
INTERNATIONAL
WELL
BUILDING
INSTITUTE™
THE
WELL
COMMUNITY
STANDARD™
PILOT
The premier global standard for supporting health and well-being through inclusive, integrated and resilient communities.

INTRODUCTION

Comprehensive and interdisciplinary approaches are necessary to meaningfully address complex issues related to human health and well-being. Many factors of the physical environment have a significant impact on day-to-day health, happiness and productivity. A growing body of research supports these claims but much more needs be done to translate research into practice. IWBI's standards marry best practices in design and construction with evidence-based medical and scientific research—harnessing buildings and communities as vehicles to support human health and well-being.

The WELL Community Standard aims to impact individuals not just within the walls of their home or workplace, but throughout the public spaces where they spend their days. A WELL community is designed to support health and well-being across all aspects and areas of community life. The vision for a WELL community is inclusive, integrated and resilient, with a strong community identity fostering high levels of social interaction and engagement. Resources in a WELL community—natural, human and technological—are used effectively, equally and responsibly to meet the community's current and future needs and priorities.

PRINCIPLES OF THE WELL COMMUNITY STANDARD

IWBI follows the below principles with the goal that the WELL Community Standard is:

1. Evidence-based: There is a coherent body of research offering consistency in findings across the field supporting the WELL program.
2. Broadly relevant: The interventions proposed are feasible and relevant across many applications.
3. Equitable: The standard provides its benefits in a way inclusive of all demographic and economic groups.
4. Transparently developed: The standard draws upon the expertise of established leaders in the scientific and engineering fields and offers multiple opportunities for stakeholder engagement.
5. Resilient: The standard is responsive to advances in scientific knowledge and technology, continually able to integrate innovation and adapt to a changing climate.

USING THE WELL COMMUNITY STANDARD

The WELL Community Standard is in its pilot stage, so there remains some flexibility in the interpretation of the requirements. Over the course of its existence as a pilot, IWBI will use information and feedback gathered from pilot projects and industry experts to further refine and enhance the WELL Community Standard. The certification process is administered by Green Business Certification Inc. (GBCI). See the WELL Certification Guidebook for more details.

THE WELL COMMUNITY STANDARD IS ORGANIZED INTO THE FOLLOWING CONCEPTS:

1. AIR: ambient air quality; strategies to reduce traffic pollution; strategies to reduce exposure to pollution.
2. WATER: drinking water quality; public water sanitation; facilities provisions; strategies for managing contaminated water on a systems scale; strategies to promote drinking water access.
3. NOURISHMENT: fruit and vegetable access, availability and affordability; policies to reduce the availability of processed foods; nutritional information and nutrition education; food advertising and promotion; food security; food safety; strategies to support breastfeeding.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

4. LIGHT: maintained illuminance levels for roads and walkways; strategies for limiting light pollution and light trespass; glare and discomfort avoidance.
5. MOVEMENT: environmental design and operational strategies to reduce the risk of transportation-related injuries; mixed land use and connectivity; walkability; cyclist infrastructure; infrastructure to encourage active transportation; strategies to promote daily physical activity and exercise.
6. THERMAL COMFORT: strategies to reduce heat island effect; policies to deal with extreme temperatures; policies to manage sun exposure and ultraviolet risk.
7. SOUND: noise exposure assessment; planning for acoustics; techniques to reduce sound propagation; hearing health education.
8. MATERIALS: strategies to reduce exposure to hazardous chemical substances in cases of uncontrolled/accidental release and contaminated sites; strategies to limit use of hazardous chemicals in landscaping and outdoor structures.
9. MIND: access to mental health care, substance abuse and addiction services; access to green spaces.
10. COMMUNITY: health impact assessments; policies that address the social determinants of health; health promotion programming; policies that foster social cohesion, community identity and empowerment; crime prevention through environmental design; policies and planning for community disaster and emergency preparedness.

FEATURES, PARTS AND REQUIREMENTS

The ten concepts in the WELL Community Standard are comprised of 110 features.

Every feature is intended to address specific aspects of the health and well-being of community members. Each feature is divided into parts and then further into requirements. Features and parts are named, and features also have unique three-letter codes for use in shorthand. Except when occasionally specified, all parts of a feature must be completed in order to achieve the feature. Each part describes which of its constituent requirement(s) must be achieved for compliance.

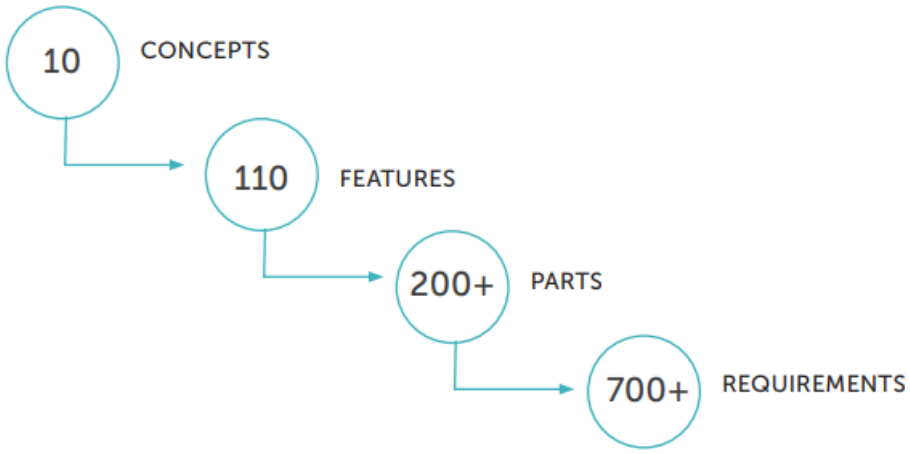

Figure 1: Organization of the WELL Community Standard.

Parts and features can be either:

- Design strategies that require specific zoning, construction or geography.
- Policies that apply to ongoing practices, rules or schedules.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

- Performance-based strategies that mandate thresholds for environmental conditions and therefore are affected by both design and operation.

These designations are useful for project teams to consider when scheduling and undertaking the planning, construction or expansion of a community.

Features are also categorized by whether or not they are mandatory for certification:

- Preconditions (P after the feature name) are mandatory for all levels of WELL Certification: Silver, Gold or Platinum. Failure of a single precondition will prevent a project from becoming certified.
- Optimizations (O after the feature name) are selected by projects in a flexible pathway toward certification.

ALTERNATIVE ADHERENCE PATHWAYS

WELL allows for innovative, alternative solutions for meeting requirements to be submitted through the alternative adherence path process. Project teams may propose an alternative for any requirement of WELL by submitting a completed alternative adherence path (AAP) to IWBI for review. Proposals must meet the intent of the requirement and be supported by cited scientific, medical or industry research.

SCORING

The WELL Community Standard has three levels of certification, each with a minimum point threshold.

Level	Minimum Points
Silver	50
Gold	60
Platinum	80

Figure 2: Certification levels.

Preconditions do not contribute points since they are required to achieve any level of certification. Projects accumulate points through achieving optimizations, which are worth 1 point each. Thus, all optimizations in total are worth 100 points.

Projects may also earn up to 10 points for Innovation (see more detail on these features, on page 166). Finally, projects with buildings certified by healthy or green rating systems may earn up to 30 points (see Certified Buildings, below).

In addition to reaching the necessary number of points, projects must achieve at least one optimization in each concept.

WELL COMMUNITY STANDARD: COMMUNITY SEALS

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

EXAMPLE PROJECT SCORES

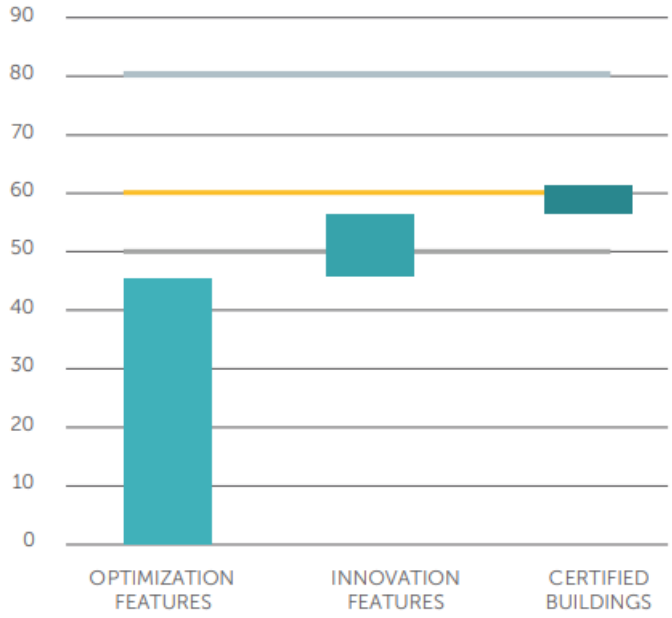

Figure 3: WELL Certified communities require 50 points for Silver, 60 points for Gold and 80 points for Platinum. This example project has achieved Gold through a combination of optimizations, innovations and certified buildings.

CERTIFIED BUILDINGS

In general, the features of the WELL Community Standard do not address the design or conditions within buildings, but rather the way in which they interact with each other in the landscape. Nevertheless, we spend about 90% of our time in buildings,[1] and the way that they are designed, constructed and maintained impacts the way we sleep, what we eat and how we feel.

To ensure that all parts of the community are addressed as spaces that hold the potential to deliver health and wellness benefits, WELL Community Certification requires some buildings to be certified under a qualifying health and wellness building standard, and provides projects the opportunity to earn additional points for going above the minimum. Because planetary health and human health are inextricably connected, WELL standards aim to be interoperable and synergistic with green rating systems, and therefore WELL Community Certification offers points for buildings certified under green rating systems as well.

Requirements

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Figure 4 presents criteria for qualifying health and wellness and green rating systems under WELL Community Certification. The current list of programs approved to count for health and wellness and green building certification is available on the IWBI website. Early stage review or design awards ("precertifications") for health and well-being or green rating systems, such as WELL Precertification, LEED precertification or projects subscribed to WELL at scale but not WELL Certified, are considered acceptable under initial WELL Community Standard certification. However, such buildings must be fully certified by WELL Community Standard recertification. Project teams or standard bodies may suggest additional options for IWBI to evaluate, and when approved, those options will be added.

Health and wellness and green rating systems must meet the following criteria:

Inclusion Criteria	Health & Wellness	Green
Third-party reviewed	X	X
Viewable online at no-cost	X	X
Transparent development, rating, and scoring processes	X	X
Encompasses minimum number of topics	6	3
Evidence-based	X	X
Demonstrates leadership and innovation	X	X
Post-occupancy or -construction evaluation of on-site indoor environmental (IEQ) parameters	6	

Figure 4: Inclusion criteria for health and wellness and green rating systems.

Scoring

All projects must contain at least one health and wellness certified building.

For new developments, health and wellness certified buildings must represent at least 15% of total building count or total gross building area (to project's benefit) that is owned, operated or managed by the project owner. Existing communities pursuing WELL Certification are not held to this 15% requirement. Existing communities are defined as developments with over 50% of total floor area constructed by time of registration.

A WELL Community Project may subscribe all buildings owned, operated or managed by the project owner in WELL at scale in lieu of meeting the minimum certified building requirement.

Projects that are unable to meet the 15% certification requirement—for instance, if the party making decisions on building certification is distinct from the party making decisions on community certification—may apply to be exempt from this requirement by submitting a request, including the basis for the exemption, to IWBI at wellcommunity@wellcertified.com

Both new and existing communities with health and wellness certified buildings earn points as shown in Figure 5.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CERTIFIED BUILDINGS • as percent of all buildings owned, operated or managed by project owner within community project • based on either building count or on gross building area, to project's benefit	POINTS AWARDED
30% (in a minimum of three different buildings)	3
40% (in a minimum of four different buildings)	5
50% (in a minimum of five different buildings)	8
60% (in a minimum of six different buildings)	13
70% (in a minimum of seven different buildings)	21
80% (in a minimum of eight different buildings)	30

Figure 5: Points awarded for health and wellness building certification.

Additionally, all projects earn one point for each certified building within the project boundary not owned, operated or managed by the project owner, provided the total number of points awarded for health and wellness certified buildings does not exceed 30.

Finally, projects may earn one point for each building certified under a qualifying green rating system, up to a maximum of 10 points. In addition, the combined points awarded for green and healthy certified buildings cannot exceed 30 points. Green and healthy building certifications may be combined to earn points, and doubly certified buildings count in both categories. For the purpose of counting buildings, a building is considered a "certified building" if at least 75% of its total area is certified. Note that each certified project is considered a single "building" for scoring purposes, even if it is made up of structures not physically connected to each other.

For example, consider the following project, where all buildings are owned by the project owner:

- WELL Certified buildings: five, totaling 500,000 ft^2
- LEED-certified buildings: two, totaling 1,000,000 ft^2
- Total buildings within project boundary: 15, totaling 10,000,000 ft^2

In this project, 33% of the buildings by count (though just 5% by area) are certified with a health and wellness standard, exceeding the base eligibility requirements and earning the project three points. The two LEED-certified buildings earn an additional two points in the green rating system category, for a total of five.

PROJECT SCOPE AND BOUNDARIES

The project must define the boundaries of the WELL community, which may contain public infrastructure areas as well as future proposed or existing infrastructure, buildings and landscapes. It may also involve renovations or expansions to existing developments, infill developments or new construction. The boundaries may include land and buildings under separate ownership or management. Project owners may use their discretion to determine project boundaries; however, once selected, the certification requirements must be applied consistently across the premises, including to properties under separate ownership (unless indicated otherwise in the standard). Projects must not contain non-contiguous parcels, but parcels can be separated by public rights-of-way within the project boundary.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Throughout the WELL Community Standard, many features make reference to percentages and proportions related to a total. For example, “75% of all parking spaces” or “all (minimum one) outdoor drinking water fountains located in public use areas." In these and other cases, the standard is meant to govern spaces and conditions within the project boundary unless otherwise indicated. For example, the operations of parking spaces nearby but outside of the project boundary would not affect the calculations.

ELIGIBILITY REQUIREMENTS

To qualify for registration for the WELL Community Standard, projects must meet at least two of the following conditions:

- Planned daytime or nighttime population of 500 people or more.
- Planned total floor area of 50,000 m^2 [538,000 ft^2] or more.
- Planned total building count of 10 or more.
- Total land area of two hectares [five acres] or more.

In addition, the WELL Community Standard is designed for integrated, mixed-use developments. Therefore, projects must also include at least two of the following:

- Multifamily residential: at least one building with five or more dwelling units.
- Office and/or retail: at least one space, employing a total of at least five people.
- Public use recreation or leisure, accessible from dawn to dusk: of at least 0.4 hectare [1 acre], composed of one or more spaces each at least .02 hectares [.05 acres].

PROJECT CONTROL

Some features may mandate design or rules in areas that are outside of a project’s control. For example, a project owner may not be able to alter the timing of pedestrian walk signals or the color quality of streetlights. Large-scale developments require the collaboration of many parties, however IWBI recognizes that, in some cases, projects may not be able to make changes to certain aspects of the public realm. In these cases, projects may apply for exemptions to certain parts of features by documenting how existing regulations or land/asset ownership prevents completion of those features.

CERTIFICATION STEPS

STEP ONE: PROJECT REGISTRATION

The path to certification begins with registration at wellcertified.com. At this point, the project is assigned a WELL coaching contact from IWBI, who can provide technical support and answer questions about the WELL Certification process.

STEP TWO: WELL PRECERTIFICATION AND DOCUMENTATION REVIEW

When a project submits documentation, it is assigned a WELL reviewer from the certification body, GBCI, who is responsible for reviewing the project's documentation and performance data to ensure compliance with the WELL Community Standard's requirements.

Submission for documentation review is possible only after project construction and occupancy. Projects that wish to target an interim award prior to project completion can pursue WELL Precertification, an optional

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

review based on documents that reflect planned conditions (see WELL Precertification, below). The WELL Community Standard does not mandate a specific threshold of construction completion prior to certification. However, the project must meet all eligibility requirements (e.g., minimum size) and the conditions required within all features pursued at the time documentation is submitted for review (e.g., access to a grocery store).

Feature review: Projects must submit documentation in accordance with the type required for each feature (e.g., professional narrative, policy document, letter of assurance). For performance-based features, see Step Three: Performance Verification.

For some features (for example, Movement Network Planning (MNP)), projects must gather information and make planning decisions based on it. During review of these features, GBCI makes no assessment of the data quality or sufficiency; rather, GBCI evaluates whether or not a project has a plan to consider this data and to take proactive steps and actions based upon it.

Healthy and/or green buildings: At the point of documentation review, all buildings the project intends to use as certified buildings for the purpose of eligibility and point-earning must have a valid certification status, as described previously in Certified Buildings.

Community narrative: Lastly, projects submit a community narrative, which details the mission and goals of the WELL community; the stakeholders and other key players involved; and the expected timelines and schedules for various types of development. The narrative must describe how health and well-being:

- Are given top priority.
- Become integral to infrastructure.
- Become integral to culture and operations in the district.
- Are incentivized through the inclusion of health and wellness certified buildings.
- Are considered inclusive of all potential residents, employees and visitors to the development.

WELL Precertification: District-scale projects take place along an extended timeline. Therefore, projects wishing to demonstrate their commitment to health and well-being prior to the completion of construction and documentation review may pursue WELL Precertification, an optional interim award that can communicate progress toward WELL Certification.

For WELL Precertification, projects submit similar documents for review of design- and policy-based features as during documentation review, except that these documents may represent anticipated conditions and future operations of the project rather than those in place. In addition, projects must submit a narrative describing strategies the project will employ to meet any performance-based features. Projects must also identify which buildings in the master plan will be pursuing a health and wellness and/or green building certification. With this information, projects submit the quantity of buildings targeting certification, which must at least meet the minimum thresholds. Finally, projects must submit a draft of the community narrative.

While WELL Precertification can be a helpful way for projects to communicate their progress, the award does not guarantee nor imply certification will be awarded. For more information about WELL Precertification, please see the WELL Certification Guidebook for the WELL Community Standard.

STEP THREE: PERFORMANCE VERIFICATION

Projects are able to submit performance data for the necessary features in the Air and Water concepts either together with other documentation or at a later point once data is collected. The water quality tests for the features Drinking Water Quality (WQT), Public Water Additives (WAD) and High Quality Drinking Water (WQO) are one-time samples of the current conditions at project completion. The air quality tests for the features Fundamental Air Quality (AQU), Long-Term Air Quality (LTA), Enhanced Long-Term Air Quality (LTE), Short-

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Term Air Quality (STA) and Enhanced Short-Term Air Quality (STE) take place over a 12-month period, but this may commence (if the project desires) prior to the completion of construction or of documentation review. Data that is already collected for the community at the municipal level, such as from a public air quality monitoring station, may be used as long as it meets the parameters for performance data collection. GBCI will review the provided performance data and the method of data collection against the feature requirements.

For more information, please refer to the Performance Verification Guidebook for the WELL Community Standard.

STEP FOUR: CERTIFICATION AND RECERTIFICATION

After successful review of performance data, the project achieves WELL Certification. WELL Certification under the WELL Community Standard is valid for five years.

To maintain certification status, projects must attest at recertification that all designs, operations and policies used to achieve certification still exist, and submit new documentation to show that any altered conditions still meet the features previously awarded. To demonstrate the quality of on-site conditions, projects must also submit new performance data reflecting current conditions.

Project scores may change at the time of recertification if additional improvements have been made or if policies or programs have been discontinued. Projects may submit evidence of achievement of additional optimization features to improve their certification level at this time. Conversely, it is possible for the project's certification to be revoked or downgraded if sufficient features are no longer met.

If the project is constructed in phases, the owner may choose to pursue certification for a single phase. Then, the project may include additional phases to also be evaluated at the time of recertification under a single expanded boundary.

---

1 Neil E. Klepeis, William C. Nelson, Wayne R. Ott, et al. The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants. Washington, DC: Environmental Protection Agency; n.d. https://indoor.lbl.gov/sites/all/files/lbnl-47713. pdf

This WELL Community Standard™ document constitutes proprietary information of IWBI. All information contained herein is provided without warranties of any kind, either express or implied, including but not limited to warranties of the accuracy or completeness of the information or the suitability of the information for any particular purpose. Use of this document in any form implies acceptance of these conditions.

IWBI authorizes individual use of this WELL Community Standard. In exchange for this authorization, the user agrees:

1. to retain all copyright and other proprietary notices contained in the WELL Community Standard,
2. not to sell or modify the WELL Community Standard, and
3. not to reproduce, display or distribute the WELL Community Standard in any way for any public or commercial purpose.

Unauthorized use of the WELL Community Standard violates copyright, trademark and other laws and is prohibited.

International WELL Building Institute™, IWBI™, WELL™, the WELL Building Standard™, the WELL Community Standard™, WELL Certified™ and their related logos are trademarks of the International WELL Building Institute PBC in the US and other countries. All third party trademarks and rating systems referenced herein such as LEED™, BREEAM™, GREEN STAR™ and BABY-FRIENDLY™ are the trademarks and rating systems of their respective owners.

Disclaimer

None of the parties involved in the funding or creation of the WELL Community Standard, including IWBI, its affiliates and its affiliates' respective owners, officers, directors, employees, agents, representatives or contractors assume any liability or responsibility to the user or

any third parties for the accuracy, completeness or use of or reliance on any information contained in the WELL Community Standard, or for any injuries, losses or damages (including, without limitation, equitable relief) arising from such use or reliance. Although the information contained in the WELL Community Standard is believed to be reliable and accurate, all materials set forth within are provided without warranties of any kind, either express or implied, including but not limited to warranties of the accuracy or completeness of information or the suitability of the information for any particular purpose. This document and the WELL Community Standard are intended to educate and assist community stakeholders, real estate owners and tenants in their efforts to create healthier spaces and communities, and nothing in this document and the WELL Community Standard should be considered, or used as a substitute for, quality control, safety analysis, legal compliance (including zoning), comprehensive urban planning or medical advice, diagnosis or treatment. The WELL Community Standard is meant to promote health and wellness in communities but is not intended to be an all-inclusive solution and other features may be added in later versions that address the overall goals expressed herein. Some items related to community wellness are not addressed herein because they are otherwise addressed by laws, codes and regulations in most jurisdictions.

As a condition of use, the user covenants not to sue and agrees to waive and release IWBI, its affiliates, members, employees or contractors from any and all claims, demands and causes of action for any injuries, losses or damages (including, without limitation, equitable relief) that the user may now or hereafter have a right to assert against such parties as a result of the use of, or reliance on the WELL Community Standard.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AIR

Clean air is a critical environmental determinant of human health. Poor ambient air quality is the number one environmental cause of premature mortality, contributing to 200,000 premature deaths annually in the United States alone and approximately seven million, or one in eight, premature deaths worldwide.[1,2]

Globally, outdoor air quality is impacted by many sources, including pollution from traffic, construction, agricultural activity and combustion sources. In addition, the global transition away from agrarian societies to more peri-urban and urban megacenters, poses unique challenges for environmental health and air quality. As the link between human activity, air pollution and human health becomes clearer, a push for cleaner energy and better pollution control has emerged out of necessity, and many cities around the world are epicenters for these forward-thinking solutions. In developed nations, pollution control technologies and federally enforceable limits have made tremendous progress in protecting the health of the public. In addition, the Clean Air Act (CAA), a federally enforceable U.S. standard, has saved an estimated two trillion dollars in health care costs in the U.S. since it was implemented in 1963.[3] The CAA regulates the six major pollutants, known as criteria pollutants, that have been shown to be of great concern for human health: 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).[4]

The success of the CAA and other related programs has led to both the adoption and implementation of similar regulations in countries around the world, as well as the development of ambient Air quality guidelines (AQGs) by the World Health Organization (WHO).[5] In order to meet requirements regulating these pollutants, major sources of emissions, such as the transportation industry, face increasingly stringent regulations in developed countries.[6] Increasingly, evidence suggests that the transportation industry poses major challenges for environmental quality and is linked to poor health outcomes.[7,8]

According to the WHO, exposure to ambient air pollution is associated with adverse health outcomes including stroke, heart disease, lung cancer and both chronic and acute respiratory diseases, including asthma.[9] The evidence indicates that when air quality is addressed at the community level, positive health indicators, such as lung function and lung capacity, improve significantly.[10] The link between air pollution and poor health outcomes is well established, and so too is the effectiveness of mitigation strategies. At the local level, limiting combustion sources, reducing vehicle idling time and encouraging shared vehicle or public transportation use are a few ways to reduce air pollution and limit exposure to environmental contaminants.[11-13] Long-term changes in ambient air quality require a concerted effort at the local, regional and national levels.[9] By implementing solutions intended to directly affect the quality of air in communities, communities can provide an environment in which people can thrive.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AQU FUNDAMENTAL AIR QUALITY | P

Intent:
To promote health and well-being by recognizing communities with good air quality, or to employ strategies to reduce ambient air pollution.

Summary:
The WHO defines air pollution as contamination of indoor or outdoor air by chemical, physical or biological agents that alter the natural qualities and characteristics of the air.[14] Air pollution poses one of the leading environmental threats to population health around the globe, and as communities continue on a path of rapid urbanization and industrialization, these threats have never been more important.[15] In 2014, an estimated 92% of the global population lived in an area that failed to meet the Air quality goals AQGs established by the WHO.[9] Thus, addressing air pollution on a global scale has emerged as one of the most pressing issues; global initiatives such as the Sustainable Development Goals include improved ambient air quality as performance indicators including the health, cities and energy goals.[16]

While recognizing that sources of pollution can be regional sources outside the control of a local community, there are still many methods within a project's control to reduce local air pollution. For example, including trees and other vegetation throughout the urban landscape of a community has been shown to positively affect ambient air quality.[15]

Part 1 Base Air Quality Standard

For All Spaces:

Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Annual average $PM_{2.5}$ less than 35 $\mu g/m^3$.[5]
b. Annual average PM_{10} less than 70 $\mu g/m^3$.[5]
c. Annual fourth-highest daily average 24-hour concentration (99th percentile) $PM_{2.5}$ less than 75 $\mu g/m^3$.[5]
d. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM_{10} less than 150 $\mu g/m^3$.[5]
e. Highest 8-hour average ozone less than 240 $\mu g/m^3$ (122 ppb).[5]
f. Highest 8-hour average carbon monoxide less than 14 mg/m^3 (12 ppm).

OR

> **Note:** Projects pursuing this strategy are limited in WELL Certification level to Silver regardless of total points achieved.

The following requirement is met and certification condition applies:

a. The project achieves 3 points within the Air concept of the WELL Community Standard. The following features outside of the Air concept may also count toward this total:
    - Feature SGR—Integration of Streetscape Greenery
    - Feature GRE—Restorative Green Spaces
    - Feature VEG—Urban Vegetation and Green Spaces

OR

> **Note:** Projects pursuing this strategy are limited in WELL Certification level to Gold regardless of total points achieved.

The following requirement is met and certification condition applies:

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

a. The project achieves 6 points within the Air concept of the WELL Community Standard. The following features outside of the Air concept may also count toward this total:
    - Feature SGR—Integration of Streetscape Greenery
    - Feature GRE—Restorative Green Spaces
    - Feature VEG—Urban Vegetation and Green Spaces

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SMK SMOKING BAN | O (MAX: 1 PT)

Intent: To discourage smoking and protect nonsmokers from environmental tobacco smoke in indoor environments.

Summary: According to the WHO, smoking is the single greatest preventable cause of death with nearly 6 million deaths attributed annually to tobacco smoke and smoking, of which nearly 600,000 deaths are due to secondhand smoke.[17] The WHO estimates that nearly 80% of the 1 billion smokers around the world reside in low- and middle-income countries.[17]When indoor smoking bans are implemented, a significant reduction in hospitalizations for acute coronary-related illness, heart attack and COPD is observed.[18-20] However, despite the well-documented public health benefits, only about 1.3 billion people, or 18% of the global population, are protected by smoke-free legislation.[17]

Part 1 Building Interiors

For All Spaces:

Smoking and use ofe-cigarettes is prohibited in all buildings (including garages) owned, operated, or managed by the project owner except:

a. Detached homes.

b. Retail stores, restaurants, and bars with a designated smoking area. All such smoking areas must have distinct ventilation from other buildings or tenants (if any).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SMO OUTDOOR SMOKING BAN | O (MAX: 1 PT)

Intent: To discourage smoking and protect nonsmokers from environmental tobacco smoke in outdoor environments.

Summary: Smoking has been linked to many serious health consequences, including cancer, heart disease, chronic obstructive pulmonary disease (COPD) and complications during pregnancy.[21] Furthermore, exposure to secondhand smoke, which contains more than seven thousand toxic chemicals, has been linked to numerous health outcomes in infants and children, including asthma, respiratory and ear infections, and sudden infant death syndrome, and is associated with heart disease, lung cancer, and stroke in adults.[21]

Part 1 Building Surroundings

For All Spaces:

Smoking and use of e-cigarettes is prohibited within 7.5 m [25 ft] of the following locations related to buildings owned, operated, or managed by the project owner:

a. Operable windows.
b. Building air intakes.
c. Building entrances.

Part 2 Outdoor Activity Areas

For All Spaces:

Smoking and use of e-cigarettes is prohibited in the following locations owned, operated or managed by the project owner:

a. Parks, recreational areas, pedestrian plazas and parking lots.[22]
b. Entertainment facilities.[22]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LTA LONG-TERM AIR QUALITY | O (MAX: 1 PT)

Intent: To recognize projects with higher-quality long-term conditions than exist in many parts of the world and where people are not exposed to extreme levels of ambient air pollutants.

Summary: Particulate matter can contain elemental and organic carbon, salts, mineral and metal dust, ammonia and water, which coagulate into tiny solids and globules. Both human-made (anthropogenic) and natural sources emit particulate matter or gaseous components that react in the air to form particulate matter.[23] Particulates vary in size, shape, density and chemical composition and for measurement purposes, are generally designated as $PM_{2.5}$ (2.5 µm and smaller) PM_{10} (10 µm and smaller, including $PM_{2.5}$). Long- and short-term exposure to these particles has been linked to numerous cardiorespiratory diseases and excess mortality.[5,15,24,25] The WHO's air quality guidelines (AQGs) offer global guidance on thresholds and limits for key air pollutants that pose health risks.[5] The guidelines indicate that by reducing particulate matter (PM_{10}) pollution from 70 to 20 µg/m^3, air pollution–related deaths could be reduced by roughly 15%![5]Exposure to ambient air with elevated nitrogen dioxide (NO_2) levels has been shown to aggravate respiratory disease, especially asthma, and increase susceptibility to respiratory infection.[26] Furthermore, nitrogen dioxide and other nitrogen oxides react readily with other airborne pollutants to form particulate matter and ozone, both of which are harmful to health.[26] Elevated ozone is particularly threatening for individuals with asthma, young children, older adults and people who work outdoors, and is linked to a variety of health outcomes including chest pain, throat irritation, airway inflammation, lung tissue damage and risk of death from respiratory causes.[27,28]The particulate matter limits proposed here are part of a WHO strategy of incrementally lowering air pollution across the globe, referencing the Interim target-2 in the AQG.[5] The nitrogen dioxide limit is derived from the U.S. Environmental Protection Agency's (EPA) National Ambient Air Quality Standard.[29]

Part 1 Particulate Matter

For All Spaces:

Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Annual average $PM_{2.5}$ less than 25 µg/m^3.[5]
b. Annual average PM_{10} less than 50 µg/m^3.[5]

Part 2 Inorganic Gases

For All Spaces:

Area-level measurements for the following pollutant meet the listed limits, when analyzed over a one-year period:

a. Annual average nitrogen dioxide less than 100 µg/m^3 (53 ppb).[29]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LTE ENHANCED LONG-TERM AIR QUALITY | O (MAX: 1 PT)

Intent: To recognize projects with especially low average levels of air pollution.

Summary: The limits proposed here correspond to WHO's Air Quality Guidelines.[5]

Part 1 Enhanced Particulate Matter

For All Spaces:

Area-level measurements for the following pollutants meet the following listed limits, when analyzed over a one-year period:

a. Annual average $PM_{2.5}$ less than 10 µg/m^3.[5]
b. Annual average PM_{10} less than 20 µg/m^3.[5]

Part 2 Enhanced Inorganic Gases

For All Spaces:

Area-level measurements for the following pollutant meets the listed limit, when analyzed over a one-year period:

a. Annual average nitrogen dioxide less than 40 µg/m^3 (21 ppb).[5]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

STA SHORT-TERM AIR QUALITY | O (MAX: 1 PT)

Intent: To recognize projects with higher-quality short-term conditions than exist in many parts of the world and where people are not exposed to extreme levels of ambient air pollutants.

Summary: The particulate matter and ozone limits proposed here are part of a WHO strategy of incrementally lowering air pollution across the globe referencing Interim targets.[5] The nitrogen dioxide and carbon monoxide limits correspond to WHO's Air Quality Guidelines.[5,30]

Part 1 Particulate Matter

For All Spaces:

Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Annual fourth-highest daily average 24-hour concentration (99th percentile) $PM_{2.5}$ less than 50 $\mu g/m^3$.[5]
b. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM_{10} less than 100 $\mu g/m^3$.[5]

Part 2 Inorganic Gases

For All Spaces:

Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Highest 1-hour average nitrogen dioxide less than 200 $\mu g/m^3$ (106 ppb).[5]
b. Highest 8-hour average carbon monoxide less than 10 mg/m^3 (9 ppm).[29,30]
c. Highest 8-hour average ozone less than 160 $\mu g/m^3$ (82 ppb).[5]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

STE ENHANCED SHORT-TERM AIR QUALITY | O (MAX: 1 PT)

Intent: To recognize projects with especially low peak levels of air pollution.

Summary: The particulate matter, ozone and carbon monoxide limits proposed here correspond to the WHO's air quality guidelines and the sulfur dioxide limit is from the EPA's National Ambient Air Quality Standards.[5,29]

Part 1 Particulate Matter

For All Spaces:

Area-level measurements of the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Fourth highest daily average (99th percentile) $PM_{2.5}$ less than 25 µg/m^3.[5]
b. Fourth highest daily average (99th percentile) PM_{10} less than 50 µg/m^3.[5]

Part 2 Enhanced Inorganic Gases

For All Spaces:

Area-level measurements of the following pollutants meet the listed limits, when analyzed over a one-year period:

a. Highest 24-hour average carbon monoxide less than 7 mg/m^3 (6 ppm).[30]
b. 99th percentile of 1-hour daily maximums of sulfur dioxide less than 200 µg/m^3 (75 ppb).[29]
c. Highest 8-hour average ozone less than 100 µg/m^3 (51 ppb).[5]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SEP POLLUTION SOURCE SEPARATION | O (MAX: 1 PT)

Intent: To reduce the population exposure of pollutants within the project by creating a buffer between transportation pollution sources and sensitive and active populations.

Summary: Ease-of-use and convenience has led to construction of homes, businesses and schools near major roads and highways. However, combustion sources including automobiles are major sources of gaseous pollutants such as carbon monoxide and nitrogen dioxide and create conditions for the synthesis of other pollutants, such as ozone.[31] While proximity to major roadways provides easy access to places and amenities that are integral to everyday life, it also is correlated with the prevalence of multiple health issues, including hypertension, renal dysfunction and leukemia.[32-35] The effects of living near a roadway go beyond individual health, and affect the health of the next generation. For example, data shows that mothers who live near roadways are at increased risk of preterm birth and low birth weight.[36,37]These findings generally report continuously decreasing risk as distance increases from 50 m [164 ft] to 1 km [0.6 mi].[31-37] In particular, locations greater than 90 m [300 ft] from highways have lower concentration of ultrafine particulate matter.[38]

Part 1 Traffic Separation

For All Spaces:

The building and land use cases listed below are more than 90 m [300 ft] from roads with a speed limit greater than 65 km/hr [40 mph]:

a. At least 75% of dwelling units, measured by unit count.
b. At least 75% of outdoor recreation and congregation areas greater than 0.6 hectare [1.5 acre] including plazas, parks, beaches and playgrounds, measured by acreage.
c. 100% of schools, grades K–12 (elementary, middle, high schools).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PRK PARKING RESTRICTIONS | O (MAX: 1 PT)

Intent: To encourage active transportation and discourage vehicle use by restricting on- and off-street parking.

Summary: Emerging research suggests that increased parking supply may be associated with lower walking and transit use, as it promotes more opportunities for sedentary modes of travel such as driving.[39,40] Case-based evidence suggests that eliminating or restricting the availability of parking in communities increases opportunities for other, less-polluting modes of transportation and interventions, such as parking fees, have been shown to reduce automobile use.[40,41]Policy and design strategies at the community scale that limit parking access must be supplemented with adequate alternative-transportation opportunities. Potential alternatives include investment in pedestrian and cyclist infrastructure such as sidewalks and bicycle lanes, which have been associated with increased walking and cycling, and providing on-site bicycle parking, which is associated with increased probability of cycling to the workplace.[41-48] Furthermore, access to mass transportation opportunities also discourages reliance on personal motor vehicles and encourages more active forms of transportation that are less burdensome on ambient air quality.[41] For more information on solutions to support active transportation, walkability and bikeability, please refer to the Movement concept.

Part 1 Allocated Parking

For All Spaces:

At least two of the following parking restrictions are in place:

a. In new residential buildings, at-grade building frontages that face the pedestrian circulation network are free of parking facilities.
b. In new residential and commercial office buildings, parking facilities do not exceed the minimum number of spaces required by code or law.
c. At least 5% of on-street parking spaces are designated for carpool or shared-use vehicles.
d. Public use bike parking is available at no cost in a number of spaces equal to 5% of on-street parking spaces. Bike parking may be designated on sidewalks, in an on-street space (such as a traditional vehicle parking space or pedestrian zone), in a bike share station or some combination.

Part 2 Real Cost of Parking

For All Spaces:

At least 75% of all parking spaces (including private, dedicated lots, but not including driveways) use one of the following systems:

a. Unbundle the cost of parking from the affiliated activity, and separately charge at least 50% of the market rate for parking.
b. Provide cash in lieu of free parking worth at least 50% of the market rate for parking.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LEV LOW EMISSION VEHICLES | O (MAX: 1 PT)

Intent: To reduce the emissions by promoting low- or no-emission vehicles and allowing larger vehicles to use electric power while stationary.

Summary: The transportation sector is one of the leading sources of air pollution.[15] Transportation-derived pollution can be mitigated either by reducing the distance driven by vehicles or by reducing the amount of pollution each vehicle generates. For example, since the EPA's Amendments to the Clean Air Act in 1990 to regulate mobile and stationary sources of pollution, sulfur dioxide levels have fallen in the U.S. by 79%, even as vehicle miles traveled has grown by 40%.[3,49] By transitioning away from gasoline and diesel whenever possible, emissions can be further reduced and air quality further improved.[15]The areas near freight transportation centers often have especially high levels of air pollution. For example, in Hong Kong, over one third of all respirable particulate matter and nitrous oxides emissions and over half of all sulfur dioxide emissions are from ships servicing ports.[50] The engines on the trucks and ships often remain running while being loaded and serviced to keep auxiliary systems operating. To eliminate the need to run the engine in these cases, the port or other facility can provide electrical power, HVAC, and any other services directly to the stationary vehicles and vessels through what is known as shore power. By eliminating the need for additional local sources of combustion, air quality can be improved at the local level.[51,52]

Part 1 Low Emission Vehicles

For All Spaces:

The following requirements are met:

a. At least two electric vehicle charging stations are present at all parking lots and garages that contain at least 400 spaces.

b. Priority parking is available for low-emission vehicles rated at a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE).[54] Number of priority parking spaces equals or exceeds number of disabled/ accessible parking spaces and they are located within 30 m [100 ft] of each other. Spaces with electric vehicle charging stations may be counted in this number.

c. At least 75% of light duty vehicles operated by the project are rated at a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE).[53]

Part 2 Stationary Vehicle Electrification

For All Spaces:

All ship berths (cargo and passenger ships) and truck stops (if any) meet the following requirements:

a. Provide electric "shore power" to docked ships and parked trucks.[51,52]

b. Implement policies requiring docked and parked vehicles to turn off their diesel engines.[51,52]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AED AIR QUALITY EDUCATION | O (MAX: 1 PT)

Intent: To inform community members about ambient air quality in order to encourage them to modify their activities based on conditions and to reduce risk of radon exposure.

Summary: For individuals to make informed decisions about daily outdoor activities, near real-time information regarding air quality at both the area and local levels can help mitigate exposure risks. Mixed-media messaging designed to inform residents about the potential environmental health risks they face in their community may help individuals make more informed decisions about engaging in outdoor activities.[54]Education can also combat exposure to pollutants indoors. For example, radon is a carcinogenic radioactive gas that is the leading cause of lung cancer among nonsmokers, responsible for about 21,000 deaths per year in the U.S. alone.[26] By increasing the use of home radon testing, residents are made more aware of the risks of radon and are less likely to ignore mitigation strategies.[54,55]

Part 1 Air Quality Monitoring

For All Spaces:

Air quality alerts meet the following requirements:

a. Daily air quality data is measured in real time, or forecasted one day ahead.
b. Air quality data, including at least ozone and $PM_{2.5}$ levels, is readily available, at no cost to the public, and includes mixed-media messaging capable of reaching a majority of the occupants within the project when air quality alerts are in place.

Part 2 Radon Test Promotion

For All Spaces:

A radon risk communication program is in place that:

a. Communicates the local risk for presence of radon and identifies potential areas of likely exposure.[56]
b. Outlines measurement methods and prevention measures.[56]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: Caiazzo F, Ashok A, Waitz IA, Yim SHL, Barrett SRH. Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005. Atmospheric Environment. 2013;79:198-208. http://www.sciencedirect.com/science/article/pii/S1352231013004548

2: World Health Organization. 7 million premature deaths annually linked to air pollution. http://www.who.int/mediacentre/news/releases/2014/ air-pollution/en/. Published 2014. Accessed May 20, 2016.

3: Environmental Protection Agency. Benefits and Costs of the Clean Air Act 1990-2020, the Second Prospective Study. https://www.epa.gov/ clean-air-act-overview/benefits-and-costs-clean-air-act-1990-2020- second-prospective-study. Published 2015. Accessed May 20, 2016.

4: Environmental Protection Agency. Criteria Air Pollutants https://www. epa.gov/criteria-air-pollutants. Published 2016. Accessed July 15, 2016.

5: World Health Organization. WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulfer dioxide: Global update 2005-Summary of risk assessment. 2005 ed. Geneva, Switzerland: WHO Press; 2006. http://apps.who.int/iris/bitstream/10665/69477/1/WHO_ SDE_PHE_OEH_06.02_eng.pdf

6: United Nations Environment Programme. Air Quality Management Handbook. United Nations Environment Program; 2005. http://www. unep.org/urban_environment/Publications/index.asp

7: Environmental Protection Agency. Overview of Air Pollution from Transportation. https://www.epa.gov/air-pollution-transportation/learnabout-air-pollution-transportation. Published n.d. Accessed June 20, 2017.

8: Environmental Protection Agency. Global Greenhouse Gas Emissions Data. https://www.epa.gov/ghgemissions/global-greenhouse-gasemissions-data - Sector. Published n.d. Accessed June 20, 2017.

9: World Health Organization. Ambient (outdoor) air quality and health. http://www.who.int/mediacentre/factsheets/fs313/en/. Published 2016. Accessed May 20, 2016.

10: Gauderman WJ, Urman R, Avol E, et al. Association of improved air quality with lung development in children. N Engl J Med. 2015;372(10):905-913. https://www.ncbi.nlm.nih.gov/ pubmed/25738666

11: San Francisco Department of the Environment. Vehicle Idle Reduction http://sfenvironment.org/article/sfccc-projects/vehicle-idle-reduction. Published n.d. Accessed July 28, 2016.

12: Yap PS, Garcia C. Effectiveness of residential wood-burning regulation on decreasing particulate matter levels and hospitalizations in the San Joaquin Valley Air Basin. Am J Public Health. 2015;105(4):772-778. https://www.ncbi.nlm.nih.gov/pubmed/25713937

13: Environmental Protection Agency. Sample Calculation of Emission Reductions and Fuel Savings from a Carpool Program. Washington, DC: Environmental Protection Agency;2008. https://www3.epa.gov/otaq/consumer/420f08028.pdf

14: World Health Organization. Air Pollution. http://www.who.int/topics/ air_pollution/en/. Published n.d. Accessed December 1, 2016.

15: The Nature Conservancy. Planting Healthy Air: A Global analysis of the role of urban trees in addressing particulate matter pollution and extreme heat. Arlington, VA: The Nature Conservancy;2016. https://thought-leadership-production.s3.amazonaws. com/2016/11/07/14/13/22/685dccba-cc70-43a8-a6a7-e3133c07f095/20160825_PHA_Report_Final.pdf

16: World Health Organization. Ambient air pollution: A global assessment of exposure and burden of disease. Geneva, Switzerland: World Health Organization;2016. http://apps.who.int/iris/bitstream/10665/250141/1/9789241511353-eng.pdf?ua=1

17: World Health Organization. Fact Sheet: Tobacco http://www.who.int/ mediacentre/factsheets/fs339/en/. Published 2009.

18: Frazer K, Callinan JE, McHugh J, et al. Legislative smoking bans for reducing harms from secondhand smoke exposure, smoking prevalence and tobacco consumption. Cochrane Database Syst Rev.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

2016;2:CD005992. https://www.ncbi.nlm.nih.gov/pubmed/26842828

19: Humair JP, Garin N, Gerstel E, et al. Acute respiratory and cardiovascular admissions after a public smoking ban in Geneva, Switzerland. PLoS One. 2014;9(3):e90417. https://www.ncbi.nlm.nih.gov/pubmed/24599156

20: Naiman A, Glazier RH, Moineddin R. Association of anti-smoking legislation with rates of hospital admission for cardiovascular and respiratory conditions. CMAJ. 2010;182(8):761-767. https://www.ncbi.nlm.nih.gov/pubmed/20385737

21: Centers for Disease Control and Prevention. Smoking and Tobacco Use: Health Effects of Second Hand Smoke. https://www.cdc.gov/tobacco/ data_statistics/fact_sheets/secondhand_smoke/health_effects/index.htm. Published 2016. Accessed December 1, 2016.

22: New York City Council. Smoke Free Air Act. New York, NY: City of New York; 2011. http://nycsmokefree.org/existing-legislation

23: Environmental Protection Agency. Final Report: Integrated Science Assessment for particulate Matter. Washington, DC: Environmental Protection Agency;2009. https://cfpub.epa.gov/ncea/risk/recordisplay. cfm?deid=216546

24: Brunekreef B, Forsberg B. Epidemiological evidence of effects of coarse airborne particles on health. Eur Respir J. 2005;26(2):309-318. https:// www.ncbi.nlm.nih.gov/pubmed/16055881

25: Brunekreef B, Holgate ST. Air pollution and health. Lancet. 2002;360(9341):1233-1242. https://www.ncbi.nlm.nih.gov/ pubmed/12401268

26: Environmental Protection Agency. EPA Assessment of Risks from Radon in Homes. Washington, DC: Environmental Protection Agency; 2003. https://www.epa.gov/sites/production/files/2015-05/documents/402-r-03-003.pdf

27: Environmental Protection Agency. Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution: What are the harmful effects of CO? https://www.epa.gov/co-pollution/basic-information-aboutcarbon-monoxide-co-outdoor-air-pollution - Effects. Published n.d. Accessed December 1, 2016.

28: Jerrett M, Burnett RT, Pope CA, 3rd, et al. Long-term ozone exposure and mortality. N Engl J Med. 2009;360(11):1085-1095. https://www.ncbi.nlm.nih.gov/pubmed/19279340

29: Environmental Protection Agency. NAAQS Table. https://www.epa.gov/ criteria-air-pollutants/naaqs-table. Published 2016. Accessed July 15, 2016.

30: World Health Organization. WHO Guidelines Approved by the Guidelines Review Committee. WHO Guidelines for Indoor Air Quality: Selected Pollutants. Geneva, Switzerland: World Health Organization; 2010. https://www.ncbi.nlm.nih.gov/pubmed/23741784

31: U.S. Department of Agriculture. Ozone-Its Formation and Impacts on People and Plants. In: U.S. Forest Service, ed. Washington, DC: U.S. Department of Agriculture; 2013. https://webcam.srs.fs.fed.us/pollutants/ozone/

32: Boothe VL, Boehmer TK, Wendel AM, Yip FY. Residential traffic exposure and childhood leukemia: a systematic review and meta-analysis. Am J Prev Med. 2014;46(4):413-422. https://www.ncbi.nlm.nih.gov/pubmed/24650845

33: Kirwa K, Eliot MN, Wang Y, et al. Residential proximity to major roadways and prevalent hypertension among postmenopausal women: results from the Women's Health Initiative San Diego Cohort. J Am Heart Assoc. 2014;3(5):e000727. https://www.ncbi.nlm.nih.gov/ pubmed/25274494

34: Kingsley SL, Eliot MN, Whitsel EA, et al. Residential proximity to major roadways and incident hypertension in post-menopausal women. Environ Res. 2015;142:522-528. https://www.ncbi.nlm.nih.gov/pubmed/26282224

35: Lue SH, Wellenius GA, Wilker EH, Mostofsky E, Mittleman MA. Residential proximity to major roadways and renal function. J Epidemiol Community Health. 2013;67(8):629-634. https://www.ncbi.nlm.nih.gov/pubmed/23669275

36: Padula AM, Mortimer KM, Tager IB, et al. Traffic-related air pollution and risk of preterm birth in the San

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Joaquin Valley of California. Ann Epidemiol. 2014;24(12):888-895e884. https://www.ncbi.nlm.nih.gov/ pubmed/25453347

37: Sram RJ, Binkova B, Dejmek J, Bobak M. Ambient air pollution and pregnancy outcomes: a review of the literature. Environ Health Perspect. 2005;113(4):375-382. https://www.ncbi.nlm.nih.gov/ pubmed/15811825

38: Zhu Y, Hinds WC, Kim S, Sioutas C. Concentration and size distribution of ultrafine particles near a major highway. J Air Waste Manag Assoc. 2002;52(9):1032-1042. https://www.ncbi.nlm.nih.gov/ pubmed/12269664

39: City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. New York, NY;2010. http://www1.nyc.gov/assets/ planning/download/pdf/plans-studies/active-design-guidelines/ adguidelines.pdf or http://www.drkarenlee.com/resources/adg

40: Urban Land Institute. Intersections: Health and the Built Environment. Washington, DC: Urban Land Institute 2013. http://uli.org/wp-content/ uploads/ULI-Documents/Intersections-Health-and-the-BuiltEnvironment.pdf

41: Robert L. Ehrlich, Michael S. Steele, Zimbler R. Driving Urban Environments: Smart Growth Parking Best Practices Annapolis, MD: Governor's Office of Smart Growth; n.d. http://www.mass.gov/hed/ docs/dhcd/cd/smartgrowth/parking.pdf

42: Pucher J, Dill J, Handy S. Infrastructure, programs, and policies to increase bicycling: an international review. Prev Med. 2010;50 Suppl 1:S106-125. https://www.ncbi.nlm.nih.gov/pubmed/19765610

43: Zhu X, Yu CY, Lee C, Lu Z, Mann G. A retrospective study on changes in residents' physical activities, social interactions, and neighborhood cohesion after moving to a walkable community. Prev Med. 2014;69 Suppl 1:S93-97. https://www.ncbi.nlm.nih.gov/pubmed/25158208

44: Rundle AG, Sheehan DM, Quinn JW, et al. Using GPS Data to Study Neighborhood Walkability and Physical Activity. Am J Prev Med. 2016;50(3):e65-e72. https://www.ncbi.nlm.nih.gov/pubmed/26558700

45: Renalds A, Smith TH, Hale PJ. A systematic review of built environment and health. Fam Community Health. 2010;33(1):68-78. https://www. ncbi.nlm.nih.gov/pubmed/20010006

46: American Planning Association. The Benefits of Street-scale Features for Walking and Biking. Princeton, NJ: Planning and Community Health Center;2015. https://planning-org-uploaded-media.s3.amazonaws. com/legacy_resources/nationalcenters/health/streetscale/pdf/ walkingbikingfinalreport.pdf

47: Alliance for Biking and Walking. Bicycling & Walking in the United States: 2016 Benchmarking Report. Washington, DC;2016. http://www. bikewalkalliance.org/resources/benchmarking

48: Gu J, Mohit B, Muennig PA. The cost-effectiveness of bike lanes in New York City. Inj Prev. 2017;23(4):239-243. https://www.ncbi.nlm.nih.gov/ pubmed/27613434

49: Environmental Protection Agency. Progress Cleaning the Air and Improving People's Health. https://www.epa.gov/clean-air-actoverview/progress-cleaning-air-and-improving-peoples-health. Published 2016. Accessed July 24, 2016.

50: Government of the Hong Kong Specila Administrative Region. 2015 Hong Kong Emission Inventory Report. In: Environmental Protection Department , ed. Hong Kong, China; 2017. http://www.epd.gov.hk/epd/ sites/default/files/epd/2015_EI_Report_Eng_v2.pdf

51: U.S. Department of Energy. Truck Stop Electrification for HeavyDuty Trucks. http://www.afdc.energy.gov/conserve/idle_reduction_ electrification.html. Published 2016. Accessed July 24, 2016.

52: California Environmental Protection Agency. Shore Power for Oceangoing Vessels. http://www.arb.ca.gov/ports/shorepower/shorepower. htm. Published 2016. Accessed July 24, 2016.

53: American Council for an Energy-Efficient Economy (ACEEE). Greenest & Meanest: Model Year 2017. http://www.greenercars.org/greenestmeanest/greenest. Published n.d. Accessed June 23, 2017.

54: Wen X-J. Association Between Media Alerts of Air Quality Index and Change of Outdoor Activity Among Adult Asthma in Six States, BRFSS, 2005. Journal of Community Health. 2009;34(1):40-46. http://link. springer.com/article/10.1007/s10900-008-9126-4

55: Weinstein ND, Klotz ML, Sandman PM. Optimistic biases in public perceptions of the risk from radon. Am J

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Public Health. 1988;78(7):796- 800. https://www.ncbi.nlm.nih.gov/pubmed/3381955

56: World Health Organization. WHO Handbook on Indoor Radon: A Public Health Perspective. Geneva, Switzerland: WHO Press; 2009. http://apps. who.int/iris/bitstream/10665/44149/1/9789241547673_eng.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WATER

Clean drinking water is essential for maintaining health and preventing disease. More than two-thirds of the human body is comprised of water, accounting for a major component of cells, as well as the medium for the transport of nutrients and waste throughout the body.[1] Additionally, water helps to regulate internal body temperature and serves as a shock absorber for the brain and spinal cord. The National Academies of Medicine 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.[2] These amounts are appropriate to offset what leaves the body through respiration, perspiration and excretion, aiding in the removal of toxins, by-products and other waste.

Despite being an integral part of human physiology, water is vulnerable to contamination by biological, chemical and radioactive pollutants. Drinking water contamination is a major public health issue, with many people receiving water that has been exposed to potentially harmful levels of biological, chemical and mineral contaminants. The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) report that as of 2015, 663 million individuals still lacked access to safe drinking water worldwide.[3] The WHO defines safe drinking water as "water that does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages."[4] Contaminants such as lead, arsenic, glyphosate, atrazine and microbes that are naturally occurring or inadvertently introduced into the water can pose serious health threats.[4,5] Unfortunately, treatment and distribution systems meant to keep drinking water safe can also be a potential source of contamination.[6] For example, chlorine and chloramine, which are commonly added to water to kill pathogenic organisms, can lead to the formation of disinfectant by-products such as trihalomethanes and haloacetic acids, as well as N-nitrosodimethylamine, which may lead to cancer and other adverse health effects when exposure occurs at levels above U.S. Environmental Protection Agency (EPA) standards.[7] Finally, pharmaceuticals, personal care products and other emerging contaminants are increasingly finding their way into water supplies, yet the health effects remain largely unknown.[8]

An issue facing communities around the world is the availability of clean water for use in basic sanitation.[9] Lack of basic sanitation has been shown to cause diarrhea, with more than 500,000 diarrheal deaths being attributed to contaminated drinking water each year.[10] Globally, diarrheal diseases account for 4% of all deaths and 5% of health loss to disability.[11] When both clean water and basic sanitation facilities are available for use, diarrhea and mortality associated with diarrheal diseases is greatly diminished.[12-16]

Humans need water every day to hydrate and cleanse the body, prepare foods and perform many other functions. However, the quality of the water that fills and sustains us is dependent on many factors. Often the water source that serves a community is in an area outside of the jurisdictional control of the community. It is important, therefore, to take every effort possible to protect watersheds and aquifers to prevent contamination, while also following up with periodic testing to maintain high quality.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WQT DRINKING WATER QUALITY | P

Intent: To provide healthy drinking water without high concentrations of pollutants or risk factors for bacteria.

Summary: Drinking water sources such as lakes, rivers, springs and reservoirs are prone to contamination from natural sources as well as human activities. 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 while the presence of coliform bacteria suggests the presence of more dangerous pathogens, including bacteria, viruses and protozoa.[17,18] Exposure to these pathogens through water containing coliforms can lead to adverse gastrointestinal effects such as diarrhea, vomiting, nausea and cramps.[19]Water, especially downstream from industry, may also contain dissolved metals. Exposure to even minute amounts of certain metals such as lead and mercury has been linked to developmental delays and deficits in learning abilities in children as well as high blood pressure and kidney problems in adults.[20,21] Additionally, organic pollutants from industrial activities such as polychlorinated biphenyls (PCBs) and vinyl chloride have been associated with a range of adverse health effects, including cancer, immune deficiencies and nervous system difficulties.[22,23] Lastly, in areas within the watershed of agricultural land, pesticides and herbicides can enter the public water supply. For example, consumption of water polluted with atrazine and glyphosate has been linked to kidney, thyroid, gastrointestinal and reproductive effects.[19,24,25,26]

Part 1 Sediment

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Turbidity of the water sample is less than 1.0 NTU![19]

Part 2 Microorganisms

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Total coliforms (including E. coli) are not detected in the water sample![27]

Part 3 Dissolved Metals and Metalloids

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Lead less than 0.01 mg/L.[4]

b. Arsenic less than 0.01 mg/L.[27]

c. Antimony less than 0.006 mg/L.[27]

d. Mercury less than 0.002 mg/L.[27]

e. Nickel less than 0.012 mg/L.[28]

f. Copper less than 1.0 mg/L.[27]

Part 4 Organic Pollutants

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Styrene less than 0.0005 mg/L.[29]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

b. Benzene less than 0.001 mg/L.[29]

c. Ethylbenzene less than 0.3 mg/L.[29]

d. Polychlorinated biphenyls less than 0.0005 mg/L.[27]

e. Vinyl chloride less than 0.002 mg/L.[27]

f. Toluene less than 0.15 mg/L.[30]

g. Xylenes (total: m, p, and o) less than 0.5 mg/L.[4]

h. Tetrachloroethylene less than 0.005 mg/L.[4]

Part 5 Herbicides and Pesticides

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Simazine less than 0.002 mg/L.[4]

b. Glyphosate less than 0.70 mg/L.[27]

c. 2,4-Dichlorophenoxyacetic acid less than 0.07 mg/L.[27]

d. Atrazine less than 0.001 mg/L.[30]

Part 6 Fertilizers

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas meets that are owned, managed or operated by the project owner the following limits:

a. Nitrate less than 44 mg/L (less than 10 mg/L nitrogen)[27]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WAD PUBLIC WATER ADDITIVES | O (MAX: 1 PT)

Intent: To provide drinking water with adequate measures of disinfection without high concentrations of disinfectants and to promote dental health.

Summary: Certain chemicals are intentionally added to public water supplies to promote health.[18,19] For example, chlorine or chloramine may be added to water to act as disinfectants, and fluoride may be added to prevent tooth decay.[31,32] 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 (aestic mottling of the teeth), stomach discomfort and eye and skin irritation.[18,31] In addition, chlorine can react with naturally present organic matter to form disinfectant by-products (DBPs), such as trihalomethanes (THMs) and haloacetic acids (HAAs), which have been linked to cancer and kidney damage.[7]

Part 1 Disinfectants

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Residual chlorine is present but at a concentration less than 4 mg/L.[27]
b. Residual chloramine is present but at concentration less than 4 mg/L.[27]

Part 2 Disinfectant By-products

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Total trihalomethanes less than 0.08 mg/L.[27]
b. Total haloacetic acids less than 0.06 mg/L.[27]

Part 3 Fluoride

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

a. Fluoride less than 4.0 mg/L.[27]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PWT PERIODIC WATER QUALITY TESTING | O (MAX: 1 PT)

Intent: To maintain up-to-date knowledge of local water conditions and to prepare strategies for addressing unacceptable conditions.

Summary: Changing industrial practices and temporal variations in temperature, pH and weather may affect the leaching rate of inorganic metals into drinking water sources. Further, the detection of coliforms often indicates that the water source is contaminated and should be investigated for suitability of human contact (including consumption). Where possible, routine testing can help to detect any large variations in the contaminants present in water and help to maintain consistency in water quality.

Part 1 Testing for Microorganisms

For All Spaces:

Water from all (minimum one) outdoor drinking water fountains located in public use areas is tested quarterly (with reports submitted annually to IWBI) for the presence of the following:

a. Total coliforms (including E. coli).

Part 2 Testing for Inorganic Compounds

For All Spaces:

Water from all (minimum one) outdoor drinking water fountains located in public use areas is tested quarterly (with reports submitted annually to IWBI) for the presence of the following dissolved metals or metalloids:

a. Lead.[4]
b. Arsenic.[4]
c. Mercury.[4]
d. Copper.[4]

Part 3 Water Data Records

For All Spaces:

A written policy is provided specifying:

a. Detailed enforcement strategies for monitoring and keeping record of water quality parameters listed in part 1 and part 2 of this feature, including full data from field inspections or laboratory results where appropriate.

Part 4 Water Data Response

For All Spaces:

A detailed plan for dealing with unacceptable water conditions is provided, including:

a. Plans for immediate public notification upon identification of hazardous conditions, such as warning notices sites within the project boundary.
b. Plans for action and remediation of unacceptable conditions.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WQO HIGH QUALITY DRINKING WATER | O (MAX: 1 PT)

Intent: To provide drinking water without high concentrations of substances that could affect its taste and appearance.

Summary: Access to clear, good-tasting water helps to promote proper hydration throughout the day, encouraging water consumption and reducing reliance on bottled water.Common contaminants such as aluminum, sodium and chlorides can affect the taste as well as the appearance of water. These more aesthetic concerns are monitored through non-mandatory National Secondary Drinking Water Regulations (NSDWRs) that establish secondary maximum contaminant levels (SMCLs), set by the EPA to help public water systems maintain the taste, color and odor of the drinking water. For example, high levels of sodium can cause water to become salty, and chlorides can give water an unpleasant mineral taste, both situations increasing the likelihood that individuals will turn to bottled water or other beverages. Meanwhile, aluminum and manganese can discolor water, potentially causing community members to mistakenly believe that water from the public system is not safe to drink. By maintaining the highest level of water quality, communities can better promote tap water consumption.

Part 1 Drinking Water Taste Properties

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or maintained by the project owner meets the following limits:

a. Aluminum less than 0.2 mg/L.[27]
b. Chloride less than 250 mg/L.[27]
c. Manganese less than 0.05 mg/L.[27]
d. Sodium less than 270 mg/L.[33]
e. Sulfate less than 250 mg/L.[27]
f. Iron less than 0.3 mg/L.[27]
g. Zinc less than 5 mg/L.[27]
h. Total Dissolved Solids less than 500 mg/L.[27]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WAC DRINKING WATER ACCESS | O (MAX: 1 PT)

Intent: To encourage public drinking water consumption and to reduce the consumption of less-healthy beverage alternatives.

Summary: Access to clean, palatable drinking water in public spaces is essential for supporting the hydration needs of the community and a critical component of healthy spaces. By promoting access to potable drinking water, communities can provide a healthier alternative to sugar-sweetened beverages and other high-sugar drinks, such as fruit juices, while also encouraging proper hydration. Preventing dehydration, especially in activity-oriented public spaces or during warmer months, is important for the health of the community, as even mild dehydration can result in headache, dry skin and disruptions in physical and cognitive performance.[34] Drinking water availability and promotion is also associated with improved childhood obesity outcomes.[35,36] Access to drinking water further supports active lifestyles, making drinking water fountain placement around parks, playgrounds and recreational areas important.[37,38] Additionally, drinking water fountains and water bottle–refilling stations can help reduce dependency on single-use plastic water and beverage bottles and the associated negative environmental impacts.

Part 1 Drinking Water Fountains

For All Spaces:

The following requirements are met in public use spaces owned, managed or contracted by the project owner:

a. Drinking water fountains are available with at least one fountain per 800 m [0.5 mi] radius.
b. Drinking water fountains are available at least every 1.6 km [1.0 mi] on all designated walking and/or running routes.
c. All newly installed drinking water fountains are available for use year-round.
d. All newly installed drinking water fountains are universally designed.

Part 2 Hydration Stations

For All Spaces:

The following requirements are met in public use spaces owned, managed or operated by the project owner:

a. Water bottle–refilling stations are present in high-traffic outdoor public spaces, including parks, playgrounds and outdoor recreational activity spaces.[39]
b. All newly installed drinking water fountains are designed for water bottle–refilling.[40]

Part 3 Drinking Water Fountain Maintenance

For All Spaces:

Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner include the following:

a. Regular cleaning schedules for mouthpieces, protective guards and collection basins to prevent lime and calcium buildup.[41]
b. Regular cleaning schedules for outlet screens and aerators to remove debris and dust.[41]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FAC SANITARY FACILITIES PROVISION | O (MAX: 1 PT)

Intent: To promote community-wide hygiene through the provision and maintenance of public facilities.

Summary: Population-wide sanitation can be better upheld if meaningful and supportive provisions are in place for all community residents to use. Providing community members with access to public facilities promotes population-wide improvements in well-being, comfort and sanitation, and enhances the livability and accessibility of communities and participation in public life.[42]

Part 1 Public Facilities

For All Spaces:

The following requirements are met:

a. At least one public use restroom within 1 km [0.6 mi] of each park 4,000 m^2 [1 acre] or larger.
b. At least one public use restroom per 4 hectares [10 acres] of project size.

Part 2 Restrooms Access

For All Spaces:

Public use restrooms owned, managed or maintained by the project owner meet the following requirements:

a. Allow dawn-to-dusk year-round access at no cost for all potential visitors.
b. Provide alternatives if the facility is closed for more than one week.

Part 3 Handwashing Promotion

For All Spaces:

Public use restrooms owned, managed or maintained by the project owner meet the following requirements:

a. Provide disposable paper towels (air dryers are not forbidden).[45]
b. Include at least one sink with a handwashing basin.
c. Include signage at the sink promoting proper hand-washing technique using soap and water for a minimum of 20 seconds.[43]
d. Provide fragrance-free non-antibacterial soap.[44]

Part 4 Sanitary Materials

For All Spaces:

The following are provided at all public use restrooms owned, managed or maintained by the project owner:

a. Sanitary pads or tampons.
b. Infant changing table.
c. Syringe drop box.

Part 5 Facilities Maintenance

For All Spaces:

The cleaning plan for all public use restrooms owned, managed or maintained by the project owner includes the following:

a. The Cleaning Equipment and Training section of Table A4 in Appendix C in the WELL Building Standard.
b. A list of approved product seals with which all cleaning, disinfection and hand hygiene products must comply in accordance with the Cleaning, Disinfection and Hand Hygiene Product section in Table A4 in

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Appendix C in the WELL Building Standard.

c. A list of high-touch surfaces and schedule of sanitization or disinfection as specified in the Disinfection and Sanitization section in Table A4 in Appendix C in the WELL Building Standard.

d. A cleaning schedule that specifies the extent and frequency of cleaning, including the Entryway Maintenance section of Table A4 in Appendix C in the WELL Building Standard.

e. Dated cleaning logs that are maintained and available to all occupants.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WFS WATER FEATURE SANITATION | O (MAX: 1 PT)

Intent:
To maintain sanitary conditions in man-made and natural public bodies of water.

Summary: Public interactive water features and fountains are aesthetic uses of water that are commonly integrated into the social parts of community settings. These features often contribute to the enjoyment of a public space, and along with access to natural bodies of water, they offer a physical point of engagement and a center of congregation for community members. Given that public use water features, fountains and natural water bodies encourage interaction and potentially service a large, transient population, it is vital to maintain their sanitary condition to prevent the spread of infection or disease.

Part 1 Natural Water Bodies

For All Spaces:

Bodies of water, if any, where a large number of people are expected to swim (not including swimming pools or artificially created bodies of water) are tested (with reports submitted annually to IWBI) with the following parameters:

a. Publicly accessible inland waters: total coliforms (including E. coli) do not exceed 500 cfu/100 mL.[46]
b. Publicly accessible coastal and transitional waters: total coliforms (including E. coli) do not exceed 250 cfu/100 mL.[46]
c. Water sampling occurs at minimum every two weeks.[46]

Part 2 Water Quality Limits

For All Spaces:

The following limits are met for public interactive water features or fountains:

a. Free available chlorine: 3.0 to 5.0 ppm; or Bromine: 5.5 to 7.5 ppm.[47]
b. Cyanuric acid in outdoor facilities: 20 ppm.[47]
c. Cyanuric acid in indoor facilities: 0.0 ppm.[47]
d. pH level: 6.5-9.5.

Part 3 Supply and Circulation System Design

For All Spaces:

The following requirements are met for public interactive water features or fountains:

a. The initial water supply of all water features is potable water.[47]
b. The water distribution system is protected by a high-hazard backflow preventer.[47]
c. Hose bibs are protected with a vacuum breaker.[47]
d. Filter backwash water or drainage water is treated as wastewater and disposed of accordingly.[47]

Part 4 Maintenance and Sanitation Records

For All Spaces:

Projects provide a written policy specifying that the following records pertaining to any public use interactive water features or fountains are kept for a minimum of three years, including full data from field inspections or laboratory results, where appropriate:

a. Date of construction of the water feature.[47]
b. Daily chemical log.[47]
c. Chlorine test results.[47]
d. Bromine test results.[47]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

e. Cyanuric acid test results.[47]
f. pH test results.[47]
g. Any supplemental water treatment.[47]
h. Routine maintenance schedule and log.[47]
i. Preventative maintenance schedule and log.[47]
j. Documentation of methods for determining turnover rates.[47]
k. Manufacturer's instructions for operation of disinfection equipment.[47]
l. Manufacturer's instructions for operation of chemical control equipment.[47]
m. Manufacturer's instructions for operation of the chemical feed system.[47]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LEG LEGIONELLA CONTROL | O (MAX: 1 PT)

Intent: To minimalize the risk posed by *Legionella* by promoting awareness and planning at the building level.

Summary: Municipal water systems represent a critical point for water purification and treatment. Freshwater and untreated groundwater sources can be contaminated with various bacteria that can contribute to waterborne and airborne diseases if introduced into water supplies. Of particular concern is *Legionella*, a species of bacteria that can be transmitted via waterborne aerosol inhalation to cause respiratory disease. In mild forms, *Legionella* can lead to Pontiac fever, and in more severe forms it can result in Legionnaires' disease, a potentially fatal type of pneumonia.[48] A key measure to protecting against Legionnaires' disease is preventing systems from promoting the growth of the bacteria.[49]

Part 1 Risk Management Plan

For All Spaces:

A point-by-point narrative describes strategies for addressing *Legionella*, including the below-listed ones for all buildings owned, managed or operated by the project owner that use water-based cooling or heating systems:

a. Formation of a team for *Legionella* management.[50]
b. Water system inventory and production of process flow diagrams.[50]
c. Hazard analysis of water assets.[50]
d. Identification of control locations.[50]
e. Establishment of control limits and planned corrective actions.[50]
f. Monitoring with maintenance and control measures.[50]
g. Documentation, verification and validation of procedures.[50]

Part 2 Legionella Awareness

For All Spaces:

All buildings not owned, managed or maintained by the project owner that use water-based cooling or heating systems, meet the following:

a. Building engineer or management body is provided with guidelines to minimize *Legionella* risk, such as "Developing a Water Management Program to Reduce *Legionella* Growth & Spread in Buildings."[51]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SWA STORMWATER MANAGEMENT | O (MAX: 1 PT)

Intent: To curtail the release of untreated storm runoff water into the natural water system.

Summary: Stormwater runoff refers to rainfall or snowmelt that runs over the ground and gathers natural and human-made pollutants such as sediment, metals, oils, nutrients, bacteria and viruses.[52,53] Impervious (nonporous) surfaces often found in urban environments such as roads, parking lots, rooftops and compacted soils reduce infiltration of the water into the ground and thereby increase the amount of runoff.[54,55] When not properly managed, stormwater can overwhelm sewage systems and potentially flood streets and buildings with water and associated contaminants. In severe events, this flooding can lead to infrastructural damage.[54]

Part 1 Low Impact Development

For All Spaces:

A narrative describes strategies across the entire project for preventing the off-site discharge of untreated water from all (minimum one) rainfall events up to and including the ninety-fifth percentile storm event that incorporates one or more of the following:

a. Rain gardens, bioretention and infiltration planters.[56]
b. Porous pavements.[56]
c. Vegetated swales and bioswales.[56]
d. Green roofs.[56]
e. Trees and tree boxes.[56]
f. Pocket wetlands.[56]
g. Reforestation/revegetation using native plants.[56]
h. Protection and enhancement of riparian buffersand floodplains.[56]
i. Rainwater harvesting.[56]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

OVF OVERFLOW WATER MANAGEMENT | O (MAX: 1 PT)

Intent: To curtail the release of untreated sewage into the natural water system during rainstorms.

Summary: In some circumstances, stormwater runoff from the first hour of a moderate- to high-intensity storm can contain a greater concentration of pollutants than that found in raw sewage.[53] Further, stormwater may eventually be carried back into streams, rivers and reservoirs, thus risking contamination of these water sources.[54] One of the best ways to manage this problem and prevent overflow events and environmental contamination is to address water management through infrastructural solutions that treat water from storms and sewage water separately.

Part 1 Sewer Separation

For All Spaces:

One of the following requirements is met:

a. Sanitary sewage and stormwater are consistently conveyed through separate pipes.[57]

b. All combined sewer systems (CSS) are separated into discrete stormwater and sanitary sewer systems with stormwater outfalls designed to discharge into receiving water bodies.[57]

c. Combined sewer systems have sufficient treatment and retention capabilities to avoid any overflow events.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: U.S. Geological Survey. The Water in You. http://water.usgs.gov/edu/propertyyou.html. Published 2016. Accessed July 19, 2016.

2: Report Sets Dietary Intake Levels for Water, Salt, and Potassium to Maintain Health and Reduce Chronic Disease Risk (press release). The National Academies of Sciences, Engineering and Medicine, 2003.

3: United Nations. Goal 6: Ensure access to water and sanitation for all. http://www.un.org/sustainabledevelopment/water-and-sanitation/. Published n.d. Accessed March 28, 2017.

4: World Health Organization. Guidelines for drinking-water quality. Geneva, Swizerland: WHO Press; 1996. http://www.who.int/water_ sanitation_health/publications/2011/dwq_guidelines/en/

5: World Health Organization. Preventing Disease Through Healthy Environments: Action is needed on chemicals of major public health concern. Geneva, Switzerland: World Health Organization;2010. http://www.who.int/ipcs/features/10chemicals_en.pdf?ua=1

6: Moe CL, Rheingans RD. Global challenges in water, sanitation and health. J Water Health. 2006;4 Suppl 1:41-57. https://www.ncbi.nlm.nih. gov/pubmed/16493899

7: Villanueva CM, Cantor KP, Grimalt JO, et al. Bladder cancer and exposure to water disinfection by-products through ingestion, bathing, showering, and swimming in pools. Am J Epidemiol. 2007;165(2):148-156. https://www.ncbi.nlm.nih.gov/pubmed/17079692

8: World Health Organization. Briefing Note-Antimicrobial Resistance: An Emerging Water, Sanitation and Hygiene Issue. Geneva, Switzerland: WHO Press; 2014. http://www.who.int/water_sanitation_health/emerging/AMR_briefing_note.pdf?ua=1

9: World Health Organization. Monitoring water and sanitation: for evidence-based policy and intervention. Geneva, Switzerland: WHO Press; 2010. http://apps.who.int/phe/events/wha_66/flyer_wsh_monitoring.pdf

10: World Health Organization. Drinking-water. http://www.who.int/ mediacentre/factsheets/fs391/en/. Published 2016. Accessed May 24, 2016.

11: World Health Organization. Water-related diseases. http://www.who.int/water_sanitation_health/diseases/diarrhoea/en/. Published 2016. Accessed July 19, 2016.

12: Aryal KK, Joshi HD, Dhimal M, et al. Environmental burden of diarrhoeal diseases due to unsafe water supply and poor sanitation coverage in Nepal. J Nepal Health Res Counc. 2012;10(21):125-129. https://www.ncbi.nlm.nih.gov/pubmed/23034374

13: Baker KK, O'Reilly CE, Levine MM, et al. Sanitation and Hygiene-Specific Risk Factors for Moderate-to-Severe Diarrhea in Young Children in the Global Enteric Multicenter Study, 2007-2011: Case-Control Study. PLoS Med. 2016;13(5):e1002010. https://www.ncbi.nlm.nih.gov/ pubmed/27138888

14: Esrey SA, Potash JB, Roberts L, Shiff C. Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. Bull World Health Organ. 1991;69(5):609-621. https://www.ncbi.nlm.nih.gov/pubmed/1835675

15: Esrey SA, Feachem RG, Hughes JM. Interventions for the control of diarrhoeal diseases among young children: improving water supplies and excreta disposal facilities. Bull World Health Organ. 1985;63(4):757-772. https://www.ncbi.nlm.nih.gov/pubmed/3878742

16: Thomas TK, Bell J, Bruden D, Hawley M, Brubaker M. Washeteria closures, infectious disease and community health in rural Alaska: a review of clinical data in Kivalina, Alaska. Int J Circumpolar Health. 2013;72. https://www.ncbi.nlm.nih.gov/pubmed/23986890

17: Dvorak BI, Skipton SO. Drinking Water Treatment: An Overview. Lincoln, NE: University of Nebraska;2014.

18: Olson E. What's On Tap? New York, NY: Naural Resources Defense Council;2003. https://www.nrdc.org/sites/default/files/whatsontap.pdf

19: U.S. Congress. 40 CFR Subchapter D part 141. In: Environmental Protection Agency, ed. Washington, DC: U.S. Government Publishing Office; 2002. http://www.ecfr.gov/cgi-bin/text-idx?

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SID=b5d691cc7ec9076672facb531b2defb2&mc=true&node=pt40.25.141&rgn=div5

20: Environmental Protection Agency. Basic Information about Lead in Drinking Water. https://www.epa.gov/ground-water-and-drinkingwater/basic-information-about-lead-drinking-water. Published 2016. Accessed July 29, 2016.

21: Environmental Protection Agency. Basic Information About Mercury (Inorganic) in Drinking Water. http://water.epa.gov/drink/contaminants/ basicinformation/mercury.cfm. Published 2014. Accessed May 1, 2015.

22: Agency for Toxic Substances & Disease Registry. Toxicological Profile for Vinyl Chloride. http://www.atsdr.cdc.gov/toxprofiles/ TP.asp?id=282&tid=51. Published 2015. Accessed July 29, 2016.

23: Agency for Toxic Substances & Disease Registry. Public Health Statement?Polychlorinated Biphenyls. http://www.atsdr.cdc.gov/phs/ phs.asp?id=139&tid=26. Published 2015. Accessed July 29, 2016.

24: Gilliom RJ, Barbash JE, Crawford CG, et al. The Quality of Our Nation?s Waters Pesticides in the Nation?s Streams and Ground Water, 1992?2001. U.S. Geological Survey;2007. https://pubs.usgs.gov/ circ/2005/1291/pdf/circ1291.pdf

25: New York State Department of Health. Human Health Fact Sheet: 2,4-Dichlorophenoxyacetic acid (2,4-D) New York, NY;1995. https:// www.epa.gov/sites/production/files/2015-06/documents/ny_ hh_367_w_03121998.pdf

26: Environmental Working Group. National Drinking Water Database. http://www.ewg.org/tap-water/whatsinyourwater/2105/VT/ Vermont/24-D/. Published 2011. Accessed July 29, 2016.

27: Environmental Protection Agency. 2012 Edition of the Drinking Water Standards and Health Advisories. Washington, DC: Environmental Protection Agency;2012. https://rais.ornl.gov/documents/2012_ drinking_water.pdf

28: Office of Environmental Health Hazard Assessment. Public Health Goal for Nickel in Drinking Water. http://oehha.ca.gov/water/publichealth-goal/public-health-goals-nickel-and-uranium. Published 2010. Accessed July 29, 2016.

29: Office of Environmental Health Hazard Assessment. Public Health Goal for Styrene. http://oehha.ca.gov/water/public-health-goal/publichealth-goal-styrene. Published 2010. Accessed July 29, 2016.

30: California Water Board. Maximum Contaminant Levels and Regulatory Dates for Drinking Water US EPA vs California. https://www. cdph.ca.gov/certlic/drinkingwater/Documents/DWdocuments/ EPAandCDPH-11-28-2008.pdf. Published 2008. Accessed July 29, 2016.

31: Centers for Disease Control and Prevention. Nature's Way to Prevent Tooth Decay: Water Fluoridation. http://www.cdc.gov/fluoridation/pdf/ natures_way.pdf. Published 2006. Accessed July 29, 2016.

32: Environmental Protection Agency. Basic Information about Chloramines and Drinking Water Disinfection. https://www.epa.gov/dwreginfo/ basic-information-about-chloramines-and-drinking-water-disinfection. Published 2015. Accessed July 29, 2016.

33: New York State Department of Health. Individual Water Supply WellsFact Sheet #3 Recommended Residential Water Quality Testing. https:// www.health.ny.gov/environmental/water/drinking/regulations/fact_ sheets/fs3_water_quality.htm. Published 2008. Accessed July 29, 2016

34: Popkin BM, D'Anci KE, Rosenberg IH. Water, hydration, and health. Nutr Rev. 2010;68(8):439-458. https://www.ncbi.nlm.nih.gov/ pubmed/20646222

35: Muckelbauer R, Libuda L, Clausen K, Reinehr T, Kersting M. A simple dietary intervention in the school setting decreased incidence of overweight in children. Obes Facts. 2009;2(5):282-285. https://www. ncbi.nlm.nih.gov/pubmed/20057194

36: Muckelbauer R, Libuda L, Clausen K, et al. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics. 2009;123(4):e661-667. https://www. ncbi.nlm.nih.gov/pubmed/19336356

37: American Planning Association. Quenching Community Thirst: Planning for More Access to Drinking

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Water in Public Places. Washington, DC;2013. https://planning-org-uploaded-media.s3.amazonaws.com/legacy_resources/research/publichealth/pdf/wateraccessreport.pdf

38: American Heart Association. Increasing Access to Safe Drinking Water in Schools and Communities: Policy Statement. Dallas, TX;2015. https:// www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/ucm_475974.pdf

39: City of New York. Active Design: Guide for Community Groups. New York, NY: City of New York; 2013. https://centerforactivedesign.org/ communityguide

40: City of New York. Incorporating Active Design Principles in City Construction. In: Office of the Mayor, ed. New York, NY: City of New York; 2013. http://home.nyc.gov/html/om/pdf/eo/eo_359.pdf

41: Environmental Protection Agency. Drinking Water Best Management Practices for Schools and Child Care Facilities Served by Municipal Water Systems. Washington, DC: Environmental Protection Agency; 2013. https://www.epa.gov/nscep

42: American Restroom Association. 29 CFR 1910.141(c)(1)(i): Toilet Facilities. http://www.americanrestroom.org/gov/ohsa/. Published n.d. Accessed July 29, 2016.

43: Centers for Disease Control and Prevention. Handwashing: Clean Hands Save Lives. http://www.cdc.gov/handwashing/show-me-the-sciencehandwashing.html. Published 2015. Accessed July 29, 2016.

44: World Health Organization. WHO Guidelines on Hand Hygiene in Health Care: a Summary. Geneva, Switzerland: WHO Press; 2009. http://www. who.int/gpsc/5may/tools/who_guidelines-handhygiene_summary.pdf

45: Boyce JM, Pittet D, Healthcare Infection Control Practices Advisory C, Force HSAIHHT. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Professionals in Infection Control/Infectious Diseases Society of America. MMWR Recomm Rep. 2002;51(RR-16):1-45, quiz CE41-44. https://www.ncbi.nlm.nih.gov/pubmed/12418624

46: European Parliament. Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC. Official Journal of the European Union; 2006. http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX%3A32006L0007

47: Office of the Secretary of State. Texas Administrative Code: Rule ?265.303-Operation and Maintenance of Public Interactive Water Features and Fountains. Texas; 2010. https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=25&pt=1&ch=265&rl=303

48: World Health Organization. Legionella and the prevention of legionellosis. Geneva, Switzerland: WHO Press; 2007. http://www.who. int/water_sanitation_health/emerging/legionella.pdf

49: Centers for Disease Control and Prevention. Legionella (Legionnaires' Disease and Pontiac Fever). http://www.cdc.gov/legionella/watersystem-maintenance.html. Published 2016. Accessed July 29, 2016.

50: ASHRAE/ANSI. ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems. Vol 188-2015. Atlanta, Georgia: ASHRAE; 2015. https://www.ashrae.org/resources--publications/bookstore/ansi-ashrae-standard-188-2015-legionellosisrisk-management-for-building-water-systems

51: Centers for Disease Control and Prevention. Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings: A Practical Guide to Implementing Industry Standards. In: U.S. Department of Health and Human Services, ed. Atlanta, GA: Centers for Disease Control and Prevention; 2016. http://www.cdc.gov/legionella/ downloads/toolkit.pdf

52: Environmental Protection Agency. Polluted Runoff: Nonpoint Source Pollution. https://www.epa.gov/polluted-runoff-nonpoint-sourcepollution. Published 2016. Accessed July 29, 2016.

53: New York City Department of Environmental Protection. Stormwater Management. http://www.nyc.gov/html/dep/html/watershed_ protection/stormwater_management.shtml. Published 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Accessed July 29, 2016.

54: Environmental Protection Agency. EPA Facility Stormwater Management. https://www.epa.gov/greeningepa/epa-facilitystormwater-management. Published 2016. Accessed July 29, 2016.

55: Environmental Protection Agency. CADDIS Volume 2: Sources, Stressors & Responses. https://www3.epa.gov/caddis/ssr_urb_is1.html. Published 2016. Accessed July 29, 2016.

56: Environmental Protection Agency. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. Washington, DC: Environmental Protection Agency; 2009. https://www.epa.gov/sites/ production/files/2015-08/documents/epa_swm_guidance.pdf

57: Environmental Protection Agency. Combined Sewer Overflow Management Fact Sheet Sewer Separation. Washington, DC: Environmental Protection Agency;1999. https://www3.epa.gov/npdes/ pubs/sepa.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

NOURISHMENT

Poor nutrition is a major contributor to and modifiable risk factor of numerous preventable chronic diseases.[1] Dietary patterns around the world are influenced by a complex mixture of personal, cultural and environmental factors, including the local food environment. The local food environment encompasses the type and density of food retail outlets, including grocery stores and food service outlets, and the consistent availability of healthy, wholesome foods at these venues. Fortunately, various planning, policy and organizational strategies exist that can effectively encourage individuals to improve their dietary patterns by leveraging the built environment in which they live, study, work and play.

Global dietary patterns are undergoing a nutrition transition characterized by both qualitative changes in foods consumed as well as increasing quantities of consumption.[1] Since the 1960s, global and regional per capita food consumption (kcals) has been steadily increasing, while simultaneously being mirrored by a shift toward more energy-dense and less nutrient-dense foods.[1] Global consumption of meat, vegetable oils, dairy and eggs and sugar has increased, while consumption of cereals and grains has leveled off.[2] Conversely, fruit and vegetable consumption has been stymied by rapid urbanization that is typically accompanied by increased importation of processed foods (energy dense) from industrialized countries.[3] Additionally, urbanization and changing consumer habits have led to significant increases in the number of people buying and eating food prepared outside of the home.[4] Foods that are prepared away from home are generally provided in portions that contain more calories and saturated fat; contain fewer nutrient-dense foods such as vegetables, fruits and whole grains; and are associated with higher rates of overweight and obesity.[5]

The relationship between the local food environment, dietary behaviors and excess body weight gain is mediated by the food retail outlets and food options available in communities. Increased healthy food retail outlet density is associated with a lower body mass index (BMI) while supermarket availability is associated with meeting dietary recommendations.[6] There is also evidence that exposure to an unhealthy food environment with many fast food outlets and unhealthy food choices may be associated with poorer quality diets and excess body weight.[7] The typology of these food outlets and the food options available at these locations can have a significant influence on the health and well-being of community members as well as their risk for excess body weight gain, a public health problem that has worsened over the last several decades. Worldwide, obesity has more than doubled since 1980, and in 2014 more than 1.9 billion adults, or 39% of the world's population, were considered overweight, 600 million adults (13%) were considered obese and 41 million children under the age of five were considered overweight or obese.[8] At the same time, more than 500 million people in over 76 countries are food insecure—an economic and social condition of limited or uncertain access to nutritionally adequate food—with the share of the population that is food insecure projected to surpass 15% in 2025.[9]

Obesity and food insecurity are global health issues that greatly increase the risk for other health problems. Obesity places adults at a higher risk of non-communicable, diet-related chronic diseases including cardiovascular disease, diabetes, musculoskeletal disorders and some cancers, with childhood obesity increasing these risks in adulthood.[8] Food insecurity is also associated with adverse health outcomes and cardiovascular risk factors, including hypertension, dyslipidemia and diabetes.[10] Reliance on low-nutrient, energy-dense foods can lead to excess body weight gain in food-insecure individuals. In more vulnerable populations such as children, food insecurity is linked to an increased risk of asthma and, in seniors, food insecurity further limits activities of daily living.[11]

The local food environment of communities is inextricably linked to dietary behaviors and food choices. Addressing the broader food context of communities requires reconsidering the distribution and density of various food outlets and options and how the local food environment can work more equitably and effectively to support healthier dietary patterns for populations.[12,13] A variety of planning and policy strategies within the built environment exist to help increase access to healthy food options, enable residents to make more informed dietary choices and allow communities to support good nutrition.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SUP SUPERMARKET ACCESS | P

Intent: To improve community nutritional status by enabling equitable access to supermarkets and grocery stores.

Summary: Supermarket access is a critical component of the local food environment. Supermarkets and full-service grocery stores not only offer the greatest variety of fruit and vegetables, including fresh, frozen, dried and canned options, but they also have the lowest prices when compared to smaller grocery stores and convenience stores.[14] Research suggests that increased availability and density of supermarkets is associated with a lower BMI, smaller waist circumference and increased ability to meet the Dietary Guidelines for Americans, specifically the recommended amount of fruits and vegetables.[6,15] Moreover, communities with greater access to supermarkets have lower rates of diabetes and diet-related deaths, and individuals living in a community with at least one supermarket consume up to 32% more fruits and vegetables than individuals living in a community without one.[16,17] Eliminating transportation barriers by planning mass transit routes around community food needs or through implementation of a supermarket or grocery shuttle that provides a direct ride to the store can further promote equitable food access.

Part 1 Supermarket Location

For All Spaces:

An existing or planned supermarket or grocery store with a produce section meets one of the following proximity requirements:

a. Located within an 800 m [0.5 mi] walk distance of at least 75% of dwelling units.
b. Located within a 400 m [0.25 mi] walk distance of at least 50% of dwelling units.[18]

Part 2 Supermarket Connectivity

For All Spaces:

An existing or planned supermarket or grocery store with a produce section within 800 m [0.5 mi] of the project boundary is accessible via at least one of the following:

a. Bicycle lane within 400 m [0.25 mi] of the store entrance and connecting to a point within the project boundary.[18]
b. Mass transit route containing a stop within the project boundary and a stop within 400 m [0.25 mi] of the store entrance that is connected by a pedestrian pathway up to the store entrance.[19]
c. Supermarket or grocery store shuttle between the store and a point within the project boundary provided at no-cost.[20]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FRU FRUITS AND VEGETABLES | O (MAX: 1 PT)

Intent: To promote year-round access to fresh and/or locally sourced produce within a walk distance of where residents live or work.

Summary: Fruits and vegetables are critical components of a healthy eating pattern, yet most individuals around the world do not consume the daily recommended five servings (400 g) of fruits and vegetables.[1] Insufficient fruit and vegetable intake is attributable to 14% of gastrointestinal cancer deaths, 11% of ischemic heart disease deaths and 9% of stroke deaths globally.[21] In addition to permanent retail food stores, farmers' markets, produce stands and mobile carts can serve as useful supplements to supermarkets and grocery stores in communities working to cultivate a BMI-healthy food environment through increased access to fruits and vegetables. Although they typically have lower accessibility and frequently higher costs, farmers' markets require less investment in infrastructure and can increase access to fresh, local and organic produce.[22] Additionally, community supported agriculture (CSA) members also report consuming more and a greater variety of fruits and vegetables.[23] In addition to supporting public health and local food systems, both farmers' markets and CSA programs can help foster a sense of community and enhance the potential for social integration in public spaces.

Part 1 Fruit and Vegetable Sources

For All Spaces:

At least two of the following existing or planned fruit and vegetable sources are located within an 800 m [0.5 mi] walk distance of at least 75% of dwelling units or a 400 m [0.25 mi] walk distance of at least 50% of dwelling units:

a. Small fruit and vegetable stand or mobile cart that is open at least five days a week and operates year-round.[24]
b. Farmers' market that is open at least once a week and operates for at least four months of the year.[18]
c. CSA share distribution point within the project boundary that is available to and has resource capacity to deliver fruit and vegetable shares to residents at least twice a month, for at least four months of the year.[18]
d. Other fruit and vegetable source that provides fresh and/or locally sourced produce year-round.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HFO HEALTHY FOOD PROCUREMENT | O (MAX: 1 PT)

Intent: To increase the offering of healthier food and beverage choices in vending machines and concession stands.

Summary: Healthy food procurement or purchasing policies can be adopted by local governments, organizations, institutions and companies to provide healthier food options and make a positive impact on community health.[25] Typical healthy procurement policies may include nutritional standards that limit the number of calories, salt or sugar in food and beverage offerings, require the provision of fruits and vegetables or prohibit the purchase of certain foods and beverages. Some policies also support the local economy by setting additional local purchasing or sustainability requirements.

Part 1 Healthy Vending

For All Spaces:

Foods and non-alcoholic beverages sold in vending machines owned, operated or managed by the project owner adhere to one of the following:

a. Existing local healthy procurement policy.
b. National Alliance for Nutrition and Activity's Model Beverage and Food Vending Machine Standards.[26]
c. Healthy procurement policy in compliance with Feature 39 Processed foods in the WELL Building Standard v1.

Part 2 Healthy Concessions

For All Spaces:

Foods and non-alcoholic beverages sold in concession standsowned, operated or managed by the project owner adhere to one of the following:

a. Existing local healthy procurement policy.
b. General Services Administration's Standard Criteria for Food Selection Guidelines in Concessions.[27]
c. Healthy procurement policy in compliance with Feature 38 Fruits and vegetables and Feature 39 Processed foods in the WELL Building Standard v1.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FAD FOOD ADVERTISING | O (MAX: 1 PT)

Intent: To limit unhealthy food marketing and advertising and promote a healthy food environment.

Summary: Billions of dollars are spent annually on food marketing and advertising around the world![28] While some advertisements are aimed at nutritious options, the overwhelming majority promote highly processed products including sugar-sweetened beverages, breakfast cereals and fast foods. Much of this marketing targets audiences susceptible to deceptive campaigns, such as children and youth, thereby encouraging and normalizing the consumption of suboptimal food choices that are high in saturated fats, trans fats, added sugars or sodium from an early age.[29] Within communities, food advertising can be found on billboards, posters and mass transit, and is associated with an increased probability of soda consumption and obesity.[30] Limiting advertising cues for unhealthy foods and providing the opportunity for nutrition-positive marketing can encourage individuals to make healthier food choices while also discouraging the consumption of highly processed foods.

Part 1 Healthy Eating Promotion

For All Spaces:

A point-by-point narrative describes how food advertising is addressed within the project boundary, including the following leading concerns:

a. Limiting the marketing and advertising of foods and beverages on building facades, streetscaping, bulletin boards, etc.
b. Promoting local supermarkets, grocery stores, farmers' markets, CSA share distribution points and/or fruit and vegetable stands.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

NED NUTRITION EDUCATION | O (MAX: 1 PT)

Intent: To enhance individual nutrition knowledge and promote water consumption through educational opportunities.

Summary: Nutrition education is an important tool in improving individual dietary habits, food choices and health literacy. Research shows that nutrition education programs are effective in helping individuals make healthier food choices and increasing at-home fruit and vegetable consumption, particularly among individuals participating in food assistance programs.[31,32] Providing onsite educational opportunities at farmers' markets or community gardens can positively impact children's willingness to try new vegetables and increase vegetable taste ratings.[33] Higher nutrition knowledge is also significantly associated with healthy eating patterns in adults. Adults with the highest nutrition knowledge are almost 25 times more likely to meet the dietary recommendations for fruit, vegetable and fat intake compared to adults with the lowest nutrition knowledge.[34] Similarly, promotion and provision of drinking water is associated with increased water consumption among children in schools, and promotion and education of city tap water is a common theme among healthy planning initiatives.[35,36]

Part 1 Nutrition Education Programming

For All Spaces:

At least one of the following educational opportunities is available year-round and at no cost at public use locations:

a. Monthly nutrition education classes.
b. Monthly cooking demonstrations.
c. Monthly gardening or agriculture classes.

Part 2 Drinking Water Promotion

For All Spaces:

Drinking water is promoted through water-positive messaging that includes at least one of the following:

a. Public art or community mural.
b. Artistically designed drinking water fountains.[37,38]
c. Informative or educational decals at drinking water sources.
d. Signage that identifies location of drinking water fountains.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AGR URBAN AGRICULTURE I - PROVISION | O (MAX: 1 PT)

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

Summary: Urban agriculture, including local, community-sustained agriculture, provides greater opportunities for involvement in food production and increased access to healthy produce, including fruits, vegetables and herbs. Participants in community gardening projects have higher fruit and vegetable intake, are more socially engaged and have a lower likelihood of consuming less nutritious food options, such as sugar-sweetened beverages or processed sweets.[39] These benefits can extend beyond the individual gardener, with participation in community agriculture also associated with increased household fruit and vegetable intake.[40] Beyond the nutritional benefits, gardening can also help fortify social cohesion, increase physical activity, provide on-site educational opportunities and increase perceptions of community safety.[41]

Part 1 Urban Agriculture Space

For All Spaces:

Permanent and accessible urban agriculture space of at least 1 m^2 [10 ft^2] per dwelling unit is allocated within an 800 m [0.5 mi] walk distance of all dwelling units through one or more of the following:

a. Community garden.[18]
b. Edible landscaping, with labeled plants and signage containing harvesting guidelines.[42]
c. Small farm or orchard.
d. Private garden.[24]
e. Rooftop garden.

Part 2 Urban Agriculture Support

For All Spaces:

An urban agriculture governance and management plan is in place that addresses the following:

a. Management and maintenance of urban agriculture spaces.
b. Training and educational opportunities available for garden users.
c. Provision of planting support for gardens or farms, such as fencing, water systems, secure garden tool storage and other garden bed enhancements.[42]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AGP URBAN AGRICULTURE II - PROMOTION | O (MAX: 1 PT)

Intent: To encourage the integration of urban agriculture through policies or incentives.

Summary: The benefits of urban agriculture extend beyond improving access to fresh produce or livestock and increasing community involvement. Recognizing the various health, environmental and economic benefits of urban agriculture, local governments have acted to incentivize urban agriculture policies in order to encourage the transformation of private, vacant or undeveloped land for public benefit. The City of New York and New York State, for example, provide a one-year tax abatement of $4.50 per square foot of green roof per building, while the city of San Francisco passed an urban agriculture incentive ordinance to promote urban agriculture spaces and educational opportunities at the sites through a new tax credit.[43,44] Policies and regulations that support the integration of urban agriculture into the community landscape have the potential to positively impact the social, physical and economic growth of communities everywhere.[45]

Part 1 Policies to Support Urban Agriculture

For All Spaces:

A point-by-point narrative describes how the project promotes current and future integration of urban agriculture through at least one of the following:

a. Policies for unused or vacant land owned by the project owner being allocated to urban agriculture.
b. Policies that enable urban agriculture in underutilized spaces, such as rooftops.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FAF FOOD AFFORDABILITY | O (MAX: 1 PT)

Intent: To support affordable food and fruit and vegetable access at various food retail outlets.

Summary: Food affordability can serve as an immense barrier to food access for many individuals and households. In order to create a more equitable and affordable food environment, communities can expand purchasing assistance opportunities in local grocery stores and farmers' markets by increasing the acceptance of Electronic Benefit Transfer (EBT) and financial incentive programs. These programs can benefit both the consumer and the seller, with research showing that acceptance of EBT results in almost doubled daily sales revenue and a significant increase in produce purchased compared to markets without EBT.[46] Acceptance of assistance programs may help decrease barriers to fruits and vegetable access, increase produce purchases and consumption and promote a healthier, better-nourished community.

Part 1 Affordable Food Access

For All Spaces:

All supermarkets and grocery stores with produce sections within the project boundary accept at least one the following:

a. Electronic Benefit Transfer (EBT) payments.
b. Other programs that enable affordable monthly food access.

Part 2 Affordable Fruit and Vegetable Access

For All Spaces:

Farmers' markets and/or community-supported agriculture (CSA) shares accept at least one of the following for the purchase of fruits and vegetables:

a. Electronic Benefit Transfer (EBT) payments.[19]
b. Healthy food incentive programs, such as Health Bucks offered in New York City.[47]
c. CSA restaurant subsidy programs.[48]
d. Senior farmers' market coupon programs.[49]
e. Other programs that enable fruit and vegetable access.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FSE FOOD SECURITY | O (MAX: 1 PT)

Intent: To address food insecurity among local populations and to promote community resiliency.

Summary: Food insecurity is an economic and social condition of limited or uncertain access to nutritious food.[9] Individuals who face food insecurity are disproportionately affected by diet-related chronic diseases including hypertension and other cardiovascular risk factors and have poorer diets than the general population.[10] By increasing access to nutritious foods to those in immediate need, communities can reduce or even prevent the negative health effects associated with food insecurity. Through targeted food drives and other forms of community engagement, healthier food options can be supplied to local food banks to help increase access to nutritious foods and provide a greater diversity of food options for those experiencing transient food insecurity or hunger. Additionally, investments in local agriculture have been shown to significantly increase food availability and can further support food security.[50]

Part 1 Equitable Food Access

For All Spaces:

Community Food Support

The project allocates a minimum of one dollar per dwelling unit (minimum $1,000 USD) per year to one of the following:

a. Local hunger relief organization.
b. Local community garden or food production resource.

OR

Community Food Drive

An annual food drive or programming event with targeted food donations is held and meets the following requirements:

a. Healthy and nutritious food donations are promoted and encouraged.
b. All donations benefit the project or local populations in need of assistance (as demonstrated by available food insecurity data).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

FSA PUBLIC FOOD INSPECTION INFORMATION | O (MAX: 1 PT)

Intent: To mitigate foodborne illness and increase consumer knowledge of food inspection results by requiring restaurants to display letter grades or sanitary inspection reports.

Summary: Food quality is a public health necessity, with 68% of reported foodborne illness outbreaks in the U.S. originating from a food service setting.[51] Restaurant grading and public posting programs have been implemented in some communities, resulting in increased public awareness of restaurant cleanliness and quality, as well as incentivizing food establishments to uphold and maintain sanitary measures and hygiene practices. In New York City, for example, 88% of surveyed residents reported considering health Department ratings in their dining decisions, underscoring the value of the rating systems in reassuring patrons regarding foods consumed away from home.[52] Most importantly, implementation of a restaurant grading system has been shown to reduce the overall risk of foodborne disease. The Los Angeles restaurant hygiene grading and posting system, for example, was associated with an approximate 13% decrease in the number of foodborne-disease hospitalizations, further reinforcing the potential public health benefit of this intervention.[53]

Part 1 Restaurant Ratings

For All Spaces:

Food service establishments owned, operated or managed by the project owner within the project boundary have at least one of the following prominently displayed on-premises and clearly visible to customers entering the establishment:

a. Scoring or letter grading system issued by the local health Department.[54]
b. Publicly available food hygiene or sanitary inspection report by the local health Department.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

BRE BREASTFEEDING SUPPORT | O (MAX: 1 PT)

Intent: To create a supportive breastfeeding environment through the provision of space, amenities and educational opportunities.

Summary: Breastfeeding is widely recognized as the best source of nutrition to support optimal growth and development of infants. The WHO, UNICEF and American Academy of Pediatrics recommend exclusive breastfeeding during an infant's first six months of life as it is associated with reduced risk of infections, type 2 diabetes and childhood obesity.[55-57] Continued breastfeeding beyond this period has benefits as well, since breast milk offers nutritional benefits that aid in child growth and development.[58] For mothers, breastfeeding can help reduce both postpartum weight retention and also the risk of breast and ovarian cancer.[59,60] In 2011, the Surgeon General of the U.S. Department of Health and Human Services declared support for breastfeeding in communities as a public health goal.[55] Supportive environments that provide nursing mothers with the space and resources for breastfeeding can help promote breastfeeding and in turn promote the health of mothers and their children. Educational strategies can also help relay the value of breastfeeding and allow families to make well-informed decisions.

Part 1 Breastfeeding Facilities

For All Spaces:

A lactation or nursing room that meets the requirements in Appendix N1 or a mobile lactation station is available at the following locations:

a. 50% of public spaces of assembly (Appendix N2) that are owned, operated or managed by the project owner.
b. 20% of buildings that are owned, operated or managed by the project owner.

Part 2 Breastfeeding Empowerment

For All Spaces:

At least one of the following requirements is met:

a. Breastfeeding information, resources or instruction classes are offered at a community center or other public use space within the project boundary.[61]
b. Breastfeeding information, resources or instruction classes are offered through a partnership with a local or regional breastfeeding support organization or group.[61]
c. Designated meeting or programming space for peer support groups is available in an easily accessible location within the project boundary.[62]
d. A resource directory of local breastfeeding facilities or lactation support services that are available to new mothers is publicized and offered in print or online.[63]
e. A hospital or birthing center located within the project boundary or within an 8 km [5 mi] radius has achieved BabyFriendly® designation.[64]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX N1: BREASTFEEDING SUPPORT:

A lactation or nursing room (that is not a bathroom) is at least 2.1 m × 2.1 m [7 ft × 7 ft] and provides the following, at a minimum:

a. Work surface and chair.[65]

b. Sink, faucet and paper towel dispenser.[65]

c. User-operated lock for privacy.[65]

d. Multiple electrical outlets.[65]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX N2: PUBLIC SPACES OF ASSEMBLY:

Category	Building Type
Social	Community or recreation center
	Meeting hall
	Convention Center
	Sports arena or stadium
	Cultural arts facility (museum, performing arts)
Entertainment	Entertainment venue
	Casino
	Zoo
Services	Airport
	Transportation terminal
	Education facility
	Government office that serves public on-site
Civic and community facilities	Public Library
	Social services center
	Health care facility
	Place of worship

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: World Health Organization. Diet, nutrition and the prevention of chronic diseases-Report of the joint WHO/FAO expert consultation. Geneva, Switzerland: World Health Organization;2003. http://www.who.int/dietphysicalactivity/publications/trs916/intro/en/

2: European Commission. World food consumption patterns-trends and drivers. 2015. http://ec.europa.eu/agriculture/markets-and-prices/ market-briefs/pdf/06_en.pdf

3: Kearney J. Food consumption trends and drivers. Philos Trans R Soc Lond B Biol Sci. 2010;365(1554):2793-2807. https://www.ncbi.nlm.nih. gov/pubmed/20713385

4: World Health Organization. Food safety. http://www.who.int/ mediacentre/factsheets/fs399/en/. Published 2015. Accessed July 20, 2016.

5: U.S. Department of Agriculture. Food-Away-from-Home. http://www. ers.usda.gov/topics/food-choices-health/food-consumption-demand/ food-away-from-home.aspx. Published 2014. Accessed July 20, 2016.

6: Lamichhane AP, Puett R, Porter DE, et al. Associations of built food environment with body mass index and waist circumference among youth with diabetes. Int J Behav Nutr Phys Act. 2012;9:81. https://www.ncbi.nlm.nih.gov/pubmed/22747523

7: U.S. Department of Health and Human Services, U.S. Department of Agriculture. Dietary Guidelines for Americans, 2015-2020. 8 ed. Washington, DC: U.S. Department of Health and Human Services; 2015. https://health.gov/dietaryguidelines/2015/resources/2015-2020_ Dietary_Guidelines.pdf

8: World Health Organization. Obesity and overweight. http://www.who.int/mediacentre/factsheets/fs311/en/. Published 2015. Accessed June 14, 2016.

9: U.S. Department of Agriculture. Global Food Security. http://www.ers. usda.gov/topics/international-markets-trade/global-food-security/ questions-answers.aspx. Published 2016. Accessed July 19, 2016.

10: Seligman HK, Laraia BA, Kushel MB. Food insecurity is associated with chronic disease among low-income NHANES participants. J Nutr. 2010;140(2):304-310. https://www.ncbi.nlm.nih.gov/pubmed/20032485

11: Gundersen C, Ziliak JP. Food Insecurity and Health Outcomes. Health Aff (Millwood). 2015;34(11):1830-1839. https://www.ncbi.nlm.nih.gov/ pubmed/26526240

12: City of New York. Food Retail Expansion to Support Health. http://www. nyc.gov/fresh Published 2013. Accessed November 13, 2016.

13: World Health Organization, Karen K. Lee. Cities for Health. Working Across Sectors for Health Equity. Kobe, Japan: WHO Press; 2014:26-33. http://www.who.int/kobe_centre/publications/cities_for_health_final. pdf or http://www.drkarenlee.com/resources/who-citiesforhealth

14: Glanz K, Sallis JF, Saelens BE, Frank LD. Nutrition Environment Measures Survey in stores (NEMS-S): development and evaluation. Am J Prev Med. 2007;32(4):282-289. https://www.ncbi.nlm.nih.gov/pubmed/17383559

15: Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. Am J Prev Med. 2009;36(1):74-81. https://www.ncbi.nlm.nih.gov/pubmed/18977112

16: Lang B, Harries C, Manon M, et al. The Healthy Food Financing Handbook: From Advocacy to Implementation. Philadelphia, PA: The Food Trust; 2013. http://thefoodtrust.org/uploads/media_items/hffhandbookfinal.original.pdf

17: The Food Trust. The Grocery Gap: Who Has Access to Healthy Food and Why it Matters. Philadelphia, PA: The Food Trust; 2010. http:// thefoodtrust.org/uploads/media_items/grocerygap.original.pdf

18: U.S. Green Building Council. LEED v4 for Neighborhood Development. Washington, DC: U.S. Green Building Council; 2014. http://www.usgbc. org/sites/default/files/LEED v4 ND_04.05.16_current.pdf

19: Centers for Disease Control and Prevention. The CDC's Guide to Strategies to Increase the Consumption of Fruits and Vegetables. Atlanta, GA: U.S. Department of Health and Human Services;2011. http://www.cdc.gov/obesity/downloads/FandV_2011_WEB_TAG508.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

20: Mohan V, Cassady D. Supermarket Shuttle Programs: A Feasibility Study for Supermarkets Located in Low-Income, Transit Dependent, Urban Neighborhoods in California. Davis, CA: University of California Davis;2002. http://eatbettermovemore.org/sa/pdf/ShuttleReport.pdf

21: World Health Organization. The World Health Report: Reducing Risks, Promoting Healthy Life. Geneva, Switzerland: World Health Organization;2002. http://epsl.asu.edu/ceru/Documents/whr_ overview_eng.pdf

22: Krishna Larsen, Jason Gilliland. A farmers? market in a food desert: Evaluating impacts on the price and availability of healthy food. Health and Place. 2009;15:1158-1162. http://www.theheal.ca/uploads/pdf/LarsenGilliland_2009_FarmersMarketFoodDesert.pdf

23: Vasquez A, Sherwood NE, Larson N, Story M. Community-Supported Agriculture as a Dietary and Health Improvement Strategy: A Narrative Review. J Acad Nutr Diet. 2017;117(1):83-94. https://www.ncbi.nlm.nih.gov/pubmed/27847311

24: City of New York. Active Design: Guide for Community Groups. New York, NY: City of New York; 2013. https://centerforactivedesign.org/ communityguide

25: Change Lab Solutions. Understanding healthy procurement: Using government's purchasing power to increase access to healthy food. Oakland, CA: Change Lab Solutions; 2011. http://www.changelabsolutions.org/sites/default/files/Understanding Healthy Procurement 2011_20120717.pdf

26: National Alliance for Nutrition and Activity. Model Beverage and Food Vending Machine Standards. Washington, DC: National Alliance for Nutrition and Activity; 2013. https://cspinet.org/new/pdf/final-modelvending-standards.pdf

27: U.S. Department of Health and Human Services. Health and Sustainability Guidelines for Federal Concessions and Vending Operations. In: General Services Administration, ed. Washington, DC: U.S. Department of Health and Human Services; 2012. https://www.gsa. gov/portal/getMediaData?mediaId=239667

28: Yale Rudd Center for Food Policy & Obesity. Fast Food Facts 2013. http://www.rwjf.org/en/library/research/2013/11/fast-food-facts-2013. html. Published 2013. Accessed July 20, 2016.

29: World Health Organization. Set of recommendations on the marketing of foods and non-alcoholic beverages to children. Geneva, Switzerland: WHO Press; 2010. http://whqlibdoc.who.int/publications/2010/9789241500210_eng.pdf

30: Lesser LI, Zimmerman FJ, Cohen DA. Outdoor advertising, obesity, and soda consumption: a cross-sectional study. BMC Public Health. 2013;13(1):20. https://www.ncbi.nlm.nih.gov/pubmed/23305548

31: Long Valerie, Cates Sheryl, Blitstein Jonathan, et al. Supplemental Nutrition Assistance Program Education and Evaluation Study (Wave II). Washington, DC: U.S. Department of Agriculture;2013. https://fns-prod.azureedge.net/sites/default/files/SNAPEdWaveII.pdf

32: Spronk I, Kullen C, Burdon C, O'Connor H. Relationship between nutrition knowledge and dietary intake. The British Journal of Nutrition. 2014;111(10):1713-1726.

33: Morgan PJ, Warren JM, Lubans DR, et al. The impact of nutrition education with and without a school garden on knowledge, vegetable intake and preferences and quality of school life among primary-school students. Public Health Nutr. 2010;13(11):1931-1940. https://www.ncbi. nlm.nih.gov/pubmed/20441683

34: Wardle J, Parmenter K, Waller J. Nutrition knowledge and food intake. Appetite. 2000;34(3):269-275. https://www.ncbi.nlm.nih.gov/ pubmed/10888290

35: Muckelbauer R, Libuda L, Clausen K, et al. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics. 2009;123(4):e661-667. https://www.ncbi.nlm.nih.gov/pubmed/19336356

36: American Planning Association. Quenching Community Thirst: Planning for More Access to Drinking Water in Public Places. Washington, DC;2013. https://planning-org-uploaded-media.s3.amazonaws.com/legacy_resources/research/publichealth/pdf/wateraccessreport.pdf

37: Paul W. Ogren, Mart Altman. Drinking Fountain Project. In: Department of Public Works, ed. Minneapolis, MN;2008. http://www.ci.minneapolis. mn.us/www/groups/public/@council/documents/webcontent/

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

convert_268084.pdf

38: Pilot Projects Design Collective LLC. 100 Fountains. http://pilotprojects.org/projects/project/100-fountains. Published n.d. Accessed November 13, 2016.

39: Blair D, Giesecke CC, Sherman S. A dietary, social and economic evaluation of the Philadelphia urban gardening project. Journal of Nutrition Education. 1991;23(4):161-167. http://www.sciencedirect.com/science/article/pii/S0022318212811915

40: Alaimo K, Packnett E, Miles RA, Kruger DJ. Fruit and vegetable intake among urban community gardeners. J Nutr Educ Behav. 2008;40(2):94- 101. https://www.ncbi.nlm.nih.gov/pubmed/18314085

41: Local Government Commission. Cultivating Community Gardens: The Role of Local Government in Creating Healthy, Livable Neighborhoods. Sacramento, CA: Local Government Commission; n.d. http://www.lgc.org/wordpress/docs/freepub/community_design/fact_sheets/ community_gardens_cs.pdf

42: U.S. Green Building Council. LEED BD+C: Local Food Production. Washington, DC: U.S. Green Building Council; 2009. http://www.usgbc. org/node/2743606?return=/pilotcredits

43: City of San Francisco. AB-551 Local government: urban agriculture incentive zones. San Francisco, CA: City of San Francisco; 2013- 2014. http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140AB551

44: City of New York. NYC Green Roof Property Tax: Abatement Program. New York, NY: City of New York; 2010. http://www1.nyc.gov/assets/ buildings/pdf/green_roof_tax_abatement_info.pdf

45: Policy Link. Growing Urban Agriculture: Equitable Strategies and Policies for Improving Access to Healthy Food and Revitalizing Communities. Oakland, CA: Policy Link; 2012. https://www.policylink.org/sites/default/files/URBAN_AG_FULLREPORT.PDF

46: Baronberg S, Dunn L, Nonas C, Dannefer R, Sacks R. The impact of New York City's Health Bucks Program on electronic benefit transfer spending at farmers markets, 2006-2009. Prev Chronic Dis. 2013;10:E163. https://www.ncbi.nlm.nih.gov/pubmed/24070035

47: New York City Department of Health and Mental Hygiene. Health Bucks. https://www1.nyc.gov/site/doh/health/health-topics/healthbucks.page. Published n.d. Accessed July 20, 2016.

48: Local Food Research Center. CSAs as a Strategy to Increase Food Access: Models of Success. Asheville, NC: Appalachian Sustainable Agriculture Project;2013. http://asapconnections.org/downloads/csasas-a-strategy-to-increase-food-access.pdf

49: U.S. Department of Agriculture. Senior Farmers' Market Nutrition Program. Washington, DC: U.S. Department of Agriculture; 2016. http:// www.fns.usda.gov/sites/default/files/sfmnp/SFMNPFactSheet.pdf

50: Food and Agriculture Organization of the United Nations. Food security and nutrition: the drivers of change. Rome, Italy: The United Nations;2015. http://www.fao.org/3/a-i4646e/i4646e03.pdf

51: McKelvey W, Wong MR, Matis B. Letter Grading and Transparency Promote Restaurant Food Safety in New York City. J Environ Health. 2015;78(2):46-48. https://www.ncbi.nlm.nih.gov/pubmed/26502567

52: Wong MR, McKelvey W, Ito K, et al. Impact of a letter-grade program on restaurant sanitary conditions and diner behavior in New York City. Am J Public Health. 2015;105(3):e81-87. https://www.ncbi.nlm.nih.gov/pubmed/25602861

53: Simon PA, Leslie P, Run G, et al. Impact of restaurant hygiene grade cards on foodborne-disease hospitalizations in Los Angeles County. J Environ Health. 2005;67(7):32-36, 56; quiz 59-60. https://www.ncbi.nlm.nih.gov/pubmed/15794461

54: National Association of County and City Health Officials. Study of Retail Food Establishment Inspection Scoring and Grading Systems. Washington, DC;2014. https://www.foodsafetyflorida.org/Files/Resources/Study of Retail Food Establishment Inspection Scoring and Grading Systems.pdf

55: U.S. Department of Health and Human Services. The Surgeon General?s Call to Action to Support Breastfeeding. Washington, DC: Office of the Surgeon General;2011. http://www.surgeongeneral.gov/library/calls/ breastfeeding/calltoactiontosupportbreastfeeding.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

56: United Nations International Children's Emergency Fund. Breastfeeding. https://www.unicef.org/nutrition/index_24824.html. Published 2015. Accessed December 1, 2016.

57: American Academy of Pediatrics. Policy Statement: Breastfeeding and the Use of Human Milk. Pediatrics. 2012;129(3). http://pediatrics. aappublications.org/content/pediatrics/129/3/e827.full.pdf

58: World Health Organization. Community-based strategies for breastfeeding promotion and support in developing countries. Geneva, Switzerland: World Health Organization;2004. http://apps.who.int/iris/bitstream/10665/42859/1/9241591218.pdf

59: Ip S, Chung M, Raman G, et al. Breastfeeding and maternal and infant health outcomes in developed countries. Evid Rep Technol Assess (Full Rep). 2007(153):1-186. https://www.ncbi.nlm.nih.gov/pubmed/17764214

60: Baker JL, Gamborg M, Heitmann BL, et al. Breastfeeding reduces postpartum weight retention. Am J Clin Nutr. 2008;88(6):1543-1551. https://www.ncbi.nlm.nih.gov/pubmed/19064514

61: Centers for Disease Control and Prevention. The CDC's Guide to Strategies to Support Breastfeeding Mothers and Babies. Atlanta, GA: U.S. Department of Health and Human Services;2013. https://www.cdc.gov/breastfeeding/pdf/BF-Guide-508.PDF

62: Baby-Friendly USA. Guideline and Evaluation Criteria. Albany, NY: BabyFriendly USA;2016. https://www.babyfriendlyusa.org/get-started/theguidelines-evaluation-criteria

63: Shealy KR, Li R, Benton-Davis S, LM G-S. The CDC Guide to Breastfeeding Interventions. Atlanta, GA: U.S. Department of Health and Human Services;2005. https://www.cdc.gov/breastfeeding/pdf/breastfeeding_interventions.pdf

64: World Health Organization. Baby-Friendly Hospital Initiative. Geneva, Switzerland: World Health Organization;2009. http://www.who.int/ nutrition/topics/bfhi/en/

65: Liz York, Joyce Lee. Lactation/Wellness Room Design. Washington, DC: American Institute of Architects; 2016. https://wellnessroomsite.files. wordpress.com/2016/08/0908_lactation-room_english1.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LIGHT

The advent of a long-lasting, economical lamp in 1879 greatly facilitated the ability for people and communities to harness the power of light.[1] Since its inception, electric lighting has become nearly ubiquitous, and since the 1970s trends show increased usage at night, leading to what is now known as light pollution.[2] Light pollution is defined as excessive, misdirected or obtrusive electric light at night that interferes with starlight in the form of reflection, glare or trespass.[3] While this may seem like a mild inconvenience, or perhaps progress in some instances, the complex interplay of physiology, over-stimulation and habitat disruption caused by nighttime lighting in excess has been shown to adversely affect both humans and animals.[4-12]

Light is a visible form of electromagnetic radiation, bordered in the spectrum by ultraviolet radiation at shorter wavelengths and infrared at longer wavelengths. Light enters the eye and stimulates photoreceptors on the retina: rods, cones and intrinsically photosensitive retinal ganglion cells (ipRGCs). These cells absorb light and send it as information in the form of electrochemical signals to different parts of the brain. Depending on the cell activated and the part of the brain it communicates to, light can facilitate vision, have direct impacts on alertness or mood and act as a zeitgeber: an environmental cue that tells the body what time of day it is. A master clock that lives in a part of the brain called the suprachiasmatic nucleus (SCN) uses that light information to then synchronize physiological functions across the body's various tissues and organs with roughly 24-hour cycles called circadian rhythms. While several zeitgebers exist that regulate the body's circadian rhythms, light is one of the strongest of cues.

Disruptions to these cycles are associated with neuro-inflammation, breast cancer, sleep disorders and metabolic dysfunction.[10,13,14] This is because multiple physiological processes are regulated in part by the variance and interplay of hormones involved in circadian rhythms.[6,15] Specifically, chronic, inappropriate exposure to certain intensities and wavelengths of light at night is associated with adverse health outcomes, both acute and potentially long lasting. The theoretical basis for that association further raises the question of if poorly controlled ambient light in the form of light pollution or light trespass—which may be diffuse yet still represents light that reaches the eye at night—is associated with certain health outcomes. There is some epidemiological evidence that suggests this may be the case; studies that use satellite imagery find associations between community light pollution and rates of disease in the corresponding population.[5,6,9,10,11,12]

Overall, light in the community serves many important purposes; it can be used to promote visibility and security and to help us maneuver around obstacles and danger. There are also cultural and social elements of lighting: it can activate a space, creating an inviting environment and contributing to a greater sense of community and neighborhood identity. When properly designed and implemented, lighting at night can provide many functional and cultural benefits, including obstacle detection and injury avoidance, perceived safety, crime reduction, promotion of increased physical activity, social cohesion and community pride.[16-23] No matter the intended use, lighting often serves multiple functions at once, and should be planned to maximize benefits and to reduce light pollution, light trespass and adverse health outcomes.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LMP LIGHTING MASTER PLAN | P

Intent: To promote an overarching plan for light across the entirety of the community prior to development as a tool to determine appropriate limitations on lighting and plans for existing lighting that may not be easily changed.

Summary: Within any given community there are many and varied functions that lighting can serve—all critical and often aligned, but at other times in conflict. Good lighting design provides appropriate light to achieve specific activities with the desired aesthetics without contributing to excessive light use or creating uncomfortable glare. Lighting can facilitate visibility and maneuverability, and encourage engagement with the space—all positive outcomes of good lighting design.[24,25] On a community scale, however, planners must also consider the way each individual light source and activity area contributes to and makes up the total amount of light used in the community.

Part 1 Light Zone Map

For All Spaces:

One of the following requirements is met:

a. If prior to development: the entirety of the project is categorized according to thelighting zones defined by the Joint IDA-IES Model Lighting Ordinance (MLO) or by IES/ASHRAE 90.1-2013, Table 9.4.2-1 or any updated versions of the text.[17,26]

b. If an existing community: lighting zones as defined by the Joint IDA-IES MLO or by IES/ASHRAE 90.1-2013, Table 9.4.2-1 or any updated versions of the text are overlaid onto the entirety of the project, as coordinated with census information, development density and any other relevant metrics such as dwelling units per acre.[17,26]

Part 2 Lighting Goals

For All Spaces:

A point-by-point narrative outlines lighting goals for specific activity areas and across the entirety of the community, including a consideration of the following:

a. Color quality of lighting, including consideration of maximum allowable Correlated Color Temperature (CCT) and minimum allowable Color Rendering Index (CRI) of lights.

b. Pedestrian, cyclist and vehicular conflicts.[18]

c. Security and crime prevention.[18]

d. Light pollution and trespass.[18]

e. Inclusion of lighting for social and aesthetic purposes.[18]

f. Daytime appearance of luminaires.[19]

g. Minimum horizontal illuminance targets in all public areas, including all building exteriors and pathways.

h. Minimum vertical illuminance targets in all public areas, including all building exteriors and pathways.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LCS LIGHTING CONTROL SCHEDULE | O (MAX: 1 PT)

Intent: To reduce unnecessary lighting by adjusting light output in preparation of anticipated changes in activity.

Summary: It has long been established that light pollution has adverse ecological effects, disrupting the nighttime environment for many species.[4] Light pollution also affects humans, most obviously by obscuring the view of the night sky, but some epidemiological studies suggest correlations between light at night and light pollution with rates of breast cancer and obesity.[5,6,9,10,11,12,13,20] However, communities require light at night for a number of reasons, ranging from increasing social activity to addressing safety concerns. Minimizing the use of light at night therefore must be weighed against other considerations that require light and should encompass a broad approach that looks at specific areas or times at which lighting use can be safely minimized

Part 1 Lighting Curfew Hours

For All Spaces:

Except as required by code and excluding cases of outdoor lighting where only one luminaire is present, lights are motion-activated, are in use for a 24-hour establishment or event or are in use for signage for safety or navigation purposes, a project-wide lighting curfew time is established after which point the following requirement is met:

a. Total outdoor luminaire lumens, as measured across the entirety of the project, are reduced by at least 30% (including by dimming or switching off lights).[17]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

EMI COMMUNITY-WIDE EMITTANCE CAPS | O (MAX: 1 PT)

Intent: To set lumen limits for residential and non-residential areas in order to put a cap on the total contribution of light at night from the community.

Summary: One way to reduce light pollution and avoid overlighting is by placing restrictions on the total contribution of light allowable across a community. The cumulative light output of a community considers all the varied applications of light within the community. A consideration of light in such a holistic view allows the community to be aware of the total light output and provides a lens for balancing light use and understanding where limitations may be safely and appropriately placed, as well as where the use of light is critical to achieve lighting goals.

Part 1 Non-Residential Lumen Limits

For All Spaces:

The project meets one of the following for all non-residential outdoor spaces:

a. The total installed initial luminaire luminous flux (lumens) of all outdoor lighting shall not exceed the total site lumen limit of either the Parking Space Method (Table A) or the Hardscape Area Method (Table B) of the Joint IDA-IES MLO, as applicable.[17]

b. The maximum vertical illuminance from outdoor lighting does not exceed the limits established by Section IV Option B of Joint IDA-IES MLO.

Part 2 Residential Lumen Limits

For All Spaces:

In residential areas, the following requirement is met for all outdoor lighting:

a. The allowed total installed initial luminaire* lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table G of the Joint IDA-IES MLO per lighting zone and lighting application as appropriate with the luminaire's shielding.[17]

Note: *The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LCT OBTRUSIVE LIGHT CONTROL | O (MAX: 1 PT)

Intent: To curtail the amount of obtrusive light by setting limits on the amount of uplight, backlight and glare acceptable for specific lighting zones regarding a luminaire classification system, or by strategies such as shielding.

Summary: Obtrusive light may refer to glare or any stray light that is outside of the light needed for the intended task. It can include light pollution and sky glow, which can obscure views of the night sky, and light trespass, which can project light beyond intended boundaries. A community may employ several strategies related to light source choice and luminaire installation (e.g., shielding, limiting lumen emittance, implementing curfew hours) to restrict obtrusive light, and depending on the kinds of activities intended to take place in each space, more stringent restrictions can be applied.

Part 1 Non-Residential Properties

For All Spaces:

The following requirement is met for at least 75% of exterior luminaires (excluding lighting within public right-of-way or easement and ornamental street lighting) in non-residential properties with defined property lines. Public areas should consider the nearest residential or commercial property line as the property line for compliance purposes:

a. The luminaire's BUG rating does not exceed that which is outlined as appropriate per lighting zone in the Joint IDA-IES MLO.[17]

Part 2 Residential Properties

For All Spaces:

For all exterior luminaires in residential areas, one of the following requirements is met:

a. Shielded such that no light emits at or above 90° above nadir.

b. Allowed total initial luminaire lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table G of the Joint IDA-IES MLO per lighting zone and lighting application as appropriate with the luminaire's shielding.[17]

Part 3 Right-of-way Areas

For All Spaces:

75% of exterior luminaires within the public right-of-way or easement meet the following requirement:

a. Shielded such that no light emits at or above 90° above nadir with the exception of ornamental street lighting, which adheres to the uplight control requirements of Table H of the Joint IDA-IES MLO per lighting zone.[17]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LTR LIGHT TRESPASS MITIGATION FOR SLEEP | O (MAX: 1 PT)

Intent: To reduce light trespass into adjacent spaces in ways that may prevent the onset of sleep or disrupt sleep throughout the night.

Summary: Light trespass refers to light that is incident upon an adjacent property that it is not intended to illuminate. Unintended stray light could therefore contribute to annoyance or discomfort. This is of concern in residential areas, hotel rooms, shelters or any other place where a person may sleep where light trespass could contribute to delays of sleep onset or disrupt slumber throughout the night.[5]

Part 1 Residential Exterior Lighting

For All Spaces:

Protected Dwelling Units

One of the following requirements is met for all luminaires adjacent to any dwelling units that are currently occupied or already built and intended for occupation:

a. Otherwise designed in ways related to the luminaire or via other non-luminaire design solutions to prevent light from directly penetrating windows of dwelling units.

b. Fully shielded to prevent light from directly penetrating windows of dwelling units.

OR

Residential Light Trespass Avoidance

All outdoor luminaires in residential areas meet one of the following requirements:

a. BUG rating no more than B2-U2-G2.[27]

b. USGBC's LEED v4 ND: Built Project, Light pollution reduction credit's Option 2. Calculation method, Table 2. Maximum percentage of lumens above horizontal, by lighting zone.[27]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SVI VISIBILITY FACILITATION | O (MAX: 1 PT)

Intent: To facilitate enhanced visual acuity by providing high-quality lighting for exterior environments while limiting blue-biased light at night, and supporting that colors are rendered accurately.

Summary: Beyond providing basic ambient illumination, there are other elements of lighting that can have an impact on the ability of light to accurately render the scene to the viewer. Depending on the color of clothing, for example, a pedestrian may be more or less visible to drivers. A light source with good color-rendering abilities therefore may aid in viewers' ability to perceive colors in the environment more accurately, on top of potentially contributing to aesthetics. Further, there may be certain spots that require higher lighting levels to allow proper visibility. When providing for such spaces, it is still important to consider a balance between providing lighting for visibility while limiting exposure to high levels of blue-content light at night.

Part 1 Color Rendering Index

For All Spaces:

The following requirement is met for 75% or more of the exterior light sources on roadways and pedestrian paths:

a. CRI (average of R1 through R8) of 70 or higher.[19]

Part 2 Correlated Color Temperature

For All Spaces:

The following requirement is met for 75% or more of the exterior luminaires on roadways and pedestrian paths:

a. CCT between 2700K and 3000K.[19]

Part 3 Roadway Signage

For All Spaces:

The following requirement is met as allowable by code for all roadway signage that does not use reflective materials:

a. Achieves a maintained vertical illuminance of 200 lux [18 fc].[28]
b. Employs downlighting strategies to illuminate signage.

Part 4 Signage Luminance Cap

For All Spaces:

Luminance levels for digital and internally illuminated signage do not exceed the following limits per lighting zone:

a. LZ0: no digital or internally illuminated signage.
b. LZ1: 100 cd/m^2.
c. LZ2: 200 cd/m^2.
d. LZ3: 300 cd/m^2.
e. LZ4: 500 cd/m^2.

Part 5 Signage Distraction Mitigation

For All Spaces:

The following requirements are met for all digital and internally illuminated signage:

a. Controls provide dimming abilities.
b. Copy movement or image changes are restricted or limited to reduce driver distraction.
c. Digital signage in residential areas provides a transition time between images of two seconds.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

RLI RIGHT-OF-WAY LIGHTING | O (MAX: 1 PT)

Intent: To promote visibility and navigation by facilitating adequate and uniform lighting conditions for visibility on pathways and immediately adjacent spaces, which may thereby also promote greater opportunities for activity and community engagement.

Summary: Meeting lighting requirements on roadways is of particular importance to public health: traffic injuries are the leading cause of death worldwide for persons aged 15 to 29 years old, and in total an estimated 1.24 million road deaths occur every year.[29] Worldwide, there are more than 270,000 pedestrian fatalities every year.[21] Lighting can clearly have an impact on driving conditions and pedestrian visibility, and improved lighting at night can create a clearer environment for pedestrians and drivers.[30] It is important not just to make sure that there is an adequate amount of light at night on roadways but also to balance visibility and glare.[22] This means meeting horizontal and vertical illuminance recommendations, which are designed to provide enough light to facilitate vision, and maintaining the uniformity range of light to reduce dark spots in between luminaires that may present challenges for navigation and visibility.

Part 1 Roadways and Pedestrian Paths

For All Spaces:

Lighting for all roadways and pedestrian paths within the project boundary meets the maintained average, minimum illuminance and uniformity recommendations as appropriate for each application based on pedestrian activity levels of at least one of the following:

a. IES-ANSI RP-8-14 or any updated versions of the text.[22]
b. BS 5489-1:2013 or any updated versions of the text.[31]

Part 2 Crosswalks

For All Spaces:

One of the following requirements is met:

a. Crosswalks maintain a vertical illuminance on the plane facing approaching traffic and on the plane facing the intersection of 21 lux [2 fc] at 1.5 m [5 ft] above grade.[32]
b. Vertical illuminance levels comply with IES DG-19-08 for Roundabout Lighting based on the street classification and pedestrian volume.[31]

Part 3 Veiling Luminance Ratios

For All Spaces:

One of the following requirements is met:

a. For roadways of medium to high driving speeds, such as all highways and freeways: veiling luminance ratio of 0.3.[33]
b. For roadways of low driving speeds, such as all alleys, residential roads, pedestrian streets, roads in school zones and bicycle lanes: veiling luminance ratio of 0.4.[33]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

LEX LIGHTING FOR EXTERIORS | O (MAX: 1 PT)

Intent: To improve maneuverability and visibility in exterior spaces and encourage occupants to utilize the areas to promote opportunities for community members to come together.

Summary: Meeting exterior lighting requirements improves visibility for the users of the outdoor spaces. Good lighting design encourages use of exterior areas after dark by creating a comfortable and inviting ambience. An area that is not lit properly can pose an impediment to the occupants by making it difficult to spot obstacles in their path and can lead to accidents. It is important to avoid light trespass and obtrusive lighting while designing for these areas. However, exterior lighting can also have benefits by encouraging members of the community to interact in common spaces, facilitating social interaction.

Part 1 Public Exteriors

For All Spaces:

Lighting for all public exteriors in the project meet the maintained vertical and horizontal illuminance and uniformity recommendations per lighting zone as appropriate of at least one of the following:

a. IES RP-33-14 or any updated versions of the text.[18]
b. IES Lighting Handbook 10th Edition, Table 26.2, or any updated versions of the text.[34]
c. BS 5489-1:2013 or any updated versions of the text for public amenity areas and EN 12464-2:2014 or any updated versions of the text for outdoor work places.[31,35]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MLI MASS TRANSIT LIGHTING | O (MAX: 1 PT)

Intent: To encourage frequent and safe use of mass transit in communities by promoting adequate lighting for visibility at interior and exterior locations.

Summary: Meeting standard lighting requirements supports adequate visibility for people to perform basic tasks and accurately perceive the environment. Regardless of the specific luminaires or design layouts adopted by any given community, as a basic offering a community must provide adequate lighting for visibility so that community members can easily navigate a space, particularly in mass transit areas. Promoting mass transit use can also have other community benefits, by potentially encouraging more physical activity and reducing reliance on individual car use, thereby improving air quality on a community scale.[36,37]

Part 1 Interior Stops

For All Spaces:

The following average horizontal illuminance levels are met at grade per area type at all interior mass transit stops, as allowable by local code:

a. Station platforms: 430 lux [40 fc].[38]
b. Stairs, elevators and escalators: 270 lux [25 fc].[38]
c. Mechanical rooms and bathrooms: 215 lux [20 fc].[38]

Part 2 Exterior Stops

For All Spaces:

The following average horizontal illuminance levels are met at grade per area type at all exterior mass transit stops, as allowable by local code:

a. Station platforms, covered: 75 lux [7 fc].[38]
b. Station platforms, uncovered: 43 lux [4 fc], with a minimum maintained illuminance of 21 lux [2 fc] at the platform edge.[38]
c. Passenger loading areas (e.g., "kiss and ride") and bicycle stands: 54 lux [5 fc].[38]
d. Bus-loading zones: 75 lux [7 fc].[38]
e. Outdoor entrances to stairs, elevators and escalators: 108 lux [10 fc].[38]

Part 3 Pedestrian Crossings

For All Spaces:

For exterior pedestrian crossings that intersect trackways, one of the following is provided at night within a 30 m [100 ft] radius of the crossing, as allowable by local code:

a. 1.5 times trackway illumination.[38]
b. Horizontal illumination of 13 to 18 lux [1.2 to 1.7 fc] at grade.[38]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: Edison Innovation Foundation. Thomas Edison's Most Famous Inventions. http://www.thomasedison.org/index.php/education/ inventions/. Published 2014. Accessed July 19, 2016.

2: Bennie J, Davies TW, Duffy JP, Inger R, Gaston KJ. Contrasting trends in light pollution across Europe based on satellite observed night time lights. Sci Rep. 2014;4:3789. https://www.ncbi.nlm.nih.gov/ pubmed/24445659

3: Globe at Night. What Is Light Pollution. http://www.globeatnight.org/ light-pollution.php. Published 2016. Accessed July 19, 2016.

4: Longcore T, Rich C. Ecological Light Pollution. Front Ecol Environ. 2004;2(4):191-198. http://www.urbanwildlands.org/Resources/ LongcoreRich2004.pdf

5: Chepesiuk R. Missing the dark: health effects of light pollution. Environ Health Perspect. 2009;117(1):A20-27. https://www.ncbi.nlm.nih.gov/ pubmed/19165374

6: Cho Y, Ryu SH, Lee BR, et al. Effects of artificial light at night on human health: A literature review of observational and experimental studies applied to exposure assessment. Chronobiol Int. 2015;32(9):1294-1310. https://www.ncbi.nlm.nih.gov/pubmed/26375320

7: Fonken LK, Aubrecht TG, Melendez-Fernandez OH, Weil ZM, Nelson RJ. Dim light at night disrupts molecular circadian rhythms and increases body weight. J Biol Rhythms. 2013;28(4):262-271. https://www.ncbi. nlm.nih.gov/pubmed/23929553

8: Contin MA, Benedetto MM, Quinteros-Quintana ML, Guido ME. Light pollution: the possible consequences of excessive illumination on retina. Eye (Lond). 2016;30(2):255-263. https://www.ncbi.nlm.nih.gov/ pubmed/26541085

9: Kloog I, Haim A, Stevens RG, Barchana M, Portnov BA. Light at night co-distributes with incident breast but not lung cancer in the female population of Israel. Chronobiol Int. 2008;25(1):65-81. https://www. ncbi.nlm.nih.gov/pubmed/18293150

10: Hurley S, Goldberg D, Nelson D, et al. Light at night and breast cancer risk among California teachers. Epidemiology. 2014;25(5):697-706. https://www.ncbi.nlm.nih.gov/pubmed/25061924

11: Kim YJ, Lee E, Lee HS, Kim M, Park MS. High prevalence of breast cancer in light polluted areas in urban and rural regions of South Korea: An ecologic study on the treatment prevalence of female cancers based on National Health Insurance data. Chronobiol Int. 2015;32(5):657-667. https://www.ncbi.nlm.nih.gov/pubmed/25955405

12: Koo YS, Song JY, Joo EY, et al. Outdoor artificial light at night, obesity, and sleep health: Cross-sectional analysis in the KoGES study. Chronobiol Int. 2016;33(3):301-314. https://www.ncbi.nlm.nih.gov/ pubmed/26950542

13: Wyse CA, Selman C, Page MM, Coogan AN, Hazlerigg DG. Circadian desynchrony and metabolic dysfunction; did light pollution make us fat? Med Hypotheses. 2011;77(6):1139-1144. https://www.ncbi.nlm.nih.gov/ pubmed/21983352

14: Lambert KG, Nelson RJ, Jovanovic T, Cerda M. Brains in the city: Neurobiological effects of urbanization. Neurosci Biobehav Rev. 2015;58:107-122. https://www.ncbi.nlm.nih.gov/pubmed/25936504

15: Ruger M, Gordijn MC, Beersma DG, de Vries B, Daan S. Time-of-daydependent effects of bright light exposure on human psychophysiology: comparison of daytime and nighttime exposure. Am J Physiol Regul Integr Comp Physiol. 2006;290(5):R1413-1420. https://www.ncbi.nlm. nih.gov/pubmed/16373441

16: Fotios S, Castleton H. Specifying Enough Light to Feel Reassured on Pedestrian Footpaths. Leukos. 2016;12(4):235-243. http://dx.doi.org/10.1 080/15502724.2016.1169931

17: Illuminating Engineering Society. Model Lighting Ordinance (MLO). Illuminating Engineering Society; 2011. http://www.ies.org/PDF/MLO/ MLO_FINAL_June2011.pdf

18: Illuminating Engineering Society. Lighting for Exterior Environments Illuminating Engineering Society; 2016. https://www.ies.org/store/ product/recommended-practice-for-the-economic-analysis-oflighting-

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

1360.cfm

19: U.S. Department of Energy. Pedestrian Friendly Outdoor Lighting Washington, DC: U.S. Department of Energy;2013. http://apps1.eere. energy.gov/buildings/publications/pdfs/ssl/2013_gateway_pedestrian. pdf

20: Navara KJ, Nelson RJ. The dark side of light at night: physiological, epidemiological, and ecological consequences. J Pineal Res. 2007;43(3):215-224. https://www.ncbi.nlm.nih.gov/pubmed/17803517

21: World Health Organization. Make Walking Safe: A Brief Overview of Pedestrian Safety Around the World. Geneva, Switzerland: WHO Press; 2011. http://who.int/violence_injury_prevention/publications/road_ traffic/make_walking_safe.pdf

22: Illuminating Engineering Society. Roadway Lighting ANSI/IES RP-8-14. Illuminating Engineering Society; 2016.

23: American National Standard. American National Standard Practice for Roadway Lighting. Journal of the Illuminating Engineering Society. 1977;7(1):16-54. http://dx.doi.org/10.1080/00994480.1977.10748960

24: Aub? M. Physical behaviour of anthropogenic light propagation into the nocturnal environment. Philosophical Transactions of the Royal Society of London B: Biological Sciences. 2015;370(1667). http://rstb. royalsocietypublishing.org/content/370/1667/20140117.abstract

25: Fotios S, Castleton H. Specifying Enough Light to Feel Reassured on Pedestrian Footpaths. LEUKOS. 2016:1-9. http://dx.doi.org/10.1080/155 02724.2016.1169931

26: American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE). ANSI/ASHRAE/IES Standard 90.1-2016-Energy Standard for Buildings Except Low-Rise Residential Buildings. Atlanta, GA: American National Standards Insititute (ANSI); 2013. https://www. ashrae.org/resources--publications/bookstore/standard-90-1

27: U.S. Green Building Council. LEED v4 for Neighborhood Development. Light Pollution Reduction. Washington, DC: U.S. Green Building Council; n.d. http://www.usgbc.org/node/2614441?return=/credits/neighborhooddevelopment

28: Center for Excellence in Universal Design. Building for Everyone: A Universal Design Approach. Vol 8: Center for Excellence in Universal Design; n.d.: http://universaldesign.ie/Built-Environment/Building-for-Everyone/8-Building Management.pdf. Accessed July 29, 2016.

29: World Health Organization. Global Status Report on Road Safety. Geneva, Switzerland: World Health Organization;2015. http://www.who.int/violence_ injury_prevention/road_safety_status/2015/en/

30: World Health Organization. Facts: Road safety-Visibility. Geneva, Switzerland: WHO Press; 2004. http://www.who.int/violence_injury_prevention/ publications/road_traffic/world_report/visibility_en.pdf

31: British Standards Institution. BS 5489-1:2013-Code of practice for the design of road lighting. Part 1: Lighting of roads and public amenity areas. BSI Standards Limited; 2012. https://a465gilwern2brynmawr.files.wordpress. com/2014/02/dd401-bss489-12013.pdf

32: U.S. Department of Transportation Federal Highway Administration. FHWA Lighting Handbook. Washington, DC: U.S. Department of Transportation Federal Highway Administration 2012. http://safety.fhwa.dot.gov/roadway_ dept/night_visib/lighting_handbook/

33: U.S. Department of Transportation Federal Highway Administration. Guidelines for the Implementation of Reduced Lighting on Roadways Washington, DC: U.S. Department of Transportation Federal Highway Administration; 2014. http://www.fhwa.dot.gov/publications/research/ safety/14050/14050.pdf

34: Illuminating Engineering Society. Lighting Handbook, 10th Edition. Illuminating Engineering Society; 2011. http://www.ies.org/handbook/pdf/

35: British Standards Institution. BS EN 12464-2:2007-Lighting of work places. Outdoor work places. BSI Standards Limited; 2007. http://shop.bsigroup. com/ProductDetail/?pid=000000000030163020

36: American Public Transportation Association. Public Transportation Benefits. http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx. Published n.d. Accessed June 28, 2016.

37: Besser LM, Dannenberg AL. Walking to public transit: steps to help meet physical activity recommendations. Am J Prev Med. 2005;29(4):273-280. https://www.ncbi.nlm.nih.gov/pubmed/16242589

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

38: Central Corridor Light Rail Transit Metropolitan Council. Design Criteria. 2008. https://metrocouncil.org/Transportation/Publications-And-Resources/Transit/ Central-Corridor-Light-Rail-Transit-Design-Criteri.aspx

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MOVEMENT

The encouragement of physical activity, promotion of active living and reduction of sedentary behaviors are central to the WELL Movement concept. Research shows that regular physical activity not only improves these domains of fitness but can also have a profound positive impact on health and well-being including reduced risk of chronic diseases such as cardiovascular disease, type 2 diabetes and some of the most common and deadly cancers; reduced risk of premature mortality; improved weight control; enhanced muscle and bone strength; better mental health and well-being; and improved ease of activities of daily living, especially among older adults.[1,2]

Despite well-established and widely disseminated guidelines (Appendix V3), physical inactivity is highly prevalent worldwide, with 23% of adults failing to meet international activity guidelines established by the World Health Organization (WHO).[2] In general, more women than men fail to meet international activity guidelines, a gap that is more evident in low- and middle-income countries.[2] Among adolescents (11–17 years), 78% of boys and 84% of girls fail to meet WHO physical activity recommendations.[2] Inactivity is also a concern among older age groups.[3] In an analysis of data from the U.S., researchers found that the prevalence of inactivity increases with age from 25.4% in older adults aged 50–64 years to 35.3% among those aged 75 years and above.[4] In addition, people are becoming increasingly sedentary, which poses independent and serious consequences for health beyond insufficient (or low) physical activity levels.[5]

Physical inactivity is linked to numerous chronic diseases and conditions, including obesity and diabetes.[6,7] Additionally, the WHO notes that individuals who are insufficiently active have a 20 to 30% higher risk of mortality compared to those who meet international recommendations.[2] The economic burden, including both direct and indirect costs, of physical inactivity is also substantial. Based on representative data from 142 countries, it is estimated that health care spending and productivity losses (direct and indirect costs) attributed to physical inactivity cost the global economy $67.5 billion in 2013.[8] By region, these estimates ranged from $0.6 billion in Africa to about $26 billion in North America.[8] When isolating indirect costs, in 2013 alone, premature deaths attributed to physical inactivity resulted in nearly $14 billion in productivity losses around the world.[8]

The built environment has increasingly come under focus as an important driver of physical activity and active living. According to the WHO, common barriers to physical activity linked to the built environment include fear of crime and violence in outdoor spaces, traffic and safety concerns, poor air quality and a lack of "activity-centric" infrastructure, such as parks, activity spaces and streets designed for active transportation.[2] Design strategies, operational policies and programs can actively (e.g., activity programming in a local park) and passively (e.g., neighborhood connectivity, walkability, access to public transportation) promote active lifestyles and discourage sedentary behaviors. In addition, strategies that address community design, infrastructure and operational policies that are associated with physical activity not only make community members more active but also make communities more socially viable, more economically prosperous and more ecologically sound.[9]

Collectively, the design and operation of the built environments constitute powerful and sustainable interventions that promote more active ways of living across the lifespan. The potential impact of improving physical activity behaviors is profound. In a seminal 2012 study published in The Lancet, researchers estimated that "if inactivity were not eliminated, but decreased instead by 10% or 25%, more than 533,000 and more than 1.3 million deaths, respectively, could be averted every year."[10]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MIX MIXED-USE DEVELOPMENT | P

Intent: To encourage a high degree of and proximity to mixed-uses to create a more compact, connected and active community.

Summary: Land use policies that promote diverse uses (mixed-use) and proximity to those uses, in concert with other community-scale active design strategies, can help foster more livable and active communities.[11] Land use policies are increasingly recognized for their role in creating the conditions that allow healthy communities to flourish.[12] Mixed-use developments are associated with physical activity and specifically, higher levels of walking and biking.[11,13,14,15,16,17,18] In addition, mixed-use developments are associated with lower body weight and obesity and are considered an important determinant of mobility and physical activity levels among older populations.[19,20] Research suggests that individuals significantly increase walking for recreation and transportation, reduce total time spent on mass transportation and reduce automobile travel time after moving to a neighborhood with greater land use mix.[21] Greater land use mix is also associated with various co-benefits including the presence of neighborhood green spaces, an improved sense of community and reductions in isolation, stress and crime.[14]

Part 1 Land Use Mix

For All Spaces:

The following requirements are met:

a. At least 50% of dwelling units are located within a 400 m [0.25 mi] walk distance of at least four use categories defined in Appendix V1.[22] For projects with no dwelling units, at least four use categories defined in Appendix V1 are present within the project boundary.

b. At least 75% of dwelling units are located within an 800 m [0.5 mi] walk distance of at least four use categories defined in Appendix V1.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MNP MOVEMENT NETWORK PLANNING | O (MAX: 1 PT)

Intent: To assess transportation networks and impact transportation planning using data-driven processes.

Summary: Decades of car-centric transportation planning policies and development have continued to prioritize automobiles on the streets of communities and discouraged and even displaced more active modes of transportation.[23,24] Today, road traffic injuries are among the leading causes of mortality worldwide, with more than 1.2 million deaths attributed to road traffic injuries each year, half of which are among pedestrians, cyclists and motorcyclists.[25] In addition, substantial inequalities exist across and within countries where those who are socioeconomically disadvantaged experience an unjust burden of motorist, cyclist and pedestrian-related traffic injuries.[25,26] By placing people-centric design at the forefront of transportation planning, communities can reframe how they assess and develop transportation policies in order to encourage active transportation, improve physical activity levels and reduce the risk of injuries among roadway users.[27,28]Transportation planning for relevant stakeholders involves a multistep, cross-disciplinary process of data collection, analysis, goal setting, prioritization, programming toward specific performance-based outcomes and monitoring and evaluation.[29] Common data collected during a transportation assessment include local crash rates for pedestrians, cyclists and motor vehicles; existing and/or planned roadway characteristics; exposure data, including traffic volume, and roadway miles traveled; streets with speeds above 40 km/h [25 mph]; mode share, including user counts and average trip length; and needs and concerns of community members.[29,30]

Part 1 Transportation Analysis

For All Spaces:

A point-by-point narrative demonstrates an assessment of the following:

a. Locations throughout the project boundary with existing and/or potential transportation safety issues and potential contributing factors based on available data.
b. Potential evidence-based countermeasures and their feasibility of implementation.
c. Inter-sectoral policies and/or relationships that could impact transportation planning for the project.
d. The long-term impact of advanced transportation technologies (e.g., autonomous vehicles) and mass transportation systems (e.g., metro, bus rapid transit, light rail).
e. Community transportation safety needs and concerns.

Part 2 Transportation Safety Plan

For All Spaces:

One of the following is met:

a. The findings from Part 1: Transportation Analysis have impacted transportation planning within the project master plan.
b. For projects that do not have purview over the transportation network, the findings from Part 1: Transportation Analysis have been shared with the local Department of Transportation (or equivalent), including a summary of proposals made and an explanation of why the project was unable to incorporate transportation safety elements into the project master plan.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WAK WALKABILITY | O (MAX: 1 PT)

Intent: To provide connected, walkable and accessibly designed streets and pathways to foster physical activity.

Summary: Many elements of the built environment impact pedestrian activity, including land use mix, residential density, intersection density, transit stop density, population density and the ratio of retail to residential building floor area.[31,32,33,34,35,36,37] In addition, the ways in which streets are designed and planned can have an impact on many aspects of community vitality, including pedestrian activity and health, social cohesion, crime prevention, the micro and macro economies and environmental sustainability.[23,30] Walkable communities are associated with higher moderate-to-vigorous activity levels, where some research shows that residents who live in a high- compared to low-walkability neighborhood achieve nearly 800 more steps per day, on average.[17,31,38,39,40] Additional evidence shows that walkable neighborhoods are associated with lower levels of sedentary behavior, diabetes, obesity and depression.[33,36,37,39] Notably, the benefits of walkable communities appear to be most beneficial for individuals with the lowest physical activity levels, a population also at the highest risk for poor health outcomes.[38,41]

Part 1 Walkable Design

For All Spaces:

At least one of the following requirements is met:

a. Street segments intersect at least one other street segment (excluding alleys) every 80–100 m [262–328 ft].[19,30]

b. Minimum street connectivity index of 1.4.[42]

c. Minimum of 54 intersections per km^2 [140 intersections per mi^2].[22]

d. Minimum Walk Score™ of 70.[43]

Part 2 Pedestrian Pathways

For All Spaces:

The following requirement is met:

a. 90% of the circulation network block length has continuous sidewalks or all-weather pathways present on both sides.[22]

Part 3 Accessible Design

For All Spaces:

At least one of the following requirements is met:

a. All newly constructed pedestrian pathways are compliant with local accessible design laws and/or standards.

b. The project commits to upgrade at least 50% of the existing pedestrian paths to be compliant with local accessible design laws and/or standards.

Part 4 Pedestrian Pathway Maintenance

For All Spaces:

A policy is in place that addresses and identifies the following:

a. A maintenance commitment and responsible entities for inspection and maintenance of pedestrian pathways and applicable pedestrian infrastructure including:

Minor repairs (e.g., repairing surface cracks or uneven surfaces).[44]

Major repairs (e.g., breaking ground).[44]

Snow and/or ice removal, as applicable by climate.[44]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PED PEDESTRIAN-SCALE DESIGN | O (MAX: 1 PT)

Intent: To create an active, engaging and inviting pedestrian environment through pedestrian-scale amenities and the articulation of street-facing façades to encourage physical activity.

Summary: Pedestrian-scale design draws upon design strategies that consider the pedestrian perspective and experience by designing the transportation network to invite pedestrian activity and support safety. Pedestrian-scale design can positively impact the user experience, increase pedestrian activity and can address important community elements such as street connectivity, accessibility, comfort and safety.[11,30,45,46] Furthermore, interventions that consider the pedestrian experience can also contribute to a sense of place, especially when embedded with the cultural and historical values of each unique community.[30]In a systematic review conducted by the CDC, researchers identified several evidence-based design strategies that can be used to improve the pedestrian experience, including street lighting, sidewalk continuity, crosswalk safety (e.g., center islands or raised crosswalks) and pedestrian-scale aesthetics (e.g., landscaping).[11] Additional pedestrian-friendly strategies, such as active façades and street furnishings, are outlined in evidence-based guidelines such as Active Design: Shaping the Sidewalk Experience and are supported by peer-reviewed literature.[46,47]

Part 1 Active Façades

For All Spaces:

The articulation of street-facing façades, for buildings owned, operated or managed by the project owner, are designed such that no more than 40% or 15 m [50 ft] (whichever is less) is blank, and incorporate at least two of the following:

a. Street-level windows, which allow visibility into the space.
b. Window display cases.
c. Murals or other artistic installations.
d. Biophilic and other landscape elements.
e. Mixed building textures, colors and/or other design elements.

Part 2 Active Streets

For All Spaces:

The following requirement is met:

a. No more than 20% of the circulation network block length (measured in linear meters) is faced directly by at-grade commercial garages or service bay openings (alley and other service ways are excluded from block-length calculations).[22]

Part 3 Street Furnishings

For All Spaces:

At least two of the following are present at regular intervals along at least 75% of the total existing and/or planned block length (driveways and service entryways are exempt from block length calculations):

a. Permanent and/or movable seating furniture.[46]
b. Trees, planters and/or other landscaped/biophilic elements.[46,48]
c. Natural (e.g., landscape elements such as trees) or man-made shading devices intended to block direct sunlight and glare.[46,48]
d. Artistic installations.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PDS ENHANCED PEDESTRIAN ENVIRONMENTS | O (MAX: 1 PT)

Intent: To improve pedestrian infrastructure and encourage physical activity through evidence-based safety countermeasures.

Summary: Nearly 25% of the 1.2 million annual road traffic deaths on the world's roads are among pedestrians.[49] Successful planning programs, such as Vision Zero, implemented in places including New York City and Sweden, are built on the premise that no traffic fatality is acceptable, and have been shown to be successful at saving lives.[50,51] Pedestrian safety strategies fall into three broad categories: (i) separation of pedestrians from other roadway users, such as pedestrian over- and/or underpasses;[24,52,53] (ii) improved visibility of pedestrians, such as high-visibility crosswalk markings;[23,30,54] and (iii) reduced vehicular speeds, such as traffic-calming design strategies.[24,30,44,52,53,55,56,57]For places such as NYC that have committed to Vision Zero action plans, locations that have implemented Vision Zero design strategies such as neighborhood slow zones, street markings, street lighting and safety engineering at intersections, have observed a decrement in pedestrian fatalities at twice the rate compared to locations that do not implement these strategies.[49,50]

Part 1 Pedestrian Safety Countermeasures

For All Spaces:

A point-by-point narrative demonstrates that the transportation network includes design and/or policy strategies that address each of the following categories:

a. Separation of pedestrians and other roadway users.
b. Visibility of pedestrians.
c. Management of vehicular speed.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CYC CYCLIST INFRASTRUCTURE | O (MAX: 1 PT)

Intent: To provide a network of designated, connected and easily accessible bicycle lanes that are regularly maintained in order to encourage cycling.

Summary: Cycling as a mode of active transportation is on the rise. In the U.S. alone, the number of workers who regularly commute via bike increased from about 500,000 to nearly 800,000 from 2001 to 2012, and in New York City specifically, cycling trips increased by nearly 50% from 2009 to 2014.[58,59] In other cities, such as Amsterdam, trips have increased more than 40% since the 1990s.[60] Research shows that the collective health benefits of cycling, such as lower risk of obesity, far outweigh the risks, such as increased exposure to air pollution and increased risk of traffic accidents.[19,61]Ecological studies, surveys and focus groups provide evidence that a variety of built environment elements have a positive impact on cycling behavior, including high intersection density, greater land use mix, greater population density, presence of bicycle signage, traffic calming interventions and aesthetics.[62,63] Investment in basic cyclist infrastructure, such as designated bicycle lanes or shared bicycle lanes, has been shown to increase cycling and quality-adjusted life years (QALYS) at little added cost ($1,297 USD per QALY per person).[23,64,65] Other benefits of cyclist infrastructure include revenue for local businesses and improved real-estate values, multimodal transit corridor use and increased cyclist visibility, comfort and safety.[64,66] Maintenance of this infrastructure is also an important consideration for ridership as many cities fail to maintain bicycle lanes, especially during snowy and icy conditions.[67]

Part 1 Bicycle Lane Geography

For All Spaces:

At least one of the following requirements is met:

a. Project boundary has a minimum Bike Score™ of 50.[68]

b. 75% of all buildings are within 400 m [0.25 mi] cycling distance of an existing or planned (with funding commitments) bicycle network that connects riders to at least 10 diverse uses that are within a 4.8 km [3 mi] cycling distance.[22]

c. 50% of all buildings are located on streets with an existing or planned (with funding commitments) bicycle network that connects riders to at least 10 diverse uses that are within a 4.8 km [3 mi] cycling distance.[22]

d. Projects commit to bicycle lane conversion by the time of recertification (with funding commitments):

    10% of conventional bicycle lanes are converted to separated bicycle lanes or protected bicycle lanes.

    25% of streets with a shared lane environment (i.e., include no designated bicycle lane) are converted to include a conventional, separated or protected bicycle lane(s).

Part 2 Bicycle Lane Geometry

For All Spaces:

All cyclist infrastructure meets the following requirements:

a. Bicycle lane width is designed to the maximum width allowable by local code.

b. Buffer strategies (examples provided in Appendix V2) are used where possible and are designed to the maximum width allowable by local code.

Part 3 Bicycle Lane Maintenance

For All Spaces:

A policy is in place that addresses and identifies the following:

a. A maintenance commitment and entities responsible for inspection and maintenance of bicycle lanes and applicable infrastructure for cyclists including the following:

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Minor repairs (e.g., repairing surface cracks or uneven surfaces).[66]

Major repairs (e.g., breaking ground).[66]

Snow and/or ice removal, as applicable.[66]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

BPK BICYCLE PARKING | O (MAX: 1 PT)

Intent: To provide publicly accessible and secure bicycle parking facilities that are integrated into community infrastructure in order to facilitate cycling and reduce barriers to ridership.

Summary: Bicycle parking facilities are a key supportive element to ridership. These facilities should be visible, accessible and secure; have adequate lighting; and be protected from weather when possible.[69] Bicycle parking facilities fall into two broad categories, short-term and long-term parking, and their placement requires considerations of current and potential user groups and their needs along with existing and planned public and private infrastructure.[70,71]Research suggests that lack of secure bicycle parking options is one of the leading reason cyclists do not bike to the workplace.[71,72] Experts highlight that incorporating bicycle parking opportunities requires little additional space; for example, a 4.3 × 1.8 m [14 × 6 ft] space could store up to 12 bicycles in some cases.[71] A systematic review on this topic found that parking facilities were associated with increased perceptions that cycling to work was convenient and thus increased likelihood that employees would ride to work.[73] Furthermore, evidence from this same review suggests that implementing outdoor parking alone would increase mode share by 5.8%, indoor parking alone by 6.3% and indoor parking plus on-site showers by 7.1%.[73]

Part 1 Bicycle Parking Infrastructure and Policy

Note: Two of the following options are required to satisfy this feature.

For All Spaces:

Bicycle Parking Infrastructure

Bicycle parking facilities are present throughout the community such that at least one of the following requirements is met:

a. Buildings owned, operated or managed by the project owner provide short-term bicycle parking for at least 2.5% of peak visitors (minimum of two spaces) and long-term bicycle parking for at least 5% of regular occupants (minimum of two spaces).[22]

b. All newly constructed parking lots and/or garages allocate a minimum of one bicycle parking space (available for public use at no cost) per 10 automobile parking spaces (up to a maximum of 200 spaces) that include racks, poles, hooks and locking devices for cyclists to secure bicycles.[71,74]

OR

Building Bicycle Policy

The following requirement is met for buildings owned, operated or managed by the project owner:

a. Where no designated indoor bicycle parking space/area can be accommodated or existing spaces are fully occupied, policy is in place that allows occupants to bring personal bicycles inside the building and utilize elevators (or freight elevators) to transport bicycles between floors.[71,75]

OR

Pro-cyclist Transit

At least one of the following is met:

a. At least 50% of mass transit stations (rail, bus and/or ferry stations) have no-cost, public use and secure short-term bike parking facilities present within 30 m [100 ft] of the station's main entrance and/or boarding area.

b. At least 75% of mass transit stations are within 400 m [0.25 mi] of a secure long-term bicycle parking facility that is available for public use at no cost.

c. A policy is developed or adopted so that mass transit users may bring bicycles on-board during select hours of operation.

d. At least 25% of the aboveground transit fleet (e.g., buses, aboveground light rail, trollies) is fitted with on-board (interior or exterior) bicycle racks that cyclists may use during all hours of operation.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CYS ENHANCED CYCLIST ENVIRONMENTS | O (MAX: 1 PT)

Intent: To improve cyclist infrastructure and promote physical activity through evidence-based safety countermeasures.

Summary: Cyclist-friendly communities provide a variety of comprehensive, cyclist-specific infrastructure and amenities that encourage ridership. Communities should also support the cyclist environment and strive to reduce risk of cyclist injury and conflict with other transportation network users. This requires an understanding of the cyclist network and the unique risks posed throughout transit network use areas including major and minor streets.[76] The presence of cyclist infrastructure is shown to increase cycling behavior and is fundamental to accommodate and encourage cyclists of all abilities, levels of experience, confidence and ages.[30,76] Designing inviting street environments for cyclists can help promote cycling as an active transportation alternative to more sedentary modes of transportation. While the health benefits of cycling, such as lower risk of obesity, far outweigh the dangers, cyclists still represent 4% of global traffic deaths.[25,61,77] In general, cyclists prefer streets with less traffic, lower traffic speeds and cyclist-specific amenities that separate cyclists from other roadway users.[18] Infrastructure that separates cyclists from motorized traffic and pedestrians decreases potential conflict among network users and is more inviting to cyclists.[52,66] Furthermore, design strategies such as intersection treatments, lane markings, signage, medians and/or signal detection can increase visibility, identify a clear right-of-way, and facilitate awareness of potential conflict among roadway users, ultimately creating a more inviting environment for cyclists.[24,30,44,52,53,56,57,66]

Part 1 Cyclist Safety Countermeasures

For All Spaces:

A point-by-point narrative demonstrates that the transportation network includes design and/or policy strategies from each of the following categories:

a. Separation of cyclists and other roadway users.
b. Visibility of cyclists.
c. Management of vehicular speed.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

BSH COMMUNITY BICYCLE SHARE | O (MAX: 1 PT)

Intent: To provide a comprehensive bicycle share program and promote use of community bike share.

Summary: Today, more than 800 bicycle share programs are available around the world with some of the largest programs found in Paris, France (20,000 bicycles) and Wuhan, China (70,000 bicycles).[78,79] Bicycle share eliminates some of the barriers to cycling, such as the cost of cycle ownership and concerns of bicycle theft.[30] Furthermore, there is no indication that bike share programs increase risk of collision or "close-calls" among cyclists and other roadway users.[80] One of the major benefits of cycle share is displacement of sedentary transportation modes, such as automobiles, where some research indicates that about 60% of bike share trips replace sedentary modes of transportation.[79] Bicycle share programs are also associated with co-benefits including reduced traffic congestion, flexible mobility, improved connectivity to public transportation and air pollution mitigation.[78]Convenience and proximity to a docking station have emerged among the top usability factors for bicycle share.[79] Additionally, these factors play an important role in the planning process including the bicycle share coverage area, program density and station spacing.[30] Ideally, stations are designated in areas with high land use mix, are colocated at public transportation stations when possible and are located along dedicated bicycle lanes.[30,70,81]

Part 1 Bicycle Share Program

For All Spaces:

At least 80% of the project boundary falls within the coverage area of a bicycle share program that meets at least one of the following requirements (building bike share programs may be included in these calculations):

a. Minimum docking station density of 11 docking stations per 1 km^2 [.386 mi^2].[30]
b. Minimum of 2 bicycle docks for every shared bicycle in service.[81]
c. Minimum area density of 1 docking station every 300 m [1,000 ft] along a dedicated bike lane.[30,81]

Part 2 Membership Promotion

For All Spaces:

The bicycle share program is promoted through two of the following strategies:

a. Occupants of buildings owned, contracted or managed by the project owner receive a no-cost or discounted trial membership (e.g., day pass) or a similar trial incentive.
b. Occupants of buildings owned, contracted or managed by the project owner receive a meaningful subsidy toward an annual membership.
c. Mixed-media messaging and/or programming events offered at least once per quarter.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

TRA MASS TRANSIT INFRASTRUCTURE | O (MAX: 1 PT)

Intent: To promote mass transit opportunities to facilitate active transportation and discourage more sedentary forms of transportation.

Summary: Mass transit includes multiple modes/types, such as subways, cable and street cars, buses, trolleys, light rails, ferries and water taxies, carpool services and commuter trains, among others.[82] Within the European Union alone, 56.7 billion trips were reported in 2014, or about 152 trips per person.[83] The same data showed that nearly 56% of those trips were taken on a bus or trolley compared to 14% by suburban rail.[83] In the U.S., ridership reached 10.7 billion trips in 2013, rising 37% since 1995 (nearly double the population growth over the same time period).[84]Evidence shows that individuals who use public transportation are more physically active, achieving about 19 more minutes of activity per day.[85] Beyond the health benefits associated with increased physical activity, investment in mass transit infrastructure also offers economic benefits including reduced health-care expenditures.[86,87]As the global community continues to urbanize, modernize and grow in social and structural complexity, cities will increasingly need to provide a transportation network that effectively moves more people and can adapt to changing transportation patterns and needs. For example, bus rapid transit (BRT), which emphasizes reliability, comfort and speed.[88-90] Light rail transit (LRT), which emphasizes similar amenities as BRT, represents about 3% of all public transportation trips worldwide and is associated with reduced body mass index (BMI) and odds of becoming obese over time (81%).[91] Additionally, evidence suggests that individuals are willing to walk farther to these rapid transit access points, especially when those access routes have pedestrian-friendly amenities.[88,90]

Part 1 Mass Transit Availability

For All Spaces:

The project is located on a site with existing or planned (with funding commitments) mass transit such that at least one of the following requirements is met:

a. The project is located on a site with a minimum (current or anticipated) Transit Score® of 70.[92]
b. At least 50% of all dwelling units and 50% of non-residential buildings are within a 400 m [0.25 mi] walk distance (measured from the main building entrance) from a mass transit access point that achieves at least 1 point toward minimum daily service trips outlined in Table 1 of the LT Credit: Access to Quality Transit in LEED for Neighborhood Development.[22]
c. At least 75% of all dwelling units and 75% of non-residential buildings are within an 800 m [0.5 mi] walk distance from a mass transit access point that achieves at least 1 point toward minimum daily service trips outlined in Table 1 of the LT Credit: Access to Quality Transit in LEED for Neighborhood Development.[22]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

TRN MASS TRANSIT SUPPORT | O (MAX: 1 PT)

Intent: To encourage public transportation use through supportive programming initiatives and policies.

Summary: Supportive programming and policy initiatives can complement public and mass transit infrastructure and encourage public and mass transit use. For example, amenities that make transit more inviting to the community, such as infrastructure that protects riders from inclement weather, can encourage use in this rapidly growing sector.[19,87,93] Beyond mass transit station amenities, supportive policies such as subsidies can also encourage use of mass transit for all sectors of society.[94] Furthermore, working with media to communicate the benefits and further advocate for mass transit use are promising strategies toward increasing mass transit ridership.[95,96]

Part 1 Mass Transportation Campaign

For All Spaces:

A mixed-media campaign is implemented that provides information on at least two of the following:

a. Information on the physical activity benefits of using mass transit.
b. Information on how community members can obtain mass transit passes or tickets, if passes or tickets are available.
c. Information on available transportation subsidies.

Part 2 Mass Transportation Amenities

For All Spaces:

All transit stations within the project boundary provide at least two of the following:

a. Benches or other permanent seating furniture.[97]
b. Shelters for weather protection.[93,97,98]
c. Natural or man-made shading intended to block direct sunlight and glare (not applicable to below-grade stations).
d. Public art or landscape elements.
e. Trash receptacles.[97]
f. Security lighting that is in compliance with applicable features in the Light concept.[97]

Note: Projects without mass transit stations within their project boundary may instead meet these requirements for all stations within 800 m [0.5 mi] of the project boundary.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WAY COMMUNITY WAYFINDING | O (MAX: 1 PT)

Intent: To provide comprehensive wayfinding signage that fosters successful navigation throughout the project boundary to encourage physical activity.

Summary: Wayfinding is defined as an individual's ability to mentally represent his or her location within a physical space, and integrate this information into a decision-making process that leads to successful passage to their destination.[99] Conditions of the built environment have an integral link to this process including the physical design and legibility of a space, the unique landscape and architectural focal points of each community and the small- and large-scale wayfinding signage systems that help users navigate. Wayfinding systems, such as maps and other signage (including digital signage), have become increasingly important as the built environment grows in complexity, size and density. Wayfinding systems aim to encourage walking, cycling and transit use by providing multimodal wayfinding information through the different perspectives of these user groups.[30] These systems help users reach their destinations easily while contributing to accessibility, reduced stress and user empowerment.[100] Many cities have integrated wayfinding systems into their urban landscape successfully. For example, the Legible London initiative is already working across many boroughs of London with more than 1,300 signs already in place.[101] Other streetscape improvement projects, such as Walk! Philadelphia, incorporate directional signage (about 425 signs), diskmaps (about 258 signs) and transit portal signage (about 90 signs), throughout the city and utilize a database system for documenting necessary repairs and upkeep of wayfinding signage throughout the community.[102]

Part 1 Wayfinding System

For All Spaces:

A point-by-point narrative describes the following considerations:

a. How existing or planned built environment elements contribute to community wayfinding (e.g., landmarks, architectural focal points and sight lines).

b. How the project determines the type(s), quantity and placement of wayfinding signage that will be used within the project boundary.

c. Which entities are responsible for inspecting and maintaining the integrity of wayfinding infrastructure.

Part 2 Active Maps

For All Spaces:

Wayfinding signage is present and includes the following:

a. Forward-facing street map that includes street names.[103]

b. Basic cardinal directions.[103]

c. Designation of bicycle routes.

d. Identification and location of, distance to and/or time to key community focal points such as those within an 800 m [0.5 mi] walk distance or bicycle ride.[30,103]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PAS PHYSICAL ACTIVITY SPACES | O (MAX: 1 PT)

Intent: To provide diverse physical activity opportunities in indoor and outdoor spaces that are publicly accessible.

Summary: Access to and availability of outdoor and indoor physical activity spaces can facilitate physical activity engagement and healthy weight status across diverse age groups.[19,45,46,104,106,107,108,109,110,111,112,113,114,115] However, research shows that socioeconomic disparities and overarching neighborhood deprivation are negatively associated with availability, accessibility and quality of physical activity spaces.[116-120] Green spaces and parks serve as key opportunities to promote physical activity and serve as a public use space for physical activity programming. In addition, some cities are installing "fitness zones"—easy-to-use, all-weather, outdoor fitness equipment—in public spaces (such as parks and plazas), which have emerged as a promising intervention to improve park use and energy expenditure.[121-123]The availability of indoor activity spaces can also support physical activity engagement, particularly during inclement or extreme weather conditions. Furthermore, indoor recreational facilities for children can also be colocated with activity spaces for adults and/or older adults, which may promote activity engagement for multiple age groups.[19]

Part 1 Outdoor Fitness Spaces

For All Spaces:

At least two of the following are available for public use (at no-cost) within an 800 m [0.5 mi] walk distance of all residential buildings:

a. Athletic field and/or court.
b. Trail network.
c. Blue space.
d. Play space geared toward children (e.g., playground).
e. Fitness zone that includes all-weather fitness equipment.
f. Colocated adult and child physical activity space (e.g., a playground with an adult fitness zone).
g. Park or green space.
h. Plaza.

Part 2 Indoor Fitness Spaces

For All Spaces:

At least two of the following are available for public use within an 800 m [0.5 mi] walk distance of all residential buildings (residential buildings that meet this part within their property are considered to be in compliance):

a. Fitness center, gym or studio.
b. Recreation center.
c. Play space geared toward children.
d. Colocated adult and child physical activity space (e.g., a fitness center with an indoor play space for children).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PRG ACTIVITY PROGRAMMING | O (MAX: 1 PT)

Intent: To promote physical activity through diverse, age- and culturally appropriate activity programming in public use spaces throughout the community.

Summary: The WHO notes that physical activity is a "vital investment" for communities that has far-reaching impacts across the economic and social vitality of communities.[124] Community programming and access to physical activity spaces has been shown to increase physical activity levels among adults and can even improve social cohesion.[112,125,126] Organized programs that encourage physical activity can be offered in a variety of community settings including public parks, public plazas and community centers. These programs should include a wide variety of age-appropriate and culturally relevant moderate-to-vigorous–intensity activities that encompass different types of movement and can be tailored to children, adults and the elderly of different ability levels. Successful community programming can be observed in many cities, big and small, developed and developing. For example, New York City offers a diverse selection of activities at no cost, including aerobics, Zumba, chair yoga and many others that are held in public parks throughout the five boroughs.[127] Another example of community-wide programming, popularized in South American cities, is temporary street closures that allow for exclusive use by fitness groups, pedestrians and/or cyclists of diverse age groups and abilities.[128-133] A systematic review on this topic found that street-closure programming ranges from 18 to 64 yearly events, lasting anywhere from 2 to 12 hours, and in some cases includes as few as 60 or as many as 1,000,000 participants.[133] Research also demonstrates that many participants would have otherwise been sedentary had they not participated in activity programming on car-free streets.[129,130] Notably, research indicates that efforts should be made to bring these exciting programs to a more diverse segment of the community, and emphasize how program leaders can better engage community stakeholders such as local city agencies, shop owners, community partners and other groups to improve the success and sustainability of these programs.[132,134]

Part 1 Physical Activity Promotion

For All Spaces:

Fitness programming (at one or more locations) is offered and meets the following:

a. Accessible within an 800 m [0.5 mi] walk distance of 75% of all dwelling units.
b. Offered at no-cost or for a nominal fee.
c. Offered at least once every three months.
d. Directed by qualified staff or personnel.
e. Includes diverse physical activity programming and/or instruction that is friendly for diverse age and ability types (e.g., yoga, aerobics, strength-training, aquatics, fitness education and other group fitness classes).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PET PET SUPPORT | O (MAX: 1 PT)

Intent: To support pet ownership through pet-friendly, public use spaces to foster physical activity.

Summary: The U.S. Public Health Service highlights emerging evidence on the benefits of pet ownership suggesting that it has a host of positive health benefits, including improved mental and emotional well-being, such as lower rates of stress, anxiety and depression.[135] In addition, pet owners are more likely to meet physical activity guidelines.[135] Possibly as a result of this higher level of physical activity and exercise, pet owners have an improved cardiovascular risk profile and lower rates of obesity.[135,136]

Part 1 Pet Friendly Spaces

For All Spaces:

At least one of the following is located within the project boundary or a 1.2 km [0.75 mi] walk distance of all dwelling units and includes water bowls (if potable water infrastructure is available), waste receptacles and pet-waste bags at no cost:

a. Dog-run area.
b. Public park and/or public space with daily off-leash hours and/or on-leash walking policies.
c. Walking trail with daily off-leash hours and/or on-leash walking policies.
d. Fenced dog park.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX V1: USE CATEGORIES:

Category	Use Type
Food retail	Grocery with produce section
	Supermarket
	Convenience store
	Farmers' market
Community-serving retail	Hardware store
	Pharmacy
	Other retail
Services	Bank
	Entertainment venue
	Gym, health club, exercise studio
	Hair salon
	Laundry, dry cleaner
	Restaurant, café, diner (excluding those with only drive-through service)
	Adult or senior care (licensed)
	Childcare (licensed)
Civic and community facilities	Community or recreation center
	Cultural arts facility (museum, performing arts)
	Education facility
	Government office that serves public on-site
	Medical clinic or office that treats patients
	Place of worship
	Police or fire station
	Post office
	Public library
	Public park
	Social services center

Source: LEED for Neighborhood Development.[22]

The following restrictions apply:

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

1. A use may be counted as only one use type (e.g., a retail store may be counted only once even if it sells products in several categories).

2. No more than two uses in each use type may be counted (e.g., if five restaurants are within the required distance, only two may be counted).

3. The uses accessible to each counted dwelling unit must represent at least two categories.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX V2: CYCLIST INFRASTRUCTURE:

Table 1: Buffer Strategies

Strategy	Requirements
Delineator posts	· Maximum 12 m [40 ft] spacing.[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30]
Bollards	· Maximum 12 m [40 ft] spacing.[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30]
Concrete barrier	· Continuous spacing (can allow drainage gaps).[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30]
Raised median	· Minimum curb height of 15 cm [6 in].[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30] · Continuous spacing (can allow drainage gaps).[138]
Raised lane	· Minimum 7.6 cm [3 in] rise.[138] · Includes a recommended buffer zone of at least 1 m [3.2 ft].[30]
Planters	· Consistent spacing (can allow drainage gaps).[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30]
Parking stops	· Minimum barrier height 10 cm [4 in].[138] · Minimum barrier length 1.8 m [6 ft].[138] · Minimum barrier spacing 1.8 m [6 ft].[138] · Maintain a recommended buffer zone of 1 m [3.2 ft].[30]
Parked cars	· Parked cars may be used to separate cyclists from traffic but should maintain a recommended buffer zone of 1 m [3.2 ft] between the cycle and parking lanes.[30] · Parking spaces are compliant with applicable preconditions or achieved optimizations in the Air concept.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX V3: PHYSICAL ACTIVITY RECOMMENDATIONS:

The World Health Organization (WHO) recommends that adults (ages 18–64) and older adults (ages 65 and above) engage in at least 150 minutes/week of moderate-intensity physical activity, or 75 minutes/week of vigorous-intensity activity (or an equivalent combination), plus muscle-strengthening activities on two or more days/week.[2] Children (ages 6–17) are encouraged to engage in at least 60 minutes/day of age-appropriate moderate- to vigorous-intensity activities, muscle-strengthening activities on at least three days per week, and bone-strengthening activities (i.e., weight-bearing activities such as jumping, stair climbing and weight-lifting) on at least three days/week.[2] The U.S. Department of Health and Human Services (HHS) further recommends that older adults participate in neuromuscular training activities (i.e., balance and coordination activities) to mitigate fall risk and age-related functional declines.[139]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: Centers for Disease Control and Prevention. Physical Activity Basics: Physical Activity and Health. https://www.cdc.gov/physicalactivity/basics/pa-health/ index.htm - ImproveMentalHealth. Published n.d. Accessed June 13, 2016.

2: World Health Organization. Physical Activity. http://www.who.int/ mediacentre/factsheets/fs385/en/. Published 2015. Accessed June 10, 2016.

3: Bauman A, Merom D, Bull FC, Buchner DM, Fiatarone Singh MA. Updating the Evidence for Physical Activity: Summative Reviews of the Epidemiological Evidence, Prevalence, and Interventions to Promote "Active Aging". Gerontologist. 2016;56 Suppl 2:S268-280. https://www.ncbi.nlm.nih.gov/ pubmed/26994266

4: Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report: Physical Inactivity Among Adults Aged 50 Years and Older? United States, 2014. Atlanta, GA: U.S. Department of Health and Human Services;2016. http://www.cdc.gov/mmwr/volumes/65/wr/mm6536a3. htm?s_cid=mm6536a3_w

5: Thorp AA, Owen N, Neuhaus M, Dunstan DW. Sedentary behaviors and subsequent health outcomes in adults a systematic review of longitudinal studies, 1996-2011. Am J Prev Med. 2011;41(2):207-215. https://www.ncbi. nlm.nih.gov/pubmed/21767729

6: World Health Organization. Obesity and overweight. http://www.who. int/mediacentre/factsheets/fs311/en/. Published 2015. Accessed June 14, 2016.

7: World Health Organization. Diabetes. http://www.who.int/mediacentre/factsheets/fs312/en/. Published 2016. Accessed June 14, 2016.

8: Ding D, Lawson KD, Kolbe-Alexander TL, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet. 2016;388(10051):1311-1324. https://www.ncbi.nlm.nih. gov/pubmed/27475266

9: Centers for Disease Control and Prevention. Physical Activity: Community Strategies. https://www.cdc.gov/physicalactivity/ community-strategies/index.htm. Published 2015. Accessed June 15, 2016.

10: Lee IM, Shiroma EJ, Lobelo F, et al. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet. 2012;380(9838):219-229. https:// www.ncbi.nlm.nih.gov/pubmed/22818936

11: Heath GW, Ross CB, Kruger J, et al. The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review. Journal of Physical Activity and Health. 2006;3(Suppl 1):S55-S76.

12: Chriqui JF, Nicholson LM, Thrun E, Leider J, Slater SJ. More Active Living?Oriented County and Municipal Zoning Is Associated with Increased Adult Leisure Time Physical Activity?United States, 2011. Environment and Behavior. 2016;48(1):111-130. http://eab.sagepub. com/content/48/1/111.full.pdf+html

13: de Nazelle A, Nieuwenhuijsen MJ, Anto JM, et al. Improving health through policies that promote active travel: a review of evidence to support integrated health impact assessment. Environ Int. 2011;37(4):766-777. https://www.ncbi.nlm.nih.gov/pubmed/21419493

14: Centers for Disease Control and Prevention. Physical Activity: Community-Scale Urban Design Land Use Policies. https://www. thecommunityguide.org/findings/physical-activity-community-scaleurban-design-and-land-use-policies. Published 2004. Accessed April 2, 2016.

15: Durand CP, Andalib M, Dunton GF, Wolch J, Pentz MA. A systematic review of built environment factors related to physical activity and obesity risk: implications for smart growth urban planning. Obes Rev. 2011;12(5):e173-182. https://www.ncbi.nlm.nih.gov/pubmed/21348918

16: McCormack GR, Shiell A. In search of causality: a systematic review of the relationship between the built environment and physical activity among adults. Int J Behav Nutr Phys Act. 2011;8(1):125. https://www. ncbi.nlm.nih.gov/pubmed/22077952

17: Hajna S, Ross NA, Brazeau AS, et al. Associations between neighbourhood walkability and daily steps in

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

adults: a systematic review and meta-analysis. BMC Public Health. 2015;15:768. https://www.ncbi.nlm.nih.gov/pubmed/26260474

18: Active Living Research. Moving Toward Active Transportation: How Policies Can Encourage Walking and Bicycling. San Diego, CA: Robert Wood Johnson Foundation;2016. http://activelivingresearch.org/sites/default/files/ALR_Review_ActiveTransport_January2016.pdf

19: City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. New York, NY;2010. http://www1.nyc.gov/assets/ planning/download/pdf/plans-studies/active-design-guidelines/adguidelines.pdf or http://www.drkarenlee.com/resources/adg

20: Mackenbach JD, Rutter H, Compernolle S, et al. Obesogenic environments: a systematic review of the association between the physical environment and adult weight status, the SPOTLIGHT project. BMC Public Health. 2014;14:233. https://www.ncbi.nlm.nih.gov/ pubmed/24602291

21: Mumford KG, Contant CK, Weissman J, Wolf J, Glanz K. Changes in physical activity and travel behaviors in residents of a mixed-use developmnet. Am J Prev Med. 2011;41(5):504-507. http://europepmc.org/abstract/med/22011422

22: U.S. Green Building Council. LEED v4 for Neighborhood Development. Washington, DC: U.S. Green Building Council; 2014. http://www.usgbc. org/sites/default/files/LEED v4 ND_04.05.16_current.pdf

23: American Planning Association. The Benefits of Street-scale Features for Walking and Biking. Princeton, NJ: Planning and Community Health Center;2015. https://planning-org-uploaded-media.s3.amazonaws.com/legacy_resources/nationalcenters/health/streetscale/pdf/ walkingbikingfinalreport.pdf

24: World Health Organization, FIA Foundation for the Automobile and Society, Global Road Safety partnership, World Bank. Pedestrian safety: a road safety manual for decision-makers and practitioners (in IRIS). Geneva, Switzerland: WHO Press; 2013. http://apps.who.int/iris/bitstream/10665/79753/1/9789241505352_eng.pdf

26: Morency P, Gauvin L, Plante C, Fournier M, Morency C. Neighborhood social inequalities in road traffic injuries: the influence of traffic volume and road design. Am J Public Health. 2012;102(6):1112-1119. https://www.ncbi.nlm.nih.gov/pubmed/22515869

27: Larry Cohen, Janani Srikantharajah, Leslie Mikkelsen. Traffic Injury Prevention: A 21st-Century Approach. In: Malekafzali S, ed. Healthy, Equitable Transportation Policy: Recommendations and Research. Oakland, CA: PolicyLink; 2009. http://www.preventioninstitute.org/ component/jlibrary/article/id-118/127.html

28: Jongeneel-Grimen B, Busschers W, Droomers M, et al. Change in neighborhood traffic safety: does it matter in terms of physical activity? PLoS One. 2013;8(5):e62525. https://www.ncbi.nlm.nih.gov/pubmed/23658741

29: Federal Highway Administration. Applying Safety Data and Analysis to Performance-Based Transportation Planning. In: U.S. Department of Transportation, ed. Washington, DC: Federal Highway Administration; 2015. http://safety.fhwa.dot.gov/tsp/fhwasa15089/data_anl.pdf

30: National Association of City Transportation Officials. Global Street Design Guide. Island Press; 2016. http://globaldesigningcities.org/ publication/global-street-design-guide/

31: Rundle AG, Sheehan DM, Quinn JW, et al. Using GPS Data to Study Neighborhood Walkability and Physical Activity. Am J Prev Med. 2016;50(3):e65-e72. https://www.ncbi.nlm.nih.gov/pubmed/26558700

32: Rundle A, Quinn J, Lee KK, Eisenhower D. Neighborhood walkability and physical activity in New York City. In: New York City Department of Health and Mental Hygiene, ed. Vol 42. New York, NY: Epi Data Brief; 2014. https://www1.nyc.gov/assets/doh/downloads/pdf/epi/databrief42. pdf

33: Freeman L, Neckerman K, Schwartz-Soicher O, et al. Neighborhood walkability and active travel (walking and cycling) in New York City. J Urban Health. 2013;90(4):575-585. https://www.ncbi.nlm.nih.gov/pubmed/22941058

34: Neckerman KM, Lovasi GS, Davies S, et al. Disparities in urban neighborhood conditions: evidence from GIS measures and field observation in New York City. J Public Health Policy. 2009;30 Suppl 1:S264-285. https://www.ncbi.nlm.nih.gov/pubmed/19190579

35: Booth GL, Creatore MI, Moineddin R, et al. Unwalkable neighborhoods, poverty, and the risk of diabetes

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

among recent immigrants to Canada compared with long-term residents. Diabetes Care. 2013;36(2):302-308. https://www.ncbi.nlm.nih.gov/pubmed/22988302

36: Creatore MI, Glazier RH, Moineddin R, et al. Association of Neighborhood Walkability With Change in Overweight, Obesity, and Diabetes. JAMA. 2016;315(20):2211-2220. https://www.ncbi.nlm.nih.gov/pubmed/27218630

37: Muller-Riemenschneider F, Pereira G, Villanueva K, et al. Neighborhood walkability and cardiometabolic risk factors in Australian adults: an observational study. BMC Public Health. 2013;13:755. https://www.ncbi.nlm.nih.gov/pubmed/23947939

38: Zhu X, Yu CY, Lee C, Lu Z, Mann G. A retrospective study on changes in residents' physical activities, social interactions, and neighborhood cohesion after moving to a walkable community. Prev Med. 2014;69 Suppl 1:S93-97. https://www.ncbi.nlm.nih.gov/pubmed/25158208

39: Renalds A, Smith TH, Hale PJ. A systematic review of built environment and health. Fam Community Health. 2010;33(1):68-78. https://www. ncbi.nlm.nih.gov/pubmed/20010006

40: Stevens RB, Brown BB. Walkable new urban LEED_NeighborhoodDevelopment (LEED-ND) community design and children's physical activity: selection, environmental, or catalyst effects? Int J Behav Nutr Phys Act. 2011;8:139. https://www.ncbi.nlm.nih.gov/pubmed/22185673

41: Calise TV, Heeren T, DeJong W, Dumith SC, Kohl HW, 3rd. Do neighborhoods make people active, or do people make active neighborhoods? Evidence from a planned community in Austin, Texas. Prev Chronic Dis. 2013;10:E102. https://www.ncbi.nlm.nih.gov/ pubmed/23786909

42: National Complete Streets Coalition. Greenfield Tool Box: Connectivity Index. Calgary, Canada: Calgary Regional partnership; n.d. http:// greenfield.calgaryregion.ca/tools/greenfield_process_connectivityIndex. pdf

43: Walk Score. Walk Score Methodology. https://www.walkscore.com/ methodology.shtml. Published n.d. Accessed July 27, 2016.

44: New York City Department of Transportation. Street Design Manual. New York, NY: New York City Department of Transportation; 2015. http://www.nyc.gov/html/dot/html/pedestrians/streetdesignmanual.shtml

45: U.S. Department of Health and Human Services. STEP IT UP! The Surgeon General's Call to Action to Promote Walking and Walkable Communities. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General;2015. http://www. surgeongeneral.gov/library/calls/walking-and-walkable-communities/ call-to-action-walking-and-walkable-communites.pdf

46: City of New York. Active Design: Shaping the Sidewalk Experience. New York, NY: City of New York; 2013. http://www1.nyc.gov/assets/planning/ download/pdf/plans-studies/active-design-sidewalk/active_design.pdf or http://www.drkarenlee.com/resources/sidewalks

47: Ewing R, Hajrasouliha A, Neckerman KM, Purciel-Hill M, Greene W. Streetscape Features Related to Pedestrian Activity. Journal of Planning Education and Research. 2015;36(1):5-15. http://jpe.sagepub.com/content/36/1/5.abstract

48: Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies-Trees and Vegetation. Washington, DC: Environmental Protection Agency; 2008. https://www.epa.gov/sites/production/files/2014-06/documents/treesandvegcompendium.pdf

49: World Health Organization. Make walking safe: a brief overview of pedestrian safety around the world Geneva, Switzerland: WHO Press; 2013:1-8. http://who.int/violence_injury_prevention/publications/road_traffic/make_walking_safe.pdf?ua=1&ua=1

50: City of New York. Vision Zero Action Plan. New York, NY: City of New York; 2014. http://www.nyc.gov/html/visionzero/pdf/nyc-vision-zeroaction-plan.pdf

51: Business Sweden-The Swedish Trade and Invest Council. Vision Zero-Traffic Safety by Sweden. http://www.visionzeroinitiative.com/. Published n.d. Accessed November 20, 2016.

52: Johns Hopkins Center for Injury Research and Policy, NYC Department of Health and Mental Hygiene, Society for Public Health Education. Active Design Supplement: Promoting Safety. Vol 2. New York, NY;2013.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

http://www.jhsph.edu/research/centers-and-institutes/johns-hopkinscenter-for-injury-research-and-policy/publications_resources/ CenterPubs/PromotingSafety.html or http://www.drkarenlee.com/resources/safety

53: Pollack KM, Bailey MM, Gielen AC, et al. Building safety into active living initiatives. Prev Med. 2014;69 Suppl 1:S102-105. https://www.ncbi.nlm. nih.gov/pubmed/25117526

54: National Association of City Transportation Officials. Urban Street Design Guide. New York, NY: Island Press; 2013. http://nacto.org/ publication/urban-street-design-guide/

55: Retting RA, Ferguson SA, McCartt AT. A review of evidence-based traffic engineering measures designed to reduce pedestrian-motor vehicle crashes. Am J Public Health. 2003;93(9):1456-1463. https://www.ncbi.nlm.nih.gov/pubmed/12948963

56: World Health Organization. Road traffic injury prevention: training manual. Geneva, Switzerland: WHO Press; 2006. http://whqlibdoc.who. int/publications/2006/9241546751_eng.pdf

57: Institute of Transportation Engineers. Traffic Calming Measures. http:// www.ite.org/traffic/tcdevices.asp. Published n.d. Accessed July 28, 2016.

58: New York City Department of Transportation. Cycling in the City. New York, NY: City of New York;2016. http://www.nyc.gov/html/dot/ downloads/pdf/cycling-in-the-city.pdf

59: Brian McKenzie. Modes Less Traveled?Bicycling and Walking to Work in the United States: 2008?2012. U.S. Census Bureau; 2014. http://www. census.gov/hhes/commuting/files/2014/acs-25.pdf

60: Urban Land Institute. Active Transportation and Real Estate: The Next Frontier. Washington, DC: Urban Land Institute; 2016. http://uli.org/ wp-content/uploads/ULI-Documents/Active-Transportation-and-RealEstate-The-Next-Frontier.pdf

61: Johan de Hartog J, Boogaard H, Nijland H, Hoek G. Do the health benefits of cycling outweigh the risks? Environ Health Perspect. 2010;118(8):1109-1116. https://www.ncbi.nlm.nih.gov/ pubmed/20587380

62: Wahlgren L, Schantz P. Exploring bikeability in a suburban metropolitan area using the Active Commuting Route Environment Scale (ACRES). Int J Environ Res Public Health. 2014;11(8):8276-8300. https://www.ncbi.nlm.nih.gov/pubmed/25153462

63: Winters M, Brauer M, Setton EM, Teschke K. Built environment influences on healthy transportation choices: bicycling versus driving. J Urban Health. 2010;87(6):969-993. https://www.ncbi.nlm.nih.gov/pubmed/21174189

64: Alliance for Biking and Walking. Bicycling & Walking in the United States: 2016 Benchmarking Report. Washington, DC;2016. http://www. bikewalkalliance.org/resources/benchmarking

65: Gu J, Mohit B, Muennig PA. The cost-effectiveness of bike lanes in New York City. Inj Prev. 2017;23(4):239-243. https://www.ncbi.nlm.nih.gov/ pubmed/27613434

66: National Association of City Transportation Officials. Urban Bikeway Design Guide, Second Edition. New York, NY: Island Press; 2014:260. http://nacto.org/publication/urban-bikeway-design-guide/

67: Jack Cebe, Joe Gilpin, Steve Durrant, Alta Planning + Design. Winter Bike Lane Maintenance: A Review of National and International Best Practices (Updated 2/14). Perspectives in Planning. n.d.;2(1). http://www.altaplanning.com/wp-content/uploads/winter-bike-riding-white-paperalta.pdf

68: Walk Score. Bike Score. https://www.walkscore.com/bike-scoremethodology.shtml. Published n.d. Accessed October 7, 2016.

69: Federal Highway Administration. Lesson 17: Bicycle Parking and Storage. In: U.S. Department of Transportation, ed. Washington, DC:2006. https://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/ pdf/lesson17lo.pdf

70: TriMet. TriMet Bike Plan. Portland, OR: TriMet; 2016. http://trimet.org/ bikeplan/bikeplan-web.pdf

71: Transportation Alternatives. Bicycle Parking Solutions: A Resource Guide for Improving Secure Bicycle Parking in New York City. New York, NY: Transportation Alternatives; n.d. https://www.transalt.org/sites/default/ files/issues/bike/bikeparking.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

72: Transportation Alternatives. Indoor Bicycle Parking. https://www.transalt.org/issues/bike/network/parking/indoor. Published n.d. Accessed July 29, 2016.

73: Pucher J, Dill J, Handy S. Infrastructure, programs, and policies to increase bicycling: an international review. Prev Med. 2010;50 Suppl 1:S106-125. https://www.ncbi.nlm.nih.gov/pubmed/19765610

74: City of New York. Subchap. 17-? 20-327.1 Bicycle Parking Spaces. New York, NY: City of New York; 2011. https://www.lawserver.com/law/state/ new-york/ny-laws/ny_new_york_city_administrative_code_20-327-1

75: New York City Department of Transportation. Bikes in Buildings. http://www.nyc.gov/html/dot/html/bicyclists/bikesinbuildings.shtml. Published n.d. Accessed October 7, 2016.

76: Teschke K, Frendo T, Shen H, et al. Bicycling crash circumstances vary by route type: a cross-sectional analysis. BMC Public Health. 2014;14:1205. https://www.ncbi.nlm.nih.gov/pubmed/25416928

77: City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. New York, NY;2010. http://www1.nyc.gov/assets/ planning/download/pdf/plans-studies/active-design-guidelines/adguidelines.pdf or http://www.drkarenlee.com/resources/sidewalks

78: Fishman E, Washington S, Haworth N. Bike Share: A Synthesis of the Literature. Transport Reviews. 2013;33(2):148-165. http://www. tandfonline.com/doi/abs/10.1080/01441647.2013.775612

79: Fishman E, Washington S, Haworth N. Bikeshare?s impact on active travel: Evidence from the United States, Great Britain, and Australia. Journal of Transport & Health. 2015;2(2):135-142. http://www.sciencedirect.com/science/article/pii/S2214140515000195

80: Fuller D, Gauvin L, Morency P, Kestens Y, Drouin L. The impact of implementing a public bicycle share program on the likelihood of collisions and near misses in Montreal, Canada. Prev Med. 2013;57(6):920-924. https://www.ncbi.nlm.nih.gov/pubmed/23747355

81: Institute for Transportation Development and Policy. The Bike-Share Planning Guide. New York, NY: Institute for Transportation Development and Policy; 2013. https://www.itdp.org/the-bike-share-planningguide-2/

82: American Public Transportation Association. Public Transportation Benefits. http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx. Published n.d. Accessed June 28, 2016.

83: International Association of Public Transport. Statistics Brief. Brussels, Belgium;2016. http://www.uitp.org/sites/default/files/cck-focuspapers-files/UITP_Statistics_PT_in_EU_DEF_0.pdf

84: American Public Transportation Association. Public transportation use is growing-here are the facts. http://www.apta.com/mediacenter/ ptbenefits/Pages/Public-Transportation-Use-is-Growing-.aspx. Published 2014. Accessed October 12, 2016.

85: Besser LM, Dannenberg AL. Walking to public transit: steps to help meet physical activity recommendations. Am J Prev Med. 2005;29(4):273-280. https://www.ncbi.nlm.nih.gov/pubmed/16242589

86: Active Living Research. Active Transportation: Making the Link from Transportation to Physical Activity and Obesity. San Diego, CA: Robert Wood Johnson Foundation;2009. http://activelivingresearch.org/sites/default/files/ALR_Brief_ActiveTransportation_0.pdf

87: Urban Land Institute. Intersections: Health and the Built Environment. Washington, DC: Urban Land Institute;2013. http://uli.org/wp-content/ uploads/ULI-Documents/Intersections-Health-and-the-BuiltEnvironment.pdf

88: Jiang Y, Christopher Zegras P, Mehndiratta S. Walk the line: station context, corridor type and bus rapid transit walk access in Jinan, China. Journal of Transport Geography. 2012;20(1):1-14. http://www.sciencedirect.com/science/article/pii/S0966692311001499

89: Deng T, Nelson JD. Bus Rapid Transit implementation in Beijing: An evaluation of performance and impacts. Research in Transportation Economics. 2013;39(1):108-113. http://www.sciencedirect.com/science/article/pii/S0739885912000741

90: Day K, Loh L, Ruff RR, et al. Does Bus Rapid Transit promote walking? An examination of New York City's Select Bus Service. J Phys Act Health. 2014;11(8):1512-1516. https://www.ncbi.nlm.nih.gov/pubmed/24732785

91: MacDonald JM, Stokes RJ, Cohen DA, Kofner A, Ridgeway GK. The effect of light rail transit on body mass

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

index and physical activity. Am J Prev Med. 2010;39(2):105-112. https://www.ncbi.nlm.nih.gov/pubmed/20621257

92: Walk Score. Transit Score Methodology. https://www.walkscore.com/ transit-score-methodology.shtml. Published n.d. Accessed October 11, 2016.

93: Herber S. Levinson, Paul Ryus, Joseph L. Schofer, et al. Guidelines for Providing Access to Public Transportation Stations. Washington, DC: Transportation Research Board;2012. http://www.trb.org/Publications/ Blurbs/166516.aspx

94: Centers for Disease Control and Prevention. Physical Activity: Transportation and Travel Policies and Practices. https://www. thecommunityguide.org/findings/physical-activity-transportation-andtravel-policies-and-practices. Published 2004. Accessed April 2, 2016.

95: American Public Transportation Association. Working with the Media. http://www.publictransportation.org/community/media/Pages/default. aspx. Published n.d. Accessed June 23, 2017.

96: Erik Weber, Ethan Arpi, Aileen Carrigan, Dave K. Cooper. From Here to There: A creative guide to making public transit the way to go. Washington, DCn.d. http://www.wrirosscities.org/sites/default/files/EMB2011_From_Here_to_There_web.pdf

97: Valley Regional Transit. Bust Stop Location and Transit Amenities Development Guidelines. 2013. http://www.valleyregionaltransit.org/ Portals/0/Board/2013/BusStopGuidelines.pdf

98: City of New York. Coordinated Street Furniture-Bus Shelters. http://www.nyc.gov/html/dot/html/infrastructure/streetfurniture.shtml. Published n.d. Accessed November 19, 2016.

99: Passini R. Wayfinding in architecture. New York: Van Nostrand Reinhold; 1984.

100: Barbara J. Huelat. Wayfinding: Design for Understanding. The Center for Health Design; 2007. https://www.healthdesign.org/chd/research/ wayfinding-design-understanding

101: Transportation for London. Legible London. https://tfl.gov.uk/info-for/ boroughs/legible-london?intcmp=16006. Published n.d. Accessed November 10, 2016.

102: David Kanthor. Pedestrian Wayfinding. Philadelphia, PA: Delaware Valley Regional Planning Commission; 2013. http://www.dvrpc.org/ Transportation/BicyclePedestrian/Summit/14.Walk Philadelphia and Wayfinding in Center City - Kanthor.pdf

103: New York City Department of Transportation. Pedestrians: WalkNYC. http://www.nyc.gov/html/dot/html/pedestrians/walknyc.shtml. Published n.d. Accessed Novemeber 10, 2016.

104: Ingunn Fjortoft. Landscape as Playscape: The Effects of Natural Environments on Children?s Play and Motor Development. Children, Youth, and Environments. 2004;14(2):21-44. http://www.springzaad.nl/litdocs/landscape_as_playscape_the_effects_of_natural_environments_on_childrens_play_and_motor_development.pdf

105: Active Living Research. The potential for safe, secure and accessible playgrounds to increase childrens physical activity. Princeton, NJ: Robert Wood Johnson Foundation;2011. http://activelivingresearch.org/sites/default/files/ALR_Brief_SafePlaygrounds_0.pdf

106: Nicola Ridgers, Gareth Stratton, Stuart Fairclough, Jos Twisk. Long-term effects of a playground markings and physical structures on children's recess physical activity levels. Prev Med. 2007;44:393-397.

107: Blaes A, Ridgers ND, Aucouturier J, et al. Effects of a playground marking intervention on school recess physical activity in French children. Prev Med. 2013;57(5):580-584. https://www.ncbi.nlm.nih.gov/pubmed/23933267

108: Willenberg LJ, Ashbolt R, Holland D, et al. Increasing school playground physical activity: a mixed methods study combining environmental measures and children's perspectives. J Sci Med Sport. 2010;13(2):210- 216. https://www.ncbi.nlm.nih.gov/pubmed/19553158

109: Jeri Brittin, Dina Sorensen, Matthew Trowbridge, et al. Physical Activity Design Guidelines for School Architecture. PLoS One. 2015;10(7). http:// journals.plos.org/plosone/article?id=10.1371/journal.pone.0132597

110: Escalante Y, Garcia-Hermoso A, Backx K, Saavedra JM. Playground designs to increase physical activity

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

levels during school recess: a systematic review. Health Educ Behav. 2014;41(2):138-144. https://www.ncbi.nlm.nih.gov/pubmed/23836828

111: Nicaise V, Kahan D, Reuben K, Sallis JF. Evaluation of a redesigned outdoor space on preschool children's physical activity during recess. Pediatr Exerc Sci. 2012;24(4):507-518. https://www.ncbi.nlm.nih.gov/pubmed/23196760

112: Centers for Disease Control and Prevention. Physical Activity: Creation of or Enhanced Access to Places for Physical Activity Combined with Informational Outreach Activities. https://www.thecommunityguide.org/findings/physical-activity-creation-or-enhanced-access-placesphysical-activity-combined. Published 2001. Accessed October 19,, 2016.

113: Han B, Cohen DA, Derose KP, et al. How much neighborhood parks contribute to local residents' physical activity in the City of Los Angeles: a meta-analysis. Prev Med. 2014;69 Suppl 1:S106-110. https://www.ncbi.nlm.nih.gov/pubmed/25199733

114: Bancroft C, Joshi S, Rundle A, et al. Association of proximity and density of parks and objectively measured physical activity in the United States: A systematic review. Soc Sci Med. 2015;138:22-30. https://www.ncbi. nlm.nih.gov/pubmed/26043433

115: Pleson E, Nieuwendyk LM, Lee KK, et al. Understanding older adults' usage of community green spaces in Taipei, Taiwan. Int J Environ Res Public Health. 2014;11(2):1444-1464. https://www.ncbi.nlm.nih.gov/pubmed/24473116

116: Lovasi GS, Hutson MA, Guerra M, Neckerman KM. Built environments and obesity in disadvantaged populations. Epidemiol Rev. 2009;31:7-20. https://www.ncbi.nlm.nih.gov/pubmed/19589839

117: McKenzie TL, Moody JS, Carlson JA, Lopez NV, Elder JP. Neighborhood Income Matters: Disparities in Community Recreation Facilities, Amenities, and Programs. J Park Recreat Admi. 2013;31(4):12-22. https://www.ncbi.nlm.nih.gov/pubmed/25006598

118: Gomez LF, Sarmiento R, Ordonez MF, et al. Urban environment interventions linked to the promotion of physical activity: a mixed methods study applied to the urban context of Latin America. Soc Sci Med. 2015;131:18-30. https://www.ncbi.nlm.nih.gov/pubmed/25748111

119: Halonen JI, Stenholm S, Kivimaki M, et al. Is change in availability of sports facilities associated with change in physical activity? A prospective cohort study. Prev Med. 2015;73:10-14. https://www.ncbi.nlm.nih.gov/pubmed/25602907

120: Hillsdon M, Panter J, Foster C, Jones A. Equitable access to exercise facilities. Am J Prev Med. 2007;32(6):506-508. https://www.ncbi. nlm.nih.gov/pubmed/17533066

121: Cohen DA, Marsh T, Williamson S, Golinelli D, McKenzie TL. Impact and cost-effectiveness of family Fitness Zones: a natural experiment in urban public parks. Health Place. 2012;18(1):39-45. https://www.ncbi.nlm.nih.gov/pubmed/22243905

122: Chow HW. Outdoor fitness equipment in parks: a qualitative study from older adults' perceptions. BMC Public Health. 2013;13:1216. https://www.ncbi.nlm.nih.gov/pubmed/24359536

123: Deborah Cohen, Terry Marsh, Stephanie Williamson, Thomas McKenzie, Daniela Golinelli. Family Fitness Zones Increase MVPA. Paper presented at: 2011 Active Living Research Annual Conference; 2011.

124: World Health Organization. Promoting physical activity and active living in urban environments: The role of local governments. Geneva, Switzerland: WHO Press; 2006. http://www.euro.who.int/__data/assets/pdf_file/0009/98424/E89498.pdf

125: Robert Wood Johnson Foundation. Policies & Programs, filtered by "Diet and Exercise"-Policies and programs that can improve health. http://www.countyhealthrankings.org/policies/communityfitness-programs. Published n.d. Accessed July 27, 2016.

126: Centers for Disease Control and Prevention. Physical Activity: Community Strategies. https://www.cdc.gov/physicalactivity/ community-strategies/index.htm. Published 2015. Accessed November 14, 2016.

127: City of New York. Shape Up NYC. https://www.nycgovparks.org/ programs/recreation/shape-up-nyc. Published n.d. Accessed November 17, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

128: City of New York. Play Streets. https://www1.nyc.gov/site/doh/ health/health-topics/play-streets.page. Published n.d. Accessed November 16, 2016.

129: Wolf SA, Grimshaw VE, Sacks R, et al. The impact of a temporary recurrent street closure on physical activity in New York City. J Urban Health. 2015;92(2):230-241. https://www.ncbi.nlm.nih.gov/pubmed/25575672

130: Cohen D, Han B, Derose KP, et al. CicLAvia: Evaluation of Participation, physical activity and cost of an open streets event in Los Angeles. Prev Med. 2016;90:26-33. https://www.ncbi.nlm.nih.gov/pubmed/27317978

131: Eyler AA, Hipp JA, Lokuta J. Moving the Barricades to Physical Activity: A Qualitative Analysis of Open Streets Initiatives Across the United States. Am J Health Promot. 2015;30(1):e50-58. https://www.ncbi.nlm.nih.gov/pubmed/25162326

132: Hipp JA, Eyler AA, Kuhlberg JA. Target population involvement in urban ciclovias: a preliminary evaluation of St. Louis open streets. J Urban Health. 2013;90(6):1010-1015. https://www.ncbi.nlm.nih.gov/pubmed/22948790

133: Sarmiento O, Torres A, Jacoby E, et al. The Ciclovia-Recreativa: A mass-recreational program with public health potential. J Phys Act Health. 2010;7 Suppl 2:S163-180. https://www.ncbi.nlm.nih.gov/pubmed/20702905

134: Zieff SG, Hipp JA, Eyler AA, Kim MS. Ciclovia initiatives: engaging communities, Partners, and policy makers along the route to success. J Public Health Manag Pract. 2013;19(3 Suppl 1):S74-82. https://www.ncbi.nlm.nih.gov/pubmed/23529059

135: U.S. Public Health Service. Pets Promote Public Health. Washington, DC: U.S. Public Health Service; n.d. http://dcp.psc.gov/osg/veterinarian/documents/Petspublichealth.pdf

136: Cutt H, Giles-Corti B, Knuiman M, Burke V. Dog ownership, health and physical activity: a critical review of the literature. Health Place. 2007;13(1):261-272. https://www.ncbi.nlm.nih.gov/pubmed/16503185

137: U.S. Green Building Council. LEED v4 for Neighborhood Development. Washington, DC: U.S. Green Building Council; 2014. http://www.usgbc. org/sites/default/files/LEED v4 ND_04.05.16_current.pdf

138: Federal Highway Administration. Separated Bike Lane Planning and Design Guide. In: U.S. Department of Transportation, ed. Washington, DC: Federal Highway Administration; 2015. http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/separatedbikelane_ pdg.pdf

139: U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. http://health.gov/paguidelines/guidelines/children. aspx. Published 2008. Accessed June 10, 2016.

25: World Health Organization. Global Status Report on Road Safety. Geneva, Switzerland: World Health Organization;2015. http://www.who.int/violence_ injury_prevention/road_safety_status/2015/en/

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

THERMAL COMFORT

Extreme hot and cold temperatures can result in extended periods of extreme weather, resulting in events such as summer heat waves and winter cold spells.[1] Heat waves, defined as periods of hot weather that persist for multiple days, can lead to an increased risk of hyperthermia as well as all-cause morbidity and mortality.[2] Cold spells, or periods of cold weather persisting for multiple days, can result in hypothermia as well as increased risk for all-cause mortality.[3] Due to the substantial variations in local climates, both heat waves and cold spells are defined relative to local conditions. Vulnerable groups including children, the elderly, outdoor workers and individuals with preexisting health conditions are particularly vulnerable to both extremely hot and extremely cold temperatures.[3-6] The largest increase in excess mortality in recent history attributed to a single heat wave occurred in Europe in August of 2003: a total of 70,000 excess deaths were documented.[7] Studies project substantial increases of heat-related mortality under a changing climate rarely offset by decreases in cold-related deaths.[8-10]

As the urban landscape evolves, buildings, roads and infrastructure replace areas that were once open land and sources of vegetation. This development has led to the formation of urban heat islands, a phenomenon whereby dense urban areas experience higher temperatures and slower cooling than their rural surroundings.[11] In densely populated urban areas, solar energy is absorbed by solid building materials and released back into the atmosphere, keeping temperatures elevated while the temperatures in surrounding, less densely populated areas drop at night.[12] Urban heat islands are a major problem in densely developed areas, as the effects cause increases in energy consumption, elevated emissions of air pollutants, decreased water quality and compromised human health.[11-14]

In addition to the sun's health impacts related to increased ambient temperatures, the long-term effects of exposure to ultraviolet radiation from solar rays are a known cause of skin cancer.[15-17] Globally, between two and three million non-melanoma skin cancers and 132,000 melanoma skin cancers occur each year, and are responsible for an estimated 10,000 deaths a year.[18,19] Furthermore, while not a direct effect of an increase in temperature, sunburns are a physical manifestation of solar damage.[20] Damage to the skin caused by ultraviolet radiation, a sunburn, causes swelling, pain, redness and blistering.[20]

The World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and other institutions present interventions aimed at protecting both vulnerable populations and the community at large during periods of extreme high or low temperature. Policies that support early weather warning systems, access to designated areas for shelter and respite, mitigation of urban heat island effects through building and landscaping guidelines and strategies that decrease absorption of solar energy and increase evapotranspiration can work together to produce an appreciable reduction on the power grid and improve community health.[6,13,21,22,23]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

EXT EXTREME WEATHER WARNINGS | P

Intent: To protect against indoor and outdoor impacts of extreme temperatures by communicating extreme weather warnings and health-relevant advice in a timely manner to all people in the community potentially affected by extreme weather events.

Summary: Periods of extended heat and extreme cold can have significant adverse impacts on physical and mental health.[6,24,25,26,27] Heat waves can result in discomfort, respiratory difficulties, heat cramps and exhaustion as well as heat stroke and heat-related mortality.[12,28] Cold spells can lead to increased systolic and diastolic blood pressure, greater risk of myocardial infarction and stroke and other types of cold-related morbidity and mortality.[26] Vulnerable populations such as the elderly and homeless are particularly susceptible to heat- and cold-related distress.[4,28] The effects of heat waves occur within one to two days, while the impacts of cold spells may occur over longer periods.[26,29] Studies have demonstrated a reduction of heat- and cold-related adverse effects in communities where preventative measures have been implemented.[3,30] Early warnings play a critical role in protecting communities, particularly the most vulnerable individuals, from adverse health impacts.[31] A mechanism for issuing heat and cold warnings as well as a basic communication plan should exist in every community to address the adverse population impacts of extreme weather. Since both heat waves and cold spells are defined relative to local conditions, percentile thresholds are commonly used to issue replicable thresholds.[31] Temperatures above the 95th or 99th percentiles have been associated with heat-wave–related mortality and temperatures under the 1st or 5th percentiles with cold-spell–related mortality.[3,29,32,33] Heat waves and cold spells are often defined as temperatures below or above the identified thresholds indicators for at least two consecutive days.[31,24,25,26,27]

Part 1 Heat Warnings

For All Spaces:

Advance heat warnings are issued when local temperatures exceed either one of the following conditions:

a. Existing heat indices or other threshold values that meet a location-specific definition of a heat wave.[35]
b. The 95th percentile for two or more consecutive days.[31,35]

Part 2 Cold Warnings

For All Spaces:

Advance cold warnings are issued when local temperatures fall below either one of the following conditions:

a. The 5th percentile for two or more consecutive days.[3]
b. Existing threshold values that meet a location-specific definition of a cold spell![35]

Part 3 Adverse Impacts Communication

For All Spaces:

The following requirement is met:

a. A public education and outreach plan is in place to communicate ways to protect against the indoor and outdoor impacts of extreme weather before, during and after heat waves and cold spells, with particular focus on communicating to the elderly, children, mobility-restricted individuals and low-income households.[3,36,37]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HET URBAN HEAT ADAPTATION: COMMUNITY SUPPORT | O (MAX: 1 PT)

Intent: To promote community resiliency during extreme heat events, particularly as it relates to equipping vulnerable populations with tools to offset potential negative health impacts, via infrastructural and basic needs support.

Summary: Although heat warnings are important regarding reducing urban heat and heat-related impacts, they are likely to have limited effectiveness if not accompanied by comprehensive strategies addressing adverse heat impacts.[38] Urban adaptation to heat should encompass various measures that improve both the emergency response to heat waves and the long-term heat resilience of communities.[36] These measures should ideally go beyond basic extreme weather response warnings and communication and integrate quantitative and qualitative data on exposure, sensitivity and adaptive capacity.[39] Communities may also consider implementing protocols whereby residents check in on high-risk groups during emergency events to provide assistance and support if necessary. These practices are strongly encouraged to foster social cohesion in the community and to promote health and well-being during heat-wave episodes. For instance, one study estimated that heat warnings, in combination with other heat adaptation measures, reduced excess mortality in Philadelphia by 2.6 lives per day over a three-year period among individuals 65 years of age and older.[40]

Part 1 Cooling Shelters

For All Spaces:

The following requirements are met when heat warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

a. Public announcements informing the public of all heat-relief services available in the community.[36,41]
b. Public and privately owned buildings with designated public use space, if present, are open during normal business hours and designated as public cooling shelters.[36,42]
c. Public and private homeless shelters, if present, provide connection services to find vacancies to accommodate all homeless persons.[36,41]

Part 2 Utility Management for Hot Weather

For All Spaces:

One of the following requirements is met when heat warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

a. Planned upcoming utility shutoffs are temporarily suspended.[28]
b. Cooling assistance is provided for energy use in low-income households.[43]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HPE URBAN HEAT ADAPTATION: PUBLIC EDUCATION | O (MAX: 1 PT)

Intent: To promote community resiliency during extreme heat events, particularly as it relates to educating vulnerable populations about tools to offset potential negative health impacts.

Summary: Although heat warnings are important for reducing urban heat and reducing heat-related impacts, they are likely to have limited effectiveness if not accompanied by comprehensive strategies addressing adverse heat impacts.[38] Common community practices range from operating emergency "heat lines" and cooling centers to community education aimed at improving heat risk awareness, working closely with health service providers and encouraging residents to check in on each other in times of extreme weather.[44-46]

Part 1 Emergency Phone Lines

For All Spaces:

Emergency heat lines are operated for community members to receive information on at least the following:

a. Symptoms of heat stress and other heat-related morbidities.[47]
b. Available heat-related services and resources in the community.[47]

Part 2 Community Education and Engagement

For All Spaces:

The following requirements are met:

a. Community education initiatives are planned in collaboration with local organizations throughout the year on symptoms of heat stress and necessary measures to help protect the health and well-being of vulnerable populations, including the elderly, children, mobility-restricted individuals, outdoor workers and low-income households.[36]
b. Specific community members are designated responsible for performing checks during heat waves on vulnerable populations, including the elderly, children, mobility-restricted individuals and low-income households.[44]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CLD URBAN COLD ADAPTATION: COMMUNITY SUPPORT | O (MAX: 1 PT)

Intent: To promote community resiliency during extreme cold weather events, particularly as it relates to equipping vulnerable populations with tools designed to offset potential negative health impacts, via infrastructural and basic needs support.

Summary: Urban adaptation to cold weather involves a comprehensive set of measures aimed at improving the community response. For instance, longer and more intense cold spells, as well as cold spells occurring earlier in the season, are more dangerous to humans.[32] In addition, since a substantial portion of the cold-related health impacts are due to factors other than cold weather, such as influenza, the prevention of influenza, cardiovascular diseases and other common cold-season health issues can improve the public health resilience to cold temperatures.[48] Any local adaptation measures should consider individual-level vulnerabilities, including homelessness, poverty, old or young age, disability and various health conditions.[3,49] Various short- and long-term measures such as financial aid for energy use, operating warming shelters and improving housing conditions can be implemented to reduce cold-related health impacts.[50,51]

Part 1 Warming Shelters

For All Spaces:

The following requirements are met when cold warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

a. Public and private homeless shelters, if present, provide connection services to find vacancies to accommodate all homeless persons.[41]
b. Public announcements informing the public of all available cold relief services and locations.[41]

Part 2 Utility Management for Cold Weather

For All Spaces:

One of the following requirements is met when cold warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

a. Planned upcoming utility shutoffs are temporarily suspended.
b. Financial aid is provided for energy use in low-income households.[3]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CPE URBAN COLD ADAPTATION: PUBLIC EDUCATION | O (MAX: 1 PT)

Intent: To promote community resiliency during extreme cold weather events, particularly as it relates to educating vulnerable populations about tools to offset potential negative health impacts.

Summary: Urban adaptation to cold should involve a comprehensive set of measures aimed at providing a high level of awareness of possible disease during the winter season. For instance, longer and more intense cold spells as well as cold spells occurring earlier in the season are more dangerous to humans.[32] Various short- and long-term measures such as risk communication and education should be implemented to reduce cold-related health impacts in parallel with issuing cold warnings.[3,50]

Part 1 Public Health Preparedness

For All Spaces:

Community education programs are initiated to educate the public on at least the following:

a. Common diseases related to cold weather events such as influenza, the common cold, sinusitis, cardiovascular diseases and asthma.[3]

b. Individual-level cold adaptation strategies such as wearing appropriate clothing, exercise and avoiding alcohol and drug use.[50]

c. Related services and resources available in the community such as immunizations.[3]

Part 2 Community Outreach

For All Spaces:

One of the following requirements is met:

a. Educating homeowners, building managers and other stakeholders who can improve the energy efficiency of buildings (e.g., through retrofit programs) about the long-term financial and health benefits of various interventions.[50]

b. Improving community cohesion by enabling a dialogue between citizens, policy makers and various professionals involved with cold adaptation, such as public health workers and emergency planners.[50,52]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HIM URBAN HEAT ISLAND MITIGATION | O (MAX: 1 PT)

Intent: To diminish the buildup of heat in cities by reducing the amount absorbed and retained by buildings and hardscape.

Summary: As communities expand, development replaces natural features of the landscape. By replacing open spaces and vegetation with buildings that inhibit wind and that use materials that retain heat, a new phenomenon known as the urban heat island has permeated the urban landscape.[53-55] The most prominent feature of an urban heat island is a sustained elevated temperature when compared to the immediately surrounding suburban or undeveloped areas.[11] A cascade of negative effects associated with sustained elevated temperature, such as increased energy demand and increased air pollution, pose a dangerous threat to urban populations. A wide range of infrastructure-related and greening strategies can be adopted to mitigate urban heat islands. Most strategies are aimed at restoring the natural system of evapotranspiration, thereby releasing solar radiation back toward the sky.[13] For example, green roofs not only reduce the temperature inside of buildings as a result of evapotranspiration and the shading but also have a cooling effect on the ambient air.[56] Various cool roof technologies similarly lower local air temperatures and improve human comfort.[57-59] Reducing surface temperatures of sidewalks, roadways and parking lots can also be effectively achieved through a mixture of greening, use of various high albedo and colored pavements and design strategies. Three overall strategies are traditionally used to reduce surface temperature of pavements: (1) increasing albedo, (2) reducing the proportion of the absorption to the thermal conduction and (3) raising thermal inertia.[60] Specific approaches include resurfacing pavements with light-colored materials or utilizing reflective concrete or thermochromic pavements.[61-63] Water-holding and heat- harvesting pavements are also efficient in mitigating the urban heat island.[64-67]

Part 1 Roof Tops

For All Spaces:

75% of all non-occupiable or non-mechanical rooftops (excluding areas with photovoltaic installations) owned, operated or managed by the project owner meet one or more of the following:

a. Low-sloped roofs (slope ≤ 2:12) have a three-year aged solar reflectance index (SRI) of 64, or an initial SRI of 82.[69]
b. Steep-sloped roofs (slope > 2:12) have a three-year aged SRI of 32, or an initial SRI of 39.[69]
c. Uses a green roof system that includes at least a 2-inch covering of hardy groundcover.[56,58,68]

Part 2 Sidewalks and Roadways

For All Spaces:

For 50% or more of pedestrian-accessible street segments in the project and for 50% of roadways in the project, one or more of the following is met:

a. Sidewalks provide shade with trees or with architectural devices or structures that have a three-year aged solar reflectance (SR) value of at least 0.28, or an initial SR of at least 0.33 at installation.[69]
b. Roads use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28, or initial SR of at least 0.33 at installation.[69]

Part 3 Parking Lots

For All Spaces:

25% or more of all parking (measured by number of spaces) meets one of the following requirements:

a. Constructed of cool pavement such as asphalt modified with high albedo materials or colored pavements.[62,70,71]
b. Grass covered with soil enclosed in a lattice structure providing lateral containment.[71-73]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

c. Constructed of vegetated or non-vegetated permeable pavements.[70,74]

d. Covered by another floor of parking, a building, a roof, or other coverings.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

VEG URBAN VEGETATION AND GREEN SPACES | O (MAX: 1 PT)

Intent: To promote heat mitigation strategies relying on tree and/or vegetation that reflect local climate conditions in both sparse and crowded areas.

Summary: Urban vegetation can play an important role in moderating local climate throughout the year. The use of trees or vegetation facilitates evapotranspiration through the provision of shade, contributing to lower surface and air temperatures.[13] A shaded surface can be up to 25 °C [45 °F] cooler than the peak temperature of the unshaded surface.[75] Co-benefits of introducing urban vegetation and green spaces into a community include improved air quality, water quality (often via improved stormwater management) and savings in energy and pavement maintenance.[75] Mimicking natural ecosystems can also be a good strategy for improving sustainability and reducing tree maintenance requirements (i.e., by relying on plants that are native to the climate).[76]

Part 1 Tree Shading

For All Spaces:

One of the following requirements is met using trees and landscaping appropriate to the climate:

a. 25% or more of paved surfaces area as measured across the entirety of the project boundary including roads, pedestrian-accessible street segments and parking lots are covered within 15 years of construction by tree canopy.[76]

b. 25% or more of road length as measured across the entirety of the project boundary with more than one lane in each direction separated by a line of trees.[76,77]

Part 2 Vegetation Coverage

For All Spaces:

A combination of the following requirements is met for all playgrounds, sports fields, courtyards and public squares or plazas:

a. 10% or more of the area is covered with vegetation.[75,78] For trees, use the area of the canopy footprint. For climbing plants, use the area of the plant against the wall or trellis.

b. 10% or more of existing walls and other infrastructure are adapted to support vines or other types of green wall vegetation.[79,80]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WAT URBAN WATER BODIES | O (MAX: 1 PT)

Intent: To temper local temperature fluctuations in urban areas, particularly in hot climates.

Summary: Water bodies can have a positive effect on microclimates in urban areas by moderating extreme temperatures. Small water bodies such as fountains, pools and ponds can regulate temperature fluctuations and help improve thermal comfort during days of extreme heat.[81,82] Studies suggest that temperatures around and downwind of water bodies can be 1–2°C [2–4°F] lower compared to surrounding areas.[82]

Part 1 Water Bodies

For All Spaces:

At least one of the following water bodies is within 1.2 km [0.75 mi] walk distance (or 15-minute mass transit trip) of 50% of community residents:

a. A pond or other body of water.
b. A water fountain or other water feature.
c. A pool or alternative water body for swimming.[82]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SUN PERSONAL SUN EXPOSURE | O (MAX: 1 PT)

Intent: To promote a multipronged approach to ultraviolet radiation protective behaviors at the community level so that excessive exposure to the sun is limited.

Summary: Moderate exposure to sunlight can be beneficial; however, excessive exposure to sun can pose serious hazards. Ultraviolet (UV) radiation is a class 1 carcinogen, a "known human carcinogen" according to the International Agency for Research on Cancer (IARC).[83] Exposure to UV radiation, while not 100% preventable, is manageable. The CDC recommends interventions and strategies tailored to activity and setting, such as occupational exposure, tourist activity exposure and everyday precautions.[84,85]

Part 1 Occupational Exposure

For All Spaces:

Employers managed or contracted by the project owner requiring five or more employees to work outdoors at one time implement the following:

a. Work rest schedules based on heat index and level of activity.[86]
b. Ultraviolet radiation protection plan.[87]
c. Team health awareness plan.[88]

Part 2 Recreational Exposure

For All Spaces:

Recreation areas that are owned, operated or managed by the project owner that charge admission for the expressed purpose of tourism or leisure activity where patrons are exposed to direct sunlight for an extended period meet one of the following requirements:

a. Offer broad-spectrum UV protection at no cost, with a minimum sun protection factor (SPF) of 15 for times with least 50% of anticipated occupancy.[84]
b. Solar shades, umbrellas, tree canopies and other natural or artificially shaded areas that can provide coverage for at least 25% of anticipated occupancy.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: Environmental Protection Agency. Climate Change Indicators in the United States: High and Low Temperatures. https://www3.epa.gov/ climatechange/pdfs/print_high-low-temps-2013.pdf. Published 2013. Accessed July 20, 2016.

2: Centers for Disease Control and Prevention. Warning Signs and Symptoms of Heat-Related Illness. http://www.cdc.gov/extremeheat/ warning.html. Published 2011. Accessed July 26, 2016.

3: Laaidi K, Economopoulou A, Wagner V, et al. Cold spells and health: prevention and warning. Public Health. 2013;127(5):492-499. https:// www.ncbi.nlm.nih.gov/pubmed/23608022

4: Page LA, Hajat S, Kovats RS, Howard LM. Temperature-related deaths in people with psychosis, dementia and substance misuse. Br J Psychiatry. 2012;200(6):485-490. https://www.ncbi.nlm.nih.gov/ pubmed/22661680

5: Xu Z, Etzel RA, Su H, et al. Impact of ambient temperature on children's health: a systematic review. Environ Res. 2012;117:120-131. https:// www.ncbi.nlm.nih.gov/pubmed/22831555

6: Xiang J, Bi P, Pisaniello D, Hansen A. The impact of heatwaves on workers' health and safety in Adelaide, South Australia. Environ Res. 2014;133:90-95. https://www.ncbi.nlm.nih.gov/pubmed/24906072

7: Robine JM, Cheung SL, Le Roy S, et al. Death toll exceeded 70,000 in Europe during the summer of 2003. C R Biol. 2008;331(2):171-178.

8: Huang C, Barnett AG, Wang X, et al. Projecting future heat-related mortality under climate change scenarios: a systematic review. Environ Health Perspect. 2011;119(12):1681-1690. https://www.ncbi.nlm.nih.gov/ pubmed/21816703

9: Martin SL, Cakmak S, Hebbern CA, Avramescu ML, Tremblay N. Climate change and future temperature-related mortality in 15 Canadian cities. Int J Biometeorol. 2012;56(4):605-619. https://www.ncbi.nlm.nih.gov/ pubmed/21597936

10: Hajat S, Vardoulakis S, Heaviside C, Eggen B. Climate change effects on human health: projections of temperature-related mortality for the UK during the 2020s, 2050s and 2080s. J Epidemiol Community Health. 2014;68(7):641-648. https://www.ncbi.nlm.nih.gov/pubmed/24493740

11: Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies-Urban Heat Island Basics. Washington, DC: Environmental Protection Agency 2008. https://www.epa.gov/sites/ production/files/2014-06/documents/basicscompendium.pdf

12: Environmental Protection Agency. Heat Island Impacts https://www. epa.gov/heat-islands/heat-island-impacts - health. Published 2015. Accessed March 1, 2016.

13: Environmental Protection Agency. Heat Island Cooling Strategies https://www.epa.gov/heat-islands/heat-island-cooling-strategies. Published 2015. Accessed March 1, 2016.

14: Tremeac B, Bousquet P, de Munck C, et al. Influence of air conditioning management on heat island in Paris air street temperatures. Applied Energy. 2012;95:102-110. http://www.sciencedirect.com/science/ article/pii/S0306261912001092

15: Wu S, Han J, Vleugels RA, et al. Cumulative ultraviolet radiation flux in adulthood and risk of incident skin cancers in women. Br J Cancer. 2014;110(7):1855-1861. https://www.ncbi.nlm.nih.gov/ pubmed/24595003

16: Buendia-Eisman A, Conejo-Mir J, Prieto L, et al. "Buen Rayito Study": awareness, attitudes and behavior of teenagers to sunlight through a web based system in Spain. Eur J Dermatol. 2013;23(4):505-509. https://www.ncbi.nlm.nih.gov/pubmed/24001588

17: Idorn LW, Thieden E, Philipsen PA, Wulf HC. Influence of having a home garden on personal UVR exposure behavior and risk of cutaneous malignant melanoma in Denmark. Int J Cancer. 2013;132(6):1383-1388. https://www.ncbi.nlm.nih.gov/pubmed/22821769

18: World Health Organization. Ultraviolet radiation and the INTERSUN Programme. http://www.who.int/uv/faq/skincancer/en/index1.html. Published 2016. Accessed July 20, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

19: Skin Cancer Foundation. Prevention Guidelines. http://www.skincancer. org/prevention/sun-protection/prevention-guidelines. Published 2016. Accessed July 20, 2016.

20: Centers for Disease Control and Prevention. Chapter 2: The Pre-Travel Consultation Counseling & Advice for Travelers. Atlanta, GA: Centers for Disease Control and Prevention 2015. http://wwwnc.cdc.gov/travel/yellowbook/2016/the-pre-travel-consultation/sun-exposure

21: Rosenzweig C, Solecki WD, Parshall L, et al. Mitigating New Yok City's heat island: Integrating stakeholder perspectives and scientific evaluation Bulletin of the American Meteorological Scoiety. 2009;90:1297-1312. http://pubs.giss.nasa.gov/docs/2009/2009_ Rosenzweig_etal_1.pdf

22: Norton BA, Coutts AM, Livesley SJ, et al. Planning for cooler cities: A framework to prioritise green infrastructure to mitigate high temperatures in urban landscapes. Landscape and Urban Planning. 2015;134:127-138. http://www.sciencedirect.com/science/article/pii/ S0169204614002503

23: Centers for Disease Control and Prevention. Extreme heat can impact our health in many ways. https://www.cdc.gov/climateandhealth/pubs/ extreme-heat-final_508.pdf. Published n.d. Accessed July 21, 2016.

24: Kovats RS, Hajat S. Heat stress and public health: a critical review. Annu Rev Public Health. 2008;29:41-55. https://www.ncbi.nlm.nih.gov/ pubmed/18031221

25: Anderson GB, Bell ML. Heat waves in the United States: mortality risk during heat waves and effect modification by heat wave characteristics in 43 U.S. communities. Environ Health Perspect. 2011;119(2):210-218. https://www.ncbi.nlm.nih.gov/pubmed/21084239

26: Ryti NR, Guo Y, Jaakkola JJ. Global Association of Cold Spells and Adverse Health Effects: A Systematic Review and Meta-Analysis. Environ Health Perspect. 2016;124(1):12-22. https://www.ncbi.nlm.nih.gov/pubmed/25978526

27: Hansen A, Bi P, Nitschke M, et al. The effect of heat waves on mental health in a temperate Australian city. Environ Health Perspect. 2008;116(10):1369-1375. https://www.ncbi.nlm.nih.gov/ pubmed/18941580

28: World Health Organization. Heatwaves and health: guidance on warning-system development Geneva, Switzerland: WHO Press; 2015: http://www.who.int/globalchange/publications/heatwaves-healthguidance/en/.

29: Anderson BG, Bell ML. Weather-related mortality: how heat, cold, and heat waves affect mortality in the United States. Epidemiology. 2009;20(2):205-213. https://www.ncbi.nlm.nih.gov/pubmed/19194300

30: Boeckmann M, Rohn I. Is planned adaptation to heat reducing heatrelated mortality and illness? A systematic review. BMC Public Health. 2014;14:1112. https://www.ncbi.nlm.nih.gov/pubmed/25349109

31: World Health Organization. Heatwaves and health: guidance on warning-system development. Geneva, Switzerland2015. http://www. who.int/globalchange/publications/heatwaves-health-guidance/en/

32: Barnett AG, Hajat S, Gasparrini A, Rocklov J. Cold and heat waves in the United States. Environ Res. 2012;112:218-224. https://www.ncbi.nlm.nih. gov/pubmed/22226140

33: Bell ML, O'Neill MS, Ranjit N, et al. Vulnerability to heat-related mortality in Latin America: a case-crossover study in Sao Paulo, Brazil, Santiago, Chile and Mexico City, Mexico. Int J Epidemiol. 2008;37(4):796-804. https://www.ncbi.nlm.nih.gov/pubmed/18511489

34: Egondi T, Kyobutungi C, Rocklov J. Temperature variation and heat wave and cold spell impacts on years of life lost among the urban poor population of Nairobi, Kenya. Int J Environ Res Public Health. 2015;12(3):2735-2748. https://www.ncbi.nlm.nih.gov/ pubmed/25739007

35: Environmental Protection Agency. Excessive Heat Events Guidebook. Washington, DC: Environmental Protection Agency; 2006. https://www. epa.gov/sites/production/files/2016-03/documents/eheguide_final.pdf

36: O'Neill MS, Carter R, Kish JK, et al. Preventing heat-related morbidity and mortality: new approaches in a changing climate. Maturitas. 2009;64(2):98-103. https://www.ncbi.nlm.nih.gov/pubmed/19748195

37: Kovats RS, Kristie LE. Heatwaves and public health in Europe. Eur J Public Health. 2006;16(6):592-599. https://www.ncbi.nlm.nih.gov/ pubmed/16644927

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

38: Toloo G, FitzGerald G, Aitken P, Verrall K, Tong S. Evaluating the effectiveness of heat warning systems: systematic review of epidemiological evidence. Int J Public Health. 2013;58(5):667-681. https://www.ncbi.nlm.nih.gov/pubmed/23564031

39: Olga VW, Mary HH. Connecting people and place: a new framework for reducing urban vulnerability to extreme heat. Environmental Research Letters. 2010;5(1):014021. http://stacks.iop.org/1748-9326/5/i=1/a=014021

40: Ebi KL, Teisberg TJ, Kalkstein LS, Robinson L, Weiher RF. Heat Watch/ Warning Systems Save Lives: Estimated Costs and Benefits for Philadelphia 1995?98. Bulletin of the American Meteorological Society. 2004;85(8):1067-1073. http://dx.doi.org/10.1175/BAMS-85-8-1067

41: Baltimore City Health Department . Code Blue. Baltimore, MD: Baltimore City Health Department ; 2016. http://health.baltimorecity. gov/emergency-preparedness-response/code-blue

42: State of Connecticut. State of Connecticut Local Emergency Operations Plan #6. State of Connecticut; 2016. http://www.ct.gov/demhs/lib/ demhs/eppi/leop_esf_6_mass_care_standards_guidelines_v_1.pdf

43: Governor Cuomo Announces $3 Million in Cooling Assistance ror New Yorkers with Heat-Related Health Issues (press release). New York, NY: New York State,2016.

44: Kalkstein LS, Jamason PF, Greene JS. Philadelphia?s Hot Weather-Health Watch/Warning System response actions. Philadelphia, PA: Phildadelphia Department of Health and Human Services 1995. http://www1.udel. edu/SynClim/phl.html

45: Public Health England. Heatwave plan for England: Protecting health and reducing harm from severe heat and heatwaves. London, England: Public Health England;2015. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/429384/Heatwave_Main_ Plan_2015.pdf

46: City of New York. Chapter 4: Section 4.5-Extreme Heat. NYC's Risk Landscape: A Guide to Hazard Mitigation. New York, NY: City of New York,; 2014. https://www1.nyc.gov/assets/em/downloads/pdf/hazard_mitigation/nycs_risk_landscape_a_guide_to_hazard_mitigation_final. pdf

47: Kristie L. Ebi, Thomas J. Teisberg, Laurence S. Kalkstein, Lawrence Robinson, Rodney F. Weiher. Heat Watch/Warning Systems Save Lives: Estimated Costs and Benefits for Philadelphia 1995?98. American Meteoroligical Society. 2004;85(5):1067-1073. http://journals.ametsoc. org/doi/pdf/10.1175/BAMS-85-8-1067

48: Shaman J, Kohn M. Absolute humidity modulates influenza survival, transmission, and seasonality. Proc Natl Acad Sci U S A. 2009;106(9):3243-3248. https://www.ncbi.nlm.nih.gov/ pubmed/19204283

49: World Health Organization. Housing, energy and thermal comfort: a review of 10 countries within the WHO European Region. Geneva, Switzerland; 2007. http://www.euro.who.int/en/health-topics/environment-and-health/Housing-and-health/publications/pre-2009/ housing,-energy-and-thermal-comfort-a-review-of-10-countrieswithin-the-who-european-region-2007

50: Conlon KC, Rajkovich NB, White-Newsome JL, Larsen L, O'Neill MS. Preventing cold-related morbidity and mortality in a changing climate. Maturitas. 2011;69(3):197-202. https://www.ncbi.nlm.nih.gov/pubmed/21592693

51: Centers for Disease Control and Prevention. Natural Disasters and Severe Weather: Winter Weather - About Winter Weather. https://www. cdc.gov/disasters/winter/about.html. Published 2016. Accessed March 28, 2017.

52: Ebi KL, Semenza JC. Community-based adaptation to the health impacts of climate change. Am J Prev Med. 2008;35(5):501-507. https:// www.ncbi.nlm.nih.gov/pubmed/18929976

53: UCAR Center for Science Education. Urban Heat Islands. http://www. scied.ucar.edu/longcontent/urban-heat-islands. Published 2011. Accessed March 28, 2017.

54: Environmental Protection Agency. Heat Island Effect. http://www.epa. gov/heat-islands. Published n.d. Accessed March 28, 2017.

55: National Geographic. Urban Heat Island. http://www. nationalgeographic.org/encyclopedia/urban-heat-island/. Published n.d. Accessed March 28, 2017.

56: McPherson G. E. Cooling Urban Heat Islands with Sustainable Landscapes. Urbanization and Terrestrial

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Ecosystems. Amherst, MA: University of Massachusetts Press; 1994:151-171. https://www.treesearch.fs.fed.us/pubs/42252

57: U.S. Department of Energy. Cool roofs are ready to save energy, cool urban heat islands, and help slow global warming. Washington, DC: U.S. Department of Energy; n.d. https://www1.eere.energy.gov/buildings/pdfs/cool_roof_fact_sheet.pdf

58: Giguere M. Literature Review of Urban Heat Island Mitigation Strategies. Quebec, Canada: Institute National de Sant? Publique du Queb?c; 2009. https://www.inspq.qc.ca/pdf/publications/1513_UrbanHeatIslandMitigationStrategies.pdf

59: Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies-Cool Roofs. Washington, DC: Environmental Protection Agency;2014. https://www.epa.gov/sites/production/ files/2014-06/documents/coolroofscompendium.pdf

60: Qin Y. A review on the development of cool pavements to mitigate urban heat island effect. Renewable and Sustainable Energy Reviews. 2015;52:445-459. http://www.sciencedirect.com/science/article/pii/S1364032115008242

61: Karlessi T, Santamouris M, Apostolakis K, Synnefa A, Livada I. Development and testing of thermochromic coatings for buildings and urban structures. Solar Energy. 2009;83(4):538-551. http://www.sciencedirect.com/science/article/pii/S0038092X08002569

62: Levinson R, Akbari H, Berdahl P, et al. A novel technique for the production of cool colored concrete tile and asphalt shingle roofing products. Solar Energy Materials and Solar Cells. 2010;94(6):946-954. http://www.sciencedirect.com/science/article/pii/S0927024809004425

63: Marceau L. M, VanGeem G. M. Solar Reflectance of Concretes for LEED Sustainable Sites Credit: Heat Island Effect Skokie, IL: Portland Cement Association;2007. http://www.cement.org/docs/default-source/fc_concrete_technology/sn2982-solar-reflectance-of-concretes-forleed-sustainable-sites-credit-heat-island-effect.pdf?sfvrsn=6

64: Mullaney J, Lucke T. Practical Review of Pervious Pavement Designs. CLEAN-Soil, Air, Water. 2014;42(2):111-124. http://dx.doi.org/10.1002/ clen.201300118

65: Ferguson K. B. Porous Pavements. New York, NY: Taylor & Francis; 2005. https://www.crcpress.com/Porous-Pavements/Ferguson/p/ book/9780849326707

66: Hong W, Shaopeng W, Mingyu C, Yuan Z. Numerical simulation on the thermal response of heat-conducting asphalt pavements. Physica Scripta. 2010;2010(T139):014041. http://stacks.iop.org/1402-4896/2010/i=T139/a=014041

67: van Bijsterveld W, Houben L, Scarpas A, Molenaar A. Using Pavement as Solar Collector: Effect on Pavement Temperature and Structural Response. Transportation Research Record: Journal of the WELL COMMUNITY STANDARD 285 Transportation Research Board. 2001;1778:140-148. http://dx.doi.org/10.3141/1778-17

68: Oberndorfer E, Lundholm J, Bass B, et al. Green Roofs as Urban Ecosystems: Ecological Structures, Functions, and Services. BioScience. 2007;57(10):823-833. http://dx.doi.org/10.1641/B571005

69: U.S. Green Building Council. LEED BD+C: New Construction-Heat Island Reduction. Washington, DC: U.S. Green Building Council; n.d. http://www.usgbc.org/node/2613950?return=/credits

70: Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies-Cool Pavements. Washington, DC: Environmental Protection Agency 2015. https://www.epa.gov/sites/production/files/2014-06/documents/coolpavescompendium.pdf

71: Feng D, Zhong J, Xie N. Solar-reflective coating as a cooling overlay for asphalt pavement. SPIE. 2012;8409. http://spie.org/Publications/ Proceedings/Paper/10.1117/12.923301

72: Pomerantz M, Akbari H, Chen A, Taha H, Rosenfeld AH. Paving materials for heat island mitigation. United States 1997-11-01 1997. http://www. osti.gov/scitech/servlets/purl/291033

73: Takebayashi H, Moriyama M. Study on the urban heat island mitigation effect achieved by converting to grass-covered parking. Solar Energy. 2009;83(8):1211-1223. http://www.sciencedirect.com/science/article/pii/S0038092X09000309

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

74: William J, Thompson K. M. Chapter 11: Contaminants from Four New Pervious and Impervious Pavements in a Parking-lot. Journal of Water Management Modeling. 2011.

75: Environmental Protection Agency. Using Trees and Vegetation to Reduce Heat Islands. https://www.epa.gov/heat-islands/usingtrees-and-vegetation-reduce-heat-islands. Published n.d. Accessed November 27, 2016.

76: Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies-Trees and Vegetation. Washington, DC: Environmental Protection Agency;2014. https://www.epa.gov/sites/production/files/2014-06/documents/treesandvegcompendium.pdf

77: McPherson E. G. Effects of street tree shade on asphalt concrete pavement performance. Journal of Aboriculture. 2005;31(6):303-310.

78: Maco E. S, McPherson E. G. Assessing Canopy Cover over Streets and Sidewalks in Street Tree Populations. Journal of Arboriculture. 2002;28(6).

79: Alexandri E, Jones P. Temperature decreases in an urban canyon due to green walls and green roofs in diverse climates. Building and Environment. 2008;43(4):480-493. http://www.sciencedirect.com/science/article/pii/S0360132306003957

80: Kingsbury N, Dunnett N. Planting Green Roofs and Living Walls. Portland, OR: Timber Press; 2008. http://www.timberpress.com/books/ planting_green_roofs_living_walls/kingsbury/9780881929119

81: Spronken-Smith RA, Oke TR, Lowry WP. Advection and the surface energy balance across an irrigated urban park. International Journal of Climatology. 2000;20(9):1033-1047. http://dx.doi.org/10.1002/1097-0088(200007)20:93.0.CO;2-U

82: Coutts AM, Tapper NJ, Beringer J, Loughnan M, Demuzere M. Watering our cities. Progress in Physical Geography. 2012;37(1):2-28. http:// journals.sagepub.com/doi/abs/10.1177/0309133312461032

83: International Agency for Research on Cancer. Solar and Ultraviolet Radiation. IARC Monograph 55. Lyon, France: WHO Press; 1992. http:// monographs.iarc.fr/ENG/Monographs/vol100D/mono100D-6.pdf

84: Centers for Disease Control and Prevention. Preventing Skin Cancer: Interventions in Outdoor Recreational and Tourism Settings. http:// www.thecommunityguide.org/cancer/skin/education-policy/outdoorrecreation.html. Published 2015. Accessed April 2, 2016.

85: Centers for Disease Control and Prevention. Preventing Skin Cancer: Multicomponent Community-wide Interventions. http:// www.thecommunityguide.org/cancer/skin/community-wide/multicomponent.html. Published 2014. Accessed April 2, 2016.

86: American Conference of Governmental Industrial Hygienists. 2016 TLVs and BEIs. Cincinnati, OH: ACHIH; 2016. https://www.acgih.org/forms/ store/ProductFormPublic/2016-tlvs-and-beis

87: Radiation Health Committee of Australia. Occupational Exposure to Ultraviolet Radiation. Yallambie, Victoria: Radiation Health & Safety Advisory Council; 2006. http://www.arpansa.gov.au/pubs/rps/rps12.pdf

88: U.S. Occupational Safety and Health Administration. Using the Heat Index: A Guide for Employers. https://www.osha.gov/SLTC/heatillness/ heat_index/pdfs/all_in_one.pdf. Published n.d. Accessed July 23, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SOUND

Acoustic comfort is a state of satisfaction with the sound environment. It does not imply an absence of sound; rather, it requires that sound in a space is of the appropriate type and level for work, communication or leisure. It is a subjective measure; what one person may consider relaxing, another may deem distracting or annoying sound. Sound that is distracting, annoying or disruptive—most simply described as unwanted sound—is called noise.

In community settings, noise is discussed in the context of environmental noise. As defined by the World Health Organization (WHO), environmental noise includes noise from all sources in a community with the exception of occupational noise at an industrial workplace.[1] Typical sources of environmental noise include traffic, such as road, rail and aircraft; industry, including construction; and neighbors, for instance, noise from residences or commercial establishments.

The significance of the health effects from environmental noise exposure varies. Impulsive or intermittent noise can disrupt speech or affect work productivity, and noise at a sufficiently high volume and duration can cause hearing loss. Noise exposure can activate the sympathetic nervous system and prolonged exposure can cause stress, which is correlated to myriad physiological and psychological health effects.[2-4] Noise need not be excessively loud to be bad for health.[5] Exposure to environmental noise, even at volumes lower than thresholds for hearing loss, is correlated to adverse health outcomes including annoyance, sleep disturbance, cognitive impairment and cardiovascular disease.[2]

As populations continue to grow and global urbanization intensifies, the prevalence of noise and the number of individuals negatively impacted by noise increases. Data from six European countries identifies traffic noise as the third most important stressor related to environmental disease burden after particulate matter pollution and secondhand smoke.[6] The WHO estimates that in Western European countries alone, "at least 1 million healthy life years are lost every year from traffic-related noise."[2]

Exposure to community noise and the impacts of noise exposure, especially in the residential setting, are not experienced equally across a community. Older adults, children, people who have chronic medical conditions and shift workers are at increased risk for ill health effects from noise exposure due to their exceptional sleep schedules and sensitivity to disturbances.[7] Furthermore, people who live with poor-quality housing conditions (e.g., poor insulation) and in residential areas with noise pollution suffer disproportionate risk of poor health outcomes due to excessive noise exposure.[7]

Strategies that aim to address environmental noise target at least one of three elements of sound propagation: the source, the transmission pathway or the receiver. These strategies come in many forms, from administrative controls, such as land use and zoning policies, to design principles that separate noise sources from receivers or block receivers from experiencing noise. Programmatic approaches, including education programs, promote hearing health and policies, such as the distribution of hearing protection devices (HPDs) that assist individuals in protecting themselves from noise exposure that can cause hearing loss. While each of these known strategies can help reduce noise propagation and exposure, the creation and maintenance of healthy acoustical environments for communities requires a prioritization of acoustics in the project planning, design development and construction process. By prioritizing acoustics and its impacts on health, collaboration between decision-makers and stakeholders can lead to healthier communities.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SOU SOUND PLANNING | P

Intent: To prioritize consideration of environmental noise in project planning and design development.

Summary: Planning is a key strategy to achieving suitable environmental noise levels in communities. Noise is best addressed at its source, which means that proper acoustical planning has the potential to eliminate or reduce the risk for environmental noise production and exposure. Properly planning for acoustic priorities and incorporating design and policy best practices in the built and natural environment help to create communities with healthy and comfortable levels of environmental noise.

Part 1 Noise Narrative

For All Spaces:

A comprehensive narrative describes how the project prioritizes acoustics in the planning and design development process and details an action plan for noise mitigation and management, including a description of each of the following:

a. Major sources of sound, both desirable and undesirable, within or nearby the project prior to construction outset and anticipated throughout the life of the project.
b. Acoustic priorities for different land use zones within the project, including the identification of noise-sensitive spaces.
c. Sound mitigation design elements of the project.
d. Strategies for protecting the acoustic environment in areas of the project that presently have a healthy level of environmental noise (e.g., quiet spaces).[8]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SMP COMMUNITY SOUND MAPPING | O (MAX: 1 PT)

Intent: To illustrate the acoustic environment in an area in order to inform noise mitigation planning that protects residents from exposure to harmful noise levels.

Summary: Noise maps are assessment tools that depict modeled or measured exposure to environmental noise over a specified area and time period. As comprehensive illustrations of an area's soundscape, noise maps can guide planners and designers in site planning and land use decision-making, including the incorporation of sound mitigation strategies in the built and natural environment.[8]

Part 1 Noise Map

For All Spaces:

A strategic noise map, reviewed and revised (as necessary) every five years, includes the geographic area within the project boundary and identifies each of the following:

a. Noise sources, including transportation infrastructure (roads, railways, airports, etc.), industrial activity sites and noise generated from other human activity.[8]

b. Day, evening and nighttime environmental noise, presented as long-term averaged sound levels (e.g., L_{den}, L_{night}, L_{dn}), modeled prior to construction outset and updated throughout the project lifecycle.[8,9]

c. Environmental elements that affect sound propagation, including terrain, land cover, barriers, roads and buildings.[9]

d. Loud and quiet (relatively) areas of the project and its surrounding areas.

e. Estimate of the number of people exposed to environmental noise, with exposure specified by sound level bands.[8]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PLN PLANNING FOR ACOUSTICS | O (MAX: 1 PT)

Intent: To reduce resident exposure to noise from traffic and industry through land use planning.

Summary: Land use planning is a valuable tool utilized by urban planners to define and maximize the use of a parcel of land. In the context of acoustics, land use planning is implemented to maintain efficient use of land for transportation, entertainment and future development while minimizing disruptions to the acoustic comfort of those who live, work and play in a community. Exposure to noise can have negative impacts on physical and mental health.[2] Children exposed to aircraft and rail traffic noise in their schools can experience detriments to cognitive development, including reading comprehension delays.[10,11] Even at moderate exposure levels in their communities, children exposed to noise can experience elevated stress and negative effects on memory.[12,13] Poor health effects from excessive noise exposure are not limited to children. Adults exposed to noise in their homes and communities are at higher risk for hypertension, myocardial infarction and stroke.[14-20] Long-term exposure to aircraft noise has even been linked to increased risk for diabetes in older adults.[21] Noise-sensitive spaces such as schools, homes and hospitals should especially be protected from common community noise sources including aircraft, road and rail traffic. When deciding how to incorporate a variety of land use cases in a community, projects should consider the acoustic priorities and goals of different space types.

Part 1 Noise Compatible Development

For All Spaces:

A narrative describes how noise-compatible development (siting facilities and properties so that their uses and sound priorities complement one another) within the following areas (as applicable) is utilized to maximize acoustic comfort:

a. Industrial facilities.[22]
b. Commercial facilities.[22]
c. Public service facilities.[22]
d. Community service facilities.[22]
e. Residential properties.[22]
f. Multiuse properties.[22]
g. Public and private right-of-ways.[22]
h. Public spaces.[22]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ORD NOISE ORDINANCE | O (MAX: 1 PT)

Intent: To reduce resident exposure to environmental noise through policies that prohibit excessive noise.

Summary: Ordinances or regulations that pointedly address environmental noise exist in cities around the world. Noise ordinances can include a variety of policies, including limits on nighttime sound levels and the establishment of curfews for major noise sources, such as industrial activity or neighborhood noise. Setting regulations on noise is an effective strategy for noise management, and can cost less than other mitigation approaches such as alterations to the built environment.[23]

Part 1 Ordinance Option

For All Spaces:

A noise ordinance (e.g., existing municipal code, community bylaw, self-imposed policy) defines, at minimum, the following requirements:

a. Maximum allowable sound levels by receiving land use.[24]
b. Prohibited acts, including time period restrictions for allowable noise from sources such as traffic, industry, commercial establishments and residential dwellings.[24]
c. Exceptions and variances.[24]
d. Enforcement duties.[24]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

NLV NOISE LEVEL LIMIT | O (MAX: 1 PT)

Intent: To reduce exposure to environmental noise, especially in noise-sensitive spaces.

Summary: Most commerce and activity in a community takes place during daylight hours, with evening and nighttime hours primarily reserved for rest and sleep. Policies that limit the maximum allowable level of community noise throughout the day help to lower overall noise in a community, protecting the health and acoustic comfort of community members.

Part 1 Maximum Allowable Sound Level

For All Spaces:

A plan for achieving the following environmental sound level goal, including a timeline, strategy for evaluation and summary of progress is maintained:

a. Outside of residences: L_{dn} 65 dBA or less.[25]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HEA HEARING HEALTH EDUCATION | O (MAX: 1 PT)

Intent: To educate community members on the health and well-being impacts of excessive noise exposure and promote strategies to protect hearing health.

Summary: Excessive noise exposure carries health risks, including a host of physiological and psychological health effects.[2] In particular, noise-induced hearing loss (NIHL) due to excessive noise exposure is completely preventable.[26] Despite its preventability, prevalence of hearing loss is increasing in the U.S., particularly among adolescents.[27] Globally, half of all hearing loss cases are avoidable through primary prevention methods including immunization, screening and reducing exposure to excessive noise.[28] Programs that educate the public on the health risks of noise exposure and provide them with the tools they need to protect themselves help individuals make informed decisions about their hearing health.

Part 1 Hearing Health Promotion

For All Spaces:

Noise awareness education across the lifespan is facilitated through at least two of the following:

a. Public dissemination of noise and hearing health information.

b. School-based hearing health education programs.[1]

c. Occupational-setting-based hearing health education programs for employers managed or contracted by the project owner.[29]

d. Recreational-setting-based hearing health education programs.

Part 2 Hearing Protection Programming

For All Spaces:

At least one of the following hearing protection programs is implemented:

a. No-cost hearing protection device (HPD) (such as earplugs) distribution programs in all indoor and outdoor venues owned, managed or contracted by the project owner where sounds levels exceed a four-hour time-weighted average sound level of 95 dBA.[30,31]

b. Hearing conservation programs in all occupational settings where eight-hour time-weighted average sound level is 85 dB or higher.[32]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: Berglund B, Lindvall T, Schwela DH, World Health Organization. Guidelines for community noise. Geneva, Switzerland: WHO Press; 1999. http://whqlibdoc.who.int/hq/1999/a68672.pdf

2: World Health Organization. Burden of Disease from Environmental Noise: Quantification of Healthy Life Years Lost in Europe. Copenhagen, Denmark: WHO Regional Office for Europe; 2011. http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf

3: Basner M, Babisch W, Davis A, et al. Auditory and non-auditory effects of noise on health. Lancet. 2014;383(9925):1325-1332. https://www.ncbi. nlm.nih.gov/pubmed/24183105

4: Stansfeld SA, Matheson MP. Noise pollution: non-auditory effects on health. Br Med Bull. 2003;68:243-257. https://www.ncbi.nlm.nih.gov/ pubmed/14757721

5: Ising H, Kruppa B. Health effects caused by noise: evidence in the literature from the past 25 years. Noise Health. 2004;6(22):5-13. https:// www.ncbi.nlm.nih.gov/pubmed/15070524

6: Hanninen O, Knol AB, Jantunen M, et al. Environmental burden of disease in Europe: assessing nine risk factors in six countries. Environ Health Perspect. 2014;122(5):439-446. https://www.ncbi.nlm.nih.gov/pubmed/24584099

7: World Health Organization. Data and Statistics http://www.euro.who. int/en/health-topics/environment-and-health/noise/data-and-statistics. Published 1999. Accessed May 2, 2016.

8: European Parliament. Directive 2002/49/EC. http://eur-lex.europa.eu/ legal-content/EN/TXT/?uri=celex%3A32002L0049. Published 2002. Accessed May 2, 2016.

9: Kaliski K, Duncan E, Cowan J. Noise Mapping in the United States Sound and Vibration. 2007;September 14-17. http://www.sandv.com/ downloads/0709kali.pdf

10: Stansfeld SA, Berglund B, Clark C, et al. Aircraft and road traffic noise and children's cognition and health: a cross-national study. Lancet. 2005;365(9475):1942-1949. https://www.ncbi.nlm.nih.gov/ pubmed/15936421

11: Bronzaft A. The Effect of Elevated Train Noise on Reading Ability Environment and Behavior. 1975;7:517-528. http://eab.sagepub.com/ content/7/4/517.full.pdf

12: Lercher P, Evans GW, Meis M. Ambient Noise and Cognitive Processes among Primary Schoolchildren. Environment and Behavior. 2003;35(6):725-735. http://eab.sagepub.com/content/35/6/725.short

13: Evans GW, Bullinger M, Hygge S. Chronic Noise Exposure and Physiological Response: A Prospective Study of Children Living under Environmental Stress. Psychological Science. 1998;9(1):75-77. http://www.jstor.org/stable/40063251

14: Kingsley SL, Eliot MN, Whitsel EA, et al. Residential proximity to major roadways and incident hypertension in post-menopausal women. Environ Res. 2015;142:522-528. https://www.ncbi.nlm.nih.gov/pubmed/26282224

15: Jarup L, Babisch W, Houthuijs D, et al. Hypertension and exposure to noise near airports: the HYENA study. Environ Health Perspect. 2008;116(3):329-333. https://www.ncbi.nlm.nih.gov/pubmed/18335099

16: van Kempen E, Babisch W. The quantitative relationship between road traffic noise and hypertension: a meta-analysis. J Hypertens. 2012;30(6):1075-1086. https://www.ncbi.nlm.nih.gov/ pubmed/22473017

17: Evrard AS, Bouaoun L, Champelovier P, Lambert J, Laumon B. Does exposure to aircraft noise increase the mortality from cardiovascular disease in the population living in the vicinity of airports? Results of an ecological study in France. Noise Health. 2015;17(78):328-336. https://www.ncbi.nlm.nih.gov/pubmed/26356375

18: Sorensen M, Andersen ZJ, Nordsborg RB, et al. Road traffic noise and incident myocardial infarction: a prospective cohort study. PLoS One. 2012;7(6):e39283. https://www.ncbi.nlm.nih.gov/pubmed/22745727

19: Hansell AL, Blangiardo M, Fortunato L, et al. Aircraft noise and cardiovascular disease near Heathrow airport in London: small area study. Bmj. 2013;347:f5432. https://www.ncbi.nlm.nih.gov/ pubmed/24103537

20: Sorensen M, Hvidberg M, Andersen ZJ, et al. Road traffic noise and stroke: a prospective cohort study. Eur

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Heart J. 2011;32(6):737-744. https://www.ncbi.nlm.nih.gov/pubmed/21266374

21: Sorensen M, Andersen ZJ, Nordsborg RB, et al. Long-term exposure to road traffic noise and incident diabetes: a cohort study. Environ Health Perspect. 2013;121(2):217-222. https://www.ncbi.nlm.nih.gov/pubmed/23229017

22: New Jersey Department of Environmental Protection. Model Noise Control Ordinance New Jersey Department of Environmental Protection; 2014. http://www.nj.gov/dep/enforcement/docs/noise-ord. pdf

23: Salter C, Ahn R, Yasin F, Burke TF. Chapter 8-Community Noise, Urbanization, and Global Health: Problems and Solutions. Innovating for Healthy Urbanization. Boston, MA: Springer US; 2015. https://link.springer.com/chapter/10.1007%2F978-1-4899-7597-3_8 - page-1

24: Environmental Protection Agency. Model Community Noise Control Ordinance. In: Environmental Protection Agency, ed. Vol EPA 550/9-76- 003. Washington, DC: Environmental Protection Agency; 1975. https:// nepis.epa.gov/Exe/ZyNET.exe/9101HHGL.

25: U.S. Department of Housing and Urban Development. Chapter 1-Basic Overview of the Environmental Noise Problem. Washington, DC;2009. https://www.hudexchange.info/resource/313/hud-noise-guidebook/

26: U.S. Department of Health and Human Services. Noise-induced Hearing Loss. Washington, DC: National Institute on Deafness and Other Communications Disorders;2008. https://www.nidcd.nih.gov/sites/default/files/Documents/health/hearing/NIDCD-Noise-InducedHearing-Loss.pdf

27: Shargorodsky J, Curhan SG, Curhan GC, Eavey R. Change in prevalence of hearing loss in US adolescents. JAMA. 2010;304(7):772-778. https:// www.ncbi.nlm.nih.gov/pubmed/20716740

28: World Health Organization. Deafness and hearing loss. http://www.who.int/mediacentre/factsheets/fs300/en/. Published 2015. Accessed December 1, 2016.

29: U.S. Department of Labor. Occupational Noise Exposure: Hearing Conservation. https://www.osha.gov/SLTC/noisehearingconservation/ hearingprograms.html. Published n.d. Accessed November 25, 2016.

30: U.S. Department of Labor. 29 CFR part 1910. In: Occupational Safety and Health Administration, ed. Washington, DC: U.S. Department of Labor; n.d. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9736

31: World Health Organization. Hearing loss due to recreational exposure to loud sounds: a review. Geneva, Switzerland: World Health Organization;2015. http://apps.who.int/iris/bitstream/10665/154589/1/9789241508513_eng.pdf

32: U.S. Department of Labor. Hearing Conservation. Washington, DC: Occupational Safety and Health Administration;2002. https://www.osha. gov/Publications/osha3074.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MATERIALS

The chemical industry is central to the global economy, responsible for converting raw materials such as oil, natural gas, air, water, metals and minerals into more than 70,000 different chemical substances and an endless variety of products and materials that make up buildings, developments and products.[1] Despite the industry's positive impact on life expectancy, living conditions and health, the increase in volume and exposure to numerous chemicals over the past 150 years poses mounting health and environmental concerns.[2]

Global chemical production continues to rise today at an annual rate of about 3%; projected to surpass the global population growth rate.[2] Unfortunately, current government and international regulations and policies demonstrate gaps and inconsistencies in the legal tools needed to mitigate risks.[3] Currently, there are no globally applicable regulations dictating safe chemical use, and individual countries that do have national chemical safety regulations enforce their own standards. The lack of an international standard of classification has led to a piecemeal system of global regulations with no enforcing body or oversight.[3] The Centers for Disease Control and Prevention (CDC), which provides one of the most authoritative listings of biomonitoring data for the United States, found 265 chemicals across the survey period 2012–2015 in the blood, serum and urine from a representative sample of about 2,500 Americans.[4] Some of these chemicals, such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs), have been banned for more than 30 years.[4] In Europe, the World Health Organization (WHO) found elevated levels of multiple chemical carcinogens such as cadmium, hexavalent chromium and benzene in blood and urine, as well as brominated flame retardants, including 2,2',4,4',5- pentabromodiphenyl ether (BDE99), commonly used in polyurethane foams, upholstered furniture and carpet backing, and Hexabromocyclododecane (HBCD), typically used in polystyrene insulation foams in buildings, both of which are targeted by UNEP Stockholm Convention's persistent organic pollutants (POPs) list for elimination.[5-7] These results highlight the need for a global system of risk assessment and chemical management.

Despite the ubiquity of man-made chemicals in global circulation, the compositional nature, longevity and the health and environmental impact of a large number of them is largely unknown.[8] Chemical hazards at the community level can come from various sources. For example, older structures undergoing renovation or demolition can expose community residents to toxic chemicals such as asbestos, a known human carcinogen; PCBs, a probable human carcinogen; and lead, a neurotoxicant.[9,10] Common outdoor structures, including park benches, railings, decks and picnic tables, can be sources of hazardous fungicides and biocides, while various hazardous pesticides and herbicides commonly used in landscaping pose a number of serious health risks.[4,11,12,13] Fortunately, there is growing demand for, and supply of, green chemistry technologies and emerging tools that promote transparency and accountability in material and product manufacturing. Existing databases, tools and guidelines can provide direction in implementing policies for sampling, assessment and remediation, thus helping communities identify high-priority hazards and select better products that fulfill community priorities and needs.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HWM HAZARDOUS WASTE MANAGEMENT | P

Intent: To support waste management and sanitation practices that take into account hazardous waste streams and reduce risk of environmental contamination and health hazards.

Summary: "Hazardous waste" is a label assigned to a specific class of refuse. This describes a class of waste potentially dangerous to living beings and/or the environment, particularly when handled, transported or disposed of in an unregulated or uncontrolled manner, thereby creating exposure risk via air, water and soil.[14] Typically, waste goes through several steps to categorize and determine exemption or exclusion from hazardous waste regulation, which is typically defined at the national level, and/or through international waste treaties and agreements. Waste that is considered hazardous is then assigned a code reflecting necessary regulatory measures. Codes can reflect human health hazards, i.e., toxicity, or other properties including ignitability, corrosiveness and reactivity. Wastes with hazardous properties can range from products of manufacturing and industrial processes to batteries and fluorescent bulbs.[14]Because of differences in the national definitions of hazardous wastes, national data collection, monitoring and enforcement, the amount of hazardous waste generated globally is unknown. Further, because the practice of hazardous waste disposal is highly regulated in some countries while not in others, this discrepancy has contributed to a dangerous practice of dumping of hazardous waste across international borders.[15] Proper, regulated disposal of hazardous waste is critically important to human health and the environment; effective management at the community scale can mitigate risk of environmental contamination and damage to human health.

Part 1 Hazardous Waste Management

For All Spaces:

A plan that includes information on deposit locations and hours of operation governs the management of the following hazardous wastes, as defined per regulations/guidelines in Table X1:

a. Batteries (e.g., nickel cadmium).
b. Pesticides that are either recalled or collected in waste pesticide collection programs.
c. Mercury-containing equipment.
d. Mercury-containing lamps.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WST WASTE STREAM MANAGEMENT | O (MAX: 1 PT)

Intent: To support comprehensive waste management and sanitation practices to mitigate environmental contamination and health hazards.

Summary: Global municipal solid waste generation is expected to increase to approximately 2.2 billion tons per year from 1.3 billion tons by 2025, an increase from 1.2 to 1.42 kg per person per day.[16] Improperly managed waste can have tremendous health, environmental and economic costs downstream; unsanitary waste disposal methods can release hazardous chemicals into nearby groundwater and air and contribute to diseases.[16] Particularly in developing countries, uncollected solid waste can be responsible for flooding and air and water pollution. Waste generation is closely linked with urbanization. As the rate of urbanization increases, particularly in larger, emerging markets, waste disposal and management will become a central and critical barrier to sustainable global development. No solution to waste management is without cost. Uncontrolled burning can result in serious toxic airborne releases, and while controlled waste incineration is necessary, it is also expensive, negatively impacts air since much of the waste stream is not combustible and requires steps such as by-product/ash disposal. Landfills are also tricky, requiring land availability, careful siting and management. Solid waste management is the most critical service a municipality provides. A well-planned and properly maintained waste prevention and management practice is designed to address various material-related streams, to reduce environmental contamination and to protect health and well-being at the community level.

Part 1 Waste Reduction

For All Spaces:

A waste stream management narrative and plan focusing on waste diversion is developed and applied demonstrating the below hierarchy, or (if applicable) local plan cited:

a. Waste or source reduction (including prevention, minimization and reuse).
b. Recycling and materials recovery.
c. Disposal (including incineration).

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REM SITE REMEDIATION AND REDEVELOPMENT | O (MAX: 1 PT)

Intent: To support policies that mandate remediation and redevelopment of sites contaminated with hazardous waste or pollution from previous commercial use, alleviate environmental contamination and mitigate human exposure to toxic chemicals.

Summary: As communities grow and change, land use and development type undergo change as well. Such change poses challenges, for example sites that may have previously contained hazardous industries may contain residual chemicals lingering in the soil, air, surface or groundwater. Contaminated soil can leach toxic chemicals into nearby groundwater or surface waters, accumulate in sediments, volatilize and pose hazards to indoor air in buildings on the premises or be carried by wind-borne dust.[17] When left unmanaged, contaminants from such sites can pose exposure hazards to those who live and work nearby through inhalation, ingestion or dermal contact.[18]Un-remediated areas pose a significant public health risk if redevelopment or reuse occurs without proper mitigation of the remaining chemical hazards. Remediation removes hazards, and further redevelopment can work to accommodate environmentally responsible growth and save green land from sprawl development. Economically this can mean new sources of local revenue from previously unproductive land and revitalized neighborhoods.[19,20]

Part 1 Cleanup and Redevelopment

For All Spaces:

Contaminated land within the project boundary is identified and remediated prior to development per standards/guidelines in Table X1 or approved equivalent standard/guideline. To be considered equivalent, standards/guidelines must include the following criteria:

a. Provide risk-based approach to sustainable remediation (risk assessment/risk benefit analysis).

b. Consider the three pillars of sustainability: society, environment and economy.

c. Apply a tiered approach to assessment and provide an appraisal of remediation options.

d. Consider safe working practices for workers during remediation.

e. Require record keeping of decision making and assessment processes.

f. Provide protocol for engaging stakeholders, including management of impacts on community.

g. Adopt a long-term vision that ensures lasting results.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CRE CONSTRUCTION REMEDIATION | O (MAX: 1 PT)

Intent: To support policies that mandate a protocol for demolition/ renovation of structures, both interior and exterior, to mitigate airborne contamination and potential exposure hazards.

Summary: The process of demolition, renovation and construction brings with it many challenges including the handling of materials that might have at one time been deemed safe but are now considered hazardous. The global construction waste management market is forecast to grow at an annual rate of 9.67% through 2019, highlighting the importance of proper waste disposal. Improper handling and disposal of waste poses a very real threat to human health and the environment.[21,22] Contamination of air, water and soil due to the process of demolition or renovation can have direct impact on community members. Although local and national laws in some countries mandate safe handling and disposal of construction waste, this is not necessarily the case globally. In developing countries, regulations that protect health are often viewed as cumbersome or as a hindrance.[3] The establishment of remediation protocols and responsible disposal of materials is vital to population health at the community level.

Part 1 Lead Abatement

For All Spaces:

Renovation or demolition of buildings owned, operated or managed by the project owner and constructed prior to any applicable laws banning or restricting lead paint, lead evaluation and abatement is conducted in accordance with the following guidelines:

a. An on-site investigation of the space is conducted by a certified risk assessor or inspector technician to determine the presence of any lead-based hazards in paint, dust and soil using definitions established by standard(s) in Table X1.
b. All spaces found to have lead-based hazards must adhere to work practice standards for conducting lead-based paint activities, as outlined in regulations/guidelines Table X1.

Part 2 Asbestos Abatement

For All Spaces:

Renovation or demolition of buildings owned, operated or managed by the project owner constructed prior to any applicable laws banning or restricting asbestos, testing, evaluation and abatement is conducted in accordance with the following guidelines:

a. An on-site investigation of the space is conducted by a certified risk assessor or inspector technician to determine the presence of asbestos hazards per standard(s) in Table X1.
b. All spaces determined to contain asbestos hazards must adhere to work practice standards for conducting asbestos abatement activities, as outlined in Table X1.

Part 3 Polychlorinated Biphenyl Abatement

For All Spaces:

Renovation or demolition of buildings owned, operated or managed by the project owner constructed or renovated between 1950 and the institution of any applicable laws banning or restricting PCBs carry out the following:

a. Conduct evaluation and abatement of materials in accordance with regulations/ guidelines in Table X1.
b. Conduct removal and safe disposal of PCB-containing fluorescent light ballasts in accordance with regulations/guidelines in Table X1.

Part 4 Mercury Abatement

For All Spaces:

Renovation or demolition of buildings owned, operated or managed by the project owner identify and collect all mercury-containing equipment and devices for recycling in accordance with the following guidelines:

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

a. Conduct evaluation and abatement of materials in accordance with regulations/guidelines in Table X1.
b. Conduct removal and safe disposal of all mercury-containing equipment and devices in accordance with regulations/guidelines in Table X1.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ODS OUTDOOR STRUCTURES | O (MAX: 1 PT)

Intent: To mandate safe guidelines for chemical use on outdoor structures and mitigate environmental contamination and community exposure to potentially hazardous chemicals.

Summary: Oftentimes the use of specialized chemicals is needed to preserve and protect structures. The use of preservatives and special treatments to protect against the weather and pest infestation has become an important part of maintaining the built environment. Chemicals used in outdoor products are often more hazardous than those indoors, a fact that is based less on the nature of the chemicals than concentration of chemicals and likelihood of exposure, or overexposure. It is estimated that up to 75% of the lumber produced from the mid-1970s to 2004 was pressure treated with chromated copper arsenate (CCA), a treatment that can leach arsenic into the soil where children, plants and pets can be exposed.[23] Lead in dust and soil can come from weathering and chipping of lead-based paint from infrastructure such as buildings, bridges etc., and further exposure hazards, particularly for children, include wear and tear or flaking of paint found on older playground equipment.[24] A precautionary approach to the vetting and selection of materials used in outdoor structures is vital at a community level.

Part 1 Treated Wood

For All Spaces:

Pressed wood and wood chip materials used in playgrounds and parks owned, managed or operated by the project owner meet the following conditions:

a. Wood or wood mulch containing chromated copper arsenate (CCA) is not used.[25]
b. Wood containing chromated copper arsenate (CCA) is replaced with an alternative per regulations/guidelines in Table X1.
c. CCA wood structures that cannot be removed or replaced must be treated with oil-based semi-transparent stain to minimize leaching of arsenic per regulations/guidelines in Table X1.

Part 2 Lead Paint

For All Spaces:

All playgrounds and child play areas owned, managed or operated by the project owner meet the following conditions:

a. Paint and surface coatings used on new structures meet regulations/guidelines in Table X1.
b. Lead hazard assessment, abatement and interim strategies to control lead paint exposure are applied per regulations/guidelines in Table X1.

Part 3 Lead in Soil and Dust

For All Spaces:

All playgrounds and child play areas owned, managed or operated by the project owner meet the following conditions per regulations/guidelines in Table X1:

a. Exterior lead dust hazard assessment and remediation.
b. Lead soil hazard assessment, remediation or well-managed programs of interim controls.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PES LANDSCAPING AND PESTICIDE USE | O (MAX: 1 PT)

Intent: To support policies that mandate the regulation and minimization of pesticide use to mitigate potential community exposure to chemicals known to pose high hazards.

Summary: There are many reasons to want to control pests in a community: they are vectors for disease, cause property damage and can destroy local flora. While it is important to take steps to control pests, it should not be done at the expense of human health. Approximately one billion pounds of pesticides are used in a typical year in the U.S. alone, with no known estimate of how this compares globally.[26] Pesticides and herbicides are of special concern because of the numerous exposure routes to humans in the community. It is estimated that 2.26 million tons of the active ingredients in pesticides are produced annually, with more than 25% of the production being done in developing countries where exposure laws may not be as comprehensive.[27] Many pesticides and herbicides are applied by aerosolizing a liquid that can then be inhaled, or settle to the ground where it can permeate the soil and reach aquifers, or deposit directly into streams and rivers. Given the various exposure routes to pesticide chemicals and potential associated hazards, alternative methods to pest management, and careful evaluation, selection and use of low hazard pesticides is essential.

Part 1 Pesticide and Herbicide Use

For All Spaces:

The following conditions are met for outdoor areas owned, managed or operated by the project owner per regulations/guidelines in Table X1:

a. A plan for non-pesticide based pest management is applied.
b. Only pesticides with low hazard tier rankings are used.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HAZ HAZARD COMMUNICATION | O (MAX: 1 PT)

Intent: To support transparency on the storage, use and handling of hazardous substances in order to support emergency preparedness and promote community knowledge and advocacy for chemical safety.

Summary: Over 15 million chemical substances are currently in market use, and according to the World Health Organization "approximately 60,000 to 70,000 chemical substances in regular use and between 200 and 1,000 chemicals are produced in excess of one tonne annually."[28] As the global production and dependence on chemicals increases, particularly in emerging markets, the potential public health impacts of accidental toxic exposures must be taken into account. Providing public access to chemical handling information, use and storage can help hold facilities accountable and strengthens a community's capacity to support the laws and regulations that protect them against chemical incidents and emergencies. In order to mitigate negative impacts of chemical incidents, a community has the right to know of potential chemical hazards it faces within and near its borders.

Part 1 Right to Know

For All Spaces:

The following requirement is met:

a. Projects provide access to an electronic resource database with complete information on the storage, use and handling of hazardous substances within the project boundary, reportable by local code.

Part 2 Hazard Information

For All Spaces:

Information on the storage, use and handling of hazardous substances reportable by local code within project boundaries provides the following details per regulations/guidelines in Table X1:

a. Facility Inventory Forms.
b. Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS).
c. Risk Management Plan for extremely hazardous substances or regulated toxic substances in quantities exceeding locally determined thresholds.
d. Site plans indicating storage location.
e. Notice of accidental spills and releases.
f. Notices of violation.
g. Notice of change for new storage of hazardous substances.
h. Literacy level sensitive glossary of technical terms.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX X1: REGULATIONS, GUIDELINES AND EQUIVALENTS:

Table X1 further describes the regulations and guidelines referred to in the Materials concept. When more than one document is listed in the Regulations/Guidelines column, either one is acceptable. Projects may submit additional programs for evaluation as Equivalency Proposals.

Table X1: Regulations, Guidelines and Equivalents

Feature Code	Feature Name	Part Name	Regulations/Guidelines
REM	Site Remediation and Redevelopment	Cleanup and Redevelopment	Req. a ISO/PRF 18504—Soil quality—Guidance on sustainable remediation[29] ASTM E2893—16 Standard Guide for Greener Cleanups[30,31]
CRE	Construction Remediation	Lead Abatement	Req. a U.S. EPA 40 CFR Part 745.65 for residential dwellings or child-occupied facilities[32] Req. b U.S. EPA 40 CFR Part 745.227 work practice standards for conducting lead-based paint activities, as outlined for multi-family dwellings[32]
		Asbestos Abatement	National Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61.145, Subpart M[33]
		Polychlorinated Biphenyl Abatement	U.S. EPA Steps to Safe PCB Abatement Activities[34]
		Mercury Abatement	United States Solid Waste and Environmental Protection Emergency Response Agency. Resource Conservation and Recovery Act. Construction, Demolition, and Renovation.[35]
		Treated Wood	Req. b United States Department of Agriculture; Preservative-Treated Wood and Alternative Products in the Forest Service[11] Req. c Washington Toxics Coalition. Identifying Effective Sealants for CCA-Treated Wood.[36]
ODS	Outdoor Structures	Lead Paint	Req. a Consumer Product Safety Improvement Act 2008; Section 101 of Public Law 110-314, as modified by H.R. 2715 (Public Law 112-28, August 12, 2011) and in 16 CFR part 1303[37] Req. b

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

				Consumer Product Safety Commission; Staff Recommendations for Identifying and Controlling Lead Paint on Public Playground Equipment[24]
		Lead Soil and Exterior Dust		U.S. EPA 40 CFR Part 745.65 for residential dwellings or child-occupied facilities[32]
PES	Landscaping and Pesticide Use	Pesticide and Herbicide Use	Req. a	San Francisco Environment Code; Chapter 3, Integrated Pest Management (IPM) program[38]
			Req. b (one of the following applies for pesticides)	Evaluated through the City of San Francisco Pesticide Hazard Screening Protocol with a Hazard Tier ranking of 3 (least hazardous).[41]
				Listed in the most recent version of the City of San Francisco's Reduced Risk Pesticide List as directed in the list (including limitations).
				All active substances are catalogued as "low-risk" in the EU Pesticides Database.
				All active substances are marked as “Approved” in the EU Pesticides Database and are either classified as Class U or not classified in the latest version of “The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification.”
HAZ	Hazard Communication	Hazard Information		Right to Know Program, City of New York, Bureau of Police and Security Division of Emergency Response, 2016[42]
HWM	Hazardous Waste Stream Management	Hazardous Waste Management		U.S. EPA 40 CFR Part 273 Standards for Universal Waste Management[43] Batteries as described in §273.2, Pesticides as described in §273.2, Mercury-containing equipment as described in §273.4, Lamps as described in §273.5

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: National Research Council. Sustainability in the Chemical Industry: Grand Challenges and Research Needs-A Workshop Report. Washington, DC: The National Academies Press; 2005. http://www.nap.edu/catalog/11437/sustainability-in-the-chemical-industry-grandchallenges-and-research-needs

2: Wilson MP, Schwarzman MR. Toward a new U.S. chemicals policy: rebuilding the foundation to advance new science, green chemistry, and environmental health. Environ Health Perspect. 2009;117(8):1202-1209. https://www.ncbi.nlm.nih.gov/pubmed/19672398

3: United Nations Environment Programme. Global Chemicals Outlook. Nairobi, Kenya: United Nations Press; 2013. http://www.unep.org/ hazardoussubstances/Portals/9/Mainstreaming/GCO/The Global Chemical Outlook_Full report_15Feb2013.pdf

4: Crinnion WJ. The CDC's fourth national report on human exposure to environmental chemicals: what it tells us about our toxic burden and how it assist environmental medicine physicians. Altern Med Rev. 2010;15(2):101-109. https://www.ncbi.nlm.nih.gov/pubmed/20806995

5: United Nations Environment Programme. Listing of POPs in the Stockholm Convention. http://chm.pops.int/TheConvention/ThePOPs/ ListingofPOPs. Published n.d. Accessed December 1, 2016.

6: Centers for Disease Control and Prevention. Biomonitoring Summary: Polybrominated Diphenyl Ethers and 2,2',4,4',5,5'-Hexabromobiphenyl (BB-153). https://www.cdc.gov/biomonitoring/PBDEs_ BiomonitoringSummary.html. Published 2013. Accessed December 1, 2016.

7: Environmental Protection Agency. Partnership to Evaluate Flame Retardant Alternatives to HBCD. https://www.epa.gov/saferchoice/ Partnership-evaluate-flame-retardant-alternatives-hbcd. Published n.d. Accessed December 1, 2016.

8: U.S. Geological Survey. Contaminants of Emerging Concern in the Environment http://toxics.usgs.gov/investigations/cec/index.php. Published 2016. Accessed July 20, 2016.

9: Environmental Protection Agency. ACE Biomonitoring https://www.epa. gov/ace/ace-biomonitoring. Published 2016. Accessed July 20, 2016.

10: Environmental Protection Agency. Lead Compounds http://www.epa. gov/ttnatw01/hlthef/lead.html. Published 2016. Accessed July 20, 2016.

11: U.S. Department of Agriculture. Preservative-Treated Wood and Alternative Products in the Forest Service Washington, DC: United States Forest Service;2006. http://www.fs.fed.us/t-d/pubs/htmlpubs/ htm06772809/index.htm

12: San Francisco Commission on the Environment. 2015 San Francisco Reduced-Risk Pesticide List for City-owned properties. http:// sfenvironment.org/sites/default/files/fliers/files/sfe_reduced_risk_ pesticide_list_2015_finaldraft.pdf. Published 2015. Accessed May 2, 2015.

13: Jones RR, Yu CL, Nuckols JR, et al. Farm residence and lymphohematopoietic cancers in the Iowa Women's Health Study. Environ Res. 2014;133:353-361. https://www.ncbi.nlm.nih.gov/ pubmed/25038451

14: Environmental Protection Agency. RCRA Orientation Manual, 2014. Washington, DC: Environmental Protection Agency; 2014. https://www. epa.gov/sites/production/files/2015-07/documents/rom.pdf

15: Jan Albers. Responsibility and Liability in the Context of Transboundary Movements of Hazardous Wastes by Sea. Boston, MA: Springer; 2014. http://www.springer.com/us/book/9783662433485

16: Daniel Hoornweg, Perinaz Bhada-Tata. What a Waste: A Global Review of Solid Waste Management. Washington, DC;2012. https:// openknowledge.worldbank.org/handle/10986/17388

17: Environmental Protection Agency. Contaminated Land. https://cfpub. epa.gov/roe/chapter/land/contaminated.cfm. Published n.d. Accessed March 27, 2017.

18: Science for Environment Policy. Soil Contamination: Impacts on Human Health. http://ec.europa.eu/science-environment-policy. Published 2013. Accessed June 1, 2017.

19: The Brownfields and Land Revitalization Technology Support Center. Brownfields Road Map.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

https://brownfieldstsc.org/roadmap/contguide. cfm. Published 2016. Accessed May 16, 2016.

20: Environmental Protection Agency. Brownfield Overview and Definition. https://www.epa.gov/brownfields/brownfield-overview-and-definition. Published 2016. Accessed July 25, 2016.

21: State of North Carolina. Illegal Dumping http://deq.nc.gov/about/ divisions/waste-management/waste-management-permit-guidance/ solid-waste-section/illegal-dumping - Impacts. Published 2016. Accessed July 25, 2016.

22: Technavio. Global Construction Waste Management Market 2015- 2019. 2015. http://www.researchmoz.us/global-construction-wastemanagement-market-2015-2019-report.html

23: de Koff J, Lee BD, Schwab P. Avoiding Arsenic Exposure from Treated Lumber Around the Home. https://www.extension.purdue.edu/ extmedia/HENV/HENV-100-W.pdf. Published 2007. Accessed March 1, 2017.

24: U.S. Consumer Product Safety Commission. CPSC Staff Recommendations for Identifying and Controlling Lead Paint on Public Playground Equipment. http://www.cpsc.gov/en/ Business--Manufacturing/Business-Education/Lead/CPSC-StaffRecommendations-for-Identifying-and-Controlling-Lead-Paint-onPublic-Playground-Equipment/. Published 1996. Accessed May 12, 2016.

25: U.S. Consumer Product Safety Commision. Public Playground Safety Handbook. Washington, DC: U.S. Consumer Product Safety Commision; 2015. https://www.cpsc.gov/PageFiles/122149/325.pdf

26: Alavanja MCR. Pesticides Use and Exposure Extensive Worldwide. Reviews on environmental health. 2009;24(4):303-309. http://www. ncbi.nlm.nih.gov/pmc/articles/PMC2946087/

27: World Health Organization. Pesticides: Children's Health and the Environment. WHO Press; 2008. http://www.who.int/ceh/capacity/ Pesticides.pdf

28: World Health Organization. Manual for the public health management of chemical incidents. Geneva, Switzerland: WHO Press; 2009. http:// www.who.int/environmental_health_emergencies/publications/FINALPHM-Chemical-Incidents_web.pdf

29: International Organization for Standardization. ISO/PRF 18504 Soil quality-Guidance on sustainable remediation. International Organization for Standardization; n.d. http://www.iso.org/iso/catalogue_detail.htm?csnumber=62688

30: American Society for Testing and Materials. ASTM E2893-16 Standard Guide for Greener Cleanups. American Society for Testing and Materials; 2016. http://www.astm.org/Standards/E2893.htm

31: Environmental Protection Agency. Encouraging Greener Cleanup Practices through Use of ASTM International's Standard Guide for Greener Cleanups. Washington, DC: Environmental Protection Agency; 2013. https://www. epa.gov/sites/production/files/2016-01/documents/oswer-aa-gc-memo_ december-2013.pdf

32: U.S. Congress. 40 CFR 745.227-Work practice standards for conducting lead-based paint activities: target housing and child-occupied facilities. Washington, DC: U.S. Government Publishing Office; 1996. http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr745_ main_02.tpl

33: U.S. Congress. 40 CFR 61.145-Standard for demolition and renovation. Washington, DC: U.S. Government Publishing Office; n.d. https://www. law.cornell.edu/cfr/text/40/61.145

34: Environmental Protection Agency. Steps to Safe PCB Abatement Activities. http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/caulk/ guide/guide-sect4a.htm Published 1985. Accessed July 29, 2016.

35: Environmental Protection Agency. RCRA in Focus Construction, Demolition, and Renovation. In: National Service Center for Environmental Publications, ed. Washington, DC: Environmental Protection Agency; 2004. https://nepis.epa.gov/Exe/ZyNET. exe/3000665I.

36: Dickey P, Washington Toxics Coalition. Identifying Effective Sealants for CCA-Treated Wood. Washington Toxics Coalition; n.d. http:// toxicfreefuture.org/wp-content/uploads/2016/09/sealants-for-treatedwood.pdf

37: U.S. Congress. Consumer Product Safety Improvement act of 2008. In: United States of America, ed. 122

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

STAT 3016 Public Law 110-314. Code of Federal Regulations;2008. https://www.gpo.gov/fdsys/pkg/CFR2011-title40-vol8/pdf/CFR-2011-title40-vol8-Part61-subPartM.pdf

38: San Francisco Commision on the Environment. Integrated Pest Management Ordinance. http://sfenvironment.org/article/city-staff/ pest-management. Published 2011. Accessed July 29, 2016.

39: Pesticide Research Institute. PestSmart. http://pesticideresearch.com/ site/pestsmart/. Published n.d. Accessed March 28, 2017.

40: Pesticide Research Institute. Pesticide Product Evaluator. http:// pesticideresearch.com/site/evaluator/. Published n.d. Accessed March 28, 2017.

41: SF Environment. Guide to San Francisco's Reduced Risk Pesticide List. San Francisco, CA: City and County of San Francisco; 2013. https:// sfenvironment.org/sites/default/files/fliers/files/sfe_th_guide_to_reduced_risk_pesticide_listposted.pdf

42: City of New York. New York City Community Right-to-Know Laws and Regulations. In: Department of Environmental Protection, ed. New York, NY: City of New York; 2016. http://www.nyc.gov/html/dep/pdf/tier2/ regs.pdf

43: U.S. Congress. 40 CFR Part 273-Standards for Universal Waste Management. Washington, DC: U.S. Government Publishing Office; n.d. https://www.law.cornell.edu/cfr/text/40/Part-273

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

MIND

Health is not defined by simply the absence of disease. Rather, it is indicative of an individual's overall physical, social and mental well-being. This holistic definition captures the ways in which social, physiological and mental processes collectively impact an individual's comprehensive health status. Mental health is an integral and essential component of overall health, a vital component of social well-being, and is critical to participation in a community. As such, it is necessary to understand the drivers of mental well-being in populations and leverage strategies that improve population mental health across all sectors of the community.

Mental, neurological and substance use disorders are a clear threat to global health. Collectively, they account for 13% of the global burden of disease, with depression alone ranking as the leading cause of disability worldwide.[1,2] If left unmanaged, depression, as well as other mental health conditions, can place an individual at serious risk for suicidal ideation, attempted suicide and completed suicide. Suicide results in a tragic and preventable death, accounting for more than 800,000 deaths per year.[3] Young adults and adolescents are particularly at mental health risk: mental health conditions are among the leading causes of disability in youth, and suicide is the second leading cause of death among adolescents and young adults (15–29 years old).[1,3] Although treatments for these conditions exist, they are often unavailable or vastly underutilized. Even in high-income countries, 35% to 50% of people living with mental health conditions receive no care or treatment.[2] This gap widens in low- and middle-income countries, where 76% to 85% of people living with mental health conditions do not receive necessary treatment.[2]

It is increasingly recognized that there exists a complex and inextricable relationship between the mind and body, and that this interplay can significantly impact health and well-being. Mental health plays an important and bi-directional role across some of the most common chronic diseases, including HIV, cardiovascular disease and diabetes.[1] Furthermore, states of chronic stress are associated with increased risk of numerous adverse health consequences, such as depression, cardiovascular disease, diabetes and upper respiratory infection.[2] Depression alone is associated with increased risk of disease, including diabetes, cancer, cardiovascular disease and asthma.[2]

The built environment serves as a powerful tool to help mitigate these adverse mental health outcomes. Improving access to green space creates opportunities for mental restoration, which can help relieve stress, anxiety and symptoms of depression.[2] Similarly, streetscape greenery can contribute to positive outcomes, such as improved self-reported mental health status.[2] Additionally, community-based strategies that provide mental health services, treatment and prevention to all sectors of society can help address the profound gaps in availability and access to care.[2] Combined, these design and operations strategies, along with other built environment interventions, have the potential to positively shape the mental health and well-being of individuals throughout a community.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

AMH ACCESS TO MENTAL HEALTH SERVICES | P

Intent: To improve the availability of and access to community-based mental health support and care.

Summary: Mental, neurological and substance use disorders account for 13% of the global burden of disease and are among the leading causes of disability in youth.[1,2] Unfortunately, 35% to 50% of people living with mental health conditions in high-income countries receive no treatment.[2] This gap widens in low- and middle-income countries, where 76% to 85% of individuals do not receive the treatment they need.[2] Many complex factors contribute to this gap: inadequate public health and human resources available, a lack of mental health promotion, the stigma associated with mental health conditions, along with many other factors.[2] For example, data from the World Health Organization (WHO) suggests that there is less than one mental health professional per 200,000 people in low- and middle-income countries.[2] Equitable access to care facilities and mental health services can help mitigate poor mental health outcomes by promoting care utilization, focusing on early diagnosis and improving receipt of adequate mental health care.[4]

Part 1 Mental Health Services

For All Spaces:

Essential mental health services are available and located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary, including at least two of the following:

a. Inpatient hospital treatment.[5]
b. Outpatient counseling services.[5]
c. Intensive case-management.[5]
d. Partial hospitalization programs.[5]
e. Rehabilitation services (e.g., day centers, clubhouses).[6,7]
f. Therapeutic group homes or supervised residential services.[7]
g. Hospital diversion programs.[7]
h. Emergency crisis services (e.g., mobile mental health crisis teams).[7-9]
i. Telemental health programs (mass transit and distance requirements do not apply).[10]

Part 2 Community-Based Support Services

For All Spaces:

Informal community mental health care and support services are available and located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance, including at least two of the following:

a. Early identification of mental health risks or conditions through screening initiatives.[8]
b. Referrals to health services.[8]
c. Assistance with activities of daily living.[8]
d. Community reintegration support (e.g., housing placement, employment).[8]
e. Consumer-run or peer programs.[11]
f. Advocacy for individuals living with mental health conditions (e.g., anti-stigma campaigns).[8]
g. Mental health promotion.[8]
h. Practical support.[8]
i. Crisis support.[8]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CRI MENTAL HEALTH CRISIS SUPPORT | O (MAX: 1 PT)

Intent: To support and encourage help-seeking for individuals experiencing a mental health crisis through availability and access to services, and to encourage stakeholders to consider and implement reasonable design-interventions to support these individuals.

Summary: A mental health crisis is as important to address as any other health crisis. It can occur without warning, and involves any situation in which a person is at risk of hurting him- or herself or others.[12] Many factors can trigger a mental health crisis, including stress, physical illness, loss, trauma, violence and substance use.[12] Among mental health crises, suicidal ideation is an acute health risk, and can result in an emergency situation if an individual decides to act upon their thoughts. Suicide accounts for more than 800,000 deaths per year, with a global mortality rate of 11.4 per 100,000 people.[3,13] The links between suicide and depression, alcohol abuse or addiction and other mental health conditions are well established, yet suicide also occurs among individuals without preexisting mental health conditions who suffer intense moments of crisis.[14] Vulnerable or marginalized populations are particularly at risk, such as adolescents and young adults; lesbian, gay, bisexual, transgender, and intersex (LGBTI) persons; refugees; or persons who have experienced abuse or trauma.[14,15] Suicide can have a major impact on a family and the surrounding community, and proper intervention is needed on a community level to prevent suicide and its tragic consequences.

Part 1 Crisis Support Services

For All Spaces:

At least one of the following mental health crisis services is available:

a. Emergency crisis services (e.g., mobile mental health crisis teams).[7-9]
b. 24-hour crisis telephone line, chat or text services.

Part 2 Emergency Prevention

For All Spaces:

A plan includes the following information:

a. Consideration of the most common means of suicide within the project boundary based on local suicide attempt and completion data, to the extent such data exists and is available for the area within the project boundary.
b. Restricting or managing means of suicide, as local laws allow.[15]

Part 3 Hotspot Management

For All Spaces:

A plan includes the following information:

a. Identification of suicide hotspots within the project boundary, if any.[15,16]
b. Design interventions that limit access to identified hotspots (e.g., installation of physical interventions, such as bridge barriers, nets or fencing).[16]
c. Design interventions at identified hotspots that encourage crisis help-seeking (e.g., implementation of signage indicating 24-hour crisis hotlines and language that encourages distressed individuals to seek help).[15,16]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ABU SUBSTANCE ABUSE AND ADDICTION SERVICES | O (MAX: 1 PT)

Intent: To increase availability and access to community-based substance abuse and addiction programs that improve treatment outcomes through the provision of effective care

Summary: Tobacco, alcohol and drug use contribute significantly to the global burden of premature death and disability.[17] In 2013, 246 million people between 15 and 64 years of age used illicit drugs, of which 1 in 10 suffered from a drug use disorder or dependency.[18] Half of these individuals included people who use injection drugs, a population at high risk of transmission of infectious diseases, such as HIV and hepatitis C.[18] Harmful use of alcohol is a leading global risk factor for premature death and disability, accounting for 3.3 million deaths per year (or 5.9% of all deaths) and 5.1% of the global burden of disease.[19] Alcohol addiction is also a risk factor for neuropsychiatric disorders and non-communicable diseases, including cardiovascular diseases, cirrhosis of the liver and numerous cancers.[20] Tobacco use is the largest preventable risk factor for non-communicable diseases.[21] Smoking kills approximately six million people a year, of which more than five million are the result of direct tobacco use and 600,000 are the result of secondhand smoke.[21] By 2020, it is predicted that tobacco will account for 10% of all deaths worldwide.[17]Despite the need for health intervention, substance use and addiction treatment is not available for many individuals. Community-based substance abuse and addiction treatment offers an integrated, comprehensive network of services that support and empower those undergoing treatment, including ease of patient treatment, reduced disruption of family and working life, flexibility and affordability.[22]

Part 1 Treatment and Care

For All Spaces:

Substance abuse and addiction programs are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary, including at least four of the following:

a. Individual and group counseling.[23]
b. Inpatient and/or residential treatment.[23,24]
c. Intensive outpatient treatment.[23]
d. Case or care management.[23]
e. Medication-assisted treatment.[23]
f. Recovery support services (e.g., recovery homes, supportive housing).[23-26]
g. Peer support (e.g., mentoring or peer-led support groups).[23,27]
h. Screening initiatives supported by brief interventions.[28]
i. Telephone or online support programs (mass transit and distance requirements do not apply).
j. Harm reduction interventions (e.g., needle exchange program).[22]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ARK SUBSTANCE ABUSE AND ADDICTION SERVICES FOR AT-RISK POPULATIONS | O (MAX: 1 PT)

Intent: To support the provision of specialized substance abuse and addiction services in order to mitigate barriers to access for at-risk populations, as well as to promote early intervention and effective treatment.

Summary: At-risk populations experience a higher probability for substance abuse and addiction, and simultaneously also face greater barriers to treatment. Treatment for drug use is out of reach for many, with only one in six users accessing treatment. Women in particular face greater barriers to treatment: although one in three global drug users is a woman, women comprise only one in five users in treatment. Additionally, women who use drugs intravenously are more susceptible to HIV infection than men, thus contributing to a higher HIV prevalence among this vulnerable population.[18] Other at-risk populations include adolescents, who are at greater risk of drug abuse and addiction than the general population, as well as racial and ethnic minority groups, who tend to more frequently experience social, environmental and economic risk factors and poorer access to care.[29] A greater burden of substance use disorders extends to various at-risk populations, including children, women of childbearing age, pregnant and breastfeeding women, older adults, indigenous peoples, persons living with HIV/AIDS, homeless individuals, sex workers, sexual minorities and those with lower socioeconomic status.[30,31] Substance abuse problems can have devastating impacts on individuals, families and communities. Addressing substance abuse in populations with unique risk factors is a critical path to community health and well-being.

Part 1 Specialized Programs

For All Spaces:

Specialized substance abuse and addiction services are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary, including at least two of the following:

a. Specialized programs and outreach tailored to the needs of identified at-risk populations.[29]
b. Community care and support for affected individuals and their families.[19]
c. Gender-specific programs that address challenges commonly faced among women struggling with substance abuse and addiction (e.g., pregnancy/ breastfeeding, accessibility due to childcare needs).[32]
d. Adolescent or youth-specific programs.[29]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ALC ALCOHOL ENVIRONMENT | O (MAX: 1 PT)

Intent: To reduce public health risks associated with excessive alcohol consumption.

Summary: Alcohol consumption is associated with numerous and widespread public health issues including injuries from motor vehicle crashes, fall-related injuries, violence and death.[33,34] Beyond the individual physiological health risks associated with excessive alcohol consumption and misuse, the broader alcohol environment of a community poses a public health risk to children, youth and other vulnerable groups. Alcohol outlet density is associated with higher rates of crime and violence, lower perceptions of safety, excessive alcohol consumption and other related harms.[35-37] The U.S. Centers for Disease Control (CDC) defines an alcohol outlet as a space where alcohol is legally sold for on- or off-premise consumption.[35] The CDC supports community limits on their density as an effective strategy to reduce public health risks.[35] In regard to exposure among special populations, research shows that children who are exposed to an alcohol outlet on their route to and/or from school are more than twice as likely to be offered alcohol or other drugs, and are nearly two times more likely to be exposed to the sale of drugs or to see others using drugs.[38] Evidence from the CDC also demonstrates that policies that prohibit sales to minors are effective at reducing underage purchasing.[39] Additional evidence supports limiting the hours or days in which alcohol can be sold as these policies effectively reduce excessive alcohol consumption and its related risks.[40,41]

Part 1 Alcohol Environment Policy

For All Spaces:

At least two of the following requirements are met:

a. Policy is in place that limits the density of alcohol outlets (including those where alcohol is sold for on- or off-premise consumption) within the project boundary.[35]

b. Policy is in place that limits the days and/or hours in which alcohol can be sold (applicable to alcohol outlets where alcohol can be purchased for on- or off-premise consumption).[40,41]

c. Policy is in place that limits the sale of alcohol (of any kind) to minors (applicable to alcohol outlets where alcohol can be purchased for on- or off-premise consumption).[39]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

RDR RESPONSIBLE DRIVING | O (MAX: 1 PT)

Intent: To reduce public health risks posed by drinking and driving through responsible driver programs.

Summary: Driving while intoxicated poses significant public health risks.[42] Drivers whose blood alcohol concentration (BAC) reaches between 0.02 and 0.05 g/dl are at least three times more likely to be involved in a fatal accident.[42] Between 2014 and 2015, fatal alcohol-related accidents in the U.S. increased by 3.2%, with the total fatalities rising to nearly 10,000 people.[43,44] In the U.S. alone, the collective economic burden of alcohol-impaired driving is estimated to be more than $44 billion annually.[43] At the global scale, evidence from the WHO indicates that BACs above the legal limit were present in blood samples of about 20% of fatally injured drivers in high-income countries, and between 33 and 69% of samples from low- and middle-income countries.[33] The WHO recognizes drinking and driving legislation, in concert with enforcement, as a successful strategy to reduce alcohol-related crash risk and burden.[42]Alternative strategies such as education programs, mass media campaigns and designated driver programs (e.g., offering designated drivers nonalcoholic beverages at no cost paired with informational signage about designated drivers incentives) have also proven effective in reducing the burden of alcohol-related vehicle injuries and deaths.[45,46] Safe ride services have also emerged as a potential strategy, such as volunteer programs and partnerships with rideshare companies for safe rides home.[47,48]

Part 1 Responsible Driving Programs

For All Spaces:

A responsible driver program is implemented incorporating one or more of the following:

a. Education and awareness.[49]
b. Mass media campaign.[45]
c. Designated driver program.
d. Safe ride services.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

IPV SUPPORT FOR VICTIMS OF INTERPERSONAL VIOLENCE | O (MAX: 1 PT)

Intent: To increase availability and access to services and support programs for victims of interpersonal violence.

Summary: Annually, over half a million people die from interpersonal violence, with millions living as victims of nonfatal violence.[50] Intimate partner violence (IPV), a type of interpersonal violence, is a serious global health problem faced by one-third of women in their lifetime.[50] Interpersonal violence, as well as child mistreatment and abuse, can carry on for years without intervention or help.[50] In addition to physical harm, interpersonal violence is associated with serious mental health consequences, including depression, anxiety and posttraumatic stress disorder, as well as increased risk for adopting health-negative coping behaviors, such as smoking and/or drug and alcohol abuse.[50] Housing instability for women experiencing IPV is connected with elevated stress, decreased self-care and overall reduced health stability, and is the leading cause of homelessness and housing insecurity.[51-53] The availability of emotional, social and legal support, including shelters, counseling, medical care, legal assistance and housing, offers a key role in helping those who are seeking refuge from an abusive environment.[50] Caring for and supporting victims is critical in breaking the cycles of violence facing this vulnerable population.

Part 1 Community Services and Support Programs

For All Spaces:

Services and support programs are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary and include at least two of the following:

a. Safety planning assistance.[54]
b. Temporary, safe accommodation (e.g., women's shelters, family shelters).[51,54]
c. Communication regarding or linkages to temporary, safe housing services.[51,54]
d. Priority preference on waiting lists for stable, affordable housing.[51]
e. Communication regarding or linkages to stable, affordable housing service providers.[51]
f. Legal assistance and referrals for obtaining protection orders.[54]
g. Support applying for public assistance (e.g., housing subsidies).[54]
h. Counseling and support groups for survivors and children.[54]
i. Crisis counseling or hotlines (mass transit and distance requirements do not apply).[54]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SGR INTEGRATION OF STREETSCAPE GREENERY | O (MAX: 1 PT)

Intent: To support the integration of streetscape greenery in order to promote mental restoration and mental health and to improve perceptions of the urban environment.

Summary: Streetscape greenery is an integral part of the urban environment. It brings visually pleasing aesthetics and vitality to the predominantly gray urban landscape and contributes to the overall urban forest.[55-57] Trees offer multiple functions beyond aesthetic value, providing a wide range of health, social, economic and environmental benefits.[58] The level of greenery in the urban environment has an established relationship with mental health, levels of reported stress and perceptions of social cohesion within a neighborhood.[55] Residents living in neighborhoods with more streetscape greenery perceive their own health as better, experience fewer acute health-related complaints and report better overall mental health status.[55]Additionally, streetscape greenery can aid in the mitigation of urban oppressiveness, a form of environmental stress resulting from urban scenes in which high-rise buildings dominate the visual field, are uninterrupted by vegetation, block sky visibility and reduce the perceived openness of the outdoor environment.[59] The resulting negative psychological pressure can induce stress, anxiety and feelings of claustrophobia; however, the presence of trees between building façades and the sidewalk may alleviate these sensations.[59] Compared to built or hardened surfaces, trees and other natural elements have enhanced stress-reducing qualities, and, as such, are key contributors to the quality of the urban streetscape.[55]

Part 1 Placement of Streetscape Scenery

For All Spaces:

A narrative describes the planting and placement of streetscape greenery along roadways within the project boundary, including consideration of:

a. Deliberate spacing of streetscape greenery.
b. Environmental equity.[60]
c. Areas with high population density and low preexisting tree cover.[61,61]

Part 2 Installation and Maintenance of Streetscape Greenery

For All Spaces:

Plans for the installation and maintenance of streetscape greenery along roadways within the project boundary include:

a. Installation of street trees and other green landscaping on project roadways in accordance with local street tree planting codes and requirements (e.g., permits, planting season, planting locations, species selection).
b. Maintenance of tree plantings.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CHI OUTDOOR CHILD PLAY SPACES | O (MAX: 1 PT)

Intent: To provide children with access to outdoor environments designed to promote enriching play opportunities.

Summary: Opportunities to connect with the natural, green environment are associated with a range of health and developmental benefits for children.[62,63] Children who play in highly natural playgrounds have been found to experience fewer attention and concentration problems, as well as experience improvements in cognitive and physical functioning.[64] Additionally, spaces that encourage more playful engagement styles, such as free play and exploration, are associated with numerous benefits including proper brain development, mental and emotional health and cognitive and social skill development.[62,63] These spaces may also confer benefits to youth with attention deficit disorder (ADD) or attention-deficit/hyperactivity disorder (ADHD).[65,66] Research in youth with ADD revealed that attentional capacities improved after children engaged in activities in green spaces rather than indoor spaces, and outdoor activities significantly reduced symptoms in youth with ADHD.[65,66] Despite the mental and developmental benefits that natural play spaces afford children, children today have fewer opportunities for outdoor play.[67]

Part 1 Access to Play Spaces

For All Spaces:

Outdoor child play spaces meet the following requirements:

a. Located within the grounds of a public use green space.
b. Signage at entrance of play space indicates hours of accessibility. If play space operates seasonally, signage at entrance will indicate months of accessibility.

Part 2 Design of Play Spaces

For All Spaces:

A design plan and narrative describes how play spaces meet one of the following:

a. Seven C's of Young Children's Outdoor Play Spaces (Appendix M1).[68,69]
b. Head Start Body Start Play Space Assessment (Appendix M1).[70]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

GRE RESTORATIVE GREEN SPACES | O (MAX: 1 PT)

Intent: To support the provision of access to green spaces with restorative qualities designed to promote mental recovery and mental health.

Summary: Urban green spaces are associated with a range of short- and long-term mental health benefits, positively affecting age groups across the life span, from children to older adults.[71-73] The many associated benefits include lower levels of anxiety and depression as well as improved mental recovery from stress and fatigue.[74,75] Conversely, the mental health cost associated with a lack of green spaces is alarming. Individuals who have less green space, who are dissatisfied with their access to green spaces and who perceive green and open spaces as far from home are at a greater risk for anxiety, depression and poor mental health.[72,76,77] Socioeconomic inequalities in mental health are narrower in communities where residents report good access to green spaces or recreational areas.[78]Environments that promote restoration are designed to provide relief from fatigue-inducing stressors, and to moderate the stress, irritability and overall negative effects that result from cognitive fatigue.[79,80] Researchers hypothesize that green spaces impact mental health and well-being through cognitive restoration, and that physiological and emotional changes take place when individuals are exposed to natural settings.[81] Through increased access, the potentially beneficial outcomes of restorative urban green can be distributed across a wide range of ages and socioeconomic groups within a community.[82]

Part 1 Access to Green Spaces

For All Spaces:

Green spaces within the project boundary meet the following requirements:

a. At least 75% of dwelling units are within 300 m [1,000 ft] of public use green spaces that total a minimum size of 0.5 hectare [1.25 acre] or greater.[83]
b. Entry points face a minimum of one public street.
c. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance indicates months of accessibility.

Part 2 Design of Green Spaces

For All Spaces:

A narrative and design plan detail how green spaces contain the following:

a. Minimum of 70% plantings, including tree canopies, verdant foliage or other visually stimulating plantings, such as bushes, flower beds and/or grass.[84,85]

Part 3 Integration of Restorative Elements

For All Spaces:

A narrative describes how green spaces are designed to provide the following:

a. Respite from the surrounding urban environment.
b. Elements that encourage involuntary attention.[79,83]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

BLU RESTORATIVE BLUE SPACES | O (MAX: 1 PT)

Intent: To support the provision of access to blue spaces with restorative qualities designed to promote mental recovery and mental health.

Summary: Although environments with water play an enormous cultural and economic role in human history, they are often omitted from the discourse on human health and the built environment.[86] Nevertheless, research identifies a strong relationship between restorative experiences and blue space, with blue space integrated into an urban context showing potential for stress reduction, mood enhancement and attentional restoration.[87] Both natural and built scenes containing water are associated with greater positive affect, are perceived to be more restorative and are associated with more positive subjective reactions compared to places without blue space.[86]There are a number of reasons why blue space is associated with positive affect. For example, the visual properties of aquatic environments, such as lines and patterns of light that are interesting to the human eye, can be both attractive and restorative.[86] Additionally, the sound of water (e.g., breaking waves) is considered calming and restorative.[86] Aquatic environments often suggest a shared social, public space where people of diverse ages and backgrounds gather and congregate.[88,89] Combined, these features can create a therapeutic landscape that brings together a mix of features designed to enhance health: individual restoration from everyday stress, positive socialization, social cohesion and the promotion of a strong sense of place.[88]

Part 1 Access to Blue Spaces

For All Spaces:

Blue spaces meet the following requirements:

a. At least one public use blue space is located within the project boundary or within 400 m [0.25 mi] walk distance of the project boundary.
b. Land adjacent to blue spaces faces a minimum of one public street.
c. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance indicates months of accessibility.

Part 2 Integration of Restorative Elements

For All Spaces:

A narrative describes how blue spaces are designed to provide the following:

a. Respite from the surrounding urban environment.
b. Elements that encourage involuntary attention.[79,83]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

BLT RESTORATIVE BUILT SPACES | O (MAX: 1 PT)

Intent: To support the provision of access to built spaces with restorative qualities that promote mental recovery and mental health.

Summary: Cognitive restoration can be achieved across a wide variety of contexts, and as such, not all restorative places need to be green or blue.[80] In a study of workers living in an urban environment, average levels of cortisol and self-reported stress were significantly reduced by a brief visit to an art gallery during lunch.[90] Similarly, research indicates that certain built places, such as historic plazas or promenades, can be perceived as similarly restorative and preferred equally to an urban park.[91] Additionally, houses of worship can provide a restorative atmosphere that eases attentional fatigue while also fostering contemplation and reflection.[92] By integrating restorative elements that relieve individuals from fatigue-inducing environmental stressors, these built spaces have the potential to provide similar positive effects as green, blue or other naturally oriented environments.

Part 1 Restorative Places

For All Spaces:

At least two of the following spaces are available for public use at no cost and located within the project boundary or within a 400 m [0.25 mi] walk distance of the project boundary:

a. Museum or art gallery space.[90]
b. House of worship.[80,92]
c. Meditation or prayer space.[80,92]
d. Historical site.[91]
e. Promenade.[91]
f. Plaza.[91]

Part 2 Access to Restorative Built Spaces

For All Spaces:

Restorative built spaces located within the project boundary meet the following requirements:

a. Entry points face a minimum of one public use street.
b. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance will indicate months of accessibility.

Part 3 Integration of Restorative Elements

For All Spaces:

A narrative describes how built spaces are designed to provide the following:

a. Respite from the surrounding urban environment.
b. Elements that encourage involuntary attention.[79,83]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SCE PRESERVATION OF SCENIC VIEWS | O (MAX: 1 PT)

Intent: To preserve and maintain visual access to green and blue spaces and other scenic resources.

Summary: Views that comprise natural areas, forests and cultural and historic resources can have a positive impact on health. Access to green, blue and natural spaces, including passive views, is linked to positive health outcomes and well-being, which includes reduced psychological distress.[64,93,94] Studies demonstrate that exposure to green or natural views is associated with various positive mental health outcomes, including stress reduction, memory recall and other aspects of cognitive performance.[95-97] Visual access to scenic views and green spaces at a community scale can impact the interpretation of accessibility and thereby help improve associated positive health outcomes and mitigate health inequities. Access to green spaces and nature at a community level also facilitates attachment to place and promotes opportunities for social engagement and cohesion.[97]

Part 1 Designation of Scenic Views

For All Spaces:

A point-by-point narrative demonstrates the designation of scenic views within the project boundary and addresses the following:

a. Designation of specific and general characteristics.[98]
b. Site visits and identification of scenic resources.[98]
c. Prioritization of specific views for preservation.[98]
d. Preparation of a scenic resource map for public use.[98]
e. Maintenance of an up-to-date list of scenic resources.[98]

Part 2 Preservation and Management of Scenic Views

For All Spaces:

A narrative for the preservation and management of scenic views and resources within the project boundary includes consideration of:

a. How a proposed subdivision, land development or permit action near a designated scenic resource will work to avoid, minimize and/or mitigate negative scenic impacts.[98]
b. Protection of natural scenic resources, such as local farmland, timberland, pastures or open space.[99]
c. Protection of private land that benefits the local community, such as maintaining a scenic view.[100]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX M1: OUTDOOR CHILD PLAY SPACES:

Seven C's of Young Children's Outdoor Play Spaces

Character: The overall feel, physical character and design intent and how it will guide design decisions (e.g., modern, organic, modular, reuse).[69]

Context: How the design has considered the play space itself, its surrounding landscape and how they interact with each other (e.g., sensitive to climate).[69]

Connectivity: The play space has physical, visual and cognitive connectivity (e.g., diverse pathways within the space or between indoor and outdoor spaces).[69]

Change: Differently sized subspaces provide areas for children to play alone or in groups and with changing materials (e.g., living plants or animals).[69]

Chance: Open-endedness or flexibility to encourage children to create, manipulate, shape and explore the play space (e.g., messy zones, loose and movable materials, mystery). The space should be appropriately designed to the scale of children.[69]

Clarity: Physical legibility and perceptual imageability (e.g., clear entry and exit spaces, soundscape and noise management).[69]

Challenge: Provides several levels of physical and cognitive difficulty without being hazardous.[69]

Strategies from Head Start Body Start Play Space Assessment

Key features: Play space comprises a variety of developmentally appropriate play areas and learning settings, including at least five of the following: multipurpose, open space; anchored play equipment (e.g., climbing structure, swings, slides); wheeled toys; manipulative equipment (e.g., balls, jump ropes); water play features (e.g., hose/sprinkler, wading pool); music and movement/acoustic play area (e.g., log drums, chimes); sand play area; balance beam/stepping stones; playhouse; flower or vegetable garden; loose parts for building; climbing tree; climbing/rolling mound; raised deck/stage.[70]

Movement opportunities: Play space promotes physical activity and movement, including at least five of the following actions in each relevant category: traveling actions (walking, skipping, hopping, climbing, jumping, crawling, sliding, marching, galloping, running, leaping); stabilizing actions (twisting, turning, squatting, swinging, swaying, pushing, pulling, stretching, bending, shaking, dodging, landing); manipulating actions (throwing, catching, bouncing, tossing, rolling, kicking, trapping, opening, closing, striking, object handling).[70]

Flexibility and play: Play space offers features that can be changed or played with in many different ways, including spontaneous, innovative, flexible and creative play; solitary, parallel or cooperative play; functional, construction and symbol play.[70]

Natural features: Play space incorporates a variety of natural elements, including at least three of the following categories: trees or shrubs, flowering plants (non-poisonous); vines; topographic variations (e.g., mounds, terraces, slopes); other safe ground surfaces.[70]

Welcoming atmosphere: Play space has friendly, clean, inviting atmosphere, and includes at least two of the following visual or auditory elements: banner, chime, wind sock, statue, gazing ball, flag, cultural artifact or decorative object.[70]

Sensory elements: Play space provides opportunities for a variety of sensory experiences, including all of the following: vestibular stimulation (e.g., rolling, socking, swinging, sliding, merry-go-round, gliders); proprioceptive stimulation (e.g., climbing, crawling on/through, lifting, throwing); olfactory stimulation (e.g., fragrant herb plantings).[70]

Accessibility and inclusive play: Play space provides opportunities for children across ages and abilities to access and enjoy the environment and participate with peers.[70]

Risk and challenge: Play space promotes adventure (e.g., hiding places, safe jumping perches) and challenges children's physical, social and cognitive abilities (e.g., varying height apparatus, balancing activities).[70]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: World Health Organization. 10 Facts on Mental Health. http://www.who.int/features/factfiles/mental_health/mental_health_facts/en/index4. html. Published 2015. Accessed May 10, 2016.

2: World Health Organization. Mental health action plan 2013-2020. Geneva: World Health Organization; 2013. http://www.who.int/mental_ health/action_plan_2013/en/

3: World Health Organization. Depression. http://www.who.int/ mediacentre/factsheets/fs369/en/. Published n.d. Accessed May 25, 2016.

4: Pfeiffer PN, Glass J, Austin K, et al. Impact of distance and facility of initial diagnosis on depression treatment. Health Serv Res. 2011;46(3):768-786. https://www.ncbi.nlm.nih.gov/pubmed/21210800

5: Colorado Health Partnerships. Kinds of Mental Health Services. http://www.coloradohealthPartnerships.com/services/kinds_of_mental_ health_services.htm. Published 2017. Accessed March 1, 2017.

6: Clubhouse International. International Standards for Clubhouse Programs. Vol 2. New York, NY: Clubhouse International; 2015. http:// www.iccd.org/quality.html

7: World Health Organization. Organization of services for mental health: WHO mental health policy and service guidance package. Geneva, Switzerland: WHO Press; 2003. http://www.who.int/mental_health/policy/services/essentialpackage1v2/en/

8: World Health Organization. Improving Health Systems and Services for Mental Health. Geneva, Switzerland;2009. http://apps.who.int/iris/ bitstream/10665/44219/1/9789241598774_eng.pdf

9: City of New York. Crisis Services/Mental Health: Mobile Crisis Teams. https://www1.nyc.gov/site/doh/health/health-topics/crisis-emergencyservices-mobile-crisis-teams.page. Published 2016. Accessed October 1, 2016.

10: Evans TS, Berkman N, Brown C, Gaynes B, Weber RP. Disparities Within Serious Mental Illness Rockville, MD: Agency for Healthcare Research and Quality;2016. https://www.ncbi.nlm.nih.gov/books/NBK368427/

11: Substance Abuse and Mental Health Services Administration. ConsumerOperated Services: Building Your Program. Rockville, MD: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services;2011. https://store.samhsa.gov/shin/content/SMA11-4633CD-DVD/ BuildingYourProgram-COSP.pdf

12: National Alliance on Mental Illness. Mental Health Crisis Planning. St. Paul, MN: National Alliance on Mental Illness, Minnesota;n.d. http:// www.namihelps.org/Crisis-Booklet-Adults.pdf

13: World Health Organization. Suicide Mortality Rate Data Visualization. http://apps.who.int/gho/data/node.sdg.3-4-viz-2?lang=en. Published 2016. Accessed November 15, 2016.

14: World Health Organization. Suicide Fact Sheet. http://www.who.int/ mediacentre/factsheets/fs398/en/. Published 2016. Accessed November 15, 2016.

15: World Health Organization. Preventing suicide: a global imperative. Geneva, Switzerland: WHO Press; 2014. http://www.who.int/mental_ health/suicide-prevention/world_report_2014/en/

16: Aitken P, Owens C, Tomlins S, et al. Guidance on action to be taken at suicide hotspots. Suicide Prevention Resource Center: Peninsula Medical School; n.d. http://www.sprc.org/sites/default/files/migrate/library/SuicideHotspotsGuidance PDF.pdf

17: World Health Organization. Global status report on noncommunicable diseases 2010. Geneva, Switzerland: World Health Organization;2010. http://apps.who.int/iris/bitstream/10665/44579/1/9789240686458_eng. Pdf

18: United Nations Office on Drugs and Crime. World Drug Report. Geneva, Switzerland;2015. http://www.unodc.org/documents/wdr2015/World_ Drug_Report_2015.pdf

19: World Health Organization. Global Status Report on Alcohol and Health. Geneva, Switzerland2014.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

http://www.who.int/substance_abuse/ publications/global_alcohol_report/msb_gsr_2014_1.pdf?ua=1

20: World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva, Switzerland2010. http://www.who.int/substance_ abuse/activities/gsrhua/en/

21: World Health Organization. Fact Sheet: Tobacco. http://www.who.int/ mediacentre/factsheets/fs339/en/. Published 2017. Accessed July 1, 2016.

22: United Nations Office on Drugs and Crime. Community Based Treatment: Good Practice. Geneva, Switzerland;2008. https://www. unodc.org/docs/treatment/CBTS_AB_24_01_09_accepted.pdf

23: Substance Abuse and Mental Health Services Administration. Treatments for Substance Use Disorders. http://www.samhsa.gov/treatment/ substance-use-disorders. Published 2015. Accessed July 1, 2016.

24: Kirst M, Zerger S, Misir V, Hwang S, Stergiopoulos V. The impact of a Housing First randomized controlled trial on substance use problems among homeless individuals with mental illness. Drug Alcohol Depend. 2014;146:24-29.

25: Mericle AA, Miles J, Cacciola J. A critical component of the continuum of care for substance use disorders: recovery homes in Philadelphia. Journal of Psychoactive Drugs. 2015;47(1):80-90.

26: Board of Regents of the University of Wisconsin System. What works for health: Policies and programs to improve Wisconsin's health. http://whatworksforhealth.wisc.edu/program. php?t1=109&t2=126&t3=89&id=349. Published 2016. Accessed October 5, 2016.

27: U.S. Department of Health and Human Services. Center for Substance Abuse Treatment, What are Peer Recovery Support Services? Rockville, MD: Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services;2009. https://store.samhsa. gov/shin/content/SMA09-4454/SMA09-4454.pdf

28: Madras B CW, Avula D, Stegbauer T, Stein J, Westley C. Screening, brief interventions, referral to treatment (SBIRT) for illicit drug and alcohol use at multiple healthcare sites: Comparison at intake and six months. Drug and Alcohol Dependence. 2009;99(1-3):280-295.

29: Environmental Protection Agency. Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution: What are the harmful effects of CO? https://www.epa.gov/co-pollution/basic-information-aboutcarbon-monoxide-co-outdoor-air-pollution - Effects. Published n.d. Accessed December 1, 2016.

30: Substance Abuse and Mental Health Services Administration. Specific Populations and Prescription Drug Misuse and Abuse. http://www. samhsa.gov/prescription-drug-misuse-abuse/specific-populations. Published 2015. Accessed July 1, 2016.

31: Substance Abuse and Mental Health Services Administration. Racial and Ethnic Minority Populations. http://www.samhsa.gov/specificpopulations/racial-ethnic-minority. Published 2016. Accessed July 1, 2016.

32: World Health Organization. Guidelines for the identification and management of substance use and substance use disorders in pregnancy. Geneva, Switzerland;2014. http://apps.who.int/iris/bitstream/10665/107130/1/9789241548731_eng.pdf

33: World Health Organization. Drinking and driving: A road safety manual for decision-makers and practioners. Geneva, Switzerland;2007. http://www.grsproadsafety.org/sites/grsp.drupalgardens.com/files/Drinking%26Driving_English.pdf

34: Dinh-Zarr T, Goss C, Heitman E, Roberts I, DiGuiseppi C. Interventions for preventing injuries in problem drinkers. Cochrane Database Syst Rev. 2004(3):CD001857. https://www.ncbi.nlm.nih.gov/pubmed/15266456

35: Centers for Disease Control and Prevention. Alcohol?Excessive Consumption: Regulation of Alcohol Outlet Density. http://www. thecommunityguide.org/alcohol/outletdensity.html. Published 2007. Accessed April 2, 2016.

36: Pacific Institute. Liquor Stores and Community Health. Oakland, CA: Pacific Institute; n.d. http://pacinst.org/app/uploads/2013/02/liquor_ store3.pdf

37: Ahern J, Margerison-Zilko C, Hubbard A, Galea S. Alcohol outlets and binge drinking in urban neighborhoods: the implications of nonlinearity for intervention and policy. Am J Public Health. 2013;103(4):e81-87. https://www.ncbi.nlm.nih.gov/pubmed/23409908

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

38: Milam AJ, Furr-Holden CD, Cooley-Strickland MC, Bradshaw CP, Leaf PJ. Risk for exposure to alcohol, tobacco, and other drugs on the route to and from school: the role of alcohol outlets. Prev Sci. 2014;15(1):12-21. https://www.ncbi.nlm.nih.gov/pubmed/23408286

39: Centers for Disease Control and Prevention. Alcohol?Excessive Consumption: Enhanced Enforcement of Laws Prohibiting Sales to Minors. https://www.thecommunityguide.org/findings/alcoholexcessive-consumption-enhanced-enforcement-laws-prohibitingsales-minors. Published 2006. Accessed March 23, 2017.

40: Centers for Disease Control and Prevention. Alcohol?Excessive Consumption: Maintaining Limits on Hours of Sale. http://www. thecommunityguide.org/alcohol/limitinghourssale.html. Published 2009. Accessed April 2, 2016.

41: Centers for Disease Control and Prevention. Alcohol?Excessive Consumption: Maintaining Limits on Days of Sale. https://www. thecommunityguide.org/findings/alcohol-excessive-consumptionmaintaining-limits-days-sale. Published 2008. Accessed March 23, 2017.

42: World Health Organization. Global Status Report on Road Safety. Geneva, Switzerland: World Health Organization;2015. http://www.who.int/violence_ injury_prevention/road_safety_status/2015/en/

43: Centers for Disease Control and Prevention. Impaired Driving: Get the Facts. http://www.cdc.gov/motorvehiclesafety/impaired_driving/ impaired-drv_factsheet.html. Published 2016. Accessed July 26, 2016.

44: U.S. Department of Transportation. 2015 Motor Vehicle Crashes: Overview. Washington, DC: National Highway Traffic Safety Administration; 2016. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318

45: Centers for Disease Control and Prevention. Motor Vehicle Injury? Alcohol-Impaired Driving: Mass Media Campaigns. http://www. thecommunityguide.org/mvoi/AID/massmedia.html. Published 2002. Accessed April 1, 2016.

46: Centers for Disease Control and Prevention. Motor Vehicle Injury?Alcohol-Impaired Driving: Designated Driver Promotion Programs? Population-Based Campaigns. http://www.thecommunityguide.org/mvoi/AID/RRDD-populationbased.html. Published 2003. Accessed April 2, 2016.

47: Mothers against Drunk Driving (MADD). MADD is joining forces with Lyft and UBER. http://www.madd.org/blog/2014/december/madd-isjoining-forces-with-uber-lyft.html. Published 2014. Accessed March 23, 2017.

48: Mothers Against Drunk Driving (MADD). Designated Drivers. http://www.madd.org/drunk-driving/about/designated-drivers. html?referrer=https://www.google.com/. Published n.d. Accessed March 23, 2017.

49: Centers for Disease Control and Prevention. Motor Vehicle Injury?Alcohol-Impaired Driving: Multicomponent Interventions with Community Mobilization. https://www.thecommunityguide.org/findings/motor-vehicle-injury-alcohol-impaired-drivingmulticomponent-interventions-community. Published 2005. Accessed June 1, 2017.

50: World Health Organization. WHO multi-country study on women's health and domestic violence against women. REPORT-Initial results on prevalence, health outcomes and women's responses. Geneva, Switzerland;2005. http://www.who.int/reproductivehealth/publications/ violence/24159358X/en/

51: American Civil Liberties Union. Safe Homes, Safe Communities: A Guide for Local Leaders on Domestic Violence and Fair Housing. New York, NY: American Civil Liberties Union;2015. http://www.fhrc.org/Domestic_Violence.pdf

52: Meffert SM, McCulloch CE, Neylan TC, Gandhi M, Lund C. Increase of perceived frequency of neighborhood domestic violence is associated with increase of women's depression symptoms in a nationally representative longitudinal study in South Africa. Soc Sci Med. 2015;131:89-97. https://www.ncbi.nlm.nih.gov/pubmed/25769107

53: Daoud N, Matheson FI, Pedersen C, Hamilton-Wright S, Minh A, Zhang J, O'Campo P. Pathways and trajectories linking housing instability and poor health among low-income women experiencing intimate

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

Partner violence (IPV): Toward a conceptual framework. Women's Health. 2016;56(2):208-225.

54: Family and Youth Services Bureau. Getting Help with Domestic Violence. https://www.acf.hhs.gov/fysb/resource/help-fv. Published 2014. Accessed March 1, 2017.

55: de Vries S, van Dillen SM, Groenewegen PP, Spreeuwenberg P. Streetscape greenery and health: stress, social cohesion and physical activity as mediators. Social Science and Medicine. 2013;94:26-33.

56: Crabtree P, Hall L. Trees in Urban Design. Salida, CO: Crabtree Group Inc.;n.d. https://www.cnu.org/sites/default/files/trees_in_urban_design. pdf

57: Burden D. 22 Benefits of Urban Street Trees. 2006. http:// northlandnemo.org/images/22BenefitsofUrbanStreetTrees.pdf

58: Heart Foundation. Policy Snapshot: Making the case for the investment in street trees and landscaping in urban environments. Adelaide, Australia: Heart Foundation;2013.

59: Asgarzadeh M, Lusk A, Koga T, Hirate K. Measuring oppressiveness of streetscapes. Landscape and Urban Planning. 2012;107:1-11.

60: Landry S, Chakraborty J. Street trees and equity: evaluating the spatial distribution of an urban amenity Environment and Planning. 2009;41:2651-2670.

61: United States Department of Agriculture Forest Service. Assessing Urban Forest Effects and Values: New York City?s Urban Forest. Newtown Square, PA: United States Department of Agriculture Forest Service;2007. http://www.milliontreesnyc.org/downloads/pdf/ufore_ study.pdf

62: Gill T. The benefits of children's engagement with nature: a systematic literature review. Children, Youth, and Environments. 2014;24(2):10-34.

63: White R. The Power of Play: A Research Summary on Play and Learning St. Paul, Minnesota: Minnesota Children's Museum;n.d.

64: Berto R. The role of nature in coping with psycho-physiological stress: a literature review on restorativeness. Behav Sci (Basel). 2014;4(4):394- 409. https://www.ncbi.nlm.nih.gov/pubmed/25431444

65: Faber Taylor A, Kuo FEM. Could Exposure to Everyday Green Spaces Help Treat ADHD? Evidence from Children's Play Settings. Applied Psychology: Health and Well-Being. 2011;3(3):281-303. http://dx.doi. org/10.1111/j.1758-0854.2011.01052.x

66: Kuo FE, Taylor AF. A potential natural treatment for attention-deficit/ hyperactivity disorder: evidence from a national study. Am J Public Health. 2004;94(9):1580-1586. https://www.ncbi.nlm.nih.gov/ pubmed/15333318

67: Shackell A, Butler N, Doyle P, Ball D. Design for Play: A guide to creating successful play spaces. England: Play England;2008. http://www. playengland.net/wp-content/uploads/2015/09/design-for-play.pdf

68: Herrington S, Lesmeister, C. The design of landscapes at child-care centres: Seven Cs. Landscape Research. 2006;31(1):63-82.

69: Herrington S, Lesmeister, C, Nicholls J, Stefiuk K. 7 C's: An Informational Guide to Young Children?s Outdoor Play Spaces. Vancouver: Westcoast Childcare Resource Centre;2007. http://www.wstcoast.org/playspaces/ outsidecriteria/7Cs.pdf

70: Head Start Body Start. Head Start Body Start Play Space Assessment. Reston, VA: American Association for Physical Activity and Recreation, National Association for Sport and Physical Education;2010. https:// eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/eecd/nature-basedlearning/Create and Naturalize a Play Space/play-space-assessmentpreschool.pdf

71: Pearson DG, Craig T. The great outdoors? Exploring the mental health benefits of natural environments. Front Psychol. 2014;5:1178. https:// www.ncbi.nlm.nih.gov/pubmed/25374550

72: Aggio D, Smith L, Fisher A, Hamer M. Mothers' perceived proximity to green space is associated with TV viewing time in children: The Growing Up in Scotland Study. Prev Med. 2015;70:46-49.

73: Wu YT, Prina AM, Jones A, et al. Older people, the natural environment and common mental disorders: cross-sectional results from the Cognitive Function and Ageing Study. BMJ Open. 2015;5(9):e007936.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

https://www.ncbi.nlm.nih.gov/pubmed/26377504

74: Valtchanov D, Barton KR, Ellard C. Restorative effects of virtual nature settings. Cyberpsychol Behav Soc Netw. 2010;13(5):503-512. https:// www.ncbi.nlm.nih.gov/pubmed/20950174

75: Beyer KM, Kaltenbach A, Szabo A, et al. Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. Int J Environ Res Public Health. 2014;11(3):3453-3472. https://www.ncbi.nlm.nih.gov/pubmed/24662966

76: Beyer KM, Kaltenbach A, Szabo A, et al. Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. Int J Environ Res Public Health. 2014;11(3):3453-3472. https://www.ncbi.nlm.nih.gov/pubmed/24662966

77: Guite HF, Clark C, Ackrill G. The impact of the physical and urban environment on mental well-being. Public Health. 2006;120(12):1117- 1126. https://www.ncbi.nlm.nih.gov/pubmed/17097120

78: Mitchell RJ, Richardson EA, Shortt NK, Pearce JR. Neighborhood Environments and Socioeconomic Inequalities in Mental Well-Being. Am J Prev Med. 2015;49(1):80-84. https://www.ncbi.nlm.nih.gov/pubmed/25911270

79: Kaplan S. The restorative benefits of nature: Toward an integrative framework. Journal of Environmental Psychology. 1995;15(3):169-182.

80: Ouellette P, Kaplan R, Kaplan S. The monastery as a restorative environment. Journal of Environmental Psychology. 2005;25(2):175- 188.

81: Staats H, Jahncke H, Herzog TR, Hartig T. Urban Options for Psychological Restoration: Common Strategies in Everyday Situations. PLoS One. 2016;11(1):e0146213. https://www.ncbi.nlm.nih.gov/pubmed/26731272

82: Alcock I, White MP, Wheeler BW, Fleming LE, Depledge MH. Longitudinal effects on mental health of moving to greener and less green urban areas. Environ Sci Technol. 2014;48(2):1247-1255. https://www.ncbi.nlm.nih.gov/pubmed/24320055

83: World Health Organization. Urban green spaces and health. Copenhagen: WHO Regional Office for Europe;2016. http://www.euro. who.int/__data/assets/pdf_file/0005/321971/Urban-green-spaces-andhealth-review-evidence.pdf?ua=1

84: Marcus C, Sachs, NA. Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing. Hoboken, NJ: John Wiley & Sons; 2013.

85: Erickson S. Restorative Garden Design: Enhancing wellness through healing spaces. Art and Design Discourse. 2012. http://www.extension. iastate.edu/communities/sites/www.extension.iastate.edu/files/communities/05-RESTORATIVE_GARDEN_DESIGN_Enhancing_ wellness_through_healing_spaces.pdf

86: White M, Smith A, Humphryes K, Pahl S, Snelling D, Depledge M. Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. Journal of Environmental Psychology. 2010;30:482-493.

87: Volker S, Kistemann T. The impact of blue space on human health and well-being?Salutogentic health effects of inland surface waters: A review. International Journal of Hygiene and Environmental Health. 2011:449-460.

88: Volker S, Kistemann T. Reprint of: ?I?m always entirely happy when I?m here!? Urban blue and enhancing human health and well-being in Cologne and Dusseldorf, Germany. Social Science and Medicine. 2013;91:141-152.

89: Wessells AT. Urban Blue Space and ?The Project of the Century?: Doing Justice on the Seattle Waterfront and for Local Residents. Buildings. 2014;4:764-784.

90: Clow A, Fredhoi C. Normalisation of salivary cortisol levels and selfreport stress by a brief lunchtime visit to an art gallery by London City workers. Journal of Holistic Healthcare. 2006;3(2):29-32.

91: Fornara R, Troffa T. The relationship between restorative components and environmental preference in natural and built leisure environments. 2009. https://www.researchgate.net/publication/228327761_The_relationship_between_restorative_components_and_environmental_

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

preference_in_natural_and_built_leisure_environments

92: Herzog TR. Houses of Worship as Restorative Environments. Environment and Behavior. n.d.;42.

93: Wolf K, Robbins, A. Metro Nature, Environmental Health, and Economic Value. Environmental Health Perspective. 2015;123(5):390-398.

94: Nutsford D, Pearson A, Kingham S, Reitsma F. Residential exposure to visible blue space (but not green space) associated with lower psychological distress in a capital city. Health & Place. 2016;39:70-78.

95: Brown D, Barton J, Gladwell, V. Viewing Nature Scenes Positively Affects Recovery of Autonomic Function Following Acute-Mental Stress. Environ Sci Technol. 2013;47(11):5562-5569.

96: Africa J, Logan A, Mitchell R, Korpela K, Allen D, Tyrv?inen L, Spengler J. The Natural Environments Initiative: Illustrative Review and Workshop Statement. Center for Health and the Global Environment: Harvard School of Public Health;2014.

97: Wolf K, Krueger, S, Flora, K. Place Attachment & Meaning - A Literature Review. College of the Environment, University of Washington;2014. http://www.greenhealth.washington.edu/

98: Council GT. Genesee Transportation Council - Protecting Scenic Views, Fact Sheet. http://www.gtcmpo.org/Linking Transportation/Fact Sheet_ Protecting Scenic Views.pdf. Published 2013. Accessed July 15, 2016.

99: Miskowiak D, Stoll L. Planning Implementation Tools: Transfer of Development Rights (TDR). https://www.uwsp.edu/cnr-ap/clue/ Documents/PlanImplementation/Transfer_of_Development_Rights.pdf. Published 2005. Accessed October 1, 2016.

100: Land Trust Alliance. Conservation Easements. http://www. landtrustalliance.org/what-you-can-do/conserve-your-land/questions. Published 2016. Accessed October 1, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

COMMUNITY

Communities are characterized by groups of people living in a space, though that area is not limited to its built or natural physical features. The environments in which individuals are born, live and age include social networks, cultural norms, political systems and economic structures, among other elements. Collective and individual health outcomes are shaped by access to opportunities and ability to participate and thrive within these systems and circumstances. Global, national and local conditions that surround the individual—conditions that are shaped by money, power and the distribution of resources—are known as social determinants of health.[1] Social determinants of health include constructs such as economics, education, health care, discrimination and racism.[2]

Spearheaded by leading international organizations such as the World Health Organization (WHO), a social determinants framework has unified and driven the global health agenda toward addressing health disparities, or the differences in health status among different population groups. Health disparities are often products of the unequal distribution of power and resources as a function of differences in race, ethnicity or socioeconomic status.

Data from the WHO underscores the present challenges in addressing health inequities on a global scale. In some developing regions, mortality rates for children under the age of five are 20%—a dramatic rate compared to the 1.3% mortality rate among children in the WHO European region.[3] This staggering health inequity contributes to a global 36-year gap in life expectancy.[3]

Inequities exist not only between countries but also within them. For example, in the United States, infant mortality among African Americans is between 1.5 and 3 times more likely compared to other races and ethnicities.[3] An oft-repeated expression in public health is that your postal code matters more than your genetic code, underscoring the role your surrounding neighborhood plays in determining your health and life expectancy. In some neighborhoods in the U.S., health and resource disparities are so great at the local level that individuals living just a few miles away from one another experience up to a 25-year difference in life expectancy.[4] The place where you live matters, and the systems and structures contained within these places impact health in immense ways.

Improving community design is one way to combat these health inequities. Housing and living conditions, sanitation and waste management, educational opportunity, access to health care services and safe social spaces are examples of physical and social determinants of health that can be addressed through effective, community-level policy measures and design strategies. Solutions that utilize the social determinants framework and address the overarching context in which health and disease perpetuate must equally address the question of equity and distribution of resources. Strategies that address public health issues with this frame of thinking are positioned to make profound and widespread changes in population health.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

VIS COMMUNITY VISIONING | P

Intent: To collaboratively develop a shared vision, measurements and activities for community design and development.

Summary: By engaging key community stakeholders from the onset of the project, projects are able to facilitate a dialogue between decision-makers, planners and the public, thereby creating an opportunity for the development of a collective vision that benefits the widest range of constituents.[5] In reaching for this collective vision, facilitators should also incorporate a focus on identifying a common set of measurements, reinforcing activities and continuous communication as part of a broader collective impact approach to help promote buy-in and stakeholder activation.[6,7] This public input process is instrumental for the long-term maintenance of community support so that considerable benefits are accrued for the community, and also supports the continuation of sound community decisions as it develops and progresses toward its health goals.

Part 1 Participatory Development

For All Spaces:

A point-by-point narrative describes how the project engages stakeholders in project design and development through each of the following:

a. Identification of stakeholder groups, including people from outside the project boundaries who are impacted by the project as well as anticipated users of the space.[8]
b. Consideration of barriers to stakeholder participation, including timing, location, format and cultural norms or values.[8]
c. Culturally, literacy- and numeracy-level–appropriate communication strategies.[8]
d. Discussion of project scope (including limitations) and goals with stakeholders, including discussion of HIA screening (if Feature HIA—Health Impact Assessment Screening is pursued).[8]
e. Record of response to stakeholder feedback on the project plan.[8,9]
f. Monitoring and evaluation of project development with stakeholders.[8]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HIA HEALTH IMPACT ASSESSMENT SCREENING | O (MAX: 1 PT)

Intent: To identify the current and future stakeholders affected by the project and to assess the need and feasibility of an HIA as a prospective planning tool.

Summary: The places in which people live, work, learn and play are critical determinants of their individual and population health. As defined by the World Health Organization, a Health Impact Assessment (HIA) is "a means of assessing the health impacts of policies, plans, and projects in diverse economic sectors using quantitative, qualitative, and participatory techniques."[10] The use of HIAs has grown steadily over the past 15 years and represents a method of understanding the drivers of health and disease in the context of a particular place, and illuminating the impact of policies, programs and projects on population health.[10] HIA practitioners recognize that health is influenced by factors beyond the health care system, including aspects of the physical environment as well as social determinants of health. HIAs are used as a best practice tool to consider the potential effects of a policy, program or project on the health of a community, as well as the distribution of those effects. Distinctly, HIAs provide recommendations to enhance the potential benefits and mitigate the potential harms of the options considered.[11]

Part 1 Baseline Community Health Profile and Screening

For All Spaces:

A narrative identifies the people who will potentially be affected by the project and defines the potential health impacts of the project to that community through the following (see Appendix C1: Health Impact Assessment (HIA) Screening):

a. Community health profile consisting of the geographic boundaries, socio-demographic characteristics and health needs of the affected community (note: can be sourced from a community health needs assessment, local public health Department data or other reputable source).[12-14]
b. Description of a screening process that indicates the need and feasibility of conducting an HIA.[12,15,16,17]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HII HEALTH IMPACT ASSESSMENT IMPLEMENTATION | O (MAX: 1 PT)

Intent: To evaluate potential human health impacts, provide recommendations to enhance health impacts through a participatory process and evaluate the effectiveness of HIAs.

Summary: HIAs are a valuable, data-driven tool available to stakeholders, community organizers, researchers and health leaders who aim to understand the context of health and disease in a particular place. By providing a comprehensive evidence-base, HIAs are a tool for evaluating communities across multiple dimensions (e.g., environment, education, housing, transportation, community cohesion, economics, public realm and health) to support developing interventions aimed at reducing health inequities across racial, ethnic and/or social classes and improving overall population health.[10,18,19]

Part 1 HIA Implementation

For All Spaces:

If the screening process (Feature HIA—Health Impact Assessment Screening) has established the need and feasibility of an HIA, a point-by-point narrative demonstrates completion of the following key HIA processes (for further guidance see Appendix C2: HIA Protocol):

a. Communication and dissemination of HIA findings.[12]
b. Monitoring and evaluation.[12]
c. Scope, including at least one community stakeholder meeting.[12,20]
d. Assessment, including incorporating baseline findings from the community health profile completed (Feature HIA—Health Impact Assessment Screening).[12]
e. Recommendations, including at least one community stakeholder meeting.[12,21]

Part 2 HIA Monitoring and Evaluation

For All Spaces:

A point-by-point narrative demonstrates plans for completing at least one of the following:

a. An impact evaluation within one year of project certification that demonstrates how the HIA influenced the planning and decision-making of the project.[12]
b. An outcome evaluation within one year of 50% occupancy that demonstrates if and how positive health benefits were maximized and adverse health risks minimized within the project boundary.[12]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SOC SOCIAL SPACES | O (MAX: 1 PT)

Intent: To provide public spaces, amenities and programming for community members to socialize, assemble and collaborate.

Summary: Flexible and accessible community spaces can positively impact the social and public lives of community members. Design strategies that improve access to shared, public and democratic social spaces that encourage diverse use and welcome diverse users can help facilitate the social cohesion and trust needed to build social capital.[22] Even after controlling for individual characteristics, social cohesion has been positively associated with self-rated health, as well as objective outcomes including stroke and stroke mortality.[23-15] Developers, community stakeholders and designers should consider how social spaces can be used and integrated into the surrounding environment, who will benefit from these spaces and how the spaces can be designed, redesigned and operated to promote equitable use across all social sectors and cultures to promote a more civil society.[26]

Part 1 Indoor Gathering Spaces

For All Spaces:

At least one of the following public use spaces where people can interact and congregate at no cost is within the project boundary:

a. Library.
b. Museum.
c. Atrium.
d. Community center.
e. Senior center.

Part 2 Outdoor Gathering Spaces

For All Spaces:

At least two of the following public use spaces where people can interact and congregate at no cost are within the project boundary:

a. Plaza or square.
b. Park.
c. Amphitheatre.
d. Pedestrian street.
e. Community garden.

Part 3 Programming for Social Cohesion

For All Spaces:

The project hosts or permits residents, employers, businesses and organizations to host no-cost entry events at least once per quarter such as, but not limited to, the following:

a. Block party or neighborhood association event.
b. Cultural festival.
c. Celebration of a community milestone.
d. Community-wide service day.
e. Arts festival.
f. Street fair.
g. Food festival.
h. Carnival or fair.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PUB PUBLIC SPACES | O (MAX: 1 PT)

Intent: To promote the development of an urban form that is accessible to the general public.

Summary: Privately owned public spaces (POPS), also referred to as privately owned public open spaces (POPOS), are spaces within privately owned buildings or on privately owned properties that allow access for public use. These spaces often take the form of plazas, arcades, atriums, concourses or gallerias.[27] Opening portions of private spaces for public use is a strategy for promoting spatial equity within a community, offering members from all sectors of the community the opportunity to access and enjoy space in the urban landscape.

Part 1 Privately Owned Public Use Space

For All Spaces:

75% of privately owned commercial or residential buildings with a floor area of 10,000 m^2 [108,000 ft^2] provide public access to an allotted space at no cost that meets the following requirements:

a. Provides quality seating areas and sufficient lighting and is easily navigable.[28]
b. Adheres to a regular maintenance and cleaning schedule.
c. Totals at least 186 m^2 [2,000 ft^2].
d. Accessible at all times, unless regularly closed for security purposes (e.g., during nighttime hours) or for special events.
e. Entry points are accessible from a minimum of one public use street.[28]
f. Signage at entrance indicates hours of accessibility, the space's designation as public use and that patronage of the business or building is not necessary to use the space.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SAN SANITATION | O (MAX: 1 PT)

Intent: To protect the enjoyment of the built and natural environment through the maintenance of shared public spaces.

Summary: Sanitation is a basic community necessity and a core component of health equity. Cleanliness is instrumental in preventing the spread of disease, enhancing community self-esteem and pride and maintaining the safety of communities across the lifespan.[29,30] Additionally, inadequate management of waste is linked to lower community perceptions of neighborhood safety, quality and disorder, which have been linked to negative health outcomes.[31,32] For example, among pregnant women, self-perceived poor neighborhood quality is associated with preterm birth.[31] Additionally, youth who perceive their neighborhood as disorderly have been found to be at increased risk for hypertension.[32] Neighborhood cleanliness, therefore, is not just critical for preventing the spread of communicable disease but also a subtle yet influential component in supporting the long-term health and well-being of community members.

Part 1 Waste Receptacles

For All Spaces:

Waste receptacles meet the following requirements:

a. Available on sidewalks in commercial and mixed-use zones to collect pedestrian litter.
b. Installed at least every 244 m [800 ft] along pedestrian-accessible paths.[33]
c. Emptied regularly.

Part 2 Sidewalk and Street Cleaning

For All Spaces:

The following requirements are met:

a. Sidewalk cleaning is performed regularly.
b. Street cleaning, including cleaning of designated bike lanes, is performed regularly.
c. Street cleaning schedule is posted for public notice.

Part 3 Community Beautification

For All Spaces:

The following requirements are met:

a. Residents and businesses are invited to participate in beautification initiatives that are held, at minimum, annually.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CHW COMMUNITY HEALTH AND WELL-BEING | O (MAX: 1 PT)

Intent: To increase health literacy and improve public health outcomes.

Summary: Communication messages, campaigns and programs can be a strategic and effective way to influence motivations, opinions, attitudes and behaviors surrounding a specific health behavior at the population level.[34] Targeted communications and health promotion programs disseminated across multiple platforms (e.g., television, radio, public transportation or social media) have the power to reinforce or change community norms regarding health practices, behaviors or conditions. Such campaigns approach behavior change and communications from multiple modes and tactics, including telephone reminders for cancer screenings, brochures about screening availability and locations and literacy-level–appropriate pamphlets explaining the out-of-pocket costs of screening.[35] Ultimately, the goal of these campaigns is increased public awareness of and engagement in positive health behaviors.[34] Furthermore, community health interventions such as health screening programs can be used as an opportunity to link individuals who participate in screenings with appropriate providers for follow-up care.

Part 1 Health Needs Assessment and Programming

For All Spaces:

A point-by-point narrative demonstrates plans for the following:

a. Completion or identification of a community health needs assessment that identifies the local burden of disease (including the top five causes of morbidity and mortality) in the project's municipality or county.

b. Creation and dissemination of multichannel health campaigns that include programming and education developed to address the environmental design and lifestyle factors that contribute to the top five causes of morbidity and mortality in the project

c. Evaluation of the campaigns to assess outcomes and impact.

Part 2 Screening Programs

For All Spaces:

Annual screening programs are available at no cost to all residents and visitors regardless of insurance status for at least six of the following, with selection dependent on local burden of disease data (Part 1a of this Feature), within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary:

a. Cervical cancer.
b. Skin cancer.
c. Cardiovascular disease risk factors, including blood pressure, cholesterol and body mass index (BMI).
d. Stroke risk factors, including blood pressure and cholesterol.
e. Type 2 diabetes.
f. Respiratory health.
g. Vision.
h. Hearing.
i. Mental health.
j. Sexual health.
k. Breast cancer.
l. Colorectal cancer.

Part 3 Resource Database

For All Spaces:

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

An electronic database or resource list is available that contains culturally and literacy-level– appropriate information related to each of the following:

a. Parenting and caregiving.
b. Substance use, abuse and dependency.
c. Mental health, including suicide prevention hotlines.
d. Interpersonal violence.
e. Financial education or health.
f. Employment readiness.
g. Basic life skills education.
h. Any other health condition identified in the community health needs assessment (Part 1 of this Feature).

i. Vaccination.
j. Maternal and child health.
k. Adolescent health.
l. Sexual and reproductive health.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CHR COMMUNITY HEALTH RESILIENCE | O (MAX: 1 PT)

Intent: To prepare communities to respond to and recover from threats to public health.

Summary: A community's ability to successfully respond to public health emergencies is founded in its resilience.[36-38] Resilient communities hold the physical, social, economic and psychological capacity to prepare for, withstand, adapt to and recover from various events, from local emergencies to large-scale disasters.[37-39] This type of preparation requires action-oriented planning from multiple stakeholders that can effectively reach community members and response teams. Furthermore, preparedness requires that communities have evaluated prospective risks and developed comprehensive action plans unique to different types of situations and specific to their community and cultural context.[38,39]

Part 1 Community Preparedness

For All Spaces:

An emergency planning and preparedness policy addresses relevant threats to the project (e.g., natural disasters and health emergencies) and achieves the following:

a. Identifies the unique health risks of the population within the project boundary (may include an assessment of the larger geographic area outside the project boundary, so long as the project boundary is included in that geographic unit).[37]

b. Builds partnerships to support preparedness (e.g., Red Cross and a local emergency response unit).[37]

c. Engages with community organizations to foster supportive resource networks (e.g., food banks and local health departments).[37]

d. Coordinates training and promotes community engagement in preparedness (e.g., emergency response training or drills at local schools and workplaces).[37]

Part 2 Community Recovery

For All Spaces:

A recovery policy addresses recovery, adaptation and/or regrowth and considers the following:

a. Recovery needs and monitoring of various public health, medical, mental and behavioral health systems and resources.[37]

b. Coordination of recovery efforts among public health, medical, mental and behavioral health systems.[37]

c. Efforts to mitigate damages in future incidents.[37]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PRI ACCESS TO PRIMARY HEALTH CARE | O (MAX: 1 PT)

Intent: To support and promote accessibility to primary care and mental health services.

Summary: Determinants of physical and mental health include individual factors as well as the social, cultural, economic, political and environmental contexts in which people live.[40] Among these environmental determinants is geographic access to primary care, a vital and essential component of mental and physical health. Expanding and providing transportation support to healthcare facilities not only improves access to care but also supports consistent use of health services and encourages early intervention for health issues. Additionally, integration of mental health care into routine primary care has been shown to be an effective means of increasing care delivery and overall provision of essential mental health services.[41-44] Overall, increasing equitable access to integrated primary mental health services can help reduce disparities in access to mental and physical health services and improve health outcomes by encouraging continuity of accessible, affordable and acceptable care.[40,44]

Part 1 Geographic Access

For All Spaces:

At least one of the following programs, policies or conditions is met to facilitate access to a general medicine health care facility:

a. Facility is located within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary.
b. Facility transport services are provided through at least one of the following: non-emergency medical transportation services, mass transit discounts,[45] shuttle services, parking or taxi vouchers or others means of facilitated access.[13,46]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

EDU EDUCATIONAL OPPORTUNITY | O (MAX: 1 PT)

Intent: To facilitate equitable access to educational opportunities.

Summary: Access to education is a universal right and is inextricably tied to the health and vitality of individuals in communities around the world, as called for by the United Nations in Sustainable Development Goal #4: Ensure inclusive quality education for all and ensure lifelong learning.[47,48] Early childhood education, for example, is associated with positive long-term health and social outcomes, such as decreased crime rates, decreased teen birth rates and improved emotional development.[49] In some instances, individual-level factors such as race, religion, gender, sexual orientation, disability (physical or intellectual), past academic history, language ability or income, as well as external conditions such as geographical location or availability of facilities, prevent equitable educational attainment. Frequently, certain populations are awarded greater educational access compared to others, influenced by factors such as their gender, race, or the region in which they live.[50] It is imperative that communities actively work to eliminate these potential barriers or unwarranted biases to provide sufficient education opportunities to all members of the community.

Part 1 Educational Access

For All Spaces:

The following educational support programs are provided, as appropriate based on local demographic need, within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary:

a. Secondary school completion programs.
b. Out-of-school-time academic programs.
c. Post-secondary education opportunities.[51]
d. Continuing education for formal (i.e., accredited) and informal lifelong learning.
e. Center-based early childhood education (i.e., pre-kindergarten).
f. Full-day kindergarten programs.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

HOU FUNDAMENTAL HOUSING QUALITY | O (MAX: 1 PT)

Intent: To promote equitable access to housing for all potential residents.

Summary: Consistent housing quality and conditions are a fundamental component of population health, including an adequate standard of living that includes shelter, sanitation, electricity, water, access to transportation and communications, continued maintenance and improvement and protection against rent exploitation or housing discrimination.[52] This minimum standard of healthy housing conditions is an important strategy designed for the prevention of a wide range of diseases and unintentional injuries, including respiratory or cardiovascular disease due to poor indoor air quality, communicable disease spread through unsanitary living conditions or increased vulnerability to temperature extremes.[53]

Part 1 Accessible Dwellings

For All Spaces:

All newly constructed multi-family residential buildings with at least five units (including mixed-use buildings with residences) owned, managed or operated by the project owner meet the following:

a. All entrances and public common use areas comply with U.S. Fair Housing Act Accessibility Requirements for Multifamily Housing or local equivalent.

Part 2 Universal Design

For All Spaces:

At least 90% of multi-family residential buildings with at least five units (including mixed-use buildings with residences) owned, managed or operated by the project owner design a minimum of 20% (and not fewer than one) of its units in accordance with the following:

a. LEED ND v4 Visitability and universal design Option 1[54]

Part 3 Fair Housing

For All Spaces:

For all residences in the project, the following are prohibited on the basis of race, color, national origin, religion, sex, familial status, handicap, sexual orientation or any other characteristic deemed a protected class:

a. Refusal of renting or selling housing.[55]
b. Refusal of housing negotiation.[55]
c. Making housing unavailable.[55]
d. Denying a dwelling.[55]
e. Setting uniquely different terms, conditions or privileges related to the sale or rental of housing.[55]
f. Providing uniquely different housing services or facilities.[55]
g. Falsely denying that housing is available for inspection, sale or rent.[55]
h. Persuading owners to sell or rent.[55]
i. Denying access to a facility or service related to the sale or rental of housing.[55]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

EQU HOUSING EQUITY AND AFFORDABILITY | O (MAX: 1 PT)

Intent: To support housing options for all potential residents, regardless of income level.

Summary: As the trend toward urbanization continues to accelerate, housing has become an increasingly critical design strategy for prevention of disease as well as health hazards resulting from climate change and extreme weather patterns. Research indicates that housing quality is associated with morbidity from both chronic and infectious diseases, physical injuries and mental disorders; as such, promoting access to quality housing designed to limit exposure to harmful toxins and the intrusion of disease vectors, as well as to better enable access to safe drinking water, hot water for cleanliness and proper food storage is a key component of population health.[56,57] Creating quality affordable housing may not only improve the health of specific individuals but also catalyze a movement toward healthier communities for all.

Part 1 Unit Allocation

For All Spaces:

At least one of the following requirements is met for all for-rent dwelling units, including mixed-use buildings:

a. 20% or more units are designated for tenants whose incomes are at or below 50% of local Area Median Income (AMI), adjusted for family size.[58]

b. 40% or more units are designated for tenants whose incomes are at or below 60% of local AMI, adjusted for family size.[58]

c. Adherence to locally applicable affordable housing regulations.

Part 2 Housing Cost Limits

For All Spaces:

The following requirement is met for all for-rent dwelling units:

a. Monthly housing costs (including any utility allowances) paid by the tenant are in accordance with those set under the Low-Income Housing Tax Credit (LIHTC) program based on Section 42 of the Internal Revenue Code.[58]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

DIG DIGITAL CONNECTIVITY | O (MAX: 1 PT)

Intent: To support meaningful participation in society through support of digital infrastructure and facilitation of digital connectivity.

Summary: Digital connectivity is instrumental in helping communities reach their full potential, providing benefits across economic, civic, educational, environmental and social sectors.[59] Providing fast, reliable wireless internet (Wi-Fi) in community spaces not only aids in bridging the divide between those who can and cannot afford Internet but also has the potential to help visitors with wayfinding and enhance the economic vitality of an area.[60]

Part 1 Digital and Wi-Fi Infrastructure

For All Spaces:

Digital Infrastructure

The following requirements are met:

a. Adoption of a "dig once" principle: all new buildings must install Internet cables or fiber optics cables when laying underground lines (e.g., sewer or electricity).[61]

b. All new or retrofitted buildings are fitted with provider-neutral wiring that any Internet service carrier can connect to from an access point in or near the building.[61]

OR

Wi-Fi Network

The following requirements are met:

a. Network of no-cost Wi-Fi hotspots or zones is available in public spaces.

b. Network covers at least 75% of the public use area owned, operated or managed by the project owner.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ENG CIVIC ENGAGEMENT | O (MAX: 1 PT)

Intent: To encourage the creation of opportunities for all community members to become actively involved in the community and its improvement efforts through engagement and volunteerism.

Summary: Civic engagement involves participation and engagement of citizens in the improvement and support of the vitality of the community, often through channels of volunteering, local politics or community social justice efforts.[62] Through these avenues of civic participation, residents cultivate a greater sense of identity and ownership over their community, which can contribute to positive social and health outcomes, especially through the fostering of social capital.[63] For example, volunteerism and other types of involvement can help community-dwelling older adults stay physically, socially and cognitively engaged in the community, with research showing older adult volunteers experiencing less depressive symptomatology, lower utilization of health services and greater life satisfaction.[64] Similarly, voting among older adults is linked to improved feelings of autonomy and overall subjective well-being, and political activism is linked with improved social well-being and subjective vitality.[65,66] Benefits from participation are not limited to civic acts; social participation in activities like associations and hobby clubs is also linked to self-rated good health.[67] Ensuring that all citizens have the ability, agency and opportunity to participate in various types of civic and social acts allows for the cultivation of an engaged population that benefits both residents and the community as a whole.[68]

Part 1 Voting Opportunities

For All Spaces:

At least one of the following requirements is met:

a. All dwelling units are within an 800 m [0.5 mi] walk distance of a voting station.

b. Vans, shuttles or alternative enhanced transport to voting stations are provided on voting days.

Part 2 Community Engagement

For All Spaces:

At least two of the following requirements are met:

a. Minimum of one in-person or digital town hall meeting with capabilities for digital participation is held per year.

b. Residents have the right and are encouraged to create a resident and/or tenant association that is independent of project administration.

c. Residents have the opportunity to engage in participatory budgeting.

d. Residents have the opportunity to participate in citizen advisory boards.

Part 3 Volunteerism

For All Spaces:

At least one of the following requirements is met:

a. Project maintains a list of volunteer opportunities in the project area and greater community, with a minimum of one opportunity per month open to all community members.

b. Residents have the opportunity and are encouraged to create a timebank that is supported by the project administration.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

PRE PRESERVATION AND REHABILITATION | O (MAX: 1 PT)

Intent: To respect the value of place attachment, community identity and social cohesion through preservation and creation of meaningful public spaces.

Summary: Cultural, historical or architectural spaces or landmarks are instrumental in the maintenance of community vibrancy. Destruction of meaningful places can fracture the social ecosystem and lead to poor stress-related health outcomes as well as loss of capital within a community.[69] Preservation of significant spaces provides the opportunity to elevate community history into the public landscape, adding depth of identity to the community while also socially and culturally connecting citizens to the community and cultivating a richer sense of civic pride.[70] Rehabilitation of land holdings such as vacant lots can be beneficial as well, since these spaces can be transformed into spaces for healthy food production, physical activity and social interaction.[71]

Part 1 Preservation of Place

For All Spaces:

The following requirements are met:

a. All buildings or landscapes protected by federal, state and local historic or heritage preservation programs are left intact.[70]

b. Consultation with local historic association or governing body for long-term plans for buildings or landscapes protected by federal, state and local historical or heritage preservation programs, including understanding rehabilitation needs and community constituency.

Part 2 Vacant Lot Transformation

For All Spaces:

All vacant lots owned or managed by the project owner have debris removed and undergo a lot transformation process that meets at least one of the following requirements:

a. Visual enhancement through artwork at the lot perimeter.

b. Planting of grass or vegetation with perimeter demarcation to facilitate stormwater runoff.

c. Creation of pop-up gardens or temporary planting plots.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

CEL CELEBRATION OF PLACE | O (MAX: 1 PT)

Intent: To honor local history, cultural practices, institutions and identity of the project area.

Summary: Active celebration of a place's culture and a social, economic and political history reinforces local identity and character.[72] Programming and design strategies that recognize unique aspects of the community and foster a sense of place can also highlight local assets for community members and visitors.

Part 1 Community Design and Identity

For All Spaces:

The following aspects are included in the project plan:

a. Incorporation of native flora into landscape design throughout the project area.
b. Installation of public art throughout the project area, including both temporary and permanent installations.
c. Adoption of vernacular design strategies that honor local architecture and material supply.
d. Designation of sites that celebrate local culture or history.
e. Education of residents and visitors about design and operation elements of the project.

Part 2 Community-Serving Retail and Institutions

For All Spaces:

A narrative describes how the project promotes local retail and institutional cultivation, including a consideration of the following:

a. Serving the target community demographics.
b. Supporting opportunities for locally owned retail.
c. Fostering health and wellness-oriented retail and institutional offerings.
d. Encouraging food retailers within the project area to purchase goods from local producers.
e. Encouraging active transportation to everyday services and retail needs.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ART PUBLIC ART | O (MAX: 1 PT)

Intent: To foster public creativity and appreciation for art.

Summary: Public art expresses community identity, enhances civic pride, serves as a community landmark and can stimulate communities economically.[73] Integrating art into public settings increases accessibility and visibility of art for the public and enhances public appreciation of art by removing it from the traditional museum or gallery setting and bringing it directly into the community. Beyond these benefits, public art connects artists with the community and promotes diversity in civic planning and development, allowing communities to create a more personal, enriched space that feels authentic and unique to the neighborhood.[74]

Part 1 Public Art Support

For All Spaces:

Percent for Art

All new buildings larger than 2,323 m^2 [25,000 ft^2] owned, operated or managed by the project owner meet at least one of the following requirements:

a. At least 1% of the total cost of construction (maximum required $200,000 USD) is spent on public art on the site or within the community.[75]
b. At least 20% of the building frontage is dedicated to public art.

OR

Public Art Program

The project adopts a public arts program and provides a narrative demonstrating the following:

a. Financial support from project for public art projects.
b. Prioritization of the recruitment of local artists for the creation of temporary and permanent works.
c. Consultation with an art professional in the selection of local artists.[76]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

SAF COMMUNITY CONFIDENCE | O (MAX: 1 PT)

Intent: To improve community safety, health and vitality by integrating CPTED principles into the project master plan and/or operations.

Summary: Individual perceptions of community safety are important determinants of health, behavioral and economic outcomes.[38] For example, fear or perceptions of crime (a distinct measure from actual crime rates) has been known to limit mobility of community residents and may prevent them from fully engaging with their community and peers.[77] Crime Prevention Through Environmental Design (CPTED) is a multidisciplinary design approach that focuses on incorporating passive design strategies such as lighting, landscaping and activity planning into the planning and management of public spaces and buildings.[38] A growing body of evidence shows that CPTED strategies have been effective in reducing crime rates and fear of crime in communities.[78,79] While more conclusive evidence is needed to establish concrete outcomes associated with these interventions, much of the evidence base suggests that CPTED can be an effective and pragmatic public health tool.[79]

Part 1 Crime Prevention through Environmental Design

For All Spaces:

A point-by-point narrative outlines how at least three of the following requirements of the CPTED framework are incorporated in the design and/or operation of spaces owned, operated or managed by the project owner:

a. Natural surveillance—spatial design and placement of physical elements to increase visibility within and around a space.[38]
b. Natural access management—landscape and wayfinding elements that help define and guide community members throughout space.[38]
c. Space delineation—physical and environmental attributes that help define space and express a positive sense of ownership.[38]
d. Activity support—planning and placing community social activities in public spaces.[38]
e. Physical maintenance—general upkeep plan for buildings and public spaces that includes activities such as landscaping and trash maintenance.[38]
f. Order maintenance—prevention and remediation plan for vandalism and property damage.[38]
g. Social capital—designated gathering areas, community programs or events that foster social trust and positive collective action regarding community safety.[38]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

POC POST-OCCUPANCY SURVEYS | O (MAX: 1 PT)

Intent: To allow occupants the opportunity to provide feedback to project owners, and to help further develop the WELL Community Standard.

Summary: Given the diversity of communities, 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 project is effectively promoting and protecting the health and comfort needs of its users.

Part 1 User Survey Content

For All Spaces:

A representative sample of at least 30% of occupants are surveyed annually (starting within one year of achieving 50% occupancy) on the following topics:

a. Physical environmental quality, including air, water, light, acoustics and thermal comfort.
b. Social environment, including social programming, quality of life and perceived safety.
c. Community design, including access to services and amenities.

Part 2 Information Reporting

For All Spaces:

Survey results are reported on an aggregated, anonymized basis to the following groups:

a. Project owners and managers.
b. Community residents (upon request).
c. The IWBI, at least once per year.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX C1: HEALTH IMPACT ASSESSMENT (HIA) SCREENING:

Baseline Community Health Profile and Screening Process to Inform Decision-Making

Baseline Community Health Profile

The baseline community health profile applies to populations directly affected by the project as well as populations indirectly affected by certain aspects of the project, i.e., populations located in neighboring areas adjacent to the project.

The narrative covers the following health profile components:

1. Geographic boundaries of the affected community.[13] Include a map showing the boundaries for both the project and the defined community.

    If the project is developing a new area with no previous occupants, the narrative will likely focus on affected communities in populations outside the project area.

    If the project is developing an area with no residents but has other regular occupants such as those who enter the project area to work, attend school or visit, the narrative can include the most common neighborhoods of origin of those regular occupants.

2. Socio-demographic characteristics and health needs of the affected community. This section must include at least the following:

    Socio-demographics: age, gender, race/ethnicity, economic status (such as income or percent in poverty), educational attainment and primary language.[12,13]

    Health status/needs at the smallest unit of analysis that covers the affected community and that are no larger than the county level (in the U.S.) or equivalent.[14]

3. Sources of data. The socio-demographic and health data will typically come from existing sources that are widely available to the public, such as the following:

    The U.S. Census Bureau provides population-based statistics and limited health-related statistics at levels as small as census tracts and zip code tabulation areas.[80]

    Community-level health data are often available from health Departments (e.g., Florida Department of Health in Hillsborough County, New York City Department of Health and Mental Hygiene) on a range of topics.

    County Health Rankings & Roadmaps provide health data for each U.S. county![81]

    In Europe, the country-level data is available in the Eurostat tool![82]

4. Additional resources for guidance on data sources:

    Appendix E: HIA Data Sources and Related Resources, in A Health Impact Assessment Toolkit![21]

    Attachment F: Available Data Sources for Conducting HIAs, in Guidance and Tools for Conducting Rapid Health Impact Assessments.[12]

Screening Process to Inform Decision-Making

The screening process assesses the need and feasibility of conducting an HIA for the project. Provide a summary describing or demonstrating the following:

1. **Need**. The proposed project(s) has potential health impacts. If the project has multiple components, identify which subset of components has the most potential health impacts based on existing evidence.[12]

2. **Sufficient time**. The project has five months or more for the completion of the HIA in order to inform planning or design decisions.[12]

3. **Usefulness/value**. The findings and recommendations from the HIA are likely to inform the decision-making

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

process. For example, if the project has passed the planning stages with no flexibility to adopt changes, an HIA would not be useful.[12,15,16]

There are some rare exceptions where post-decision HIAs may still be useful; for example, if a policy has been passed but not yet implemented, the HIA findings may be used to influence or modify the implementation process for a specific health issue or if similar proposals or plans are likely in the immediate future of the project.[17]

4. **Additional resources**:

Attachment B: HIEC Tool for Reviewing RHIA Proposals![12]

HIA Screening Worksheet (page 37).[21]

Considerations for the selection of appropriate policies, plans or projects for analysis using Health Impact Assessment.[17]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

APPENDIX C2: HEALTH IMPACT ASSESSMENT IMPLEMENTATION:

Health Impact Assessment (HIA) Protocol

Scope

Determine the scope of the HIA, including the methods, resources needed and community stakeholders involved in conducting the HIA. Whenever possible, drawing on literature and methods from existing similar HIAs completed, while noting differences in the community and project components, will save time and resources needed.[83] Partnering with a public health professional is highly recommended.

Scope must identify the following:

1. Potential health impacts.

2. Key community stakeholders.

3. Representatives of the impacted community, such as residents or community- based organizations serving the affected community.[12,20] A plan to convene a minimum of two community stakeholder meetings: one during scoping stage and one during the recommendations stage.[12]

4. Data sources and methods to be used.

5. A designated point of contact on staff for any public inquiries related to the HIA.

Assessment

Must include document demonstrating:

1. A logic model visualizing the pathways by which the project/policy may impact health outcomes.[12]

2. Potential health impacts, with particular attention to the distribution and vulnerable populations.

Recommendations

Provide evidence-based recommendations to mitigate negative and maximize positive health impacts for each impact the HIA has identified that includes the following: [12,21]

1. A community stakeholder meeting held to collaboratively develop recommendations.

2. Evidence-based recommendations based on existing literature.

3. Actionable and feasible recommendations on changes to the proposed project.

Plan for Communication and Dissemination of Findings

The project must provide a plan for no-cost and open access to the HIA report or findings (e.g., website or hard copies upon request).[12]

Plan for Monitoring and Evaluation

This monitoring and evaluation stage evaluates the impacts of the HIA on the project's decisions or the impacts of the HIA's findings/recommendations on the health outcomes of the affected community.[12]

1. The impact evaluation answers the following question:

    Did the project implement the recommendations of the HIA?[12]

2. The outcome evaluation answers the following question:

    Were the selected health impacts enhanced and health risks minimized in the affected community?[12]

For a sample tracking sheet, see RHIA Tracking: Impact and Outcome Indicators, Attachment J![12]

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: World Health Organization. Social Determinants of Health. http://www.who.int/social_determinants/sdh_definition/en/. Published n.d. Accessed July 19, 2016.

2: U.S. Department of Health and Human Services. Social Determinants of Health. https://www.healthypeople.gov/2020/topics-objectives/topic/ social-determinants-of-health. Published n.d. Accessed July 19, 2016.

3: World Health Organization. Fact File on Health Inequities. http://www.who.int/sdhconference/background/news/facts/en/. Published n.d. Accessed July 19, 2016.

4: Robert Wood Johnson Foundation. City Maps: Short Distance to Large Gaps in Health. http://www.rwjf.org/en/library/articles-andnews/2015/09/city-maps.html. Published 2015. Accessed December 1, 2016.

5: Environmental Protection Agency. Creating Equitable, Health, and Sustainable Communities: Strategies for Advancing Smart Growth, Environmental Justice, and Equitable Development. Washington, DC: Environmental Protection Agency;2013. https://www.epa.gov/sites/ production/files/2014-01/documents/equitable-development-report508-011713b.pdf

6: Kania J, Hanleybrown F, Splanksy Juster J. Essential Mindset Shifts for Collective Impact. Stanford Social Innovation Review. 2014;12(4):2-5. https://ssir.org/articles/entry/essential_mindset_shifts_for_collective_impact

7: Kania J, Kramer M. Collective Impact. Stanford Social Innovation Review. 2011;9(1):36-41. https://ssir.org/articles/entry/collective_impact

8: Community Places. Community Planning Toolkit-Community Engagement. Belfast, Ireland: Community Places; 2014. http://www. communityplanningtoolkit.org/sites/default/files/Engagement.pdf

9: Jonathan Morris. Back to Basics: How to Make Stakeholder Engagement Meaningful for Your Company. Business for Social Responsibility; 2012. https://www.bsr.org/reports/BSR_Five-Step_Guide_to_Stakeholder_Engagement

10: World Health Organization. Health Impact Assessment. http://www. who.int/hia/en/. Published n.d. Accessed July 19, 2016.

11: Committee on Health Impact Assessment, Board on Environmental Studies and Toxicology, Division on Earth and Life Studies, National Research Council. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press; 2011. http://www.nap.edu/catalog/13229/improving-health-inthe-united-states-the-role-of-health

12: Health Impact Evaluation Center. Guidance and tools for conducting Rapid Health Impact Assessments: Applying a health lens to policy and program decisions in Los Angeles County. Los Angeles, CA: Los Angeles County Department of Public Health 2016. http://publichealth.lacounty. gov/pa/reports/RHIA Toolkit_4 18 16_final.pdf

13: U.S. Green Building Council. LEED BD+C: New Construction-Integrative Process for Health Promotion. Washington, DC: U.S. Green Building Council; n.d. http://www.usgbc.org/credits/new-construction-coreand-shell-schools-new-construction-retail-new-construction-healthc106?view=guide&return

14: Barnett K. Best Practices for Community Health Needs Assessment and Implementation Strategy Development: A Review of Scientific Methods, Current Practices, and Future Potential. Oakland, CA: The Public Health Institute;2012. http://www.phi.org/uploads/application/files/dz9vh55o3bb2x56lcrzyel83fwfu3mvu24oqqvn5z6qaeiw2u4.pdf

15: Quigley R, den Broeder, L, Furu, P, Bond, A, Cave, B, Bos, R. Health Impact Assessment International Best Practice Principles. Fargo, ND: International Association for Impact Assessment;2006. http://activelivingresearch.org/files/IAIA_HIABestPractice_0.pdf

16: Centers for Disease Control and Prevention. Parks and Trails Health Impact Assessment Toolkit. https://www.cdc.gov/healthyplaces/parks_ trails/default.htm. Published 2016. Accessed July 20, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

17: Human Impact Partners. Considerations for the selection of appropriate policies, plans, or projects for analysis using Health Impact Assessment. Oakland, CA: Human Impact Partners;2009. http://www.humanimpact. org/new-to-hia/tools-and-resources/ - screeninggettingstarted

18: World Health Organization. Hidden cities: unmasking and overcoming health inequities in urban settings. Kobe, Japan: WHO Press; 2010. http://whqlibdoc.who.int/hq/2010/WHO_NMH_WKC_10.1_eng.pdf

19: The Pew Charitable Trusts. About Health Impact Assessment. http:// www.pewtrusts.org/en/projects/health-impact-project/health-impactassessment. Published n.d. Accessed November 25, 2016.

20: Stakeholder Participation Working Group of the 2010 HIA in the Americas Workshop. Best Practices for Stakeholder Participation in Health Impact Assessment. Oakland, CA: Health Impact Assessment Society;2011. http://www.hiasociety.org/documents/guide-forstakeholder-Participation.pdf

21: Human Impact Partners. A Health Impact Assessment Toolkit: A handbook to conducting HIA. Oakland, CA: Human Impact Partners;2011. http://www.humanimpact.org/new-to-hia/tools-andresources/ - hiaguidesandsteps

22: Giordano GN, Lindstrom M. Trust and health: testing the reverse causality hypothesis. J Epidemiol Community Health. 2016;70(1):10-16. https://www.ncbi.nlm.nih.gov/pubmed/26546287

23: Clark CJ, Guo H, Lunos S, et al. Neighborhood cohesion is associated with reduced risk of stroke mortality. Stroke. 2011;42(5):1212-1217. https://www.ncbi.nlm.nih.gov/pubmed/21493914

24: Chuang YC, Chuang KY, Yang TH. Social cohesion matters in health. Int J Equity Health. 2013;12:87. https://www.ncbi.nlm.nih.gov/ pubmed/24165541

25: Kim ES, Park N, Peterson C. Perceived neighborhood social cohesion and stroke. Soc Sci Med. 2013;97:49-55. https://www.ncbi.nlm.nih.gov/ pubmed/24161088

26: Gehl Studio NY, J. Max Bond Center on Design for the Just City. Public Life and Urban Justice in NYC's Plazas. New York, NY: Gehl Studio;2015. https://ssa.ccny.cuny.edu/programs/jmb-reports/ PublicLifeUrbanJustice_Nov2015.pdf

27: Advocates for Privately Owned Public Spaces. Home Page: About. http://apops.mas.org/about/. Published n.d. Accessed November 25, 2016.

28: New York City Department of Planning. Privately Owned Public Spaces. http://www1.nyc.gov/site/planning/zoning/districts-tools/privateowned-public-spaces.page. Published n.d. Accessed July 15, 2016.

29: World Health Organization. World Report on Ageing and Health. Geneva, Switzerland: World Health Organization;2015. http://apps.who. int/iris/bitstream/10665/186463/1/9789240694811_eng.pdf?ua=1

30: World Health Organization. Poor Sanitation Threatens Public Health. http://www.who.int/mediacentre/news/releases/2008/pr08/en/. Published n.d. Accessed July 20, 2016.

31: Bhatia N, Chao SM, Higgins C, Patel S, Crespi CM. Association of Mothers' Perception of Neighborhood Quality and Maternal Resilience with Risk of Preterm Birth. Int J Environ Res Public Health. 2015;12(8):9427-9443. https://www.ncbi.nlm.nih.gov/ pubmed/26274966

32: Ewart CK, Elder GJ, Smyth JM. How neighborhood disorder increases blood pressure in youth: agonistic striving and subordination. J Behav Med. 2014;37(1):113-126. https://www.ncbi.nlm.nih.gov/ pubmed/23229689

33: U.S. Green Building Council. Solid waste management infrastructure. http://www.usgbc.org/credits/neighborhood-development-planneighborhood-development/v2009/gibc16. Published 2016. Accessed July 20, 2016.

34: Viswanath K, Finnegan, J, Gollust, S. Communication and health behavior in a changing media environment. Health Behavior: Theory, Research, and Practice. 5 ed. San Francisco, CA: Jossey-Bass; 2015. http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118628985. html

35: Centers for Disease Control and Prevention. Increasing Cancer Screening: Reducing Structural Barriers for Clients. http://www. thecommunityguide.org/cancer/screening/client-oriented/

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

ReducingStructuralBarriers.html. Published 2016. Accessed April 2, 2016.

36: Centers for Disease Control and Prevention. All-Hazards Preparedness Guide. Atlanta, GA: Centers for Disease Control and Prevention; 2013. http://www.cdc.gov/phpr/documents/ahpg_final_march_2013.pdf

37: Centers for Disease Control and Prevention. Public Health Preparedness Capabilities: National Standards for State and Local Planning. In: Office of Public Health Preparedness and Response, ed. Atlanta, GA2011. http://www.cdc.gov/phpr/capabilities/dslr_capabilities_july.pdf

38: American Planning Association. Quick Notes: Community CPTED. n.d. https://planning-org-uploaded-media.s3.amazonaws.com/document/ PAS-QuickNotes-42.pdf

39: American Red Cross. Disaster Preparedness. http://www.redcross.org/ what-we-do/international-services/disaster-preparedness. Published 2013. Accessed July 22, 2016.

40: World Health Organization. Mental health action plan 2013-2020. Geneva, Switzerland: World Health Organization; 2013. http://www. who.int/mental_health/publications/action_plan/en/

41: Burke BT, Miller BF, Proser M, et al. A needs-based method for estimating the behavioral health staff needs of community health centers. BMC Health Serv Res. 2013;13:245. https://www.ncbi.nlm.nih.gov/pubmed/23816353

42: Whiteman KL, Naslund JA, DiNapoli EA, Bruce ML, Bartels SJ. Systematic Review of Integrated General Medical and Psychiatric Self-Management Interventions for Adults With Serious Mental Illness. Psychiatr Serv. 2016;67(11):1213-1225. https://www.ncbi.nlm.nih.gov/ pubmed/27301767

43: Webb MJ, Kauer SD, Ozer EM, Haller DM, Sanci LA. Does screening for and intervening with multiple health compromising behaviours and mental health disorders amongst young people attending primary care improve health outcomes? BMC Fam Pract. 2016;17(1):104. https://www.ncbi.nlm.nih.gov/pubmed/27488823

44: World Health Organization. Integrating mental health services into primary health care. Mental Health Policy, Planning and Service Development. http://www.who.int/mental_health/policy/services/en/ index.html. Published 2007. Accessed 30 October, 2016.

45: Environmental Protection Agency. Overview of Air Pollution from Transportation. https://www.epa.gov/air-pollution-transportation/learnabout-air-pollution-transportation. Published n.d. Accessed June 20, 2017.

46: U.S. Department of Health and Human Services. Getting There, Helping People with Mental Illness Access Transportation. Washington, DC: Center for Mental Health Services;2004. https://store.samhsa.gov/shin/content/SMA04-3948/SMA04-3948.pdf

47: Fukuda-Parr S. From the Millennium Development Goals to the Sustainable Development Goals: shifts in purpose, concept, and politics of global goal setting for development. Gender & Development. 2016;24(1):43-52. http://policy-practice.oxfam.org.uk/publications/ from-the-millennium-development-goals-to-the-sustainabledevelopment-goals-shif-599234

48: United Nations. Sustainable Development Goals-Goal 4: Ensure inclusive and quality education for all and promote lifelong learning. http://www.un.org/sustainabledevelopment/education. Published n.d. Accessed March 27, 2017.

49: Centers for Disease Control and Prevention. Promoting Health Equity Through Education Programs and Policies: Center-Based Early Childhood Education. https://www.thecommunityguide.org/findings/ health-equity-comprehensive-center-based-programs-children-lowincome-families-foster-early. Published 2015. Accessed April 2, 2016.

50: United Nations International Children's Emergency Fund. Education: Equitable access. http://www.unicef.org/education/bege_61657.html. Published 2016. Accessed July 15, 2016.

51: Autor DH. Skills, education, and the rise of earnings inequality among the "other 99 percent". Science. 2014;344(6186):843-851. https://www. ncbi.nlm.nih.gov/pubmed/24855259

52: United Nations Human Rights Office of the High Commissioner. International Standards-Adequate Housing. http://www.ohchr.org/ EN/Issues/Housing/Pages/InternationalStandards.aspx. Published n.d. Accessed July 20, 2016.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

53: Armstrong D. A survey of community gardens in upstate New York: implications for health promotion and community development. Health Place. 2000;6(4):319-327. https://www.ncbi.nlm.nih.gov/pubmed/11027957

54: U.S. Green Building Council. LEED v4 for Neighborhood Development. Washington, DC: U.S. Green Building Council; 2014. http://www.usgbc. org/sites/default/files/LEED v4 ND_04.05.16_current.pdf

55: U.S. Department of Housing and Urban Development. Fair HousingIt's Your Right. http://portal.hud.gov/hudportal/HUD?src=/program_ offices/fair_housing_equal_opp/FHLaws/yourrights. Published n.d. Accessed July 1, 2016.

56: World Health Organization. International Workshop on Housing, Health and Climate Change: Developing guidance for health protection in the built environment mitigation and adaptation responses. Geneva, Switzerland;2010. http://www.who.int/hia/house_report.pdf?ua=1

57: Robert Wood Johnson Foundation. Issue Brief 2: Housing and HealthWhere We Live Matters for Our Health: The Links Between Housing and Health. Princeton, NJ: Robert Wood Johnson Foundation; 2008. http://www.commissiononhealth.org/PDF/e6244e9e-f630-4285-9ad7- 16016dd7e493/Issue Brief 2 Sept 08 - Housing and Health.pdf

58: U.S. Department of Housing and Urban Development. Affordable Housing. http://portal.hud.gov/hudportal/HUD?src=/program_offices/ comm_planning/affordablehousing/. Published n.d. Accessed July 1, 2016.

59: Broadband USA. Community Connectivity Initiative. http://www2.ntia. doc.gov/CCI. Published 2016. Accessed July 15, 2016.

60: Open Wireless Movement. Reasons for Open Wireless. https:// openwireless.org/. Published n.d. Accessed July 15, 2016.

61: Next Century Cities. Connecting 21st Century Communities: A Policy Agenda for Broadband Stakeholders. http://nextcenturycities. org/connecting-21st-century-communities-a-policy-agenda-forbroadband-stakeholders/. Published n.d. Accessed July 20, 2016.

62: Adler RP, Goggin J. What Do We Mean By ?Civic Engagement?? Journal of Transformative Education. 2016;3(3):236-253. http://jtd.sagepub. com/content/3/3/236

63: Robert DP. The Prosperous Community. The American Prospect. 1993;4(13). http://staskulesh.com/wp-content/uploads/2012/11/ prosperouscommunity.pdf

64: Gottlieb B, Gillespie, A. Volunteerism, Health, and Civic Engagement among Older Adults. Canadian Journal on Aging. 2008;27(4).

65: Klar M, Klasser, T. . Some Benefits of Being an Activist: Measuring Activism and Its Role in Psychological Well-Being. Political Psychology. 2009;30(5):755-777.

66: Sheldon KM, Kasser T, Houser-Marko L, Jones T, Turban D. Doing one's duty: chronological age, felt autonomy, and subjective well-being. European Journal of Personality. 2005;19(2):97-115. http://onlinelibrary.wiley.com/doi/10.1002/per.535/abstract

67: Hyyppa MT, Maki J. Social Participation and health in a community rich in stock of social capital. Health Educ Res. 2003;18(6):770-779. https:// www.ncbi.nlm.nih.gov/pubmed/14654508

68: American Psychological Association. Civic Engagement. http://www. apa.org/education/undergrad/civic-engagement.aspx. Published n.d. Accessed July 15, 2016.

69: Thompson Fullilove M. Root Shock. New Village Press; 2016. http:// www.newvillagepress.net/book/?GCOI=97660100655590

70: U.S. Green Building Council. LEED for Neighborhood Development and Historic Preservation. Washington, DC: U.S. Green Building Council; 2013. http://www.usgbc.org/sites/default/files/ND_Historic_Guidance.pdf

71: Peleg Kremer, Zoe Hamstead. Transformation of Urban Vacant Lots for the Common Good: an Introduction to the Special Issue. Urban Vacant Land and Community Access. 2015;8(2). http://digitalcommons.lmu.edu/cgi/ viewcontent.cgi?article=1200&context=cate

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

72: Thompson Fullilove M. Urban Alchemy. New Village Press; 2013. http://www. newvillagepress.net/book/?GCOI=97660100238970

73: Becker J. Public Art: An Essential Component of Creating Communities. New York, NY: Americans for the Arts;2004. http://www.americansforthearts.org/sites/default/files/pdf/2013/by_program/networks_and_councils/public_art_network/PublicArtMonograph_JBecker.pdf

74: New York City Department of Cultural Affairs. Percent for Art. http://www.nyc.gov/html/dcla/html/panyc/about.shtml. Published n.d. Accessed July 15, 2016.

75: National Assembly of State Arts Agencies. State Percent for Art Programs. http://www.nasaa-arts.org/Research/Key-Topics/Public-Art/State-Percentfor-Art-Programs.php. Published 2016. Accessed July 20, 2016.

76: Americans for the Arts. Statement of Purpose: Proposed Best Practices for Public Art Projects. Americans for the Arts; 2016. http://www. americansforthearts.org/sites/default/files/pdf/2016/by_program/networks_and_councils/pan/tools/Best PracticesFINAL6.2016.pdf

77: National Crime Prevention Council. Crime Prevention Through Environmental Design Guidebook. Singapore: National Crime Prevention Council; 2003. http://www.popcenter.org/tools/cpted/PDFs/NCPC.pdf

78: Paul M. Cozens, Greg Saville, David Hillier. Crime prevention through environmental design (CPTED): a review and modern bibliography. Property Management. 2005;23(5):0263-7472.

79: Cozens PM, Saville G, Hillier D. Crime prevention through environmental design (CPTED): a review and modern bibliography. Property Management. 2005;23(5):328-356. http://dx.doi.org/10.1108/02637470510631483

80: U.S. Census Bureau. Data. https://www.census.gov/data.html. Published n.d. Accessed June 1, 2017.

81: Robert Wood Johnson Foundation. Community Health Rankings and Roadmaps: Building a Culture of Health, County by County. http://www. countyhealthrankings.org/. Published n.d. Accessed November 25, 2016.

82: European Commission. Health Care Database. n.d. http://ec.europa.eu/ eurostat/web/health/health-care/data/database

83: Dannenberg AL BR, Cole BL, Heaton SK, Feldman JD, Rutt CD. Use of health impact assessment in the U.S.: 27 case studies, 1999-2007. Am J Prev Med. 2008;34(3):241-256. https://www.cdc.gov/healthyplaces/publications/ajpm_hiacasestudies_march2008.pdf

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

INNOVATIONS

The Innovation category recognizes and rewards projects that utilize innovative practices to integrate health and well-being into the design and operation of communities. Projects may earn an additional 10 points for innovative design, performance, operations, programming or advocacy initiatives that are not addressed in the WELL Community Standard. These initiatives may include collaboration between developers and other parties, the participation of a WELL Accredited Professional (WELL AP) on the project team or a commitment to environmental sustainability through certification in a leading neighborhood or community green rating system.

Projects are limited to a total of 10 points in the Innovation category.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

GND GREEN RATING SYSTEMS | O (MAX: 10 PT)

Intent: To recognize projects that have achieved certification under a leading neighborhood or community green rating system.

Summary: The WELL Community Standard aligns with leading global green rating systems and recognizes projects with a commitment to both environmental sustainability and human health. Policies that reduce the environmental impact of buildings and large developments also contribute to the advancement of human health at the community scale. The environment itself can act as a mechanism to promote and reinforce health by providing fresh air, clean water, affordable and accessible food and green spaces for physical activity and social connection. Thus, balancing sustainability and health allows both people and the physical environment that surrounds them to thrive.

Part 1 Sustainable Community Certification

For All Spaces:

The project has achieved certification for one of the following sustainability programs:

a. LEED for Neighborhood Development.

b. Green Star–Communities.

c. ÉcoQuartier (France).

d. BREEAM Communities.

e. LEED for Cities and Communities.

f. Other programs approved by IWBI.

Note: Projects receive the full ten points for pursuing one of the sustainable community certifications in the list above. Projects cannot receive more than ten points for pursuing additional sustainable community certifications. Projects must submit proof of achievement through WELL Online.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

INP PLANNING FOR HEALTH | O (MAX: 10 PT)

Intent: To recognize projects that successfully change local planning codes, regulations or ordinances to drive the creation of healthy environments.

Summary: Health outcomes are largely shaped by the infrastructure and environments that exist within neighborhoods and communities. Decisions that impact land use, urban design and local transportation also directly impact the local air and water quality, perceptions of safety, physical activity opportunities and other factors that influence human health. Addressing public health through the built environment thus requires interdisciplinary collaboration between developers and local parties, such as government agencies or public health organizations.[1,2] Cities around the world are successfully integrating health into planning policies. Examples include integrating active design language into zoning codes or design guidelines, revising outdated zoning codes that prohibit the transformation of vacant lots or underutilized roadways and incentivizing grocers and other retailers to build in areas of underserved markets.[3,4,5] These actions lead to lasting changes that support community health and engagement as well as promote equity by reducing environmental and health disparities.

Part 1 Market Transformation

For All Spaces:

The project meets one of the following:

a. The project demonstrates that the local code has been changed as a result of project advocacy to meet or exceed a WELL feature.

b. The project demonstrates that an exemption to local code has been made to meet or exceed a WELL feature.

Note: Projects must submit a narrative describing how they have met the requirements and all supporting documentation and research through WELL Online. Projects receive one point per approved Innovation proposal, up to a maximum of ten points.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

INV INNOVATE WELL | O (MAX: 10 PT)

Intent: To recognize projects that address health and well-being in novel ways that are not addressed in the WELL Community Standard.

Summary: As the scientific understanding of health continues to evolve, so too does the ability to address the complex issue of promoting well-being through the built environment. The WELL Community Standard embraces the creative thinking that is needed to address the complex ways in which communities can contribute to the advancement of health and well-being.

Part 1 Innovation Proposal

For All Spaces:

The proposed feature meets the following requirements:

a. Relates to human health and well-being in a novel way that is not already covered in the WELL Community Standard.

b. Identifies the intent, proposed requirements for performance verification and the design approach or strategies used to meet the requirements.

Note: Projects must submit a narrative describing the details of the proposal and all supporting documentation and research through WELL Online. Projects receive one point per approved Innovation proposal.

Part 2 Innovation Support

For All Spaces:

The proposed feature is supported by the following:

a. Existing scientific, medical and industry research that is consistent with applicable laws, regulations and leading practices in community design and management.

Note: Projects must submit a narrative describing the details of the proposal and all supporting documentation and research through WELL Online. Projects receive one point per approved Innovation proposal.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

WLP WELL ACCREDITED PROFESSIONAL | O (MAX: 1 PT)

Intent: To recognize projects that engage a WELL AP to support the WELL certification process.

Summary: The WELL Accredited Professional (WELL AP) credential denotes expertise in the WELL Building Standard and a commitment to advancing human health and well-being in buildings and communities. The presence of a WELL AP on a project team can benefit project planning and achievement efforts by streamlining the WELL application and certification process.

Part 1 WELL AP

For All Spaces:

At least one member of the project team:

a. Maintains accreditation until project's initial certification is achieved.
b. Has achieved the WELL Accredited Professional credential by the time of documentation submission.

Note: Projects must submit proof of an active credential through WELL Online.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

REFERENCES

1: American Planning Association. Public Health Terms for Planners and Planning Professionals. Washington, DC: National Association of County and City Health Officials; n.d. https://planning-org-uploaded-media.s3.amazonaws. com/legacy_resources/research/healthy/pdf/jargonfactsheet.pdf

2: Centers for Disease Control and Prevention. Working Together: A Training Framework for Public Health and Planning Professionals. https://www.cdc. gov/healthyplaces/training_framework.htm. Published 2015. Accessed March 28, 2017.

3: City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. New York, NY;2010. http://www1.nyc.gov/assets/ planning/download/pdf/plans-studies/active-design-guidelines/adguidelines.pdf or http://www.drkarenlee.com/resources/adg

4: Gehl Studio NY, J. Max Bond Center on Design for the Just City. Public Life and Urban Justice in NYC's Plazas. New York, NY: Gehl Studio;2015. https://ssa.ccny.cuny.edu/programs/jmb-reports/PublicLifeUrbanJustice_Nov2015.pdf

5: Lewis LB, Galloway-Gilliam L, Flynn G, et al. Transforming the urban food desert from the grassroots up: a model for community change. Fam Community Health. 2011;34 Suppl 1:S92-S101. https://www.ncbi.nlm.nih.gov/ pubmed/21160336

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.

© Copyright 2020 International WELL Building Institute, pbc. All Rights Reserved.