Objective: Propose sustainable guidelines for new housing schemes or for upgrading those already in use, through the analysis of international methods of environmental and sustainability assessment and the analysis of existing national practices.

SUSTAINABILITY GUIDELINES FOR THE DESIGN OF HOUSING SCHEMES IN THE STATE OF SÃO PAULO – BRAZIL

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### Reality of some housing schemes

- **Objective:** Propose sustainable guidelines for new housing schemes or for upgrading those already in use, through the analysis of

### Sustainable assessment methods

- **According to Cule (2005, p.455):** tools and building environmental assessment methods have been developed “to provide an objective evaluation of resource use, indoor environmental quality within a broader culture of performance measurement that seeks to improve accountability in building construction.”

Most of the sustainable assessment methods were developed in industrialized countries and today almost all developed countries employ their own. All the methods contain rules to deal with project sites and adjacent urban areas. The principal international methods studied in this work are in the framework below:

### Brazilian initiatives toward sustainability

- **The housing scheme Atibaia D was chosen for the case study.** It has been developed by CDHU “Compania de Desenvolvimento Habitacional Urbano do Estado de São Paulo,” a state-owned company for the construction of low-income housing and urban development.

Atibaia D is located in Atibaia town, which is 67 km far from São Paulo with 111,300 inhabitants.

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### Chosen housing scheme to be evaluated by international methods

- **Case Study - Atibaia D**
  - 669 housing units
  - 710 units built by public and 150 by a contractor
  - Small variety of design solutions
  - Large internal extensions, almost a small town within itself
  - Lack of communal and service activity
  - Public companies being responsible solely for the construction of housing schemes

#### The general (re)appraisement of the housing scheme and landscape

- Total area = 83000m²
- Lot area = 77m²
- Construction is simplified by limiting the number of housing units to two types.
- Obviously, this results in a lack of diversity and architectural solutions.

#### General overall view and surroundings of the job site.

The general (re)appraisement of the housing scheme and landscape

#### Final considerations

- **The charts present 49 indicators taken from the international methods and the technical manual of CDHU.** The majority of these indicators focus on social and environmental aspects. The CDHU manual contains the highest number of indicators for social equity, but is lacking in the other areas.

- **LEED-ND and the SBTool focus on the largest number of environmental and economic indicators, satisfying the priorities of developed countries.** LEED-ND and SBTool scored high in social-change and environmental indicators, but are not concerned with adapting the project to the regional characteristics.

- **In order for a city to offer quality of life, the administration responsible for urban development has to be multi-faceted analyzed to assure that it is in agreement with the environmental, social, economical and cultural sustainability guidelines.**

- **The environmental guidelines guarantee the preservation of natural resources and help control environmental impacts.** Economic guidelines promote development and social guidelines human values, with the objective of creating a more just society.

- **Cultural guidelines help guarantee respect for the specific characteristics of each region.**

- **The existence of the set of indicators becomes a base for a future national method for evaluating the sustainability of urban areas.**

Three additional case studies having characteristics closer to Alibaia D from CDHU will be undertaken to improve the guidelines chart.

### General overview with the performance of Atibaia D by each method

#### LEED-ND

- **Location Efficiency:** Score Total 18 / 28
  - Environmental Preservation
  - Construction: A Connected Neighborhood: Resource Efficiency 7 / 25
  - Other 3 / 6
  - Total 12 / 14
  - Silver 57 - 67
  - Construction is simplified by limiting the number of housing units to two types. Obviously, this results in a lack of diversity and architectural solutions.

#### EcoHomes

- **Score Total:**
  - Energy 3 / 22
  - Transport 7 / 8
  - Pollution 5 / 10
  - Materials 0 / 14
  - Water 5 / 10
  - Land and use and Ecology 3 / 12
  - Health and wellbeing 0 / 14
  - Management 0 / 10
  - Total 22 / 100
  - Does not evaluate areas larger than 15,000m² having more than 3 buildings.

#### SBTool

- **Social:** Score Total 19 / 16
  - Economic 3 / 5
  - Environmental 1 / 5

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### List of applicable indicators to Brazilian reality

- **List of applicable indicators to Brazilian reality:**

#### Ecological value of site

- Vulnerability of land to flooding

#### Proximity to centres of employment

- Proximity to commercial and cultural facilities

#### Development density

- Proximity to public recreation areas and facilities

#### Environmental loadings

- Proximity to vital points

#### Site selection, project planning and development

- Ecology and resource efficiency

#### Environmental management

- Site selection, project planning and development

#### Support for local economy

- Ecological value of site

#### Site selection, project planning and development

- Vulnerability of land to flooding

#### Environmental management

- Site selection, project planning and development

#### Support for local economy

- Ecological value of site

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### Authors

- Patricia Auculico - patricia.auculico@usp.br
- Professor Alex Albiato - alex.albiato@usp.br

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