

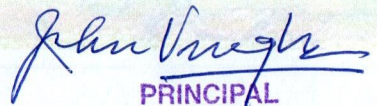
**GRIHA Existing Building
Feasibility Report
for
St Stephen's College
New Delhi**

Date of Visit: May 24, 2022



Prepared by: GRIHA Council

Submitted on: May 26, 2022


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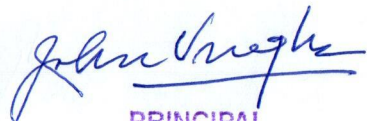
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*GRIHA is an abbreviation for Green Rating for Integrated Habitat Assessment. It is the national rating system for green buildings in India.

For more information

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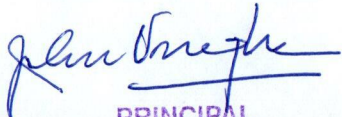
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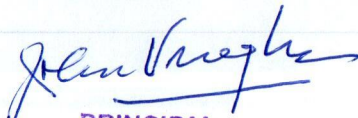
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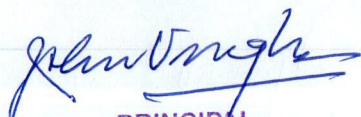
Feasibility Checklist as per GRIHA Existing Building (EB) rating

Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
Site Parameters					
Criterion 1 Accessibility to Basic Services					
1.1.1	Availability of at least 5 services (from the list given below) within the campus or within 500m walking distance from the main entrance of the project. Such as Services: Grocery store, Pharmacy, Bank/ATM, Park, Restaurant, Community Centre, Gym, Public transit stop / Metro Station.	1	1	1	0
1.1.2	Collective transport service (as listed below) to nearest public transportation nodes is provided for building occupants.	1	1	1	0
		2	2	2	0
Criterion 2 Microclimatic Impact					
2.1.1	Analyse total number of trees planted on site and demonstrate compliance with GRIHA for Existing Building threshold of 1 tree per 80m ² of plot area. Total number of trees on site must meet/exceed the GRIHA for Existing Buildings Threshold.	2	2	2	0
2.1.2	More than 25% of the site surface visible to sky (including building roofs) are either soft paved/covered with high SRI coating (SRI >50)/shaded by trees/shaded by vegetated pergolas/shaded by solar panels or any combination of these strategies.	1	2	2	0
	More than 50% of the site surface visible to sky (including building roofs) are either soft paved/covered with high SRI coating (SRI >50)/shaded by trees/shaded by vegetated pergolas/shaded by solar panels or any combination of these strategies.	2			
		4	4	4	0


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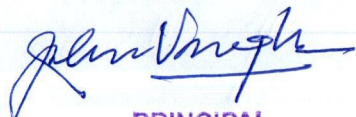


Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
Maintenance & Housekeeping					
Criterion 3 Maintenance, Green Procurement & Waste Management					
3.1.1	Ensure that maintenance and housekeeping protocols are maintained and followed for electrical, HVAC, plumbing systems, and civil repair work.	Mandatory		Mandatory	
3.1.2	In case of conditioned spaces all HVAC equipment are CFC-free and all insulation used in buildings should be CFC- and HCFC free OR phase-out plan for HCFC/CFC using equipment. Firefighting equipment are Halon-free	Mandatory		Mandatory	
3.1.3	Maintain and follow a policy of purchasing environment-friendly cleaning and pest control products for housekeeping materials with low ODP in building interiors.	1	1	0	1
3.1.4	Maintain and follow a policy of purchasing appliances with at least 3-star BEE rating for all appliances under the scheme of the BEE Star Rating program.	1	1	0	1
3.1.5	Provide infrastructure (multi-coloured dustbins/ different garbage chutes) to building occupants to ensure segregation of waste at source.	1	1	1	0
3.1.6	Provide dedicated, segregated and hygienic storage spaces in the project site to store different wastes before treatment /recycling.	1	1	0	1
3.1.7	Provide contractual tie-ups with waste recyclers for safe recycling for recyclable wastes, like metal, paper, plastic, glass, e-waste, etc.	1	1	0	1
3.1.8	Implement strategies to treat all organic (kitchen and landscape) waste on-site and to convert it into a resource (manure, biogas, etc.) and reuse.	2	2	2	0
		7	7	3	4
Criterion 4 Metering & Monitoring					
4.1.1	Demonstrate compliance with the basic metering	Mandatory		Mandatory	
4.1.2	Advanced/Sub metering requirements	3	3	0	3
4.1.3	Install one-way communicable smart meters and monitoring system	3	3	0	0


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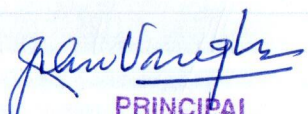
Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
4.1.4	Provide two-way communication for consumers and connect to GRIHA IT platform	4	4	0	0
		10	10	0	3
	Energy				
	Criterion 5 Energy Efficiency				
5.1.1	Building energy consumption information	Mandatory		Mandatory	
5.1.2	Implementation of operation and maintenance no cost EEMs	5	5	5	0
5.1.3	Demonstrate percentage reduction in energy consumption over the base case	15	15	0	7
		20	20	20	7
	Criterion 6 Renewable Energy Utilization				
6.1.1	Alternative I: On-site/On-site & off-site combination of renewable energy system installation to offset a part of the annual total energy consumption.	15	15	0	7
	Alternative II: Off-site renewable energy system to offset a part of total energy consumption.				
		15	15	0	7
	Water Efficiency				
	Criterion 7 Water Footprint				
7.1.1	Detailed water audit report clearly demonstrating the water supply and usage study, process and system audit, and discharge analysis.	Mandatory		Mandatory	
7.1.2	Reduction in building water consumption by 30% below the base case through water efficient fixtures.	3	3	0	3
7.1.3	Minimizing lawn area and restricting it to 25% of the total landscaped area.	2	2	0	0
7.1.4	Use of water-efficient irrigation systems to reduce the water requirement by at least 50% from the GRIHA base case.	2	2	0	2
7.1.5	Provision of on-site sewage water treatment system: • 100 % of grey water treatment on site	2	4	0	0


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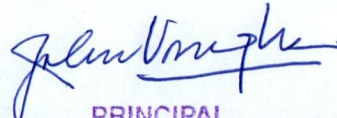
Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
	• Treatment of sewage water (grey water and black water combined) to meet 100% of non-potable water requirement	4			
7.1.6	Provision of rainwater harvesting system	2	4	0	4
	• Only roof rainwater harvesting	4			
	• 100% of catchment area	4			
		15	15	0	11
Criterion 8 Reduction in Cumulative Water Performance					
8.1.1	Cumulative water performance (WP) reduces to 20% of total water use.	2	10	0	0
	Cumulative water performance (WP) reduces to 30% of total water use.	3			
	Cumulative water performance (WP) reduces to 50% of total water use.	6			
	Cumulative water performance (WP) reduces to 70% of total water use.	10			
		10	10	0	0
Health & Comfort					
Criterion 9 Achieving Indoor Comfort Requirements (Thermal, Visual, And Acoustic)					
9.1.1	Demonstrate that project can achieve thermal comfort requirements of NBC 2005 or ASHRAE 55 or requirement of Indian Adaptive Comfort	2	2	2	0
9.1.2	9.1.2 Demonstrate following – Artificial lighting Lux level to fall within limits (lower and higher range limits), space/task specific lighting levels as per NBC 2005.	2	2	0	2
	Daylight Factor (DF) of at least 25% of all living area should meet the adequate levels as prescribed in SP 41.	2	2	0	2
9.1.3	The indoor noise levels should be within the acceptable limits as specified in NBC 2005 and key noise source on site (such as, diesel genset, chiller plant, etc.) should have sufficient acoustic insulation as per NBC 2005 norms.	2	2	2	0
		8	8	4	4

Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
Criterion 10 Maintaining Good IAQ					
10.1.1	Smoking must be banned/ prohibited within the building premises. In case smoking is allowed, the air from the smoking area must be isolated to prevent recirculation of tobacco smoke-containing air to non-smoking areas.	Mandatory		Mandatory	
10.1.2	Meet the minimum requirements of – • CPCB National Ambient Air Quality Standard (NAAQS) for quality of fresh air.	2	0	0	0
	• ASHRAE Standard 62.1–2010, Ventilation for Acceptable Indoor Air Quality or a NBC- 2005 for quantity of fresh air.	2	0	0	0
		4	0	0	0
Social Aspects					
Criterion 11 Universal Accessibility & Environmental Awareness					
11.1.1	Provide facilities as per Harmonised Guidelines and space standards for barrier-free built environment for the differently-abled person and elderly people for following minimum requirement in residential and public buildings. <ul style="list-style-type: none">• Provision of ramp at the entrance.• Parking (preferred parking near entrance, parking specifications for persons with special needs to be addressed).• Toilet for persons with special needs.	2	2	0	2
11.1.2	Adopt any three measures from the list provided in GRIHA EB manual to increase environmental awareness among users and visitors.	3	3	2	1
		5	5	2	3
	Total	96		20	32


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Sl. No.	Criterion name	Maximum Points	Applicable points	Current points	Anticipated Points
Bonus Points					
12.1.1	Adopt innovative strategies from the list provided in GRIHA EB manual or strategies apart from the list that contribute towards sustainability	4	4	4	0
	Total Points	100	96	24	32
Current status		25.00%	1 Star		
Possible rating can be achieve		63.50%	3 Star		


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Project Details

1. Site area : 47,400 m²
2. Built-up area : 27,255 m²
3. Total number of buildings : 44
4. Total occupancy : Approximately 1,890 (data for last completed academic year)¹

Note: The aforementioned details were initially shared by project team. However, as per discussion during feasibility study the scope of area has been changed. The updated area detail will be shared by project team.


Feasibility study observations

As per the feasibility visit done by GRIHA officials, the project is at 1 Star rating presently with 24 points out of 96 points. Project has scope to achieve 3 Star rating in GRIHA EB by implementing sustainability measures on site. The following observations have been concluded during the site visit:

Criterion 1: Accessibility to Basic services

- Project has following basics amenities within the campus :
 - Bank/ATM.
 - Restaurant.
 - Gym.
 - Park.
 - Clinic.
 - Photocopy shop.

¹ This data includes resident and day students, resident and day employees and the dependents of resident employees living with them in the college premises.


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- Project team has stated that students majorly commute to college through carpooling or public transport system and dedicated parking spaces have been provided for private vehicles on site.



Image 1 Worship place, ATM, Park, Restaurant and Gym were observed within the campus.

Criterion 2: Microclimatic Impact

- Project team has stated that more than 1500 matured trees existed on site.
- All walkways and roads within the campus are shaded with trees, creepers and pergolas. Brick paving was used to mitigate UHIE (Urban Heat Island Effect).
- Project team has stated that China mosaic tiles will be used on the terrace of each building.

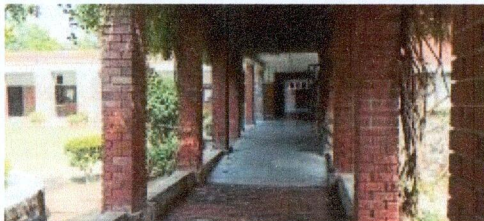


Image 2: Shaded walkways were provided.



Image 3: Brick paving was used on Pedestrian walkway

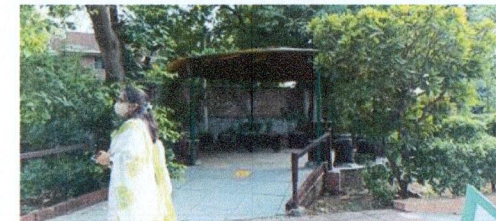


Image 4: Seating area was shaded using pergolas.

Jatin Vengal
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Criterion 3: Maintenance, Green Procurement and Waste management

- Project team has to prepare a list of all electrical and mechanical equipment such as motors, pumps, transformers, AC's etc. installed in the project.
- Project team has to prepare preventive maintenance checklist for all electrical and mechanical systems installed in the project.
- Nitrile insulation was used for split AC piping conforming to low ODP standards.
- R-22 refrigerant was used in all split AC's installed in the project conforming to low ODP standards.
- CO₂ and ABC type fire extinguishers systems was installed in the project conforming to low ODP standards.
- Project team has to prepare a purchase policy document for eco-friendly green housekeeping materials.
- Project team has to prepare a purchase policy document for electrical appliances such as ceiling fans, lights, geysers etc. with a rating of at least BEE 3 Star or above.
- Multi-coloured dust bins were provided within the building and on site as well.
- Dedicated centralised waste collection for food waste, plastic waste, paper waste and e-waste was provided on site.
- Multiple composting pits was observed on site to treat organic and landscape waste.



Image 5: CO₂ and ABC type fire extinguishers were provided on site.



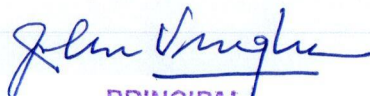
Image 6: Multi-coloured dust bins were provided on site.



Image 7: Compositing pits were provided on site.

Criterion 4: Metering and monitoring

- Energy meters were provided at the following locations on site:
 - Main supply.
 - D.G. set


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- Individual Buildings, however meters were not working at the individual building level during the visit.
- Water meters
 - Municipal Supply line.
However, borewell water supply was also being used in the project and hence metering is required for the borewell consumption as well.

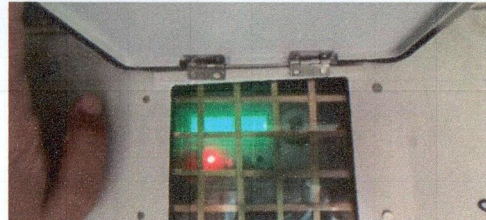


Image 8: Multi-functional energy meters were provided on site.

Criterion 5: Energy Efficiency

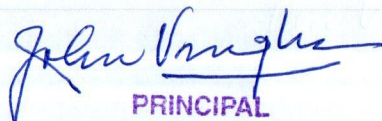
- Project team has stated that old ceiling fans and lights in the project will be replaced with new energy alternatives in the project.

Criterion 6: Renewable energy utilisation

- Project team has stated that Solar PV systems are proposed .However, the details regarding their capacity was not available on site.

Criterion 7: Water footprint

- Water audit report demonstrating the usage study, process, and system audit and discharge analysis was not available on site.
- Single flush water closets were installed within the buildings.
- Sensor based urinals were installed in administrative building.
- Kitchen and lavatory faucets were not provided with aerators on site.
- Manual hand held hose pipe was used for irrigation of landscape area on site.


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- Waste water treatment plant was not installed on site.
- 6 Nos. rain water recharging pits were provided on site to recharge storm water run-off coming from roof and non-roof areas.



Image 9: Sensor base urinals observed on site.



Image 10: Lavatory faucets observed on site without aerators.

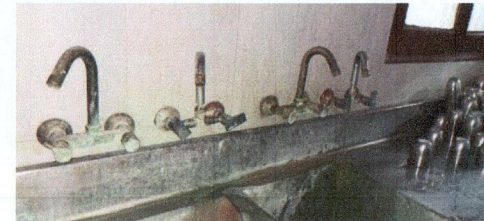


Image 11: Kitchen faucets observed on site.

Criterion 8: Reduction in cumulative water performance

- Project does not have provision to reuse waste water (rainwater, grey/black water etc.) on site to reduce their dependency on potable water sources.

Criterion 9: Achieving Indoor comfort requirement

- Buildings envelope was well insulated through direct heat gain and thermal efficient to achieve thermal comfort requirements.
- Artificial lighting fixtures were installed to achieve required lux levels as per NBC. Lighting audits are required to be done.
- All buildings in the project are surrounded with high density matures trees to achieve acoustic levels prescriber as per CPCB. Noise audit is required to be done.

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Criterion 10: Maintaining Good IAQ (Indoor Air Quality)

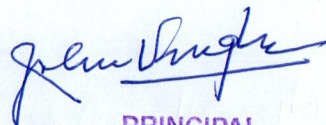
- Project team stated that smoking is prohibited on site. 'No smoking' signages have been installed in the project.



Image 12: No Smoking signages were installed on site.

Criterion 11: Universal Accessibility & Environmental Awareness

- Ramps, dedicated parking spaces and toilets was provided on site for the differently abled. However, the handrails are not as per NBC guidelines.
- The project team stated that, there is an internal society who take care for environmental awareness. Under that following actives were conducted -
 - Plantation drives
 - Poster and slogan competition on environmental and etc.,
- Further, the environmental society team spread awareness through social media and blogs.


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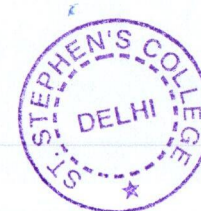




Image 13: Ramps with one sided handrail was observed at the entrance of the buildings.

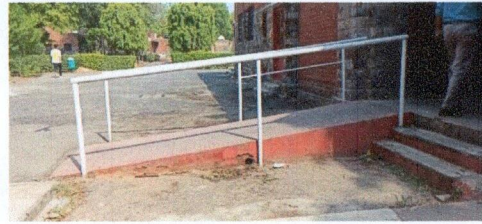


Image 14: Ramps without multi-levelled handrails observed at the entrance of building.

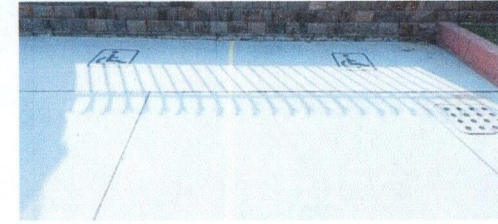


Image 15: Dedicated parking spaces were provided in the project.

Criterion 12: Innovation points

- Bird nest was provided on site to enhance bio-diversity.
- Nursery and fruiting plants were observed on site.

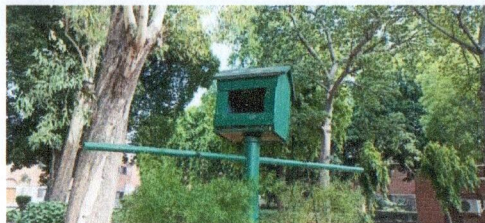
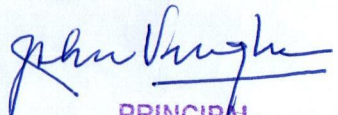


Image 16: Bird nest was provided on site.



Image 17: Fruit trees were planted on site.


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