LEED V4 TRAINING PROGRAM

SUSTAINABLE SITES

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1

SS- SUSTAINABLE SITES

TITLE				D/C	POINT
SS	PREREQUISITE	1	PREVENTION OF CONSTRUCTION POLLUTION	C	PREREQUISITE
SS	PREREQUISITE	2	ENVIRONMENTAL IMPACT ASSESSMENT OF THE LAND	D	PREREQUISITE
SS	CREDIT	1	LAND ASSESSMENT	D	1
SS	CREDIT	2	LAND DEVELOPMENT - PROTECTING AND RESTORING NATURAL LIFE	D	1
SS	CREDIT	3	OPEN SPACES	D	1
SS	CREDIT	4	RAINWATER MANAGEMENT	D	2
SS	CREDIT	5	REDUCTION OF HEAT ISLAND EFFECT	D	1
SS	CREDIT	6	REDUCTION OF LIGHT POLLUTION	D	1
SS	CREDIT	7	RESTING AREAS - HOSPITALS	D	1
SS	CREDIT	8	DIRECT ACCESS TO OUTDOOR AREAS - HOSPITALS	D	1

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2

SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

OBJECTIVE

- The aim is to create and implement an Erosion and Sediment Control (ESC) plan in accordance with the 2017 EPA Construction General Permit or, if more stringent, local codes (regulations).
- The ESC Plan Contents include:
- Preventing soil eroded due to rainwater or wind during construction,
- Preventing sedimentation in drainage channels and receiving water environments,
- Measures to prevent air pollution caused by dust and particulate matter generated during construction must be included.

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3

SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

AMAÇ

2017 EPA Construction General Permit (Yapı Genel İzni'ne) veya daha zorlayıcı ise yerel kodlara (yönetmelik) uygun olarak Erozyon ve Sedimentasyon Kontrol (ESC) planını oluşturmak ve uygulamak amaçtır.

ESC Plan İçeriğinde:

- İnşaat sırasında çıkan toprağın, yağmur suyu veya rüzgar nedeniyle erozyona uğramasını önleme,
- Akış suyu kanallarında ve alıcı su ortamında sedimentasyonu önleme,
- İnşaat sırasında oluşacak toz ve partikül kaynaklı hava kirliliğini önleme tedbirleri yer almalıdır.

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4

SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

REQUIREMENTS

- Preventing the soil generated during construction from eroding due to rainwater or wind, preventing sedimentation in flow water channels and receiving water environments, and preventing air pollution caused by dust and particulate sources during construction is mandatory regardless of the project's size. It is necessary to create and implement an Erosion and Sedimentation Control (ESC) Plan at all project sites.
- Stabilization:
- Temporary and Permanent Planting
- Covering the soil with dry grass - Mulching
- Structural Control:
- Soil Barrier
- Silt Fence that prevents fine sand intrusion
- Sediment trap
- Settling pond

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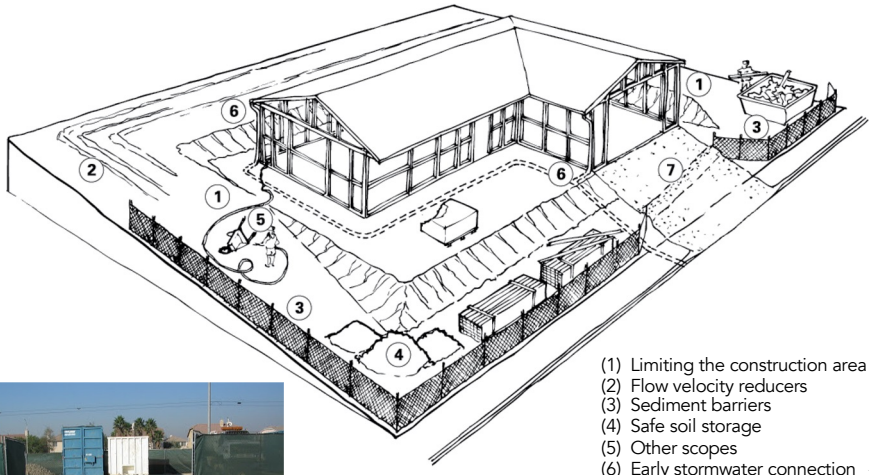
5

SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

REQUIREMENTS

- Copy of the project draft documenting the Erosion and Sedimentation Control Plan (ESC) monitoring measurements.
- Stamped drafts of the applications, inspection records, and reports
- Report explaining the corrective actions taken.



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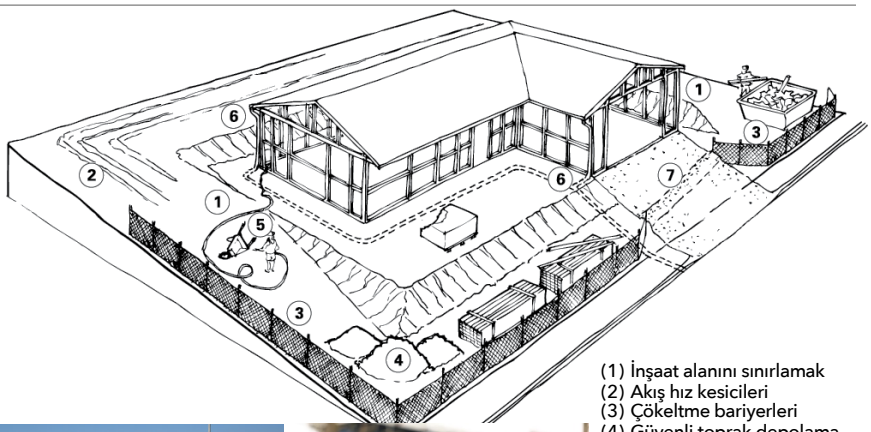
6

SS ÖNKOŞUL 1: İNŞAAT KİRLİLİĞİNİN ÖNLENMESİ

GEREKLİLİKLER

- Erozyon ve Sedimantasyon Kontrol Planı (ESC) kontrol ölçümlerini belgeleyen proje taslağının kopyası.
- Uygulamaların tarih damgalı taslakları, denetim kayıtları ve raporlar
- Alınan düzeltici önlemleri açıklayan rapor.



(1) İnşaat alanını sınırlamak
(2) Akış hız kesicileri
(3) Çökeltme bariyerleri
(4) Güvenli toprak depolama
(5) Diğer kapsamlar
(6) Erken yağmursuyu bağlantısı
(7) Kontrollü inşaat girişi

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SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

NECESSARY DOCUMENTS

Documents	Projects using the 2012 EPA CGP	Projects using Local Standards and Regulations
Documents demonstrating compliance with EPA CGP (Construction General Permit)	✓	
For zero lot line projects and Projects with minimal or no Outfall Construction Work: Identification of special circumstances and measurable ESC criteria compliance statuses	✓	✓
Comparison of Local Standards and Regulations with EPA CGP		✓
Definition of how the project complies with Local Standards and Regulations		✓
Drawings of implemented Erosion and Sedimentation Control Measures		✓
Written declarations obtained from the contractor implementing the plan or Dated and stamped Photographs or Description of the Implemented Plan.		✓

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8

SS PREREQUISITE 1: PREVENTION OF CONSTRUCTION POLLUTION

LEED V4.1 REFERENCES REFERENCE STANDARDS

- The 2012 EPA Construction General Permit has changed to the 2017 EPA Construction General Permit.
- Local Regulations (if more stringent)
- Regulations related to groundwater. (NPDES)

DIFFERENCES FROM LEED V3 2009

- The EPA CGP referenced has been updated from 2003 to 2012.
- The year/version change now imposes requirements for compliance with NPDES (National Pollutant Discharge Elimination Systems Stormwater Management) regulations for project areas larger than 1 acre.

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9

SS PREREQUISITE 2: ENVIRONMENTAL IMPACT ASSESSMENT OF THE LAND

OBJECTIVE

- The aim is to determine whether the land has been previously polluted and to rehabilitate the contaminated land to protect the health of patients and students, meaning its cleaning.
- Content:
- Phase I Environmental Assessment of the Land (ASTM E 1527-05) (ASTM E 1527-13)
- Phase II Environmental Assessment of the Land when hazardous waste is detected or suspected:
- Places that were previously used as landfill sites are not suitable for school and hospital land.
- Contaminated land must be rehabilitated.
- The rehabilitation of the land must be documented according to national or local regulations. (ASTM E 1903-11)

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10

SS PREREQUISITE 2: ENVIRONMENTAL IMPACT ASSESSMENT OF THE SITE

REQUIREMENTS

- Examination of historical records containing national and local data related to the site
- Conducting on-site observations for the identification of possible hazardous waste on the site
- Interviews with individuals knowledgeable about the history of the site
- Preparation of a report containing analysis and results
- Review of executive summaries related to the studies conducted in land assessment
- Completion of pollution remediation activities
- Preparation of official documents indicating that the remediation activities have been completed (EPA-Ready for Use Document, etc.).

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11

SS PREREQUISITE 2: ENVIRONMENTAL IMPACT ASSESSMENT OF THE SITE

REFERENCE STANDARDS

- ASTM E 1527-05 Phase I Environmental Site Assessment (ESA) (Phase I Environmental Assessment) has been replaced by ASTM E 1527-13.
- ASTM E 1903-11 Phase II Environmental Site Assessment (ESA) (Phase II Environmental Assessment), or,
- Specified national or local standards

DIFFERENCES FROM LEED v3 2009

- LEED v4 does not include any new additions to the existing ASTM guidelines.

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12

SS CREDIT 1: LAND ASSESSMENT

OBJECTIVE

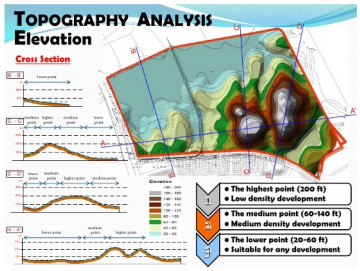
Before the design phase, it is necessary to evaluate the land conditions, develop sustainable options, and provide information related to site design.

Below, a comprehensive field study and evaluation with specified details and content must be conducted and reported:

Topography: Slope map, unique topographic features, extraction of slope stability risks.

Hydrology: Flood hazard areas, identified wetlands, lakes, rivers, coasts, rainwater harvesting and reuse opportunities, determining the initial water storage capacity of the site according to TR-55 standards.

A comparable local standard may be used for projects outside the USA



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13

SS CREDIT 1: LAND ASSESSMENT

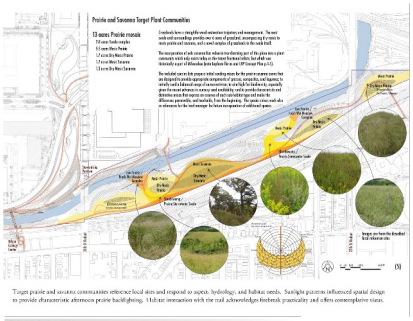
REQUIREMENTS

Climate: Reporting on sun exposure, heat island effect potential, seasonal sun angles, prevailing wind directions, monthly precipitation and temperature curves/variations. (Shading options have been added)

Vegetation: Primary vegetation types, green spaces (untouched areas), significant tree maps, endangered or endemic species, singular/unique habitat areas, and identification of invasive plant species.

Soil Structure: Soil assessments by the Natural Resources Conservation Service, primary agricultural soils by the U.S. Department of Agriculture, healthy soils (suitable for organic farming/non-polluted), previous developments, identification of degraded soils. Local equivalent standards may be used for projects outside the U.S.

Human Uses: Identification of vistas, nearby transport options and infrastructure, neighboring properties, and construction materials with existing recycling or reuse opportunities.



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14

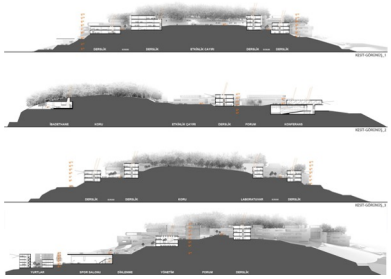
SS CREDIT 1: LAND ASSESSMENT

REQUIREMENTS

Human Health Effects: Identifying proximity to vulnerable populations, opportunities for physical activity on neighboring parcels, and proximity to significant sources of air pollution.

The research or assessment report should demonstrate the relationships between the current characteristics of the area and the topics listed above.

This Land Assessment Report should also reveal how the identified local features affect the project design and the reasons for this.



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15

SS CREDIT 1: LAND ASSESSMENT

REQUIRED DOCUMENTS

Documents	All Projects
Field Research or Assessment Plan or Map	✓
Field Assessment Forms or Summary Tables	✓

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16

SS CREDIT 1: LAND ASESSMENT

REFERENCE STANDARDS

- ASTM E 1527-05 Phase I Environmental Site Assessment (ESA)
- ASTM E 1903-11 Phase II Environmental Site Assessment (ESA) or,
- 40 CFR Part 312: Standards and Practice for All Appropriate Inquiries; Final Rule: Natural Resources Conservation Service, web soil survey
- TR-55 initial water storage capacity
- Established national or local standards

DIFFERENCES FROM LEED V3 2009

- This is a new credit title.

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17

SS CREDITS 2: TO PROTECT AND RENEW NATURAL LIFE

OBJECTIVE

The aim is to ensure the preservation of existing natural habitats and the restoration of damaged areas to conserve habitats in the project and promote biodiversity.

If there are previously unused green status areas in the project area, measures must be taken to protect 40% of the remaining natural and green areas in the project area.

Habitats and natural living areas located in the project areas should be protected, and projects should be planned in a manner that respects these habitats.

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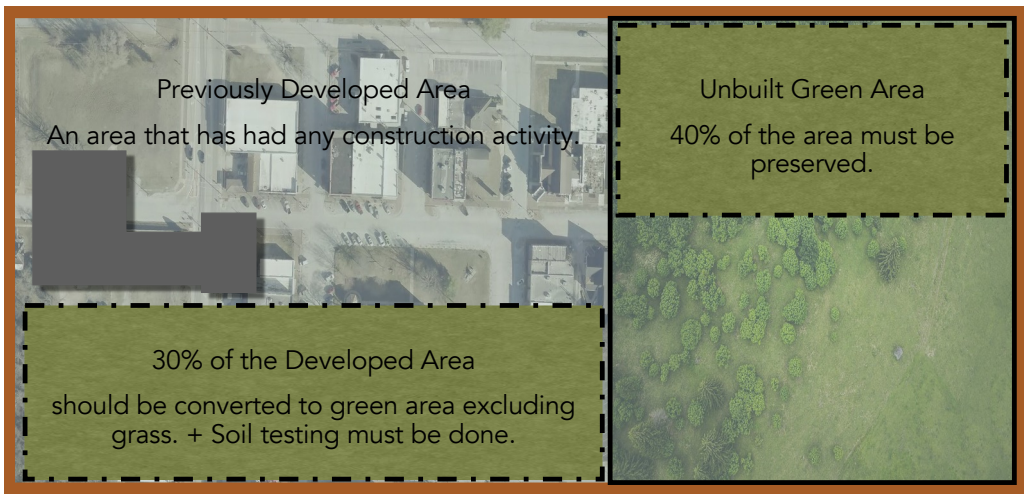
18

SS CREDIT 2: PROTECTING AND RENEWING NATURAL LIFE



Entire Project Area

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19

SS CREDIT 2: PRESERVING AND RENEWING NATURAL HABITATS

REQUIREMENTS

- Option 1: On-site Restoration (2 points for non-hospital projects, 1 point for hospital projects)
- It is necessary to vegetate 30% of the entire area previously shown as developed (including the building's footprint) using natural and adapted plant species. In projects that have achieved a density of 1.5 Floor Area Ratio, green roof areas may be considered if they are made with natural and adaptive plant species that provide habitat and promote biodiversity.
- All disturbed and collected soils within the project boundaries must be restored and re-vegetated in accordance with the requirements below.
- Soils must be reused for their original OBJECTIVEs, even if they were relocated from another site.
- Imported topsoil or soil mixtures should again be designed to be used as topsoil and must not contain the following materials:
- According to the web soil survey conducted by the Department of Natural Resources Conservation, in regionally defined soils (or according to local regulations for projects outside the U.S.), primary agricultural land, unique/individual agricultural lands, or agricultural soils of national significance; or;
- Soils brought from other green areas but coming as a by-product from previously developed areas.

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20

SS CREDIT 2: PROTECTING AND RENEWING NATURAL HABITATS

REQUIREMENTS

Option 1: On-Site Restoration

Restored soils must meet the standards in categories 1-3 of the reference list or be selected according to the standards in categories 4-5:

Organic materials

Compaction

Infiltration Rates (Water permeability rates)

Soil's Biological Function

Soil's Chemical Properties

Note: Project teams may exclude vegetated landscape areas. Because these areas need to prevent mixing of plants and soil while conducting rainwater infiltration. Therefore, it is necessary to assess these areas under the SS Rainwater Management Credit title and take infiltration measures in accordance with these requirements.

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21

SS CREDIT 2: PROTECTING AND RENEWING NATURAL HABITATS

REQUIREMENTS

Option 2. Financial Support (1 point)

For the total project area (including building footprint), a minimum of $0.40 per square foot ($0.20) ($4 per square meter) or an equivalent amount of financial support must be provided.

Financial support must be provided to a national or local land trust or a conservation organization (same as EPA Level III Ecological Region or project area definition). (For projects outside the USA, settlements located within 100 miles - 160 km of the project boundary) For US projects, these land trusts must be accredited by the Land Trust Alliance.

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22

SS CREDIT 2: PROTECTING AND RENEWING NATURAL HABITAT

REQUIRED DOCUMENTS

Documents	All Projects	Option 1	Option 2
Green Area Calculations	✓		
Definition of Green Area Protections (if applicable)	✓		
Calculation of Natural and Adapted Vegetation		✓	
Site Plan showing project boundary, building footprint area, protected green areas (if any), previously developed areas, restored areas, natural and adapted vegetation, plant species, other ecologically suitable features and other relevant site characteristics.		✓	
Identification of areas to be re-vegetated that are degraded or compacted		✓	
Reference soil characteristics and soil analysis results		✓	
Financing Support Calculations			✓
Agreement made with the land cooperative and conservation organization			✓
For US Projects: A letter indicating the accreditation of the land cooperative			✓
For projects outside the US: Documents proving that the conservation organization is nationally or locally recognized and meets these conditions			✓

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23

SS CREDIT 2: PROTECTING AND RESTORING NATURAL LIFE

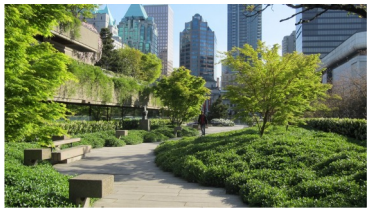
REFERENCE STANDARDS

- U.S. EPA Ecoregions
- Land Trust Alliance accreditation
- Natural Resources Conservation Service, web soil survey
- Sustainable Sites Initiative (SITES™)

DIFFERENCES FROM LEED V3 2009

- In the event of negativities, the necessary actions to be taken, conservation and restoration requirements have been replaced.
- The soil requirements have been replaced by degraded and compacted soils.
- The option outside the site has been replaced by financial support.





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24

SS CREDIT 3: OPEN SPACES

OBJECTIVE

The primary goal is to create open spaces in outdoor environments and thus support the environment, social relationships, passive recreation, and physical activities.

At least 30% of the total project area (including building footprint) should be provided as outdoor open space.

At least 25% of the open space must be planted (grass planting is not considered) or shaded with canopies that are covered with vegetation.

25

SS CREDIT 3: OPEN SPACES

REQUIREMENTS

- Open spaces must be physically accessible and should include one or more of the following:
- Green areas equipped with surface materials or physical site elements promoting outdoor social activities for pedestrians;
- Green areas equipped with surface materials or physical site elements promoting physical activities and recreation;
- Garden arrangements equipped with different types and varieties of plants that provide visual scenery throughout the year;
- Garden areas designated for Urban Agriculture or Community Gardens (Community Garden, City Farm);
- Protected or created habitats - which must meet the requirements of the Sustainable Sites (SS) Development Credit - and involve human relationships.

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26

SS CREDIT 3: OPEN SPACES

STRATEGIES

- Open spaces must be physically accessible and should be one or more of the following:
- For projects achieving a Floor Area Ratio (FAR) of 1.5, physically accessible external or internal vegetated roof applications (green roofs) can be used to meet 25% of the vegetation requirement, and roof-based physically accessible surface areas can also be utilized to satisfy credit requirements.
- Wetlands and naturally designed ponds can also be counted as open spaces if the average slope of the area achieves a ratio of 1:4 (vertical:horizontal) and is vegetated.
- If the projects are part of a multi-tenant complex; criteria for open spaces are met only by spaces adjacent to the building or in another location within the site plan that have been preserved from development. If the open spaces are not adjacent to the building, documentation is required to prove that they are areas in their natural state or areas that have been restored to their natural condition and preserved for the building's lifespan.

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27

SS CREDIT 3: OPEN SPACES

REQUIRED DOCUMENTS

Documents	All Projects	Projects with Green Roof Applications
Site Plan showing the Project Area boundary, master plan or campus boundary (if applicable) Here, the project location and open space sizes, planted areas, plant types, wetlands or artificial ponds, and the locations of green roof applications should be indicated.	✓	
Open Space and Planting Area Calculations	✓	
Definition of how physical access to open spaces is provided and demonstration of how area types are addressed	✓	
Ground Area Ratio		✓

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28

SS CREDIT 3: OPEN SPACES

REFERENCE STANDARDS

- This credit is not tied to the existence of a local regulation or ordinance.
- The same open space criteria will be applied to all projects.

DIFFERENCES FROM LEED V3 2009

- This credit is not tied to the existence of a local regulation or ordinance. The same open space criteria will be applied to all projects.
- The content of the credit has been revised to focus on the quality of green space in addition to its quantity.
- The content of the credit has been altered to support physical connectivity to open spaces, and the emphasis on biodiversity issues (this topic is covered under the Sustainable Sites (SS) Land Development-Habitat Preservation or Restoration Credit title) has been reduced.
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29

SS CREDIT 3: OPEN SPACES

LEED V4.1 CHANGES

- It is required to green the area with at least two or more plant species in areas that are 25% required to be greened.
- The term green area has been changed to landscape area in all previous statements.

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30

SS CREDIT 4: STORMWATER MANAGEMENT

OBJECTIVE

The main OBJECTIVE is to reduce the amount of runoff water by enhancing the natural hydrology and water balance of the area and to improve water quality.

This study should be based on the historical conditions of the area and the underdeveloped

Rainwater harvesting systems show diversity. Project design, land use, and capacity needs generally involve underground storage.

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31

SS CREDIT 4: STORMWATER MANAGEMENT

REQUIREMENTS

Option 1: Percentage of Rainwater Amounts

Path 1: 95% (2 points for all projects, 1 point for Hospitals)

The best method to enhance the natural area hydrology is to manage the regional and local rainwater runoff amounts coming from the developed side of the site at a rate of 95% using Low Impact Development (LID) and Green Infrastructure (GI) systems.

To calculate the 95% rainfall percentage, it is necessary to use the daily rainfall amounts from the EPA and the methodology in Section 438 of the Stormwater Runoff Control Technical Specification for Federal Projects.

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32

SS CREDIT 4: STORMWATER MANAGEMENT

REQUIREMENTS

Path 2: % 98 (3 points for projects outside Hospitals, 2 points for Hospitals)

It is necessary to use LID and green infrastructure strategies to achieve the percentage on the path and to capture the %98 ratio in regional and local rainfall.

OR

Path 3: Zero Lot Line Projects- %85 (3 points for projects outside Hospitals, 2 points for Hospitals)

Minimum density should be 1.5 FAR. The best method to replicate Natural Area Hydrology is to manage the regional and local rainfall runoff amounts coming from the developed side of the site at a rate of %85 using low impact development (LID) and Green infrastructure systems.

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33

SS CREDIT 4: STORMWATER MANAGEMENT

REQUIREMENTS

Option 2: Natural Vegetation Cover Conditions 3 points for a non-hospital setting, 2 points for hospitals

To manage the increase in annual stormwater runoff, it is necessary to restore natural soil cover to its pre-construction condition.

For projects that are part of Multi-Tenant Complexes only;

Credit requirements can be met with a coordinated approach affecting the defined project within the Master Plan Boundaries. Distribution techniques should be based on the site's watershed boundaries.

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34

SS CREDIT 4: STORMWATER MANAGEMENT

REQUIRED DOCUMENTS

Documents	All Projects	Option 1, Route 3.	Option 2
Stormwater Data	✓		
Calculates the amount of stormwater or for the selected stormwater flow	✓		
Stormwater runoff calculations	✓		
Plans, Detailed Drawings or Cross Sections showing topography, stormwater flow directions, and the location and condition of each usage, as well as explaining the GI and LID strategies used	✓		
Project forms showing measures taken for GI and LID	✓		
Calculations managed by GI or LID strategies for the volume of runoff	✓		
Explanation of why the 10-year rainfall data for the project site is not available (if applicable)	✓		
Definition of the conditions that zero out the project to the parcel		✓	
Lot Coverage Ratio		✓	
Documents showing the natural soil vegetation			✓
For Multi-Tenant Projects: Summary of the methodology in the center and description of other related techniques	✓		

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35

CREDIT SS 4: RAINWATER MANAGEMENT

REFERENCE STANDARDS

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

DIFFERENCES FROM LEED V3 2009

- Rainwater Quality and Quantity Management Credit Categories have been combined under a single credit category titled "Rainwater Management."
- Projects should use Green Infrastructure (GI) and Low Impact Development (LID) rainwater management techniques on-site.
- A specific operational model should be developed to reduce rainwater quantity in zero-lot urban development projects.
- Methods developed for multi-tenant complexes should be expanded for all retail projects.
- The evaluation of whether the total rainwater runoff quantity captures 95% of the rainwater runoff rate should be compared not with annual or biannual rainfall events but against regional and local rainwater values.

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36

SSC CREDIT 4: STORMWATER MANAGEMENT

LEED V4.1 CHANGES

Using low-impact development (LID) practices, polluted runoff from impervious surfaces (e.g. driveways, parking areas, service yards, landfill sites) should be subject to cleaning processes.

In Option 1: In all projects, the use of coal tar sealants is prohibited in all practices while collecting stormwater, wash water, condensate, irrigation water, and water arising from snowmelt.

Examples of acceptable techniques include:

- the establishment of rain gardens with natural or adapted plant materials (e.g., shrubs);
- the creation of a green roof with vegetation;
- the use of permeable surface materials (e.g., permeable paving stones, engineered products), a base layer designed to drain water away from the building, and (typically) a sub-base that is 6 inches deep (150 millimeters); and
- the establishment of permanent infiltration or retention features (e.g., vegetated swale, rain garden, rainwater harvesting) that can retain at least 100% of the flow and 80% of regional or local rainfall events.

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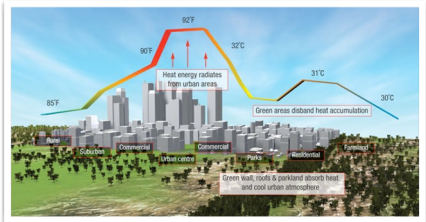
37

SS CREDIT 5: REDUCING HEAT ISLAND EFFECT

OBJECTIVE

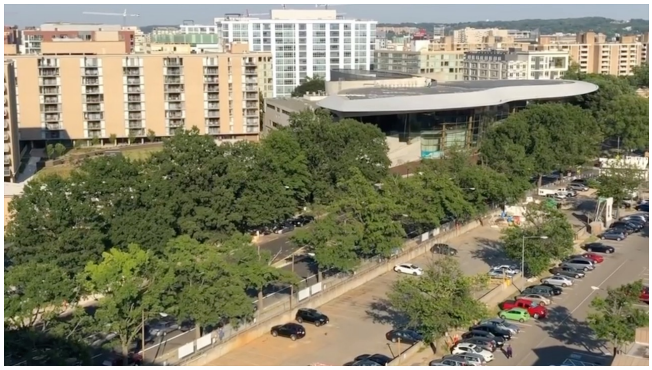


The main OBJECTIVE is to prevent the negative effects of heat island formation on the environment (micro climates), humans, and wildlife by reducing such formations.

The heat island effect is one of the major urban planning problems of the 2000s. All major metropolises in the world are producing policies related to urban heat.

These policies reduce cooling loads within the city while creating suitable living and climatic conditions for all living beings.

The heat island effect is one of the most important problems in cities. It destroys the ecological life in the city and causes excessive energy consumption between 20-25% in urban areas.



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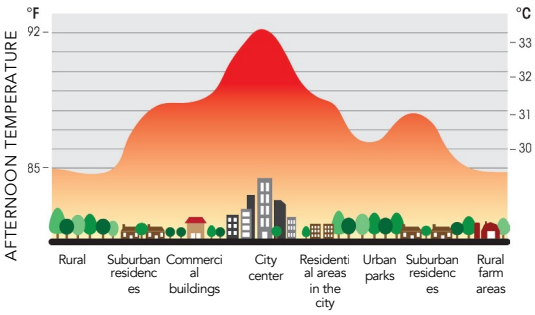
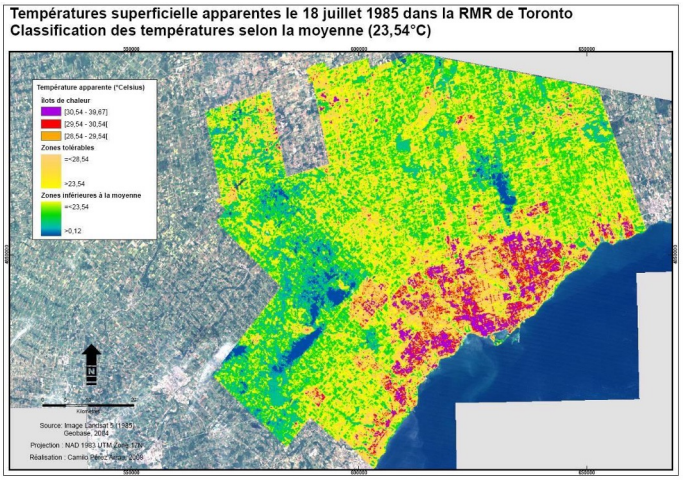
38

SS CREDIT 5: REDUCING HEAT ISLAND EFFECT

Example Application:

Measurements taken in 1985 showed that there was a high heat island effect in the southern and coastal areas of Toronto, and the city administration aimed to address the problem through certain building and facade material selection decisions.





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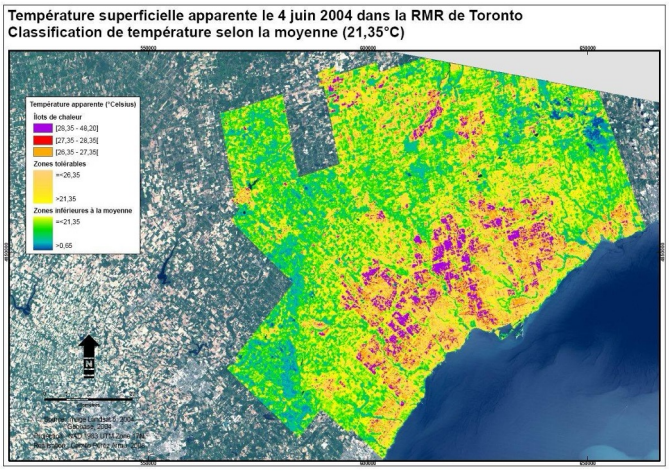
39

SS CREDIT 5: REDUCING THE URBAN HEAT ISLAND EFFECT

Sample Application:

Measurements taken in 2004 show that the urban heat island effect has largely been reduced in the southern and coastal areas of Toronto.
The increase in energy consumption due to the heat island effect in cities can reach rates of 20-25%.



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40

SS CREDIT 5: REDUCING HEAT ISLAND EFFECT

REQUIREMENTS

Option 1: On Roof Exteriors and Roof Surfaces;

2 points for non-hospitals, 1 point for hospitals

The following criterion must be met:

Alternatively, SRI and SR weighted average method can be used. Any combination of a few of the following strategies should be used for calculations.

Roof Exterior Areas		High Reflectance Roof Area		Green/Vegetated Roof Area		Total Covered Surface Area		Total Roof Area
————	+	————	+	————	≥		+	
0.5		0.75		0.75				

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41

SS CREDIT 5: REDUCING THE HEAT ISLAND EFFECT

EXTERNAL ROOF STRATEGIES

- Paved areas with hard surfaces (including children's play areas) must be shaded with existing plant cover or plants that will provide shade for 10 years. Potted plants can be utilized. Planting must be completed by the date the occupancy permit is obtained, and it must not contain any grass.
- Shading must be provided by renewable energy sources such as solar panels and wind turbines.
- Shading must be achieved through architectural elements and architectural structures with a 3-year solar reflectance index value of at least 0.28. If the 3-year SRI value cannot be met, materials with a minimum starting SRI value of 0.33 must be used.
- Shading must be provided with vegetated elements.
- Paving materials with a 3-year Solar Reflectance Index value of at least 0.28 must be used. If 3-year values are not available, materials with a minimum initial solar reflectance value of 0.33 must be used.
- Impervious surfaces must utilize Open-Lattice Paving Systems. (Pavers that are at least 50% permeable/voids)

Color	Solar Refl.	SRI
Uncolored Concrete	0.44	47
Willow Green	0.46	52
Palomino	0.44	47
Sangria	0.43	47
Sunset Rose	0.43	46
Sequoia Sand	0.42	45
Terra Cotta	0.41	44
Salmon	0.42	44
San Diego Buff	0.41	44
Mesa Buff	0.41	43
Sandstone	0.41	43

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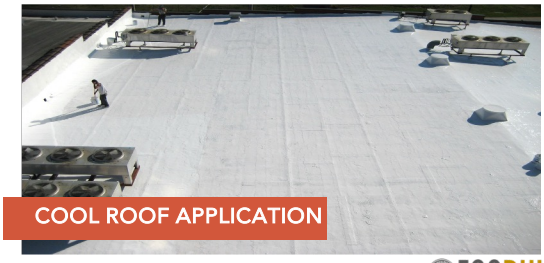
42

SS CREDIT 5: REDUCING HEAT ISLAND EFFECT

ROOF STRATEGIES

- High Reflective Roofs:
- Roofing materials with SRI values equal to or higher than those in Table 1 should be used. The 3-year SRI value criterion must be met.
- If this value cannot be met, the initial SRI value criterion of the material should be used and should comply with it.
- Planted Green Roof:
- Planted Green roof application should be implemented in suitable locations.

Roof Slope	Slope	Initial SRI	3-year SRI
Low Slope Roofs	≤ 2:12	82	64
Steep Slope Roofs	> 2:12	39	32



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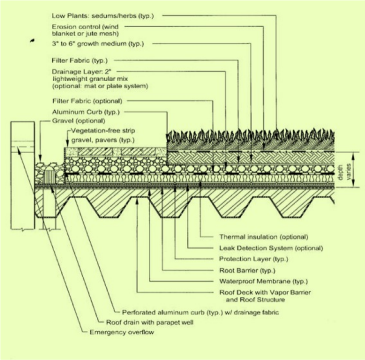
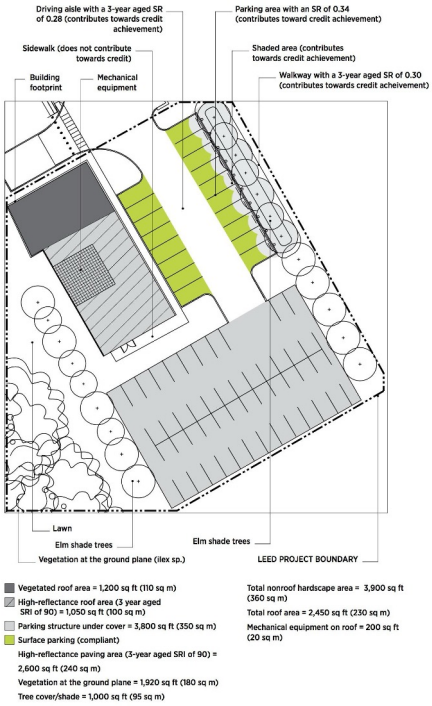
43

SS CREDIT 5: REDUCING HEAT ISLAND E

ROOF STRATEGIES

- Using materials with high SRI values on roofs
- Implementing green roof applications
- Appropriate selection of roof coverings
- Plans showing roof areas, green roof, and other applications
- SRI values and manufacturer information for materials used on roofs should be collected.





44

ROOF SLOPES SECTION EXAMPLES

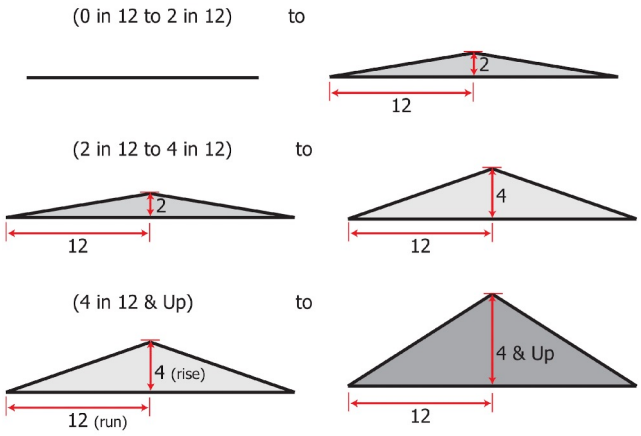
The images show the slopes of roof manufacturing.

Depending on the roof slopes, the material SRI values under the credit headings vary.

Flat Roof
Flat

Low Slope Roof
Low

Conventional Roof
Conventional

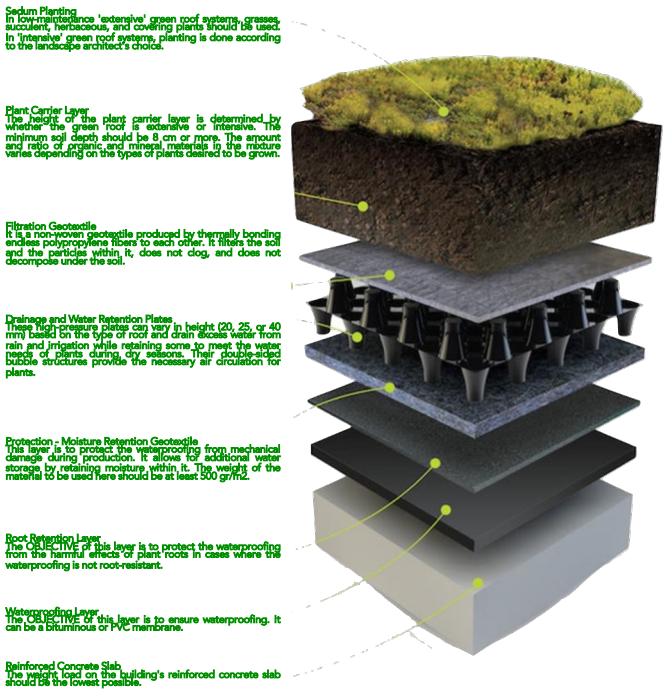


45

FOR GREEN ROOFS SECTION EXAMPLE

The images show the stages of green roof manufacturing.

Green roofs have started to be used increasingly in modern architecture day by day.



46

SS CREDIT 5: REDUCING THE HEAT ISLAND EFFECT

REQUIREMENTS

1. Option 2: Underground Parking Areas (1 point)
2. At least 75% of the parking areas must be covered or built underground.
3. On the roofs covering the parking areas:
4. Materials with a 3-year age and an SRI value of at least 32 must be used (if a 3-year-old material is not available, a material with a minimum initial SRI value of 39 should be used)
5. Must be a Green/Vegetated Roof or,
6. Should be covered with Renewable Energy Producing Systems, such as; solar panels, solar thermal collectors, and wind turbines

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47

SS CREDIT 5: REDUCING THE HEAT ISLAND EFFECT

REQUIREMENTS

- High SRI value permeable and impermeable surfaces should be created within the project boundary.
- Parking areas must be shaded with shading elements.
- Design should involve less hard and impermeable surfaces/grounds.
- For hard surfaces, materials with high SRI values should be selected.

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48

SS CREDIT 5: HEAT ISLAND EFFECT REDUCTION

NECESSARY DOCUMENTS

Documents	Option 1	Option 2
Roof External and Roof Area Calculations	✓	
A site plan showing the shaded hard surface areas, including the project boundary, building footprint, and each roof and roof external area	✓	
Catalogs showing the SRI, SR, and Coating Permeability of Products from Manufacturers	✓	✓
Parking Area Calculations		✓

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49

SS CREDIT 5: HEAT ISLAND EFFECT REDUCTION

REFERENCE STANDARDS

- ASTM E- 903
- ASTM E- 892
- Cool Roof Rating Council Standard (CRRC-1)

DIFFERENCES FROM LEED V3 2009

- This credit combines the Rooftop and Rooftop External Heat Island Effect Credits from LEED 2009 into a single credit.
- Green or Vegetated Roofs and High Reflective Roofs now have equal weight in terms of eligibility.
- Areas shaded by Tree Canopies are now calculated for 10 years after establishment instead of 5 years.
- The initial SRI threshold values for roofing materials to be used have been raised.
- The Credit Eligibility standard for rooftop external hard surface coatings is now determined by calculating the SR value instead of the SRI.
- The credit has started to consider 3-year SRI values for roofing materials.

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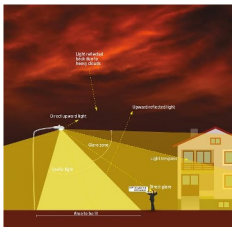
50

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

OBJECTIVE

The main OBJECTIVE is to increase access to and visibility of the night sky landscape by controlling lighting and reducing light pollution, preventing adverse effects on natural life and human life.



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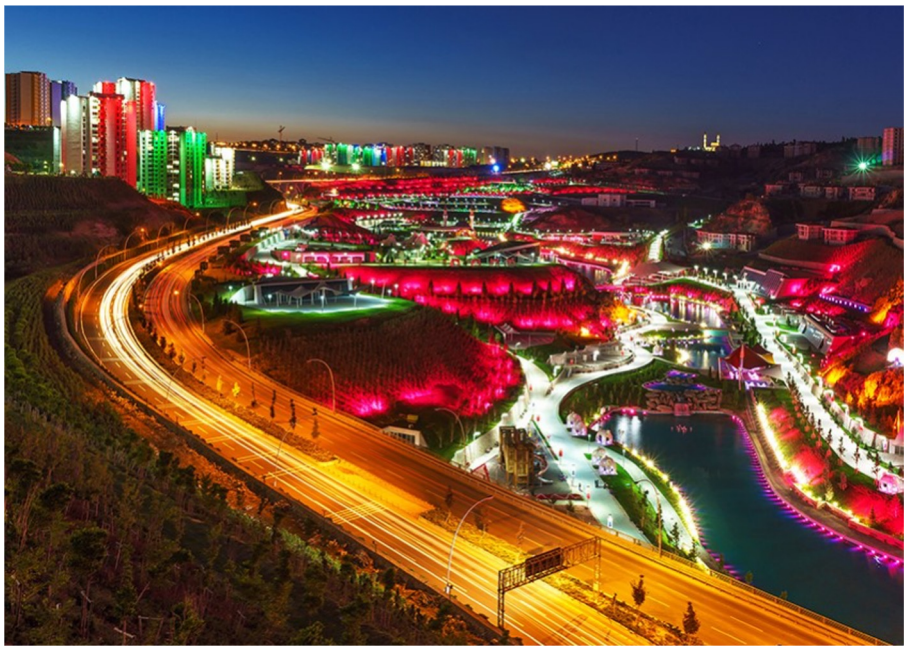
51



A NEGATIVE EXAMPLE FROM THE NORTH ANKARA PROJECT

- The termination of natural plant life
- The extinction of nocturnal living beings and plant and animal species
- Disruption of the human biological clock
- Restriction of the human field of vision
- Imposition of costs on the public with high energy consumption
- Disregard for traffic safety.

52

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

- The following criteria must be met for all outdoor lighting located within the project boundary:
- Each lighting fixture must be accounted for based on its photometric (light measurement) properties and its position within the design; and
- At the time construction begins, the project must consider the 'lighting zone' it is in. The lighting zone of the project should be determined according to the definitions of lighting zones provided by the Illuminating Engineering Society and the International Dark Sky Association (IES/IDA) Model Lighting Ordinance (MLO) User Guide.
- In addition, illuminated signage requirements indoors must be met.

MLO Lighting Zone	Lighting Uplight Degree
LZ0	U0
LZ1	U1
LZ2	U2
LZ3	U3
LZ4	U4

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53

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

- Outdoor Lighting:
- Outdoor lighting must comply with the specified light intensity limits according to the region where the building is located as per IESNA RP-33 standards. Outdoor lighting should also include facade lighting.
- LZ1: Dark (natural areas, rural areas)
- LZ2: Low (low-density residential areas, small industrial and commercial zones)
- LZ3: Medium (high-density residential areas, industrial zones)
- LZ4: High (dense settlements, commercial centers)

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54

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

- Up-lighting
- Option 1: BUG (Backlight-Uplight-Glare) Rating Method:
- The up-lighting ratings defined in the special light sources and mounting descriptions in IES TM-15-11, Addendum A should not be exceeded.
- Table 1. Maximum Up-lighting (uplight) Ratings for Lighting Elements is below.

MLO Lighting Zone	Lighting Uplight Rating
LZ0	U0
LZ1	U1
LZ2	U2
LZ3	U3
LZ4	U4

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SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

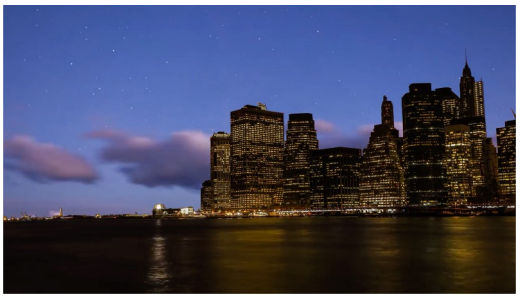
REQUIREMENTS

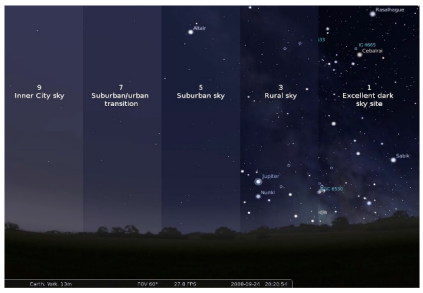
Upper Lighting

Option 2: Calculation Method

The percentage values of the lighting provided in the adjacent table should not be exceeded.

Table 2. Maximum Total Lighting Percentages by Lighting Zones is next to it.





MLO Lighting Zone	Allowed Maximum Total Lighting Percentages Horizontally
LZ0	0%
LZ1	0%
LZ2	%1.5
LZ3	3%
LZ4	6%

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56

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

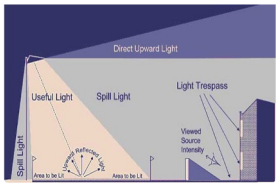
REQUIREMENTS

Light Transitions / Violations:

Option 1: BUG Rating Method

The backlight and glare degrees specified in IES TM-15-11, Addendum A for light sources, installation, and distances from the lighting boundary must not be exceeded (except for special OBJECTIVE lighting fixtures).

Table 3. Maximum Backlight and Glare Degrees are included in the table.



Lighting Installation	MLO Lighting Zone				
	LZ0	LZ1	LZ2	LZ3	LZ4
	Permitted Backlight Degrees				
installations higher than > 2 from the lighting boundary	B1	B3	B4	B5	B5
installations at a height of 1-2 from the lighting boundary and correctly oriented	B1	B2	B3	B4	B4
installations at a height of 0.5-1 from the lighting boundary and correctly oriented 0.5 to 1 mounting	B0	B1	B2	B3	B3
installations at a height of 0.5 from the lighting boundary and correctly oriented	B0	B0	B0	B1	B2
	Permitted Glare Degrees				
Mounted fixtures at a height of > 2 from any installed lighting boundary	G0	G1	G2	G3	G4
Mounted fixtures at a height of 1-2 from any installed lighting boundary	G0	G0	G1	G1	G2
Mounted fixtures at a height of 0.5-1 from any installed lighting boundary	G0	G0	G0	G1	G1
Mounted fixtures at a height of < 0.5 from any installed lighting boundary	G0	G0	G0	G0	G1
All Other Lighting	G0	G1	G2	G3	G4

57

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

- The lighting boundary is located within the area covered by the LEED project boundaries or within the property lines of the properties. The lighting boundary can be adjusted under the following conditions:
- If the property parcel boundary is adjacent to a public area such as a walkway, bike path, square, or parking lot, the lighting boundary may be shifted up to 5 feet (1.5 meters) beyond the property line.
- When the property parcel boundary is adjacent to a public street, pedestrian path, or transit corridor, the lighting boundary may be shifted to the centerline of this street or path.
- If there are other properties owned by the same developer following the property where the project is located - which should be designed according to the lighting zone in which the project falls according to the LEED Project boundary within the property lines - the lighting boundary can be expanded to include these properties.
- All lighting fixtures should be positioned no less than 2 mounting heights from the lighting boundary, and backlighting points should also be placed as close as possible to the lighting boundary.
- Except for specialty lighting fixtures, the backlighting and glare levels specified in the definitions of light sources, mounting, and distances from the lighting boundary in IES TM-15-11, Addendum A should not be exceeded.

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58

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

Option 2: Calculation Method

The vertical illumination models at the lighting boundary given in the table should not be exceeded (the Lighting Boundary Definition in Option 1 should be used).

Calculation scores should not be more than 5 feet (1.5 meters) apart.

Lighting modules should be located on a vertical line parallel to the lighting boundary, with each vertical surface oriented towards the parcel boundary and positioned vertically at the lighting boundary. It should also be at least 33 feet (10 meters) above the highest lighting module.

and

Table 4: Maximum Vertical Lighting Amounts at the Lighting Boundary According to Lighting Zones

MLO Lighting Zones	Vertical Lighting Amounts
LZ0	0.05 fc (0.5 lux)
LZ1	0.05 fc (0.5 lux)
LZ2	0.10 fc (1 lux)
LZ3	0.20 fc (2 lux)
LZ4	0.60 fc (6 lux)

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59

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIREMENTS

- Internally illuminated exterior signage
- Illuminations during night hours should not exceed 200 cd/m2 (nits), and during daytime hours, they should not exceed 2000 cd/m2 (nits).
- Exceptions to the Requirements for Uplighting and Light Transitions: The following external illuminations are exceptions to the requirements and must be provided and controlled separately from other illuminations.
- Specialized signal, guidance, and sign illuminations for transportation;
- Facade and landscape illuminations of buildings located in LZ3 and LZ4 (i.e., city centers) which automatically turn off from midnight to 6:00 AM;
- Illuminations made for stage, film, and video performances for theater and performing arts;
- Roadway illuminations;
- Emergency Service Departments and Helicopter Pads of hospitals;
- Illumination of the National Flag located in LZ2, LZ3, and LZ4; a
- Internally illuminated signboards.

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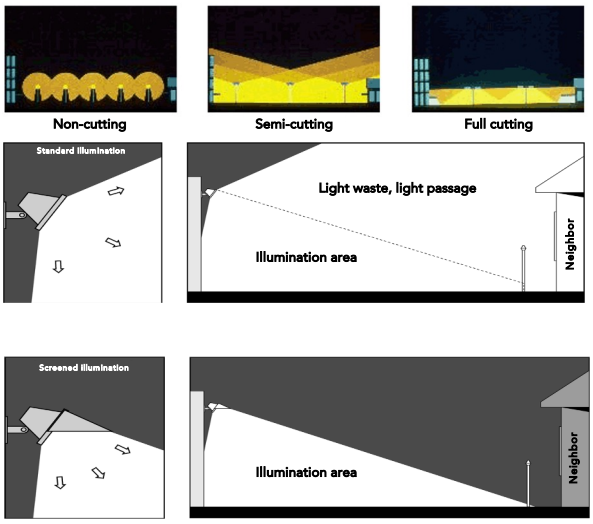
60

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

STRATEGIES

- Outdoor lighting should only be implemented for safety and comfort OBJECTIVEs.
- Efficient and controlled lighting fixtures should be used.
- Building facade lighting should also be considered within this scope, and,
- The project boundaries and the areas to be illuminated should be identified in the lighting model.



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61

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REQUIRED DOCUMENTS

Documents	All Projects	Option 1		Option 2	
		Uplighting	Light Pollution	Uplighting	Light Pollution
Field lighting plan including all boundaries, elements, settlements, and applicable measurements	✓				
Indoor illuminated external sign table projects: Must provide maximum lighting data	✓				
Lighting program showing uplighting		✓			
Lighting programs showing Backlighting, Luminance Levels, and Installation Heights			✓		
Calculations of the amount of lighting falling on each lighting element and horizontally absorbed illuminations				✓	
Calculation of high vertical lighting values in vertical planes within the lighting limits; must be based on the lighting calculation of the poorly lit area remaining in the darkest corner.					✓

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62

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

REFERENCE STANDARDS

- ASTM E 408-71 (1996) e1
- ASTM C 1371-04a
- ASTM E 903-96
- ASTM E 1918-97
- ASTM C 1549-04
- Illuminating Engineering Society and International Dark Sky Association (IES/IDA) Model Lighting Ordinance User Guide and IES TM-15-11, Addendum A

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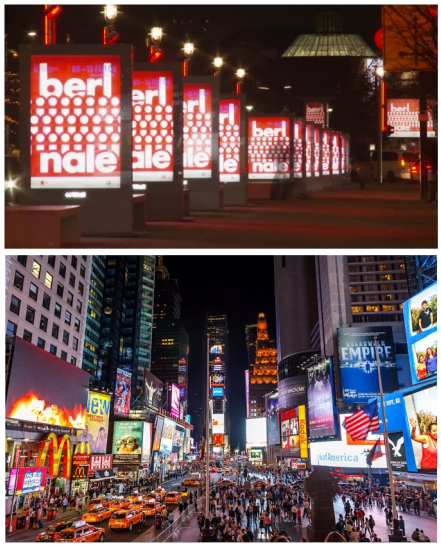
63

SS CREDIT 6: REDUCTION OF LIGHT POLLUTION

DIFFERENCES FROM LEED V3

- A new standard/qualification option based on BUG (backlight-uplight-glare) ratings has been added.
- Lighting power density requirements have been realigned according to EA (Energy and Atmosphere) Prerequisite-Minimum Energy Performance.
- Interior lighting requirements have been realigned according to EA (Energy and Atmosphere) Prerequisite-Minimum Energy Performance.
- Photometric information will now also include Vertical Indoor Lighting Calculations. Additionally, point-to-point calculations will be made for areas remaining in worst/blind spots in vertical planes (not for all area lighting), and the outputs will be obtained.
- Sports area lighting (including school projects) will not be exempt from credit requirements.



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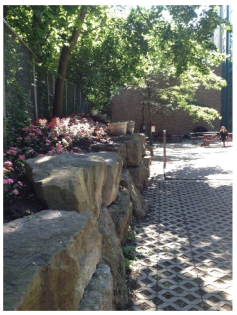
64

SS CREDIT 7: RESTING AREAS

OBJECTIVE

The primary aim is to create outdoor rest areas to ensure that the natural environment positively contributes to the health of patients, employees, and visitors.



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65

SS CREDIT 7: RESTING AREAS

STRATEGIES

- It is necessary to organize an area equal to 5% of the net usable area of the building (excluding functional areas such as technical volumes and stairways) as open areas that patients and visitors can use for resting OBJECTIVEs.
- Additionally, it is necessary to arrange 2% of the net usable area as resting areas for employees. The resting areas designated for employees should be positioned separately from those for patients and visitors.
- Resting areas should be outdoors or located in indoor atriums, greenhouses, solariums, or air-conditioned areas; if 90% of such areas have direct visibility to unobstructed views of nature, these indoor spaces can be used to reach 30% of the required area.

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66

SS CREDIT 7: RESTING AREAS

REQUIREMENTS

- To qualify, rest areas must meet the following requirements:
- They must be located within the building or within 60 meters of the building entrance or access point. These areas can constitute up to 30% of the total rest area.
- There should not be a location where any medical intervention or direct medical care is provided.
- It must be an open area where natural elements like fresh air, sky, and seasonal weather can be felt.
- In rest areas, there should be at least one shaded seating area for every 200 ft2 (18 m2) of garden space and one shaded wheelchair space for every five seating areas.
- They must be smoke-free areas in accordance with IEQ PREREQUISITE 2, Environmental Tobacco Smoke (ETS) Control.

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67

SS CREDITS 7: RESTING AREAS

REQUIREMENTS

- In addition to these, the following conditions must be met for qualification:
- Interior atriums, greenhouses, or illuminated or climate-controlled areas may be used up to 30% of the required area. These areas can be used if 90% of them provide an unobstructed view of nature. This view is calculated using sightlines between 30 inches and 90 inches above the floor.
- Garden Plant treatments and areas not accessible to all building occupants may be considered, but they can only be used for up to 50% of the required area. For example, private clinic or private patient use gardens (i.e., cancer healing gardens, etc.) may be used to satisfy up to 50% of the required area.
- Natural pathways accessible to visitors and staff and/or patients may be used for 30% of the required area if they are available within 200 ft (60 m) of the building entrance.
- A shaded element must be provided for an area of 200 ft2 of the garden, and there must be one wheelchair space for every five-person seating area.

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68

SS CREDIT 7: RESTING AREAS

REQUIREMENTS

- In addition to these, the following conditions must be met for eligibility:
- Examples of suitable resting areas may include pavilions or areas shaded by trees.
- At least 25% of the total outdoor resting area must be landscaped. (Provided that it is not turf)
- Resting places should be designed to open to fresh air, allowing visibility of the sky and stars.
- Open resting areas should not be located within 7.6 meters of designated smoking areas.
- Signage should comply with the 2010 FGI Guidelines for Design and Construction of Health Care Facilities (Section 1.2-6.3 and Appendix A1.2-6.3: Wayfinding).
- Resting areas must be wheelchair accessible.

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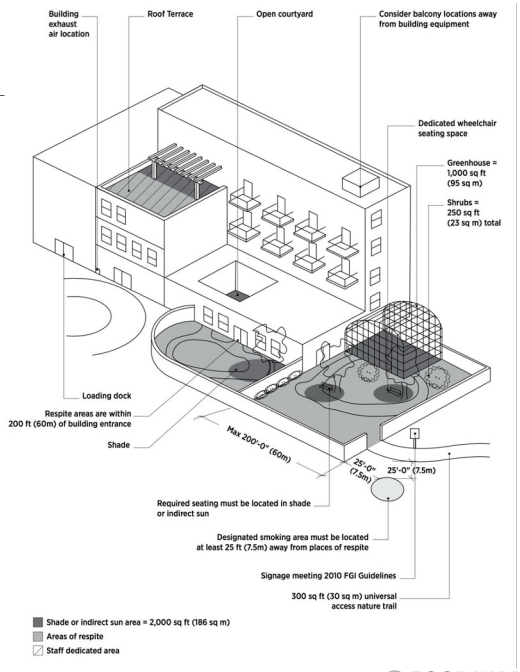
69

SS CREDIT 7: RESTING AREAS

REQUIRED DOCUMENTS

Documents	All Projects
Site plan showing resting areas for patients and staff (in square meters), seating areas, and landscaping	✓
Drawings showing access routes and walking distances to resting areas for patients, visitors, and staff.	✓
Drawings or photographs showing wayfinding signs for patients and staff.	✓



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SS CREDIT 8: DIRECT ACCESS TO EXTERNAL AREAS

OBJECTIVE

The main OBJECTIVE is to ensure that the building contributes positively to the health of patients, employees, and visitors by providing direct access to the natural environment.

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71

SS CREDIT 8: DIRECT ACCESS TO OUTDOOR AREAS

REQUIREMENTS

- The resting areas must meet the following requirements for eligibility:
- A direct access outdoor courtyard, terrace, garden, or balcony of 5 ft2 (0.465 m2) in size must be provided for every patient, for 75% of hospitalized patients and 75% of outpatient patients with a Clinical LOS (Length of Stay) of more than 4 hours.
- Patients whose Clinical LOS is to be evaluated under credit and is greater than 4 hours include dialysis patients, patients receiving infusion therapy, outpatient surgical intervention patients, and patients in stage 2 recovery.
- When this calculation is made, patients whose Clinical LOS is greater than 4 hours but are unable to move (emergency, stage 1 recovery patients, intensive care patients, etc.) are exempt from credit requirements.

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72

SS CREDIT 8: DIRECT ACCESS TO OUTDOOR SPACES

REQUIREMENTS

- Rest areas must meet the following criteria for eligibility:
- Rest areas that meet the requirements of SS Credit 7 also comply with these credit conditions if they have direct access to clinics and inpatient units.
- Areas that meet credit requirements must also fulfill the IEQ Prerequisite 2 Environmental Tobacco Smoke Control and IEQ Credit 5 Indoor Chemical and Pollutant Source Control requirements and must be located at least 100 ft away from exhaust vents, loading areas, building entrances, and roadways.

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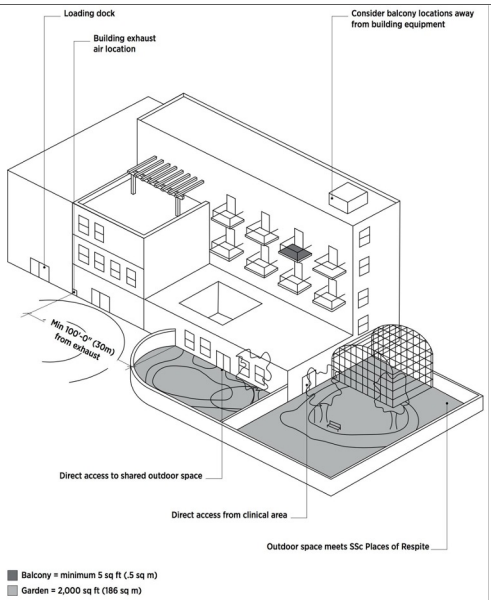
73

SS CREDIT 8: DIRECT ACCESS TO OUTDOOR SPACES

NECESSARY DOCUMENTS

Documents	All Projects
Calculations showing the number of patients, relaxation area square meters, and their locations	✓
Drawings and calculations demonstrating compliance with IEQ Prerequisite 2 and IEQ Credit 5 requirements	✓
Drawings or photographs showing wayfinding signage for patients and staff.	✓



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74