THE WELL BUILDING STANDARD®

v1 with January 2017 addenda

INTERNATIONAL WELL BUILDING INSTITUTE™

WELL Building Standard®
v1

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THE WELL BUILDING STANDARD® EXECUTIVE SUMMARY

The WELL Building Standard (WELL) focuses on the people in the building.

Over the last decade, green building standards and standard-setting organizations have made significant strides towards the market transformation of the building industry, resulting in a rapid expansion of green buildings and environmentally conscious building practices throughout the world.

Over the same period, strategies to enhance human health and well-being have played a relatively small role in the evolution of building standards. We believe that the time has come to elevate human health and comfort to the forefront of building practices and reinvent buildings that are not only better for the planet, but also for people.

1. This is the first standard of its kind that focuses solely on the health and wellness of building occupants.
2. WELL identifies 100 performance metrics, design strategies, and policies that can be implemented by the owners, designers, engineers, contractors, users and operators of a building.
3. WELL is based on a thorough review of the existing research on the effects of spaces on individuals and has been advanced through a thorough scientific and technical review.
4. In order to achieve the requirements of the WELL Building Standard, the space must undergo a process that includes an on-site assessment and performance testing by a third party.

INTERNATIONAL
WELL
BUILDING
INSTITUTE™

A Wellness Standard for Buildings

The WELL Building Standard marries best practices in design and construction with evidence-based health and wellness interventions. It harnesses the built environment as a vehicle to support human health, well-being and comfort. WELL Certified™ spaces and developments can lead to a built environment that helps to improve the nutrition, fitness, mood, sleep, comfort and performance of its occupants. This is achieved in part by implementing strategies, programs and technologies designed to encourage healthy, more active lifestyles and reducing occupant exposure to harmful chemicals and pollutants.

This document presents the overall strategies, performance targets, certification and adherence steps required for projects to meet the WELL Building Standard. WELL Building Standard v1 is applicable for commercial and institutional buildings and WELL Certification can be applied to three project types:

1. New and Existing Buildings
2. New and Existing Interiors
3. Core and Shell

Pilot programs are available for other building sectors, including multifamily residences, retail, and restaurants. Projects representing these building sectors are invited to join our ongoing pilot program. Future refinements will address the specific requirements of sports facilities, healthcare facilities, and communities.

Updates to the WELL Building Standard

The WELL Building Standard is a dynamic rating system. As the intersection between design and human health evolves, we strongly believe in the importance of advancing alongside. The WELL Building Standard (WELL) v1.0 was launched in October 2014, and as part of the development process, updates to the standard incorporate early user feedback, including simplifications, language enhancements and additional clarifications to certain feature requirements.

ORGANIZATIONAL STRUCTURE

WELL is the culmination of seven years of rigorous research in collaboration with leading physicians, scientists and industry professionals. The WELL Building Standard® was pioneered by Delos, is administered by the International WELL Building Institute™ (IWBI™), and is third-party certified through IWBI's collaboration with Green Business Certification Inc. (GBCI) – the certification body for the LEED Green Building Rating System.

International WELL Building Institute, PBC (IWBI)

IWBI is a public benefit corporation whose mission is to improve human health and well-being through the built environment. Public benefit corporations like IWBI are an emerging U.S. structure for corporations committed to balancing public benefits with profitability – harnessing the power of private capital for greater good. IWBI administers the WELL Building Standard (WELL) – a performance-based system for measuring, certifying, and monitoring features of buildings that impact the health and wellbeing of the people who live, work, and learn in them. Fulfilling the vision of IWBI Founder Paul Scialla, IWBI has a pioneering altruistic capitalism model that will address social responsibility and demonstrate a sustainable model for philanthropy. IWBI has committed to direct 51% of net profits received from WELL Certification project fees toward charitable contributions and impact investment focused on health, wellness, and the built environment. IWBI was established by Delos in 2013 pursuant to a Clinton Global Initiative commitment to improve the way people live by developing spaces that enhance occupant health and quality of life by sharing the WELL Building Standard globally.

Delos Living LLC

Delos® is pioneering the integration of health and wellness technologies into the places we live, work and learn. By placing health and wellness at the center of design, construction, technology and programming decisions, Delos is transforming our homes, offices, schools and other indoor environments into spaces that actively contribute to human health and well-being.

Alignment with Green Building Standards

The WELL Building Standard is designed to work harmoniously with the LEED Green Building Rating System, the Living Building Challenge and other leading global green building standards. We encourage projects to pursue both WELL and standards that address environmental sustainability.

WELLNESS – A COMPLEX ISSUE

Comprehensive and interdisciplinary approaches are necessary to meaningfully address the complex issues of human health and well-being. A narrow focus on select aspects of health is inadequate to the task. Many factors of the physical environment have a significant impact on day-to-day health and productivity, but it is often the interactions between multiple environmental factors that matter most. A growing body of research supports these claims but little has been done to translate research into practice. The WELL Building Standard® therefore draws from multiple disciplines of scientific study, and presents an integrated approach that reinvents the built environment around its occupants, transforming the places we live, work and learn into systems intended to promote and improve human health and well-being.

Interactions Between Humans and the Built Environment

Traditional healthcare delivery systems primarily focus on addressing health after people have already become sick. With rising costs and the increased burden of chronic diseases such as diabetes, cardiovascular disease and cancer, people are turning to more lifestyle-oriented and preventative approaches to health. The WELL Building Standard is founded on the understanding that facets of our environment interact with personal, genetic and behavioral factors to shape our overall health and well-being. WELL recognizes that many behaviors are subconsciously dictated by external cues, and thus it carefully considers interactions between humans and the built environment that shape not only our physical health but also our behavior.

The Basis for the WELL Building Standard

The WELL Building Standard v1 is the product of seven years of research and development culminating with an expert review process encompassing a scientific, practitioner and medical review. The WELL Building Standard was developed by integrating scientific and medical research and reviewing existing literature on environmental health, behavioral factors, health outcomes and demographic risk factors. By compiling leading practices in building design and management and referencing existing standards and best practice guidelines set by governmental and professional organizations, WELL works to harmonize and clarify existing thresholds and requirements. Where important issues have not been adequately addressed by the literature, the WELL Building Standard relies on expert consultation as the basis for defining performance requirements.

WELL is in large part performance-based; in most cases, specific, measurable "markers" (thresholds) are provided that must be met. In other cases, particular strategies are required, as strong evidence suggests there are benefits to implementation.

Overall, the WELL Building Standard is designed to comprehensively cover the various individual needs of building occupants while also building a common foundation for measuring wellness in the built environment.

WELLographies™

A rich body of research supported the development of the underlying concepts and requirements of the WELL Building Standard. A review of this literature is described in a series of WELLography™ publications. The WELLographies will provide the content and references for all main topics that constitute the WELL Building Standard. WELLographies cite major regulatory guidelines, position statements from trusted organizations, medical and scientific literature and well-established best practice guidelines on the topics covered in WELL.

Acknowledgements

We would like to thank all parties involved in the review of the WELL Building Standard and the supporting WELLographies. The WELL Building Standard has been evaluated by leading scientists, practitioners from the building industry and physicians from leading medical institutions.

Scientists were consulted to help prioritize the factors that contribute to wellness. In order to assess the applicability of WELL in practice, building professionals and other stakeholders were asked for input. We give special thanks to the Clinton Global Initiative, U.S. Green Building Council, International Living Future Institute, GBCI, Mayo Clinic and CBRE, who have given institutional support for our efforts.

IWBI is especially grateful for the support of Cleveland Clinic Wellness over the last few years. The organization has been an inspirational example of the effect that wellness policies can have on the health and well-being of the staff of an institution. Under the leadership of Dr. Michael F. Roizen, Cleveland Clinic Wellness has conducted a review of the WELL Building Standard and WELLographies.

A complete list of reviewers can be found in Appendix G and at www.WELLCertified.com.

ORGANIZATION OF THE WELL BUILDING STANDARD®

The WELL Building Standard is organized into seven categories of wellness called Concepts: Air, Water, Nourishment, Light, Fitness, Comfort and Mind.

WELL Building Standard Features, Parts and Requirements

The seven Concepts are comprised of 102 features. Every feature is intended to address specific aspects of occupant health, comfort or knowledge. Each feature is divided into parts, which are often tailored to a specific building type. This means that depending on the building type (e.g., New and Existing Interiors or Core and Shell), only certain parts of a given feature may be applicable. Within each part are one or more requirements, which dictate specific parameters or metrics to be met. In order for a project to receive credit for a particular feature, all of its applicable component parts specifications must be satisfied.

Features can be:

- Performance-based standards that allow flexibility in how a project meets acceptable quantified thresholds
- Prescriptive standards that require specific technologies, design strategies or protocols to be implemented

Preconditions

Some WELL features are categorized as Preconditions—necessary for all levels of WELL Certification. These features represent the core of the WELL Building Standard. Preconditions can be thought of as the foundation for wellness in the built environment. It is important to note that for certification to be awarded, all applicable Preconditions must be met.

Optimizations

Optimizations are not required to achieve Silver level certification, but create a flexible pathway towards Gold and Platinum level certification. These features include optional technologies, strategies, protocols and designs. IWBI recommends that all projects strive to achieve as many Optimizations as possible.

STANDARD VERSION	LEVEL OF ACHIEVEMENT	PRECONDITIONS THAT MUST BE ACHIEVED	OPTIMIZATIONS THAT MUST BE ACHIEVED
WELL Building Standard®	Silver Certification	All applicable	None
	Gold Certification	All applicable	40% of applicable
	Platinum Certification	All applicable	80% of applicable
WELL Pilot Standards	Silver Certification	All applicable	20% of applicable
	Gold Certification	All applicable	40% of applicable
	Platinum Certification	All applicable	80% of applicable

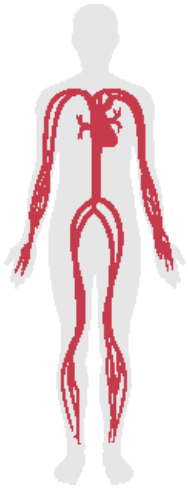
Feature Intents in the WELL Building Standard

Each WELL Building Standard feature is designed to address issues that impact the health, comfort or knowledge of occupants. Many features intended to improve health are supported by existing government standards or other standard-setting organizations. Some features are intended to change behavior through education and corporate culture, providing, for example, information and support for making positive lifestyle choices.

Wellness and Body Systems

Each feature of the WELL Building Standard is ascribed to the human body systems that are intended to benefit from its implementation. This enables project teams to classify the intended benefits of each WELL feature and develop a comprehensive set of strategies. While there are different ways to group the body's various systems, the WELL Building Standard considers each feature's impact on the following categories of body systems:

Cardiovascular System



The cardiovascular system consists of the heart, vessels and blood. Its primary function is to supply nutrients and remove waste from the body tissues. However, stress, unhealthy diets and lifestyle choices, and exposure to environmental pollutants can negatively impact cardiovascular health and lead to the development of chronic conditions that reduce quality of life.

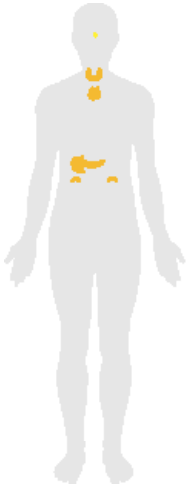
The WELL Building Standard addresses factors that play a vital role in cardiovascular health: stress, nutrition, fitness and environmental pollutants. Comfort features mitigate stress and help to maintain hormonal balance in the body. Healthy diets and active lifestyles control body weight and strengthen the muscles of the heart. Elimination of environmental pollutants in air, such as tobacco and VOCs – which directly harm the heart and vessels – also contribute towards good cardiovascular health.

Digestive System

The digestive system consists of the mouth, esophagus, stomach, small and large intestines, and the auxiliary organs – liver and pancreas – that produce digestive hormones and enzymes. This complex system is responsible for nutrient breakdown, absorption and assimilation. In addition, the gut is the largest reservoir of bacteria, which assist in digestion and play a role in immune health. These critical functions can be compromised by poor dietary habits and stress, as well as by microbes and environmental pollutants in the foods we eat and the surfaces that we touch.

The features of WELL support interventions that reduce factors that negatively impact digestive health. Comfort features mitigate stress, which affects the health and function of the microbiome. Proper diets help to limit the consumption of foods and substances that cause digestive discomfort and allergic reactions. Treatment of surfaces ensures that microbes and toxins do not enter our digestive system via our foods. Together, the features of WELL contribute towards maintaining optimal digestive and overall health.

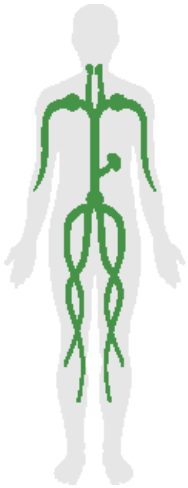
Endocrine System



The endocrine system is made up of hormone-secreting glands. Hormones are chemical compounds that regulate many important processes including growth, immunity, metabolism, reproduction, mood and digestion. Unfortunately, stress, environmental pollutants and many of today's foods and products contain chemicals that disrupt the function of the endocrine system and can cause a variety of health problems.

The features of the WELL Building Standard aim to mitigate or eliminate exposure to potentially harmful endocrine system disruptors. Comfort features help to reduce stress that can lead to chronic health conditions. Nourishment features limit the ingestion of compounds that mimic hormones and disrupt proper endocrine regulation. Elimination of environmental pollutants prevents the exposure to toxins and compounds that interfere with the endocrine regulation of many of the body's functions.

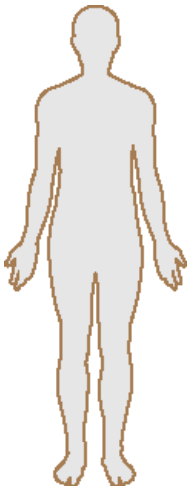
Immune System



The immune system is a complex cohort of highly specialized cells, proteins, tissues and organs that make up the body's defense system against internal and foreign disease-causing agents. It is affected by the cumulative effect of toxins, poor sleep, nutrition and excessive stress. Failure to maintain proper immune function can increase the incidence of infections by bacterial and viral pathogens, and contribute towards the development of chronic conditions such as arthritis, diabetes, cardiovascular or respiratory disease and even cancer.

The features in the WELL Building Standard aim to promote and enhance immune health. The use of non-toxic materials limits the exposure to chemicals that weaken the immune function. Water and air filtration systems limit the exposure to bacterial and viral pathogens and allergens. In addition, WELL includes features that reduce stress and improve nutrition and fitness, which help strengthen the immune system.

Integumentary System



The skin, hair and nails form the outer layer of the body, or the integumentary system. It functions to protect internal organs from impact, prevents water loss, regulates body temperature and protects the body against foreign pathogens and harmful toxins. The skin is also a host to a large community of symbiotic microorganisms that produce a moisturizing layer and aid in immune function.

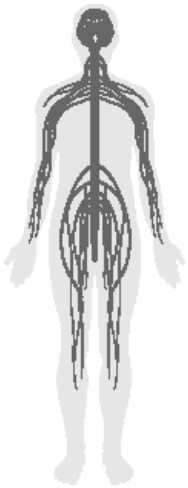
The WELL Building Standard helps to maintain integumentary system integrity, as this system provides the first line of defense against injury and/or infections. In addition, it requires that building materials are absent of toxins that could be harmful if absorbed through the body's outermost layers.

Muscular System

The human muscular system is comprised of skeletal, smooth and cardiac muscle. It supports posture, movement, blood circulation and digestion. The muscular system is also responsible for generating heat through the contraction of muscles. Balanced diet and physical activity greatly affect muscular health, as they ensure that the muscles receive adequate nutrients for proper development and function.

The WELL Building Standard contains features that are designed to encourage or enhance the opportunities for safe physical activity, promoting an active lifestyle. To complement this, ergonomic designs are intended to reduce the likelihood of ligament strain and muscular injuries. Other features promote the use of active furnishings or design principles that encourage small amounts of physical activity throughout the day and reduce sedentariness.

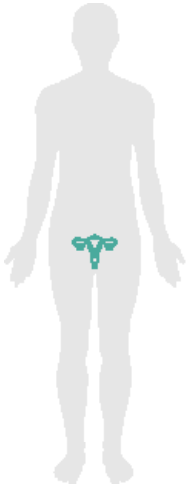
Nervous System



The nervous system includes the central nervous system, made up of the brain and spinal cord, and the peripheral nervous system, composed of nerves. The nervous system is directly and indirectly responsible for controlling nearly every bodily process, including movement, cognitive processes and maintenance of vital organ functions.

The WELL Building Standard places the utmost importance on supporting neurologic and cognitive function through a variety of interventions. Features work to limit the exposure to environmental toxins in air and water, encourage balanced diets and optimal levels of physical activity, and enhance sleep quality and mitigate stress through the implementation of a variety of comfort measures.

Reproductive System



The reproductive system consists of hormone-secreting glands in the brain and the reproductive organs. Failure to maintain proper reproductive health can have negative consequences on overall health. Further, the effects of this system are broad-reaching and can have an impact on personal and prenatal health.

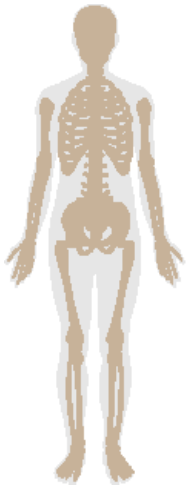
The WELL Building Standard introduces features intended to help protect reproductive health. Proper diet and exercise are two important factors that are addressed by WELL; these are complemented by ergonomic and toxin avoidance strategies that help support reproductive health.

Respiratory System

The respiratory system includes the mouth, nose, diaphragm, the trachea and the airways that reach deep into the lungs. The respiratory system works in tandem with the circulatory system in order to provide oxygen and remove carbon dioxide from the body tissues.

The features of the WELL Building Standard help to promote optimal respiratory system function by improving the quality of the air we breathe, limiting exposure to molds and microbes and by improving access to opportunities for greater fitness. Elimination of VOCs and particulate matter from ambient air helps to prevent direct damage to the lungs. Mitigation of molds and microbes reduces the incidence of infections and allergic reactions. Fitness features help to improve lung function and the overall strength of the respiratory system.

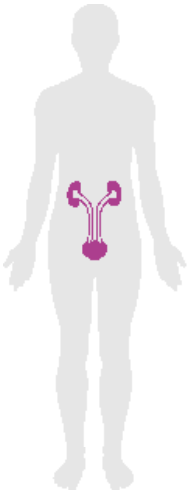
Skeletal System



The skeletal system provides support and movement, protects internal organs against impact, stores minerals, produces blood cells and aids in hormone regulation. Similarly to the closely related muscular system, skeletal health is strongly affected by proper nutrition and adequate levels of physical activity.

The WELL Building Standard is grounded in the latest research in universal design and ergonomics to improve posture and alignment and limit physical stress. In addition, features provide guidelines for fitness and nutrition that are designed to support skeletal system health and function.

Urinary System



The urinary system consists of the kidneys, ureters, bladder and the urethra. The urinary system serves a number of critical functions, including the filtration of toxins, balance of blood pH and electrolytes, maintenance of blood pressure and the elimination of waste through urine. The kidneys are sensitive organs that can be damaged by exposure to toxins, chronic high blood pressure, and excessive quantities of alcohol or medications.

The features of the WELL Building Standard help to support urinary health by reducing stress and exposure to toxins and infection-causing pathogens. Comfort features that reduce stress prevent the likelihood of high blood pressure and hormone levels that negatively affect urinary function. Restriction of toxins and pathogens helps to limit the incidence of urinary infections and other potentially serious problems.

PROJECT TYPES

The features of the WELL Building Standard® can be applied across many real estate sectors, but the version presented herein is applicable to commercial and institutional buildings. Furthermore, not all WELL features apply to all buildings, depending on the stage of construction. WELL v1 is therefore further organized into project types, which take into account the specific set of considerations that are unique to a particular building type or phase of construction. For WELL v1, there are three project types.

PROJECT TYPES	PRECONDITIONS	OPTIMIZATIONS	TOTAL
New and Existing Buildings	41	59	100
New and Existing Interiors	36	62	98
Core and Shell	26	28	54

Core and Shell

WELL Certification is available for Core and Shell building projects seeking to implement fundamental features into the entire base building for the benefit of future tenants. The Core and Shell project type addresses the building structure, window locations and glazing, building proportions, heating, cooling and ventilation systems, and water quality. This project type also encourages consideration of the site in relation to amenities and opportunities for wellness.

Core and Shell is appropriate for projects in which up to 25% of the project area is fully controlled by the building owner (i.e., 75% or more of the project space is occupied by one or more tenants). Independent of the portion of the building controlled by the owner, 100% of the building core and shell and all portions of the interior buildout or managed by the project owner are included in the project scope for design and operations. The Performance Verification Guidebook describes methods for on-site measurements and inspections.

New and Existing Interiors

This project type is relevant for office projects only occupying a portion of the space in a building, or those that occupy an entire existing building not undergoing major renovation. In Core and Shell buildings that are WELL Certified™, some WELL features may already apply towards New and Existing Interiors certification, making certification easier. WELL Certification for tenants is also possible in buildings that have not first achieved Core and Shell certification.

New and Existing Buildings

Entire buildings present opportunities for implementation of the greatest number of WELL features. This project type applies to new and existing buildings and addresses the full scope of project design and construction as well as aspects of building operations. It is relevant for office buildings where a minimum of 90% of the total floor area is occupied by the building owner and is operated by the same management (i.e., up to 10% of the building may be occupied by a different tenant or operated by different management). For example, a large office building may rent out the ground floor for retail or restaurant purposes; in these cases, the non-office area would not be subject to requirements of the WELL Building Standard or used in area calculations.

PILOT PROGRAM

Given the unique opportunities and challenges presented by different building types, additional time and resources are needed to aggregate the necessary scientific and institutional support to refine the WELL Building Standard® to the specific needs of additional project types. As such, pilot programs are in development to test and refine how WELL can best apply to different space types. The WELL Building Standard is a continuously evolving program that is updated as improved evidence and technologies become available. The following pilot standards have been released:

Current Pilots

Multifamily Residential

Multifamily Residential applies specifically to projects with at least five dwelling units in a single building with common structural elements. Projects that qualify include apartments, condominiums, townhouses and other residential complexes within all market thresholds – affordable housing, market-rate and luxury. Single-family homes and duplexes are not part of the residential pilot.

Educational Facilities

Places of learning, including elementary schools, middle schools, high schools and higher education facilities must provide for the needs of teachers and students of all ages. Educational Facilities applies to projects where dedicated staff are employed for instructional purposes, and students can be of any age. Courses may cover any range of topics, and facilities may be typified by fully scheduled days, or distinct classes that students enroll in at will.

Retail

Retail centers, including boutique shops and big-box stores, are another opportunity to design and construct buildings to the WELL Building Standard. Retail spaces are unique in that they simultaneously house and cater to two distinct groups: the transient consumer and the staff, who spend many more hours in the facility. Retail applies to locations where consumers can view and purchase merchandise on-site, and staff are employed to assist in the sale of products. The Retail pilot standard is applicable to both owner- and tenant-occupied projects, and to both those in stand-alone buildings and those integrated into larger structures.

Restaurant

Away-from-home meals constitute a significant source of nourishment for many, making restaurants a crucial place for health and wellness intervention. The design of eating spaces and the way foods are presented can subtly nudge occupants towards specific behaviors and help make healthy eating decisions. Restaurants applies to locations where a customer purchases food and dines on-site, and includes indoor or outdoor seating. The establishment may include wait staff that tend to customers, or be self-serve. The Restaurant pilot standard does not include take-out only establishments, or establishments whose primary source of revenue derives from the sale of alcoholic beverages. Further, the Restaurant pilot standard only applies to dining spaces—it does not cover kitchens in which food is prepared (see Commercial Kitchen).

Commercial Kitchens

Commercial Kitchens applies to locations where cooks prepare food for other building users. The kitchen component of a space requires specific considerations relating to ventilation and contamination. It is not applicable to office kitchenettes or home kitchens. In general, spaces subject to local health inspection are likely to use this

pilot standard. Commercial Kitchen is always paired with another standard, such as Restaurant or Education. For example, the Commercial Kitchen pilot standard may be coupled with the Restaurant pilot standard to cover both the food preparation and customer dining spaces, respectively. This pilot standard may also be paired with WELL v1 for commercial and institutional offices if projects feature kitchens with associated food-service staff engaged in food preparation activities on-site.

Future Pilots

The following pilots are in various phases of development:

Communities

Communities include multiple buildings and diverse populations and must function to protect the health and wellbeing of both residents and visitors. WELL features address aspects relevant to the design and operations of the communities as well as WELL Certification of the buildings within them.

Exercise Facilities

Some facilities, such as gymnasiums and spas, require stricter standards of hygiene and safety because such environments involve frequent dermal contact with surfaces shared across large numbers of people. WELL features must address the challenging nature of the interior environments of these types of facilities, the number and turnover rate of occupants, and their degree of physical activity.

Public Assembly

Large public buildings, such airports, convention centers, stadiums, and sport or event complexes must serve large volumes of people and provide a wide variety of functions. WELL features that apply to these building types must address the complexity, size, and variety and volume of users that frequent these environments.

Healthcare

Healthcare facilities care for the most vulnerable. WELL features that apply to hospitals, clinics, medical offices and nursing homes must address the needs of the ill and recovering, creating conditions that are conducive to healing by alleviating stress, mitigating the spread of disease, providing nutritious food and improving occupant comfort.

Primary and Secondary Space Types

IWBI uses a space category, which is defined as some or all of a building that is typified by a specific use or function. Spaces are tied to specific standards. Spaces are designated as either primary or secondary. Primary spaces are those that can apply to an entire project, whereas secondary spaces are always affiliated with a primary space.

A project therefore could be comprised of one space, meaning it applies one standard, or it could be comprised of multiple spaces and apply multiple standards. For example, a school with a cafeteria would consist of a primary space using the Educational Facilities pilot standard and an affiliated secondary space using the Commercial Kitchen pilot standard.

In order to achieve WELL Certification through the pilot program, the entirety of the project space must be evaluated. Every project is anchored by a primary space's standard. If the entirety of a project space falls under the purview of a single primary space's standard, only that standard is required for WELL Certification. If there are spaces within the project scope that meet the definition of another, existing pilot secondary space's standard, then the project must adhere to the requirements of that secondary space's standard as well. This ensures that any distinct spaces within

the project scope that may require unique considerations will only be held to those requirements appropriate for that space.

These pairing requirements are only applicable to standards of the same class: either both the primary and secondary spaces must be pilot standards, or both must be graduated (i.e., non-pilot) standards. For example, a project whose primary space refers to the commercial and institutional offices will not be required to adhere to any pilot secondary space standards. However, if the primary space refers to a pilot standard, and there are applicable secondary spaces that fall under the purview of any existing pilot secondary space's standards, then the project will be required to pursue both the pilot primary and pilot secondary space standards.

WELL CERTIFICATION

Projects become certified if a sufficient number of features are satisfied. To maintain WELL Certification, projects must be recertified a minimum of every three years because building conditions can deteriorate over time to the point of adversely affecting the health and wellness of occupants.

The full process for WELL Certification is outlined in the Certification Guidebook.

Project Registration

Projects seeking to achieve WELL Certification must be registered with IWBI through WELL Online, the official online registration and project management system for WELL. Project teams may register at any point as they progress through the design and development process. However, it is advantageous to register as close to the beginning of the process as possible so that strategies to meet the WELL Building Standard® can be integrated from the very beginning.

At registration, projects define the borders of project scope. The WELL boundary may not unreasonably exclude portions of the building, space, or site to give the project an advantage in complying with credit requirements. The WELL project must accurately communicate the scope of the certifying project in all promotional and descriptive materials and distinguish it from any non-certifying space. The WELL project should be defined by a clear boundary such that the WELL project is physically distinct from other interior spaces within the building. Regardless of boundary, WELL organizational protocol requirements (as defined within Appendix D) must be adopted by the entire entity seeking certification located in the project's building, such that an occupant's location within the building does not determine the availability of these protocol requirements.

The Following Features Contain WELL Organizational Protocol Requirements:

Feature 65 – Activity Incentive Programs

Feature 66 – Structured Fitness Opportunities

Feature 90 – Healthy Sleep Policy

Feature 91 – Business travel

Feature 92 – Building Health Policy

Feature 93 – Workplace Family Support

Feature 94 – Self-monitoring

Feature 95 – Stress and Addiction Treatment

Feature 96 – Altruism

Feature 98 – Organizational Transparency

WELL Accredited Professionals

IWBI oversees the WELL Accredited Professional (WELL AP) program. WELL APs are trained on the conceptual and applied frameworks of WELL and experienced in its application on registered and certified WELL projects and can help guide projects to successful certification awards.

Alternative Adherence Paths

WELL allows for innovative, alternate solutions for meeting requirements through the alternative adherence path process, as long as proposals still meet the intent of the requirement and are supported by cited scientific, medical and industry research. Project teams may propose an alternative for any requirement of WELL by submitting a completed alternative adherence path for review.

Documentation Submission and Review

Verification that the requirements of the WELL Building Standard have been met necessitates detailed documentation. Project teams are expected to provide various documents attesting to the satisfaction of certain parts of features (See Appendix D for more information).

Performance Verification

Since large parts of the WELL Building Standard are based on building conditions, IWBI uses Performance Verification as a process for on-site assessments. These inspections and measurements include tests related to air and water quality and sound and light levels. It is a process distinct from traditional building commissioning, and assures that the building is performing as intended in accordance to the WELL Building Standard.

Performance Verification is completed by an authorized WELL Assessor who will usually spend one to three days in the building to validate the project's design documentation and to complete a series of performance tests, spot-checks and measurements spanning all WELL Concepts. Testing is completed according to IWBI's sampling protocols based on the size and type of the project, and samples are sent to third-party labs for analysis.

Any WELL feature is subject to verification on-site by a WELL Assessor during Performance Verification—even those accounted for by documentation. The assessor may therefore provide additional documentation generated during spot-checks or spot-measurements for final consideration, in the form of an inspection document.

Scoring

In evaluating adherence to the WELL Building Standard, a project's assessor will grade each Concept independently on a numerical scale. While this Concept-by-Concept analysis is used initially to ensure that all Preconditions per Concept are met, the final WELL Score is calculated based on the total Preconditions and Optimizations achieved across the board—not as a function of averaging independent Concept scores.

Failure to achieve any Precondition in any Concept will preclude the award of WELL Certification. If all Preconditions are satisfied, higher levels of certification award are possible. In evaluating award levels, all Optimization features are treated equally.

Concept scores and the overall WELL score are calculated as follows for the number of WELL features applicable to a specific project type:

Total Preconditions = TP

Preconditions Achieved = PA

Total Optimizations = TO

Optimizations Achieved = OA

Wellness Score = WS

FAIL: *If* $\left(\frac{PA}{TP}\right) < 1$ *then WS* $= \left(\frac{PA}{TP}\right) \times 5$ *(rounded down to nearest whole number)*

PASS: *If* $\left(\frac{PA}{TP}\right) = 1$ *then WS* $= 5 + \left(\frac{OA}{TO}\right) \times 5$ *(rounded down to nearest whole number)*

In making these calculations, Innovation Features are not included among the total optimizations (TO), though achieving them will increase Optimizations Achieved (OA).

The example below shows an office that successfully meets the requirements of the New and Existing Buildings project type. With all Preconditions met and 29 Optimizations met, it will receive the scores calculated as shown.

CONCEPT	PRECONDITIONS		OPTIMIZATIONS		CONCEPT SCORES
	APPLICABLE	ACHIEVED	APPLICABLE	ACHIEVED	
Air	12	12	17	3	5
Water	5	5	3	0	5
Nourishment	8	8	7	6	9
Light	4	4	7	2	6
Fitness	2	2	6	3	7
Comfort	5	5	7	2	6
Mind	5	5	12	12	10
Total and WELL Score	41	41	59	29	7

Lower scores (0 – 4) comprise the compulsory Precondition features; a score less than 5 would denote failure to meet the Preconditions in that Concept and thus failure for overall certification or compliance. Silver scores (5 – 6) mean that all compulsory Precondition features have been met in the Concept. Gold scores (7 – 8) and Platinum scores (9 – 10) comprise the non-compulsory Optimizations.

WELL Scorecard

The WELL Scorecard is the aggregate of all of the WELL Scores for each Concept. The scorecard shows Gold level certification for the previous building example.

Recertification Requirements

WELL Certification is valid for three years. In order to maintain a current certification, WELL Certified™ projects must undergo Performance Verification again and apply for recertification to verify that the building continues to perform in accordance with the requirements of the WELL Building Standard before the end of the three-year Certification period. During the Certification period, annual data must also be submitted for the features that require more frequent reporting.

Project scores may change at the time of recertification if additional improvements have been made or if WELL features have not been properly maintained. It is possible for the building's certification to be revoked if the quality of the interior environment declined considerably since initial certification. Projects may also submit evidence of achievement of additional features to improve their certification level at this time.

WELL BUILDING STANDARD® FEATURES MATRIX

This table shows which features are Preconditions and Optimizations for the different project types of the standard for commercial and institutional offices. Refer to the tables in the beginning of each concept for details about the applicability of specific parts.

		Core and Shell	New and Existing Interiors	New and Existing Buildings
Air				
01	Air quality standards	P	P	P
02	Smoking ban	P	P	P
03	Ventilation effectiveness	P	P	P
04	VOC reduction	P	P	P
05	Air filtration	P	P	P
06	Microbe and mold control	P	P	P
07	Construction pollution management	P	P	P
08	Healthy entrance	P	O	P
09	Cleaning protocol		P	P
10	Pesticide management	P		P
11	Fundamental material safety	P	P	P
12	Moisture management	P		P
13	Air flush		O	O
14	Air infiltration management	O	O	O
15	Increased ventilation	O	O	O
16	Humidity control		O	O
17	Direct source ventilation	O	O	O
18	Air quality monitoring and feedback		O	O
19	Operable windows	O	O	O
20	Outdoor air systems	O	O	O
21	Displacement ventilation		O	O
22	Pest control		O	O
23	Advanced air purification	O	O	O
24	Combustion minimization	O	O	O
25	Toxic material reduction		O	O
26	Enhanced material safety		O	O
27	Antimicrobial activity for surfaces		O	O
28	Cleanable environment		O	O
29	Cleaning equipment		O	O
Water				
30	Fundamental water quality	P	P	P
31	Inorganic contaminants	P	P	P
32	Organic contaminants	P	P	P
33	Agricultural contaminants	P	P	P
34	Public water additives	P	P	P
35	Periodic water quality testing		O	O
36	Water treatment	O	O	O
37	Drinking water promotion	O	O	O

		Core and Shell	New and Existing Interiors	New and Existing Buildings
Nourishment				
38	Fruits and vegetables		P	P
39	Processed foods	P	P	P
40	Food allergies	P	P	P
41	Hand washing		P	P
42	Food contamination		P	P
43	Artificial ingredients	O	P	P
44	Nutritional information	O	P	P
45	Food advertising	O	P	P
46	Safe food preparation materials		O	O
47	Serving sizes		O	O
48	Special diets		O	O
49	Responsible food production		O	O
50	Food storage		O	O
51	Food production	O	O	O
52	Mindful eating	O	O	O
Light				
53	Visual lighting design		P	P
54	Circadian lighting design		P	P
55	Electric light glare control	P	P	P
56	Solar glare control	O	P	P
57	Low-glare workstation design		O	O
58	Color quality		O	O
59	Surface design		O	O
60	Automated shading and dimming controls		O	O
61	Right to light	O	O	O
62	Daylight modeling	O	O	O
63	Daylighting fenestration	O	O	O
Fitness				
64	Interior fitness circulation	P	O	P
65	Activity incentive programs		P	P
66	Structured fitness opportunities		O	O
67	Exterior active design	O	O	O
68	Physical activity spaces	O	O	O
69	Active transportation support	O	O	O
70	Fitness equipment	O	O	O
71	Active furnishings		O	O
Comfort				
72	Accessible design	P	P	P
73	Ergonomics: visual and physical		P	P
74	Exterior noise intrusion	P	O	P
75	Internally generated noise	O	P	P
76	Thermal comfort	P	P	P
77	Olfactory comfort		O	O
78	Reverberation time		O	O
79	Sound masking		O	O
80	Sound reducing surfaces		O	O
81	Sound barriers		O	O
82	Individual thermal control		O	O
83	Radiant thermal comfort	O	O	O

		Core and Shell	New and Existing Interiors	New and Existing Buildings
Mind				
84	Health and wellness awareness	P	P	P
85	Integrative design	P	P	P
86	Post-occupancy surveys		P	P
87	Beauty and design I	P	P	P
88	Biophilia I - qualitative	O	P	P
89	Adaptable spaces		O	O
90	Healthy sleep policy		O	O
91	Business travel		O	O
92	Building health policy		O	O
93	Workplace family support		O	O
94	Self-monitoring		O	O
95	Stress and addiction treatment		O	O
96	Altruism		O	O
97	Material transparency	O	O	O
98	Organizational transparency		O	O
99	Beauty and design II	O	O	O
100	Biophilia II - quantitative	O	O	O
Innovation				
101	Innovation I	O	O	O
102	Innovation II	O	O	O
103	Innovation III	O	O	O
104	Innovation IV	O	O	O
105	Innovation V	O	O	O

AIR

BACKGROUND

Clean air is a critical component to our health. Air pollution is the number one environmental cause of premature mortality, contributing to 50,000 premature deaths annually in the United States and approximately 7 million, or one in eight premature deaths worldwide.

Globally, outdoor air quality is deteriorating due to pollution from traffic, construction, agricultural activity, combustion sources and particulate matter. Because ambient air diffuses easily, even distant sources of pollution have a huge impact on the more than 15,000 liters of air we breathe every day. Indoor air quality can be degraded by these outdoor sources, as well as by off-gassing from building materials, indoor combustion sources and water leaks. Poor ventilation practices can fail to address these sources, exposing us to volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and microbial pathogens. Another way in which indoor air quality may be diminished is via surfaces, which can accumulate airborne germs. All of these contaminants contribute to a range of negative health outcomes such as asthma, allergies and other upper respiratory illnesses. In addition, air quality issues can diminish work productivity and lead to sick building syndrome (SBS), where no disease or cause can be identified, yet acute health effects are linked to time spent in a building. SBS symptoms include various nonspecific symptoms such as eye, skin and airway irritation, as well as headache and fatigue.

The reactions people have to air pollutants vary widely and depend on multiple factors including the concentration of the contaminant, the rate of intake and the duration of exposure. Pollution source avoidance, proper ventilation and air filtration are some of the most effective means of achieving high indoor air quality. In the U.S., the Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) according to ongoing research and monitoring. These Standards have been credited with dramatic improvements in outdoor air quality, and create exposure limits based on both duration of exposure and concentration for the six major air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$) and sulfur dioxide (SO_2). The WELL Building Standard® expands upon these requirements by incorporating standards from additional agencies, such as the World Health Organization (WHO). To help minimize transmission through contact with unsanitary surfaces, the WELL Building Standard provides an approach that combines the installation of appropriate materials with the implementation of effective protocols to regularly disinfect targeted areas.

In addition to limiting pollutant and contaminant concentrations, WELL incorporates best practices from industry organizations, whose guidelines are evidence-based and recommended by professionals. One such group is the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), which regularly updates its building handbook to include new techniques for enhancing air quality within buildings. Although ASHRAE is a technical society without a legal mandate, many state and local governments have modeled their codes based on ASHRAE's standards. In addition, the U.S. Green Building Council's LEED® program continues to set new standards for both air filtration and building material selection to improve air quality.

INTENT

The WELL Building Standard for Air promotes clean air through reducing or minimizing the sources of indoor air pollution, requiring optimal indoor air quality to support the health well-being of building occupants.

AIR FEATURE LEVEL MATRIX

	Core and Shell	New and Existing Interiors	New and Existing Buildings
01 AIR QUALITY STANDARDS			
1: Standards for Volatile Substances	P	P	P
2: Standards for Particulate Matter and Inorganic Gases	P	P	P
3: Radon	P	P	P
02 SMOKING BAN			
1: Indoor Smoking Ban	P	P	P
2: Outdoor Smoking Ban	P	-	P
03 VENTILATION EFFECTIVENESS			
1: Ventilation Design	P	P	P
2: Demand Controlled Ventilation	P	P	P
3: System Balancing	-	P	P
04 VOC REDUCTION			
1: Interior Paints and Coatings	P	P	P
2: Interior Adhesives and Sealants	P	P	P
3: Flooring	P	P	P
4: Insulation	P	P	P
5: Furniture and Furnishings	P	P	P
05 AIR FILTRATION			
1: Filter Accommodation	P	P	P
2: Particle Filtration	P	P	P
3: Air Filtration Maintenance	P	P	P
06 MICROBE AND MOLD CONTROL			
1: Cooling Coil Mold Reduction	P	P	P
2: Mold Inspections	P	P	P
07 CONSTRUCTION POLLUTION MANAGEMENT			
1: Duct Protection	P	P	P
2: Filter Replacement	P	P	P
3: Moisture Absorption Management	P	P	P
4: Dust Containment and Removal	P	P	P
08 HEALTHY ENTRANCE			
1: Permanent Entryway Walk-Off Systems	P	O	P
2: Entryway Air Seal	P	O	P
09 CLEANING PROTOCOL			
1: Cleaning Plan for Occupied Spaces	-	P	P

	Core and Shell	New and Existing Interiors	New and Existing Buildings
10 PESTICIDE MANAGEMENT			
1: Pesticide Use	P	-	P
11 FUNDAMENTAL MATERIAL SAFETY			
1: Asbestos and Lead Restriction	P	P	P
2: Lead Abatement	P	P	P
3: Asbestos Abatement	P	P	P
4: Polychlorinated Biphenyl Abatement	P	P	P
5: Mercury Limitation	P	P	P
12 MOISTURE MANAGEMENT			
1: Exterior Liquid Water Management	P	-	P
2: Interior Liquid Water Management	P	-	P
3: Condensation Management	P	-	P
4: Material Selection and Protection	P	-	P
13 AIR FLUSH			
1: Air Flush	-	O	O
14 AIR INFILTRATION MANAGEMENT			
1: Air Leakage Testing	O	O	O
15 INCREASED VENTILATION			
1: Increased Outdoor Air Supply	O	O	O
16 HUMIDITY CONTROL			
1: Relative Humidity	-	O	O
17 DIRECT SOURCE VENTILATION			
1: Pollution Isolation and Exhaust	O	O	O
18 AIR QUALITY MONITORING AND FEEDBACK			
1: Indoor Air Monitoring	-	O	O
2: Air Data Record Keeping and Response	-	O	O
3: Environmental Measures Display	-	O	O
19 OPERABLE WINDOWS			
1: Full Control	O	O	O
2: Outdoor Air Measurement	O	O	O
3: Window Operation Management	O	O	O
20 OUTDOOR AIR SYSTEMS			
1: Dedicated Outdoor Air Systems	O	O	O
21 DISPLACEMENT VENTILATION			
1: Displacement Ventilation Design and Application	-	O	O
2: System Performance	-	O	O
22 PEST CONTROL			
1: Pest Reduction	-	O	O
2: Pest Inspection	-	O	O
23 ADVANCED AIR PURIFICATION			
1: Carbon Filtration	O	O	O
2: Air Sanitization	O	O	O
3: Air Quality Maintenance	O	O	O

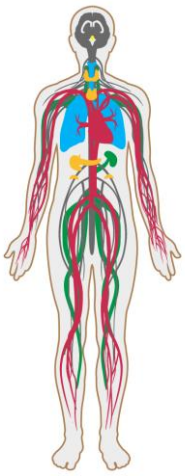
	Core and Shell	New and Existing Interiors	New and Existing Buildings
24 COMBUSTION MINIMIZATION			
1: Appliance and Heater Combustion Ban	O	O	O
2: Low-Emission Combustion Sources	O	-	O
3: Engine Exhaust Reduction	O	-	O
4: Construction Equipment	O	-	O
25 TOXIC MATERIAL REDUCTION			
1: Perfluorinated Compound Limitation	-	O	O
2: Flame Retardant Limitation	-	O	O
3: Phthalate (Plasticizers) Limitation	-	O	O
4: Isocyanate-Based Polyurethane Limitation	-	O	O
5: Urea-Formaldehyde Restriction	-	O	O
26 ENHANCED MATERIAL SAFETY			
1: Precautionary Material Selection	-	O	O
27 ANTIMICROBIAL ACTIVITY FOR SURFACES			
1: High-Touch Surfaces	-	O	O
28 CLEANABLE ENVIRONMENT			
1: Material Properties	-	O	O
2: Cleanability	-	O	O
29 CLEANING EQUIPMENT			
1: Equipment and Cleaning Agents	-	O	O
2: Chemical Storage	-	O	O

01

AIR QUALITY STANDARDS

Pollutants generated indoors can lead to a variety of symptoms and health conditions. Volatile organic compounds (VOCs), combustion byproducts and airborne particulate matter are known to trigger nausea, headaches, asthma, respiratory irritation and allergies. While ambient outdoor air is often better quality, natural ventilation methods, operable doors and windows, and general building envelope infiltration can diminish indoor air quality if external air quality parameters are poor.

Intent: To ensure a basic level of high indoor air quality.



Cardiovascular
Endocrine
Immune
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: STANDARDS FOR VOLATILE SUBSTANCES	P	P	P

The following conditions are met:

a.[1] Formaldehyde levels less than 27 ppb.

b.[1] Total volatile organic compounds less than 500 µg/m³.

PART 2: STANDARDS FOR PARTICULATE MATTER AND INORGANIC GASES	P	P	P

The following conditions are met:

a.[2] Carbon monoxide less than 9 ppm.

b.[2] $PM_{2.5}$ less than 15 µg/m³.

c.[3] PM_{10} less than 50 µg/m³.

d.[3] Ozone less than 51 ppb.

PART 3: RADON	P	P	P

The following conditions are met in projects with regularly occupied spaces at or below grade:

a.[4] Radon less than 4 pCi/L in the lowest occupied level of the project.

02

SMOKING BAN

Over 42 million adults in the U.S. and over a billion individuals worldwide are cigarette smokers. In the U.S. alone, smoking tobacco is related to over 400,000 premature annual deaths. Furthermore, the average life expectancy of a smoker is 10 years less than that of a non-smoker. In addition to nicotine, cigarettes contain about 600 ingredients that form over 7,000 compounds when burned, of which at least 69 are known to be carcinogenic. Secondhand smoke exposes non-smokers to the same toxins, increasing the number of people subject to health risks from smoking.

Intent: To deter smoking, minimize occupant exposure to second hand smoke, and reduce smoke pollution.

Cardiovascular
Digestive
Endocrine
Immune
Integumentary
Muscular
Nervous
Reproductive
Respiratory
Skeletal
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: INDOOR SMOKING BAN	P	P	P
PART 2: OUTDOOR SMOKING BAN	P	-	P

PART 1: INDOOR SMOKING BAN

Building policy or local code reflects the following:

a.[5] Smoking and the use of e-cigarettes is prohibited inside the building.

PART 2: OUTDOOR SMOKING BAN

Signage is present to indicate:

a.[1] A smoking ban within 7.5 m [25 ft] (or the maximum extent allowable by local codes) of all entrances, operable windows and building air intakes.

b. A smoking ban on all decks, patios, balconies, rooftops and other regularly occupied exterior building spaces.

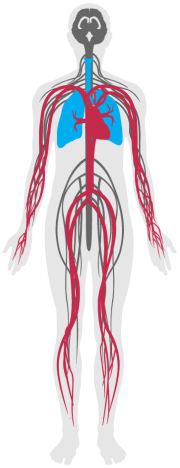
c. The hazards of smoking, in all areas beyond 7.5m of the building entrances (if smoking is permitted in this areas). These signs are to be placed along all walkways with a distance of not more than 30 m [100 ft] between signs.

03

VENTILATION EFFECTIVENESS

Routine indoor activities including cooking, cleaning, building operations and maintenance and even the presence of occupants themselves can degrade air quality. Many indoor pollutants resulting from such activities, including particulate matter and VOCs can cause discomfort and trigger asthma and eye, nose and throat irritation. Because it is difficult to test for every potential pollutant, and because carbon dioxide is easy to detect, carbon dioxide levels serve as a proxy for other indoor pollutants.

Intent: To ensure adequate ventilation and high indoor air quality.



Cardiovascular
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: VENTILATION DESIGN	P	P	P
PART 2: DEMAND CONTROLLED VENTILATION	P	P	P
PART 3: SYSTEM BALANCING	-	P	P

PART 1: VENTILATION DESIGN

One of the following requirements is met for all spaces:

a.[6] Ventilation rates comply with all requirements set in ASHRAE 62.1-2013 (Ventilation Rate Procedure or IAQ Procedure).

b.[6] Projects comply with all requirements set in any procedure in ASHRAE 62.1-2013 (including the Natural Ventilation Procedure) and demonstrate that ambient air quality within 1.6 km [1 mi] of the building is compliant with either the U.S. EPA's NAAQS or passes the Air Quality Standards feature in the WELL Building Standard for at least 95% of all hours in the previous year.

PART 2: DEMAND CONTROLLED VENTILATION

For all spaces 46.5 m² [500 ft²] or larger with an actual or expected occupant density greater than 25 people per 93 m² [1,000 ft²], one of the following requirements is met:

a.[7] A demand controlled ventilation system regulates the ventilation rate of outdoor air to keep carbon dioxide levels in the space below 800 ppm.

b.[7] Projects that have met the Operable windows feature demonstrate that natural ventilation is sufficient to keep carbon dioxide levels below 800 ppm at intended occupancies.

PART 3: SYSTEM BALANCING

After the HVAC system is installed, the following requirement is met:

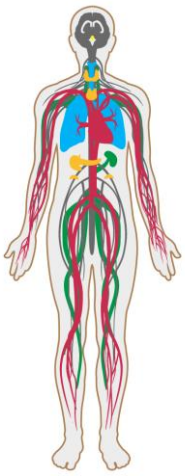
a. After substantial completion and prior to occupancy, the HVAC system has (within the last 5 years), or is scheduled to, undergo testing and balancing.

04

VOC REDUCTION

Indoor air quality can be degraded significantly by volatile organic compounds (VOCs) that off-gas from paints, finishes and other coatings, and also result from the use of cleaning products, air fresheners, personal care products and other materials brought into the building. VOCs include benzene (classified by the EPA as a known human carcinogen), formaldehyde and other chemical compounds, which at high concentrations can lead to irritation of the nose and pharynx, and have been associated with leukemia, childhood asthma and other respiratory disorders. VOC levels can be 5 times higher indoors than outdoors.

Intent: To minimize the effect of VOCs in building materials on indoor air quality.



Cardiovascular
Endocrine
Immune
Integumentary
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: INTERIOR PAINTS AND COATINGS	P	P	P
PART 2: INTERIOR ADHESIVES AND SEALANTS	P	P	P
PART 3: FLOORING	P	P	P

PART 1: INTERIOR PAINTS AND COATINGS

The VOC limits of newly applied paints and coatings meet one of the following requirements:

a.[1] 100% of installed products meet California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011 for VOC content.

b.[1] At minimum 90%, by volume, meet the California Department of Public Health (CDPH) Standard Method v1.1-2010 for VOC emissions.

c.[1] Applicable national VOC content regulations or conduct testing of VOC content in accordance with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

PART 2: INTERIOR ADHESIVES AND SEALANTS

The VOC limits of newly applied adhesives and sealants meet one of the following requirements:

a.[1] 100% of installed products meet South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1 2005 for VOC content.

b.[1] At minimum 90%, by volume, meet the California Department of Public Health (CDPH) Standard Method v1.1-2010 for VOC emissions.

c.[1] Applicable national VOC content regulations or conduct testing of VOC content in accordance with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

PART 3: FLOORING

The VOC emissions of all newly installed flooring must meet all limits set by the following, as applicable:

a.[1] California Department of Public Health (CDPH) Standard Method v1.1-2010.

PART 4: INSULATION

P	P	P

The VOC emissions of all newly installed thermal and acoustic insulation inside the waterproofing membrane must meet all limits set by the following, as applicable:

a.[1] California Department of Public Health (CDPH) Standard Method v1.1-2010.

PART 5: FURNITURE AND FURNISHINGS

P	P	P

The VOC emissions of at least 95% (by cost) of all newly purchased furniture and furnishings within the project scope must meet all limits set by the following, as applicable:

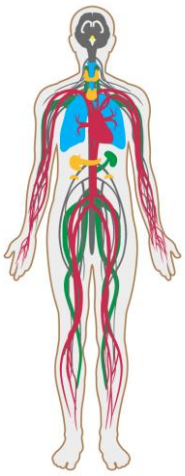
a.[1] ANSI/BIFMA e3-2011 Furniture Sustainability Standard sections 7.6.1 and 7.6.2, tested in accordance with ANSI/BIFMA Standard Method M7.1-2011.

05

AIR FILTRATION

Air quality is subject to variability due to weather, dust, traffic and localized pollutant sources. Seasonal variations in pollen can trigger asthma and allergies in sensitive individuals. Similarly, exposure to high levels of coarse and fine particulate matter introduced from the outside can lead to respiratory irritation and has been associated with increases in lung cancer as well as cardiovascular disease and mortality. Carbon filters are designed to absorb such volatile pollutants and remove the largest particles, while media filters are meant to address smaller particles.

Intent: To remove indoor and outdoor airborne contaminants through air filtration.



Cardiovascular
Endocrine
Immune
Integumentary
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: FILTER ACCOMMODATION	P	P	P
PART 2: PARTICLE FILTRATION	P	P	P
PART 3: AIR FILTRATION MAINTENANCE	P	P	P

PART 1: FILTER ACCOMMODATION

If recirculated air is used, the following requirements are met in ventilation assemblies in the main air ducts for recirculated air:

a. Rack space and fan capacity is in place for future carbon filters or combination particle/carbon filters.

b. The mechanical system is sized to accommodate the additional filters.

PART 2: PARTICLE FILTRATION

One of the following requirements is met:

a.[1] MERV 13 (or higher) media filters are used in the ventilation system to filter outdoor air.

b. Project demonstrates that for 95% of all hours in a calendar year, ambient outdoor PM_{10} and $PM_{2.5}$ levels measured within 1.6 km [1 mi] of the building are below the limits set in the WELL Air Quality Standards feature.

PART 3: AIR FILTRATION MAINTENANCE

To verify that the filtration system continues to operate as designed, projects must annually provide IWBI with:

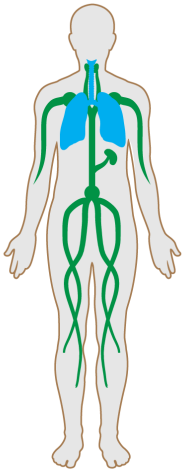
a. Records of air filtration maintenance, including evidence that filters have been properly maintained as per the manufacturer's recommendations.

06

MICROBE AND MOLD CONTROL

Mold often grows on cooling coils in HVAC systems due to moisture condensation and can be introduced into the building's indoor air. It can also occur on or within wall assemblies due to water damage or improper detailing in humid locations, for example kitchens and bathrooms. Mold spores can trigger asthma, headaches, allergies and other respiratory system disorders.

Intent: To reduce mold and bacteria growth within buildings, particularly from water damage or condensation on cooling coils.



Immune
Integumentary
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: COOLING COIL MOLD REDUCTION

In buildings that rely on a mechanical system for cooling, one of the following requirements is met:

a. Ultraviolet lamps (using a wavelength of 254 nm so as not to generate ozone) are employed on the cooling coils and drain pans of the mechanical system supplies. Irradiance reaching the cooling coil and drain pan, including the plenum corners, is modeled.

b.[9] Building policy states that all cooling coils are inspected on a quarterly basis for mold growth and cleaned if necessary. Dated photos demonstrating adherence are provided to the IWBI on an annual basis.

P	P	P

PART 2: MOLD INSPECTIONS

The following are not present:

a.[12] Signs of discoloration and mold on ceilings, walls or floors.

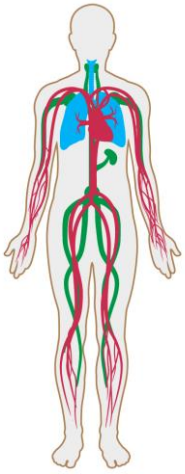
b.[12] Signs of water damage or pooling.

07

CONSTRUCTION POLLUTION MANAGEMENT

Proper design and material selection is essential in creating healthy indoor air quality. However, this strategy can be compromised if equal care is not taken during construction to clear the space of dust, chemical vapors and other debris. Pollutants inadvertently introduced into the space can lead to various respiratory symptoms and will increase the likelihood of failing indoor air quality standards.

Intent: To minimize the introduction of construction-related pollutants into indoor air and protect building products from degradation.



Cardiovascular
Immune
Integumentary
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: DUCT PROTECTION	P	P	P
PART 2: FILTER REPLACEMENT	P	P	P
PART 3: MOISTURE ABSORPTION MANAGEMENT	P	P	P
PART 4: DUST CONTAINMENT AND REMOVAL	P	P	P

PART 1: DUCT PROTECTION

To prevent pollutants from entering the ventilation system, all ducts are either:

a.[1] Sealed and protected from possible contamination during construction.

b. Vacuumed out prior to installing registers, grills and diffusers.

PART 2: FILTER REPLACEMENT

To prevent pollutants from entering the air supply post-occupancy, if the ventilation system is operating during construction, the following requirement is met:

a.[1] All filters are replaced prior to occupancy.

PART 3: MOISTURE ABSORPTION MANAGEMENT

To prevent building materials from absorbing water or moisture during construction, the following requirements are met:

a.[1] A separate area is designated to store and protect absorptive materials, including but not limited to carpets, acoustical ceiling panels, fabric wall coverings, insulation, upholstery and furnishings.

PART 4: DUST CONTAINMENT AND REMOVAL

The following procedures are followed during building construction:

a.[1] All active areas of work are isolated from other spaces by sealed doorways or windows or through the use of temporary barriers.

b.[1] Walk-off mats are used at entryways to reduce the transfer of dirt and pollutants.

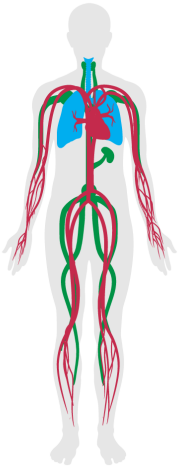
c.[1] Saws and other tools use dust guards or collectors to capture generated dust.

08

HEALTHY ENTRANCE

Occupants often track harmful contaminants indoors, including bacteria, heavy metals, lawn and agricultural pesticides, among other toxins. In addition, as occupants walk through entry doors, potentially polluted air can enter the building. Both of these modes of introducing outdoor pollutants to the indoor environment highlight the need for measures that minimize or prevent the introduction of potentially harmful substances to indoor spaces.

Intent: To minimize the introduction of pollutants into indoor air at building entrances.



Cardiovascular
Immune
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	O	P

PART 1: PERMANENT ENTRYWAY WALK-OFF SYSTEMS

To capture particulates from occupant shoes at all regularly used entrance(s) to the project, one of the following is installed and is maintained on a weekly basis:

a.[1] Permanent entryway system comprised of grilles, grates or slots, which allow for easy cleaning underneath, at least the width of the entrance and 3 m [10 ft] long in the primary direction of travel.

b.[1] Rollout mats, at least the width of the entrance and 3 m [10 ft] long in the primary direction of travel.

c.[1] Material manufactured as an entryway walk-off system, at least the width of the entrance and 3 m [10 ft] long in the primary direction of travel.

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	O	P

PART 2: ENTRYWAY AIR SEAL

One of the following is in place to slow the movement of air from outdoors to indoors within mechanically ventilated main building entrances:

a. Building entry vestibule with two normally-closed doorways.

b. Revolving entrance doors.

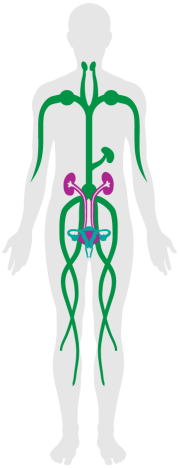
c. At least 3 normally-shut doors that separate occupied space from the outdoors. For example, a space on the fifth-floor could be separated by the exterior building doors, the first-floor elevator doors and the fifth-floor elevator doors. This option is applicable only for buildings whose entrance lobby is not a regularly occupied space.

09

CLEANING PROTOCOL

Regular cleaning is an important practice as it helps to remove potentially harmful debris and maintain a healthy indoor environment. However, numerous chemicals and improper cleaning techniques can undermine indoor air quality. Harmful ingredients in cleaning products can lead to eye, nose, throat and skin irritation, and emit VOCs into the indoor environment, which may lead to other health effects including sick building syndrome (SBS). An adequate cleaning regimen using non-toxic, hypoallergenic cleaners helps to reduce bioloads, pests, environmental allergens and unpleasant odors without introducing chemicals that might adversely impact indoor air quality.

Intent: To reduce occupant exposure to pathogens, allergens, and harmful cleaning chemicals.



Immune
Reproductive
Respiratory
Urinary

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 1: CLEANING PLAN FOR OCCUPIED SPACES

A cleaning plan is created which includes following requirements:

a. A list of high-touch and low-touch surfaces in the space (see Table A1 in Appendix C).

b. A cleaning schedule that specifies the extent and frequency that a surface is cleaned, sanitized, or disinfected in accordance with the Disinfection and Sanitization and Entryway Maintenance sections of Table A4 in Appendix C.

c. A cleaning protocol and dated cleaning logs that are maintained and available to all occupants.

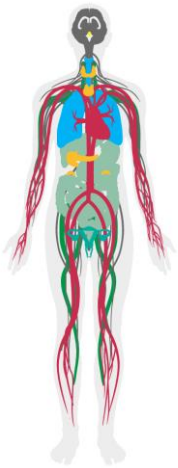
d. A list of approved product seals with which all cleaning products must comply (see Table A4 in Appendix C).

e. The Cleaning Equipment and Training section of Table A4 in Appendix C.

10

PESTICIDE MANAGEMENT

Approximately one billion pounds of pesticides are used in a typical year in the U.S. alone. Pesticides and herbicides contaminate rivers and streams, and seep into groundwater through runoff. A U.S. Geological Survey conducted in the 1990s detected pesticide compounds in virtually every stream in agricultural, urban and mixed-use areas, as well as in over 50 percent of sampled wells assessing ground water in agricultural and urban areas. Atrazine, one of the most widely used pesticides, is a suspected endocrine disruptor and is associated with cardiovascular problems. Long-term exposure to glyphosate, a widely used herbicide, may lead to kidney problems and reproductive difficulties.



Cardiovascular
Digestive
Endocrine
Immune
Nervous
Reproductive
Respiratory

Intent: To reduce the presence of pests in buildings and minimizing occupant exposure to harmful chemicals.

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	-	P

PART 1: PESTICIDE USE

The following conditions are met for all pesticides and herbicides used on outdoor plants:

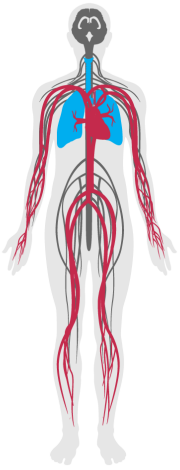
a.[14] Pesticide and herbicide use is minimized by creating a use plan based on Chapter 3 of the San Francisco Environment Code Integrated Pest Management (IPM) program.

b.[14] Only pesticides with a hazard tier ranking of 3 (least hazardous) as per The City of San Francisco Department of the Environment's (SFE) Hazard Tier Review Process are used. Refer to Table A2 in Appendix C for more details.

11

FUNDAMENTAL MATERIAL SAFETY

Some hazardous materials, such as asbestos, a known human carcinogen, and polychlorinated biphenyls (PCBs), a probable human carcinogen, are currently restricted or banned in many countries, but are often encountered in older buildings. Others, including lead, remain in limited use. Exposure to asbestos fibers through inhalation can occur when building materials degrade over time or are disturbed during renovation or demolition, and is associated with lung cancer and mesothelioma. Exposure to lead can have neurotoxic effects, even at low levels, and in early development is associated with negative effects on memory, IQ, learning and behavior. (Please refer to Table A3 for additional details.)



Cardiovascular
Nervous
Respiratory

Intent: To reduce or eliminate occupant exposure to lead, asbestos, and PCBs from building materials.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: ASBESTOS AND LEAD RESTRICTION	P	P	P
PART 2: LEAD ABATEMENT	P	P	P

PART 1: ASBESTOS AND LEAD RESTRICTION

All newly-installed building materials meet the following materials composition requirements:

a. No asbestos.

b.[36] Not more than 100 ppm (by weight) added lead.

PART 2: LEAD ABATEMENT

For repair, renovation or painting on buildings constructed prior to any applicable laws banning or restricting lead paint, lead evaluation and abatement is conducted in accordance with the following guidelines:

a.[31] An on-site investigation of the commercial space conducted by a certified risk assessor or inspector technician to determine the presence of any lead-based hazards in paint, dust and soil using the definitions in U.S. EPA 40 CFR Part 745.65 for residential dwellings or child-occupied facilities.

b.[31] All commercial and institutional spaces found to have lead-based hazards must adhere to U.S. EPA 40 CFR Part 745.227 work practice standards for conducting lead-based paint activities, as outlined for multi-family dwellings.

c.[31] Adherence to final rules, as they are proposed by the U.S. EPA, regarding the lead renovation, repair and painting program for public and commercial buildings (RIN: 2070-AJ56) supersedes adherence to definitions and protocols outlined in U.S. EPA 40 CFR Part 745 for residential dwellings or child-occupied facilities.

PART 3: ASBESTOS ABATEMENT

P	P	P

To reduce hazards in buildings constructed prior to any applicable laws banning or restricting asbestos, the following testing, evaluation and abatement is conducted:

a.[33] Projects conduct asbestos inspection every three years through an accredited professional per Asbestos Hazard Emergency Response Act (AHERA)'s Asbestos Model Accreditation Plan (MAP), National Standards for Hazardous Air Pollutants (NESHAP), accredited asbestos consultant (State or local equivalent) or by a U.S. EPA accredited company experienced in asbestos assessment.

b.[33] In accordance with the Asbestos Hazard Emergency Response Act (AHERA), development, maintenance and update of asbestos management plans, including all necessary actions to minimize asbestos hazards: repair, encapsulation, enclosure, maintenance and removal, follow protocol detailed in the Asbestos-Containing Materials in Schools Rule (40 CFR part 763).

c.[33] Projects conduct post-abatement clearance in accordance with Asbestos Hazard Emergency Response Act (AHERA) Asbestos-Containing Materials in Schools (40 CFR part 763).

PART 4: POLYCHLORINATED BIPHENYL ABATEMENT

P	P	P

Any projects undergoing current renovation or demolition which were constructed or renovated between 1950 and the institution of any applicable laws banning or restricting PCBs carry out the following:

a.[34] Conduct evaluation and abatement of materials in accordance with the U.S. EPA Steps to Safe PCB Abatement Activities.

b.[34] Conduct removal and safe disposal of PCB-containing fluorescent light ballasts in accordance with the U.S. EPA guidelines.

PART 5: MERCURY LIMITATION

P	P	P

Mercury-containing equipment and devices are restricted in accordance with the below guidelines:

a.[1] Project does not specify or install new mercury containing thermometers, switches and electrical relays.

b.[1] Project develops a plan to upgrade current mercury-containing lamps to low-mercury or mercury-free lamp technology per limits specified in Appendix C, Table A5.

c.[1] Illuminated exit signs only use Light-Emitting Diode (LED) or Light-Emitting Capacitor (LEC) lamps.

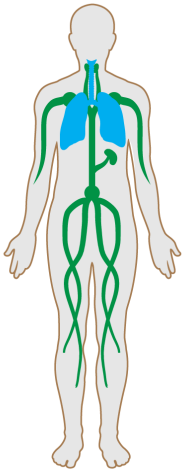
d.[1] No mercury vapor or probe-start metal halide high intensity discharge lamps are in use.

12

MOISTURE MANAGEMENT

Good design principles and strategies to mitigate water damage help to preserve good indoor air quality. Moisture can enter buildings and building assemblies in four ways: bulk water, capillary water, air-transported moisture and vapor diffusion. In addition to preventing wetting from all four channels, managing moisture is also about promoting drying potential.

Intent: To limit the potential for bacteria and mold growth within buildings from water infiltration and condensation.



Immune
Integumentary
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	-	P

PART 1: EXTERIOR LIQUID WATER MANAGEMENT

A point-by-point narrative describes how liquid water from outside the building is addressed, responding to the nature and intensity of wetting based on the project's site and climate, and includes the following leading concerns:

a.[176] Site drainage, including the impact of any site irrigation.

b.[176] The local water table.

c.[176] Building penetrations (especially windows and plumbing/electrical/mechanical penetrations).

d.[176] Porous building materials connected to exterior sources of liquid water.

P	-	P

PART 2: INTERIOR LIQUID WATER MANAGEMENT

A point-by-point narrative describes how liquid water from interior sources is addressed, including these leading concerns:

a.[176] Plumbing leaks.

b.[176] "Hard-piped" plumbing appliances (appliances such as clothes washers exposed to building water pressure even when not in use).

c.[176] Porous building materials connected to interior sources of liquid water.

d.[176] New building materials with “built-in” high moisture content or building materials wetted during construction but now on the inside of the building.

PART 3: CONDENSATION MANAGEMENT

P	-	P

A point-by-point narrative describes how condensation is addressed, including these leading concerns:

a.[176] High interior relative humidity levels, particularly in susceptible areas like bath and laundry rooms and below-grade spaces.

b.[176] Air leakage which could wet either exposed interior materials or interstitially "hidden" materials.

c.[176] Cooler surfaces, such as basement or slab-on-grade floors, or closets/cabinets on exterior walls.

d.[176] Oversized air conditioning units.

PART 4: MATERIAL SELECTION AND PROTECTION

P	-	P

A point-by-point narrative describes how moisture-tolerant materials have been selected and/or moisture-sensitive materials (MSP) are being protected, considering these leading concerns:

a.[176] Exposed entryways and glazing.

b.[176] Porous cladding materials.

c.[176] Finished floors in potentially damp or wet rooms such as basements, bathrooms and kitchens.

d.[176] Interior sheathing in damp or wet rooms.

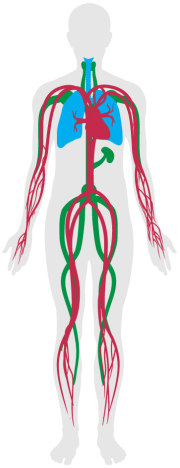
e.[1] Sealing and storing of absorptive materials during construction.

13

AIR FLUSH

An air flush or building flush is a technique whereby air is forced through a building after construction and prior to occupancy in order to remove or reduce pollutants, such as VOCs and particulate matter, inadvertently introduced indoors during construction. Air flushing improves indoor air quality by limiting the exposure to an intense contamination period.

Intent: To remediate construction-related indoor air contamination.



Cardiovascular
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: AIR FLUSH

A building air flush is performed while maintaining an indoor temperature of at least 15 °C [59 °F] and relative humidity below 60%, at one of the following volumes:

a.[1] A total air volume of 4,500 m^3 of outdoor air per m^2 of floor area [14,000 ft^3 per ft^2 of floor area] prior to occupancy.

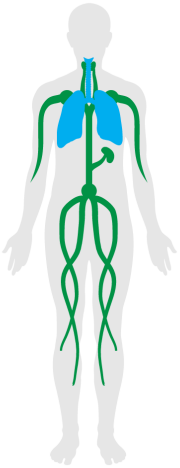
b.[1] A total air volume of 1,066 m^3 of outdoor air per m^2 of floor area [3,500 ft^3 per ft^2 of floor area] prior to occupancy, followed by a second flush of 3,200 m^3 of outdoor air per m^2 of floor area [10,500 ft^3 per ft^2 of floor area] post-occupancy. While the post-occupancy flush is taking place, the ventilation system must provide at least 0.1 m^3 per minute of outdoor air per m^2 of floor area [0.3 CFM outdoor air per ft^2 of floor area] at all times.

14

AIR INFILTRATION MANAGEMENT

Indoor air quality and thermal comfort can be compromised by leaks and gaps that break the building's air barrier. These weak points are not only wasteful but can also lead to conditions conducive to growth of molds and the infiltration of pests or polluted air.

Intent: To minimize air quality and thermal comfort issues resulting from the infiltration of untreated air through the building envelope.



Core and Shell	New and Existing Interiors	New and Existing Buildings
○	○	○

PART 1: AIR LEAKAGE TESTING

The following is performed after substantial completion and prior to occupancy to ensure the structure is airtight:

a.[1] Envelope commissioning in accordance with ASHRAE Guideline 0-2005 and the National Institute of Building Sciences (NIBS) Guideline 3-2012 (for new construction or structural renovation).

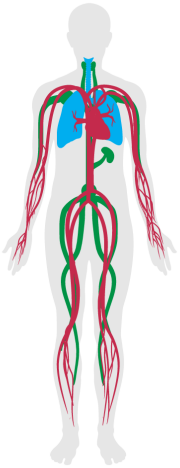
b. Detailed plan for action and remediation of unacceptable conditions.

15

INCREASED VENTILATION

The guidelines put forth by ASHRAE provide the basis for acceptable indoor air quality, but not necessarily for best-in-class air quality for buildings. Unusually high building occupancy, a high risk of accidents that might degrade air quality or space capacity to install filtration make exceeding ASHRAE requirements a worthwhile strategy.

Intent: To expel internally-generated pollutants through an increased supply of outdoor air.



Cardiovascular
Immune
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
○	○	○

PART 1: INCREASED OUTDOOR AIR SUPPLY

The following is required in terms of the rate of outdoor air supply to all regularly occupied spaces:

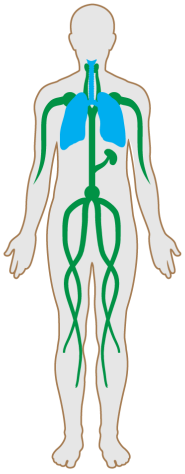
a.[1] Exceed ASHRAE outdoor air supply rates met in the WELL Ventilation Effectiveness feature by 30%.

16

HUMIDITY CONTROL

Extremely low humidity can lead to dryness and irritation of the skin, eyes, throat and mucous membranes. Conversely, high humidity may promote the accumulation and growth of microbial pathogens, including bacteria, dust mites and mold, which can lead to odors and cause respiratory irritation and allergies in sensitive individuals. Additionally, higher humidity levels can lead to increased off-gassing: an increase in relative humidity of 35% can increase the emissions of formaldehyde by a factor of 1.8–2.6.

Intent: To limit the growth of pathogens, reduce off-gassing, and maintain thermal comfort by providing the appropriate level of humidity.



Immune
Integumentary
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: RELATIVE HUMIDITY

At least one of the following is required:

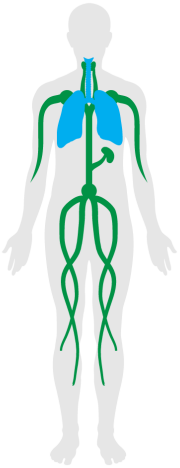
a.[8] A ventilation system with the capability to maintain relative humidity between 30% to 50% at all times by adding or removing moisture from the air.

b. Modeled humidity levels in the space are within 30% to 50% for at least 95% of all business hours of the year. Buildings in climates with narrow humidity ranges are encouraged to pursue this option.

17

DIRECT SOURCE VENTILATION

Air pollution can be created from a number of indoor sources, including cleaning products, office equipment and humid environments. Chemical storage closets can be a source of harmful vapors, including VOCs that are linked to cancer, organ and central nervous system damage. Copy rooms can contribute to the production of ozone, which is linked to asthma and other respiratory diseases. Bathrooms can be a source of mold and mildew that release spores and toxins, which can trigger asthma and allergies in susceptible individuals.



Intent: To preserve air quality in occupied spaces through the isolation and proper ventilation of indoor pollution sources and chemical storage areas.

Core and Shell	New and Existing Interiors	New and Existing Buildings
O	O	O

PART 1: POLLUTION ISOLATION AND EXHAUST

All cleaning and chemical storage units, all bathrooms, and all rooms that contain printers and copiers (except those meeting the low-emission criteria of Ecologo CCD 035, Blue Angel RAL-UZ 171, or Green Star) meet the following conditions:

a. Are closed from adjacent spaces with self-closing doors.

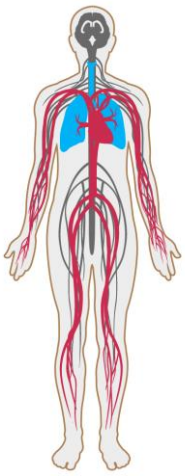
b.[1] Air is exhausted so that all air is expelled rather than recirculated.

18

AIR QUALITY MONITORING AND FEEDBACK

Building performance, such as ventilation and infiltration rates, is highly variable and has a direct effect on indoor air quality. To maintain ideal performance metrics, projects must continuously gather data on building performance. Collecting this data allows individuals to be aware of and promptly fix any deviations in indoor quality metrics.

Intent: To monitor and effectively remediate indoor air quality issues and inform building managers and occupants of the quality of the indoor environment.



Cardiovascular
Integumentary
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: INDOOR AIR MONITORING	-	○	○
PART 2: AIR DATA RECORD KEEPING AND RESPONSE	-	○	○
PART 3: ENVIRONMENTAL MEASURES DISPLAY	-	○	○

PART 1: INDOOR AIR MONITORING

Monitors measure 2 of the following pollutants in a regularly occupied or common space (minimum one per floor) within the building, at intervals no longer than once an hour, and results are annually transmitted to the IWBI:

a. Particle count (resolution 35,000 counts per m^3 [1,000 counts per ft^3] or finer) or particle mass (resolution 10 $\mu g/m^3$ or finer).

b.[1] Carbon dioxide (resolution 25 ppm or finer).

c. Ozone (resolution 10 ppb or finer).

PART 2: AIR DATA RECORD KEEPING AND RESPONSE

In an effort to consistently meet the WELL parameters, projects provide a written policy specifying:

a. Detailed enforcement strategies for monitoring and record-keeping of parameters listed in the Air Quality Standards feature.

b. Records are to be kept for a minimum of 3 years, including full data from field inspectors or laboratory results where appropriate.

c. Detailed plan for action and remediation of unacceptable conditions.

PART 3: ENVIRONMENTAL MEASURES DISPLAY

Real-time display of the following indoor environmental parameters are made available per 930 m^2 [10,000 ft^2] of regularly occupied space on a screen no smaller than 15 cm [5.9 inches] by 13 cm [5.1 inches]:

a. Temperature.

b. Humidity.

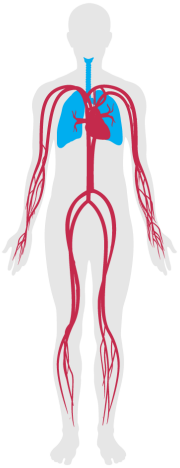
c. Carbon dioxide concentration.

19

OPERABLE WINDOWS

Achieving natural ventilation through open windows, doors and louvers can provide a positive occupant experience, but challenges the ability to maintain strict control over interior air quality. When weather and local ambient parameters indicate high quality outdoor air, WELL encourages the use of natural ventilation strategies. Open windows can then provide a supply of outdoor air and lower the levels of carbon dioxide and VOCs, such as formaldehyde, without compromising indoor air quality.

Intent: To increase the supply of high quality outdoor air and promote a connection to the outdoor environment by encouraging occupants to open windows when outdoor air quality is acceptable.



Cardiovascular
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: FULL CONTROL	○	○	○

The following requirement is met:

a.[13] Every regularly occupied space has operable windows that provide access to outdoor air and daylight.

PART 2: OUTDOOR AIR MEASUREMENT	○	○	○

Outdoor levels of ozone, PM_{10}, temperature and humidity are monitored based on the following requirement, and data collected is made available to the building occupants:

a. A data-gathering station located within 1.6 km [1 mi] of the building.

PART 3: WINDOW OPERATION MANAGEMENT	○	○	○

If the outdoor air measurement system indicates that outdoor air either (i) exceeds ozone levels of 51 ppb or PM_{10} levels of 50 µg/m³; (ii) has a temperature of 8 °C [15 °F] above or below set indoor temperature; or (iii) has a relative humidity above 60%, then one of the following is used to discourage occupants from opening windows:

a. Software on occupants' computers or smartphones.

b. Indicator lights at all operable windows.

20

OUTDOOR AIR SYSTEMS

Dedicated outdoor air systems (DOAS) remove the constraints associated with linking heating and cooling with ventilation, so that optimal air quality and thermal comfort can be independently achieved. A properly designed DOAS can save energy compared to conventional systems while always supplying the appropriate amount of ventilation.

Intent: To allow buildings to control the outdoor air supply independently from the heating/cooling needs of the building.

Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
○	○	○

PART 1: DEDICATED OUTDOOR AIR SYSTEMS

Dedicated outdoor air systems are used for heating and/or cooling systems and verified as being adequate through one of the following:

a. The system complies with local codes or standards regarding dedicated outdoor air systems.

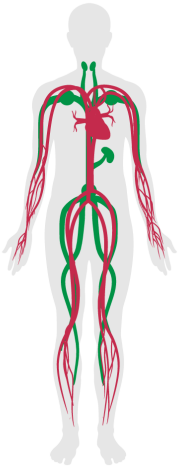
b. A detailed design review of the proposed system is conducted by an independent, qualified and registered professional mechanical engineer (not employed or compensated by the mechanical engineer on record). The review addresses thermal comfort (temperature, humidity, air velocity, etc.) and ventilation rates, as well as overall serviceability and system reliability. Report must demonstrate satisfactory compliance with all applicable ASHRAE standards and codes.

21

DISPLACEMENT VENTILATION

By strategically designing the height of air ventilation, displacement ventilation can enhance air change effectiveness. Displacement ventilation supplies air at very low velocity levels at or near the floor level, which then rises to the ceiling level. Since heat in a room is naturally stratified, displacement ventilation not only ensures that air is not delivered and pushed through the return air path (often the dirtiest portion of the air stream), but also tends to concentrate pollutants near the ceiling. Once there, the pollutants are out of the breathing zone and can be more easily removed.

Intent: To improve air quality in the breathing zone of the room and maintain thermal comfort by supplying low velocity outdoor air near the floor and expelling near the ceiling.



Cardiovascular
Immune

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: DISPLACEMENT VENTILATION DESIGN AND APPLICATION	-	○	○

Projects implement a displacement ventilation system for heating and/or cooling in which one of the following is met:

a.[41] Low side wall air distribution with the air supply temperature slightly cooler or warmer than the desired space temperature. The system must use the System Performance Evaluation and ASHRAE Guidelines RP-949 as the basis for design.

b.[37] Underfloor Air Distribution (UFAD) with the air supply temperature slightly cooler or warmer than the desired space temperature. This system must use ASHRAE's UFAD Guide (Design, Construction and Operations of Underfloor Air Distribution Systems) as the basis of design. Displacement ventilation applied as part of an underfloor air distribution system must be installed at a raised floor height whereby the underfloor area can be cleaned on an annual basis.

PART 2: SYSTEM PERFORMANCE	-	○	○

The following requirements are met:

a. A Computational Fluid Dynamics (CFD) analysis is conducted for the displacement ventilation system.

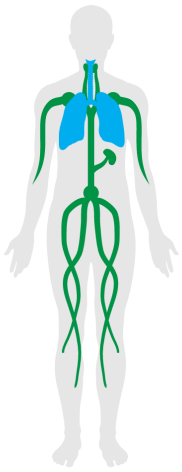
b.[92] The displacement ventilation system meets ASHRAE 55-2013 (Thermal Environmental Conditions for Human Occupancy) for comfort for at least 75% of all regularly occupied space.

22

PEST CONTROL

Unhygienic conditions lead to the presence of pests and dust mites, which are common sources of indoor allergens. Their bodies, feces and saliva contain allergens which can trigger asthma and allergic reactions in susceptible individuals. Asthma can also be compounded by sensitivity to other allergens; up to 60% of individuals with asthma who live in urban environments also have a sensitivity to cockroach allergens.

Intent: To reduce the presence of pests in buildings and minimize occupant exposure to pest-related allergens.



Immune
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: PEST REDUCTION	-	○	○
PART 2: PEST INSPECTION	-	○	○

PART 1: PEST REDUCTION

The following are met:

a. All non-refrigerated perishable food, including pet food, is stored in sealed containers.

b. All indoor garbage cans (except paper recycling bins) less than 113 liters [30 gallons] have lids and hands-free operation, or are enclosed by cabinetry in an under-counter pull-out drawer, with a handle separate from the trash can.

c. All indoor garbage cans greater than 113 liters [30 gallons] have a lid.

PART 2: PEST INSPECTION

Inspections show that the following are not present:

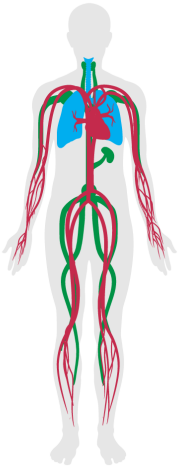
a. Signs of infestation by cockroaches, termites or other pests.

23

ADVANCED AIR PURIFICATION

Some circumstances justify greater investment in air purification strategies. For example, proximity to highly traveled roads, manufacturing plants and seasonal variation can affect outdoor air quality, increasing ozone and VOC content, and in turn diminishing indoor air quality. Similarly, climates with high humidity levels and inadequate indoor ventilation can foster the development of mold and spores in indoor environments.

Intent: To improve recirculated indoor air quality through the implementation of advanced air purification strategies.



Cardiovascular
Immune
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: CARBON FILTRATION	○	○	○

To reduce VOCs in the indoor air, buildings which recirculate air use one of the following methods:

a. Activated carbon filters in the main air ducts to filter recirculated air. Replacement is required as recommended by the manufacturer.

b. A standalone air purifier with a carbon filter used in all regularly occupied spaces. Purifiers must be sized appropriately to the spaces they are serving. Filter replacement is required as recommended by the manufacturer.

PART 2: AIR SANITIZATION	○	○	○

Spaces with more than 10 regular occupants, within buildings that recirculate air, use one of the following treatments or technologies to treat the recirculated air, either integrated within the central ventilation system or as a standalone device:

a.[15] Ultraviolet germicidal irradiation.

b.[15] Photocatalytic oxidation.

PART 3: AIR QUALITY MAINTENANCE	○	○	○

As evidence that the selected filtration/sanitation system chosen continues to be fully operational, projects must annually provide IWBI with:

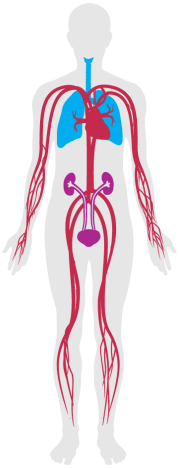
a. Records of air filtration/sanitization maintenance, including evidence that the filter and/or sanitizer has been properly maintained as per the manufacturer's recommendations.

24

COMBUSTION MINIMIZATION

Although wood and gas fireplaces have aesthetic benefits, they can also be detrimental to indoor air quality. If not effectively sealed off from the living space, they can contribute harmful combustion byproducts such as carbon monoxide and particulate matter. Carbon monoxide has 210 times the binding affinity for hemoglobin compared to oxygen, and thus prevents oxygen from being delivered to the body, leading to hypoxia—lack of oxygen delivery to body tissues that can cause nausea, loss of consciousness and death. Carbon monoxide leads to about 170 non-automotive fatal poisonings in the U.S. every year.

Intent: To reduce occupant exposure to combustion-related air pollution from heating and transportation sources.



Cardiovascular
Respiratory
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: APPLIANCE AND HEATER COMBUSTION BAN	O	O	O
PART 2: LOW-EMISSION COMBUSTION SOURCES	O	-	O
PART 3: ENGINE EXHAUST REDUCTION	O	-	O

PART 1: APPLIANCE AND HEATER COMBUSTION BAN

The following are forbidden in regularly occupied spaces:

a.[29] Combustion-based fireplaces, stoves, space-heaters, ranges and ovens.

PART 2: LOW-EMISSION COMBUSTION SOURCES

All combustion equipment used in the project for heating, cooling, water-heating, process heating or power generation (whether primary or back-up) must meet California's South Coast Air Quality Management District rules for pollution:

a.[39] Internal combustion engines.

b.[39] Furnaces.

c.[39] Boilers, steam generators and process heaters.

d.[39] Water heaters.

PART 3: ENGINE EXHAUST REDUCTION

Signage, visible from pick-up, drop-off and parking areas indicates:

a. Idling with vehicle engines on for more than 30 seconds is prohibited.

PART 4: CONSTRUCTION EQUIPMENT

○	-	○

To reduce particulate matter emissions from both on-road and non-road diesel fueled vehicles and construction equipment, the following requirements are met:

a.[85] All non-road diesel engine vehicles comply with the U.S. EPA Tier 4 PM emissions standards or local equivalent when applicable. Engines may be retrofitted with verified technology (required to be U.S. EPA or California Air Resources Board approved) at the time the equipment is first placed on the job site.

b.[85] All on-road diesel engine vehicles meet the requirements set forth in the U.S. EPA model year 2007 on-road standards for PM, or local equivalent when applicable. Engines may be retrofitted with verified technology (required to be U.S. EPA or California Air Resources Board approved) at the time the equipment is first placed on the job site.

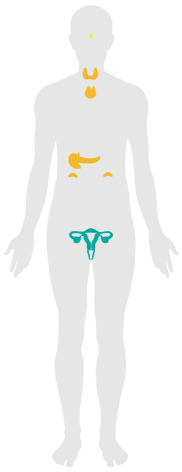
c.[85] All equipment, vehicles and loading/unloading are located away from air intakes and operable openings of adjacent buildings when available.

25

TOXIC MATERIAL REDUCTION

Various chemicals are still used in the manufacture of building materials, despite known or suspected health hazards. Flame retardant chemicals, which are used to increase fire-resistance of materials, include PBDEs (polybrominated diphenyl ethers)—which, based on animal tests, are associated with potential neurobehavioral, carcinogenic and immune effects. Some of these chemicals can bioaccumulate in fat and result in food chain contamination, including human milk. All parts of this feature only apply to materials installed inside the weather proofing membrane of a project. (Please refer to Table A3 for additional details.)

Intent: To minimize the impact of hazardous building material chemicals on indoor air quality and protect the health of manufacturing and maintenance workers.



Endocrine
Reproductive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: PERFLUORINATED COMPOUND LIMITATION	-	O	O

No perfluorinated compounds (PFCs) are present in the following condition:

a.[36] At levels equal to or greater than 100 ppm in components that constitute at least 5% by weight of a furniture or furnishing (drapes/curtains) assembly.

PART 2: FLAME RETARDANT LIMITATION	-	O	O

Halogenated flame retardants are limited in the following components to 0.01% (100 ppm) to the extent allowable by local code:

a.[36] Window and waterproofing membranes, door and window frames and siding.

b.[36] Flooring, ceiling tiles and wall coverings.

c.[36] Piping and electrical cables, conduits and junction boxes.

d.[36] Sound and thermal insulation.

e.[36] Upholstered furniture and furnishings, textiles and fabrics.

PART 3: PHTHALATE (PLASTICIZERS) LIMITATION	-	O	O

DEHP, DBP, BBP, DINP, DIDP or DNOP (often found in polyvinyl chloride [PVC]) are limited in the following components to 0.01% (100 ppm):

a.[36] Flooring, including resilient and hard surface flooring and carpet.

b.[36] Wall coverings, window blinds and shades, shower curtains, furniture and upholstery.

c.[36] Plumbing pipes and moisture barriers.

PART 4: ISOCYANATE-BASED POLYURETHANE LIMITATION

-	○	○

Isocyanate-based polyurethane products are not used in:

a.[16] Interior finishes.

PART 5: UREA-FORMALDEHYDE RESTRICTION

-	○	○

Urea-formaldehyde presence is limited in the following components to 100 ppm:

a.[1] Furniture or any composite wood products.

b.[1] Laminating adhesives and resins.

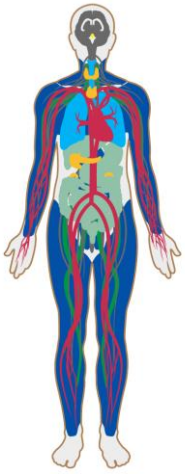
c.[1] Thermal insulation.

26

ENHANCED MATERIAL SAFETY

Some of the chemicals used in building materials have not been fully evaluated for safety and may carry potential health risks. Off-gassing from such materials can contribute to SBS (sick building syndrome) and associated respiratory, neurotoxic and dermatologic symptoms. A precautionary approach—taking reasonable steps to minimize risks and avoid hazards—suggests substituting potentially dangerous materials with safe ones when possible. Various voluntary programs in the market allow suppliers that have carefully screened the composition of their products and avoided potentially harmful substances to be recognized for their achievements.

Intent: To minimize the impact of hazardous building material ingredients on indoor air quality and protect the health of manufacturing and maintenance workers.



Cardiovascular
Digestive
Endocrine
Immune
Integumentary
Muscular
Nervous
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: PRECAUTIONARY MATERIAL SELECTION

At least one of the following requirements is met:

a.[13] The project completes all Imperatives in the Materials Petal under the Living Building Challenge 3.0.

b.[1] At least 25% of products by cost (including furnishings, built-in furniture, all interior finishes and finish materials) are Cradle to Cradle™ Material Health Certified with a V2 Gold or Platinum or V3 Bronze, Silver, Gold or Platinum Material Health Score.

c.[1] At least 25% of products by cost (including furnishings, built-in furniture, all interior finishes and finish materials) have no GreenScreen® Benchmark 1, List Translator 1 or List Translator Possible 1 substances over 1,000 ppm, as verified by a qualified Ph.D. toxicologist or Certified Industrial Hygienist.

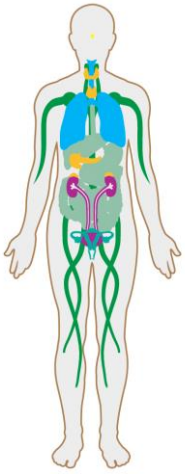
d.[1] At least 25% of products by cost (including furnishings, built-in furniture, all interior finishes and finish materials) meet some combination of the certifications described in requirements b and c.

27

ANTIMICROBIAL ACTIVITY FOR SURFACES

Antimicrobial activity on surfaces can accelerate the natural rate of microbial cell death. Non-leaching antimicrobial surfaces are capable of killing microorganisms upon contact without leaching significant amounts of antimicrobial materials into the surrounding environment. Alternatively, cleaning processes and equipment that use short wavelength ultraviolet light (UV-C) effectively can reduce the bacterial load on surfaces, so long as they are used with sufficient frequency to prevent the bioload from being re-established.

Intent: To reduce occupant exposure to both harmful pathogens and hazardous cleaning agents.



Digestive
Endocrine
Immune
Integumentary
Reproductive
Respiratory
Urinary

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: HIGH-TOUCH SURFACES

All countertops and fixtures in bathrooms and kitchens, and all handles, doorknobs, lightswitches and elevator buttons are one of the following:

a.[21] Coated with or comprised of a material that is abrasion-resistant, non-leaching and meets EPA testing requirements for antimicrobial activity.

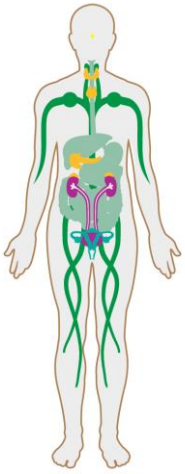
b. Cleaned with a UV cleaning device that has an output of at least 4 mW/cm², used as recommended by the manufacturer.

28

CLEANABLE ENVIRONMENT

Surfaces exposed to frequent human touch can harbor microbes and toxins for extended periods of time. However, these surfaces can be kept sanitary if they are designed with suitable materials that facilitate easy cleaning. This reduces the need for cleaning products that contain potentially toxic chemicals and may also reduce the frequency of cleaning.

Intent: To reduce occupant exposure to pathogens on high-touch surfaces.



Digestive
Endocrine
Immune
Integumentary
Reproductive
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: MATERIAL PROPERTIES	-	O	O
PART 2: CLEANABILITY	-	O	O

PART 1: MATERIAL PROPERTIES

High-touch and non-porous surfaces (refer to Table A1 in Appendix C) meet the following requirements:

a. Smooth and free of defects visible to the unaided eye.

b. Finished to maintain smooth welds and joints.

c. Free of sharp internal angles, corners and crevices.

PART 2: CLEANABILITY

The following requirements are met:

a.[30] No permanent wall-to-wall carpeting is used; only removable rugs, removable carpet tiles or hard surfaces are allowed.

b. The building provides adequate flexible storage space for all permanent, movable items to allow high-touch surfaces to be completely cleared during cleaning.

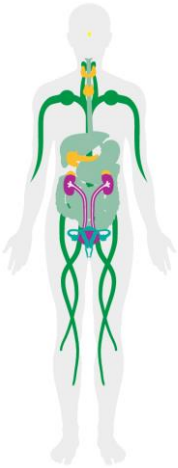
c. Right angles between walls and windows/floors are sealed.

29

CLEANING EQUIPMENT

High performance cleaning equipment increases the effectiveness of cleaning practices. Cleaning equipment that effectively removes debris and fomite material not only prevents the spread of contaminants, but also reduces repetitive work and contact with potentially harmful chemicals.

Intent: To reduce occupant exposure to both harmful pathogens and hazardous chemicals through the use of high quality cleaning equipment and the proper storage of cleaning agents.



Digestive
Endocrine
Immune
Reproductive
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: EQUIPMENT AND CLEANING AGENTS	-	O	O
PART 2: CHEMICAL STORAGE	-	O	O

PART 1: EQUIPMENT AND CLEANING AGENTS

All cleaning equipment meets the following:

a.[23] Mops, rags and dusters used to clean all non-porous surfaces consist of microfiber with a denier no higher than 1.0.

b.[23] Mops do not have to be wrung by hand.

c.[40] Vacuum cleaners contain filters with a HEPA rating.

PART 2: CHEMICAL STORAGE

All cleaning equipment meets the following:

a.[26] In cleaning storage areas, bleach and ammonia-based cleaning products are kept in separate bins from one another.

b.[23] Any bins and bottles of bleach and ammonia-based cleaning products are affixed with large, color-coded labels indicating they are not to be mixed.

WATER

BACKGROUND

Clean drinking water is a prerequisite for optimal health. More than two-thirds of the human body is comprised of water, a major component of cells, and the medium for the transport of nutrients and waste throughout the body. In addition, water helps to regulate the internal body temperature and serves as a shock absorber for the brain and spinal cord. The Institute of Medicine (IOM) recommends that women consume approximately 2.7 liters [91 oz] and men 3.7 liters [125 oz] of water per day (from all sources including drinking water, other beverages and food). These amounts are appropriate to offset what leaves the body through respiration, perspiration and excretion, aiding in the removal of toxins, byproducts and other waste.

Drinking water contamination is a major public health issue. Many people receive water that has been exposed to potentially harmful levels of biological, chemical and mineral contaminants. The World Health Organization (WHO) reports that almost one billion people lack access to safe drinking water worldwide, and two million annual deaths are attributable to unsafe water, sanitation and hygiene.

The source of water contamination can sometimes be traced back to industry and its related processes. Contaminants like lead, arsenic, glyphosate, atrazine and microbes that are naturally occurring or inadvertently introduced into the water can pose serious health threats. However, treatment and distribution systems meant to keep our drinking water safe are also potential sources of contamination. For example, chlorine and chloramine which are commonly added to water to kill pathogenic organisms can lead to the formation of disinfectant byproducts such as trihalomethanes (THMs) and haloacetic acids (HAAs), as well as N-nitrosodimethylamine (NDMA), which may lead to cancer and other adverse health effects when exposure occurs at levels above the EPA standards. Finally, pharmaceuticals, personal care products (PPCPs) and other emerging contaminants are increasingly finding their way into our water supplies, with largely unknown health effects.

The quality of the U.S. surface water relies largely on The Clean Water Act of 1974. The U.S. Environmental Protection Agency (EPA) works to implement this Act and others (namely, the Safe Drinking Water Act), and publishes threshold concentration standards for water contaminants. These limits are set based on the likelihood of the development of cancer and other adverse health effects after long-term exposure to the specified contaminants. Nevertheless, drinking water contamination is a persistent problem. In a 2009 report, the EPA warned that "threats to drinking water are increasing," adding that "we can no longer take our drinking water for granted."

While taste and aesthetic preferences lead many people to drink bottled water, consumption of bottled water is not without its drawbacks. Overreliance on bottled water has environmental implications, but even putting aside those concerns, the quality of bottled water is subject to degradation. In one study, levels of antimony in 48 brands of bottled water from 11 European countries increased by 90% after 6 months of storage due to antimony leaching from polyethylene terephthalate bottles (PET(E) bottles, designated as recyclable "1").

The same standards for quality are typically applied across all uses of potable water. This can result in a significant waste of resources, since each use does not require the same level of protection. The WELL Building Standard® seeks to simultaneously preserve this resource while enhancing its quality for human health in the context of different uses. Therefore, WELL requires a broad initial assessment to evaluate a building's water source. From there, filtration can be installed to meet the thresholds required for each use. Buildings can continue to perform periodic testing to maintain quality water over time.

INTENT

The WELL Building Standard for Water promotes safe and clean water through the implementation of proper filtration techniques and regular testing in order for building occupants to receive optimal quality of water for various uses.

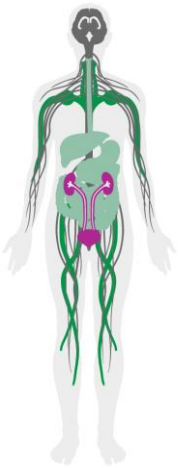
WATER FEATURE LEVEL MATRIX

	Core and Shell	New and Existing Interiors	New and Existing Buildings
30 FUNDAMENTAL WATER QUALITY			
1: Sediment	P	P	P
2: Microorganisms	P	P	P
31 INORGANIC CONTAMINANTS			
1: Dissolved Metals	P	P	P
32 ORGANIC CONTAMINANTS			
1: Organic Pollutants	P	P	P
33 AGRICULTURAL CONTAMINANTS			
1: Herbicides and Pesticides	P	P	P
2: Fertilizers	P	P	P
34 PUBLIC WATER ADDITIVES			
1: Disinfectants	P	P	P
2: Disinfectant Byproducts	P	P	P
3: Fluoride	P	P	P
35 PERIODIC WATER QUALITY TESTING			
1: Quarterly Testing	-	O	O
2: Water Data Record Keeping and Response	-	O	O
36 WATER TREATMENT			
1: Organic Chemical Removal	O	O	O
2: Sediment Filter	O	O	O
3: Microbial Elimination	O	O	O
4: Water Quality Maintenance	O	O	O
5: Legionella Control	O	O	O
37 DRINKING WATER PROMOTION			
1: Drinking Water Taste Properties	O	O	O
2: Drinking Water Access	-	O	O
3: Water Dispenser Maintenance	-	O	O

30

FUNDAMENTAL WATER QUALITY

Two properties of water—turbidity and total coliforms—serve as indicators for the possible presence of many harmful contaminants. High turbidity can provide food and shelter for germs, and may also indicate that a building's filtration system is not working properly. Removing turbidity may also remove harmful pathogens such as protozoa. Another test is the measurement of total coliforms. Coliform bacteria are naturally present in the environment and are generally considered harmless. However, their presence in water suggests that water may contain more dangerous pathogens, including bacteria, viruses and protozoa. Exposure to these pathogens through water containing coliforms can lead to adverse gastrointestinal effects such as diarrhea, vomiting, nausea and cramps.



Digestive
Immune
Nervous
Urinary

Intent: To limit the presence of sediment and water-borne pathogens in water designated for human contact.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: SEDIMENT	P	P	P
PART 2: MICROORGANISMS	P	P	P

PART 1: SEDIMENT

All water being delivered to the project area except water not designated for human contact meets the following requirements:

a.[50] Turbidity of the water sample is less than 1.0 NTU.

PART 2: MICROORGANISMS

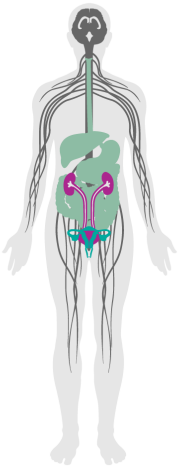
All water being delivered to the project area except water not designated for human contact meets the following requirements:

a.[54] Total coliforms (including E. coli) are not detected in the sample.

31

INORGANIC CONTAMINANTS

While there are numerous metals that are necessary for healthy body functions, high levels of these essential metals can be harmful to health. Many dissolved metals that contaminate water supplies can be acutely or chronically toxic. Contamination levels vary widely by geographic location and water source, spurring the need for localized testing. Exposure to even minute amounts of certain metals such as lead and mercury through drinking water has been linked to developmental delays and deficits in learning abilities in children, as well as high blood pressure and kidney problems in adults. If necessary, reverse osmosis (RO) systems or Kinetic Degradation Fluxion (KDF) filters can remove dissolved metals at the point of delivery.



Cardiovascular
Digestive
Nervous
Reproductive
Urinary

Intent: To limit the presence of inorganic contaminants in drinking water.

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: DISSOLVED METALS

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

a.[53] Lead less than 0.01 mg/L.

b.[54] Arsenic less than 0.01 mg/L.

c.[54] Antimony less than 0.006 mg/L.

d.[54] Mercury less than 0.002 mg/L.

e.[43] Nickel less than 0.012 mg/L.

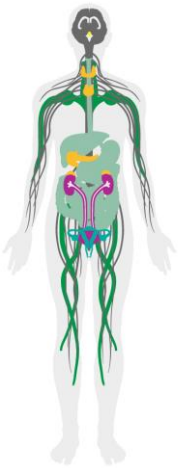
f.[54] Copper less than 1.0 mg/L.

32

ORGANIC CONTAMINANTS

Organic contaminants are generally found in trace amounts in ground and surface waters and may pose serious threats to human health. Common sources of organic pollutants include industrial activities that inadvertently leach chemical runoff into surface waters. Exposure to organic contaminants such as polychlorinated biphenyls (PCBs) and vinyl chloride in drinking water has been associated with a range of adverse health effects, including cancer, immune deficiencies and nervous system difficulties. Activated carbon filters are effective in removing these and other harmful chemical substances.

Intent: To limit the presence of organic contaminants in drinking water.



Digestive
Endocrine
Immune
Nervous
Reproductive
Urinary

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: ORGANIC POLLUTANTS

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

a.[45] Styrene less than 0.0005 mg/L.

b.[44] Benzene less than 0.001 mg/L.

c.[44] Ethylbenzene less than 0.3 mg/L.

d.[54] Polychlorinated biphenyls less than 0.0005 mg/L.

e.[54] Vinyl chloride less than 0.002 mg/L.

f.[44] Toluene less than 0.15 mg/L.

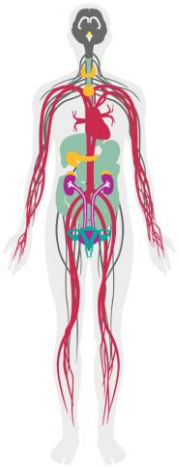
g.[53] Xylenes (total: m, p and o) less than 0.5 mg/L.

h.[54] Tetrachloroethylene less than 0.005 mg/L.

33

AGRICULTURAL CONTAMINANTS

A U.S. Geological Survey conducted in the 1990s detected pesticide compounds in virtually every stream in agricultural, urban and mixed-use areas, as well as in 30-60% of the groundwater. These chemicals may enter the water supply from agricultural and storm water runoff, and their exposure has been linked to kidney, thyroid, gastrointestinal and reproductive effects. Atrazine, one of the most widely used pesticides, is a suspected endocrine disruptor and is associated with cardiovascular difficulties. Long-term exposure to glyphosate, a widely used herbicide, may lead to kidney problems and reproductive difficulties. If detected, these contaminants can be removed with carbon filters.



Cardiovascular
Digestive
Endocrine
Nervous
Reproductive
Urinary

Intent: To limit the presence of agricultural contaminants in drinking water.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: HERBICIDES AND PESTICIDES	P	P	P

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

a.[44] Atrazine less than 0.001 mg/L.

b.[53] Simazine less than 0.002 mg/L.

c.[54] Glyphosate less than 0.70 mg/L.

d.[54] 2,4-Dichlorophenoxyacetic acid less than 0.07 mg/L.

PART 2: FERTILIZERS	P	P	P

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

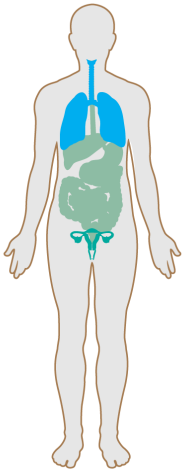
a.[54] Nitrate less than 10 mg/L nitrogen.

34

PUBLIC WATER ADDITIVES

Sometimes, chemicals are intentionally added to water supplies. For example, chlorine or chloramine may be added to water to act as disinfectants, and fluoride may be added to prevent tooth decay. Although the addition of small amounts of these chemicals is beneficial for public health and safety, excessive exposure can lead to adverse effects, including fluorosis (aesthetic mottling of the teeth), stomach discomfort and eye and skin irritation. In addition, the use of chlorine can lead to the formation of disinfectant byproducts (DBPs), such as trihalomethanes (THMs) and haloacetic acids (HAAs), which have been linked to cancer and kidney damage.

Intent: To limit the presence of certain disinfectants, disinfection byproducts and fluoride in drinking water.



Digestive
Integumentary
Reproductive
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: DISINFECTANTS	P	P	P

All water being delivered to the project area for human consumption (at least one water dispenser per project) and showers/baths meets the following limits:

a.[42] Residual chlorine less than 0.6 mg/L.

b.[54] Residual chloramine less than 4 mg/L.

PART 2: DISINFECTANT BYPRODUCTS	P	P	P

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

a.[54] Total trihalomethanes less than 0.08 mg/L.

b.[54] Total haloacetic acids less than 0.06 mg/L.

PART 3: FLUORIDE	P	P	P

All water being delivered to the project area for human consumption (at least one water dispenser per project) meets the following limits:

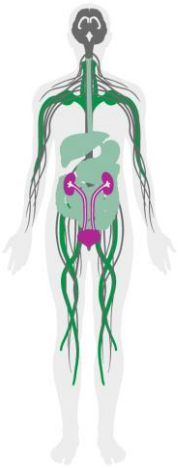
a.[54] Fluoride less than 4.0 mg/L.

35

PERIODIC WATER QUALITY TESTING

Changing industrial practices and temporal variations in temperature, pH and weather may affect the leaching rate of inorganic metals into drinking water sources. Where possible, routine testing can help to detect any large variations in the chemicals present in water and help alert building occupants if a building is inconsistently receiving high quality water.

Intent: To maintain high quality water through regular water quality monitoring and remediation.



Digestive
Immune
Nervous
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: QUARTERLY TESTING	-	○	○

All water being delivered to the project area for human consumption is tested quarterly (with reports submitted annually to the IWBI) for the presence of the following dissolved metals or metalloids:

a.[53] Lead.

b.[53] Arsenic.

c.[53] Mercury.

d.[53] Copper.

PART 2: WATER DATA RECORD KEEPING AND RESPONSE	-	○	○

Projects provide a written policy specifying:

a. Detailed enforcement strategies for monitoring and keeping record of water quality parameters listed in the WELL Building Standard.

b. Records are kept for a minimum of 3 years, including full data from field inspections or laboratory results where appropriate.

c. A detailed plan for action and remediation of unacceptable conditions.

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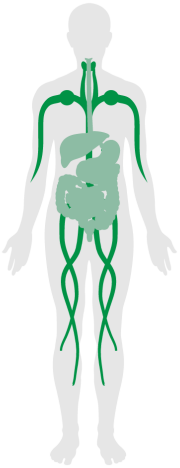
WATER TREATMENT

There are many types of contaminants that may compromise water quality, from pathogens and heavy metals to pesticide and herbicide residues. While routine testing helps to keep track of potential pollutants, sampling alone cannot guarantee the elimination of all risk. Disruptions to water supply, droughts, flooding and construction and infrastructure changes can temporarily affect water quality. Therefore, implementing and maintaining appropriate water treatment systems - including carbon filters, sediment filters and UV sanitization - is key in order to continuously deliver high quality water.



Intent: To improve water quality by requiring the use of water treatment systems.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: ORGANIC CHEMICAL REMOVAL	○	○	○

All water being delivered to the project area for human consumption or showers/baths is treated with the following:

a.[187] Activated carbon filter.

PART 2: SEDIMENT FILTER	○	○	○

All water being delivered to the project area for human consumption or showers/baths is treated with the following:

a. Filter rated to remove suspended solids with pore size 1.5 µm or less.

PART 3: MICROBIAL ELIMINATION	○	○	○

All water being delivered to the project area for human consumption or showers/baths is treated with one of the following:

a.[188] UVGI water sanitation.

b. Filter rated by the NSF to remove microbial cysts.

PART 4: WATER QUALITY MAINTENANCE	○	○	○

To verify that the selected filtration/sanitation system chosen continues to operate as designed, projects must annually provide the IWBI with:

a. Record-keeping for a minimum of 3 years, including evidence that the filter and/or sanitizer has been properly maintained as per the manufacturer's recommendation.

PART 5: LEGIONELLA CONTROL

○	○	○

A point-by-point narrative describes how the building addresses Legionella, and includes the following:

a.[177] Formation of a team for legionella management in the building.

b.[177] Water system inventory and production of process flow diagrams.

c.[177] Hazard analysis of water assets.

d.[177] Identification of critical control points.

e.[177] Maintenance and control measures, monitoring, establishment of performance limits and corrective actions.

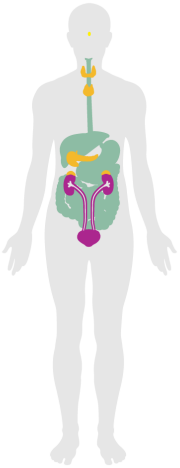
f.[177] Documentation, verification and validation procedures.

37

DRINKING WATER PROMOTION

Access to clear, good-tasting water helps to promote proper hydration throughout the day. Many otherwise healthy people unknowingly suffer from mild dehydration, a condition where there is less water and fluids in the body than there should be, which results in avoidable symptoms such as muscle cramps, dry skin and headaches. Drinking plenty of water, especially when exercising and at higher temperatures is essential to ensure good hydration. Improving the taste and appearance of tap water encourages increased water consumption and reduces reliance on bottled water.

Intent: To promote the consumption of water by making high quality drinking water easily accessible to occupants.



Digestive
Endocrine
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: DRINKING WATER TASTE PROPERTIES	O	O	O
PART 2: DRINKING WATER ACCESS	-	O	O
PART 3: WATER DISPENSER MAINTENANCE	-	O	O

PART 1: DRINKING WATER TASTE PROPERTIES

All water being delivered to the project area for human consumption:

a.[54] Aluminum less than 0.2 mg/L.

b.[54] Chloride less than 250 mg/L.

c.[54] Manganese less than 0.05 mg/L.

d.[47] Sodium less than 270 mg/L.

e.[54] Sulfate less than 250 mg/L.

f.[54] Iron less than 0.3 mg/L.

g.[54] Zinc less than 5 mg/L.

h.[54] Total Dissolved Solids less than 500 mg/L.

PART 2: DRINKING WATER ACCESS

To encourage water consumption, the following is met:

a. At least one dispenser is located within 30 m [100 ft] of all parts of regularly occupied floor space (minimum one per floor).

PART 3: WATER DISPENSER MAINTENANCE

The components of dispensers that provide water for human consumption are cleaned with at least the following regularity:

a.[48] Daily, for mouthpieces, protective guards and collective basins, to prevent lime and calcium build-up.

b.[48] Quarterly, for outlet screens and aerators, to remove debris and sediment.

NOURISHMENT

BACKGROUND

Nutrition plays a key role in health maintenance, weight management and chronic disease prevention. However, adherence to the dietary recommendations in the U.S. is poor. Similarly, global dietary patterns are also less than optimal; in many countries, people consume more than 500 calories from added sugars per day. In the U.S., half of the population consumes sugar-sweetened beverages (SSBs) on any given day, with a quarter of the population consuming over 200 calories from SSBs daily. In addition, the average dietary intake of calories in the U.S. in 2010 was nearly 2,600 calories per person per day, which is a 25% increase in energy intake since 1970. Consumption of flour and cereal products, added fats and oils, and added sugars and sweeteners are some of the chief contributors to the increase in caloric intake.

Together with physical inactivity, poor diet is a major contributor to the U.S. overweight (Body Mass Index (BMI) of 25-29.9) and obesity (BMI over 30) epidemic, increasing the risk of cardiovascular disease, diabetes and cancer. Over two thirds (69%) of all American adults (20 years and older) today are overweight, and more than a third (35%) are obese. The situation is similar worldwide, with more than 1.9 billion (39%) adults overweight in 2014, of which over 600 million (13%) were obese, making obesity not just an epidemic but a global pandemic.

Suboptimal dietary patterns can also lead to other detrimental health outcomes. For example, high consumption of SSBs has been linked to diabetes, metabolic syndrome, obesity, hypertension, dental caries and even depression. High intake of red and processed meat is associated with heart failure, hypertension, coronary heart disease, and colorectal and breast cancers. Moreover, low fruit and vegetable consumption is associated with a higher rate of type 2 diabetes, cardiovascular mortality, as well as breast and gastrointestinal cancers. The World Health Organization (WHO) reports that 2.7 million deaths worldwide are attributed to insufficient fruit and vegetable intake, making it one of the top 10 risk factors contributing to global mortality.

While the components and ingredients that often make up our foods represent a significant and reasonable concern, another issue is the changes in cultural food practices. Busy lives and longer workdays are encouraging unhealthy behaviors, including eating meals on the go and in front of the TV, snacking between meals and eating large portion meals. Further, high-fat, high-sugar snack foods of low nutritional quality are engineered to be tastier, with potentially addictive qualities. These foods are often supported by colorful and enticing advertisements that inundate our environments, from vending machines to restaurants and supermarket shelves. In the U.S. alone, more than $1.6 billion is spent annually by the food industry specifically marketing cereal, fast-food and soft drinks to children and adolescents, which, according to the Institute of Medicine (IOM), is "out of balance with recommended healthful diets", contributing to unhealthy dietary patterns and putting the health of the American youth at risk.

Fortunately, food purchase and consumption decisions, dietary patterns and preparation practices all represent not only points of concern, but also venues for health improvement. A variety of social, economic, physiological and environmental factors can affect individual dietary behaviors; the built environment is one of them. Distance and access to grocery stores and other places that have fresh fruits and vegetables, access to farmers' markets, the use of behavioral economics in cafeterias, increased availability of healthy foods and reduced marketing and availability of unhealthy foods, provision of caloric information and many other strategies can have an effect on our food choices and overall dietary patterns. The WELL Building Standard® recognizes this and seeks to implement design strategies and policies within the built environment that increase access to healthy food options, enable people to make more informed dietary choices and lead to better health and well-being.

INTENT

The WELL Building Standard for Nourishment requires the availability of fresh, wholesome foods, limits unhealthy ingredients and encourages better eating habits and food culture.

NOURISHMENT FEATURE LEVEL MATRIX

	Core and Shell	New and Existing Interiors	New and Existing Buildings
38 FRUITS AND VEGETABLES			
1: Fruit and Vegetable Variety	-	P	P
2: Fruit and Vegetable Promotion	-	P	P
39 PROCESSED FOODS			
1: Refined Ingredient Restrictions	P	P	P
2: Trans Fat Ban	P	P	P
40 FOOD ALLERGIES			
1: Food Allergy Labeling	P	P	P
41 HAND WASHING			
1: Hand Washing Supplies	-	P	P
2: Contamination Reduction	-	P	P
3: Sink Dimensions	-	P	P
42 FOOD CONTAMINATION			
1: Cold Storage	-	P	P
43 ARTIFICIAL INGREDIENTS			
1: Artificial Substance Labeling	O	P	P
44 NUTRITIONAL INFORMATION			
1: Detailed Nutritional Information	O	P	P
45 FOOD ADVERTISING			
1: Advertising and Environmental Cues	O	P	P
2: Nutritional Messaging	O	P	P
46 SAFE FOOD PREPARATION MATERIALS			
1: Cooking Material	-	O	O
2: Cutting Surfaces	-	O	O
47 SERVING SIZES			
1: Meal Sizes	-	O	O
2: Dinnerware Sizes	-	O	O
48 SPECIAL DIETS			
1: Food Alternatives	-	O	O
49 RESPONSIBLE FOOD PRODUCTION			
1: Sustainable Agriculture	-	O	O
2: Humane Agriculture	-	O	O
50 FOOD STORAGE			
1: Storage Capacity	-	O	O

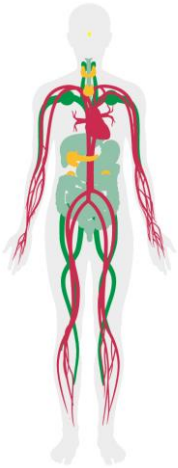
	Core and Shell	New and Existing Interiors	New and Existing Buildings
51 FOOD PRODUCTION			
1: Gardening Space	O	O	O
2: Planting Support	O	O	O
52 MINDFUL EATING			
1: Eating Spaces	O	O	O
2: Break Area Furnishings	O	O	O

38

FRUITS AND VEGETABLES

Regular consumption of fresh fruits and vegetables is the cornerstone of a healthy diet and can lower the risk of cancer, diabetes, heart disease and obesity. Insufficient fruit and vegetable intake, on the other hand, is one of the top 10 risk factors contributing to global mortality, leading to approximately 2.7 million deaths worldwide. The Dietary Guidelines for Americans recommend an average consumption of at least 4 servings of fruits and 5 servings of vegetables per day. However, only 8% of the U.S. population consume the recommended amount of fruit, and only 6% achieve the recommended intake of vegetables.

Intent: To promote the consumption of fruits and vegetables by making fruits and vegetables easily accessible to occupants.



Cardiovascular
Digestive
Endocrine
Immune

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: FRUIT AND VEGETABLE VARIETY	-	P	P
PART 2: FRUIT AND VEGETABLE PROMOTION	-	P	P

PART 1: FRUIT AND VEGETABLE VARIETY

If solid foods are sold or distributed on a daily basis on the premises by (or under contract with) the project owner, then the selection includes at least one of the following:

a. At least 2 varieties of fruits (containing no added sugar) and at least 2 varieties of non-fried vegetables.

b. At least 50% of available options are fruits and/or non-fried vegetables.

PART 2: FRUIT AND VEGETABLE PROMOTION

Cafeterias operated or contracted by the project owner, if present, include the following design interventions:

a.[180] Salad bar or a similar salad-providing section which is positioned away from the walls, allowing 360° access.

b.[73] Fruits and vegetables are visually apparent, either through display or through color photographs on the menu.

c.[73] Vegetable dishes are placed at the beginning of the food service line.

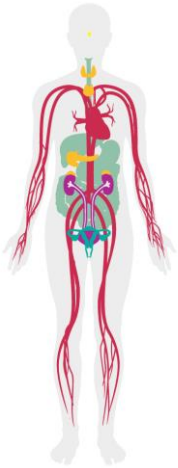
d.[73] Fruits or fruit dishes are placed in a bowl or in a stand at the checkout location.

39

PROCESSED FOODS

Foods that contain highly processed ingredients tend to be high in sugar, calories and added fats, and have low nutritional value. More than half of the U.S. population consumes sugar-sweetened beverages on a given day, and the average consumption of added sugars is more than 22 teaspoons per day, even though the recommended limit is 6-9 teaspoons. High consumption of added sugars is associated with weight gain, obesity, type 2 diabetes, kidney disease, hypertension and other negative health effects.

Intent: To help occupants avoid highly-processed ingredients and foods.



Cardiovascular
Digestive
Endocrine
Reproductive
Urinary

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: REFINED INGREDIENT RESTRICTIONS	P	P	P
PART 2: TRANS FAT BAN	P	P	P

PART 1: REFINED INGREDIENT RESTRICTIONS

All foods, beverages, snacks and meals sold or distributed on a daily basis on the premises by (or under contract with) the project owner meet the following conditions:

a.[78] No beverage with more than 30 g of sugar per container is sold or distributed through catering services, vending machines or pantries. Bulk containers of 1.9 L (2 quart) or larger are exempt from this requirement.

b.[78] In beverage vending machines and on food service menus, at least 50% of slots or listings are products that have 15 g of sugar or less per 240 mL [8 oz] serving.

c.[78] No individually sold, single-serving, non-beverage food item contains more than 30 g of sugar.

d.[55] In any foods where a grain flour is the primary ingredient by weight, a whole grain must be the primary ingredient.

PART 2: TRANS FAT BAN

All foods, beverages, snacks and meals sold or distributed on a daily basis on the premises by (or under contract with) the project owner do not contain:

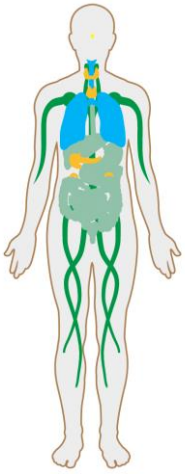
a.[56] Partially-hydrogenated oil.

40

FOOD ALLERGIES

Without clear labeling of ingredients, individuals with food allergies face an increased risk of exposure to allergens. Currently, about 8% of children and 4% of adults in the U.S. have food allergies. Every year, about 30,000 people require emergency room treatment, 2,000 are hospitalized and 150 die because of allergic reactions to food. Because there is no cure for food allergies, sensitive individuals must strictly avoid all foods containing the allergen in order to prevent serious allergic reactions. The FDA requires that all packaged foods explicitly declare the presence of common allergens, and several municipalities and state governments have additional guidelines regarding allergen labeling for prepared foods served in food service establishments.

Intent: To help occupants avoid potential food allergens.



Digestive
Endocrine
Immune
Integumentary
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: FOOD ALLERGY LABELING

All foods sold or distributed on a daily basis on the premises by (or under contract with) the project owner are clearly labeled to indicate if they contain the following allergens:

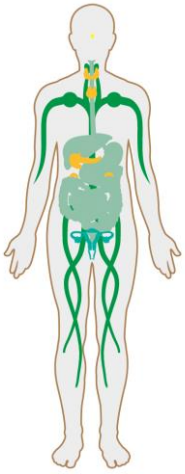
a.[57] Peanuts.
b.[57] Fish.
c.[57] Shellfish.
d.[57] Soy.
e.[57] Milk and dairy products.
f.[57] Egg.
g.[57] Wheat.
h.[57] Tree nuts.
i.[57] Gluten, in compliance with the definitions and restrictions set forth by the FDA in 21 C.F.R. § 101.91.

41

HAND WASHING

Hand washing is one of the most important and effective means of reducing the transmission of pathogens through food. Responsible for approximately 48 million illnesses, 128,000 hospitalizations and 3,000 deaths occurring in the U.S. each year, foodborne illness is a major cause of preventable illness and death, personal distress and avoidable economic burden. Regular rinsing with soap and water helps to reduce the spread of unwanted and potentially dangerous germs. In addition, using paper towels to dry hands is more effective in removing bacteria than using air dryers.

Intent: To reduce pathogen transmission by providing accessible and sanitary hand washing facilities.



Digestive
Endocrine
Immune
Integumentary
Reproductive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: HAND WASHING SUPPLIES	-	P	P
PART 2: CONTAMINATION REDUCTION	-	P	P
PART 3: SINK DIMENSIONS	-	P	P

PART 1: HAND WASHING SUPPLIES

The following are provided, at a minimum, at all sink locations:

a.[76] Fragrance-free non-antibacterial soap.

b.[68] Disposable paper towels (air dryers are not forbidden, but are supplemented).

PART 2: CONTAMINATION REDUCTION

The following is provided at all sink locations:

a.[68] Liquid soap in dispensers with disposable and sealed soap cartridges.

PART 3: SINK DIMENSIONS

Bathroom and kitchen sinks meet the following requirements:

a.[70] Sink column of water is at least 25 cm [10 inches] in length.

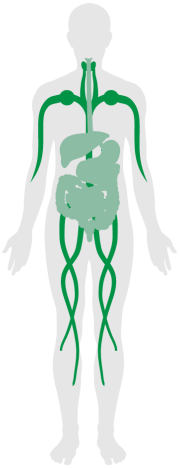
b.[70] The handwashing basin is at least 23 cm [9 inches] in width and length.

42

FOOD CONTAMINATION

Foods such as raw meat, fish and poultry pose an increased risk of becoming contaminated with bacteria. Microorganisms from such foods can be transmitted to other products via cutting boards and other equipment and surfaces, leading to gastrointestinal problems associated with food poisoning. To mitigate foodborne illnesses, foods must be properly stored and clearly labeled, and prepared at sufficiently high temperatures. Effective sanitation techniques also need to be put in place to prevent or minimize the growth of pathogenic microorganisms and thus reduce the risk of contamination and transmission.

Intent: To minimize occupant exposure to food-borne pathogens by providing safe food storage.



Digestive
Immune

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 1: COLD STORAGE

If raw meat is prepared or stored on site, cold storage spaces contain the following:

a.[71] At least one removable, cleanable drawer or container located at the bottom of the unit, designated and labeled for storing raw foods (uncooked meat, fish and poultry).

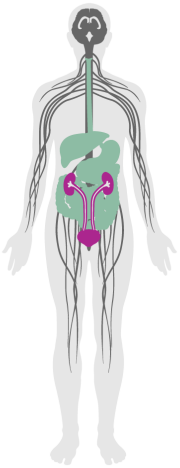
b. A visual display of holding temperatures to ensure accurate representation of storage temperatures.

43

ARTIFICIAL INGREDIENTS

Numerous artificial ingredients are typically added to highly processed foods to improve taste and extend shelf life. However, some people may be sensitive to these ingredients, such as sulfites, which can lead to breathing problems in individuals with asthma. Since these additives do not add nutritional value to a food, and tend to appear in foods with low nutritional qualities, they should be avoided as often as possible.

Intent: To help occupants avoid artificial colors, sweeteners and preservatives in food.



Digestive
Nervous
Urinary

Core and Shell	New and Existing Interiors	New and Existing Buildings
O	P	P

PART 1: ARTIFICIAL SUBSTANCE LABELING

All food sold or distributed on a daily basis on the premises by (or under contract with) the project owner are labeled to indicate if they contain the following:

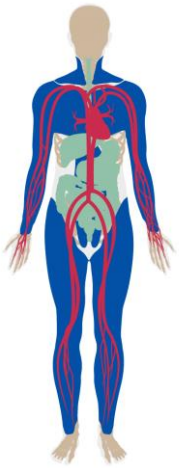
a.[10] Artificial colors.
b.[10] Artificial flavors.
c.[10] Artificial sweeteners.
d.[10] Brominated vegetable oils.
e.[10] Potassium bromate.
f.[10] BHA (Butylated hydroxyanisole).
g.[10] BHT (Butylated hydroxytoluene).
h.[10] Monosodium glutamate (MSG).
i.[10] Hydrolyzed vegetable protein (HVP).
j.[10] Sodium nitrate and sodium nitrite.
k.[10] Sulfites.

44

NUTRITIONAL INFORMATION

Access to nutritional information allows consumers to make informed dietary choices. For example, being able to compare the sodium content of two different snacks can enable individuals who need to limit their salt intake choose the better option. The FDA sets specific requirements for nutrition labeling in packaged foods, and several municipal administrations have extended a labeling regulation to apply to prepared foods as well.

Intent: To help occupants make informed food consumption choices.



Cardiovascular
Digestive
Muscular
Skeletal

Core and Shell	New and Existing Interiors	New and Existing Buildings
O	P	P

PART 1: DETAILED NUTRITIONAL INFORMATION

For foods and beverages sold or distributed on a daily basis on the premises by (or under contract with) the project owner, the following are accurately displayed (per meal or item) on packaging, menus or signage:

a.[74] Total calories.

b.[61] Macronutrient content (total protein, total fat and total carbohydrate) in weight and as a percent of the estimated daily requirements (daily values).

c.[61] Micronutrient content (vitamins A and C, calcium and iron) in weight or international units (IU) and/or as a percent of the estimated daily requirements (daily values).

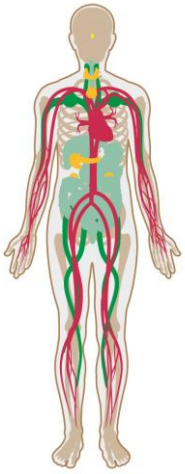
d.[61] Total sugar content.

45

FOOD ADVERTISING

Every year, food companies spend billions of dollars marketing and advertising unhealthy foods to children and adults, contributing to the creation of an obesogenic (obesity-promoting) environment. Over a billion dollars are spent annually on marketing breakfast cereals, carbonated beverages and restaurant food to youth alone. However, access to nutrition information can help individuals learn about and develop better eating habits. Further, limiting advertising cues for unhealthy foods can help individuals make better food selections and mitigate suboptimal nutritional choices.

Intent: To promote healthy food consumption choices.



Cardiovascular
Digestive
Endocrine
Immune
Integumentary
Skeletal

Core and Shell	New and Existing Interiors	New and Existing Buildings
O	P	P

PART 1: ADVERTISING AND ENVIRONMENTAL CUES

The following requirement is met:

a.[77] Advertisements for any food or beverage items that do not conform to the requirements set forth in the Processed Foods feature are not displayed on the premises.

O	P	P

PART 2: NUTRITIONAL MESSAGING

Using prominent displays such as educational posters, brochures or other visual media, designated eating areas or common areas contain a total of at least 3 instances of messaging intended to achieve each of the following requirements:

a.[77] Encourage the consumption of whole, natural foods and cuisines.

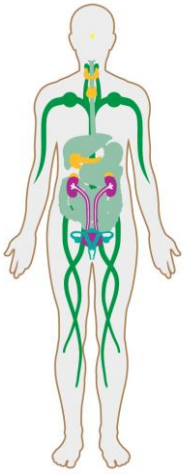
b.[77] Discourage the consumption of sugary or processed foods, beverages and snacks.

46

SAFE FOOD PREPARATION MATERIALS

Food preparation equipment can be a source of potentially hazardous contaminants. Porous surfaces can harbor harmful toxins, while chemicals used to impart special attributes to food preparation equipment, such as non-stick properties for cookware, can leach or volatize during use. One such contaminant is bisphenol-A (BPA), a phenolic-based chemical that is used in products ranging from baby bottles and plastic foodware to water bottles and food can linings. While generally stable, BPA can be released when products containing BPA are exposed to heat or UV light, and may have negative effects on human health.

Intent: To reduce occupant exposure to harmful contaminants that may originate from food preparation materials and eliminate surfaces that harbor pathogens.



Digestive
Endocrine
Immune
Integumentary
Reproductive
Urinary

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: COOKING MATERIAL

Pots, pans and other cooking tools used to prepare food (except cutting boards) are made entirely of one or more of the following inert materials:

a.[67] Ceramics, except those containing lead.

b.[67] Cast iron.

c.[67] Stainless steel.

d.[67] Glass.

e.[67] Coated aluminum.

f. Solid (non-laminated) wood that is untreated or treated with food-grade mineral or linseed oil.

-	○	○

PART 2: CUTTING SURFACES

All cutting boards are made from the following materials, and are replaced when they become excessively worn or have deep grooves from cutting:

a.[75] Marble.

b.[75] Plastic.

c.[75] Glass.

d.[75] Pyroceramic.

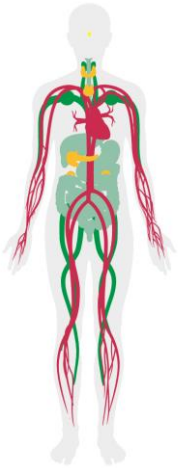
e.[75] Solid (non-laminated) wood that is untreated or treated with food-grade mineral or linseed oil.

47

SERVING SIZES

Excess caloric intake, especially through easy access to oversized meal options, can lead to excess weight gain and obesity. Some studies show that individuals will serve and eat more food when provided with larger plates and bowls compared to smaller ones. In addition, larger portions of energy-dense foods also promote overconsumption. Therefore, reducing the size and caloric content of meals can reduce the likelihood of unintended overeating, thereby encouraging healthier eating habits.

Intent: To reduce unintended overconsumption.



Cardiovascular
Digestive
Endocrine
Immune

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: MEAL SIZES	-	○	○
PART 2: DINNERWARE SIZES	-	○	○

PART 1: MEAL SIZES

Where food sold or distributed on a daily basis by (or under contract with) the project owner is prepared to order, for at least half of all available entrées, the following option is available and listed on the menu:

a.[58] A version or portion of the entrée that is 650 calories or less and at a lower cost compared to the larger, regular version.

PART 2: DINNERWARE SIZES

Where food sold or distributed on a daily basis on the premises by (or under contract with) the project owner is self-serve and requires the use of a serving plate, bowl or cup, each of the following is met (as applicable):

a. Circular plates: the diameter of a plate is no larger than 24 cm [9.5 inches].

b. Non-circular plates: the total surface area of a plate does not exceed 452 cm^2 [70 $inches^2$].

c. Bowls are no larger than 296 mL [10 oz].

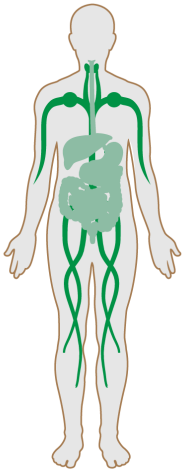
d. Cups are no larger than 240 mL [8 oz].

48

SPECIAL DIETS

Individuals with food allergies or dietary restrictions often encounter difficulty in finding suitable meal options. Clear labeling can prevent unintended exposure to allergens or food items that require some degree of restriction, but if a sufficient variety of alternatives is unavailable, these individuals may be at risk for consuming potentially harmful foods.

Intent: To provide alternative food choices to individuals with food restrictions or allergies.



Digestive
Immune
Integumentary

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	O	O

PART 1: FOOD ALTERNATIVES

Meals or catering provided by (or under contract with) the project owner include at least one option for each of the following criteria (as necessary, by request):

a.[32] Peanut-free.

b.[60] Gluten-free, in compliance with the definitions and restrictions set forth by the FDA in 21 C.F.R. § 101.92.

c.[60] Lactose-free.

d.[60] Egg-free.

e.[60] Vegan (contains no animal products).

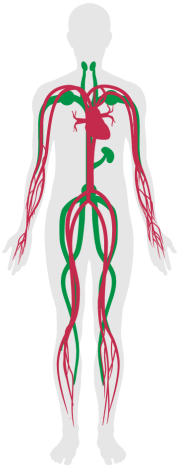
f.[60] Vegetarian (contains no animal products, except for eggs and dairy).

49

RESPONSIBLE FOOD PRODUCTION

Organic and sustainable farming practices are designed to reduce environmental pollution and increase the quality of life of livestock that we rely upon for food. Organic farming makes up a rapidly growing share of food cultivation processes in the U.S. due to increasing demand from conscientious consumers. While research on health effects of consuming organic versus conventionally-grown foods is still inconclusive, studies have found higher levels of antioxidants and lower levels of pesticide residues and antibiotic-resistant bacteria in organic as compared to conventionally-grown foods.

Intent: To reduce occupant exposure to pesticides or hormones, limit environmental degradation and promote humane livestock practices.



Cardiovascular
Immune

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: SUSTAINABLE AGRICULTURE	-	○	○

Produce is sold or distributed on the premises on a daily basis by (or under contract with) the project owner and it meets the following criteria:

a.[63] Federally Certified Organic labeling (based on the country).

PART 2: HUMANE AGRICULTURE	-	○	○

If meat, egg or dairy products are sold or distributed on the premises on a daily basis by (or under contract with) the project owner, they meet the following criteria for the humane treatment of livestock:

a.[64] Humane Certified™ labeling, or equivalent (based on the country).

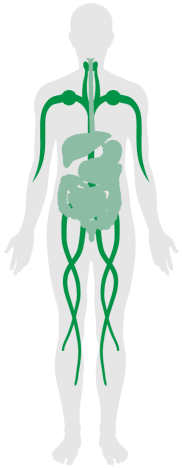
b.[63] Federally Certified Organic labeling (based on the country).

50

FOOD STORAGE

Most refrigerators are not designed with the intent to preserve the taste and nutrient content of fresh fruits and vegetables, which are typically best stored at relatively higher temperatures. Additionally, crisper drawers are often too small to store a sufficient quantity of produce for a moderately-sized group of people, potentially discouraging individuals from bringing healthier food options to work.

Intent: To encourage the consumption of fresh foods by providing sufficient cold food storage to occupants.



Digestive
Immune

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: STORAGE CAPACITY

The space provides cold storage that meets the following requirements:

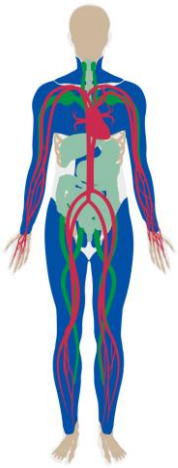
a. Total volume of at least 20 L [0.7 ft^3] per occupant (no more than 7,000 L [247 ft^3] of combined space is required).

51

FOOD PRODUCTION

Gardening or the cultivation of produce and herbs increases access to healthy, fresh and nutrient-rich foods and allows individuals to be more engaged with food production processes. Studies show that gardening can lead to better eating habits and more positive perceptions of overall health, and has been associated with lower BMI as well as lower odds of overweight and obesity.

Intent: To improve access to fresh produce by providing space, infrastructure and tools for on-site food production.



Cardiovascular
Digestive
Immune
Muscular
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: GARDENING SPACE	○	○	○
PART 2: PLANTING SUPPORT	○	○	○

PART 1: GARDENING SPACE

A space of at least 0.1 m² [1 ft²] per occupant (no more than 70 m² [754 ft²] maximum is required) is allocated within 0.8 km [0.5 mi] of the project boundary for one or a combination of the following:

a.[22] A garden.

b.[22] A greenhouse.

PART 2: PLANTING SUPPORT

Adequate quantities of the following supplies are provided to grow and maintain vegetables, herbs or other edible plants in the Gardening Space provided:

a.[22] Planting medium.

b.[22] Irrigation.

c.[22] Lighting (interior spaces only).

d.[22] Plants.

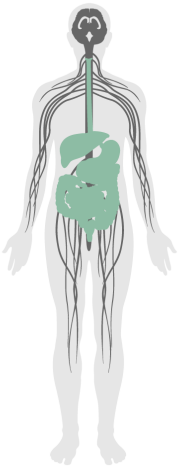
e. Gardening tools.

52

MINDFUL EATING

Demanding work schedules and a lack of communal eating spaces can lead people to eat in isolation during meal breaks. Distracted eating at workstations while doing work, reading, watching television or listening to the radio may result in eating more, both immediately and during later food intake. Eating attentively and placing focus on the process of eating, on the other hand, may lead to better control of food intake. Time spent in break areas can lead to better eating habits, encourage social interactions, and help reduce stress.

Intent: To encourage mindful eating behaviors and socialization by providing communal eating spaces.



Digestive
Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: EATING SPACES	○	○	○
PART 2: BREAK AREA FURNISHINGS	○	○	○

PART 1: EATING SPACES

Eating spaces for employees adhere to the following requirements:

a. Contain tables and chairs to accommodate at least 25% of total employees at a given time.

b. Are located within 60 m [200 ft] of at least 90% of all occupants.

PART 2: BREAK AREA FURNISHINGS

Eating spaces for employees contain all of the following:

a. Refrigerator, device for reheating food (such as microwave or toaster oven), and sink.

b. Amenities for dish washing.

c. At least one cabinet or storage unit available for employee use.

d. Eating utensils, including spoons, forks, knives and microwave-safe plates and cups.

LIGHT

BACKGROUND

Light is a visible form of electromagnetic radiation, bordered in the spectrum by ultraviolet radiation at smaller wavelengths and infrared at larger wavelengths. Current lighting codes and guidelines provide illuminance recommendations for different room types, derived from usual lighting requirements for typical activities per room. These standards, created by technical groups such as Illuminating Engineering Society (IES), ensure good visual acuity in a variety of tasks to avoid eyestrain and to minimize productivity losses and headaches.

Light enters the eye and hits photoreceptors on the retina: rods, cones and intrinsically photosensitive retinal ganglion cells (ipRGCs). All of these cells absorb light and send it as information in the form of electrochemical signals to different parts of the brain. Rods facilitate peripheral vision and vision in dim lighting conditions, with peak sensitivity to green-blue light (498 nm). Cones facilitate daytime vision and color perception, and the peak sensitivity for the sensation of brightness with this system occurs at green-yellow light (555 nm).

In addition to facilitating vision, 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. The body responds to a number of zeitgebers—the external cues that align physiological functions to the solar day in this cycle. Light is the most important of these zeitgebers, keeping the body's internal clocks synchronized in a process known as circadian photoentrainment.

The ipRGCs are critical to the circadian system, sending information to various parts of the brain to trigger reactions downstream in the body. These cells demonstrate peak sensitivity to teal-blue light (≈480 nm). Notably, the ipRGCs project information to a specific part of the brain called the suprachiasmatic nucleus to let it know the time of day based on the light received, and this main clock then acts as an oscillator to likewise synchronize clocks in peripheral tissues and organs.

Multiple physiological processes—including those relating to alertness, digestion and sleep—are regulated in part by the variance and interplay of hormones involved in this cycle. A consideration of light exposure is particularly significant considering the role this plays in sleep, and given that the Institute of Medicine reports that about 50 to 70 million U.S. adults have a chronic sleep or wakefulness disorder. Further, such disorders and chronic sleep deprivation are associated with increased risk of certain morbidities, including diabetes, obesity, depression, heart attack, hypertension and stroke.

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, especially if paired with inappropriate light exposure at night. Humans are continuously sensitive to light, and under normal circumstances, light exposure in the late night/early morning will shift our rhythms forward (phase advance), whereas exposure in the late afternoon/early night will shift our rhythms back (phase delay). To maintain optimal, properly synchronized circadian rhythms, the body requires periods of both brightness and darkness.

INTENT

The WELL Building Standard® for Light provides illumination guidelines that are aimed to minimize disruption to the body's circadian system, enhance productivity, support good sleep quality and provide appropriate visual acuity where needed.

LIGHT FEATURE LEVEL MATRIX

	Core and Shell	New and Existing Interiors	New and Existing Buildings
53 VISUAL LIGHTING DESIGN			
1: Visual Acuity for Focus	-	P	P
2: Brightness Management Strategies	-	P	P
54 CIRCADIAN LIGHTING DESIGN			
1: Melanopic Light Intensity for Work Areas	-	P	P
55 ELECTRIC LIGHT GLARE CONTROL			
1: Lamp Shielding	-	P	P
2: Glare Minimization	P	P	P
56 SOLAR GLARE CONTROL			
1: View Window Shading	O	P	P
2: Daylight Management	O	P	P
57 LOW-GLARE WORKSTATION DESIGN			
1: Glare Avoidance	-	O	O
58 COLOR QUALITY			
1: Color Rendering Index	-	O	O
59 SURFACE DESIGN			
1: Working and Learning Area Surface Reflectivity	-	O	O
60 AUTOMATED SHADING AND DIMMING CONTROLS			
1: Automated Sunlight Control	-	O	O
2: Responsive Light Control	-	O	O
61 RIGHT TO LIGHT			
1: Lease Depth	O	O	O
2: Window Access	-	O	O
62 DAYLIGHT MODELING			
1: Healthy Sunlight Exposure	O	O	O
63 DAYLIGHTING FENESTRATION			
1: Window Sizes for Working and Learning Spaces	O	O	O
2: Window Transmittance in Working and Learning Areas	O	O	O
3: Uniform Color Transmittance	O	O	O

53

VISUAL LIGHTING DESIGN

Adequate light levels are needed for a broad variety of activities, including reading various qualities and types of print, and working on detail-oriented tasks. Brightness levels also contribute to the perception of spaciousness, as well as to the overall visual appeal of illuminated spaces. Targeted task lighting can provide the necessary amount of light at workspaces without over-illuminating ancillary spaces; ambient light levels of 300 lux are sufficient for most tasks. Pairing adjustable direct task lighting with indirect or diffuse ambient lighting allows user customization and good visual acuity while providing more suitable background light. Light intensity for visual acuity is measured in lux (or foot candles), which is a measure of the way the eye responds to light weighted to the response of the cone cells—the main photoreceptors for daytime vision, located on the retina of the human eye.

Endocrine
Muscular
Nervous

Intent: To support visual acuity by setting a threshold for adequate light levels and requiring luminance to be balanced within and across indoor spaces.

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 1: VISUAL ACUITY FOR FOCUS

The following requirements are met at workstations or desks:

a. The ambient lighting system is able to maintain an average light intensity of 215 lux [20 fc] or more, measured on the horizontal plane, 0.76 m [30 inches] above finished floor. The lights may be dimmed in the presence of daylight, but they are able to independently achieve these levels.

b. The ambient lighting system is zoned in independently controlled banks no larger than 46.5 m^2 [500 ft^2] or 20% of open floor area of the room (whichever is larger).

c.[81] If ambient light is below 300 lux [28 fc], task lights providing 300 to 500 lux [28 to 46 fc] at the work surface are available upon request.

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 2: BRIGHTNESS MANAGEMENT STRATEGIES

Provide a narrative that describes strategies for maintaining luminance balance in spaces, which takes into consideration at least two of the following:

a. Brightness contrasts between main rooms and ancillary spaces, such as corridors and stairwells, if present.

b. Brightness contrasts between task surfaces and immediately adjacent surfaces, including adjacent visual display terminal screens.

c. Brightness contrasts between task surfaces and remote, non-adjacent surfaces in the same room.

d. The way brightness is distributed across ceilings in a given room.

54

CIRCADIAN LIGHTING DESIGN

Light is one of the main drivers of the circadian system, which starts in the brain and regulates physiological rhythms throughout the body's tissues and organs, affecting hormone levels and the sleep-wake cycle. Circadian rhythms are kept in sync by various cues, including light which the body responds to in a way facilitated by intrinsically photosensitive retinal ganglion cells (ipRGCs): the eyes' non-image-forming photoreceptors. Through ipRGCs, lights of high frequency and intensity promote alertness, while the lack of this stimulus signals the body to reduce energy expenditure and prepare for rest. The biological effects of light on humans can be measured in Equivalent Melanopic Lux (EML), a proposed alternate metric that is weighted to the ipRGCs instead of to the cones, which is the case with traditional lux. Tables L1 and L2 in Appendix C show how to calculate the EML of individual lamps and larger spaces.

Cardiovascular
Digestive
Endocrine
Immune
Muscular
Nervous

Intent: To support circadian health by setting a minimum threshold for daytime light intensity.

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 1: MELANOPIC LIGHT INTENSITY FOR WORK AREAS

At least one of the following requirements is met:

a. Light models or light calculations (which may incorporate daylight) show that at least 250 equivalent melanopic lux is present at 75% or more of workstations, measured on the vertical plane facing forward, 1.2 m [4 ft] above finished floor (to simulate the view of the occupant). This light level is present for at least 4 hours per day for every day of the year.

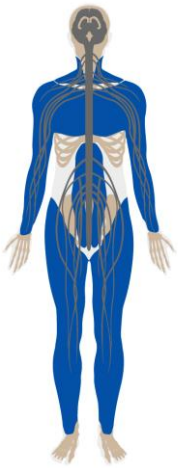
b.[174] For all workstations, electric lights (which may include task lighting) provide maintained illuminance on the vertical plane of equivalent melanopic lux, greater than or equal to the lux recommendations in the Vertical (Ev) Targets for the 25-65 category in Table B1 of IES-ANSI RP-1-12. For example, Reception Desks are provided with 150 equivalent melanopic lux from the electric lights.

55

ELECTRIC LIGHT GLARE CONTROL

Non-diffuse, bright indoor lights create uneven levels of brightness in the visual field. The resulting glare, defined as "excessive brightness of the light-source, excessive brightness-contrasts and excessive quantity of light", can cause visual discomfort (discomfort glare), fatigue, visual impairment and even injury (disability glare), and can be attributed to either direct or reflected glare. In the case of glare caused by electric light sources, lamps should be shielded based on their luminance. This quantity, often given in cd/m2, can be measured directly or calculated from lighting specification sheets with sufficient detail. Light fixtures of greater luminous intensity require a greater shielding angle to reduce the likelihood of creating direct glare for occupants.

Intent: To minimize direct and overhead glare by setting limits on the luminous intensity of luminaires.



Muscular
Nervous
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: LAMP SHIELDING	-	P	P
PART 2: GLARE MINIMIZATION	P	P	P

PART 1: LAMP SHIELDING

Lamps with the following luminance in regularly occupied spaces are shielded by the angles listed below or greater:

a. Less than 20,000 cd/m², including reflected sources: no shielding required.

b.[79] 20,000 to 50,000 cd/m²: 15°.

c.[79] 50,000 to 500,000 cd/m² : 20°.

d.[79] 500,000 cd/m² and above: 30°.

PART 2: GLARE MINIMIZATION

At workstations, desks, and other seating areas, the following requirement is met:

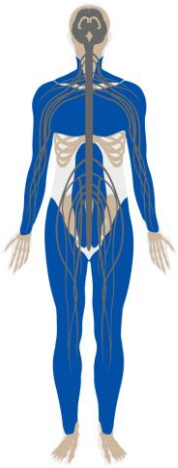
a.[174] Bare lamps and luminaire surfaces more than 53° above the center of view (degrees above horizontal) have luminances less than 8,000 cd/m².

56

SOLAR GLARE CONTROL

Though bright light during the day is conducive to good health, uneven levels of brightness in the visual field can cause visual fatigue and discomfort. Glare, or excessive brightness, is caused by light scattering within the eye (intraocular scattering), thereby creating a "veil" of luminance that reduces the luminance contrast as received by the retina. In buildings, sources of glare are often unshielded or poorly shielded light, or sunlight directly hitting the eye or reflective surfaces.

Intent: To avoid glare from the sun by blocking or reflecting direct sunlight away from occupants.



Muscular
Nervous
Skeletal

Core and Shell	New and Existing Interiors	New and Existing Buildings
O	P	P

PART 1: VIEW WINDOW SHADING

At least one of the following is present for all glazing less than 2.1 m [7 ft] above the floor in regularly occupied spaces:

a.[80] Interior window shading or blinds that are controllable by the occupants or set to automatically prevent glare.

b. External shading systems that are set to prevent glare.

c. Variable opacity glazing, such as electrochromic glass, which can reduce transmissivity by 90% or more.

O	P	P

PART 2: DAYLIGHT MANAGEMENT

At least one of the following is required for all glazing greater than 2.1 m [7 ft] above the floor in regularly occupied spaces:

a.[80] Interior window shading or blinds that are controllable by the occupants or set to automatically prevent glare.

b. External shading systems that are set to prevent glare.

c. Interior light shelves to reflect sunlight toward the ceiling.

d. A film of micro-mirrors on the window that reflects sunlight toward the ceiling.

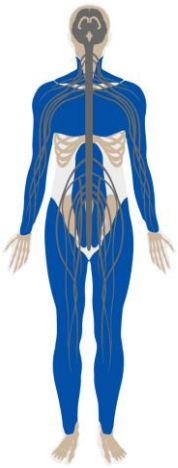
e. Variable opacity glazing, such as electrochromic glass, which can reduce transmissivity by 90% or more.

57

LOW-GLARE WORKSTATION DESIGN

Glare is commonly generated when high-intensity electric or natural light reflects off glossy surfaces that may be positioned at suboptimal angles in and around occupant spaces, in relation to windows. The resulting discomfort can be a hindrance to an otherwise comfortable and effective work environment. Adjusting the angle at which the light hits a surface can help guide the light away from reflecting directly into the eye, thereby avoiding glare.

Intent: To minimize visual discomfort by situating computer monitors in a way that avoids glare and luminance contrast.



Muscular
Nervous
Skeletal

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: GLARE AVOIDANCE

The following requirements are met:

a.[81] To minimize glare caused by incoming sunlight, all computer screens at desks located within 4.5 m [15 ft] of view windows can be oriented within a 20° angle perpendicular to the plane of the nearest window.

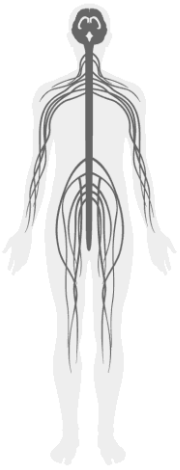
b. Overhead luminaires are not aimed directly at computer screens.

58

COLOR QUALITY

Color quality is a function of the spectral output of a light source, the spectral absorbance/reflectance of an object, and the sensitivity of the eye's cone photoreceptors to different wavelengths of light, which we perceive as color. Color quality impacts visual appeal and can either contribute to or detract from occupant comfort. Poor color quality can reduce visual acuity and the accurate rendering of illuminated objects. For instance, foods, human skin tones and plants may appear dull or unsaturated under lights that have low color quality metrics. Color rendering index (CRI) is a common way to measure color quality, capturing R1-R8 metrics. R9, while not always reported, is also included as part of this feature, as R9 values further take into consideration how we perceive the saturation of warmer hues.

Intent: To enhance spatial aesthetics and color differentiation through the use of lamps with quality color rendering abilities.



Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: COLOR RENDERING INDEX

To accurately portray colors in the space and enhance occupant comfort, all electric lights (except decorative fixtures, emergency lights and other special-purpose lighting) meet the following conditions:

a.[80] Color Rendering Index Ra (CRI, average of R1 through R8) of 80 or higher.

b.[80] Color Rendering Index R9 of 50 or higher.

59

SURFACE DESIGN

Exposure to light not only facilitates image-formation and color perception, but can also trigger a series of non-visual effects involving the regulation of the circadian cycle. Light exposure mainly occurs via two ways: (1) directly from luminous sources, and (2) indirectly from reflected surfaces. Since most light encountered within buildings is reflective, quality of surfaces greatly affects the amount of light ultimately reaching the eye. Surfaces with lower light reflectance values (LRVs) absorb light from the source and result in lower overall light intensity. Higher LRVs mean that the surface reflects more light from the source, resulting in maximum light intensity and promoting alertness and activity. Choosing surfaces with higher LRV values thus represents a good strategy for ensuring that a sufficient amount of light reaches the eye without increasing energy consumption or glare.

Endocrine
Muscular
Nervous

Intent: To increase overall room brightness through reflected light from room surfaces and avoiding glare.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: WORKING AND LEARNING AREA SURFACE REFLECTIVITY	-	O	O

The following Light Reflectance Values (LRV) are met:

a.[80] Ceilings have an average LRV of 0.8 (80%) or more for at least 80% of surface area in regularly occupied spaces.

b.[80] Walls have an average LRV of 0.7 (70%) or more for at least 50% of surface area directly visible from regularly occupied spaces.

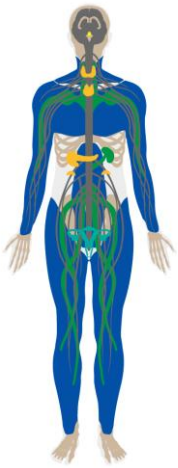
c. Furniture systems have an average LRV of 0.5 (50%) or more for 50% of surface area directly visible from regularly occupied spaces.

60

AUTOMATED SHADING AND DIMMING CONTROLS

Design features such as adjustable window shades and lights with dimmers must be actively managed to be effective. Automated controls can help to ensure that these systems continually operate as intended and meet intended benefits such as glare avoidance and energy reduction. Furthermore, setting these features to automatically adjust can greatly contribute to comfort without disrupting occupants from other tasks.

Intent: To prevent glare and encourage reliance on natural light through automated shading and dimming.



Endocrine
Immune
Muscular
Nervous
Reproductive
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: AUTOMATED SUNLIGHT CONTROL	-	○	○

All windows larger than 0.55 m² [6 ft²] have the following:

a.[80] Shading devices that automatically engage when light sensors indicate that sunlight could contribute to glare at workstations and other seating areas.

PART 2: RESPONSIVE LIGHT CONTROL	-	○	○

The following requirements are met in all major workspace areas:

a.[80] All lighting except decorative fixtures is programmed using occupancy sensors to automatically dim to 20% or less (or switch off) when the zone is unoccupied.

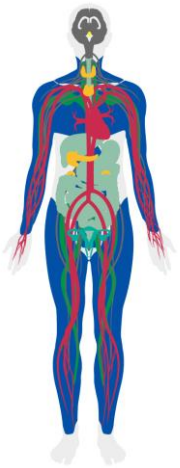
b.[80] All lighting except decorative fixtures has the capacity and is programmed to dim continuously in response to daylight.

61

RIGHT TO LIGHT

Exposure to adequate levels of sunlight is critical for health and well-being, for effects ranging from visual comfort to potential psychological and neurological gains: there are measurable physiological benefits to receiving the quality of light provided by the sun, as well as positive subjective reports from occupants able to enjoy access to sunlight. Proximity to windows, outdoor views and daylight in indoor spaces are some of the most sought-after elements of design. As such, buildings should utilize daylight as a primary source of lighting to the greatest extent possible.

Intent: To promote exposure to daylight and views of varying distances by limiting the distance workstations can be from a window or atrium.



Cardiovascular
Digestive
Endocrine
Immune
Muscular
Nervous
Reproductive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: LEASE DEPTH	○	○	○
PART 2: WINDOW ACCESS	-	○	○

PART 1: LEASE DEPTH

The following requirement is met:

a. 75% of the area of all regularly occupied spaces is within 7.5 m [25 ft] of view windows.

PART 2: WINDOW ACCESS

The following conditions are met:

a. 75% of all workstations are within 7.5 m [25 ft] of an atrium or a window with views to the exterior.

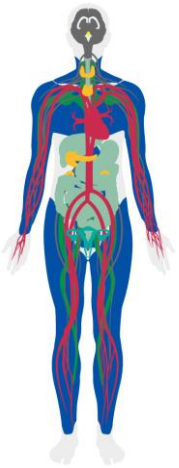
b. 95% of all workstations are within 12.5 m [41 ft] of an atrium or a window with views to the exterior.

62

DAYLIGHT MODELING

Exposure to appropriate amounts of natural light reinforces the alignment of our circadian rhythms and reduces dependence on electricity for artificial lighting; however, excessive sunlight, during can cause glare and unwanted visual contrast. This is not only important to consider throughout the course of the day, but also throughout the course of the year, such that occupants are able to enjoy the benefits of daylight exposure in all seasons. Therefore, it is necessary to find a balance between Spatial Daylight Autonomy (sDA), which measures the percentage of floor area that receives adequate sunlight, and Annual Sun Exposure (ASE), which measures the percentage of floor area receives too much direct sunlight.

Intent: To support circadian and psychological health by setting thresholds for indoor sunlight exposure.



Cardiovascular
Digestive
Endocrine
Immune
Muscular
Nervous
Reproductive

Core and Shell	New and Existing Interiors	New and Existing Buildings
○	○	○

PART 1: HEALTHY SUNLIGHT EXPOSURE

Lighting simulations demonstrate that the following conditions are expected:

a.[1] Spatial daylight autonomy (sDA300,50%) is achieved for at least 55% of regularly occupied space. In other words, at least 55% of the space receives at least 300 lux [28 fc] of sunlight for at least 50% of operating hours each year.

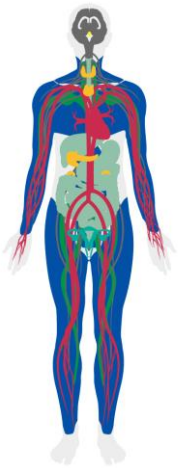
b.[1] Annual sunlight exposure (ASE1000,250) is achieved for no more than 10% of regularly occupied space. In other words, no more than 10% of the area can receive more than 1,000 lux [93 fc] for 250 hours each year.

63

DAYLIGHTING FENESTRATION

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.

Intent: To optimize occupant exposure to daylight and limit glare through enhanced fenestration parameters.



Cardiovascular
Digestive
Endocrine
Immune
Muscular
Nervous
Reproductive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: WINDOW SIZES FOR WORKING AND LEARNING SPACES	○	○	○

The following conditions are met on façades along regularly occupied spaces:

a. Window-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.

b. Between 40% and 60% of window area is at least 2.1 m [7 ft] above the floor (Daylight Glass).

PART 2: WINDOW TRANSMITTANCE IN WORKING AND LEARNING AREAS	○	○	○

The following visible transmittance (VT) conditions are met for all non-decorative glazing:

a. All glazing located higher than 2.1 m [7 ft] from the floor (Daylight Glass) has VT of 60% or more.

b. All glazing located 2.1 m [7 ft] or lower from the floor (Vision Glass) has VT of 50% or more.

PART 3: UNIFORM COLOR TRANSMITTANCE	○	○	○

All windows used for daylighting meet the following requirement:

a. The visible light transmittance of wavelengths between 400 and 650 nm does not vary by more than a factor of 2.

FITNESS

BACKGROUND

The Centers for Disease Control (CDC) define fitness as "the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies". Regular physical activity is essential to achieve optimal health, including weight management, chronic disease prevention and fitness maintenance. The American College of Sports Medicine, among others, recommends that all healthy adults engage in at least 30 minutes of moderate-intensity aerobic activity five days per week, and muscle-strengthening activities at least two days per week. Numerous types of physical activities, including walking, running, cycling, swimming and resistance training have demonstrated health benefits, with greater gains when performed at higher intensities or for longer periods of time.

However, the majority of people today are physically inactive. Modern transportation, labor saving conveniences and sedentary jobs have created an environment in which millions of people fail to achieve the minimum level of activity necessary to help prevent type 2 diabetes, metabolic syndrome, obesity, heart disease and other chronic conditions. In the U.S. alone, fewer than 50% of elementary school students, 10% of adolescents and 5% of adults obtain 30 minutes of daily physical activity. An average adult obtains only 6-10 minutes of moderate to vigorous intensity physical activity a day. The situation is similar worldwide—over 60% of all people do not get the recommended daily 30-minute minimum of moderate-intensity physical activity, and are thus considered inactive.

Physical inactivity poses one of the biggest modern threats to public health. It is an independent risk factor for numerous chronic diseases and is estimated to be responsible for 30% of ischemic heart disease, 27% of type 2 diabetes and 21-25% of breast and colon cancer cases. Lack of physical activity can also increase the odds of having a stroke by 20-30% and shave off 3-5 years of life. Together, these and other conditions make physical inactivity the fourth leading risk factor for mortality, accounting for 6-9% of deaths worldwide, or three to five million mortalities every year.

While the issue of insufficient activity is multi-faceted, one of the factors known to impact physical activity levels is the built environment. Neighborhood walkability, access to and use of mass transit, active transportation, availability of physical activity facilities near workplaces and homes, stair accessibility in buildings, active furnishings and many other factors can affect the physical activity level of an individual. Considering that 90% of our time is spent within the built environment, urban planning and building design strategies that are consciously articulated either to encourage more physical activity or discourage sedentariness can constitute powerful intervention strategies to promote a more active lifestyle.

The WELL Building Standard® recognizes the physical activity-promoting policies and strategies that can be implemented in the built environment to encourage physical activity and reduce sedentariness, thus helping to combat obesity and other chronic diseases.

INTENT

The WELL Building Standard for Fitness promotes the integration of physical activity into everyday life by providing the opportunities and support for an active lifestyle and discouraging sedentary behaviors.

FITNESS FEATURE LEVEL MATRIX

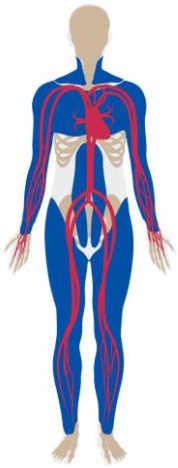
	Core and Shell	New and Existing Interiors	New and Existing Buildings
64 INTERIOR FITNESS CIRCULATION			
1: Stair Accessibility	P	O	P
2: Stair Promotion	P	O	P
3: Facilitative Aesthetics	P	O	P
65 ACTIVITY INCENTIVE PROGRAMS			
1: Activity Incentive Programs	-	P	P
66 STRUCTURED FITNESS OPPORTUNITIES			
1: Professional Fitness Programs	-	O	O
2: Fitness Education	-	O	O
67 EXTERIOR ACTIVE DESIGN			
1: Pedestrian Amenities	O	O	O
2: Pedestrian Promotion	O	O	O
3: Neighborhood Connectivity	O	O	O
68 PHYSICAL ACTIVITY SPACES			
1: Site Space Designation for Offices	O	O	O
2: External Exercise Spaces	O	O	O
69 ACTIVE TRANSPORTATION SUPPORT			
1: Bicycle Storage and Support	O	O	O
2: Post Commute and Workout Facilities	O	O	O
70 FITNESS EQUIPMENT			
1: Cardiorespiratory Exercise Equipment	O	O	O
2: Muscle-strengthening Exercise Equipment	O	O	O
71 ACTIVE FURNISHINGS			
1: Active Workstations	-	O	O
2: Prevalent Standing Desks	-	O	O

64

INTERIOR FITNESS CIRCULATION

The integration of interior pathways and stairs within the built environment can provide a convenient way to incorporate short periods of physical activity into the workday, thus reducing sedentary tendencies. Stair climbing is a low-impact, moderate-to-vigorous intensity physical activity that burns calories and has been associated with improved cardiorespiratory fitness and a lower risk of stroke. To encourage greater use, pathways and stairs should be aesthetically pleasing and easily accessible from high-traffic routes.

Intent: To encourage intermittent bouts of physical activity and reduce sedentary behavior through accessible, safe, and visually appealing stairs, entryways, and corridors.



Cardiovascular
Muscular
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: STAIR ACCESSIBILITY	P	O	P
PART 2: STAIR PROMOTION	P	O	P
PART 3: FACILITATIVE AESTHETICS	P	O	P

PART 1: STAIR ACCESSIBILITY

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

a.[27] Stairs are accessible to regular building occupants during all regular business hours.

b.[87] Wayfinding signage and point-of-decision prompts are present to encourage stair use (at least one sign per elevator bank).

PART 2: STAIR PROMOTION

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

a.[27] Located within 7.5 m [25 ft] of the entrance to the building or the edge of its lobby.

b.[27] Clearly visible from the main entrance to the project, or located visually before any elevators present upon entering from the main entrance.

c.[87] Stair width set at a minimum of 1.4 m [56 in] between handrails.

PART 3: FACILITATIVE AESTHETICS

In projects of 2 to 4 floors, both common stairs and paths of frequent travel display elements of aesthetic appeal by incorporating at least 2 of the following:

a.[87] Artwork, including decorative painting.

b.[87] Music.

c.[27] Daylighting using windows or skylights of at least 1 m^2 [10.8 ft^2] in size.

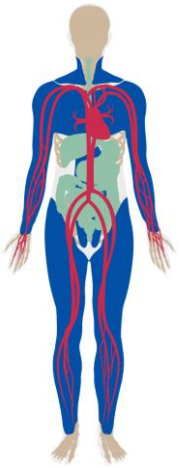
d.[87] View windows to the outdoors or building interior.

e. Light levels of at least 215 lux [20 fc] when the stairs are in use.

65

ACTIVITY INCENTIVE PROGRAMS

The health benefits of physical activity are numerous, from reduced risk of chronic diseases such as cancer, cardiovascular disease and diabetes, to better mental health and increased quality of life. In addition, relatively small amounts of activity can lead to significant benefits: just 2.5 hours of moderate-intensity physical activity per week can reduce overall mortality risk by nearly 20%. Research shows that even small incentives can significantly influence individual decisions and behaviors towards physical activity. Incentives that encourage greater levels of physical activity through reimbursement of gym memberships or other means of physical activity can help people develop and maintain regular exercise routines and achieve greater fitness levels.



Muscular
Skeletal

Intent: To promote active lifestyles through the provision of physical activity incentive programs.

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	P	P

PART 1: ACTIVITY INCENTIVE PROGRAMS

A plan with at least 2 of the following is developed and implemented:

a.[88] Tax-exempt payroll deductions relating to bicycle commuting and mass transit (such as the Transportation Fringe Benefits in Section 132(f) of the U.S. Internal Revenue Code) or a direct subsidy for an equivalent amount.

b.[82] $200 or greater reimbursements or incentive payments in every 6-month period that an employee meets a 50-visit minimum to the gym or professional program.

c. A subsidy of at least $240 per year is available to each interested employee to cover the costs of participation in races, group fitness activities and sports teams.

d. A subsidy of at least $240 per year is available to employees to cover the costs of fitness or training programs offered in professional gyms or studios.

e. A subsidy of at least $50 per year is available to employees to cover the costs of a bicycle share membership.

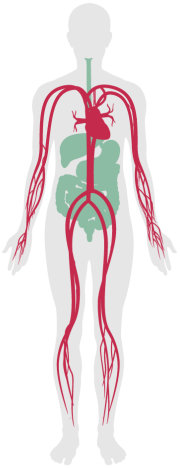
f. A fitness program in which it is demonstrated that at least 30% of regular building occupants utilize free access to gyms or fitness classes.

66

STRUCTURED FITNESS OPPORTUNITIES

Access to advice and training programs developed by experts can help individuals learn new fitness techniques and achieve physical health goals. Individuals with special considerations that require further guidance to ensure they engage in physical activity routines that are safe and appropriate for their level or particular disability can especially benefit from expert guidance. Training programs, depending on frequency and duration, can help increase aerobic fitness and muscle endurance, assist in weight loss, lower blood pressure and decrease worker absenteeism. Providing individuals with access to fitness services is an important step towards making exercise a part of a healthy work culture.

Intent: To promote safe and convenient exercise through access to on-site professional fitness training and education.



Cardiovascular
Digestive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: PROFESSIONAL FITNESS PROGRAMS	-	○	○
PART 2: FITNESS EDUCATION	-	○	○

PART 1: PROFESSIONAL FITNESS PROGRAMS

The following is offered at least once a month:

a.[84] Onsite fitness or training programs.

PART 2: FITNESS EDUCATION

Classes from a qualified professional are offered at least once every 3 months to cover the following:

a. Different modes of exercise.

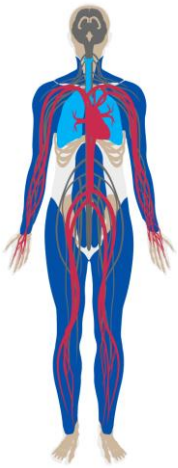
b. Safe fitness techniques.

c. Comprehensive exercise regimens.

67

EXTERIOR ACTIVE DESIGN

Greater land-use mix has been linked to higher physical activity levels and lower rates of obesity. In addition, the presence of retail shops, bus stops and offices within walking distance from residences is linked to a higher likelihood of walking and using transit. Similarly, integrating elements of active design into the building and site, and creating cyclist and pedestrian-friendly environments around the building can help incentivize physical activity. Providing facilities such as benches, drinking fountains and water bottle refilling stations along a building's walking routes can help support occupant activity throughout the day. Incorporating active design principles is particularly important for projects that are isolated from urban centers where automobile transportation predominates.



Cardiovascular
Muscular
Nervous
Respiratory
Skeletal

Intent: To promote active lifestyles through the integration of active design elements into the building exterior.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: PEDESTRIAN AMENITIES	○	○	○

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 and walking paths:

a.[87] A bench.

b.[87] A cluster of movable chairs and tables.

c.[87] A drinking fountain or water refilling station.

PART 2: PEDESTRIAN PROMOTION	○	○	○

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.[87] A water fountain or other water feature.

b.[87] A plaza.

c. A garden.

d.[87] Public art.

PART 3: NEIGHBORHOOD CONNECTIVITY	○	○	○

To encourage neighborhood connectivity and daily activity, at least one of the following requirements is met:

a.[86] The building address has a Walk Score® of 70 or greater.

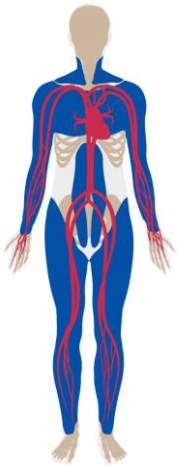
b.[1] The project is eligible for at least 3 points in the LEED BD+C: New Construction "Surrounding density and diverse uses" credit.

68

PHYSICAL ACTIVITY SPACES

In the U.S., the presence of both indoor and outdoor physical activity facilities within a census-block group is associated with an increased likelihood of performing five or more bouts of moderate- to vigorous-intensity physical activity per week, and is linked to a lower risk of being overweight. In addition, buildings that contain an interior fitness space incentivize occupants to engage in regular exercise routines and allow a variety of exercise activities, including low-impact exercises like yoga or Pilates, or more intense activities such as aerobic and muscle-strengthening exercise.

Intent: To promote physical activity through complimentary on-site indoor and local outdoor physical activity spaces.



Cardiovascular
Muscular
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: SITE SPACE DESIGNATION FOR OFFICES	○	○	○

Spaces with more than 10 regular occupants provide the following:

a.[87] Dedicated exercise space that is at least 18.6 m² [200 ft²] plus 0.1 m² [1 ft²] per regular building occupant, up to a maximum of 370 m² [4,000 ft²].

PART 2: EXTERNAL EXERCISE SPACES	○	○	○

At least one of the following is accessible within 0.8 km [0.5 mi] walking distance of the building:

a.[87] Parks with playgrounds, workout stations, trails or an accessible body of water.

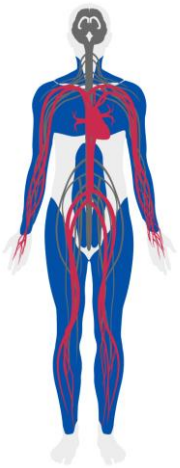
b.[1] Complimentary access to gyms, playing fields or swimming pools.

69

ACTIVE TRANSPORTATION SUPPORT

Active transportation is a cost-effective way to integrate physical activity into daily routines while reducing carbon footprint. Biking or walking to work has been associated with lower rates of diabetes, hypertension, overweight and obesity. Showers and changing rooms at work are preferred by the majority of employees as a support strategy for more physical activity. Therefore, providing amenities and facilities on-site can support the ability of occupants to engage in active commuting.

Intent: To promote daily physical activity through the provision of on-site support for active commuting.



Cardiovascular
Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: BICYCLE STORAGE AND SUPPORT	○	○	○

The following are provided onsite or within 200 m [650 ft] of the building's main entrance:

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

b.[18] 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.

PART 2: POST COMMUTE AND WORKOUT FACILITIES	○	○	○

The following are provided onsite or within 200 m [650 ft] of the building's main entrance:

a.[18] One shower with changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.

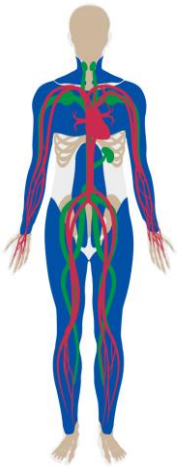
b. One locker for every 5 regular building occupants, or evidence that the lockers provided exceed demand by at least 20%.

70

FITNESS EQUIPMENT

Convenient access to varied types of fitness equipment can make regular exercise habits easier to achieve. Aerobic and muscle-strengthening activities each provide unique health benefits, including weight control, lower risk of cardiovascular disease, diabetes and cancer, better bone health, cardiorespiratory and muscular fitness, and improved cognitive function. Providing equipment that allows for a variety of exercise options can give occupants a wider range of health benefits.

Intent: To promote both cardiovascular and muscle-strengthening exercise by providing on-site fitness equipment.



	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: CARDIORESPIRATORY EXERCISE EQUIPMENT	○	○	○

Some combination of the following is provided in the interior fitness space free of charge, in a quantity that would allow use by at least 1% of regular building occupants and accompanied by instructions for safe use:

a.[27] Treadmills.

b.[27] Elliptical machines.

c.[27] Rowing machines.

d.[27] Stationary exercise bicycles.

PART 2: MUSCLE-STRENGTHENING EXERCISE EQUIPMENT	○	○	○

Some combination of the following is provided in the interior fitness space free of charge, in a quantity that would allow use by at least 1% of regular building occupants and accompanied by instructions for safe use:

a.[27] Multi-station equipment.

b.[27] Bench-press with a self-spotting rack.

c.[27] Full squat-rack.

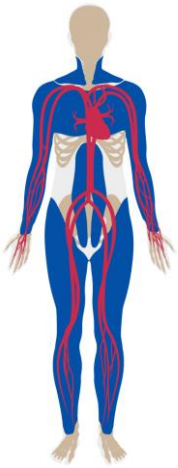
d.[27] Pull-up bar.

71

ACTIVE FURNISHINGS

Most individuals spend the majority of their time indoors in a seated position. Prolonged sitting is associated with a number of adverse health conditions, including an increased risk of cancer, weight gain, and greater fatigue and back discomfort. In addition, sitting burns 50 fewer calories per hour than standing, and sitting for more than 3 hours per day is associated with a 2-year lower life expectancy. Unfortunately, regular exercise does not appear to negate the health consequences of long periods of sitting. Therefore, creating opportunities that mitigate prolonged sitting, while sustaining work productivity is essential to reduce sitting time during the workday.

Intent: To reduce sedentary behavior by making active workstations readily available to occupants.



Cardiovascular
Muscular
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: ACTIVE WORKSTATIONS	-	O	O

Some combination of the following is required for 3% or more of employees (minimum one), and are available for any employee to reserve or use:

a. Treadmill desks.

b. Bicycle desks.

c. Portable desk pedal or stepper machine.

PART 2: PREVALENT STANDING DESKS	-	O	O

At least 60% of workstations feature one of the following:

a. Adjustable height standing desk.

b. Standard desk with desk-top height adjustment stand.

COMFORT

BACKGROUND

The indoor environment should be a place of comfort. In pursuit of that vision, the WELL Building Standard® focuses 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.

Built environments can harbor sounds that are distracting and disruptive to work or relaxation. Employee surveys show that acoustic problems are a leading source of dissatisfaction within the environmental conditions of an office. As acoustic comfort is determined in part by the physical properties and contents of environments, the WELL Building Standard aims to shape spaces to mitigate unwanted indoor noise levels and reduce exterior noise intrusion in order to enhance social interaction, learning, satisfaction and productivity. While noise is ubiquitous, we are able to adopt policies, technologies and practices that ensure quieter acoustical environments and minimize our exposure to harmful and unnecessary sound.

In addition to acoustic comfort, ergonomics and universal design play a significant role in mitigating physical and mental stress. Most of the adverse health effects related to ergonomics are seen in the musculoskeletal and nervous systems of the human body. Musculoskeletal disorders (MSDs), including low back pain, neck pain, osteoarthritis and others are extremely common in nearly all populations. Low back pain affects about 31 million Americans, and 380,600 days of work were missed in 2013 because of musculoskeletal disorders, accounting for one third of the total number of days away from work. The statistics are similar worldwide and in 2010, nearly 7% (more than 169 million) of all disability-adjusted life years (DALYs) resulted from musculoskeletal disorders. The WELL Building Standard promotes comprehensive ergonomics solutions that help prevent stress and injury and facilitate comfort and well-being. These design strategies not only provide access for people with limited mobility, but also prevent injury by encouraging navigable spaces for everyone.

Thermal comfort is another factor that plays a large role in the way we experience places where we live and work. In 2006, only 11% of the office buildings surveyed in the U.S. provided thermal environments that met generally accepted goals of occupant satisfaction. Six primary personal and environmental variables contribute to an occupant's thermal comfort: air speed, dry bulb temperature, radiant temperature, humidity, metabolic rate and clothing or other insulation, all of which interact to create a subjective, individualized response. Finally, in addition to the measurable metrics, there are also psychological parameters such as individual expectations that may also affect thermal comfort. This makes thermal comfort subjective, meaning that not everyone will be equally comfortable under the same conditions. The WELL Building Standard takes a holistic approach to thermal comfort and provides a combination of strategies to address occupant issues.

INTENT

The WELL Building Standard for Comfort establishes requirements designed to create distraction-free, productive and comfortable indoor environments.

COMFORT FEATURE LEVEL MATRIX

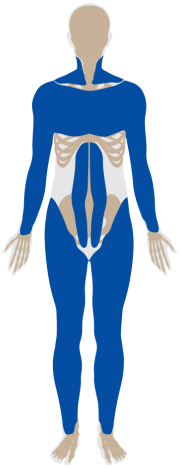
	Core and Shell	New and Existing Interiors	New and Existing Buildings
72 ACCESSIBLE DESIGN			
1: Accessibility and Usability	P	P	P
73 ERGONOMICS: VISUAL AND PHYSICAL			
1: Visual Ergonomics	-	P	P
2: Desk Height Flexibility	-	P	P
3: Seat Flexibility	-	P	P
74 EXTERIOR NOISE INTRUSION			
1: Sound Pressure Level	P	O	P
75 INTERNALLY GENERATED NOISE			
1: Acoustic Planning	-	P	P
2: Mechanical Equipment Sound Levels	O	P	P
76 THERMAL COMFORT			
1: Ventilated Thermal Environment	P	P	P
2: Natural Thermal Adaptation	P	P	P
77 OLFACTORY COMFORT			
1: Source Separation	-	O	O
78 REVERBERATION TIME			
1: Reverberation Time	-	O	O
79 SOUND MASKING			
1: Sound Masking Use	-	O	O
2: Sound Masking Limits	-	O	O
80 SOUND REDUCING SURFACES			
1: Ceilings	-	O	O
2: Walls	-	O	O
81 SOUND BARRIERS			
1: Wall Construction Specifications	-	O	O
2: Doorway Specifications	-	O	O
3: Wall Construction Methodology	-	O	O
82 INDIVIDUAL THERMAL CONTROL			
1: Free Address	-	O	O
2: Personal Thermal Comfort Devices	-	O	O
83 RADIANT THERMAL COMFORT			
1: Lobbies and Other Common Spaces	O	-	O
2: Offices and Other Regularly Occupied Spaces	-	O	O

72

ACCESSIBLE DESIGN

Ensuring that individuals with physical disabilities have access and mobility is an important aspect of an equitable building environment.

Intent: To promote equity by providing buildings that are accessible and usable by people of all physical abilities.



Muscular
Skeletal

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: ACCESSIBILITY AND USABILITY

The project demonstrates compliance with one of the following:

a.[89] Current ADA Standards for Accessible Design.

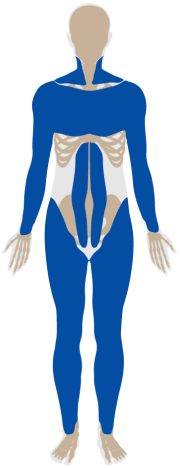
b.[189] ISO 21542:2011 - Building Construction - Accessibility and Usability of the Built Environment, Appendix B: Standards.

73

ERGONOMICS: VISUAL AND PHYSICAL

Overuse of the same muscles and ligaments while trying to adjust to static furniture or equipment over time can cause discomfort and strain the body, especially in occupational environments that require repetitive tasks. Under such conditions, the effects of even slight visual or physical discomfort are compounded, leading to decreased occupant comfort and focus.

Intent: To reduce physical strain and maximize ergonomic comfort and safety.



Muscular
Skeletal

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: VISUAL ERGONOMICS	-	P	P

The following requirement is met:

a.[83] All computer screens are adjustable in terms of height and distance from the user.

PART 2: DESK HEIGHT FLEXIBILITY	-	P	P

At least 30% of workstations have the ability to alternate between sitting and standing positions through a combination of the following:

a. Adjustable height sit-stand desks.

b. Desk-top height adjustment stands.

c. Pairs of fixed-height desks of standing and seated heights (which need not be located adjacent to each other).

PART 3: SEAT FLEXIBILITY	-	P	P

Employee furnishings are adjustable in the following ways:

a.[178] Workstation chair height adjustability is compliant with the HFES 100 standard or BIFMA G1 guidelines.

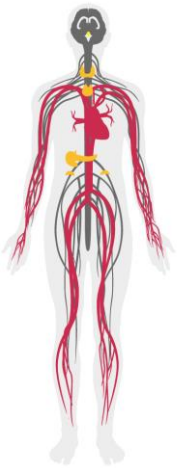
b.[178] Workstation seat depth adjustability is compliant with the HFES 100 standard.

74

EXTERIOR NOISE INTRUSION

Particularly in urban areas, loud or repetitive exterior noises can be a source of stress and a risk factor for certain health outcomes. Studies show that individuals exposed to traffic noise have a higher risk for diabetes, stroke and heart attack, and those exposed to road traffic and aircraft noises have a higher risk for hypertension. In addition, exposure to noise can lead to reduced reaction time and increased levels of annoyance. Preventing excessive exterior noise from reaching building interiors can help improve occupant comfort and well-being.

Intent: To reduce acoustic disruptions by limiting external noise intrusion.



Cardiovascular
Endocrine
Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	O	P

PART 1: SOUND PRESSURE LEVEL

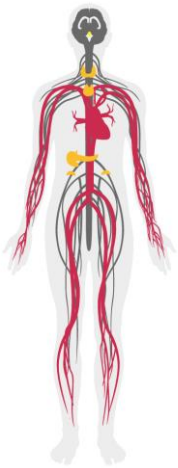
Each regularly occupied space meets the following sound pressure level as measured when the space and adjacent spaces are unoccupied, but within 1 hour of normal business hours:

a. Average sound pressure level from outside noise intrusion does not exceed 50 dBA.

75

INTERNALLY GENERATED NOISE

Electronics, HVAC systems, mechanical equipment and other noise-emitting office devices, as well as occupants themselves can be major sources of indoor noise. As offices and workspaces are increasingly designed to promote employee interaction, occupants can experience decreased levels of privacy and acoustic comfort, especially when users with different job types share a space. Office noise can lead to decreased productivity, especially in open-plan offices where aural distractions and interruptions from other employees are frequent. Additionally, studies show that exposure to noise generated within the building can lead to reduced concentration and mental arithmetic performance, and increased distraction due to reduced speech privacy.



Cardiovascular
Endocrine
Nervous

Intent: To reduce acoustic disruptions and increase speech privacy by creating an acoustic plan and limiting internal noise levels.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: ACOUSTIC PLANNING	-	P	P
PART 2: MECHANICAL EQUIPMENT SOUND LEVELS	O	P	P

PART 1: ACOUSTIC PLANNING

An acoustic plan is developed that identifies the following:

a.[90] Loud and quiet zones.

b. Noisy equipment in the space.

PART 2: MECHANICAL EQUIPMENT SOUND LEVELS

The mechanical equipment system meets the following requirements once interior build-out is complete in the following spaces:

a.[90] Open office spaces and lobbies that are regularly occupied and/or contain workstations: maximum noise criteria (NC) of 40.

b.[90] Enclosed offices: maximum noise criteria (NC) of 35.

c. Conference rooms and breakout rooms: maximum noise criteria (NC) of 30 (25 recommended).

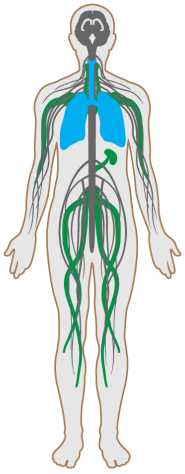
d.[90] Teleconference rooms: maximum noise criteria (NC) of 20.

76

THERMAL COMFORT

Thermal comfort in the body is provided through homeothermy, the balancing of heat gains and losses to maintain the body's core temperature within its narrow range, 36-38 °C [97-100 °F], and regulated by the hypothalamus. Thermal comfort can affect mood, performance and productivity. However, temperature preferences are highly personal and differ from one individual to another. Balancing the energy requirements of large buildings with the varied occupant preferences can thus be challenging.

Intent: To promote occupant productivity and ensure a sufficient level of thermal comfort.



	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: VENTILATED THERMAL ENVIRONMENT	P	P	P
PART 2: NATURAL THERMAL ADAPTATION	P	P	P

PART 1: VENTILATED THERMAL ENVIRONMENT

All spaces in mechanically-ventilated projects meet the design, operating and performance criteria:

a.[92] ASHRAE Standard 55-2013 Section 5.3, Standard Comfort Zone Compliance.

PART 2: NATURAL THERMAL ADAPTATION

All spaces in naturally-ventilated projects meet the following criteria:

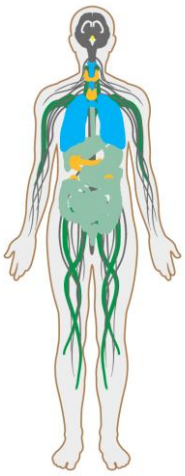
a.[92] ASHRAE Standard 55-2013 Section 5.4, Adaptive Comfort Model.

77

OLFACTORY COMFORT

Excessively strong or distinct odors can disrupt physical and psychological comfort, and even trigger eye, nose and throat irritation, nausea and headaches. Limiting these odors is a simple strategy that can greatly contribute to occupant comfort and well-being.

Intent: To maximize olfactory comfort by reducing the transmission of strong smells and odors within the building.



Digestive
Endocrine
Immune
Integumentary
Nervous
Respiratory

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	O	O

PART 1: SOURCE SEPARATION

All restrooms, janitorial closets, kitchens, cafeterias and pantries prevent strong odors from migrating to workspaces through one or more of the following separation methods:

a. Negative pressurization.

b. Interstitial rooms.

c. Vestibules.

d. Hallways.

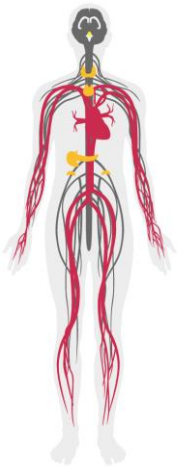
e. Self-closing doors.

78

REVERBERATION TIME

Reverberation time, or RT60, is a metric which describes the length of time taken for a sound to decay by 60 dB from its original level. Optimal reverberation times vary depending on room volume, intended use of the space and the frequency of transmitted sound. In spaces with high reverberation times, the sounds of voices and footsteps take longer to dissipate, contributing to higher levels of ambient noise. The noise produced by reverberation can decrease speech intelligibility and in some situations cause additional stress. This performance specification can be met through the use of sound-absorbing materials on various surface and design elements.

Intent: To help maintain comfortable sound levels by limiting reverberation times.



Cardiovascular
Endocrine
Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: REVERBERATION TIME

The following spaces have maximum reverberation time (RT60) as described:

a.[90] Conference rooms: 0.6 seconds.

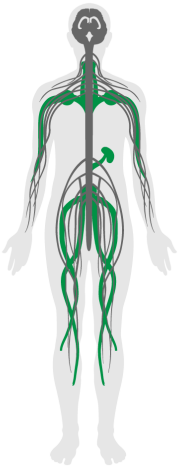
b. Open workspaces: 0.5 seconds.

79

SOUND MASKING

Ambient silence can be just as distracting as a loud environment as it highlights acoustical disturbances and decreases speech privacy. Overhearing private conversations is reported as a specific cause of employee acoustic dissatisfaction in open offices. Sound masking systems supply a low level of background noise to provide workers with a degree of confidentiality in their communications and can decrease distraction associated with aural interruptions.

Intent: To reduce acoustic disruptions and increase speech privacy by implementing sound masking into the building design.



Immune
Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: SOUND MASKING USE	-	○	○
PART 2: SOUND MASKING LIMITS	-	○	○

PART 1: SOUND MASKING USE

All open workspaces use the following:

a.[90] Sound masking systems.

PART 2: SOUND MASKING LIMITS

If sound masking systems are used, sound levels fall within the following range, when measured from the nearest workspace:

a.[90] Open workspaces: 45 - 48 dBA.

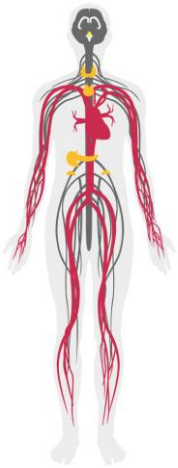
b.[90] Enclosed offices: 40 - 42 dBA.

80

SOUND REDUCING SURFACES

Proper design and construction are not always enough to achieve acoustic comfort in buildings. Sources that contribute to acoustic dissatisfaction such as sound transmission from internal and external sources, footfall noise and voices from adjacent spaces are difficult to control. However, sound reduction treatments that incorporate absorptive surfaces, such as wall panels, ceiling baffles and surface enhancements can help with reverberation management and improve acoustic comfort. The noise reduction coefficient (NRC) of a material is an average value that determines its absorptive properties. The larger the NRC value, the better the material is at absorbing sound under standardized conditions.

Intent: To reduce sound reverberation and maintain comfortable sound levels though absorptive ceiling and wall surfaces.



Cardiovascular
Endocrine
Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: CEILINGS	-	○	○
PART 2: WALLS	-	○	○

PART 1: CEILINGS

The following spaces, if present, have ceilings that meet the specifications described:

a.[90] Open workspaces: minimum NRC of 0.9 for the entire surface area of the ceiling (excluding lights, skylights, diffusers and grilles).

b.[90] Conference and teleconference rooms: minimum NRC of 0.8 on at least 50% of the surface area of the ceiling (excluding lights, skylights, diffusers and grilles).

PART 2: WALLS

The following spaces, if present, have walls that meet the NRC specifications described:

a.[90] Enclosed offices, conference and teleconference rooms: minimum NRC of 0.8 on at least 25% of the surface area of interior surrounding walls.

b.[90] Open workspaces: minimum NRC of 0.8 on at least 25% of the surface area of the surrounding walls.

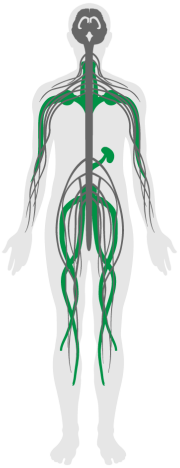
c.[90] Partitioned office spaces: partitions reach at least 1.2 m [48 inches] and have a minimum NRC of 0.8.

81

SOUND BARRIERS

Noise from adjacent spaces can be disturbing to building occupants. Careful detailing and high quality construction materials can greatly improve the sound reducing abilities of interior partitions or doors that act as sound barriers and reduce sound transmission between adjacent spaces.

Intent: To reduce sound transmission and acoustic disruptions through sound barriers.



Immune
Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: WALL CONSTRUCTION SPECIFICATIONS	-	O	O

The following spaces, if present, have interior partition walls that meet the Noise Isolation Class (NIC) described:

a.[90] Enclosed offices: minimum NIC of 35 when a sound masking system is present, or minimum NIC of 40 when no sound masking system is used.

b.[90] Conference rooms and teleconference rooms: minimum NIC of 53 on walls adjoining private offices, conference rooms or other teleconference rooms.

PART 2: DOORWAY SPECIFICATIONS	-	O	O

Doors connecting to private offices, conference rooms and teleconference rooms are constructed with at least one of the following:

a.[90] Gaskets.

b.[90] Sweeps.

c.[90] Non-hollow core.

PART 3: WALL CONSTRUCTION METHODOLOGY	-	O	O

All interior walls enclosing regularly occupied spaces are constructed for optimal performance by reducing air gaps and limiting sound transmission through the following:

a.[90] Properly sealing all acoustically rated partitions at the top and bottom tracks.

b.[90] Staggering all gypsum board seams.

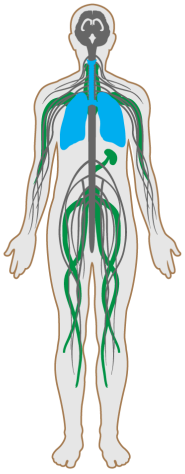
c.[90] Packing and sealing all penetrations through the wall.

82

INDIVIDUAL THERMAL CONTROL

Thermal comfort preferences are highly individual, and can be affected by metabolism, body type and clothing. These factors make it nearly impossible to find a temperature that will satisfy all occupants in the same space at the same time. Providing areas with different thermal gradients, as well as individual thermal comfort devices can ensure that building occupants can choose areas with temperatures that best fit their thermal preferences (termed "free address").

Intent: To maximize and personalize thermal comfort among all occupants.



Immune
Integumentary
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: FREE ADDRESS	-	O	O
PART 2: PERSONAL THERMAL COMFORT DEVICES	-	O	O

PART 1: FREE ADDRESS

Projects over 200 m² [2,150 ft²] meet the following free address requirement:

a. The building provides a thermal gradient of at least 3 °C [5 °F] across open workspaces and between rooms or floors.

b. All open office spaces with occupants performing tasks that require similar workstations allow for at least 50% free address to allow occupants to select a work space with a desired temperature.

PART 2: PERSONAL THERMAL COMFORT DEVICES

The following condition is met in spaces with 10 or more workstations in the same heating or cooling zone:

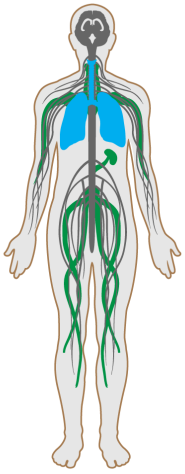
a. Employees have access to personal thermal comfort devices such as fans (excluding space heaters).

83

RADIANT THERMAL COMFORT

New technology surrounding radiant temperature systems has led to recent advances making the systems more energy efficient. Additional benefits include saved floor space, lower dust transportation and increased thermal comfort through the separation of temperature controls and outdoor air supply systems. In addition, with the use of radiant heating, the mean radiant temperature in a space can be kept lower compared to convective heating, providing the benefit of a slightly higher relative humidity in winter time.

Intent: To maximize floor space, reduce dust transmission and increase thermal comfort by incorporating radiant heat and cooling systems into the building design.



Immune
Integumentary
Nervous
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: LOBBIES AND OTHER COMMON SPACES	O	-	O
PART 2: OFFICES AND OTHER REGULARLY OCCUPIED SPACES	-	O	O

PART 1: LOBBIES AND OTHER COMMON SPACES

All lobbies and other common spaces meet the requirements set forth in ASHRAE Standard 55-2013 for thermal comfort through the use of one of the following systems:

a.[93] Hydronic radiant heating and/or cooling systems.

b.[93] Electric radiant systems.

PART 2: OFFICES AND OTHER REGULARLY OCCUPIED SPACES

At least 50% of the floor area in all offices and other regularly occupied spaces meets the requirements set forth in ASHRAE Standard 55-2013 for thermal comfort through the use of one of the following systems:

a.[93] Hydronic radiant heating and/or cooling systems.

b.[93] Electric radiant systems.

MIND

BACKGROUND

While mental and physical health are often conceptualized as separate domains, our minds and bodies are inextricably connected. For instance, exercise increases the release of serotonin, which can elevate mood and regulate the sleep cycle. The simple act of worrying, on the other hand, can trigger physiological responses similar to the way physical stress and injury can. While the body has a remarkable capacity for recovering from a single acute stressor, chronic, repeated activation of the stress response can be especially damaging both physiologically and psychologically. Because humans have the capacity to worry about abstract and often non-immediately resolvable problems such as loss, career, finance issues and self-esteem, modern life can be wrought with stressors that lead to low mood, depression and a negative sense of self.

The global burden of mental health illnesses is significant. In 2010, mental illnesses and substance use disorders accounted for nearly 184 million disability-adjusted life years (DALYs), 8.6 million years of life lost to premature mortality (YLL) and over 175 million years lived with disability (YLD) worldwide. Furthermore, it is estimated that the life expectancy among those with mental illness is more than 10 years shorter compared to those without mental illnesses, and that more than 14%, or 8 million deaths each year are attributable to mental disorders.

The lifetime prevalence of mood disorders in the U.S. (classified as the presence of a major depressive disorder, dysthymic disorder or bipolar disorder) is estimated at nearly 21%. Major depression is one of the most common of all mood disorders, affecting about 16 million adults in the U.S. Mood disorders are inevitably linked to physical illness and are associated with a range of detrimental health outcomes. Chronic low level disturbances or mental distress play increasingly important roles in some of the most common chronic diseases. For example, depression is associated with a higher risk of heart disease and immunosuppression. Chronic stress and anxiety are also directly responsible for stress hormones associated with a variety of negative physiological outcomes, including increased risk of metabolic syndrome, cardiovascular disease, gastrointestinal disorders and skin conditions such as acne and psoriasis.

Because the mind plays a vital role in an individual's overall health and well-being, an atmosphere that supports a healthy mental state can have significant psychological and physical benefits. Interventions to mediate stress can either be direct or indirect. This includes providing access to therapies that help promote relaxation and address mental or emotional trauma, instituting policies that improve sleep hygiene or encourage altruism and community engagement, and promoting the use of sensor technologies that increase awareness of physiological and environmental factors to inform positive behavioral changes.

The WELL Building Standard® recognizes the features of the built environment and identifies workplace policies that can be implemented to positively impact mood, sleep, stress levels and psychosocial status in order to promote and enable overall occupant health and well-being.

INTENT

The WELL Building Standard for Mind requires design, technology and treatment strategies designed to provide a physical environment that optimizes cognitive and emotional health.

MIND FEATURE LEVEL MATRIX

	Core and Shell	New and Existing Interiors	New and Existing Buildings
84 HEALTH AND WELLNESS AWARENESS			
1: WELL Building Standard® Guide	P	P	P
2: Health and Wellness Library	P	P	P
85 INTEGRATIVE DESIGN			
1: Stakeholder Charrette	P	P	P
2: Development Plan	P	P	P
3: Stakeholder Orientation	P	P	P
86 POST-OCCUPANCY SURVEYS			
1: Occupant Survey Content	-	P	P
2: Information Reporting	-	P	P
87 BEAUTY AND DESIGN I			
1: Beauty and Mindful Design	P	P	P
88 BIOPHILIA I - QUALITATIVE			
1: Nature Incorporation	O	P	P
2: Pattern Incorporation	O	P	P
3: Nature Interaction	O	-	P
89 ADAPTABLE SPACES			
1: Stimuli Management	-	O	O
2: Privacy	-	O	O
3: Space Management	-	O	O
4: Workplace Sleep Support	-	O	O
90 HEALTHY SLEEP POLICY			
1: Non-Workplace Sleep Support	-	O	O
91 BUSINESS TRAVEL			
1: Travel Policy	-	O	O
92 BUILDING HEALTH POLICY			
1: Health Benefits	-	O	O
93 WORKPLACE FAMILY SUPPORT			
1: Parental Leave	-	O	O
2: Employer Supported Child Care	-	O	O
3: Family Support	-	O	O
94 SELF-MONITORING			
1: Sensors and Wearables	-	O	O

	Core and Shell	New and Existing Interiors	New and Existing Buildings
95 STRESS AND ADDICTION TREATMENT			
1: Mind and Behavior Support	-	O	O
2: Stress Management	-	O	O
96 ALTRUISM			
1: Charitable Activities	-	O	O
2: Charitable Contributions	-	O	O
97 MATERIAL TRANSPARENCY			
1: Material Information	O	O	O
2: Accessible Information	O	O	O
98 ORGANIZATIONAL TRANSPARENCY			
1: Transparency Program Participation	-	O	O
99 BEAUTY AND DESIGN II			
1: Ceiling Height	O	O	O
2: Artwork	O	O	O
3: Spatial Familiarity	O	O	O
100 BIOPHILIA II - QUANTITATIVE			
1: Outdoor Biophilia	O	O	O
2: Indoor Biophilia	-	O	O
3: Water Feature	O	O	O

84

HEALTH AND WELLNESS AWARENESS

Health literacy, defined by the National Academy of Medicine as "the degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health decisions", is essential for optimal health and well-being. Literacy requires awareness and an ability to decipher health literature and options for health services. Both accessibility and customizability of health-oriented literature are necessary to promote increased health awareness and well-being.

Intent: To promote a deeper understanding of factors that impact health and wellness.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: WELL BUILDING STANDARD® GUIDE	P	P	P

Explanatory guides allow occupants to familiarize themselves with and benefit from features that are incorporated into the project, as well as gain a broader understanding of health and wellness factors beyond the built environment. The following is provided:

a. A guide (available to all occupants) describing the WELL Building Standard features pursued by the project.

PART 2: HEALTH AND WELLNESS LIBRARY	P	P	P

A digital and/or physical library of resources is provided that focuses on mental and physical health and meets the following criteria:

a. Contains at least one book title or one magazine subscription for every 20 occupants (no more than 20 titles are required).

b. Is prominently displayed and readily available to all occupants.

85

INTEGRATIVE DESIGN

A truly collaborative design process ensures that construction and upkeep of a space follows the original expectations and goals for the building. A focus on health and wellness principles throughout the design process guarantees that health-promoting criteria are well understood and integrated into a project.

Intent: To facilitate a collaborative development process and ensure adherence to collective wellness goals.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: STAKEHOLDER CHARRETTE	P	P	P
PART 2: DEVELOPMENT PLAN	P	P	P
PART 3: STAKEHOLDER ORIENTATION	P	P	P

PART 1: STAKEHOLDER CHARRETTE

Prior to the design and programming of the project, all stakeholders, including at a minimum the owner, architects, engineers and facilities management team, meet to:

a. Perform a values assessment and alignment exercise within the team to inform any project goals as well as strategies to meet occupant expectations.

b.[1] Discuss the needs of the occupants, focusing on wellness.

c. Set future meetings to stay focused on the project goals and to engage future stakeholders who join the process after the initial meeting, such as contractors and sub-contractors.

PART 2: DEVELOPMENT PLAN

A written document detailing the building's health-oriented mission is produced with the consent of all stakeholders, incorporating all of the following:

a. Building site selection, taking into account public transportation.

b. WELL concepts of air, water, nourishment, light, fitness, comfort and mind.

c. Plans for implementation of the above analyses and decisions.

d. Operations and maintenance plans for facility managers and building policy requirements related to wellness.

PART 3: STAKEHOLDER ORIENTATION

Upon construction completion, the designers, owners, managers and facilities staff must:

a. Tour the building as a group.

b. Discuss how building operations will support adherence to the WELL Building Standard.

86

POST-OCCUPANCY SURVEYS

Given the diversity of built environments, it is difficult to prescribe a comprehensive set of features that are effective across all settings. Occupancy surveys can be useful in measuring the extent to which a building is effectively promoting and protecting the health and comfort needs of its occupants. In addition, the ability to offer feedback and have a recognized stake in one's comfort and well-being can have a positive impact on occupant mood.

Intent: To allow occupants to provide feedback to building owners and management, and help further develop the WELL Building Standard.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: OCCUPANT SURVEY CONTENT	-	P	P

In buildings with 10 or more employees, the Occupant Indoor Environmental Quality (IEQ) Survey™ from the Center for the Built Environment at UC Berkeley (or approved alternative) is completed by a representative sample of at least 30% of employees at least once per year unless otherwise noted. The survey covers the following topics of occupant satisfaction:

a.[35] Acoustics.

b.[35] Thermal comfort, including humidity and air flow, at least twice a year (once during the cooling season and once during the heating season).

c.[35] Furnishings.

d.[35] Workspace light levels and quality.

e.[35] Odors, stuffiness and other air quality concerns.

f.[35] Cleanliness and maintenance.

g.[35] Layout.

PART 2: INFORMATION REPORTING	-	P	P

Aggregate results from surveys are reported within 30 days to the following groups:

a. Building owners and managers.

b. Building occupants (upon request).

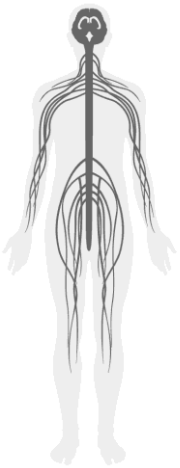
c. The International WELL Building Institute.

87

BEAUTY AND DESIGN I

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. The incorporation of design elements and artwork to a space can create a calming environment able to improve occupant mood.

Intent: To thoughtfully create unique and culturally-rich spaces.



Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
P	P	P

PART 1: BEAUTY AND MINDFUL DESIGN

The project contains features intended for all of the following:

a.[13] Human delight.

b.[13] Celebration of culture.

c.[13] Celebration of spirit.

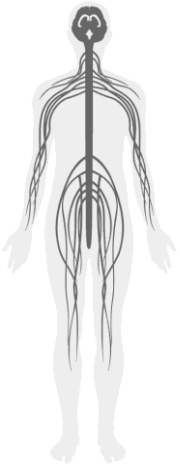
d.[13] Celebration of place.

e.[13] Meaningful integration of public art.

88

BIOPHILIA I - QUALITATIVE

Until relatively recently in human history, people had constant interaction with living things and their natural surroundings. Biophilia, or the idea that humans have an affinity towards the natural world, is an emerging field that aims to address our psychological need to be around life and life-like processes. Exposure to views and images of nature can help to speed up healing and recovery time, boost positive feelings and reduce negative ones. Interior environments that are cold, sterile and devoid of life, on the other hand, can diminish our experience, mood and happiness. Modeled after the Living Building Challenge, the biophilia requirements involve conducting historical, cultural, ecological and climatic studies to inform biophilic elements and creating a biophilic framework that tracks biophilia at each design phase of the project.



Nervous

Intent: To nurture the innate human-nature connection within the project.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: NATURE INCORPORATION	O	P	P
PART 2: PATTERN INCORPORATION	O	P	P
PART 3: NATURE INTERACTION	O	-	P

PART 1: NATURE INCORPORATION

A biophilia plan is developed that includes a description of how the project incorporates nature through the following:

a.[13] Environmental elements.

b.[13] Lighting.

c.[13] Space layout.

PART 2: PATTERN INCORPORATION

A biophilia plan is developed that includes a description of how the project incorporates the following:

a.[13] Nature's patterns throughout the design.

PART 3: NATURE INTERACTION

A biophilia plan is developed that provides sufficient opportunities for human-nature interactions:

a.[13] Within the building.

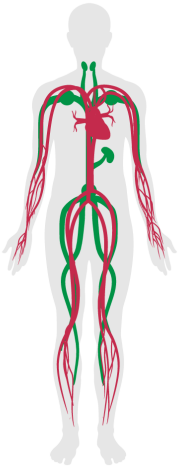
b.[13] Within the project boundary, external to the building.

89

ADAPTABLE SPACES

Healthy work environments should be designed to mitigate stress and optimize productivity, and should therefore be sufficiently adaptable to working, focusing, collaborating and resting as needed. Research demonstrates that the presence of a variety of workspaces that enable individuals to adjust their environments and choose the degrees of engagement is associated with job satisfaction and group cohesiveness.

Intent: To reduce distractions, mitigate stress and enable focused work by integrating a stimuli management program within the building.



Cardiovascular
Immune

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: STIMULI MANAGEMENT	-	O	O

PART 1: STIMULI MANAGEMENT

Seating and spatial layouts are organized into separate workplace zones and provide differing degrees of sensory engagement. Regularly occupied spaces of 186 m² [2,000 ft²] or larger provide documentation of methods used to establish appropriate zones based on the below guidelines:

a. A programing 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.

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

c. Designated quiet zones are provided as enclosable or semi-enclosable rooms with no more than 3 seats per room.

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

PART 2: PRIVACY	-	O	O

PART 2: PRIVACY

Areas greater than 1,860 m² [20,000 ft²] provide a designated quiet space for focus, contemplation and relaxation, which meets the following requirements:

a. Space is at minimum 7 m² [75 ft²] plus 0.1 m² [1 ft²] per regular building occupant, up to a maximum of 74 m² [800 ft²].

b.[183] Ambient lighting provides continuously dimmable light levels at 2,700 K or less.

c. Noise Criteria (NC) from mechanical systems is 30 or lower.

d. A plan is developed that includes a description of how the project incorporates two of the following elements into the space: (i) plant wall and/or floor plantings, (ii) audio device with nature sounds, (iii) variety of seating arrangements.

PART 3: SPACE MANAGEMENT

-	○	○

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

a. A workstation cabinet at a minimum volume of 0.1 m^3 [4 ft^3] for each regular occupant.

b. A personal locker at a minimum volume of 0.1 m^3 [4 ft^3] for each regular occupant.

PART 4: WORKPLACE SLEEP SUPPORT

-	○	○

Short naps are an effective and healthy means for improving mental and physical acuity, even more so than caffeine, which can disrupt sleep. At least one of the following furniture options must be provided for the first 30 regular building occupants and an additional one for every 100 regular building occupants thereafter:

a. Couch.

b. Cushioned roll-out mat.

c. Sleep pod.

d. Fully reclining chair.

e. Hammock.

90

HEALTHY SLEEP POLICY

High quality sleep is essential to good health. Adequate sleep improves mental health, is necessary for maintaining sustained mental and physical performance throughout the day and can help prevent unhealthy weight gain. Insufficient sleep, on the other hand, has been associated with a higher risk of depression, diabetes, heart attack, hypertension and stroke. Adopting this feature demonstrates that the organization values sleep quality and understands its impact on overall worker productivity and well-being.

Intent: To support healthy sleep habits by discouraging occupants from working late at night and providing them with sleep support software.

Cardiovascular
Endocrine
Immune
Muscular

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	O	O

PART 1: NON-WORKPLACE SLEEP SUPPORT

The following requirements are met:

a. For non-shift work, introduce organizational cap at midnight for late night work and communications.

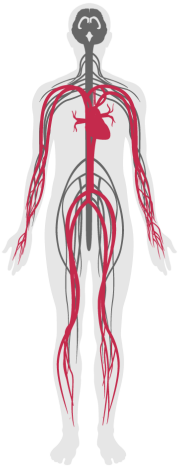
b. Provide employees with a 50% subsidy on software and/or applications that monitor daytime sleep-related behavior patterns such as activity levels, caffeine and alcohol intake, and eating habits.

91

BUSINESS TRAVEL

Business travel is often associated with a number of negative health outcomes. Research from the World Bank indicates that business travel is associated with higher total medical claim costs, with the highest increase attributed to psychological disorders related to stress. Additionally, findings indicate that the main stressors of business travel are impacts on family and personal life, jetlag, increased workload upon return and isolation from family and friends.

Intent: To minimize disruptions to occupants' sleep and fitness regimens, and personal relationships by adopting supportive travel policies.



Cardiovascular
Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: TRAVEL POLICY

In order to reduce stress related to business travel, employers promote the following policies:

a. Employees are provided the option to select non red-eye flights or are given the option to work remotely on the day of arrival from a red-eye flight.

b. Employees are not required to take business trips for which the total travel time (including lay-overs, wait times and travel to and from terminals) exceeds both 5 hours and 25% of the total trip duration.

c.[119] During long business trips (domestic travel lasting more than 2 weeks and international travel lasting more than 4 weeks), employees are given the time off and a budget to fly home for at least 48 hours or to fly a friend or family member to meet them.

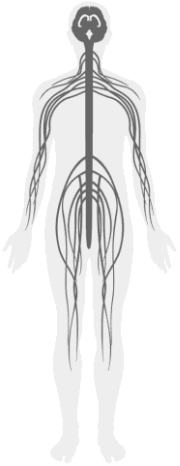
d.[119] Employees are booked at hotels with free fitness centers or reimbursed for any gym usage fees incurred during their travel.

92

BUILDING HEALTH POLICY

Protecting employee health is of the utmost importance since it impacts various aspects of work including productivity, concentration and even the health of coworkers. Employees often feel overwhelmed and unable to take appropriate rest or time away from work to recover. Workplace health policies can help support employees' physical and mental well-being, make adopting and maintaining healthy behaviors easier and create and foster a company culture promoting good health.

Intent: To protect the overall health and well-being of occupants and their families by adopting comprehensive health policies.



Nervous

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	O	O

PART 1: HEALTH BENEFITS

Employers provide at least three of the following to employees:

a.[185] Employer-based health insurance for part- and full-time workers, as well as their spouses and dependents, or subsidies to purchase individual insurance through an exchange.

b.[184] Flexible spending accounts.

c.[184] Health savings accounts.

d.[91] On-site immunizations or time off during the workday to receive immunizations.

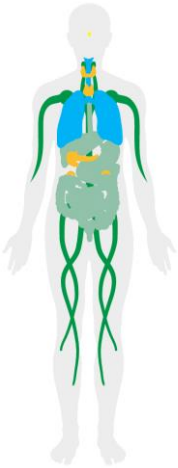
e.[20] Workplace policies that encourage ill employees to stay home or work remotely.

93

WORKPLACE FAMILY SUPPORT

Work-life balance can often be overlooked and personal lives neglected to work responsibilities. Family care policies ensure that employees are able to take the necessary time off for self-care and balance their work and personal lives in a healthy manner. Research shows that employees with extensive time-flexible policies report lower stress levels.

Intent: To ensure occupants are able to properly care for themselves and their families by adopting supportive family care policies.



Digestive
Endocrine
Immune
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: PARENTAL LEAVE	-	O	O

Employers provide the following:

a.[182] Paid paternity and maternity leave for 6 workweeks during any 12-month period.

b.[46] Additional 12 workweeks of paternity or maternity leave during any 12-month period.

PART 2: EMPLOYER SUPPORTED CHILD CARE	-	O	O

Employers provide at least one of the following:

a.[66] On-site child care centers compliant with local child care licensure.

b.[66] Subsidies or vouchers for child care.

PART 3: FAMILY SUPPORT	-	O	O

Employers provide the following:

a.[46] At least 12 workweeks of leave during any 12-month period for the care of a seriously ill child, spouse, domestic partner, parent, parent-in-law, grandparent, grandchild or sibling.

b.[51] The option to use paid sick time for the care of a child, spouse, domestic partner, parent, parent-in-law, grandparent, grandchild or sibling.

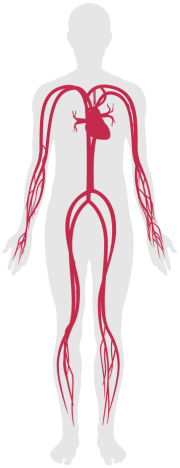
c.[51] All nursing mothers with break times of at least 15 minutes, every 3 hours.

94

SELF-MONITORING

Self-monitoring devices that accurately observe and quantify changes to the body over time show promise in promoting awareness of one's health status. These technologies can provide a powerful tool for gaining personal insight into the physiological states of the body, thereby encouraging positive behavioral and lifestyle changes. Monitoring food intake, weight and physical activity is a proven behavior therapy technique that can aid in weight loss and weight maintenance programs, promoting improved health and well-being.

Intent: To promote awareness of individual biomarkers associated with health and wellness.



Cardiovascular

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	○	○

PART 1: SENSORS AND WEARABLES

A sensor capable of measuring at least 2 of the following parameters is made available to each occupant for his/her personal use and is subsidized by at least 50%:

a.[94] Body weight/mass.

b.[62] Activity and steps.

c. Heart rate variability.

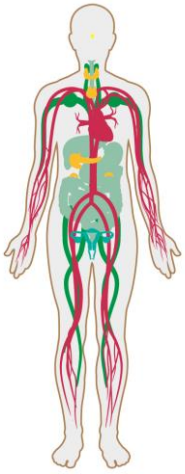
d. Sleep duration, quality and regularity.

95

STRESS AND ADDICTION TREATMENT

Chronic stress adversely impacts the body, from the nervous to the cardiovascular system. Substance addiction is one of the most damaging manifestations of stress, combining the toxicity of the substance itself with the mental distress associated with the social stigma of the disease. In recent years, refinements in addiction treatment and stress reduction therapies, as well as pharmacological interventions have been successful in helping to mitigate these debilitating conditions.

Intent: To avoid or mitigate substance use and addiction issues by providing access to stress management programs.



Cardiovascular
Digestive
Endocrine
Immune
Reproductive

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: MIND AND BEHAVIOR SUPPORT	-	O	O
PART 2: STRESS MANAGEMENT	-	O	O

PART 1: MIND AND BEHAVIOR SUPPORT

A program that addresses psychological and behavioral distress is made available to workplace occupants through:

a.[97] Employee Assistance Programs (EAPs) offering short-term treatment and referrals to qualified professionals for depression, anxiety, substance use, addiction and co-occurring mental health issues.

PART 2: STRESS MANAGEMENT

A stress management program is made available to occupants through:

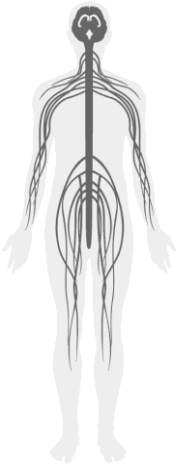
a. A qualified counselor offering group or private workshops and referrals.

96

ALTRUISM

Research demonstrates beneficial health and wellness outcomes associated with acts of generosity and charity. Volunteering fulfills many functions, providing a way for individuals to express their values, strengthen social relationships and gain career-related experience. The Mental Health Foundation states that helping others increases social support by increasing feelings of belonging, while decreasing feelings of isolation and loneliness. For these reasons, altruistic sentiments and behaviors are increasingly incentivized within the workplace.

Intent: To enhance community identity and promote social cohesion.



Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: CHARITABLE ACTIVITIES	-	○	○
PART 2: CHARITABLE CONTRIBUTIONS	-	○	○

PART 1: CHARITABLE ACTIVITIES

Individuals are given the option to take paid time off work to participate in volunteer activities as follows:

a. 8 hours of paid time organized by the employer for a registered charity twice a year.

PART 2: CHARITABLE CONTRIBUTIONS

Employers commit to the following:

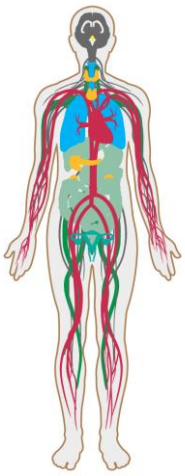
a. Contributing annually to a registered charity to match employee donations.

97

MATERIAL TRANSPARENCY

Just as consumers have a right to know the contents of the food they consume (whether to avoid allergic reactions or to make healthier nutrition choices), they should also have a right to know what is in the products and materials that make up the buildings they occupy. Due to the complex and multi-tiered nature of the global material production supply chain, little is known about the tens of thousands of chemicals in circulation today. This lack of data obscures necessary information required to identify potential hazards to the environment and human health. Demand for material ingredient disclosure at the consumer level pushes supply chain transparency and—even more importantly—supports innovation and green chemistry.

Intent: To promote material transparency along the supply chain.



Cardiovascular
Digestive
Endocrine
Immune
Integumentary
Nervous
Reproductive
Respiratory

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: MATERIAL INFORMATION	○	○	○
PART 2: ACCESSIBLE INFORMATION	○	○	○

PART 1: MATERIAL INFORMATION

At least 50% (as measured by cost) of interior finishes and finish materials, furnishings (including workstations) and built-in furniture have some combination of the following material descriptions:

a.[19] Declare Label.

b.[28] Health Product Declaration.

c.[1] Any method accepted in USGBC's LEED v4 MR credit: Building Product Disclosure and Optimization - Material Ingredients, Option 1: material ingredient reporting.

PART 2: ACCESSIBLE INFORMATION

The following condition is met:

a. All declaration information is compiled and made readily available to occupants either digitally or as part of a printed manual.

98

ORGANIZATIONAL TRANSPARENCY

Organizations that espouse fair, equitable and just treatment toward their workforce help create a culture of reduced stress and greater employee satisfaction, as well as a heightened sense of loyalty. Research shows that high levels of perceived justice in the decision making process at work are correlated with a lower risk of poor health, whereas declining levels of perceived justice can in turn increase such risk. By transparently sharing their policies and investment decisions, organizations not only allow employees, clients and patrons to determine if their personal values are shared by the organization, but also provide them the opportunity to voice their opinion about the organization's social equity practices.

Intent: To promote economic and social equity by requiring the adherence to and disclosure of fair and equitable business practices.

Core and Shell	New and Existing Interiors	New and Existing Buildings
-	O	O

PART 1: TRANSPARENCY PROGRAM PARTICIPATION

The entity seeking WELL certification or WELL compliance must participate in one of the following programs, and results must be publicly available within the project premises and on the entity's website:

a.[72] The JUST program operated by the International Living Future Institute (for more information, see www.justorganizations.com).

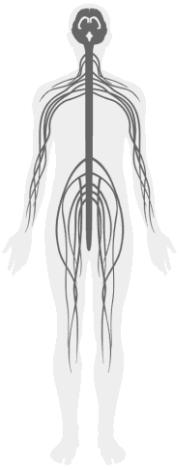
b.[181] Sustainability reporting following the G4 Sustainability Reporting Guidelines organized by the Global Reporting Initiative (for more information, see www.globalreporting.org).

99

BEAUTY AND DESIGN II

A beautiful and meaningful space in which design aesthetics are expressly considered can have a positive impact on occupant morale and mood. Elements that provide visual complexity, balance and proportion can impart a sense of comfort, ease and potentially mitigate stress.

Intent: To promote occupant comfort and spatial familiarity by designing spacious, familiar and aesthetically appealing spaces.



Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: CEILING HEIGHT	○	○	○
PART 2: ARTWORK	○	○	○

PART 1: CEILING HEIGHT

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:

a.[96] Rooms of 9 m [30 ft] width or less have ceiling height of at least 2.7 m [8.8 ft].

b. Rooms of greater than 9 m [30 ft] width have ceiling height of at least 2.75 m [9 ft] plus at least 0.15 m [0.5 ft] for every 3 m [10 ft] over 9 m [30 ft].

c. 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 2.75 m [9 ft] for a room width of 12 m [40 ft] plus at least 0.15 m [0.5 ft] for every 4.5 m [15 ft] over 12 m [40 ft].

PART 2: ARTWORK

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:

a. Entrances and lobbies.

b. All regularly occupied space greater than 28 m^2 [300 ft^2].

PART 3: SPATIAL FAMILIARITY

○	○	○

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 929 m² [10,000 ft²] or larger through use of the following elements:

a. Artwork that is distinct in shape and color.

b. Visually grouped zones or areas that use the following unifying design components: (i) lighting, (ii) furniture color and (iii) flooring pattern/color.

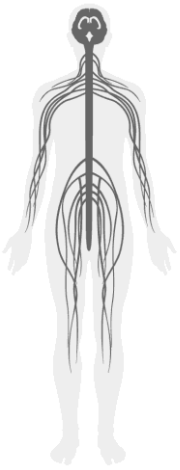
c. Corridors over 9 m [30 ft] in length end in artwork or a view window to the exterior with a sill height no taller than 0.9 m [3 ft] from the floor and with at least a 30 m [100 ft] vista.

100

BIOPHILIA II - QUANTITATIVE

Biophilia supports the idea that humans have an affinity towards the natural world. Evidence on the emotional and psychological benefits of nature is mounting. Research indicates that the experience of nature or nature-derived patterns can improve experience, mood and happiness.

Intent: To support occupant emotional and psychological well-being by including the natural environment in interior and exterior design.



Nervous

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: OUTDOOR BIOPHILIA	○	○	○
PART 2: INDOOR BIOPHILIA	-	○	○
PART 3: WATER FEATURE	○	○	○

PART 1: OUTDOOR BIOPHILIA

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

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

b.[95] Consists of, at minimum, 70% plantings including tree canopies (within the 25%).

PART 2: INDOOR BIOPHILIA

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

a.[95] Potted plants or planted beds cover at least 1% of floor area per floor.

b.[95] 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.

PART 3: WATER FEATURE

At least one water feature for every 9,290 m² [100,000 ft²] in projects larger than 9,290 m² [100,000 ft²] which meets the following requirements:

a.[95] At least 1.8 m [5.8 to 6 ft] in height or 4 m² [43 ft²] in area.

b. Ultraviolet sanitation or other technology to address water safety.

INNOVATION

101-105

INNOVATION FEATURES

As the scientific understanding of health continues to evolve, so too does the ability to address complex issues of promoting wellness through the built environment. Recent discoveries in neuroscience, for example, have led to new insights in light's impact on the human brain, opening the door for addressing sleep disruption through improvements in lighting design. It is likely that similar discoveries will continue to be made. The WELL Building Standard embraces the creative thinking that is needed to address the complex ways in which interior spaces contribute to health and wellness.

Intent: To promote the continuous evolution of the Standard by enabling projects to propose a new feature that addresses health and wellness in a novel way.

	Core and Shell	New and Existing Interiors	New and Existing Buildings
PART 1: INNOVATION PROPOSAL	○	○	○
PART 2: INNOVATION SUPPORT	○	○	○

PART 1: INNOVATION PROPOSAL

The feature meets one of the following requirements:

a. Describes how a feature normally not applicable to this project type is relevant to this project.

b. Relates to the wellness concept in a novel way that is not already covered in the WELL Building Standard.

PART 2: INNOVATION SUPPORT

The feature is supported by the following:

a. The feature is fully substantiated by existing scientific, medical and industry research, and is consistent with applicable laws and regulations and leading practices in building design and management.

Appendix A: Glossary

General Terms

Acute Exposure	Single exposure to an environmental condition (not lasting more than a day). Acute exposures contrast with chronic exposures, which are prolonged and repeated. Single exposures still have effects on health.
Allergic Reaction	An exaggerated or pathological reaction (sneezing, respiratory irritation, itching or skin rashes) to substances that are without comparable effect on the average individual.
Alveoli	Small thin-walled air-containing compartments of the lung that are typically arranged in saclike clusters that give the tissue a honeycomb appearance and expand its surface area for the purpose of air exchange.
Alzheimer's Disease	A type of dementia marked by the loss of cognitive ability, affecting memory, thinking and behavior generally over a period of 10 to 15 years.
Asthma	Chronic inflammatory disease of the airways. Asthma attacks are often triggered by exposure to allergens, and during an attack the airways spasm, alternatively swelling and narrowing, causing the individual to wheeze or gasp for air.
Building Envelope	The separation between the interior and the exterior environments of a building, restricting transfer of air, water, heat, light, noise and creatures.
Chronic Diseases	Any disease that is persistent or has long-lasting health effects.
Chronic Exposure	Repeated, continuous exposure to a substance or condition over an extended period from several years to a lifetime.
Circadian Rhythms	Internal clock that keeps the body's hormones and bodily processes on a roughly 24-hour cycle, even in continuous darkness.
Collaboration Zone	A physical area within a building that encourages group interplay and discussion though its strategic layout and design.
Cone Cells	Photosensitive cells in the eye used to differentiate colors and brightness in moderate and high levels of illumination.
Diabetes	A group of diseases that impact the metabolism due to insufficient insulin production (Type 1) and/or high insulin resistance (Type 2), and a leading cause of death. Results in poor blood sugar control, frequent urination, increased thirst, increased hunger and other symptoms.
Environmental Product Declaration (EPD)	Quantified environmental data for a product with pre-set categories of parameters based on the International Organization of Standards (ISO) 14040 series of standards, but not excluding additional environmental information.
Fenestration	An opening in a surface (as a wall or membrane).
Focus Zone	A physical area within a building that encourages concentration and attentiveness to a task among occupants though its strategic layout and design.
Free Address	Ability for occupants to be able to choose their own workspace within the office or workplace.
Fungi	Any of a group of unicellular, multicellular or syncytial spore-producing organisms feeding on organic materials.
Glazing	Glasswork, which must be carefully designed in order to avoid excessive glare and heat gain.
Health Product Declaration (HPD)	A standard format for reporting product content and associated health information for building products and materials.
Heart Disease	A class of disease that affects the heart, arteries, capillaries or veins.
Heating, Ventilating, and Air Conditioning System (HVAC)	Equipment, distribution systems and terminals that provide the processes of heating, ventilating or air conditioning.
High Efficiency Particulate Air (HEPA) Filter	Filter which removes 99.97% of all particles greater than 0.3 micrometers and satisfies standards of efficiency set by the Institute of Environmental Sciences and Technology.
High-touch Surfaces	Surfaces that are frequently touched by building users and occupants such as door knobs, hand rails and tables. See Table A1.
Homeostasis	A state of having regulated responses to environmental conditions to retain stability.
Immune System	The integrated body system of organs, tissues, cells and cell products such as antibodies that differentiates self from non-self and neutralizes potentially harmful organisms or substances.
Immuno-compromised	An inability to develop a normal immune response, usually as a result of disease, malnutrition or medical therapy that affects the immune system.

Inflammation	Localized protective reaction of tissue to irritation, injury or infection, characterized by pain, redness, swelling and sometimes loss of function.
Intrinsically Photoreceptive Retinal Ganglion Cells (ipRGCs)	Relay environmental light levels to the suprachiasmatic nucleus through the retinohypothalamic tract. Most sensitive to blue light.
Liver	An organ that plays a vital role in a range of important metabolic processes including detoxification, protein synthesis and glycogen storage.
Malnutrition	A condition that results from insufficient nutrient intake, excess nutrient intake or nutrient intake in the wrong proportions.
Metabolic	Any biochemical process that occurs within an organism that is necessary to sustain life.
Metabolic Syndrome	A cluster of medical conditions or risk factors that increase the chances of developing cardiovascular disease, diabetes fatty liver disease and several cancers.
Metamers	Different spectral distributions of light which produce the same response on the cones and are therefore visually identical.
Nanoparticles	Particles between 1 and 100 nanometers in size.
Nap Pod	A personal dedicated resting space optimized to offer a short but regenerative sleep.
National Ventilation Procedure	ANSI/ASHRAE Standards 62.1 is the recognized standard for ventilation system design and acceptable procedure with regards to establishing an effective ventilation system.
Neurocognitive Diseases	Diseases of the brain and nervous system.
Newly Installed	Products or materials applied or installed within one year prior to the WELL Performance Verification are considered to be newly installed.
Obesity	A medical condition in which the accumulation of excess adipose tissue poses an adverse effect on health.
Occupational Safety and Health Administration (OSHA)	Outlines current indoor air quality guidelines for the workplace.
Pathogen	An infectious biological agent such as bacteria, virus and fungus that is capable of causing disease in its host.
Photocatalytic oxidation (PCO)	Achieved when you combine UV light rays with a TiO2-coated filter.
Public Health Goals (PHGs)	Unenforced regulations developed by California Office of Environmental Health Hazard Assessment. Similar in concept to the EPA's Maximum Contaminant Level Goal (MCLG).
Radioactivity	The energy and particles which are released during the decomposition process of atomic nuclei is called radiation.
Regularly Occupied Space	An area or areas where workers or other building occupants perform focused activities inside a building for an average of one hour a day or more.
Respiratory Failure	Inadequate gas exchange by the respiratory system, with the result that oxygen and/or carbon dioxide levels leaving the heart cannot be maintained within their normal ranges.
Retina	Light-sensitive membrane found at the back end of the eyeball that receives the image produced by the lens.
Rod Cells	Photosensitive cells in the eye used to discern peripheral vision in low levels of illumination.
Sick Building Syndrome (SBS)	A set of symptoms, such as headache, fatigue, eye irritation and breathing difficulties, that typically affect workers in modern airtight office buildings, and that are believed to be caused by indoor pollutants and poor environmental control.
Sleep Hygiene	Personal habits and practices that help maximize sleep quality.
Tissues	A group of cells that perform a common and specified function. At an organizational level, tissues are between cells and organs.
Toxicity	Extent to which a substance is harmful to a living thing.
Trail	Any outdoor pathways designated for pedestrian or biker use.
Ultraviolet Germicidal Irradiation (UVGI)	A sterilization method that uses ultraviolet (UV) light to break down microorganisms by destroying their DNA. Often used in a variety of applications, such as food, air and water purification.
Universal Design (UD)	Designing objects and spaces with aesthetically pleasing while maximizing accessibility, usability and operability regardless of the user's age, ability and other factors.
Ventilation Rate	Rate of exchange of outside air, as well as the circulation of air within the building.

Wayfinding	Act of spatial problem solving.
Weather Resistant Barrier (WRB)	A sheet, spray- or trowel-applied membrane or material layer that prevents the passage of liquid water even after long or continuous exposure to moisture.
Zeitgebers	Physical stimuli which have an impact on the body's circadian rhythm. Examples include light, temperature and eating or drinking behaviors.

Substances

2,4-Dichlorophenoxyacetic Acid (2,4-D)	A major herbicide that is very susceptible to running off or leaching into ground and surface water sources.
Acrylamides	A potentially toxic and potentially cancer-causing substance that can be naturally present in uncooked, raw foods in very small amounts.
Aerosols	Substances consisting of very fine particles of a liquid or solid suspended in a gas. For example, mist which consists of very fine droplets of water in air.
Allergen	Environmental substance that can produce an allergic reaction in the body but may not be intrinsically harmful. Common allergens include pollen, animal dander, house dust, feathers and various foods.
Antibody	Proteins generally found in the blood that detect and rid the body of potentially damaging organisms, such as bacteria and viruses.
Antimony	A naturally occurring metal found in ore deposits; the most common form of antimony is antimony trioxide, which is used as a flame retardant.
Arsenic	An element found in the earth's crust that has applications in various industrial processes, however runoff from factories, agricultural practices and natural deposits can lead to high concentrations in water.
Asbestos	A naturally occurring mineral that was commonly used in insulation because of its chemical and flame resistance, tensile strength and sound absorption properties. It is now known to be a leading cause of mesothelioma and lung cancer.
Atrazine	Among the most widely used pesticides in the United States and among the most commonly detected pesticide in drinking water.
Benzene	Widely used as a precursor to various materials such as detergents, dyes, pesticides, Styrofoam, nylon and other synthetic fibers.
Carbohydrate	Any of a group of organic compounds that includes sugars, starches, celluloses and gums and serves as a major energy source to support bodily functions and physical activity. Easily digestible carbohydrates found in white bread, pastries and soda may contribute to weight gain and promote diabetes and heart disease.
Carbon Monoxide	Colorless, odorless and highly poisonous gas formed by incomplete combustion. Replaces oxygen in hemoglobin, limiting blood's ability to deliver oxygen and can lead to death.
Carcinogens	A compound that increases the risk of developing cancer.
Chloramine	A disinfectant formed when ammonia is added to chlorine and is commonly used as a secondary disinfectant in public water systems.
Chlorine	A highly irritating, greenish-yellow gaseous halogen, capable of combining with nearly all other elements, produced principally by electrolysis of sodium chloride and used widely to purify water, as a disinfectant and bleaching agent.
Coarse Particles	Particulate matter larger than 2.5 micrometers and smaller than 10 micrometers in diameter; also called PM_{10}. Often found near roadways and dusty industries.
Copper	Metallic element that enters water sources through natural deposits, but contamination most commonly occurs through corrosion of copper or brass.
Cortisol	A hormone that plays a primary role in stress, during which it increases blood sugar, suppresses the immune system and aids in protein, fat and carbohydrate metabolism. Also undergoes diurnal variation, playing an important role in the sleep-wake cycle.
Decorative Glazing	Coating on window surfaces purely for aesthetic purposes with no other functionality.
Ethylbenzene	A naturally occurring component of crude oil and a combustion byproduct.
Fine Particles	Particulate matter 2.5 micrometers in diameter or smaller. Can be directly emitted from combustion sources such as forest fires or can form when gases emitted from power plants, industries and automobiles react in the air. Also called $PM_{2.5}$
Flame Retardants	Chemicals used in thermoplastics, thermosets, textiles and coatings that inhibit or resist the spread of fire. Some of these chemicals have been linked to cancer, delayed development, low IQ and thyroid disruption.

Food Additives	Substances typically added to processed foods to enhance or preserve flavor or appearance.
Formaldehyde	A colorless gas compound, HCHO. Used for manufacturing melamine and phenolic resins, fertilizers, dyes and embalming fluids as preservatives and disinfectants.
Fructose	A simple sugar that is found naturally in small amounts in fruits and vegetables, but which occurs in extremely large quantities in many modern foods. High fructose intake has been implicated in liver disease, inflammation, metabolic syndrome, diabetes, heart disease and cancer.
Fungicides	Chemicals applied to crops or structures to reduce the harmful effects of mold, mushrooms and other fungi.
Glucose	A simple sugar that occurs widely in most plant and animal tissue. It is the principal circulating sugar in the blood and the major energy source of the body. Once eaten, carbohydrates break down immediately into glucose. Elevated blood glucose levels are one of the distinguishing elements of diabetes.
Glyphosate	A non-selective herbicide used in many pesticide formulations; exposure may result from its normal use due to spray drift, residues in food crops and from runoff into drinking water sources.
Haloacetic Acid	When chlorine and chloramine are added to water and react with other organic matter to produce haloacetic acids known as a disinfectant byproduct (DBP), these can damage internal organs and the nervous system in elevated concentrations and can lead to cancer.
Herbicides	A group of pesticides commonly used on farms and lawns to eliminate weeds from the fields.
Hormones	A chemical released by a cell, gland or organ that transmits a signal to another part of the body.
Hydrogenation	Made by forcing hydrogen gas into oil at high pressure in order to increase the shelf life and prevent rancidity of an oil.
Inorganic Chemicals	Refers to a chemical compound that is not "organic". Broadly, compounds not containing carbon.
Iron	Necessary for healthy blood circulation, but excessive iron particles in water can provide a shelter for disease-causing bacteria.
Lead	A naturally occurring metal found deep within the ground. Used in creation of old pipes, ceramics and paint. Also the stable final element of uranium's radioactive decay series.
Manganese	Small amounts are required for a healthy diet, but higher amounts may cause neurological damage.
Melatonin	"Darkness hormone" whose levels in the body is regulated by the circadian rhythm and the presence of light and in humans acts a driver for sleep.
Mercury	A naturally-occurring poisonous metal element which occurs naturally in the earth's surface.
Microflora	Bacteria and microscopic algae and fungi, especially those living in a particular site or habitat.
Nickel	Enters groundwater and surface water by dissolution of rocks and soils, from atmospheric fallout and biological decays and waste disposal.
Nitrogen Dioxide (NO_2)	A product of combustion mainly found near burning sources (for instance, wood smoke and traffic combustion).
Nutrient	A chemical that is required for metabolic processes, which must be taken from food or another external source. Macronutrients taken from food sources include carbohydrates, proteins, fats and vitamins.
Organic Chemicals	Broadly refers to chemical compounds that possess carbon-based atoms, generally found in biological systems.
Oxidized Lipids	A lipid, any of a diverse group of organic compounds including fats, oils, hormones and certain components of membranes that are grouped together because they do not interact appreciably with water, combined chemically with oxygen.
Ozone	Triatomic form of oxygen. Hazardous to the respiratory system at ground level, but a layer in the upper atmosphere blocks much of the ultraviolet radiation from the sun.
Partially Hydrogenated Oil	Vegetable oils that have been hydrogenated or partially hydrogenated for the purpose of being solid at room-temperature, which contain trans-fats.
Particulate Matter	A complex mixture of elemental and organic carbon, salts, mineral and metal dust, ammonia and water that coagulate together into tiny solids and globules.
Perfluorinated Compound (PFC)	A family of fluorine-containing chemicals with unique properties to make materials stain- and stick-resistant.
Petrochemical	A chemical that is made from petroleum or natural gas.
Polychlorinated Biphenyls (PCBs)	A former commercially produced synthetic organic chemical compound that may be present in products and materials produced before the 1979 PCB ban.

Polyunsaturated Fat	Polyunsaturated fats are among the "good" fats that can help reduce cholesterol levels and risk of heart disease and stroke. Polyunsaturated fats are found in sunflower, corn, soybean and flaxseed oils, walnuts and many fish.
Polyurethane	A synthetic resin used chiefly in paints and varnishes. Diisocyanates in polyurethane products can be toxic if inhaled or touched during installation.
Polyvinyl Chloride (PVC)	An inexpensive plastic that is widely used for many objects. Exposure to its chemical precursors, additives and products of combustion can be harmful.
Radon	Radioactive, carcinogenic noble gas generated from the decay of natural deposits of uranium.
Saturated Fat	Typically solid at room temperature, saturated fats are found in high concentrations in salmon, butter, bacon, beef and cheese.
Serotonin	Neurotransmitter hormone produced in the gut and brain stem which regulates mood, sleep and digestion.
Simazine	Widely used in agriculture as an herbicide to control weeds; high levels of simazine exposure over a short period can cause weight loss and blood damage.
Sodium	Sodium is consumed as sodium chloride in common salt. It is a vital nutrient, but unhealthy in high amounts.
Sulfate	Sulfates occur naturally and can erode into water supplies; the health effects of sulfates are uncertain, but ingesting large amounts has been linked to negative health effects.
Tetrachloroethylene	A chlorinated hydrocarbon used as a dry cleaning solvent, an additive in textile processing and metal degreasing that has been linked to cancer.
Toxicant	Any toxic substance, generally created by human activity.
Toxin	A poisonous substance produced by a living organism.
Trihalomethane	Chlorine in water can combine with organic matter to form compounds called disinfectant byproducts (DBPs), such as trihalomethanes.
Ultrafine Particles	Also called nanoparticles, ultrafine particles are a subcategory of $P_{2.5}$ which are exclusively less than 0.1 µm. Due to the small size they are often airborne and can easily reach the alveoli of the lungs.
Urea-formaldehyde (UF)	A low-cost thermosetting resin that is used in the wood product industry.
Volatile Organic Compounds (VOCs)	Organic, and therefore carbon and hydrogen containing, materials which evaporate and diffuse easily at ambient temperature. VOCs are emitted by a wide array of building materials, paints and common consumer products.
Xylene	Typical applications include solvents for the printing, rubber and leather industries as well as ingredients in paper and fabric coatings.

Units and Measures

Air Changes Per Hour (ACH)	A measure of how many times the volume of air within a defined space is replaced, used in the context of building ventilation and air tightness.
Annual Sunlight Exposure (aSE)	Percentage of space in which the light level from direct sun alone exceeds a pre-defined threshold (such as 1000 lux) for some quantity of hours (such as 250) in a year.
A-Weighted Decibel (dBA)	Acoustic decibel modified using "A-weighting" to adjust the frequency-dependent response of human hearing.
Candela (cd)	Measurement of luminous intensity and the SI base unit of light.
Clothing Insulation (CLO)	Clothing insulation is the resistance to heat transfer provided by clothing measured in clo (1 clo = 0.155 m^2K/W = 0.88°F ft^2h/BTU).
Color Rendering Index (CRI)	Comparison of the appearance of 8 to 14 colors under a light source in question, to a blackbody source of the same color temperature. CRI or Ra refers to the average of the first 8 comparisons and R9 describes the lighting accuracy on red surfaces.
Correlated Color Temperature (CCT)	Spectral distribution of electromagnetic radiation of a blackbody at a given temperature. For example, the color temperature during the daytime is approximately 15,000 K, while during sunset is approximately 1,850 K.
Cubic feet per minute (CFM)	Measures the mass of gas that passes through a certain point.
Decibel (dB)	A unit of measurement for sound. The decibel is a logarithmic unit so an increase in 10 decibels equals an increase by a factor of 10.
Dry Bulb Temperature (DBT)	Temperature of air measured by a thermometer freely exposed to the air but shielded from radiation and moisture. This temperature is usually thought of as air temperature and it is the true thermodynamic temperature. Dry bulb temperature does not take humidity into account.

Equivalent Continuous Level (LAeq)	The time averaged sound pressure level on the A-weighted scale, converted to decibels.
Equivalent Melanopic Lux (EML)	A measure of light used to quantify how much a light source will stimulate melanopsin's light response.
Footcandle (fc)	Unit of illuminance, equivalent to one lumen per square foot.
Frequency (f)	The number of times an event repeats itself per a specified unit of time. Hertz (Hz) is a common unit for frequency and equals cycles per second i.e. 1 Hz = 1 cycle/second. Most commonly used with waves (sound and light) and is the number of times the wave repeats itself at its particular wavelength.
Illuminance (Lux)	Amount of light passing through a given area in space. Measured in lux or foot-candles.
Impact Insulation Class (IIC)	Extent to which a physical structure blocks out sound, typically used in describing flooring, a higher IIC reduces footfall noise, and other impact sounds.
Light Reflectance Value (LRV)	Rating from 0 (black) to 100 (white) describing the amount of visible and usable light that reflects from (or absorbs into) a painted surface.
Lumens	Measure of luminous flux, derived from the SI base unit candela, and therefore weighted to the eye's sensitivity to light; 1 W of light at 555 nm equates to 683 lumens.
Luminance (cd/m²)	Measurement of how bright a surface or light source will appear to the eye. Measured in candela/m² or foot-lamberts.
Luminous Flux	Total luminous output of a light source, measured in lumens. Weighted to the eye's visual sensitivity.
Luminous Intensity	Radiant power weighted to human vision, describing light emitted by a source in a particular direction. Measured by the candela.
Lux	Unit of illuminance, one lux being equivalent to one lumen per square meter.
Maximum Contaminant Level Goal (MCLG)	Concentration of a substance in drinking water believed to result in no adverse effects. Derived from on Population Adjusted Dose and estimated daily water consumption, fraction of exposure from water and body weight.
Maximum Contaminant Levels (MCL)	Enforceable water quality limits for a substance, based on the Maximum Contaminant Level Goal, but taking into account technology and cost limitations of treatment.
Mean Radiant Temperature (MRT)	The uniform surface temperature of an imaginary black enclosure in which an occupant would gain or lose the same amount of radiant heat as in the actual non-uniform space; MRT is a primary driver of human thermal comfort, roughly equal in influence to air temperature.
Metabolic Rate (MET)	Rate that chemical energy in the body is converted to heat and mechanical energy.
Micro-Ra	Roughness rating of a physical surface, averaged in micro-meters & micro-inches.
Milliwatt (mW)	Unit of measurement for electromagnetic radiation, equal to 1/1000 watt. Not weighted to biological responses such as vision.
Minimum Efficiency Reporting Value (MERV)	Value assigned to an air filter to describe the amount of different types of particles removed when operating at the least effective point in its life.
Nephelometric Turbidity Units (NTU)	Measure the turbidity of water.
Noise Criteria (NC)	Define the sound pressure limits of the octave band spectra ranging from 63-8000 Hz. The noise criteria equals the lowest curve which is not exceeded in the spectrum.
Noise Isolation Class (NIC)	Field test for determining the sound transmitting abilities of a wall. Higher NIC values indicate better sound insulation i.e. more effective sound cancellation between spaces. NIC specifications are defined in ASTM Standard E366.
Noise Reduction Coefficient (NRC)	Average value that determines the absorptive properties of materials.
Parts per Billion (PPB)	Measurement of the mass of a chemical or contaminate per unit volume of water.
Parts Per Million (PPM)	A unit of measurement to express very dilute concentrations of substances.
PicoCurie per Liter (pCi/L)	A non-SI unit of radioactivity.
Relative Humidity (rH)	Ratio of partial pressure of water vapor in the air to the saturation pressure of water vapor at the same temperature and pressure.
Reverberation Time (RT)	Time it takes for sound to decay. The most commonly used reverberation time is RT60, the time it takes for the sound level to decrease 60 decibels. Additional reverberation time measurements are RT20 and RT30, for decreases of 20 and 30 decibels, respectively.

Sound Pressure Level (SPL)	Sound pressure level (SPL), also known as acoustic pressure, is the pressure variation associated with sound waves. Usually measured in decibels, the acoustic pressure is a ratio between the measured value and a reference value; a common reference is threshold of hearing or the minimum sound level that the average person can hear.
Sound Transmission Class (STC)	A laboratory method for determining the sound transmission through a wall. Higher STC values indicate more effective noise isolation than lower ones. STC specifications are found in ASTM Standards E90-09 and E1425.
Spatial Daylight Autonomy (sDA)	Percentage of floor space where a minimum light level (for example 300 lux) can be met completely for some proportion (for example 50%) of regular operating hours by natural light.
Visible Transmittance (VT)	Amount of light in the visible portion of the spectrum that passes through a glazing material.
Walk Score®	A measurement that takes into account a building inhabitants' physical output; it is recommended a building obtains a Walk Score® of 70 or greater.
Wavelength (λ)	The distance between two points on a wave in which the wave repeats itself. Often used to describe light waves.
$\mu g/m^3$	The concentration of an air pollutant (e.g. ozone) is given in micrograms (one-millionth of a gram) per cubic meter air or µg/m3.

Appendix B: Standards Citations

Citations are organized by the endnote number found next to each Requirement letter in the WELL Building Standard. The reference codes below the citation refer to a specific Feature number, Part number and Requirement letter.

1 U.S. Green Building Council. *LEED v4: Reference Guide for Building Design and Construction*. Washington D.C.: U.S. Green Building Council; 2013: 37, 43-44, 541-552, 567, 605, 623, 645-53, 658-61, 682-3, 685-6, 723-4.

1.1.a USGBC's LEED v4: Reference Guide for Building Design and Construction EQ Credit: Indoor Air Quality Assessment requires demonstration of formaldehyde levels less than 27 ppb.

1.1.b USGBC's LEED v4: Reference Guide for Building Design and Construction EQ Credit: Indoor Air Quality Assessment requires demonstration of total VOC levels less than 500 µg/m³.

2.2.a USGBC's LEED v4 EQ prerequisite: Environmental Tobacco Smoke requires prohibition of smoking outside the building except in designated smoking areas located at least 25 feet from all entries, outdoor air intakes and operable windows.

4.1.a Adherence to CARB SCM for Architectural Coatings or SCAQMD Rule 1113 satisfies the requirements for VOC content but not the emissions requirement of USGBC's LEED v4 EQ Credit: Low-Emitting Materials for wet-applied products.

4.1.b USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires that 90%, by volume, for emissions of paints and coatings applied to walls, floors and ceilings are tested and determined compliant with CDPH Standard Method v1.1-2010.

4.1.c USGBC's LEED v4 EQ Credit: Low Emitting Materials suggests projects outside the U.S. meet applicable national VOC control regulations or conduct testing of VOC content in accordance with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

4.2.a USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires that adhesives and sealants wet-applied on site meet the applicable VOC limits of the SCAQMD Rule 1168, in addition to emissions requirements.

4.2.b USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires that 90% of interior adhesives and sealants, for emissions, applied on site are tested and determined compliant with CDPH Standard Method v1.1-2010.

4.2.c USGBC's LEED v4 EQ Credit: Low Emitting Materials suggests projects outside the U.S. meet applicable national VOC control regulations or conduct testing of VOC content in accordance with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

4.3.a USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires flooring ofollow the test method and meet the emissions criteria of CDPH Standard Method v1.1-2010.

4.4.a USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires insulation follow the test method and meet the emissions criteria of CDPH Standard Method v1.1-2010.

4.5.a USGBC's LEED v4 EQ Credit: Low-Emitting Materials requires furniture and furnishings to comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard sections 7.6.1 and 7.6.2, and be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011.

5.2.a USGBC's LEED v4 EQ Credit: Enhanced Indoor Air Quality Strategies requires ventilation systems for outdoor air with particle filters to have a MERV of 13 or higher or Class F7 or higher (CEN Standard EN 779-2002) particle air filters.

7.1.a USGBC's LEED v4 EQ Credit: Construction Indoor Air Quality Management Plan requires adherence to certain SMACNA guidelines, including sealing all ductwork, registers, diffusers, and returns when stored on site or not in service.

7.2.a USGBC's LEED v4 BD+C EQ Credit: Construction Indoor Air Quality Management Plan requires the the replacement of all filtration media with new filters before occupancy.

7.3.a USGBC's LEED v4 BD+C EQ Credit: Construction Indoor Air Quality Management Plan requires that absorptive materials stored on-site and installed are protected from moisture damage.

7.4.a USGBC's LEED v4 EQ Credit: Construction Indoor Air Quality Management Plan requires adherence to certain SMACNA guidelines, including sealing doorways and windows, or tenting off areas as needed using temporary barriers, such as plastic separations.

7.4.b USGBC's LEED v4 EQ Credit: Construction Indoor Air Quality Management Plan requires adherence to certain SMACNA guidelines, including the provision of walk-off mats at entryways to reduce introduced dirt and pollutants.

7.4.c USGBC's LEED v4 EQ Credit: Construction Indoor Air Quality Management Plan requires adherence to certain SMACNA guidelines, including the use of dust guards and collectors on saws and other tools.

8.1.a USGBC's LEED v4: Reference Guide for Building Design and Construction EQ Credit: Enhanced Indoor Air Quality Strategies requires permanent entry walk-off systems.

8.1.b USGBC's LEED v4: Reference Guide for Building Design and Construction EQ Credit: Enhanced Indoor Air Quality Strategies requires permanent entry walk-off systems.

8.1.c USGBC's LEED v4: Reference Guide for Building Design and Construction EQ Credit: Enhanced Indoor Air Quality Strategies requires permanent entry walk-off systems.

11.5.a USGBC's LEED v4 For Healthcare: MR prerequisite, PBT Source Reduction - Mercury bans the use of mercury containing equipment, including thermostats, switching devices and other building systems in new construction (of healthcare facilities).

11.5.b USGBC's LEED v4 For Healthcare: MR prerequisite, PBT Source Reduction - Mercury recommends phasing out mercury products and upgrading current mercury-containing lamps to low mercury or mercury-free lamp technology in renovating healthcare facilities.

11.5.c USGBC's LEED v4 For Healthcare: MR prerequisite, PBT Source Reduction - Mercury recommends that projects only specify and install illuminated exit signs that use Light Emitting Diode (LED) or Light-Emitting Capacitor (LEC) lamps.

11.5.d USGBC's LEED v4 For Healthcare: MR prerequisite: PBT Source Reduction - Mercury recommends that projects do not install or specify mercury vapor type high intensity discharge (HID) lamps and probe start metal halide HID lamps in interior spaces.

12.4.e USGBC's LEED v4 BD+C EQ Credit: Construction Indoor Air Quality Management Plan requires that absorptive materials stored on-site and installed are protected from moisture damage.

13.1.a USGBC's LEED v4 EQ Credit: Indoor Air Quality Assessment requires performance of a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of gross floor area.

13.1.b USGBC's LEED v4 EQ Credit: Indoor Air Quality Assessment requires that the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area.

14.1.a LEED v4 BD+C: Enhanced commissioning provides two options for the credit, one of which involves following commissioning processes for the building's thermal envelope in accordance with ASHRAE Guideline 0-2005 and NIBS Guideline 3-2012.

15.1.a USGBC's LEED v4 EQ prerequisite: Minimum Indoor Air Quality Performance requires using the minimum outdoor air intake flow for mechanical ventilation systems using the ventilation rate procedure from ASHRAE 62.1–2010.

17.1.b USGBC's LEED v4 EQ Credit: Enhanced Indoor Air Quality Strategies requires no recirculation of air in spaces where hazardous gases or chemicals may be present or used (e.g., garages, housekeeping and laundry areas, and copying and printing rooms).

18.1.b USGBC's LEED v4 EQ prerequisite: Minimum Indoor Quality Performance requires carbon dioxide monitoring within each thermal zone for mechanically ventilated spaces.

25.5.a USGBC's LEED 2009 for Healthcare MR Credit sets limits for furniture and medical furnishings including textiles, finishes and dyes, to less than 100 ppm of at least four out of five chemical groups, including urea-formaldehyde.

25.5.b USGBC's LEED 2009 for Healthcare MR Credit sets limits for furniture and medical furnishings including textiles, finishes and dyes, to less than 100 ppm of at least four out of five chemical groups, including urea-formaldehyde.

25.5.c USGBC's LEED 2009 for Healthcare MR Credit sets limits for furniture and medical furnishings including textiles, finishes and dyes, to less than 100 ppm of at least four out of five chemical groups, including urea-formaldehyde.

26.1.b USGBC's LEED v4 MR Credit: Building Product Disclosure and Optimization - Material Ingredients allows Cradle to Cradle v2 Gold or Platinum or v3 Silver, Gold or Platinum as one way to achieve Option 2.

26.1.c USGBC's LEED v4 MR Credit: Building Product Disclosure and Optimization - Material Ingredients allows GreenScreen v1.2 Benchmark as one way to achieve Option 2.

26.1.d USGBC's LEED v4 MR Credit: Building Product Disclosure and Optimization - Material Ingredients, Option 3 allows projects to combine allowed programs in meeting the 25% threshold.

62.1.a USGBC's LEED v4 EQ Credit: Daylight, Option 1 requires that at least 55% of space receives at least 300 lux of sunlight for an award of 2 points.

62.1.b LUSGBC's LEED v4 EQ Credit: Daylight, Option 1 requires that annual sunlight exposure ASE(1000,250) is achieved for no more than 10% of regularly occupied space.

67.3.b USGBC's LEED v4 LT credit: Surrounding Density and Diverse Uses is intended to "promote walkability, and transportation efficiency and reduce vehicle distance traveled" and "improve public health by encouraging daily physical activity".

68.2.b USGBC's LEED v4 SS credit: Joint Use of Facilities, for Schools, Option 3 requires collaboration between school authorities and organizations/agencies to provide access to various types of spaces, including gyms, playing fields and swimming pools.

85.1.b USGBC's LEED BD+C: Healthcare requires the generation of an Owner's Project Requirements (OPR) document that outlines ways to optimize occupant health.

97.1.c USGBC's LEED v4 MR credit: Building Product Disclosure and Optimization - Material Ingredients Option 1 has projects use at least 20 permanently installed products from at least 5 different manufacturers that use any of 4 programs described in the credit.

2 U.S. Environmental Protection Agency. *National Ambient Air Quality Standards*. 40 CFR Part 50. http://www.epa.gov/air/criteria.html. Revised October 2011. Updated December 14, 2012. Accessed September 16, 2014.

1.2.a The EPA's 2012 NAAQS require ambient air in cities to keep 8-hr average levels of carbon monoxide below 9 ppm and 1-hr averages below 35 ppm, not to be exceeded more than once per year.

1.2.b The EPA's 2012 NAAQS requre $PM_{2.5}$ to be less than 12 µg/m³ for a primary annual mean, secondary annual mean of 15 µg/m³ and a 24-hour concentration of 35 µg/m³, averaged over three years .

3 World Health Organization. *WHO Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide*. Geneva: World Health Organization; 2005: 9, 14.

1.2.c The WHO's Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide, and Sulfur set 50 µg/m³ as a 24-hour mean concentration limit for PM_{10}.

1.2.d The WHO's Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide, and Sulfur Dioxide recommend ozone limits at 100 µg/m³ 8-hour mean.

4 U.S. Environmental Protection Agency. A Citizen's Guide To Radon: The Guide to Protecting Yourself And Your Family From Radon. http://www.epa.gov/radon/pdfs/citizensguide.pdf. Published May 2012. Accessed September 16, 2014.

1.3.a The EPA's A Citizen's Guide to Radon recommends radon levels to be less than 4 pCi/L.

5 State of New York. Regulation of Smoking in Public and Work Places § 1399. https://www.health.ny.gov/regulations/public_health_law/section/1399/. Revised 2009. Accessed September 15, 2014.

2.1.a The State of New York's Regulation of Smoking in Public and Work Places does not permit smoking indoors at places of employment.

6 ASHRAE Standing Standard Project Committee 62.1. *ANSI/ASHRAE STANDARD 62.1-2013: Ventilation for Acceptable Indoor Air Quality*. Atlanta: ASHRAE; 2013.

3.1.a ASHRAE's Standard 62.1: Ventilation for Acceptable Indoor Air Quality provides guidelines for ventilation rates.

3.1.b ASHRAE's Standard 62.1: Ventilation for Acceptable Indoor Air Quality provides ventilation rates.

7 Illinois Department of Public Health. Illinois Department of Public Health Guidelines for Indoor Air Quality. http://www.idph.state.il.us/envhealth/factsheets/indoorairqualityguide_fs.htm. Updated May 2011. Accessed September 15, 2014.

3.2.a The IDPH's Guidelines for Indoor Air Quality recommend properly ventilated buildings should have carbon dioxide levels with a floor or building average of 800 ppm or less.

3.2.b The IDPH's Guidelines for Indoor Air Quality recommend properly ventilated buildings should have carbon dioxide levels with a floor or building average of 800 ppm or less.

8 U.S. Environmental Protection Agency. A Brief Guide to Mold, Moisture, and Your Home. http://www.epa.gov/mold/moldguide.html . Published 2010. Accessed September 15, 2014 .

16.1.a The EPA's A Brief Guide to Mold, Moisture, and Your Home recommends maintaining relative humidity between 30% and 50%.

9 National Air Duct Cleaners Association (NADCA). *NADCA White Paper on Ultraviolet Lighting Applications in HVAC Systems*. http://nadca.com/sites/default/files/userfiles/documents/2014/bod_final_approved_draft_uv_paper_9-20_-_pdf.pdf. Accessed October 8, 2014.

6.1.b NADCA's White Paper on Ultraviolet Lighting Applications in HVAC Systems states that to avoid ozone production, use UVC lamps with a wavelength of 254 nm.

10 Jacobson, Michael. Chemical Cuisine: Your guide to food additives. Nutrition Action; 2014.

43.1.a The CSPI's Chemical Cuisine reports that artificial colorings often suggest absence of fruit and other natural ingredients, and that artificial colorings can contribute to hyperactivity in some children, cause tumors in animals and allergic reactions.

43.1.b The CSPI's Chemical Cuisine reports evidence that most flavoring chemicals also occur in nature and are probably safe, but are used almost exclusively in junk foods.

43.1.c The CSPI's Chemical Cuisine states that evidence continues to mount that artificial sweeteners negatively impact the digestive microbiome, leading to glucose intolerance and metabolic dysregulation.

43.1.d The CSPI's Chemical Cuisine reports that brominated vegetable oil leaves residue in the human body, and in animal studies has been shown to cause heart lesions, changes in the liver, and impaired growth and behavioral development.

43.1.e The CSPI's Chemical Cuisine reports that potassium bromate is banned in most countries, but not in the U.S., where it is frequently used in baked goods.

43.1.f The CSPI's Chemical Cuisine reports that BHA is classified as "reasonably anticipated to be a human carcinogen" by the Department of Health and Human Services.

43.1.g The CSPI's Chemical Cuisine reports that BHT increases the risk of various cancers in animals and has been shown to accumulate in human fat.

43.1.h The CSPI's Chemical Cuisine reports that studies have found that some people are sensitive to large amounts of MSG and may experience adverse reactions.

43.1.i The CSPI's Chemical Cuisine reports that HVP contains MSG and may cause reactions in sensitive people.

43.1.j The CSPI's Chemical Cuisine reports that sodium nitrate and sodium nitrite "introduce only a small risk", but are still worth avoiding.

43.1.k The CSPI's Chemical Cuisine Reports that sulfiting agents destroy vitamin B1 and can cause reactions in people, particularly those who have asthma.

12 National Center for Healthy Housing and American Public Health Association. National Healthy Housing Standard. http://www.nchh.org/Portals/0/Contents/NHHS_Full_Doc.pdf. Published 2014. Accessed September 15, 2014.

6.2.a The National Healthy Housing Standard states that building materials affected by mold or mildew should be cleaned, dried, and repaired. It also states that interior and exterior surfaces shall have no signs of visible mold growth.

6.2.b The National Healthy Housing Standard states that the foundation, roof, roofing components, exterior walls, doors, skylights and windows shall be free of persistent dampness or moisture.

13 International Living Future Institute. *Living Building Challenge 3.0*. Seattle; 2014: 38, 43-49, 60.

19.1.a The International Living Future Institute's Living Building Challenge 3.0 Imperative 07 requires full control of windows.

26.1.a The International Living Future Institute's Living Building Challenge 3.0 Imperatives 10 and 12 require independently verified declarations of products.

87.1.a The International Living Future Institute's Living Building Challenge 3.0 Imperative 19 requires design features to support human delight.

87.1.b The International Living Future Institute's Living Building Challenge 3.0 Imperative 19 requires design features to support celebration of culture.

87.1.c The International Living Future Institute's Living Building Challenge 3.0 Imperative 19 requires design features to support celebration of spirit.

87.1.d The International Living Future Institute's Living Building Challenge 3.0 Imperative 19 requires design features to support celebration of place.

87.1.e The International Living Future Institute's Living Building Challenge 3.0 Imperative 19 requires design features to support meaningful integration of public art.

88.1.a The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines the way the project will be transformed through the incorporation of nature through environmental elements in the project.

88.1.b The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines the way the project will be transformed through the incorporation of nature through lighting elements in the project.

88.1.c The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines the way the project will be transformed through the incorporation of nature through space in the project.

88.2.a The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines the way the project will be transformed through the incorporation of nature's patterns into the project.

88.3.a The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines ways to provide human-nature interactions in the interior of the building.

88.3.b The International Living Future Institute's Living Building Challenge 3.0 Imperative 9 requires a framework and plan that outlines ways to provide human-nature interactions in the exterior of the project.

14 San Francisco Department of the Environment. Integrated Pest Management Ordinance. http://www.sfenvironment.org/article/city-staff/pest-management. Published 2011. Accessed September 14, 2014

10.1.a The San Francisco Department of the Environment's Integrated Pest Management recommends that pesticide products be used as a last result, only after other non-chemical management options have been exhausted.

10.1.b The San Francisco Department of the Environment's Integrated Pest Management Ordinance assigns hazard tiers to pesticide products from lowest to highest concern.

15 U.S. Environmental Protection Agency. *Residential Air Cleaners: A Summary of Available Information*. Washington, DC: U.S. Environmental Protection Agency; August 2009.

23.2.a The EPA's "Residential Air Cleaners" notes that properly designed UVGI cleaners in typical airstream disinfection applications could reduce the viability of vegetative bacteria and molds, and could provide low to moderate reduction in viruses.

23.2.b The EPA's Residential Air Cleaners document notes that photocatalytic oxidation cleaners are intended to change gaseous pollutants and associated odors into harmless products.

16 U.S. Environmental Protection Agency. Methylene Diphenyl Diisocycanate and Related Compounds Action Plan.http://www.wftaylor.com/wp-content/uploads/2012/03/EPA_MDI_Action_Plan.pdf . Published April 2011. Accessed October 17, 2014.

25.4.a The EPA's Methylene Diphenyl Diisocyanate and Related Compounds Action Plan outlines the risk of exposure to isocyanate-based compounds.

18 U.S. Green Building Council. Sustainable Site 4: Alternative Transportation – Bicycle Storage and Changing Rooms. http://www.usgbc.org/node/1731996?return=/credits. Published 2009. Accessed October 17, 2014.

69.1.b USGBC's LEED v4 LT Credit: Bicycle Facilities requires separate and secure bicycle storage for at least 5% of regular building occupants (minimum 4) and short-term bicycle storage for at least 2.5% of all peak visitors.

69.2.a USGBC's LEED v4 LT Credit: Bicycle Facilities requires at least one on-site shower with a changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.

19 Declare. The Ingredients Label for Building Projects. https://ilbi.org/about/About-Docs/handouts-docs/declare-postcard. Seattle: International Living Future Institute; Accessed September 15, 2014.

97.1.a Declare promotes materials transparency by providing a platform for manufacturers to disclose product ingredients and other relevant information.

20 National Partnership for Women and Families. *Paid Sick Days: Good for for Business, Good for Families.* http://www.nationalpartnership.org/research-library/work-family/psd/paid-sick-days-good-for-business-and-workers.pdf. Published August 2012. Accessed October 16, 2014.

92.1.e National Partnership for Women and Families' Paid Sick Days: Good for Business, Good for Workers notes that "when sick workers are able to stay home, the spread of disease slows and workplaces are both healthier and more productive."

21 U.S. Environmental Protection Agency. *Protocol for Residual Self-Sanitizing Activity of Dried Chemical Residues on Hard, Non-Porous Surfaces*, #01-1A. https://www.epa.gov/sites/production/files/2015-09/documents/cloroxpcol_final.pdf. Published September 2015. Accessed Jun 2016.

27.1.a The EPA's process is created to "determine the residual sanitizing efficacy of antimicrobial products after application to inanimate, nonporous, non-food contact hard surfaces."

22 U.S. Green Building Council. Pilot Credit 82: Local Food Production. http://www.usgbc.org/node/2743606?return=/pilotcredits. Published 2009. Accessed October 17, 2014.

51.1.a LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires provisions for onsite food production.

51.1.b LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires the provision of a greenhouse.

51.2.a LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires the provision for onsite food production.

51.2.b LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires the provision of a watering system.

51.2.c LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires the provision of access to sunlight.

51.2.d LEED v4: Reference Guide for Building Design and Construction sets a Pilot Credit (local food production) for onsite food production, which requires the provision of vegetable gardens and/or edible nut and fruit-bearing plants.

23 Occupational Safety and Health Administration. Protecting Workers Who Use Cleaning Chemicals. https://www.osha.gov/Publications/OSHA3512.pdf. Published 2012. Accessed October 17, 2014.

29.1.a OSHA/NIOSH's Protecting Workers Who Use Cleaning Chemicals info sheet recommends the use of microfiber mops, rags and dusters.

29.1.b OSHA's Protecting Workers Who Use Cleaning Chemicals info sheet recommends the use of hands-free mops.

29.2.b Protecting Workers Who Use Cleaning Chemicals info sheet recommends avoiding the mixing of cleaning products that contain bleach and ammonia.

26 U.S. Environmental Protection Agency. *Chemical Management Resource Guide for School Administrators*, EPA 747-R-06-002. Washington, DC: U.S. Environmental Protection Agency; December 2006.

29.2.a The EPA's Chemical Management Resource Guide for School Administrators recommends separate storage for bleach and ammonia products.

27 U.S. Green Building Council. Pilot Credit 78: Design for Active Occupants. http://www.usgbc.org/node/4810558?return=/credits/new-construction/v4. Published 2013. Accessed October 17, 2014.

64.1.a LEED v4 Pilot Credit 78: Design for Active Occupants for primary staircase(s) includes classifying regularly occupied floors for re-entry, allowing all building users to access them, and providing access via stairs to at least 50% of the tenant floors.

64.2.a LEED v4 Pilot Credit 78: Design for Active Occupants includes a requirement for a main staircase to be located within 25 ft of any edge of the lobby.

64.2.b LEED v4 Pilot Credit 78: Design for Active Occupants includes a requirement to locate a main staircase that is visible before occupants encounter elevators and/or escalators.

64.3.c LEED v4 Pilot Credit 78: Design for Active Occupants requires some features, one of which is the provision of daylighting with windows and/or skylights that are at least 8 square feet.

70.1.a USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.1.b USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.1.c USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.1.d USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.2.a USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.2.b USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.2.c USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

70.2.d USGBC's LEED Pilot Credit 78: Design for Active Occupants requires equipment to be provided in the interior fitness space and for use by 5% of regular building occupants.

28 Health Product Declaration Collaborative (HPD). *Health Product Declaration Standard Version 1.0*. http://hpdcollaborative.org/standard-documents/hpdstandard_v1_0_121215.pdf . Updated December 15, 2012. Accessed June 9, 2015.

97.1.b The Health Product Declaration's Standard Version 1.0 provides guidance for declaring "product content and direct health hazards associated with exposure to its individual contents."

29 U.S. Environmental Protection Agency. *Protecting your health*. http://www.epa.gov/greenhomes/protectingyourhealth.htm. Updated December 19, 2012. Accessed October 16, 2014.

24.1.a The EPA notes that under certain conditions, combustion appliances such as heaters, ranges, ovens, stoves, furnaces, fireplaces, water heaters and clothes dryers can release contaminants into the home that can seriously damage health.

30 U.S. Department of Housing and Urban Development. Lead Paint Safety. http://www.hud.gov/offices/lead/training/LBPguide.pdf. Washington, D.C. Published March 2001. Accessed October 17, 2014.

28.2.a The U.S. HUD's Lead Paint Safety document recommends rugs to be removable and permanent wall-to-wall carpeting not to be used.

31 U.S. Environmental Protection Agency. Work Practice Standards for Conducting Lead-Based Paint Activities: Target Housing and Child-occupied Facilities. http://www.law.cornell.edu/cfr/text/40/745.227. Published 1996. Accessed September 15, 2014.

11.2.a The EPA's Work Practice Standards for Conducting Lead-Based Paint Activities document establishes requirements for conducting lead-based paint activities.

11.2.b The EPA's Work Practice Standards for Conducting Lead-Based Paint Activities document establishes requirements for conducting lead-based paint activities.

11.2.c The EPA's Work Practice Standards for Conducting Lead-Based Paint Activities document establishes requirements for conducting lead-based paint activities.

32 Centers for Disease Control and Prevention. Voluntary Guidelines for Managing Food Allergies In Schools and Early Care and Education Programs. http://www.cdc.gov/healthyyouth/foodallergies/pdf/13_243135_A_Food_Allergy_Web_508.pdf. Published 2013. Accessed October 14, 2014.

48.1.a The CDC's Voluntary Guidelines for Managing Food Allergies In Schools and Early Care and Education Programs reports that 50%-62% of fatal or near fatal allergic reactions are caused by peanuts.

33 U.S. Environmental Protection Agency. Guidelines for Conducting the AHERA TEM Clearance Test to Determine Completion of an Asbestos Abatement Project. Published 1989: 5

11.3.a AHERA's Asbestos Model Accreditation Plan establishes asbestos limits.

11.3.b The EPA's Guidelines for Conducting the AHERA TEM Clearance Test to Determine Completion of an Asbestos Abatement Project guidelines establish requirements for conducting post-abatement checks.

11.3.c The EPA's Guidelines for Conducting the AHERA TEM Clearance Test to Determine Completion of an Asbestos Abatement Project guidelines establish requirements for conducting post-abatement checks.

34 U.S. Environmental Protection Agency. Steps to Safe PCB Abatement Activities. http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/caulk/guide/guide-sect4a.htm . Published 2012. Accessed 2011 .

11.4.a The EPA's Steps to Safe PCB Abatement Activities establishes PCB abatement procedures.

11.4.b The EPA's Steps to Safe PCB Abatement Activities provides guidance on the handling, storage, and disposal of PCB waste.

35 Center for the Built Environment. Occupant Indoor Environmental Quality (IEQ) Survey. http://www.cbe.berkeley.edu/research/survey.htm. Accessed June 8, 2015.

86.1.a CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including acoustic quality.

86.1.b CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including thermal comfort.

86.1.c CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including office furnishings.

86.1.d CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including lighting.

86.1.e CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including air quality.

86.1.f CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including cleanliness and maintenance.

86.1.g CBE's Occupant Indoor Environmental Quality (IEQ) Survey™ covers several core question areas that address key aspects of the indoor environment, including office layout.

36 U.S. Green Building Council. Pilot Credit 54: Avoidance of Chemicals of Concern. http://www.usgbc.org/node/2606894?return=/pilotcredits/Commercial-Interiors/v2009. Accessed September 15, 2014.

11.1.b USGBC's LEED v4 Pilot Credit 54, v3 2009 requires that a minimum of 20%, by cost, of at least 3 building product and material types must not contain lead and lead compounds greater than 0.01% (100 ppm) as calculated by mass.

25.1.a USGBC's LEED v3 Pilot Credit 54 requires that third party certified building materials may not include perfluorinated compounds at levels equal to or greater than 100 ppm.

25.2.a USGBC's LEED v3 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) brominated or halogenated flame retardants containing bromine, chlorine, or fluorine.

25.2.b USGBC's LEED v3 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) brominated or halogenated flame retardants containing bromine, chlorine, or fluorine.

25.2.c USGBC's LEED v3 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) brominated or halogenated flame retardants containing bromine, chlorine, or fluorine.

25.2.d USGBC's LEED v3 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) brominated or halogenated flame retardants containing bromine, chlorine, or fluorine.

25.2.e USGBC's LEED v3 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) brominated or halogenated flame retardants containing bromine, chlorine, or fluorine.

25.3.a USGBC's LEED v4 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) of phthalates.

25.3.b USGBC's LEED v4 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) of phthalates.

25.3.c USGBC's LEED v4 Pilot Credit 54 requires that third party certified building products not contain more than 0.01% by mass (100ppm) of phthalates.

37 American Society of Heating, Refrigerating and Air-Conditioning Engineers. *UFAD Guide: Design, Construction and Operation of Underfloor Air Distribution Systems.* Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers; 2013.

21.1.b ASHRAE's Underfloor Air Distribution Guide provides recommendations for underfloor air distribution systems.

39 South Coast Air Quality Management District. *Rules and Regulations, Regulation XI - Source Specific Standards.* http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Accessed October 17, 2014.

24.2.a The South Coast Air Quality Management District Rule 1110.2 (amended 9/7/2012) establishes requirements for gaseous- and liquid-fueled engines for the purpose of reducing emission of oxides from nitrogen, VOCs and carbon monoxide.

24.2.b The South Coast Air Quality Management District Rule 1111 (amended 9/5/14) establishes requirements for natural gas fired, fan-type central furnaces for the purpose of reducing emission of nitrogen oxides.

24.2.c The South Coast Air Quality Management District Rules 1146.1 (amended 11/1/13) and 1146.2 (amended 5/5/06) establish requirements for the reduction of emissions of oxides of nitrogen from boilers, process heaters and steam generators.

24.2.d The South Coast Air Quality Management District Rules 1121 (amended 9/3/04) and 1146.2 (amended 5/5/06) establish requirements for emissions of nitrogen oxides from residential natural gas-fired water heaters and large water heaters.

40 Centers for Disease Control and Prevention. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf. Published 2012. Accessed September 15, 2014.

29.1.c The CDC's Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings recommends vacuum cleaners be equipped with HEPA filters.

41 ASHRAE. *Performance Evaluation and Development of Design Guidelines for Displacement Ventilation, RP-949*. Atlanta, GA: American Society of Heating, Refrigerating, and Air-Conditioning Engineers; 1999.

21.1.a The Performance Evaluation and Development of Design Guidelines for Displacement Ventilation document recommends air supply temperatures.

42 National Water Quality Management Strategy. *Australian Drinking Water Guidelines 6 Version 2.0*. Canberra: National Health and Medical Research Council. 2011: 167.

34.1.a The Australian Drinking Water Guidelines set an aesthetic guideline value of 0.6 mg/L of chlorine in drinking water.

43 Office of Environmental Health Hazard Assessment. Public Health Goal for Nickel in Drinking Water. Sacramento: California Environmental Protection Agency; 2010: 1.

31.1.e The California Office of Environmental Health Hazard Assessment and the California EPA set a public health goal for Nickel in drinking water at 0.012 mg/L.

44 California Water Boards. Maximum Contaminant Levels and Regulatory Dates for Drinking Water US EPA vs California. http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/dwdocuments/MCLsEPAvsDWP-2014-07-01.pdf. Sacramento: California Environmental Protection Agency; 2014.

32.1.b The California Environmental Protection Agency regulates Benzene in drinking water to a Maximum Contaminant Level set at 0.001 mg/L.

32.1.c The California Environmental Protection Agency regulates Ethylbenzene in drinking water to a Maximum Contaminant Level of 0.3 mg/L.

32.1.f The California Environmental Protection Agency regulates Toluene in drinking water to a Maximum Contaminant Level set at 0.15 mg/L.

33.1.a The California Environmental Protection Agency regulates Atrazine in drinking water to a Maximum Contaminant Level of 0.001 mg/L.

45 Office of Environmental Health Hazard Assessment. Public Health Goal for Styrene in Drinking Water. Sacramento: California Environmental Protection Agency; 2010: 1.

32.1.a The California Office of Environmental Health Hazard Assessment and the California EPA set a public health goal of Styrene in water at 0.5 µg/L.

46 *United States Code* (2006). 29 U.S.C. § 2612.

93.1.b US federal law entitles eligible employees to up to 12 workweeks of leave during any 12-month period for reasons listed in § 2612(a)(1), including the birth of a child, or placement of a child with the employee for adoption or foster care.

93.3.a United States federal law permits eligible employees to receive up to 12 workweeks of leave during any 12-month period for an employee to care for a spouse, child or parent with a serious health condition.

47 New York State Department of Health. *Individual Water Supply Wells - Fact Sheet #3 Recommended Residential Water Quality Testing*. Troy: New York State Department of Health Bureau of Water Supply Protection; 2006.

37.1.d The New York State Department of Health notes that water containing more than 270 mg/L of sodium should not be used by people on moderately restricted sodium diets.

48 U.S. Environmental Protection Agency (EPA). *Drinking Water Best Management Practices*, EPA 816-B-13-002. Washington, D.C.: U.S. Environmental Protection Agency; April 2013.

37.3.a The EPA's Drinking Water Best Management Practices notes that it is "important to clean drinking water fountains to remove lime and calcium build-up."

37.3.b The EPA's Drinking Water Best Management Practices note to clean debris out of all outlet screens and aerators on a regular basis.

50 U.S. Environmental Protection Agency. *National Primary Drinking Water Regulations*. EPA 816-F-09-004. Published May 2009. Washington, D.C.

30.1.a The US EPA National Primary Drinking Water Regulations notes that for systems that use conventional or direct filtration, "samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month".

51 National Partnership for Women and Families. Expecting Better: A State-by-State Analysis of Laws That Help New Parents. http://www.nationalpartnership.org/research-library/work-family/expecting-better-2014.pdf. Published June, 2014:23. Accessed September 15, 2014.

93.3.b The National Partnership for Women and Families' Expecting Better recognizes US states that allow workers to use their earned paid sick days to care for either a new child or an ill family member.

93.3.c The National Partnership for Women and Families' "Expecting Better" recognizes US states that improve upon federal law by "providing all nursing mothers with reasonable break times and/or a place other than a bathroom to express breast milk at work."

53 World Health Organization. *Guidelines for Drinking-water Quality Fourth Edition*. Geneva: World Health Organization; 2011: 26, 371, 383, 416, 433.

31.1.a The WHO Guidelines for Drinking Water Quality note a provisional guideline value of 0.01 mg/L for Lead concentrations.

32.1.g The WHO Guidelines for Drinking Water Quality set a guideline value for Xylene concentrations at 0.5 mg/L.

33.1.b The WHO Guidelines for Drinking Water Quality set a guideline value for Simazine concentrations at 0.002 mg/L.

35.1.a The WHO Guidelines for Drinking-water Quality, Fourth Edition notes that some hazards "may arise intermittently, often associated with seasonal activity or seasonal conditions."

35.1.b The WHO Guidelines for Drinking-water Quality, Fourth Edition notes that some hazards "may arise intermittently, often associated with seasonal activity or seasonal conditions."

35.1.c The WHO Guidelines for Drinking-water Quality, Fourth Edition notes that some hazards "may arise intermittently, often associated with seasonal activity or seasonal conditions."

35.1.d The WHO Guidelines for Drinking-water Quality, Fourth Edition notes that some hazards "may arise intermittently, often associated with seasonal activity or seasonal conditions."

54 Office of Water. *2012 Edition of the Drinking Water Standards and Health Advisories*. Washington D.C.: U.S. Environmental Protection Agency; 2012: 2, 3, 5-11.

30.2.a The EPA 2012 Edition of the Drinking Water Standards and Health Advisories set a Maximum Contaminant Level Goal for Total Coliforms at 0.

31.1.b The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Arsenic concentrations at 0.01 mg/L.

31.1.c The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Antimony concentrations at 0.006 mg/L.

31.1.d The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Mercury (inorganic) concentrations at 0.002 mg/L.

31.1.f The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Copper concentrations at 1.0 mg/L.

32.1.d The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Polychlorinated biphenyl concentrations at 0.0005 mg/L.

32.1.e The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Vinyl Chloride at 0.002 mg/L.

32.1.h The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Tetrachloroethylene concentrations at 0.005 mg/L.

33.1.c The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Glyphosate concentrations at 0.7 mg/L.

33.1.d The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for 2,4-Dichlorophenoxyacetic Acid concentrations at 0.07 mg/L.

33.2.a The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Nitrate (as N) concentrations at 10 mg/L.

34.1.b The EPA 2012 Edition of the Drinking Water Standards and Health Advisories notes that the 1998 Final Rule for Disinfectants and Disinfection By-products set a Maximum Residual Disinfection Level for Chloramine concentrations at 4 mg/L.

34.2.a The EPA's 2012 Edition of the Drinking Water Standards and Health Advisories notes that the 1998 Final Rule for Disinfection By-products set the total concentration for trihalomethanes at 0.08 mg/L.

34.2.b The EPA's 2012 Edition of the Drinking Water Standards and Health Advisories notes that the 1998 Final Rule for Disinfection By-products set the total concentration for five Haloacetic acids at 0.06 mg/L.

34.3.a The EPA's Drinking Water Standards and Health Advisories set a Maximum Contaminant Level for Fluoride at 4 mg/L.

37.1.a The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Aluminum concentrations at 0.2 mg/L.

37.1.b The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Chloride concentrations at 250 mg/L.

37.1.c The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Manganese concentrations at 0.05 mg/L.

37.1.e The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Sulfate concentrations at 250 mg/L.

37.1.f The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Iron concentrations at 0.3 mg/L.

37.1.g The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Zinc concentrations at 5 mg/L.

37.1.h The EPA Secondary Drinking Water Regulations set a secondary Maximum Contaminant Level for Total Dissolved Solids concentrations at 500 mg/L.

55 American Heart Association. Whole Grains and Fiber. http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Whole-Grains-and-Fiber_UCM_303249_Article.jsp. Published 2014. Accessed September 15, 2014.

39.1.d The AHA's Whole Grains and Fiber fact sheet identifies whole grains as good source of fiber and nutrients.

56 Centers for Disease Control and Prevention. Trans Fat: The Facts. http://www.cdc.gov/nutrition/downloads/trans_fat_final.pdf. Published 2010. Accessed September 15, 2014.

39.2.a The CDC Trans Fat: The Facts identifies partially hydrogenated oils as a source of trans fats that should be avoided.

57 National Institute of Allergy and Infectious Diseases. Food Allergy: An Overview. http://www.niaid.nih.gov/topics/foodallergy/documents/foodallergy.pdf. Published 2010. Accessed September 15, 2014.

40.1.a The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children and adults is peanuts.

40.1.b The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children and adults is fish.

40.1.c The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children and adults is shellfish.

40.1.d The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children, especially infants, is soy.

40.1.e The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children is milk.

40.1.f The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children is eggs.

40.1.g The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children is wheat.

40.1.h The NIAID publication, Food Allergy: An Overview states that one of the most common food allergens to children and adults is tree nuts.

40.1.i The NIAID publication, Food Allergy: An Overview states that people with celiac disease cannot tolerate gluten.

58 New York City Department of Health and Mental Hygiene. Food Standards. http://www.health.ny.gov/diseases/cardiovascular/heart_disease/toolkits/docs/cafeterias_cafes_implementation_guide.pdf. Published 2012. Accessed September 15, 2014.

47.1.a The New York State Department of Health's Cafes/Cafeterias Implementation Guide recommends eateries serve at least one healthy value meal that contains no more than 650 calories.

60 California Department of Developmental Services. Diet Manual. http://www.dds.ca.gov/Publications/docs/DDSDietManual.pdf. Published 2010. Accessed September 15, 2014.

48.1.b The Diet Manual recommends providing a gluten-free diet to treat gluten induced enteropathy.

48.1.c The Diet Manual recommends providing a milk-free or lactose-controlled diet to prevent or reduce symptoms associated with ingesting cow's milk or dairy containing products.

48.1.d The Diet Manual recommends providing an egg-free diet for individuals with an egg allergy.

48.1.e The Diet Manual recommends providing a vegetarian diet for those who wish to omit all or some animal products from their diet for religious, health, environmental, or ethical reasons.

48.1.f The Diet Manual recommends providing a vegetarian diet for those who wish to omit all or some animal products from their diet for religious, health, environmental, or ethical reasons.

61 Food and Drug Administration. How to Understand and Use the Nutrition Facts Label. http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm274593.htm. Published 2004. Accessed September 15, 2014.

44.1.b The FDA's How to Understand and Use the Nutrition Facts Label requires that packaged food items list the macronutrient content as both a weight and a percentage of the recommended daily value.

44.1.c The FDA's How to Understand and Use the Nutrition Facts Label requires that packaged food items list the micronutrient content as both a weight and a percentage of the recommended daily value.

44.1.d The FDA's How to Understand and Use the Nutrition Facts Label requires that packaged food items list the sugar content as a weight.

62 Community Preventive Services Task Force. *Technology-supported Multicomponent Coaching or Counseling Interventions to Reduce Weight and Maintain Weight Loss.* http://www.thecommunityguide.org/obesity/TechnologicalCoaching.html. Updated December 9, 2013. Accessed April 24, 2015.

94.1.b Community Preventive Services Task Force's Technology-supported Multicomponent Coaching or Counseling Interventions to Reduce Weight and Maintain Weight Loss recommends technology-supported interventions, including the use of pedometers.

63 U.S. Department of Agriculture. Organic Regulations. http://www.usda.gov/wps/portal/usda/usdahome?navid=organic-agriculture. Published 2014. Accessed September 10, 2014.

49.1.a The USDA's Organic Requlations require that organic products do not contain genetically modified ingredients and avoid synthetic materials such as antibiotics and pesticides.

49.2.b The USDA's Organic Requlations require that organic products do not contain genetically modified ingredients and avoid synthetic materials such as antibiotics and pesticides.

64 Certified Humane. Humane Farm Animal Care Comprehensive Animal Welfare Standards Comparison By Program. http://certifiedhumane.org/wp-content/uploads/2014/01/Comp.Standards.Comparison.Chart_.wappendix.11.26.13.pdf. Published 2013. Accessed September 15, 2014.

49.2.a Humane Farm Animal Care's Humane Farm and Animal Care Comprehensive Animal Welfare Standards Comparison by Program requires that animals are uncaged throughout their lives and not exposed to antibiotics and hormones.

66 Sloan Work and Family Research Network. Why is Employer-Supported Child Care an Important Business Issue? https://workfamily.sas.upenn.edu/sites/workfamily.sas.upenn.edu/files/imported/pdfs/EWS_ESCC.pdf. Published 2009. Accessed September 15, 2014.

93.2.a Sloan Work and Family Research Network's "Why is Employer-Supported Child Care an Important Business Issue" states that on-site childcare centers increase loyalty to an organization and reduce commuting time for employees.

93.2.b Sloan Work and Family Research Network's "Why is Employer-Supported Child Care an Important Business Issue" notes that subsidies and vouchers provide tax credits for employers and lower employees' personal financial expenses.

67 National Institutes of Health. Cooking Utensils and Nutrition. http://www.nlm.nih.gov/medlineplus/ency/article/002461.htm. Published 2014. Accessed September 15, 2014.

46.1.a The National Institutes of Health's Cooking Utensils and Nutrition recommends that children be protected from ceramic cookware potentially containing lead.

46.1.b The National Institutes of Health's Cooking Utensils and Nutrition identifies that dietary iron may increase due to the use of cast iron cookware.

46.1.c The National Institutes of Health's Cooking Utensils and Nutrition identifies the low cost, durable, heat resistant and non-hazardous properties of stainless steel.

46.1.d The National Institutes of Health's Cooking Utensils and Nutrition identifies the scratch resistant and cleanable properties of glass cutting boards.

46.1.e The National Institutes of Health's Cooking Utensils and Nutrition identifies easily cleanable, scratch resistant and non-hazardous properties of anodized aluminum cookware.

68 Centers for Disease Control and Prevention. Guideline for Hand Hygiene in Health-Care Settings. http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf. Published 2002. Accessed September 15, 2014.

41.1.b The CDC's Guideline for Hand Hygiene in Health-Care Settings recommend the use of disposable towels for the maintenance of hand-hygiene.

41.2.a The CDC's Guideline for Hand Hygiene in Health-Care Settings identifies that the practice of "topping off" hand soap dispensers can lead to bacterial contamination of soap.

70 Facility Guidelines Institute. Guidelines for Design and Construction of Healthcare Facilities. http://www.apic.org/Resource_/TinyMceFileManager/Practice_Guidance/APIC-ASHE-Statement-electronic-faucets.pdf. Published 2011. Accessed September 15, 2014.

41.3.a The Guidelines for Design and Construction of Healthcare Facilities set the discharge point of hand-washing sinks at minimum 10 inches (25.40 centimeters) above the bottom of the basin.

41.3.b The Guidelines for Design and Construction of Healthcare Facilities set the area of a hand washing basin at minimum 144 square inches (929 square cm), with a minimum 9-inch (22.86-cm) width or length.

71 Food Standards Agency Northern Ireland. A Survival Guide to Food. http://www.food.gov.uk/sites/default/files/multimedia/pdfs/survivalguidetofood.pdf. Published 2014. Accessed September 15, 2014.

42.1.a The Food Standards Agency in Northern Ireland's A Survival Guide to Food recommends keeping raw meat in a separate storage space at the bottom of a refrigerator.

72 International Living Future Institute. JUST User Manual. http://justorganizations.com/sites/default/files/140808JUSTmanualRevisedwithoutBibliography.pdf. Published 2013. Accessed September 15, 2014.

98.1.a The JUST program "provides an innovative social justice transparency platform for organizations to disclose their operations, including how they treat their employees and where they make financial and community investments."

73 Hanks AS, Just DR, Wansink B. Smarter Lunchrooms Can Address New School Lunchroom Guidelines and Childhood Obesity. 2013. The Journal of Pediatrics, Volume 162, Issue 4, pp. 867-869.

38.2.b Smarter Lunchrooms Can Address New School Lunchroom Guidelines and Childhood Obesity recommends color photo of fruit and vegetables on menu selection.

38.2.c Smarter Lunchrooms Can Address New School Lunchroom Guidelines and Childhood Obesity recommends vegetable dishes be made available at the start of the food distribution line.

38.2.d Smarter Lunchrooms Can Address New School Lunchroom Guidelines and Childhood Obesity recommends that fruits are made available at the checkout location.

74 New York City Department of Health and Mental Hygiene. The Requirement to Post Calorie Counts on Menus, Section 81.50. http://www.nyc.gov/html/doh/downloads/pdf/cdp/calorie_compliance_guide.pdf. Published 2008. Accessed September 17, 2014.

44.1.a The New York City Department of Health requires all eating establishments with 15 or more locations to post total calorie counts on menus.

75 U.S. Department of Agriculture. Cutting Boards and Food Safety. http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/cutting-boards-and-food-safety. Published 2013. Accessed September 15, 2014.

46.2.a The USDA recommends consumers choose cutting boards with a nonporous surface such as marble.

46.2.b The USDA recommends consumers choose cutting boards with a nonporous surface such as plastic.

46.2.c The USDA recommends consumers choose cutting boards with a nonporous surface such as glass.

46.2.d The USDA recommends consumers choose cutting boards with a nonporous surface such as pyroceramic.

46.2.e The USDA recommends consumers choose cutting boards with a nonporous surface such as wood. Laminated boards may crack and split.

76 World Health Organization. WHO Guidelines on Hand Hygiene in Health Care. http://www.who.int/gpsc/5may/tools/who_guidelines-handhygiene_summary.pdf. Published 2009. Accessed September 15, 2014.

41.1.a The WHO Guidelines on Hand Hygiene in Health Care state that antibacterials offer no additional benefit to using non-antibacterial soap. Fragrance is not recommended because of the risk of allergies.

77 U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition, December 2010. U.S. Government Printing Office, Washington, D.C.

45.1.a The U.S. Department of Agriculture's Dietary Guidelines for Americans identifies that nutrition and physical activity decisions are influenced by marketing and media.

45.2.a The U.S. Department of Agriculture's Dietary Guidelines for Americans identifies that nutrition and physical activity decisions are influenced by marketing and media.

45.2.b The U.S. Department of Agriculture's Dietary Guidelines for Americans identifies that nutrition and physical activity decisions are influenced by marketing and media.

78 Centers for Disease Control and Prevention. Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages. http://www.cdph.ca.gov/SiteCollectionDocuments/StratstoReduce_Sugar_Sweetened_Bevs.pdf Published 2010. Accessed September 15, 2014.

39.1.a The CDC's Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages identifies that limited access to sugar sweetened beverages can decrease their consumption and increase consumption of healthier beverages.

39.1.b The CDC's Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages identifies that limited access to sugar sweetened beverages can decrease their consumption and increase consumption of healthier beverages.

39.1.c The CDC's Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages identifies that limited access to sugar sweetened beverages can decrease their consumption and increase consumption of healthier beverages.

79 licht.de. *licht.wissen 04: Office Lighting: Motivating and Efficient*. Frankfurt; 2014: 35.

55.1.b Office Lighting: Motivating and Efficient notes that to avoid glare caused by bright light sources, lamps should be shielded. The minimum shielding angle for lamp luminance of 20,000 - 50,000 cd/m² is 15°.

55.1.c Office Lighting: Motivating and Efficient notes that to avoid glare caused by bright light sources, lamps should be shielded. The minimum shielding angle for lamp luminance of 50,000 - 500,000 cd/m² is 20°.

55.1.d Office Lighting: Motivating and Efficient notes that to avoid glare caused by bright light sources, lamps should be shielded. The minimum shielding angle for lamp luminance of 500,000 cd/m² and above is 30°.

80 U.S. General Services Administration (GSA). *Facilities Standards for the Public Buildings Service*. March 2014, Washington, D.C., pp. 135-136.

56.1.a The U.S. GSA's Facilities Standard for the Public Buildings Service Tier 1 High Performance rating requires view-preserving blinds.

56.2.a The U.S. GSA's Facilities Standard for the Public Buildings Service Tier 1 High Performance rating requires view-preserving blinds.

58.1.a The U.S. GSA's Facilities Standard for the Public Buildings Service Tier 1 High Performance rating requires CRI of 80 or higher.

58.1.b The GSA's Facilities Standard for the Public Buildings Service Tier 2 High Performance requires a Color Rendering Index R9 of at least 50.

59.1.a The GSA's Facilities Standard for the Public Buildings Service Baseline requires an average LRV for ceilings of 80% or greater.

59.1.b The GSA's Facilities Standard for the Public Buildings Service Tier 2 High Performance recommends an average LRV on walls of 70%.

60.1.a The GSA's Facilities Standard for the Public Buildings Service notes that automatic shade controls help occupants manage luminance levels.

60.2.a The GSA's Facilities Standard for the Public Buildings Service notes that automatic controls for occupancy save energy.

60.2.b The GSA's Facilities Standard for the Public Buildings Service notes that automatic controls for daylight dimming save energy.

81 Ontario Ministry of Labour. *Computer Ergonomics: Workstation Layout and Lighting*. Toronto: Ontario Ministry of Labour; September 2004: 16.

53.1.c The Ontario Ministry of Labour's "Computer Ergonomics: Workstation Layout and Lighting" provides a checklist for computer workstations, which includes checking that light levels fall within 300-500 lux, and also that task lights are provided if required.

57.1.a The Ontario Ministry of Labour's "Computer Ergonomics: Workstations and Lighting" recommends that worker's line of sight is parallel to the plane of windows.

82 Oxford Health Plans. Gym Reimbursement. https://www.oxhp.com/secure/materials/Gym_Reimbursement.pdf . Published 2011. Accessed October 17, 2014.

65.1.b Certain Oxford health plans allow for reimbursement of a portion of the gym membership fee for each 6-month period wherein the employee meets a 50-visit minimum.

83 Business + Institution Furniture Manufacturers Association. *BIFMA Ergonomics Guideline Ultimate Test for Fit*. Grand Rapids: Business + Institution Furniture Manufacturers Association; 2013: 3.

73.1.a BIFMA's Ergonomics Guideline for Furniture Used in Office Work Spaces Designed for Computer Use recommends monitors be positioned at heights that permit seated or standing users to view the entire monitor display quickly and with little effort.

84 Community Preventive Services Task Force. Obesity Prevention and Control: Worksite Programs. http://www.thecommunityguide.org/obesity/workprograms.html . Published 2013. Accessed September 15, 2014.

66.1.a The Community Preventive Services Task Force recommends worksite physical activity programs, including the provision of on-site facilities for exercise.

85 U.S. Green Building Council. Pilot Credit 75: Clean Construction. http://www.usgbc.org/node/4810551?return=/credits/new-construction/v4/pilot-credits. Published 2013. Accessed October 18, 2014.

24.4.a USGBC's LEED v4 Pilot Credit 75: Clean Construction requires non-road diesel engine vehicles on site that are 25 horsepower and greater to comply with the US EPA Tier 4 PM emissions standards, or a local equivalent.

24.4.b USGBC's LEED v4 Pilot Credit 75: Clean Construction requires 95% of all diesel engine contractor/subcontractor vehicles meet the requirements set forth in the US EPA model year 2007 on-road standards, or a local equivalent.

24.4.c USGBC's LEED v4 Pilot Credit 75: Clean Construction requires all equipment, vehicles and loading/unloading to be located away from air intakes and operable openings of adjacent buildings.

86 Walk Score. Walk Score Methodology. http://www.walkscore.com/methodology.shtml . Published 2014. Accessed October 17, 2014.

67.3.a Walk Score's City and Neighborhood Ranking identifies that a Walk Score® of 70 or greater is one that allows most errands to be accomplished on foot.

87 New York City Departments of Design and Construction, Health and Mental Hygiene, Transportation, City Planning. Active Design Guidelines: Promoting Physical Activity and Health in Design. Published 2010: 4-7; 34; 43; 72-76; 85-87.

64.1.b NYC Active Design Guidelines: Promoting Physical Activity and Health in Design recommends including permanent signage encouraging stair use, to be integrated with the building's wayfinding program.

64.2.c NYC Active Design Guidelines recommends a strategy for making stairs wide enough for traveling in groups, or in two directions, a width of at least 56 inches can comfortably accommodate this.

64.3.a NYC Active Design Guidelines recommends strategies for encouraging stair use through a number of methods, including the incorporation of artwork into the stair environment.

64.3.b NYC Active Design Guidelines recommends strategies for encouraging stair use through a number of methods, including adding music to stairwells.

64.3.d NYC Active Design Guidelines recommends strategies for encouraging stair use through a number of methods, including highlighting interesting views onto nature or interior areas.

67.1.a NYC Active Design Guidelines identifies the design of pedestrian-friendly streets with a number of features, including benches, as a key recommended measure to encourage active environments.

67.1.b NYC Active Design Guidelines recommends strategies for creating pedestrian and bicycle-friendly public spaces, including the provision of both movable and fixed seating.

67.1.c NYC Active Design Guidelines recommends strategies for increasing walking, including the provision of supportive infrastructure along walking routes, such as drinking fountains and water refilling stations.

67.2.a NYC Active Design Guidelines recommends strategies for creating pedestrian and bicycle-friendly public spaces, including the provision of water fountains.

67.2.b NYC Active Design Guidelines: Promoting Physical Activity and Health in Design recommends strategies for creating attractive plaza spaces.

67.2.d NYC Active Design Guidelines: Promoting Physical Activity and Health in Design recommends incorporating temporary and permanent public art installations into the streetscape to provide a more attractive and engaging environment.

68.1.a The NYC Active Design Guidelines recommend providing physical activity spaces such as exercise rooms, active play spaces, and multi-purpose recreational spaces in public, workplace and residential buildings.

68.2.a NYC Active Design Guidelines recommend locating places of residence and work near existing recreational facilities, walking paths, parks, and waterfront areas.

88 U.S. Internal Revenue Service. Internal Revenue Code of 1986 §132(f). Washington, D.C.: Internal Revenue Service; 1986.

65.1.a IRC Section 132(f) on qualified transportation fringe allows employers to offer employees the opportunity to set aside a portion of their salary to pay for certain transportation expenses.

89 U.S. Department of Justice Civil Rights Division. *2010 ADA Standards for Accessible Design*. Washington, D.C.: U.S. Dept of Justice Civil Rights Division; 2010.

72.1.a The Department of Justice Civil Rights Division's 2010 ADA Standards for Accessible Design set accessibility standards for new construction and alterations.

90 U.S. General Services Administration Center for Workplace Strategy Public Buildings Service. *Sound Matters: How to Achieve Acoustic Comfort in the Contemporary Office.* Washington, D.C.: 2012: 11, 29, 32, 33, 36.

75.1.a The General Services Administration's Sound Matters recommends to carefully consider the effect on neighboring workstations when locating supporting activities, i.e. copier rooms, coffee bars, entries to conference rooms.

75.2.a The General Services Administration's Sound Matters recommends a background noise maximum of NC 40 for open plan workspaces.

75.2.b The General Services Administration's Sound Matters recommends a background noise maximum of NC 35 for private offices.

75.2.d The General Services Administration's Sound Matters recommends a background noise maximum of NC 20 for teleconference facilities.

78.1.a The General Services Administration's Sound Matters recommends RT60 of 0.6 seconds for meeting rooms.

79.1.a The General Services Administration's Sound Matters recommends that sound masking should be considered a technique to achieve acoustic comfort in contemporary offices.

79.2.a The General Services Administration's Sound Matters recommends sound masking at 45-48 dBA for open plan workspaces.

79.2.b The General Services Administration's Sound Matters recommends sound masking at 40-42 dBA for private offices.

80.1.a The General Services Administration's Sound Matters recommends this NRC value for open plan workspaces.

80.1.b The General Services Administration's Sound Matters recommends this NRC value for meeting rooms and teleconference rooms.

80.2.a The General Services Administration's Sound Matters recommends a minimum NRC of 0.8 on at least 25% of two adjacent walls for enclosed workspaces.

80.2.b The General Services Administration's Sound Matters recommends this NRC value for open plan workspaces.

80.2.c The General Services Administration's Sound Matters recommends this NRC value for quiet open offices which have head-height walls.

81.1.a The General Services Administration's Sound Matters recommends this NIC value for private offices.

81.1.b The General Services Administration's Sound Matters recommends this NIC value for teleconference rooms.

81.2.a The General Services Administration's Sound Matters recommends door gaskets to help prevent noise intrusion into offices.

81.2.b The General Services Administration's Sound Matters recommends that the undercut should be shielded in some fashion such as a sweep or drop seal gasket.

81.2.c The General Services Administration's Sound Matters advises that as it relates to acoustics, hollow core doors are only good to poor.

81.3.a The General Services Administration's Sound Matters recommends caulking gypsum partition slabs as an effective sound blocking technique.

81.3.b The General Services Administration's Sound Matters recommends staggering gypsum partition slabs as an effective sound blocking technique.

81.3.c The General Services Administration's Sound Matters recommends plugging holes as an effective sound blocking technique.

91 Greenbaum E., Meinert E. Vaccinating Against the Flu: A Business Case. http://www.businessgrouphealth.org/pub/f3137df6-2354-d714-5143-de37eb0ecd7c. Published 2010. Accessed October 16, 2014.

92.1.d The National Business Group on Health's Vaccinating Against the Flu: A Business Case notes to consider offering opportunities for employees to get vaccinated against the flu on-site.

92 ASHRAE. *Standard 55: Thermal Environmental Conditions for Human Occupancy*, Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers; 2013: 4; 8-13.

21.2.b ASHRAE Standard 55 provides guidelines for displacement ventilation systems for thermal environmental comfort.

76.1.a ASHRAE Standard 55: Thermal Environmental Conditions for Human Occupancy sets best practices for thermal comfort in buildings.

76.2.a ASHRAE Standard 55: Thermal Environmental Conditions for Human Occupancy sets best practices for thermal comfort in buildings.

93 U.S. Department of Energy. *Radiant Heating*. http://energy.gov/energysaver/articles/radiant-heating. Published 2012. Accessed September 15, 2014.

83.1.a The Department of Energy identifies radiant heating systems as more effiicient and less likely to distribute allergens than forced-air systems.

83.1.b The Department of Energy identifies radiant heating systems as more effiicient and less likely to distribute allergens than forced-air systems.

83.2.a The Department of Energy recommends radiant heating systems over forced-air systems as they are usually more efficient and do not distribute allergens.

83.2.b The Department of Energy identifies radiant heating systems as more effiicient and less likely to distribute allergens than forced-air systems.

94 National Heart, Lung, and Blood Institute. *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. http://www.nhlbi.nih.gov/files/docs/guidelines/prctgd_c.pdf. Published 2000. Accessed April 24, 2015.

94.1.a The NHLBI Obesity Education Initiative's "Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults" states that self-monitoring a behavior usually changes that behavior in the desired direction.

95 Marcus, C. C. & Sachs, N. A. Therapeutic Landscapes: An Evidence-based Approach to Designing Healing. Hoboken: John Wiley & Sons; 2013.

100.1.b Marcus and Sachs' Therapeutic Landscapes: An Evidence-based Approach to Designing Healing provide guidelines for planting, including the provision of gardens that have an approximate ratio of 70% softscape (plants) to 30% hardscape.

100.2.a Marcus and Sachs' Therapeutic Landscapes: An Evidence-based Approach to Designing Healing recommends providing opportunities for indoor nature connection, such as through the use of potted plants.

100.2.b Marcus and Sachs' Therapeutic Landscapes: An Evidence-based Approach to Designing Healing recommends incorporating vegetation growing at multiple heights, such as through planted walls.

100.3.a Marcus and Sachs' Therapeutic Landscapes: An Evidence-based Approach to Designing Healing recommends providing at least one water feature.

96 The New South Wales Planning Department. The Residential Flat Design Code. http://www.planning.nsw.gov.au/programservices/pdf/designcode/03_part03_a.pdf. Published 2002. Accessed September 15, 2014.

99.1.a New South Wales Department of Planning's Residential Flat Design Code recommends a minimum ceiling height of 2.7 m for all habitable rooms, and a preferred minimum of 2.4 m for all non-habitable rooms.

97 Employee Assistance Professionals Association. *Standards and Professional Guidelines for Employee Assistance Programs*. http://www.valueoptions.com/providers/Handbook/treatment/EAP_Guidelines.pdf. Published 2010. Accessed October 17, 2014.

95.1.a The EAPA Standards and Professional Guidelines recommend Employee Assistance Programs with short-term counseling, referrals, and follow-up services for employees who have personal and work-related concerns or issues.

119 CWT Solutions Group. Stress Triggers for Business Travelers: Traveler Survey Analysis. http://www.cwt-solutions-group.com/export/sites/cwtpreprod/.content/files/cwt-stress-triggers-for-business-travelers.pdf. Published 2012. Accessed September 24, 2014.

91.1.c CWT Solutions Group's Stress Triggers for Business Travelers notes that, compared to respondents living alone, respondents living with a partner reported that traveling during the weekends was more stressful.

91.1.d In CWT Solutions Group's Stress Triggers for Business Travelers, "not able to maintain workout routine" was listed as a medium stress factor.

174 American National Standards Institute and Illuminating Engineering Society of North America. *American National Standard Practice for Office Lighting*. New York, NY: Illuminating Engineering Society of North America; 2012. RP-1-12.

54.1.b ANSI/IES American National Standard Practice for Office Lighting (RP-1-12) provides recommended maintained illuminance targets for various types of spaces by age group. For reception desks, RP-1-12 recommends a maintained target of 150 lux for ages 25-65.

55.2.a ANSI/IES American National Standard Practice for Office Lighting (RP-1-12) notes that luminaires at angles higher than 53° above horizontal may cause discomfort, and that such luminaires should be less than 8,000 cd/m².

176 U.S. Environmental Protection Agency. *Moisture Control Guidance for Building Design, Construction and Maintenance*. Washington, DC: U.S. Environmental Protection Agency; Dec 2013. EPA 402-F-13053.

12.1.a EPA 402-F-13053 notes that effectively controlling water intrusion requires directing drain rain and irrigation water away frm the building.

12.1.b EPA 402-F-13053 notes to design buildings such that the interior floor grade is above the local water table.

12.1.c EPA 402-F-13053 notes to design exterior walls to manage rainwater.

12.1.d EPA 402-F-13053 advises to consider key elements of moisture behavior, including transport mechanisms such as moisture wicking through porous materials.

12.2.a EPA 402-F-13053 notes that leaks in pipes or tanks in the plumbing system can release water.

12.2.b EPA 402-F-13053 notes that moisture problems include leaks in pressurized pipes and vessels in appliances that use water.

12.2.c EPA 402-F-13053 advises to consider key elements of moisture behavior, including transport mechanisms such as moisture wicking through porous materials.

12.2.d EPA 402-F-13053 notes to "avoid enclosing wet materials in new construction by protecting moisture-sensitive and porous materials" as part of a comprehensive strategy to control liquid water movement.

12.3.a EPA 402-F-13053 notes that in low-rise buildings, damp basements and crawlspaces may add water vapor to the air.

12.3.b EPA 402-F-13053 notes that air that infiltrates the building through air leaks represents one of the largest sources of humidity.

12.3.c EPA 402-F-13053 notes that condensation may be caused by "excessively high dew point, unusually cold surfaces, or a combination of the two."

12.3.d EPA 402-F-13053 notes that "oversized cooling systems do not solve humidity control problems—instead, they cause them."

12.4.a EPA 402-F-13053 advises to use materials able to tolerate repeated wetting and drying in wet areas. The document also notes that particularly in buildings in cold climates, it is important to consider the condensation potential of glazing designs.

12.4.b EPA 402-F-13053 notes that exterior cladding and other measures can intercept most of the rain water and direct it away from the building.

12.4.c EPA 402-F-13053 advises to use materials able to tolerate repeated wetting and drying in wet areas.

12.4.d EPA 402-F-13053 advises to use low-permeability insulating sheathing and interior finishes.

177 ASHRAE. Proposed New Standard 188, Prevention of Legionellosis Associated with Building Water Systems. Atlanta, GA: ASHRAE; Jun, 2011. BSR/ASHRAE Standard 188P.

36.5.a ASHRAE's proposed Hazard Analysis and Critical Control Point Plan requires the development of a team comprised of members who understand the building's water systems and the principles of the plan.

36.5.b ASHRAE's proposed Hazard Analysis and Critical Control Point Plan requires teams to develop at least two process flow diagrams mapping the receipt, processing and delivery of water to occupants.

36.5.c ASHRAE's proposed Hazard Analysis and Critical Control Point plan for preventing building associated legionellosis includes conducting a hazard analysis.

36.5.d ASHRAE's proposed Hazard Analysis ad Critical Control Point plan includes identifying critical control points.

36.5.e ASHRAE's Hazard Analysis and Critical Control Point plan for preventing building associated legionellosis includes monitoring identified control points and establishing procedures for corrective measures.

36.5.f ASHRAE's proposed Hazard Analysis and Critical Control Point plan for preventing building-associated legionellosis includes establishing documentation and verification procedures.

178 O'Neill M, Knoll, Inc. *Office Ergonomics Standards: A Layperson's Guide*. https://www.knoll.com/knollnewsdetail/office-ergonomic-standards. Published 2011. Accessed May 5, 2015.

73.3.a HFES standards accommodate at least 90% of the North American workforce. The BIFMA G1 provides recommendations for sizing furniture to accommodate the 5th percentile female to the 95th percentile male of the North American population.

73.3.b HFES standards accommodate at least 90% of the North American workforce. The BIFMA G1 provides recommendations for sizing furniture to accommodate the 5th percentile female to the 95th percentile male of the North American population.

180 Wansink B. *Smarter Lunchrooms*. In: Slim By Design: Mindless Eating Solutions for Everyday Life. New York, NY: HarperCollins Publishers; 2014: 185-224.

38.2.a In Slim by Design, Wansink notes that in one intervention in a school, positioning the salad bar away from the wall led to an increase in salad bar sales by 200 to 300 percent within a few weeks.

181 Global Reporting Initiative. *G4 Sustainability Reporting Guidelines: Reporting Principles and Standard Disclosures*. https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf. Published 2013. Accessed June 9, 2015.

98.1.b The Global Reporting Initiative's G4 Sustainability Reporting Guidelines offers a framework for standardized, sustainability reporting.

182 The White House. *Presidential Memorandum -- Modernizing Federal Leave Policies for Childbirth, Adoption and Foster Care to Recruit and Retain Talent and Improve Productivity*. https://www.whitehouse.gov/the-press-office/2015/01/15/presidential-memorandum-modernizing-federal-leave-policies-childbirth-ad. Published January 15, 2015. Accessed June 11, 2015.

93.1.a A 2015 Presidential Memorandum from the White House directs federal agencies to ensure employee policies offering 240 hours (equivalent to 6 workweeks) of advanced (i.e., paid) sick leave for appropriate uses, including the birth or adoption of a child.

183 The Society of Light and Lighting. Lighting for the Built Environment - Lighting Guide 13: Lighting for Places of Worship. England: The Lavenham Press; 2014.

89.2.b CIBSE's Lighting Guide 13: Lighting for Places of Worship notes that lamps with a correlated color temperature of 2700-3000 K for congregation spaces can help these spaces feel psychologically "warmer".

184 Cohen RA. *Impact of type of insurance plan on access and utilization of health care services for adults aged 18-64 years with private health insurance: United States, 2007-2008*. NCHS Data Brief. 2010(28): 1-8.

92.1.b A 2010 NCHS Data Brief reports that according to the National Health Interview Survey, for privately insured adults, having a flexible spending account or health savings account was associated with increase health care utilization for some services.

92.1.c A 2010 NCHS Data Brief reports that according to the National Health Interview Survey, adults with private health insurance without a health savings account were more likely to have unmet medical needs compared to those with health savings accounts.

185 Cohen RA, Martinez ME. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, January–March 2012*. Atlanta, GA: Centers for Disease Control and Prevention. 2013.

92.1.a A report from the National Center for Health Statistics found that, based on responses from the National Health Interview Survey, an estimated 45.5 million people in the US were uninsured, including 18.5% of respondents who had employment.

187 Minnesota Department of Health. Water Treatment Using Carbon Filters (GAC). http://www.health.state.mn.us/divs/eh/hazardous/topics/gac1.pdf. Published 2013. Accessed June 10, 2015.

36.1.a The Minnesota Department of Health notes that "A filter with granular activated carbon (GAC) is a proven option to remove certain chemicals, particularly organic chemicals, from water".

188 United States Environmental Protection Agency Office of Water. *Alternative Disinfectants and Oxidants Guidance Manual*. http://www.epa.gov/ogwdw/mdbp/alternative_disinfectants_guidance.pdf. Published April 1999. Accessed June 12, 2015.

36.3.a The US EPA's Alternative Disinfectants and Oxidants Guidance Manual notes that the optimum UV range is between 245 and 285 nm, which corresponds to UV-C radiation (200-280 nm).

189 International Organization for Standardization. *ISO 21542:2011 - Accessibility and Usability of the Built Environment*, Technical Committee ISO/TC 59, Buildings and Civil Engineering Works, Subcommittee SC 16.

72.1.b The ISO's 21542:2011 provides standards on accessibility for newly constructed or renovated buildings.

Appendix C: Tables

The following tables are referred to in various requirements of the Standard. The first letter of the table name denotes the Concept chapter it refers to, e.g. "A" for Air.

Table A1: High Touch Surfaces

Table A2: Reduced Risk Pesticides

Table A3: Materials Restrictions

Table A4: Cleaning Protocol

Table A5: Mercury Limits

Table L1: Melanopic Ratio

Table L2: Melanopic and Visual Response

Table N1: Produce Storage Temperatures

Table A1: High-Touch Surfaces

These are surfaces that require more frequent and thorough sanitization. Cleaning protocols should list these surfaces within the project and incorporate the correct cleaning instructions accordingly. Based on CDC Environmental Checklist for Monitoring Terminal Cleaning.

Non-porous

- Tabletops
- Doorknobs
- Elevator buttons
- Telephones
- Public digital devices and keyboards
- Light switches
- Chairs
- Bathroom handles and fixtures
- Countertops in bathrooms
- Toilet handles and lids
- Bathtubs and shower walls and floor
- Interior shower and bath surfaces
- Kitchen handles and fixtures
- Countertops in kitchens
- Non-disposable medical devices
- Bed railing
- Serving trays and bed tables

Porous

- Rugs
- Upholstered furniture covers
- Fabric curtains
- Towels
- Bedding: linens, pillow cases and comforter

Table A2: Reduced Risk Pesticides

For up-to-date and immediate San Francisco Hazard Review Process evaluation results, the Pesticide Research Institute's PestSmart tool [1] or Pesticide Product Evaluator tool [2] may be used.

If a pesticide has not yet been evaluated by the Pesticide Research Institute's tools above, use the Guide to the San Francisco's Reduced Risk Pesticide List Hazard Tier Review Process, which outlines the procedure for evaluating pesticides [3].

[1] http://pesticideresearch.com/site/pestsmart/
[2] https://pesticideresearch.com/site/evaluator/
[3] http://sfenvironment.org/sites/default/files/fliers/files/sfe_th_guide_to_reduced_risk_pesticide_listposted.pdf

Table A3: Materials Restrictions

This table specifies the harmful chemicals found in building materials that are disallowed by the WELL Building Standard in the features listed below.

Feature : Fundamental material safety — PRECONDITION

Chemical Name	CAS
Polychlorinated biphenyl	
Polychlorinated biphenyls	1336-36-3
Lead	
Neutral anhydrous carbonate $PbCO_3$	598-63-0
Lead sulfate Pbx SO_4	15739-80-7
Lead sulfate $PbSO_4$	7446-14-2
Trilead-bis(carbonate)- dihydroxide 2Pb CO_3-$Pb(OH)_2$	1319-46-6
Asbestos	
Asbestos	1332-21-4
Actinolite	77536-66-4/12172-67-7
Anthophyllite	77536-67-5/17068-78-9
Amosite	12172-73-5/12172-73-5
Chrysotile	12001-29-5/12001-29-5
Crocidolite	12001-28-4/12001-28-4
Tremolite	77536-68-6/14567-73-8

Feature : Toxic material reduction — OPTIMIZATION

Chemical Name	CAS
Polyurethane	
Hexamethylene diisocyanate	822-06-0
Methylene diphenyl diisocyanate	101-68-8/9016-87-9
Toluene diisocyantes	584-84-9
Phthalates	
Dibutyl phthalate	84-74-2
Diisodecyl phthalate	26761-40-0/68515-49-1
Benzylbutyl phthalate	85-68-7
Di-n-octyl phthalate	117-84-0
Di-2-ethylhexyl phthalate	117-81-7
Diisononyl phthalate	28553-12-0/68515-48-0

Halogenated flame retardants

Pentabromodiphenyl ether	182346-21-0
Tris(2-chloroethyl)phosphate	115-96-8
Hexabromocyclododecane	25637-99-4
Octabromodiphenyl ether	446255-56-7
Decabromodiphenyl ether	1163-19-5
Tetrabromobisphenol-A	79-94-7
Tris(2-chloroisopropyl) phosphate	13674-84-5
Dechlorane Plus	13560-89-9

Formaldehyde based resins

Phenol formaldehyde	9003-35-4
Urea formaldehyde	9011-05-6
Melamine formaldehyde	82115-62-6

Table A4: Cleaning Protocol

Cleaning Equipment and Training

An improved cleaning protocol is achieved through a baseline assessment or evaluation prior to incorporation of appropriate changes. A project's cleaning practice must be evaluated to best incorporate the following changes and/or additions.

Cleaning Equipment

Projects must implement a program for the use of sustainably powered cleaning equipment that abide by Green Seal 42, Standard for Commercial and Institutional Cleaning Services for Powered Equipment Use/ Maintenance Plan or local equivalent for projects outside the United States. Additionally, the following requirements must be met:

1. For projects in humid climates, as designated by ANSI/ASHRAE/IESNA 90.1-2007, powder carpet cleaning systems must be used in place of traditional carpet extraction systems.
2. Battery-powered equipment must be equipped with environmentally preferable gel batteries.
3. Equipment must be designed with safeguards, such as rollers or rubber bumpers, to reduce potential damage to building surfaces.
4. Where possible, equipment that eliminates or reduces chemical use and qualifies as a sanitizing device under EPA when used with water and no chemicals, including steam vapor equipment and spray/vacuum touch-free cleaning systems, must be used.

Program Protocol

A successful cleaning program requires, beyond the selection of safer products, proper training and use of green cleaning materials and products. Projects must have in place a cleaning program that addresses the following:

1. Chemical Measuring and Dilution: A control system; for example a wall mounted dispensing system for concentrates, that limits direct handling and worker exposure to chemicals, ensures proper dilution of mixtures and prevents overuse or waste.
2. Training on Procedures: Sequencing of cleaning steps and use of personal protective equipment.
3. Training on Safety: Training on how to reduce and prevent ergonomic injuries and exposure to hazardous materials.
4. Annual In-Service Training: Training on use of certified green cleaning products, materials and equipment.
5. Training on Purchasing: Training of purchasing personnel in the selection of green cleaning materials.

Cleaning Product Selection

Eco-label certifiers: Design for the Environment (DfE), EcoLogo, and Green Seal address the human health, ecological toxicity and environmental fate characteristics of chemical ingredients used in cleaning products. By establishing specifications that prioritize ingredients that pose the least concern among chemicals in their class, these eco-label certifiers reduce potential hazards associated with use of cleaning products. When selecting cleaning products, all projects must comply by below guidelines (adopted from U.S. Green Building Council's LEED for Existing Buildings: Operations & Maintenance Rating System Version 4). For projects outside the United States, any Type 1 eco-labeling program as defined by ISO 14024: 1999 developed by a member of the Global Ecolabelling Network may be used in place of DfE, Green Seal, or UL EcoLogo standards.

Cleaning Products by Functional Class

Cleaning products must meet the relevant standard per appropriate functional class or use case, or a local equivalent for projects outside the United States.

1. Green Seal GS-37, for general-purpose, bathroom, glass and carpet cleaners used for industrial and institutional purposes.
2. UL EcoLogo 2792, for cleaning and degreasing compounds.
3. UL EcoLogo 2759, for hard-surface cleaners.
4. UL EcoLogo 2795, for carpet and upholstery care.
5. Green Seal GS-40, for industrial and institutional floor care products.
6. UL EcoLogo 2777, for hard-floor care.
7. UL EcoLogo 2798, for digestion additives for cleaning and odor control.
8. UL EcoLogo 2791, for drain or grease trap additives.
9. UL EcoLogo 2796, for odor control additives.
10. Green Seal GS-52/53, for specialty cleaning products.
11. EPA Design for the Environment Program's Standard for Safer Cleaning Products.

Hand Hygiene Products

Hand soaps and hand sanitizers must meet the relevant standard per appropriate functional class or use case, or a local equivalent for projects outside the United States.

1. No antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (e.g., food service and health care requirements).
2. Green Seal GS-41, for industrial and institutional hand cleaners.
3. UL EcoLogo 2784 or EPA's Design for the Environment, for hand cleaners and hand soaps.
4. UL EcoLogo 2783, for hand sanitizers.
5. EPA Design for the Environment Program's standard for safer cleaning products.

Janitorial Products

Disposable janitorial paper products and trash must meet the relevant standard per appropriate functional class or use case, or a local equivalent for projects outside the United States.

1. EPA comprehensive procurement guidelines for janitorial paper.
2. Green Seal GS-01 for tissue paper, paper towels and napkins.
3. UL EcoLogo 175 for toilet tissue.
4. UL EcoLogo 175 for hand towels.
5. California integrated waste management requirements (California Code of Regulations Title 14, Chapter 4, Article 5, or SABRC 42290-42297 Recycled Content Plastic Trash Bag Program) or EPA comprehensive procurement guidelines for plastic trash can liner

Disinfection and Sanitization

High-touch surfaces present increased risk for contamination, particularly in high transit areas. A cleaning protocol must take into account the degree to which disinfection and sanitization are necessary. Unnecessary disinfection and sanitization can negatively impact immune health. Although reduced exposure to microorganisms and parasites can result in decreased disease and illness, it is also increasingly linked to a rising prevalence of hypersensitivity disorders and autoimmune diseases, especially in industrialized nations.

Cleaning for Health

Projects must limit disinfection to high-touch surfaces in areas including but not limited to restrooms, community rooms, gymnasium and workout areas in accordance with Green Seal 42, Standard for Commercial and Institutional Cleaning Services Edition 2.1, 2013.

1. Disinfection (Section 4.6, with the exception of product specification in 4.6.2)
2. Restroom Care (Section 4.7)
3. Dining Areas and Break Rooms (Section 4.8)

Entryway Maintenance

Entryway maintenance and care is critical to minimizing dirt and pollutants tracked in from the outdoor environment. Clean and well-maintained entryways can contribute greatly to improved indoor air quality.

Entryways and Lobbies

In order to minimize the migration of contaminants into the building, projects must adhere to the below cleaning and maintenance guidelines for entryways and lobbies:

1. Walk-off mats, indoor and outdoor, should be wet-cleaned once every two days and allowed to dry before being used.
2. The underside of entry mats should be cleaned at least once a day and twice a day during inclement weather.
3. Entry mats must be vacuumed using a vacuum with a beater bar in both directions, at least once a day and twice a day during inclement weather.
4. Non-toxic and environmentally safe ice melting compounds (e.g., non-corrosive, non- phosphate) must be selected through the winter months.

Table A5: Mercury Limits

This table indicates allowable mercury limits in lamps, as referred to in the Fundamental Material Safety feature. Values from LEED PBT source reduction - mercury prerequisite

Fluorescent

Lamp	Maximum Hg Content
Compact, integral ballast	3.5 mg
Compact, nonintegral ballast	3.5 mg
T-5, circular	9 mg
T-5, linear	2.5 mg
T-8, eight-foot	10 mg
T-8, four-foot	3.5 mg
T-8, two- and three-foot	3.5 mg
T-8, U-bent	6 mg

High-pressure sodium

Lamp	Maximum Hg Content
400 W or less	10 mg
Over 400 W	32 mg

Table L1: Melanopic Ratio

This unit Equivalent Melanopic Lux (EML) was proposed by Lucas and others (Lucas et al., "Measuring and using light in the melanopsin age." Trends in Neuroscience, Jan 2014). The authors provided a toolbox which for a desired spectrum derives equivalent "α-opic" lux for each of the five photoreceptors in the eye (three cones, rods, and the ipRGCs). The authors selected scaling constants such that each of the values would be identical to each other and the standard definition of lux for a light spectrum of perfectly uniform energy (CIE Standard Illuminant E).

Given a spectrum of light, each equivalent α-opic lux is related to each other by a constant. The table below shows the example ratios between the equivalent melanopic lux and the standard visual lux for several sources.

To calculate the equivalent melanopic lux (EML), multiply the visual lux (L) designed for or measured in a building by this ratio (R): EML = L × R. For example, if incandescent lights provide 200 lux in a space, they will also produce 108 equivalent melanopic lux. If daylight is modeled to provide the same visual brightness (200 lux), it will also provide 220 equivalent melanopic lux.

Similar melanopic ratios can be determined by incorporating the spectrum of the desired source into the calculations in Table L2. Projects are encouraged to use this approach to obtain more accurate results. Both the authors of the journal article and the IWBI have spreadsheets to aid in this calculation.

CCT (K)	Light Source	Ratio
2700	LED	0.45
3000	Fluorescent	0.45
2800	Incandescent	0.54
4000	Fluorescent	0.58
4000	LED	0.76
5450	CIE E (Equal Energy)	1.00
6500	Fluorescent	1.02
6500	Daylight	1.10
7500	Fluorescent	1.11

Table L2: Melanopic and Visual Response

To calculate the melanopic ratio of light, start by obtaining the light output of the lamp at each 5 nm increment, either from manufacturer or by using a spectrometer. Then, multiply the output by the melanopic and visual curves given below to get the melanopic and visual responses. Finally, divide the total melanopic response by the total visual response and multiply the quotient by 1.218.

Although the ipRGCs have a peak sensitivity at about 480 nm, the melanopic response in this table peaks at 490 nm because it takes into account the adult eye's lens, which preferentially transmits longer wavelength light.

Wavelength	Light Output	Melanopic Curve	Melanopic Response	Visual Curve	Visual Response
380		0.00092		0.00004	
385		0.00167		0.00006	
390		0.00309		0.00012	
395		0.00588		0.00022	
400		0.01143		0.00040	
405		0.02281		0.00064	
410		0.04615		0.00121	
415		0.07948		0.00218	
420		0.13724		0.00400	
425		0.18710		0.00730	
430		0.25387		0.01160	
435		0.32068		0.01684	
440		0.40159		0.02300	
445		0.47400		0.02980	
450		0.55372		0.03800	
455		0.62965		0.04800	
460		0.70805		0.06000	
465		0.78522		0.07390	
470		0.86029		0.09098	
475		0.91773		0.11260	
480		0.96560		0.13902	
485		0.99062		0.16930	
490		1.00000		0.20802	
495		0.99202		0.25860	
500		0.96595		0.32300	
505		0.92230		0.40730	
510		0.86289		0.50300	
515		0.78523		0.60820	
520		0.69963		0.71000	
525		0.60942		0.79320	
530		0.51931		0.86200	
535		0.43253		0.91485	
540		0.35171		0.95400	
545		0.27914		0.98030	
550		0.21572		0.99495	
555		0.16206		1.00000	
560		0.11853		0.99500	
565		0.08435		0.97860	
570		0.05870		0.95200	

575	0.04001	0.91540	
580	0.02687	0.87000	
585	0.01786	0.81630	
590	0.01179	0.75700	
595	0.00773	0.69490	
600	0.00507	0.63100	
605	0.00332	0.56680	
610	0.00218	0.50300	
615	0.00143	0.44120	
620	0.00095	0.38100	
625	0.00063	0.32100	
630	0.00042	0.26500	
635	0.00028	0.21700	
640	0.00019	0.17500	
645	0.00013	0.13820	
650	0.00009	0.10700	
655	0.00006	0.08160	
660	0.00004	0.06100	
665	0.00003	0.04458	
670	0.00002	0.03200	
675	0.00001	0.02320	
680	0.00001	0.01700	
685	0.00001	0.01192	
690	0.00000	0.00821	
695	0.00000	0.00572	
700	0.00000	0.00410	
705	0.00000	0.00293	
710	0.00000	0.00209	
715	0.00000	0.00148	
720	0.00000	0.00105	
725	0.00000	0.00074	
730	0.00000	0.00052	
735	0.00000	0.00036	
740	0.00000	0.00025	
745	0.00000	0.00017	
750	0.00000	0.00012	
755	0.00000	0.00008	
760	0.00000	0.00006	
765	0.00000	0.00004	
770	0.00000	0.00003	
775	0.00000	0.00002	
780	0.00000	0.00001	
Totals:		_____	_____

Appendix D: Feature Types and Verification Methods

Parts of the WELL Building Standard fall into one of three categories with respect to the interventions necessary for their completion – design elements, protocols or performance standards. Design standards require that a specific technology or design strategy be used. Protocols are also prescriptive, but for building or company policies or schedules. Performance-based standards mandate environmental conditions and therefore are affected by both building design and operation. They are also technology- and practice-neutral, allowing flexibility in how a project meets acceptable quantified thresholds.

The following table also displays the type of documentation relevant (if any) for each Part of a Feature. Project teams should consult this table to understand what document needs to be submitted to demonstrate that the Part has been satisfied, or if no action is necessary because an assessor will check the Part on-site during the Performance Verification.

-Policy document: a formally adopted set of rules of operation or behavior followed by or implemented in the project to comply with WELL feature requirements.
-Operations schedule is a document outlining routine or cyclical maintenance implemented in the project to comply with WELL feature requirements.

AIR	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 01: AIR QUALITY STANDARDS			
PART 1 (Performance) STANDARDS FOR VOLATILE SUBSTANCES			PERFORMANCE TEST
PART 2 (Performance) STANDARDS FOR PARTICULATE MATTER AND INORGANIC GASES			PERFORMANCE TEST
PART 3 (Performance) RADON			PERFORMANCE TEST
FEATURE 02: SMOKING BAN			
PART 1 (Protocol) INDOOR SMOKING BAN		POLICY DOCUMENT	
PART 2 (Protocol) OUTDOOR SMOKING BAN			VISUAL INSPECTION
FEATURE 03: VENTILATION EFFECTIVENESS			
PART 1 (Design) VENTILATION DESIGN	MEP		
PART 2 (Design) DEMAND CONTROLLED VENTILATION	MEP		
PART 3 (Design) SYSTEM BALANCING		TESTING AND BALANCING REPORT	

AIR	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 04: VOC REDUCTION			
PART 1 (Design) INTERIOR PAINTS AND COATINGS	ARCHITECT & CONTRACTOR		
PART 2 (Design) INTERIOR ADHESIVES AND SEALANTS	ARCHITECT & CONTRACTOR		
PART 3 (Design) FLOORING	ARCHITECT & CONTRACTOR		
PART 4 (Design) INSULATION	ARCHITECT & CONTRACTOR		
PART 5 (Design) FURNITURE AND FURNISHINGS	ARCHITECT & OWNER		
FEATURE 05: AIR FILTRATION			
PART 1 (Design) FILTER ACCOMMODATION	MEP		SPOT CHECK
PART 2 (Design) PARTICLE FILTRATION	MEP		SPOT CHECK
PART 3 (Design) AIR FILTRATION MAINTENANCE		OPERATIONS SCHEDULE	
FEATURE 06: MICROBE AND MOLD CONTROL			
PART 1 (Design) COOLING COIL MOLD REDUCTION		MEP DRAWING OR OPERATIONS SCHEDULE	
PART 2 (Performance) MOLD INSPECTIONS			VISUAL INSPECTION
FEATURE 07: CONSTRUCTION POLLUTION MANAGEMENT			
PART 1 (Protocol) DUCT PROTECTION	CONTRACTOR		
PART 2 (Protocol) FILTER REPLACEMENT	CONTRACTOR		
PART 3 (Protocol) MOISTURE ABSORPTION MANAGEMENT	CONTRACTOR		
PART 4 (Protocol) DUST CONTAINMENT AND REMOVAL	CONTRACTOR		
FEATURE 08: HEALTHY ENTRANCE			
PART 1 (Design) PERMANENT ENTRYWAY WALK-OFF SYSTEMS			VISUAL INSPECTION
PART 2 (Design) ENTRYWAY AIR SEAL			VISUAL INSPECTION
FEATURE 09: CLEANING PROTOCOL			
PART 1 (Protocol) CLEANING PLAN FOR OCCUPIED SPACES		OPERATIONS SCHEDULE	

AIR	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 10: PESTICIDE MANAGEMENT			
PART 1 (Protocol) PESTICIDE USE		OPERATIONS SCHEDULE	
FEATURE 11: FUNDAMENTAL MATERIAL SAFETY			
PART 1 (Design) ASBESTOS AND LEAD RESTRICTION	ARCHITECT & MEP		
PART 2 (Protocol) LEAD ABATEMENT		REMEDIATION REPORT	
PART 3 (Protocol) ASBESTOS ABATEMENT		REMEDIATION REPORT	
PART 4 (Protocol) POLYCHLORINATED BIPHENYL ABATEMENT		REMEDIATION REPORT	
PART 5 (Design) MERCURY LIMITATION		POLICY DOCUMENT	
FEATURE 12: MOISTURE MANAGEMENT			
PART 1 (Design) EXTERIOR LIQUID WATER MANAGEMENT		PROFESSIONAL NARRATIVE	
PART 2 (Design) INTERIOR LIQUID WATER MANAGEMENT		PROFESSIONAL NARRATIVE	
PART 3 (Design) CONDENSATION MANAGEMENT		PROFESSIONAL NARRATIVE	
PART 4 (Design) MATERIAL SELECTION AND PROTECTION		PROFESSIONAL NARRATIVE	
FEATURE 13: AIR FLUSH			
PART 1 (Protocol) AIR FLUSH	CONTRACTOR		
FEATURE 14: AIR INFILTRATION MANAGEMENT			
PART 1 (Design) AIR LEAKAGE TESTING		COMMISSIONING REPORT	
FEATURE 15: INCREASED VENTILATION			
PART 1 (Design) INCREASED OUTDOOR AIR SUPPLY	MEP		
FEATURE 16: HUMIDITY CONTROL			
PART 1 (Design) RELATIVE HUMIDITY	MEP		SPOT MEASUREMENT
FEATURE 17: DIRECT SOURCE VENTILATION			
PART 1 (Design) POLLUTION ISOLATION AND EXHAUST		MECHANICAL AND ARCHITECTURAL DRAWINGS	

AIR	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 18: AIR QUALITY MONITORING AND FEEDBACK			
PART 1 (Design) INDOOR AIR MONITORING	MEP		SPOT CHECK
PART 2 (Protocol) AIR DATA RECORD KEEPING AND RESPONSE		OPERATIONS SCHEDULE	
PART 3 (Design) ENVIRONMENTAL MEASURES DISPLAY			VISUAL INSPECTION
FEATURE 19: OPERABLE WINDOWS			
PART 1 (Design) FULL CONTROL	ARCHITECT		SPOT CHECK
PART 2 (Design) OUTDOOR AIR MEASUREMENT		POLICY DOCUMENT	
PART 3 (Design) WINDOW OPERATION MANAGEMENT	OWNER		SPOT CHECK
FEATURE 20: OUTDOOR AIR SYSTEMS			
PART 1 (Design) DEDICATED OUTDOOR AIR SYSTEMS	MEP		
FEATURE 21: DISPLACEMENT VENTILATION			
PART 1 (Design) DISPLACEMENT VENTILATION DESIGN AND APPLICATION	MEP		
PART 2 (Design) SYSTEM PERFORMANCE	MEP		
FEATURE 22: PEST CONTROL			
PART 1 (Design) PEST REDUCTION		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Performance) PEST INSPECTION			VISUAL INSPECTION
FEATURE 23: ADVANCED AIR PURIFICATION			
PART 1 (Design) CARBON FILTRATION	MEP		SPOT CHECK
PART 2 (Design) AIR SANITIZATION	MEP		SPOT CHECK
PART 3 (Protocol) AIR QUALITY MAINTENANCE		OPERATIONS SCHEDULE	

AIR	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 24: COMBUSTION MINIMIZATION			
PART 1 (Design) APPLIANCE AND HEATER COMBUSTION BAN	OWNER		SPOT CHECK
PART 2 (Design) LOW-EMISSION COMBUSTION SOURCES	MEP		
PART 3 (Protocol) ENGINE EXHAUST REDUCTION			VISUAL INSPECTION
PART 4 (Protocol) CONSTRUCTION EQUIPMENT	CONTRACTOR		
FEATURE 25: TOXIC MATERIAL REDUCTION			
PART 1 (Design) PERFLUORINATED COMPOUND LIMITATION	ARCHITECT & OWNER		
PART 2 (Design) FLAME RETARDANT LIMITATION	ARCHITECT & CONTRACTOR		
PART 3 (Design) PHTHALATE (PLASTICIZERS) LIMITATION	ARCHITECT & CONTRACTOR		
PART 4 (Design) ISOCYANATE-BASED POLYURETHANE LIMITATION	ARCHITECT & CONTRACTOR		
PART 5 (Design) UREA-FORMALDEHYDE RESTRICTION	ARCHITECT & CONTRACTOR		
FEATURE 26: ENHANCED MATERIAL SAFETY			
PART 1 (Design) PRECAUTIONARY MATERIAL SELECTION	ARCHITECT, CONTRACTOR, & OWNER		
FEATURE 27: ANTIMICROBIAL ACTIVITY FOR SURFACES			
PART 1 (Design) HIGH-TOUCH SURFACES		ARCHITECTURAL DRAWING OR OPERATIONS SCHEDULE	
FEATURE 28: CLEANABLE ENVIRONMENT			
PART 1 (Design) MATERIAL PROPERTIES	ARCHITECT & CONTRACTOR		SPOT CHECK
PART 2 (Design) CLEANABILITY	ARCHITECT & CONTRACTOR		SPOT CHECK
FEATURE 29: CLEANING EQUIPMENT			
PART 1 (Protocol) EQUIPMENT AND CLEANING AGENTS		OPERATIONS SCHEDULE	
PART 2 (Design) CHEMICAL STORAGE			VISUAL INSPECTION

WATER	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 30: FUNDAMENTAL WATER QUALITY			
PART 1 (Performance) SEDIMENT			PERFORMANCE TEST
PART 2 (Performance) MICROORGANISMS			PERFORMANCE TEST
FEATURE 31: INORGANIC CONTAMINANTS			
PART 1 (Performance) DISSOLVED METALS			PERFORMANCE TEST
FEATURE 32: ORGANIC CONTAMINANTS			
PART 1 (Performance) ORGANIC POLLUTANTS			PERFORMANCE TEST
FEATURE 33: AGRICULTURAL CONTAMINANTS			
PART 1 (Performance) HERBICIDES AND PESTICIDES			PERFORMANCE TEST
PART 2 (Performance) FERTILIZERS			PERFORMANCE TEST
FEATURE 34: PUBLIC WATER ADDITIVES			
PART 1 (Performance) DISINFECTANTS			PERFORMANCE TEST
PART 2 (Performance) DISINFECTANT BYPRODUCTS			PERFORMANCE TEST
PART 3 (Performance) FLUORIDE			PERFORMANCE TEST
FEATURE 35: PERIODIC WATER QUALITY TESTING			
PART 1 (Protocol) QUARTERLY TESTING		OPERATIONS SCHEDULE	
PART 2 (Protocol) WATER DATA RECORD KEEPING AND RESPONSE		OPERATIONS SCHEDULE	
FEATURE 36: WATER TREATMENT			
PART 1 (Design) ORGANIC CHEMICAL REMOVAL	MEP		SPOT CHECK
PART 2 (Design) SEDIMENT FILTER	MEP		SPOT CHECK
PART 3 (Design) MICROBIAL ELIMINATION	MEP		SPOT CHECK
PART 4 (Protocol) WATER QUALITY MAINTENANCE		OPERATIONS SCHEDULE	
PART 5 (Design) LEGIONELLA CONTROL		PROFESSIONAL NARRATIVE	

WATER	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 37: DRINKING WATER PROMOTION			
PART 1 (Performance) DRINKING WATER TASTE PROPERTIES			PERFORMANCE TEST
PART 2 (Design) DRINKING WATER ACCESS	ARCHITECT		SPOT CHECK
PART 3 (Protocol) WATER DISPENSER MAINTENANCE		OPERATIONS SCHEDULE	

NOURISHMENT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 38: FRUITS AND VEGETABLES			
PART 1 (Protocol) FRUIT AND VEGETABLE VARIETY		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Protocol) FRUIT AND VEGETABLE PROMOTION		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 39: PROCESSED FOODS			
PART 1 (Protocol) REFINED INGREDIENT RESTRICTIONS		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Protocol) TRANS FAT BAN		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 40: FOOD ALLERGIES			
PART 1 (Protocol) FOOD ALLERGY LABELING		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 41: HAND WASHING			
PART 1 (Protocol) HAND WASHING SUPPLIES		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Protocol) CONTAMINATION REDUCTION			VISUAL INSPECTION
PART 3 (Design) SINK DIMENSIONS	ARCHITECT		SPOT CHECK
FEATURE 42: FOOD CONTAMINATION			
PART 1 (Design) COLD STORAGE	OWNER		SPOT CHECK
FEATURE 43: ARTIFICIAL INGREDIENTS			
PART 1 (Protocol) ARTIFICIAL SUBSTANCE LABELING		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 44: NUTRITIONAL INFORMATION			
PART 1 (Protocol) DETAILED NUTRITIONAL INFORMATION			VISUAL INSPECTION

NOURISHMENT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 45: FOOD ADVERTISING			
PART 1 (Protocol) ADVERTISING AND ENVIRONMENTAL CUES			VISUAL INSPECTION
PART 2 (Protocol) NUTRITIONAL MESSAGING			VISUAL INSPECTION
FEATURE 46: SAFE FOOD PREPARATION MATERIALS			
PART 1 (Protocol) COOKING MATERIAL		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Protocol) CUTTING SURFACES		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 47: SERVING SIZES			
PART 1 (Protocol) MEAL SIZES		OPERATIONS SCHEDULE	SPOT CHECK
PART 2 (Protocol) DINNERWARE SIZES		OPERATIONS SCHEDULE	SPOT CHECK
FEATURE 48: SPECIAL DIETS			
PART 1 (Protocol) FOOD ALTERNATIVES		OPERATIONS SCHEDULE	
FEATURE 49: RESPONSIBLE FOOD PRODUCTION			
PART 1 (Protocol) SUSTAINABLE AGRICULTURE		OPERATIONS SCHEDULE	
PART 2 (Protocol) HUMANE AGRICULTURE		OPERATIONS SCHEDULE	
FEATURE 50: FOOD STORAGE			
PART 1 (Design) STORAGE CAPACITY	OWNER		SPOT CHECK
FEATURE 51: FOOD PRODUCTION			
PART 1 (Design) GARDENING SPACE	OWNER		SPOT CHECK
PART 2 (Design) PLANTING SUPPORT	OWNER		SPOT CHECK
FEATURE 52: MINDFUL EATING			
PART 1 (Design) EATING SPACES		ARCHITECTURAL DRAWING	
PART 2 (Design) BREAK AREA FURNISHINGS	OWNER		SPOT CHECK

LIGHT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 53: VISUAL LIGHTING DESIGN			
PART 1 (Design) VISUAL ACUITY FOR FOCUS	ARCHITECT	POLICY DOCUMENT	SPOT MEASUREMENT
PART 2 (Design) BRIGHTNESS MANAGEMENT STRATEGIES		PROFESSIONAL NARRATIVE	
FEATURE 54: CIRCADIAN LIGHTING DESIGN			
PART 1 (Design) MELANOPIC LIGHT INTENSITY FOR WORK AREAS	ARCHITECT		SPOT MEASUREMENT
FEATURE 55: ELECTRIC LIGHT GLARE CONTROL			
PART 1 (Design) LAMP SHIELDING	ARCHITECT		
PART 2 (Design) GLARE MINIMIZATION	ARCHITECT		
FEATURE 56: SOLAR GLARE CONTROL			
PART 1 (Design) VIEW WINDOW SHADING	ARCHITECT		SPOT CHECK
PART 2 (Design) DAYLIGHT MANAGEMENT	ARCHITECT		SPOT CHECK
FEATURE 57: LOW-GLARE WORKSTATION DESIGN			
PART 1 (Design) GLARE AVOIDANCE			VISUAL INSPECTION
FEATURE 58: COLOR QUALITY			
PART 1 (Design) COLOR RENDERING INDEX	ARCHITECT		
FEATURE 59: SURFACE DESIGN			
PART 1 (Design) WORKING AND LEARNING AREA SURFACE REFLECTIVITY	ARCHITECT		
FEATURE 60: AUTOMATED SHADING AND DIMMING CONTROLS			
PART 1 (Design) AUTOMATED SUNLIGHT CONTROL	MEP		
PART 2 (Design) RESPONSIVE LIGHT CONTROL	MEP		
FEATURE 61: RIGHT TO LIGHT			
PART 1 (Design) LEASE DEPTH		ARCHITECTURAL DRAWING	SPOT CHECK
PART 2 (Design) WINDOW ACCESS		ARCHITECTURAL DRAWING	SPOT CHECK
FEATURE 62: DAYLIGHT MODELING			
PART 1 (Design) HEALTHY SUNLIGHT EXPOSURE		MODELING REPORT	

LIGHT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 63: DAYLIGHTING FENESTRATION			
PART 1 (Design) WINDOW SIZES FOR WORKING AND LEARNING SPACES		ARCHITECTURAL DRAWING	SPOT CHECK
PART 2 (Design) WINDOW TRANSMITTANCE IN WORKING AND LEARNING AREAS	ARCHITECT		
PART 3 (Design) UNIFORM COLOR TRANSMITTANCE	ARCHITECT		

FITNESS	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 64: INTERIOR FITNESS CIRCULATION			
PART 1 (Design) STAIR ACCESSIBILITY			VISUAL INSPECTION
PART 2 (Design) STAIR PROMOTION			VISUAL INSPECTION
PART 3 (Design) FACILITATIVE AESTHETICS			VISUAL INSPECTION
FEATURE 65: ACTIVITY INCENTIVE PROGRAMS			
PART 1 (Organizational Protocol) ACTIVITY INCENTIVE PROGRAMS		POLICY DOCUMENT	
FEATURE 66: STRUCTURED FITNESS OPPORTUNITIES			
PART 1 (Organizational Protocol) PROFESSIONAL FITNESS PROGRAMS		POLICY DOCUMENT	
PART 2 (Organizational Protocol) FITNESS EDUCATION		POLICY DOCUMENT	
FEATURE 67: EXTERIOR ACTIVE DESIGN			
PART 1 (Design) PEDESTRIAN AMENITIES	OWNER		SPOT CHECK
PART 2 (Design) PEDESTRIAN PROMOTION	OWNER		SPOT CHECK
PART 3 (Design) NEIGHBORHOOD CONNECTIVITY		ANNOTATED MAP	
FEATURE 68: PHYSICAL ACTIVITY SPACES			
PART 1 (Design) SITE SPACE DESIGNATION FOR OFFICES		ARCHITECTURAL DRAWING	
PART 2 (Design) EXTERNAL EXERCISE SPACES		ANNOTATED MAP	

FITNESS	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 69: ACTIVE TRANSPORTATION SUPPORT			
PART 1 (Design) BICYCLE STORAGE AND SUPPORT	OWNER		SPOT CHECK
PART 2 (Design) POST COMMUTE AND WORKOUT FACILITIES	ARCHITECT		SPOT CHECK
FEATURE 70: FITNESS EQUIPMENT			
PART 1 (Design) CARDIORESPIRATORY EXERCISE EQUIPMENT	OWNER		SPOT CHECK
PART 2 (Design) MUSCLE-STRENGTHENING EXERCISE EQUIPMENT	OWNER		SPOT CHECK
FEATURE 71: ACTIVE FURNISHINGS			
PART 1 (Design) ACTIVE WORKSTATIONS	OWNER		SPOT CHECK
PART 2 (Design) PREVALENT STANDING DESKS	OWNER		SPOT CHECK

COMFORT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 72: ACCESSIBLE DESIGN			
PART 1 (Design) ACCESSIBILITY AND USABILITY	ARCHITECT		
FEATURE 73: ERGONOMICS: VISUAL AND PHYSICAL			
PART 1 (Design) VISUAL ERGONOMICS	OWNER		SPOT CHECK
PART 2 (Design) DESK HEIGHT FLEXIBILITY	OWNER		SPOT CHECK
PART 3 (Design) SEAT FLEXIBILITY	OWNER		SPOT CHECK
FEATURE 74: EXTERIOR NOISE INTRUSION			
PART 1 (Performance) SOUND PRESSURE LEVEL			PERFORMANCE TEST
FEATURE 75: INTERNALLY GENERATED NOISE			
PART 1 (Protocol) ACOUSTIC PLANNING	ARCHITECT		
PART 2 (Performance) MECHANICAL EQUIPMENT SOUND LEVELS			PERFORMANCE TEST
FEATURE 76: THERMAL COMFORT			
PART 1 (Design) VENTILATED THERMAL ENVIRONMENT	MEP		SPOT MEASUREMENT
PART 2 (Design) NATURAL THERMAL ADAPTATION	MEP		SPOT MEASUREMENT

COMFORT	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 77: OLFACTORY COMFORT			
PART 1 (Design) SOURCE SEPARATION		ARCHITECTURAL DRAWING	
FEATURE 78: REVERBERATION TIME			
PART 1 (Performance) REVERBERATION TIME			PERFORMANCE TEST
FEATURE 79: SOUND MASKING			
PART 1 (Design) SOUND MASKING USE	MEP		
PART 2 (Performance) SOUND MASKING LIMITS			PERFORMANCE TEST
FEATURE 80: SOUND REDUCING SURFACES			
PART 1 (Design) CEILINGS	ARCHITECT		
PART 2 (Design) WALLS	ARCHITECT		
FEATURE 81: SOUND BARRIERS			
PART 1 (Design) WALL CONSTRUCTION SPECIFICATIONS	ARCHITECT		
PART 2 (Design) DOORWAY SPECIFICATIONS	ARCHITECT & CONTRACTOR		
PART 3 (Design) WALL CONSTRUCTION METHODOLOGY	CONTRACTOR		
FEATURE 82: INDIVIDUAL THERMAL CONTROL			
PART 1 (Protocol) FREE ADDRESS		POLICY DOCUMENT	
PART 2 (Protocol) PERSONAL THERMAL COMFORT DEVICES	OWNER		SPOT CHECK
FEATURE 83: RADIANT THERMAL COMFORT			
PART 1 (Design) LOBBIES AND OTHER COMMON SPACES	MEP		
PART 2 (Design) OFFICES AND OTHER REGULARLY OCCUPIED SPACES	MEP		

MIND	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 84: HEALTH AND WELLNESS AWARENESS			
PART 1 (Protocol) WELL BUILDING STANDARD® GUIDE			VISUAL INSPECTION
PART 2 (Protocol) HEALTH AND WELLNESS LIBRARY			VISUAL INSPECTION

MIND	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 85: INTEGRATIVE DESIGN			
PART 1 (Protocol) STAKEHOLDER CHARRETTE		POLICY DOCUMENT	
PART 2 (Protocol) DEVELOPMENT PLAN		POLICY DOCUMENT	
PART 3 (Protocol) STAKEHOLDER ORIENTATION		POLICY DOCUMENT	
FEATURE 86: POST-OCCUPANCY SURVEYS			
PART 1 (Protocol) OCCUPANT SURVEY CONTENT		POLICY DOCUMENT	
PART 2 (Protocol) INFORMATION REPORTING		POLICY DOCUMENT	
FEATURE 87: BEAUTY AND DESIGN I			
PART 1 (Design) BEAUTY AND MINDFUL DESIGN		PROFESSIONAL NARRATIVE	
FEATURE 88: BIOPHILIA I - QUALITATIVE			
PART 1 (Design) NATURE INCORPORATION		PROFESSIONAL NARRATIVE	
PART 2 (Design) PATTERN INCORPORATION		PROFESSIONAL NARRATIVE	
PART 3 (Design) NATURE INTERACTION		PROFESSIONAL NARRATIVE	
FEATURE 89: ADAPTABLE SPACES			
PART 1 (Design) STIMULI MANAGEMENT	ARCHITECT		SPOT CHECK
PART 2 (Design) PRIVACY	ARCHITECT		SPOT CHECK
PART 3 (Design) SPACE MANAGEMENT	OWNER		SPOT CHECK
PART 4 (Protocol) WORKPLACE SLEEP SUPPORT	OWNER		SPOT CHECK
FEATURE 90: HEALTHY SLEEP POLICY			
PART 1 (Organizational Protocol) NON-WORKPLACE SLEEP SUPPORT		POLICY DOCUMENT	
FEATURE 91: BUSINESS TRAVEL			
PART 1 (Organizational Protocol) TRAVEL POLICY		POLICY DOCUMENT	
FEATURE 92: BUILDING HEALTH POLICY			
PART 1 (Organizational Protocol) HEALTH BENEFITS		POLICY DOCUMENT	

MIND	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 93: WORKPLACE FAMILY SUPPORT			
PART 1 (Organizational Protocol) PARENTAL LEAVE		POLICY DOCUMENT	
PART 2 (Organizational Protocol) EMPLOYER SUPPORTED CHILD CARE		POLICY DOCUMENT	
PART 3 (Organizational Protocol) FAMILY SUPPORT		POLICY DOCUMENT	
FEATURE 94: SELF-MONITORING			
PART 1 (Organizational Protocol) SENSORS AND WEARABLES		POLICY DOCUMENT	
FEATURE 95: STRESS AND ADDICTION TREATMENT			
PART 1 (Organizational Protocol) MIND AND BEHAVIOR SUPPORT		POLICY DOCUMENT	
PART 2 (Organizational Protocol) STRESS MANAGEMENT		POLICY DOCUMENT	
FEATURE 96: ALTRUISM			
PART 1 (Organizational Protocol) CHARITABLE ACTIVITIES		POLICY DOCUMENT	
PART 2 (Organizational Protocol) CHARITABLE CONTRIBUTIONS		POLICY DOCUMENT	
FEATURE 97: MATERIAL TRANSPARENCY			
PART 1 (Design) MATERIAL INFORMATION	ARCHITECT, CONTRACTOR, & OWNER		
PART 2 (Design) ACCESSIBLE INFORMATION			VISUAL INSPECTION
FEATURE 98: ORGANIZATIONAL TRANSPARENCY			
PART 1 (Organizational Protocol) TRANSPARENCY PROGRAM PARTICIPATION		POLICY DOCUMENT	SPOT CHECK
FEATURE 99: BEAUTY AND DESIGN II			
PART 1 (Design) CEILING HEIGHT		ARCHITECTURAL DRAWING	SPOT CHECK
PART 2 (Design) ARTWORK			VISUAL INSPECTION
PART 3 (Design) SPATIAL FAMILIARITY			VISUAL INSPECTION

MIND	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 100: BIOPHILIA II - QUANTITATIVE			
PART 1 (Design) OUTDOOR BIOPHILIA	OWNER		SPOT CHECK
PART 2 (Design) INDOOR BIOPHILIA	ARCHITECT		SPOT CHECK
PART 3 (Design) WATER FEATURE	ARCHITECT		SPOT CHECK

INNOVATION	Letters of Assurance	Annotated Documents	On-Site Checks
FEATURE 101: INNOVATION I			
PART 1 (Innovation) INNOVATION PROPOSAL		INNOVATION PROPOSAL	
PART 2 (Innovation) INNOVATION SUPPORT		INNOVATION PROPOSAL	
FEATURE 102: INNOVATION II			
PART 1 (Innovation) INNOVATION PROPOSAL 2		INNOVATION PROPOSAL	
PART 2 (Innovation) INNOVATION SUPPORT 2		INNOVATION PROPOSAL	
FEATURE 103: INNOVATION III			
PART 1 (Innovation) INNOVATION PROPOSAL 3		INNOVATION PROPOSAL	
PART 2 (Innovation) INNOVATION SUPPORT 3		INNOVATION PROPOSAL	
FEATURE 104: INNOVATION IV			
PART 1 (Innovation) INNOVATION PROPOSAL 4		INNOVATION PROPOSAL	
PART 2 (Innovation) INNOVATION SUPPORT 4		INNOVATION PROPOSAL	
FEATURE 105: INNOVATION V			
PART 1 (Innovation) INNOVATION PROPOSAL 5		INNOVATION PROPOSAL	
PART 2 (Innovation) INNOVATION SUPPORT 5		INNOVATION PROPOSAL	

Appendix E: LEED v4 Similarities

The IWBI and USGBC share similar certification processes and feature intents, particularly as related to air quality and daylighting. Because of their shared intentions, attainment of WELL features can help achieve certain LEED credits. However, due to differences in structure and small variations in content, complying with one does not guarantee credit for the other.

01 Air quality standards

Pilot Credit 68: Indoor Air Quality Performance Testing

02 Smoking ban

EQ prerequisite: Environmental Tobacco Smoke Control

03 Ventilation effectiveness

EQ credit: Enhanced Indoor Air Quality Strategies (Option 2)

EQ prerequisite: Minimum Indoor Air Quality Performance (Option 1)

05 Air filtration

EQ credit: Enhanced Indoor Air Quality Strategies (Option 1)

07 Construction pollution management

EQ credit: Construction Indoor Air Quality Management Plan

08 Healthy entrance

EQ credit: Enhanced Indoor Air Quality Strategies (Option 1, for mechanically ventilated spaces)

13 Air flush

EQ credit: Indoor Air Quality Assessment (Option 1)

14 Air infiltration management

EA credit: Enhanced Commissioning (Option 2)

15 Increased ventilation

EQ credit: Enhanced Indoor Air Quality Strategies (Option 2, for mechanically ventilated or mixed-mode system spaces)

16 Humidity control

EQ credit: Thermal Comfort

17 Direct source ventilation

EQ credit: Enhanced Indoor Air Quality Strategies (Option 1, for mechanically ventilated spaces)

18 Air quality monitoring and feedback

EQ: Enhanced Indoor Air Quality Strategies (Option 2)

24 Combustion minimization

Pilot credit 66: Community contaminant prevention - airborne releases

Pilot credit 75: Clean Construction

25 Toxic material reduction

MR credit: Building Product Disclosure and Optimization – Material Ingredients (Option 2)

26 Enhanced material safety

MR credit: Building Product Disclosure and Optimization – Material Ingredients (Option 2)

51 Food production

Pilot credit 82: Local Food Production

53 Visual lighting design

EQ credit: Interior Lighting (Option 2)

55 Electric light glare control

EQ credit: Interior Lighting (Option 2)

56 Solar glare control

EQ credit: Daylight

58 Color quality

EQ credit: Interior Lighting

59 Surface design

EQ credit: Interior Lighting

61 Right to light

EQ credit: Quality Views

62 Daylight modeling

EQ credit: Daylight (Option 1)

64 Interior fitness circulation

Pilot credit 78: Design for Active Occupants

67 Exterior active design

LT credit: Surrounding Density and Diverse Uses

68 Physical activity spaces

SS credit: Open Space

69 Active transportation support

LT credit: Bicycle Facilities

73 Ergonomics: visual and physical

Pilot credit 44: Ergonomics Strategy

74 Exterior noise intrusion

Pilot credit 57: Enhanced Acoustical Performance: Exterior Noise Control

75 Internally generated noise

EQ credit: Acoustic Performance

76 Thermal comfort

EQ credit: Thermal Comfort (Option 1)

78 Reverberation time

EQ credit: Acoustic Performance

79 Sound masking

EQ credit: Acoustic Performance

81 Sound barriers

EQ credit: Acoustic Performance

82 Individual thermal control

EQ credit: Thermal Comfort

97 Material transparency

MR credit: Building Product Disclosure and Optimization – Material Ingredients (Option 1)

Appendix F: Living Building Challenge 3.0 Overlap

IWBI welcomes projects to pursue both the Living Building Challenge alongside WELL in order to promote both environmental and personal sustainability. To make the process easier for projects pursuing both programs, IWBI has organized the WELL Standard so that specific LBC Imperatives are clearly mapped to WELL Features. IWBI can't guarantee that meeting the WELL features will result in LBC certification, however the links are fairly straight forward. It is important to note that pursuing certain features in WELL could allow projects to achieve between 15-35% of LBC Imperatives.

01 Air quality standards

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC requires indoor air quality testing before and nine months after occupancy - this intent is directly in line with the Air Quality Standards of the WBS in that an air quality test is required during the on-site audit for certification.

02 Smoking ban

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC prohibits smoking within the project boundary. WELL also requires signage indicating the hazards of smoking if smoking is allowed beyond 7.5 m of entrances.

03 Ventilation effectiveness

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC and the WBS require compliance with the most current version of ASHRAE 62.

04 VOC reduction

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC requires all interior building products comply with CDPH Standard Method v1.1-2010, WBS requires low voc emitting paints, coatings, and sealants.

08 Healthy entrance

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC requires an entryway approach that addresses particulate reduction tracked in through shoes. WELL requires similar methods be used to reduce particulates at entryways, specifically walk-off mats, dirt track in systems, and grates.

09 Cleaning protocol

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC requires an outline of the cleaning protocol and that all cleaning products comply with the EPA DfE program. This is directly in line with the cleaning protocol requirements and cleaning chemical requirements of WELL.

17 Direct source ventilation

Imperative 08: Healthy Interior Environment — PARTIAL FULFILLMENT

LBC requires dedicated exhaust from janitorial areas, which is also required in WELL.

19 Operable windows

Imperative 07: Civilized Environment — COMPLETE FULFILLMENT

26 Enhanced material safety

Imperative 10: Red List — PARTIAL FULFILLMENT

LBC requires that all projects be Red List compliant. Achieving the Materials petal of LBC is one method of obtaining this WELL feature.

64 Interior fitness circulation

Imperative 04: Human Powered Living — PARTIAL FULFILLMENT

LBC requires the promotion of stairs over elevators through interior layout and quality of stairways - this is directly in line with Part 2 - Stairs Promotion of the Interior Fitness Circulation feature.

65 Activity incentive programs

Imperative 04: Human Powered Living — PARTIAL FULFILLMENT

LBC requires a transit subsidy which is in line with Part 1.b of the Activity Incentive Programs features.

69 Active transportation support

Imperative 04: Human Powered Living — PARTIAL FULFILLMENT

LBC requires secure storage for human powered vehicles (bicycles), and shower and changing facilities that are accessible by all building occupants. These requirements from LBC are directly in line with Part 1 - Bicycle Storage and Support and Part 2 Post-Workout Facilities of the Activity Incentive Programs feature.

87 Beauty and design I

Imperative 19: Beauty and Spirit — COMPLETE FULFILLMENT

88 Biophilia I - qualitative

Imperative 09: Biophilic environment — COMPLETE FULFILLMENT

97 Material transparency

Imperative 12: Responsible Industry — PARTIAL FULFILLMENT

LBC requires all timber be certified by the Forest Stewardship Council (FSC) and that projects provide 1 Declare product for every 500 square meters of project. The Material Transparency feature of the WBS promotes the use of Declare products and other product information programs such as HPD.

98 Organizational transparency

Imperative 18: JUST Organizations — COMPLETE FULFILLMENT

Appendix G: External Reviewers

The IWBI would like to extend its sincere gratitude to the following external reviewers for their time in reviewing and providing critical feedback.

Jennifer Berthelot-Jelovic	A SustainAble Production
Bill Browning	Terrapin
Lisa Cohen, PhD	Beth Israel Medical Center
Lisa Colicchio	CBRE
Mary Davidge	Google
Jason Garay	Cancer Care Ontario
Chad Groshart	Atelier Ten
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Kathy Wardle	Perkins and Will
Lauren Yarmuth	YR&G
Peter Yost	Building Green
Technical Development Subject Matter Experts	U.S. Green Building Council
Certification Review Subject Matter Experts	Green Building Certification Institute

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Appendix I: Core & Shell Scope

WELL Core and Shell Certified projects integrate fundamental WELL features into the base building design and operation, which creates an incentive for future tenants seeking to support the health and productivity of their occupants. It also enables future tenants to more easily pursue WELL Certification for their interior spaces.

Core and Shell Certification includes the areas of the building controlled by the owner, including common spaces, such as lobbies and elevator banks, as well as any areas of the interior buildout managed by the project owner. Depending on the developer's scope, Core and Shell projects can receive Innovation credit for complying with all parts of a WELL feature determined to be not applicable (see the WELL applicability matrix in the Introduction to the WELL Building Standard).

For further clarity, the following document outlines five applicability determinations for Core and Shell projects.

·Entire Building: These features are required to be met throughout the entire building, in both tenant and owner-occupied spaces and may require inclusion in a lease agreement. For features which are intended to impact all occupants, such as amenity and common spaces, Core and Shell projects should use the expected building occupancy or the default occupancy of 250 ft^2/person (23 m^2/person).

·Extent of Developer Buildout: These features are required to be met in all common areas, spaces under owner control, and all portions of the interior buildout managed by the project owner.

·Extent of Developer Buildout with Capacity for Tenant Achievement: These features are required to be met in all spaces included in the developer buildout and require that the building systems in place have capacity to allow tenants to implement the feature requirements within their leased space.

·Extent of Developer Buildout and Confirmed Tenant Support: These features are required to be met in all spaces included in the developer buildout and require the building owner to provide tenants with full support to ensure their space is meeting the feature requirement. This may include providing tenants fiscal allowance to implement the feature.

·Common Areas and Spaces under Owner Control: These features are required to be met in common areas and spaces under building owner control.

AIR	Scope
FEATURE 01: AIR QUALITY STANDARDS	
PART 1: Standards for Volatile Substances	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 2: Standards for Particulate Matter and Inorganic Gases	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 3: Radon	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 02: SMOKING BAN	
PART 1: Indoor Smoking Ban	ENTIRE BUILDING
PART 2: Outdoor Smoking Ban	ENTIRE BUILDING
FEATURE 03: VENTILATION EFFECTIVENESS	
PART 1: Ventilation Design	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 2: Demand Controlled Ventilation	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT

AIR	Scope
FEATURE 04: VOC REDUCTION	
PART 1: Interior Paints and Coatings	EXTENT OF DEVELOPER BUILDOUT
PART 2: Interior Adhesives and Sealants	EXTENT OF DEVELOPER BUILDOUT
PART 3: Flooring	EXTENT OF DEVELOPER BUILDOUT
PART 4: Insulation	EXTENT OF DEVELOPER BUILDOUT
PART 5: Furniture and Furnishings	EXTENT OF DEVELOPER BUILDOUT
FEATURE 05: AIR FILTRATION	
PART 1: Filter Accommodation	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 2: Particle Filtration	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 3: Air Filtration Maintenance	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
FEATURE 06: MICROBE AND MOLD CONTROL	
PART 1: Cooling Coil Mold Reduction	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 2: Mold Inspections	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 07: CONSTRUCTION POLLUTION MANAGEMENT	
PART 1: Duct Protection	ENTIRE BUILDING
PART 2: Filter Replacement	ENTIRE BUILDING
PART 3: Moisture Absorption Management	EXTENT OF DEVELOPER BUILDOUT
PART 4: Dust Containment and Removal	ENTIRE BUILDING
FEATURE 08: HEALTHY ENTRANCE	
PART 1: Permanent Entryway Walk-Off Systems	ENTIRE BUILDING
PART 2: Entryway Air Seal	ENTIRE BUILDING
FEATURE 10: PESTICIDE MANAGEMENT	
PART 1: Pesticide Use	ENTIRE BUILDING
FEATURE 11: FUNDAMENTAL MATERIAL SAFETY	
PART 1: Asbestos and Lead Restriction	ENTIRE BUILDING
PART 2: Lead Abatement	ENTIRE BUILDING
PART 3: Asbestos Abatement	ENTIRE BUILDING
PART 4: Polychlorinated Biphenyl Abatement	ENTIRE BUILDING
PART 5: Mercury Limitation	EXTENT OF DEVELOPER BUILDOUT

AIR	Scope
FEATURE 12: MOISTURE MANAGEMENT	
PART 1: Exterior Liquid Water Management	ENTIRE BUILDING
PART 2: Interior Liquid Water Management	EXTENT OF DEVELOPER BUILDOUT
PART 3: Condensation Management	EXTENT OF DEVELOPER BUILDOUT
PART 4: Material Selection and Protection	EXTENT OF DEVELOPER BUILDOUT
FEATURE 14: AIR INFILTRATION MANAGEMENT	
PART 1: Air Leakage Testing	ENTIRE BUILDING
FEATURE 15: INCREASED VENTILATION	
PART 1: Increased Outdoor Air Supply	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
FEATURE 17: DIRECT SOURCE VENTILATION	
PART 1: Pollution Isolation and Exhaust	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
FEATURE 19: OPERABLE WINDOWS	
PART 1: Full Control	ENTIRE BUILDING
PART 2: Outdoor Air Measurement	ENTIRE BUILDING
PART 3: Window Operation Management	ENTIRE BUILDING
FEATURE 20: OUTDOOR AIR SYSTEMS	
PART 1: Dedicated Outdoor Air Systems	ENTIRE BUILDING
FEATURE 23: ADVANCED AIR PURIFICATION	
PART 1: Carbon Filtration	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 2: Air Sanitization	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 3: Air Quality Maintenance	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
FEATURE 24: COMBUSTION MINIMIZATION	
PART 1: Appliance and Heater Combustion Ban	ENTIRE BUILDING
PART 2: Low-Emission Combustion Sources	ENTIRE BUILDING
PART 3: Engine Exhaust Reduction	ENTIRE BUILDING
PART 4: Construction Equipment	ENTIRE BUILDING

WATER	Scope
FEATURE 30: FUNDAMENTAL WATER QUALITY	
PART 1: Sediment	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 2: Microorganisms	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
FEATURE 31: INORGANIC CONTAMINANTS	
PART 1: Dissolved Metals	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT

WATER	Scope
FEATURE 32: ORGANIC CONTAMINANTS	
PART 1: Organic Pollutants	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
FEATURE 33: AGRICULTURAL CONTAMINANTS	
PART 1: Herbicides and Pesticides	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 2: Fertilizers	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
FEATURE 34: PUBLIC WATER ADDITIVES	
PART 1: Disinfectants	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 2: Disinfectant Byproducts	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 3: Fluoride	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
FEATURE 36: WATER TREATMENT	
PART 1: Organic Chemical Removal	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 2: Sediment Filter	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 3: Microbial Elimination	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 4: Water Quality Maintenance	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 5: Legionella Control	ENTIRE BUILDING
FEATURE 37: DRINKING WATER PROMOTION	
PART 1: Drinking Water Taste Properties	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT

NOURISHMENT	Scope
FEATURE 39: PROCESSED FOODS	
PART 1: Refined Ingredient Restrictions	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 2: Trans Fat Ban	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 40: FOOD ALLERGIES	
PART 1: Food Allergy Labeling	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 43: ARTIFICIAL INGREDIENTS	
PART 1: Artificial Substance Labeling	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 44: NUTRITIONAL INFORMATION	
PART 1: Detailed Nutritional Information	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 45: FOOD ADVERTISING	
PART 1: Advertising and Environmental Cues	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 2: Nutritional Messaging	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 51: FOOD PRODUCTION	
PART 1: Gardening Space	ENTIRE BUILDING
PART 2: Planting Support	ENTIRE BUILDING

NOURISHMENT	Scope
FEATURE 52: MINDFUL EATING	
PART 1: Eating Spaces	ENTIRE BUILDING
PART 2: Break Area Furnishings	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT

LIGHT	Scope
FEATURE 55: ELECTRIC LIGHT GLARE CONTROL	
PART 2: Glare Minimization	EXTENT OF DEVELOPER BUILDOUT
FEATURE 56: SOLAR GLARE CONTROL	
PART 1: View Window Shading	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
PART 2: Daylight Management	EXTENT OF DEVELOPER BUILDOUT AND CONFIRMED TENANT SUPPORT
FEATURE 61: RIGHT TO LIGHT	
PART 1: Lease Depth	ENTIRE BUILDING
FEATURE 62: DAYLIGHT MODELING	
PART 1: Healthy Sunlight Exposure	ENTIRE BUILDING
FEATURE 63: DAYLIGHTING FENESTRATION	
PART 1: Window Sizes for Working and Learning Spaces	ENTIRE BUILDING
PART 2: Window Transmittance in Working and Learning Areas	ENTIRE BUILDING
PART 3: Uniform Color Transmittance	ENTIRE BUILDING

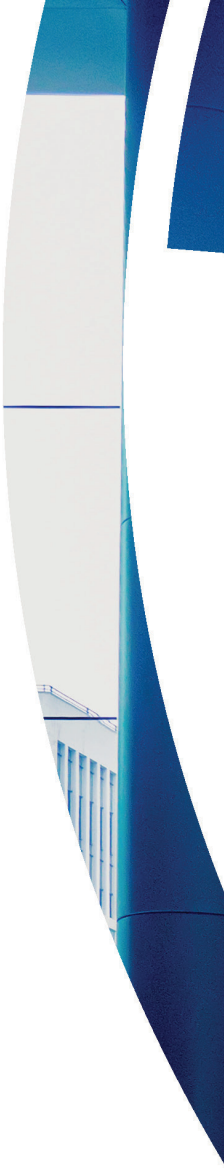
FITNESS	Scope
FEATURE 64: INTERIOR FITNESS CIRCULATION	
PART 1: Stair Accessibility	ENTIRE BUILDING
PART 2: Stair Promotion	ENTIRE BUILDING
PART 3: Facilitative Aesthetics	ENTIRE BUILDING
FEATURE 67: EXTERIOR ACTIVE DESIGN	
PART 1: Pedestrian Amenities	ENTIRE BUILDING
PART 2: Pedestrian Promotion	ENTIRE BUILDING
PART 3: Neighborhood Connectivity	ENTIRE BUILDING
FEATURE 68: PHYSICAL ACTIVITY SPACES	
PART 1: Site Space Designation for Offices	ENTIRE BUILDING
PART 2: External Exercise Spaces	ENTIRE BUILDING
FEATURE 69: ACTIVE TRANSPORTATION SUPPORT	
PART 1: Bicycle Storage and Support	EXTENT OF DEVELOPER BUILDOUT WITH CONFIRMED TENANT SUPPORT
PART 2: Post Commute and Workout Facilities	EXTENT OF DEVELOPER BUILDOUT WITH CONFIRMED TENANT SUPPORT

FITNESS	Scope
FEATURE 70: FITNESS EQUIPMENT	
PART 1: Cardiorespiratory Exercise Equipment	ENTIRE BUILDING
PART 2: Muscle-strengthening Exercise Equipment	ENTIRE BUILDING

COMFORT	Scope
FEATURE 72: ACCESSIBLE DESIGN	
PART 1: Accessibility and Usability	EXTENT OF DEVELOPER BUILDOUT
FEATURE 74: EXTERIOR NOISE INTRUSION	
PART 1: Sound Pressure Level	ENTIRE BUILDING
FEATURE 75: INTERNALLY GENERATED NOISE	
PART 2: Mechanical Equipment Sound Levels	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 76: THERMAL COMFORT	
PART 1: Ventilated Thermal Environment	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
PART 2: Natural Thermal Adaptation	EXTENT OF DEVELOPER BUILDOUT WITH CAPACITY FOR TENANT ACHIEVEMENT
FEATURE 83: RADIANT THERMAL COMFORT	
PART 1: Lobbies and Other Common Spaces	COMMON AREAS AND SPACES UNDER OWNER CONTROL ONLY

MIND	Scope
FEATURE 84: HEALTH AND WELLNESS AWARENESS	
PART 1: WELL Building Standard® Guide	ENTIRE BUILDING
PART 2: Health and Wellness Library	ENTIRE BUILDING
FEATURE 85: INTEGRATIVE DESIGN	
PART 1: Stakeholder Charrette	EXTENT OF DEVELOPER BUILDOUT
PART 2: Development Plan	EXTENT OF DEVELOPER BUILDOUT
PART 3: Stakeholder Orientation	EXTENT OF DEVELOPER BUILDOUT
FEATURE 87: BEAUTY AND DESIGN I	
PART 1: Beauty and Mindful Design	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 88: BIOPHILIA I - QUALITATIVE	
PART 1: Nature Incorporation	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 2: Pattern Incorporation	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 3: Nature Interaction	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 97: MATERIAL TRANSPARENCY	
PART 1: Material Information	EXTENT OF DEVELOPER BUILDOUT
PART 2: Accessible Information	EXTENT OF DEVELOPER BUILDOUT

MIND	Scope
FEATURE 99: BEAUTY AND DESIGN II	
PART 1: Ceiling Height	EXTENT OF DEVELOPER BUILDOUT
PART 2: Artwork	COMMON AREAS AND SPACES UNDER OWNER CONTROL
PART 3: Spatial Familiarity	COMMON AREAS AND SPACES UNDER OWNER CONTROL
FEATURE 100: BIOPHILIA II - QUANTITATIVE	
PART 1: Outdoor Biophilia	ENTIRE BUILDING
PART 3: Water Feature	ENTIRE BUILDING



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