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EVALUATING PERFORMANCE AND COSTING OF ECOLOGICAL SUSTAINABLE SCIENTIFIC REASERCH AND INSTITUTIONAL BUILDING

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Abstract - *Development is gradually converting the bio diverse habitat in to a concrete jungle which consists of an impervious cover to landscape resulting into a lack of woodland habitat and conservation of the most precious element on the earth "WATER". The vast canvas of built environment necessitates a greener color into it picture.*

One of the ways to achieve sustainable construction is the Green Building Design, which is the core area of attention for greener built environment Green Building Designs have environmental considerations as a basic scrutinizing criteria which attempts to integrate and achieve concepts of energy efficiency, water conservation and recharge, solid waste management, exploration of renewable energy resources, use of eco friendly materials and to minimize the negative impact on the nature, plant and animal species, non renewable material conservation and preserve resources and processes that prevail in nature. Several Green Building Rating Systems have been developed to objectively evaluate energy and environmental performance that spans the broad spectrum of sustainability.

In developing country like India where population increase squares the value every year, which had made her a potential global market leading to rapid urbanization and increased standard of living resulting into an upswing in construction activities. In an already hours of power cut off and load shedding situation this results into an extra burden on the conventional forms of energy used traditionally by burning fossil fuels which endanger the earth by Green House Gas Emissions and an adverse effect on the environment. Keeping the collective goal of energy conservation and environmental protection, eco friendly buildings emerges to be the only solution for not compromising the development of the nation and at the same time using the resources judiciously for the optimum utility.

Key Words: *sustainability, urbanization, eco friendly buildings & Green Building.*

1.INTRODUCTION

An ecology sustainable building, it is a structure that is designed, built, renovated, operated, or reused in an ecological and resource efficient manner. To build a green building we have to consider the parameters such as sustainable site, water resources, energy & atmosphere, materials & resources and indoor environment quality. The key objective of this study is to develop a smart and sustainable building which will reduce our conventional energy consumption and increase renewable energy consumption. This will make our buildings eco-friendly economic and social benefits.

Worth noticing is that most of us talk about energy consumption and pollution because of industry and transport when at least 40%of the total energy produced is consumed by buildings.

WHY PEOPLES ARE ATTRACTED TOWARDS ECOLOGY SUSTAINABLE BUILDINGS;-

This question has been posed to several occupants of a sustainable building. Of all the many reasons, three top reasons often cited by those occupying these buildings are the following:

i. Operational Savings:- Green buildings consume at least 40-50 % less energy and 20-30 % less water via a conventional building. This comes at an incremental cost of about 5 – 8%. The incremental cost gets paid back in 3-5years time.

ii. Daylights & views:- Working in an environment with access to daylight and views provides connection to the exterior environment. This has a soothing effect on the mind. Various studies prove that the productivity of people who have access to day lighting and views is atleast 12-15 % higher.

iii. Air quality:- Ecology sustainable buildings are always fresh and healthy. Every sustainable building will have to purge continuous fresh air to meet the ASHRAE 62 requirements. The green Buildings use interior materials with low volatile organic compound (VOC) emissions. A typical office building would require purging of fresh air of about 15 cfm/person which provides a fresh ambience inside the building.

1.1 Objectives

1. To Create a credible alternative to the traditional buildings construction

2. To reduce the construction cost by using locally available materials.
3. To make the buildings eco-friendly.
4. To reduce the operational cost of building.
5. To increase the working efficiency of employees..
6. To reuse and recycle used materials.
7. Healthy indoor environments
8. Extended life cycles through durable flexible and adaptive design.

1.2 Methodology

To achieve the objectives of this study, a comprehensive literature review on green and sustainable building construction was first carried out.

The aim of the literature review was to find out what are the essential differences between conventional and green construction projects in design, construction, and commissioning phases and what are the challenges encountered in green building construction project management. In addition, the objective behind the review was to explore some innovative management skills applied in these projects that can be implemented in new context. The examination and analysis of past work related to green construction also provided a better understanding of green and sustainable building construction and the project management processes involved.

Then, a survey questionnaire was developed to capture a specific set of challenges encountered in the Singapore construction industry. The survey also captured a comprehensive and accurate outlook of management culture adopted by local green construction industry.

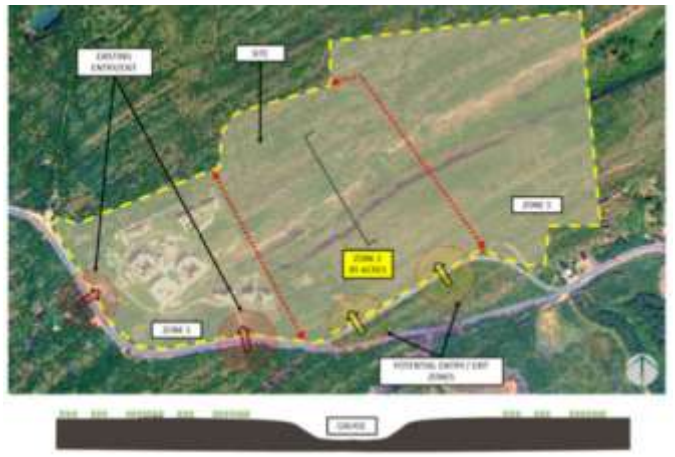
2. SALIENT FEATURES OF STUDY AREA

The NCR-Biotech Science Cluster (NCR-BSC) is currently being developed in three zones (i.e. 40 acres, 85.20 acres and 74.81 acres). The construction work of phase – I has been completed and occupied by the respective users.

The construction of phase – I buildings was done without sustaining the ecology elements resulting the operational cost is so high and also changed the diversity. Now new buildings under phase – II is being proposed for ecology sustainable construction. Phase II of the project has been envisaged over 85 acres of land under which it is been required to augment and create new advanced facilities for Agri-Biotech Research, Translational Technology Platform, Pilot Plants, Research hospital, Policy Centre, etc. fully supported by Department of Biotechnology, Govt. of India allotted by Municipal Corporation Faridabad. Buildings for NIBCR, NBRC, NII are also proposed to be part of Phase-II. Expansion of RCB is proposed in existing THSTI Building. 2 Hostel Buildings and sports facilities are also proposed. With the addition of these facilities NCR-BSC will be a world class hub of Biotech activities in North India.

SITE LOCATION

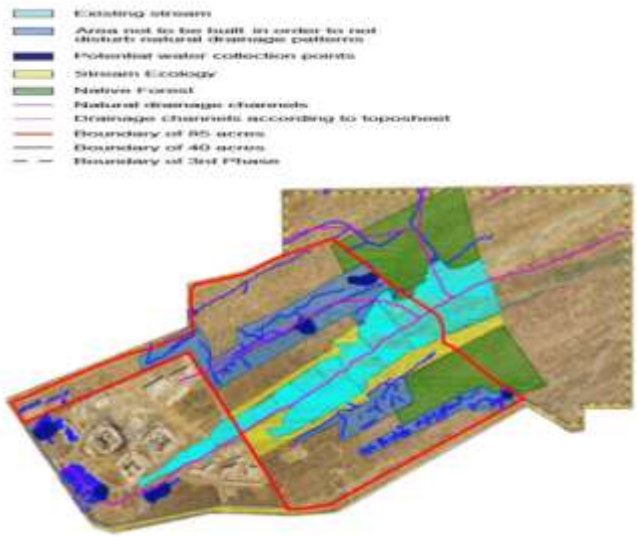
STUDY AREA PHOTOGRAPHS



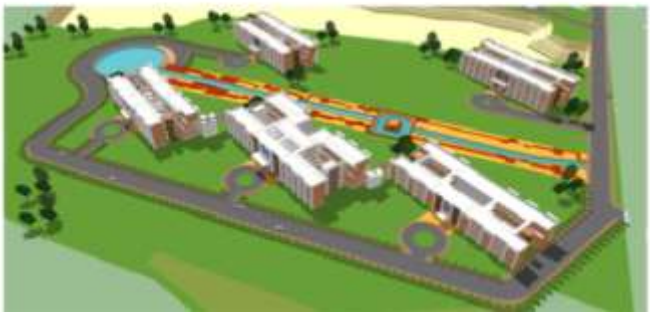
3. GUIDELINES FOR DEVELOPMENT AND PROPOSED APPROACH

Objectives	Guidelines and focus areas	Approach
Sustainable Building Construction and Performance	Adequate Day Lighting Solar Energy generation on Site Waste regeneration	Net Zero Building Mutual Shading among Buildings
Ecological Sensitivity and Conservation of Natural Resources	Sensitive response to topographical features. Sensitive response to hydrological systems existing on site.	N-S Oriented Buildings Simulation of Building-Integrated Solar Thermal System
New Campus Experience	Exploring new and alternative structures of spatial organization. Focus on creating environments for learning and interaction that are integrated Creating with natural environment	Micro climate experience

4. ECOLOGY CONSIDERATIONS

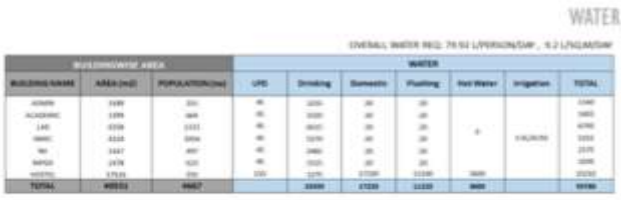


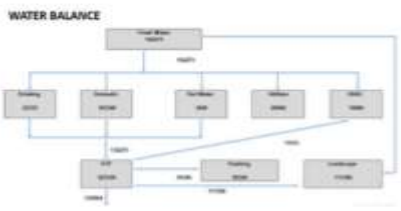
5. MASTER PLAN

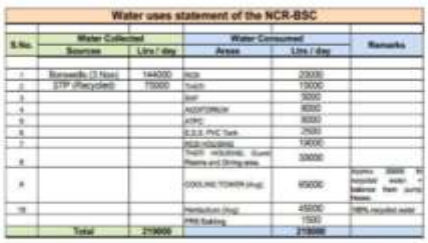


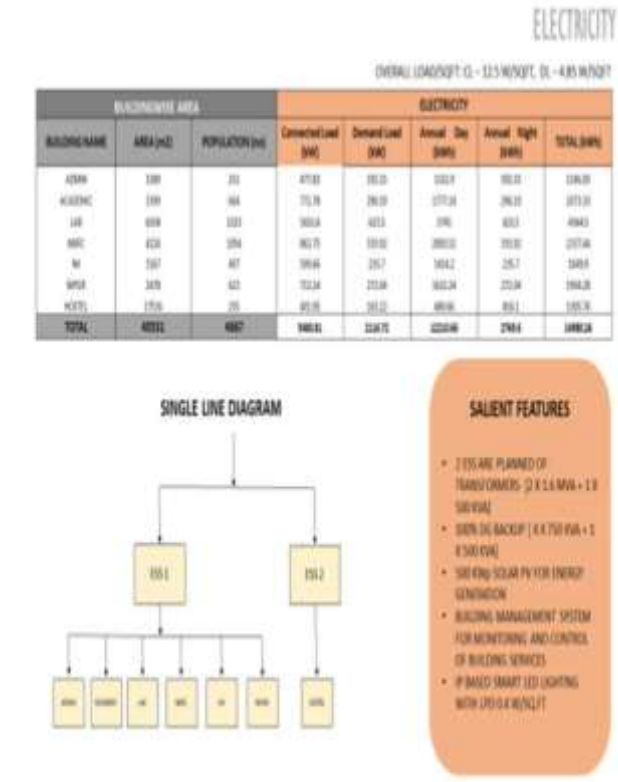
5. DATA ANALYSIS

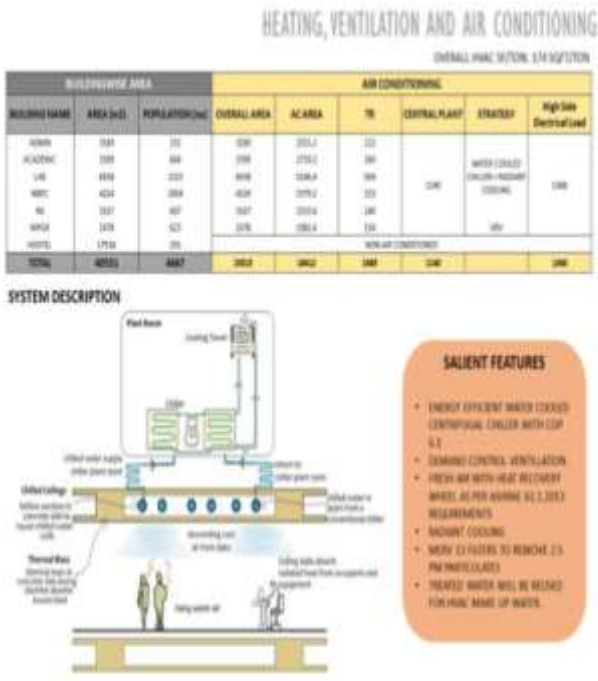
Following are the tables of water, Electicity and HVAC system of NCR-BSC, Faridabad.











6. CONCLUSIONS

- WATER CONSERVATION; Water conservation for NCR-BSC, Faridabad is 2.19 lac liter/day. On an average 75000 liter/day of water is saved by recycling
- POWER SAVED; Power saved for NCR-BSC, Faridbad is 9000kw/month by using solar system. Average cost saved per month is Rs.50000
- ELECTRIC APPLIANCE FOR ENERGY SAVING; Cost of electric appliance for energy saving in NCR-BSC is Rs.5.86 lakh.
- CHILLER PLANT; Average cost saving of chillers plant by making eco-friendly environment & reduced temperature is Rs.1.25 lakh/ month.
- CFL & PL LAMPS; A cost of CFL & PL Lamps per thousand sq ft. is Rs.2.27 lakh. Average cost of CFL & PL Lamps per thousand sq ft. is Rs.2.2 lakh.
- PLUMBING; Average cost of plumbing per thousand sq ft. is Rs.1.035 lakh. As the modernization and technological advancement are gaining momentum in the self build industry in the world, the eco-friendliness is taking a back seat. The sudden spurt of technological advancement sans care for the nature is doing more harm than good. Actually, the process should be the reverse. We should be more concerned about the environment by constructing environmentally friendly and sustainable structures. In response to growing awareness of the building environment's effect on the natural environment, architects and builders, activists and government agencies are increasingly championing an alternative method of designing and construction. It's an approach called ecology sustainable buildings. The essence of sustainable building is creating structures that are far more efficient in their consumption of energy and water and less wasteful in their use of materials than conventional buildings. Once a movement on the architectural fringe, green design principles are starting to appear in everything from a new generation of government buildings and corporate offices to single family homes and apartment complexes. Ecology sustainable building can often cost more than conventional construction. But proponents say higher up-front costs will pay for themselves in the long run. A recent study reports that 2 percent additional cost in a sustainable building's design translates into savings of up 20 percent in energy costs over the life span of the building. And all these combine to make more comfortable, more effective to operate, and yet highly cost-effectively space. Thus, in all, it can be said that Construction of Eco-friendly Structures has become the need of the day.

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