

# BUILDOTECH

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*Plus* INTERIORS

Making an  
**Intelligent  
Home**

**Smart Cities:**

A symbiosis of heritage,  
ecology, architecture,  
& technology

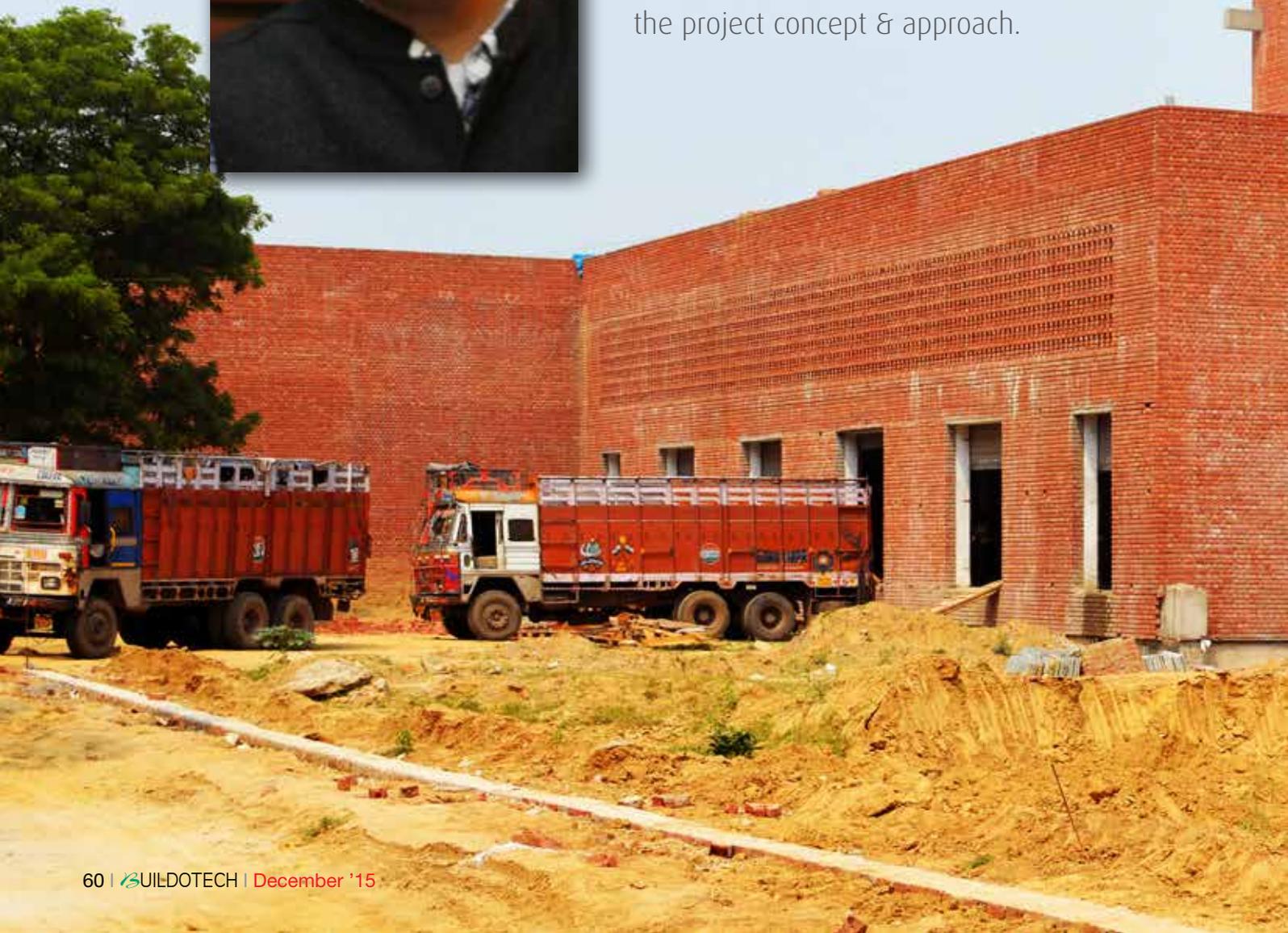
**High-Performance  
Buildings**

Why invest

# Eco-sensitive warehouse design



Architect **Amit Khanna**, founder of **Amit Khanna Design Associates (AKDA)** believes in making regional specificity and sustainability intrinsic to the design process and the final product. In his recent project of designing an automated warehouse, a comprehensive environmental and energy strategy became the basis of the project concept & approach.



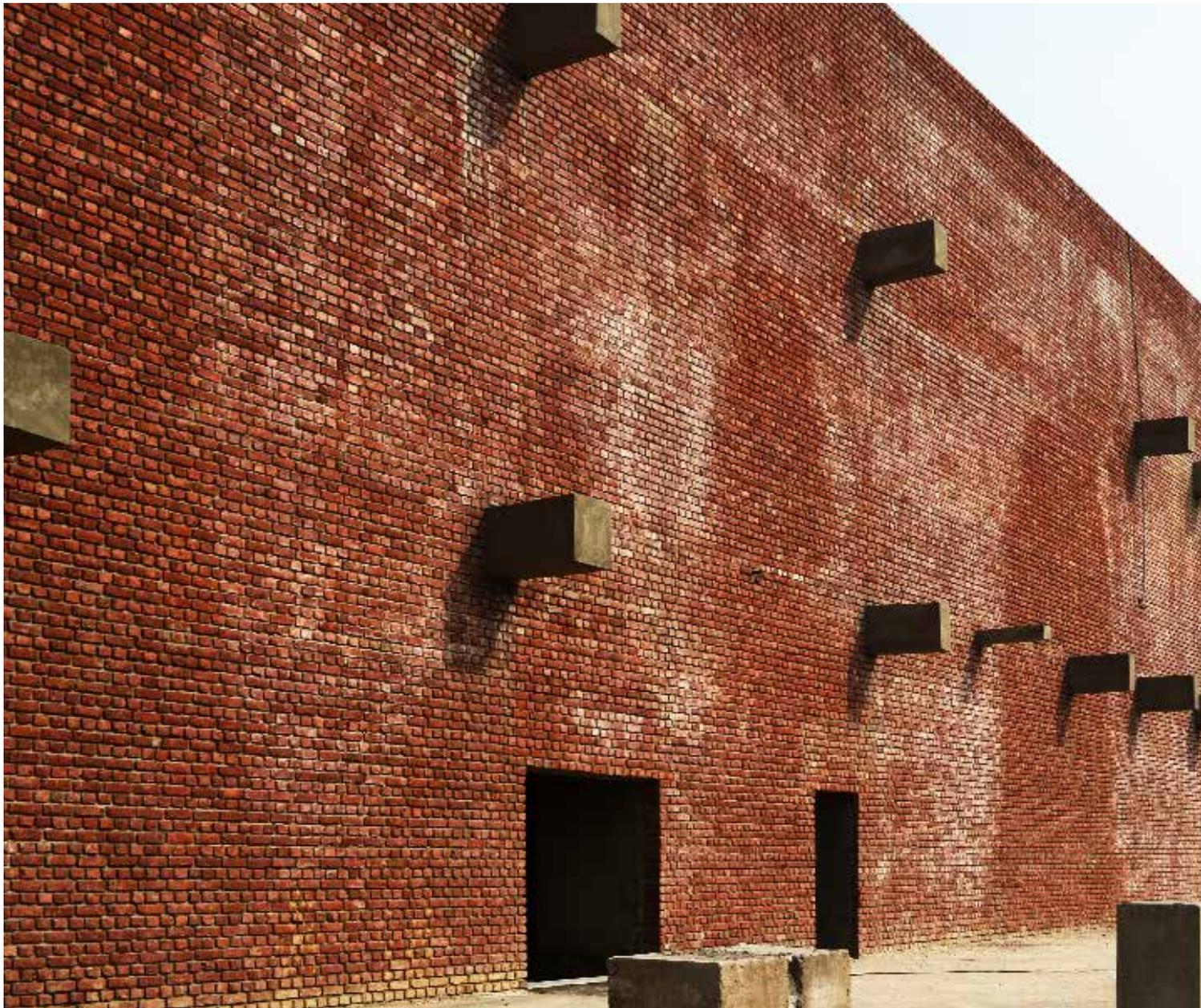
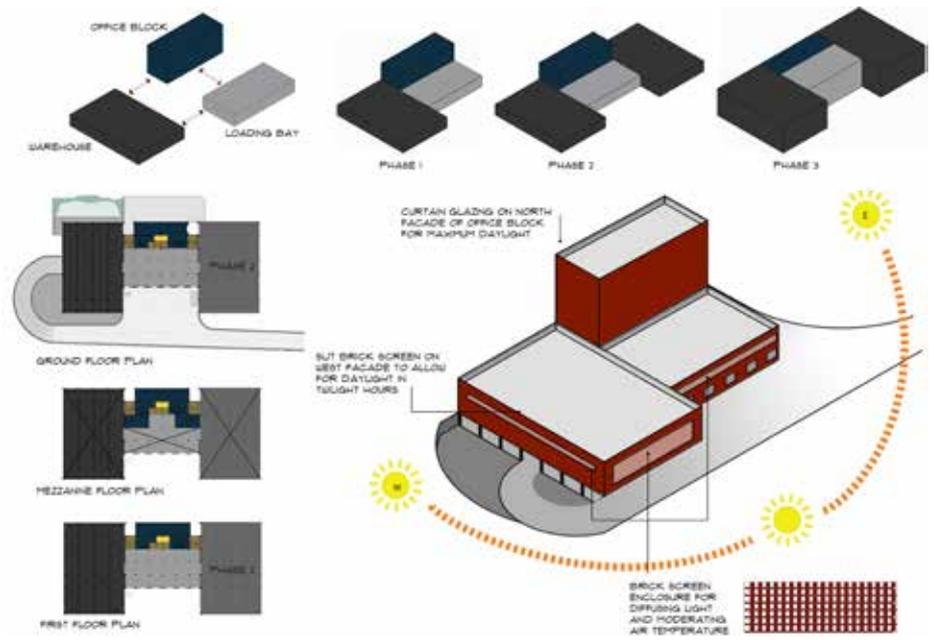
Surrounded by a rapidly urbanizing village settlement, the seven acre site in village Anangpur, Faridabad is on the outskirts of New Delhi. The site's existing rocky terrain posed a significant challenge to the spatial planning of the site. The project brief was to create a large warehousing facility that would be equipped with a high degree of automation. With the exception of the office block, the building would have minimal human occupancy.

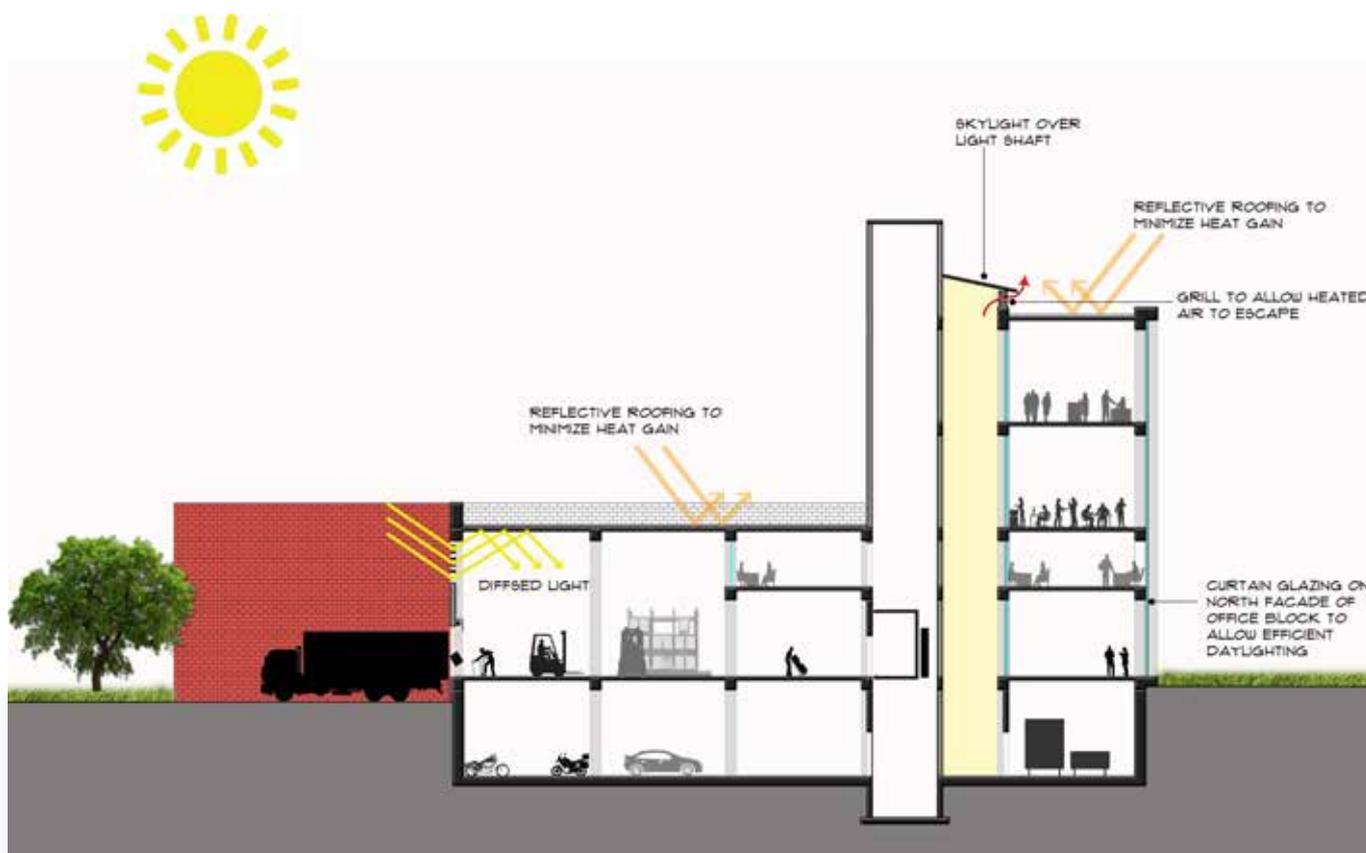
## Schematics

Planned in three incremental phases, the 1,40,000sqft structure was programmatically divided into three parts – the warehouse, the loading bay and the north-facing office block which was interlocked with the other two. This layout enabled easy stacking of future expansion with no loss of efficiency in material/ man movement. ➤



Each block was designed from within, the individual requirements dictating the overall dimensions. The thin and narrow office space faces the north through a glazed wall that brings in optimum daylight. The warehouses are largely square to enable efficiency and the dimensions of robotic arms and stocking pallets dictate the spatial planning, including the 20' high ceilings. The loading bay provides the interface between the two elements and also the exterior cargo area.





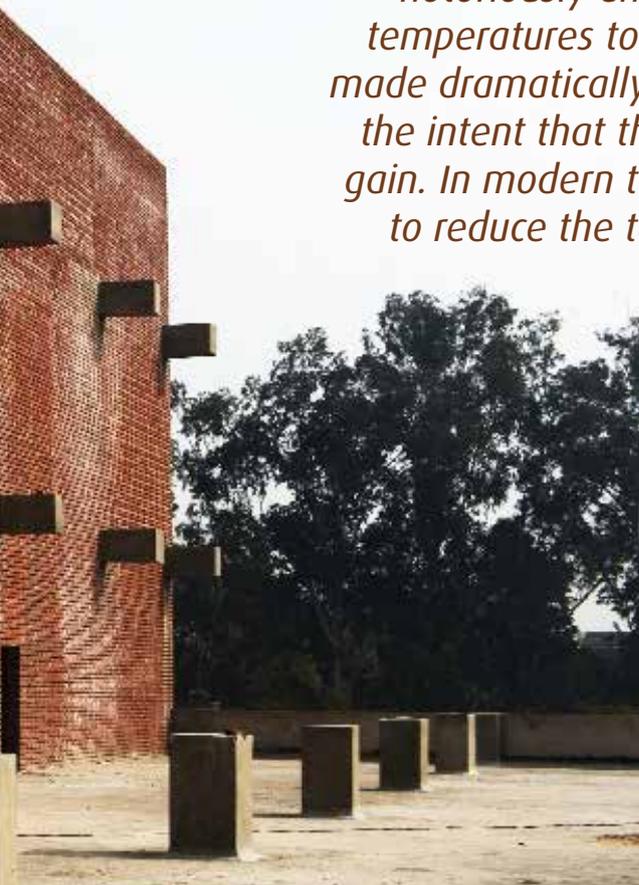
*Delhi has an extreme climate and a severely dusty micro-environment, both of which contribute to making buildings notoriously energy-intensive in trying to cool down ambient temperatures to human comfort levels. Traditionally, walls were made dramatically thicker than required for structural integrity, with the intent that the increased thermal mass would minimize heat gain. In modern times, a single skin façade is simply not adequate to reduce the temperature and air-conditioning is mandatory.*

## Environmental strategy

Rather than overlay a conventional window-based punctured façade over the structural frame, the warehouse and loading bay were wrapped in a perforated brickwork screen. This screen shades a glazed dust barrier, recessed by 1200mm from the south and north facades, creating a buffer zone that cuts glare, serves as a utility zone and provides a high degree of passive insulation. The glazed

barrier can be opened during good weather for ventilation and during extreme weather to allow for mechanical ventilation.

The west façade is mostly blank with only a sliver of brick screen near the ceiling to permit evening illumination and the completely blank east façade faces the loading bay. The exposed brick unifies the various facades and minimizes the visual impact of the building on the surroundings. Additionally, the building was set nearly 4m within the ground, allowing for





the parking, mechanical and canteen spaces to be naturally illuminated while the adjacency to the ground provides thermal insulation.

The surrounding site was sloped away from the subterranean floor, saving costly retaining walls and providing views from within. These sunken areas catch rainwater for

harvesting which is diverted to a local well. The roofs were covered with reflective tiling to minimize heat gain and a slim courtyard between the office block and loading bay helps draw out hot air from within the building.

Post occupancy evaluation of the building showed a temperature

differential of over 10degrees between the exterior and interior spaces. The design helps maintain habitable temperatures throughout the year and the light quality within the building is even, cool, bright but without the glare. Which, in a climate like Delhi, is nothing short of a miracle.

