

BEYOND

SMART CITIES

LOCATION AND TRANSPORTATION - GREEN

BUILDING TECHNOLOGY TRAINING PROGRAM

FOR GREEN BUILDING AND SUSTAINABILITY SPECIALISTS

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

GREEN BUILDING SPECIALIST CURRICULUM

GREEN BUILDING SPECIALIST

BEYOND SMART CITIES



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SURROUNDING DENSITY AND DIVERSE

USES - CREDIT

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LEARNING OBJECTIVES



Intent of Surrounding Density and Diverse Uses - Credit

Behind the Intent

Step by Step Guidance

Requirements

Required Documentation

Connection to Ongoing Performance

Terms and Definitions

STEP-BY-STEP GUIDANCE

STEP 3. PERFORM SEPARATE RESIDENTIAL AND NONRESIDENTIAL DENSITY CALCULATIONS, IF APPLICABLE

If the information is available, calculate the density for each building type within the 1/4-mile (400-meter) radius. Designate each building and its associated land area as residential, nonresidential, or mixed use (see [Getting Started, Density](#)).

- Calculate total dwelling units per acre or hectare for all residential buildings.
- Calculate the total floor-area ratio for all nonresidential buildings.
- For mixed-use buildings within the radius, use Equations 1 and 2 to apply a weighted average of the residential and nonresidential components.

EQUATION 1. Weighted average applied to residential land use for mixed-use projects

Mixed-use residential land = % residential floor area X Total mixed-use land area (acres or hectares)

EQUATION 2. Weighted average applied to nonresidential land use for mixed-use projects

Mixed-use nonresidential land = % nonresidential floor area X Total mixed-use land area (acres or hectares)

Add the mixed-use buildings' dwelling units, nonresidential floor area, residential land, and nonresidential land to the values determined when calculating the densities of purely residential or nonresidential areas (see [Further Explanation, Example 1](#)).





STEP-BY-STEP GUIDANCE

STEP 4. CALCULATE COMBINED DENSITY, IF APPLICABLE

When separate residential or nonresidential density calculations cannot be performed for all areas, use Equation 3 instead to determine the combined density within the prescribed radius.

- Exclude parking garages.
- For buildings with simple, rectangular footprints, estimate floor area by measuring the building footprint area and multiplying it by the number of floors.

EQUATION 3. Combined density

Combined density (D) (dwelling units or sq ft/hectare) = Total floor area (D' or sq ft) ÷ Total building land (acres or hectares)

STEP 5. DETERMINE POINTS EARNED

Refer to Table 1 in the credit requirements to determine points earned, based on the combined or separate residential and nonresidential densities.

For separate calculations, if the point values for the residential and nonresidential densities are different, the lowest performing land use is used to determine the number of points achieved.

Option 2. Diversity of Uses

STEP 1. DOCUMENT NEARBY USES

During the eligible zoning use in or near the project and classify the use type according to Appendix 1. To be eligible, uses that are planned but not currently operating must be included within one year of the project start date.

- Use the credit requirements to determine the number and category of uses that contribute to credit achievement. Note the restriction on the number of uses of each type (see [Further Explanation, Example 2](#)).



Figure 1. Document nearby uses to determine uses.





STEP-BY-STEP GUIDANCE

STEP 2. MAP WALKING ROUTES TO USES

On a map, label the eligible uses and plot walking routes from the project's main entrance.

- Measure the distance along each walking route to determine whether it meets the credit's distance requirements (see [Figure 1 and L1 Overview, Walking and Bicycling Distances](#)).

WAREHOUSES AND DISTRIBUTION CENTERS

STEP 1. CHOOSE PROJECT LOCATION

Select a project location that is a previously developed site used for industrial or commercial purposes, is adjacent to sites currently used for industrial or commercial purposes, or is close to transportation as outlined in the credit criteria. Determine whether planned transportation will be applicable to the project.

STEP 2. SELECT ONE OR BOTH OPTIONS

Select the appropriate option(s) for the project.

- Option 1 is for projects located on a previously developed site, with or without adjacency to previous development.
- Option 2 is for projects sited near transportation resources as identified in the credit criteria.

Option 1. Development and Adjacency

STEP 1. CONFIRM PREVIOUS DEVELOPMENT AND USE

Map the project site, indicating previous development. Calculate the percentage of the site that is previously developed. To be considered a previously developed site, the land area must be 75% previously developed (see [Getting Started, Previous Development](#)).

Confirm that the site was previously used for commercial or industrial purposes.

STEP 2. DETERMINE ADJACENT SITE STATUS, IF APPLICABLE

For an additional point, confirm that the project site is located on an adjacent site (see [Definitions](#)). Adjacent sites must be currently used for industrial or commercial purposes. If necessary, identify the uses of adjacent parcels using zoning maps, parcel maps, or similar resources to confirm their status.

Option 2. Transportation Resources

STEP 1. MEASURE DRIVING DISTANCES

On a map, plot driving routes from the project to any of the applicable transportation resources identified in the credit criteria. Indicate driving distances to each resource.

STEP 2. CONFIRM COMPLETION OR CONSTRUCTION OF EXISTING AND PLANNED TRANSPORTATION RESOURCES

Confirm that any transportation resource counted for Option 2 (such as a seaport, off-ramp to a highway, or freight rail line) is completed or will be under construction within 24 months of project completion.





REQUIREMENTS

Option 1. Surrounding Density (2-3 points BD&C except Core and Shell, 2-4 points Core and Shell)
Locate on a site whose surrounding existing density within a 1/4-mile (400-meter) offset of the project boundary meets the values in Table 1. Use either the "separate residential and nonresidential densities" or the "combined density" values.

Table 1a. Points for average density within 1/4 mile of project (IP units)

Combined density	Separate residential and nonresidential densities		Points BD&C (except Core and Shell)	Points BD&C (Core and Shell)
Square feet per acre of buildable land	Residential density (DU/acre)	Nonresidential density (FAR)		
22,000	7	0.5	2	2
35,000	12	0.8	3	4

Table 1b. Points for average density within 400 meters of project (SI units)

Combined density	Separate residential and nonresidential densities		Points BD&C (except Core and Shell)	Points BD&C (Core and Shell)
Square meters per hectare of buildable land	Residential density (DU/hectare)	Nonresidential density (FAR)		
5,050	17.5	0.5	2	2

REQUIREMENTS +

RGS	30	0.8	3	4
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(DU = dwelling units; FAR = floor-area ratio)

Bridge
Option 1. Surrounding Density and Connectivity (2-3 points)

Path 1. Surrounding Density

Locate on a site whose surrounding existing density within a 1/4-mile (400-meter) offset of the project boundary meets the values in Table 1. Use either the "separate residential and nonresidential densities" or the "combined density" values.

Table 1a. Points for average density within 1/4 mile of project (IP units)

Combined density	Separate residential and nonresidential densities		Points
Square feet per acre of buildable land	Residential density (DU/acre)	Nonresidential density (FAR)	
22,000	7	0.5	2
35,000	12	0.8	3

Table 1b. Points for average density within 400 meters of project (SI units)

Combined density	Separate residential and nonresidential densities		Points
Square meters per hectare of buildable land	Residential density (DU/hectare)	Nonresidential density (FAR)	
5,050	17.5	0.5	2
8,050	30	0.8	3

(DU = dwelling units; FAR = floor-area ratio)

Physical location values that are part of the project site, such as playing fields and associated buildings used during sporting events only (e.g., concession stands) and playgrounds with play equipment, are excluded from the surrounding density calculation.

Path 2. Connected Site (2 points)

Locate the project on a previously developed site that also meets one of the connected site conditions listed below.

Table 2. Points for connected site

Type of site	Points
--------------	--------

Adjacent	1
----------	---

Site	2
------	---

REQUIREMENTS +

1. To qualify as an adjacent site, at least 25% of the project boundary must border parcels that are previously developed.

2. To qualify as a site that is at least 75% of the project boundary must border parcels that are previously developed, the:

• Adjacent parcels must be zoned for a use that is compatible with the project's proposed use.

• The proposed site must represent at least three of the five categories, exclusions of the building's primary use.

AND/OR

Option 2. Bridge (2-3 points)

Construct or renovate a building or a space within a building such that the building's main entrance is within 1/4-mile (400-meter) walking distance from the primary portion of use (see Appendix 1), as listed below.

Table 3. Points for proximity to use

Time	Points
------	--------

0-7	1
-----	---

0.8	2
-----	---

The following restrictions apply:

1. A site located on the edge of a site, a retail store may be counted only once even if it sells products to several categories.

2. For sites located on the edge of a site, a retail store may be counted only once even if it sells products to several categories.

3. The proposed site must represent at least three of the five categories, exclusions of the building's primary use.

Data Collection, Maintenance & Distribution Center

Option 1. Development and Adjacency (2-3 points)

Construct or renovate the project on a previously developed site that was used for industrial or commercial purposes (2 points).

OR

Construct or renovate the project on a site that is primarily developed and an adjacent site. The adjacent site must be used for industrial or commercial purposes (2 points).

AND/OR

Option 2. Transportation Network (2 points)

Construct or renovate the project on a site that has bus or train (2 points) or four (2 points) of the following transportation features:

1. The site is within a 1/4-mile (400-meter) walking distance of a main transit hub, defined as an elevated, expressway, or light-rail station with passenger transportation.

2. The site is within a 1/4-mile (400-meter) walking distance of a main transit hub, defined as an elevated, expressway, or light-rail station with passenger transportation.

3. The site is within a 1/4-mile (400-meter) walking distance of an arterial road with an active transit stop.

4. The site is served by an active transit stop.

5. If all three required transportation features must be met, transit and urban contribution by the date of the certificate of occupancy and complete within 24 months of that date.

Option 1. Surrounding Density (1 point)

- At least 7 dwelling units per acre (17.5 DU per hectare) with a 0.5 floor-area ratio. The

1. At least 7 dwelling units per acre (17.5 DU per hectare) with a 0.5 floor-area ratio. The counted density must be existing density, not zoned density, or
2. At least 22,000 square feet per acre (5,050 square meters per hectare) of buildable land.

For previously developed existing rural healthcare campus sites, achieve a minimum development density of 30,000 square feet per acre (5000 square meters per hectare).

Option 2. Diverse Uses of point.

The following restrictions apply:

- The counted uses must represent at least three of the five categories, exclusive of the building's primary use.

ALL DONE

Option 3: Walkable Location

Table 1. Points for walkable location (7-8 points BD+C except Core & Shell and Healthcare, 6 points Green & Shell, 5 points Healthcare)

Walk Score®	Points	Points (Core & Shell)	Points Offsite/Other
90 to 100	5	6	-
80 to 90	4	4	-
70 to 80	3	3	-
60 to 69	2	2	-
50 to 59	1	1	-
≤ 50	-	-	1

Locating a building in a dense area served by transit and diverse uses would have a significant positive impact on the transportation patterns of building occupants. As a result, this credit makes the performance-based LT prerequisite Transportation Performance more achievable.

All BD+C except Warehouses and Distribution Centers		Option 1	Option 2
Area plan or map showing project site and location of existing residential and non-residential buildings within ¼-mile (400-meter) radius of project site		X	
Description of the previous development on the site		X	
Area plan or map showing project site, location and type of each use, and walking routes			X
Warehouses and Distribution Centers		Option 1	Option 2
Area plan or map showing project site, its previous development, and (if applicable) industrial or commercial properties adjacent to project site		X	
Area plan or map showing project site, location and type of transportation resources, and driving distance to each			X
If planned transportation resources are counted, verification that they will be funded and under construction by date of certificate of occupancy and complete within two years of that date			X

REFERENCED STANDARDS

NONE



TERMS AND DEFINITIONS

Floor area ratio (FAR) the density of nonresidential land use, exclusive of parking, measured as the total nonresidential building floor area divided by the total buildable land area available for nonresidential structures. For example, on a site with 10,000 square feet (930 square meters) of buildable land area, an FAR of 1.0 would be 10,000 square feet (930 square meters) of building floor area. On the same site, an FAR of 1.5 would be 15,000 square feet (1395 square meters), an FAR of 2.0 would be 20,000 square feet (1860 square meters), and an FAR of 0.5 would be 5,000 square feet (465 square meters).

Adjacent site a site having at least a continuous 25% of its boundary bordering parcels that are previously developed sites. Only consider bordering parcels, not intervening rights-of-way. Any fraction of the boundary that borders a water body is excluded from the calculation.

Buildable land the portion of the site where construction can occur, including land voluntarily set aside and not constructed on. When used in density calculations, buildable land excludes public rights-of-way and land excluded from development by codified law.



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THANK YOU



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