- I. Design elements can be used to establish way-finding, aid in orientation and provide spatial familiarity. A plan is developed that includes a description of how the project incorporates way-finding elements in projects with floor plates 10,000 feet² or larger through the use of the following elements:

- | Artwork that is distinct in shape and color

- | Visually grouped zones or areas that use the following unifying design components: lighting, furniture color, flooring pattern/color

- | Corridors over 30 feet in length end in artwork or a view window to the exterior with a sill height no taller than 3 feet from the floor and with at least a 100 feet vista

08

INDOOR BIOPHILIA

SEE FIGURE 8.1

I. Indoor Biophilia: Wall and potted plants are incorporated into the design of interior space according to the following:

| Potted plants or planted bed cover at least 1% of floor area per floor

| A plant wall per floor, covering a wall area equal or greater than 2% of the floor area, or covering the largest of the available walls, whichever is greater

09

WATER FEATURE

I. At least one water feature for every 100,000ft² in projects larger than 100,000 ft² which meets the following requirements:

| At least 5.8 to 6 feet in height or 43 ft² in area

| Ultraviolet sanitation or other technology to address water safety

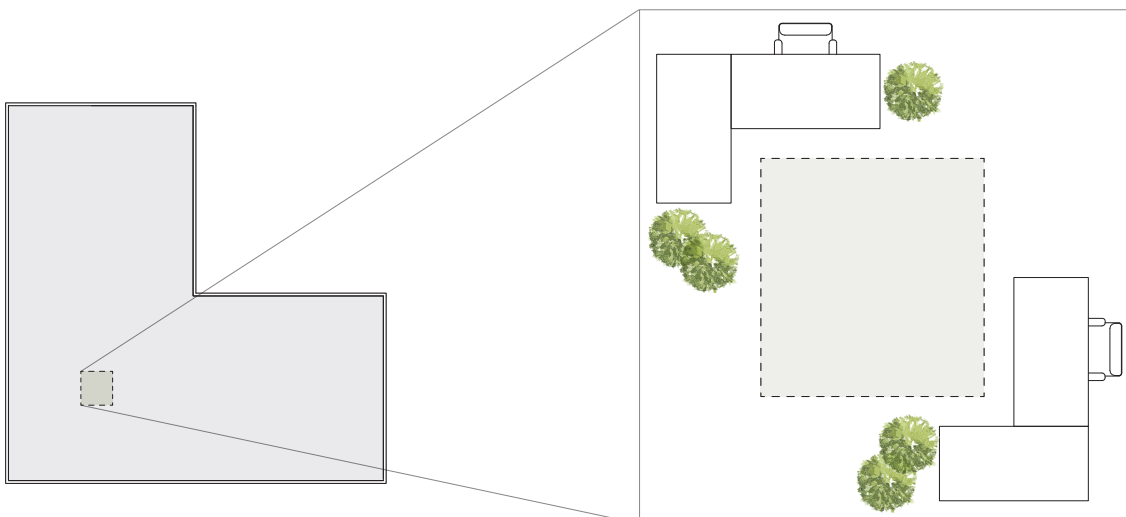


Figure 8.1 | Indoor Biophilia

DESIGNING FOR
LIGHT

D E S I G N S T A N D A R D S

“Exposure to natural light can improve occupant mood, alertness and overall health. Ideal lighting involves proper exposure to diffuse daylight, as well as careful design of windows and glazing to avoid excessive glare and heat gain. Windows are therefore a key variable for both ensuring that occupants receive enough light for positive physiological and subjective effects, but also not too much light that causes discomfort or becomes a source of distraction. Balancing energy performance, thermal comfort and access to quality daylight are essential to proper building design.”

-WELL INSTITUTE

DESIGNING FOR LIGHT

DAYLIGHTING FENESTRATION*

10

WINDOW SIZES

FOR LEARNING AND WORKING SPACES

I. The following conditions are met on facades along regularly occupied spaces:

Window-to-wall ratio as measured on external elevations is between 20% and 60%. Percentages greater than 40% require external shading or adjustable opacity glazing to control unwanted heat gain and glare

Between 40% and 60% of window area is at least 7 feet above the floor

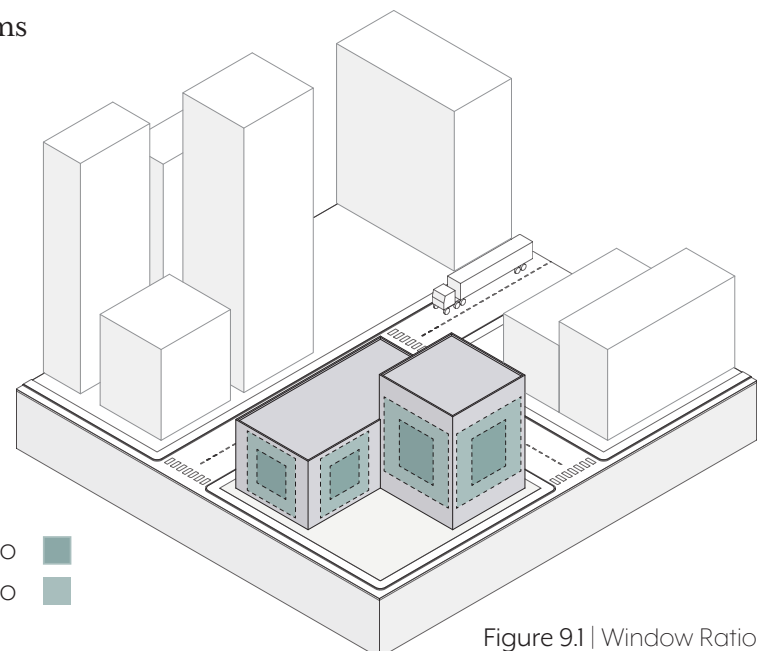
11

WINDOW SIZES

FOR LIVING SPACES

I. The window/wall ratio as measured on external elevations is:

Between 30% and 60% in living rooms
Between 20% and 40% in bedrooms



12

WINDOW TRANSMITTANCE IN WORKING AND LEARNING AREAS

I. The following visible transmittance conditions are met for all non-decorative glazing:

All glazing (excluding skylights) located higher than 7 feet from the floor has a visible transmittance of 60% or more

All glazing located 7 feet or lower from the floor has a visible transmittance of 50% or more

13

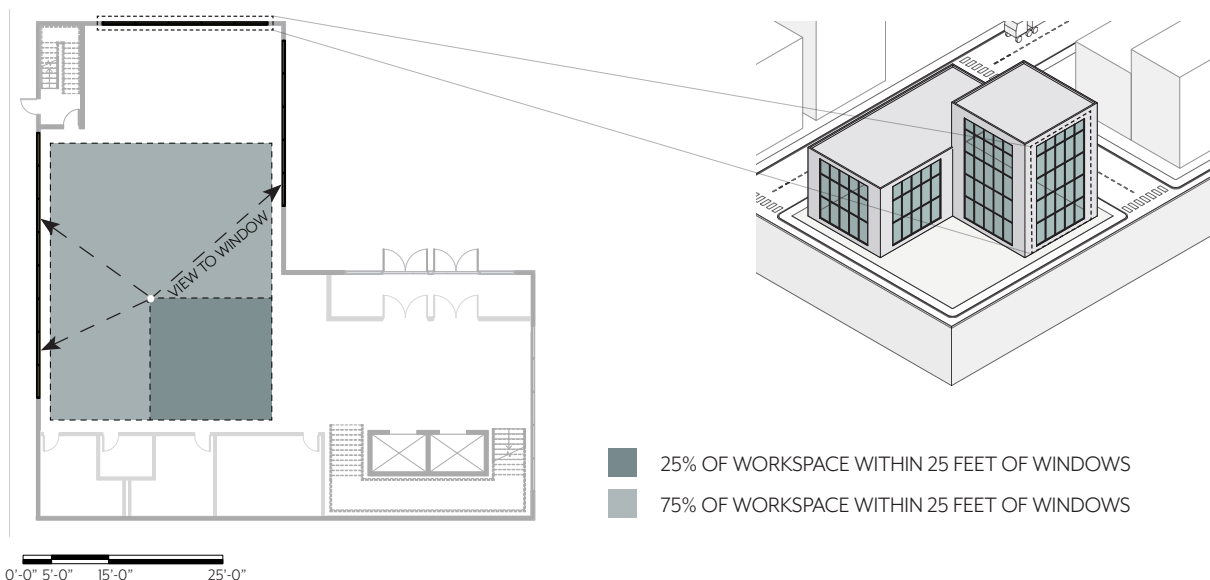
WINDOW ACCESS AND LEASE DEPTH

I. The following conditions must be met:

75% of the area of all regularly occupied spaces is within 25 feet of view windows

75% of all workstations are within 25 feet of an atrium or a window with view to the exterior

95% of all workstations are within 41 feet of an atrium or a window with views to the exterior



DESIGNING FOR LIGHT

CIRCADIAN EMULATION*

14

MELANOPIC LIGHTING

FOR WORK AREAS

- I. Light models or light calculations demonstrate that at least one of the following requirements is met:

At 75% or more of workstations, at least 200 equivalent melanopic lux is present, measured on the vertical plane facing toward 4 feet above finished floor (to simulate view of the occupant). This light level may incorporate daylight, and is present for at least the hours between 9:00AM and 1:00PM for every day of the year

For all workstations, electric lights provide maintained illuminance on the vertical plane facing forward (to simulate view of the occupant) of 150 equivalent melanopic lux or greater

15

MELANOPIC LIGHTING

FOR LIVING AREAS

- I. In all bedrooms, bathrooms, and rooms with windows, one or more fixtures provide the following:

200 or more equivalent melanopic lux as measured facing the wall in the center of the room 4 feet above the finished floor. The lights may be dimmed in the presence of daylight but are able to independently achieve these levels

Lights provide not more than 50 equivalent melanopic lux (to the extent allowable by code) as measured 30 inches above the finished floor

16

MELANOPIC LIGHTING

IN BREAKROOMS

- I. Workplaces where employees spend most of their time in spaces with light levels limited by work type (such as restaurant servers or hospital ward workers), must have break rooms which meet the following requirement:

Lights provide a maintained average of at least 250 equivalent melanopic lux as measured on the vertical plane facing forward at surfaces (4 ft) above finished floor. The lights may be dimmed in the presence of daylight, but are able to independently achieve these levels.

17

MELANOPIC LIGHTING

FOR LEARNING AREAS

- I. At least one of the following requirements must be met:

Early education, primary and secondary schools, and adult education for students primarily under 25 years of age: Light models (which may incorporate daylight) show that at least 125 equivalent melanopic lux is present at 75% or more of desks, on the vertical plane facing forward 4 feet above finished floor (to simulate view of occupant). The light level is present for at least 4 hours per day for every day of the year.

Ambient lights provide maintained illuminance on the vertical plane of equivalent melanopic lux greater than or equal to the lux recommendations in the Vertical Targets in Table 3 of IES-ANSI RP-3-13, following age group category most appropriate for population serviced by the school.

DESIGNING FOR LIGHT

CIRCADIAN LIGHT DESIGN*

18

CIRCADIAN LIGHTING

IN LIVING AREAS

- I. In all bedrooms, bathrooms, and residential rooms with windows, the lighting system must meet the following requirements:

- | Allow users to set a “bed time” and a “wake time”

- | If lights are turned on in the interval spanning “wake time” and 2 hours before “bed time”, they provide a maintained average of at least 250 equivalent melanopic lux

- | If lights are turned on in the interval spanning 2 hours before “bed time” and “wake time”, they provide a maintained average of 50 equivalent melanopic lux or less

19

DAWN SIMULATION

- I. In all bedrooms, the lighting system or a standalone device must meet the following requirements:

- | Gradually increases light (as measured at the bed, viewing the light) from 0 to at least 250 equivalent melanopic lux over the course of 15 minutes or longer

DESIGNING FOR LIGHT

CIRCADIAN LIGHT PATTERNS

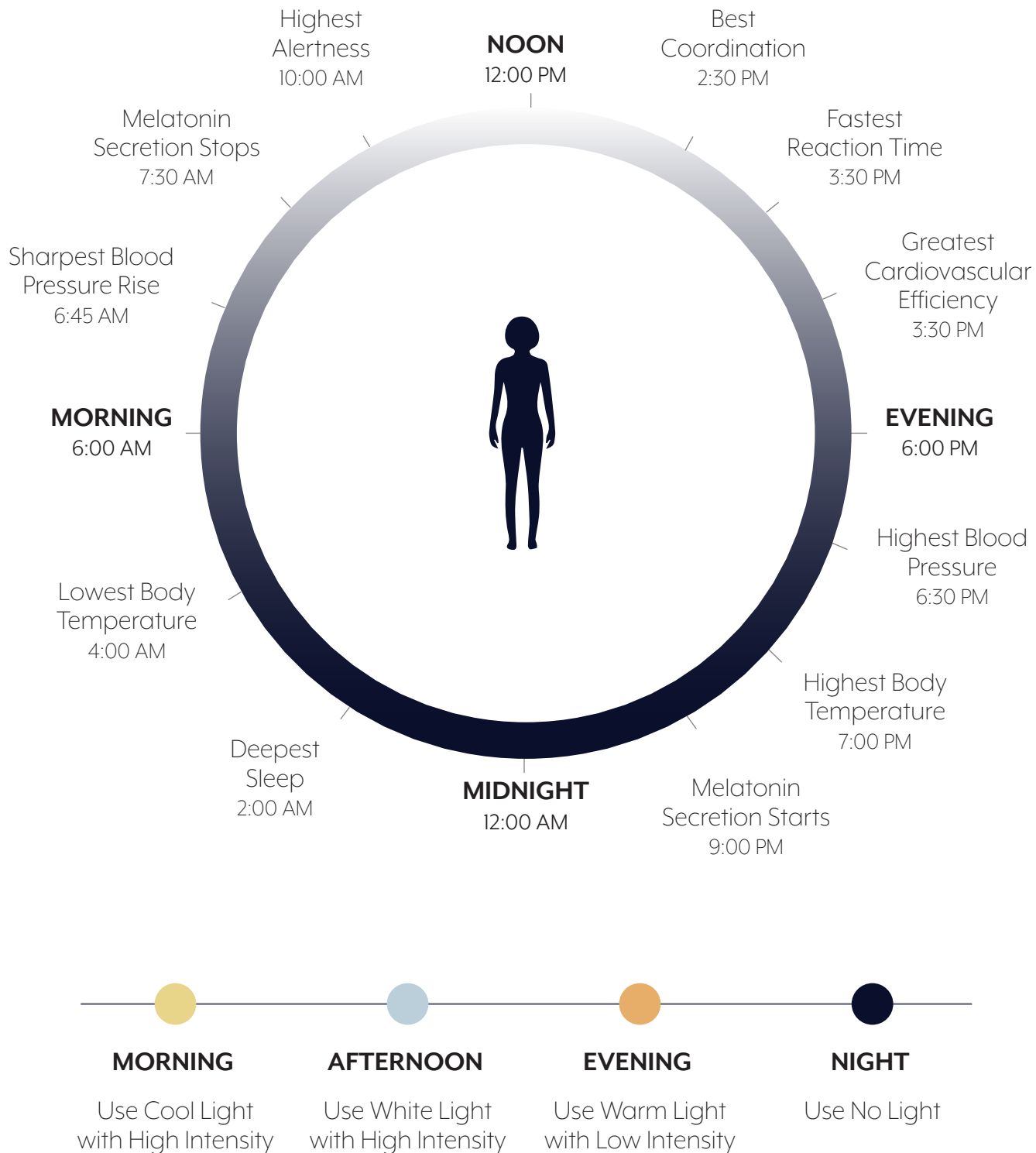


Figure 10.1 | Circadian Lighting and the Body

DESIGNING FOR
FITNESS

D E S I G N S T A N D A R D S

“Exercise is one of the most effective ways to improve mental health” (HelpGuide, n.d.) In fact, regular exercise has the ability to have a positive impact on mental illnesses including anxiety, depression, ADHD, and so on. Physical exercise also allows for the release of endorphins, which energize a person and release positive feelings. Incorporating vertical elements, like stairs, or access to active transportation, into a project allows building occupants to incorporate physical activity into their day-to-day lives to promote well-being.

DESIGNING FOR FITNESS

INTERIOR FITNESS CIRCULATION*

20

STAIR ACCESSIBILITY

AND PROMOTION

I. **Stair Accessibility and Promotion:** In projects of 2 to 4 floors, at least one common staircase meets the following requirements:

Stairs are accessible to regular building occupants during all regular business hours

Throughout the space way finding signage and point-of-decision prompts are present to encourage stair use (at least one sign per elevator bank)

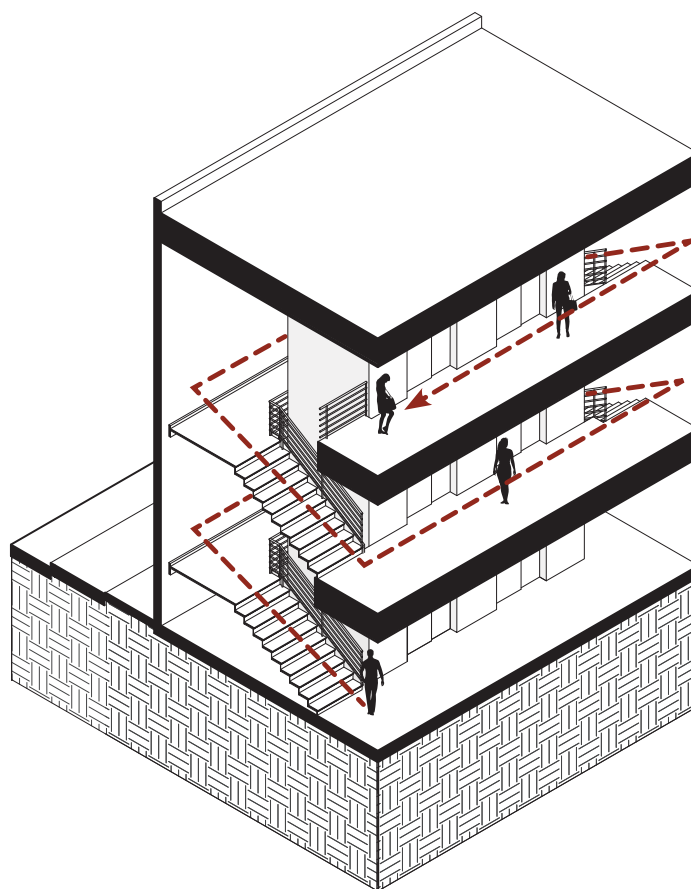


Figure II.1 | Stair Accessibility

STAIRCASE DESIGN

SEE FIGURE 11.2

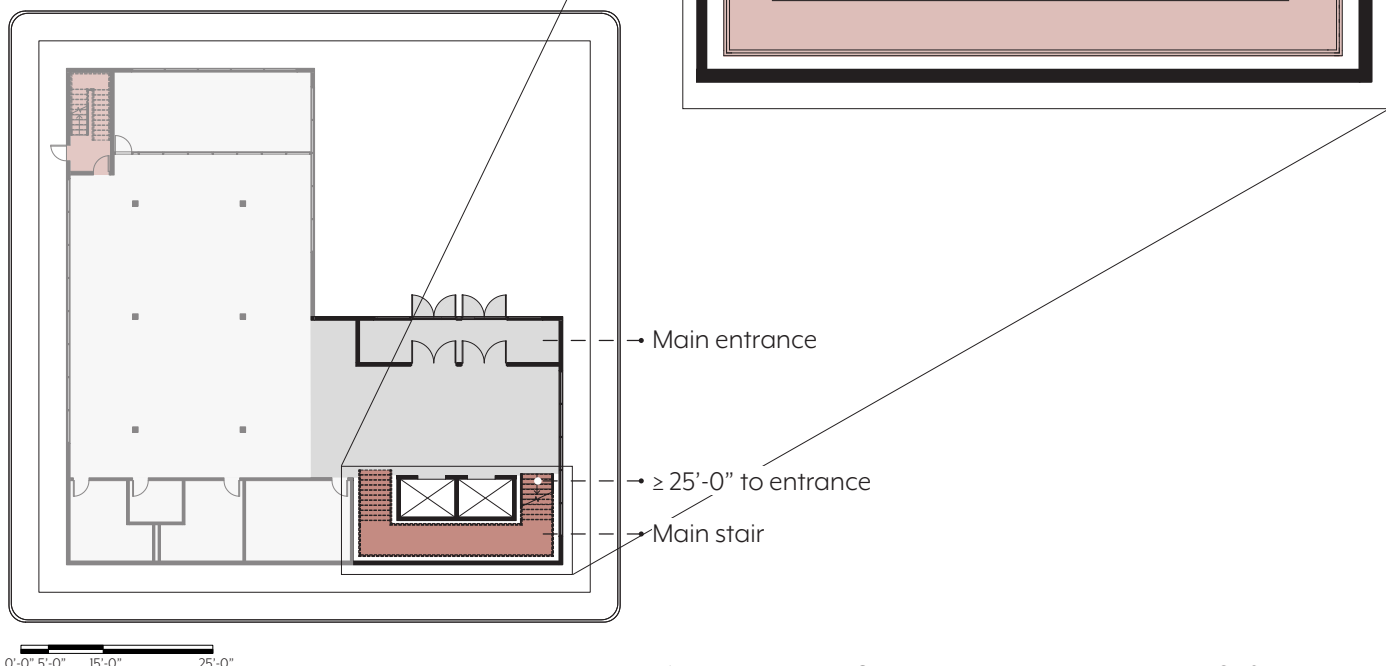
I. In projects of 2 to 4 floors, at least one common staircase meets the following requirements:

Located within 25 feet of the main project entrance, main entry check-point (ex. welcome/reception desk), the edge of its main lobby, or edge of its main welcome area

Clearly visible from the main project entrance, main entry check-point (ex. welcome/reception desk), the edge of its main lobby, or edge of its main welcome area, or are located visually before any elevators present upon entering from the main entrance

Stair width set at a minimum of (56 in) between handrails, or the width allowable by local code

Figure 11.2 | Stair Design



DESIGNING FOR FITNESS

EXTERIOR FITNESS CIRCULATION*

22

PEDESTRIAN AMENITIES

AND PROMOTION

- I. Sites in which the building takes up less than 75% of the total lot size provide at least one of the following within highly-trafficked areas, such as building entrances, public transportation stops, walking paths and plazas:

- A bench

- A cluster of movable chairs and tables

- A drinking fountain or water refilling station

23

PEDESTRIAN PROMOTION

SEE FIGURE 12.2

- I. To encourage more pedestrian activity, sites in which the building takes up less than 75% of the total lot size include at least two of the following in the outdoors:

- A water fountain or other water feature

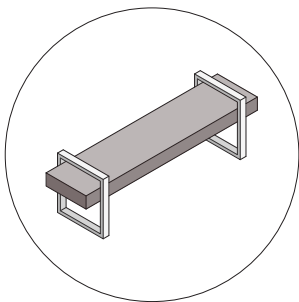
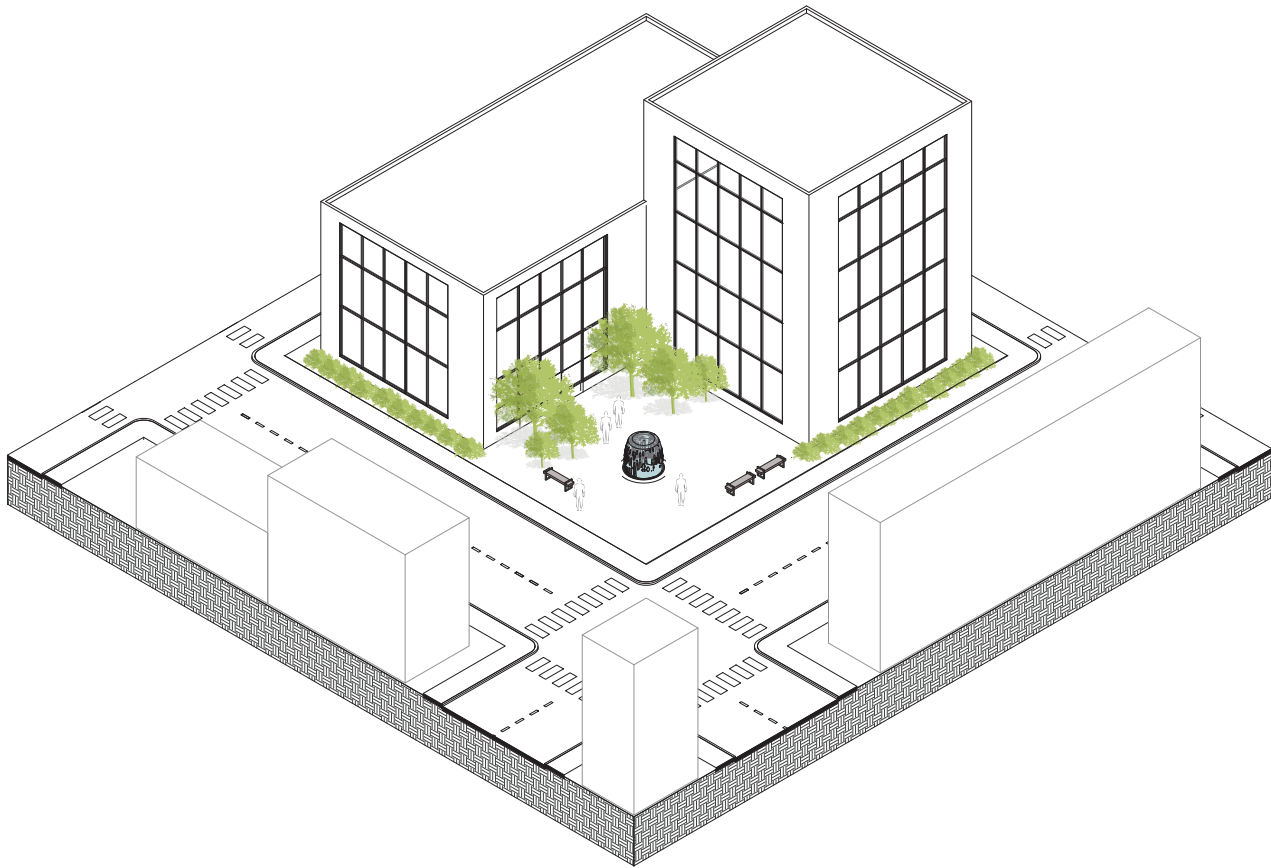
- A plaza or open air courtyard

- A garden or other landscaped elements

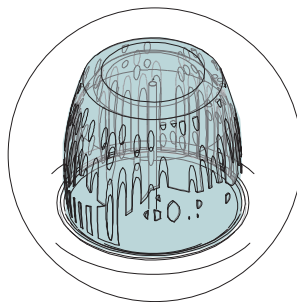
- Public art

DESIGNING FOR FITNESS

PEDESTRIAN AMENITIES DIAGRAM



PEDESTRIAN
BENCHES



WATER
FEATURE



BIOPHILIA FOR
SHADE

Figure 12.1 | Pedestrian Amenities

DESIGNING FOR FITNESS

PHYSICAL ACTIVITY SPACES*

24

SITE SPACE DESIGNATION

FOR OFFICES

- I. Spaces with more than 10 regular occupants provide complimentary access to the following:

Dedicated exercise space that is at least 200 ft² plus 1 ft² per regular building occupant, up to a maximum of 4,000 ft²

25

EXTERNAL EXERCISE SPACES

- I. At least one of the following spaces is within 0.5 miles walking distance of the main building entrance with complimentary access:

A green space or park with playground features
A workout station or fitness zone
A trail network
An accessible body of water or public swimming pool
A gym, fitness or training center
A recreational field

ACTIVE TRANSPORTATION SUPPORT

I. Bicycle Storage and Support: The following are provided on-site or within 650 feet of the main building entrance:

Basic bicycle maintenance tools, including tire pumps, patch kits and hex keys available for use

Separate and secure bicycle storage for at least 5% of regular building occupants, as well as short-term bicycle storage for at least 2.5% of all peak visitors

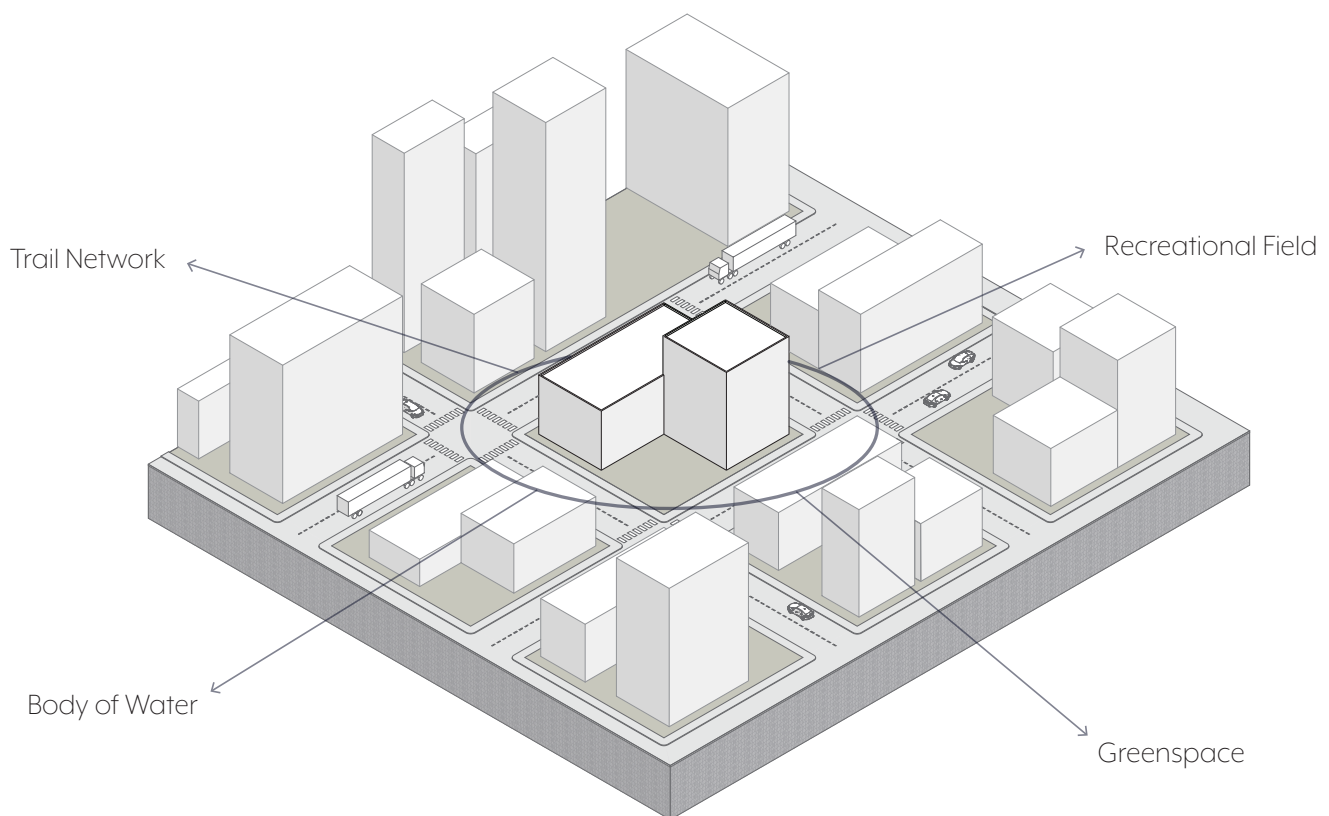


Figure 13.1 | Physical Activity Access from Site

APPENDIX

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ABOUT THE RESEARCHER



Amy A. Mueller recently received her Bachelor's of Architecture degree at North Dakota State University and is working to complete her Master's Degree upon completion of her architectural thesis project. While her passions lie within the realm of architecture and design, she also enjoys the topic of health and wellness- both physical and mental. With completion of the thesis project, her hopes are to educate and pose new ideas behind architecture and how the built environment can create healthier spaces for all people's mental health.
