GRIHA LD
GRIHA for Large Developments

Apoorv Vij
Association for Development and Research of Sustainable Habitats
National Conference on Green Design
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2005

Genesis

TERI-GRIHA
CESE, IIT Kanpur – 5 star TERI-GRIHA

2007

Going National

GRIHA
Suzlon OneEarth, Pune – 5 star GRIHA

2012

GRIHA for you and me

SVA GRIHA
Simple Versatile Affordable GRIHA
ZED Earth Villa, Bengaluru – 5 star SVAGRIHA

Source: http://v23.fsccache1.c.bjgcache.googleapis.com/static.panoramio.com/photos/original/6384620.jpg
Looking at the big picture

GRIHA LD
GRIHA for Large Developments

Background

According to the 12th Five Year Plan, released by the Planning Commission of the Government of India, nearly 285 million people were living in urban agglomerations.

This number increased to almost 380 million in the year 2011.

And the projections are that by 2030, almost 600 million people will be living in urban areas.
Projects which can be rated under GRIHA LD

All projects which satisfy either of the following two thresholds may apply for a GRIHA LD rating:

• Total built up area greater than or equal to 1, 50,000 sq.m; and/or

• Total site area greater than or equal to 50 hectares.

Projects which can be rated under GRIHA LD

1. Large (mixed-use) townships:
   – Housing complex by builders
   – Housing complexes by urban development organizations
   – Housing board and Public Sector Undertaking Townships
   – Plotted developments with part construction by the developer

2. Educational and institutional campuses

3. Medical colleges and Hospital complexes (eg: AIIMS)

4. Special economic zones

5. Hotels/ resorts
Different in Approach

Green habitats are those which reduce their detrimental impact on the environment.

Conventional Rating System

The higher the points, the higher the rating.

GRIHA LD

The lower the detrimental impact, the higher the rating.
The rating of the projects will be done in parts:

– Design Stage Rating

– Rating of Each Subsequent Stage
Sections

The impact of the development is analysed across 6 sections, which are:

– Site Planning
– Energy
– Water & Waste Water
– Solid Waste Management
– Transport
– Social

Impact in each section

The impact in each section is evaluated in two parts:

– Quantitative parameters – how much?
– Qualitative parameters – how good/bad?
Carrying Capacity
only indicative

Water availability to support the population
9 sqm green cover per capita
Per capita CO$_2$ emissions to be less than 1.18 tonnes per annum (India’s national average).

Impact Parameter - Example
Water & Waste water
Total annual water required from the municipal supply/groundwater source
Water demand – (D)  Water Reuse – (S)

- Total water required by buildings on site – NBC – lpcd
- Total water required for landscape on site

Water Reuse – (S)
- Rainwater that is captured, stored and reused after filtration
- Waste water that is recycled and reused

If S = 0, impact is 100%
If D = S, impact is 0%

Site Planning
Increase in ambient air temperature
Energy
Net annual kWh required from the utility grid/diesel genset

Solid Waste Management
Total organic waste treated on site
Transport

Net CO₂ emitted through intra-site travel.

Qualitative Parameters

In addition to the quantitative impact parameter, each section has been assigned several qualitative parameters as well.
Qualitative Parameters – Example - Transport

- Provision of footpaths and bicycling tracks and for safe interaction of NMT traffic with motorized traffic
- Road network planning
- Provision of collective transport services
- Disincentivising parking for cars and two wheelers
- Electric charging infrastructure for vehicles
Qualitative assessment parameters for Social

- Facilities for construction workers
- Social infrastructure in development
  - Universal accessibility
  - Environmental awareness
  - Resting facilities for service staff
- Planning for low-income group population
  - EWS housing
  - Dedicated health and education centers
  - Provision for informal markets

Normalizing Multipliers

Additionally, each section has been assigned a “normalizing multiplier” to reflect:

- different national priorities revolving around resource scarcity
- relative variation in investment for different strategies
- balance between social, economic and environmental aspects; and
- balance between Quantitative parameters and Qualitative parameters
### Final Design Impact - Quantitative

<table>
<thead>
<tr>
<th>Section</th>
<th>Quantitative Impact (from 0 to 100%) (Qn)</th>
<th>Normalizing multiplier (M)</th>
<th>Final impact score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Planning</td>
<td>100</td>
<td>0.9</td>
<td>$I_n$</td>
</tr>
<tr>
<td>Energy</td>
<td>100</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>100</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Waste</td>
<td>100</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>100</td>
<td>0.9</td>
<td></td>
</tr>
</tbody>
</table>

### Final Design Impact - Qualitative

<table>
<thead>
<tr>
<th>Section</th>
<th>Point score</th>
<th>Qualitative Impact (from 0 to 100%) (Ql)</th>
<th>Normalizing multiplier (M)</th>
<th>Final impact score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Planning</td>
<td>0</td>
<td>100</td>
<td>1.0</td>
<td>$I_q$</td>
</tr>
<tr>
<td>Energy</td>
<td>0</td>
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<td></td>
</tr>
<tr>
<td>Transport</td>
<td>0</td>
<td>100</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>0</td>
<td>100</td>
<td>0.9</td>
<td></td>
</tr>
</tbody>
</table>
Overall Appraisal

\[ I_t = \frac{I_n \text{ (design case)} + I_q \text{ (design case)}}{I_n \text{ (base case)} + I_q \text{ (base case)}} \times 100 \]

<table>
<thead>
<tr>
<th>Overall Impact - (I_t)</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 % - 66 %</td>
<td>1 star</td>
</tr>
<tr>
<td>65 % - 56 %</td>
<td>2 star</td>
</tr>
<tr>
<td>55 % - 46 %</td>
<td>3 star</td>
</tr>
<tr>
<td>45 % - 36 %</td>
<td>4 star</td>
</tr>
<tr>
<td>35 % or lower</td>
<td>5 star</td>
</tr>
</tbody>
</table>
Thank You

apoorv.vij@grihaindia.org