



LEED v4.1 CITIES AND COMMUNITIES: PLAN AND DESIGN

Getting started guide for beta participants

April 2019

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Welcome to LEED v4.1

Welcome to the next evolution of LEED for Cities and Communities! Whether you are a seasoned LEED practitioner, or new to LEED, we encourage you to test out this bigger, stronger, bolder rating system for your city or community and to be a leader in shaping the future of sustainability performance.

Six key goals have guided the technical development process for the LEED v4.1 Cities and Communities program:

- ▶ inspire leadership
- ▶ foster achievement of global goals
- ▶ ensure continuity of performance from design to development and operation
- ▶ leverage the large portfolio of complementing systems in GBCI portfolio, particularly STAR
- ▶ expand the market from buildings to cities and communities
- ▶ focus on quality of life of residents and enhance living standards

This version of LEED is the result of countless hours of effort from our volunteers and staff and we are confident that the rating system meets those goals.

LEED is a global rating system for the design, construction and operation of high-performance green buildings. For the last 18 years, various versions of LEED have pushed the global green building market forward progressively, with more than 93,000 registered and certified projects and more than 19 billion square feet of space worldwide.

Regions and markets move at different paces, and we want to be sure we can meet the needs of everyone in the green building and sustainability community. LEED v4.1 represents a series of upgrades that will improve our standards, encourage leadership, and make our platform more user friendly, more accessible—and most importantly—more collaborative than ever before.

LEED v4.1 will be our most inclusive and transparent platform to date. That is because our most important requirement for adoption will come from our most valuable resource of all—YOU!

Highlights of LEED v4.1 Cities and Communities

Integrative Process (IP)	<ul style="list-style-type: none">• The rating system has an overarching prerequisite and a credit. The prerequisite intends to drive an inclusive process in city or community planning, while the credit ensures that a majority of buildings in the city or community are green and sustainable by design.• The prerequisite on integrative planning and design facilitates teamwork for early analysis of city systems to derive cost effective, high performance outcomes.• The credit is a facilitator for green buildings in the city or community. Buildings are primary constituents of any city or community that can contribute to higher energy and water consumption, higher waste generation and could lead to environmental degradation, if not designed and operated sustainably. The design and operation of green buildings support and contribute to better environmental, social and economic goals of a city and community. The rating system thus encourages cities to introduce policies, incentives and programs to encourage design construction and operation of green buildings certified to LEED or any other equivalent green building rating system, as an overarching credit.
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<p>Ecology and Natural Systems (EN)</p>	<ul style="list-style-type: none"> • Cities depend on nature and ecosystem services to not only sustain life but also enhance the quality of life. Ecosystems protect and even regenerate natural systems, thereby increasing the ecosystem services they provide and creating ecologically resilient communities. These are better able to withstand and recover from episodic floods, droughts, wildfires, and other catastrophic events. • This category consists of prerequisites on Ecosystem Assessment, Construction Activity Pollution Prevention and Green Spaces, which outline the steps to analyze and respond to the local ecosystem; prevent or reduce pollution resulting from construction; cater to minimum green spaces essential for community health and well-being; and enhance environmental quality. • Credits on Natural Resource Conservation and Restoration and Light Pollution Reduction focus on maintaining the integrity of the natural ecosystems and the necessary steps to conserve and restore ecosystems and to reduce the adverse impacts of lighting. • Resilience Planning requires the city to generate awareness about climate risks and build strategies to effectively tolerate disturbances when faced with shocks and stresses. It also encourages cities and communities to carry out comprehensive climate risk assessments and prepare resilience plans.
<p>Transportation and Land Use (TR)</p>	<ul style="list-style-type: none"> • The transport sector is responsible for a quarter of energy-related greenhouse gas (GHG) emissions worldwide.¹ Land use is the key driver of mobility in a city and rapid urbanization has disrupted land use patterns, resulting in urban sprawl and increased dependency on personal, motorized vehicles. This credit category encourages cities to adopt an integrated approach towards urban planning through mixed use development, efficient transportation, better connectivity and engagement with stakeholders. • This category does not have any prerequisites. The credit on Compact, Mixed Use and Transit Oriented Development addresses land use and encourages compact development and access to diverse uses. This in turn discourages urban sprawl and encourages people to walk or bike thereby improving public health. The Walkability and Bikeability credit further lays out principles for designing safe walkable and bikeable cities and communities. • Access to Quality Transit encourages use of diverse transportation modes to reduce the reliance on personal vehicles within the city or community. It also addresses intermodal connectivity for easy access and transition from one mode of transport to another. • The credit on Alternative Fuel Vehicles encourages a shift to alternative fuel vehicles by providing infrastructure such as charging stations for electric vehicles and through policies and incentives. • Smart Mobility and Transportation Policy intends to promote efficiency in operation of transport systems, user facilitation, policies and behavior change to reduce environmental impacts. • The High Priority Site credit intends to preserve and revive the urban fabric of a city by promoting engagement, community development and social and mental

¹ <https://unfccc.int/news/in-detail-role-of-transport-sector-in-fighting-climate-change>. Accessed on April 1, 2019.

	<p>wellbeing. It also encourages preservation of historic structures and sites and focuses on growth and redevelopment for infill and other priority locations.</p>
<p>Water (WE)</p>	<ul style="list-style-type: none"> • Water is the lifeline of any city. However, equity and access have been a major challenge in many cities. Water demand has been constantly increasing in urban and peri-urban areas and is stressing freshwater reserves, creating a perennial shortage of water in these cities. This credit category addresses water at multiple levels – meeting demand, maintaining water quality, reducing water losses, capturing stormwater, and managing urban floods. • There are two prerequisites in this category. The prerequisite for Integrated Water Management requires reduced freshwater consumption and encourages the shift to a net zero water city. • Water Access and Quality requires the implementation of policies and infrastructure for the equitable supply of quality water to all members of society, along with the treatment of wastewater and stormwater before it is released into the environment. • The credit on Stormwater Management focuses on strategies to capture the maximum possible quantity of rainwater to reduce runoff volume, prevent erosion, and flooding, as well as recharge groundwater. • The credit on Waste Water Management is designed reduce pollution from wastewater, encourage water reuse and reduce stress on freshwater sources. • Smart Water Systems encourages cities to improve operational efficiency, reduction in water losses, and monitoring of water flow within the city through the use of smart technologies such as smart meters.
<p>Energy and Greenhouse Gas Emissions (EN)</p>	<ul style="list-style-type: none"> • Cities consume over two-thirds of the world’s energy and account for more than 70% of global CO² emissions.² City energy systems can play a huge role in combating climate change. In addition, access to energy is critical in determining the quality of life of residents. This credit category encourages cities to provide equitable access to reliable power while simultaneously reducing the adverse impacts of energy use on environment. • There are two prerequisites in this category. The second prerequisite is the only prerequisite in the rating system that carries a score. The prerequisite on Power Access, Reliability and Resiliency addresses equitable access to a reliable power supply, along with system resiliency to withstand shocks and stresses. • The second prerequisite that also has incremental scoring necessitates that the city or community estimate and limit greenhouse gas (GHG) emissions from proposed development. The prerequisite on Energy and Emissions Management measures the GHG emissions per capita. • The credit on Energy Efficiency focuses on actions for efficient water and wastewater services to the city, public lighting and district energy systems within the city. • The Renewable Energy credit focuses on reducing the environmental impacts of conventional energy generation through installation of small scale and large-scale renewables, as well as renewable energy certificates and carbon offsets in energy procurement.

² https://www.c40.org/why_cities

	<ul style="list-style-type: none"> • As GHG emissions are driven by a city’s economic activity, the credit on Low Carbon Economy encourages the city to measure and lower the carbon intensity of its economy. • The credit for Grid Harmonization intends to improve operational efficiency of the energy system and encourage consumer participation in energy use optimization through the use of advanced technologies and the Internet of Things (IoT). This section leverages the Performance Excellence in Electricity Renewal (PEER) rating system that evaluates power generation, transmission and distribution systems.
Materials and Resources (MR)	<ul style="list-style-type: none"> • Cities are large aggregators of materials and nutrients, accounting for the highest natural resource consumption affecting the environment and human health. The intent behind this category is to eliminate waste from mainstream consumption and instead utilize waste as a resource. The development of cities provides opportunities to drive a global transition from a linear to a circular economy. With their high concentration of resources, capital, data and skills over a small geographic territory, cities could greatly benefit from the outcomes of such a transition. • There are two prerequisites that prepare a new city and community to strive towards net zero waste and a circular economy through recycling, reuse and reduction of waste generation. The prerequisite for Construction and Demolition Waste Management requires cities to reduce the disposal of C&D waste in landfills and incineration facilities through recovery, reuse, and recycling. • The Solid waste Management prerequisite requires cities to put up adequate waste management infrastructure by properly estimating waste generation and diversion. Maximum diversion from landfills is the prime intent. • The credits for Organic Waste Management and Recycling Infrastructure prepare the city or community to manage and treat organic and inorganic waste, so that there is a minimal load on landfills. • Responsible Sourcing for Infrastructure encourages use of products and materials that have environmentally, economically, and socially preferable life cycle impacts. • As in other credit categories, the Smart Waste Management credit promotes strategies to improve operational efficiency of the waste management system.
Quality of Life (QL)	<ul style="list-style-type: none"> • Quality of Life is the general well-being of individuals and populations in the city or community. New cities are being developed as economic engines for their respective countries, thereby creating new jobs in the region. While the livability aspects of a city are mainly driven by the operations and management, this category addresses design and planning interventions to promote prosperity, health, and safety for all. • This credit category supports better quality of life for future residents. There are three prerequisites: Demographic Assessment, Social Infrastructure, and Economic Growth. These prerequisites require the city or community to assess its population, provision for adequate social infrastructure, and prepare economic growth pathways. • The Affordable Housing credit recognizes the importance of providing affordable housing for all. • The credit for Public Health assists cities and communities in planning for health-promoting services and opportunities for all citizens, while the Emergency Management and Response credit requires sufficient capacity to respond to emergency incidents and reduce their impacts on human health.

Program Overview

LEED for Cities and Communities is the leading global rating system and certification program for evaluating the sustainability and quality of life in a city or community. Our program serves as a catalyst and transformative tool toward more sustainable, equitable and resilient communities around the world. The rating system encompasses economic, environmental and social performance measures and provides a clear data-driven approach to benchmark and communicate progress.

Like the suite of LEED rating systems for buildings, LEED for Cities and Communities is designed to be applicable at all phases of a city's or community's lifecycle. New or developing cities, existing cities, neighborhoods or districts in redevelopment - all are examples of applicable projects. The flexible menu of standardized metrics and strategies in the rating system can be applied at various levels and stages of development and allow data to be rolled from the project level all the way up to a city or a larger regional level. Sustainability strategies can be incorporated more effectively and efficiently at an early stage of development. Cities can register as early as the conceptual phase and earn precertification. Cities with a Master Plan that is finalized can achieve full Plan and Design certification. Cities at the development phase can also apply the Plan and Design rating system. While the evaluation is based on the Master Plan, these cities are encouraged to undertake additional strategies to ensure that they can meet the prerequisite requirements. For example, if the city is under development and the master plan does not meet the prerequisite requirements for green spaces, the city can incorporate innovative strategies such as vertical gardens or urban rooftop gardens to meet the requirements.

New cities and communities are mostly developed in phases. Projects with phases at various stages of planning and construction must follow the guidance provided below:

- ▶ Precertification: A project must use Plan and Design precertification for the full project. Precertification is mandatory for these projects.
- ▶ Certification:
 - a. Plan and Design:: A project must use the Plan and Design rating system for the phase that is at planning stage or is constructed less than 75% of its total building floor area.
 - b. Existing: If the phase is constructed over 75%, it must use the Existing rating system and must certify after being operational for a minimum period of one year.

LEED for Cities and Communities is performance-driven and includes a verified certification program. The resulting transparency and accountability of shared metrics and verified performance ensures a new generation of healthy, inclusive and prosperous places that offer people and businesses an environment in which to thrive.

This program aligns with our vision that buildings and communities will regenerate and sustain the health and vitality of all life within a generation. If you are designing a new city or community or if you are a city or community manager, we encourage you to test out this system. The rating system is intended to help cities and communities manage resources sustainably and provide a better quality of life for residents and visitors. Lastly, the rating system supports the United Nations Sustainable Development Goals for environmentally-sensitive, socially-responsible and economically-viable communities.

WHAT IS A CITY OR A COMMUNITY AS DEFINED BY LEED v4.1?

The terms 'Cities' and 'Communities' are defined for purposes of the rating system as follows:

Cities: Cities are political jurisdictions or places defined by their municipal public-sector governance (e.g., mayors or town managers) except in those regions (especially Asia) where the term 'city' is culturally understood as encompassing some places with private sector governance.

Communities: Communities are defined as every urbanized location that is *not* a 'city' including sub-city locations such as districts and meta-city regions such as counties. In addition, privately developed or owned urban areas (for example, Songdo District or Rockefeller Center) generally fit within the definition of 'Community' except where they are self-identified (per definition of 'city' above) as cities.

WHO CAN PARTICIPATE?

LEED for Cities and Communities is flexible so that local governments (counties and municipalities), as well as the private sector, can use the rating system to achieve their goals. The primary applicant for LEED for Cities certification is the governing body of a city or municipality. LEED for Communities certification applies to non-city areas, such as counties, regions, districts, economic zones, neighborhoods, campuses and military installations.

Examples of LEED for Cities and Communities: Plan and Design applicants include:

- A city manager representing a rapidly growing city
- A private sector planner developing a new city or community
- A local developer working on an eco-district or collection of buildings on an urban site/block within a mature city
- A housing authority or local group developing a neighborhood
- Townships or large area development projects
- Neighborhood developments
- Large educational, institutional or industrial campuses and communities

TECHNICAL DEVELOPMENT GOALS

In past three years of working with 140+ cities globally to develop and refine LEED for Cities (through the LEED for Cities pilot program that precedes this beta and STAR Communities), USGBC and GBCI have gained immense experience on the system. This has helped us to move to the next level of technical development. We have now expanded the program to cover new and greenfield cities and communities in addition to existing cities. Now, with the Plan and Design version of the system, greenfield cities and communities can incorporate actions, strategies, policies and programs to perform sustainably.

The beta LEED for Cities and Communities rating system embeds the following inherent guiding principles in its development trajectory:

LEED Impact categories, UN Sustainable Development Goals and Triple Bottom Line:

- The LEED for Cities and Communities rating system aligns with the seven Impact Categories of LEED.
- The rating system addresses all of the Sustainable Development Goals set by United Nations in 2015 to help cities achieve global goals.
- It upholds the triple bottom line and addresses social, environmental and financial aspects of a city.

Future-Ready Cities:

- Requirements in the rating system encourage cities to adopt concepts of being carbon neutral, water positive, zero waste, human centric and equitable, transit oriented, connected through smart technologies, and integrated with a circular economy, to name a few.
- Social equity is a critical issue in contemporary cities. Cities and communities are encouraged to cater to social infrastructure at the design stage to support better quality of life and community well-being.

Integrated USGBC and GBCI Programs – LEED, STAR, SITES, PEER, LEED for Transit, TRUE:

- LEED for Cities and Communities is aligned with the STAR Community Rating System, LEED for Neighborhood Development, and other GBCI rating systems such as PEER, TRUE and SITES.
 - Integration of a prerequisite or credit from a rating system entails that the intent of the credit is being met. This can be by (i) referencing the original credit as-is (ii) adapting the language to fit the city or community scale, (iii) adapting the requirements to fit within the LEED framework, or (iv) using the same thresholds as the original credit.

Reviewable Requirements:

- Selection of prerequisites and credits is based on their measurability and reviewability.
 - For example, Green Spaces has been included as a prerequisite in the Ecology and Natural Systems credit category, as vegetated area can be measured and reported at city level and thus can be reviewed.

Building on the Foundations of Global Best Practices:

- The rating system draws upon and references global best management practices wherever applicable.
 - For instance, the Recycling Infrastructure credit has been developed based on the review and analysis of programs, policies and regulations for extended producer responsibility, remanufacturing, sustainable consumption and production, and material recovery.

Applicability at Global Level:

- To ensure global applicability of LEED for Cities and Communities, due consideration has been given to credit and prerequisite applicability in various geographies.
 - National or regional equivalencies, compliance paths, regional priority designations, and guidance will be developed subsequently.

Encouraging Cities to Adopt Green Buildings:

- The LEED for Cities and Communities program aims to support USGBCs market transformation goal at two levels. First, it encourages green practices at city scale; and second, at the building level, it encourages the city to adopt policies and regulations to support sustainability.

What You Need to Know

As a first step in launching LEED v4.1, USGBC released beta versions of each LEED rating system, allowing the market to work with the draft rating systems and provide feedback based on real-world application.

USGBC will present LEED v4.1 for public comment, followed by a member ballot. This beta rating system is not final; feedback from the beta will inform the public comment draft(s). We will update this document as needed and as more program features become available.

This document is a comprehensive guide to the LEED Cities and Communities: Plan and Design v4.1 beta program. The v4.1 Beta Guide contains guidance sections for basic usability and there shall be detailed reference guide available in due course of time. The rating systems such as PEER V2, Star Communities, Sites, LEED ND are referenced in several credits. Projects are encouraged to access these systems and respective reference guides to get further details and guidance.

LEED CITIES AND COMMUNITIES V4.1 CERTIFICATION

- ▶ Registration
 - Your first step is to confirm eligibility and select the appropriate rating system.
 - Next, register your project under the selected LEED Cities and Communities v4.1 beta rating system in LEED Online at [lo.usgbc.org](https://www.usgbc.org).
 - For registration fees, view our detailed fees table at [usgbc.org](https://www.usgbc.org).
- ▶ Certification
 - To complete your application for certification you will need to upload required documentation and/or provide requested information (*for each prerequisite / credit being pursued*).
 - In addition to documentation for specific prerequisites and credits, you need to submit the following documents to provide general information about the city or community:
 - Master Plan highlighting LEED boundary: Master plan of the city or community highlighting the LEED boundary that will receive a performance score and LEED for Cities and Communities certification.
 - Governance structure: Entities responsible for designing strategies that lead to the outcomes impacting the LEED score.
 - USGBC population calculator: Total population of the city or community. This should be inclusive of floating or transient population commuting daily for employment, education or other purposes.
 - GBCI, the certification body for the LEED rating system, will perform the beta certification reviews, in accordance with the Guide to Certification for Cities and Communities.

Total 110 points are available. A minimum of 40 points are required for certification. LEED has four levels of certification, depending on the point thresholds achieved:

- Certified: 40-49 points
- Silver: 50-59
- Gold: 60-79
- Platinum: 80+

PRECERTIFICATION REVIEW

You may choose to pursue precertification ahead of full certification if you would like additional support and formal recognition up-front. This is an optional review pathway available for a fee for LEED for Cities and Communities: Plan and Design projects that focusses on intended design and construction strategies. We offer precertification prior to a full certification application to help you determine which credits and prerequisites your project is likely to achieve during the full review, as well as attract tenants, businesses, developers, financiers, and even permitting benefits in certain localities. If you are interested in pursuing precertification, select this option after registration in LEED Online within the *Timeline* tab. Achieve precertification by completing the LEED Precertification Worksheet that is

provided in LEED Online, marking prerequisites and credits as attempted, and submitting the project for review.

LEED for Cities and Communities v4.1 precertification expires after three years.

RECERTIFICATION

All certified projects are strongly encouraged to pursue recertification once it is available.

LEED for Cities and Communities Scorecard

LEED for Cities and Communities		Cities	Communities
INTEGRATIVE PROCESS		POSSIBLE: 5	POSSIBLE: 5
Prerequisite	Integrative Planning and Design Process	REQUIRED	REQUIRED
Credit	Green Building Policy and Incentives	5	5
NATURAL SYSTEMS & ECOLOGY		POSSIBLE: 13	POSSIBLE: 13
Prerequisite	Ecosystem Assessment	REQUIRED	REQUIRED
Prerequisite	Construction Activity Pollution Prevention	REQUIRED	REQUIRED
Prerequisite	Green Spaces	REQUIRED	REQUIRED
Credit	Natural Resources Conservation and Restoration	5	5
Credit	Light Pollution Reduction	2	2
Credit	Resilience Planning	6	6
TRANSPORTATION & LAND USE		POSSIBLE: 18	POSSIBLE: 18
Credit	Compact, Mixed Use and Transit Oriented Development	6	6
Credit	Walkability and Bikeability	4	4
Credit	Access to Quality Transit	2	2
Credit	Alternative Fuel Vehicles	2	2
Credit	Smart Mobility and Transportation Policy	2	2
Credit	High Priority Site	2	2
WATER EFFICIENCY		POSSIBLE: 12	POSSIBLE: 12
Prerequisite	Integrated Water Management	REQUIRED	REQUIRED
Prerequisite	Water Access and Quality	REQUIRED	REQUIRED
Credit	Stormwater Management	5	5
Credit	Wastewater Management	5	5
Credit	Smart Water Systems	2	2
ENERGY AND GREENHOUSE GAS EMISSIONS		POSSIBLE: 31	POSSIBLE: 31
Prerequisite	Power Access, Reliability and Resiliency	REQUIRED	REQUIRED
Prerequisite	Energy and Greenhouse Gas Emissions Management	15	19
Credit	Energy Efficiency	4	4
Credit	Renewable Energy	6	6

Credit	Low Carbon Economy	4	
Credit	Grid Harmonization	2	2

MATERIALS AND RESOURCES

		POSSIBLE: 11	POSSIBLE: 11
Prerequisite	Construction and Demolition Waste Management	REQUIRED	REQUIRED
Prerequisite	Solid Waste Management	REQUIRED	REQUIRED
Credit	Organic Waste Treatment	2	2
Credit	Recycling Infrastructure	5	5
Credit	Responsible Sourcing for Infrastructure	2	2
Credit	Smart Waste Management Systems	2	2

QUALITY OF LIFE

		POSSIBLE: 10	POSSIBLE: 10
Prerequisite	Demographic Assessment	REQUIRED	REQUIRED
Prerequisite	Social Infrastructure	REQUIRED	REQUIRED
Prerequisite	Economic Growth	REQUIRED	REQUIRED
Credit	Affordable Housing	2	2
Credit	Public Health	6	6
Credit	Emergency Management and Response	2	2

INNOVATION

		POSSIBLE: 6	POSSIBLE: 6
Credit	Innovation	6	6

REGIONAL PRIORITY

		POSSIBLE: 4	POSSIBLE: 4
Credit	Regional Priority	4	4

TOTAL

		110	110
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40- 49 Points

50-59 Points

60-79 Points

80+ Points

CERTIFIED

SILVER

GOLD

PLATINUM

INTEGRATIVE PROCESS (IP)

IP Prerequisite: Integrative Planning and Design Process

Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To support high-performance, cost-effective city outcomes through an early analysis of the interrelationships among city systems.

Requirements

CITIES, COMMUNITIES

Use inter-disciplinary teams and at a minimum, ensure the following processes are followed:

1. **Comprehensive plan:** Prepare a plan which will include vision, mission, key goals and objectives of the city or community.
2. **LEED for Cities or Communities team:** Assemble and convene an interdisciplinary, cross-departmental project team. Include diverse team members from at a minimum three of the following areas of expertise.
 - ▶ Development Authority
 - ▶ Urban / Master Planning and Design
 - ▶ Engineering (Energy and Power; Hydrology; Transportation; Waste)
 - ▶ Economic Development
 - ▶ Urban Ecologist, Biologist or Landscape Architect
 - ▶ Construction Management
 - ▶ Human Services
 - ▶ Education / School Board
 - ▶ Sustainability / Resilience Officer
 - ▶ Data Officer / Information Technology

Include any other experts or stakeholders as relevant to the city or community. Conduct regular meetings with the integrative project team to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.

3. **Preliminary rating goals:** As early as practical and preferable before master planning, conduct a preliminary LEED meeting with a minimum of three key project team members and the City Development Authority. As part of the meeting, create a LEED action plan to determine the LEED certification level to pursue (Certified, Silver, Gold, or Platinum), identifying the potential LEED credits to be attempted and identifying the responsible parties to ensure the LEED requirements for each prerequisite and selected credit are met.
4. **Design Charrette:** As early as practical and preferably before master plan approval, conduct a design charrette with the project team as defined above and representatives of the citizens who will

get impacted by the project. The goal is to optimize the integration of green strategies across all aspects of city planning and design, construction and operation, drawing on the expertise of all participants.

Guidance

Behind the Intent

All over the world, urban areas are experiencing rapid growth, and it is projected that 60% of the world’s population will be living in urban settings by 2030. Cities are closely connected to economic growth, producing over 75% of the world’s gross domestic product (GDP) and 75% of carbon dioxide emissions, while consuming 75% of global natural resources. It is clear that cities have a leadership opportunity to pioneer ways of living that strengthen ecosystems and promote high social and economic welfare. A comprehensive, integrative process accounts for the interaction of all buildings and systems, relying on an iterative cycle of analysis, stakeholder feedback, implementation, and performance tracking. This prerequisite facilitates teamwork for early analysis of city systems to derive cost-effective, high-performance outcomes.

Further Explanation

Required Documentation

Documentation	All cities and communities
Narrative describing comprehensive plan that will include vision, mission, key goals and objectives of the city or community	X
Narrative addressing prerequisite requirements for the LEED for Cities or Communities project team and Design Charrette.	X
Action plan from preliminary rating goals.	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

IP Credit: Green Building Policy and Incentives

This credit applies to

- ▶ Cities (1-5 points)
- ▶ Communities (1-5 points)

Intent

To encourage the design, construction, and retrofit of buildings using green building practices.

Requirements

CITIES, COMMUNITIES

Option 1. Buildings owned and/or operated by the local government or development authority (1-2 points)

Register and certify buildings, above 5000 square feet (465 square meter), owned by the local government or development authority to LEED, EDGE or an equivalent green building³ rating system. Points are awarded as per the table given below.

Table 1. Points for certified green buildings

Percentage of buildings registered to certify to LEED or equivalent green building rating system	Points
51% to 75 %	1
Greater than 75%	2

AND/OR

Option 2. Green Building Policy and Incentives (1-4 points)

Provide incentives for LEED or an equivalent green building rating system in the city. (1 point per incentive provided; up to 4 points can be achieved through this option.)

- Structural Incentives: Provide expedited review or permitting processes to buildings achieving certification.
- Structural Incentives: Provide density or height bonus allowing for percentage increases in Floor Area Ratio or other measures of density contingent upon certification.
- Financial Incentives: Provide tax credits for buildings achieving certification.
- Financial Incentives: Provide permitting fee reduction or waivers for buildings achieving certification.

³ Green building rating systems should address energy, water, waste, sustainable sites, location and transportation and human health.

Guidance

Behind the Intent

Cities cover 2% of the world's land area but they account for 70% of greenhouse gas emissions. 30% of emissions are generated by buildings, the building blocks of cities.⁴ Similarly, buildings impact resource consumption, ecological systems, and human health and well-being. Hence, green buildings are an essential component of a city's strategy towards sustainable development. The LEED for Cities rating system is targets macro-level strategies. Green buildings support the micro-level strategies to help cities be more sustainable. Green public buildings help the city lead by example, and green building policies and incentives ensure alignment of future development with the city's long-term strategy.

Further Explanation

Required Documentation

Documentation	Option 1	Option 2
List of buildings above 5000 square feet (465 square meters), owned by the local government or development authority	X	
Calculations demonstrating achievement of the point threshold	X	
Documentation supporting registration and /or certification of buildings to be owned by the local government or development authority	X	
Documentation supporting green building policy and incentives or programs		X

Exemplary Performance

This credit is not eligible for exemplary performance.

⁴ <https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/benefits-of-green-buildings-human-health-economics-environment/>

NATURAL SYSTEMS AND ECOLOGY (NS)

NS Prerequisite: Ecosystem Assessment

Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To assess existing ecosystem conditions and services provided by ecosystems, built landscapes, and other open spaces to inform the city development along with conservation and restoration efforts.

Requirements

CITIES, COMMUNITIES

Complete and document an ecosystem assessment for the entire city or community boundary that includes the following topics:

1. **Topography**- Contour mapping, unique topographic features, slope stability risks.
2. **Soils**- Natural Resources Conservation Service soils delineation, U.S. Department of Agriculture prime farmland, unique farmland or farmland of statewide or local importance, healthy soils, soils disturbed by previous development and degree of disturbance (local equivalent standards may be used for cities or communities outside the U.S.).
3. **Vegetation and Habitat**- Total existing vegetated area, primary vegetation types, native plants and plant communities, significant tree mapping, identification of top three threatened species as per The IUCN Red List of Threatened Species⁵ or local or regional standards, habitat for threatened or endangered species, unique habitat, identification of top three invasive plant species and mapping of degraded vegetation and habitats as applicable.
4. **Hydrology and aquatic ecosystems**- Special Flood Hazard Areas (SFHA) as determined by FEMA's Flood Insurance Rate Map (FIRM) (or local equivalent for cities or communities outside the U.S.), wetlands, lakes, streams, shorelines; Precipitation, rainwater collection and reuse opportunities including overland water flow, water quality, storage capacity of the watershed conditions, potable and non-potable water sources; Pollution sources and pollutants. Map areas with degraded aquatic ecosystems as applicable.

Explain how the identified conditions and resources will influence the sustainable design.

Note: Not all topics apply to every area, and each city may contain additional important unique elements that are not explicitly addressed here.

References:

LEED v4 BD+C SS Credit: Site Assessment
SITES v2 Section 2: Pre-Design Assessment + Planning

⁵ <http://www.iucnredlist.org/> , accessed on December 17, 2018.

Guidance

Behind the Intent

An ecosystem assessment evaluates environmental features that the cities and communities should take into consideration. It identifies assets, such as favorable wetlands, lakes, streams, shorelines, steep slopes and healthy plant populations, as well as liabilities, such as unhealthy soils, blighted structures, pollution sources, , and water quality. Performing an ecosystem assessment is part of an integrative planning process to account for a site’s ecological context. This assessment must address the city or community’s topography, soil, vegetation and habitat. Moreover, hydrology and aquatic ecosystems are important because they can significantly influence the city strategy and performance.

Further Explanation

Required Documentation

Documentation	All cities and communities
Annotated ecosystem assessment report highlighting sections addressing all of the required topics	X
Overlay maps for each of the ecological systems	X
Narrative describing how the findings of the ecosystem assessment have informed the planning and design	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

NS Prerequisite: Construction Activity Pollution Prevention

Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust.

Requirements

CITIES, COMMUNITIES

Create and implement an erosion and sedimentation control plan for all construction activities, including but not limited to construction of roads and highways, transit systems, water and wastewater systems, energy systems, waste management systems, buildings to be undertaken by the city development authorities. The plan must conform to the erosion and sedimentation requirements of the 2017 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) or local equivalent, whichever is more stringent. Projects must apply the CGP regardless of size. The plan must describe the measures to be implemented.

Reference:

LEED BD+C v4 SS Prerequisite Construction Activity Pollution Prevention

Guidance

Behind the Intent

This prerequisite promotes environmental protection measures that reduce construction disturbances to neighboring land areas, rainwater systems, and the city or community itself. To ensure that all projects implement erosion and sedimentation control (ESC) measures during construction, the credit applies a U.S.-based national standard, the U.S. Environmental Protection Agency (EPA) construction general permit (CGP). Local jurisdictions typically look to this standard when writing their own code requirements and adopt ESC measures that are applicable to local soils, weather, natural waterways, and municipal rainwater systems. Therefore, cities or communities that follow local codes derived from the CGP can often demonstrate compliance with the prerequisite; projects outside the U.S. can use a local equivalent.

Further Explanation

Required Documentation

Documentation	All cities and communities
Erosion and sedimentation control plan	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

NS Prerequisite: Green Spaces

Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To provide accessible green spaces to positively impact physical, mental and psychological health and well-being of the community while also enhancing the environmental quality.

Requirements

CITIES, COMMUNITIES

Meet all of the following requirements:

- ▶ Provide a minimum of 121 square feet per person (11.25 square meter per person) of green space within the city.
- ▶ Minimum area of each parcel of green space must be no less than 7212 square feet (670 square meters).
- ▶ 90% of the dwelling units must have a green space within 1/2 mile (800 meters) walkable distance. Adopt either or combination of both of the following criteria to meet the requirement.
 - Walkable access to a public park.
 - Adopt building ordinance to the effect that residential areas which are not within walkable distance of a public park should provide an equivalent of 121 square feet per person (11.25 square meter per person) of green space within walkable distance.

Green space is defined as land that is partly or completely covered with trees, shrubs, grass or other vegetation. This includes urban parks, trails and community farms or gardens⁶ including roof top gardens. This does not include schoolyards, playgrounds, public seating areas, public plazas or vacant lots.

Areas allocated for urban agriculture under *QL Credit: Public Health* may be included to meet the requirements of this credit.

References:

LEED v4 ND NPD Credit: Access to Civic and Public Space
STAR Communities V2 BE-6: Public Parkland, Outcome 2: Proximity

Guidance

Behind the Intent

⁶ Adopted from United States Environmental Protection Agency's 'What is Open Space / Green Space?' retrieved from <https://www3.epa.gov/region1/eco/uep/openspace.html>, accessed on December 17, 2018.

Green spaces provide important community-building space for people to gather, play, exercise, celebrate, learn, relax, reflect, and enjoy nature and city life. Recent estimates show that physical inactivity, linked to poor walkability and lack of access to recreational areas, accounts for 3.3% of global deaths.⁷ Green spaces also are important to mental health. Having access to green spaces can reduce health inequalities, improve well-being, and support mental wellness. Some analysis suggests that physical activity in a natural environment can help remedy mild depression and reduce physiological stress indicators.⁸

Further Explanation

Required Documentation

Documentation	All cities and communities
Master Plan with mapping of green spaces and schedule and/or table listing the green spaces along with area of each.	X
Calculations demonstrating achievement of prerequisite threshold	X
Narrative describing how the requirement for 90% of the dwelling units having a green space within 1/2 mile (800 meters) walkable distance is met.	X
Policy, regulation or building ordinance to the effect that residential areas which are not within walkable distance of a public park should provide an equivalent of 121 square feet per person (if any of the residential areas which are not within walkable distance of a public park)	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

⁷ <https://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/> Accessed on March 23, 2019

⁸ <https://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/> Accessed on March 23, 2019

NS Credit: Natural Resources Conservation and Restoration

This credit applies to

- ▶ Cities (2-5 points)
- ▶ Communities (2-5 points)

Intent

To conserve and restore the natural resources within the city.

Requirements

CITIES, COMMUNITIES

Natural Resource Acreage (3 points)

Maintain natural resource⁹ acreage at 80 square meters per person (861 square feet per person).

OR

Maintain natural resource acreage at 11.5% or more of total jurisdictional land area.

Reference:

STAR Communities V2 NS-3: Natural Resource Protection Outcome 1: Natural Resource Areas

Natural resource areas include but are not limited to critical aquifer recharge areas; deserts and arid lands; fish or wildlife habitat, natural deltas or floodplains, steep slopes, natural parkland, forests, geologically hazardous areas, grasslands and prairies, habitats of endangered and threatened species, shorelines and their buffers, streams and their buffers and wetlands. Green spaces as defined and /or provided under *NS Prerequisite: Green Spaces* can be included within the Natural Resource Acreage.

AND / OR

Natural Resource Conservation and Restoration Plan¹⁰ (2 points)

Develop a Natural Resource Conservation and Restoration Plan based on the study carried out under *NS Prerequisite: Ecosystem Assessment* to meet requirements of ANY two of the following ecosystems as applicable to the city. Adopt policies or regulations to support the execution of the Plan.

1. Steep Slopes:

⁹ Natural resource areas include but are not limited to critical aquifer recharge areas; deserts and arid lands; fish or wildlife habitat, natural deltas or floodplains, steep slopes, natural parkland, forests, geologically hazardous areas, grasslands and prairies, habitats of endangered and threatened species, shorelines and their buffers, streams and their buffers; and wetlands.

¹⁰ In lieu of a consolidated Natural Resources and Conservation Plan, cities and communities may provide individual plans, ordinances, regulations or policies to demonstrate compliance to credit requirements.

- ▶ Do not permit development on slopes greater than 40% and do not disturb portions of the land area within 50 feet (15 meters) horizontally of the top of the slope and 75 feet (23 meters) horizontally from the toe of the slope.
- ▶ For undeveloped slopes from 26% to 40%, development can be permitted on 40% of the area.
- ▶ For undeveloped slopes from 15% to 25%, development can be permitted on 60% of the area.
- ▶ For previously developed slopes (above 15%) restore a minimum of 50% of the slopes with native vegetation or noninvasive adaptive plants within a period of 5 years.

OR

If construction is permitted on steep slopes (greater than 15%), adopt a regulation to the effect that development permits and building permits will be issued after reviewing the following for each project:

- ▶ A general site survey, topographic and land feature survey along with geotechnical evaluation.
- ▶ A grading plan that indicates a clear feasibility for roads, driveways and building envelop without massive manipulation of the site.
- ▶ A tree and vegetation plan.
- ▶ A drainage management plan.
- ▶ An erosion control plan that avoids massive manipulation of the site.
- ▶ An Environmental Inventory and Assessment to identify environmentally sensitive areas and features to be protected, and to measures to avoid, minimize or mitigate environmental impacts of the proposed development and development activities.

Reference:

LEED v4 ND SLL Credit: Steep Slope Protection

2. **Agricultural land and food production:**

Do not disturb prime farmland, unique farmland, or farmland of statewide or local importance as defined by the U.S. Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 and identified in a state Natural Resources Conservation Service soil survey (or local equivalent for projects outside the U.S.).

Reference:

LEED v4 ND SLL Prerequisite: Agricultural Land Conservation

OR

If the development footprint affects farmland of any category, mitigate the loss by providing alternative area for farming such as rooftop farming or vertical farming in the ratio of 2:1 (i.e. two square meters of alternative area for every one square meter farmland affected). In addition, plan for farmer's markets or supermarket or grocery stores with a produce section in residential areas which will be within 1/2 mile (800 meter) walking distance.

3. **Vegetation and Habitat:**

- ▶ If the site has any threatened or endangered species or ecological communities, as identified during the ecosystem assessment, comply with an approved habitat conservation plan under the U.S. Endangered Species Act (or local equivalent for cities outside the U.S.) for each identified species or ecological community.

- ▶ Conserve any Significant Habitat¹¹ present within the city.
- ▶ Adopt or enforce an ordinance requiring control of listed top three invasive species or enact a preferred plant ordinance for private and public landscaping.
- ▶ Restore degraded vegetation and habitats within the city, identified during the Ecosystem Assessment. Restoration strategies must be developed based on Society for Ecological Restoration Science & Policy Working Group. 2002, The SER Primer on Ecological Restoration, Section 3, Attributes of Restored Ecosystems¹².

References:

SLL Prerequisite: Imperiled Species and Ecological Communities Conservation
 LEED v4 ND SLL Credit: Site Design for Habitat or Wetland and Water Body Conservation
 SITES v2 Prerequisite 4.2: Control and manage invasive plants
 SITES v2 Credit 4.4: Conserve healthy soils and appropriate vegetation
 SITES v2 Credit 4.5: Conserve special status vegetation
 SITES v2 Credit 4.8: Optimize biomass
 STAR Communities v2 Action 2: Policy and Code Adjustment

4. Aquatic Ecosystems:

Do not permit any development within limits specified below except for minor improvements or comply with the equivalent local or national regulations.

- ▶ Shorelines and coastal areas: Within 200 feet (61 meters) from normal high tide line.
- ▶ Floodplains, rivers and streams: A flood hazard area shown on a legally adopted flood hazard map or otherwise legally designated by the local jurisdiction or the state or entirely outside any floodplain subject to a 1% or greater chance of flooding in any given year.
- ▶ Wetlands: Within 50 feet (15 meter) of a wetland, except for minor improvements.
- ▶ Water bodies: Within 100 feet (30 meters) of a water body which is greater than 50 contiguous acres (20 hectares) and within 50 feet (15 meters) for waterbodies less than 50 contiguous acres (20 hectares).
- ▶ Restore degraded aquatic ecosystems identified during the Ecosystem Assessment. Restoration strategies must be developed based on Society for Ecological Restoration Science & Policy Working Group. 2002, The SER Primer on Ecological Restoration, Section 3, Attributes of Restored Ecosystems.

References:

LEED v4 ND SLL Prerequisite: Wetland and Water Body Conservation
 SITES v2 Prerequisite 1.3: Conserve aquatic ecosystems
 SITES v2 Credit 3.6: Restore aquatic ecosystems

OR

Demonstrate a local Watershed Health Index of greater than or equal to 70.

Reference:

¹¹ Significant Habitat for the purpose of this prerequisite is defined as (i) locally or regionally significant habitat of any size, or patches of predominantly native vegetation at least 150 acres (60 hectares) (even if part of the area lies outside the project boundary) (ii) Special status plants which include plants designated as special status in the region. These plants may include, but are not limited to, heritage or legacy trees, specimen trees (as designated by a local tree board), rare vegetation in a unique habitat, and unusual genetic variants of a particular species; and any (iii) habitat flagged for conservation under a regional or state conservation or green infrastructure plan.

¹² https://www.ctahr.hawaii.edu/LittonC/PDFs/682_SERPrimer.pdf , accessed on December 17, 2018.

Guidance

Behind the Intent

Ecosystems around the world have been impacted extensively by human influence, particularly over the past 50 years. In response, communities are taking action to protect and restore natural systems and maintain ecosystem services. Natural systems provide a wide range of services for human populations, such as clean water, food, forest products, and flood control. Cities and communities demonstrate leadership conservation and restoration by establishing robust natural resource protection goals and implementing strategies that improve the quality of natural resource areas.¹³ At times, cities must weigh trade-offs between protecting ecological services in undeveloped areas while also managing land to prevent urban sprawl and overcrowding.

Further Explanation

Required Documentation

Documentation	Natural Resource Acreage	Natural Resource Conservation and Restoration Plan
Master Plan with mapping of natural resources and schedule and/or table listing the natural resource type and area of each.	X	
Calculations demonstrating achievement of point threshold	X	
Natural Resource Conservation and Restoration Plan highlighting the sections demonstrating the achievement of the listed requirements		X
Supporting documentation for each of the ecological systems (as applicable)		X

Exemplary Performance

This credit is not eligible for exemplary performance.

¹³ STAR Communities V2.0 Technical Guide, NS-3: Natural Resource Protection
28

NS Credit: Light Pollution Reduction

This credit applies to

- Cities (2 points)
- Communities (2 points)

Intent

Minimize negative effects on nocturnal environments and human health and functioning, reduce sky-glow, and increase nighttime visibility by reducing light trespass within the city.

Requirements

CITIES, COMMUNITIES

Street lighting in the city or community must meet the requirements of Section on Glare and Sky-Glow requirements of 'ANSI/IESNA RP-8-14 Roadway Lighting' or local equivalent.

AND

CITIES

Adopt a lighting ordinance for the city conforming to the Section II to VI of the Model Lighting Ordinance (MLO), 2011¹⁴ developed jointly by the International Dark Sky Association and Illuminating Engineering Society.

Reference:
STAR Communities BE-1: Ambient Noise & Light

Guidance

Behind the Intent

Inappropriate or excessive use of artificial light, known as light pollution, can have serious environmental consequences for humans, wildlife, and the climate. Components of light pollution include glare, skyglow, light trespass, and clutter. Much of outdoor lighting used at night is inefficient, overly bright, poorly targeted, improperly shielded, and, in many cases, completely unnecessary. This light, and the electricity used to create it, is being wasted rather than being focused on targeted areas that need to be illuminated. Moreover, artificial lights disrupt the natural light patterns and the delicate balance of our environment. A growing body of evidence links the brightening night sky directly to measurable negative impacts including disrupting the ecosystem and wildlife and harming human health¹⁵. The credit requires compliance with standards to reduce light pollution and limit its negative effects.

Further Explanation

¹⁴ http://darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF , accessed on December 17, 2018.

¹⁵ <https://www.darksky.org/light-pollution/> accessed on March 24, 2019

Required Documentation

Documentation	All cities and communities
Declaration from development authority or electrical / energy engineer stating street lighting will meet the requirements from the listed standard.	X
Narrative explaining the lighting type and design for various types of streets	X
Lighting ordinance for the city	X (cities only)

Exemplary Performance

This credit is not eligible for exemplary performance.

NS Credit: Resilience Planning

This credit applies to

- ▶ Cities (6 points)
- ▶ Communities (6 points)

Intent

To strengthen the resilience of communities to climate change risks, natural and man-made hazards and extreme events.

Requirements

CITIES, COMMUNITIES

Vulnerability and capacity assessment (3 points)

Identify the local environmental context and conduct a vulnerability and capacity assessment for climate change risks, natural and man-made hazards and extreme events as per the table below. Map the impact (affected groups and sectors) of these events against the planned socio economic profile, urban health and urban infrastructure.

Table 2. Classification of impacts for Vulnerability and Capacity Assessment

Natural		Man-made	
Geo Physical	Earthquake	Social	Complex Emergencies/Conflicts
	Landslide		Displaced Populations
	Tsunami		
	Volcanic Activity	Technological	Cyber Attack
Hydrological	Avalanches	Industrial	Infrastructure failure
	Flood		Fire
Climatological	Extreme Temperatures	Transport	Explosion
	Drought		Accidents
	Wildfires	Pollution	Accidents On Road, Air, Railway, Maritime
	Extreme heat/ cold		Air and water
	Heat Island Effect		
Meteorological	Cyclones		
	Storms/Wave Surges		
Biological	Disease Epidemics		

Requirements for vulnerability and capacity assessment:

- **Risk Identification-** Identify the impacts from which an area is at risk. Use national/state level maps and historic data of occurrence to identify the potential threats.
- **Risk Assessment-** Estimate the probability of occurrence of the extreme events. Study their characteristics, frequency and potential severity. Conduct a socio-economic and environmental assessment of the impact.
- **Vulnerability and Capacity Assessment-** Assess the most exposed and affected sections of the city or community.

- **Adaptation and Mitigation Goal-** Set goals based on the vulnerability and capacity assessment. Highlight threats having maximum damage potential and most vulnerable areas that require mitigation strategies. The goal should address the top two natural and man-made hazards.

AND

Resilience Plan (3 points)

Develop Resilience Plan for the city or community. The plan should meet at least two of the following requirements:

- Adaptation and Mitigation Strategies- Adaptation and Mitigation strategies to meet the goals identified under Vulnerability and Capacity Assessment above.
- Fundamental Emergency planning and preparedness- Access to basic needs - First aid, emergency supplies, water, food communication, temporary shelter.
- Early Warning Systems- Strategies for early warning systems during the extreme event. Demonstrate at least one early warning system in practice.
- Critical Infrastructure- Operation of critical facilities during the extreme event and post-event rehabilitation. Map and reduce over time any critical infrastructure that is located in designated high risk areas.
- Policy Intervention- Incorporate building structure resilience strategy to withstand the potential damage due to natural hazards in the building regulations.
- Meet the requirements of *PEER v2 Rating System*¹⁶, *RR Credit: Damage and Exposure Prevention* to achieve a minimum of 2 points. (Appendix 1)

References:

- RELI v1: Risk Adaptation + Mitigation for Acute Events
- STAR v2 CE-1: Climate Adaptation
- STAR v2 HS-6: Hazard Mitigation
- PEER V2 RR Credit: Damage and Exposure Prevention

Guidance Behind the Intent

Common signs of climate change include higher annual average temperatures, rising sea levels, and extreme weather. Serious impacts of climate change may involve flooding, drought, prolonged heat waves, and/or increased frequency of dangerous storm events. Such impacts can radically shift ecosystems, destabilize economies, and threaten quality of life. Climate change exacerbates the stress on already-strained infrastructure systems. Communities that make the choice to address future stresses and shocks from climate impacts today are likely to save money and experience a safer, healthier community now and in the future.

Further Explanation

Required Documentation

Documentation	Vulnerability and capacity assessment	Resilience Plan
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¹⁶ <http://peer.gbci.org/sites/default/files/resources/PEER-v2-Rating-System.pdf> , accessed on December 17, 2018.

Narrative describing the risks identified and assessed, vulnerability and capacity assessment along with adaptation and mitigation goals for each of the top two natural and manmade hazards.	X	
Annotated resilience plan clearly highlighting the sections within the plan that demonstrate achievement of at least two of the listed requirements.		X

Exemplary Performance

This credit is not eligible for exemplary performance.

TRANSPORTATION AND LAND USE (TR)

TR Credit: Compact, Mixed Use and Transit Oriented Development

This credit applies to

- ▶ Cities (5-6 points)
- ▶ Communities (5-6 points)

Intent

To encourage compact and mixed use development, high level of connectivity within the city or community and encourage walking, biking, and transit use.

Requirements

CITIES, COMMUNITIES

Design Compact and Complete Centers (CCCs) on the master plan or land use map of the city or community. CCCs are measured as areas within a ½ mile (800 meters) walking distance of a central point that represent a strong mix of uses, public transit availability, density, and walkability. CCCs may overlap. The CCCs should support mixed use development which is internally and/or contextually complementary, is densely populated and has internal and surrounding connectivity.

Meet the following requirements:

1. Population density (1-2 points)

Demonstrate that the majority of estimated population of the city or community resides within CCCs. Cities are awarded points based on the table given below.

Table 3. Percentage of population residing in CCC

Percentage of population in CCC (Total of all CCCs)	Points
40% to 69%	1
70% and above	2

2. Complementary uses¹⁷ (2 points)

Demonstrate that each CCC has a balanced mix of uses and activities such as residential (high, medium and low density), commercial and institutional, accessible and usable open areas¹⁸ and others in each CCC.

¹⁷ TOD guidelines, ITDP

¹⁸ Open areas may include green spaces and open community spaces such as plazas and squares.

Define land use mix in all CCCs as internally complementary and/or contextually complementary.

▶ **Internally complementary development**

- Residential uses between 15% and 85% of the total planned floor area and is complemented by other use types within the CCC.

AND/ OR

▶ **Contextually complementary development**

- More than 50% of the total planned floor area is dedicated to uses that balance the category of uses predominant in surrounding transit station catchment area¹⁹ or adjacent CCC within the project boundary.

3. Access to transit facilities and diverse uses²⁰ (2 points)

Design CCCs to ensure that all residential and non-residential buildings are within ½ mile (800 meters) walking distance of an existing or planned mass transit station such as bus rapid transit stops, passenger rail stations (i.e. light, heavy, or commuter rail) or commuter ferry terminals or within ¼ mile (400 meters) walking distance of an existing or planned bus, streetcar or informal transit stops that connects to a mass rapid transit station or a pulse point within 3 miles (5 kilometers) and within ¼ mile (400 meters) walking distance of at least 10 planned diverse uses (see Appendix 2). Diverse uses provided should reflect the planned socioeconomic profile (income, demographics, race and ethnicity) of the CCC.

The following restrictions apply:

- ▶ 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).
- ▶ 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).
- ▶ The uses accessible to each counted dwelling unit must represent at least two categories.

AND

At least 75% of all residential and non-residential buildings outside the identified CCC are within ¼ mile (400 meters) walking distance of an existing or planned bus, streetcar or informal transit stops that connects to a CCC's mass rapid transit station or a pulse point within 3 miles (5 kilometers).

References:

STAR BE-3 Compact & Complete Communities

LEED v4 ND NPD credit: Mixed-Use Neighborhoods

¹⁹ Station catchment area is defined as area that is within walking distance of 1/3 mile (500 meters) up to a maximum walking distance of 3/5 miles (1000 meters) from the rapid transit station entrance to the entrance of the final destination (doorstep of a building). The 3/5 miles (1000 meters) represents a walking time of approximately 20 minutes at the average urban speed of 3 km/h (including waits at intersections). A single station catchment area can cover close to 3.14 km² (but usually somewhat less since walking distance, not radius, is considered). For further details, refer to TOD Guidelines by ITDP, page 109.

Similarly, an adjacent CCC should be within walking distance of 1/3 mile (500 meters) up to a maximum walking distance of 3/5 miles (1000 meters) from the CCC in consideration.

²⁰ TOD guidelines, ITDP

**Guidance
Behind the Intent**

This credit addresses high-level urban planning of the city or community. It encourages development in compact, human-scaled, walkable, and universally-accessible centers and neighborhoods that connect to public transit and offer diverse uses and services. The credit promotes street networks that are comfortable, safe, uninterrupted, and accessible for all people regardless of age, ability, and other factors. Cities and communities with dense, compact, and mixed-use development are able to contain urban sprawl, reduce dependency on motorized vehicles, encourage walking and bicycling, and reduce vehicular emissions.

**Further Explanation
Required Documentation**

Documentation	All cities and communities	1. Population density	2. Complementary uses	3. Access to transit facilities and diverse uses
Master plan with land use showing CCCs with radius of ½ mile (800 meters) walking distance from a central point	X			
Documentation to demonstrate achievement of thresholds on percentage of total population residing in CCCs		X		
Master plan with land use showing percentage of area under residential use and area under other land use types such as commercial, institutional and other (as applicable) complementing the residential use type, for all CCCs			X	
Description of achievement of internally and contextually complementary uses for all CCCs			X	
Master plan showing location of residential and non-residential buildings within and outside CCC, walking routes with distance from farthest buildings to the planned or existing transit stations and/or stops and location of use types				X
Description of socioeconomic profile of all CCCs that is reflected in selected use types				X

Exemplary Performance

This credit is not eligible for exemplary performance.

TR Credit: Walkability and Bikeability

This credit applies to

- ▶ Cities (4 points)
- ▶ Communities (4 points)

Intent

To ensure accessible, connected and safe walking and cycling infrastructure to improve public health and reduce environmental impacts.

Requirements

CITIES, COMMUNITIES

Design sidewalks, bike lanes and crosswalks that are unobstructed and barrier-free for people with disabilities, including wheelchair users and people with low vision. Comply with Americans with Disabilities Act (ADA) or relevant national or local guidelines for 100% of sidewalks, bikeways and crosswalks.

AND

Design at least 90% of the total street length within the city or community as per the following requirements²¹ or meet the national, state or local regulations on designing of streets, sidewalks and bike lanes:

- ▶ For street segments with speed limit up to 9 miles per hour (15 kilometers per hour), no segregation of either pedestrians or cyclists is required.
- ▶ For street segments with speed limit more than 9 miles per hour (15 kilometers per hour), provide walkways on both sides separated by a physical buffer to ensure safety of pedestrians.
- ▶ For street segments with vehicular speed limit less than 18 miles per hour (30 kilometers per hour), protected bike lanes are not required. However, demarcate the bike lanes.
- ▶ For street segments with vehicular speed limit more than 18 miles per hour (30 kilometers per hour), provide exclusive and protected bike lanes.

AND

Achieve at least four of the following requirements for 90% of total street length:

- ▶ Sidewalks must be at least 10 feet (3 meters) wide for retail or mixed-use blocks and for all other sidewalks it should be a minimum of 5 feet (1.5 meters)²². One-way bike lanes should be a minimum of 5 feet (1.5 meters) and two-way bike lanes should be a minimum of 8 feet (2.5 meters).
- ▶ Provide shade from trees for at least 40% of all sidewalks and bike lanes for the users. Additionally use other locally appropriate amenities for providing shade. Such amenities include buildings (e.g.,

²¹ TOD guidelines, ITDP

²² LEED ND NPD Credit: Walkable Streets and TOD guidelines, ITDP

arcades, awnings, cast shadows), freestanding structures (e.g., shade shelters at intersections and public transport shelters), and vertical wind and solar screens (e.g., walls and lattices)²³.

- ▶ Design roads to ensure high degree of connectivity by providing prioritized connectivity ratio²⁴ of 1 or higher in the circulation network.
- ▶ The pedestrian sidewalks and crosswalks must be a continuous network and devoid of cul-de-sacs. For exceptions, include a pedestrian or bicycle through-connection or crosswalks for paths with cul-de-sac.
- ▶ Design roads with traffic calming measures as applicable to limit the speed as per Section 1.2 in Traffic Calming ePrimer by Federal Highway Administration of U.S. Department of Transportation²⁵ or in compliance with the state or local regulations.
- ▶ Limit the length of urban blocks up to 820 feet (250 meters). For block lengths larger than 820 feet (250 meters) provide interconnectivity, through-connections, skywalks or alleys²⁶.
- ▶ Design complete streets for safety and security of all users including pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

Reference:

LEED v4 ND NPD Credit: Walkable Streets

Guidance Behind the Intent

This credit encourages cities and communities to provide walking and bicycling infrastructure that is comfortable, safe, uninterrupted, and accessible for all people regardless of age, ability, and other factors. The credit promotes protection for pedestrians and cyclists from vehicular traffic by limiting road speeds, as well as separating and by providing buffers between the vehicular, walking and bicycling paths. Better pedestrian and cycling environments encourage residents to walk and bike to work and access diverse uses, such as schools, shopping areas, parks, etc. Reduced dependency on motorized vehicles helps to reduce GHG emissions, increase physical activity among residents, and improve public health.

Further Explanation Required Documentation

Documentation	All cities and communities	For designing streets
Letter of Assurance by an authorized signatory confirming compliance with Americans with Disabilities Act (ADA) or an equivalent national or local standard for sidewalks, bikeways and crosswalks	X	
Master plan showing streets classification based on speed limits given in list and segregation for pedestrians and cyclists, as required or classification based on national, state or local regulations		X

²³ TOD guidelines, ITDP

²⁴ Prioritized connectivity ratio is the ratio of all publicly accessible intersections including pedestrian intersection and motor vehicle intersections to intersections that are only for motor vehicles and devoid of pedestrian walkways. For further details refer to Objective 3.B.1 Prioritized Connectivity, TOD Guidelines, ITDP

²⁵ https://safety.fhwa.dot.gov/speedmgmt/ePrimer_modules/module1.cfm, accessed on December 17, 2018.

²⁶ TOD Guidelines, EMBARQ

Typical plan and section of streets showing physical buffer used for pedestrians, demarcation of bike lanes and design of exclusive protected bikeways		X
For sidewalks, typical plan and section of street showing width of sidewalks based on various use type		X
For shading, documentation showing shading for 40% total length of sidewalks and bike lanes with trees and/or other locally appropriate amenities		X
For degree of connectivity, map showing circulation network; calculation to demonstrate prioritized connectivity ratio		X
For pedestrian sidewalks and crosswalks, map showing circulation network to demonstrate continuity and if cul-de-sacs are present, show through-connections		X
For traffic calming, typical plan and section of street showing traffic calming measures; description of measures adopted		X
For block length, typical plan or other documentation such as building codes demonstrating length of blocks to be limited to 820 feet (250 meters) and for blocks with length greater than 820 feet (250 meters), show interconnectivity		X
For complete streets, documentation showing achievement of features for complete streets design		X

Exemplary Performance

This credit is not eligible for exemplary performance.

TR Credit: Access to Quality Transit

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

Intent

To encourage use of diverse transportation modes in order to reduce the reliance on personal vehicles within the city community.

Requirements

CITIES, COMMUNITIES

All cities and communities must disclose data on modal split showing the percentage of population commuting to work and other places by using the following transportation modes:

- ▶ Drive alone (or chauffeured)
- ▶ Carpool
- ▶ Motorcycle
- ▶ Taxicab
- ▶ Public transportation (excluding taxicab)
- ▶ Walk
- ▶ Bicycle
- ▶ Or, other means

AND

Option 1. Quality of transit facilities (1 point)

Design safe and comfortable transit stops to encourage use of public transport. Ensure the following for at least 80% of transit facilities:

- ▶ Are covered and partially enclosed to buffer wind and rain, have seating and illumination, has signage that display transit schedules and route information. Ensure that the transit facilities are illuminated and display transit schedules and route information at peak and non-peak hours.
- ▶ Minimized interference with pedestrian flow.
- ▶ Main roads have right-of-way for public transportation, preferably with dedicated lanes²⁷.

Reference:

LEED v4 ND NPD credit Transit Facilities

AND/OR

Option 2. Intermodal connectivity (1 point)

Design at least 50% of planned transit stations as identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities* such as bus rapid transit stops, passenger rail stations (i.e. light, heavy, or commuter rail), commuter ferry terminals, bus, streetcar or informal transit

²⁷ TOD Guidelines, EMBARQ
40

stops to meet the requirement in *Option 2, LT Credit Intermodal Connectivity and Placemaking of LEED v4 BD+C Transit* (Appendix 3).

Reference:

STAR v2 BE-7 Transportation Choices, Outcome 1 and Outcome 3
LEED v4 BD+C Transit, LT Credit: Intermodal Connectivity and Placemaking

OR

Option 3. Frequency of trips (1 point)

Ensure that transit stations identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities*, including an existing or planned rapid mass transit station, bus rapid transit stops, passenger rail stations (i.e. light, heavy, or commuter rail), commuter ferry terminals, bus, streetcar or informal transit stops, meet the minimum requirement of 72 weekday trips and 30 weekend trips. The transit service at these stops and stations in aggregate must meet the given minimum requirement for each CCC as identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development*. Planned stops and stations may count if they are sited, funded, and under construction during the time of certification.

Both weekday and weekend trip minimums must be met.

- ▶ For each qualifying transit route, only trips in one direction are counted towards the threshold.
- ▶ For weekend trips, only trips on the day with the higher number of trips are counted towards the threshold.
- ▶ If a qualifying transit route has multiple stops within the required walking distance, only trips from one stop are counted towards the threshold.
- ▶ Privately-run shuttles are only acceptable if the service is also made available to the public.

If existing transit service is temporarily rerouted outside the required distances for less than two years, the city may meet the requirements, provided the local transit agency has committed to restoring the routes with service at or above the prior level.

Reference:

LEED v4.1 BD+C, LT Credit: Access to Quality Transit

Guidance Behind the Intent

This credit requires cities and communities to provide multiple transit options as alternatives to personal motorized vehicles and encourage a shift to public transit that supports the environment as well as public health. Providing safe, comfortable, attractive, and convenient transit facilities tends to increase ridership of public transit. It is equally important to provide transit service that is frequent and regular.

Further Explanation Required Documentation

Documentation	All cities and communities	Option 1	Option 2	Option 3
Documentation on estimated modal split showing percentage of population using different modes of transportation such as drive alone, carpool, motorcycle, taxicab, public transportation, walk, bicycle, and others (as applicable)	X			
Description supported by typical drawings showing design of public transit stops,		X		

minimized interference with pedestrian flow, main roads with right-of-way for all public transit stops				
Documentation of selected options from the list			X	
For bus routes, vicinity map showing mass transit stations and connectivity with three or more bus routes			X	
For bicycle storage, site plan showing location and number of short-term and/ or long-term bicycle storage spaces or valet at mass transit station			X	
For bicycle storage, policy allowing bicycles on mass transit systems			X	
For vehicle parking, site plan showing location of vehicle parking at the mass transit station			X	
For vehicle parking, description supporting provision of carpool services at vehicle parking at the mass transit station			X	
For connectivity to airport, map showing distance of airport from mass transit station			X	
For rail, map showing connectivity to regional or commuter rail			X	
For ferry, map showing connectivity of mass transit station with ferry			X	
For passenger drop-off area, site plan showing location of designated passenger drop-off area			X	
Timetables or other-service level documentation showing frequency of weekday and weekend trips				X

Exemplary Performance

This credit is not eligible for exemplary performance.

TR Credit: Alternative Fuel Vehicles

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

Intent

To reduce pollution by promoting alternatives to fossil fuel vehicles.

Requirements

CITIES, COMMUNITIES

Option 1. Electric Vehicle charging facilities (2 points)

Install electrical vehicle supply equipment (EVSE) in 2% of all public parking spaces or at least two spaces, whichever is greater. Clearly identify and reserve these spaces for the sole use by plug-in electric vehicles.

The electrical vehicle supply equipment (EVSE) must:

- ▶ Provide a Level 2 charging capacity (208 - 240 volts) or greater.
- ▶ Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for cities outside the U.S.
- ▶ Be vehicle-to-grid (V2G) connected and comply (e.g. ISO 15118 compliant) and be capable of responding to time-of-use market signals (e.g. price). Cities pursuing *EN credit Grid Harmonization* should incorporate EVSE into any demand response program or load flexibility and management strategies.

Demonstrate that the number of planned private and public electric vehicle charging stations exceed 1.07 per 10,000 residents.

OR

Demonstrate compliance with local or national policy for all vehicles (privately and publicly owned vehicles or fleet) for electric vehicle charging facilities within the city or community.

AND/ OR

Option 2. Alternative fuel stations (1 point)

Demonstrate that the total number of government and privately owned planned alternative fuel²⁸ stations meet or exceed 1.52 per 10,000 residents.

OR

²⁸ Alternative fuel refers to low-polluting, non-gasoline fuels such as hydrogen, propane, compressed natural gas, liquid natural gas, methanol, and ethanol.

Demonstrate compliance with local or national policy for providing alternative fuel stations for all vehicles (privately and publicly owned vehicles or fleet) within the city or community.

References:

STAR v2 CE-3 Greening the Energy Supply, Outcome 1

LEED v4 BD+C Transit LT Credit Green Vehicles

Guidance Behind the Intent

In 2016, transportation accounted for 28% of total U.S. GHG emissions which is the largest portion of the total emissions.²⁹ GHG emissions not only impact the global climate, but also pose health risks from pollution, especially for children, seniors, and other sensitive populations. This credit requires cities and communities to promote alternative fuels for vehicles that are lower-emitting and non-gasoline-based, such as electricity, hydrogen, propane, compressed natural gas, liquid natural gas, methanol, and ethanol. Initiatives such as preferred parking spaces, provision of charging and refueling stations, and incentives encourage a greener transportation system.

Further Explanation Required Documentation

Documentation	Option 1	Option 2
Master plan showing public parking spaces and electric vehicle charging spaces;	X	
Calculations demonstrating achievement of point threshold		
Master plan showing electric vehicle charging stations; calculations based on number of electric vehicle charging stations per 10,000 residents	X	
National or local policy providing regulation on provision of electric vehicle charging facilities such as electric vehicle charging stations, charging spaces, incentives or other features that encourage use of electric vehicles	X	
Master plan showing alternative fuel stations; calculations demonstrating number of alternative fuel stations per 10,000 residents		X
National or local policy providing regulation on provision of alternative fuel stations such as fuel stations, charging spaces, incentives or other features that encourage use of electric vehicles		X

Exemplary Performance

This credit is not eligible for exemplary performance.

²⁹ <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions> (accessed on March 22, 2019)

TR Credit: Smart Mobility and Transportation Policy

This credit applies to

- ▶ Cities (2 points)
- ▶ Communities (2 points)

Intent

To promote efficient operation of transport systems, user facilitation, behaviour change and reduced environmental impact through smart technologies and transportation policies.

Requirements

CITIES

Adopt any four solutions or policies to support a city-wide smart and efficient transportation system.

COMMUNITIES

Adopt any two solutions or policies to support a community-wide smart and efficient transportation system.

Indicative list of solutions³⁰:

- ▶ Passenger Information System (PIS) - At least 80% of all transit stations identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities* must be equipped with PIS system.
- ▶ Automated Speed Enforcement- At least 80% of city roads to be equipped for automated speed enforcement.
- ▶ Traffic Surveillance- At least 80% of all transit stations identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities* must be equipped with CCTVs for traffic surveillance.
- ▶ Global Positioning System (GPS)/ General Packet Radio Service (GPRS) - All public transit vehicles must be equipped with GPS system.
- ▶ Signal Synchronization and Transit Signal Priority- All signals on major roads must be synchronized or prioritized to address varying traffic flows.
- ▶ Integrated Ticketing System- At least 80% of all public transit systems and subsystems to have Automatic Ticketing System.
- ▶ Real-time Parking Management- At least 80% of all public and multi-level parking to have real-time parking management system.
- ▶ Electronic Toll Collection- All toll booths and plazas to have electronic toll collection system.
- ▶ Radio Frequency Identification (RFID): Adopt RFID technology for logistics and/or for public transportation system.

³⁰ <http://www.grantthornton.in/globalassets/1.-member-firms/india/assets/pdfs/smart-transportation-report.pdf> , accessed on December 17, 2018.

**Guidance
Behind the Intent**

Cities and communities face transportation-related issues such as traffic congestion, inadequate or inefficient mass transit infrastructure, issues hindering the safety, mobility, and productivity of commuters. This credit requires cities and communities to integrate information and communication technologies into the transportation system through the adoption of the given strategies or policies for smart technologies. Technologies such as passenger information systems, electronic toll collection, transit signal priority and synchronization, and real-time parking management help improve overall transportation system efficiency.

**Further Explanation
Required Documentation**

Documentation	All cities and communities
Documentation to show achievement of thresholds for selected solutions as applicable for a city or community, from the indicative list of solutions for smart and efficient transportation system. For solutions selected from outside of the given list, demonstrate servicing a minimum of 50% of city or community transportation network with these solutions	X
Policy to support smart transportation system showing solutions implemented and percentage of city or community transportation network that is serviced by these solutions	X

Exemplary Performance

This credit is not eligible for exemplary performance.

TR Credit: High-Priority Site

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

Intent

To preserve historic structures and sites and focus growth and redevelopment to infill and other priority locations.

Requirements

CITIES, COMMUNITIES

Attempt any of the following options for a maximum of 2 points.

Option 1. Historic Preservation (1 point)

This option is applicable to city with at least one historic building, contributing building in a historic district, or cultural landscape within the city or community boundary.

Develop an inventory of building(s) and/or areas within the city that should be considered for preservation and conservation. Include, the historic buildings and/or historic district(s) and cultural landscapes that are outside the city boundary but are impacted by the city development.

Do not demolish any historic buildings or contributing buildings in a historic district, or portions thereof, or alter any cultural landscapes as part of the city.

An exception is granted only with approval from an appropriate review body. For buildings or landscapes listed locally, approval must be granted by the local historic preservation review board, or equivalent. For buildings or landscapes listed in a state register or in the National Register of Historic Places (or equivalent for cities outside the U.S.), approval must appear in a programmatic agreement with the state historic preservation office or National Park Service (or local equivalent for cities outside the U.S.).

Reference:

LEED ND GIB credit Historic Resource Preservation and Adaptive Reuse

AND/OR

Option 2. Brownfield remediation (1 point)

Identify the areas within the city or community boundary equivalent to at least 20% of the gross city or community area that are identified as a brownfield and requires remediation. Meet the requirements of *Option 1: Brownfield Site, SLL credit Brownfield Remediation of LEED v4 Neighborhood Development* to achieve this credit. (Appendix 3)

Reference:

LEED ND SLL credit Brownfield Remediation

AND/OR

Option 3. Previously Developed sites (1 point)

Identify areas within the city or community boundary that are served by existing water and wastewater infrastructure, are previously developed and are equivalent to at least 20% of the gross city or community area.

Reference:

SITES credit 1.5: Redevelop Degraded Sites

AND/OR

Option 4. Infill sites (1 point)

Locate the city or community on an infill site.

Reference:

LEED ND SLL prerequisite Smart Location

Guidance
Behind the Intent

This credit requires cities and communities to identify high-priority redevelopment sites such as historic structures and buildings, brownfields, previously developed sites and infill sites. Redeveloping these sites have many environmental advantages over development in greenfields and environmentally-sensitive areas. Reusing historic structures helps in preserving community character, and underutilized properties can have a rich history. The redevelopment of sites in historic districts can also reduce urban sprawl through adaptive reuse. Building a project on a high-priority redevelopment site can revitalize the neighborhood and bring social and economic benefits to the surrounding community. Such projects also achieve savings because they are served by existing infrastructure.

Further Explanation
Required Documentation

Documentation	Option 1	Option 2	Option 3	Option 4
Document from historic preservation entity confirming historic structures and sites	X			
Policy with terms and conditions for alterations or additions to historic structures and sites	X			
For brownfield sites, documentation from authority having jurisdiction declaring existence of specific contamination for an area equivalent to at least 20% of the gross city or community area and confirming that remediation has been or will be completed to its satisfaction		X		
Vicinity map or other documentation showing previously developed sites for an area equivalent to at least 20% of the gross city or community area			X	
Vicinity map or other documentation showing infill sites for an area equivalent to at least 20% of the gross city or community area				X

Exemplary Performance

This credit is not eligible for exemplary performance.

WATER EFFICIENCY (WE)

WE Prerequisite: Integrated Water Management

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To support water management, reduce freshwater consumption and encourage to move towards a net zero water city.

Requirements

CITIES, COMMUNITIES

Water balance statement

Develop an integrated water management process by developing a water balance statement for the city by projecting the total water demand based on various uses and designing the supply side to meet the total water demand.

Demonstrate that the ratio of water withdrawals for human use to the total freshwater resources is less than 0.2.

Develop Water balance calculator which consist of the following to demonstrate flow of water within the city:

1. **Water Availability Assessment**

Assess the total quantity of water available for use to the city or community.

2. **Water demand**

Estimate water demand for all of the following sectors and use types present within the city or community for a period of one full calendar year:

- ▶ Buildings – All use types such as residential, commercial, institutional and industrial buildings under the public and private sector.
- ▶ Landscaping for public spaces such as parks, alongside roadways and open spaces.
- ▶ Any other sector as applicable to the city.

Calculate the projected water demand for a sector as percentage savings based on baseline performance, the baseline should be based on (i) industry “standard practice” (ii) existing codes, standards or regulatory requirements (iii) published data or (iv) projects of similar scope and size operating within the same geographical area or within a geographical area with similar operating condition. Additionally, water demand for baseline buildings must comply with *LEED v4 BD+C*

*Water Efficiency Prerequisite: Outdoor Water Use Reduction*³¹ and *Water Efficiency Prerequisite: Indoor Water Use Reduction*. Support water use reduction strategies which are not within the scope of the development authority's direct execution with appropriate regulations or policies. Document the assumptions for differing daytime and night time population or permanent and transitory population, if variations in projected population is expected to significantly alter total water demand.

3. **Water supply**

Identify the sources of water supply that will be used to meet the total water demand of the city or community. Sources of water supply may include but not be limited to the following:

- ▶ Freshwater
- ▶ Desalinated water
- ▶ Reclaimed water: Reclaimed water includes:
 - Treated wastewater- For each of the sectors identified in Water Demand, identify the wastewater generated. For reusing treated wastewater at city level, provide centralized water treatment plant. Support treated waste water reuse which is within the scope of the development authority's direct execution, such as at building or community level by adopting appropriate regulations, policies or ordinances. In addition, meet the requirements for waste water quality as per *WE Prerequisite Water Access and Quality*.
 - Harvested stormwater- For each of the sectors identified in Water Demand, identify the quantity of stormwater harvested. For harvesting stormwater at city level provide stormwater infrastructure. Support stormwater harvesting for areas within the scope of the development authority's direct execution, such as at building or community level by adopting appropriate regulations, policies or ordinances. In addition, meet the requirements for stormwater quality as per *WE Prerequisite Water Access and Quality*.

Reference:

Variation on STAR v2 BE-2 Community Water Systems Outcome 2

Guidance Behind the Intent

Water is a vital resource needed to sustain life, human and ecosystem health, and the economy. Conventional water management systems consider water supply, wastewater, and stormwater as separate entities. However, sustainable urban water management has become critical with increases in water demand due to increased populations, urbanization, industrialization, and resulting low water availability. This credit requires cities and communities to take a comprehensive approach to urban water services, maintain the inflow and outflow of water in a city, and maintain water balance. To uphold the water balance, it is critical to assess the total amount of water available annually for use from surface water resources and plan the uses in a city or community based on that availability. This credit also encourages cities and communities to reduce dependency on non-renewable sources of water such as groundwater and to reuse treated wastewater and harvested rainwater to meet water demand. Ultimately, the credit encourages cities and communities to move towards a net zero water status. Achieving Net Zero Water means balancing the consumption of water resources and returning the same

³¹ Detailed guidance on development of baseline will be provided in the Reference Guide.

quantity back to the watershed so as not to deplete the resources of that region in quantity or quality over the course of the year.

Further Explanation

Required Documentation

Documentation	All cities and communities	Water availability assessment	Water Demand	Water Supply
Calculations demonstrating water balance with total water demand based on various use types and water supplied by various sources calculated for a period of one year	X	X	X	X
Documentation showing ratio of total quantity of water available for use to total water that will be withdrawn for potable use from natural resources	X	X	X	
Report or other documentation showing total quantity of water available for use from natural resources	X	X		

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

WE Prerequisite: Water Access and Quality

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To provide all sections of the society with equitable access to clean drinking water and sanitation services.

Requirements

CITIES, COMMUNITIES

Water and wastewater systems must meet the following requirements:

Water and Sanitation Access

100% coverage of all buildings within the boundary by public water supply and wastewater collection system including centralized and decentralized systems.

Requirement can be met using private water wells if it is permitted within the local or regional jurisdiction.

Drinking water quality

Comply with U.S. EPA's 2018 Edition of the Drinking Water Standards and Health Advisories Tables for drinking water rules on chemical and microbial contaminants in drinking water pipes or comply with local, state, or national equivalent.

- ▶ Provide information on periodic water quality testing as per the adopted standard for each of the water supply facility under the following categories:
 - Frequency of water quality testing (quarterly, monthly, bi-monthly, etc.)
 - Water quality testing parameters
- ▶ Commit to enforcement actions to be taken in case of non-compliance for the following:
 - Violation of testing frequency
 - Violation in water quality parameter threshold

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 1: Drinking Water Quality

Treated Wastewater Quality

All centralized or decentralized (on-site, individual systems, septic systems, and others) wastewater treatment systems owned or operated by the city development authorities (or service providers) and the wastewater discharged to surface waters must comply with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program of Clean Water Act (CWA) or local, state, or national equivalent for 100% of wastewater generated. Meet the water quality parameter thresholds in NPDES permit program manual, Section 5.1.1 - Secondary and Equivalent to Secondary Treatment Standards.

- ▶ Provide information on periodic water quality testing as per the adopted standard for each of the wastewater treatment facility under the following categories:

- Frequency of water quality testing (quarterly, monthly, bi-monthly, etc.)
- Water quality testing parameters
- ▶ Commit to enforcement actions to be taken in case of non-compliance for the following:
 - Violation of testing frequency
 - Violation of water quality parameter threshold

All wastewater treatment systems that are independently operated onsite or decentralized and are outside the jurisdiction of the city development authority must disclose the applicable standards for wastewater treatment and discharge.

Wastewater management system should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 3: Safe Wastewater Management

Stormwater quality

CITIES

Adopt a policy to comply with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program for stormwater pollution prevention from construction and industrial activities and municipal sources or local, state, or national equivalent.

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 4: Safe Stormwater Management

COMMUNITIES

Monitor the quality of stormwater discharged from the community and ensure compliance with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program for stormwater pollution prevention from construction and industrial activities and municipal sources or local, state, or national equivalent.

Guidance Behind the Intent

This prerequisite addresses three critical issues: access to clean drinking water, access to sanitation services, and pollution prevention from wastewater discharge and stormwater runoff.

Cities and communities are grappling with issues of equity and diversity among vulnerable populations, at times resulting in a total lack of basic amenities. Cities must ensure access to clean drinking water and sanitation services for all members of society. The drinking water must comply with water quality standards to ensure the safety of consumers.

Untreated or poorly-treated wastewater degrades surface water and makes it unsafe for many uses. This credit requires compliance with standards for maintaining quality of treated wastewater before it is reused or discharged into natural water bodies.

Rainwater in cities and communities picks up oil and other pollutants while flowing over impervious areas such as roof tops, paved surfaces, and parking lots before entering water bodies. Proper

stormwater management by harvesting and treating runoff can help reduce flooding and pollution. In addition, reclaimed water can be reused to help meet a city's water demand.

Further Explanation

Required Documentation

Documentation	All cities and communities	Drinking water Quality	Treated Wastewater Quality	Stormwater Quality
Documentation from jurisdictional authority demonstrating percentage of consumers that will have public water supply and percentage of all buildings that will have connection to wastewater system	X			
Report or other documentation from public water supply and management utility providing information on compliance to U.S. EPA standards for drinking water and treated wastewater quality or to local, state, or national equivalent; frequency of water and wastewater quality testing and parameters to be tested		X	X	
Description of enforcement actions to be taken in case of violation of testing frequency, meeting water quality parameter threshold and frequency of water quality testing		X	X	
For stormwater management in cities, policy on compliance with U.S. EPA's NPDES permit program and for communities, report or other documentation from authority demonstrating compliance with U.S. EPA's NPDES permit program for stormwater discharge				X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

WE Credit: Stormwater Management

This credit applies to

- ▶ Cities (3-5 points)
- ▶ Communities (3-5 points)

Intent

To reduce runoff volume, prevent erosion, flooding and recharge groundwater.

Requirements

CITIES, COMMUNITIES

Option 1. Rainfall event based (3-5 points)

Provide adequate infrastructure to manage stormwater within the city to demonstrate reduction in runoff, maximum capture, treatment and reuse of stormwater for a minimum of 60th percentile of local or regional rainfall event for ten year 24-hr rainfall event data. Refer the methodology given in Part I, Section E of U.S. EPA Section 438 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects of the Energy Independence and Security Act to obtain 60th percentile rainfall event. Points are awarded according to Table 4.

Table 4 Points for retaining percentile of rainfall retained in the city or community

Percentile rainfall retained	Points
60th percentile	3
80th percentile	4
90th percentile	5

References:

LEED v4 ND GIB Credit: Rainwater Management
SITES v2 Water Prerequisite 3.1: Manage Precipitation on Site
SITES v2 Water Credit 3.3: Manage Precipitation beyond Baseline

OR

Option 2. Reducing post-development stormwater run-off³² (3-5 points)

Reduce post-development stormwater run-off by preserving pre-development runoff conditions in the planned city or community. The post-construction rate, volume, duration and temperature of runoff should not exceed the pre-development rates and the predevelopment hydrology should be replicated through design and other appropriate strategies. These goals should be accomplished through the use of infiltration, evapotranspiration, and/or rainwater harvesting and reuse.

³² U.S. EPA Section 438 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects of the Energy Independence and Security Act

Table 5 Points for preserving pre-development to post-development run-off conditions in the city or community

Pre-development to post-development runoff percentage	Points
15%	3
10%	4
Lesser than 10%	5

OR

Option 3. Green Stormwater Infrastructure (3-5 points)

Ensure that 35% of the jurisdiction’s land area has designated green stormwater infrastructure providing bioretention and infiltration services that are interconnected.

Provide details on strategies planned to be adopted to inspect and maintain the stormwater management facilities.

Table 6 Points for percentage of land area with designated stormwater infrastructure

% of land area with designated stormwater infrastructure	Points
35%	3
40%	4
50%	5

Reference:

STAR NS-1 Green Infrastructure, Outcome 1: Green Stormwater Infrastructure

In a manner best replicating natural site hydrology processes, retain (i.e. infiltrate, evapotranspire, or collect and reuse) on site the runoff³³ from the developed site for Option 1, Option 2 and Option 3.

For all cities and communities, the use of coal tar sealants shall be prohibited in any application exposed to stormwater, wash waters, condensates, irrigation water, snowmelt, or icemelt.

³³ Examples of acceptable techniques to achieve above requirements:

- Planting rain gardens with native or adapted plant material (e.g. trees shrubs);
- Installing a vegetated roof;
- Using permeable paving, consisting of porous above-ground materials (e.g., open pavers, engineered products), a base layer designed to drain water away from the building, and (often) a 6-inch-deep (150 millimeters) subbase; and
- Installing permanent infiltration or collection features (e.g., vegetated swale, rain garden, rainwater cistern) that can retain 100% of the runoff from at minimum, the 80th percentile of regional or local rainfall events.

Cities may also refer to Urban Best Management Practice Database and Codes by Maryland Department of Environment that provides a list of BMPs under the category of environmental site design, structural and other practices.

<https://mde.maryland.gov/programs/water/stormwatermanagementprogram/documents/Urban%20BMP%20Database%20for%20Phase%20I%20MS4s%202016.pdf> , accessed on December 17, 2018.

A combination of Low Impact Development (LID) approaches are recommended (but not required) as they are holistic measures which maximize benefits. In contrast to LID, conventional stormwater techniques include grey infrastructure, such as detention or retention ponds, pipes, and vaults. Conventional grey infrastructure devices may be accepted only if integrated within a holistic LID system (i.e. a combination of LID techniques).

**Guidance
Behind the Intent**

City and community developments impact land, impervious surfaces, soil compaction, vegetation, and natural drainage patterns, disrupting natural hydrological systems and watersheds. The cumulative effect of these changes is disruption to the natural water balance and water flow. Typically, a conventional city’s rainwater management technique is to convey runoff as quickly as possible into centralized facilities at the base of drainage areas. However, such a strategy, although intended to prevent flooding and promote efficient drainage, can harm watersheds; it increases the volume, temperature, peak flow, and duration of runoff, eroding streams and causing other ecological damage.

Green infrastructure (GI) and low-impact development (LID) rainwater management strategies and techniques improve upon that conventional approach by mimicking an area’s natural hydrology. These techniques involve minimizing disturbed areas, preserving pre-development run-off conditions, limiting the amount of impervious cover, and infiltrating, storing, evaporating, or detaining rainwater runoff.

**Further Explanation
Required Documentation**

Documentation	Option 1	Option 2	Option 3
Rainfall data for past ten years, showing 60 th , 80 th or 90 th percentile rainfall data, as applicable	X		
Typical plans, details, or cross sections depicting project conditions and GI or LID strategies, highlighting topography, direction of water flow, and area of site that each stormwater management facility addresses	X	X	X
Narrative confirming measures that qualify as GI or LID	X	X	
Calculations for volume of rainwater managed by GI or LID strategies	X	X	
Runoff volume calculations for each zone in the city based on land use types, showing reductions in run-off volumes for post-development phase by preserving pre-development run-off conditions		X	
Master plan showing designated green stormwater infrastructure			X
Calculation showing percentage of total area with designated green stormwater infrastructure			X
Description of strategies that will be adopted for inspection and maintenance of stormwater facilities	X	X	X

Exemplary Performance

This credit is not eligible for exemplary performance.

WE Credit: Wastewater Management

This credit applies to

- ▶ Cities (2-5 points)
- ▶ Communities (2-5 points)

Intent

To reduce pollution from wastewater, encourage water reuse and reduce stress on freshwater sources.

Requirements

CITIES, COMMUNITIES

Use treated wastewater to meet the city water demand. Calculate the percentage of treated wastewater used to meet the city water demand using the following equation.

$$\text{Treated wastewater reused \%} = \frac{\text{Treated wastewater (liters)}}{\text{Total water demand (liters)}} \times 100$$

Support treated wastewater reuse from decentralized plants, which is not within the scope of the development authority's direct execution, such as at building or community level by adopting appropriate regulations, policies or ordinances.

Cities should meet the requirements of *WE Prerequisite: Water Access and Quality* to meet the quality requirements of treated and discharged wastewater. Points are awarded as per the Table below.

Table 7. Percentage of wastewater reused to meet total water demand

Percentage of wastewater reused	Points
70% and above	5
50% to 69%	4
30% to 49%	3
10% to 29%	2

Wastewater management system should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

Guidance

Behind the Intent

Collection and treatment of sewage and wastewater is vital to public and environmental health. Sewage water contains pathogenic microorganisms, and untreated or poorly treated wastewater degrades surface waters, making them unsafe for human uses such as drinking, fishing, and swimming. This credit required cities and communities to collect and treat wastewater for reuse, as well as meet certain water quality standards before release into natural water systems. It is vital to ensure the quality of treated wastewater before its release into the environment to prevent pollution of both surface water and land. This credit encourages cities to treat wastewater using centralized and decentralized wastewater treatment systems.

Further Explanation

Required Documentation

Documentation	All cities and communities
Calculation showing percentage of treated wastewater from centralized and decentralized plants, if applicable, which is reused to meet the total water demand	X
Report or other documentation from jurisdictional authority demonstrating percentage of wastewater treated for reuse from centralized and decentralized treatment plants	X

Exemplary Performance

Meet >80% of the total city water demand using treated wastewater.

WE Credit: Smart Water Systems

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

Intent

To manage water efficiently by tracking consumption, losses, leakages, theft and reduce wastage of water through smart solutions.

Requirements

CITIES, COMMUNITIES

Smart water metering (2 points)

Commit to cover 100% of water connection units with smart water meters to measure the total potable water use at the point of connection.

AND/OR

Water supply monitoring and audit (1 point)

Design water supply system to provide information on water consumption, water losses, theft and wastage. Provide auditing and monitoring systems.

Guidance

Behind the Intent

This credit requires a city to apply information technology to enhance water efficiency. Smart water systems optimize water utility performance by improving efficiency, longevity, and reliability. These systems also help improve the overall performance of water supply networks by measuring, collecting, and analyzing data, then taking appropriate corrective actions. Smart water systems can link together multiple systems within a network to share data across platforms. Considering many of the common challenges faced by utilities, including leak management, regulation compliance, and customer service, utilities can improve performance by integrating systems in a manner that tracks and highlights specific problem areas.

Required Documentation

Documentation	Option 1	Option 2
Commitment from jurisdictional authority to cover all points of connection with smart water meters	X	
Description of automation of water supply system to collect data, track and monitor water supply and conduct water audits		X

Exemplary Performance

This credit is not eligible for exemplary performance.

ENERGY AND GREENHOUSE GAS EMISSIONS (EN)

EN Prerequisite: Power Access, Reliability and Resiliency

Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To provide safe, secured, reliable, resilient and equitable access to power.

Requirements

CITIES, COMMUNITIES

Power system must meet the following requirements. Cities with multiple utilities or service providers must aggregate the data from the respective utility to demonstrate compliance.

Access

100% coverage of all buildings by power supply.

Reliability and Resiliency

Protect the power system from common external threats that may cause equipment damage, malfunctioning or service interruption by meeting all requirements as applicable to the project.

Option 1. External Damage Prevention

Identify risks and avoid infrastructure damage and / or service interruption from external risks such as tree contact, animal / bird contact, vehicle traffic or human interference, fire / hazardous area and weather.

AND / OR

Option 2. Power System Hardening

Have in place the following design considerations and/or infrastructure to harden power systems against flooding, storms, and other extreme events.

▶ Flooding avoidance

- Prevent damage to electrical equipment and assets (e.g., substations, diesel generator sets, transformers, OH cables) and ancillary equipment (e.g., pumps, compressors), by having a permanent storm water drainage system to protect critical power assets from inundation based on a 100-year flood mark or flood map. Protect stored fuel to meet or exceed the requirements set by the authority having jurisdiction.

- Existing infrastructure can meet this infrastructure requirement by installing a standalone pump (operable in the absence of power supply) to pump water from low-lying areas around the electrical systems or permanently relocate the assets or increase the height of critical power assets in the flood-prone area as described in American Society of Civil Engineers (ASCE) - Chapter 7, 24 or equivalent.
- ▶ **Storm protection** – Outdoor equipment should withstand three-second wind gusts up to 140 mph or equivalent.
- ▶ **Seismic protection** – Have in place seismic restraint-certified equipment for critical electrical systems and/or install a seismic restraint structural support for critical electrical systems, based on the seismic zone.

AND / OR

Option 3. Undergrounding

Bury a minimum of 10% of the total electric cable length underground or protect them in conduits or underground tunnels.

AND

Power Surety and Resiliency

Identify cities' or communities' critical loads or emergency facilities and essential services that require backup power during widespread outages or disasters. Determine minimum daily runtime requirements for all the emergency facilities and essential services. Demonstrate that the city, utility or service provider can supply power to all emergency facilities and essential services for at least duration greater than the minimum daily runtime for one week or longer.

Off-grid developments or micro-grids are eligible if they independently meet the above requirements and are supported by the city development plans or policies.

References:

PEER v2 RR Credit: Damage and Exposure Prevention
 PEER v2 RR Credit: Power Surety and Resiliency

Guidance Behind the Intent

This credit aligns with one of the key targets under the United Nations Sustainable Development Goal 7, which calls for universal access to affordable, reliable, and modern energy services by 2030. Along with access, reliable delivery is a fundamental goal for energy system operators as it directly impacts livability of a city or community. The failure to supply power—whether to a specific community or to the entire distribution network—undermines the confidence of citizens and wastes money and resources. Moreover, careful design of the power system can reduce the likelihood of equipment failures. Power outages during severe weather events (such as floods, heavy winds, hurricanes, and cyclones) have increased over the past decade, and many utilities, cities, and campuses are “hardening” their systems by making the major electrical equipment less susceptible to damage. Designing with hardening strategies during the initial stages of a project can help reduce future operational and damage costs.

Power reliability means providing short-term power to support critical loads, such as traffic controls or communication systems, while power resiliency means providing long-term power for essential services such as medical centers to support a community through an extended outage. Essential services must be supplied with highly-reliable power for at least one week, although power does not need to be continuous or offer full functionality.

Further Explanation**Required Documentation**

Documentation	Option 1	Option 2	Option 3
Declaration from development authority or the electrical / energy engineer stating 100% coverage of buildings with power supply.	X	X	X
Power surety and resiliency: List the cities' or communities' critical loads or emergency facilities and essential services, with their minimum daily runtimes, identify the alternative power supply for each, including type, location, capacity, and minimum daily runtime.	X	X	X
Reliability, resiliency and power surety: Narrative describing the design considerations and strategies undertaken to protect the power system from common external threats. For critical loads and emergency facilities explain the energy storage or backup generators duty cycle, with their energy storage capacity (including fuel) and typical energy consumption.	X	X	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

EN Prerequisite: Energy and Greenhouse Gas Emissions Management

Required, 1-19 points

This prerequisite applies to

- ▶ Cities (1-15)
- ▶ Communities (1-19)

Intent

To move towards a zero emissions city and reduce environmental and economic harms associated with excessive energy use.

Requirements

CITIES, COMMUNITIES

Estimate the annual energy consumption and Greenhouse Gas (GHG) emissions for the city.

The projected energy performance must meet the following criteria:

Include Scope 1 and Scope 2 GHG emissions in the calculations. Address all of the following sectors present within the city:

- ▶ Buildings – All types of buildings such as residential, commercial, institutional and industrial buildings under public and private sector.
- ▶ Transportation – Public and private transportation.
- ▶ Street lighting and public area lighting.
- ▶ Water and wastewater.
- ▶ Waste management.
- ▶ Any other sector such as energy generation, mining or extraction if it falls within the city boundary.

- ▶ For cities or communities in US and Canada:
 - ▶ Use U.S. Environmental Protection Agency's (EPA) regional grid mix coefficients to calculate GHG emissions by energy source; or
 - ▶ Use hourly emissions profiles from U.S. Environmental Protection Agency's (EPA) AVOIDed Emissions and geneRation Tool (AVERT)
- ▶ For other International cities:
 - ▶ Use national grid mix coefficients from the International Energy Agency CO₂ Emissions from Fuel Combustion 2017 report to calculate GHG emissions by energy source.
 - ▶ ISO 52000-1:2017 – Greenhouse gas emission factors for each building energy source shall be determined consistently with ISO Standard 52000-1:2017 and published for the country or region where the project is located.

Calculate the projected energy performance for a sector as percentage savings based on baseline performance, the baseline should be based on (i) industry “standard practice” (ii) existing codes, standards or regulatory requirements (iii) published data or (iv) projects of similar scope and size operating within the same geographical area or within a geographical area with similar operating

condition. Additionally, baseline buildings must comply with ANSI/ASHRAE/IESNA Standard 90.1-2016³⁴, with errata or a USGBC-approved equivalent standard.

Support energy and GHG reduction strategies which are not within the scope of the development authority's direct execution with appropriate regulations or policies.

Document the assumptions for differing daytime and night time population if varying numbers are used to arrive at GHG emissions per capita.

LEED points are based on projected energy and GHG performance based on Greenhouse gas emissions per capita (tons CO₂ per capita).

Table 8. Points for projected energy performance of the city

GHG emissions per capita	Energy and GHG Management Points	
	Cities	Communities
No greater than 9.5	Prerequisite	Prerequisite
9.0	1	1
8.5	2	2
8.0	3	3
7.5	4	4
7.0	5	5
6.5	6	6
6.0	7	7
5.5	8	8
5.0	9	9
4.5	10	10
4.0	11	11
3.5	12	12
3.0	13	13
2.5	14	14
2.0	15	15
1.5		16
1.0		17
0.5		18
0		19

Guidance

³⁴ ASHRAE 90.1-2016 Compliance pathways in Section 4.2.1.1 include compliance with all mandatory provisions, and compliance with one of the following: (i) Prescriptive provisions of Sections 5 through 10 (ii) Section 11 Energy Cost Budget Method or (ii) Normative Appendix G Performance Rating Method. When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCIt) in accordance with the methodology provided in Section 4.2.1.1.

Behind the Intent

Cities cover an estimated 0.5% to 2.7% of global land area, yet they could account for up to 70 percent of the world’s anthropogenic (human-induced) GHG emissions. Cities consume significant fossil fuels across various sectors – transportation, industry, waste, and buildings. Any effort to mitigate and adapt to climate change requires an understanding and accounting of the various sources of, and sinks for, emissions in cities. As an example, parks and forestland can provide sinks to capture carbon dioxide. This credit requires cities and communities to develop an emissions inventory that can identify the most effective low-carbon growth strategies, reduce exposure to the risks of climate change, improve energy security, and attract climate finance.

Further Explanation

Required Documentation

Documentation	All cities and communities
USGBC calculator for total annual greenhouse gas emissions from all sectors	X
Documentation (such as policies, ordinance or research) to support strategies for GHG emissions estimation.	X
Detailed Calculations for per capita emissions (including energy modeling for designed buildings as per requirements of ASHRAE 90.1-2016)	X

Exemplary Performance

- ▶ Cities: Demonstrate GHG emissions lower than 2.0 tCO₂e per capita.
- ▶ Communities: Demonstrate negative GHG emissions per capita.

EN Credit: Energy Efficiency

This credit applies to

- ▶ Cities (1-4 points)
- ▶ Communities (1-4 points)

Intent

To improve the energy efficiency of city services

Requirements

CITIES, COMMUNITIES

Attempt any of the following options for a maximum of 4 points:

Street Lighting and public area lighting (2 points)

Street lighting design should meet the efficiency related requirements of 'ANSI/IESNA RP-8-14 Roadway Lighting' or internal equivalent standard. In addition, lamps should have a minimum Luminous Efficacy of 100 lumens per watt.

AND / OR

Water and Wastewater (2 points)

All pumps used in the water and wastewater systems must meet the Pump Energy Index listed in Table I.1—Proposed Energy Conservation Standards for Pumps, 10 CFR Parts 429 and 431 of DOE standards Federal Register final rule Energy Conservation Program: Energy Conservation Standards for Pumps³⁵ or international equivalent standard.

AND / OR

District Energy Systems (1-2 points)

Incorporate a District Energy System (DES). For the purposes of this credit, a DES is a heating and/or cooling system that produces steam, hot water, and/or chilled water in a centralized plant using cogeneration or tri-generation and distributes this energy to multiple buildings. Determine the percentage of city's electric, cooling and/or heating demand serviced by the DES using the following formula. Single-family residential buildings may be excluded from the calculation.

$$\% \text{ District Energy} = \% H_{DES} + \% C_{DES} + \% E_{DES}$$

Where:

%H_{DES}: Percentage of city's heating demand supplied by DES

%C_{DES}: Percentage of city's cooling demand supplied by DES

%E_{DES}: Percentage of city's electric demand supplied by DES

³⁵ <https://www.regulations.gov/document?D=EERE-2011-BT-STD-0031-0060> , accessed on December 17, 2018.

Points are awarded based on percentage of city load supplied by district energy resources as shown in table below.

Table 6. Points for District Energy

% District Energy	Points
80%	1
160%	2

District Energy Systems should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

Reference:
PEER v2 EE Credit: Distributed Energy Resources

Guidance Behind the Intent

This credit focuses on demand-side energy efficiency in the city. It includes activities typically under the purview of the local government or development authority - street lighting, water and wastewater, and district energy systems. Energy efficiency in buildings is addressed through the Green Building Policy and Incentives credit. Transportation-related strategies such as use of alternative fuel vehicles are included under the Transportation and Land Use credit category.

Further Explanation Required Documentation

Documentation	Street Lighting	Water and wastewater	District Energy Systems
Declaration from development authority or electrical / energy engineer stating street lighting will meet the requirements from the listed standard.	X		
Narrative explaining the lighting type and design for various types of streets	X		
Declaration from development authority or electrical / energy that all pumps will meet the requirements of the Pump Energy Index (PEI) of the listed standard.		X	
Narrative explaining the district energy system.			X
Calculation of the percentage of heating and cooling loads served by the system.			X

Exemplary Performance

This credit is not eligible for exemplary performance.

EN Credit: Renewable Energy

This credit applies to

- ▶ Cities (2-6 points)
- ▶ Communities (2-6 points)

Intent

To reduce the environmental and economic harms associated with fossil fuel energy and reduce Greenhouse Gas emissions by increasing self-supply of renewable energy, use of grid-source renewable energy technologies and carbon mitigation projects.

Requirements

CITIES, COMMUNITIES

Cities or communities may choose one or more strategies for procuring renewable energy (such as solar PV, wind, geothermal, micro or small scale hydro, or biomass) from the categories below. Points are based on percentage of total city electricity consumption from EN Prerequisite Energy Performance met by the specific strategy as per Table below. Points achieved in each category may be added for up to a total of 6 points.

- ▶ **On-site Renewables-** Includes on-site nonpolluting renewable energy generation, which will be owned, leased or subsidized by the city, utility, or energy provider
- ▶ Local renewables should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.
- ▶ **New Off-Site Renewables-** Includes large scale renewable energy plant with a minimum capacity of 1 MW, to meet the energy needs of the city. Plant maybe located within or outside the city boundary and should be owned or leased for a period of fifteen years by the city development authorities. Large scale renewables should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase. The plant built within the last year or contracted prior to renewable energy project development. A new or on-going Power Purchase Agreement (PPA) or Virtual Power Purchase Agreement (VPPA) between the city/ community, utility and/or renewable energy provider is acceptable.
- ▶ **Existing Off-Site Renewables-** Includes renewable energy procured from an existing renewable energy provider or utility (Contract not required).
- ▶ **Green-e Certified RECs and Carbon Offsets-** Includes green-e certified Renewable Energy Certificates (RECs), and/or carbon offsets purchased by the city to mitigate the environmental impacts of city energy consumption; if purchased by the utility or energy provider, RECs and Carbon Offsets must be prorated as per the city's annual energy share in the utility's generation. RECs and carbon offsets must be Green-e certified. Carbon offsets must be purchased from recognized GHG reduction projects within the country where the city is located. For this purpose,

engage in a contract for qualified resources that have come online since January 1, 2005³⁶, for a minimum of fifteen years to be delivered annually. Contract for qualified resources that have come online since January 1, 2005³⁷, for a minimum of fifteen years to be delivered annually. If RECs or carbon offsets are purchased by the utility serving multiple cities, these must be prorated as per the city's annual energy share in the utility's generation.

- **RECs and Carbon Offsets-** Includes other Renewable Energy Credits and Carbon Offsets purchased by the city; if purchased by the utility, RECs and Carbon Offsets must be prorated as per the city's annual energy share in the utility's generation.

Prosumers, Community Choice Aggregation (CCA) or other aggregated consumers with a minimum on-grid capacity of 2 MW renewables which will be owned and operated by consumers may be included in the calculations based on whether these are on-site or off-site renewables.

Environmental benefits of the procurement must be retained by the city, utility or service provider. All off-site qualifying resources must be contracted, owned, or leased for at least 15 years.

Table 10. Points for Renewables Procurement

Points	On-Site Renewables	New Off-Site Renewables	Existing Off-Site Renewables	Green-e Certified: RECs and Carbon Offsets	RECs and Carbon Offsets
2	2 %	20 %	60 %	100%	150%
3	6 %	40 %	80 %	200%	
4	15 %	60 %	100 %	300%	
5	35 %	80 %			
6	60 %	100 %			

Guidance Behind the Intent

There are multiple ways a city or community can incorporate renewable energy in its energy portfolio. These include small-scale renewables such as rooftop photovoltaics (PV) or large-scale such as grid-connected wind farms. This credit provides a single pathway for cities to evaluate their effectiveness and advance towards renewable energy. Moreover, the credit is structured to reward cities based on their level of effort and the impact of their solutions. A collaborative approach between the cities and

utilities or service providers is critical to the success of implementing upstream and downstream renewable energy solutions.

**Further Explanation
Required Documentation**

Documentation	On-Site	New Off-Site	Existing Off-Site	Green-e Certified: RECs and Carbon Offsets	RECs and Carbon Offsets
Documentation for planned renewable energy source and rated capacity	X		X		
Calculations for determining annual renewable energy generated	X		X		
Contract (or Power Purchase Agreement or Virtual Power Purchase Agreement) indicating percentage ownership, lease, or allocation of new off-site renewable system, specific location of new off-site system, the term and annual energy output		X			
Calculations demonstrating achievement of the point threshold	X	X	X	X	X
Confirmation of renewable attribute ownership	X	X	X	X	X
Purchase letter or contract of commitment showing renewable electricity or carbon offsets for targeted point threshold				X	X
Green-e certificate or documentation showing label development, transparent accounting processes and standards, if not Green-e certified				X	X

Exemplary Performance

- ▶ On-Site Renewables: Meet 75% of the total estimated electricity consumption using on-site renewables.
- ▶ New Off-Site Renewables: Generate 120% of the total electricity consumption using off-site renewables to feed excess back into the grid.
- ▶ Green-e Certified RECs and Carbon Offsets: Purchase Green-e Certified RECs and Carbon Offsets equivalent to 400% of the total estimated electricity consumption.
- ▶ RECs and Carbon Offsets: Purchase RECs and Carbon Offsets equivalent to 300% of the total estimated electricity consumption.

EN Credit: Low Carbon Economy

This credit applies to

- Cities (4 points)

Intent

To progress towards a low carbon economy by decoupling economic growth of the city or community from greenhouse gas emissions.

Requirements

CITIES

Greenhouse Gas Intensity

Report the total estimated GHG emissions by the city or community per unit estimated economic output measured in Gross Domestic Product (GDP) by the city. Total GHG emissions must be as per *EN Prerequisite Energy and Greenhouse Gas Emissions Performance*.

GDP of the city should include the projected increase in GDP of the region due to the economic activities planned in the city. Data at city level or apportioned metro or state level data must be used.

$$\text{GHG Intensity} = \text{Total GHG of the city} / \text{Total GDP}$$

Guidance

Behind the Intent

The post-industrial era is marked by an increase in GHG emissions attributable to economic growth. The strong coupling of economic growth and GHG emissions has been a major contributor to human-induced climate change. As cities are the engines of economic growth, they are required to estimate the GHG intensity of the economy and devise effective strategies to decouple GHG emissions and economic growth.

Further Explanation

Required Documentation

Documentation	All cities
Total estimated annual Greenhouse Gas emissions from all sectors as reported under <i>EN Prerequisite Energy and Greenhouse Gas Emissions Performance</i>	X
Projected GDP for the city and supporting documentation	X
Calculations for carbon intensity	X

Exemplary Performance

This credit is not eligible for exemplary performance.

EN Credit: Grid Harmonization

This credit applies to

- Cities (2 points)
- Communities (2 points)

Intent

To improve operational efficiency of the energy system.

Requirements

Option 1. Load Management (2 points)

Have in place (or initiate dialogue with utility to be committed to) infrastructure and programs that provide access to dynamic pricing for metered users to motivate load shifting. Rate structures must be clearly defined, communicated to metered users in a standard format, and easily accessible. At minimum, have a tariff scheme that offers, Time of Use pricing with at least one time block and two tiers for all consumers.

Reference: PEER v2 GS Credit: Demand Side Management

OR

Option 2. Demand Response (2 points)

Have in place (or initiate dialogue with utility to be committed to) tariff options that support short-term reduction in peak demand. Have in place following tariff structures for residential, commercial and industrial consumer categories at minimum:

- ▶ Critical Peak Pricing
- ▶ Critical Peak Rebate

Reference: PEER v2 GS Credit: Demand Response

OR

Option 3. Net Metering and Interconnection Policy (2 points)

The policy should meet the following requirements which are based on the Standard for Interconnecting Distributed Resources with Electric Power Systems, by Institute of Electrical and Electronics Engineers 1547-2003 or local equivalent.

- ▶ Applicability to all renewable generation and energy storage technologies (Distributed Power sources, Electric Vehicles).
- ▶ System capacity of 100 kW or more
- ▶ Incorporate the following best practices for interconnection policies:
 - Provisions for a fast-track, low-cost interconnection process for customers with generation capacity of 100 kW or less (Distributed Power sources, Electric Vehicles).
 - Defined timelines and an engineering fee structure for various stages of the process.
 - Identification of technical standards for interconnection of generation systems (Distributed Power sources, Electric Vehicles).
- ▶ Incorporate at least three of the following best practices for net metering policies:
 - Monthly rollover of excess energy to be permitted up to one year.
 - Compensation is provided for excess energy at predefined, nonzero rates.
 - Ownership of renewable energy certificates is offered to the customer.
 - Third-party ownership and meter aggregation are permitted.

**Guidance
Behind the Intent**

The energy industry’s business model remained fundamentally unaltered for more than a century: the utility generated power and, in a one-way flow, sold it to customers, the energy consumers. Demand was fairly predictable. Today, with advanced technology, consumers can make informed choices about energy usage or even become energy producers themselves.³⁸ This credit requires the city to collaborate with the utility or service provider to deploy advanced technologies and provide a modernized grid with low environmental impact.

**Further Explanation
Required Documentation**

Documentation	Option 1	Option 2	Option 3
Narrative describing dynamic pricing programs available to (or commitment made to) for customers, including the terms and applicable for each customer classes.	X		
Policies, programs, and tariff structures in place (or commitment made to) for different consumer categories the same		X	
Provide the percentage of customers/consumers eligible for the demand - response program and provide descriptions or narratives explaining describe or explain how these values were determined		X	
Rules, policies, and program requirements covering fees, process timelines, and applicability for the interconnection standards.			X
Policies, practices, programs, and compensation rates for net metering.			X

Exemplary Performance

This credit is not eligible for exemplary performance.

³⁸ PEER v2 EE Credit: Distributed Energy Resources
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MATERIALS AND RESOURCES (MR)

MR Prerequisite: Construction and Demolition Waste Management

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing and recycling materials.

Requirements

CITIES, COMMUNITIES³⁹

Develop a detailed construction and demolition (C&D) waste management plan and commit to divert minimum of 35% of C&D waste from all infrastructure works and construction undertaken by the city development authority. This includes but is not limited to roads and highways, transits, water supply and wastewater treatment plants, public spaces and parks and buildings owned by the development authorities. The plan must include an overall project waste diversion goal and identify the strategies for waste diversion. Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

Provide a C&D facility within or outside the city boundary to treat C&D waste generated from all infrastructure works and construction undertaken by the city development authority. Ensure that waste from city/ community is treated by the assigned facility. For cities, where C&D waste management services are undertaken by the subcontractors, ensure all above requirements are met.

Reference:

LEED BD+C v4 MR Prerequisite: Construction and Demolition Waste Management Planning.

Guidance

Behind the Intent

Diversion of construction waste has increased greatly in recent years because of new market incentives, better recycling and reuse infrastructure, and sophisticated sorting technology. However, the majority of diverted materials are limited to those that occur in high volume, such as structural waste, or are easily resold, such as metals.

³⁹ Communities must meet all the requirements for type of infrastructure within their scope.

Both planning and implementation are critical to reducing construction and demolition (C&D) waste. Cities can reduce C&D waste disposed of in landfills and incineration facilities by recovering, reusing and recycling materials. Developing a C&D waste management plan early in the design process allows more time for planning and coordination, identifying appropriate strategies, and developing contractual agreements. Educating development team members, site workers, and waste haulers helps ensure that the plan is followed and material is actually diverted from landfills and incinerators. A well-devised plan can also minimize cost and maximize return by decreasing tipping fees, bringing in revenue from selling high-value scrap materials, or identifying materials for reuse.

Further Explanation Required Documentation

Documentation	All cities and communities
Construction and Demolition (C&D) waste management plan	X
Commitment from local authority to divert a minimum 35% of C&D waste	X
Narrative providing details of facility where C&D waste will be processed.	X

Exemplary Performance

Develop a detailed construction and demolition (C&D) waste management plan and commit to divert minimum of 70% of C&D waste from all infrastructure works and construction undertaken by the city development authority.

MR Prerequisite: Solid Waste Management

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To move towards a zero waste city and reduce environmental and economic harms associated with waste generation.

Requirements

CITIES, COMMUNITIES⁴⁰

Waste collection services

100% coverage of all buildings for segregated waste collection services including but not limited to recycling, organics, and solid waste for municipal solid waste.

AND

Waste Generation and Diversion

Estimate the annual municipal solid waste generation and municipal solid waste diversion from landfill for the city. In addition, city must also estimate the total waste generated (in metric tons per year) and waste diverted (percentage diverted) from special waste streams. Special wastes are defined as non-municipal solid waste generated within the city including industrial waste, agricultural, bio-medical waste, hazardous waste or any other as specific to the city.⁴¹

The projected performance should meet the following criteria:

1. Waste Generation

- i. Project municipal solid waste generation per year for all of the following sectors present within the city:
 - Residential
 - Institutional
 - Commercial
 - Open Spaces/ Yard waste
 - Other sector as applicable for the city
- ii. Municipal solid waste generated from each sector must be classified according to following waste categories
 - Organic waste including food or kitchen waste and yard waste.
 - Recyclables such as paper, corrugated cardboard, glass, plastic and metal.

⁴⁰ Communities must meet all the requirements which are within the scope of the services provided or contracted by the community.

⁴¹ What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050

<http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>, accessed on December 17, 2018.

- iii. Calculate the projected waste generation for a sector as percentage savings based on baseline performance, the baseline should be based on (i) industry “standard practice” (ii) existing codes, standards or regulatory requirements (iii) published data or (iv) projects of similar scope and size operating within the same geographical area or within a geographical area with similar operating condition.
- iv. Document the assumptions for differing daytime and night time population if varying numbers are used to arrive at waste generation based on population.

AND

2. Waste Diversion

Estimate the waste diversion from landfill as the total waste diverted from landfill, in a year as a percentage of total waste generated.

$$\text{Diversion rate} = \frac{\text{Total waste diverted from landfill} \times 100}{\text{Total waste generated}}$$

- ▶ Diverted waste includes all recycled, salvaged or reused materials.
- ▶ Construction and demolition waste is not included in this calculation. Exclude land clearing debris, soil and landscaping materials.

Waste to energy may count as waste diversion method if the facility meets European Commission Waste Framework Directive 2008/98/EC and the European Commission Waste Incineration Directive 2000/76/EC ⁴² or local, state or national equivalent. In addition, cities or communities must demonstrate that reuse and recycling strategies were exhausted before sending material to waste to energy facility.

Support waste management and diversion strategies which are not within the scope of the development authority’s direct execution with appropriate regulations or policies.

AND

3. Waste Disposal

CITIES

⁴² These standards consist of performance metrics of both efficiency and emissions for different types of energy recovery systems. In addition, the facility must meet the applicable European standards based on the fuel type. See *Referenced Standards* for more information on these directives:

EN 303-1—1999/A1—2003, Heating boilers with forced draught burners
 EN 303-2—1998/A1—2003, Heating boilers with forced draught burners
 EN 303-3—1998/AC—2006, Gas-fired central heating boilers
 EN 303-4—1999, Heating boilers with forced draught burners
 EN 303-5—2012, Heating boilers for solid fuels
 EN 303-6—2000, Heating boilers with forced draught burners
 EN 303-7—2006, Gas-fired central heating boilers equipped with a forced draught burner

Meet the requirements of Chapter 2: Design objectives and consideration, Chapter 3: Site Development and Chapter 4: Site Infrastructure of EPA Landfill Manuals – Landfill Site Design or local, state or national equivalent for designing landfill where the waste from the city will be brought. ⁴³

COMMUNITIES

Provide dedicated areas and take appropriate measures for safe disposal of waste streams remaining after waste diversion.

**Guidance
Behind the Intent**

With rapid urbanization, economic development and population growth, more and more resources are needed to meet consumer demand. As nations and cities expand, they must offer more services to citizens and in turn manage, treat, and dispose of corresponding amounts of waste.

Around the world, almost 40% of waste is disposed of in landfills.⁴⁴ About 19% is recovered through recycling and composting,⁴⁵ and 11% is treated through modern incineration. Although globally 33% of waste is still openly dumped,⁴⁶ governments are increasingly facing the risks and costs of pollution and pursuing sustainable waste disposal methods. To address these issues, this prerequisite encourages effective, efficient, and systematic waste management. It allows cities to pursue sustainable waste management methods through composting, recycling, and safe disposal.

Further Explanation

Required Documentation

Documentation	All cities and communities
Declaration from development authority or the chief engineer stating 100% coverage of all buildings with segregated waste collection services.	X
USGBC calculator for estimation of total waste generated - municipal and special waste streams	X
Calculations for waste diversion rate for municipal solid waste and each type of special waste	X
Narrative describing diversion strategies	X

⁴³ For waste disposal services which are not within the scope of the development authority's direct execution (such as provided by contracts/sub-contracts) must be supported with appropriate contracts, regulations or policies to demonstrate compliance.
⁴⁴ Chrisafis, Angeliq. 2016. "French Law Forbids Food Waste by Supermarkets." The Guardian, February 4. <https://www.theguardian.com/world/2016/feb/04/french-law-forbids-food-waste-by-supermarkets>.
⁴⁵ FAO (Food and Agriculture Organization). 2015. Global Initiative on Food Loss and Waste Reduction. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/a-i4068e.pdf>.
⁴⁶ "SAVE FOOD: Global Initiative on Food Loss and Waste Reduction." Food and Agriculture Organization of the United Nations, Rome. <http://www.fao.org/save-food/news-and-multimedia/news/news-details/en/c/1105834/>.

Narrative describing municipal solid waste and special waste stream diversion strategies.	X
Documentation of appropriate regulations and policies supporting waste management services.	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

MR Credit: Organic Waste Treatment

This credit applies to

- ▶ Cities (2 points)
- ▶ Communities (1-2 points)

Intent

To encourage diversion of organic matter away from landfill and move towards creation of valuable nutrient rich soil and clean power.

Requirements

Meet all of the following requirements:

CITIES

Incorporate decentralized and /or centralized waste management systems to treat 100% of organic waste estimated as per *MR Prerequisite Waste Management* generated within the city.

COMMUNITIES

- ▶ Incorporate waste management systems to treat organic waste estimated as per *MR Prerequisite Waste Management* generated within the community.
- ▶ Points are awarded based on the percentage of organic waste treated by using any or both of the following options.

Table 11. Points for treating organic waste

Percentage of organic waste treated	Points
75%	1
100%	2

- Decentralized organic waste management- Adopt a policy for buildings and/or communities to treat on-site the organic waste generated using composting or anaerobic digestion.
- Centralized organic waste management- Provide centralized composting or waste-to-energy plant/s to treat the organic waste generated within the city. Centralized systems may be provided within or outside the boundary of the city.
- ▶ Allocate areas within the city’s green spaces for utilization of the compost produced.

For waste management services which are not within the scope of the development authority’s direct execution (such as provided by contractor/sub-contractor) must be supported with appropriate contracts, regulations or policies to demonstrate compliance.

Waste to energy may count as waste diversion method if the facility meets European Commission Waste Framework Directive 2008/98/EC and the European Commission Waste Incineration

Directive 2000/76/EC⁴⁷ or local, state or national equivalent. In addition, cities or communities must demonstrate that reuse and recycling strategies were exhausted before sending material to waste to energy facility.

Waste management system should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

**Guidance
Behind the Intent**

Around the world, almost 40% of waste is disposed of in landfills.⁴⁸ About 19% undergoes material recovery through recycling and composting,⁴⁹ and 11% is treated through modern incineration.⁵⁰ In order to close the nutrient cycle of circular economy, this credit encourages the diversion of organic matter away from landfills and creation of valuable nutrient-rich compost and cleaner power. Planning organic waste management systems early in the design process allows cities and communities to acquire more useful material and build a circular and regenerative economy.

**Further Explanation
Required Documentation**

Documentation	All cities and communities
Documentation of percentage of organic waste treated and strategies adopted for treatment.	X
Declaration from development authority that 100% of organic waste generated within the city will be treated.	X
Documentation of contracts/sub-contracts with service providers supporting waste management services.	X

Exemplary performance

This credit is not eligible for exemplary performance.

⁴⁷ These standards consist of performance metrics of both efficiency and emissions for different types of energy recovery systems. In addition, the facility must meet the applicable European standards based on the fuel type. See *Referenced Standards* for more information on these directives:

- EN 303-1—1999/A1—2003, Heating boilers with forced draught burners
- EN 303-2—1998/A1—2003, Heating boilers with forced draught burners
- EN 303-3—1998/AC—2006, Gas-fired central heating boilers
- EN 303-4—1999, Heating boilers with forced draught burners
- EN 303-5—2012, Heating boilers for solid fuels
- EN 303-6—2000, Heating boilers with forced draught burners
- EN 303-7—2006, Gas-fired central heating boilers equipped with a forced draught burner

⁴⁸ Chrisafis, Angelique. 2016. "French Law Forbids Food Waste by Supermarkets." *The Guardian*, February 4. <https://www.theguardian.com/world/2016/feb/04/french-law-forbids-food-waste-by-supermarkets>.

⁴⁹ FAO (Food and Agriculture Organization). 2015. *Global Initiative on Food Loss and Waste Reduction*. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/a-i4068e.pdf>.

⁵⁰ *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*

<http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>, accessed on December 17, 2018.

MR Credit: Recycling Infrastructure

This credit applies to

- ▶ Cities (2-5 points)
- ▶ Communities (3 points)

Intent

To encourage waste diversion of inorganic matter away from landfill and move towards 100% diversion from landfill.

Requirements

CITIES

Option 1. Remanufacturing (2 points)

- ▶ Collection centers must be provided equipped with facilities to collect and store the waste products including (i) Electronics and Electrical Equipment (e-waste) and (ii) Packaging or metal cans to transfer these to the manufacturers. Collection centers must be within or outside the city boundary and may be operated by the municipality or other organizations such as Producer Responsible Organizations (PRO).

AND

- ▶ Mandate a Manufacturers or Producer's Extended Producer Responsibility (EPR) policy for companies within the city's jurisdiction to encourage refurbishment, remanufacturing and recycling of the products collected. Policy should meet all of the following requirements:
 - Include specific guidelines regarding channelization, collection centers, storage, transportation, environmentally sound dismantling, recycling and refurbishment.
 - Mandate companies to collect a minimum of 10% of the total annual waste generated. Waste generated by the producer is calculated using the formula:

E-waste generation in the financial year 'x-y' = Sales in the financial year '(x-z) - (y-z)'

Where,

'x - y' = financial year in which generation is estimated (in weight or volume)

z = average life span of the products

OR

- ▶ Identify suitable market for all the waste products collected from consumers. Vendors may be within the city or outside the city boundary.

References:

LEED BD+C v4 MR Credit: Building Product Disclosure and Optimization- Sourcing of raw materials.

TRUE Leadership Credit 4: Take responsibility for company products and packaging

AND / OR

CITIES, COMMUNITIES

Option 2. Material Recovery Facility (MRF) (3 points)

- ▶ Waste Collection and Storage: Comply with the 'Requirement' sections of U.S. Code of Federal Regulations, Title 40, Volume 26, Part 243 on Storage, Safety and Collection (or local, state or national equivalent) for storage and collection of recyclables.
- ▶ Design a Material Recovery Facility (MRF) to recycle the inorganic waste such as paper/ corrugated cardboard, glass, plastic and metal generated within the city. Facility must be designed and

operated in accordance to local/ national regulations including design features for sorting to specialization, bailing, shredding, crushing and compaction to prepare recyclables for end user manufacturer.

- Identify suitable markets to collect MRF output for paper/ corrugated cardboard, glass, plastic and metal. Vendors may be within the city or outside the city boundary.

Recycling infrastructure should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

Guidance Behind the Intent

Looking beyond the conventional waste management model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system.⁵¹ This credit provides cities with a pathway to advance to a circular economy by enabling the recovery and restoration of products, components, and materials through strategies like reuse, repair, remanufacture, or recycling. Around the world, almost 40% of waste is disposed of in landfills,⁵² only 19% undergoes materials recovery through recycling and composting.⁵³ Designing proper recycling infrastructure early in the design phase can offer long-term social, environmental, and economic benefits.

Further Explanation Required Documentation

Documentation	Option 1	Option 2
Narrative describing commitment for collection centers to collect and store the waste products listed in credit requirements.	X	
Extended producer responsibility policy. OR Narrative describing suitable markets for collected waste products under EPR	X	
Documentation of compliance with the 'Requirement' sections of U.S. Code of Federal Regulations, Title 40, Volume 26, Part 243 on Storage, Safety and Collection (or local, state or national equivalent for storage and collection of recyclables.		X
Documentation of material recovery facility equipped with design features for sorting to specialization, bailing, shredding, crushing and compaction		X
Narrative describing details of the MRF facility including location, design and suitable markets for recovered output.		X
Declaration from development authority to meet the requirements of the listed standard for collection and storage of collected recyclables.		X

⁵¹ <https://www.ellenmacarthurfoundation.org/circular-economy/concept> accessed on March 24, 2019
⁵² Chrisafis, Angelique. 2016. "French Law Forbids Food Waste by Supermarkets." The Guardian, February 4. <https://www.theguardian.com/world/2016/feb/04/french-law-forbids-food-waste-by-supermarkets>.
⁵³ FAO (Food and Agriculture Organization). 2015. Global Initiative on Food Loss and Waste Reduction. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/a-i4068e.pdf>.

Exemplary Performancev

This credit is not eligible for exemplary performance.

MR Credit: Responsible Sourcing for Infrastructure

This credit applies to

- ▶ Cities (2 points)
- ▶ Communities (2 points)

Intent

To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward cities for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements

CITIES, COMMUNITIES

Demonstrate that city is using one or more of the following criteria for minimum 20% by cost of the total value of permanently installed-top three materials used in infrastructure [1 point].

Demonstrate that city is using one or more of the following criteria for minimum 40% by cost, of the total value of permanently installed top five materials used in infrastructure [2 points].

Include new construction or demolition works undertaken or contracted by the local government for a period of one full calendar year. Infrastructure includes but is not limited to roads and highways, transits, water supply and wastewater treatment plants, public spaces and parks.

Material used must meet at least one of the following sourcing and extraction requirements:

- ▶ **Extended producer responsibility (EPR)** - Products purchased from a manufacturer (producer) that participate in an EPR program or is directly responsible for extended producer responsibility. Products meeting EPR criteria are valued at 50% of their cost for the purpose of credit achievement calculations.
- ▶ **Leadership extraction practices – Material reuse** – Reuse includes salvaged, refurbished or reused materials/products. Materials meeting reuse criteria are valued 200% of their cost for the purpose of credit achievement calculations.
- ▶ **Leadership extraction practices – Recycled content** – Materials meeting recycled content criteria are valued 100% of their cost for the purpose of credit achievement calculations.
 - Recycled content is the sum of postconsumer recycled content plus one half of pre-consumer recycled content, based on weight.
 - The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
- ▶ **Leadership extraction practices – USGBC approved program** – Other USGBC approved program meeting responsible sourcing and extraction criteria.

Reference:

LEED BD+C v4 MR Credit: Building Product Disclosure and Optimization- Sourcing of raw materials.

**Guidance
Behind the Intent**

Raw material extraction and sourcing has a direct environmental impact on ecosystems. This credit encourages the use of products and materials for which life-cycle information is available and that have been extracted and sourced in a responsible manner. Extended producer responsibility programs can close the material loop through a circular economy and promote take-back programs.

In addition to ensuring the responsible sourcing of virgin materials, teams are encouraged to reduce raw material usage by selecting reused and recycled materials. Teams may also adhere to leadership performance standards and certifications that encourage local sourcing. To recognize the rapidly changing marketplace conditions for product and material transparency, this credit has an additional “USGBC-approved program” criterion designed to recognize leadership certification programs that may be developed in the future.

**Further Explanation
Required Documentation**

Documentation	All cities and communities
Total cost of construction (estimated) of infrastructure projects	X
Identification of top three (or five) permanently installed materials and calculations demonstrating these meet the point threshold.	X
Narrative describing sourcing and extraction strategies and potential vendors or sources of materials to meet the specified requirement.	X

Exemplary Performance

Demonstrate that city is using materials meeting one or more of the listed criteria for a minimum of 60% by cost, of the total value of permanently installed top five materials used in infrastructure.

MR Credit: Smart Waste Management Systems

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

Intent

To improve efficiency of the waste management system.

Requirements

CITIES, COMMUNITIES

Provide smart waste management systems using any or both of the following options listed below or adopt the supporting policy to develop smart waste management systems for the city. Points are awarded based on the percentage of total waste generated by the city which is handled by the smart systems.

Table 7. Points for Smart Waste Management

Percentage of total waste generated by the city handled by the smart systems	Points
50%	1
75%	2

Option 1. Pneumatic Transport Systems

- ▶ **Loading Stations-** Design public and private areas with hatches, called loading stations. Two pipes, one for compostable and other for recyclable waste should run parallel underground.
- ▶ **Transport Network-** Design underground transport network with appropriate diameter (500mm) 3-layer Polyethylene pipes. PVC conduits (compressed air and system communication) should run parallel to waste pipes.
- ▶ **Central Waste Handling Facility-** All pipes shall be designed to transfer waste for compaction. Through automated software this waste shall then be directed to proper container, further trucked for recycling.

AND/ OR

Option 2. Smart Bin & Route Optimization

Submit a plan for route optimization for the waste transportation. The plan must include information about sensor bin location and route optimization of waste vehicles moving within the city.

- ▶ **Sensor Bins:** Ultrasonic sensors installed in trash bins to guide fill level of waste and a communication system will transfer this information to the cloud for further processing and analysis.
 - Sensor Bins with Radio frequency identification (RFID) technology for e-waste: Electronic waste bins installed with ultrasonic sensors and RFID technology to automatically identify and track tags attached to products. The tags containing electrically stored information will exchange information between cloud and trucks for disposal or directly for the waste bins where the information from each bin is conveyed to the cloud and product recycling can be eased.

- **Route Optimization:** Information analyzed at the cloud will be processed further and sent to waste vehicle operators to optimize the fleet routing for waste collection.

**Guidance
Behind the Intent**

The world is on a trajectory where waste generation will drastically outpace population growth, by more than double, by 2050.⁵⁴ Although there are improvements and innovations in solid waste management globally, it is a complex issue requiring urgent action. This credit encourages cities to improve the overall efficiency of waste management systems through a comprehensive smart technologies, such as pneumatic transport systems, cloud-based software connected to IoT smart sensors, and smart bin technology.

**Further Explanation
Required Documentation**

Documentation	Option 1	Option 2
Total estimated waste generated from MR Prerequisite Solid Waste Management	X	X
Calculations demonstrating achievement of point threshold.	X	X
Narrative describing pneumatic transport system	X	
Narrative describing Smart bin and route optimization		X

Exemplary Performance

This credit is not eligible for exemplary performance.

⁵⁴ What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>, accessed on December 17, 2018.

QUALITY OF LIFE (QL)

QL Prerequisite: Demographic Assessment

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To describe the population demographics and housing characteristics of the area.

Requirements

CITIES, COMMUNITIES

Provide a comprehensive demographic plan that must include at least following population and housing characteristics:

- Brief history of development, noting critical points of change for the overall area or specific neighborhoods.
- Document current land use.
- Develop plan for relocation and rehabilitation of residing population if any. Address impact on current means of livelihood and provide details on future means of livelihood.
- Age cohorts, including the following categories: Under 18 years, 18 years and over, and 65 years and over.
- Prominent sociocultural groups present, such as migrants, religious groups, and linguistically isolated. Include racial / ethnic composition if applicable.

Guidance

Behind the Intent

New cities and communities aim to attract new people. However, often times there are existing settlements and history associated with the land. This credit serves the dual purpose of examining the social effects of infrastructure projects and other development interventions, as well as planning for the diverse needs of future populations.

Further Explanation

Required Documentation

Documentation	All cities and communities
Narrative describing the demographic assessment	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

QL Prerequisite: Social Infrastructure

This prerequisite applies to

- ▶ Cities
- ▶ Communities

Intent

To provide facilities and services to citizens that help meet their social needs, maximize their potential for development, and enhance community well-being.

Requirements

CITIES, COMMUNITIES

Provide social infrastructure listed below to meet or exceed the baseline requirements.

- ▶ Education: Provide infrastructure facilities for the following education categories:
 - Secondary Education
 - Higher Secondary Education
 - Vocational Training
- ▶ Special Education: Infrastructure requirements to meet special need education, aided education or exceptional education. In addition to above social infrastructure requirements, provide details on adapted equipment and materials, technology and resource room.
- ▶ Skill Development: Training centers for skill development to support local economy.
- ▶ Health Care: Facilities for community health clinics, hospital activities including total bed capacity, medical equipment and diagnostic laboratories.
- ▶ Community Development: Provide sports club/ centers and socio-cultural facilities like public library, senior citizens center and museum for the residential population in the city.
- ▶ Safety and Security: Facilities of police stations and fire station in the city.

Baseline social infrastructure requirement for the city should be built on (i) existing codes, standards or regulatory requirements (ii) published data or (iii) average of a minimum of three projects of similar scope and size operating within the same geographical area or within a geographical area with similar operating conditions.

Guidance

Behind the Intent

Social infrastructure covers a range of services and facilities including health, education, safety and security, community development, recreation, and emergency facilities. Easily-accessible social infrastructure and services directly affect the health and well-being of residents, help build inclusive communities, and improve the livability of the area. This infrastructure provides opportunities for social interaction and integration by offering a platform for people to come together. This credit encourages new cities and communities to plan for social infrastructure to attract new residents to the area.

Further Explanation

Required Documentation

Documentation	All cities and communities
---------------	----------------------------

Table with baseline requirement vis-à-vis actual provided / planned for each of the social infrastructure element	X
Documentation supporting baseline development	X
Master Plan indicating the location of each of the social infrastructure elements	X

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

QL Prerequisite: Economic Growth

This prerequisite applies to

- ▶ Cities

Intent

To encourage development that will drive economic well-being of the residents.

Requirements

CITIES

Develop a comprehensive economic development plan for the city addressing all of the following:

- ▶ Feasibility or market analysis identifying the human capital and mapping it with the economic sectors and clusters.
- ▶ Dedicated land areas and zones for economic activities. Plot size must match the requirements of the specific sector.
- ▶ Provision of sector specific enabling infrastructure by the city governing body. (For example, logistics hub for manufacturing sector)
- ▶ Small economic localization plan to increase local production for local consumption and export

Reference:
STAR V2 EJ-3: Local Economy Action 2

Guidance

Behind the Intent

Cities are the economic engines of most nations, and new cities are built to further economic growth. This credit focuses on this economic aspect of the triple bottom line. It encourages cities to be economically-independent by analyzing and identifying the most appropriate growth sectors. Rather than depending on local businesses in an ad-hoc manner or chasing emerging technologies, a market analysis is required to leverage the existing regional strengths and expand related parts of the value chain to reinforce the cluster and encourage innovation. Concentrating on targeted industry sectors enables local economic development efforts to coordinate with complementary activities and initiatives in the region and align with workforce development strategies.⁵⁵

Further Explanation

Required Documentation

Documentation	All cities
Annotated economic development plan for the city with sections addressing clearly highlighted the feasibility analysis, sector specific enabling infrastructure and economic localization strategies.	X
Annotated map of economic zones and supporting infrastructure	X

⁵⁵ Adopted from STAR Communities V2 Technical Guide EJ-5: Targeted Industry Development

Exemplary Performance

This prerequisite is not eligible for exemplary performance.

QL Credit: Affordable Housing

This credit applies to

- ▶ Cities (2 points)
- ▶ Communities (2 points)

Intent

To provide access to housing at reasonable costs to sections of the society which are in need of assistance.

Requirements

CITIES, COMMUNITIES

Adopt a comprehensive housing policy for the city. The policy must address the following elements:

- ▶ Higher density of residential units closer to transit hubs. Achieve a minimum of two points under *TR Credit Compact, Mixed Use and Transit Oriented Development*.
- ▶ Land policies to ensure equitable balance for housing for all.
- ▶ For housing catering to the lower income groups, define basic socially acceptable standard housing unit based on what is required for decent living. The floor space requirement for standard unit based on building by-laws, regulatory constraints and market conditions. The definition should also include minimum standards for basic amenities (running water, a toilet) as well as access to essential social services such as schools and health clinics. An acceptable housing unit should also place workers no more than an hour's commute from centers of employment.
- ▶ Region specific guidance to developers on value engineering to improve capital productivity and industrial or modular construction techniques to improve labor productivity and shorten delivery time.
- ▶ Housing policies and regulations to support the implementation of strategies.

Guidance

Behind the Intent

Many cities across the globe today struggle with the dual challenges of housing their poorest citizens and providing housing at a reasonable cost for low- and middle-income populations. This credit encourages new cities to proactively plan for the housing needs of lower-income groups. While the definition of affordable housing for these groups can vary among countries and governments, this credit defines affordable housing based on mortgage payments. This credit requires the city to go beyond land policies and look into additional affordability aspects, such as construction practices or value engineering, that can keep housing prices affordable for all income levels.

Further Explanation

Required Documentation

Documentation	All cities and communities
Housing policy for the city highlighting the provision for affordable housing.	X

Exemplary Performance

This credit is not eligible for exemplary performance.

QL Credit: Public Health

This credit applies to

- ▶ Cities (2-6 points)
- ▶ Communities (2-6 points)

Intent

To promote health and wellness in the city.

Requirements

CITIES, COMMUNITIES

1. Outdoor Air Monitoring (2 points)

Monitor and publicly display the outdoor air quality in key residential, commercial, industrial and sensitive areas based on the national or regional air quality monitoring standards. Each monitoring station must monitor air quality data for minimum five pollutants including Ozone (O₃, Particulate Matter (PM_{2.5}, PM₁₀) and any of the three pollutants from - Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO), Ammonia (NH₃), Lead (Pb) or Volatile Organic Compounds (VOCs).

AND/OR

2. Access to healthful food (2 points)

Provide permanent and accessible urban agriculture space of at least 2.5 square feet per capita (0.25 square meter per capita) allocated within all residential zones through one or more of the following (i) Community garden (ii) Edible landscaping with labeled plants and signage containing harvesting guideline (iii) Small farm or orchard (iv) Private garden (v) Rooftop garden.

Areas allocated as Green Spaces under NS Prerequisite: Green Spaces may be used for the purpose of urban agriculture.

OR

Adopt regulation to provide supermarkets or grocery stores selling fresh produce within all residential zones. Within each residential zone, a minimum of 50% of the buildings must have access within 1/4 mile (400 meter) walking distance.

AND/OR

3. Active Lifestyle (2 points)

Provide access to a minimum of two of the following within all residential areas

- Athletic field and/or court.
- Trail network.
- Play space geared toward children (e.g., playground).
- All-weather fitness zone.
- Co-located adult and child physical activity space (e.g., a playground with an adult fitness zone).

Reference:

WELL Community Standard: Physical Activity Spaces

**Guidance
Behind the Intent**

Public health is fundamental to livability, yet the quality of health is profoundly influenced by factors outside the traditional health care system. The social, economic, and physical conditions in which people live, otherwise known as the social determinants of health, affect health-related choices and behaviors. The knowledge and means to avoid toxic exposure and to access healthy food, physical activity opportunities, and safe housing all contribute to an individual’s overall health.⁵⁶ This credit focuses on maintaining healthy outdoor air quality, access to healthful food, and active lifestyles. Fostering health and well-being of citizens is one of the fundamental principles of the rating system.

Further Explanation

Required Documentation

Documentation	Option 1	Option 2	Option 3
Declaration from development authority stating the requirements for outdoor air quality monitoring and display will be met	X		
Map of monitoring stations in residential, commercial, industrial and sensitive areas	X		
Narrative describing potential strategies for publicly display of outdoor air quality	X		
Calculations demonstrating achievement of point threshold for provision of urban agricultural space		X	
Master Plan highlighting location of urban agricultural spaces		X	
Policy, regulation or ordinance to provide supermarkets or grocery stores selling fresh produce within all residential zones. In addition, for each residential zone a minimum of 50% of the buildings must have access to fresh produce within 1/4 mile (400 meter) walking distance.		X	
Master Plan highlighting the location of the active lifestyle elements in each of the residential areas			X

Exemplary Performance

This credit is not eligible for exemplary performance.

⁵⁶ STAR Communities V2 Technical Guide HS-2: Community Health
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QL Credit: Emergency Management and Response

This credit applies to

- ▶ Cities (2 points)
- ▶ Communities (2 points)

Intent

To create sufficient capacity and capability to respond to emergency incidents and reduce its impact on human life/health.

Requirements

CITIES, COMMUNITIES

Design the emergency management systems such that the emergency response time meets the National Fire Protection Association (NFPA)⁵⁷ 1710 and 1720 requirement of response time to be within 9 minutes of the dispatch notification or local, state or national equivalent for each of the following emergencies:

- ▶ Fire
- ▶ Medical
- ▶ Police
- ▶ Special circumstances or operations as relevant for the city.

Guidance

Behind the Intent

This credit requires planning to ensure high-quality and adequate emergency response systems are in place to respond during and immediately after emergency events take place. This credit affects and informs the planning decisions for facilities such as fire stations, police stations, and hospitals. The objective is closely aligned with that of NS Credit Resilience Planning. However, this credit focuses on individual and community-specific emergencies, while the latter targets broader city-wide events.

Further Explanation

Required Documentation

Documentation	All cities and communities
Narrative describing the emergency management system	X

⁵⁷ NFPA 1710- 2016, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1710>

Exemplary Performance

This credit is not eligible for exemplary performance.

INNOVATION (IN)

IN Credit: Innovation

This credit applies to

- ▶ Cities (1-6 points)
- ▶ Communities (1-6 points)

Intent

To encourage cities to achieve exceptional or innovative performance.

Requirements

One point is awarded for each Innovation credit achieved, up to a maximum of six. A city or community may use any combination of the options below. Each option is equivalent to one point.

Option 1. Achieve significant, measurable environmental performance using a strategy not addressed in the LEED for Cities and Communities rating system.

Identify all of the following:

- Intent of the proposed innovation credit
- Proposed requirements for compliance
- Proposed submittals to demonstrate compliance
- Design approach or strategies used to meet the requirements.

AND / OR

Option 2. Achieve exemplary performance in any of the LEED for Cities and Communities prerequisite or credit. An exemplary performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.

AND / OR

Option 3. Meet all of the requirements of a prerequisite or credit from any of the below rating systems at the city or utility level:

- STAR Community Rating System v2, October 2016
- LEED v4 for Neighborhood Development, July 2017
- PEER Rating System v2, February 2018
- LEED for Transit

Guidance

Behind the Intent

Sustainable design is spurred forward by innovative strategies, as well as exceptional efforts that go beyond minimum thresholds. When cities innovate and go beyond LEED requirements, they not only achieve measurable environmental benefits beyond those specified by the LEED rating system, but also have the opportunity to explore cutting-edge pilot credits and contribute to the development of future LEED credits. When cities or communities can demonstrate that they exceeds the standard level of performance associated with one or more LEED credits, their innovation can inspire and motivate other teams in the future.

Further Explanation

Required Documentation

Documentation	Option 1	Option 2	Option 3
Proposed credit language, including intent of the proposed innovation credit, proposed requirements for compliance and proposed submittals to demonstrate compliance	X		
Documentation to support the design approach or strategies used to meet the requirements	X		
Identify the LEED for Cities and Communities prerequisite or credit for exemplary performance		X	
Identify the credit and provide all supporting documentation as per the specific rating system prerequisite or credit requirement			X

REGIONAL PRIORITY (RP)

RP Credit: Regional Priority

This credit applies to

- ▶ Cities (1-4 points)
- ▶ Communities (1-4 points)

Intent

To provide an incentive for the achievement of credits that address geographically specific socio-economic and environmental priorities,

Requirements

Option 1: One point is awarded for each Regional Priority credit achieved, up to a maximum of four.

- ▶ Identify the credit which is a regional priority.
- ▶ Provide Background and context outlining the regional priority.
- ▶ Achieve the full points for respective LEED for Cities and Communities credit.

AND/OR

Option 2. Achieve significant, measurable environmental performance for a regional priority using a strategy not addressed in the LEED for Cities and Communities rating system.

Identify all of the following:

- ▶ Intent of the proposed regional priority credit
- ▶ Provide Background and context outlining the regional priority.
- ▶ Proposed requirements for compliance
- ▶ Proposed submittals to demonstrate compliance
- ▶ Design approach or strategies used to meet the requirements.

Guidance

Behind the Intent

LEED cities and communities exist in diverse contexts. Climate, population density, and local regulations can differ significantly from one location to another, making certain environmental issues more critical than others. Examples include water conservation in arid climates versus rainwater management in wet climates. LEED cities and communities can be more transformative if teams recognize their location's priority environmental issues and address them through design, construction, and operation choices. LEED encourages a focus on regional issues through Regional Priority credits—existing LEED credits that USGBC volunteers around the world have determined to be especially important in a given area and result in a bonus point if achieved.

Required Documentation

Documentation	Option 1	Option 2
Narrative providing background and context outlining the regional priority for the identified credit.	X	
Credit write up including intent of the proposed innovation credit, proposed requirements for compliance and proposed submittals to demonstrate compliance		X
Narrative providing background and context outlining the regional priority for the identified credit.		X
Documentation to support the design approach or strategies used to meet the requirements		X

Appendices

APPENDIX 1. DIVERSE USES

List of Diverse Uses

Category	Use type
Food retail	Supermarket
	Grocery with produce section
Community-serving retail	Convenience store
	Farmers market
	Hardware store
	Pharmacy
	Other retail
Services	Bank
	Family entertainment venue (e.g., theater, sports)
	Gym, health club, exercise studio
	Hair care
	Laundry, dry cleaner
	Restaurant, café, diner (excluding those with only drive-thru service)
Civic and community facilities	Adult or senior care (licensed)
	Child care (licensed)
	Community or recreation center
	Cultural arts facility (museum, performing arts)
	Education facility (e.g., K–12 school, university, adult education center, vocational school, community college)
	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
Open community spaces such as squares and plazas	

APPENDIX 2. LT CREDIT: INTERMODAL CONNECTIVITY AND PLACEMAKING

(LEED v4 BD+C TRANSIT)

1-4 points

Intent

To encourage development in locations shown to have multimodal transportation choices or otherwise reduced motor vehicle use, thereby reducing greenhouse gas emissions, air pollution, and other environmental and public health harms associated with motor vehicle use.

Requirements

Option 1. Transit for Placemaking

Ensure that the station displays characteristics that will integrate a mixture of uses to connect people and places and maximize utilization (1-3 points)

- ▶ Walkable Streets
- ▶ Compact Development
- ▶ Public Spaces and Cultural Opportunities
- ▶ Mixed Use

Table 1. Points for Placemaking Characteristics

Number of placemaking characteristics displayed by station	Points
1 characteristic	1
2 characteristics	2
3-characteristics	3
4-characteristics	4

AND/OR

Option 2. Transit for People-moving: Intermodal Connections (1-4 points)

Ensure that the station is connected to three or more other modes of transportation and includes at least 3 of 8 of the following intermodal connectivity features:

- ▶ Three or more bus routes at station
- ▶ Minimum of four short-term bicycle storage spaces at station
- ▶ Minimum two long-term bicycle storage spaces or valet at station or policies to allow bicycles on transit systems
- ▶ Vehicle parking at station with carpool services provided
- ▶ Airport within one connection and total transit travel time of less than . . . 1.5 hours
- ▶ Regional or commuter rail within one connection and total transit travel time of less than . . . 1 hour
- ▶ Ferry within one connection
- ▶ Designated passenger drop off area

Table 2. Points for intermodal connections

Number of modal connections offered at station	Points
3 connections	1
4 connections	2
5 connections	3
6+ connections	4

APPENDIX 3. SLL CREDIT: BROWNFIELD REMEDIATION

(LEED v4 ND)

1-2 points

This credit applies to

- ▶ Neighborhood Development Plan
- ▶ Neighborhood Development

Intent

To encourage the cleanup of contaminated lands and developing sites that have been identified as contaminated.

Requirements

ND PLAN, ND (SLL)

Option 1. Brownfield Site (1 point)

At a project site identified as a brownfield or where soil or groundwater contamination has been identified, and the local, state, or national authority (whichever has jurisdiction) requires its remediation, perform remediation to the satisfaction of that authority.

OR

Option 2. High-Priority Redevelopment Area (2 points)

Achieve the requirements in Option 1.

AND

Locate the project in one of the following high-priority redevelopment areas:

- ▶ EPA National Priorities List
- ▶ Federal Empowerment Zone
- ▶ Federal Enterprise Community
- ▶ Federal Renewal Community
- ▶ Department of the Treasury Community Development Financial Institutions Fund Qualified Low-Income Community (a subset of the New Markets Tax Credit Program)
- ▶ U.S. Department of Housing and Urban Development's Qualified Census Tract (QCT) or Difficult Development Area (DDA)
- ▶ Or a local equivalent program administered at the national level for projects outside the U.S.